Fan Speed Control

- **During heating** – When heat is required and active, the control continuously monitors the supply air temperature to verify it does not rise above the configured **Maximum Heating SAT Limit** (110° default). As the SAT approaches this value, the control increases the fan speed as required to ensure the SAT remains within the limit. This provides the most quiet and efficient operation by running the fan at the lowest speed possible.
- **During cooling** – When mechanical cooling is required and active, the control continuously monitors the supply air temperature to verify it does not fall below the configured **Minimum Cooling SAT Limit** (50° default). As the SAT approaches this value, the control increases the fan speed as required to ensure the SAT will remain within the limit. Fan operates at the lowest speed during dehumidification to maximize latent capacity during cooling.

Fan Status - You can configure an optional input as either an occupancy input contact or a fan status input. If configured as fan status, the controller compares the status of the fan to the desired commanded state. When the fan is commanded to run (ON), the fan status is checked and verified to match the commanded state. If the fan status is not on, then a fan status alarm is generated after 1 minute and the equipment's compressor(s) and auxiliary heat is disabled and the optional OA damper closes.

Cooling

The WSHP Open operates 1 or 2 stages of compression to maintain the desired cooling setpoint. The compressor outputs are controlled by the PI (Proportional-integral) cooling loop and cooling stages capacity algorithm. The algorithm calculates the desired number of stages needed to satisfy the space by comparing the space temperature (SPT or ZS) to the appropriate cooling setpoint.

NOTE The waterside economizer, if applicable, is used for 1st stage cooling, in addition to the compressor(s).

The following conditions must be true for the cooling algorithm to run:

- **Cooling** is set to **Enable**
- The **Fire/Smoke Input** and **Shutdown** modes are inactive
- **Heat** mode is not active and the compressor time guard(s) have expired
- **Condensate Overflow** input in **Normal**
- **Fan Status** is **True** (if option is enabled)
- If occupied, the SPT or ZS is greater than the occupied cooling setpoint
- Space temperature reading is valid
- If unoccupied, the SPT or ZS is greater then the unoccupied cooling setpoint
- If economizer cooling is available and active, and the economizer alone is insufficient to provide enough cooling
- OAT > **Cooling Lockout Temperature** if OAT is available
- **Source Water Pump** is on (if **Source Water Linkage** is active)

If all of the above conditions are met, the compressors' relays are energized as required. Otherwise, they will be de-energized. If cooling is active and if the SAT approaches the minimum SAT limit, the fan will be indexed to the next higher speed. If this is insufficient, and if the SAT falls further (equal to the minimum SAT limit), the fan will be indexed to the maximum speed. If the SAT still continues to falls 5° F below the minimum SAT limit, all cooling stages will be disabled.

During **Cooling**, the reversing valve output is held in the cooling position (either B or O type, as configured), even after the compressor is stopped. The valve does not switch position until the heating mode is required.

The configuration screens contain the **Min SAT** parameter as well as **Cooling Lockout** based on outdoor air temperature (OAT). Both can be adjusted to meet various specifications.

There is a 5-minute off-time for the compressor, as well as a 5-minute time delay, when staging up to allow the SAT to achieve a stable temperature, before energizing a second stage of capacity. Likewise, there is a 45-second delay when staging down.

After a compressor is staged off, it may be restarted again after a normal time-guard period of 5 minutes and if the supply air temperature has increased above the minimum supply air temperature limit.

The WSHP Open provides a status input to monitor the compressor operation. The status is monitored to determine if the compressor status matches the commanded state. This input is used to determine if a refrigerant safety switch or other safety device has tripped and caused the compressor to stop operating normally. If this occurs, an alarm is generated to indicate the faulted compressor condition.

Reverse cycle heating

The WSHP Open operates 1 or 2 stages of compression to maintain the desired cooling setpoint. The compressor outputs are controlled by the heating PI (Proportional-integral) loop and heating stages capacity algorithm. The algorithm calculates the desired number of stages needed to satisfy the space by comparing the space temperature (SPT or ZS) to the appropriate heating setpoint.

The following conditions must be true for the heating algorithm to run:

- **Heating** is set to **Enable**
- The **Fire/Smoke Input** and **Shutdown** modes are inactive
- **Cool** mode is not active and the compressor time guard has expired
- **Condensate Overflow** input in **Normal**
- **Fan Status** is **True** (if option is enabled)
- If occupied, the SPT or ZS is less than the occupied heating setpoint
- **Space Temperature** reading is valid
- If unoccupied, the SPT or ZS is less then the unoccupied heating setpoint
- **OAT** > **Heating Lockout Temperature** if OAT is available
- **Source Water Pump** is on (if **Source Water Linkage** active)

If all the above conditions are met, the heating outputs are energized as required, otherwise they are de-energized. If the heating is active and the SAT approaches the maximum SAT limit, the fan is indexed to the next higher speed. If this is insufficient, and if the SAT rises further and reaches the **Maximum Heating SAT** limit, the fan is indexed to the maximum speed. If the SAT still continues to rise 5° F above the maximum limit, all heating stages are disabled.

During **Heating**, the reversing valve output is held in the heating position (either B or O-type, as configured), even after the compressor is stopped. The valve does not switch position until the cooling mode is required.

The configuration screens contain the **Max SAT** parameter as well as heating lockout based on outdoor air temperature (OAT). Both can be adjusted to meet various specifications.

There is a 5-minute off-time for the compressor, as well as a 5-minute time delay, when staging up to allow the SAT to achieve a stable temperature before energizing a second stage of capacity. Likewise, a 45 second delay is used when staging down.

After a compressor is staged off, it may be restarted again after a normal time-guard period of 5 minutes and if the supply air temperature has fallen below the maximum supply air temperature limit.

The WSHP Open provides a status input to monitor the compressor operation. The status is monitored to determine if the compressor status matches the commanded state. This input is used to determine if a refrigerant safety switch or other safety device has tripped and caused the compressor to stop operating normally. If this occurs, an alarm is generated to indicate the faulted compressor condition. Also, if auxiliary heat is available (see below), the auxiliary heat replaces the reverse cycle heating and maintains the space temperature as required.

Auxiliary heat

The WSHP Open can control a 2-position or modulating water or steam valve, connected to a coil on the discharge side of the unit and supplied by a boiler, or a single stage ducted electric heater, in order to maintain the desired heating setpoint. If the compressor capacity is insufficient, or a compressor failure occurs, the auxiliary heat is used. Unless the compressor fails, the auxiliary heat only operates to supplement the heat provided by the compressor, if the space temperature falls more than 1° F below the desired heating setpoint. (This amount is configurable.) The heat is controlled so the SAT does not exceed the **Maximum Heating SAT** limit.

The same conditions required for **Reverse Cycle Heating** must be true in order for the **Auxiliary Heat** algorithm to run.

Auxiliary Modulating Hot Water / Steam Heating Reheat - The control can modulate a hot water or steam valve connected to a coil on the discharge side of the unit, and supplied by a boiler in order to maintain the desired heating setpoint, if the compressor capacity is insufficient, or a compressor failure occurs. Unless a compressor fault condition exists, the valve only operates to supplement the heat provided by the compressor if the space temperature falls more than 1° F below the desired heating setpoint. The valve is controlled so the SAT does not exceed the **Maximum Heating SAT** limit.

2- Position Hot Water / Steam Heating Reheat - The control can operate a 2-position, NO or NC, hot water or steam valve, connected to a coil on the discharge side of the unit and supplied by a boiler, in order to maintain the desired heating setpoint, if the compressor capacity is insufficient or a compressor failure occurs. Unless a compressor fault condition exists, the valve only opens to supplement the heat provided by the compressor, if the space temperature falls more than 1° F below the desired heating setpoint. The valve is controlled so the SAT does not exceed the **Maximum Heating SAT** limit and is subject to a 2-minute minimum OFF-time to prevent excessive valve cycling.

Single Stage Electric Auxiliary Heat – The control can operate a field-installed single stage of electric heat that is installed on the discharge side of the unit, in order to maintain the desired heating setpoint, if the compressor capacity is insufficient or a compressor failure occurs. Unless a compressor fault condition exists, the heat stage only operates to supplement the heat provided by the compressor if the space temperature falls more than 1° F below the desired heating setpoint. The heat stage is controlled so the SAT does not exceed the **Maximum Heating SAT** limit and is subject to a 2-minute minimum OFF-time to prevent excessive cycling.

Indoor air quality (IAQ) and demand control ventilation (DCV)

If the optional hardwired indoor air quality sensor is installed, ZS CO^2 (IAQ), or the **System Space AQ** network input point is used, the WSHP Open maintains indoor air quality with a modulating OA damper, which provides demand-controlled ventilation. The control operates the modulating OA damper during occupied periods, monitors the CO2 level, compares it to the configured setpoints, and adjusts the ventilation rate, as required. The control provides proportional ventilation to meet the requirements of ASHRAE specifications by providing a base ventilation rate and then increasing the rate as the CO2 level increases. The control proportionally increases ventilation when the CO2 level rises above the start ventilation setpoint and reaches the full ventilation rate when the CO2 level is at or above the maximum setpoint. You can configure a minimum damper position to ensure that proper base ventilation is delivered when occupants are not present. Access the IAQ configurations through the **Configuration** screen.

The following conditions must be true in order for this algorithm to run:

- **Damper Control** is configured for **DCV**
- The **Fire/Smoke Input** and **Shutdown** modes are inactive
- **Fan Status** is **True** (if option is enabled)
- The unit is in an occupied mode
- IAQ sensor reading is greater than the **DCV Start CTRL Setpoint**

The control has the following 4 adjustable setpoints:

- **DCV Start Ctrl Setpoint**
- **DCV Max Ctrl Setpoint**
- **Minimum Dmpr Pos**
- **DCV Max Vent Damper Pos**

NOTE In order for the damper to maintain proper base ventilation, you must configure the fan as **Continuous** or **Always On**.

2-position OA Damper - You can configure the control to operate as a ventilation damper in a 2-position ventilation mode to provide the minimum ventilation requirements during occupied periods.

Dehumidification

The WSHP Open provides occupied and unoccupied dehumidification only on units that are equipped with the reheat option. This function requires an accessory hardwired space relative humidity sensor. When using a relative humidity sensor to control dehumidification during occupied or unoccupied times, the dehumidification setpoints are used accordingly. Also, you may use a ZS Humidity Sensor or a network input point **System Space RH** in place of the hardwired RH sensor.

When the indoor relative humidity becomes greater than the dehumidification setpoint, a dehumidification demand is acknowledged. Once acknowledged, the dehumidification output is energized, bringing on the supply fan (medium speed), mechanical cooling, and the integral reheat coil. The controls engage cooling mode and the waste heat from the compressor cooling cycle is returned to the reheat coil simultaneously, meaning that the reversing valve causes the compressor to operate in the cooling mode.

NOTE During cooling mode, the unit cools and dehumidifies, and disables the reheat coil. However, once the call for cooling has been satisfied and there is still a call for dehumidification, the unit continues to operate in the reheat mode.

Waterside economizer

The WSHP Open can provide modulating, or 2-position water economizer operation (for a field-installed economizer coil mounted to the entering return air side of the unit and connected to the source water loop), in order to provide free cooling or preheating, when water conditions are optimal. Water economizer settings can be accessed on **Properties** > **Equipment** > **Status**.

The following conditions must be true for economizer operation:

- SAT reading is available
- EWT reading is available
- If occupied, the SPT or ZS is greater than the occupied cooling setpoint or less than the occupied heating setpoint and the sourcer water is suitable
- Space temperature reading is valid
- If unoccupied, the SPT or ZS is greater than the unoccupied cooling setpoint, or less than the unoccupied heating setpoint, and the source water is suitable

Modulating water/2-Position water economizer control - modulates a water valve to control source water flowing through a coil on the entering air side of the unit

- **Cooling** - Provides an economizer cooling function by using the water loop when the entering water loop temperature is at least 5°F below space temperature. If the water loop conditions are suitable, the valve modulates open to maintain a **Supply Air Temperature** that meets the load conditions. If the economizer coil capacity alone is insufficient for a period greater than 5 minutes, or if a high humidity condition occurs, then the compressor starts, in order to satisfy the load. If the SAT approaches the **Minimum Cooling SAT** limit (**HOME** > **CONFIG > UNIT**), the economizer valve modulates closed during compressor operation.
- **Heating** - In addition, the control modulates the water valve if the entering source water loop temperature is suitable for heating (at least 5°F above space temperature) and heat is required. The valve is controlled in a similar manner, except to satisfy the heating requirement. If the coil capacity alone is insufficient to satisfy the space load conditions for more than 5 minutes, then the compressor starts in order to satisfy the load. If the SAT approaches the **Maximum Heating SAT** limit, the economizer valve modulates closed during compressor operation.

2-position water economizer control - has the capability to control a NO or NC, 2-position water valve to control source water flow through a coil on the entering air side of the unit.

- **Cooling** - The purpose is to provide a cooling economizer function directly from the source water loop when the entering water loop temperature is at least 5° F below space temperature. If the optional coil is provided and the water loop conditions are suitable, then the valve opens to provide cooling to the space, when required. If the capacity is insufficient for a period greater than 5 minutes, or if a high humidity condition occurs, the compressor is started in order to satisfy the load. If the SAT reaches the **Minimum Cooling SAT** limit, the economizer valve closes during compressor operation.
- **Heating** - In addition, the economizer control opens the water valve, if the entering water loop temperature is suitable for heating (at least 5° F above space temperature) and heat is required. The valve is controlled in a similar manner, except to satisfy the heating requirement. If the coil capacity is insufficient to satisfy the space load for more than 5 minutes, then the compressor is started to satisfy the load. If the SAT reaches the **Maximum Heating SAT** limit, the economizer valve closes during compressor operation.

Demand limiting

The WSHP Open can accept 3 levels of demand limit from the BACnet network. In response to a demand limit, the unit decreases its heating setpoint and increases its cooling setpoint to widen the range, in order to immediately lower the electrical demand. You can configure the temperature adjustment for both heating and cooling and for each demand level. You can also set the response to a particular demand level to 0.

Power failure restart delay

The control provides a delay when recovering from a power failure, a shutdown mode, or when transitioning from unoccupied to occupied mode, in order to prevent excessive demand when many units start simultaneously. Each unit can be configured for a unique delay between 0 and 600 seconds. The factory-programmed default delay is 60 seconds.

Alarms

Fire/Smoke Detector Alarm – The control monitors the voltage input to J1-9 to detect if a smoke detector or fire detector NC contact has opened, indicating an alarm condition. The control verifies the presence of 24 Vac on this input. If the input opens at any time, an alarm is generated after 3 seconds and the equipment (fan, compressor, aux heat, and damper) immediately shuts down.

Space Temperature Alarms – The control provides the ability to generate an alarm when the space temperature exceeds the alarm setpoint. A separate occupied hysteresis and fixed unoccupied high and low alarm setpoints are provided. The control provides a 5-minute alarm delay during unoccupied periods. During occupied periods, the control uses the occupied temperature setpoint and applies the hysteresis value to determine the alarm setpoints. When occupancy transitions from unoccupied to occupied or the occupied temperature setpoints are changed, causing an alarm condition to occur, the control automatically calculates an alarm delay (equivalent to the configured delay time in minutes/ ° F, multiplied by the temperature error, + 15 minutes). This prevents nuisance alarms when an occupancy change occurs and allows time for the unit to correct an alarming temperature condition.

Source Water Temperature Alarm – The control has 4 configurable alarm limits for source water temperature. The control verifies that the water temperature is within operating range (between high and low limits) for the specific operating mode (heating or cooling) before energizing the compressor. Once the compressor is started, the source water temperature is further monitored to verify that it is within limits to insure sufficient water is flowing through the coil. If the leaving water temperature rises above or falls below the appropriate limits, and lasts for more than 15 seconds, an alarm is generated and the compressor shuts down.

Supply Air Temperature Alarm – The control has 2 configurable alarm limits for supply air temperature. The control verifies that the supply air temperature is within operating range (between high and low limits) when the compressor or auxiliary heat is operating. If the air temperature rises above or falls below the appropriate limits, and this lasts for more than 5 minutes, an alarm is generated.

High Condensate/Overflow Alarm – The control monitors a discrete input to determine the state of a condensate level switch. You can configure the input to alarm on either an open or closed switch condition. If this input is in an alarm state, the control starts a timer, and after the timer exceeds a configurable **Condensate Overflow Alarm Delay** limit (10-second default), the control generates an alarm and the unit disables the compressor and fan outputs.

Fan Status Alarm (optional) – The control generates a fan status alarm if the fan status input detects the fan is OFF after any fan speed output has been enabled. A 30-second alarm delay is used to allow the fan to start operation before an alarm condition is detected. The control monitors the fan output and if the fan is operating at any speed, the fan status must detect the fan is operating.

Compressor Status Alarm – The control generates a compressor failure alarm if the compressor status input detects the compressor is OFF after the compressor output has been energized. A 6-minute alarm delay is used to allow the compressor to start (prevents alarms due to timeguard operation) before an alarm condition is detected. The control monitors the compressor output and if the compressor output is energized, the compressor status input must detect the compressor operation.

Filter Status Alarm – The control provides the ability to generate a dirty filter alarm after the number of fan run hours exceeds a configurable filter alarm timer limit. The control monitors the fan output and if the fan is operating at any speed, it accumulates run time. If the fan run time hours exceed the configurable limit, an alarm is generated. To reset the alarm timer after the alarm has been generated, a **Reset Filter Alarm** input is provided. You can disable the filter alarm by setting the **Filter Alarm Timer Delay** to **0** (factory default).

Indoor Air Quality Alarm – The control provides the ability to generate a high CO_2 level alarm during occupied periods when the CO_2 sensor value exceeds the adjustable limit. When a transition from unoccupied to occupied occurs, or the occupied alarm limit is changed to a value that causes an alarm condition to occur, the control will automatically calculate an alarm delay (equivalent to the configured delay time in minutes/ppm, times the error that occurred, + 15 minutes). This prevents nuisance alarms from occurring when occupancy changes or the setpoint is changed. You can disable the IAQ alarm by setting **Occupied High IAQ Alarm Limit** to **0**.

Relative Humidity Alarm – The control provides the ability to generate an alarm when the space relative humidity exceeds the alarm setpoint. Separate occupied and unoccupied high humidity alarm setpoints are provided. The control provides a 5-minute alarm delay during unoccupied periods. During occupied periods, the controller uses the occupied high RH alarm limit. When an occupancy transition from unoccupied to occupied occurs, or the occupied high alarm limit is lowered, causing an alarm condition to occur, the control automatically calculates an alarm delay (equivalent to the configured delay time in minutes/% RH, times the humidity error condition that occurred, + 15 minutes). This prevents nuisance alarms when an occupancy change occurs and allows time for the unit to correct an alarming humidity condition.

Source Water Linkage Failure Alarm (if **Source Water Linkage** was active) – The control generates a **Source Water Linkage** failure alarm if Linkage fails after once being active. The Linkage status is monitored and if it fails to be updated from the Loop controller, then a **Source Water Linkage** alarm is generated. There is a 6-minute alarm delay to prevent false alarms.

NOTE You can reset this alarm only by re-establishing Linkage and correcting the condition that caused the Linkage failure, or by momentarily setting the **Shutdown** point to **Active**.

Airside Linkage Failure Alarm (if **Airside Linkage** was active) – The control generates an **Airside Linkage** failure alarm if Linkage fails after once being active. The Linkage status is monitored and if it fails to be updated from the master zone controller, then an **Airside Linkage** alarm is generated. There is a 6-minute alarm delay to prevent false alarms.

NOTE You can reset this alarm only by re-establishing Linkage and correcting the condition that caused the Linkage failure, or by momentarily setting the **Shutdown** point to **Active**.

OAT Sensor Alarm (if **Network OA Temperature** was active) – The control generates an OAT Sensor failure alarm if the value of OAT fails to be updated through the network after once being active. The update status is monitored and if it fails to be updated, then an OAT sensor alarm is generated. There is an alarm delay (approximately 1 hour) to prevent false alarms, while minimizing the required update rate for OAT.

NOTE You can reset this alarm by momentarily setting the **Shutdown** point to **Active**.

SPT Sensor Alarm (if SPT sensor was active)– The control generates an SPT sensor failure alarm if the SPT sensor fails to communicate with the control for 5 minutes or greater. The update status is monitored and if it fails to be updated, then an SPT sensor alarm is generated.

ZS Sensor Alarm (if ZS sensor was active)– The control generates a ZS sensor failure alarm if the ZS sensor fails to communicate with the control for 5 minutes or greater. The update status is monitored and if it fails to be updated, then a ZS sensor alarm is generated.

Troubleshooting the WSHP Open

The WSHP Open controller acts as an intelligent embedded thermostat to the water source heat pump, but can be monitored and controlled from a third party network.

You must determine which of the following needs troubleshooting:

- The WSHP Open controller
- The mechanical systems of the WSHP unit
- The third party connected network

The WSHP Open controller can troubleshoot itself with Service Test, communicating LED's, and built-in alarms. See the unit's Controls and Troubleshooting instructions.

Disconnecting the WSHP Open from the unit control inputs can be valuable in determining whether the problem is related to the unit/equipment, the controller/equipment, or the controller/network. When disconnected from the unit control inputs, you can use simple 24V signals to activate G, Y1, Y2, W1, W2, etc. to verify proper unit operation. If the problem occurs without the WSHP Open connected, then you should begin troubleshooting the unit/equipment rather than the WSHP Open or network.

LED's

The LED's indicate if the controller is speaking to the other devices on the network. The LED's should reflect communication traffic based on the baud rate set. The higher the baud rate, the more solid the LED's will appear.

The LED's on the WSHP Open show the status of certain functions.

If this LED is on...	Status is...
Power	The WSHP Open has power
Rx	The WSHP Open is receiving data from the network segment
Tx	The WSHP Open is transmitting data over the network segment
BO#	The binary output is active

NOTE If Tx is not lit, the MS/TP token is not being passed between controllers.

The **Run** and **Error** LED's indicate controller and network status.

If Run LED shows...	And Error LED shows...	Status is..
2 flashes per second	Off	Normal
2 flashes per second	2 flashes, alternating with **Run** LED	Five minute auto-restart delay after system error
2 flashes per second	3 flashes, then off	Controller has just been formatted
2 flashes per second	On	Two or more devices on this network have the same network address

If Run LED shows...	And Error LED shows...	Status is..
2 flashes per second	On	Firmware halted after frequent system errors or control programs halted
5 flashes per second	Off	Firmware transfer in progress, Boot is running
7 flashes per second	7 flashes per second, alternating with **Run** LED	Ten second recovery period after brownout
14 flashes per second	14 flashes per second, alternating with **Run** LED	Brownout
On	On	Failure. Try the following solutions: • Turn the WSHP Open off, then on. • Replace the WSHP Open.

Compliance

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE Compliance

WARNING This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

BACnet Compliance

BACnet® is a registered trademark of ASHRAE. ASHRAE does not endorse, approve or test products for compliance with ASHRAE standards. Compliance of listed products to requirements of ASHRAE Standard 135 is the responsibility of BACnet International. BTL® is a registered trademark of BACnet International.

Appendix A: Network Points List for WSHP Open

Network points list for BACnet and Modbus

				BACnet		Modbus	
Point Name	Point Access	Units	Default Value	BACnet Point Name	BACnet Object ID	Modbus Register Type	Modbus Register #
Aux Heat Control Setpoint	R	°F		aux_heat_stpt	AV:3014	Input Register (Float)	161
Auxiliary Heat Output	R	%		aux_heat_output	AV:2021	Input Register (Float)	163
Cooling Lockout Temperature	R/W	°F	45	oat_cl_lockout	AV:9002	Holding Register (Float)	43
Damper Output	R	%		oa_dpr_pos	AV:2022	Input Register (Float)	169
Leaving Source Water Temp	R	°F		cwl_temp	AV:1017	Input Register (Float)	167
Vent Dmpr Pos / DCV Min Pos	R/W	%	20	econ_min	AV:4005	Holding Register (Float)	131
Outdoor Air Temperature	R	°F		oa_temp	AV:1003	Input Register (Float)	87
Override Time Remaining	R	min		ovrde_time	AV:2016	Input Register (Float)	93
Setpoint	R/W	°F		occ_ht_stpt	AV:3002	Holding Register (Float)	19
Setpoint Adjustment	R	°F		stpt_adj	AV:1006	Input Register (Float)	99
Space Temperature - Prime Variable	R	°F		space_temp	AV:2007	Input Register (Float)	107
Supply Air Temperature	R	°F		sa_temp	AV:1008	Input Register (Float)	109
System Space AQ	R/W	no units	-999	system_iaq	AV:1903	Holding Register (Float)	149
System Space RH	R/W	%	-999	system_rh	AV:1904	Holding Register (Float)	151
System Space Temperature	R/W	°F	-999	system_spt	AV:1902	Holding Register (Float)	123

				BACnet		Modbus	
Point Name	Point Access	Units	Default Value	BACnet Point Name	BACnet Object ID	Modbus Register Type	Modbus Register #
Unocc Relative Humidity Setpoint	R/W	%rh	95	unocc_dehum_stpt	AV:3012	Holding Register (Float)	129
Water Economizer Control Setpoint	R	°F		h2o_econ_ctrl_stpt	AV:3015	Input Register (Float)	171
Water Economizer Output	R	%		h2o_econ_output	AV:2023	Input Register (Float)	173
Compressor Status	R	(0) Normal (1) Alarm		comp_alarm	BV:7013	Discrete Input	30
Condensate Overflow	R	(0) Normal (1) Alarm		overflow_alarm	BV:7028	Discrete Input	60
Source Water Temperature	R	(0) Normal (1) Alarm		cwt_alarm	BV:7027	Discrete Input	61
Cool Enable	R/W	(0) Disable (1) Enable	(1) Enable	cl_enable	BV:1011	Coil	36
Dehumidification	R	(0) Disable (1) Enable		dehum	BV:2006	Discrete Input	9
Supply Fan Status	R	(0) Off (1) On		sfan_status	BV:1003	Discrete Input	24
Filter	R	(0) Normal (1) Alarm		filter_alarm	BV:7017	Discrete Input	31
Fire / Smoke Shutdown	R	(0) Normal (1) Alarm		fire_alarm	BV:7007	Discrete Input	32
Heat Enable	R/W	(0) Disable (1) Enable	(1) Enable	ht_enable	BV:1012	Coil	37
High Space Temperature	R	(0) Normal (1) Alarm		spt_hi_alarm	BV:7011	Discrete Input	35
Indoor Air Quality	R	(0) Normal (1) Alarm		iaq_alarm	BV:7005	Discrete Input	33
Low Space Temperature	R	(0) Normal (1) Alarm		spt_lo_alarm	BV:7012	Discrete Input	39
Occupancy Status	R	(0) Unoccupied (1) Occupied		occ_status	BV:2008	Discrete Input	18
Setpoint Adjustment	R/W	(0) Disable (1) Enable	(1) Enable	stpt_adj_enable	BV:1013	Coil	26
Shutdown	R/W	(0) Inactive (1) Active	(0) Inactive	shutdown	BV:9001	Coil	1
Space Relative Humidity	R	(0) Normal (1) Alarm		sprh_hi_alarm	BV:7018	Discrete Input	34
Space Temp Sensor	R	(0) Normal (1) Alarm		spt_fail	BV:7001	Discrete Input	46
Supply Air Temperature	R	(0) Normal (1) Alarm		sat_alarm	BV:7004	Discrete Input	47
Supply Fan Failure	R	(0) Normal (1) Alarm		sfan_fail_alarm	BV:7008	Discrete Input	5
Fan / Speed	R	(1) Off (2) Low (3) Med (4) High (5) On		fan_run	MSV:2004	Input Register (Signed)	175
Optimal Start Type	R/W	(1) None (2) Temp Compensated (3) Learning Adaptive	2	start_type	MSV:2009	Holding Register (Signed)	154

				BACnet		Modbus	
Point Name	Point Access	Units	Default Value	BACnet Point Name	BACnet Object ID	Modbus Register Type	Modbus Register #
System Mode	R	(1) Off (2) Fan Only (3) Economize (4) Cooling (5) Heating (6) Cont Fan (7) Test (8) Start Delay		run_status	MSV:2002	Input Register (Signed)	1
Occ Relative Humidity Setpoint	R/W	%rh	60	occ_dehum_stpt	AV:3011	Holding Register (Float)	83
Optimal Start	R/W	hr	1	optm_start	AV:9026	Holding Register (Float)	147
Smoke Detector Contact	R	(0) Alarm / Open (1) Normal / Closed		smk_detect	BV:1004	Discrete Input	1
Effective Cool Setpoint	R	°F		eff_cl_stpt	AV:3005	Input Register (Float)	55
Setpoint	R/W	°F		unocc_cl_stpt	AV:3003	Holding Register (Float)	15
Heating Lockout Temperature	R/W	°F	65	oat_ht_lockout	AV:9003	Holding Register (Float)	69
Power Fail Restart Delay	R/W	seconds	180	start_delay	AV:9007	Holding Register (Float)	127
Setpoint	R/W	°F		occ_cl_stpt	AV:3001	Holding Register (Float)	9
Filter Service Alarm Timer	R/W	hr	600	filter_service_hrs	AV:2019	Holding Register (Float)	67
Indoor Air Quality CO2 (ppm)	R	ppm		iaq	AV:1009	Input Register (Float)	73
Setpoint	R/W	°F		unocc_ht_stpt	AV:3004	Holding Register (Float)	17
System Outdoor Air Temperature	R/W	°F	-999	system_oat	AV:1901	Holding Register (Float)	119
System Setpoint Adjustment	R/W	°F	-999	system_stpt_adj	AV:1913	Holding Register (Float)	53
Reset Filter Alarm	R/W	(0) Off (1) On	(0) Off	filter_rntm_clr	BV:7517	Coil	22
Effective Heat Setpoint	R	°F		eff_ht_stpt	AV:3006	Input Register (Float)	57
Maximum Heating SAT	R/W	°F	110	sat_ht_max	AV:83004	Input Register (Float)	41
Minimum Cooling SAT	R/W	°F	50	sat_cl_min	AV:83003	Input Register (Float)	61

				BACnet		Modbus	
Point Name	Point Access	Units	Default Value	BACnet Point Name	BACnet Object ID	Modbus Register Type	Modbus Register #
Setpoint Adjustment Range	R/W	°F	5	stpt_adj_range	AV:9015	Holding Register (Float)	101
BAS On / Off	R/W	(1) Inactive (2) Occupied (3) Unoccupied	1	keypad_ovrde	MSV:1001	Holding Register (Signed)	133
ZS Sensor Configuration	R	(0) Normal (1) Alarm		zs_config_fail	BV:7055	Discrete Input	63
Space Relative Humidity	R	%rh		space_rh	AV:1011	Input Register (Float)	103
Space Temp Source	R	(1) Sensor Failure (2) SPT Sensor (3) T55 / T56 (4) Network (5) Airside Linkage (6) Locked Value		spt_status	MSV:2003		
Fan Off Delay	R/W	seconds	90	fan_delay_off	AV:9024		
Air Source Supply Air Temp	R	°F		link_sat	AV:2608		
Water Loop Temp	R	°F		link_cwt	AV:2701		
Aux Heat Boiler Water Temp	R	°F		link_hwt	AV:2702		
Airside Linkage	R	(0) Normal (1) Alarm		air_linkage_fail	BV:7030		
Source Water Linkage	R	(0) Normal (1) Alarm		cond_water_linkage_fail	BV:7031		
System Heating Demand Level	R	no units		heat_demand_level	AV:9036		
Airside Linkage	R	(0) Not Active (1) Active		a_link_status	BV:2601		
Occ Override Delay	R/W	min	15	occ_ovr_delay	AV:9028		
Loop Pump Request	R	no units		loop_request	AV:2024		
Source Water Linkage	R	(0) Not Active (1) Active		cw_link_status	BV:2701		
Aux Heat HW Pump Status	R	(0) Off (1) On		hw_pump	BV:2703		
System Cooling Demand Level	R	no units		cool_demand_level	AV:9006		
Filter Runtime	R	hr		filter_rntm	AV:2015		
Compressor Capacity	R	%		comp_cap	AV:5001	Input Register (Float)	165
Air Source Mode	R	(1) Off (2) Warmup (3) Heat (4) Cooling (5) Freecool (6) Pressure (7) Evac (8) Vent		link_ahu_mode	MSV:2005	-	-
SPT Sensor	R	(0) Normal (1) Alarm		spt_sensor_fail	BV:7032	Discrete Input	38
ZS Temp Sensor	R	(0) Normal (1) Alarm		zst_sensor_fail	BV:7051		

				BACnet		Modbus	
Point Name	Point Access	Units	Default Value	BACnet Point Name	BACnet Object ID	Modbus Register Type	Modbus Register #
Loop Pump Status	R	(0) Off (1) On		loop_pump	BV:2702		
Outdoor Air Temp Sensor	R	(0) Normal (1) Alarm		oat_fail	BV:7029		
Fan On Delay	R/W	seconds	10	fan_delay_on	AV:9025		

Network points list for N2 and LonWorks

				N2		LonWorks	
Point Name	Point Access	Units	Default Value	N2 Network Point Type	N2 Network Point Address	SNVT Type	SNVT Name
Aux Heat Control Setpoint	R	°F		ADF	70	nvoAuxHtSP	SNVT_temp_p(105)
Auxiliary Heat Output	R	%		ADF	71	nvoAuxHtOut	SNVT_lev_percent(81)
Cooling Lockout Temperature	R/W	°F	45	ADF	16	nviClLckTemp	SNVT_temp_p(105)
Damper Output	R	%		ADF	74	nvoOAVntDmpr	SNVT_lev_percent(81)
Leaving Source Water Temp	R	°F		ADF	73	nvoLvgCWTemp	SNVT_temp_p(105)
Vent Dmpr Pos / DCV Min Pos	R/W	%	20	ADF	60	nviDCVMinPos	SNVT_lev_percent(81)
Outdoor Air Temperature	R	°F		ADF	38	nvoOAT	SNVT_temp_p(105)
Override Time Remaining	R	min		ADF	41	nvoOvrTmRem	SNVT_time_min(123)
Setpoint	R/W	°F		ADF	9	nviOccHeatSP	SNVT_temp_p(105)
Setpoint Adjustment	R	°F		ADF	44	nvoSPAdjust	SNVT_temp_p(105)
Space Temperature - Prime Variable	R	°F		ADF	48	nvoSpaceTemp	SNVT_temp_p(105)
Supply Air Temperature	R	°F		ADF	49	nvoSAT	SNVT_temp_p(105)
System Space AQ	R/W	no units	-999	ADF	39	nviSysSpAQ	SNVT_ppm(29)
System Space RH	R/W	%	-999	ADF	40	nviSysSpRH	SNVT_lev_percent(81)
System Space Temperature	R/W	°F	-999	ADF	56	nviSysSpTmp	SNVT_temp_p(105)
Unocc Relative Humidity Setpoint	R/W	%rh	95	ADF	59	nviUnoccRHSP	SNVT_lev_percent(81)
Water Economizer Control Setpoint	R	°F		ADF	75	nvoWtrEconSP	SNVT_temp_p(105)
Water Economizer Output	R	%		ADF	76	nvoWtrEcnOut	SNVT_lev_percent(81)
Compressor Status	R	(0) Normal (1) Alarm		BI	30	nvoCmpSafety	SNVT_switch(95)
Condensate Overflow	R	(0) Normal (1) Alarm		BI	60	nvoOvrflwAlm	SNVT_switch(95)
Source Water Temperature	R	(0) Normal (1) Alarm		BI	61	nvoCWTempAlm	SNVT_switch(95)

				N2		LonWorks	
Point Name	Point Access	Units	Default Value	N2 Network Point Type	N2 Network Point Address	SNVT Type	SNVT Name
Cool Enable	R/W	(0) Disable (1) Enable	(1) Enable	BO	36	nviClEnb	SNVT_switch(95)
Dehumidification	R	(0) Disable (1) Enable		BI	9	nvoDehmRelay	SNVT_switch(95)
Supply Fan Status	R	(0) Off (1) On		BI	24	nvoFanStatus	SNVT_switch(95)
Filter	R	(0) Normal (1) Alarm		BI	31	nvoFilter	SNVT_switch(95)
Fire / Smoke Shutdown	R	(0) Normal (1) Alarm		BI	32	nvoFrShtdwn	SNVT_switch(95)
Heat Enable	R/W	(0) Disable (1) Enable	(1) Enable	BO	37	nviHtEnb	SNVT_switch(95)
High Space Temperature	R	(0) Normal (1) Alarm		BI	35	nvoHiSpTemp	SNVT_switch(95)
Indoor Air Quality	R	(0) Normal (1) Alarm		BI	33	nvoIAQAlm	SNVT_switch(95)
Low Space Temperature	R	(0) Normal (1) Alarm		BI	39	nvoLoSpTmp	SNVT_switch(95)
Occupancy Status	R	(0) Unoccupied (1) Occupied		BI	18	nvoOccStatus	SNVT_switch(95)
Setpoint Adjustment	R/W	(0) Disable (1) Enable	(1) Enable	BO	26	nviSPAdjEnbl	SNVT_switch(95)
Shutdown	R/W	(0) Inactive (1) Active	(0) Inactive	BO	1	nviShutdown	SNVT_switch(95)
Space Relative Humidity	R	(0) Normal (1) Alarm		BI	34	nvoHiSPRHAlm	SNVT_switch(95)
Space Temp Sensor	R	(0) Normal (1) Alarm		BI	46	nvoSPTmpSen	SNVT_switch(95)
Supply Air Temperature	R	(0) Normal (1) Alarm		BI	47	nvoSATSensor	SNVT_switch(95)
Supply Fan Failure	R	(0) Normal (1) Alarm		BI	5	nvoSFAlarm	SNVT_switch(95)
Fan / Speed	R	(1) Off (2) Low (3) Med (4) High (5) On		ADI	4	nvoFanSpeed	SNVT_count_inc(9)
Optimal Start Type	R/W	(1) None (2) Temp Compensated (3) Learning Adaptive	2	ADI	20	nviOptStType	SNVT_count_inc(9)
System Mode	R	(1) Off (2) Fan Only (3) Economize (4) Cooling (5) Heating (6) Cont Fan (7) Test (8) Start Delay		ADI	13	nvoOpMode	SNVT_count_inc(9)
Occ Relative Humidity Setpoint	R/W	%rh	60	ADF	36	nviOcRHSP	SNVT_lev_percent(81)
Optimal Start	R/W	hr	1	ADF	61	nviOptmStart	SNVT_time_hour(124)
Smoke Detector Contact	R	(0) Alarm / Open (1) Normal / Closed		BI	1	nvoSmkDetect	SNVT_switch(95)

				N2		LonWorks	
Point Name	Point Access	Units	Default Value	N2 Network Point Type	N2 Network Point Address	SNVT Type	SNVT Name
Effective Cool Setpoint	R	°F		ADF	22	nvoEffCoolSP	SNVT_temp_p(105)
Setpoint	R/W	°F		ADF	7	nviUnoccClSP	SNVT_temp_p(105)
Heating Lockout Temperature	R/W	°F	65	ADF	29	nviHtLckTmp	SNVT_temp_p(105)
Power Fail Restart Delay	R/W	seconds	180	ADF	58	nviUntStrDly	SNVT_time_sec(107)
Setpoint	R/W	°F		ADF	4	nviOccCoolSP	SNVT_temp_p(105)
Filter Service Alarm Timer	R/W	hr	600	ADF	28	nviFltAlmTm	SNVT_time_hour(124)
Indoor Air Quality CO2 (ppm)	R	ppm		ADF	31	nvoIAQ	SNVT_ppm(29)
Setpoint	R/W	°F		ADF	8	nviUnoccHtSP	SNVT_temp_p(105)
System Outdoor Air Temperature	R/W	°F	-999	ADF	54	nviSysOAT	SNVT_temp_p(105)
System Setpoint Adjustment	R/W	°F	-999	ADF	68	nviSysSptAdj	SNVT_count_inc(9)
Reset Filter Alarm	R/W	(0) Off (1) On	(0) Off	BO	22	nviRstFilAlm	SNVT_switch(95)
Effective Heat Setpoint	R	°F		ADF	23	nvoEffHeatSP	SNVT_temp_p(105)
Maximum Heating SAT	R/W	°F	110	ADF	33	nviMaxHtSAT	SNVT_temp_p(105)
Minimum Cooling SAT	R/W	°F	50	ADF	42	nviMinClSAT	SNVT_temp_p(105)
Setpoint Adjustment Range	R/W	°F	5	ADF	45	nviSPAdjRng	SNVT_temp_p(105)
BAS On / Off	R/W	(1) Inactive (2) Occupied (3) Unoccupied	1	ADI	1	nviBASOnOff	SNVT_count_inc(9)
ZS Sensor Configuration	R	(0) Normal (1) Alarm		BI	63	nvoZsCfgFail	SNVT_switch(95)
Space Relative Humidity	R	%rh		ADF	46	nvoSpaceRH	SNVT_lev_percent(81)
Compressor Capacity	R	%		ADF	72		
SPT Sensor	R	(0) Normal (1) Alarm		BI	38		

Appendix B: BACnet Protocol Implementation Conformance Statement

The PIC statements are updated regularly. Please refer to the *BACnet website http://www.bacnetinternational.net/catalog/index.php?m=28* for the latest information.

Appendix C: Modbus Protocol Implementation Conformance Statement

Date: 11/12/2013

Vendor Name: **Carrier**

Product Names: **WSHP Open**

Product Model Number: **Water Source Heat Pump**

Protocol Description:

The WSHP Open controller speaks the Modicon Modbus RTU/ASCII Protocol as described in the *Modicon Modbus Protocol Reference Guide, PI-MBUS-300 Rev.J.* Further details on the Modbus implementation are described below.

Product Description:

The WSHP Open is a factory-installed water source heat pump controller that is capable of speaking multiple protocols.

Serial Transmission Mode:	Supported?
RTU	Slave only
ASCII	Not supported

Communication Types:	Baud rates:	Data Bits:	Parity:	Stop Bits:
2-wire EIA-485,	9600, 19200, 38400, 76800	8	None	1

Function Codes:	Purpose:	Used with Register Numbers:
01 – Read Coil Status	Read Discrete Outputs	00001 - 65535
02 – Read Input Status	Read Discrete Inputs	00001 - 65535
03 – Read Holding Registers	Read Holding Registers	00001 - 65535
04 – Read Input Registers	Read Input Registers	00001 - 65535
05 – Force Single Coil	Write Discrete Outputs (single)	00001 - 65535
06 – Preset Single Register	Write Holding Registers (single)	00001 - 65535
15 – Force Multiple Coils	Write Discrete Outputs	00001 - 65535
16 – Preset Multiple Coils	Write Holding Registers	00001 - 65535

Register Type:	Range:	Function Codes Used with this Register Type:
Float Value (FLOAT)	Single-Precision IEEE floating point value	3 – Read Holding Register 6 – Preset Single Register 16 – Preset Multiple Register

Unsigned Integer (UINT)	0 - 65535	3 – Read Holding Register 6 – Preset Single Register 16 – Preset Multiple Register
Signed Integer (SINT)	-32768 - 32767	3 – Read Holding Register 6 – Preset Single Register 16 – Preset Multiple Register
Discrete Input (DI)	0 = Off, 1 = On	2 – Read Input Status
Discrete Output (DO)	0 = Off, 1 = On	1 – Read Coil Status 5 – Force Single Coil 15 – Force Multiple Coils

Appendix D: Johnson N2 Protocol Implementation Conformance Statement

Date: 11/12/2013

Vendor Name: **Carrier**

Product Names: **WSHP Open**

Product Model Number: **Water Source Heat Pump**

Protocol Description:

N2 is not a standard protocol, but one that was created by Johnson Controls, Inc. that has been made open and available to the public. The speed of N2 network is limited to only 9600 baud. The N2 slave address can be set from 01 to 99.

Product Description:

The WSHP Open is a factory-installed water source heat pump controller that is capable of speaking multiple protocols. The WSHP Open controller speaks the Johnson N2 Open Protocol as described in the *Metasys N2 System Protocol Specification (for Vendors) document*, revision 6/13/96. Further details on the N2 supported implementation are described below.

Communication Types:	Baud rates:	Data Bits:	Parity:	Stop Bits:
2-wire EIA-485	9600	8	None	1

Network Point Types:
Analog Inputs (AI)
Binary Inputs (BI)
Analog Outputs (AO)
Binary Outputs (BO)
Internal Floats (ADF)
Internal Integers (ADI)
Internal Bytes (BD)

Protocol Commands:
Identify Device Type
Sync Time
Poll Without Acknowledge
Poll With Acknowledge
Read Analog Input
Read Binary Input
Read Analog Output
Read Binary Output
Read Internal Parameter
Write Analog Input
Write Binary Input
Write Analog Output
Write Binary Output

Write Internal Parameter
Override Analog Input
Override Binary Input
Override Internal Parameter
Override Release Request

Appendix E: LonWorks Protocol Implementation Conformance Statement

Date: 11/12/2013

Vendor Name: **Carrier**

Product Names: **WSHP Open**

Product Model Number: **Water Source Heat Pump**

Product Description:

The WSHP Open is a factory-installed water source heat pump controller that is capable of speaking multiple protocols. When the LonWorks Option Card (LON-OC), is installed in the field, it enables the WSHP Open to communicate over a LonTalk network. The WSHP Open does not conform to a standard LonWorks profile, but is self-documenting and any network management tool can manage and configure it over the network. An external interface file (.XIF), is also available so that any network management tool can design and configure the WSHP Open prior to installation. Contact your Carrier representative for this .XIF file.

LonWorks is an open protocol that requires the use Echelon's Neuron microprocessor to encode and decode the LonWorks packets. In order to reduce the cost of adding the Echelon chip to every module, a separate LonWorks Option Card (LON-OC) was designed to connect to the WSHP Open.

This accessory card must be ordered separately and is connected by attaching its ribbon cable into the **J15** connector on the WSHP Open. The WSHP Open's baud rate (**DS1** and **DS2** on **SW3**) must be set to 38.4k to communicate with the LON-OC. The address switches (**SW1** and **SW2**) are not used with LonWorks.

Tranceiver Type: TP/FT 10

Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
5/27/15	Wiring inputs and outputs	Correction - added ZS sensors	C-TS-RD-E-WB
5/13/15	Sequence of Operation - Dehumidification	Correction - removed references to specific reheat type.	C-AE-WB-E
3/10/15	Start-up	Removed BACview and added Equipment Touch and System Touch.	C-AE-BR-O-WB
	Adjusting MS/TP properties using an Equipment Touch	New topic	C-AE-BR-O-WB
	Appendix A: Network points list for WSHP Open	Network points list updated for BACnet, Modbus, N2, and LonWorks	C-AE-BR-O-WB
	Entire document	Replaced references to BACview with Equipment Touch	C-AE-BR-O-WB
6/5/14	Configuring for BACnet MS/TP	Added note that controller counts as a full load on the MS/TP bus.	C-TS-RD-E

* For internal use only

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3M™ Super 77™ Multi-Purpose Spray Adhesive – Low VOC <25%

Technical Data **March 2012**

Product Description

A high tack and fast drying mist spray adhesive.

Key Features

- Securely bonds many lightweight materials such as attaching foils, carpeting, lightweight paper, cardboard, felt, and cloth to painted or unpainted metals, wood.
- Meets CARB / OTC VOC Requirements.
- Helps contribute to LEED® credits.
- GREENGUARD Indoor Air Quality Certified®.

Typical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Product	**3M™ Super 77 ™ Multi-Purpose Spray Adhesive – Low VOC <25%**
Base:	Synthetic Elastomer
Solids Content - (by wt.):	19.4%
Density (lbs/gal):	6.6
Viscosity (cps):	N/A
Color(s):	Translucent
Volatile Organic Compounds (VOC):	< 25%
Hazardous Air Pollutants (HAPS) % wt (calculated):	No
CARB Compliant:	Yes
GREENGUARD Indoor Air Quality Certified®:	Yes
LEED® Eligible:	Yes
Coverage @ 1 gram /ft^2 per Can:	99
Spray Pattern:	Mist
Dry Time:	15 - 30 sec.
Bonding Range:	15 sec. – 30 mn.
Shear Adhesion Failure Test - SAFT[(1)]:	205
Flammable Solvent:	Yes
Flammable Propellant:	Yes

[(1)]SAFT Shear Adhesion Failure Test with birch plywood, 1 inch overlap, 100 grams used, temperature start at 90F and ramped 10F every 10 mn. until complete failure.

Available Sizes

Container Size	**3M Stock Number**	**UPC Number**
24 Fl. Oz. (Net Wt. 18.0 oz) - clear	62-4876-4930-3	00-051111-97956-3

Super 77™ Multi-Purpose Spray Adhesive – Low VOC <25%

Storage	Store product at 60°-80°F (16°-27°C) for maximum storage life. Higher temperatures reduce normal storage life. Lower temperatures may cause increased viscosity of a temporary nature. Rotate stock on a "first in-first out" basis.
Shelf Life	When stored at the recommended conditions in original, unopened container, this product has a shelf life if 15 months from date of shipment.
Precautionary Information	Refer to product label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-3577 or (651) 737-6501.
Technical Information	The technical information, recommendations and other statements contained in this document are based upon testes or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.
Product Use	Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.
Warranty, Limited Remedy, and Disclaimer	Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOMER OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.
Limitation of Liability	Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

Industrial Adhesives and Tapes Division
3M Center, Building 225-3S-06
St. Paul, MN 55144-1000
800-362-3550 • 877-369-2923 (Fax)
www.3M.com/lowvocaerosols

Safety Data Sheet

Document Group:	16-3472-4	**Version Number:**	37.00
Issue Date:	09/11/14	**Supercedes Date:**	04/19/12

SECTION 1: Identification

1.1. Product identifier
3M(TM) Super 77(TM) Multipurpose Adhesive (Aerosol)

Product Identification Numbers
62-4977-4730-3, 62-4977-4925-9, 62-4977-4929-1, 62-4977-4930-9, 62-4977-4935-8

1.2. Recommended use and restrictions on use

Recommended use
general purpose aerosol adhesive, General Purpose Aerosol adhesive

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Industrial Adhesives and Tapes Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number
1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification
Flammable Aerosol: Category 1.
Serious Eye Damage/Irritation: Category 2A.
Reproductive Toxicity: Category 2.
Simple Asphyxiant.
Specific Target Organ Toxicity (single exposure): Category 1.
Specific Target Organ Toxicity (central nervous system): Category 3.

2.2. Label elements
Signal word
Danger

Symbols
Flame | Exclamation mark | Health Hazard |

Pictograms

Hazard Statements
Extremely flammable aerosol.

Causes serious eye irritation.
May cause drowsiness or dizziness.
Suspected of damaging fertility or the unborn child.
May displace oxygen and cause rapid suffocation.

Causes damage to organs:
cardiovascular system |

Precautionary Statements
General:
Keep out of reach of children.

Prevention:
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Do not spray on an open flame or other ignition source.
Pressurized container: Do not pierce or burn, even after use.
Do not breathe dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wear protective gloves and eye/face protection.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.

Response:
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.
Specific treatment (see Notes to Physician on this label).

Storage:
Protect from sunlight. Do not expose to temperatures exceeding 50C/122F.
Keep container tightly closed.
Store locked up in a well-ventilated place.

Disposal:
Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

Notes to Physician:
Exposure may increase myocardial irritability. Do not administer sympathomimetic drugs unless absolutely necessary.

2.3. Hazards not otherwise classified
None.

36% of the mixture consists of ingredients of unknown acute dermal toxicity.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Non-volatile components (N.J.T.S. Registry No. 04499600-6433P)	Trade Secret*	20 - 30 Trade Secret *
Acetone	67-64-1	20 - 30 Trade Secret *
Propane	74-98-6	15 - 25 Trade Secret *
Cyclohexane	110-82-7	10 - 20 Trade Secret *
Petroleum distillates	64742-49-0	10 - 20 Trade Secret *
Hexane	110-54-3	< 0.5

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Remove person to fresh air. Get medical attention.

Skin Contact:
Wash with soap and water. If signs/symptoms develop, get medical attention.

Eye Contact:
Immediately flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. Get medical attention.

If Swallowed:
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required
Exposure may increase myocardial irritability. Do not administer sympathomimetic drugs unless absolutely necessary.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media
Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture
Closed containers exposed to heat from fire may build pressure and explode.

Hazardous Decomposition or By-Products

Substance	Condition
Aldehydes	During Combustion
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion

5.3. Special protective actions for fire-fighters

Water may not effectively extinguish fire; however, it should be used to keep fire-exposed containers and surfaces cool and prevent explosive rupture.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use only non-sparking tools. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions
Avoid release to the environment.

6.3. Methods and material for containment and cleaning up
If possible, seal leaking container. Place leaking containers in a well-ventilated area, preferably an operating exhaust hood, or if necessary outdoors on an impermeable surface until appropriate packaging for the leaking container or its contents is available. Contain spill. Cover spill area with a fire-extinguishing foam. An appropriate aqueous film forming foam (AFFF) is recommended. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible using non-sparking tools. Place in a metal container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Keep out of reach of children. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Do not pierce or burn, even after use. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.) Use personal protective equipment (gloves, respirators, etc.) as required.

7.2. Conditions for safe storage including any incompatibilities
Store in a well-ventilated place. Keep container tightly closed. Protect from sunlight. Do not expose to temperatures exceeding 50C/122F. Store away from heat. Store away from acids. Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits
If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
Hexane	110-54-3	OSHA	TWA:1800 mg/m3(500 ppm)	
Hexane	110-54-3	ACGIH	TWA:50 ppm	Skin Notation
Cyclohexane	110-82-7	ACGIH	TWA:100 ppm	
Cyclohexane	110-82-7	OSHA	TWA:1050 mg/m3(300 ppm)	
Petroleum distillates	64742-49-0	CMRG	TWA:50 ppm	
Acetone	67-64-1	OSHA	TWA:2400 mg/m3(1000 ppm)	

Acetone	67-64-1	ACGIH	TWA:500 ppm;STEL:750 ppm	A4: Not class. as human carcin
Propane	74-98-6	ACGIH	Limit value not established:	
Propane	74-98-6	OSHA	TWA:1800 mg/m3(1000 ppm)	

ACGIH : American Conference of Governmental Industrial Hygienists
AIHA : American Industrial Hygiene Association
CMRG : Chemical Manufacturer's Recommended Guidelines
OSHA : United States Department of Labor - Occupational Safety and Health Administration
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls
Do not remain in area where available oxygen may be reduced. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Indirect Vented Goggles

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing.
Gloves made from the following material(s) are recommended: Butyl Rubber
Nitrile Rubber

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
Half facepiece or full facepiece supplied-air respirator

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form:	Liquid aerosol
Specific Physical Form:	Aerosol
Odor, Color, Grade:	Clear, sweet, fruity odor
Odor threshold	*No Data Available*
pH	*No Data Available*
Melting point	*No Data Available*
Boiling Point	*Not Applicable*
Flash Point	-42.00 ºF [*Test Method:* Tagliabue Closed Cup]
Evaporation rate	1.90 [*Ref Std:* ETHER=1]

Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
Vapor Density	2.97 [*Ref Std:* AIR=1]
Density	0.726 g/ml
Specific Gravity	0.726 [*Ref Std:* WATER=1]
Solubility in Water	Nil
Solubility- non-water	*No Data Available*
Partition coefficient: n-octanol/ water	*No Data Available*
Autoignition temperature	*No Data Available*
Decomposition temperature	*Not Applicable*
Viscosity	*Not Applicable*
Hazardous Air Pollutants	<=0.4 % weight [*Test Method:* Calculated]
VOC Less H2O & Exempt Solvents	<=51 % [*Test Method:* calculated SCAQMD rule 443.1]
Solids Content	>=22.4 %

SECTION 10: Stability and reactivity

10.1. Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4. Conditions to avoid
Heat

10.5. Incompatible materials
Strong oxidizing agents

10.6. Hazardous decomposition products

Substance	**Condition**
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:
Intentional concentration and inhalation may be harmful or fatal.

Simple Asphyxiation: Signs/symptoms may include increased heart rate, rapid respirations, drowsiness, headache, incoordination, altered judgement, nausea, vomiting, lethargy, seizures, coma, and may be fatal.

Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

May cause target organ effects after inhalation.

Skin Contact:
Dermal Defatting: Signs/symptoms may include localized redness, itching, drying and cracking of skin.

Eye Contact:
Severe Eye Irritation: Signs/symptoms may include significant redness, swelling, pain, tearing, cloudy appearance of the cornea, and impaired vision.

Ingestion:
Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

May cause target organ effects after ingestion.

Target Organ Effects:

Single exposure may cause:
Central Nervous System (CNS) Depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

Single exposure, above recommended guidelines, may cause:
Cardiac Sensitization: Signs/symptoms may include irregular heartbeat (arrhythmia), faintness, chest pain, and may be fatal.

Reproductive/Developmental Toxicity:
Contains a chemical or chemicals which can cause birth defects or other reproductive harm.

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE > 5,000 mg/kg
Overall product	Ingestion		No data available; calculated ATE > 5,000 mg/kg
Propane	Inhalation-Gas (4 hours)	Rat	LC50 > 200,000 ppm
Acetone	Dermal	Rabbit	LD50 > 15,688 mg/kg
Acetone	Inhalation-Vapor (4 hours)	Rat	LC50 76 mg/l
Acetone	Ingestion	Rat	LD50 5,800 mg/kg
Cyclohexane	Dermal	Rat	LD50 > 2,000 mg/kg
Cyclohexane	Inhalation-Vapor (4 hours)	Rat	LC50 > 32.9 mg/l
Cyclohexane	Ingestion	Rat	LD50 6,200 mg/kg
Petroleum distillates	Dermal	Rabbit	LD50 > 3,160 mg/kg

Petroleum distillates	Inhalation-Vapor (4 hours)	Rat	LC50 > 14.7 mg/l
Petroleum distillates	Ingestion	Rat	LD50 > 5,000 mg/kg
Non-volatile components (N.J.T.S. Registry No. 04499600-6433P)	Ingestion		LD50 estimated to be 2,000 - 5,000 mg/kg
Hexane	Dermal	Rabbit	LD50 > 2,000 mg/kg
Hexane	Inhalation-Vapor (4 hours)	Rat	LC50 170 mg/l
Hexane	Ingestion	Rat	LD50 > 28,700 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
Propane	Rabbit	Minimal irritation
Acetone	Mouse	Minimal irritation
Cyclohexane	Rabbit	Mild irritant
Petroleum distillates	Rabbit	Irritant
Non-volatile components (N.J.T.S. Registry No. 04499600-6433P)		Minimal irritation
Hexane	Human and animal	Mild irritant

Serious Eye Damage/Irritation

Name	Species	Value
Propane	Rabbit	Mild irritant
Acetone	Rabbit	Severe irritant
Cyclohexane	Rabbit	Mild irritant
Petroleum distillates	Rabbit	Mild irritant
Hexane	Rabbit	Mild irritant

Skin Sensitization

Name	Species	Value
Petroleum distillates	Guinea pig	Not sensitizing
Hexane	Human	Not sensitizing

Respiratory Sensitization

Name	Species	Value

Germ Cell Mutagenicity

Name	Route	Value
Propane	In Vitro	Not mutagenic
Acetone	In vivo	Not mutagenic
Acetone	In Vitro	Some positive data exist, but the data are not sufficient for classification
Cyclohexane	In Vitro	Not mutagenic
Cyclohexane	In vivo	Some positive data exist, but the data are not sufficient for classification
Petroleum distillates	In Vitro	Not mutagenic
Hexane	In Vitro	Not mutagenic
Hexane	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
Acetone	Not Specified	Multiple animal species	Not carcinogenic
Petroleum distillates	Inhalation	Mouse	Some positive data exist, but the data are not sufficient for classification
Hexane	Dermal	Mouse	Not carcinogenic
Hexane	Inhalation	Mouse	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
Acetone	Ingestion	Not toxic to female reproduction	Mouse	NOAEL 11,298 mg/kg/day	13 weeks
Acetone	Ingestion	Some positive male reproductive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,700 mg/kg/day	13 weeks
Acetone	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 5.2 mg/l	during organogenesis
Cyclohexane	Inhalation	Not toxic to female reproduction	Rat	NOAEL 24 mg/l	2 generation
Cyclohexane	Inhalation	Not toxic to male reproduction	Rat	NOAEL 24 mg/l	2 generation
Cyclohexane	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 6.9 mg/l	2 generation
Hexane	Ingestion	Not toxic to development	Mouse	NOAEL 2,200 mg/kg/day	during organogenesis
Hexane	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 0.7 mg/l	during gestation
Hexane	Ingestion	Toxic to male reproduction	Rat	NOAEL 1,140 mg/kg/day	90 days
Hexane	Inhalation	Toxic to male reproduction	Rat	LOAEL 3.52 mg/l	28 days

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Propane	Inhalation	cardiac sensitization	Causes damage to organs	Human	NOAEL Not available	
Propane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Propane	Inhalation	respiratory irritation	All data are negative	Human	NOAEL Not available	
Acetone	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Acetone	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	
Acetone	Inhalation	immune system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL 1.19 mg/l	6 hours
Acetone	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Guinea pig	NOAEL Not available	
Acetone	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	poisoning and/or abuse
Cyclohexane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human and animal	NOAEL Not available	
Cyclohexane	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human and animal	NOAEL Not available	
Petroleum distillates	Inhalation	central nervous system depression	May cause drowsiness or dizziness		NOAEL Not available	

Petroleum distillates	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	
Hexane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	not available
Hexane	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Rabbit	NOAEL Not available	8 hours
Hexane	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 24.6 mg/l	8 hours

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Acetone	Dermal	eyes	Some positive data exist, but the data are not sufficient for classification	Guinea pig	NOAEL Not available	3 weeks
Acetone	Inhalation	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL 3 mg/l	6 weeks
Acetone	Inhalation	immune system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL 1.19 mg/l	6 days
Acetone	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Guinea pig	NOAEL 119 mg/l	not available
Acetone	Inhalation	heart | liver	All data are negative	Rat	NOAEL 45 mg/l	8 weeks
Acetone	Ingestion	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 900 mg/kg/day	13 weeks
Acetone	Ingestion	heart	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 2,500 mg/kg/day	13 weeks
Acetone	Ingestion	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 200 mg/kg/day	13 weeks
Acetone	Ingestion	liver	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 3,896 mg/kg/day	14 days
Acetone	Ingestion	eyes	All data are negative	Rat	NOAEL 3,400 mg/kg/day	13 weeks
Acetone	Ingestion	respiratory system	All data are negative	Rat	NOAEL 2,500 mg/kg/day	13 weeks
Acetone	Ingestion	muscles	All data are negative	Rat	NOAEL 2,500 mg/kg	13 weeks
Acetone	Ingestion	skin | bone, teeth, nails, and/or hair	All data are negative	Mouse	NOAEL 11,298 mg/kg/day	13 weeks
Cyclohexane	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 24 mg/l	90 days
Cyclohexane	Inhalation	auditory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1.7 mg/l	90 days
Cyclohexane	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rabbit	NOAEL 2.7 mg/l	10 weeks
Cyclohexane	Inhalation	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 24 mg/l	14 weeks
Cyclohexane	Inhalation	peripheral nervous system	All data are negative	Rat	NOAEL 8.6 mg/l	30 weeks
Hexane	Inhalation	peripheral nervous	Causes damage to organs	Human	NOAEL Not	occupational

		system	through prolonged or repeated exposure		available	exposure
Hexane	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Mouse	LOAEL 1.76 mg/l	13 weeks
Hexane	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	6 months
Hexane	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 1.76 mg/l	6 months
Hexane	Inhalation	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 35.2 mg/l	13 weeks
Hexane	Inhalation	auditory system | immune system | eyes	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
Hexane	Inhalation	heart | skin | endocrine system	All data are negative	Rat	NOAEL 1.76 mg/l	6 months
Hexane	Ingestion	peripheral nervous system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,140 mg/kg/day	90 days
Hexane	Ingestion	endocrine system | hematopoietic system | liver | immune system | kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	13 weeks

Aspiration Hazard

Name	Value
Cyclohexane	Aspiration hazard
Petroleum distillates	Aspiration hazard
Hexane	Aspiration hazard

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

Ecotoxicological information

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations

13.1. Disposal methods

Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of waste product in a permitted industrial waste facility. Facility must be capable of handling aerosol cans.

EPA Hazardous Waste Number (RCRA): D001 (Ignitable)

SECTION 14: Transport Information

For Transport Information, please visit **http://3M.com/Transportinfo** or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information

15.1. US Federal Regulations
Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - Yes Pressure Hazard - Yes Reactivity Hazard - No Immediate Hazard - Yes Delayed Hazard - Yes

Section 313 Toxic Chemicals subject to the reporting requirements of that section and 40 CFR part 372 (EPCRA):

Ingredient	C.A.S. No	% by Wt
Cyclohexane	110-82-7	10 - 20

15.2. State Regulations
Contact 3M for more information.

15.3. Chemical Inventories
The components of this product are in compliance with the chemical notification requirements of TSCA.

Contact 3M for more information.

15.4. International Regulations
Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification
Health: 2 **Flammability:** 4 **Instability:** 0 **Special Hazards:** None
Aerosol Storage Code: 3

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification
Health: *2 **Flammability:** 4 **Physical Hazard:** 0 **Personal Protection:** X - See PPE section.

Hazardous Material Identification System (HMIS® III) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® III ratings are to be used with a fully implemented HMIS® III program. HMIS® is a registered mark of the American Coatings Association (ACA).

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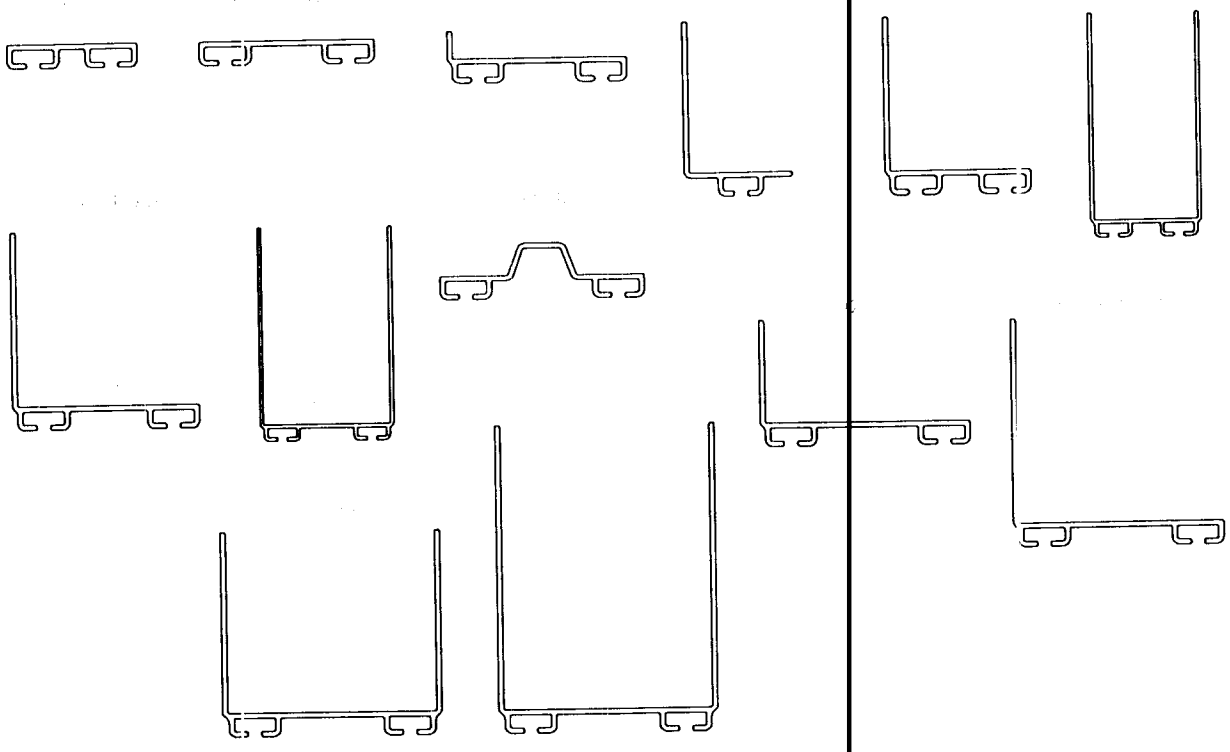
3M USA SDSs are available at www.3M.com

BOTTOM SEALS

ALUMINUM BOTTOM SEAL RETAINERS

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
A1015-01-W	1" x 1 1/2" L-Shaped	Call	Call	Call	Call
A1250-00-W	1 1/4" Flat	Call	Call	Call	Call
A1315-01-W	1 3/8" x 1 1/2" L-Shaped	Call	Call	Call	Call
A1330-01-W	1 3/8" x 3" U-Shaped	Call	Call	Call	Call
A1330-02-W	1 3/8" x 3" L-Shaped	Call	Call	Call	Call
A1700-00-W	1 5/8" Flat	Call	Call	Call	Call
A1703-00-W	1 5/8" L-Shaped	Call	Call	Call	Call
A1818-01-W	1 3/4" x 1 3/4" L-Shaped	Call	Call	Call	Call
A1830-01-W	1 3/4" x 3" U-Shaped	Call	Call	Call	Call
A2000-TG-W	2' Tongue & Groove Panel	Call	Call	Call	Call
A2010-01-W	2"x1" L-Shaped	Call	Call	Call	Call
A2020-01-W	2"x 2" L-Shaped	Call	Call	Call	Call
A2030-01-W	2" x 3" U-Shaped	Call	Call	Call	Call
A2040-01-W	2" x 2" U-Shaped	Call	Call	Call	Call

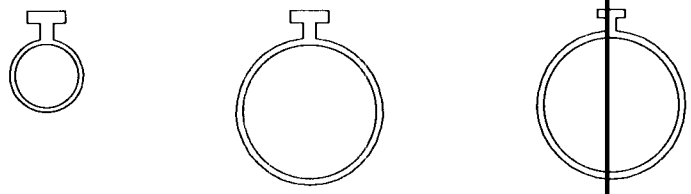


PLASTIC BOTTOM SEAL RETAINERS

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
P1700-BK-W	1 5/8" Flat, Black	Call	Call	Call	Call
P1315-BK-W	1 3/8" X 1 1/2" L-Shape, Black	Call	Call	Call	Call
P1818-BK-W	1 3/4" X 1 3/4" L-Shape, Black	Call	Call	Call	Call
P2020-BK-W	2" x 2" L-Shape, Black	Call	Call	Call	Call

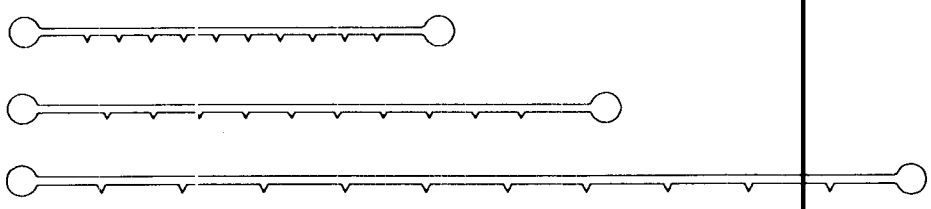
BOTTOM "T" BULB VINYL SEALS

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
V0500-GR-W	1/2" Gray	Call	Call	Call	Call
V1000-GR-W	1" Gray	Call	Call	Call	Call
V1500-GR-W	1 1/2" Gray	Call	Call	Call	Call
V1500-YL-W	1 1/2" Yellow	Call	Call	Call	Call



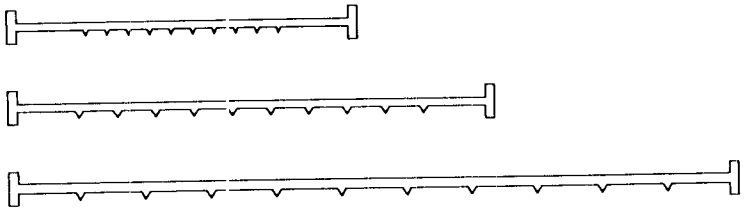
BOTTOM "BEAD" END VINYL SEALS

PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ REELS
V3563-00-W	3", 200' Reel	Call	Call	Call
V3564-00-W	4", 200' Reel	Call	Call	Call
V3566-00-W	6", 100' Reel	Call	Call	Call

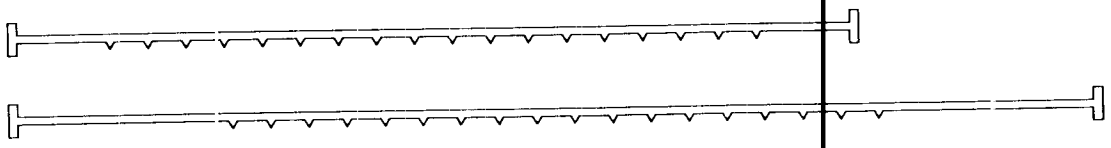


BOTTOM "T" RUBBER SEALS

PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ REELS
T2563-00-W	3" T-Rubber, Black, 150' Reel	Call	Call	Call
T2564-00-W	4" T-Rubber, Black, 150' Reel	Call	Call	Call
T2566-00-W	6" T-Rubber, Black, 100' Reel	Call	Call	Call



PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ ROLLS
T2567-00-W	7" T-Rubber, Black, 100' Roll	Call	Call	Call
T2569-00-W	9" T-Rubber, Black, 100' Roll	Call	Call	Call



BOTTOM "T" VINYL SEALS

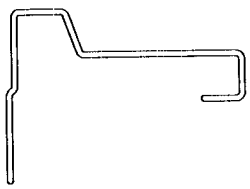
PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ REELS
V2563-BL-W	3" T Vinyl, Black, 200' Reel	Call	Call	Call
V2563-GR-W	3" T Vinyl, Gray, 200' Reel	Call	Call	Call

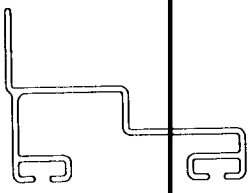
PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ REELS
V2564-BL-W	4" T Vinyl, Black, 200' Reel	Call	Call	Call
V2564-GR-W	4" T Vinyl, Gray, 200' Reel	Call	Call	Call
V2564-YL-W	4" T Vinyl, Yellow, 200' Reel	Call	Call	Call

PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ REELS
V2566-BL-W	6" T Vinyl, Black, 200' Reel	Call	Call	Call
V2566-GR-W	6" T Vinyl, Gray, 200' Reel	Call	Call	Call

SHIP-LAP/TONGUE-AND-GROOVE ADAPTERS

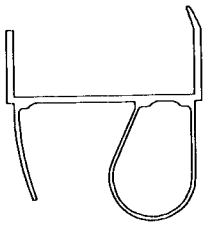
PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
A2015-01-W	2" x 1 1/2"	Call	Call	Call	Call
A2015-02-W	2" x 1 1/2"	Call	Call	Call	Call





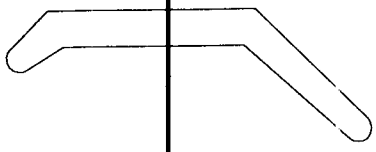
ONE-PIECE VINYL BOTTOM SEAL

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
PL206-BK-W	2" x 7/8" Black	Call	Call	Call	Call



WOOD DOOR BOTTOM NAIL-ON SEALS

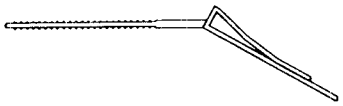
PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ ROLLS
BDR14-00-W	Dense Rubber, 100' Roll	Cal	Call	Call
BDF14-00-W	Soft Sponge, 100' Roll	Cal	Call	Call



SECTIONAL CLIP-ON SEALS

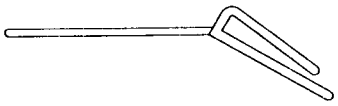
FLEXIBLE VINYL REVERSE ANGLE JAMB SEALS

PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ ROLLS
PL030-GR-W	Gray, 100' Roll	Call	Call	Call
PL031-WH-W	White, 100' Roll	Call	Call	Call
PL032-BR-W	Brown, 100' Roll	Call	Call	Call
PL033-BL-W	Black, 100' Roll	Call	Call	Call



FLEXIBLE TPR REVERSE ANGLE JAMB SEALS

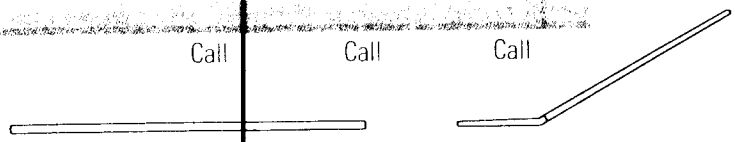
PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ ROLLS
PLT30-GR-W	Gray, 100' Roll	Call	Call	Call
PLT31-WH-W	White, 100' Roll	Call	Call	Call
PLT32-BR-W	Brown, 100' Roll	Call	Call	Call
PLT33-BL-W	Black, 100' Roll	Call	Call	Call



FLEXIBLE TOP SEAL

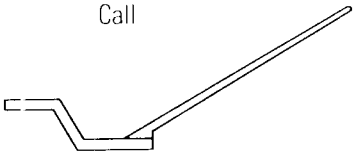
PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+
PL053-BL-W	Black, 100' Rolls	Call	Call	Call

PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+
PL063-GR-W	2 3/4", Gray, 250' Reel	Call	Call	Call



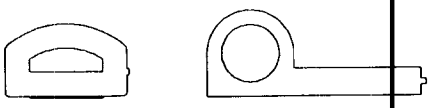
RIGID T&G AND SHIPLAP TOP SEAL

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
PL043-BL-W	Black	Call	Call	Call	Call



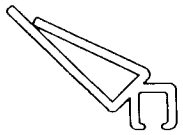
EPDM THERMAL COMPRESSION SEALS

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
Z0100-00-W	"D", 3/8"W x 1/4"H, Black	Call	Call	Call	Call
Z0150-00-W	"D", 3/4"W x 9/16"H, Black	Call	Call	Call	Call
Z0175-00-W	"D", 13/16"W x 3/4"H, Black	Call	Call	Call	Call
Z0200-00-W	"D", 9/16"W x 3/8"H, Black	Call	Call	Call	Call
Z0250-00-W	"P", 1 1/8"W x 7/16"H, Black	Call	Call	Call	Call

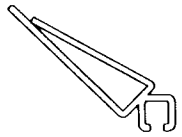


CLIP-ON GUIDE SEALS

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
PL035-00-W	Gray	Call	Call	Call	Call

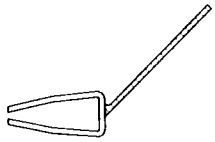


PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
PL235-GR-W	Gray	Call	Call	Call	Call



ONE-PIECE CLIP-ON GUIDE SEAL

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
CN102-06-W	Black	Call	Call	Call	Call

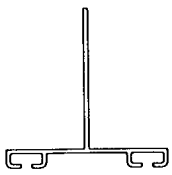


ROLLING STEEL BOTTOM SEAL

PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ ROLLS
BDS13-00-W	EPDM, 100' Roll	Call	Call	Call

PART NUMBER	DESCRIPTION	CUSTOM LENGTH	EACH	10+ ROLLS
VBDS13-00-W	Vinyl, 100' Roll	Call	Call	Call

PART NUMBER	DESCRIPTION	0-299'	300-899'	900-1999'	2000'
A2050-01-W	T-Shape Bottom Retainer, 2" x 2", Mill	Call	Call	Call	Call



Safety Data Sheet
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SECTION 1: Identification of the substance/mixture and of the company/ undertaking

· **1.1 Product identifier**

· **Trade name: Touch n Seal All - Seasons Foam**

· **Article number:** EHS 9457

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Sealant

· **1.3 Details of the supplier of the Safety Data Sheet**

· **Manufacturer/Supplier:**
Convenience Products, division of Clayton Corp.
866 Horan Drive
Fenton, MO 63026-2416
Phone: 636-349-5855

· **1.4 Emergency telephone number:**
ChemTel Inc.
(800)255-3924, +1 (813)248-0585

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**
The following Hazard Statements are applicable only to the EU regulations and not the US GHS regulation: H222-H229.
The following Hazard Statements are applicable only to the general GHS regulations and not the specific CLP regulation: H222.


H222: Extremely flammable aerosol.


flame

Flam. Aerosol 1 H222-H229 Extremely flammable aerosol. Pressurised container: May burst if heated.


health hazard

Resp. Sens. 1	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
STOT RE 2	H373	May cause damage to organs through prolonged or repeated exposure.

Acute Tox. 4	H332	Harmful if inhaled.
Skin Irrit. 2	H315	Causes skin irritation.
Eye Irrit. 2	H319	Causes serious eye irritation.

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Skin Sens. 1	H317	May cause an allergic skin reaction.
STOT SE 3	H335	May cause respiratory irritation.

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**


Xn; Harmful

R20: Harmful by inhalation.


Xn; Sensitising

R42/43: May cause sensitisation by inhalation and skin contact.


Xi; Irritant

R36/37/38: Irritating to eyes, respiratory system and skin.


F+; Extremely flammable

R12: Extremely flammable.

· **Information concerning particular hazards for human and environment:**
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
Warning! Pressurised container.

· **Classification system:**
The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**


GHS02 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
diphenylmethanediisocyanate,isomeres and homologues
4,4'-methylenediphenyl diisocyanate

· **Hazard statements**
The following Hazard Statements are applicable only to the EU regulations and not the US GHS regulation: H222-H229.
The following Hazard Statements are applicable only to the general GHS regulations and not the specific CLP regulation: H222.
H222: Extremely flammable aerosol.
H222-H229 Extremely flammable aerosol. Pressurised container: May burst if heated.
H332 Harmful if inhaled.
H315 Causes skin irritation.

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H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.

· **Precautionary statements**
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P251 Pressurized container: Do not pierce or burn, even after use.
P260 Do not breathe mist/vapours/spray.
P211 Do not spray on an open flame or other ignition source.
P280 Wear protective gloves / eye protection.
P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
P314 Get medical advice/attention if you feel unwell.
P410+P412 Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.

· **Additional information:**
Contains isocyanates. May produce an allergic reaction.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
Do not spray on a naked flame or any incandescent material. Keep away from sources of ignition - No smoking.
Buildup of explosive mixtures possible without sufficient ventilation.

· **Hazard description:**

· **WHMIS-symbols:**
A - Compressed gas
B5 - Flammable aerosol
D2A - Very toxic material causing other toxic effects

· **NFPA ratings (scale 0 - 4)**

Health = 2
Fire = 4
Reactivity = 1

· **HMIS-ratings (scale 0 - 4)**

Health = *2
Fire = 4
Reactivity = 1

* - Indicates a long term health hazard from repeated or prolonged exposures.

· **HMIS Long Term Health Hazard Substances**	
9016-87-9	diphenylmethanediisocyanate,isomeres and homologues
101-68-8	4,4'-methylenediphenyl diisocyanate

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

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Trade name: Touch n Seal All - Seasons Foam

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· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.2 Mixtures**

· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 9016-87-9	diphenylmethanediisocyanate,isomeres and homologues Xn R20; Xn R42/43; Xi R36/37/38 Carc. Cat. 3 Resp. Sens. 1, H334; STOT RE 2, H373 Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317; STOT SE 3, H335	20-40%
CAS: 68527-02-6 EINECS: 271-247-1	alkenes, C12-24, chloro Xi R36/37/38 Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335	10-20%
CAS: 101-68-8 EINECS: 202-966-0 Index number: 615-005-00-9	4,4'-methylenediphenyl diisocyanate Xn R20; Xn R42/43; Xi R36/37/38 Carc. Cat. 3 Resp. Sens. 1, H334; STOT RE 2, H373 Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317; STOT SE 3, H335	10-20%
CAS: 115-10-6 EINECS: 204-065-8 Index number: 603-019-00-8	dimethyl ether F+ R12 Flam. Gas 1, H220 Press. Gas C, H280	5-10%
CAS: 13674-84-5	tris(2-chlorisopropyl)-phosphate R52/53 Aquatic Chronic 3, H412	5-10%
CAS: 72-28-5	Isobutane F+ R12 Flam. Gas 1, H220	1-5%
CAS: 74-98-6 EINECS: 200-827-9 Index number: 601-003-00-5	propane F+ R12 Flam. Gas 1, H220 Press. Gas C, H280	1-5%
CAS: 8001-22-7 EINECS: 232-274-4	Soybean Oil substance with a Community workplace exposure limit	1-5%
CAS: 6425-39-4 EINECS: 229-194-7	Morpholine 4,4-(oxydi-2) Xi R36 Eye Irrit. 2, H319	1-5%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

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SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
Take affected persons out into the fresh air.
· **After inhalation:**
Supply fresh air; consult doctor in case of complaints.
Provide oxygen treatment if affected person has difficulty breathing.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
Do not pull solidified product off the skin.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Immediately remove contact lenses if possible.
Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; call for medical help immediately.
· **4.2 Most important symptoms and effects, both acute and delayed**
Asthma attacks
Headache
Breathing difficulty
Allergic reactions
Coughing
Nausea
Gastric or intestinal disorders when ingested.
Irritant to skin and mucous membranes.
Irritant to eyes.
Dizziness
Disorientation
· **Hazards**
Danger of impaired breathing.
Danger of disturbed cardiac rhythm.
Danger of convulsion.
Danger of pulmonary oedema.
Danger of pneumonia.
· **4.3 Indication of any immediate medical attention and special treatment needed**
Severe allergic skin reaction, bronchial spasms and anaphylactic shock are possible.
Treat skin and mucous membrane with antihistamine and corticoid preparations.
In cases of irritation to the lungs, initial treatment with cortical steroid inhalants.
Monitor circulation.
If necessary oxygen respiration treatment.
Medical supervision for at least 48 hours.

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Contains isocyanates. May produce an allergic reaction.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
Water in flooding quantities.
· **For safety reasons unsuitable extinguishing agents:** None.
· **5.2 Special hazards arising from the substance or mixture**
Danger of receptacles bursting because of high vapour pressure when heated.
During heating or in case of fire poisonous gases are produced.
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
· **Additional information**
Eliminate all ignition sources if safe to do so.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Cool endangered receptacles with water spray.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Use respiratory protective device against the effects of fumes/dust/aerosol.
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources.
Protect from heat.
Isolate area and prevent access.
Keep people at a distance and stay on the windward side.
· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Allow to solidify. Pick up mechanically.
Send for recovery or disposal in suitable receptacles.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Keep away from heat and direct sunlight.

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Use only in well ventilated areas.

· **Information about fire - and explosion protection:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.
Pressurised container: protect from sunlight and do not expose to temperatures exceeding 50 °C, i.e. electric lights. Do not pierce or burn, even after use.
Do not spray onto a naked flame or any incandescent material.
Emergency cooling must be available in case of nearby fire.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Observe official regulations on storing packagings with pressurised containers.
Provide ventilation for receptacles.
Avoid storage near extreme heat, ignition sources or open flame.
· **Information about storage in one common storage facility:**
Store away from foodstuffs.
Store away from oxidising agents.
· **Further information about storage conditions:**
Protect from heat and direct sunlight.
Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting.
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
101-68-8 4,4'-methylenediphenyl diisocyanate	
PEL (USA)	Ceiling limit: 0,2 mg/m³, 0,02 ppm
REL (USA)	Long-term value: 0,05 mg/m³, 0,005 ppm Ceiling limit: 0,2* mg/m³, 0,02* ppm *10-min
TLV (USA)	Long-term value: 0,051 mg/m³, 0,005 ppm
EL (Canada)	Short-term value: C 0,01 ppm Long-term value: 0,005 ppm Skin; S
EV (Canada)	Long-term value: 0,005 ppm
115-10-6 dimethyl ether	
IOELV (EU)	Long-term value: 1920 mg/m³, 1000 ppm
WEEL (USA)	Long-term value: 1000 ppm
EL (Canada)	Long-term value: 1000 ppm

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74-98-6 propane	
PEL (USA)	Long-term value: 1800 mg/m³, 1000 ppm
REL (USA)	Long-term value: 1800 mg/m³, 1000 ppm
TLV (USA)	refer to Appendix F: minimal oxygen content
EL (Canada)	Long-term value: 1000 ppm
EV (Canada)	Long-term value: 1,000 ppm
8001-22-7 Soybean Oil	
PEL (USA)	Short-term value: 15* 5** mg/m³ *Total dust **Respirable fraction
OEL (Canada)	Short-term value: 10* 3** mg/m³ *Mist **Respirable Mist

· **DNELs** No further relevant information available.
· **PNECs** No further relevant information available.
· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
The usual precautionary measures are to be adhered to when handling chemicals.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.
Clean skin thoroughly immediately after handling the product.
· **Respiratory protection:**

Combined Organic Vapor and Particulate Respirator is recommended for use during all processing activities.

· **Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

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· **Eye protection:**

Safety glasses

· **Body protection:** Protective work clothing
· **Limitation and supervision of exposure into the environment**
No further relevant information available.
· **Risk management measures**
See Section 7 for additional information.
No further relevant information available.

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Aerosol
Colour:	Amber coloured
· **Odour:**	Light Petroleum-like
· **Odour threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/Melting range:	Not Determined.
Boiling point/Boiling range:	-44 °F / -42 °C (propellant)
· **Flash point:**	-155 °F / -104 °C (propellant)
· **Flammability (solid, gaseous):**	Not applicable.
· **Auto/Self-ignition temperature:**	Not determined.
· **Decomposition temperature:**	Not determined.
· **Self-igniting:**	Product is not self-igniting.
· **Danger of explosion:**	Product is not explosive. However, formation of explosive air/ vapour mixtures are possible.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure:**	Not determined.
· **Density at 20 °C:**	1,01 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not applicable.

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· **Solubility in / Miscibility with water:** Not miscible or difficult to mix.

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**
Dynamic: Not determined.
Kinematic: Not determined.

· **Solvent content:**
VOC content: 13,0 %
VOC (US EPA Method 24) 155 g/l

· **9.2 Other information** No further relevant information available.

SECTION 10: Stability and reactivity

· **10.1 Reactivity**
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
Danger of receptacles bursting because of high vapour pressure when heated.
· **10.3 Possibility of hazardous reactions**
Develops readily flammable gases/fumes.
Flammable.
Reacts with oxidising agents.
Can form explosive mixtures in air if heated above flash point and/or when sprayed or atomised.
Danger of receptacles bursting because of high vapour pressure when heated.
Contact with acids releases toxic gases.
Toxic fumes may be released if heated above the decomposition point.
· **10.4 Conditions to avoid**
Keep ignition sources away - Do not smoke.
Store away from oxidising agents.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Nitrogen oxides (NOx)
Hydrogen cyanide (prussic acid)
Phosphorus oxides (e.g. P2O5)
Chlorine

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SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values relevant for classification:**		
101-68-8 4,4'-methylenediphenyl diisocyanate		
Oral	LD50	2200 mg/kg (mouse)

· **Primary irritant effect:**
· **on the skin:** Irritant to skin and mucous membranes.
· **on the eye:** Irritating effect.
· **Sensitisation:**
Sensitisation possible through inhalation.
Sensitisation possible through skin contact.
· **Subacute to chronic toxicity:**
Inhalation of concentrated vapours as well as oral intake will lead to anaesthesia-like conditions and headache, dizziness, etc.
· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Harmful
Irritant
Danger through skin adsorption.
Toxic and/or corrosive effects may be delayed up to 24 hours.
In addition to local irritant manifestations, there is a narcotic effect when inhaling high concentrations, with the danger of central respiratory arrest.
· **Acute effects (acute toxicity, irritation and corrosivity):** Vapours have narcotic effect.
· **Repeated dose toxicity:**
May cause damage to organs through prolonged or repeated exposure.
Repeated exposures may result in skin and/or respiratory sensitivity.

SECTION 12: Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Avoid transfer into the environment.
This statement was deduced from products with a similar structure or composition.
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

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· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Can be disposed of with household garbage after solidification following consultation with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.

SECTION 14: Transport information

· **14.1 UN-Number**
· **DOT, ADR, IMDG, IATA** UN1950
· **14.2 UN proper shipping name**

Limited Quantity for packages less than 30 kg (66 lb) and inner packagings less than 1 L (0.3 gal).

· **DOT** Aerosols, flammable
· **ADR** 1950 AEROSOLS, flammable
· **IMDG, IATA** AEROSOLS, flammable
· **14.3 Transport hazard class(es)**

· **DOT**

· **Class** 2.1
· **Label** 2.1

· **ADR**

· **Class** 2 5F Gases.
· **Label** 2.1

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· **IMDG, IATA**

· **Class**	2.1
· **Label**	2.1
· **14.4 Packing group**	
· **DOT, ADR, IMDG, IATA**	Not Regulated
· **14.5 Environmental hazards:**	
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Warning: Gases.
· **Danger code (Kemler):**	-
· **EMS Number:**	F-D,S-U
· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	1L
· **Transport category**	2
· **Tunnel restriction code**	D
· **UN "Model Regulation":**	UN1950, AEROSOLS, flammable, 2.1

SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **United States (USA)**
· **SARA**

· **Section 355 (extremely hazardous substances):**
None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**

9016-87-9	diphenylmethanediisocyanate,isomeres and homologues
101-68-8	4,4'-methylenediphenyl diisocyanate

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients are listed.

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· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients are listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**

9016-87-9	diphenylmethanediisocyanate,isomeres and homologues	CBD
101-68-8	4,4'-methylenediphenyl diisocyanate	D, CBD

· **IARC (International Agency for Research on Cancer)**

9016-87-9	diphenylmethanediisocyanate,isomeres and homologues	3
101-68-8	4,4'-methylenediphenyl diisocyanate	3

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients are listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients are listed.

· **Canada**

· **Canadian Domestic Substances List (DSL)**
All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

101-68-8	4,4'-methylenediphenyl diisocyanate

· **Canadian Ingredient Disclosure list (limit 1%)**
None of the ingredients are listed.

· **Other regulations, limitations and prohibitive regulations**

· **Substances of very high concern (SVHC) according to REACH, Article 57**
None of the ingredients are listed.

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases**
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.

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H412 Harmful to aquatic life with long lasting effects.

R12 Extremely flammable.
R20 Harmful by inhalation.
R36 Irritating to eyes.
R36/37/38 Irritating to eyes, respiratory system and skin.
R42/43 May cause sensitisation by inhalation and skin contact.
R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
VOC: Volatile Organic Compounds (USA, EU)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
Flam. Gas 1: Flammable gases, Hazard Category 1
Flam. Aerosol 1: Flammable aerosols, Hazard Category 1
Press. Gas C: Gases under pressure: Compressed gas
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
Resp. Sens. 1: Sensitisation - Respirat., Hazard Category 1
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3
STOT RE 2: Specific target organ toxicity - Repeated exposure, Hazard Category 2
Aquatic Chronic 3: Hazardous to the aquatic environment - Chronic Hazard, Category 3

· **Sources**
SDS Prepared by:
ChemTel Inc.
1305 North Florida Avenue
Tampa, Florida USA 33602-2902
Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573
Website: www.chemtelinc.com

1. PRODUCT NAME
Touch 'n Seal® All Seasons Gun Foam

2. MANUFACTURER
Convenience Products
866 Horan Dr., Fenton, MO 63026
USA
(636) 349-5855
(800) 325-6180
FAX (636) 349-5335
E-mail support@touch-n-seal.com
Website: www.touch-n-seal.com

3. PRODUCT DESCRIPTION
Touch 'n Seal All Seasons one-component, moisture curing polyurethane foam sealant is uniquely formulated to perform under difficult low temperature conditions where traditional polyurethane foam sealants fail to cure. All Seasons Gun Foam cures at temperatures as low as 20°F (-7°C) and as high as 120°F (49°C). All Seasons Gun Foam meets the insulating and air sealing requirements of professional commercial, industrial, agricultural and residential contractors who must work in extreme temperatures. Once cured, All Seasons Gun Foam is non-toxic, fire-retardant, non-shrinking and permanently fills and seals cracks and gaps.

Basic Use
Use Touch 'n Seal All Seasons Gun Foam when an application must be made during extreme low or high temperatures. All Seasons Gun Foam seals cracks and gaps up to 1-½ inch (38mm) wide, providing a permanent insulating and air sealing solution to most building component materials, including: wood, concrete, insulating foam boards, metal, plastics and sheetrock.

The Touch 'n Seal All Seasons Gun Foam protects against both vapor migration and energy robbing air infiltration, helps to improve indoor air quality and provides superior insulation performance.

Composition & Materials
Touch 'n Seal All Seasons Gun Foam is permanent and dries within minutes of application.

Sizes
Gun Foam – Item # 4004529812
24 ounce (680 gm)

Benefits
- Use in temperatures as low as 20°F (-7°C) and as high as 120°F (49°C)
- Provides a permanent seal against air, moisture and insect infiltration
- Permanent installation; does not shrink or settle as do many caulk type sealants
- Compatible with all fiber insulation systems including cellulose, fiberglass and rockwool
- Bonds to common building materials, including: wood, concrete, insulating foam boards, metal, plastics and sheetrock
- Expands to fill gaps up to 1-½" (38mm) wide reducing air exchanges
- Reduces energy loss by as much as 40%
- Reduces use of fossil fuels and improves air quality
- No Ozone Depleting Chemicals
- Helps to reduce Greenhouse Gas Emissions
- Closed cell structure
- Allows for down sized HVAC systems; uses less energy, fewer cycle times, more consistent "comfort level", reduces equipment maintenance
- Outperforms fiberglass
- Fire retardant

Limitations
- Foam is combustible. Do not expose to temperatures above 250°F (121°C), open flames or sparks
- Not for exposure to ultraviolet light
- Chemicals must be 60°F (16°C) - 90°F (32°C) prior to dispensing
- Do not store in temperatures above 120°F (49°C)
- Always refer to local building code regulations
- Do not leave product exposed – cover with approved facings
- Flammable propellant. Read MSDS and do not use near high heat, sparks or open flame

4. TECHNICAL DATA
Applicable Standards
- ASTM E84 Surface Burning Characteristics
- ASTM C518 R-Value
- ATM C 1536 Yield
- ASTM D1622 Density

Approvals/Certifications/Listings
- ICC ES ESR-1926
- International Building Code
- International Residential Code
- BOCA National Building Code
- 1999 Standard Building Code
- ICC-Evaluation Services

Physical/Chemical Properties
See Table. Test data available upon request.

Shelf Life
12 months in unopened container when stored between 60°-90°F (16°-32°C), in a dry, well ventilated area.

Storage & Disposal
Keep containers tightly closed in a cool, well ventilated area. Ideal storage temperature is 60°-90°F (16°-32°C). Storage above 90°F (32°C) will reduce shelf life. Do not store at temperatures above 120°F (49°C). Avoid Freezing. Do not expose containers to conditions that may damage, puncture, or burst the

containers. Dispose of leftover material/containers in accordance with Federal, state and local regulations. See Material Safety Data Sheet for more information.

5. INSTALLATION/APPLICATION
Always refer to local building codes prior to application of Touch 'n Seal foam.

The Touch 'n Seal All Seasons Gun Foam can be applied to and will adhere to almost any traditional construction surfaces, including: wood, concrete, polystyrene, gypsum board, fiberboard, masonry and metal. Surfaces to receive Touch 'n Seal All Seasons Gun Foam must be dry, clean and free of dust, dirt, grease and other substances that may inhibit proper adhesion. Fill application area about 1/3 full, leaving room for foam to expand.

For best results apply Touch 'n Seal All Seasons Gun Foam when surface and ambient temperatures are between 60°-90°F (16°-32°C). Touch 'n Seal All Seasons Gun Foam may be applied to ambient and surface temperatures as low as 20°F (-7°C) and as high as 120°F (49°C). Chemical contents must be between 60°- 90°F (16°-32°C) before dispensing.

Use all chemical contents within 30 days of initial dispensing. Clean uncured foam from applicator tools with Touch 'n Seal Poly-Clean.

Keep out of reach of children.
Always wear proper personal protective equipment, including gloves, clothing and eyewear. Use in well ventilated area.

See material safety data sheet for additional warnings and information.

Please refer to manufacturers' instructions or request a faxed set of instructions from Convenience Products by calling Customer Service at 800-325-6180.

6. AVAILABILITY & COST
Availability
Touch 'n Seal polyurethane foams are available throughout the U.S., Canada, Mexico and the world. Contact Convenience Products Customer Service at 800-325-6180 or FAX 636-349-1708 for distributor information.

Cost
Contact Convenience Products for local distributors who can provide cost and delivery information.

7. WARRANTY
Convenience Products warrants All Seasons Gun Foam to be free of defects in workmanship and function.

Convenience Products is not liable for any incidental, consequential or any other damages or remedies. There are no Warranties that extend beyond the description herein, however, certain states have specific laws regarding limitation on incidental or consequential damages, in which case, and you may have other legal rights.

8. MAINTENANCE
None.

9. TECHNICAL SERVICES
Technical assistance, including more detailed information, product literature, test results, assistance with preparing project specifications and application training is available by contacting Convenience Products Customer Service.

10. FILING SYSTEMS
Additional information is available from the manufacturer upon request.

The information contained herein was accurate at the time of publishing. Please refer to the Touch 'N Seal website for the latest information.

TYPICAL PROPERTIES OF TOUCH 'N SEAL ALL SEASONS GUN FOAM

Shelf Life	1 year; unopened container	
Surface Dry Time/Surface Tack Free Time	10 minutes @ 72˚F/50% R.H.	
Fully Cured	Approximately 1 hour	
Cuttable	30 minutes	
ASTM E84 Surface Burning Characteristics	UL-723 (three - 3/4" beads)	ULC-S102 (three - 18mm beads)
Flame Spread	10	20
Smoke Development	15	20
ASTM C1536 Yield for Aerosol Foam Sealants	2,230 ft (680m) @ ¼" (6mm)	
ASTM D1622 Core Density	1.6 – 2.1 PCF	
International Building Code	Conforms	
International Residential Code	Conforms	
BOCA National Building Code	Conforms	
1999 Standard Building Code	Conforms	
ICC-ES	Listed ESR 1926	
NFPA 30B Classification	Aerosol Level 2	
Underwriters Laboratories Classified Caulking & Sealants	UL	ULC
	BLIS.R14175,	BLEZC.R14175

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

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1 Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Touch N Seal CP 750 FR ICC Part - A**

· **Article number:** EHS2732 - SDS / A REGULAR

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Polyurethane-sealant

· **1.3 Details of the supplier of the Safety Data Sheet**
· **Manufacturer/Supplier:**
Convenience Products, division of Clayton Corp.
866 Horan Drive
Fenton, MO 63026-2416
Phone: 636-349-5855

· **1.4 Emergency telephone number:**
ChemTel Inc.
(800)255-3924, +1 (813)248-0585

2 Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**


health hazard

Resp. Sens. 1 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
STOT RE 2 H373 May cause damage to organs through prolonged or repeated exposure.

Acute Tox. 4 H332 Harmful if inhaled.
Skin Irrit. 2 H315 Causes skin irritation.
Eye Irrit. 2 H319 Causes serious eye irritation.
Skin Sens. 1 H317 May cause an allergic skin reaction.
STOT SE 3 H335 May cause respiratory irritation.

H229 Pressurised container: May burst if heated.

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**
Xn; Harmful
R20-40-48/20: Harmful by inhalation. Limited evidence of a carcinogenic effect. Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Xn; Sensitising
R42/43: May cause sensitisation by inhalation and skin contact.

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Xi; Irritant

R36/37/38: Irritating to eyes, respiratory system and skin.

· **Information concerning particular hazards for human and environment:**
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
Warning! Pressurized container.

· **Classification system:**
The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

· **Hazard pictograms**


GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
diphenylmethanediisocyanate,isomeres and homologues
4,4'-methylenediphenyl diisocyanate

· **Hazard statements**
H229 Pressurised container: May burst if heated.
H332 Harmful if inhaled.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.

· **Precautionary statements**

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read label before use.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P285	In case of inadequate ventilation wear respiratory protection.
P264	Wash thoroughly after handling.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P342+P311	If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

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· **Additional information:**
Contains isocyanates. May produce an allergic reaction.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
· **Hazard description:**
· **WHMIS-symbols:**
A - Compressed gas
D2A - Very toxic material causing other toxic effects

· **NFPA ratings (scale 0 - 4)**

Health = 2
Fire = 0
Reactivity = 1

· **HMIS-ratings (scale 0 - 4)**

Health = *2
Fire = 0
Reactivity = 1

· **HMIS Long Term Health Hazard Substances**	
101-68-8	4,4'-methylenediphenyl diisocyanate
9016-87-9	diphenylmethanediisocyanate,isomeres and homologues

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **3.2 Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

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CAS: 9016-87-9	diphenylmethanediisocyanate,isomeres and homologues Xn R20; Xn R42/43; Xi R36/37/38 Carc. Cat. 3 Resp. Sens. 1, H334; STOT RE 2, H373 Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317; STOT SE 3, H335	> 50%
CAS: 101-68-8 EINECS: 202-966-0 Index number: 615-005-00-9	4,4'-methylenediphenyl diisocyanate Xn R20; Xn R42/43; Xi R36/37/38 Carc. Cat. 3 Resp. Sens. 1, H334; STOT RE 2, H373 Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317; STOT SE 3, H335	25-50%
CAS: 811-97-2 EINECS: 212-377-0	Norflurane Press. Gas, H280	10-25%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

4 First aid measures

· **4.1 Description of first aid measures**
· **General information:**
Take affected persons out into the fresh air.
Do not leave affected persons unattended.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:**
Supply fresh air and to be sure call for a doctor.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
Do not pull solidified product off the skin.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Protect unharmed eye.
Rinse opened eye for several minutes under running water.
Call a doctor immediately.
Do not remove contact lenses if worn.
· **After swallowing:**
Unlikely route of exposure.
Do not induce vomiting; call for medical help immediately.
· **4.2 Most important symptoms and effects, both acute and delayed**
Asthma attacks
Headache
Allergic reactions
Coughing
Breathing difficulty
Dizziness

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· **Hazards**
Danger of impaired breathing.
Danger of pulmonary oedema.
Danger of convulsion.
Danger of disturbed cardiac rhythm.
Condition may deteriorate with alcohol consumption.
· **4.3 Indication of any immediate medical attention and special treatment needed**
Severe allergic skin reaction, bronchial spasms and anaphylactic shock are possible.
If necessary oxygen respiration treatment.
Later observation for pneumonia and pulmonary oedema.
Monitor circulation, possible shock treatment.
Treat skin and mucous membrane with antihistamine and corticoid preparations.

5 Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents:** None.
· **5.2 Special hazards arising from the substance or mixture**
Danger of receptacles bursting because of high vapour pressure when heated.
In case of fire, the following can be released:
Nitrogen oxides (NOx)
Hydrogen cyanide (HCN)
Carbon monoxide (CO)
Under certain fire conditions, traces of other toxic gases cannot be excluded.
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
· **Additional information** Cool endangered receptacles with water spray.

6 Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Use respiratory protective device against the effects of fumes/dust/aerosol.
Remove persons from danger area.
Ensure adequate ventilation
Wear protective equipment. Keep unprotected persons away.
Protect from heat.
· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Allow to solidify. Pick up mechanically.
Clean the affected area carefully; suitable cleaners are:
Warm water and cleansing agent
Dispose contaminated material as waste according to item 13.

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· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **7.1 Precautions for safe handling**
Use only in well ventilated areas.
Take note of emission threshold.
Ensure good ventilation/exhaustion at the workplace.
· **Information about fire - and explosion protection:**
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C, i.e. electric lights. Do not pierce or burn, even after use.
Do not spray onto a naked flame or any incandescent material.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Observe official regulations on storing packagings with pressurized containers.
Store in a cool location.
Provide ventilation for receptacles.
· **Information about storage in one common storage facility:**
Store away from foodstuffs.
Do not store together with acids.
Store away from oxidizing agents.
· **Further information about storage conditions:**
Store in cool, dry conditions in well sealed receptacles.
Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting.
Protect from heat and direct sunlight.
Store receptacle in a well ventilated area.
· **7.3 Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
101-68-8 4,4'-methylenediphenyl diisocyanate	
PEL (USA)	Short-term value: C 0,2 mg/m³, C 0,02 ppm
REL (USA)	Short-term value: C 0,2* mg/m³, C 0,02* ppm Long-term value: 0,05 mg/m³, 0,005 ppm *10-min

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TLV (USA)	0,051 mg/m³, 0,005 ppm
EL (Canada)	Short-term value: C 0,01 ppm Long-term value: 0,005 ppm Skin; S
EV (Canada)	0,005 ppm
811-97-2 Norflurane	
WEEL (USA)	1000 ppm

· **DNELs** No further relevant information available.
· **PNECs** No further relevant information available.
· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Use suitable respiratory protective device in case of insufficient ventilation.
Use suitable respiratory protective device when high concentrations are present.
· **Protection of hands:**


Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.
· **Material of gloves**
Nitrile rubber, NBR
PVC gloves
Fluorocarbon rubber (Viton)
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Not suitable are gloves made of the following materials:** Natural rubber, NR
· **Eye protection:**
Contact lenses should not be worn.

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Safety glasses

Goggles recommended during refilling
· **Body protection:** Impervious protective clothing
· **Limitation and supervision of exposure into the environment**
No further relevant information available.
· **Risk management measures**
See Section 7 for additional information.
No further relevant information available.

9 Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Aerosolized liquid with compressed gas in cylinders
Colour:	Cream coloured
· **Odour:**	Characteristic
· **Odour threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/Melting range:	Not Determined.
Boiling point/Boiling range:	Not applicable, as aerosol.
· **Flash point:**	Not applicable, as aerosol.
· **Flammability (solid, gaseous):**	Not applicable.
· **Auto/Self-ignition temperature:**	Not determined.
· **Decomposition temperature:**	Not determined.
· **Self-igniting:**	Product is not self-igniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	5716 hPa
· **Density at 20 °C:**	1,03 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not applicable.

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· **Solubility in / Miscibility with water:** Not miscible or difficult to mix.

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**
Dynamic: Not determined.
Kinematic: Not determined.

· **Solvent content:**
VOC (US EPA Method 24) 0 g/l

· **9.2 Other information** No further relevant information available.

10 Stability and reactivity

· **10.1 Reactivity**
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **10.3 Possibility of hazardous reactions**
Reacts with alcohols, amines, aqueous acids and alkalis.
Contact with acids releases toxic gases.
Danger of receptacles bursting because of high vapour pressure when heated.
Reacts with oxidizing agents.
Exothermic polymerization.
· **10.4 Conditions to avoid** Store away from oxidizing agents.
· **10.5 Incompatible materials:** Contact with acids liberates toxic gas.
· **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Ammonia
Isocyanate
Nitrogen oxides

11 Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values relevant for classification:**		
101-68-8 4,4'-methylenediphenyl diisocyanate		
Oral	LD50	2200 mg/kg (mouse)

· **Primary irritant effect:**
· **on the skin:** Irritant to skin and mucous membranes.
· **on the eye:** Irritating effect.
· **Sensitization:**
Sensitization possible through inhalation.
Sensitization possible through skin contact.

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· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Harmful
Irritant
Toxic and/or corrosive effects may be delayed up to 24 hours.
· **Sensitisation:** Sensitization possible by inhalation and/or dermal contact.
· **Repeated dose toxicity:** Repeated exposures may result in skin and/or respiratory sensitivity.

12 Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** The product contains materials that are harmful to the environment.
· **12.2 Persistence and degradability** The product is partially biodegradable. Significant residuals remain.
· **12.3 Bioaccumulative potential** Does not accumulate in organisms.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
This statement was deduced from products with a similar structure or composition.
Due to available data on eliminability/decomposition and bioaccumulation potential prolonged term damage of the environment can not be excluded.
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

13 Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Can be disposed of with household garbage after solidification following consultation with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations.
Can be burned with household garbage after consulting with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations.
Contact waste processors for recycling information.

· **Uncleaned packaging:**
· **Recommendation:**
Packagings that may not be cleansed are to be disposed of in the same manner as the product.
Disposal must be made according to official regulations.

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14 Transport information

· **14.1 UN-Number**
· **DOT, ADR, IMDG, IATA** UN3500
· **14.2 UN proper shipping name**
· **DOT, IMDG, IATA** Chemical under pressure, n.o.s. (Fluorinated Hydrocarbon, Nitrogen)
· **ADR** 3500 CHEMICAL UNDER PRESSURE, N.O.S. (Fluorinated Hydrocarbon, Nitrogen)
· **14.3 Transport hazard class(es)**

· **DOT**

· **Class** 2.2
· **Label** 2.2

· **ADR**

· **Class** 2 8A Gases.
· **Label** 2.2

· **IMDG, IATA**

· **Class** 2.2
· **Label** 2.2
· **14.4 Packing group**
· **DOT, ADR, IMDG, IATA** Not Regulated
· **14.5 Environmental hazards:**
· **Marine pollutant:** No
· **14.6 Special precautions for user** Warning: Gases.
· **Danger code (Kemler):** 20
· **EMS Number:** F-D,S-U
· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.
· **Transport/Additional information:**

· **ADR**
· **Limited quantities (LQ)** 120 ml
· **Transport category** 3

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· **Tunnel restriction code** C/E
· **UN "Model Regulation":** UN3500, CHEMICAL UNDER PRESSURE, N.O.S. (Fluorinated Hydrocarbon, Nitrogen), 2.2

15 Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **United States (USA)**
· **SARA**

· **Section 355 (extremely hazardous substances):**
None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

9016-87-9	diphenylmethanediisocyanate,isomeres and homologues
101-68-8	4,4'-methylenediphenyl diisocyanate

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**

9016-87-9	diphenylmethanediisocyanate,isomeres and homologues	CBD
101-68-8	4,4'-methylenediphenyl diisocyanate	CBD

· **IARC (International Agency for Research on Cancer)**

9016-87-9	diphenylmethanediisocyanate,isomeres and homologues	3
101-68-8	4,4'-methylenediphenyl diisocyanate	3

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **Canada**

· **Canadian Domestic Substances List (DSL)**
All ingredients are listed.

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· **Canadian Ingredient Disclosure list (limit 0.1%)**

101-68-8	4,4'-methylenediphenyl diisocyanate

· **Canadian Ingredient Disclosure list (limit 1%)**

None of the ingredients is listed.

· **Other regulations, limitations and prohibitive regulations**

· **Substances of very high concern (SVHC) according to REACH, Article 57**

None of the ingredients is listed.

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases**

H280 Contains gas under pressure; may explode if heated.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 May cause respiratory irritation.
H373 May cause damage to organs through prolonged or repeated exposure.

R20 Harmful by inhalation.
R36/37/38 Irritating to eyes, respiratory system and skin.
R42/43 May cause sensitisation by inhalation and skin contact.

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
: Flammable aerosols, Hazard Category 3
Press. Gas: Gases under pressure: Compressed gas
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
Resp. Sens. 1: Sensitisation - Respirat., Hazard Category 1

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Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3
STOT RE 2: Specific target organ toxicity - Repeated exposure, Hazard Category 2

· **Sources**

SDS Prepared by:
ChemTel Inc.
1305 North Florida Avenue
Tampa, Florida USA 33602-2902
Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573
Website: www.chemtelinc.com

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1 Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: Touch N Seal CP 750 FR ICC Part - B**

· **Article number:** EHS2732 – SDS / B REGULAR

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture** Polyurethane-sealant

· **1.3 Details of the supplier of the Safety Data Sheet**

· **Manufacturer/Supplier:**
Convenience Products, division of Clayton Corp.
866 Horan Drive
Fenton, MO 63026-2416
Phone: 636-349-5855

· **1.4 Emergency telephone number:**
ChemTel Inc.
(800)255-3924, +1 (813)248-0585

2 Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**


health hazard

Repr. 1A H360 May damage fertility or the unborn child.

Acute Tox. 4 H302 Harmful if swallowed.
Skin Irrit. 2 H315 Causes skin irritation.
Eye Irrit. 2 H319 Causes serious eye irritation.

H229 Pressurised container: May burst if heated.

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**


T; Toxic

R60: May impair fertility.


Xn; Harmful

R22: Harmful if swallowed.


Xi; Irritant

R36: Irritating to eyes.

· **Information concerning particular hazards for human and environment:**
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

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Warning! Pressurized container.

· **Classification system:**
The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labelling:**
Polyether polyol
Methyloxirane polymer with oxirane, ether with 2,6-bis[(bis(2-hydroxyethyl)amino) methyl]-4-nonylphenol (5:1)
halogenated aliphatic polyether polyol
· **Hazard statements**
H229 Pressurised container: May burst if heated.
H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H360 May damage fertility or the unborn child.
· **Precautionary statements**

P281	Use personal protective equipment as required.
P264	Wash thoroughly after handling.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.

· **Additional information:**
Contains diglycidyl 1,2-cyclohexanedicarboxylate, Neodecanoic Acid. May produce an allergic reaction.
Restricted to professional users.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
· **Hazard description:**
· **WHMIS-symbols:**
D1B - Toxic material causing immediate and serious toxic effects
D2A - Very toxic material causing other toxic effects

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· **NFPA ratings (scale 0 - 4)**

Health = 2
Fire = 0
Reactivity = 1

· **HMIS-ratings (scale 0 - 4)**

Health = *2
Fire = 0
Reactivity = 1

* - Indicates a long term health hazard from repeated or prolonged exposures.

· **HMIS Long Term Health Hazard Substances**
None of the ingredients is listed.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **3.2 Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**		
CAS: 811-97-2 EINECS: 212-377-0	Norflurane Press. Gas, H280	10-25%
	Polyether polyol Xn R22; Xi R36/37/38 Acute Tox. 4, H302; Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335	10-25%
CAS: 68441-62-3	halogenated aliphatic polyether polyol Xn R22; Xi R36 Acute Tox. 4, H302; Eye Irrit. 2, H319	10-25%
CAS: 460-73-1	1,1,1,3,3-Pentafluoropropane, (Genetron®245fa) Press. Gas, H280	<10%

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CAS: 52019-35-9	Methyloxirane polymer with oxirane, ether with 2,6-bis[(bis(2-hydroxyethyl) amino) methyl]-4-nonylphenol (5:1) T R60; Xi R36/37/38 Repr. 1A, H360 Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335	<10%
CAS: 5493-45-8 EINECS: 226-826-3	diglycidyl 1,2-cyclohexanedicarboxylate Xi R36/37/38; Xi R43 Skin Irrit. 2, H315; Eye Irrit. 2, H319; Skin Sens. 1, H317; STOT SE 3, H335	<10%
CAS: 26896-20-8 EINECS: 248-093-9	Neodecanoic Acid Xn R22; Xi R38-41; Xi R43 Eye Dam. 1, H318 Acute Tox. 4, H302; Skin Irrit. 2, H315; Skin Sens. 1, H317	<10%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

4 First aid measures

· **4.1 Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Remove contact lenses if worn.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; call for medical help immediately.
· **4.2 Most important symptoms and effects, both acute and delayed**
Gastric or intestinal disorders.
Dizziness
Coughing
Allergic reactions
· **Hazards** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
If swallowed, gastric irrigation.
If necessary oxygen respiration treatment.
Treat skin and mucous membrane with antihistamine and corticoid preparations.
In cases of irritation to the lungs, initial treatment with cortical steroid inhalants.

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5 Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents:** None.
· **5.2 Special hazards arising from the substance or mixture**
In case of fire, the following can be released:
Carbon monoxide (CO)
Nitrogen oxides (NOx)
Under certain fire conditions, traces of other toxic gases cannot be excluded.
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
· **Additional information** Cool endangered receptacles with water spray.

6 Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Use respiratory protective device against the effects of fumes/dust/aerosol.
Ensure adequate ventilation
Wear protective equipment. Keep unprotected persons away.
· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Allow to solidify. Pick up mechanically.
Dispose contaminated material as waste according to item 13.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **7.1 Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
· **Information about fire - and explosion protection:** Keep respiratory protective device available.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Observe official regulations on storing packagings with pressurized containers.
Avoid storage near extreme heat, ignition sources or open flame.
· **Information about storage in one common storage facility:**
Do not store together with oxidizing and acidic materials.

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Store away from foodstuffs.
· **Further information about storage conditions:** Store in cool, dry conditions in well sealed receptacles.
· **7.3 Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
811-97-2 Norflurane	
WEEL (USA)	1000 ppm

· **DNELs** No further relevant information available.
· **PNECs** No further relevant information available.
· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Use suitable respiratory protective device when high concentrations are present.
Use suitable respiratory protective device in case of insufficient ventilation.
· **Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

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· **Eye protection:**
Contact lenses should not be worn.


Safety glasses

· **Body protection:** Protective work clothing
· **Limitation and supervision of exposure into the environment**
No further relevant information available.
· **Risk management measures**
See Section 7 for additional information.
No further relevant information available.

9 Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Aerosol
Colour:	Amber coloured
· **Odour:**	Like aromates
· **Odour threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/Melting range:	Not Determined.
Boiling point/Boiling range:	-15 °F / -26 °C
· **Flash point:**	Not applicable, as aerosol.
· **Flammability (solid, gaseous):**	Not applicable.
· **Auto/Self-ignition temperature:**	>500 °F / >260 °C
· **Decomposition temperature:**	Not determined.
· **Self-igniting:**	Product is not self-igniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure at 20 °C:**	5716 hPa
· **Density at 20 °C:**	1,2 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not determined.
· **Evaporation rate**	Not applicable.

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· **Solubility in / Miscibility with water:** Fully miscible.

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**
Dynamic: Not determined.
Kinematic: Not determined.

· **Solvent content:**
Organic solvents: 0,0 %
Water: 0,7 %
VOC (US EPA Method 24) 0 g/l

· **9.2 Other information** No further relevant information available.

10 Stability and reactivity

· **10.1 Reactivity**
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **10.3 Possibility of hazardous reactions**
Reacts with catalysts.
Reacts with peroxides.
Reacts with strong oxidizing agents.
Reacts with strong acids.
Exothermic polymerization.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Phosphorus compounds
Chlorine compounds
Nitrogen oxides (NOx)
Poisonous gases/vapours
Phosgene

11 Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** Slight irritant effect on skin and mucous membranes.
· **on the eye:** Irritating effect.
· **Sensitization:**
Sensitizing effect by skin contact is possible by prolonged exposure.
Sensitizing effect through inhalation is possible by prolonged exposure.

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· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Harmful
Irritant
Toxic and/or corrosive effects may be delayed up to 24 hours.
· **Repeated dose toxicity:** May cause damage to organs through prolonged or repeated exposure.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction):**
Repr. 1A

12 Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

13 Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

14 Transport information

· **14.1 UN-Number**
· **DOT, ADR, IMDG, IATA** UN3500
· **14.2 UN proper shipping name**
· **DOT, IMDG, IATA** Chemical under pressure, n.o.s. (Fluorinated Hydrocarbon, Nitrogen)
· **ADR** 3500 CHEMICAL UNDER PRESSURE, N.O.S (Fluorinated Hydrocarbon, Nitrogen)

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· **14.3 Transport hazard class(es)**

· **DOT**

· **Class**	2.2
· **Label**	2.2

· **ADR**

· **Class**	2 8A Gases.
· **Label**	2.2

· **IMDG, IATA**

· **Class**	2.2
· **Label**	2.2
· **14.4 Packing group**	
· **DOT, ADR, IMDG, IATA**	Not Regulated
· **14.5 Environmental hazards:**	
· **Marine pollutant:**	No
· **14.6 Special precautions for user**	Warning: Gases.
· **Danger code (Kemler):**	20
· **EMS Number:**	F-D,S-U
· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	

· **ADR**

· **Limited quantities (LQ)**	120 ml
· **Transport category**	3
· **Tunnel restriction code**	C/E
· **UN "Model Regulation":**	UN3500, CHEMICAL UNDER PRESSURE, N.O.S. (Fluorinated Hydrocarbon, Nitrogen), 2.2

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15 Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **United States (USA)**
· **SARA**

· **Section 355 (extremely hazardous substances):**
None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**
None of the ingredients is listed.

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.

· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **Canada**

· **Canadian Domestic Substances List (DSL)**
All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**
None of the ingredients is listed.

· **Canadian Ingredient Disclosure list (limit 1%)**
None of the ingredients is listed.

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· **Other regulations, limitations and prohibitive regulations**

· **Substances of very high concern (SVHC) according to REACH, Article 57**

None of the ingredients is listed.

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases**

H280 Contains gas under pressure; may explode if heated.
H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H360 May damage fertility or the unborn child.

R22 Harmful if swallowed.
R36 Irritating to eyes.
R36/37/38 Irritating to eyes, respiratory system and skin.
R38 Irritating to skin.
R41 Risk of serious damage to eyes.
R43 May cause sensitisation by skin contact.
R60 May impair fertility.

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
: Flammable aerosols, Hazard Category 3
Press. Gas: Gases under pressure: Compressed gas
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1
Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
Repr. 1A: Reproductive toxicity, Hazard Category 1A
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

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· **Sources**
SDS Prepared by:
ChemTel Inc.
1305 North Florida Avenue
Tampa, Florida USA 33602-2902
Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573
Website: www.chemtelinc.com

TECH DATA SHEET

1. PRODUCT NAME
Touch 'n Seal® Foam Kit 1.75 pcf FR ICC

2. MANUFACTURER
Convenience Products
866 Horan Dr.
Fenton, MO 63026 USA
Phone: (636) 349-5855
Toll Free: (800) 325-6180
FAX: (636) 349-5335
E-mail: support@touch-n-seal.com
Website: www.touch-n-seal.com

3. PRODUCT DESCRIPTION
Touch 'n Seal Foam Kit 1.75 pcf FR ICC is a two-component foam system, available in a variety of low-pressure dispensing units. When used according to manufacturer's directions, Foam Kit 1.75 pcf FR ICC produces a closed cell rigid polyurethane foam with ASTM E-84 Class A(I) fire resistance. The system complies with 2006, 2009 and 2012 IBC, IRC, and IECC as supported by ICC Evaluation Services listing ESR-3052

Basic Use

Touch 'n Seal Foam Kit 1.75 pcf FR ICC i**s suitable for Type V(B) construction where code jurisdictions require an ICC-ES listing to demonstrate code compliance.**

Sizes:

Product	Yield, Bd. ft.*	Item #
FOAM KIT 200 1.75 PCF FR ICC	200	4004001200
FOAM KIT 600 1.75 PCF FR ICC	600	4004521600
FOAM KIT 600 1.75 PCF FR ICC Replacement	600	4004521601
CP-750 1.75 PCF FR ICC	750	4505500750
RF-17 1.75 PCF FR ICC	2000	4505200000
RF-60 1.75 PCF FR ICC	6800	4505170000
RF-120 1.75 PCF FR ICC	15,400	4505113000

Features/Benefits

- Medium density spray polyurethane foam insulates and seals
- Saves energy
- Increases comfort by reducing drafts
- Foam Kits contain everything needed – ready to use
- No shaking or pre-mixing required
- Applied with patented no-crossover applicator
- Closed cell structure
- Cured foam does not shrink or settle
- Reduces vibration and sound transmission
- Low-odor formulation
- Easy to transport
- Low maintenance
- Increases structural strength
- 15 month shelf life

Limitations

- Chemical contents must be 70° - 90°F (21° – 32°C) prior to spraying.
- Surface and ambient temperatures should be between 60° - 90°F (16° – 32°C).
- Foam is combustible. Do not expose to temperatures above 250°F (121°C), open flames or sparks.
- Do not expose uncoated foam to sunlight or UV.
- Do not use for filling closed gypsum board stud wall cavities
- Product is not a fire stop.
- Refer to local building code authorities for guidance in construction applications. Ignition or thermal barrier coating may be required over exposed foam.

4. TECHNICAL DATA
Applicable Methods & Standards

- ASTM G21 Fungi Resistance
- ASTM E84 Surface Burning Characteristics
- ASTM E96 Vapor Permeance
- ASTM E283 Air Permeance
- ASTM C518 R-Value
- ASTM D1621 Compressive Strength
- ASTM D1622 Density
- ASTM D1623 Tensile Strength
- ASTM D2126 Dimensional Stability
- ASTM D6226 Closed Cell Content

5. SAFE USE AND HANDLING

- Keep out of reach of children.
- Always wear proper personal protective equipment, including head covering, gloves, clothing, eyewear and respirator
- Use in well-ventilated area
- Refer to product Safety Data Sheet (SDS) and the "Safe Use, Storage and Handling for Low Pressure Spray Foam Products" brochure, both available from Customer Service at 800-325-6180 or at www.touch-n-seal.com prior to handling or using Touch 'n Seal products.

Storage & Disposal

- Store containers tightly closed in a well-ventilated area between 60° - 90°F (16° – 32°C). Storage above 90°F (32°C) will reduce shelf life.
- Storage below 60°F (16°C) may cause crystals to form in A-component.
- Do not store at temperatures above 120°F (49°C).
- Do not expose containers to conditions that may damage, puncture, or burst the containers.
- Dispose of leftover material / containers in accordance with federal, state and local regulations.
- See Safety Data Sheet for more information.
- Refer to "Foam Kit Operation Instructions" for storage of partially used disposable Foam Kits.

Shelf Life

15 months in unopened container when stored between 60° - 90°F (16° – 32°C), in a dry, well-ventilated area.

TECH DATA SHEET

6. INSTALLATION / APPLICATION

Refer to local building code authorities for guidance in construction applications. Touch 'n Seal spray foam can be applied to and will adhere to almost any traditional building material surfaces including; wood, concrete, polystyrene, gypsum board, fiberboard, masonry and metal.

Surfaces to be sprayed must be dry, clean and free of dust, dirt, grease and other substances that may inhibit proper adhesion. For best results apply Touch 'n Seal Slow Rise foam when surface and ambient temperatures are between 60° - 90°F (16° – 32°C). Chemical contents must be between 70° - 90°F (21° – 32°C) before dispensing.

Use all chemical contents within 30 days of initial dispensing.

7. AVAILABILITY

Touch 'n Seal Two Component Spray Foam Kits are available throughout the U.S., Canada, Mexico and the world. Contact Convenience Products Customer Service at 800-325-6180 or FAX 636-349-1708 for distributor information

8. WARRANTY

Convenience Products warrants this product to be free from defects. The Company shall not be liable for any consequential or other damage or remedy; its sole obligation and your exclusive remedy are limited to product replacement. Warranty is null and void if unit is operated without attaching a new spray foam applicator gun/hose set. Some states do not allow limitations on the exclusive or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. There are no warranties which extend beyond the description on the face hereof.

9. MAINTENANCE

Refer to "Foam Kit Operation Instructions."

10. TECHNICAL SERVICE

Technical assistance, including detailed information, product literature, test results, assistance with preparing project specifications and application training is available by contacting Convenience Products.

TYPICAL PROPERTIES OF Touch 'n Seal® Foam Kit 1.75 pcf FR ICC

Property	Test Method	Typical Values	
Shelf Life		15 months; unopened container	
Dry time / Tack Free Time		45 seconds	
Cuttable Time		5 minutes	
Fully Cured Time		1 hour	
R-Value, aged 1 in. 2 in.	ASTM C518	 5.4 h·ft^2·°F/Btu (0.95 K·m^2/W) 11 h·ft^2·°F/Btu (1.9 K·m^2/W)	
Compressive Strength	ASTM D1621	**31 psi (21 kPa)**	
Tensile Strength	ASTM D1623	31 psi (21 kPa)	
Density, Free Rise	ASTM D1622	1.75 pcf (28 kg/m^3)	
Surface Burning Characteristics 2" thickness Flame Spread Index Smoke Developed	ASTM E84	 15 350	
Vapor Permeance	ASTM E96	1.77 perm @ 1 in. (25 mm) 0.98 perm @ 2 in. (50 mm) 0.69 perm @ 3 in. (75 mm)	
Air Permeance	ASTM E283	< 0.004 CFM / ft^2 (< 0.02 L/s/m^2)	
Dimensional Stability, % volume change	ASTM D2126	- 4 °F (- 20°C)	0.9%
		158°F (70°C) / 97% r.h.	5.7%
		176 °F (80°C)	1.6%
Sound Transmission Class (STC Rating)	ASTM C90	32 @ 1 ½ in. (38 mm)	
Closed Cell Content	ASTM D6226	>90%	
Fungi Resistance	ASTM C1338	Does not support growth	

**Theoretical yield is used as an industry standard to represent the size of two-component foam kits. The calculation is based upon ideal conditions, does not include blowing agent loss, and may vary according to application method or environmental factors.*

The higher the R-value the greater the insulating power. Ask your seller for the fact sheet on R-values.

The information contained herein was accurate at the time of publishing. Please refer to the Touch 'N Seal website for the latest information.

Convenience Products
866 Horan Dr., Fenton, MO 63026 USA
(800) 325-6180, (636) 349-5855 tel.

MADE IN U.S.A.

Safety Data Sheet

24 Hour Emergency Phone Numbers
Medical/Poison Control:
In U.S.: Call 1-800-222-1222

Outside U.S.: Call your local poison control center

Transportation/National Response Center:

1-800-535-5053
1-352-323-3500

NOTE: The National ResponseCenter emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

IMPORTANT: Provide this information to employees, customers, and users of this product. Read this SDS before handling or disposing of this product. This product is covered by the OSHA Hazard Communication Standard and this document has been prepared in accordance with requirements of this standard. All abbreviated terms used in this MSDS are further described in Section 16.

1. Identification

This Material Safety Data Sheet is available in American Spanish upon request.
Los Datos de Serguridad del Producto pueden obtenerse en Espanol si lo riquiere.

Product Name:	Alex Plus Clear	**Revision Date:**	6/19/2015
Product UPC Number:	18071	**Supercedes Date:**	7/10/2014
Product Use/Class:	Caulking Compound	**SDS No:**	00010019001
Manufacturer:	DAP Products Inc. 2400 Boston Street Suite 200 Baltimore, MD 21224-4723 888-327-8477 (non - emergency matters)		
Preparer:	Regulatory Department		

2. Hazards Identification

EMERGENCY OVERVIEW: Under normal use conditions, this product is not expected to cause adverse health effects. This product contains ethylene glycol.

GHS Classification
Not a hazardous substance or mixture.

Symbol(s) of Product

None

Signal Word
Not a hazardous substance or mixture.

3. Composition/Information on Ingredients

Chemical Name	CAS-No.	Wt. %	GHS Symbols	GHS Statements
White mineral oil	8042-47-5	10-25	GHS03-GHS07-GHS08	H270-304-312

Ethylene glycol	107-21-1	1.0-2.5	GHS03-GHS06	H270-331
Amorphous silica	112945-52-5	1.0-2.5	GHS03-GHS07	H270-315-319-332-335
Poly(oxy-1,2-ethanediyl), α-sulfo-ω-(nonylphenoxy)-, branched, sodium salt	68891-39-4	0.1-1.0	GHS03	H270

The text for GHS Hazard Statements shown above (if any) is given in the "Other information" Section.

4. First-aid Measures

FIRST AID - INHALATION: Material is not likely to present an inhalation hazard at ambient conditions. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical attention immediately.

FIRST AID - SKIN CONTACT: No health hazards are known to exist. In case of contact, wash skin immediately with soap and water.

FIRST AID - EYE CONTACT: In case of contact, immediately flush eyes with large quantities of water for at least 15 minutes until irritation subsides. Get medical attention immediately.

FIRST AID - INGESTION: If swallowed, DO NOT INDUCE VOMITING. Get medical attention immediately.

5. Fire-fighting Measures

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

SPECIAL FIREFIGHTING PROCEDURES: Wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear. Use water spray to cool exposed surfaces.

EXTINGUISHING MEDIA: Carbon Dioxide, Dry Chemical, Foam, Water Fog

6. Accidental Release Measures

ENVIRONMENTAL MEASURES: No Information

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled material and remove with inert absorbent. Dispose of contaminated absorbent, container and unused contents in accordance with local, state and federal regulations. Scrape up dried material and place into containers. Use personal protective equipment as necessary. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations.

7. Handling and Storage

HANDLING: KEEP OUT OF REACH OF CHILDREN!DO NOT TAKE INTERNALLY. Use only with adequate ventilation. Ensure fresh air entry during application and drying. Wash thoroughly after handling.

STORAGE: Avoid excessive heat and freezing. Do not store at temperatures above 120 degrees F. Store away from caustics and oxidizers.

8. Exposure Controls/Personal Protection

Ingredients with Occupational Exposure Limits

Chemical Name	ACGIH TLV-TWA	ACGIH-TLV STEL	OSHA PEL-TWA	OSHA PEL-CEILING
White mineral oil	N.E.	N.E.	N.E.	N.E.
Ethylene glycol	N.E.	N.E.	N.E.	N.E.
Amorphous silica	N.E.	N.E.	N.E.	N.E.
Poly(oxy-1,2-ethanediyl), α-sulfo-ω-(nonylphenoxy)-, branched, sodium salt	N.E.	N.E.	N.E.	N.E.

Further Advice: MEL = Maximum Exposure Limit OES = Occupational Exposure Standard SUP = Supplier's Recommendation Sk = Skin Sensitizer N.E. = Not Established

Personal Protection

RESPIRATORY PROTECTION: No personal respiratory protective equipment normally required.

SKIN PROTECTION: Rubber gloves.

EYE PROTECTION: Goggles or safety glasses with side shields.

OTHER PROTECTIVE EQUIPMENT: Not required under normal use.

HYGIENIC PRACTICES: Wash hands before breaks and at the end of workday. Remove and wash contaminated clothing before re-use.

9. Physical and Chemical Properties

Appearance:	White (changes to clear as it cures)	**Physical State:**	Paste
Odor:	Very Slight Ammonia	**Odor Threshold:**	Not Established
Density, g/cm3:	1.03 - 1.04	**pH:**	Between 7.0 and 12.0
Freeze Point, °C:	Not Established	**Viscosity (mPa.s):**	Not Established
Solubility in Water:	Not Established	**Partition Coeff., n-octanol/water:**	Not Established
Decomposition Temperature, °C:	Not Established	**Explosive Limits, %:**	N.I. - N.I.
Boiling Range, °C:	N.I. - N.I.	**Auto-Ignition Temperature, °C**	Not Established
Minimum Flash Point, °C:	93.3	**Vapor Pressure, mmHg:**	No Information
Evaporation Rate:	Slower Than n-Butyl Acetate	**Flash Method:**	Seta Closed Cup
Vapor Density:	Heavier Than Air		
Combustibility:	Does not support combustion		

(See "Other information" Section for abbreviation legend)
(If product is an aerosol, the flash point stated above is that of the propellant.)

10. Stability and Reactivity

STABILITY: Stable under recommended storage conditions.

CONDITIONS TO AVOID: Excessive heat and freezing.

INCOMPATIBILITY: Incompatible with strong bases and oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Normal decomposition products, i.e., COx, NOx.

11. Toxicological Information

EFFECT OF OVEREXPOSURE - INHALATION: Under normal use conditions, this product is not expected to cause adverse health effects. Inhalation of vapors in high concentration may cause mild irritation of respiratory system (nose, mouth, mucous membranes).

EFFECT OF OVEREXPOSURE - SKIN CONTACT: Under normal use conditions, this product is not expected to cause adverse health effects. Prolonged or repeated contact with skin may cause mild irritation.

EFFECT OF OVEREXPOSURE - EYE CONTACT: Under normal use conditions, this product is not expected to cause adverse health effects. Direct eye contact may cause irritation.

EFFECT OF OVEREXPOSURE - INGESTION: Under normal use conditions, this product is not expected to cause adverse health effects. Single dose oral toxicity is very low. Amounts ingested incidental to industrial handling are not likely to cause injury; however,

ingestion of large amounts may cause injury. Ingestion of ethylene glycol can cause gastrointestinal irritation, nausea, vomiting, diarrhea and if ingested in sufficient quantities, death.

CARCINOGENICITY: No Information

PRIMARY ROUTE(S) OF ENTRY: Inhalation, Skin Contact

Acute Toxicity Values
The acute effects of this product have not been tested. Data on individual components are tabulated below

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
8042-47-5	White mineral oil	>5000 mg/kg Rat	2000 mg/kg Rabbit	>20 mg/L
107-21-1	Ethylene glycol	4000 mg/kg Rat	9530 mg/kg Rabbit	> 2.5 mg/L Rat
112945-52-5	Amorphous silica	>3300 mg/kg Rat	>2000 mg/kg Rabbit	>20 mg/L
68891-39-4	Poly(oxy-1,2-ethanediyl), α-sulfo-ω-(nonylphenoxy)-, branched, sodium salt	N.I.	N.I.	N.I.

N.I. = No Information

12. Ecological Information

ECOLOGICAL INFORMATION: Ecological injuries are not known or expected under normal use.

13. Disposal Information

DISPOSAL INFORMATION: This product does not meet the definition of a hazardous waste according to U.S. EPA Hazardous Waste Management Regulation, 40 CFR Section 261. Dispose as hazardous waste according to all local, state, federal and provincial regulations. State and Local regulations/restrictions are complex and may differ from Federal regulations. Responsibility for proper waste disposal is with the owner of the waste.

14. Transport Information

SPECIAL TRANSPORT PRECAUTIONS: No Information

DOT UN/NA Number:	N.A.
DOT Proper Shipping Name:	Not Regulated.
DOT Technical Name:	N.A.
DOT Hazard Class:	N.A.
Hazard SubClass:	N.A.
Packing Group:	N.A.

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Acute Health Hazard, Chronic Health Hazard

SARA SECTION 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
Ethylene glycol	107-21-1

TOXIC SUBSTANCES CONTROL ACT:

All ingredients in this product are either on TSCA inventory list, or otherwise exempt.
This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(b) components exist in this product.

CALIFORNIA PROPOSITION 65 CARCINOGENS

WARNING: This product contains chemicals known to the State of California to cause cancer.

CALIFORNIA PROPOSITION 65 REPRODUCTIVE TOXINS

This product does not contain any chemicals known to the State of California to cause birth defects or other reproductive harm.

International Regulations: As follows -

CANADIAN WHMIS:

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

WHMIS Class Consumer Commodity

16. Other Information

Revision Date: 6/19/2015 **Supersedes Date:** 7/10/2014

Reason for revision: HazCom2012/GHS Conversion

Datasheet produced by: Regulatory Department

HMIS Ratings:

Health:	1	**Flammability:**	0	**Reactivity:**	0	**Personal Protection:**	X

VOC Less Water Less Exempt Solvent, g/L 44.0

VOC Material, g/L: 26

VOC as Defined by California Consumer Product Regulation, Wt/Wt%: 0.1

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H270	May cause or intensify fire; oxidiser.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Icons for GHS Pictograms shown in Section 3 describing each ingredient:

GHS03

GHS06

GHS07

GHS08

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

DAP believes the data and statements contained herein are accurate as of the date hereof. They are offered in good faith as typical values and not as a product specification. NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE WITH REGARD TO THE INFORMATION HEREIN PROVIDED OR THE PRODUCT TO WHICH THE INFORMATION REFERS. Since thisdocument is intended only as a guide to the appropriate use and precautionary handling of the referenced product by a properly trained person, it is therefore the responsibility of the user to (i) review the recommendations with due consideration for the specific context of the intended use and (ii) determine if they are appropriate.

Technical Bulletin

2400 Boston Street, Suite 200, Baltimore, Maryland 21224
Phone: 410-675-2100 or 800-543-3840

Revised: 9/8/11

DAP® ALEX PLUS® Acrylic Latex Caulk Plus Silicone – Clear

- **Waterproof Seal**
- **Paintable**
- **Cured Caulk is Mold & Mildew Resistant**
- **Excellent Flexibility**
- **Easy Water Clean-Up**
- **Indoor/Outdoor Use**
- **Exceeds ASTM C834**

Packaging:	10.1 fl. oz. (300 mL) cartridge
Color:	Clear
UPC Number:	7079818072, 7079818156, 7079818660, 7079811521, 7079811427, 7079874252, 7079818071

Company Identification:

Manufacturer:	DAP Products Inc., 2400 Boston St., Ste. 200, Baltimore, Maryland 21224
Usage Information:	Call 1-888-DAP-TIPS or visit dap.com & click on "Ask the Expert"
Order Information:	800-327-3339
Fax Number:	410-534-2650

Product Description:

ALEX PLUS® Acrylic Latex Caulk Plus Silicone is a professional quality caulking product formulated to last. It is an all-purpose adhesive caulk ideal for a wide variety of applications for interior and exterior use. ALEX PLUS® contains silicone, which allows for excellent adhesion and flexibility to resist expansion and contraction without cracking. It provides a waterproof seal and prevents air and moisture from passing through cracks and joints thereby improving energy efficiency. Cured caulk is mildew resistant. ALEX PLUS® is paintable with latex and oil-based paints. It is easy to use, easy to tool, low in odor, cleans up easily with soap and water and has a low VOC content.

Suggested Uses:

Ideal for caulking and sealing:

- *Windows and door frames*
- *Eaves*
- *Baseboards*
- *Pipes*
- *Molding*
- *Vents*
- *Siding and trim*
- *Corner Joints*
- *Ducts*

Adheres to:

- *Wood*
- *Brick*
- *Drywall*
- *Metal*
- *Painted Surfaces*
- *Glass*
- *Plaster*
- *Most common building materials*

Performance Characteristics:

- Exceeds ASTM C834.
- Contains silicone to improve adhesion and flexibility.
- Resists cracking and chalking.
- Tack-free in 30 minutes.

Surface Preparation & Application:

1. Surface must be clean, dry and free of old caulk, dirt, dust, debris and grease.
2. Cut nozzle at a 45° angle to desired bead size.
3. Puncture inner foil seal.
4. Load cartridge into caulking gun.
5. Fill gap with caulk, pushing caulk ahead of nozzle.
6. If necessary, smooth bead with finishing tool.
7. Clean up excess uncured caulk with a damp sponge before it skins over. Cured caulk must be cut or scraped away.
8. **Allow caulk to dry clear before painting with latex or oil-based paints.**
9. Reseal cartridge for storage and reuse.

For Best Results:

- *Apply in temperatures above 40ºF.*
- *Do not apply when rain or freezing temperatures are forecasted before full cure can occur.*
- *Do not use below waterline or for marine or automotive applications.*
- *Do not use for filling butt joints, surface defects, for tuck pointing or expansion joints.*
- *Joint size should not exceed 1/2" wide x 1/2" deep. If joint depth exceeds 1/2", use backer rod material.*
- ***Caulk applies white and dries clear in 7 – 14 days (depending on joint depth, temperature and humidity).***
- *Store away from extreme heat or cold.*

Physical & Chemical Characteristics:

Vehicle:	Siliconized Acrylic Polymer
Tooling Time:	10 minutes
Tack-Free Time:	30 minutes
Paintable:	Yes
Service Temperature Range (cured caulk):	-20ºF to 180ºF
Application Temperature Range:	40ºF to 100ºF
Coverage:	10.1 fl. oz. = 55 linear ft. at a 3/16" diameter bead (three average size doors or four average size windows)
Dynamic Joint Movement:	± 12%
Odor:	Very Mild
Consistency:	Smooth and Creamy
Volatile:	Water
Flash Point:	None
Specific Gravity:	1.02 ± 0.01
Solids:	54% ± 1% by weight
Weight per Gallon:	8.50 ± 0.05 lbs./gal.

Freeze Thaw Stability:	Passes 5 Cycles @ 0ºF
Shelf Life:	12 months
MSDS No:	00010019001

Clean Up:
Clean up excess uncured caulk with a damp sponge before it skins over. Wash hands with warm water and soap. Excess dried caulk must be cut or scraped away.

Safety:
See product label and Material Safety Data Sheet (MSDS) for safety information. You can request an MSDS by visiting our website at dap.com or by calling 1-888-DAP-TIPS.

35 Year Satisfaction Guarantee:
If product fails to perform when used as directed, return used container and sales receipt to DAP Products Inc., Technical Customer Service, 2400 Boston St., Ste. 200, Baltimore, MD 21224 for replacement product or sales price refund. DAP is not liable for incidental or consequential damages.

An RPM Company

Safety Data Sheet

24 Hour Emergency Phone Numbers:

Medical/Poison Control:

In U.S.: Call 1-800-222-1222
Outside U.S.: Call your local poison control center

Transportation/National Response Center:

1-800-535-5053
1-352-323-3500

NOTE: The National ResponseCenter emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

IMPORTANT: Provide this information to employees, customers, and users of this product. Read this SDS before handling or disposing of this product. This product is covered by the OSHA Hazard Communication Standard and this document has been prepared in accordance with requirements of this standard. All abbreviated terms used in this MSDS are further described in Section 16.

1. Identification

This Material Safety Data Sheet is available in American Spanish upon request.
Los Datos de Serguridad del Producto pueden obtenerse en Espanol si lo riquiere.

Product Name:	!00% Silicone Window & Door Clear	**Revision Date:**	5/19/2015
Product UPC Number:	08641	**Supercedes Date:**	No Information
Product Use/Class:	Caulking Compound	**SDS No:**	00008687001
Manufacturer:	DAP Products Inc. 2400 Boston Street Suite 200 Baltimore, MD 21224-4723 888-327-8477 (non-emergency matters)		
Preparer:	Regulatory Department		

2. Hazards Identification

EMERGENCY OVERVIEW: Under normal use conditions, this product is not expected to cause adverse health effects. High concentration of vapors may cause irritation to eyes and respiratory system.

GHS Classification
Not a hazardous substance or mixture.

Symbol(s) of Product

Not a hazardous substance or mixture.

Signal Word
Not a hazardous substance or mixture.

3. Composition/Information on Ingredients

Chemical Name	CAS-No.	Wt. %	GHS Symbols	GHS Statements
Hydrotreated middle distillate	64742-46-7	10-25	GHS06	H331

Silica, amorphous	7631-86-9	2.5-10	GHS07	H332
Silanetriol, methyl-, triaceta	4253-34-3	2.5-10	GHS07	H302-312-315-319-332

The text for GHS Hazard Statements shown above (if any) is given in the "Other information" Section.

4. First-aid Measures

FIRST AID - INHALATION: Material is not likely to present an inhalation hazard at ambient conditions. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical attention immediately.

FIRST AID - SKIN CONTACT: Wash skin with soap and water for 15 minutes. Get medical aid if symptoms persist.

FIRST AID - EYE CONTACT: In case of contact, immediately flush eyes with large quantities of water for at least 15 minutes until irritation subsides. Get medical attention immediately.

FIRST AID - INGESTION: If swallowed, DO NOT INDUCE VOMITING. Get medical attention immediately.

5. Fire-fighting Measures

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

SPECIAL FIREFIGHTING PROCEDURES: Wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear. Use water spray to cool exposed surfaces.

EXTINGUISHING MEDIA: Carbon Dioxide, Dry Chemical, Foam, Water Fog

6. Accidental Release Measures

ENVIRONMENTAL MEASURES: No Information

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled material and remove with inert absorbent. Dispose of contaminated absorbent, container and unused contents in accordance with local, state and federal regulations. Scrape up dried material and place into containers. Use personal protective equipment as necessary. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations.

7. Handling and Storage

HANDLING: KEEP OUT OF REACH OF CHILDREN!DO NOT TAKE INTERNALLY. Avoid breathing vapor and contact with eyes, skin and clothing. Use only with adequate ventilation. Ensure fresh air entry during application and drying. Wash thoroughly after handling. Remove contact lenses before using. Do not handle contact lenses until all sealant has been cleaned from fingertips, nails and cuticles. Residual sealant may transfer to contact lenses and cause severe eye irritation.

STORAGE: Avoid excessive heat and freezing. Do not store at temperatures above 120 degrees F. Store away from caustics and oxidizers.

8. Exposure Controls/Personal Protection

Ingredients with Occupational Exposure Limits

Chemical Name	ACGIH TLV-TWA	ACGIH-TLV STEL	OSHA PEL-TWA	OSHA PEL-CEILING
Hydrotreated middle distillate	N.E.	N.E.	N.E.	N.E.
Silica, amorphous	N.E.	N.E.	N.E.	N.E.
Silanetriol, methyl-, triaceta	N.E.	N.E.	N.E.	N.E.

Further Advice: MEL = Maximum Exposure Limit OES = Occupational Exposure Standard SUP = Supplier's Recommendation Sk = Skin Sensitizer N.E. = Not Established

Personal Protection

RESPIRATORY PROTECTION: No personal respiratory protective equipment normally required.

SKIN PROTECTION: Wear nitrile or neoprene gloves.

EYE PROTECTION: Goggles or safety glasses with side shields.

OTHER PROTECTIVE EQUIPMENT: Not required under normal use.

HYGIENIC PRACTICES: Wash hands before breaks and at the end of workday. Remove and wash contaminated clothing before re-use.

9. Physical and Chemical Properties

Appearance:	Clear	**Physical State:**	No Information
Odor:	Acetic Acid	**Odor Threshold:**	Not Established
Density, g/cm3:	0.96 - 0.96	**pH:**	Not Established
Freeze Point, °C:	Not Established	**Viscosity (mPa.s):**	Not Established
Solubility in Water:	Not Established	**Partition Coeff., n-octanol/water:**	Not Established
Decomposition Temperature, °C:	Not Established	**Explosive Limits, %:**	N.I. - N.I.
Boiling Range, °C:	N.I. - N.I.	**Auto-Ignition Temperature, °C**	Not Established
Minimum Flash Point, °C:	93.3	**Vapor Pressure, mmHg:**	No Information
Evaporation Rate:	Slower Than n-Butyl Acetate	**Flash Method:**	Seta Closed Cup
Vapor Density:	Heavier Than Air		
Combustibility:	Does not Support Combustion		

(See "Other information" Section for abbreviation legend)
(If product is an aerosol, the flash point stated above is that of the propellant.)

10. Stability and Reactivity

STABILITY: Stable under recommended storage conditions.

CONDITIONS TO AVOID: Oxidizing agents. Excessive heat and freezing.

INCOMPATIBILITY: Incompatible with strong bases and oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Normal decomposition products, i.e., COx, NOx.

11. Toxicological Information

EFFECT OF OVEREXPOSURE - INHALATION: Under normal use conditions, this product is not expected to cause adverse health effects. During application and cure, this product releases methanol. During application and cure, this product releases acetic acid. Inhalation of vapors in high concentration may cause mild irritation of respiratory system (nose, mouth, mucous membranes).

EFFECT OF OVEREXPOSURE - SKIN CONTACT: Under normal use conditions, this product is not expected to cause adverse health effects. Prolonged or repeated contact with skin may cause mild irritation.

EFFECT OF OVEREXPOSURE - EYE CONTACT: Under normal use conditions, this product is not expected to cause adverse health effects. Direct eye contact may cause irritation.

EFFECT OF OVEREXPOSURE - INGESTION: Under normal use conditions, this product is not expected to cause adverse health

effects. Single dose oral toxicity is very low. Amounts ingested incidental to industrial handling are not likely to cause injury; however, ingestion of large amounts may cause injury. Ingestion may result in obstruction when material hardens.

CARCINOGENICITY: No Information

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Inhalation, Skin Contact

Acute Toxicity Values
The acute effects of this product have not been tested. Data on individual components are tabulated below

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
64742-46-7	Hydrotreated middle distillate	7400 mg/kg Rat	>2000 mg/kg Rabbit	4.6 mg/L Rat
7631-86-9	Silica, amorphous	>3300 mg/kg Rat	>5000 mg/kg Rabbit	>20 mg/L
4253-34-3	Silanetriol, methyl-, triaceta	1602 mg/kg Rat	1060 mg/kg Rabbit	11.6 mg/L

N.I. = No Information

12. Ecological Information

ECOLOGICAL INFORMATION: Ecological injuries are not known or expected under normal use.

13. Disposal Information

DISPOSAL METHOD: This product does not meet the definition of a hazardous waste according to U.S. EPA Hazardous Waste Management Regulation, 40 CFR Section 261. Dispose as hazardous waste according to all local, state, federal and provincial regulations. State and Local regulations/restrictions are complex and may differ from Federal regulations. Responsibility for proper waste disposal is with the owner of the waste.

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled material and remove with inert absorbent. Dispose of contaminated absorbent, container and unused contents in accordance with local, state and federal regulations. Scrape up dried material and place into containers. Use personal protective equipment as necessary. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations.

14. Transport Information

SPECIAL TRANSPORT PRECAUTIONS: No Information

DOT Proper Shipping Name: Not Regulated
DOT Technical Name: N.A.
DOT Hazard Class: N.A.
Packing Group: N.A.
Hazard SubClass: N.A.
DOT UN/NA Number: N.A.

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Acute Health Hazard, Chronic Health Hazard

SARA SECTION 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

No Sara 313 components exist in this product.

TOXIC SUBSTANCES CONTROL ACT:

All ingredients in this product are either on TSCA inventory list, or otherwise exempt.
This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA12(b) components exist in this product in concentrations at or above their thresholds.

CALIFORNIA PROPOSITION 65 CARCINOGENS

This product does not contain any chemicals known to the State of California to cause cancer.

CALIFORNIA PROPOSITION 65 REPRODUCTIVE TOXINS

This product does not contain any chemicals known to the State of California to cause birth defects or other reproductive harm.

International Regulations: As follows -

CANADIAN WHMIS:

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

WHMIS Class Consumer Commodity

16. Other Information

Revision Date: 5/19/2015 **Supersedes Date:** No Information

Reason for revision: HazCom2012/GHS Conversion

Datasheet produced by: Regulatory Department

HMIS Ratings:

Health:	1	**Flammability:**	1	**Reactivity:**	0	**Personal Protection:**	X

VOC Less Water Less Exempt, g/L: 28.9

VOC, Material, g/L: 29

VOC as Defined by California Consumer Product Regulation, Wt/Wt%: 3.0

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H332	Harmful if inhaled.

Icons for GHS Pictograms shown in Section 3 describing each ingredient:

GHS06

GHS07

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

DAP believes the data and statements contained herein are accurate as of the date hereof. They are offered in good faith as typical values and not as a product specification. NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE WITH REGARD TO THE INFORMATION HEREIN PROVIDED OR THE PRODUCT TO WHICH THE INFORMATION REFERS. Since thisdocument is intended only as a guide to the appropriate use and precautionary handling of the referenced product by a properly trained person, it is therefore the responsibility of the user to (i) review the recommendations with due consideration for the specific context of the intended use and (ii) determine if they are appropriate.

Technical Bulletin

2400 Boston Street, Suite 200, Baltimore, Maryland 21224
Phone: 410-675-2100 or 800-543-3840

Revised: October 10, 2013

DAP® 100% Silicone Window, Door & Siding Sealant

- **100% silicone**
- **Indoor/ Outdoor**
- **Flexible**
- **Minimal shrinkage**

Packaging: 2.8 fluid ounce squeeze tube (83 mL), 10.1 fluid ounce cartridge (300 mL)
Colors: White, Clear, Almond, Black, Aluminum, Bronze
UPC Nos: 70798 00683, 00684, 08646, 08641, 05841, 08642, 08643, 08647, 08649, 73473, 73477, 73462, 73485, 73497

Company Identification:
Manufactured by/ for: DAP Products Inc., 2400 Boston Street, Baltimore, Maryland 21224
Usage Information: DAP HELPLINE: 888-DAP-TIPS, 9:00 am to 7:00 pm EST
Order Information: 800-327-3339
Also, visit the DAP website at **www.dap.com.**

Product Description:
DAP® 100% Silicone Window, Door & Siding Sealant is an all-purpose, one component, acetoxy cure sealant ideal for indoor/outdoor use. It provides a watertight, flexible seal that won't crack, crumble or shrink. Once cured, it is unaffected by temperature extremes (-40°F to 400°F). When tested in accordance with ASTM C719, meets C920 specification for Class 25, Uses G & A* -(*Use A does not include Clear)

Suggested Uses:
Ideal for caulking and sealing:
- Around windows and doors
- Siding and trim
- Gutters and vents
- Molding

Adheres to:
- Glass
- Ceramic
- Fiberglass
- Porcelain
- Non-oily woods
- Canvas
- Most metals *(see **For Best Results** section)*
- Most plastics and rubbers
- Painted surface

Surface Preparation & Application:
- Remove old caulk from surface. Prepare a clean, dry surface which is free of loose debris, dust, dirt, soap, oil or grease.
- When using 2.8 oz squeeze tube, remove cap and puncture inner seal with other side of cap. Screw on nozzle and cut at 45° angle to desired bead size.

- When using 10.1 oz cartridge, cut nozzle at 45° angle to desired bead size. Puncture inner foil seal. Load into caulking gun.
- Apply sealant to surface, pushing sealant ahead of nozzle.
- Smooth bead with finishing tool if necessary.
- Clean up excess uncured sealant from surface and tools with mineral spirits. Excess cured sealant must be cut or scraped away. Wash hands with soap and water.
- Allow 24 hours for sealant to cure. Sealant will not cure in totally confined spaces.
- When applying to hard rubber or plastic surfaces, lightly sand or roughen surface before application to maximize adhesion.
- When bonding two surfaces together, always clamp until cured, if possible.
- When using sealant to form weather-stripping or other formed rubber parts, place wax paper over sealant to prevent sticking to mating piece until it has cured.
- Reseal for reuse.

For Best Results:
- Application temperature is between -35°F and 140°F.
- Joint width should not exceed 1/2". If joint depth exceeds 1/2", use backer rod material.
- Not paintable. Paint surfaces before sealing.
- Not recommended for continuous underwater use, below grade use, use on wet surfaces, oily woods, stovepipes or chimneys. Not for fireplace applications, tuck pointing, butt joints, structural glazing or repairing surface defects.
- Not recommended for use on cementitious materials or surfaces that might bleed oils, plasticizers or solvents. Substrates made of methylmethacrylate, polycarbonate, polypropylene, polyethylene and polytetrafluoroethylene do not allow for best adhesion and compatibility with sealant. Try test area before using.
- Not recommended for use on brass, copper, magnesium, zinc, iron, galvanized metals or other surfaces prone to attack by weak acids.
- Do not use where abrasion and physical abuse are encountered.
- Store in temperatures below 90°F in a dry place.

Typical Physical & Chemical Characteristics:

Polymer:	Silicone Rubber
Tooling Time:	5-10 Minutes
Tack Free Time:	10-20 Minutes
Dynamic Joint Movement:	±25%
Paintable:	No
Odor:	Vinegar-like
Consistency:	Smooth, Gunnable Paste
Specific Gravity:	0.96 @ 25°C
Solids:	97.0% by weight
Density:	8.0 lbs./gallon
Temperature Service Range:	-40°F to 400°F (after full cure)
Temperature Application Range:	-35°F to 140°F
Freeze Thaw Stable:	Yes
Shelf Life:	18 months from manufactured date
Coverage:	10.1 fl. oz.: 55 linear ft. at a 3/16" bead size
	2.8 fl. oz.: 15 linear ft. at a 3/16" bead size

Clean Up:

Remove excess uncured sealant from surfaces and tools with mineral spirits. Do not use mineral spirit to clean skin. Wash hands with soap and water. Cured sealant must be cut or scraped away.

Safety:
See product label and Safety Data Sheet (SDS) for safety information. You can request an SDS by visiting our website at **www.dap.com** or by calling **888-DAP-TIPS.**

Satisfaction Guaranteed:
If not satisfied with product performance within one year of purchase, return used container and sales receipt to DAP Inc., Technical Customer Service, 2400 Boston Street, Suite 200, Baltimore, MD 21224 for product replacement or sales price refund. DAP will not be liable for incidental or consequential damages.

An RPM Company

SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY

Product name: THERMAX™ 0.50 Inch Insulation Sheathing **Issue Date:** 05/04/2015
Print Date: 06/19/2015

THE DOW CHEMICAL COMPANY encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: THERMAX™ 0.50 Inch Insulation Sheathing

Recommended use of the chemical and restrictions on use
Identified uses: Thermal insulation. For industrial use. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY
2030 WILLARD H DOW CENTER
MIDLAND MI 48674-0000
UNITED STATES

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 800-424-9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Other hazards
no data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration

Modified Polyisocyanurate Rigid Cellular Polymer	Not applicable	> 55.0 %
Aluminum	7429-90-5	> 25.0 - < 35.0 %
Tris(1-chloro-2-propyl) phosphate	13674-84-5	< 10.0 %
Cyclopentane (8CI, 9CI)	287-92-3	< 10.0 %
Isopentane	78-78-4	< 5.0 %
Continuous Filament Glass Fiber	Not applicable	< 5.0 %
1-Bromopropane	106-94-5	< 5.0 %
2,2-Dimethylbutane	75-83-2	< 5.0 %

4. FIRST AID MEASURES

Description of first aid measures
General advice: If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Skin contact: Wash off with plenty of water.

Eye contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion: If swallowed, seek medical attention. May cause gastrointestinal blockage. Do not give laxatives. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers.

Unsuitable extinguishing media: no data available

Special hazards arising from the substance or mixture
Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. In smoldering or flaming conditions, carbon monoxide, carbon dioxide and carbon are generated. Combustion products may include and are not limited to: Nitrogen oxides. Combustion products may include trace amounts of: Hydrogen cyanide. Hydrogen halides.

Unusual Fire and Explosion Hazards: Container may vent and/or rupture due to fire. When product is stored in closed containers, a flammable atmosphere can develop. Mechanical cutting, grinding, crushing or sawingcan cause formation of dusts. To reduce the potential for dust explosion, do not permit dust to accumulate. This product contains a flame retardant to inhibit accidental ignition from small fire sources. This plastic foam product is combustible and should be protected from flames and other high heat sources. For more information, contact Dow. Dense smoke is emitted when burned without sufficient oxygen.

Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Soak thoroughly with water to cool and prevent re-ignition. Cool surroundings with water to localize fire zone.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: There are no special required instructions. Isolate area. Keep upwind of spill. Ventilate area of leak or spill. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Recover spilled material if possible. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: This material is combustible and should not be exposed to flame or other ignition sources. No smoking, open flames or sources of ignition in handling and storage area. Fabrication methods which involve cutting into this product may release the blowing agent(s) remaining in the cells. Provide adequate ventilation to assure localized concentrations in release areas are maintained below the lower flammable limit. Refer to Exposure Controls and Personal Protection, Section 8 of the MSDS. Avoid breathing vapor. Use with adequate ventilation. Keep container closed. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Good housekeeping and controlling of dusts are necessary for safe handling of product.

Conditions for safe storage: Minimize sources of ignition, such as static build-up, heat, spark or flame. Flammable vapors may accumulate in some storage situations. During shipment, storage, installation and use, this material should not be exposed to flame or other ignition sources.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Aluminum	OSHA Z-1	TWA total dust	15 mg/m3 , Aluminium
	OSHA Z-1	TWA respirable fraction	5 mg/m3 , Aluminium
	ACGIH	TWA Respirable fraction	1 mg/m3 , Aluminium
Cyclopentane (8CI, 9CI)	ACGIH	TWA	600 ppm
Isopentane	ACGIH	TWA	1,000 ppm
1-Bromopropane	Dow IHG	TWA	5 ppm
	ACGIH	TWA	0.1 ppm
2,2-Dimethylbutane	ACGIH	TWA	500 ppm
	ACGIH	STEL	1,000 ppm

Concentrations of the blowing agents anticipated incidental to proper handling are expected to be well below those which cause acute inhalation effects and below exposure guidelines.

Exposure controls

Engineering controls: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye/face protection: Eye protection should not be necessary. For fabrication operations safety glasses (with side shields) are recommended. If there is a potential for exposure to particles which could cause eye discomfort, wear chemical goggles.

Skin protection

Hand protection: Use gloves to protect from mechanical injury. Selection of gloves will depend on the task.

Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. If respiratory irritation is experienced, use an approved air-purifying respirator.
The following should be effective types of air-purifying respirators: Particulate filter.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Board
Color	Tan
Odor	Mild
Odor Threshold	No test data available
pH	Not applicable
Melting point/range	Not applicable
Freezing point	Not applicable
Boiling point (760 mmHg)	Not applicable
Flash point	**closed cup** Not applicable
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	no data available
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Vapor Pressure	Not applicable
Relative Vapor Density (air = 1)	Not applicable
Relative Density (water = 1)	0.02 - 0.05 *Literature*
Water solubility	*Literature* Insoluble in water
Partition coefficient: n-octanol/water	no data available
Auto-ignition temperature	490 °C (914 °F) *ASTM D1929*
Decomposition temperature	No test data available
Kinematic Viscosity	Not applicable
Explosive properties	no data available
Oxidizing properties	no data available
Molecular weight	No test data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical stability: Thermally stable at typical use temperatures.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Avoid temperatures above 150°C (302°F) Exposure to elevated temperatures can cause product to decompose. Avoid direct sunlight.

Incompatible materials: Avoid contact with: Strong oxidizers.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials. Toxic gases are released during decomposition.

11. TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear in this section when such data is available.

Acute toxicity

Acute oral toxicity
Swallowing is unlikely because of the physical state. Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. May cause choking if swallowed.

As product: Single dose oral LD50 has not been determined.

Based on information for component(s):
LD50, Rat, > 5,000 mg/kg

Acute dermal toxicity
Skin absorption is unlikely due to physical properties.

As product: The dermal LD50 has not been determined.

For the minor component(s):
LD50, Rabbit, > 5,000 mg/kg

Acute inhalation toxicity
Dusts or fibers generated in processing may cause irritation of the upper respiratory tract (nose and throat). Fumes or dusts generated from cutting or grinding operations may cause irritation of the upper respiratory tract and lungs. Concentrations of the blowing agents anticipated incidental to proper handling are expected to be well below those which cause acute inhalation effects and below exposure guidelines.

As product: The LC50 has not been determined.

For the minor component(s):
LC50, Rat, 4 Hour, Aerosol, > 4.6 mg/l

Skin corrosion/irritation
May cause itching.
May cause skin irritation due to mechanical abrasion.

Serious eye damage/eye irritation
Solid or dust may cause irritation or corneal injury due to mechanical action.
Fumes or dust generated from cutting or grinding operations may cause eye irritation.

Sensitization
For skin sensitization:
Relevant data not available.

For respiratory sensitization:
Relevant data not available.

Specific Target Organ Systemic Toxicity (Single Exposure)
Product test data not available.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Repeated exposures to dusts of this material are not anticipated to result in systemic toxicity or permanent lung injury; however, excessive exposures may cause less severe respiratory effects.
The data presented are for the following material:
The fiberglass in this product is continuous filament fiberglass.
Repeated exposure to particles generated by grinding may result in implantation of particles in the skin.
Contains a component(s) that is/are encapsulated in the product and are not expected to be released under normal processing conditions or foreseeable emergency

Carcinogenicity
The fiberglass in this product is continuous filament fiberglass. IARC's evaluation of data on continuous filament fiberglass is that there is inadequate evidence of carcinogenicity in animals and in humans. IARC's classification was based primarily on animal studies involving routes of administration (intratracheal, intrapleural, and intraperitoneal) which have limited relevance to typical exposures anticipated in industrial settings. Contains a component(s) that is/are encapsulated in the product and are not expected to be released under normal processing conditions or foreseeable emergency

Teratogenicity
Contains a component(s) that is/are encapsulated in the product and are not expected to be released under normal processing conditions or foreseeable emergency

Reproductive toxicity
Contains a component(s) that is/are encapsulated in the product and are not expected to be released under normal processing conditions or foreseeable emergency

Mutagenicity
The data presented are for the following material: The fiberglass in this product is continuous filament fiberglass. In vitro genetic toxicity studies were inconclusive. Contains a component(s) that is/are encapsulated in the product and are not expected to be released under normal processing conditions or foreseeable emergency

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

COMPONENTS INFLUENCING TOXICOLOGY:

Aluminum
Specific Target Organ Systemic Toxicity (Single Exposure)

Available data are inadequate to determine single exposure specific target organ toxicity.

Tris(1-chloro-2-propyl) phosphate

Specific Target Organ Systemic Toxicity (Single Exposure)
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Cyclopentane (8CI, 9CI)

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause drowsiness or dizziness.
Route of Exposure: Inhalation
Target Organs: Central nervous system

Isopentane

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause drowsiness or dizziness.
Route of Exposure: Inhalation
Target Organs: Central nervous system

Continuous Filament Glass Fiber

Specific Target Organ Systemic Toxicity (Single Exposure)
Available data are inadequate to determine single exposure specific target organ toxicity.

1-Bromopropane

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Lungs

May cause drowsiness or dizziness.
Route of Exposure: Inhalation
Target Organs: Central nervous system

2,2-Dimethylbutane

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause drowsiness or dizziness.
Target Organs: Central nervous system

Carcinogenicity

Component	List	Classification
1-Bromopropane	ACGIH	A3: Confirmed animal carcinogen with unknown relevance to humans.

12. ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data is available.

Toxicity

Acute toxicity to fish
Not expected to be acutely toxic to aquatic organisms.

Persistence and degradability

Biodegradability: Surface photodegradation is expected with exposure to sunlight. No appreciable biodegradation is expected.

Bioaccumulative potential

Bioaccumulation: No bioconcentration is expected because of the relatively high molecular weight (MW greater than 1000).

Mobility in soil

In the terrestrial environment, material is expected to remain in the soil.
In the aquatic environment, material is expected to float.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Landfill. Incinerator or other thermal destruction device.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Not regulated for transport

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

OSHA Hazard Communication Standard
This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
This product is not a hazardous chemical under 29CFR 1910.1200, and therefore is not covered by Title III of SARA.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Components	**CASRN**
Aluminum	7429-90-5

Pennsylvania Worker and Community Right-To-Know Act:
The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	**CASRN**
Aluminum	7429-90-5
1-Bromopropane	106-94-5
Cyclopentane (8CI, 9CI)	287-92-3
Isopentane	78-78-4
2,2-Dimethylbutane	75-83-2

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
WARNING: This product contains a chemical(s) known to the State of California to cause birth defects or other reproductive harm.

Components	**CASRN**
1-Bromopropane	106-94-5

United States TSCA Inventory (TSCA)
The product meets the definition of an article and is exempt from inventory requirements.

16. OTHER INFORMATION

Product Literature
Additional information on this product may be obtained by calling your sales or customer service contact. Ask for a product handling guide.

Revision
Identification Number: 101195906 / A001 / Issue Date: 05/04/2015 / Version: 15.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
Dow IHG	Dow Industrial Hygiene Guideline
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
STEL	Short-term exposure limit
TWA	8-hour, time-weighted average

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

THE DOW CHEMICAL COMPANY urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

THERMAX™ Sheathing

1. PRODUCT NAME

THERMAX™ Sheathing

2. MANUFACTURER

The Dow Chemical Company
Dow Building Solutions
200 Larkin
Midland, MI 48674
1-866-583-BLUE (2583)
Fax 1-989-832-1465
www.dowbuildingsolutions.com

3. PRODUCT DESCRIPTION

THERMAX™ Sheathing is a non-structural, rigid board insulation consisting of a glass-fiber-infused polyisocyanurate foam core laminated between 1.0 mil smooth, reflective aluminum facers on both sides. The glass-fiber reinforcement contributes to improved fire performance and dimensional stability. THERMAX™ Sheathing can be installed exposed to the interior without a thermal barrier.

THERMAX™ Sheathing offers high, long-term R-value. Used in conjunction with the appropriate joint closure system for the application, THERMAX™ Sheathing with its low perm rating helps to reduce moisture condensation within and behind the insulation.

BASIC USE

THERMAX™ Sheathing is specially designed to have a Class A fire rating and can be used in a range of concealed and exposed applications, above and below grade, and can be used in exterior walls. Because of its improved fire performance, THERMAX™ Sheathing is especially appropriate for hourly rated assemblies. THERMAX™ Sheathing is approved for use, per Section 2603.5 of the International Building Code, in Exterior Walls of Types I,II,III and IV construction. THERMAX™ Sheathing is designed for use as continuous insulation in both interior and exterior applications to assist in meeting and exceeding both the most current IECC and the ASHRAE 90.1 energy standards. Maximum length is 30 ft. (9.1 m) and maximum thickness is 4.25" (108 mm).

4. TECHNICAL DATA

APPLICABLE STANDARDS

THERMAX™ Sheathing meets ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board, Type I, Class 2. Applicable standards include:

- C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- C209 – Standard Test Methods for Cellulosic Fiber Insulating Board
- C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- D2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- E96 – Standard Test Method for Water Vapor Transmission of Materials
- D1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics

TYPICAL PHYSICAL PROPERTIES

THERMAX™ Sheathing exhibits the typical physical properties and characteristics indicated in Table 2 when tested as represented.

ENVIRONMENTAL DATA

THERMAX™ Sheathing is manufactured with a zero ozone depleting potential. The use of THERMAX™ Sheathing helps reduce the carbon footprint of commercial buildings.

FIRE INFORMATION

THERMAX™ Sheathing products should be used only in strict accordance with product application instructions. THERMAX™ products are combustible and when used in a building containing combustible materials, may contribute to the spread of fire. For more information, consult MSDS and/or call Dow at 1-866-583-BLUE (2583). In an emergency, call 1-989-636-4400.

CODE COMPLIANCES

THERMAX™ Sheathing complies with the following codes:

- ASTM E2178 Standard Test Method for Air Permeance of Building Materials - leakage rates less than 0.001 L/s/m² at a test pressure of 75 Pa.
- ASTM E283 Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under specified Pressure differences across the specimen. Results were <0.02 L/s/m²
- ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies - no leakage
- ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference - no leakage
- 2009 International Residential Code (IRC) Section 316
- 2009 International Building Code (IBC) Section 2603
- ICC-ES ESR-1659
- FM 4880 – Wall-Ceiling Construction Metal-Faced – Class 1 Fire Rated to Max. 30' Exposure High, 4.25" Thick, 4' Wide, When Installed as Described in the Current Edition of FMRC Approval Guide
- FM 4450 Approval Standard for Class 1 Insulated - Steel Deck Roofs
- THERMAX™ products are covered under Underwriters Laboratories Inc. (UL) File R5622

- UL 1256 – Fire Test of Roof Deck Constructions, Roof Deck Construction No. 120 and No. 123
- UL 723 (ASTM E84) Surface Burning Characteristics of Building Materials
- The following designs are 1, 2, 3 or 4 hour wall rated assemblies as listed in the UL Fire Resistance Directory: U026, U326, U330, U354, U355, U424, U425, U460, U902, U904, U905, U906, U907, V454, V482, V499
- Fire Performance Evaluation of an Exterior Masonry Wall System Incorporating THERMAX™ Insulation Tested in Accordance With NFPA 285, 2006 Edition (UBC 26.9, intermediate scale – multistory testing)
- FMVSS No. 302 – Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses (Docket No. 3-3; Notice 4)
- Miami-Dade NOA 08-0320.01 Interior Insulation on CMU Block

Contact your Dow sales representative or local authorities for state and local building code requirements and related acceptances.

5. INSTALLATION

Boards of THERMAX™ Sheathing are lightweight and can be sawed or cut with a knife. They install quickly to walls (girts, steel stud, tilt-up, block, wood) and ceilings – inside and outside of purlins, trusses or bar joints. Butt joints must be installed over structural members. "Best practice" recommendations for high-humidity environments include continuously sealing the surface of the insulation at all joints with a Dow joint closure system.

Contact a local Dow representative or access the literature library at www.dowbuildingsolutions.com for more specific instructions.

6. AVAILABILITY

THERMAX™ Sheathing is manufactured in several locations and is distributed through an extensive network. For more information, call 1-800-232-2436.

7. WARRANTY

Fifteen-year limited warranty is available. Contact your Dow representative for details.

8. MAINTENANCE

Not applicable.

9. TECHNICAL SERVICES

Dow can provide technical information to help address questions when using THERMAX™ Sheathing. Technical personnel are available to assist with any insulation project. For technical assistance, call 1-866-586-BLUE (2583).

10. FILING SYSTEMS

- www.dowbuildingsolutions.com
- www.DowMetalBuilding.com

TABLE 1: SIZES, R-VALUES AND EDGE TREATMENTS FOR THERMAX™ SHEATHING

Nominal Board Thickness(1), in.	R-value (2)(3)	Board Size, ft	Edge Treatment
0.5	3.3	4 × 8, 4 × 9, 4 × 10	Square Edge
0.75	5	4 × 8, 4 × 9, 4 × 10	Square Edge
1	6.5	4 × 8, 4 × 9, 4 × 10	Square Edge
1.5	9.8	4 × 8, 4 × 9, 4 × 10	Square Edge, Shiplap
2	13	4 × 8, 4 × 9, 4 × 10	Square Edge, Shiplap

(1) Contact your Dow seller for information at different R-values and other sizes and lead time requirements. Not all product sizes are available in all regions.
(2) R means resistance to heat flow. The higher the R-value, the greater the insulating power. Stabilized R-values @ 75°F mean temperature determined in accordance with ASTM C518. R-values expressed in $ft^2 \cdot h \cdot °F/Btu$.
(3) An additional 2.77 R-value may be added to the system R-value, when a minimum 3/4" ideal air space and horizontal heat flow are present in accordance with the ASHRAE Fundamentals Handbook on FTC, 16 CFR Part 460.

TABLE 2: TYPICAL PHYSICAL PROPERTIES OF THERMAX™ SHEATHING

Property and Test Method	Value
Compressive Strength (1), ASTM D1621, psi, min.	25
Flexural Strength, ASTM C203, psi, min.	40
Water Absorption, ASTM C209, % by volume, max.	0.1
Water Vapor Permeance, ASTM E96, perm, max.	≤0.04
Maximum Use Temperature, °F	250

(1) Vertical compressive strength is measured at 10 percent deformation or at yield, whichever occurs first.

In the U.S.
The Dow Chemical Company
Dow Building Solutions
200 Larkin Center,
Midland, MI 48674

Technical Information
1-866-583-BLUE (2583)
Sales Information
1-800-232-2436

dowbuildingsolutions.com

Form No. 179-01015 -0715 CDP

Aluminum Carrier

for use with QDS 650

ECP Building Envelope Specialists, Inc.

Product Application:
Compression Seal Carrier/Swing Door

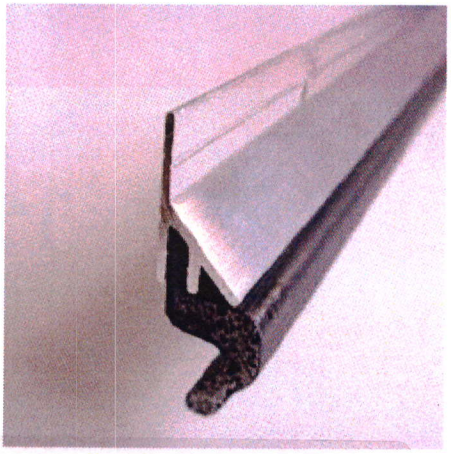
Material:
6063-T5 Anodized Aluminum

Width:
.875 ± .010

Height:
.450 ± .007

Length:
84 inches

Color:
Mill Finish Aluminum,Bronze Anodized, Black Anodized



Carrier shown with QDS 650
Clear Mill Finish

Installation:
Mechanically fastened to strike side, hinge side and header.

Specifications:
T5 temper 6063 has an ultimate tensile strength of at least 22,000 psi (152 MPa) in thicknesses up to 0.5-inch (13 mm), and 21,000 psi (145 MPa) from 0.5 to 1.0-inch (25 mm) thick, and yield strength of at least 16,000 psi (110 MPa) up to 0.5-inch (13 mm) and 15,000 psi (103 MPa) (from 0.5 to 1.0-inch (25 mm). It has elongation of 8%.

Note:
All carrier is cut to meet specific length requirements for each door weather-stripping installation.

ECP Building Envelope Specialists, Inc.

88 Connecticut Rd
Plattsburgh, NY 12903

Phone: 518-563-0579
Fax: 518-563-2659
E-mail: rwhisher@ecp1.com

ECP
BUILDING ENVELOPE SPECIALISTS, INC.

Q-LON® QDS 650 DOOR SEAL

Schlegel®

SUPERIOR WEATHER PROTECTION BACKED BY THE SCHLEGEL STORM SHIELD GUARANTEE

QDS 650

PRODUCT APPLICATIONS
Compression Seal/Swing Door

MATERIAL
Polyethylene Clad Urethane Foam

KERF WIDTH
.125" (3.2mm)

KERF DEPTH
.438" (11.1mm)

COMPRESSION
Recommended 50%
Minimum 10%
Maximum 60%

RABBET DEPTH
2-1/8" (54mm)

COMPRESSION SET
Less than 5% when compressed to 50% of its original reach for 22 hrs. at 158° F (70° C).

INSTALLATION
One profile seals the strike side, hinge side and header.

FIRE RATING
Category H Edge Sealing System and Category J Gasketing for use with Category B wood doors rated 20 minutes fire tested without hose stream and Category B wood and plastic-covered composite doors rated up to 90 minutes.

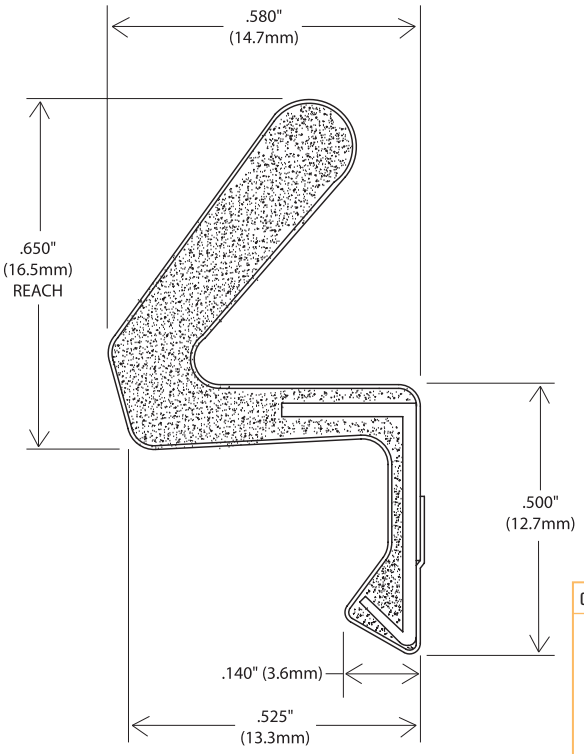
STANDARD PACK

37" (.94m) 250 pcs./carton	97" (2.46m) 125 pcs./carton
82" (2.08m) 125 pcs./carton	120" (3.05m) 125 pcs./carton
86" (2.18m) 100 pcs./carton	144" (3.66m) 125 pcs./carton

COLORS
Grey, black, white, bronze, beige

COLOR/LENGTH	PART NO.	COLOR/LENGTH	PART NO.
Grey 37" (.94m)	U8331-03700	White 97" (2.46m)	U8333-09700
Grey 82" (2.08m)	U8331-08200	White 120" (3.05m)	U8333-12000
Grey 86" (2.18m)	U8331-08600	White 144" (3.66m)	U8333-14400
Grey 97" (2.46m)	U8331-09700	Bronze 37" (.94m)	U8334-03700
Grey 120" (3.05m)	U8331-12000	Bronze 82" (2.08m)	U8334-08200
Grey 144" (3.66m)	U8331-14400	Bronze 86" (2.18m)	U8334-08600
Black 37" (.94m)	U8332-03700	Bronze 97" (2.46m)	U8334-09700
Black 82" (2.08m)	U8332-08200	Bronze 120" (3.05m)	U8334-12000
Black 86" (2.18m)	U8332-08600	Bronze 144" (3.66m)	U8334-14400
Black 97" (2.46m)	U8332-09700	Beige 37" (.94m)	U8336-03700
Black 120" (3.05m)	U8332-12000	Beige 82" (2.08m)	U8336-08200
Black 144" (3.66m)	U8332-14400	Beige 86" (2.18m)	U8336-08600
White 37" (.94m)	U8333-03700	Beige 97" (2.46m)	U8336-09700
White 82" (2.08m)	U8333-08200	Beige 120" (3.05m)	U8336-12000
White 86" (2.18m)	U8333-08600	Beige 144" (3.66m)	U8336-14400

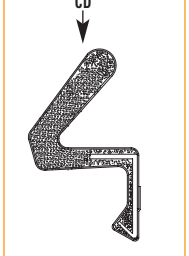
NOTE: Other lengths available upon request.
Tolerance +/- 1" (25.4mm)



CLASSIFIED UL

UP TO 90 MINUTES

CD=COMPRESSION DIRECTION



ACTUAL SIZE

Covered under Storm Shield Guarantee program. Guaranteed for the life of your door.

Q-LON® QDS 650 DOOR SEAL

Q-LON Door Seal is made of an open-cell urethane foam core and clad in an embossed polyethylene, U.V. stablized, paint-resistant liner for kerf applications.

Schlegel®

QDS 650

	LINEAL SHRINKAGE	
	%	Q-LON PERFORMANCE
Q-LON door seals	0.10	—
Knock-off door seals	1.10	11.0 times better
TPE magnetic seals	0.40	4.0 times better

	COMPRESSION SET	
	%	Q-LON PERFORMANCE
Q-LON door seals	5	—
Knock-off door seals	17	3.4 times better
Closed-cell foam seals	13	2.6 times better
TPE compression seals	25	5.0 times better
TPE magnetic seals	50	10.0 times better

PRODUCT HIGHLIGHTS

FEATURE	BENEFIT
Highly engineered embossed polyethylene liner	Resists paints and varnishes. Long lasting. Maintains an attractive appearance.
UV stabilized	Stable in sunlight (UV stable). Tested up to 5,000 Kj/m^2 with no visible degradation.
Resilient urethane open-celled foam	Shape and resiliency are retained over time. Offers excellent all-temperature sealing performance. No corner leaks. Seal conforms to uneven surfaces.
Fully wrapped insert	Offers maximum protection against wood preservatives.

Q-LON DOOR SEAL TEST DATA

WATER INFILTRATION Passed water penetration tests at 25 mph (40km/h) and 34 mph (55km/h) ASTM E-331 standard test method.

WATER ABSORPTION No visible effects in degradation; water absorption negligible after being submerged in water for 24 hours and then exposed to -30° F (-34° C) for one week. Compressed 50% upon removal from the freezer. (Tested at Schlegel Testing Laboratories.)

Schlegel®

Schlegel Systems, Inc.
1555 Jefferson Road
Rochester, New York
14692-3197

800.586.0354 Toll free
585.427.9993 Fax

www.schlegel.com C - 282
e-mail: bpdproducts@schlegel.com

DOOR SEAL | SURFACE

Q-LON® QFS 375 DOOR SEAL (ADHESIVE BACKED)

SUPERIOR WEATHER PROTECTION BACKED BY THE SCHLEGEL STORM SHIELD GUARANTEE

QFS 375

PRODUCT APPLICATIONS
Compression Seal/Fire-Rated Door

MATERIAL
Polyethylene Clad Urethane Foam

STOP WIDTH
.500" (12.7mm)

COMPRESSION
Recommended 50%
Minimum 20%
Maximum 60%

COMPRESSION SET
Less than 5% when compressed to 50% of its original reach for 22 hrs. at 158° F (70° C).

INSTALLATION
Profile seals the strike side, hinge side and header.

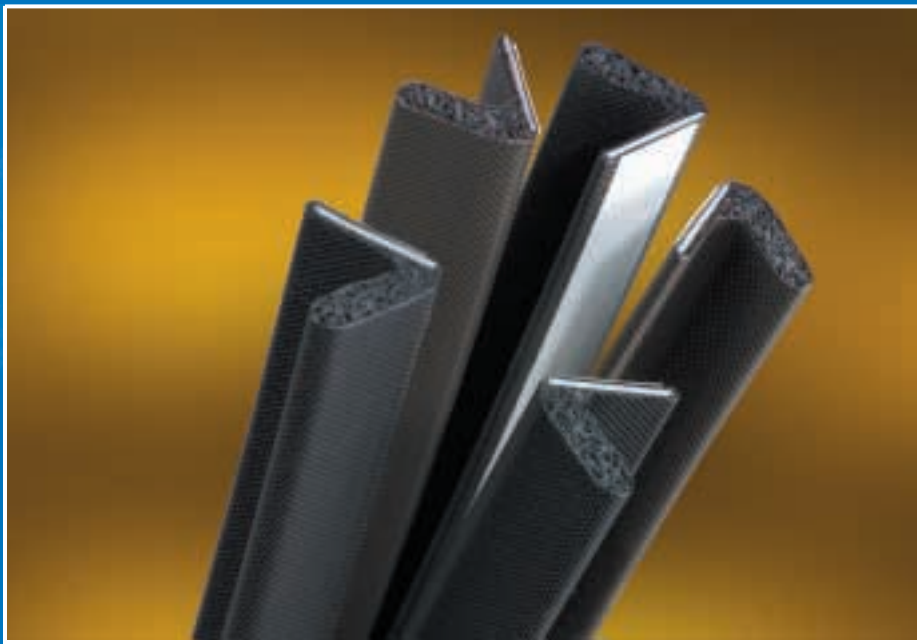
FIRE RATING
Category H Edge Sealing System and Category J Gasketing for use with Category B wood doors rated 20 minutes fire tested without hose stream and Category B wood and plastic-covered composite doors rated up to 90 minutes. Also for use with Listed steel frames and/or Classified steel covered composite, hollow metal doors rated up to 3 hours. These seals comply with the requirements of Underwriters Laboratories UL 10C and UBC 7-2-97, GVYI, file #R14384.

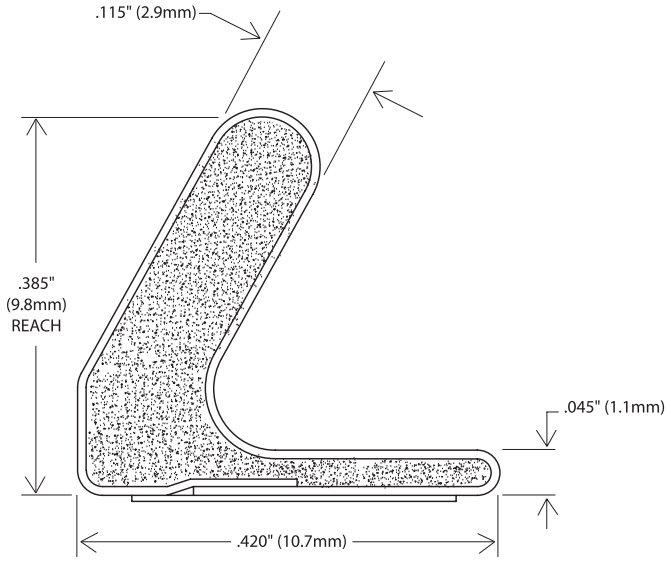
STANDARD PACK
39" (.99m) 300 pcs./carton,
all others 150 pcs./carton.

COLORS
Black, white, bronze

COLOR/LENGTH	PART NO.
Black 39" (.99m)	U9862T03900
Black 86" (2.18m)	U9862T08600
White 39" (.99m)	U9863T03900
White 86" (2.18m)	U9863T08600
Bronze 39" (.99m)	U9864T03900
Bronze 86" (2.18m)	U9864T08600

NOTE: Other lengths available upon request.
Tolerance +/- 1" (25.4mm)





CLASSIFIED UL
UP TO 3 HOURS

CD=COMPRESSION DIRECTION

ACTUAL SIZE

Covered under Storm Shield Guarantee program. Guaranteed for the life of your door.

Q-LON® QFS 375 DOOR SEAL (ADHESIVE BACKED)

Q-LON Door Seal is made of an open-cell urethane foam core and clad in an embossed polyethylene, U.V. stablized, paint-resistant liner for kerfless applications.

Schlegel®

QFS 375

LINEAL SHRINKAGE

	%	Q-LON PERFORMANCE
Q-LON door seals	0.10	—
Knock-off door seals	1.10	11.0 times better
TPE magnetic seals	0.40	4.0 times better

COMPRESSION SET

	%	Q-LON PERFORMANCE
Q-LON door seals	5	—
Knock-off door seals	17	3.4 times better
Closed-cell foam seals	13	2.6 times better
TPE compression seals	25	5.0 times better
TPE magnetic seals	50	10.0 times better

PRODUCT HIGHLIGHTS

FEATURE	BENEFIT
Highly engineered embossed polyethylene liner	Resists paints and varnishes. Long lasting. Maintains an attractive appearance.
UV stabilized	Stable in sunlight (UV stable). Tested up to 5,000 Kj/m² with no visible degradation.
Resilient urethane open-celled foam	Shape and resiliency are retained over time. Offers excellent all-temperature sealing performance. No corner leaks. Seal conforms to uneven surfaces.
Applied to surface with Pressure Sensitive Adhesive	Mounts to any surface with high quality adhesive.

Q-LON DOOR SEAL TEST DATA

WATER INFILTRATION Passed water penetration tests at 25 mph (40km/h) and 34 mph (55km/h) ASTM E-331 standard test method.

WATER ABSORPTION No visible effects in degradation; water absorption negligible after being submerged in water for 24 hours and then exposed to -30° F (-34° C) for one week. Compressed 50% upon removal from the freezer. (Tested at Schlegel Testing Laboratories.)

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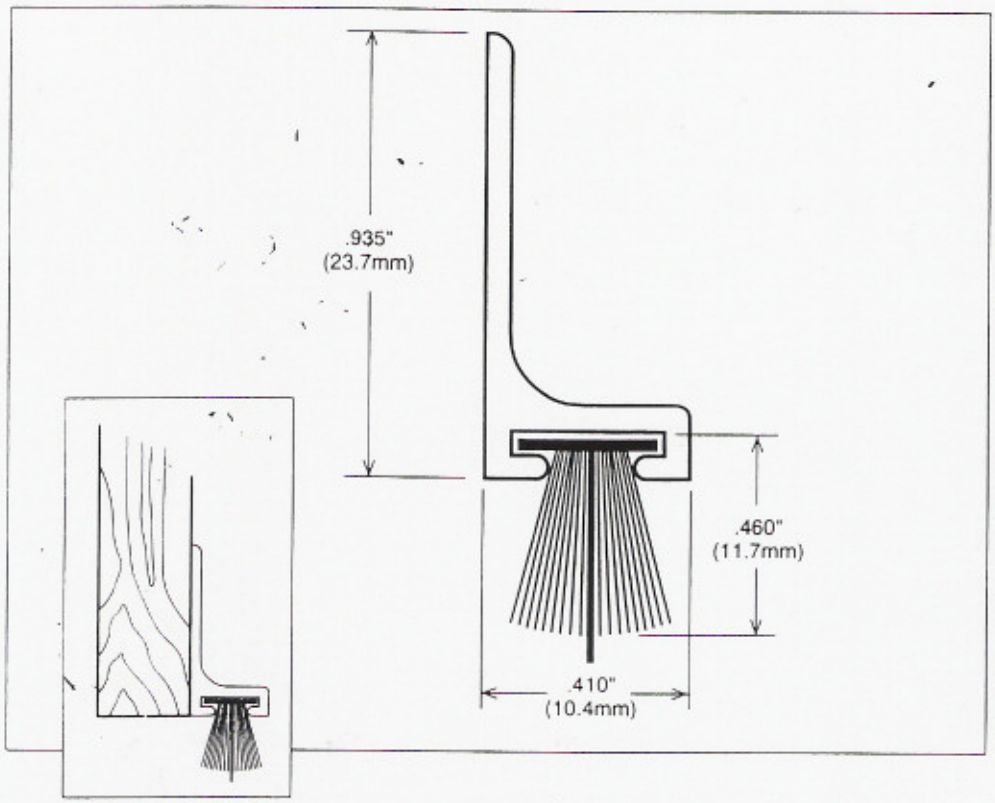


Door Sweep

Mounts on interior or exterior face of door.
Fills gaps from 1/16" to 5/16".
(1.6mm to 7.9mm).

Part Name: Door Sweep

Application: Swing Door

Material: Aluminum
Also available in anodized bronze aluminum

Compression: Recommended 30%
Minimum 10%
Maximum 50%

Installation: Mounts on interior or exterior face of door

Standard Pack: 50 pieces per carton

Colors: Mill or bronze

LENGTH/COLOR	PART NO.
36" (.91m) Mill	7595-276A-5
84" (2.13m) Mill	7595-276D-9
144" (3.66m) Mill	7595-276C-1
36" (.91m) Bronze	7595-330A-8
84" (2.13m) Bronze	7595-330D-2
144" (3.66m) Bronze	7595-330C-4

Prepunched holes for easy installation and adjustment. Includes screws.

Schlegel®
1-800-586-0354
Rapid Response Fax 1-716-427-9993
bpssproducts@schlegel.com

SEALEZE®
Problem solved.

Weatherseal Applications

Contents

About Us

Sealeze solves problems to help our customers succeed. The means: brush. The end: results.

"Customers first" at Sealeze isn't just lip service. We understand what is important to our customers: quality products that solve their problems, short lead times, fast quotes, and promised delivery dates that can be counted on. Everything we do is to meet a single end – meeting all our customer's needs and expectations.

We create solutions that address specific needs. We continually raise the bar for customer-focused innovation, drawing on a highly-skilled staff with a unique problem-solving mindset, and the broadest inventory of brush sizes, filament types, and materials in the industry.

Sealeze got its start in the 1970s as the first US distributor of strip brush for weatherseal applications. In the years since, we have become the foremost innovator in brush solutions for a broad range of applications. Sealeze joined the Jason Incorporated family of companies in 1999.

ISO 9001 Certified
Sealeze has been ISO certified since 1997 and today holds ISO 9001 certification. Everyone at Sealeze is part of the ISO experience – marketing, sales, accounting, purchasing, engineering, customer service, shipping/receiving, and manufacturing. It is not just a manufacturing system, but a company-wide way of doing business that puts the needs of our customers as the focus of what we do. ISO is not just a one-time event, it is one step in a continuous improvement process that also utilizes Lean Manufacturing principles to reduce waste and improve quality.

Help and How to Order

General Ordering

The following information for each part number will be needed when placing your order:

1. Part number, including brush length.
2. Whether or not slots and screws are required.
3. Length of the part in feet and inches.
4. Number of pieces.

Contact Us

For immediate answers and free samples*:

- Call: 800.446.7325
  804.743.1218
- Fax: 800.448.2908
  804.743.3413
- Visit: www.sealeze.com
- Email: weatherseal@sealeze.com

Therm-L-Brush® is made from 100% type-6 black nylon filament. Proseal is made of polypropylene filament. Our aluminum extrusions are stocked in the following finishes: CLA (clear satin anodized), DUR (duranodic), and GLD (polished brass anodized).

Order YOUR way to promote easy installations:

- Stocked Length: Therm-L-Brush and all Sealeze products are available directly from stock for immediate shipment in stocked lengths. Current stock lengths are 3, 7, 8 and 10 feet. (Length availability varies by products.)
- Custom Cut-To-Length: We will custom cut our weatherseals to the lengths you need—usually at no additional charge. Contact your sales representative with your requirements.
- Stocked Kits: Therm-L-Brush for entrance doors and residential garage doors is stocked in kit form in selected part numbers. Kits are poly-bagged and include the following:
  - Pre-cut weatherseals
  - Slotted holder flanges for adjustable installation
  - Self-drilling screws for fast installation
  - Instructions

  Contact your sales representative for availability.
- Custom Kits: If you need custom door kits for non-standard size doors, call your sales representative with your requirements. We'll work with you!
- Shipping†: Small orders of lengths 8 feet and under are shipped UPS unless specified otherwise. Orders with lengths over 8 feet must go by truck. To save minimum freight charges on small orders, consider having lengths longer than 8 feet cut in half or some other combination in order to save on freight costs by shipping UPS.

For questions and assistance, please call your sales representative for expert advice!

** A 4 inch sample of a brush and holder will be sent to you following a discussion with a Sealeze sales representative regarding your application requirements.*

† Therm-L-Brush is shipped with slots and self-drilling TEK screws with Phillips/hex drive slots. UL Labels are applied upon request.

Why Brush Weatherseal is Better

Doors are installed to close an opening, to keep inside air in and outside air out. However, for proper operation, doors need clearance. This clearance creates a gap that allows air infiltration. Installing Therm-L-Brush® Weatherseal is the most effective means to prevent air infiltration, thus saving money on heating and cooling costs.



Color of holders shown are approximate.

Why Sealeze Brush Weatherseal?

A ⅛ inch gap around a standard 3 x 7 foot entrance door is equivalent to a hole with an area of 30 square inches. Sounds drafty, doesn't it? Therm-L-Brush will put an end to that draft!

A ¼ inch gap on the sides and top of a 10 x 10 foot sectional door is equivalent to a hole with the area of 90 square inches. Imagine what else could be coming in with the wind! Therm-L-Brush Weatherseals prevents unwanted pests.

An unsealed 10 x 10 foot sectional door can permit 328 million cubic feet of air infiltration in a year. Think of all the money being spent on heating and cooling costs. Therm-L-Brush Weatherseals will more than pay for itself.

Why prevent air infiltration?

Air infiltration means that outside air is displacing inside air. And every cubic foot of infiltrated air will be heated or cooled at someone's expense. With air infiltration comes a host of unwanted elements including dust, sand, rain and snow, noise and fumes, birds, bats, insects and rodents. Effective weather sealing with brush keeps all of these outside where they belong and helps reduce heating and cooling costs.

Why use Therm-L-Brush Weatherseal?

It is simply the best weatherseal, effectively blocking 98.5% of air infiltration. It is at least three times more effective than vinyl, and rarely needs to be replaced. Therm-L-Brush will not interfere with the operation of the door. A study by the U.S. Navy on energy conservation found Therm-L-Brush to be the superior weatherseal material.

How does it work?

Therm-L-Brush is a dense wall of nylon filaments bound securely by a strip of galvanized steel and held in an aluminum holder. This wall of nylon forms an almost air-tight barrier. It is flexible, allowing unimpeded door movement. It will not tear or pull out and conforms to surface irregularities maintaining a complete weather tight seal for the life of the door.

It's better.

Therm-L-Brush lasts longer and seals better than vinyl, felt, neoprene, silicone, or any other weatherstrip product.

It's easy to install.

Therm-L-Brush aluminum holders come slotted with self-drilling TEK-type screws for quick, low-cost installation. When using double backed tape, installation takes seconds.

It's attractive.

Therm-L-Brush comes in a variety of holder and brush color combinations that complement any door. The aluminum holders are available in a clear anodized finish, a gold anodized finish, or a dark brown duranodic finish. Brush filaments are stocked in black.

It's UL 3-Hour Fire Door rated.

Sealeze Nylon Therm-L-Brush up to 4 inces long are UL labeled upon request) for use on 3-hour fire doors.

It lasts the longest.

Independent laboratory testing has proven our brush to stands up to 2,000,000 cycles (opening and closing) without degradation. Nylon filaments give Therm-L-Brush unmatched flexibility and durability. Not only does it to conform to all surface contours for a complete seal but, it won't tear like solid sealing materials can. Therm-L-Brush can last the life of the door, rarely needing to be replaced. The nylon holds up to the weather like nothing else. Installations of 10-15 years are the rule, not the exception.

It works in extreme temperatures. even at 70° below.

In the coldest climates, where vinyl and other materials can freeze and become brittle, Sealeze Therm-L-Brush will stay flexible.

It blocks light.

It's ideal for sealing doors to light-sensitive areas and for use around warehouses and food preparation areas to keep out pests. With no light visible, there is less of a chance of attracting pests.

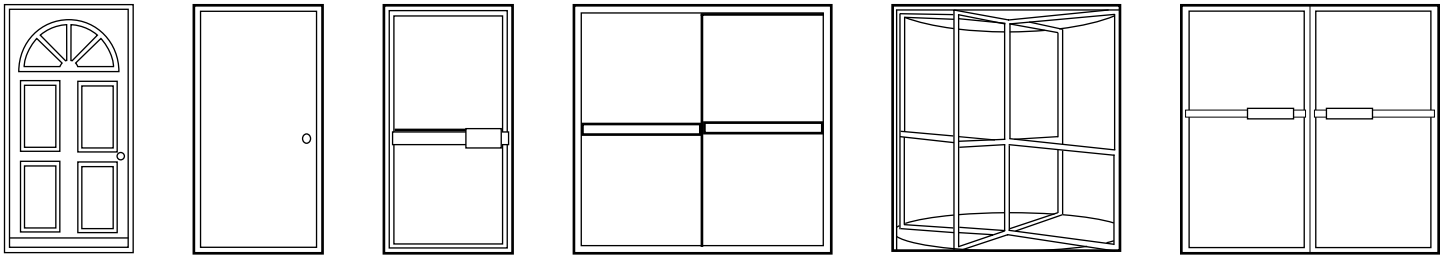
It blocks sound.

Independent laboratory tests shows Sealeze Therm-L-Brush effectively reduces sounds that can come through the openings around interior and exterior doorways.

Brush Weatherseal for Entrance Doors

The importance of sealing openings in a building applies to entrance doors just as it does to overhead doors. Any gap around a door causes energy loss due to air infiltration. Dirt and debris are just as much of a problem. Brush designed as Door Bottom Seals and Door Jamb Seals provide the most effective means of solving these problems. Mounted using special finished holders, brush weatherseals provide an attractive and effective solution to gaps for any door. And, Sealeze AstraSweep® corner seals when used with Sealeze door sweeps and astragal seals, provide a more complete seal by closing the gap between the sweep and astragal.

Keeps out: drafts, light, insects, noise, dust, sand, wind, rain, snow, sleet, fumes and rodents



Kits

Most Sealeze weatherseal products are stocked in kits for standard size entrance doors. Kits are available for sweeps, door header and jamb seals, astragal seals and AstraSweep kits which include astragal, sweep and corner seals for a more complete seal around double doors. Kits are pre-cut to size: holders are pre-slotted with self-drilling screws for fast, easy installation. Kits are packaged in clear poly bags with instructions. Easy to stock, easy to use!

Custom Kits

For special door sizes or configurations, Sealeze will custom-cut weatherseal to your specifications and package in clear poly bags.

Bulk*

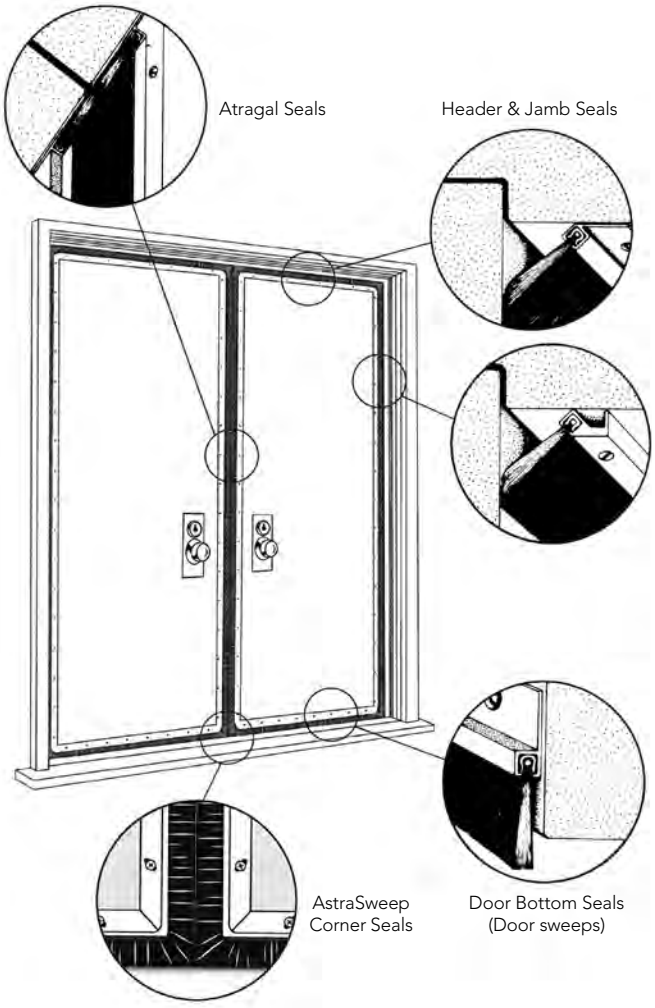
Weatherseals are also available in bulk to package yourself, or to keep on hand so you can cut to fit as needed.

Cut To Order*

For special door sizes or configurations, Sealeze will custom cut weatherseals to your specifications.

Double Backed Tape

For the fastest installation use our double backed adhesive tape. This makes installation time a matter of seconds and holds securely without screws. It is available in two forms: applied to the weatherseal holder, or in rolls. Weatherseal with applied double backed tape is not slotted.



** When ordering please specify: piece length, number of pieces.*

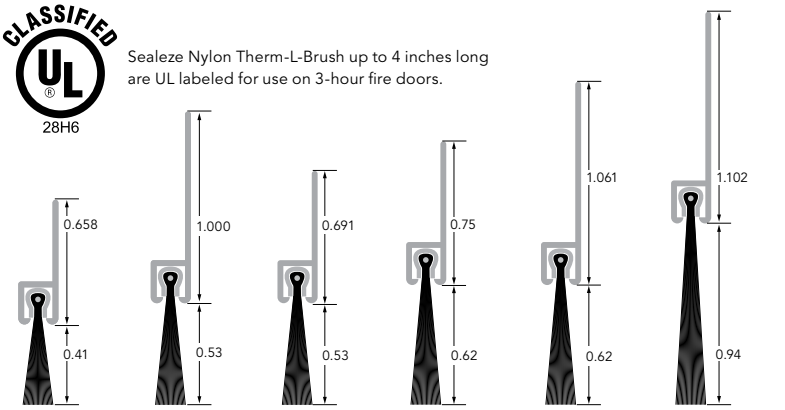
All dimensions in inches, unless otherwise indicated.
Dimensions are to Sealeze manufacturing tolerances. Contact us for more information on tolerances.

Door Sweeps

Brush weatherseals are ideal for sealing the irregular surfaces of thresholds at door bottoms, conforming to the surface while not impairing the door's movements. Select the right brush and holder, based on the size of the gap to be sealed and the desired appearance of the holder.

CLASSIFIED UL 28H6

Sealeze Nylon Therm-L-Brush up to 4 inches long are UL labeled for use on 3-hour fire doors.



A180CLA04BL
A180DUR04BL
A180GLD04BL

B210CLA05BL
B210DUR05BL

B280CLA05BL

C380CLA06BL
C380DUR06BL
C380GLD06BL

C381CLA06BL

D480CLA09BL
D480DUR09BL

Product Code	Brush Length	Holder Length	Stock Length (feet)
A180CLA04BL	0.41	0.658	7, 8, 10
A180DUR04BL	0.41	0.658	7, 10
A180GLD04BL	0.41	0.658	10
B210CLA05BL	0.53	1.000	3, 7, 10
B210DUR05BL	0.53	1.000	10
B280CLA05BL	0.53	0.691	10
C380CLA06BL	0.62	0.750	3, 7, 10
C380DUR06BL	0.62	0.750	10
C380GLD06BL	0.62	0.750	12
C381CLA06BL	0.62	1.061	8, 10
D480CLA09BL	0.94	1.102	3, 7, 8, 9, 10, 12
D480DUR09BL	0.94	1.102	8, 10, 12

Door Sweep Kits

Aluminum door sweeps in both clear and duranodic finish with black brush are the perfect complement to their corresponding door jamb seals. The aluminum holders are pre-slotted for ease of installation and sweeps are prepackaged with fasteners for 3 ft., 3.5 ft. and 4 ft. doors.

Kit Product Code	Brush Length*	Door Bottom Width (feet)
A180CLA04BL3	0.41	3
A180CLA04BL3.5	0.41	3.5
A180CLA04BL4	0.41	4
A180DUR04BL3	0.41	3
A180DUR04BL3.5	0.41	3.5
A180DUR04BL4	0.41	4
A180GLD04BL3	0.41	3
A180GLD04BL3.5	0.41	3.5
A180GLD04BL4	0.41	4
B210CLA05BL3	0.53	3

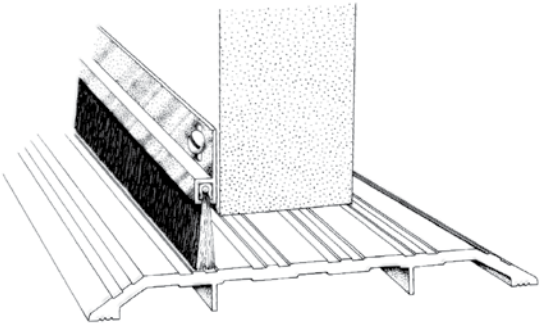
Kit Product Code	Brush Length*	Door Bottom Width (feet)
B210CLA05BL3.5	0.53	3.5
B210CLA05BL4	0.53	4
B210DUR05BL3	0.53	3
B210DUR05BL3.5	0.53	3.5
B210DUR05BL4	0.53	4
C380CLA06BL3	0.62	3
C380CLA06BL3.5	0.62	3.5
C380CLA06BL4	0.62	4
C380DUR06BL3	0.62	3
C380DUR06BL3.5	0.62	3.5

Kit Product Code	Brush Length*	Door Bottom Width (feet)
C380DUR06BL4	0.62	4
C380GLD06BL3	0.62	3
C380GLD06BL3.5	0.62	3.5
C380GLD06BL4	0.62	4
D480CLA09BL3	0.94	3
D480CLA09BL3.5	0.94	3.5
D480CLA09BL4	0.94	4
D480DUR09BL3	0.94	3
D480DUR09BL3.5	0.94	3.5
D480DUR09BL4	0.94	4

**All products are available in different brush lenghts. Call for assistance with your special application.*

How to Select the Right Door Sweep

What size gap are you sealing?	Look at these items:
Up to ⅜"	Starting with the letter "A"
Up to ½"	Starting with the letter "B"
Up to 9⁄16"	Starting with the letter "C"
Up to 1"	Starting with the letter "D"
What color should the holder be?	Look at these items:
Clear Satin (silver in color)	Items with the letters "CLA" in the middle
Bronze (dark brown in color)	Items with the letters "DUR" in the middle
Polished Brass (gold in color)	Items with the letters "GLD" in the middle



All dimensions in inches, unless otherwise indicated.
Dimensions are to Sealeze manufacturing tolerances. Contact us for more information on tolerances.

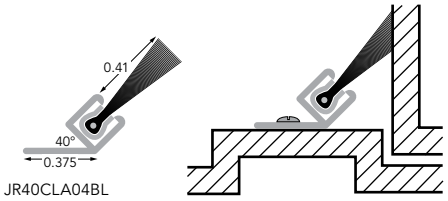
Jamb Seals & Kits

Aluminum door jamb holders are available in clear (silver color), duranodic (brown color) and polished brass (gold color) finishes. These holders are available for doors 3', 4', and 6' wide by 7' high. Kits come with screw slots for after-installation adjustment or with counter-sunk holes for a neat, flush finish. Aluminum door jamb holders are available in clear (silver color), duranodic (brown color) and polished brass (gold color) finishes.

UL listed jamb kits provide reliable seals without restricting automatic door closers. Tested for 2,000,000 cycles by Scovill Laboratories, these high-quality brush seals provide long-lasting, cost-effective service.

Jamb Seals

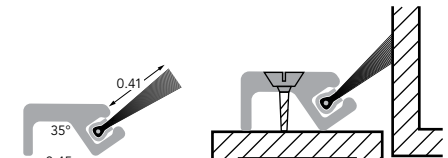
Product Code	Brush Length	Holder Length	Holder Angle	Finish Color	Stock (feet)
JR40CLA04BL	0.41	0.375	40°	Clear Anodized	7, 8, 9, 10
J135CLA04BL	0.41	0.450	35°	Clear Anodized	7, 10
J135DUR04BL	0.41	0.450	35°	Duranodic	10
J135GLD04BL	0.41	0.450	35°	Gold Anodized	7
J140CLA04BL	0.41	0.750	40°	Clear Anodized	7, 8, 10
J140DUR04BL	0.41	0.750	40°	Duranodic	7, 10



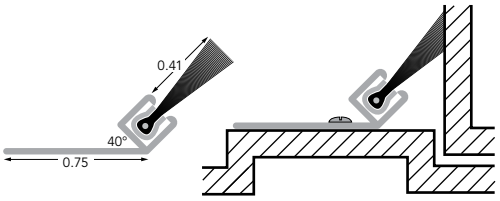
JR40CLA04BL

Jamb Seal Kits (Stock Items)

Product Code	Brush Length	Door Size (feet)	Finish Color
JR40CLA04BL17	0.41	3 X 7	Clear Anodized
JR40CLA04BL18	0.41	4 X 7	Clear Anodized
JR40CLA04BL20	0.41	6 X 7	Clear Anodized
J135CLA04BL17	0.41	3 X 7	Clear Anodized
J135CLA04BL18	0.41	4 X 7	Clear Anodized
J135CLA04BL20	0.41	6 X 7	Clear Anodized
J135DUR04BL17	0.41	3 X 7	Duranodic Finish
J135DUR04BL18	0.41	4 X 7	Duranodic Finish
J135DUR04BL20	0.41	6 X 7	Duranodic Finish
J135GLD04BL17	0.41	3 X 7	Gold Anodized
J135GLD04BL18	0.41	4 X 7	Gold Anodized
J135GLD04BL20	0.41	6 X 7	Gold Anodized
J140CLA04BL17	0.41	3 X 7	Clear Anodized
J140CLA04BL18	0.41	4 X 7	Clear Anodized
J140CLA04BL20	0.41	6 X 7	Clear Anodized
J140DUR04BL17	0.41	3 X 7	Duranodic Finish
J140DUR04BL18	0.41	4 X 7	Duranodic Finish
J140DUR04BL20	0.41	6 X 7	Duranodic Finish



J135CLA04BL
J135DUR04BL
J135GLD04BL



J140CLA04BL
J140DUR04BL

Brush lengths also available in 0.75" and 1.00".

JR40 and J140 kits come with screw slots for after-installation adjustments. J135 kits have counter-sunk screw holes for a neat, flush finish. Fasteners and installation instructions are provided with all kits.

Selecting The Right Door Jamb

What color do you need? ..... Select:

Clear Satin (silver in color)..... Items with letters "CLA" in the middle
Bronze (dark brown in color) .... Items with the letters "DUR" in the middle
Polished Brass (gold in color)... Items with the letters "GLD" in the middle

What size is the door? ..... Select:

3' x 7' ..... Item with product code ending in 17
4' x 7' ..... Item with product code ending in 18
6' x 7' ..... Item with product code ending in 20

What style holder should be used?

It's strictly a matter of preference. Our JR40 extrusion is the smallest, offering a .375" flange at a 40° angle. The J140 extrusion is slightly larger with a .75" flange at a 40° angle while the J135 extrusion brings a more "finished" look to your jambs with a .45" flange at a 35° angle.

All dimensions in inches, unless otherwise indicated.
Dimensions are to Sealeze manufacturing tolerances. Contact us for more information on tolerances.

Astragal Seals for Wood and Metal Doors

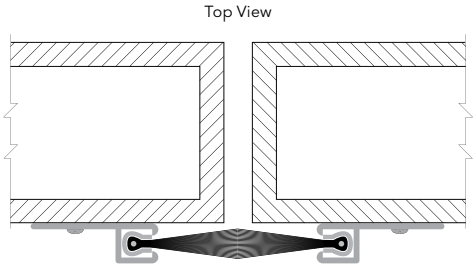
Therm-L-Brush® is perfect for astragal applications when closing the gap between two doors is necessary. Fourteen and sixteen foot standard kits, available in our A180 or C380 product codes, come poly-bagged to include fasteners and installation instructions for wood doors. Metal doors are sealed just as quickly when our weatherseals are applied by using double backed tape.

Astragal Seals

Product Code	Brush Length	Straight Holder Length	Stock Length (feet)
A180CLA04BL	0.41	0.658	7, 8
A180DUR04BL	0.41	0.658	7, 8
A180GLD04BL	0.41	0.658	7, 8
C380CLA06BL	0.62	0.750	7, 8
C380DUR06BL	0.62	0.750	7, 8
C380GLD06BL	0.62	0.750	7, 8

Astragal Kits

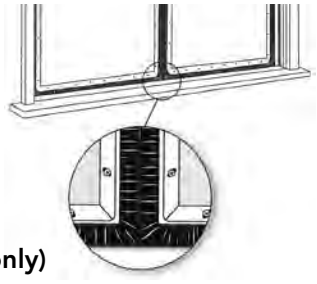
Kit Product Code	Brush Length	Door Height (feet)
A180CLA04BL14	0.41	7
A180DUR04BL14	0.41	7
A180GLD04BL14	0.41	7
C380CLA06BL14	0.62	7
C380DUR06BL14	0.62	7
C380GLD06BL14	0.62	7
A180CLA04BL16	0.41	8
A180DUR04BL16	0.41	8
A180GLD04BL16	0.41	8
C380CLA06BL16	0.62	8
C380DUR06BL16	0.62	8
C380GLD06BL16	0.62	8



AstraSweep™ Kits

Sealeze AstraSweep corner seals seal the hole between the astragal seal and the door sweep. AstraSweep Kits include two corner seals, two door sweeps and two astragal seals–all the materials necessary to seal the inside (gaps up to 1 inch) and bottoms of a double door. Holders are pre-slotted for easy installation.

Kit Product Code	Door Size (W x H, feet)	Finish Color
C380CLA06BL67	6 x 7	Clear Anodized
C380DUR06BL67	6 x 7	Duranodic
C380CLA06BL68	6 x 8	Clear Anodized
C380DUR06BL68	6 x 8	Duranodic
C380CLA06BL77	7 x 7	Clear Anodized
C380DUR06BL77	7 x 7	Duranodic
C380CLA06BL78	7 x 8	Clear Anodized
C380DUR06BL78	7 x 8	Duranodic
C380CLA06BL87	8 x 7	Clear Anodized
C380DUR06BL87	8 x 7	Duranodic
C380CLA06BL88	8 x 8	Clear Anodized
C380DUR06BL88	8 x 8	Duranodic



AstraSweep (corner seal only)

(includes 2 seals for size "C" door sweep and astragal seal)

Kit Product Code	Finish Color
C38090CLA06BLKP	Clear Anodized
C38090DUR06BLKP	Duranodic

All dimensions in inches, unless otherwise indicated.
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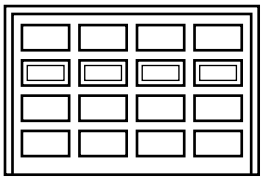
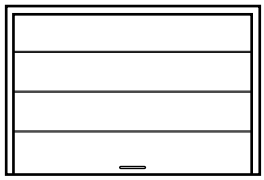
Brush Weatherseals for Overhead Doors

To minimize air and dirt infiltration around rolling steel, sectional and sliding overhead doors, install the best weatherseals available. Sealeze Brush Weatherseal's unique property of conforming to irregular surfaces provides the most effective sealing. Thousands of filaments form a solid wall for a complete weather-tight seal without impairing door movement. Order with slots & screws, or with easy-to-install double backed tape.

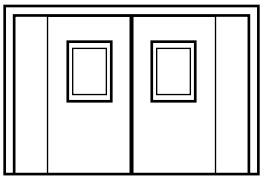


Residential

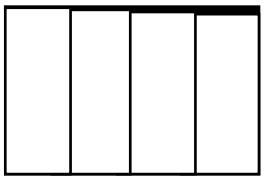
Rolling Steel



Sectional



High Speed



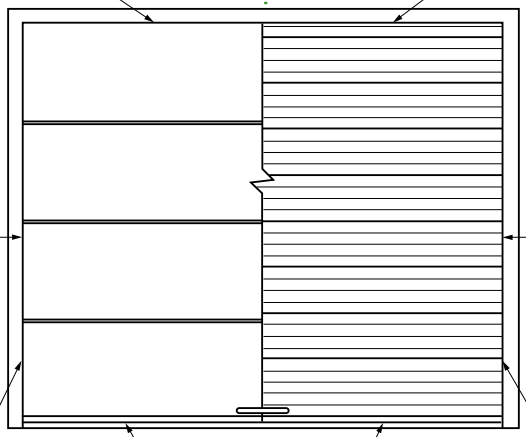
Sliding Aircraft Hangar

Side view of Header Seal

Use angled holder so top of door closes into brush for tight seal.

Side view of Header Seal

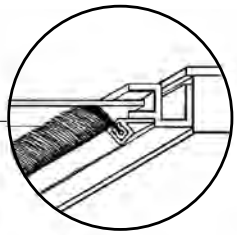
Straight holder mounts on inside of door or mounts to header exterior. Brush outlasts the vinyl flap that comes with most installations and keeps out birds, bats and insects.



Top view of Jamb Seal

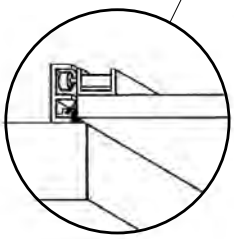
Use angled holder on jambs. Brush fills all corrugations for complete seal.

Top view of Jamb Seal



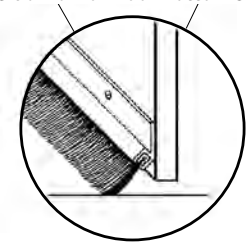
Behind-Wall Installation: Use angled holder on jambs.

Top view of Jamb Seal



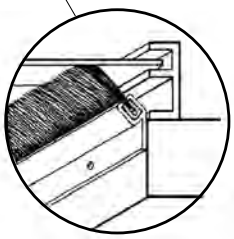
Angled holder can be mounted on inside so brush seals against edge of door. Inside mount hides seal and prevents potential impact damage. Use double backed tape for easiest installation.

Side view of Door Bottom Seal



Mount angled holder across door bottom so brush flexes on to pavement to complete all around sealing of door.

Top view of Jamb Seal



Behind-Wall Installation: Use reverse angled holder on guides.

Keeps out Drafts • Rain • Snow • Wind • Sand • Debris • Light • Noise • Insects • Rodents • Birds • Bats

All dimensions in inches, unless otherwise indicated.
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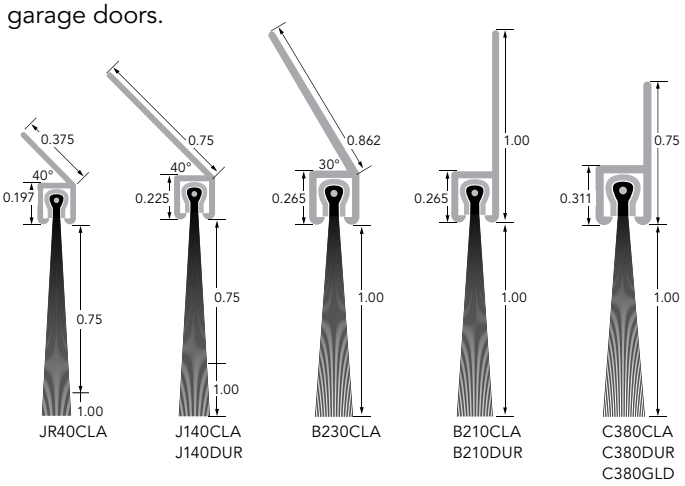
Light Duty

Light-duty brush seals are ideal for residential and commercial sectional doors. JR40 and J140 are available in kits for 9 X 7 ft. and 16 X 7 ft. garage doors.

Product Code	Brush Length	Holder Length	Holder Angle
JR40CLA08BL	0.75	0.375	40°
JR40CLA10BL	1.00	0.375	40°
J140CLA08BL	0.75	0.750	40°
J140DUR08BL	0.75	0.750	40°
J140CLA10BL	1.00	0.750	40°
J140DUR10BL	1.00	0.750	40°
B230CLA10BL	1.00	0.862	30°
B210CLA10BL	1.00	1.000	180°
B210DUR10BL	1.00	1.000	180°
C380CLA10BL	1.00	0.750	180°
C380DUR10BL	1.00	0.750	180°
C380GLD10BL	1.00	0.750	180°

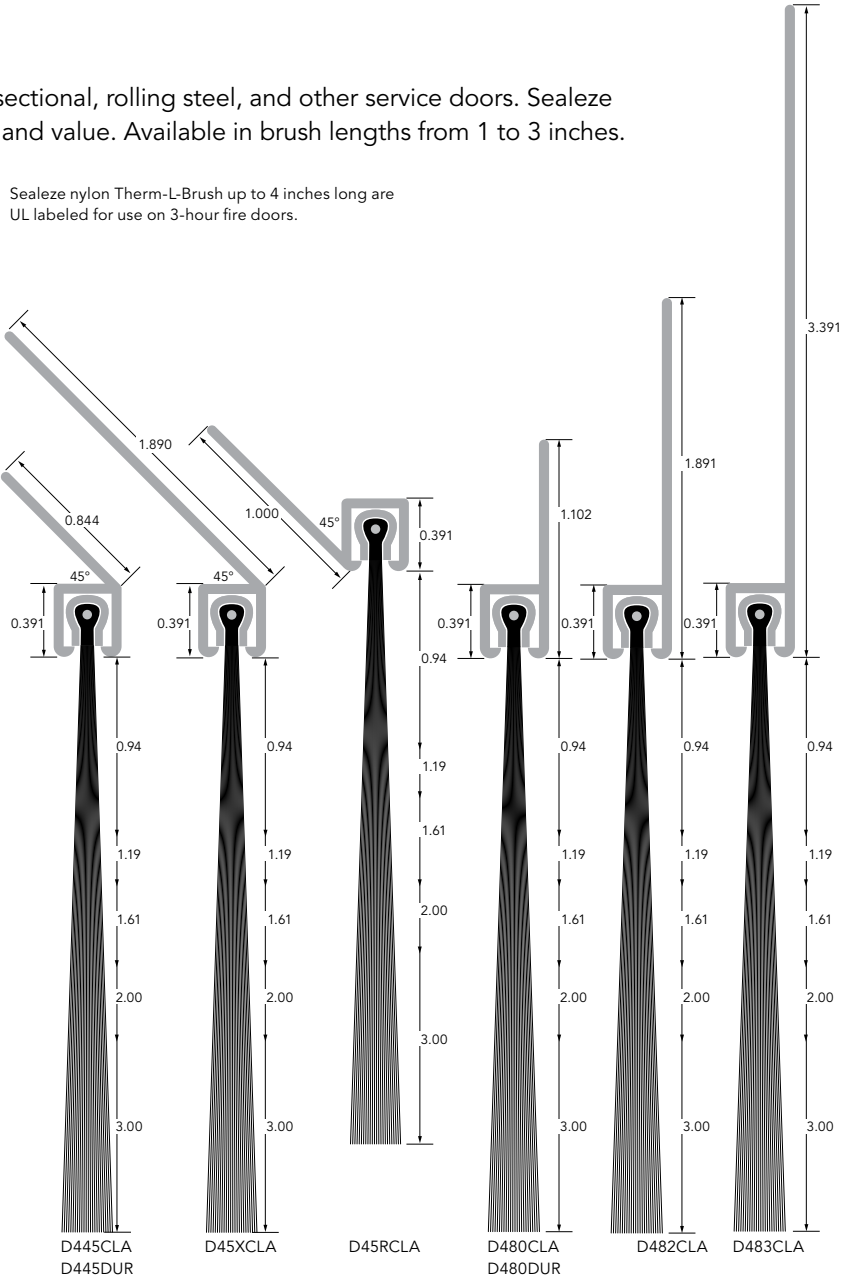


Standard Duty

Standard duty brush seals are the perfect seal for all sectional, rolling steel, and other service doors. Sealeze "D" series is synonymous with quality, energy-saving and value. Available in brush lengths from 1 to 3 inches.

Product Code	Brush Length	Holder Length	Holder Angle
D480CLA09BL	0.94	1.102	180°
D480DUR09BL	0.94	1.102	180°
D480CLA12BL	1.19	1.102	180°
D480DUR12BL	1.19	1.102	180°
D480CLA16BL	1.61	1.102	180°
D480DUR16BL	1.61	1.102	180°
D480CLA20BL	2.00	1.102	180°
D480DUR20BL	2.00	1.102	180°
D480CLA30BL	3.00	1.102	180°
D480DUR30BL	3.00	1.102	180°
D482CLA09BL	0.94	1.891	180°
D482CLA12BL	1.19	1.891	180°
D482CLA16BL	1.61	1.891	180°
D482CLA20BL	2.00	1.891	180°
D482CLA30BL	3.00	1.891	180°
D483CLA09BL	0.94	3.391	180°
D483CLA12BL	1.19	3.391	180°
D483CLA16BL	1.61	3.391	180°
D483CLA20BL	2.00	3.391	180°
D483CLA30BL	3.00	3.391	180°
D445CLA09BL	0.94	0.844	45°
D445DUR09BL	0.94	0.844	45°
D445CLA12BL	1.19	0.844	45°
D445DUR12BL	1.19	0.844	45°
D445CLA16BL	1.61	0.844	45°
D445DUR16BL	1.61	0.844	45°
D445CLA20BL	2.00	0.844	45°
D445DUR20BL	2.00	0.844	45°
D445CLA30BL	3.00	0.844	45°
D445DUR30BL	3.00	0.844	45°
D45XCLA09BL	0.94	1.890	45°
D45XCLA12BL	1.19	1.890	45°
D45XCLA16BL	1.61	1.890	45°
D45XCLA20BL	2.00	1.890	45°
D45XCLA30BL	3.00	1.890	45°
D45RCLA09BL	0.94	1.000	45° REV
D45RCLA12BL	1.19	1.000	45° REV
D45RCLA16BL	1.61	1.000	45° REV
D45RCLA20BL	2.00	1.000	45° REV
D45RCLA30BL	3.00	1.000	45° REV

Sealeze nylon Therm-L-Brush up to 4 inches long are UL labeled for use on 3-hour fire doors.



All dimensions in inches, unless otherwise indicated.
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Heavy Duty

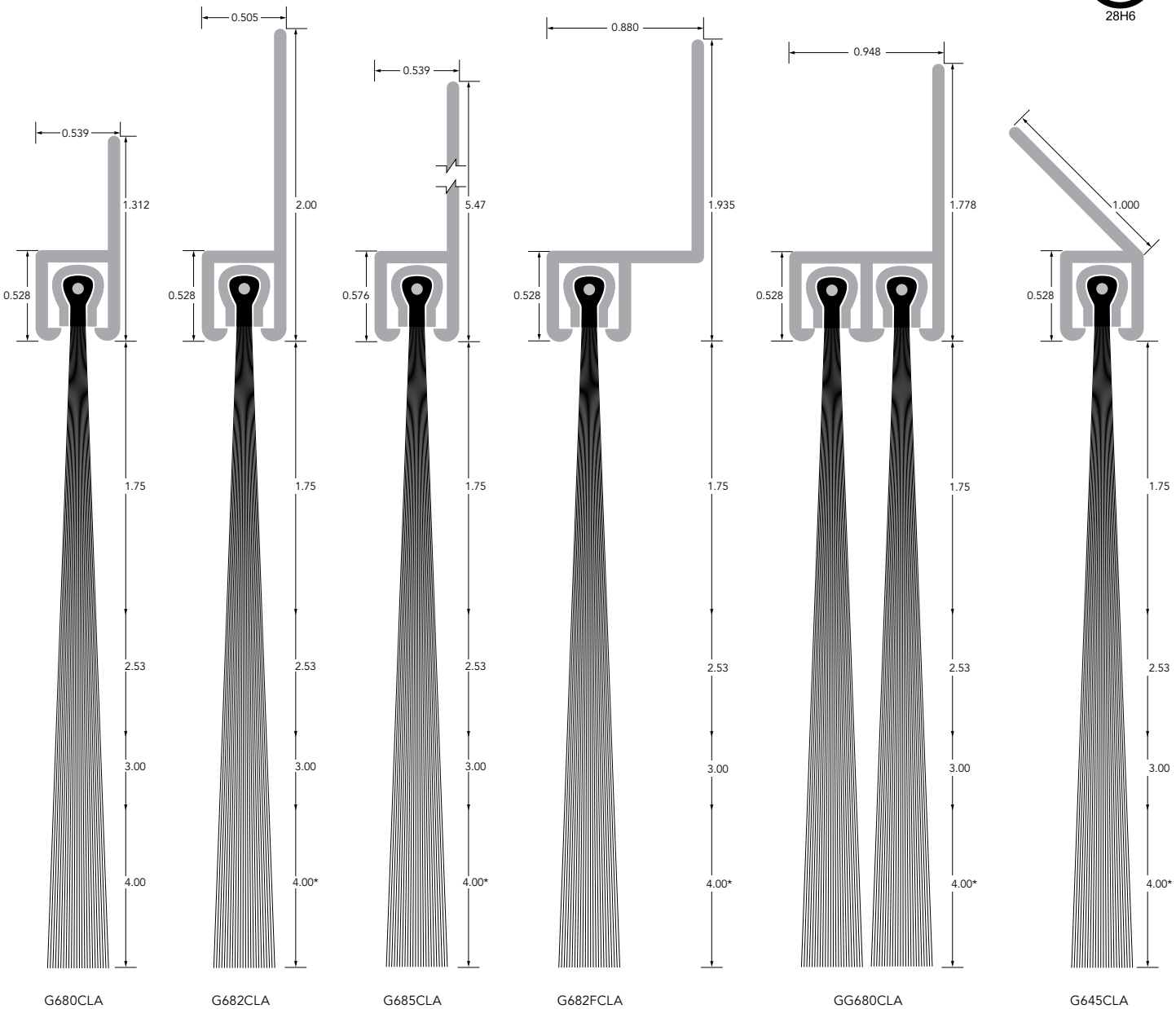
The heaviest brush seals available, Sealeze's "G" series brushes seal out the elements around large industrial rolling steel doors, sectional doors, and other large service doors, including aircraft hangar doors. Available in brush lengths up to 7". UL rating on all brushes up to 4" in length.

Product Code	Brush Length	Holder Length	Holder Angle
F580CLA15BL	1.50	1.00	180°
F580CLA20BL	2.00	1.00	180°
F580CLA25BL	2.50	1.00	180°
F580CLA30BL	3.00	1.00	180°
F580CLA40BL	4.00	1.00	180°
F580CLA50BL	5.00	1.00	180°

Product Code	Brush Length	Holder Length	Holder Angle
F582CLA15BL	1.50	1.50	180°
F582CLA20BL	2.00	1.50	180°
F582CLA25BL	2.50	1.50	180°
F582CLA30BL	3.00	1.50	180°
F582CLA40BL	4.00	1.50	180°
F545CLA15BL	1.50	1.50	45°

Product Code	Brush Length	Holder Length	Holder Angle
F545CLA20BL	2.00	1.50	45°
F545CLA25BL	2.50	1.50	45°
F545CLA30BL	3.00	1.50	45°
F545CLA40BL	4.00	1.50	45°
F545CLA50BL	5.00	1.50	45°

CLASSIFIED UL 28H6



G680CLA G682CLA G685CLA G682FCLA GG680CLA G645CLA

**Brush available up to 7", UL only applies to brush up to 4".*

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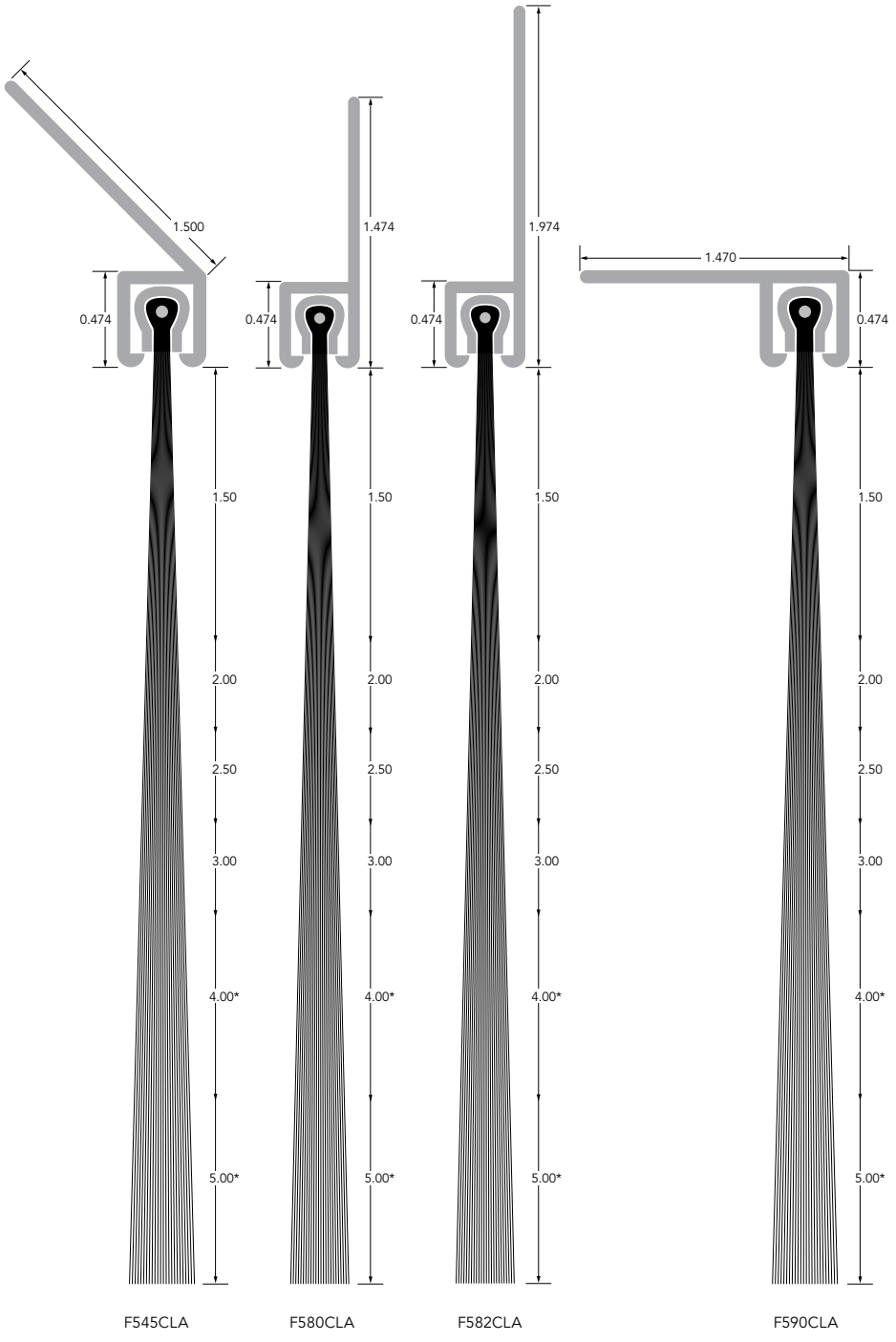
Heavy Duty

Sealeze "F" series brush are a cost-effective solution in many applications where the heavy density of our "G" series brush isn't needed. Available in lengths up to 5 inches, F-series brushes can seal gaps in many large door applications.

Product Code	Brush Length	Holder Length	Holder Angle
F590CLA15BL	1.50	1.47	90°
F590CLA20BL	2.00	1.47	90°
F590CLA25BL	2.50	1.47	90°
F590CLA30BL	3.00	1.47	90°
F590CLA40BL	4.00	1.47	90°
F590CLA50BL	5.00	1.47	90°
G680CLA18BL	1.75	1.312	180°
G680CLA25BL	2.53	1.312	180°
G680CLA30BL	3.00	1.312	180°
G680CLA40BL	4.00	1.312	180°
G680CLA50BL	5.00	1.312	180°
G680CLA60BL	6.00	1.312	180°
G680CLA70BL	7.00	1.312	180°
G682CLA18BL	1.75	2.00	180°
G682CLA25BL	2.53	2.00	180°
G682CLA30BL	3.00	2.00	180°
G682CLA40BL	4.00	2.00	180°
G682CLA50BL	5.00	2.00	180°
G682CLA60BL	6.00	2.00	180°
G682CLA70BL	7.00	2.00	180°
G685CLA18BL	1.75	5.470	180°
G685CLA25BL	2.53	5.470	180°
G685CLA30BL	3.00	5.470	180°
G685CLA40BL	4.00	5.470	180°
G685CLA50BL	5.00	5.470	180°
G685CLA60BL	6.00	5.470	180°
G685CLA70BL	7.00	5.470	180°
G682FCLA18BL	1.75	1.935	180° Offset
G682FCLA25BL	2.53	1.935	180° Offset
G682FCLA30BL	3.00	1.935	180° Offset
G682FCLA40BL	4.00	1.935	180° Offset
G682FCLA50BL	5.00	1.935	180° Offset
G682FCLA60BL	6.00	1.935	180° Offset
G682FCLA7OBL	7.00	1.935	180° Offset
GG680CLA18BL	1.75	1.778	180°
GG680CLA25BL	2.53	1.778	180°
GG680CLA30BL	3.00	1.778	180°
GG680CLA40BL	4.00	1.778	180°
GG680CLA50BL	5.00	1.778	180°
GG680CLA60BL	6.00	1.778	180°
GG680CLA70BL	7.00	1.778	180°
G645CLA18BL	1.75	1.000	45°
G645CLA25BL	2.53	1.000	45°
G645CLA30BL	3.00	1.000	45°
G645CLA40BL	4.00	1.000	45°
G645CLA50BL	5.00	1.000	45°
G645CLA60BL	6.00	1.000	45°
G645CLA70BL	7.00	1.000	45°

CLASSIFIED UL 28H6



UL only applies to brush up to 4".

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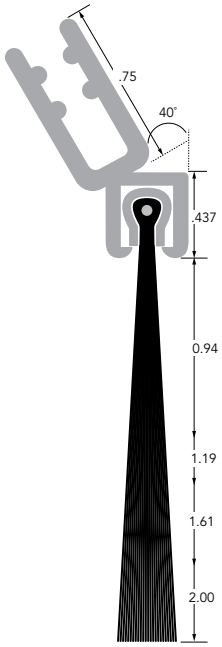
Plastic Guide Seal for Rolling Steel Door

Easy installation. Just slide extrusion over guide and let the brush conform to all surface irregularities. Extrusion fits 3/16" guides. Use alone or with epoxy for additional hold.

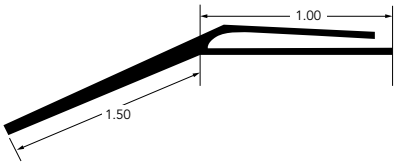


Product Code	Brush Length	Holder Length	Holder Angle
DP40PVC09BL	0.94	.75	40°
DP40PVC12BL	1.19	.75	40°
DP40PVC16BL	1.61	.75	40°
DP40PVC20BL	2.00	.75	40°
DP40PVC30BL	3.00	.75	40°

Reverse Angle Clip-On

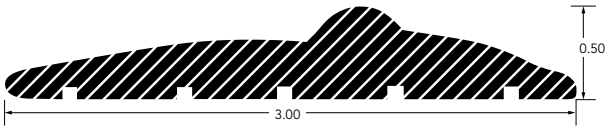
For use on commercial sectional doors. Dual durometer construction provides a hard vinyl holding section and a flexible flap. Use in situations where price is a key consideration. Fits 1/8 inch guides. Sold in cartons of 200 feet.

Product Code	Color
RG15GRYVNYL	Gray
RG15W HTVNYL	White



Garage Door Threshold

- Solid black vinyl garage door threshold.
- Seals out the elements.
- Prevents driving rain and snow from backing into garage.
- Helps keep out dirt and leaves.

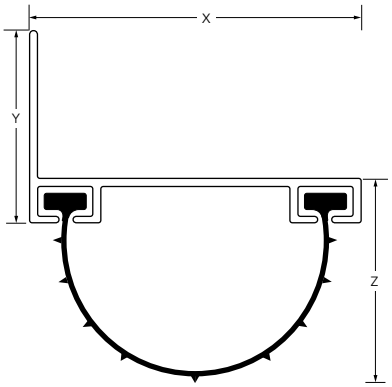


- Keeps door bottom from direct contact with concrete to prevent rust on metal doors and water damage on wood doors.
- Easy to install: Brush or wipe concrete clean and dry below door. Rough surface with wire brush for best adhesion. Apply adhesive per instructions on tube. One tube comes with every 20 feet of threshold. Installation works best when temperatures are above 50° F.

Adjustable Door Bottom

- Black Santoprene rubber.
- Won't tear or deform.
- Remains pliable in the coldest weather.
- Cushions door when closing.
- Two sizes available.
- Aluminum holder comes slotted, allowing for adjustments so it fits perfectly.

Product Code	X	Y	Z
ADB40BLK	1.75	1.00	1.5
ADB25BLK	1.375	1.00	1.0



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ProSeal

As a low-cost alternative to Therm-L-Brush, we also stock a line of polypropylene brushes. ProSeal brush lengths are from 1 inch to 4 inches and fit nicely into any of our "C" or "D" series holders. See chart below for holder and brush combinations available for ProSeal. Also available is a 1-3/8 inch gray vinyl flap. ProSeal brushes are available in a range of stock lengths, depending on product code.

ProSeal For Mini-Storage Doors

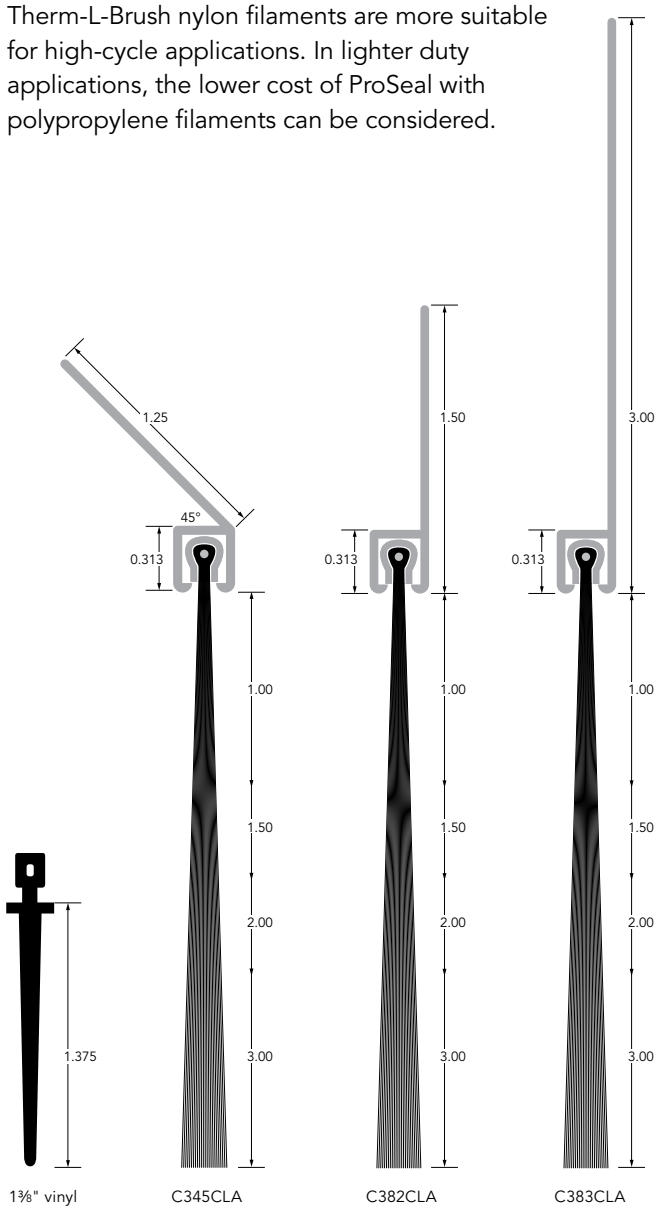
ProSeal size C brush and holders are an excellent choice for sealing corrugated roll-up doors in mini-storage units. It is available with straight exposed polypropylene filament in 1.0, 1.5, 2.0 and 3.0 inches for the best seal in these applications.

ProSeal for Aircraft Hangars/Barns

These crimped polypropylene brushes were developed for special use in sealing Aircraft Hangar Doors. This lower priced brush seals the large gaps usually associated with Hangar Doors while providing most of the advantages of nylon Therm-L-Brush. The brush can be combined with angled or straight holders and is available in brush trim lengths of 1.5, 2, 3, and 4 inches.

ProSeal or Therm-L-Brush, Which is for Me?

The sealing performance of Therm-L-Brush and ProSeal are comparable in most applications. Therm-L-Brush nylon filaments are more suitable for high-cycle applications. In lighter duty applications, the lower cost of ProSeal with polypropylene filaments can be considered.



1⅜" vinyl C345CLA C382CLA C383CLA

Product Code	Brush Type	Brush Length	Holder Length	Holder Angle
C382CLA10BP	Straight Polypropylene	1.00	1.813	180°
C382CLA15BP	Straight Polypropylene	1.50	1.813	180°
C382CLA20BP	Straight Polypropylene	2.00	1.813	180°
C382CLA30BP	Straight Polypropylene	3.00	1.813	180°
C383CLA10BP	Straight Polypropylene	1.00	3.313	180°
C383CLA15BP	Straight Polypropylene	1.50	3.313	180°
C383CLA20BP	Straight Polypropylene	2.00	3.313	180°
C383CLA30BP	Straight Polypropylene	3.00	3.313	180°
C345CLA10BP	Straight Polypropylene	1.00	1.250	45°
C345CLA15BP	Straight Polypropylene	1.50	1.250	45°
C345CLA20BP	Straight Polypropylene	2.00	1.250	45°
C345CLA30BP	Straight Polypropylene	3.00	1.250	45°
D480CLA15PC	Crimped Polypropylene	1.50	1.102	180°
D480CLA20PC	Crimped Polypropylene	2.00	1.102	180°
D480CLA30PC	Crimped Polypropylene	3.00	1.102	180°
D480CLA40PC	Crimped Polypropylene	4.00	1.102	180°
D482CLA15PC	Crimped Polypropylene	1.50	1.811	180°
D482CLA20PC	Crimped Polypropylene	2.00	1.811	180°
D482CLA30PC	Crimped Polypropylene	3.00	1.811	180°
D482CLA40PC	Crimped Polypropylene	4.00	1.811	180°
D483CLA15PC	Crimped Polypropylene	1.50	3.391	180°
D483CLA20PC	Crimped Polypropylene	2.00	3.391	180°
D483CLA30PC	Crimped Polypropylene	3.00	3.391	180°
D483CLA40PC	Crimped Polypropylene	4.00	3.391	180°
D445CLA15PC	Crimped Polypropylene	1.50	0.844	45°
D445CLA20PC	Crimped Polypropylene	2.00	0.844	45°
D445CLA30PC	Crimped Polypropylene	3.00	0.844	45°
D445CLA40PC	Crimped Polypropylene	4.00	0.844	45°
D45XCLA15PC	Crimped Polypropylene	1.50	1.890	45°
D45XCLA20PC	Crimped Polypropylene	2.00	1.890	45°
D45XCLA30PC	Crimped Polypropylene	3.00	1.890	45°
D45XCLA40PC	Crimped Polypropylene	4.00	1.890	45°
D45RCLA15PC	Crimped Polypropylene	1.50	1.000	45 REV°
D45RCLA20PC	Crimped Polypropylene	2.00	1.000	45 REV°
D45RCLA30PC	Crimped Polypropylene	3.00	1.000	45 REV°
D45RCLA40PC	Crimped Polypropylene	4.00	1.000	45 REV°
D490CLA15PC	Crimped Polypropylene	1.50	1.060	90°
D490CLA20PC	Crimped Polypropylene	2.00	1.060	90°
D490CLA30PC	Crimped Polypropylene	3.00	1.060	90°
D490CLA40PC	Crimped Polypropylene	4.00	1.060	90°

Specify 1", 1.50", 2", 3" brush or 1.375" vinyl.

All dimensions in inches, unless otherwise indicated.
Dimensions are to Sealeze manufacturing tolerances. Contact us for more information on tolerances.

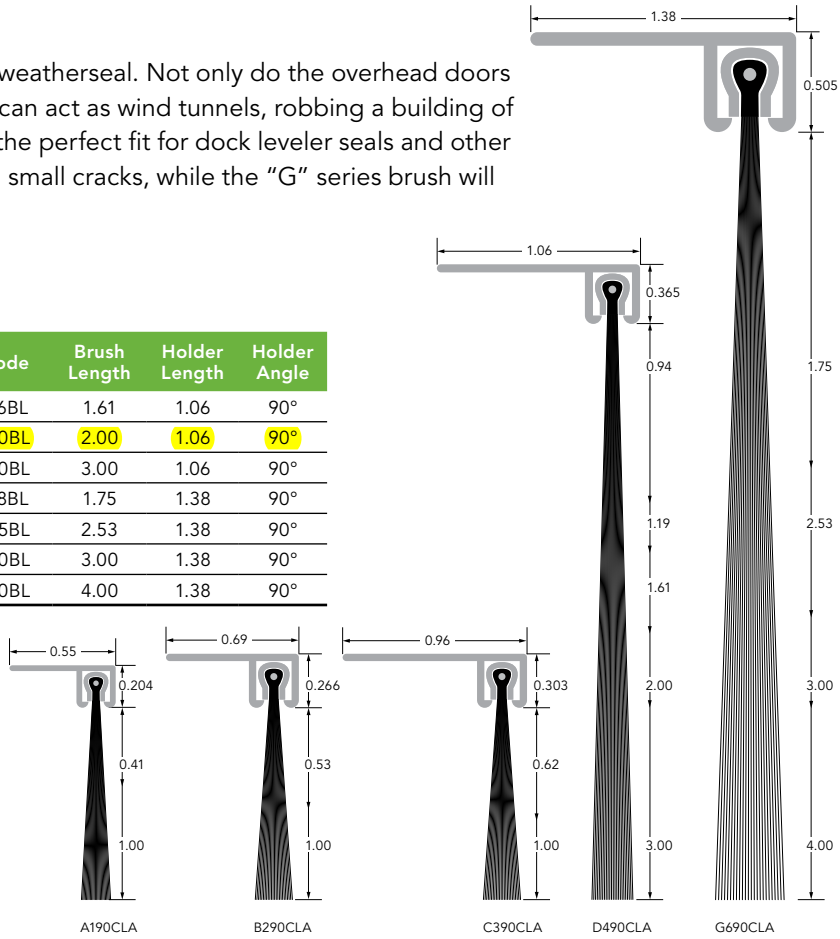
Dock Leveler Applications

Loading docks are prime areas for sealing with brush weatherseal. Not only do the overhead doors allow air infiltration, but the dock levelers themselves can act as wind tunnels, robbing a building of its conditioned air supply. Sealeze's 90° flanges form the perfect fit for dock leveler seals and other special applications. Our "A" series is ideal for sealing small cracks, while the "G" series brush will cover the largest gaps.

Dock Leveler Seals

Product Code	Brush Length	Holder Length	Holder Angle
A190CLA04BL	0.41	0.55	90°
A190CLA10BL	1.00	0.55	90°
B290CLA05BL	0.53	0.69	90°
B290CLA10BL	1.00	0.69	90°
C390CLA06BL	0.62	0.96	90°
C390CLA10BL	1.00	0.96	90°
D490CLA09BL	0.94	1.06	90°
D490CLA12BL	1.19	1.06	90°

Product Code	Brush Length	Holder Length	Holder Angle
D490CLA16BL	1.61	1.06	90°
D490CLA20BL	2.00	1.06	90°
D490CLA30BL	3.00	1.06	90°
G690CLA18BL	1.75	1.38	90°
G690CLA25BL	2.53	1.38	90°
G690CLA30BL	3.00	1.38	90°
G690CLA40BL	4.00	1.38	90°

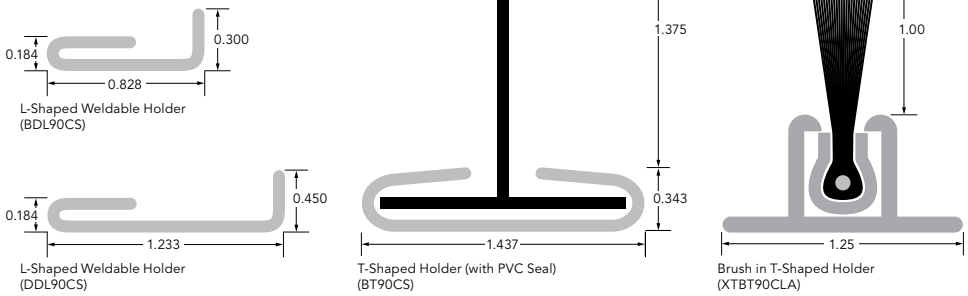


Weldable Dock Leveler Seals

Includes a steel holder that can be welded to the sides of the leveler.

Product Code	Holder Shape	Exposed Seal Length	Seal Type
BT90CLA05BLKIT8	T	0.500	Brush
BT90CLA10BLKIT8	T	1.000	Brush
BT90CLA14BLKIT8	T	1.375	Brush
BT90CS15PVCKIT8	T	1.375	PVC
BDL90CS05BLKIT8	L	0.500	Brush
BDL90CS10BLKIT8	L	1.000	Brush
BDL90CS14BLKIT8	L	1.375	Brush
DDL90CS09BLKIT8	L	1.000	Brush
DDL90CS12BLKIT8	L	1.200	Brush
DDL90CS16BLKIT8	L	1.600	Brush
DDL90CS20BLKIT8	L	2.000	Brush
DDL90CS30BLKIT8	L	3.000	Brush

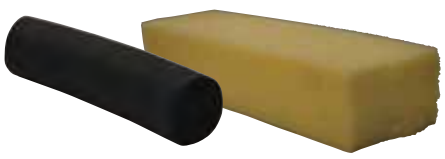
Kits includes two 96 sections. (± .031 standard tolerance)



Hinge Seals

For the rear hinge of dock levelers. Choose from a 1" diameter neoprene "rope" seal or 2" x 3" foam stock. Call for details.

Product Code	Description	Dimensions
HINGE-SEAL	Foam Seal	2" x 3" x 7'
HINGE-SEAL-ROD	Hinge Seal Stabilizer	$^3/_8$" x 7'
RS1ONEOPR	1" diameter Rope Seal	Cut-To-Order



All dimensions in inches, unless otherwise indicated.
Dimensions are to Sealeze manufacturing tolerances. Contact us for more information on tolerances.

Flexible Strip Brush

Designed to meet the needs of diverse applications, EzFlex® flexible strip brush is flexible enough to fit around tight curves, lighter than typical strip brushes, and easy to use.

EzFlex flexible brush is a cost-effective, light-weight alternative to traditional strip bush for these applications and more…

- eliminate air flow
- light/sound containment
- weatherseal
- pest management

Sealeze EzFlex flexible brush is designed using recyclable nylon filament. The filaments are heat fused to the nylon holder which also clamps around the brush providing a strong bond. Our flex brush, manufactured to fit our standard holders, is an excellent choice for closing gaps, containing air or light and for use on surfaces that are uneven or curved.

EzFlex flexible brush is available in channel or section sizes C, and D, in nearly any length to suit your needs. It's easy to work with and doesn't require special tools. It can be used with our stock aluminum holders. It's stocked in 100 ft. rolls, minimum order is 100 ft.

Installation Instructions for Sealeze Metal-Backed Brush and Aluminum Holders

Therm-L-Brush installs in 5 easy steps to help reduce labor costs and callbacks:

1. Measure the door (bottom, jambs and header).
2. Cut the brush and holder to length.
3. Pry open the ends of the holder with a screwdriver.
4. Insert the brush into the holder and peen both ends of the holder with a hammer to lock the brush in place.
5. Mount the seal by holding the aluminum flange to the jambs or door bottom while aligning brush to the proper fit. Then secure with self-drilling screws provided. Slotted holes allow for easy final adjustment for the perfect fit.

Tips:

- Cut Brush with diagonal cutting pliers, shears or bolt cutters. Cutting action must pinch ends closed to seal in filaments.
- Cut Holder with hack saw, power saw (with metal cutting blade), or angle iron shear.
- Mount Jamb Seals for either entrance or overhead doors by installing header first, then measure for jamb seal.
- Mount so brush is flexed slightly against the door to ensure complete seal and to compensate for wind deflection.
- Mount Sweep so brush just touches floor or top of threshold.
- Mount Astragal Seals so brushes just touch in the center of gap between doors.
- Piece the Brush when door dimensions exceed stocked weatherseal lengths. "Splice" 2 or more pieces together by staggering the brush and holder joints.

Key Terms & Conditions of Sale

Payment: Net Cash 30 days, subject to credit approval

Returns: An RGA number must be issued by Sealeze PRIOR to returning items. Returned goods are subject to a 25% restocking fee. *Only stock items may be returned.*

Delivery: FOB Sealeze's plant in Richmond, VA.

Minimum Order: $50.00 net — Stock Items

Prices: Subject to change without notice. Additional discounts are available for quantity purchases. Please ask your Sales Representatives for details.

Complete terms and conditions available upon request and are provided at time of order.

SEALEZE®
Problem solved.

8000 Whitepine Road
North Chesterfield, VA 23237

800.446.7325
804.743.1218
fax: 800.448.2908
804.743.3413
weatherseal@sealeze.com

ISO 9001 Certified
A Jason Company
www.sealeze.com

03.2015

Contact your Sealeze Sales Representative

MATERIAL SAFETY DATA SHEET

Sikaflex® 1A (All Colors)

HMIS

HEALTH	*2
FLAMMABILITY	1
REACTIVITY	0
PERSONAL PROTECTION	C

1. Product And Company Identification

Supplier
Sika Corporation
201 Polito Ave
Lyndhurst, NJ 07071

Company Contact: EHS Department
Telephone Number: 201-933-8800
FAX Number: 201-933-9379
Web Site: www.sikausa.com

Manufacturer
Sika Corporation
201 Polito Ave
Lyndhurst, NJ 07071

Company Contact: EHS Department
Telephone Number: 201-933-8800
FAX Number: 201-933-9379
Web Site: www.sikausa.com

Supplier Emergency Contacts & Phone Number
CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

Manufacturer Emergency Contacts & Phone Number
CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

Issue Date: 08/09/2007

Product Name: Sikaflex® 1A (All Colors)
CAS Number: Not Established
Chemical Family: Polyurethane
MSDS Number: 4016
Product Code: 0431543

2. Composition/Information On Ingredients

Ingredient Name	CAS Number		Percent Of Total Weight
POLYISOCYANATE PREPOLYMER	Trade Secret		
XYLENE (MIXED ISOMERS)	1330-20-7	<	4

3. Hazards Identification

Eye Hazards
Causes eye irritation.

Skin Hazards
May cause skin irritation. Prolonged and/or repeated skin contact may cause an allergic reaction/sensitization.

Ingestion Hazards
May be harmful if swallowed.

Inhalation Hazards
May cause nose, throat, and lung irritation. May cause an allergic respiratory reaction / sensitization after prolonged or repeated contact. Reports have associated repeated and prolonged exposure to some of the

3. Hazards Identification - Continued

Inhalation Hazards - Continued

chemicals in this product with permanent brain, liver, kidney, and Central Nervous System damage. Headaches and dizziness may result.

4. First Aid Measures

Eye

In case of contact, hold eyelids apart and immediately flush eyes with plenty of tepid water for at least 15 minutes. Get medical attention immediately if irritation develops and persists.

Skin

In case of contact, immediately flush skin with soap and plenty of tepid water for at least 15 minutes. Get medical attention immediately if irritation (redness, rash, blistering) develops and persists.

Ingestion

If victim is fully conscious do not induce vomiting, give one or two cups of water or milk to drink. Call a physician or a poison control center immediately.

Inhalation

Remove to fresh air. If not breathing, give artificial respiration, seek medical attention.

5. Fire Fighting Measures

Flash Point: N/A °F
Flash Point Method: Solid per ASTM D4359
Autoignition Point: N/AV °F
Lower Explosive Limit: N/AV
Upper Explosive Limit: N/AV

Fire And Explosion Hazards

During a fire, irritating and/or toxic gases and aerosols from the decomposition/combustion products may be present.

Extinguishing Media

In case of fire, use water spray (fog) foam, dry chemical, or CO2.

Fire Fighting Instructions

In the event of a fire, firefighters should wear full protective clothing and NIOSH-approved self-contained breathing apparatus with a full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Avoid release to the environment. Use appropriate Personal Protective Equipment (PPE). Contain spill and collect with absorbent material and transfer into suitable containers. Do not flush to sewer or allow to enter waterways. Ventilate enclosed area.

7. Handling And Storage

Handling And Storage Precautions

Keep out of reach of children. Store in a cool, dry, well ventilated area. Keep containers tightly closed.

Handling Precautions

Do not smoke. Use only in well ventilated areas. Condition to 65-85F before using. Use only with ventilation sufficient to reduce potential exposures (air borne levels of dust, fumes, vapors, etc.) to below recommended exposure limits.

Storage Precautions

Do not store near excessive heat. Store in tightly closed containers and protect from moisture and foreign

7. Handling And Storage - Continued

Storage Precautions - Continued

material. Ideal storage temperature is less than 75F. If maximum storage temperature is exceeded, material may prematurely polymerize without hazard.

Work/Hygienic Practices

Wash thoroughly with soap and water after handling.

8. Exposure Controls/Personal Protection

Engineering Controls

Use of a system of local and/or general exhaust is recommended to keep employee below applicable exposure limits. Refer to the current edition of "Industrial Ventilation: A Manual of Recommended Practice" published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Eye/Face Protection

Safety glasses with side shields or goggles.

Skin Protection

Chemical-resistant gloves. Lab coat or other work clothing to prevent skin exposure (Long sleeve shirt and long pants). Launder before reuse.

Respiratory Protection

A respirator protection program that meets 29 CFR 1910.134 requirement must be followed whenever workplace conditions warrant a respirator's use. In areas where the Permissible Exposure Limits are exceeded, use a properly fitted NIOSH-approved respirator.

Other/General Protection

Wash thoroughly after handling.

Ingredient(s) - Exposure Limits

XYLENE (MIXED ISOMERS)
- ACGIH TLV-STEL 150 ppm
- ACGIH TLV-TWA 100 ppm
- OSHA PEL-TWA 100 ppm

9. Physical And Chemical Properties

Appearance

Paste (solid) in various colors

Odor

Aromatic odor

Chemical Type: Mixture
Physical State: Solid
Melting Point: N/AV °F
Boiling Point: N/AV °F
Specific Gravity: 1.4 grams/cm3
Percent VOCs: < 4%
Packing Density: 11.5 - 12.0 pounds /gallon
Vapor Pressure: N/AV
Vapor Density: > Air
Solubility: N/AV
Evaporation Rate: Slower than ether
VOC Content: < 40 grams / liter (EPA Method 24)

10. Stability And Reactivity

Stability: Stable
Hazardous Polymerization: Will not occur

Conditions To Avoid (Stability)
Open flame

Incompatible Materials
Water, Alcohol, Amines

Hazardous Decomposition Products
Carbon Dioxide, Carbon Monoxide, and Oxides of Nitrogen, Smoke, Fumes

Conditions To Avoid (Polymerization)
None known

11. Toxicological Information

Conditions Aggravated By Exposure
Eye disease, skin disorders and allergies, chronic respiratory conditions.

12. Ecological Information

No Data Available...

13. Disposal Considerations

Dispose in accordance with applicable federal, state and local government regulations. Waste generators must determine whether a discarded material is classified as a hazardous waste. USEPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

14. Transport Information

Proper Shipping Name
Not regulated by the USDOT.

15. Regulatory Information

U.S. Regulatory Information
All ingredients of this product are listed or are excluded from listing under the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

SARA Hazard Classes
Acute Health Hazard
Chronic Health Hazard

SARA Title III - Section 313 Supplier Notification
This product contains the following toxic chemicals that are subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

XYLENE (MIXED ISOMERS) (1330-20-7) <4 %

This information must be included on all MSDSs that are copied and distributed for this material.

Ingredient(s) - U.S. Regulatory Information
XYLENE (MIXED ISOMERS)
SARA Title III - Section 313 Form "R"/TRI Reportable Chemical
SARA - Acute Health Hazard
SARA - Chronic Health Hazard

15. Regulatory Information - Continued

Ingredient(s) - U.S. Regulatory Information - Continued

SARA - Fire Hazard

Ingredient(s) - State Regulations

XYLENE (MIXED ISOMERS)
- New Jersey - Workplace Hazard
- New Jersey - Environmental Hazard
- New Jersey - Special Hazard
- Pennsylvania - Workplace Hazard
- Pennsylvania - Environmental Hazard
- Massachusetts - Hazardous Substance
- New York City - Hazardous Substance

16. Other Information

HMIS Rating

Health: *2
Fire: 1
Reactivity: 0
PPE: C

Revision/Preparer Information

MSDS Preparer: EHS Department
MSDS Preparer Phone Number: 201 933 8800
This MSDS Supercedes A Previous MSDS Dated: 12/11/2006

Disclaimer

The information contained in this Material Safety Data Sheet applies only to the actual Sika Corporation ("Sika") product identified and described herein. This information is not intended to address, nor does it address the use or application of the identified Sika product in combination with any other material, product or process. All of the information set forth herein is based on technical data regarding the identified product that Sika believes to be reliable as of the date hereof. Prior to each use of any Sika product, the user must always read and follow the warnings and instructions on the product's current Technical Data Sheet, product label and Material Safety Data Sheet for each Sika product, which are available at web site and/or telephone number listed in Section 1 of this MSDS.

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All sales of Sika products are subject to its current terms and conditions of sale available at www.sikacorp.com or 201-933-8800.

Sika Corporation

Construction

Product Data Sheet
Edition 5.11.2010
Identification no. 431
Sikaflex-1a

Sikaflex®-1a

One part polyurethane, elastomeric sealant/adhesive

SEALANT · WATERPROOFING & RESTORATION INSTITUTE
Issued to: Sika Corporation
Product: Sikaflex 1A Construction Sealant
C719: Pass ✓ Ext:+35% Comp:-35%
Substrate: Mortar, Aluminum, Glass
[mortar substrate primed with Sikaflex 429 Primer]
C661: Rating 40
Validation Date: 12/22/06 - 12/21/11
No. 1206-S1A11 *Copyright © 2006*
SEALANT VALIDATION
www.swrionline.org

Description
Sikaflex-1a is a premium-grade, high-performance, moisture-cured, 1-component, polyurethane-based, non-sag elastomeric sealant. Meets Federal specification TT-S-00230C, Type II, Class A. Meets ASTM C-920, Type S, Grade NS, Class 35, use T, NT, O, M, G, I; Canadian standard CAN/CGSB 19.13-M87.

Where to Use
- Designed for all types of joints where maximum depth of sealant will not exceed 1/2 in.
- Excellent for small joints and fillets, windows, door frames, reglets, flashing, common roofing detail applications, and many construction adhesive applications.
- Suitable for vertical and horizontal joints; readily placeable at 40°F.
- Has many applications as an elastic adhesive between materials with dissimilar coefficients of expansion.
- Submerged conditions, such as canal and reservoir joints.

Advantages
- Eliminates time, effort, and equipment for mixing, filling cartridges, pre-heating or thawing, and cleaning of equipment.
- Fast tack-free and final cure times.
- High elasticity - cures to a tough, durable, flexible consistency with exceptional cut and tear-resistance.
- Stress relaxation.
- Excellent adhesion - bonds to most construction materials without a primer.
- Excellent resistance to aging, weathering.
- Proven in tough climates around the world.
- Odorless, non-staining.
- Jet fuel resistant.
- Certified to the NSF/ANSI Standard 61 for potable water.
- Urethane-based; suggested by EPA for radon reduction.
- Paintable with water-, oil- and rubber-based paints.
- Capable of ±35% joint movement.

Coverage
10.1 fl. oz. cartridge seals 12.4 lineal ft. of 1/2 x 1/4 in. joint. 20 fl. oz. uni-pac sausage seals 24 lineal ft. of 1/2 x 1/4 in. joint.

Packaging
Disposable 10.1 fl. oz., moisture-proof composite cartridges, 24/case; and uni-pac sausages, 20 fl. oz., 20/carton.

Typical Data *(Material and curing conditions @ 73°F (23°C) and 50% R.H.)*

Shelf Life

10.1 fl. oz. cartridges	12 months
20 fl. oz. uni-pac sausages	12 months
5 gallon pail	6 months
55 gallon drum	6 months

Storage Conditions Store at 40°-95°F (4°-35°C). Condition material to 65°-75°F before using.

Colors White, colonial white, aluminum gray, limestone, black, dark bronze, capitol tan, stone and medium bronze. Special architectural colors on request.

Application Temperature 40° to 100°F. Sealant should be installed when joint is at mid-range of its anticipated movement.

Service Range -40° to 170°F

Curing Rate

Tack-free time	3 to 6 hours
Tack-free to touch	3 hours
Final cure	4 to 7 days

Tear Strength (ASTM D-624) 55 lb./in.

Shore A Hardness (ASTM D-2240) 21 day 40±5

Tensile Properties (ASTM D-412)

21 day	Tensile Stress		175 psi (1.21 MPa)
	Elongation at Break		550%
	Modulus of Elasticity	25%	35 psi (0.24 MPa)
		50%	60 psi (0.41 MPa)
		100%	85 psi (0.59 MPa)

Adhesion in Peel (TT-S-00230C, ASTM C 794)

Substrate	Peel Strength	Adhesion Loss
Concrete	20 lb.	0%
Aluminum	20 lb.	0%
Glass	20 lb.	0%

Weathering Resistance Excellent

Chemical Resistance Good resistance to water, diluted acids, and diluted alkalines. Consult Technical Service for specific data.

Construction

How to Use

Surface Preparation

Clean all surfaces. Joint walls must be sound, clean, dry, frost-free, and free of oil and grease. Curing compound residues and any other foreign matter must be thoroughly removed. A roughened surface will also enhance bond. Install bond breaker tape or backer rod to prevent bond at base of joint.

Priming

Priming is not usually necessary. Most substrates only require priming if testing indicates a need or where sealant will be subjected to water immersion after cure.

Consult Sikaflex Primer Technical Data Sheet or Technical Service for additional information on priming.

Application

Recommended application temperatures: 40°-100°F.

For cold weather application, condition units at approximately 70°F; remove prior to using.

For best performance, Sikaflex-1a should be gunned into joint when joint slot is at mid-point of its designed expansion and contraction.

Place nozzle of gun into bottom of the joint and fill entire joint. Keep the nozzle in the sealant, continue on with a steady flow of sealant preceding the nozzle to avoid air entrapment.

Avoid overlapping of sealant to eliminate entrapment of air. Tool sealant to ensure full contact with joint walls and remove air entrapment. Joint dimension should allow for 1/4 inch minimum and 1/2 inch maximum thickness for sealant. Proper design is 2:1 width to depth ratio,

For use in horizontal joints in traffic areas, the absolute minimum depth of the sealant is 1/2 in. and closed cell backer rod is recommended.

Linear Feet of Sealant per Gallon

Width \ Depth	Inches	¼	½
	¼	308.0	
	½	154.0	77.0
	¾	102.7	51.3
	1	77.0	38.5
	1 ½	61.6	30.8
	1 ¾	51.3	25.7

Limitations

- Allow 1-week cure at standard conditions when using Sikaflex-1a in total water immersion situations and prior to painting.
- When overcoating with water, oil and rubber based paints, compatibility and adhesion testing is essential.
- Avoid exposure to high levels of chlorine. (Maximum continuous level is 5 ppm of chlorine.)
- Maximum depth of sealant must not exceed 1/2 in.; minimum depth is 1/4 in.
- Maximum expansion and contraction should not exceed 25% of average joint width.
- Do not cure in the presence of curing silicone sealants.
- Avoid contact with alcohol and other solvent cleaners during cure.
- Do not apply when moisture-vapor-transmission condition exists from the substrate as this can cause bubbling within the sealant.
- Use opened cartridges and uni-pac sausages the same day.
- When applying sealant, avoid air-entrapment.
- Since system is moisture-cured, permit sufficient exposure to air.
- White color tends to yellow slightly when exposed to ultraviolet rays.
- Light colors can yellow if exposed to direct gas fired heating element.
- The ultimate performance of Sikaflex-1a depends on good joint design and proper application with joint surfaces properly prepared.
- The depth of sealant in horizontal joints subject to traffic is 1/2 in.
- Do not tool with detergent or soap solutions.
- Do not use in contact with bituminous/asphaltic materials.

Caution

Irritant

Keep away from open flames and high heat. Contains xylene; avoid breathing vapors. Use with adequate ventilation.

Combustible

Avoid skin and eye contact. Use of NIOSH approved organic vapor respirator, safe and chemical-resistant gloves recommended. Remove contaminated clothing and shoes.

First Aid

In case of skin contact, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water for at least 15 minutes; contact physician. Wash clothing before re-use. Discard contaminated shoes.

Clean Up

Uncured material can be removed with approved solvent. Cured material can only be removed mechanically. For spillage, collect, absorb, and dispose of in accordance with current, applicable local, state, and federal regulations.

Visit our website at www.sikausa.com **1-800-933-SIKA NATIONWIDE**

Regional Information and Sales Centers. For the location of your nearest Sika sales office, contact your regional center.

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: 800-933-7452
Fax: 201-933-6225

Sika Canada Inc.
601 Delmar Avenue
Pointe Claire
Quebec H9R 4A9
Phone: 514-697-2610
Fax: 514-694-2792

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Fracc. Industrial Balvanera
Corregidora, Queretaro
C.P. 76920
Phone: 52 442 2385800
Fax: 52 442 2250537

Material Safety Data Sheet

1 - Chemical Product and Company Identification

Manufacturer: WD-40 Company **Address: 1061 Cudahy Place (92110)** **P.O. Box 80607** **San Diego, California, USA** **92138 –0607** **Telephone:** **Emergency only: 1-888-324-7596 (PROSAR)** **Information: 1-888-324-7596** **Chemical Spills: 1-800-424-9300 (Chemtrec)** **1-703-527-3887 (International Calls)**	**Chemical Name: Organic Mixture** **Trade Name: WD-40 Aerosol** **Product Use: Lubricant, Penetrant, Drives Out Moisture, Removes and Protects Surfaces From Corrosion** **MSDS Date Of Preparation: 3/11/10**

2 – Hazards Identification

Emergency Overview:
DANGER! Flammable aerosol. Contents under pressure. Harmful or fatal if swallowed. If swallowed, may be aspirated and cause lung damage. May cause eye irritation. Avoid eye contact. Use with adequate ventilation. Keep away from heat, sparks and all other sources of ignition.

Symptoms of Overexposure:
Inhalation: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. Intentional abuse may be harmful or fatal.
Skin Contact: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.
Eye Contact: Contact may be irritating to eyes. May cause redness and tearing.
Ingestion: This product has low oral toxicity. Swallowing may cause gastrointestinal irritation, nausea, vomiting and diarrhea. This product is an aspiration hazard. If swallowed, can enter the lungs and may cause chemical pneumonitis, severe lung damage and death.
Chronic Effects: None expected.
Medical Conditions Aggravated by Exposure: Preexisting eye, skin and respiratory conditions may be aggravated by exposure.

Suspected Cancer Agent:
Yes No X

3 - Composition/Information on Ingredients

Ingredient	CAS #	Weight Percent
Aliphatic Hydrocarbon	64742-47-8	45-50
Petroleum Base Oil	64742-58-1 64742-53-6 64742-56-9 64742-65-0	<25
LVP Aliphatic Hydrocarbon	64742-47-8	12-18
Carbon Dioxide	124-38-9	2-3
Surfactant	Proprietary	<2
Non-Hazardous Ingredients	Mixture	<10

4 – First Aid Measures

Ingestion (Swallowed): Aspiration Hazard. DO NOT induce vomiting. Call physician, poison control center or the WD-40 Safety Hotline at 1-888-324-7596 immediately.
Eye Contact: Flush thoroughly with water. Remove contact lenses if present after the first 5 minutes and continue flushing for several more minutes. Get medical attention if irritation persists.

Skin Contact: Wash with soap and water. If irritation develops and persists, get medical attention.
Inhalation (Breathing): If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.

5 – Fire Fighting Measures

Extinguishing Media: Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet or flooding amounts of water. Burning product will float on the surface and spread fire.
Special Fire Fighting Procedures: Firefighters should always wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water. Use shielding to protect against bursting containers.
Unusual Fire and Explosion Hazards: Contents under pressure. Keep away from ignition sources and open flames. Exposure of containers to extreme heat and flames can cause them to rupture often with violent force. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back.

6 – Accidental Release Measures

Wear appropriate protective clothing (see Section 8). Eliminate all sources of ignition and ventilate area. Leaking cans should be placed in a plastic bag or open pail until the pressure has dissipated. Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly. Report spills to authorities as required.

7 – Handling and Storage

Handling: Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Use only with adequate ventilation. Keep away from heat, sparks, pilot lights, hot surfaces and open flames. Unplug electrical tools, motors and appliances before spraying or bringing the can near any source of electricity. Electricity can burn a hole in the can and cause contents to burst into flames. To avoid serious burn injury, do not let the can touch battery terminals, electrical connections on motors or appliances or any other source of electricity. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep out of the reach of children. Do not puncture, crush or incinerate containers, even when empty.
Storage: Store in a cool, well-ventilated area, away from incompatible materials Do not store above 120°F or in direct sunlight. U.F.C (NFPA 30B) Level 3 Aerosol.

8 – Exposure Controls/Personal Protection

Chemical	Occupational Exposure Limits
Aliphatic Hydrocarbon	1200 mg/m3 TWA (manufacturer recommended)
Petroleum Base Oil	5 mg/m3 TWA, 10 mg/m3 STEL ACGIH TLV 5 mg/m3 TWA OSHA PEL
LVP Aliphatic Hydrocarbon	1200 mg/m3 TWA (manufacturer recommended)
Carbon Dioxide	5000 ppm TWA (OSHA/ACGIH), 30,000 ppm STEL (ACGIH)
Surfactant	None Established
Non-Hazardous Ingredients	None Established

The Following Controls are Recommended for Normal Consumer Use of this Product
Engineering Controls: Use in a well-ventilated area.
Personal Protection:
Eye Protection: Avoid eye contact. Always spray away from your face.
Skin Protection: Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.
Respiratory Protection: None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Controls are Recommended
Engineering Controls: Use adequate general and local exhaust ventilation to maintain exposure levels below that occupational exposure limits.

Personal Protection:
Eye Protection: Safety goggles recommended where eye contact is possible.
Skin Protection: Wear chemical resistant gloves.
Respiratory Protection: None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.
Work/Hygiene Practices: Wash with soap and water after handling.

9 – Physical and Chemical Properties

Boiling Point:	361 - 369°F (183 - 187°C)	Specific Gravity:	0.8 – 0.82 @ 60°F
Solubility in Water:	Insoluble	pH:	Not Applicable
Vapor Pressure:	95-115 PSI @ 70°F	Vapor Density:	Greater than 1
Percent Volatile:	70-75%	VOC:	412 grams/liter (49.5%)
Coefficient of Water/Oil Distribution:	Not Determined	Appearance/Odor	Light amber liquid/mild odor
Flash Point:	122°F (49°C) Tag Open Cup (concentrate)	Flammable Limits: (Solvent Portion)	LEL: 0.6% UEL: 8.0%
Pour Point:	-63°C (-81.4°F) ASTM D-97	Kinematic Viscosity:	2.79-2.96cSt @ 100°F

10 – Stability and Reactivity

Stability: Stable
Hazardous Polymerization: Will not occur.
Conditions to Avoid: Avoid heat, sparks, flames and other sources of ignition. Do not puncture or incinerate containers.
Incompatibilities: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide and carbon dioxide.

11 – Toxicological Information

The oral toxicity of this product is estimated to be greater than 5,000 mg/kg based on an assessment of the ingredients. This product is not classified as toxic by established criteria. It is an aspiration hazard.
None of the components of this product is listed as a carcinogen or suspected carcinogen or is considered a reproductive hazard.

12 – Ecological Information

No data is currently available.

13 - Disposal Considerations

If this product becomes a waste, it would be expected to meet the criteria of a RCRA ignitable hazardous waste (D001). However, it is the responsibility of the generator to determine at the time of disposal the proper classification and method of disposal. Dispose in accordance with federal, state, and local regulations.

14 – Transportation Information_

DOT Surface Shipping Description: Consumer Commodity, ORM-D
IMDG Shipping Description: Un1950, Aerosols, 2.1, LTD QTY

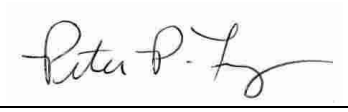
15 – Regulatory Information

U.S. Federal Regulations:

CERCLA 103 Reportable Quantity: This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.
SARA TITLE III:
Hazard Category For Section 311/312: Acute Health, Fire Hazard, Sudden Release of Pressure
Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements: None
Section 302 Extremely Hazardous Substances (TPQ): None
EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): This product does not contain chemicals regulated under California Proposition 65.
VOC Regulations: This product complies with the consumer product VOC limits of CARB, the US EPA and states adopting the OTC VOC rules.
Canadian Environmental Protection Act: One of the components is listed on the NDSL. All of the other ingredients are listed on the Canadian Domestic Substances List or exempt from notification.
Canadian WHMIS Classification: Class B-5 (Flammable Aerosol)
This MSDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

16 – Other Information:

HMIS Hazard Rating:
Health – 1 (slight hazard), Fire Hazard – 4 (severe hazard), Reactivity – 0 (minimal hazard)

SIGNATURE:  TITLE: Director of Global Quality Assurance

REVISION DATE: March 2010 SUPERSEDES: August 2009

WD-40® Technical Data Sheet

Physical Characteristics

Appearance: Aerosol—Aerosolized Liquid Bulk—Liquid	**Boiling Point :** 183° - 187 ° C (361° F - 369 ° F)
Color: Light (or pale) amber	**Vapor Density:** >1
Odor: Characteristic	**Flash Point:** 49° C (122° F)(Tag Open Cup)
Freeze Point/Pour Point: -63° C (-81.4° F)(ASTM D-97)	**Volatile by volume:** 70% - 75%
Kinematic Viscosity @ 100° F: 2.79 - 2.96cSt	**Lower flammability limit:** 0.6%
Specific Gravity @ 60° F: 0.8-0.82	**Upper flammability limit:** 8.0%
	Vapor Pressure: Aerosol: 95-115 psi @ 21° C (70°F) Bulk: 1 psi @ 38°C (100°F)(ASTM D323)

Packages

Smart Straw® 8 oz NSN 8030-01-418-9006 11 oz NSN 8030-01-418-9008 12 oz	
Big Blast® 18 oz NSN 8030-01-439-0681	
Handy Can 3 oz NSN 8030-01-418-9007	
Trigger Pro® Non-Aerosol 20 oz	
Spray Applicator Bottle 16 oz (Empty)	
Bulk Liquid 1 Gallon 5 Gallon 55 Gallon NSN 8030-00-838-7788	

Product Features

WD-40 lubricates moving parts such as hinges, wheels, rollers, chains, and gears. It protects against rust and corrosion on items like tools, and sporting equipment. It penetrates to free stuck corroded parts like nuts, bolts, valves and locks. It quickly removes adhesives, corrosion and paint. It displaces moisture to restore water flooded equipment such as engines, spark plugs and power tools.

WD-40 and the Environment

- WD-40 Multi-Use Product does not contain chloroflurocarbons (CFCs), (HCFCs)
- WD-40 Multi-Use Product does not contain Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr6), Polybrominated biphenyls (PBB), or Polybrominated di-phenylether complying with the restricted substances listed in Article 4(1) of the RoHS Directive.
- WD-40 Multi-Use Product contains no ingredients requiring California Prop 65 listing or labeling such as benzene or toluene.
- WD-40 Multi-Use Product complies with VOC regulations for all 50 states.
- WD-40 Multi-Use Product is inherently biodegradable according to OECD Method 301
- Aerosol products are recyclable, just like any other empty steel container! Thousands of communities now include aerosol product recycling in both household residential and curbside buy-back and drop-off programs. The U.S. EPA recommends that all aerosol containers be recycled once they are empty.

Properties

Operating Temperature: -10° F to 200° F **Dielectric Strength:** 44,400 - 47,800 Volts **Solubility in Water:** Insoluble	**Kb Value:** 24.8 **Film Thickness:** 17 um (US) **Coverage:** 600-1000 ft^2 per gal
Surface Compatibility For all variations : WD-40 demonstrates none to negligible deleterious effect to plastic, rubber, and metal hard surfaces. This includes Acetal, neoprene/hard rubber, HDPE, PPS Copolymer Polysulfone, Teflon, Viton, steel, galvanized steel hot dip, electroplated, copper, brass, magnesium, nickel, tin plate, titanium, and zinc.	**Surface Cautions** Nearly all surfaces interact with WD-40 as they would any high grade aliphatic petroleum spirit. Certain types of rubber will swell upon prolonged immersion. Wax polishes and certain wax coatings may be softened by WD-40. Clear polycarbonate and polystyrene may stress craze or crack. Always test surfaces first.

Performance - WD-40® Multi-Use Product

Test Method	Property	Results
ASTM 4172	Lubricates and Protects	0.60-0.70 mm at RT
ASTM 3233	Extreme Pressure Lubrication	1300-2000 lbs
ASTM B-117	Corrosion Protection (Salt Spray)	0-20% in 72 hours

Safety

WD-40 Aerosol: DANGER! *Flammable aerosol. Contents under pressure. Harmful or fatal if swallowed. If swallowed, may be aspirated and cause lung damage. May cause eye irritation. Avoid eye contact. Use with adequate ventilation. Keep away from heat, sparks and all other sources of ignition.*

WD-40 Bulk Liquid: DANGER! *Combustible liquid. Harmful or fatal if swallowed. If swallowed, may be aspirated and cause lung damage. May cause eye irritation. Avoid eye contact. Use with adequate ventilation. Keep away from heat, sparks and all other sources of ignition.*

Symptoms of Overexposure:

Inhalation: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. Intentional abuse may be harmful or fatal.
Skin Contact: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.
Eye Contact: Contact may be irritating to eyes. May cause redness and tearing.
Ingestion: This product has low oral toxicity. Swallowing may cause gastrointestinal irritation, nausea, vomiting and diarrhea. This product is an aspiration hazard. If swallowed, can enter the lungs and may cause chemical pneumonitis, severe lung damage and death.
Chronic Effects: None expected.
Medical Conditions Aggravated by Exposure: Preexisting eye, skin and respiratory conditions may be aggravated by exposure.

Suspected Cancer Agent:
Yes No X

Regulatory

U.S. Federal Regulations:

CERCLA 103 Reportable Quantity: This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

SARA TITLE III:

Hazard Category For Section 311/312: Acute Health, Fire Hazard, Sudden Release of Pressure
Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements: None
Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

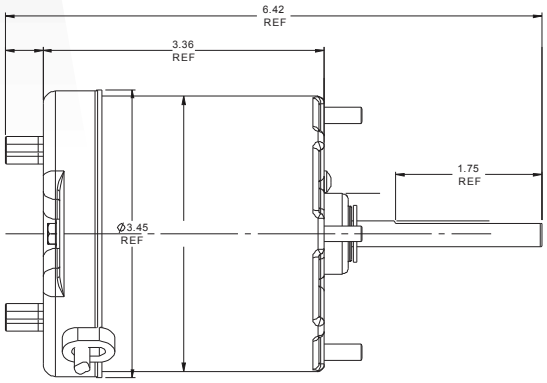
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): This product does not contain chemicals regulated under California Proposition 65.

VOC Regulations: This product complies with the consumer product VOC limits of CARB, LADCO, the US EPA and states adopting the OTC VOC rules.

WD-40 COMPANY, 1061 Cudahy Place,
San Diego, California 92110 U.S.A
WD-40 Safety Hotline 1-888-324-7596
www.WD40.com

morrillmotors®

ARKTIC™ · 59



Arktic59 motors are used in the evaporators of commercial walk-in coolers and freezers. With peak efficiencies of approximately 66%, they can be used in any air-moving application that demands high efficiency and dependability. All ratings have UL certification (E258064) and are designed for a useful life of 83,720 hours.

Features

- Energy efficient ECM technology
  - › Automatic torque variation
- Shaft: Single. 5/16" single shaft with single flat is standard.
- Mounting: Standard 1/2"- #10-32 studs on shaft end
  - › (2-13/16" bolt circle) and 1/2" - #10-32 studs on the opposite shaft end (2-13/16" bolt circle)
  - › Power cord with straight, 2-pin Lyall plug
- Temp Ranges
  - › Operating temp: -40˚C to +25˚C ambient
  - › Storage temp: -40˚C to +80˚C ambient

Benefits

- Low power consumption for maximum efficiency
- Constant rotational speed for functional consistency
- Wide array of application compatibility
- Drop-in replacement for existing shaded pole and PSC evaporator cooler motors

Stock No.	HP	RPM	Volts	FLA	Mounting	Shaft DIM	Rotation (LE)	Notes
5100A	1/15	1550	115	1.1	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CW	MOUNTING STUDS, BOTH SIDES
5101A	1/15	1550	115	1.1	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CCW	MOUNTING STUDS, BOTH SIDES
5200A	1/15	1550	208-230	0.63	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CW	MOUNTING STUDS, BOTH SIDES
5201A	1/15	1550	208-230	0.63	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CCW	MOUNTING STUDS, BOTH SIDES
5110A	1/15	1550/800	115	1.1	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CCW	MOUNTING STUDS, BOTH SIDES
5111A	1/15	1550/800	115	1.1	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CW	MOUNTING STUDS, BOTH SIDES
5210A	1/15	1550/800	208-230	0.63	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CCW	MOUNTING STUDS, BOTH SIDES
5211A	1/15	1550/800	208-230	0.63	HORIZONTAL / VERTICAL	2-5/8" X 5/16"	CW	MOUNTING STUDS, BOTH SIDES
5104A	1/15	1550	115	1.1	VERTICAL SHAFT DOWN	1" X 5/16"	CCW	SPECIAL MOUNTING BRACKET DIRECT REPLACEMENT FOR HUSSMAN/KRACK UNITS
5204A	1/15	1550	208-230	0.63	VERTICAL SHAFT DOWN	1" X 5/16"	CCW	SPECIAL MOUNTING BRACKET DIRECT REPLACEMENT FOR HUSSMAN/KRACK UNITS

All rating enclosures are TEAO.

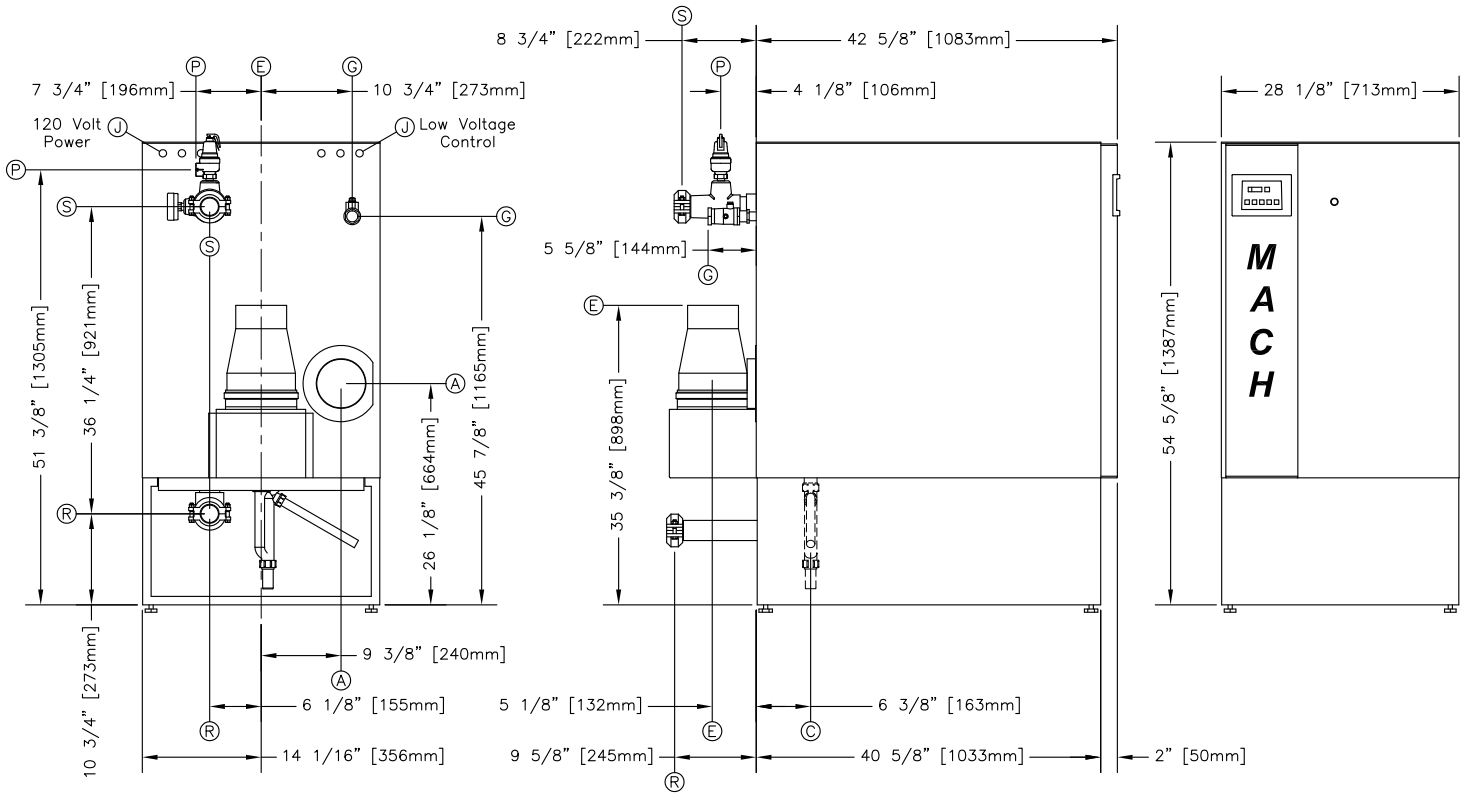
1325 Heil Quaker Blvd.
LaVergne, TN 37086
PH: 1-800-672-6495

MorrillMotors.com

List Item	Ca.t No.	Model No.	HP	Volts	RPM	FLA	Insulation Class	Enclosure	HZ	SP	Bearings	Mounting	Rotation (LE)	Shaft DIM	Description	Motor Image
1	5100A	5SME59BVA1036	1/15	115	1550	1.1	B	TEAO	60/50	1	Ball	HORIZONTAL / VERTICAL	CW	2-5/8" X 5/16"	MOUNTING STUDS, BOTH SIDES	
2	5101A	5SME59BVA1038	1/15	115	1550	1.1	B	TEAO	60/50	1	Ball	HORIZONTAL / VERTICAL	CCW	2-5/8" X 5/8"	MOUNTING STUDS, BOTH SIDES	
3	5104A	5SME59BVA1079	1/15	115	1550	1.1	B	TEAO	60/50	1	Ball	VERTICAL SHAFT DOWN	CCW	1" x 5/8"	SPECIAL MOUNTING BRACKET DIRECT REPLACEMENT FOR HUSSMAN/KRACK UNITS	
4	5204A	5SME59BVA2080	1/15	208-230	1550	0.63	B	TEAO	60/50	1	Ball	VERTICAL SHAFT DOWN	CCW	1" x 5/8"	SPECIAL MOUNTING BRACKET DIRECT REPLACEMENT FOR HUSSMAN/KRACK UNITS	
5	5110A	5SME59BVA1065	1/15	115	1550/800	1.1	B	TEAO	60/50	2	Ball	HORIZONTAL / VERTICAL	CCW	2-5/8" X 5/8"	MOUNTING STUDS, BOTH SIDES	
6	5111A	5SME59BVA1066	1/15	115	1550/800	1.1	B	TEAO	60/50	2	Ball	HORIZONTAL / VERTICAL	CW	2-5/8" X 5/8"	MOUNTING STUDS, BOTH SIDES	
7	5200A	5SME59BVA2037	1/15	208-230	1500	0.63	B	TEAO	60/50	1	Ball	HORIZONTAL / VERTICAL	CW	2-5/8" X 5/8"	MOUNTING STUDS, BOTH SIDES	
8	5201A	5SME59BVA2039	1/15	208-230	1550	0.63	B	TEAO	60/50	1	Ball	HORIZONTAL / VERTICAL	CCW	2-5/8" X 5/8"	MOUNTING STUDS, BOTH SIDES	
9	5210A	5SME59BVA2070	1/15	208-230	1550/800	0.63	B	TEAO	60/50	2	Ball	HORIZONTAL / VERTICAL	CCW	2-5/8" X 5/8"	MOUNTING STUDS, B OTH SIDES	
10	5211A	5SME59BVA2071	1/15	208-230	1550/800	0.63	B	TEAO	60/50	2	Ball	HORIZONTAL / VERTICAL	CW	2-5/8" X 5/8"	MOUNTING STUDS, BOTH SIDES	

MACH® Model C-750

ENVI® Control



Service Clearances:
24" [610mm] Above
36" [914mm] Front

The MACH® Boiler requires category II venting (condensing–negative pressure) or category IV venting (condensing–positive pressure) as defined in ANSI Z223.1/NFPA 54/CSA–B.149 Latest Edition. Harsco Industrial, Patterson–Kelley reserves the right to make changes at any time without notification.

BOILER CONNECTIONS:	
Ⓐ Combustion Air Inlet	6" dia stub
Ⓒ Condensate Drain	3/4"
Ⓔ Exhaust Vent	152mm ID (6"nom ID)
Ⓖ Main Gas Connection	1" NPT–F
Ⓙ Wiring Junction Boxes	as marked
Ⓟ Pressure Relief Valve	see list for selection
Ⓡ Boiler Water Return, Victaulic® clamp	2" pipe, grooved
Ⓢ Boiler Water Supply, Victaulic® clamp	2" pipe, grooved

Victaulic is a registered trademark of Victaulic Company, Easton, PA, USA

BOILER CONTROLS: ASME CSD–1 is standard. Complies with GE GAP (IRI) guidelines GAP.4.1.0 and GAP.4.1.3. Complies with FM Global 6–4/12–69 Section 1.0
Main Gas Train: see gas train submittal
Integrated Boiler Control, ENVI® Series
Operating Thermostat, 70°–195°F (21°–91°C)
High Limit Thermostat, Manual Reset, 100–200°F (38°–93°C)
High Exhaust Pressure Switch, Manual Reset
LWCO, Probe Type, Manual Reset
Air Switch, Differential Pressure Type
Combustion Blower, Variable Speed, 300 watt (0.4 hp)

C.S.A. CERTIFIED RATINGS AND CAPACITIES		
Fuel	☐ Natural Gas(NG)	☐ Propane(LP)
Input, BTU/hr		750,000
Output, BTU/hr		712,500
Boiler HP:		21.3
Maximum Inlet Gas Pressure:		14"w.c.
Minimum Inlet Gas Pressure:		3.5"w.c.

Electrical Requirements	120v, 1ph, 60hz
Total Operating Amps	less than 5 amps
Operating Weight	695 lbs.
Water Content	5.9 gallons

A.S.M.E. Section IV Design Data	
Maximum Pressure	80 psig
Maximum Allowable Temperature	200°F
Maximum Operating Temperature	194°F
Heated Wet Surface Area:	18.35 sq.ft.
Flow rate @ 20°F ΔT	72 GPM
Flow rate @ 40°F ΔT	36 GPM

Pressure Relief Valve	Press/Temp Gauge
☐ 80 PSIG 3/4" x 1" (standard)	0–240psi/30–240°F
☐ 30 PSIG 1"	0–100psi/30–240°F
☐ 50 PSIG 3/4" x 1"	0–100psi/30–240°F
☐ 60 PSIG 3/4"	0–100psi/30–240°F
☐ 75 PSIG 3/4" x 1"	0–240psi/30–240°F

HARSCO INDUSTRIAL
Patterson-Kelley

HARSCO INDUSTRIAL
Patterson-Kelley

MACH® GAS-FIRED BOILER

C750-C900-C1050

C.S.A. Design-Certified
Complies with ANSI Z21.13/CSA 4.9
Gas-Fired Low Pressure Steam and Hot Water Boilers

ASME Code, Section IV
Certified by Harsco Industrial, Patterson-Kelley

C.S.A. Design-Certified
Complies with ANSI Z21.13/CSA 4.9
Gas-Fired Low Pressure Steam and Hot Water Boilers

Model #:_____ Serial #_____

Start-Up Date: _____

Harsco Industrial, Patterson-Kelley
100 Burson Street,
East Stroudsburg, PA 18301
Telephone: (570) 476-7261
Facsimile: (570) 476-7247
www.harscopk.com

INSTALLATION & OWNER'S MANUAL

⚠ WARNING

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.

Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

⚠ WARNING It is essential to read, understand, and follow the recommendations of this manual before installing, operating, or servicing this equipment.

⚠ WARNING Installation and service must be performed by a qualified and knowledgeable individual who has been trained on the MACH® boiler. The same features which permit this boiler to achieve high-efficiency performance make it unlike most other boilers of this general size, so it is important to understand how this boiler operates.

What to do if you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

1 INTRODUCTION

The MACH® gas-fired boiler is fully modulating using a variable speed combustion blower, sophisticated microprocessor controls, modulating gas safety shut off / control valves and a unique aluminum alloy heat exchanger capable of operating in a fully condensing mode to provide maximum efficiency in a minimum amount of space. The high-quality materials and thoroughly tested design of the boiler should provide years of trouble-free service if the instructions in this manual are followed carefully.

This manual covers installation of MACH® boilers. The model numbers may be followed by a prefix or suffix letter in some cases to indicate special features or different options.

While details may differ slightly, basic operation is the same for all models. Boilers may be built to operate with natural gas or liquefied petroleum gas (propane). Check the rating plate for correct fuel usage and gas pressures.

The boiler is only a part of the complete heating system. This boiler may be fully operational and yet because of poor circulation, improper control or other site related characteristics, not deliver heat to the desired location. Additional equipment such as temperature sensors, pumps, flow switches, balancing valves, and check valves will be required for satisfactory operation of any system. Harsco Industrial, Patterson-Kelley cannot be responsible for the design or operation of such systems and a qualified engineer or contractor must be consulted.

2 SAFETY

2.1 GENERAL

The MACH® gas-fired boiler **must** be:

- Installed, operated, and serviced in accordance with instructions contained in this manual and other supplemental MACH® boiler manuals.
- Installed by qualified personnel in accordance with designs prepared by qualified engineers including: structural, mechanical, electrical, and other applicable disciplines.
- Operated and serviced in accordance with a comprehensive safety program determined and established **by the customer**. Do not attempt to operate or service until such a program has been established.
- Operated and serviced by experienced, qualified, properly trained personnel in accordance with all applicable codes, laws, and regulations.

NOTICE! Each safety device must be maintained and checked per the recommended schedule. Refer to Section 5.1 of this manual.

2.2 TRAINING

Proper training is the best protection against accidents.

It is essential to read, understand, and follow the recommendations of this manual before installing, operating, or servicing this equipment. Failure to do so could result in fire or explosion and serious injury, death, and/or property damage.

Operating and service personnel must be thoroughly familiar with the basic construction of the MACH® boiler, the use and locations of the controls, the operation of the boiler, adjustment of its various mechanisms, and all applicable safety precautions. If any of the provisions of this manual are not fully and completely understood, contact the Harsco Industrial, Patterson-Kelley Technical Service toll free at (877) 728-5351.

2.3 SAFETY FEATURES

It is the responsibility of the customer to maintain the safety feature, such as but not limited to: guards, safety labels, safety controls, interlocks and lockout devices.

2.4 SAFETY LABELS

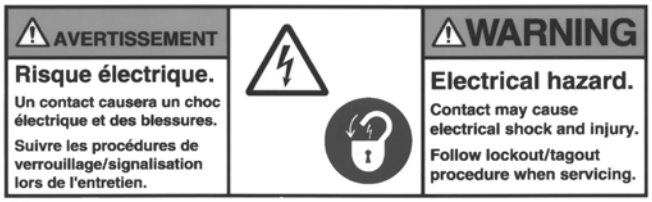
The following words are used in this manual to denote the degree of seriousness of the individual hazards.

⚠ DANGER indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury. This signal word is to be limited to the most extreme situations.

⚠ WARNING indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

⚠ CAUTION indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE/NOTE - NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol is not used with this signal word.

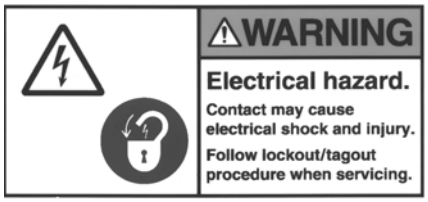


The safety labels shown above are affixed to your boiler. Although the labels are of high quality, they may become dislodged or unreadable over time. Contact Harsco Industrial, Patterson-Kelley toll-free at (877) 728-5351 for replacement labels.

2.5 SAFETY PRECAUTIONS

Provide a suitable location for the boiler away from normal personnel traffic. Ensure that you have adequate working space, adequate clearances, proper ventilation and lighting, a structure sufficiently strong and rigid to support the weight of the boiler, all piping and accessories.

2.5.1 Electrical Hazards



- Shock hazard! Properly lockout/tag out the electrical service and all other energy sources before working on or near the boiler.
- Shock hazard! Do not spray water directly on this boiler or on any electrical components.
- Electrical hazard! Do not alter wiring connections.

2.5.2 Burn, Fire and Explosion Hazards

General Warning

- Burn, fire and explosion hazards! Installation must be in strict conformance to all applicable codes and standards including NFPA 54, ANSI Z223.1 and CAN/CSA B.149.1. Install all required vent lines for gas devices. Refer to Section 3.7.1.
- Hazard from incorrect fuels! Possible fire, explosion, overheating, and damage. Do not use any fuels except the design fuels for the unit.
- Over fire hazards! High pressure in gas or propane supply could result in over firing of this appliance or other devices supplied from the same source.

- Fire and explosion hazards! Close the main gas shutoff before servicing boiler.
- Fire and explosion hazards! Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other gas fired appliance.

Hot Surface

- Burn hazard! Possible hot surfaces. Do not touch gas vent during firing operation. Use only factory recommended vent components.
- Burn hazard! Pipes, vents, and boiler components could be hot. Do not touch piping or stack surfaces during operation or immediately after shutdown of the boiler.
- Burn hazard! Hot fluids. Use caution when servicing or draining the boiler.
- Fire and explosion hazards! Use caution when servicing burner. Propane (LPG) is heavier than air and may linger in the combustion chamber, vent lines, or elsewhere.
- Gas leak hazard! Make sure the burner is installed correctly and burner hood is securely fastened following any maintenance performed on them. These connections cannot be tested after the burner is assembled.
- Gas leak hazard! All threaded gas connections must be made using a pipe compound that is resistant to liquefied petroleum. **Do not** use Teflon™ tape on threaded gas piping.
- Gas leak hazard! Check entire gas train for leaks after installation. If there is a smell of gas, shut down the boiler and obtain immediate assistance from trained service personnel and/or your local fire department.
- Excess pressure hazard! Possible fire and explosion from excess gas pressure. Make sure that gas inlet pressure does not exceed 14 inches W.C. to the regulator.
- Fire and explosion hazard! Failure to maintain all gas train components may result in malfunction of regulators and/or gas safety shut off / control valves. Annual inspection by factory-trained personnel for proper set-up and operation is recommended.
- Over fire and under fire hazards! Possible fire, explosion, overheating, and component failure. Do not attempt to adjust firing rate of the boiler. The firing rate must be adjusted **only** by factory trained personnel.

⚠ WARNING Gas may lose its odor. Proper gas sensing equipment and procedures should be used for leak checks.

2.5.3 Crush Hazards

General Warning

- Lifting hazards! Use properly rated lifting equipment to lift and position the boiler. The load is unbalanced. Test balance before lifting 3 ft. above the floor. Do not allow personnel beneath the lifted load. Refer to approximate weights in the table.

Boiler Size	Weight in Pounds
750,000 Btu	650
900,000 Btu	700
1,050,000 Btu	750

- Bump hazard from overhead ductwork and piping. Install components with adequate vertical clearance.

2.5.4 Chemical Hazards

General Warning

- Chemical hazards from cleaning products. Use caution when cleaning the system. The use of professional assistance is recommended. Use safe procedures for the disposal of all cleaning solutions.
- Combustion Condensate – an acidic pH of approximately 3.0 to 5.0 can be expected. Use PVC, CPVC, or other corrosion resistant piping for drainage. Collection and disposal must be in accordance with all applicable regulations. A condensate neutralization kit is available. Please contact your local Harsco Industrial, Patterson-Kelley representative.

2.5.5 Pressure Hazards

General Warning

- Pressure hazard! Hot fluids. Install isolation valves on boiler water inlet and outlet. Make sure isolation valves are closed before servicing boiler.
- Pressure hazard! Hot fluids. Annually test safety relief valve for proper operation. Do not operate boiler with faulty relief valve.

2.5.6 Slip, Fall Hazards

General Warning

- Tripping hazard! Do not install piping on floor surfaces. Maintain clear path around boiler.
- Slip and fall hazard! Use drip pan to catch water while draining the boiler. Maintain dry floor surfaces.
- Slip and fall hazard! **Do not** locate intake or exhaust terminations directly above a walkway; dripping of condensation can cause icing of the walking surface. (see section 3.6.3)

3 INSTALLATION

3.1 RECEIVING AND STORAGE

3.1.1 Initial Inspection

Upon receiving the boiler, inspect it for signs of shipping damage. Since some damage may be hidden, we recommend unpacking the boiler, removing the top, front, and sides covers and inspect the boiler. Verify that the total number of pieces shown on the packing slip agrees with those actually received.

NOTICE! Note any damage, suspected potential damage, or shortage of materials on the freight bill and immediately notify the carrier. File all claims for shortage or damage with the carrier. Claims for hidden damages must be filed with your carrier within 7 days. The boiler carton is equipped with a "Tip (N) Tell". If "Tip (N) Tell" arrow point is blue, that indicates that the package has been on its side or tipped over in transit.

3.1.2 Storage Prior to Installation

If the boiler is not installed immediately, it must be stored in a location adequately protected from the weather and freezing conditions, preferably indoors. If this is not possible, then it should remain in the shipping container and be covered by a tarpaulin or other waterproof covering.

NOTICE! Controls and other equipment that are damaged or fail due to weather exposure are not covered by warranty.

3.2 COMPLIANCE WITH CODES

The MACH® boiler with standard components and with many options complies with American National Standard/CSA Standard ANSI Z21.13/CSA 4.9, latest edition, Gas-Fired Low Pressure Steam and Hot Water Boilers.

The heat exchanger is constructed and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section IV for 80 psig maximum operating pressure and/or 200º F maximum temperature.

Installation of the boiler must conform to all the requirements of all national, state and local codes established by the authorities having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1/NFPA 54, latest edition in the U.S. In Canada, the equipment shall be installed in accordance with the current Installation Code for Gas Burning Appliances and Equipment, CAN/CSA-B.149, latest edition, and applicable Provincial Regulations for the class, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

Where required by local codes, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1).

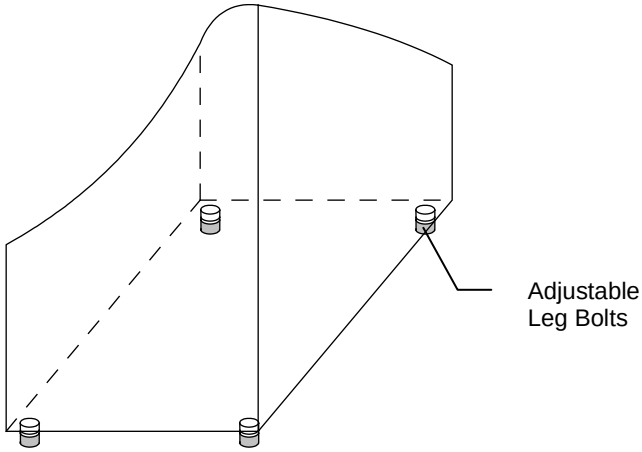
In the Commonwealth of Massachusetts (a) this unit must be installed by a licensed pipe fitter / plumber, (b) field installed gas cocks must be "T" handle type, (c) piping of condensate shall conform to the State Plumbing Code, and (d) refer to the Massachusetts supplement for further details.

3.3 SETUP

3.3.1 Foundation

Provide a firm, level foundation, preferably of concrete.

NOTICE! The boiler may be installed on a combustible floor, however the boiler must **never** be installed on carpeting.



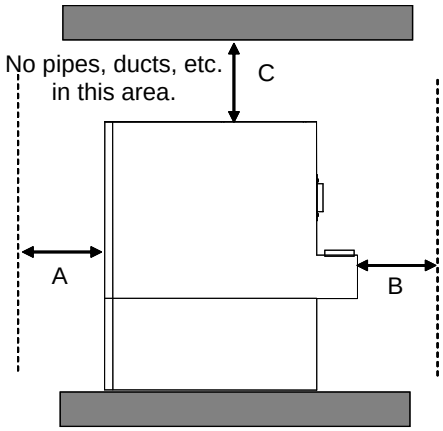
Adjustable Legs for Leveling and Floor Clearance

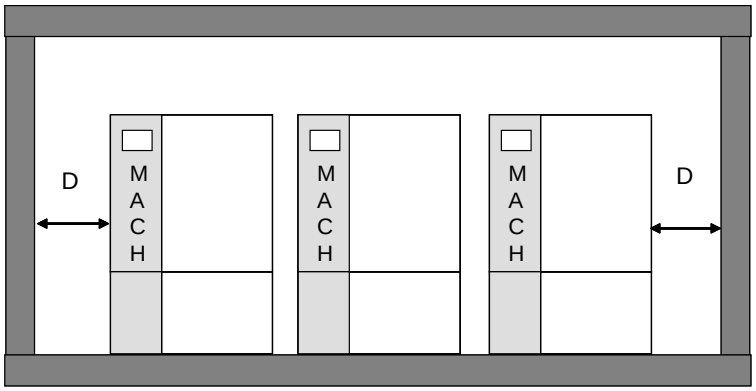
3.3.2 Placement

The boiler must be level to function properly. To assist in leveling the boiler, the four (4) adjustable leg bolts (1/2"- 13 NC) must be installed. The adjustable legs are also necessary to provide adequate floor clearance and prevent distortion of the cabinet, (twisting, etc.) in addition to leveling.

3.3.3 Clearances

If the boiler is to be installed near combustible surfaces, six (6") inches minimum clearance to the combustible surface must be maintained. Failure to provide for the service access clearances, even with non-combustible surfaces, may cause future problems servicing the boiler. The boiler must be installed in a space large in comparison to the boiler as described in the National Fuel Gas Code, NFPA 54/ANSI Z223.1, Latest Edition.





Clearances from Adjacent Walls, Ceiling, and Obstructions
Side Clearances for a Row of Boilers

Type of Surface	Dimensions (inches)			
	A	B	C†	D
CSA Minimum Clearances to Combustibles	24	24*	24	24
Recommended Service Clearances	30	24*	24	24**

† "C" dimension includes clearance to remove the burner. Do not put pipes, ducts, etc. in this area above the boiler.

*CSA minimum. Actual clearance depends upon venting requirements.

** Service access need be only on one side of a boiler or row of boilers. Boilers may be installed immediately adjacent to each other. However, Harsco Industrial, Patterson-Kelley recommends this clearance between **each boiler** when there is insufficient access at the rear to allow for service and adjustment.

⚠ CAUTION Bumping hazard from overhead ducts! Install all components with adequate vertical clearances.

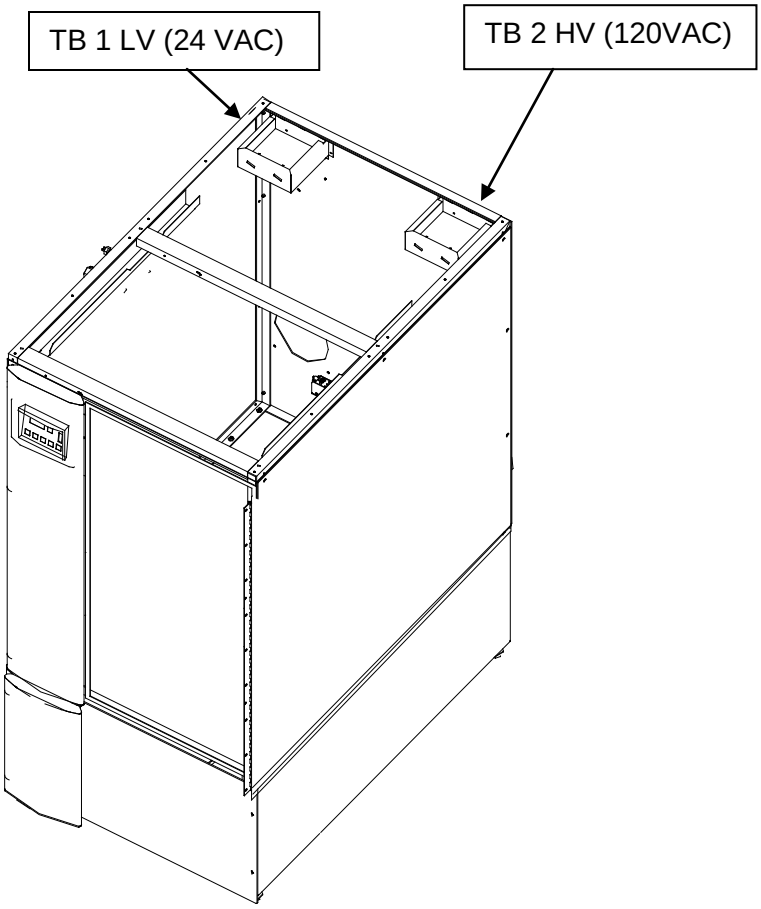
3.4 ELECTRICAL CONNECTIONS

The boiler is wired for 120 volts, single phase, 60 hertz. The total operating amperage is indicated on the rating nameplate. MACH® boiler units C750/C900/C1050 require less than 8 amps. Before starting the boiler, check to ensure that the proper electrical service is connected to the boiler.

An external electrical disconnect (not supplied with the boiler) with 15 amp overload protection is required. The boiler must be grounded in accordance with local codes or in the absence of such requirements, in the U.S. with National Electrical Codes, ANSI/NFPA No. 70 latest edition and in Canada to the current Canadian Electrical Code, Part I, CSA C22.1.

NOTICE! A dedicated earth ground (green wire) is required to avoid nuisance shutdowns. Do not ground through the conduit. It is also important that proper polarity be maintained.

The electrical boxes are located on the top rear of the boiler. For wiring details, refer to Terminal Block Assignments in section 6.1



3.4.1 High Voltage (TB2) Terminal Block

The boiler power circuit requires 120 VAC, 60 hertz, with a dedicated neutral and ground as labeled. Electrical service must be rated for 8 amps minimum. Before starting the boiler, check to ensure that the proper voltage and amperage are connected to the boiler and that the boiler is connected to a suitable fused disconnect switch or circuit breaker. There must be less than 1.0V from Neutral (TB2-3) to Ground (TB2-8)

120VAC Switched Output- This contact closes when the boiler is switched on. This provides 120VAC 5Amp service to TB2-10. The neutral for this circuit is provided on TB2-3. When the boiler is switched off, this terminal is switched off as well.

3 Way Valve- This output is normally energized, keeping the three way valve providing heat to the building. The Domestic Hot Water (DHW) call for heat de-energizes this circuit, causing the 3 way valve to self close, thereby providing heat to the DHW loop. This output provides 120VAC 0.5Amp service to TB2-11. The neutral for this circuit is provided on TB2-4.

DHW Pump Relay w/Delay Off - This output is enabled when there is a call for DHW. When the call for heat is removed, the output remains enabled for a period of time. This output provides 120VAC 0.5Amp service to TB2-12. The neutral for this circuit is provided on TB2-5.

Circ Pump Relay w/Delay Off - This output is enabled when there is a call for heat. When the call for heat is removed, the output remains enabled for a period of time. This output provides 120VAC 0.5Amp service to TB2-13. The neutral for this circuit is provided on TB2-6.

Damper Relay - This output is enabled when the call for heat is enabled. This output provides 120VAC service to TB2-14. The neutral for this circuit is provided on TB2-7. This circuit is for pilot duty only.

Master Alarm Relay – This contact closes in the event of an alarm output from the boiler control, connecting TB2-15 and TB2-16.

Flame Detected Relay – This contact closes whenever the boiler is firing, connecting TB2-17 and TB2-18.

3.4.2 Low Voltage (TB1) Terminal Block

Enable/Disable– TB1-1 and TB1-2 are used for enabling the boiler. Closing this circuit allows the boiler to run. Opening this circuit prevents the boiler from running. This circuit is energized by the boiler. It has a 24VAC potential. Devices connected to these terminals must be rated for 24VAC

External Interlock – TB1-3 and TB1-4 are used for attachment of an additional field safety device to the boiler control circuit. Closing this circuit allows the boiler to run. Opening this circuit prevents the boiler from running. This circuit is energized by the boiler with a 5V potential. Devices connected to these terminals must be rated for 5V.

Outdoor Temp Sensor – TB1-5 and TB1-6 are connected to the outdoor temperature sensor. The temperature control must be programmed to run an outdoor air schedule. The outdoor air sensor and programming help are available from the local Harsco Industrial, Patterson-Kelley Representative. This circuit is energized by the boiler with a 5V potential. The temperature sensor must be a NTC having 12k@25°C.

DHW Stat/Sensor – TB1-7 and TB1-8 are connected to the DHW temperature sensor or thermostat. This circuit is energized by the boiler with a 5V potential. The temperature sensor must be a NTC having 12k@25°C.

Header Temp Sensor – TB1-9 and TB1-10 are connected to the header temperature sensor. This circuit is energized by the boiler with a 5V potential. The temperature sensor must be a NTC having 12k@25°C.

DHW Flow Switch – TB1-11 is energized by the boiler with a 5V potential. This circuit connects through a flow switch on the domestic side of a domestic hot water system. The flow switch should close upon flow to provide a closed circuit back to TB1-12.

Analog Input– Remote signal for controlling the boiler. The boiler can be operated in a remote setpoint or a remote firing rate control mode. Input 0-10VDC signal on TB1-13 only. The 0V Analog Input is provided on TB1-14. The temperature control must be programmed to run with the analog input.

MODBUS® – TB1-17 and TB1-18 are used for connecting a MODBUS® building management system. (See the ENVI® Control Advanced Users Guide for more information)

Cascade – TB1-19 and TB1-20 are used to connect between boilers that are part of a Master/Member Network. Up to 24 boilers may be connected together. (See the ENVI® Control Advanced Users Guide for more information)

3.5 INLET AIR AND EXHAUST VENTING

3.5.1 Applicable Codes & Standards

CODES

United States:

NFPA 54/ANSI Z223.1	National Fuel Gas Code
NFPA/ANSI 211	Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances

Canada

CAN/CSA B149.1	Installation Codes for Gas Burning Equipment

STANDARDS

UL 1738	Venting Systems for Gas-Burning Appliances, Categories II, III, and IV
ULC S636-95	Standard for Type BH Venting Systems
Sheet Metal and Air Conditioning Contractors National Association (SMACNA)	Thermoplastic Duct Construction Manual

These codes and standards contain information for the venting of gas fired appliances, including, but not limited to vent sizing, location, clearance to combustibles, and safe installation practices. The installation must comply with both the above Federal Codes and with state, provincial and local codes.

⚠ WARNING Design and installation of venting systems should be done only by qualified and knowledgeable venting systems personnel and in accordance with vent system manufacturer's installation instructions. Installing a boiler or vent system using improper installation methods or materials can result in serious injury or death due to fire or asphyxiation.

⚠ WARNING Before connecting a boiler to a venting system, it must be determined whether the boiler is to be installed in a conventional or Direct Vent configuration. In the US, provisions for combustion and ventilation air must be in accordance with NFPA 54/ANSI Z223.1, *National Fuel Gas Code*, latest edition, or applicable provisions of the local building codes. In Canada, combustion and ventilation air openings shall comply with CAN/CSA B-149.1 *Natural Gas and Propane Installation Code*.

⚠ WARNING For correct installation of vent system, read all of these instructions and refer to vent manufacturer's instructions.

Failure to use a proper vent system (types and materials), as described in this manual will void the boiler warranty and may result in rapid deterioration of the venting system, creating a health or life safety hazard.

Faulty vent installation can allow toxic fumes to be released into living areas. This may cause property damage, serious bodily injury or death.

3.5.1.1 Gas Vent Categories

Several codes and standards have categorized appliances in accordance with the flue gas temperature and pressure produced by the appliance. Categories are defined as follows:

- ***Category II*** An appliance that operates with a non-positive vent static pressure and with a vent temperature that may cause excessive condensate production in the vent.

- ***Category IV*** An appliance that operates with a positive vent static pressure and with a vent temperature that may cause excessive condensate production in the vent.
- ***Direct Vent*** An appliance that is constructed and installed so that all air for combustion is derived directly from outdoors and all flue gases are discharged to the outdoors.

3.5.1.2 Venting Materials for Flue/Exhaust Systems

The MACH® C750, C900 and C1050 boilers are dual-certified as both Category II and Category IV appliances, which vent with a temperature that is likely to cause condensation in the vent. Refer to Section 3.5.3.2 for requirements of Category II installations and Section 3.5.3.3 for requirements of Category IV installations. Any venting system used with the MACH® boiler must comply with the applicable venting system category as specified in the latest edition of NFPA 54/ANSI Z223.1 in the US or the latest edition of CAN/CSA B-149.1 in Canada.

⚠ WARNING

The venting materials listed below are intended for the venting of gas burning appliances only. Do not use these venting materials for venting liquid or solid fuel (such as oil, kerosene, wood or coal) appliances.
Maintain clearances to combustibles as listed in the vent manufacturer's installation instructions or as set forth in the codes and standards listed in this section.

Do not use these vent pipes for incinerators of any sort.

This boiler is not certified for use with PVC venting. Use of PVC vent may result in vent failure and possible serious injury or death.

According to ANSI Z21.13,/CSA 4.9, Gas-Fired Low Pressure Steam and Hot Water Boilers, Table XVII "Maximum Allowable Temperatures of Typical Non-Metallic Vent Material" the maximum allowable temperature for PVC is 158°F (70°) and for CPVC is 210°F (100°C).

Table of Acceptable Materials for Venting Systems

Manufactured Venting
US and Canada
Factory Fabricated Metallic Vent Systems listed and labeled to UL1738 (Titled: *Venting Systems for Gas-Burning Appliances, Categories II, III, and IV)*

Non-metallic Venting
Within the US
CPVC pipe conforming to ASTM F441, fittings conforming to ASTM F439 (Sch 80). Joints are to be sealed with solvent conforming to ASTM F493.

Within Canada
CPVC Pipe, Fittings and Sealant listed and labeled to ULC S-636 *Standard for Type BH Venting Systems*
Table 1.3.2 Applicable Vent Materials By Boiler Model

As per ANSI Z21.13b-2012 * CSA 4.9b-2012:
*** The use of cellular core PVC, CPVC and Radel as venting materials is prohibited.**
*** The use of external insulation on plastic vent pipe is prohibited.**

Table of Applicable Vent Materials by MACH® Boiler Model

Model	AL29-4C	316L SS	CPVC	PVC
US C750 – C1050	X	X	X	No
CAN C750 – C1050	X	X	Note 2	No

Note 2: In Canada, any CPVC used for venting must be listed to ULC S636.

3.5.2 Combustion Air

Combustion air must be free from dust, lint, etc. The presence of such materials in the air supplied to the burner could cause nuisance "Low Air" shutdowns or premature burner failure. The boiler should not be operated during construction while the possibility of drywall dust, demolition dust, etc. exists.

The combustion air supply must be completely free of chemical fumes which may be corrosive when burned in the boiler. Common chemicals which must be avoided are fluorocarbons and other halogenated compounds, most commonly present as refrigerants or solvents, such as Freon, trichloroethylene, perchlorethylene, chlorine, etc. These chemicals, when burned, form acids which quickly attack the boiler and the boiler stack. The result is improper combustion and premature boiler failure.

⚠ WARNING Under no circumstances shall the boiler room ever be under a negative pressure. Particular care should be taken when exhaust fans, compressors, air-handling units or other equipment may rob air from the boiler. Note that this equipment might be in rooms other than the boiler room.

3.5.2.1 Air Inlet Requirements – United States (NFPA 54/ANSI Z223.1 & NFPA/ANSI 211)

When air is supplied from inside the building, the total required volume shall be the sum of the required volume for all the appliances located in the mechanical room. Adjacent rooms furnished with fixed openings communicating directly with the mechanical room are considered part of the required volume. The minimum volume is 50 ft^3 per 1000 Btu/hr (4.8 m^3/kW) of installed appliance input capacity.

Openings used to connect indoor spaces to obtain the required minimum volume shall be sized as follows:

- When rooms are on the same floor, each opening shall have an area equal to 1 square inch for each 1000 Btu/hr (2200 mm^2 / kW) of installed appliance input capacity, but not less than 100 square inches. One opening should commence less than 12 inches above the floor and the other less than 12 inches below the ceiling. The minimum dimension of air openings shall be 3 inches.
- When rooms are on different floors, each opening shall have an area equal to 2 square inches for each 1000 Btu/hr (4400 mm^2 / kW) of installed appliance input capacity.

When combustion air is supplied from outside the building, the boiler room shall be provided with one or two openings to ensure adequate combustion air and proper ventilation.

When using one permanent opening, the opening shall commence within 12 inches of the ceiling and shall communicate directly with the outdoors or through a vertical or horizontal duct that communicates to the outdoors.

- Minimum free area of the opening is 1 square inch for each 3000 Btu/hr (700 mm^2 / kW) of installed appliance input capacity, and
- Not less than the sum of the areas of all vent connectors in the room.

When using two permanent openings, one opening shall commence within 12 inches above the floor and the other within 12 inches below the ceiling, preferably on opposite walls. The openings shall communicate directly, or by way of ducts, with free outdoor air. The minimum net free area of the openings shall be calculated in accordance with the following:

- When air is taken directly from outside the building, each opening (minimum of two, as outlined above), 1 square inch for each 4,000 Btu per hour (550 mm^2/kW) of total boiler input is required.
- When air is taken from the outdoors through a vertical duct into the mechanical room, 1 square inch per 4,000 Btu per hour (550 mm^2/kW) of total boiler input is required.
- When air is taken from the outdoors through a horizontal duct into the mechanical room, 1 square inch per 2,000 Btu per hour (1100 mm^2/kW) of total boiler input is required.

NOTICE!
1. The required size of openings for combustion and ventilation air shall be based on the net free area of the opening.
2. Screens shall be not smaller than ¼"
3. Motorized louvers shall be interlocked with the appliance so that they are proven open prior to main burner ignition and operation.

Table of US Minimum area of ventilation openings per boiler (sq inches)

MACH® Boiler MODEL	AIR SOURCE					
	INDOOR AIR SUPPLY		OUTDOOR AIR SUPPLY			
	SAME FLOOR	DIFF FLOORS	ONE OPENING	TWO OPENINGS		
				DIRECT	VERT DUCT	HORIZ DUCT
C750	750	1500	250	188	188	375
C900	900	1800	300	225	225	450
C1050	1050	2100	350	263	263	525

3.5.2.2 Air Inlet Requirements – Canada (CAN/CSA B149.1)

A. Ventilation of the space occupied by fuel burning appliance(s) or equipment shall be supplied by a ventilation opening at the highest practicable point communicating with the outdoors. The total cross sectional area of the ventilation opening must be either 10% of the net free area required for combustion air or 10 sq. in. (6500 mm^2), whichever is greater.

B. Use the following opening calculation for MACH® or MODU-FIRE® FD boilers:

When combustion air is supplied for a forced draft burner by natural airflow from the outdoors and there is no draft regulator or draft hood in the same space, there shall be a permanent opening with a cross sectional area not less than 1 sq. in/ 30,000 Btu/Hr (70 mm^2/kW) of the total rated input to the burner(s). This opening must not interfere with the ventilation air opening defined in paragraph A.

C. Use the following opening calculation for P-K THERMIFIC® boilers or other natural draft or fan-assist appliances:

When combustion air is supplied for natural or fan-assisted burners by natural airflow from the outdoors, there shall be a permanent opening with a cross sectional area not less than 1 sq. in/ 7000 Btu/Hr (321 mm^2/kW) up to and including 1,000,000 Btu/Hr plus 1 sq. in. / 14,000 Btu/Hr (155 mm^2/kW) in excess 1,000,000 Btu/Hr. This opening must be either located at or ducted to a point not more than 18 in. (450 mm) nor less than 6 in. (150 mm) above floor level. This opening is in addition to the ventilation air opening defined in paragraph A.

D. When combustion air is supplied by natural airflow into a space containing both types of appliance described in paragraphs B and C, the cross sectional area of the opening shall be not less than the sum of the cross sectional areas for all appliances in the space as calculated by the applicable method . This opening is in addition to the ventilation air opening defined in paragraph A.

E. When a duct is used to meet the requirement for combustion air supply, as described in paragraphs A through D, above, the opening of the duct shall be located so there is no possibility of cold air affecting steam or water piping, electrical equipment or mechanical equipment.

F. When combustion air is supplied by mechanical means, an airflow-sensing device must be installed. It must be wired into the pre-ignition limit string to prevent the burner from starting or to stop an operating burner in case of air supply failure.

G. When all combustion air is supplied through a make-up air heater, and the appliance is interlocked to the heater, the requirements of paragraphs A through F do not apply.

NOTICE!

1. The free area of a combustion air supply opening is calculated by deducting the blockage area of any fixed louvers, grilles or screens from the total area of the opening.
2. Screens shall be not smaller than ¼"
3. Motorized louvers shall be interlocked with the appliance so that they are proven open prior to main burner ignition and operation

Table of Canadian Minimum Area of Combustion and Ventilation Air Openings

MACH® Boiler		Required Combustion Air Opening		Ventilation Air Opening	
Model #	Input (Btu/Hr)	in^2	mm^2	in^2	mm^2
C750	750,000	25	16,129	10	6,452
C900	900,000	30	19,355	10	6,452
C1050	1,050,000	35	22,581	10	6,452

3.5.3 Flue Venting

This boiler is not certified for use with Type "B" vent nor with PVC venting.

⚠ CAUTION All boiler venting systems should be designed by a qualified venting professional experienced in venting system design. The information contained herein should be used as a guide only and is not intended to be used in lieu of qualified technical expertise.

3.5.3.1 VENT SIZING

The vent must be sized in accordance with the ASHRAE Systems and Equipment handbook, Chapter 30 or according to the vent manufacturer's recommendations. When using manufactured venting systems, consult your vent supplier for correct sizing and structural support requirements.

Table of Vent Design Parameters

MACH® Boiler Model	Frictional Resistance	Stack Temperature	CO_2 Natural Gas	CO_2 LP Gas
C750 – C1050	0.22"	210°F	9.0%	10.4%

3.5.3.2 CATEGORY II INSTALLATIONS

The MACH C750, C900 and C1050 are dual-certified for both Category II and Category IV operation. Category II appliances operate with a non-positive vent static pressure and with a vent temperature that may cause excessive condensate production in the vent. There are several requirements for reliable operation of the boilers under Category II conditions:

1. A stainless steel vent adapter is required to mate the boiler exhaust connection and the vent pipe. See the table below for the applicable part numbers.
2. A normally-closed motorized damper is required on the boiler's air intake. See the table below for the applicable part numbers.
3. The draft, measured inside the vent at the rear of the boiler, **must not exceed -0.04" W.C.** Excessive negative draft will cause nuisance trips such as flame failures.
4. The vent system must be properly drained of condensate before returning to the boiler. Please see Section 3.5.3.6 for information on installing condensate drains in the exhaust vent.

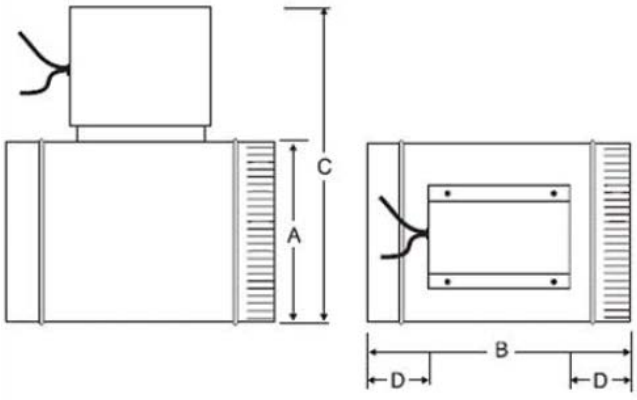
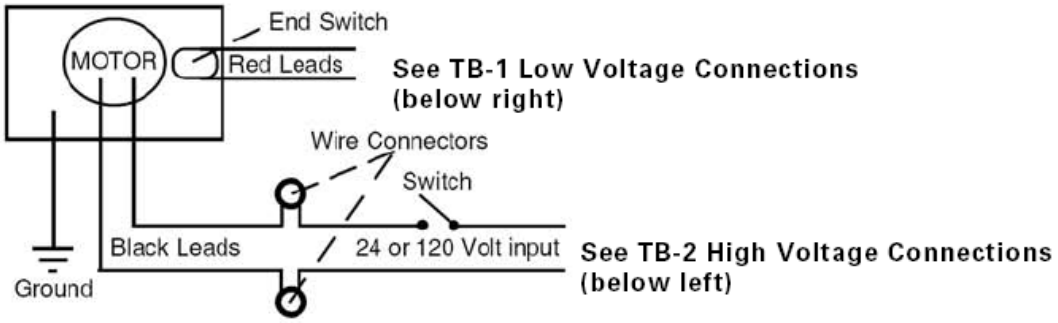


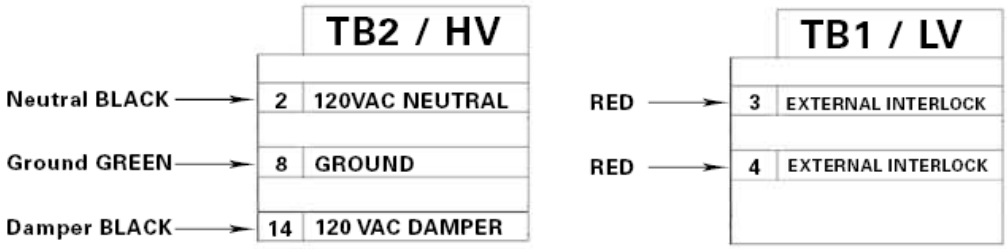
Table of Required Stainless Steel Vent Adapters and Category II Motorized Dampers

Boiler Size	Nominal Stack Size	Stainless Vent Adapter	Normally-Closed Motorized Damper	A	B	C	D
C750	6"	2620000181 (OEM)	1004906943	6"	6"	9"	1.38"
C900	8"	2620000366	1004906944	8"	8"	11"	2.38"
C1050	8"	2620000366	1004906944	8"	8"	11"	2.38"

The normally-closed motorized damper operates on 120 VAC and features an end limit switch wired into the boiler's external interlock circuit. Upon a call for heat, the boiler's damper relay will energize and drive the damper open. Once the damper reaches the fully-open position, the end limit switch makes contact and closes the external interlock circuit allowing the boiler to fire. The diagram below shows the wiring necessary to install the normally-closed motorized damper.



ENVI® Control



⚠ CAUTION Use caution if installing a barometric damper in the exhaust vent. The vent pressure **must be negative** (Category II) from the barometric to the vent termination at all times to prevent leakage of harmful flue gases into the room. Leakage of flue gases can cause serious injury or death.

3.5.3.3 CATEGORY IV INSTALLATIONS

If the vent installation is designed for Category IV conditions only (condensing – positive pressure) as it is defined in ANSI Z21.13/CSA 4.9, latest edition. The vent material must be as listed in Table in section 3.5.1.2 and can be run horizontally or vertically.

Vent installations shall be in accordance with NFPA54/ANSI Z223.1, the *National Fuel Gas Code*, or CAN/CSA-B149.1, the *Natural Gas and Propane Installation Code*, or applicable provisions of the local building codes.

⚠ WARNING **Do not use a barometric damper** if operating with a positive stack pressure (Category IV). Harmful flue gases may leak into the room which can cause serious injury or death.

3.5.3.4 CPVC VENT SYSTEM INSTALLATION

Install CPVC vent systems in accordance with this manual and the SMACNA *Thermoplastic Duct Construction Manual.* Install manufactured vent systems in accordance with the manufacturer's listing and instructions.

When venting this boiler using CPVC vent material, the following operating and installation conditions must be met:

Operating Parameters

Maximum Water Temperature Set Point 180°F

- Flue Gas Limit 200°F

Installation Parameters

- Cement and primer must conform to ASTM F493
- Three feet of venting closest to the boiler must not be enclosed
- The vent shall not be insulated

Table of CPVC Support Spacing (Feet)

Vent Size	Sch 40	Sch 80
4	4	4-1/2
6	4-1/2	5
8	5	5-1/2
10	5-1/2	6
12	6	6-1/2

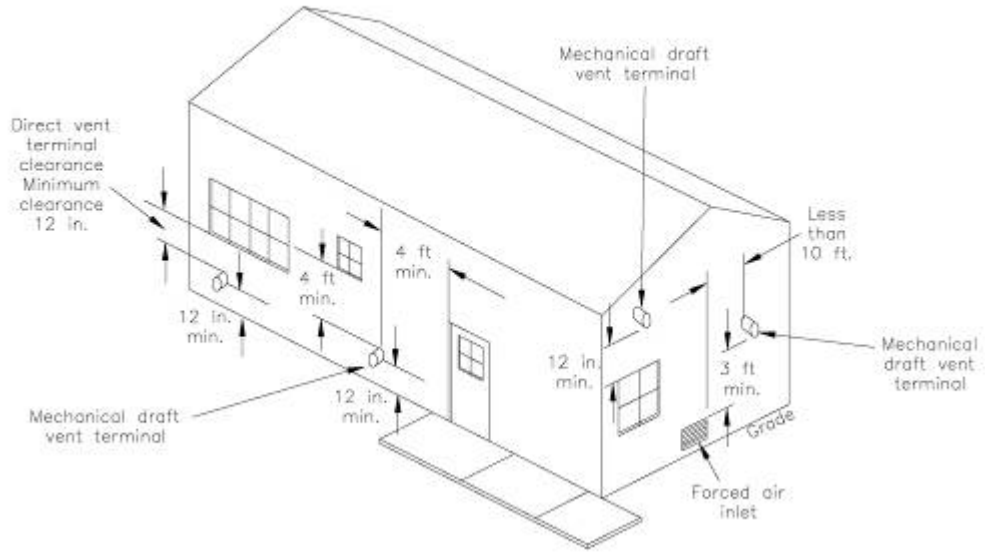
Table of Stainless Steel Adapter for CPVC Part Numbers

Boiler Size	Nominal Stack Size	Stainless Adapter for CPVC Part Number
C750	6"	2620000237
C900	8"	2620000238
C1050	8"	2620000238

A customer supplied adapter is required to be installed between the boiler and the CPVC venting. Below is a table containing the available adapter for each size MACH® boiler. Installer should use Adapters listed below or equivalent.

3.5.3.5 Required Clearances

Provide clearances between combustion air intake, exhaust vent, roof and wall surfaces, doors and window, and snow line. Refer to Figure below: Termination Clearances – Forced Draft and Direct Vent Installations.



Reference: NFPA 54/ANSI Z223.1 National Fuel Gas Code

⚠ WARNING Do not locate intake or exhaust terminations directly above a walkway; dripping of condensation can cause icing of the walking surface. Maintain a minimum clearance of 4 ft (1.22 m) horizontally from any electric or gas meter, regulator or relief equipment.

Conventional Vent Systems Clearances

The following termination clearance requirements are for conventional, non-direct vent installations.

- The vent system shall terminate at least 3 ft above a forced air inlet within 10 feet horizontally.
- The vent system shall terminate at least 4 ft below, 4 ft horizontally from or 1 ft above any door, operable window or gravity inlet into any building. The bottom of the vent terminal shall be at least 12 in. above grade or highest expected snow line (if applicable).
- Through the wall terminations shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves or other equipment.

Direct Vent (Sealed Combustion) Systems Clearances

- The vent terminal shall be located at least 12 in. from any air opening into a building. The bottom of the vent terminal shall be at least 12 in. above grade. Both the vent and air intake terminals must be at least 12 in. above the highest expected snow line.
- Through the wall terminations shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves or other equipment.

Interior Component Clearances

All vent system components shall be installed so as to maintain the following required minimum clearances:

	Combustible	Non-Combustibles
Unlisted single wall metal pipe	Do NOT Use	Do NOT Use
Single wall CPVC pipe	18 in.	As required for installation & access
UL 1738 listed Category IV vent	Per manufacturer's listing	Per manufacturer's listing

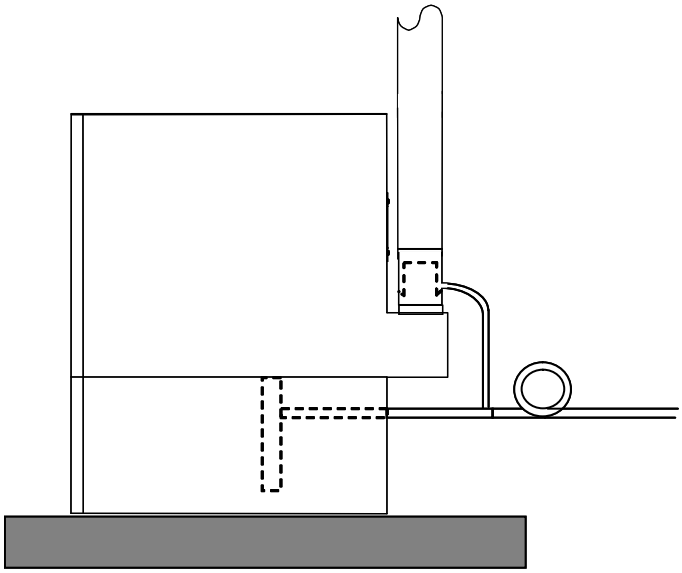
NOTE! Make sure that the weight of the vent is **not supported** by the boiler vent collar. **The collar is not designed to support the weight of the vent.** The CPVC or manufactured vent system shall be supported in accordance with the manufacturer's instructions. Horizontal vent sections shall be supported in a manner to prevent sags or low spots where condensate can collect. Structural supports must be connected to building elements of sufficient strength to withstand the weight of the vent system and any bending forces imposed by the venting system.

3.5.3.6 Flue Connection

⚠ WARNING The boiler vent should not be connected into any portion of another mechanical draft system without consulting the vent manufacturer. The boiler shall not be connected to any part of a vent system serving a Category I or II appliance, nor shall a Category I or II appliance be connected to any part of the vent system serving this appliance. Improper interconnection of venting systems may result in leakage of flue gases into occupied spaces.

The connection from the boiler to the vent should be as direct as possible and the upward slope of any horizontal breaching should be at least 1/4 inch per linear foot.

The complete exhaust with drain system is shown in the figure below. The appliance connector should incorporate provisions to drain condensate formed in the vent system. The connector should include an appropriate drain section (not provided).

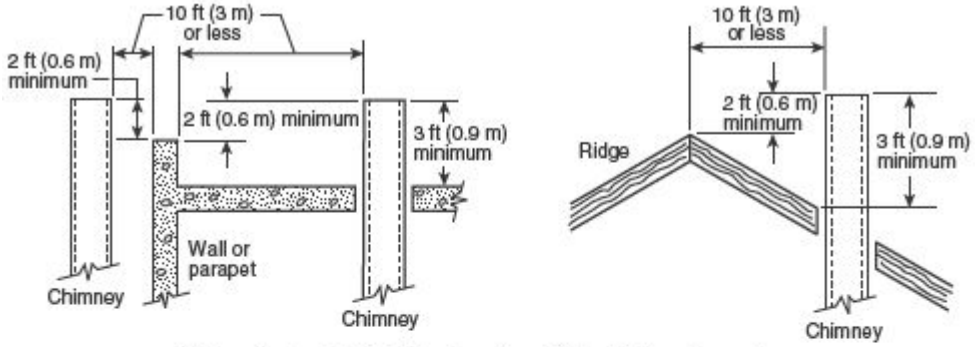


NOTICE! The condensate formed from natural gas flue gases is acidic. The condensate shall be drained in accordance with local code requirements. A condensate neutralizer may be required by local code.

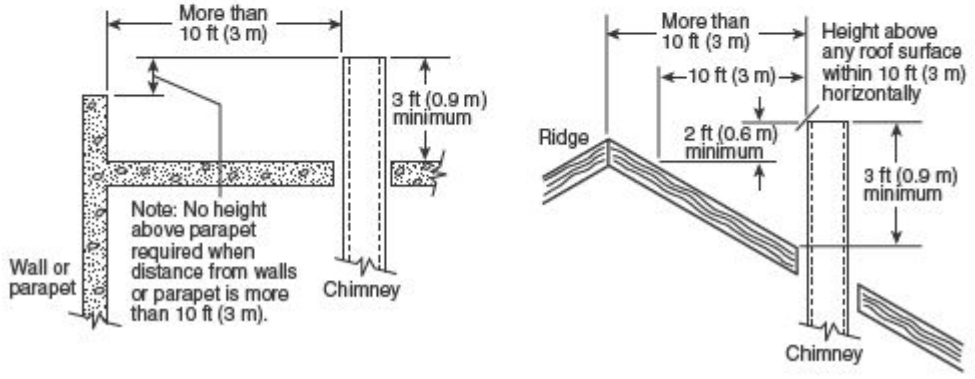
3.5.3.7 Vent Terminations

The vent shall extend at least three (3) feet above the roof, or at least two (2) feet above the highest part of any structure within ten (10) feet of the vent. This is illustrated in the following diagram. Additionally the boiler vent shall terminate at least 3 ft above a forced air inlet located within 10 ft.

Reference: NFPA 54/ANSI Z223.1 National Fuel Gas Code



(a) Termination 10 ft (3 m) or Less from Ridge, Wall, or Parapet



(b) Termination More Than 10 ft (3 m) from Ridge, Wall, or Parapet

To prevent the possible re-circulation of flue gases, the vent designer must take into consideration such things as prevailing winds, eddy zones, building configurations, etc. Harsco Industrial, Patterson-Kelley cannot be responsible for the effects such adverse conditions may have on the operation of the boilers. Dimensions listed above are minimums and may not be sufficient for conditions at a specific job site.

Vertical vents are allowed to be terminated with a variety of ends, including plain straight pipe, elbow or vent tee. Horizontal vents must be terminated as illustrated in section 3.5.5. A bird screen with 1" x 1" openings is recommended for the termination. Harsco Industrial, Patterson-Kelley does not recommend using a vent rain cap of any type.

3.5.4 Venting for Multiple Boilers

The venting instructions in this manual apply to a **single** boiler.

Venting systems for multiple boilers must be designed by experienced and knowledgeable professionals. The venting system must prevent backflow of exhaust gas through idle boilers.

3.5.5 Sealed Combustion/Direct Vent Systems

The MACH® boilers are also certified for operation with a sealed combustion air and pressurized venting system. Such a system employs a sealed combustion air intake duct leading from outdoors and a sealed exhaust vent terminating outdoors. Air flow through the system is maintained by the combustion air fan. Allowable configurations of vent and air intake terminations are illustrated below.

The combined pressure drop of the air supply duct and exhaust vent must not exceed 0.44" W.C. This total pressure drop can be distributed over the intake or exhaust as needed for the installation

3.5.5.1 Intake Duct Materials and Sizes

Table 3.5 Air Requirements – SCFM

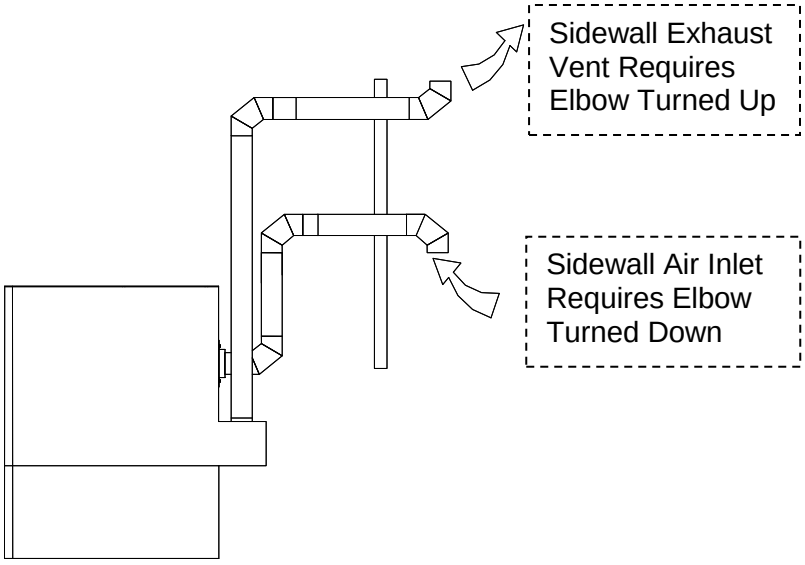
MACH® Boiler MODEL	Required SCFM
C750	175
C900	210
C1050	245

The air intake duct can be fabricated from PVC, CPVC, single wall galvanized steel, or other suitable materials. The duct must be rigid enough to maintain the full required cross sectional area under all operating conditions. Proper sealing of the intake ductwork is necessary to prevent infiltration of air from conditioned space. Joints in PVC or CPVC must be cemented. For galvanized duct, wrap each joint and seam with adhesive aluminum tape or other sealant. Connect the air supply duct to the inlet air collar on the boiler. Fasten the duct to the collar with sheet metal screws and seal with aluminum tape or sealant. The installation of a bird screen on the intake termination is recommended. Ensure that the screen does not become blocked with snow, ice, insects etc.

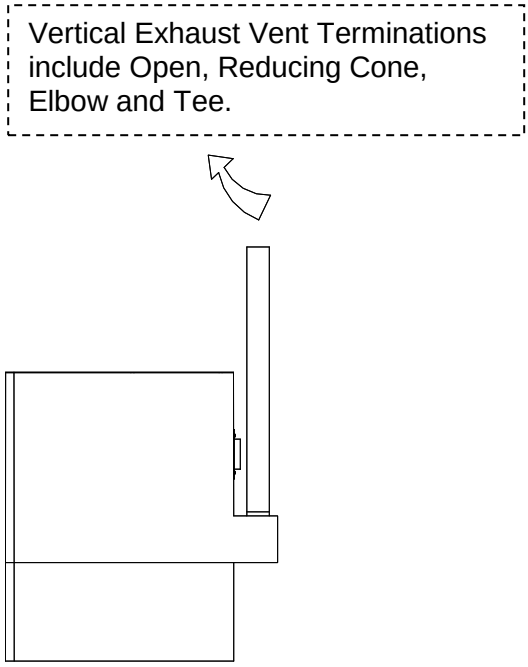
3.5.5.2 Intake/Exhaust Layout

Four basic configurations for the intake/exhaust may be used for the C750/C900/C1050. Refer to Section 3.5 for required clearances for all terminations.

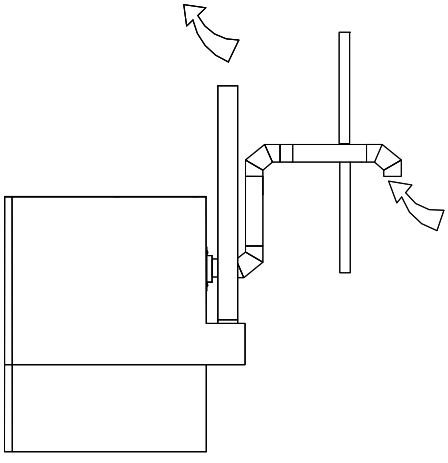
NOTICE! Drains have been omitted for clarity.



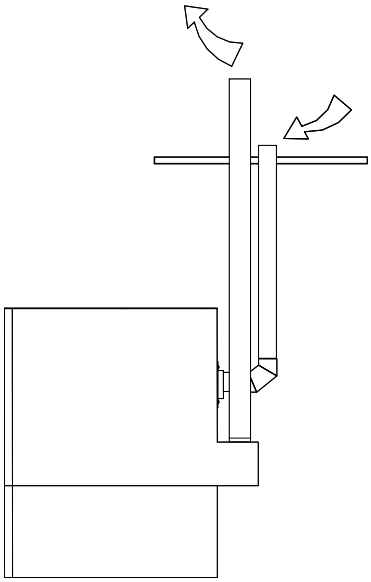
Sidewall Vent, Sidewall Air Inlet (above)



Vertical Vent, Room Air Inlet (above)



Vertical Vent, Sidewall Air Inlet (above)



Vertical Vent, Vertical Air Inlet (above)

3.5.6 Removing an Existing Boiler

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for proper venting of the appliances remaining connected to it.

At the time of removal of an existing boiler, while the other appliances remaining connected to the common venting system are not in operation, the following steps should be followed with each appliance remaining connected to the common venting system placed in operation:

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine that there is no blockage or restriction, leakage, corrosion or other deficiency which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliances not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
4. Place the appliance being inspected in operation. Follow the lighting instructions. Adjust the thermostat so that the appliance will operate continuously.
5. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle or smoke from a cigarette, cigar or pipe.
6. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous conditions of use.

Any improper operation of the common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223.1 and CSA B149 Installation Code. When resizing any portion of the common venting system, the common vent system should be resized to approach the minimum size as determined using the appropriate tables in part 11 of the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and/or CAN/CSA B149.1 Natural Gas and Propane Installation Code.

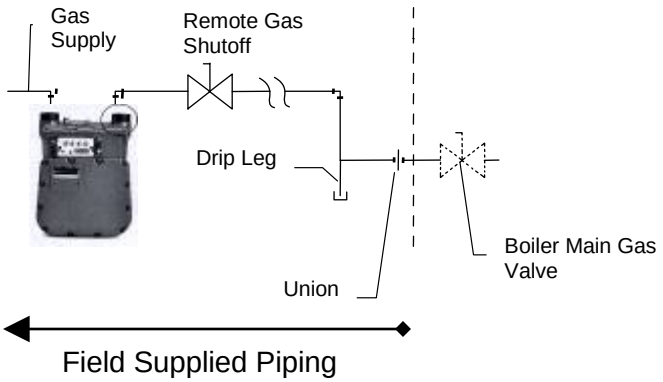
3.6 GAS PIPING

Before making the gas hook-up, make sure the boiler is being supplied with the type of fuel shown on the boiler nameplate.

The boiler shall be installed such that the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during appliance operation and service (circulator replacement, control replacement, etc.)

The boiler is factory fire-tested and adjusted for proper combustion. The gas train components are certified to handle a minimum inlet pressure of 3.5” W.C. and a maximum inlet pressure of 14" W.C. (1/2 psig.). Typical gas pressure supply for natural gas is 7" W.C. (11" W.C. for propane). If the available gas pressure exceeds 14" W.C., a suitable additional intermediate gas pressure regulator of the "lock up" type must be provided to reduce the pressure to less than 14" W.C.

⚠ WARNING All threaded connections must be made using a pipe compound that is resistant to the action of liquefied petroleum gases. **Do not use Teflon tape on gas line threads.**



Gas Piping Schematic (left)

Install a sediment trap (drip leg) and a union connection ahead of the primary manual shutoff valve on the boiler. Gas piping should be installed in accordance with National Fuel Gas Code, ANSI Z223.1, latest edition, and any other local codes which may apply; in Canada see CAN/CSA-B.149.1, latest edition. In the Commonwealth of Massachusetts, the gas cock must be a "T-handle type."

NOTICE! See Pipe Capacity for Natural Gas chart below for required pipe size, based on overall length of pipe from meter plus equivalent length of all fittings. Approximate sizing may be based on 1 cubic foot of natural gas per 1,000 Btu per hour input, i.e., 500,000 Btu per hour requires about 500 cubic feet per hour. (See "Typical Boiler Operating Conditions," Section 4.3, for more information.)

Pipe Capacity for Natural Gas

Nominal Iron Pipe Size (Inches)	Internal Diameter (Inches)	Equivalent Pipe Length		Maximum Capacity in Cubic Feet of Natural Gas per Hour Pressure Drop of 0.5 inch Water Column/Equivalent Length of Pipe (in feet)						
		90º Ell (Feet)	Tee (Feet)	20	40	60	80	100	150	200
1/2	0.622	1.55	3.1	120	82	66	57	50	40	35
3/4	0.824	2.06	4.12	250	170	138	118	103	84	72
1	1.049	2.62	5.24	465	320	260	220	195	160	135
1- 1/4	1.380	3.45	6.9	950	660	530	460	400	325	280
1- 1/2	1.610	4.02	8.04	1460	990	810	690	620	500	430
2	2.067	5.17	10.3	2750	1900	1520	1300	1150	950	800
2- 1/2	2.469	6.16	12.3	4350	3000	2400	2050	1850	1500	1280
3	3.068	7.67	15.3	7700	5300	4300	3700	3250	2650	2280
4	4.026	10.1	20.2	15800	10900	8800	7500	6700	5500	4600

3.6.1 Gas Supply Piping by Installer

The boiler and all gas piping connections should be pressure-tested and must be checked for leaks before being placed into service. Test with compressed air or inert gas if possible.

The boiler must be **disconnected** at the boiler manual shut-off valve (located at the end of the supplied gas train) from the gas supply piping system during any pressure testing of the system at pressures in excess of 1/2 psig (14" W.C.).

During any pressure testing of the gas supply piping system at pressures equal to or less than 1/2 psig (14" W.C.), the boiler should be isolated from the gas supply piping system by closing the manual shut-off.

Some leak test solutions, including soap and water, may cause corrosion. These solutions should be rinsed-off with water after testing.

3.7 BOILER WATER PIPING

3.7.1 Piping Design

Water Flow in System/Pumping Requirements

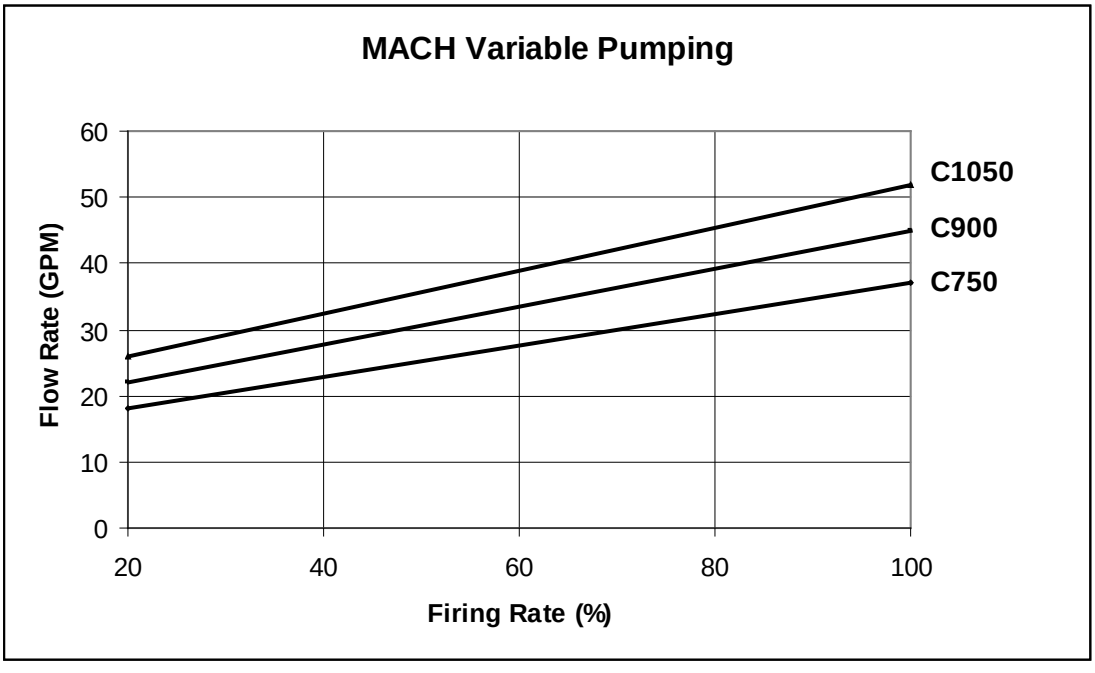
See the charts below for proper water flow requirements. Incorrect flow may result in eventual damage or premature failure of the equipment that may not be covered by warranty.

Proper flow rates may be achieved through a combination of primary and secondary flow loops. Multiple zones and pumps may result in different flow rates at different times. Consideration must be given to all possible conditions and their consequences.

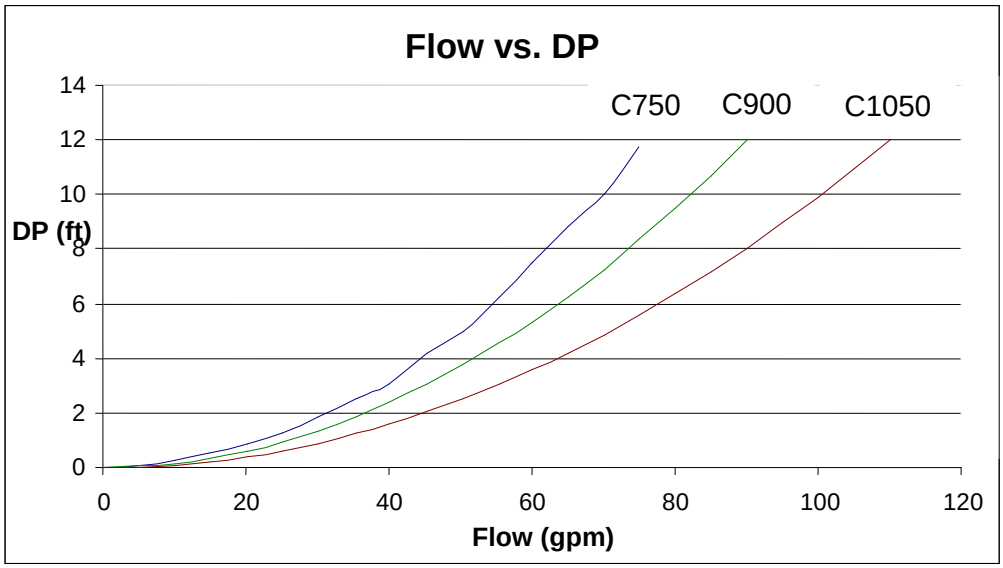
Maximum Fire Rate

Model	Max Flow GPM	Min Flow GPM	Pressure Drop (ft.) at max flow
	20°F ΔT	40°F ΔT	
1050	105	52	12
900	90	45	12
750	75	37	12

For minimum flow rates at other than maximum firing rate, see MACH® Boiler Variable Pumping Graph (below)



Delta pressure loss in pressure at a flow rate



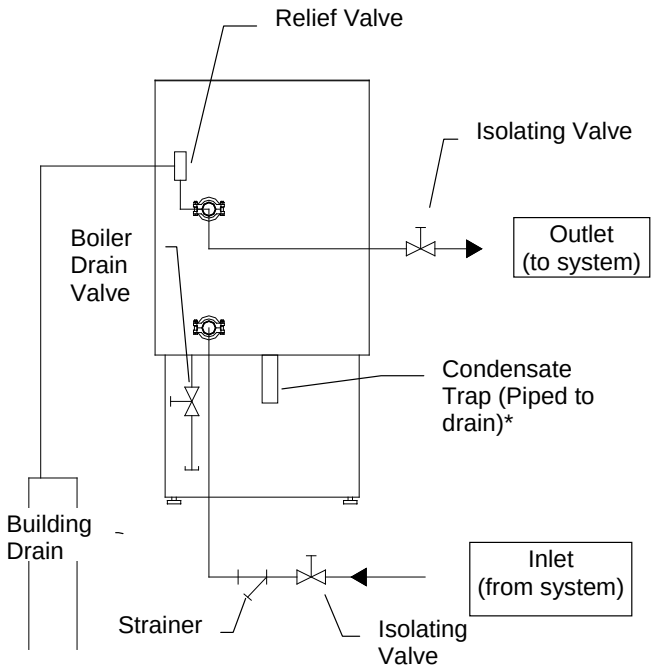
3.7.1.1 Piping with Refrigeration Machines

When installed in a two-pipe system that provides both chilled and hot water, the control system should be configured so as to limit the time rate of change of temperature at the boiler. Consult your authorized Harsco Industrial, Patterson-Kelley boiler representative for application guidance.

3.7.1.2 Piping with Air Handling Units

The boiler piping system of a hot water heating boiler connected to heating coils located in air handling units, where they may be exposed to refrigerated air circulation, must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

3.7.2 Boiler Inlet and Outlet Connections



All water connections should be in compliance with national, state and local code requirements.

NOTICE! The boiler is furnished with 2" grooved connections and Victaulic Style 75 Couplings. These couplings must be used with the EPDM Victaulic seals. Isolating valves must be installed in both water connections.

Adapters from Victaulic to NPT are available from Harsco Industrial, Patterson-Kelley.

The bottom connection to the boiler is the INLET and must be used for the return from the system.

The top connection to the boiler is the OUTLET and must be connected as the supply to the system.

NOTICE! Condensate Trap must be piped to drain in accordance with all national, state and local codes. If installed outdoors, it must be field heat traced.

3.7.3 Boiler Water Piping by Installer

Strainer
To avoid possible contamination of the boiler with dirt, rust or sediment from the system, a strainer near the boiler inlet is strongly recommended. Even new systems may contain sufficient foreign material to eventually reduce the performance of the heat exchanger. Adequate circulation of good clean water is essential for maximum efficiency and long life of the boiler.

Relief Valve Piping
Each boiler is supplied with a pressure-relief valve sized in accordance with ASME requirements. The relief valve must be piped to an acceptable drain. Reducing couplings or other restrictions are not permitted in the discharge line.

Low Water Cut-off
The boiler is furnished with a probe-type low water cut-off; no field piping is required. If the water level in the boiler drops below the probe, the boiler will shut down and a LOCKOUT LOW WATER LEVEL will be displayed on the control panel. The low water cut-off will automatically reset when the low water condition clears; however the boiler control will retain the lockout condition until the reset button on the display is pressed.

NOTICE! The low water cut-off probe only prevents boiler operation when the water level in the boiler is insufficient. It does not detect low water conditions in other parts of the system. Installation of high point vents or additional low water safety devices to protect the system should be considered.

Installation of external limit controls may be required by certain codes or in certain installations. Review applicable local codes for details.

Drain Valve and Piping
A drain valve is factory installed in the boiler inlet (system return) piping. Prior to draining the boiler, electrical power and gas supply must be turned off to the boiler, and the boiler must be isolated from the system at the supply and return connections.

NOTICE! This drain valve is factory installed for draining of the boiler water only, not the entire system. Draining of the system through the boiler will result in depositing sediment from the system in the boiler which will result in poor heat transfer characteristics of the boiler and early boiler failure.

Condensate Drain
The condensate is acidic (pH between 3.0 and 5.0) and may be corrosive to some building drain systems. A condensate neutralization system may be required and is available from Harsco Industrial, Patterson-Kelley.

Disposal of condensate must comply with all state and local codes.

The boiler could generate up to one gallon of condensate per 100,000 BTU input. See table below for typical condensate loading.

MACH® Boiler	Typical Condensate (Gal/hr)
C750	7.5
C900	9
C1050	10.5

3.7.4 Flushing and Filling

Water Quality
The MACH® boiler heat exchanger is made of an aluminum alloy. The heat exchanger requires proper water conditions to remain efficient and function properly.

NOTICE! Glycol or other treatment chemicals added to the system must be certified by the chemical manufacturer for use in multi-metal systems that include cast aluminum boilers.

NOTICE! Under no circumstances should petroleum based cleaning or sealing compounds be used in the boiler system.

NOTICE! Under no circumstances should the hydronic system be flushed while the boiler is attached to the system since the debris or corrosion products could accumulate in the boiler and plug the boiler heat exchanger.

NOTICE! If the piping system attached to this unit will be chemically cleaned, the boiler must be disconnected from the system and a bypass installed so that the chemical cleaning solution does not circulate through the boiler. Following chemical cleaning, the system should be thoroughly rinsed to remove cleaning agents prior to reconnecting the boiler to the system.

3.8 PRE-START CHECK LIST

Before attempting to start the boiler, make sure the following items have been completed.

1. Inspect the gas train, blower, ignition electrode and boiler in general to be sure there was no damage during shipment or installation.
2. Flue gas from the boiler is properly vented; (refer to Section 3.5)
3. Gas connection has been made, pressure tested for leakage and the line purged of air. Make sure all required vents have been installed. (refer to Section 3.6)
4. Water connections are complete and the boiler and system have been filled and purged of air. (refer to Section 3.7)
5. The boiler is connected to a 120 volt power source with a disconnect having adequate overload protection. (refer to Section 3.4)
6. Combustion air openings are not obstructed in any way and have adequate capacity. (refer to Section 3.5)
7. The boiler is placed the proper distance from any combustible walls, in accordance with Section 3.3.3.
8. Relief valves have been piped to an acceptable drain. (refer to Section 3.7)
9. Condensate piping is properly connected. (refer to Section 3.7)
10. Verify system water quality is within specifications.

3.9 SAFETY CHECKS

The following checks of safety systems must be made before putting the boiler into operation.

Before firing the boiler refer to Sections 4.1 and 4.2 for information on the use of the controls, lighting, and shut-down procedures.

⚠ WARNING Never attempt to operate a boiler that has failed to pass all the safety checks described below.

⚠ WARNING If a control setting is changed manually during testing, return the control to its original setting.

NOTICE! If the expected error code(s) do not appear, call for qualified service.

3.9.1 Test of Ignition Safety System

Test the ignition system safety shutdown as follows:

1) Cycle the boiler on by generating a heat request. (See Section 3.10)
2) Place the boiler in operation at the high fire setting.
3) Smoothly close the downstream manual isolation valve to reduce the gas flow and cause flame failure.
4) The display will show LOCKING FLAME FAILURE indicating a flame failure. The lockout will remain until the control is reset.

After completing this test, turn off the boiler and open the downstream manual isolation valve and turn the boiler back on.

3.9.2 Test of Low Water Cut-off

The boiler is furnished with a probe-type low water cut-off in the outlet nozzle. Test as follows:

Push and hold the red “Push to test” button for at least 5 seconds. A manual lockout reset error, displaying LOCKOUT LOW WATER LEVEL on the display panel, should occur. The LED indicator on the low water cut-off will no longer be illuminated.

(Optional Test Method)

First turn the boiler off, and then turn the pump off. Isolate the boiler from the system. Drain the water level below the low water cut-off probe. Turn the boiler back on. It should not operate, and a manual lockout reset error, displaying LOCKOUT LOW WATER LEVEL on the display panel, should occur. The LED indicator on the low water cut-off will no longer be illuminated.

Return the system to normal operation by refilling and restarting the boiler and pump.

3.9.3 Test of High-Limit Control

Fire the boiler and test the high limit control as follows:

With the main burner operating, turn down the temperature setting on the "high-limit" thermostat until the main burner shuts off. A manual reset lockout, displaying LOCKING HIGH LIMIT on the display panel, will occur. The high-limit switch must be manually reset prior to resetting the boiler at the display panel. Readjust the high-limit thermostat to the desired setpoint.

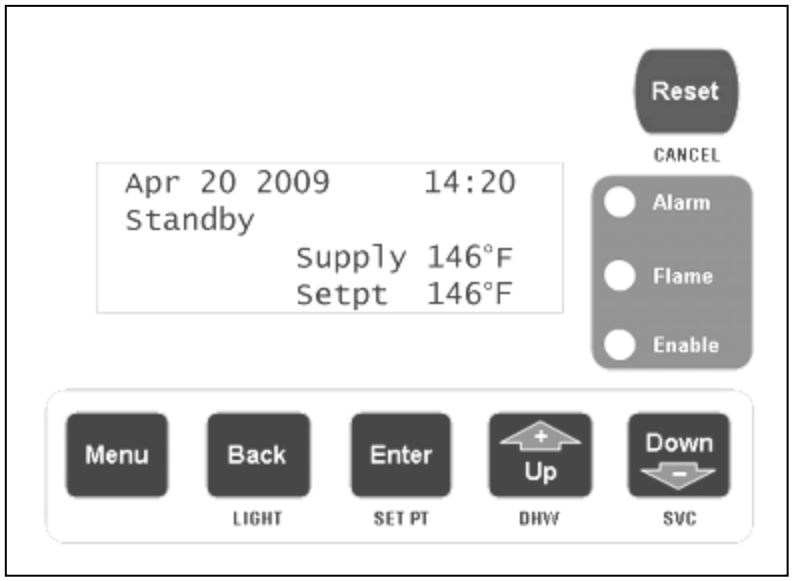
3.9.4 Test of Gas Pressure Switches

Low Gas Pressure Switch
The boiler is furnished with a low gas pressure switch. The operation of this switch must be checked by slowly closing the main gas cock while the burner is operating. The switch should shut down the main burner. When the gas pressure switch opens, a manual reset lockout displaying LOCKING LOW GAS PRESSURE on the display panel will occur. Upon re-opening the main gas cock, the LOCKING LOW GAS PRESSURE will remain on until the display panel is manually reset.

High Gas Pressure Switch
The boiler is furnished with a high pressure switch that must be checked by closing the downstream gas cock with the boiler off. When the boiler is started, it should enter its normal starting cycle and fail on high gas pressure when the automatic gas valves open. The boiler locks out and displays LOCKING HIGH GAS PRESSURE on the display panel. Upon re-opening the gas cock, the LOCKING HIGH GAS PRESSURE indicator will remain on until the display panel is manually reset.

3.10 INITIAL ADJUSTMENTS

3.10.1 Operating Temperature Controller



The MACH® boiler C750-1050 is equipped with ENVI® control; an intelligent control system with advanced features such as text-based display, communication capabilities, and boiler sequencing. Errors are date and time stamped providing built-in history of boiler status and performance. This control constantly tracks the load by recording burner high, low and mid run hours. One control to do it all – temperature control, flame safeguard, firing rate control, blocked flue protection, outdoor air reset, freeze protection, built-in cascade sequencing, MODBUS communication and more.

⚠ CAUTION The user should become thoroughly familiar with the operation of the boiler and controls before attempting to make any adjustments.

The boiler control has a text display panel. The display panel is used to setup and monitor boiler operation by means of six push buttons MENU, BACK, ENTER, UP, DOWN, and RESET as shown above. The buttons across the bottom are used to navigate through the various screens. The four line screen shows boiler operating information on various screens. The display screen is backlit for ease of viewing. Pressing any key will illuminate the backlight.

The standby screen is shown upon startup. This screen shows the date, time, boiler status, supply temp and setpoint temp. Pushing the menu button displays a menu of options.

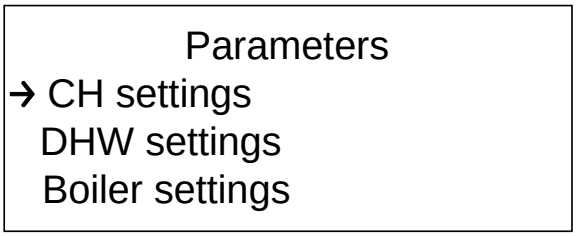
Menu
→ Standby
Information
Errors

The menu includes access to the Standby, Information, Errors, Program Parameters, Configuration, Cascade, and Service Menu. The Up and Down buttons are used to position the arrow next to the desired option and the enter button is pushed to enter that option. The list is displayed and may have more than four lines. Use the down arrow to view the complete list.

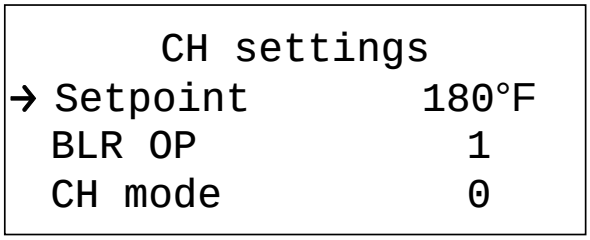
⚠ CAUTION Changing parameters requires an understanding of the parameters and the functionality of the boiler. The boiler may not function properly if parameters are changed from the factory values.

3.10.2 Boiler Setpoint

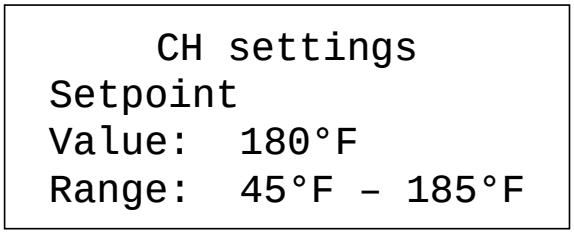
The factory default setpoint is 180 °F. If a different setpoint is desired, push the menu button and then select PROGRAM PARAMETERS from the menu. A screen opens that allows the user to view and change operating parameters (see screenshot below.)



Select the CH settings to adjust parameters related to the boilers Comfort Heat function.



For example, selecting the Setpoint parameter opens up a screen that allows the setpoint to be changed.



The UP or DOWN buttons are used to adjust the CH setpoint up or down as desired. The ENTER button is pushed once the desired temperature is reached.

3.10.3 Other CH Parameters

Other settings include the following items:

Description	Value	Units
CH Setpoint	###	°F
BLR OP (Off = 0, On = 1, Off/Pump On = 2, and On/Pump On = 3)	#	0-3
CH Mode	#	0-8
Hysteresis On (On Differential)	##	°F
Hysteresis Off (Off Differential)	##	°F
Post Pump time	###	Sec

Additional CH Parameters are available and used for the various CH Modes other than mode 0, the standard Setpoint & Stat control mode. These modes are further described in the ENVI® Control Advanced User's Guide.

3.10.4 Other Parameters

Other parameters include the settings for DHW (Domestic Hot Water), Boiler Settings and OEM Settings. Boiler and OEM Settings are used during the initial programming of the control and are not accessible.

3.10.5 Additional Menu Items

In the main menu, Standby, Information, Errors, Program Parameters, Configuration, Cascade, and Service Menus are available. They are used for various functions of the boiler. These functions are described further in the ENVI® Control Advanced User's Guide.

These menu items will be described briefly here:

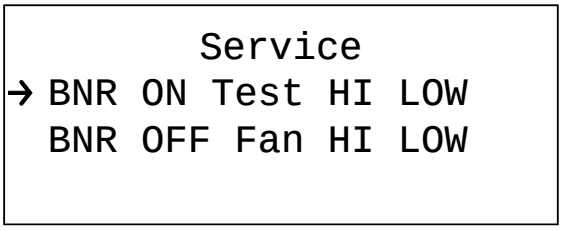
- STANDBY is the default screen and is shown during normal boiler operation.
- The INFORMATION menu lists items that the boiler monitors such as temperatures, operating conditions, and status of switches and components.
- The ERRORS menu has information about the boiler status at the time of an error.
- The PARAMETERS menu allows the user to set up selected boiler functions and operating modes.
- The CONFIGURATION menu covers basic display information such as language, units, date/time, etc.
- The CASCADE menu is used to sequence multiple boilers (up to 24) in a Master/Member network system. Use of this function is described in detail in the ENVI® Control Advanced User's Guide.
- The SERVICE menu is described below.

3.10.6 Service Menu:

Two test modes are available in the service menu.

BNR ON TEST HI LOW

BNR OFF FAN HI LOW



The first test mode allows the service technician to hold the boiler in high or low fire during firing operation so that the combustion adjustment can be performed as indicated below. The second test mode checks the fan rate with the burner off at high speed or at low speed.

These test modes will automatically terminate after 15 minutes of inactivity or can be terminated from the control/display panel by pressing the cancel/reset button.

3.11 BURNER ADJUSTMENT

NOTICE! Adjustments shall only be performed by service representative specifically trained and certified to perform maintenance on the Harsco Industrial, Patterson-Kelley MACH® boiler. Verify proper operation after servicing.

See rating plate for the minimum and maximum inlet gas pressure of the boiler. The supply pressure during main burner operation must be greater than the minimum indicated on the rating plate. Nominal gas supply pressure is 7" W.C. for natural gas. The gas pressure must not exceed 14" W.C. which is the maximum allowable pressure on the gas train components. Each boiler is furnished with a manual shut-off valve which has an integrated test port. This port is located on the upstream side of the valve body for measuring supply pressure. (Seefigure right.)

The air flow is pre-set at the factory prior to shipment. Gas flow is dependent primarily on fan speed not upstream gas pressure. The air/gas ratio may have to be adjusted to obtain proper combustion readings for specific local conditions. A combustion analyzer must be used. The probe must be place in the boiler exhaust vent immediately after the boiler. Combustion should be adjusted in accordance with Table of Combustion Exhaust Settings.

NOTICE! For high altitude adjustments (greater than 2,000 feet above sea level), see Appendix 2 at the end of this manual.

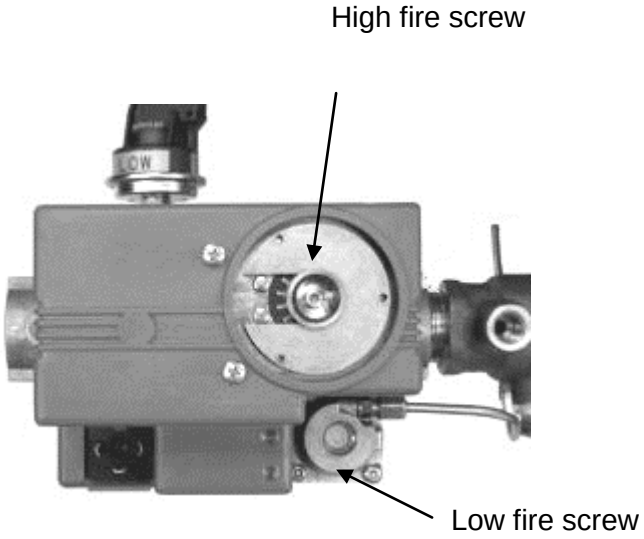
Table of Combustion Exhaust Settings

Fuel	Nominal Inlet Gas Pressure*	High Fire Setting		Low Fire Setting	
		% O_2	% CO_2	% O_2	% CO_2
Natural Gas	7" W.C	5.0 ± 0.2	9.0 ± 0.2	5.2 ± 0.2	8.8 ± 0.2
Propane	11" W.C	5.0 ± 0.2	10.4 ± 0.3	5.2 ± 0.2	10.3 ± 0.3

3.11.1 Combustion Setup and Adjustment

Boiler Test Mode for High and Low fire:
Set the combustion using the Service Menu BNR ON TEST HI & BNR ON TEST LOW modes. These test modes should be used when checking and setting the gas safety shut off / control valves on the MACH® boiler. In this mode a heat request is required. Once the boiler cycles on, use the arrow keys to access the Service Menu and select the BNR ON TEST HI/LOW mode and push enter. Then select BNR ON TEST HI or the BNR ON TEST LOW mode and push enter. The boiler will ramp to high or low fire.

NOTICE! There must be sufficient load to operate the boiler at high fire to perform the following adjustments. Start the boiler and observe proper operating parameters for the system.



C750/900/1050 Adjusting Screws for Low and High Fire

Required Tools: TORX® T40 or 5 mm hex wrench, 3 mm or 7/64 in hex wrench, Combustion analyzer
The MACH® boilers are equipped with a combined gas/air control and gas safety shut off control valves. The valve functions with the variable speed combustion blower to supply the correct gas air ratio for optimum performance and efficiency.

High Fire Setting
Set boiler to the "BNR ON TEST HI", as described above, to achieve maximum firing rate of the boiler. Check combustion readings using a combustion analyzer. If combustion readings are not in accordance with Table of Combustion Exhaust Settings, adjust as follows:

Remove the flat, round, blue plastic cap from the gas valve. Using a 3mm (7/64") hex wrench, adjust the high fire screw (see the figure below) on each of the gas control valves by turning clockwise or counterclockwise to achieve the desired CO_2 or O_2 level; see table for Combustion Exhaust Settings for correct settings. (There will be a time delay between the adjustment and the response of the CO_2/O_2 combustion analyzer). Adjust the settings in small increments. When desired adjustments are complete, reinstall the blue plastic cap on the gas valve. Clockwise rotation decreases gas flow. Counterclockwise rotation increases gas flow.

Low Fire Setting
Set boiler to the "BNR ON TEST LOW", as described above, to achieve minimum firing rate of the boiler. Check combustion readings using a combustion analyzer. If combustion readings are not in accordance with Table of Combustion Exhaust Settings, adjust as follows:

Remove the gray cap on the gas regulator using a slotted screwdriver. This will expose the low fire adjustment screw. Using a TORX® T40 or a 5 mm hex wrench, adjust the low fire screw on the pressure regulator (see the figure below) to achieve the correct CO_2 /O_2 level. Adjustments to low fire should not exceed ¼ turn at a time before allowing the readings to respond and stabilize. Clockwise rotation increases gas flow. Counterclockwise rotation decreases gas flow. After the low fire adjustment is made, reinstall the slotted cap on the regulator.

NOTICE! The rotation of the Low Fire adjustment screw is opposite to the High Fire adjustment screw.

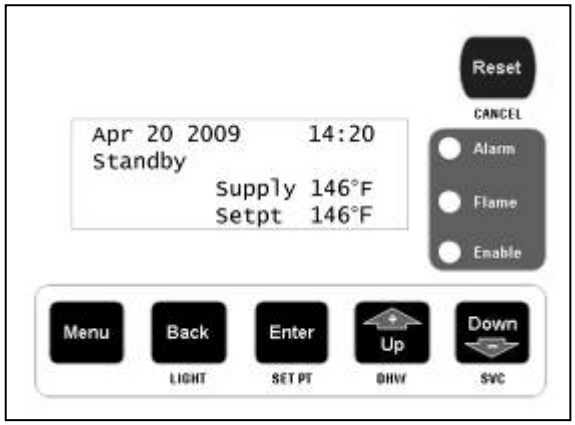
Following all gas valve adjustments, check for proper light-off and verify correct fuel/air mix and combustion quality throughout the entire firing range (from low fire to high fire).

3.11.2 Checking Flame Signal

Using the control panel, enter the information mode and scroll down to FLAME SIGNAL. When the boiler is firing, the FLAME SIGNAL will be "yes" or a 0-10 uA signal and when the boiler is not firing, the FLAME SIGNAL will be "no" or a 0-10 uA signal.

4 OPERATION

4.1 GENERAL



4.1.1 Control Panel

Become familiar with the basic operation of the boiler. The operating instructions are located inside the gray door at the front of the boiler.

4.1.2 Tests

All Harsco Industrial, Patterson-Kelley boilers are fire tested at the factory prior to shipment. This procedure includes testing of the limits and adjustment of combustion parameters. This testing and setup information is recorded on the "Factory Fire test" label located on the back of the boiler.

4.2 NORMAL LIGHTING AND SHUT-DOWN PROCEDURES

⚠ WARNING Do not use this boiler if any part has been under water. Immediately call a qualified service technician to inspect the boiler and to replace any part of the control system and any gas control which has been under water.

4.2.1 Initial Lighting Procedures

1. Make sure the system is filled with water and water is circulating in the system. Turn on electrical supply and open the gas supply valves to the boiler.
2. Turn the on/off switch to the on position. If an error is indicated, see Section 5.5 of this manual to troubleshoot the problem and take the necessary corrective action before proceeding.
3. Set the desired high temperature limit and operating temperature. The controller will now complete the automatic firing sequence.

4.2.2 Normal Shut Down Procedures

1. Turn the on/off switch to the off position.
2. Close all manual gas valves. (For extended period.)

Main Gas Cock

4.2.3 Emergency Shut-Off

⚠ WARNING If overheating occurs or the gas supply fails to shut off, do not turn off or disconnect the electrical supply to the pump. Instead, shut off the gas supply at a location external to the boiler.

4.3 TYPICAL BOILER UTILITY REQUIREMENTS

Model Number	Input Rating (Btu/hr)	Natural Gas *(1030 Btu/cu. ft.)		LP Gas **(2500 Btu/cu. ft.)		Total Amperage (15 amp breaker required)
		Gas Rate (CFH)	Output Capacity (Btu/hr)	Gas Rate (CFH)	Output Capacity (Btu/hr)	
750	750,000	728*	712,500	300**	712,500	8 amps or less
900	900,000	873*	846,000	360**	846,000	8 amps or less
1050	1,050,000	1019*	987,000	420**	987,000	8 amps or less

NOTICE! The heat exchanger is constructed and stamped for 80 psig maximum operating pressure and/or 200 º F maximum temperatures.

5 MAINTENANCE

5.1 MAINTENANCE AND INSPECTION SCHEDULE

This schedule applies when the boiler is in use. Verify proper operation after servicing.

⚠ WARNING Proper lockout/ tag out procedure must be employed when servicing this unit.

⚠ WARNING Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

⚠ WARNING Use care when reassembling main gas line to assure all connections are tight.

⚠ WARNING Use care when servicing boiler in order to prevent the accumulation of gas in or around the combustion chamber.

⚠ WARNING Determine the cause of any lockout or errors before resetting the boiler. If able to determine cause of lockout, then appropriate corrective action should be taken. If unable to determine cause of the problem, call a qualified service technician.

5.1.1 Daily

Observe operating temperature and general conditions. Make sure that the flow of combustion and ventilating air to the boiler is not obstructed. Determine the cause of any service codes or lockouts on the display panel. Observe any unusual noises or operating conditions and make the necessary corrections. Notify responsible individuals for required corrective action or repair.

⚠ WARNING Check daily to be sure that the boiler area is free and clear of any combustible materials, including flammable vapors and liquids.

5.1.2 Weekly

Observe the appearance of the main flame. If the flame appearance changes from what was observed after proper combustion adjustment, corrective action should be taken. A qualified service person should check and adjust combustion as needed.

Correct air adjustment is essential to the efficient operation of this boiler. Ensure that the flow of combustion and ventilation air is not obstructed. If an adjustment in the combustion appears necessary, the flue gas composition should be checked with a carbon dioxide (CO_2) or oxygen (O_2) analyzer and compared to the values stated in section 3.10.4. Refer to Table of Combustion Exhaust Settings. If an adjustment in the combustion is necessary, call a qualified and knowledgeable installer or service agency that has been trained on the MACH® boilers.

5.1.3 Monthly

1. Using the control panel, enter the information mode and scroll down to view the flame signal. When the boiler is firing, the signal will be “yes” and when the boiler is not firing, the signal will be “no”.
2. Test high-limit Control. (refer to Section 3.9)
3. Test operating temperature controls by reducing or increasing temperature setting as necessary to check burner operation.
4. Test the low water cut-off. Refer to Section 3.9.
5. Test low gas pressure switch. Refer to Section 3.9.
6. Check the condensate drain system. Clean and flush as necessary.

Installation and service must be performed by a qualified installer or service agency that has been trained on the MACH® boiler.

5.1.4 Semi-Annually

In addition to the recommended monthly service:

1. Clean burner of any accumulated dust or lint. See Section 5.2 on "Cleaning the Burner."
2. Inspect burner for any signs of deterioration or corrosion. Replace immediately if deterioration or corrosion is evident.
3. Check the pH level of the system fluid (refer to section 3.7.4)
4. Inspect and clean the condensate system and check for leaks. If a condensate neutralization kit is present, open the lid and inspect the limestone rocks. If they are absent or have been significantly worn away, replace them with new limestone rocks. Use hi-calcium (or pure) limestone.

Installation and service must be performed by a qualified installer or service agency that has been trained on the MACH® boiler.

The blower motor is permanently lubricated and does not require periodic lubrication.

5.1.5 Annually

In addition to the recommended monthly and semi-annual service:

1. Inspect and clean the inlet screen of any accumulated dust or lint.

2. Check burner and clean off any soot or foreign material that may have accumulated. See Section 5.2 on "Cleaning the Burner." Check for corrosion of the burner and its parts. If there is evidence of deterioration or corrosion, replace immediately. Inspect combustion chamber when the burner is removed for inspection. Note any signs of deterioration. Clean as necessary.
3. Inspect and clean heat exchanger. Remove the various covers to inspect the flue gas passageways. Clean the combustion side casting pins by flushing with clean water and blowing dry with compressed air. Do not use any cleaning agents or solvents. Do not use soap. A soft nylon brush may be used in accessible areas. Be sure to inspect the condensate collection pan that is the lowest part of the heat exchanger.
4. Replace the igniter and gasket.
5. Drain and flush the water side of the heat exchanger as required (separate from system flush) using clean water only.
6. Inspect and clean the condensate system and check for leaks. If a condensate neutralization kit is present, open the lid and inspect the limestone rocks. If they are absent or have been significantly worn away, replace them with new limestone rocks. Use hi-calcium (or pure) limestone.
7. Examine the venting system at least once a year. Refer to the vent manufacturer's instructions for requirements in addition to those listed below.
    a. Check all joints and pipe connections for tightness.
    b. Check pipe for corrosion or deterioration. If any piping needs replacing, do so immediately.
    c. Inspect and clean any screens in the vent terminal
8. Qualified service personnel should thoroughly inspect the heating system and correct any problems prior to re-starting the boiler.
9. Perform combustion analysis and readjust as necessary according to section 3.11. It is recommended that a copy of this report be filed for future reference.
10. Perform a leak test of the gas valves in accordance with the manufacturer's instructions.

Installation and service must be performed by a qualified installer or service agency that has been trained on the MACH® boiler.

5.2 CLEANING THE BURNER

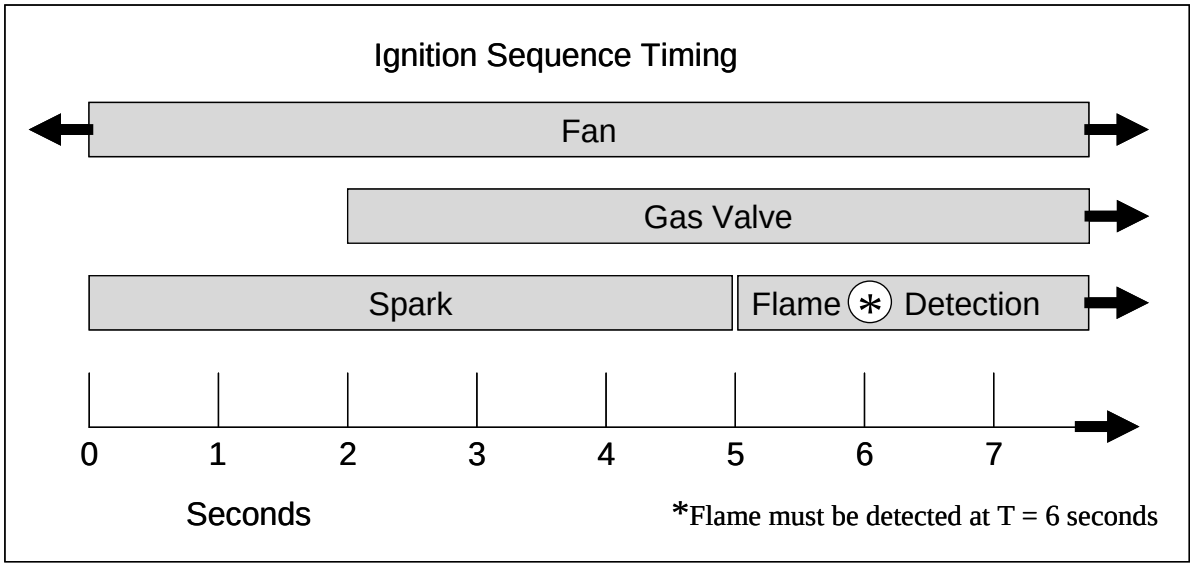
1. Lockout and tag out gas supply to the boiler.
2. Lockout and tag out electrical power to the boiler.
3. Remove the front door.
4. Disconnect the electrical connections to the blower and gas safety shut off / control valves.
5. Unbolt burner hood and remove the gas train & blower assembly.
6. Carefully remove the burner. Use water to rinse the burner clean. Using a soft clean cloth, wipe the inside surface of the burner. DO NOT wipe the mesh side (flame side) of the burner. DO NOT use compressed air or high pressure water to clean the burner.

5.3 AFTER ALL REPAIRS OR MAINTENANCE

1. Follow "Pre-Start Check List" (Section 3.8) and all "Safety Checks" (Section 3.9).
2. Check gas pressure. (Section 3.11)
3. Perform combustion check. Adjust if necessary. (Section 3.11).

5.4 SEQUENCE OF OPERATION

1. When the Boiler On/Off switch is turned on, power is provided through a circuit breaker to the boiler control and the combustion blower.
2. If the high gas, low gas or low water level control is open, the boiler control locks out and displays an error.
3. When the water temperature is below the boiler control setpoint minus the hysteresis (On Differential), a heat request is generated.
4. Provided all limits are made, the boiler will attempt to start.
5. The controller checks that the air pressure switch is open indicating no airflow. The blower is driven towards the prestart fan speed. When the air pressure switch closes, the 25 second pre-purge time is started. After the pre-purge, the blower is driven to the ignition speed.
6. A trial for ignition begins. The sequence of events is illustrated graphically below.
7. After ignition, the fan may be driven to low fire before the boiler is released to modulation.
8. The control modulates the firing rate between low and high fire to maintain the desired outlet water temperature.
9. The burner will continue firing until the outlet water temperature reaches set point plus hysteresis (Off Differential). At this temperature the fuel supply is shut off and the combustion air fan continues to run for a 30 second post-purge.
10. When the water temperature is reduced by the load on the system, a heat request is generated. The operating sequence will recycle to step 4.



NOTICE! Once the boiler begins the ignition sequence, the firing sequence will continue until main flame is reached regardless of heat request. The sequence can be interrupted by turning the power switch off.

5.5 TROUBLESHOOTING

⚠ WARNING If any "Manual Reset" limit device trips, **DO NOT** reset without determining and correcting the cause. (Manual Reset Limits include: Flame safeguard, high or low gas pressure, high temperature limit, stack temperature, low water level.)

The ENVI® control will display text based error descriptions to indicate problems with the boiler. There are two types of lockouts: **Locking** - manual reset lockouts requiring an operator to press the reset button, and **Blocking** - automatic reset lockouts that will self reset when the error condition clears. A listing of errors and their service codes is included at the end of this section.

NOTE: The ENVI® control will automatically reset itself every 24 hours when the boiler has been either firing for 24 hours or in standby for 24 hours to check the safety circuitry.

If the unit fails to operate, call a qualified service technician to troubleshoot the problem and implement corrective actions.

5.5.1 The Loss of Power

In the event of a power failure, the entire system is de-energized, closing all automatic valves and halting all boiler operations. When power is restored the sequence of operation will resume at Step 4. If any error/lockout is present when the power is lost, the control will retain that error/lockout and display the error/lockout when the power is restored.

5.5.2 Loss of Water Level

The low water cut-off switch opens when there is insufficient water level in the boiler. Lockout LOW WATER LEVEL is shown on the display, the burner operation is interrupted, and the boiler locks out. When the correct water level is re-established, press the control reset button and the sequence of operation will resume at Step 4.

5.5.3 Low Gas Pressure

The low gas pressure switch opens when there is insufficient gas pressure available for proper operation of the boiler. If an external gas-supply shut-off valve is closed, a low gas condition will result. Locking LOW GAS PRESSURE is shown on the display, the burner operation is interrupted, and the boiler locks out. When proper gas pressure is restored, press the control reset button and the sequence of operation will resume at Step 4.

5.5.4 High Gas Pressure

The high gas pressure switch opens when there is excessive manifold gas pressure for the proper operation of the boiler Locking HIGH GAS PRESSURE is shown on the display, the burner operation is interrupted, and the boiler locks out. When proper gas pressure is restored, press the control reset button and the sequence of operation will resume at Step 4.

5.5.5 High Water Temperature

When the boiler water exceeds the high limit temperature switch setting, the high limit temperature switch opens and Locking HIGH LIMIT is shown on the display. When the water temperature falls below the high limit temperature switch setting, the boiler will remain locked out until the high limit temperature switch is manually reset and the control reset button is pressed. Once reset, the sequence of operation will resume at Step 4.

5.5.6 Low Air

Error messages Locking AIR SWITCH NOT OPEN or Locking AIR SWITCH NOT CLOSED indicate improper airflow through the boiler. Check the hoses leading to the air switches. Verify proper blower operation. An air switch error does not necessarily mean that the air switch is defective.

When AIR SWITCH NOT OPEN is shown on the display, check that the air switch is open when the fan is off. Check that there is no air flow through the boiler when the fan is off.

When AIR SWITCH NOT CLOSED is shown on the display, check that the air switch is closed when the fan is running. If the air switch does not close within 5 minutes during purge, the boiler locks out. Check that the burner is clean (refer to "Cleaning the Burner," Section 5.2) and that there are no obstructions to airflow in the intake or exhaust ducts.

5.5.7 Flame Failure

In the event of a flame failure, the main fuel valves are de-energized and a manual reset lockout occurs. Locking IGNITION FAILURE or Lockout FLAME FAILURE is shown on the display. The cause of flame failure must be diagnosed and repaired before the control is reset.

When IGNITION FAILURE is shown on the display, the boiler did not light during a trial for ignition. Check that the spark, electrode, ignition wire, and gas valve are functioning properly.

When FLAME FAILURE is shown on the display, the boiler lost the flame during run. Check that the combustion is setup properly (see section 3.11), the gas pressure is correct (see section 3.6), as well as other combustion parameters.

5.5.8 Flame Error

Flame error is indicated by Locking LATE FLAME or Blocking FALSE FLAME. This may be caused by a failed or leaky gas valve or a flame detector malfunction. If gas valve leakage is suspected, the unit must be isolated by turning off the main gas supply line. Qualified and knowledgeable service personnel must be called to evaluate and repair/replace the failed parts.

5.5.9 Blocked Flue

High exhaust back pressure is indicated by BLOCKED FLUE. The cause may be a blocked stack, a blocked air inlet, or a blocked condensate system. When the blockage is removed, the boiler will automatically restart.

5.5.10 Manual Reset Error Codes – A##

A Code	Error	Int. nr	Description
A01	IGNIT ERROR	1	Three unsuccessful ignition attempts in a row
A02	TOO MANY FLAME FAILURES	24	Three times flame was lost during on demand
A03	T MAX LOCK ERROR	18	Overheat stat is open
A05	GV RELAY ERROR	5	Problems with gas valve relay= internal hardware error (pump not running)
A06	SAFTEY RELAY ERROR	6	Problems with gas valve relay = internal hardware error (pump not running)
A09	RAM ERROR	9	Internal software error
A09	FLAG BYTE INTEGRITY ERROR	27	Internal software error
A09	AD HI CPL ERROR	28	Internal software error
A09	AD LO CPL ERROR	29	Internal software error
A09	REGISTER ERROR	33	Internal software error
A10	E2PROM ERROR	12	No communication with E2prom
A12	WRONG EEPROM SIGNATURE	10	Contents of Eprom is not up-to-date
A13	STATE ERROR	13	Internal software error
A14	ROM ERROR	14	Internal software error
A15	15MS XRL ERROR	16	Internal software error
A16	20 MS XLR ERROR	22	Internal software error
A18	STACK ERROR	19	Internal software error
A19	FLAME OUT TOO LATE ERROR	20	Flame still present 10 sec. after closing the gas valve
A20	FLAME ERROR I	21	Flame detected just before gas valve opened
A30	HIGH GAS PRESSURE ERROR	32	Gas pressure is to high
A31	LOW GAS PRESSURE ERROR	31	Gas pressure is to low
A32	41MS ERROR	23	Internal software issue
A33	FAN ERROR	8	Fan deviation more than300 rpm longer than 1 minute (when fan speed > 4200 rpm this error is ignored)
A34	AIR PRESS SW NOT OPEN ERROR	25	Air pressure switch doesn't open within 30 seconds
A35	AIR PRESS SW NOT CLOSED ERROR	26	Air pressure switch doesn't close within 30 seconds
A37	UV SENSOR BROKEN	11	UV scanner not functioning
A38	MOD BACK DIFF ERROR	4	Large difference between return and flow temperatures
A39	RAPID RISE ERROR LOCK RET	15	Return temperature rise too rapidly
A40	RAPID RISE ERROR LOCK FLOW	7	Flow temperature rise to rapidly
A41	RAPID RISE ERROR LOCK HX	17	Heat exchanger rise to rapidly
A43	LOW WATER CUTOFF ERROR	30	Water pressure is to low
A44	FLAME CKT ERROR	34	Ionization (flame rod)wire lost for more than 15 seconds

NOTICE! When an Internal Error occurs, as identified above, the failure is internal to the ENVI® control and replacement of the ENVI® control is required. A qualified service technician must replace the ENVI® control.

5.5.11 Auto-reset Error Codes – E##

A Code	Error	Int. nr	Description
A01	IGNIT ERROR	1	Three unsuccessful ignition attempts in a row
A02	TOO MANY FLAME FAILURES	24	Three times flame was lost during on demand
A03	T MAX LOCK ERROR	18	Overheat stat is open
A05	GV RELAY ERROR	5	Problems with gas valve relay= internal hardware error (pump not running)
A06	SAFTEY RELAY ERROR	6	Problems with gas valve relay = internal hardware error (pump not running)
A09	RAM ERROR	9	Internal software error
A09	FLAG BYTE INTEGRITY ERROR	27	Internal software error
A09	AD HI CPL ERROR	28	Internal software error
A09	AD LO CPL ERROR	29	Internal software error
A09	REGISTER ERROR	33	Internal software error
A10	E2PROM ERROR	12	No communication with E2prom
A12	WRONG EEPROM SIGNATURE	10	Contents of Eprom is not up-to-date
A13	STATE ERROR	13	Internal software error
A14	ROM ERROR	14	Internal software error
A15	15MS XRL ERROR	16	Internal software error
A16	20 MS XLR ERROR	22	Internal software error
A18	STACK ERROR	19	Internal software error
A19	FLAME OUT TOO LATE ERROR	20	Flame still present 10 sec. after closing the gas valve
A20	FLAME ERROR I	21	Flame detected just before gas valve opened
A30	HIGH GAS PRESSURE ERROR	32	Gas pressure is to high
A31	LOW GAS PRESSURE ERROR	31	Gas pressure is to low
A32	41MS ERROR	23	Internal software issue
A33	FAN ERROR	8	Fan deviation more than300 rpm longer than 1 minute (when fan speed > 4200 rpm this error is ignored)
A34	AIR PRESS SW NOT OPEN ERROR	25	Air pressure switch doesn’t open within 30 seconds
A35	AIR PRESS SW NOT CLOSED ERROR	26	Air pressure switch doesn’t close within 30 seconds
A37	UV SENSOR BROKEN	11	UV scanner not functioning
A38	MOD BACK DIFF ERROR	4	Large difference between return and flow temperatures
A39	RAPID RISE ERROR LOCK RET	15	Return temperature rise too rapidly
A40	RAPID RISE ERROR LOCK FLOW	7	Flow temperature rise to rapidly
A41	RAPID RISE ERROR LOCK HX	17	Heat exchanger rise to rapidly
A43	LOW WATER CUTOFF ERROR	30	Water pressure is to low
A44	FLAME CKT ERROR	34	Ionization (flame rod)wire lost for more than 15 seconds

6.0 PARTS/TECHNICAL SUPPORT

Spare parts and replacement parts can be ordered from Harsco Industrial, Patterson-Kelley by calling toll free (877) 728-5351. The fax number is (570) 476-7247. Technical information is also available at the above number and at the Harsco Industrial, Patterson-Kelly website www.harscopk.com.

⚠ WARNING Use of Non-Factory Authorized replacement parts are not recommended for this equipment. All control components are engineered for safety and are designed to work in unison with each of the other components. Use of non-factory authorized replacement parts jeopardizes the functionality of the safety features as well as the performance of the boiler.

When ordering replacement parts please have the **model number** and **serial number** of your boiler available. Drawings showing boiler components are displayed on the following pages. Drawings specific to your particular boiler model can also be supplied by your local Harsco Industrial, Patterson-Kelley representative.

5.6 WIRING DIAGRAMS

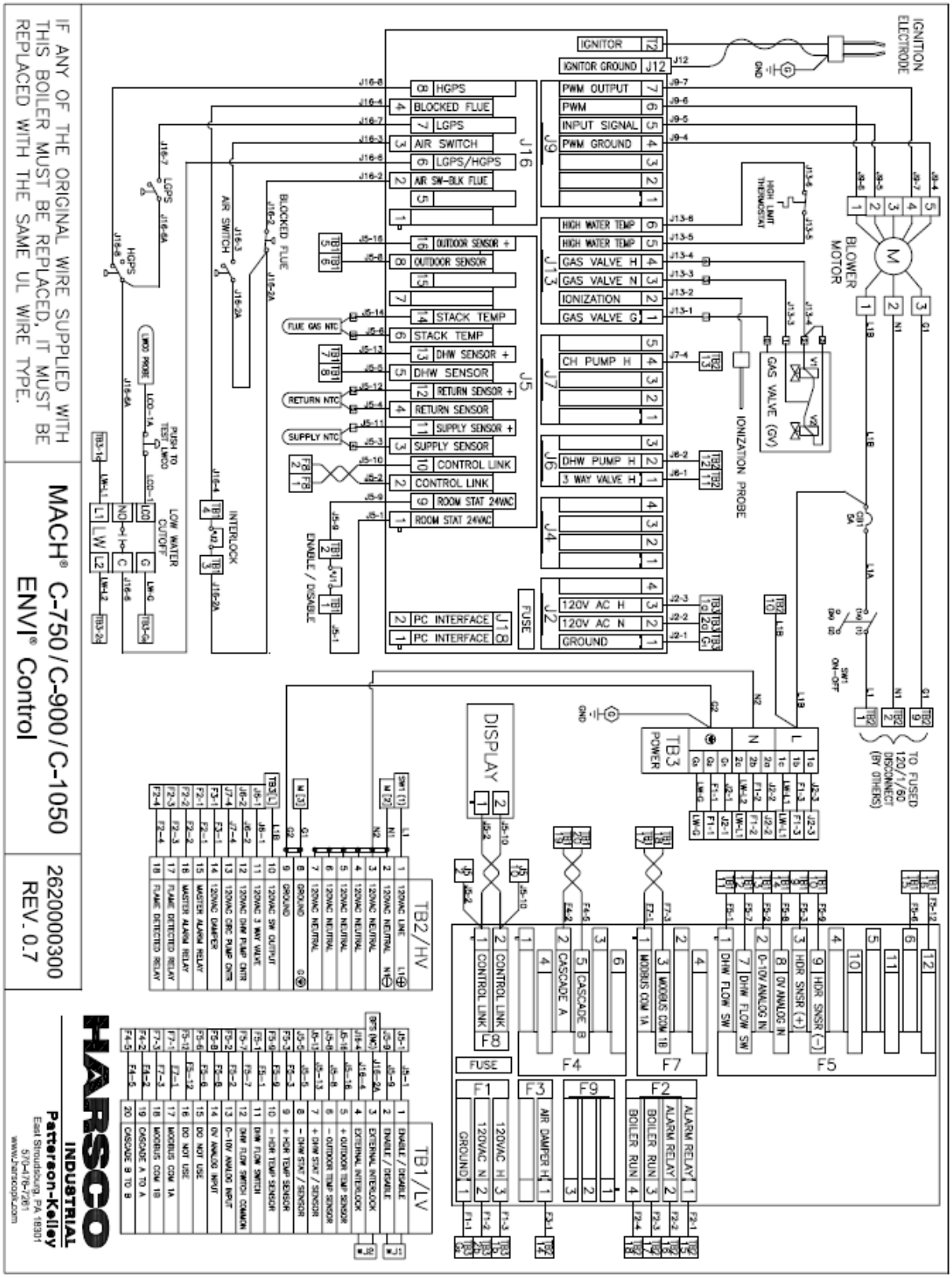
5.6.1 Terminal Block Assignments – High Voltage (120 VAC) Circuit (TB2)

Terminal Number	Label	Description
1	120 VAC LINE	Boiler Supply Power, 120 VAC, 1 ph , 60 Hz
2	120 VAC NEUTRAL	Boiler Supply Neutral, 0 VAC
3	120 VAC NEUTRAL	Neutral for use with TB2-10, Switched Output
4	120 VAC NEUTRAL	Neutral for use with TB2-11, 3 Way Valve
5	120 VAC NEUTRAL	Neutral for use with TB2-12, DHW Pump Contactor
6	120 VAC NEUTRAL	Neutral for use with TB2-13, CIRC Pump Contactor
7	120 VAC NEUTRAL	Neutral for use with TB2-14, Damper Output
8	GROUND	Boiler Supply Ground, 0 VAC
9	GROUND	Boiler Supply Ground, 0 VAC
10	120VAC SW OUTPUT	120VAC output when boiler is switched on (pilot duty only)
11	120VAC 3 WAY VALVE	120VAC output during CH Mode. 3 way valve is normally closed (not powered) for DHW, and powered open for CH Mode.
12	120VAC DHW PUMP CNTR	120VAC output when boiler is in DHW Mode (pilot duty only)
13	120VAC CIRC PUMP CNTR	120VAC output when boiler is in CH Mode (pilot duty only)
14	120VAC DAMPER	120VAC output when boiler is enabled (pilot duty only)
15	MASTER ALARM RELAY	This circuit closes when the boiler is in an alarm state
16	MASTER ALARM RELAY	
17	FLAME DETECTED RELAY	This circuit closes when the boiler is firing
18	FLAME DETECTED RELAY	

5.6.2 Terminal Block Assignments – Low Voltage (Less than 32VAC) Circuit (TB1)

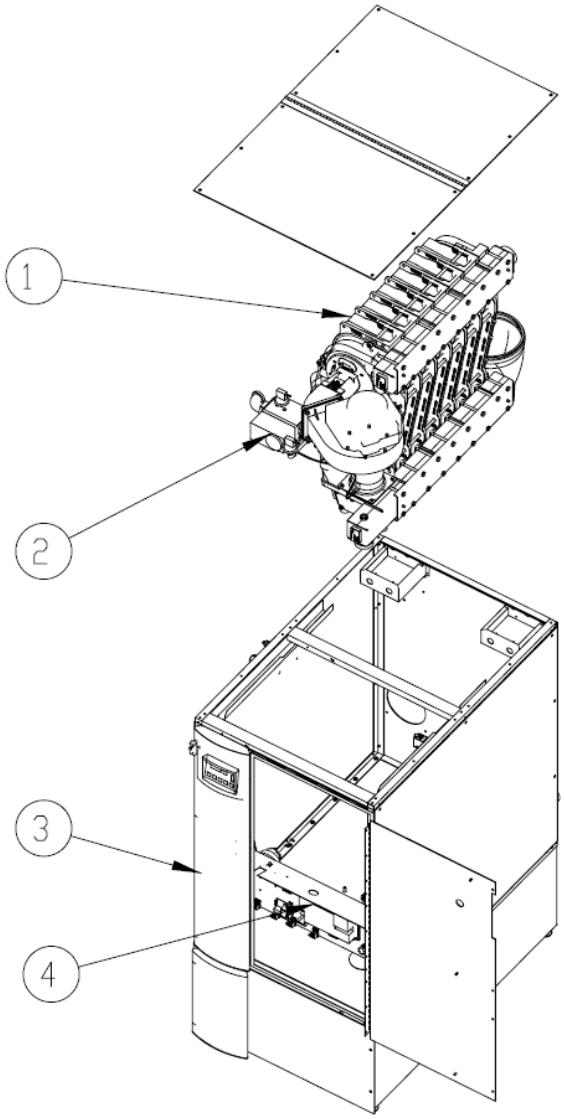
Terminal Number	Label	Description
1	ENABLE / DISABLE	Boiler Enable, Contact Closure.
2	ENABLE / DISABLE	**DO NOT ENERGIZE.**
3	EXTERNAL INTERLOCK	External Limit, Contact Closure.
4	EXTERNAL INTERLOCK	**DO NOT ENERGIZE.**
5	OUTDOOR TEMP SENSOR	Outdoor temperature sensor
6	OUTDOOR TEMP SENSOR	
7	DHW STAT OR SENSOR	Domestic Hot Water sensor or thermostat
8	DHW STAT OR SENSOR	
9	HEADER TEMP SENSOR	Header temperature sensor
10	HEADER TEMP SENSOR	
11	DHW FLOW SWITCH	Domestic Hot Water flow switch output
12	DHW FLOW SWITCH COMMON	DHW flow switch closes and indicates potable water flow/usage
13	0-10V ANALOG INPUT	Variable Input (VDC) for remote control of boiler (+)
14	0V ANALOG INPUT	0V for use with TB1-13 (-)
15	For Future Use	Not Used
16	For Future Use	
17	MODBUS COM 1A	Modbus connection to boiler
18	MODBUS COM 1B	
19	CASCADE A TO A	Cascade connection between boilers
20	CASCADE B TO B	

5.6.3 Wiring MACH® Boilers C750/900/1050



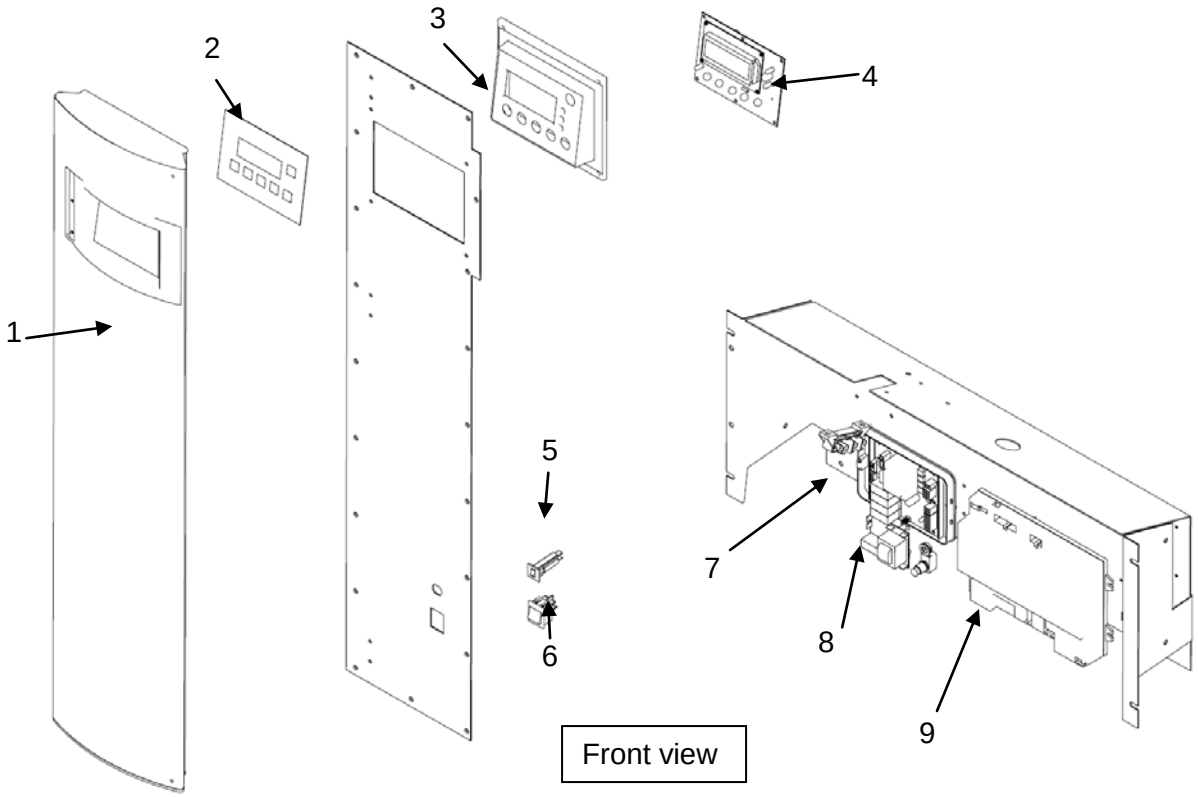
5.7 BOILER PARTS LIST

5.7.1 MACH® Boiler 750-900-1050 Main Assembly

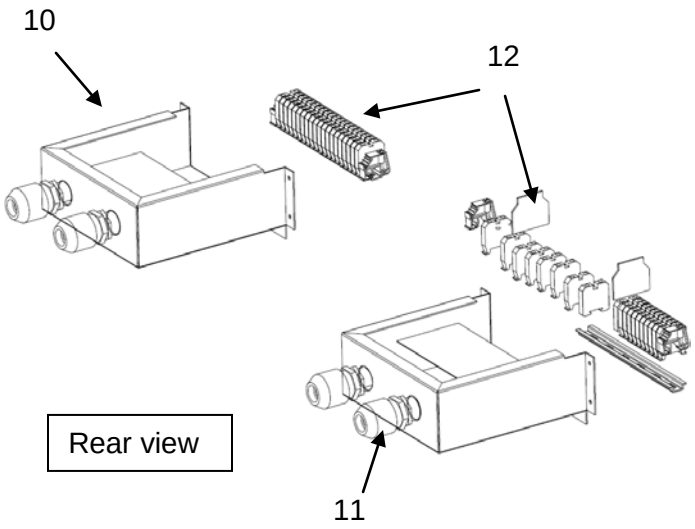


Mark	Description
1	Heat Engine
2	Boiler Gas Train
3	Cabinet
4	Control Panel

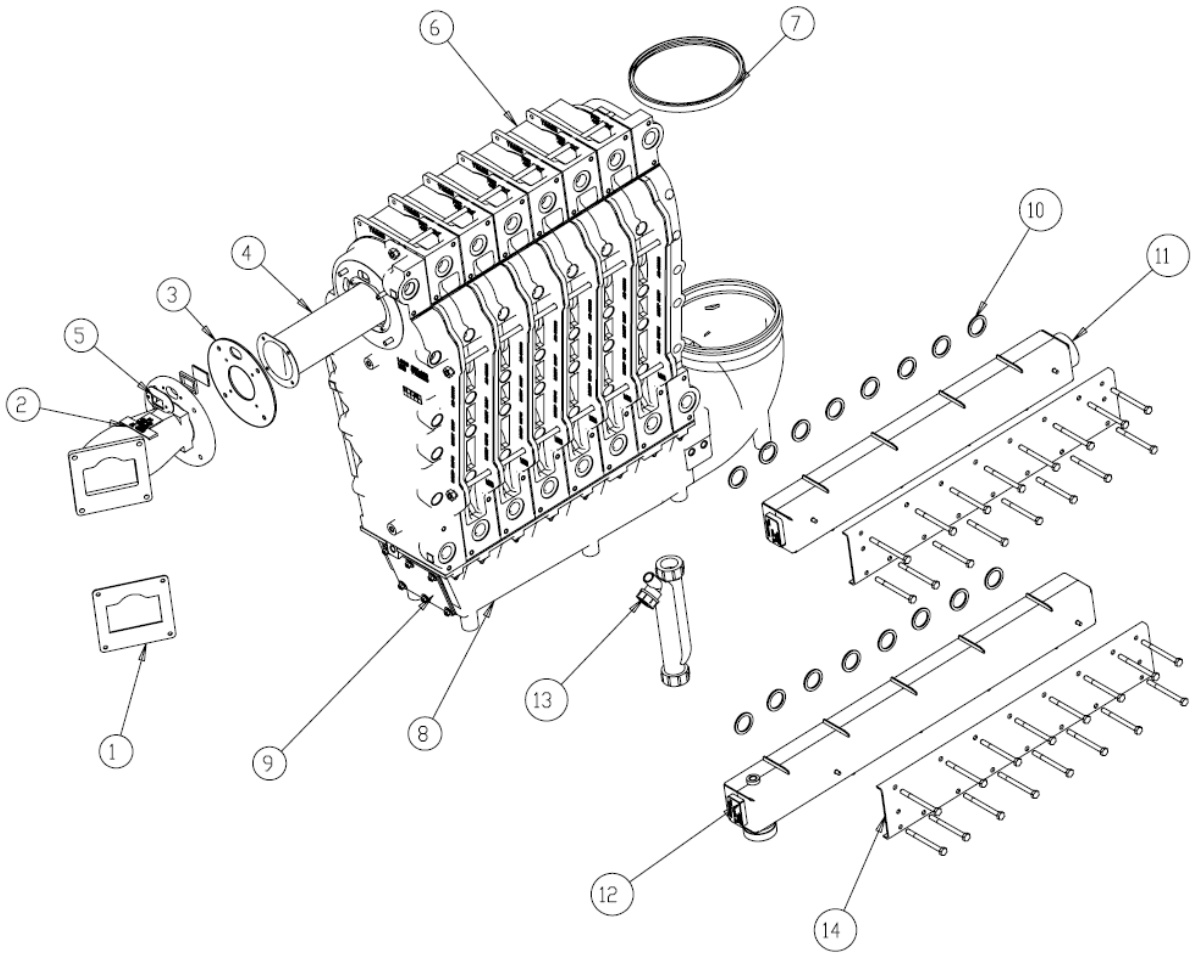
5.7.2 Control Panel



Mark	Description
1	Control Panel Aluminum Door
2	Display Label
3	Display Cover
4	ENVI® Control Display Module
5	Circuit Breaker
6	On/Off Switch
7	ENVI® Control Interface Board
8	Low Water Cut-off
9	ENVI® Control Board
10	TB1 Low Voltage (right rear of boiler)
11	TB2 High Voltage (left rear of boiler)
12	Terminal Strips (w/dividers)

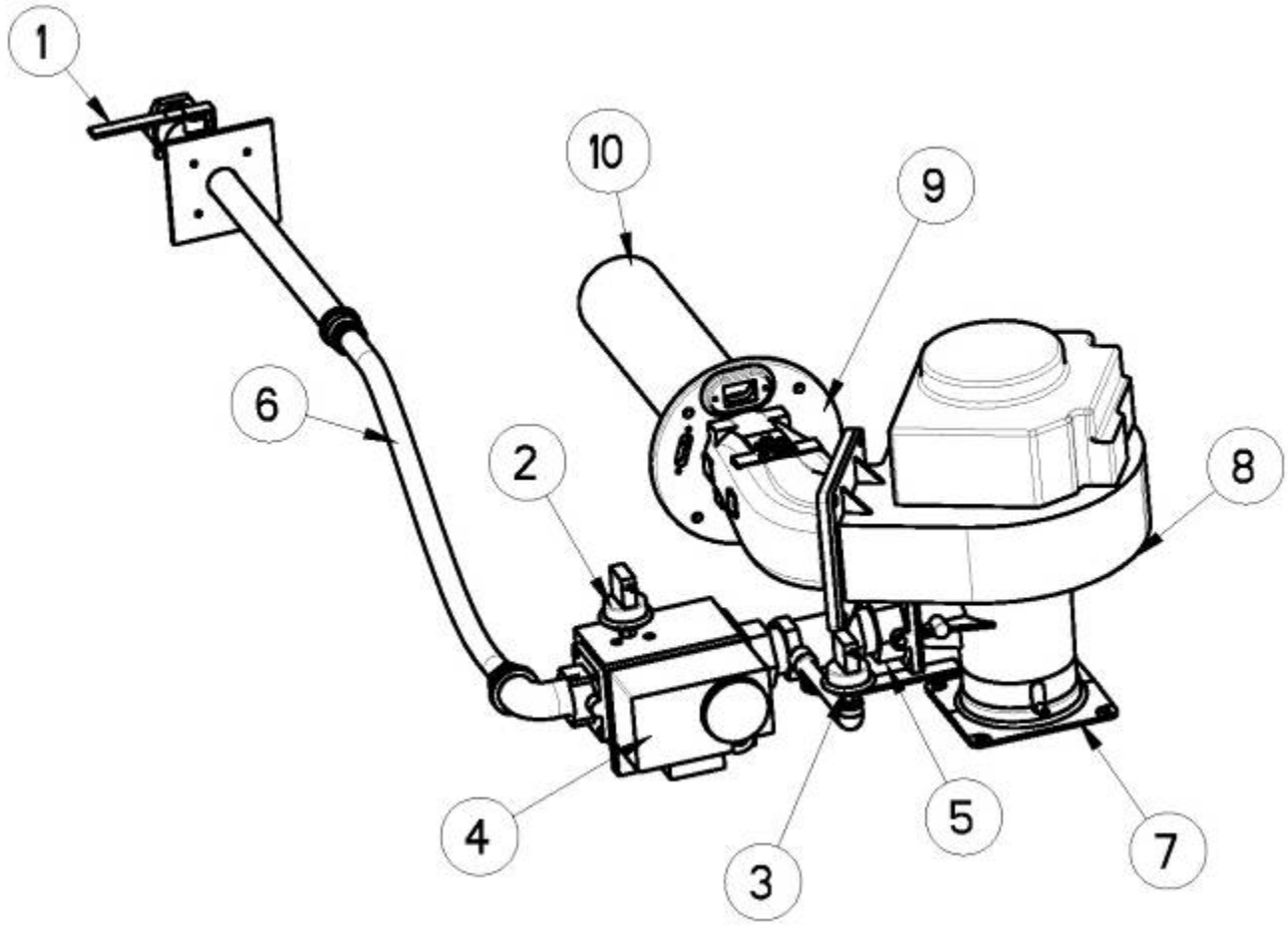


5.7.3 MACH® Boiler C750/900/1050 Heat Engine



Mark	Description
1	Gasket, Blower to Burner Hood
2	Burner Hood
3	Burner Hood Gasket
4	Burner
5	View Glass Assembly
6	Heat Exchanger Sectional Castings
7	Exhaust Gasket
8	Condensate Collector
9	Inspection Cover w/ gasket
10	Water Manifold Gaskets
11	Boiler Outlet
12	Boiler Inlet
13	Condensate Trap
14	Manifold Mounting Plate

5.7.4 MACH® Boiler C750/900/1050 Gas Train



Mark	Description
1	Main Gas Shut-off Valve
2	Low Gas Pressure Switch
3	High Gas Pressure Switch
4	Dual Main Gas Valve / Regulator
5	Gas Manifold Shut-off Valve
6	Flex Hose with Gas Valve Adaptor
7	Venturi
8	Premix Combustion Blower
9	Burner Hood
10	Burner

7 LIMITED WARRANTY

Subject to the terms and conditions herein, Harsco Industrial, Patterson-Kelley, Seller warrants to the original owner at the original installation site that products manufactured by Seller will be free from defects in materials and workmanship for a period of one (1) years from date of start up (the "Warranty Period"), provided that startup is completed within six months from the date of shipment. The heat exchanger and burner will be warranted for a period of five (5) years from the date of shipment (the “Warranty Period”).

REMEDY

The sole remedy of this warranty is expressly limited to the repair or replacement of any part found to be defective under conditions of normal use within the Warranty Period. Installation is not included.

WARRANTY

The owner must notify the original installer of the Product and Seller (Attention: Harsco Industrial, Patterson-Kelley, 100 Burson Street, East Stroudsburg, PA 18301), in writing, within the Warranty Period, providing a detailed description of all claimed defects. Transportation to the factory or other designated facility for repairs of any products or items alleged defective shall, in all events, be the responsibility and at the cost of the owner.

EXCLUSIONS

Seller shall have no liability for and this warranty does not cover:

A. Incidental, special or consequential damages, such as loss of the use of products, facilities or production, inconvenience, loss of time or labor expense involved in repairing or replacing the alleged defective Product.
B. The performance of any Product under conditions varying materially from those under which such Product is usually tested under industry standards at of the time of shipment.
C. Any damage to the Product due to abrasion, erosion, corrosion, deterioration, abnormal temperatures or the influence of foreign matter or energy.
D. The design or operation of owner's plant or equipment or of any facility or system of which any Product may be made a part.
E. The suitability of any Product for any particular application.
F. Any failure resulting from misuse, modification not authorized by Seller in writing, improper installation or lack of or improper maintenance.
G. Equipment furnished by the owner, either mounted or unmounted, or when contracted for by the owner to be installed or handled.
H. Leakage or other malfunction caused by:
    1. Defective installations in general and specifically, any installation which is made:
        a. in violation of applicable state or local plumbing housing or building codes,
        b. contrary to the written instructions furnished with the unit
    2. Adverse local conditions in general and, specifically, sediment or lime precipitation in the tubes and/or headers or corrosive elements in the atmosphere.
    3. Misuse in general and, specifically, operation and maintenance contrary to the written instructions furnished with the unit, disconnection, alteration or addition of components or apparatus, not approved by Seller, operation with fuels or settings other than those set forth on the rating plate or accidental or exterior damage.
I. Production of noise, odors, discoloration or rusty water.
J. Damage to surrounding area or property caused by leakage or malfunction.
K. Costs associated with the replacement and/or repair of the unit including: any freight, shipping or delivery charges, any removal, installation or reinstallation charges, any material and/or permits required for installation, reinstallation or repair, charges to return the boiler and or components. Seller's liability under this warranty shall not in any case exceed the amount paid for the Product found to be defective.

THIRD PARTY WARRANTIES

For goods or components not manufactured by Seller, the warranty obligations of Seller shall, in all respects, conform and be limited to one (1) year from the date of shipment.

SEVERABILITY

To the extent that any provision of this warranty would be void or prohibited under applicable law, such provisions shall be limited in effect to the minimum extent necessary to render the remaining provisions hereof enforceable.

NO OTHER WARRANTIES

Seller makes no implied warranty of merchantability or fitness for a particular purpose or other warranties with respect to any products or services except as expressly set forth in this limited warranty.

8 MACH® BOILER FIRE TEST REPORT

MACH® BOILER
FIRE-TEST REPORT

Date: _____

Boiler Serial # _____ Model # _____

Installation: Name: _____ City: _____

State: _____ Zip: _____ Contact _____ Phone: _____

Installer Name: _____ Type of Installation: _____ (Hotel, School, etc.)

Fuel: Natural Gas _____ Propane _____

Outdoor Temperature Sensor Connected Yes: _____ No: _____

1. Factory Fire-Test : (copy from boiler label)

	High	Low
Inlet Gas	"w.c.	"w.c.
Oxygen (O2)	%	%
Carbon Dioxide (CO2)	%	%
Carbon Monoxide (CO)	ppm	ppm
Gross Stack Temp.	° F	° F

Field Fire-Test: **DATE:** _____

	High	Low
Inlet Gas	"w.c.	"w.c.
Oxygen (O2)	%	%
Carbon Dioxide (CO2)	%	%
Carbon Monoxide (CO)	ppm	ppm
Nox	ppm	ppm
Gross Stack Temp.	° F	° F
Combustion Air Temp.	° F	° F
Stack Press.(exhaust)	"w.c.	"w.c.
Main Flame Signal	Yes/No	Yes/No
Efficiency	%	%
Comb. Air Pres. (intake)	"w.c.	"w.c.

2. Water Inlet temperature: ° F Water Outlet temperature: ° F
3. Flow through boiler: GPM
4. Operating Temperature Setpoint: ° F (from internal OR external control)
5. Stack Pressure (measured where stack exits boiler): "w.c. (High) "w.c. (Low)
6. Approximate stack lengths: Ft. Horizontal Ft. Vertical Flue Pipe Diameter
7. Incoming Electrical Power Volts a.c. Less than 1 volt between neutral and ground
8. **Sytem Water pH level**
9. Comments:

Performed by: _____
(Print Name)

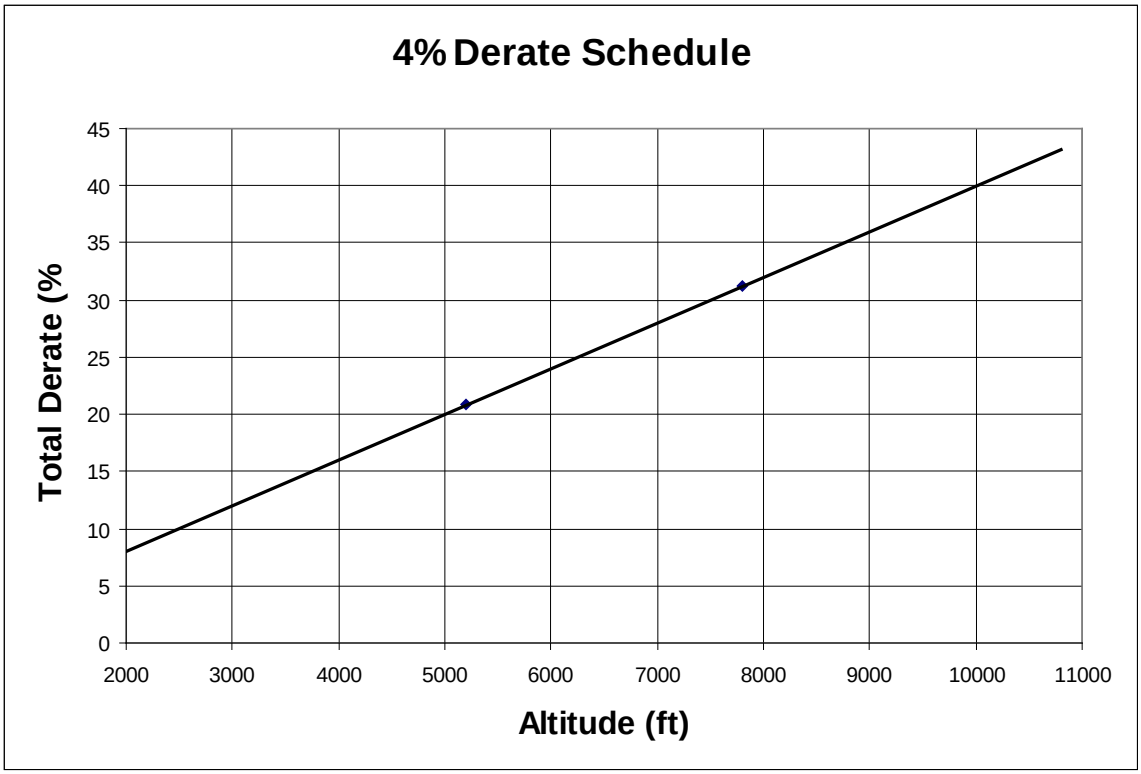
Please return a copy to Harsco Industrial, Patterson-Kelley, ATTN: Boiler Technical Service
Harsco Industrial, Patterson-Kelley • 100 Burson Street • E. Stroudsburg, PA 18301
Phone: (570) 476-7261 • Fax: (570) 476-7247 • www.harscopk.com

APPENDIX 1 – MAINTENANCE LOG

Date	Hi/Low-Fire	O_2	CO	CO_2	Stack Temp	Adjustments	By

APPENDIX 2 – MACH® BOILER ALTITUDE DERATE SCHEDULE

For installations over 2000 ft elevations, a de-rate schedule is applied. The boiler input rating must be reduced by 4% per 1000 ft above sea level, as illustrated using the following graph.



De-rate procedure is as follows:

With the boiler at high fire, adjust the gas valves (as described in section 3.10.4) to get 5% O_2 in the flue gas. If this cannot be achieved, perform the following steps:

- If the O_2% is too high, then the inlet gas pressure should be adjusted to the minimum pressure allowed, typically 5" w.c. The gas valve should be adjusted to obtain approximately 5% O_2. If the O_2% is still too high, the fan speed may be lowered. This procedure should only be performed by factory trained personnel.
- If the O_2% is too low, the gas valve settings should be reduced.

This procedure is also described in Bulletin 06-08.

Multi-Metal Systems
Water Quality Standards

HARSCO INDUSTRIAL
Patterson-Kelley

HARSCO Industrial, Patterson-Kelley boilers are designed to be incorporated into any multi-metal hydronic heating system. All multi-metal hydronic systems require that attention be paid to water treatment. The chemical additives for any multi-metal system must be specifically formulated for use with all the various metals used in that system.

Any closed, hydronic heating systems should include a meter, to monitor water addition to the recirculating loop, and a filter, pursuant to ASHRAE Standard 189.1 and the AWT Handbook. Water added to a closed hydronic system should not exceed more than 10% of the system volume per year and meter readings should be recorded, at least monthly, to ensure system losses are minimized and corrective actions shall be taken when needed.

Treatment programs for multi-metal systems should meet or exceed the following generally accepted best practices water quality guidelines:

1. Proper cleaning and surface preparation must be completed prior to system start-up.
2. pH must be maintained in a range that is appropriate for the metals contained in the system (see chart below).
3. Total Alkalinity between 100-500 ppm as $CaCO_3$.
4. Filtration at or below 5 micron.
5. Total suspended solids below 10 ppm.
6. Corrosion inhibiting compounds to protect metals at or below:
    a. Aluminum <0.25 MPY
    b. Copper <0.1 MPY, soluble copper <0.25 ppm
    c. Steel <3.0 MPY

    According to ASTM D 2688
7. Addition of strong acids is not recommended.

Prior to initiating any treatment program, a water sample of the proposed fill water should be sampled for analysis. Once filled and bled of air, a pH neutral, industrial cleaner for use in multi-metal systems should be used to clean the entire hydronic system. Samples of the system water with cleaner should be taken and analyzed to ensure proper cleaner strength. Once cleaned, the system should be flushed with fresh (fill) water until the system water is within 100 micro Siemens in conductivity of the fresh water. When flushing is complete, a treatment program that is designed for use in that multi-metal system, after consideration of the metals it contains, must be used. Treatment programs should also comply with the standard water quality guidelines listed above.

Multi-Metal Systems with Aluminum	Multi-Metal Systems with Stainless Steel	Multi-Metal Systems with Copper
Proper surface cleaning required	Proper surface cleaning required	Proper surface cleaning required.
pH maintained between 6.0-8.5*	pH maintained between 7.0-9.5*	pH range may vary *`**
Total Alkalinity 100-500 ppm as $CaCO_3$	Total Alkalinity 100-500 ppm as $CaCO_3$	Total Alkalinity 100-500 ppm as $CaCO_3$
Best Practices Filtration	Best Practices Filtration	Best Practices Filtration
Suspended solids below 10 ppm	Suspended solids below 10 ppm	Suspended solids below 10 ppm
Corrosion rates below: 0.1 MPY copper 3.0 MPY steel 0.25 MPY aluminum	Corrosion rates below: 0.1 MPY copper 3.0 MPY steel	Corrosion rates below: 0.1 MPY copper 3.0 MPY steel Max. MPY other metals
Addition of strong acid not recommended	Addition of strong acids not recommended	Addition of strong acids not recommended
When freeze protection is required, automotive grade glycols are not recommended and decomposition products should be monitored and maintained below concentrations that present corrosive conditions. For existing boiler water systems, additional requirements and operational conditions may be required to mitigate pre-existing conditions.		
* Other system components may have more restrictive ranges. **Copper has a broad range of acceptable pH and the other metallic components may require a tighter range		

iQ251 Submittal Data

Date:

Project Name:

Project #:

City/St/ZIP:

Engineer:

Contractor:

Bid Date:

Fuel Type: ☐ Natural Gas ☐ Propane

Factory Option: ☐ iNTouch-BMS

Key Features

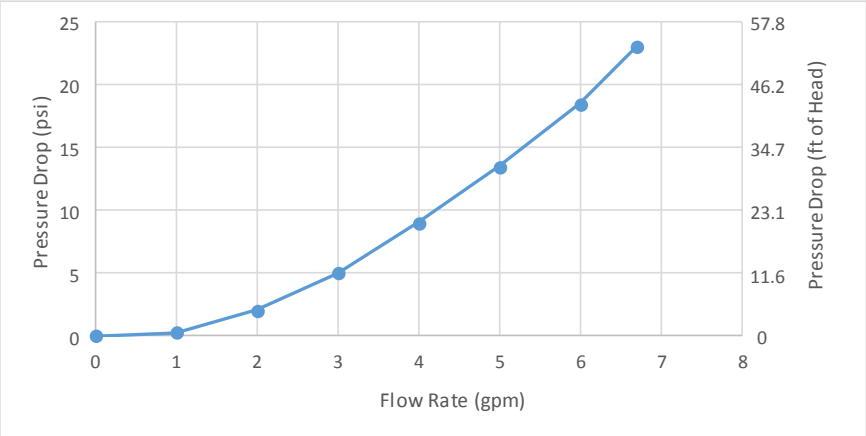
- **Stainless** (316L) heat exchanger
- **Flexible-Floating** Design, stress relieving and thermal shock capable.
- **Multi-Unit**- masterless cascading with common venting
- **Gas Pressures-** Operates on gas pressures range of 2.5"-14" w.c.
- **ASME-HLW compliant**
- **Designed and Built** in the U.S.

Performance

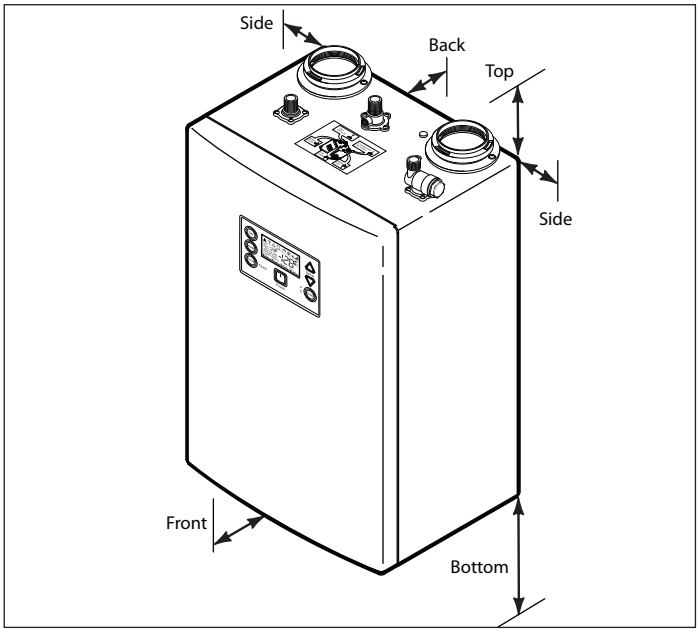
- Turndown Ratio of 8.3:1 per unit.
- Cascade up to 10 units with common venting for a total of over 2500MBH and an 83:1 total turndown ratio

	Temperature Rise (ΔT) °F						
	40	*50*	*60*	*70*	*80*	*90*	*100*
Flow (GPM)	12.0	9.6	8.0	6.9	6.0	5.4	4.8

Pressure Drop



Clearances



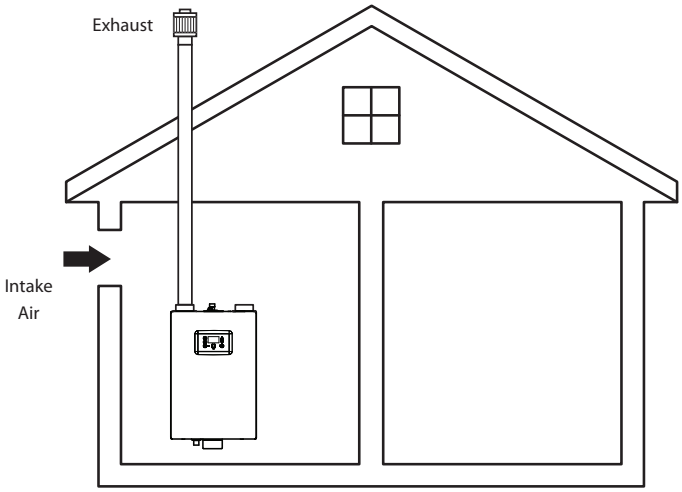
Required Mounting Clearances			
Location	**From Combustibles**	**From Non-Combustibles**	**Service Clearance[1]**
Top	6" (15.2cm)	20" (50.8cm)	12" (30.4cm)
Back[2]	5/8" (15.8mm)	5/8" (15.8mm)	5/8" (15.8mm)
Sides	1" (25.4mm)	1/2" (12.7mm)	5/8" (15.8mm)
Front	2" (5.1cm)	2" (5.1cm)	30" (76.2cm)
Bottom	12" (30.4cm)	12" (30.4cm)	12" (30.4cm)

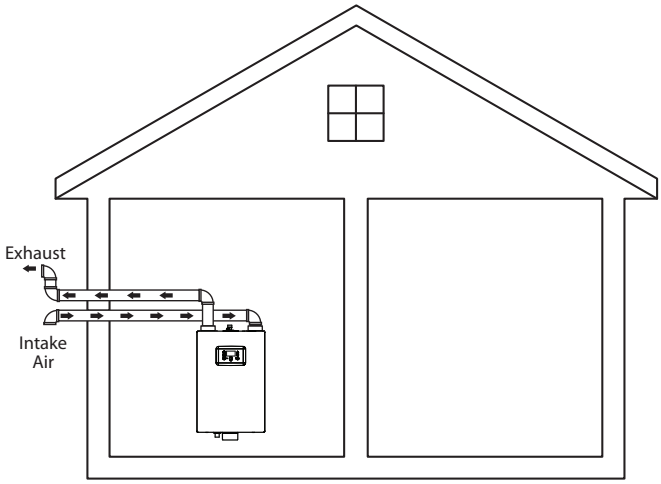
[1] Service clearances are suggested to allow for normal service
[2] Mounting bracket automatically sets this dimension

Venting

Max. Vent Length (ft.) for Power vent (1-pipe)				
Number of units	Duct Size			
	3"	4"	6"	8"
1	130	130	-	-
2	-	130	-	-
3	-	30	130	-
4	-	-	130	-
5	-	-	130	-
6	-	-	130	-
7	-	-	45	-
8	-	-	30	130
9	-	-	-	130
10	-	-	-	130
Note: Reduce the maximum equivalent length above by 5 feet per 90° elbow and by 2 feet per 45° elbow used. Do not exceed the above set limits.				

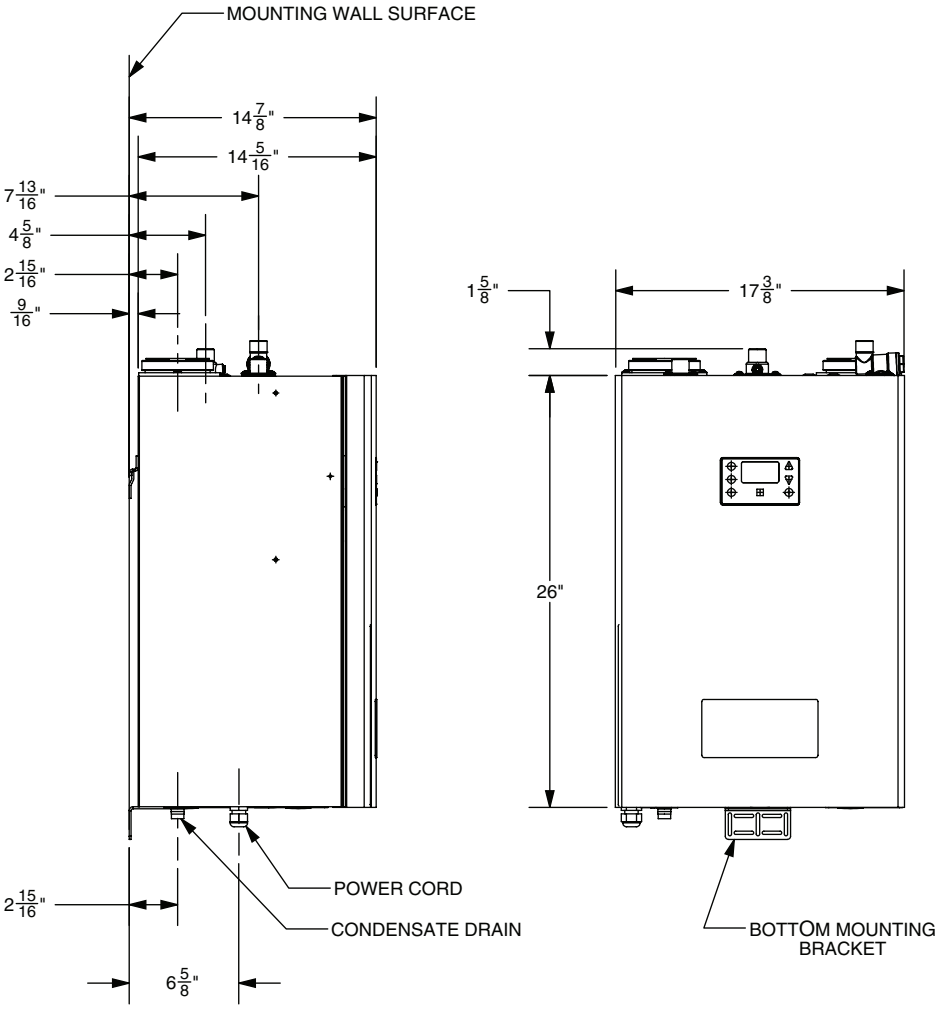
Max. Vent Length (ft.) for Direct vent (2- pipe)				
Number of units	Duct Size			
	3"	4"	6"	8"
1	65	65	-	-
2	-	65	-	-
3	-	30	65	-
4	-	-	65	-
5	-	-	65	-
6	-	-	65	-
7	-	-	45	-
8	-	-	30	65
9	-	-	-	65
10	-	-	-	65
Note: Reduce the maximum equivalent length above by 5 feet per 90° elbow and by 2 feet per 45° elbow used. Do not exceed the above set limits.				





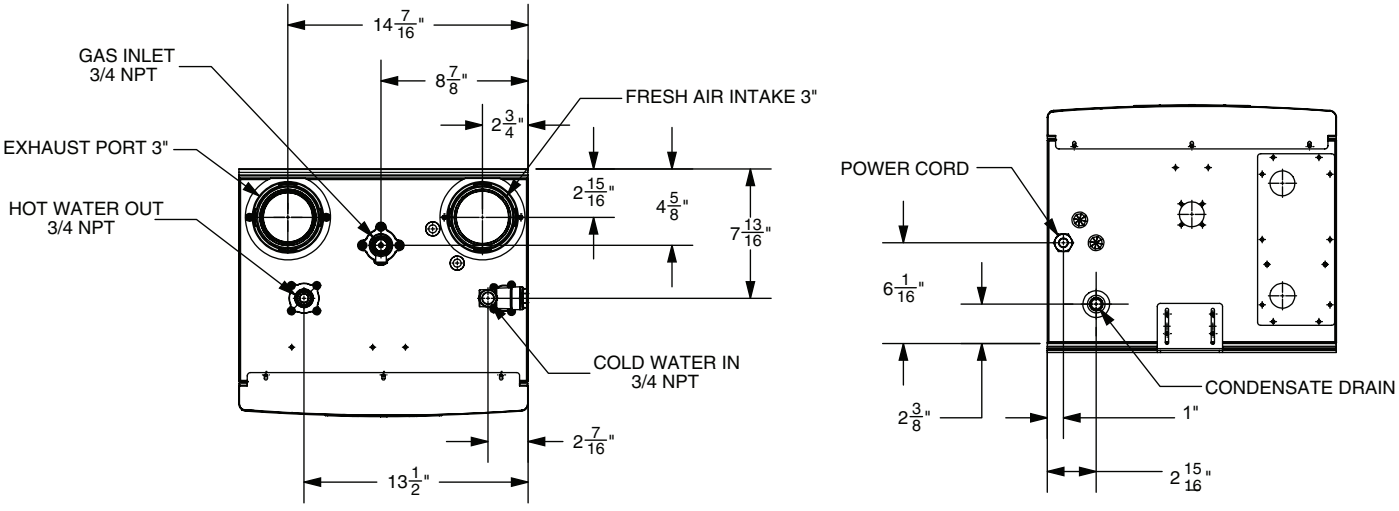
Electrical Data

Electrical power required for the water heater is 120V AC, 60 Hz. The circuit breaker shall be a minimum of 15 amps. Only one water heater should be plugged into an outlet. Please ensure correct polarity of outlet before plugging in heater



SIDE VIEW

FRONT VIEW



TOP VIEW

BOTTOM VIEW

Specifications

PARAMETERS	iQ251
Type	Indoor, Wall Hung, Fully Condensing, On-demand Water Heater
Fuel	Preset for NG / LP convertible
Minimum / Maximum Input (Btu/h)	30,000 / 251,000
Thermal Efficiency	96%
Dimensions H X W X D (inches)	26 X 17.4 X 14.9 (3.9 cu. ft)
Weight (lbs)	90
Water Inlet / Outlet Connection	3/4" NPT
Gas Inlet Connection	3/4" NPT
Minimum Flow Rate for Activation	0.6 GPM
Ignition	Electronic Spark Ignition
Venting Type	Direct Vent (2 pipe – intake & exhaust), Power Vent (1 pipe – exhaust only)
Venting Materials	Sch. 40 PVC, Sch. 40 CPVC, Polypropylene, Stainless Steel
Max 3" Vent Length – Single Pipe / Power Vent	130 ft, deduct 5 ft per 90° elbow
Max 3" Vent Length – Two Pipe / Direct Vent	65 ft, deduct 5 ft per 90° elbow
Common Venting	Yes
Safety	Flame Rod, Thermal Fuse, Overheat Prevention Device, Fan Speed Monitor, Flue Temperature Monitor, Blocked Vent Detector, Water Shut-Off Valve, 2X10A Fuse, Dual Flame Sensing, Flue Damper
Water Pressure Min / Max (PSI)	30 / 160
NG/LP – Minimum Static Gas Pressure 1/2" (non-corrugated, black iron)	6"
NG/LP – Minimum Static Gas Pressure 3/4" (non-corrugated, black iron)	2.5"
NG/LP – Maximum Static Gas Pressure	14"
Gas Pressure for Adjustments	8" for NG, 11" for LP
Electrical	120V AC, 60 Hz
Power Consumption	500W (Max 4.2 Amps), 8W (Standby)
Features	
Listing	ETL (Z21.10.3 / CSA 4.3), ASME HLW, SCAQMD (Low NO_x)
Cascading	Masterless, 10 units
Heat Exchanger	Expandable, Stainless 316L
Hot Water Capacity (35F Rise)	13.8
Hot Water Capacity (45F Rise)	10.7
Hot Water Capacity (77F Rise)	6.3
Domestic Mode Temp. Settings	100 – 140°F
Commercial Mode Temp. Settings	100 – 190°F
Warranty	Heat Exchanger Coil – 6 years, Parts – 1 year

Note: Due to Intellihot's policy of continuous product improvements, design and technical specifications are subject to change without notice.

Intellihot Green Technologies Inc.
2900 W. Main Street, Galesburg, IL 61401 · phone: 877.835.1705
email: sales@intellihot.com · www.intellihot.com

A revolutionary glass insulation technology that outsmarts sunlight to save energy, increase comfort, and save money—all year long.

EnerLogic® SERIES

EnerLogic® VEP35 SR CDF

GLASS TYPE	RESIDENTIAL 1/8" (3 mm) SINGLE PANE CLEAR	RESIDENTIAL 1/8" (3 mm) DUAL PANE CLEAR	COMMERCIAL 1/4" (6 mm) SINGLE PANE CLEAR	COMMERCIAL 1/4" (6 mm) DUAL PANE CLEAR
Visible Light Transmittance	33%	30%	31%	29%
Total Solar Energy Rejected	76%	70%	76%	70%
Solar Heat Gain Coefficient	0.24	0.30	0.24	0.30
Winter U-Value	0.60	0.34	0.59	0.33
Summer U-Value	0.43	0.30	0.42	0.30
Glare Reduction	63%	63%	65%	63%
Ultraviolet Rejected	99%	99%	99%	99%
Total Solar Transmittance	19%	17%	18%	15%
Total Solar Reflectance	49%	43%	42%	34%
Total Solar Absorptance	32%	40%	40%	51%
Visible Light Reflectance: Exterior	48%	48%	46%	45%
Visible Light Reflectance: Interior	30%	29%	28%	29%
Shading Coefficient	0.28	0.35	0.28	0.36
Emissivity	0.07	0.07	0.07	0.07
Light to Solar Heat Gain Ratio	1.38	1.00	1.29	0.97
Solar Heat Reduction	72%	60%	70%	56%

All solar properties have been measured in accordance with NFRC standards. All values averaged from routinely accumulated quality control data.

VISTA® WINDOW FILM

LLumar® VISTA® WINDOW FILM EnerLogic®

Limited Window Film Warranty

LVE

SOLAR CONTROL

APPLICATIONS: RESIDENTIAL

☐ **5 Year Limited Warranty** for LLumar® products DL05GSRCDF, DL15BSRCDF, and DL15GSRCDF.

☐ **7 Year Limited Warranty** for LLumar product R15GSRCDF.

☐ **10 Year Limited Warranty** for LLumar product E1220SRCDF.

☐ **Limited Lifetime Warranty** for LLumar products AIR80BLSRHPR, AU85UVHPR, DR15SRCDF, DR25SRCDF, DR35SRCDF, N1020SRCDF, N1020BSRCDF, N1035BSRCDF, N1040SRCDF, N1050SRCDF, N1065SRCDF, R20SRCDF, R35SRCDF, R50SRCDF, and RN07SRCDF and Vista™ products V14SRCDF, V18SRCDF, V28SRCDF, V33SRCDF, V33BSRCDF, V38SRCDF, V45SRCDF, V48SRCDF, and V58SRCDF and EnerLogic® product VEP70SRCDF where the film IS NOT required to be sealed and for Vista products V31SRCDF, V40SRCDF, V41SRCDF, V51SRCDF, VE35SRCDF, VE50SRCDF, VS60SRCDF, VS61SRCDF, and VS70SRCDF and EnerLogic product VEP35SRHPR where the film IS required to be sealed if application is within 10 kilometers of the ocean. NOTE: VS60SRCDF, VS61SRCDF, and VS70SRCDF require the use of Spectra Seal application to be valid.

These warranties are extended to the original purchaser. These products are warranted by the manufacturer against bubbling, corrosion, crazing, delaminating, and peeling when properly installed in accordance with the manufacturer's instructions on suitable INTERIOR surfaces of glass windows by a duly authorized dealer. If the film fails to comply with this warranty, the manufacturer will replace the non-conforming or defective film (labor and materials) at no cost to the consumer. For applications requiring sealant, Film-On™ installation solution is recommended. An edge sealant is required for re-installation if the warranty replacement should be necessary because of corrosion issues.

☐ **Optional Residential Gold Limited Warranty** for LLumar products AIR80BLSRHPR, DR15SRCDF, DR25SRCDF, DR35SRCDF and N1035BSRCDF, Vista products V14SRCDF, V18SRCDF, V28SRCDF, V28SRPS4, V31SRCDF, V33SRCDF, V33BSRCDF, V38SRCDF, V38SRPS8, V40SRCDF, V41SRCDF, V45SRCDF, V48SRCDF, V51SRCDF, V58SRCDF, VE35SRCDF, VE50SRCDF, VS60SRCDF, VS61SRCDF, and VS70SRCDF, and EnerLogic products VEP35SRCDF and VEP70SRCDF only.

In addition to meeting the standard Solar Control Applications: Residential warranty conditions, the manufacturer agrees to match the terms and conditions of and in force manufacturer's glass warranty. This Gold Coverage applies to the glass on which the LLumar, Vista, and/or EnerLogic Window Film has been installed in accordance with factory recommended installation instructions by an authorized dealer. Consumer must provide proof of an existing in force manufacturer's glass warranty. Certain types of window require pre-approval from the manufacturer; please see back of form for specifics. Charge for Gold Coverage is $0.35 per square foot. This warranty will not be validated unless payment is received with warranty by the manufacturer within 30 days of installation.

$0.35 x _____ Square Footage of Job = $_____.

WARRANTIES FOR VISTA AND ENERLOGIC RESIDENTIAL APPLICATIONS ARE TRANSFERABLE ONE TIME ONLY FROM THE ORIGINAL PURCHASER TO ANOTHER. SEE BACK OF THIS FORM.

SOLAR CONTROL

APPLICATIONS: COMMERCIAL

☐ **5 Year Limited Warranty** for LLumar products DL05GSRCDF, DL15BSRCDF, and DL15GSRCDF.

☐ **7 Year Limited Warranty** for LLumar product R15GSRCDF.

☐ **10 Year Limited Warranty** for LLumar products AU85UVSRHPR, DR15SRCDF, DR25SRCDF, DR35SRCDF, E1220SRCDF, N1020SRCDF, N1020BSRCDF, N1035BSRCDF, N1040SRCDF, N1050SRCDF, N1065SRCDF, R20SRCDF, R35SRCDF, R50SRCDF, and RN07SRCDF and for Vista product V33BSRCDF where the film IS NOT required to be sealed and for Vista products V31SRCDF, V40SRCDF, V41SRCDF, V51SRCDF, VE35SRCDF, VE50SRCDF, VS60SRCDF, VS61SRCDF, and VS70SRCDF where the film IS required to be sealed if application is within 10 kilometers of the ocean. NOTE: VS60SRCDF, VS61SRCDF, and VS70SRCDF require the use of Spectra Seal application to be valid.

☐ **15 Year Limited Warranty** for LLumar product AIR80BLSRHPR and Vista products V14SRCDF, V18SRCDF, V28SRCDF, V33SRCDF, V38SRCDF, V45SRCDF, V48SRCDF, and V58SRCDF and EnerLogic product VEP70SRCDF where the film IS NOT required to be sealed and for EnerLogic product VEP35SRCDF where the film IS required to be sealed if application is within 10 kilometers of the ocean.

These warranties are extended to the original purchaser. These products are warranted by the manufacturer against bubbling, corrosion, crazing, delaminating, and peeling when properly installed in accordance with the manufacturer's instructions on suitable INTERIOR surfaces of glass by a duly authorized dealer. If the film fails to comply with the warranty, the manufacturer will replace the non-conforming or defective film (labor and materials) at no cost to the purchaser. For applications requiring sealant, Film-On installation solution is recommended. An edge sealant is required for re-installation if the warranty replacement should be necessary because of corrosion issues.

WARRANTIES FOR COMMERCIAL APPLICATIONS ARE NOT TRANSFERABLE FROM ONE PURCHASER TO ANOTHER.

SAFETY-AND-SECURITY APPLICATIONS

☐ **10 Year Safety-and-Security Film Warranty: Commercial Applications**

☐ **Lifetime Safety-and-Security Film Warranty: Residential Applications**
for LLumar products N1020SRPS4, N1020SRPS8, N1040SRPS4, N1040SRPS8, N1050SRPS4, N1050SRPS8, NUV65SRPS4, R20SRPS4, R20SRPS8, SCLSRPS4, SCLSRPS6, SCLSRPS7, SCLSRPS8, SCLSRPS11, and SCLSRPS15 and Vista Products V28SRPS8 and V38SRPS8.

This warranty is extended to the original purchaser. The products are warranted by the manufacturer against corrosion, crazing, delaminating, and peeling when properly installed in accordance with the manufacturer's instructions on suitable INTERIOR surfaces of glass by a duly authorized dealer. If the film fails to comply with the warranty, the manufacturer will replace the non-conforming or defective film (labor and materials) at no cost to the purchaser. This warranty includes labor and material on safety-and-security films less than 7 mil. Films 7 mil and greater require the dealer to be approved by the manufacturer prior to installation to get a film and labor warranty. Unapproved applications are warranted for material replacement only (no labor).

WARRANTIES FOR VISTA RESIDENTIAL SAFETY-AND-SECURITY APPLICATIONS ARE TRANSFERABLE ONE TIME ONLY FROM THE ORIGINAL PURCHASER TO ANOTHER. SEE BACK OF THIS FORM. WARRANTIES FOR ALL OTHER SAFETY-AND-SECURITY APPLICATIONS ARE NOT TRANSFERABLE FROM ONE PURCHASER TO ANOTHER.

DECORATIVE APPLICATIONS

☐ **5 Year Limited Warranty** for LLumar products BLUESRHPR, FROSTED SPARKLE, GREENSRHPR, NRMFMDSRHPR, NRMFRPSRHPR, NRMFSDSRHPR, NRMMFSDSRHPR, NRMMSQSRHPR, NRM55PS4, NRM80PS2, NRMBPS2, NRMFBSRHPR, NRMFIBGSRHPR, NRMFSQSRHPR, NRMFSSRHPR, NRMFTLSRHPR, NRMMFSSRHPR, NRMMPS2, NRMPS2, NRMV60FPS3, NRMV80DCPS3, NRMWPS3, REDSRHPR, RMSPS2, and YELLOWSRHPR.

These warranties are extended to the original purchaser. These products are warranted by the manufacturer against bubbling, corrosion, crazing, delaminating, and peeling when properly installed in accordance with the manufacturer's instructions on suitable INTERIOR surfaces of glass by a duly authorized dealer. If the film fails to comply with the warranty, the manufacturer will replace the non-conforming or defective film (labor and materials) at no cost to the purchaser.

WARRANTIES FOR DECORATIVE APPLICATIONS ARE NOT TRANSFERABLE FROM ONE PURCHASE TO ANOTHER.

EXTERIOR APPLICATIONS

☐ **5 Year Limited Warranty** for LLumar products NHE35ERHPR, RHE20ERHPR, and RHE35ERHPR when installed on sloped glazing greater than or equal to 20 degrees from horizontal.

☐ **7 Year Limited Warranty** for LLumar products NHE35ERHPR, RHE20ERHPR, and RHE35ERHPR when installed on vertical glazing.

These warranties are extended to the original purchaser. The products are warranted against bubbling, corrosion, cracking, crazing, or delaminating, when properly installed in accordance with the manufacturer's instructions on suitable EXTERIOR surfaces of glass with a manufacturer-approved silicone sealant by a duly authorized dealer. If the film fails to comply with the warranty, the manufacturer will replace the non-conforming or defective film (labor and materials) at no cost to the purchaser.

All exterior mounted films must be edge-sealed with a factory approved neutral-cure sealant, such as Dow Corning (DC) 1199 (clear), DC795, DC995, DC794-F, DC796, or Tremco SSG Proglaze.

WARRANTIES FOR EXTERIOR APPLICATIONS ARE NOT TRANSFERABLE FROM ONE PURCHASER TO ANOTHER.

ANTI-GRAFFITI APPLICATIONS

☐ **2 Year Limited Warranty** for LLumar products GCLSRPS4 and GCLSRPS6.

This warranty is extended to the original purchaser. They are warranted against blistering, bubbling, or delamination when properly installed in accordance with the manufacturer's instructions on suitable INTERIOR surfaces of glass by a duly authorized dealer. This warranty does not cover the penetration of the film by objects or fluids.

WARRANTIES FOR ANTI-GRAFFITI APPLICATIONS ARE NOT TRANSFERABLE FROM ONE PURCHASER TO ANOTHER.

GLASS BREAKAGE AND SEAL FAILURE

☐ **2 Year Glass Breakage and 2 Year Seal Failure Warranty**

☐ **5 Year Glass Breakage and 3 Year Seal Failure Warranty**

☐ **Not Applicable**

☐ **Available for Purchase**

PLEASE SEE THE BACK OF THIS FORM FOR DETAILS ON GLASS BREAKAGE AND SEAL FAILURE. These warranties are extended to the original purchaser. The products are warranted against glass and seal failure when properly installed in accordance with the manufacturer's instructions on suitable surfaces of glass by a duly authorized dealer.

- Must have existing seal failure warranty by the original window manufacturer.
- Due to a wide variety of compounds used, no warranty coverage is provided for window "backbedding sealants".
- No seal failure and/or glass breakage coverage on laminated glass except as noted on Film-to-Glass Recommendations.
- Maximum allowance is $500 (US) per glass.
- Glass breakage and/or seal failure must be a result of product listed herein.
- There is a deductible of $25 (US) or 5% of the replacement cost (whichever is greater) for residential and small commercial installations. The deductible for commercial installations and installations over 2500 square feet is $100 (US) or 5% of the replacement cost (whichever is greater).

ALL INSTALLATIONS OVER 2500 SQUARE FEET REQUIRE PRE-APPROVAL FROM MANUFACTURER.

ONLY AIR, NEUTRAL N, R, DR, AND SCL SERIES FILMS ARE APPROVED FOR USE IN PROXIMITY TO POOLS AND SAUNAS ON THE CONDITIONS THAT EDGES ARE SEALED WITH FACTORY-APPROVED SEALANT AND THERE IS NO PERSISTENT CONDENSATION ON GLASS SURFACES.

Residential Gold Limited Warranty is not valid without a validation stamp from the manufacturer in this box. The validated copy will be returned within 90 days.

INSTALLATION RECORD (press hard)

Contact Name	Date	Telephone Number
Customer Name (print)	Customer Signature	E-Mail Address
Customer Address	City	State or Province and Zip Code
Authorized Dealer Name	EnerLogic Certification Number	Installer Signature
Product Number	Lot or Run Number	Square Footage
Product Number	Lot or Run Number	Square Footage
Product Number	Lot or Run Number	Square Footage

INDICATE THE TYPE OF WINDOW BELOW BY CIRCLING THE APPROPRIATE VALUES

(If more than one type of window, indicate the values for the majority of windows below. All glass types must comply with the Film-to-Glass Recommendations Chart.)

Window Type	Single Pane	Dual Pane	Triple Pane			**Laminated Glass**	Yes	No	
Glass Thickness	1/8"	3/16"	1/4"	3/8"	1/2"	**Location**	Interior	Exterior	
Glass Type	Annealed	Heat Strengthened	Tempered	Clear	Tinted	**Total Square Footage**	_____		
Glass Coatings	None	Low E	Low E^2			**Film-to-Glass Factor**	Under 10	10 - 14	Over 14

INSTALLATION OF PRODUCTS MUST COMPLY WITH THE FILM-TO-GLASS RECOMMENDATIONS CHART

The manufacturer is not responsible for any furnishings or interior items which may fade or change color. The nature of certain delicate fabrics and dyes will lead to premature fading regardless of the application of any window film protective treatment.

White Copy: Customer Canary Copy: Dealer

NFRC Certified Product Designation Number CPD: CPF - _____ - _____

To request a copy of the temporary label for an NFRC Certified product please e-mail, fax, or mail a copy of your warranty, along with your request, to the address on the back of this form.

NOTE: This warranty form must contain a manufacturer lot number in order to receive a copy of the temporary label.

	2 Year Glass Breakage and 2 Year Seal Failure	5 Year Glass Breakage and 3 Year Seal Failure	Not Applicable ★	Available for Purchase ★★
LLumar Films				
AIR80BLSRHPR		●		
AU85UVSRHPR	●			
BLUESRHPR			●	
DL05GSRCDF				●
DL15BSRCDF				●
DL15GSRCDF				●
DR15SRCDF		●		
DR25SRCDF		●		
DR35SRCDF		●		
E1220SRCDF				●
FROSTED SPARKLE				●
GCLSRPS4				●
GCLSRPS6				●
GREENSRHPR			●	
N1020SRCDF	●			
N1020SRPS4	●			
N1020SRPS8	●			
N1020BSRCDF	●			
N1035BSRCDF	●			
N1040SRCDF	●			
N1040SRPS4	●			
N1040SRPS8	●			
N1050SRCDF	●			
N1050SRPS4	●			
N1050SRPS8	●			
N1065SRCDF	●			
NHE35ERHPR			●	
NRMFMDSRHPR				●
NRMFRPSRHPR				●
NRMFSDSRHPR				●
NRMMFSDSRHPR				●
NRMMSQSRHPR				●
NRM55PS4	●			
NRM80PS2	●			
NRMBPS2				●
NRMFBSRHPR				●
NRMFIBGSRHPR				●
NRMFSQSRHPR				●
NRMFSSRHPR				●
NRMFTLSRHPR				●
NRMMFSSRHPR				●
NRMMPS2	●			
NRMPS2	●			
NRMV60FPS3	●			
NRMV80DCPS3	●			
NRMWPS3				●
NUV65SRPS4	●			
R15GSRCDF				●
R20SRCDF	●			
R20SRPS4	●			
R20SRPS8	●			
R35SRCDF	●			
R50SRCDF	●			
REDSRHPR			●	
RHE20ERHPR			●	
RHE35ERHPR			●	
RN07SRCDF	●			
RMSPS2				●
SCLSRPS4	●			
SCLSRPS6	●			
SCLSRPS7	●			
SCLSRPS8	●			
SCLSRPS11	●			
SCLSRPS15	●			
YELLOWSRHPR			●	
Vista Films				
V14SRCDF		●		
V18SRCDF		●		
V28SRCDF		●		
V28SRPS8		●		
V31SRCDF		●		
V33SRCDF		●		
V33BSRCDF		●		
V38SRCDF		●		
V38SRPS8		●		
V40SRCDF		●		
V41SRCDF		●		
V45SRCDF		●		
V48SRCDF		●		
V51SRCDF		●		
V58SRCDF		●		
VE35SRCDF		●		
VE50SRCDF		●		
VS60SRCDF		●		
VS61SRCDF		●		
VS70SRCDF		●		
EnerLogic Films				
VEP35SRCDF		●		
VEP70SRCDF		●		

★ Glass Breakage and Seal Failure Warranty is not applicable for these products.
★★ E-mail Warranty Department for fee schedule and an application form for Glass Failure and Seal Failure Warranty for these products.

Limited Glass Breakage and Seal Failure Warranty

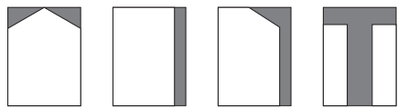
In the event of glass breakage or seal failure due to thermal shock caused solely as the a direct result of the application of an approved LLumar®, Vista™, and/or EnerLogic® Window Film, the manufacturer will:

- Replace the broken glass and/or repair or replace the sealed insulating unit.
- Replace and/or repair the portion of the window frame in direct contact with the glass, if it is damaged due to breakage or seal failure (excluding painting or finishing).
- Replace the window film.

The following terms and conditions apply:

1. We will pay for repairs or replacement of up to (but not to exceed) $500 less $25 deductible or 5% of replacement cost per unit.
2. Pre-approval is required when any of the windows falls into one of the following categories:
   - Any windows too big to be replaced with standard ladders and manpower
   - Windows exceeding 84 inches in any direction
   - Window with blinds located between the panes of glass (blinds in the air space)
3. Pre-existing conditions of either glass breakage or seal failure of the filmed lite voids this warranty coverage. We reserve the right to inspect any job prior to final issuance of a certificate of warranty coverage. Fraud by the installing dealer or warrantee shall void the warranty.
4. In order to qualify for seal failure coverage, the owner must present evidence that a seal failure warranty is currently in force from the manufacturer of the sealed glass unit. This warranty for seal failure will not extend beyond the sealed unit's manufacturer's limited warranty.
5. The warranty shall be completely invalidated if any information or representation set forth on the front of this document is not accurate.
6. We reserve the right to refuse to reapply window film after 2 occurrences to the same lite and will refund the consumer's money for the original filming of said lite.
7. "Thermal shock fracture" means a breaking or fracture to glass caused by heat or change in temperature resulting from the application of film to glass, and thermal shock breakage can be identified by the following characteristics:, (a) break lines make a right angle with the edge of glass at or near the origin, and (b) break lines separate into 2 or more lines within 2 inches of the edge and the origin. Tempered glass is not susceptible to thermal shock generated by solar control film.
8. “Seal failure” is defined as a visible break or opening of the window's air seal, resulting in an ineffective sealing of the window, allowing moisture and/or air to penetrate, causing an internal fogging of the glass.
9. This limited warranty shall NOT apply to applications in the following installations: (a) when not in strict compliance with current rules and regulations promulgated by the manufacturer; or (b) of more than one (1) film to any window; or (c) on triple pane windows, wired or textured glass, any glass on which there is affixed or otherwise applied any paint, lettering or ornamentation; or (d) on glass which is visibly damaged, chipped, cracked or pierced or where light can be seen between glass and frame; or (e) on nonglass materials, such as polycarbonates or other plastics; or (f) in locations in which there has been prior glass breakage; or (g) on glass which is framed by concrete, solid metal or sealant which is no longer resilient; or (h) on any glass of 100 square feet or more or having any linear dimension of more than 12 feet; or (i) when damage occurs partly by reason of loss by any cause other than thermal shock fracture, including, but not limited to, impact, stress, scratching, improper application or installation, wind or the elements, earthquakes or other acts of God, fire, war, invasion, hostilities, rebellion, insurrection, wear and tear, inherent vice, pre-existing break, or latent defect; or (j) when 25% or less of a glass lite is shaded and the shaded area includes more than 25% of the lite's perimeter. A portion of the examples of such harmful shading is as follows:

HARMFUL SHADING AS REFERENCED IN THE MANUFACTURER'S FILM-TO-GLASS RECOMMENDATIONS



(examples of shading)

10. Window film or window units removed prior to claim or inspection by an authorized manufacturer’s representative invalidates any stated warranty.

Any owner desiring warranty service on any product covered by this limited warranty should collect the information contained in the installation record or bill of sale furnished at the time of purchase, together with a description of the specific defect, and proof that it is LLumar, Vista, and/or EnerLogic film. The owner should then contact the authorized dealer from which the film was originally purchased and arrange for them to validate the claim or call (800) 851-7781. Proof of purchase is also required in order to obtain warranty coverage. It is therefore recommended that the purchaser retain the completed installation record and sales receipt.

EXCEPT AS PROHIBITED BY APPLICABLE LAW, THE MANUFACTURER HEREBY DISCLAIMS LIABILITY FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL AND PUNITIVE DAMAGES ARISING FROM ANY CAUSE WHATSOEVER. EXCEPT AS EXPRESSLY PROVIDED HEREIN, THE MANUFACTURER HEREBY EXCLUDES AND DISCLAIMS ANY AND ALL EXPRESS WARRANTIES AND, EXCEPT DURING THE APPLICABLE LIMITED WARRANTY PERIOD SET FORTH ABOVE, THE MANUFACTURER HEREBY EXCLUDES AND DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The manufacturer's sole obligation to the owner or purchaser, whether such claim is based in contract, negligence, tort or otherwise, shall be solely as provided hereunder and damages and remedies shall be solely as provided hereunder.

Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from state or province to state or province.

This warranty is void if the film is subject to abuse or improper care. The manufacturer assumes no liability for scratching or damaging of the film. This limited warranty or any part of it is void only where and to the extent expressly prohibited by law.

LLumar, Vista, and Enerlogic Window Films are not warranted in any way, except as expressly stated in this limited warranty.

WARRANTY TRANSFER FOR VISTA RESIDENTIAL APPLICATIONS ONLY

For a one-time only transfer of this warranty from the original purchaser to the new homeowner, the new homeowner must fill out the information below. If the new homeowner desires warranty service on any product covered by this warranty transfer, he/she must provide a copy of this form (front and back), a description of the specific defect (if for seal failure, include a copy of the original window manufacturer’s warranty), along with proof that Vista film was installed and send it to the duly authorized installing dealer or to CPFilms Inc. / Attention: Warranty Department / 575 Maryville Centre Drive / St. Louis, Missouri 63141. Proof of purchase is also required to obtain warranty coverage. THIS ONE-TIME ONLY WARRANTY TRANSFER IS FOR VISTA RESIDENTIAL APPLICATIONS ONLY.

NEW HOMEOWNER INFORMATION

Contact Name	Date	Telephone Number
Customer Name (print)	Customer Signature	E-Mail Address
Customer Address	City	State or Province and Zip Code

EASTMAN

ENERLOGIC® SERIES GUIDE SPECIFICATIONS

SECTION 08 87 13

SOLAR CONTROL FILMS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

A. The General Conditions, Supplementary Conditions, and Division 01 – General Requirements apply.

1.2 SECTION INCLUDES

A. Solar control films.

B. [Insert item description.]

1.3 RELATED SECTIONS

A. Section 08 80 00 - Glazing: Substrate for application of solar control film.

B. Section [xxxxxx] – [Section Title]: [Include brief description of work specified in another section that is related to the work of this section.]

1.4 REFERENCES

A. ASTM International (ASTM):
   1. ASTM D1044 - Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).
   2. ASTM E903 - Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.

B. National Fenestration Rating Council, Inc. (NFRC):
   1. NFRC 302 - Optical Spectral Data Verification Program.

1.5 DEFINITIONS

A. Emissivity: The ability of a surface to absorb far-infrared heat and to reflect it. The lower the emissivity, the lower the far-infrared heat absorption and the greater the far-infrared heat reflectance.

B. Far-Infrared Heat: Heat radiated from objects at temperatures below 1300 degrees F such as heat radiated from: room objects, objects heated by the sun, or a home heating system. Far-infrared heat is different from near-infrared heat that is radiated from objects at highly elevated temperatures such as the sun.

C. Light to Solar Heat Gain Ratio: Ratio of visible light transmission to solar heat gain coefficient for a glazing system.

D. Low Emissivity (Low-E) Films: Films with improved far-infrared heat reflection, with the ability to reduce winter heat loss through windows. The reflection of far-infrared heat also reduces the need for summer cooling by reducing the transmission of far-infrared heat from outdoor objects through windows into the interior of a home or building.

E. Spectrally Selective Solar Control Films: Film products that reduce solar heat gain mainly by reducing the transmission of near-infrared solar radiation with minimal reduction of visible light transmission. Films with a light to solar heat gain ratio of above 1.00 are spectrally selective.

1.6 PERFORMANCE REQUIREMENTS

A. Scratch Resistance: Solar control films shall average less than 12 percent increase in haze when tested according to ASTM D1044 using a Teledyne Taber Abrader using CS10F Type III wheels each loaded to 0.5 kg for 100 cycles in a 70 percent vacuum.

B. Scratch resistance and emissivity testing shall be performed by an independent third party agency.

C. Ultraviolet Transmission: Provide solar control films with UV absorbing materials that limit the weighted UV transmission to less than 1.0 percent when measured according to ASTM E903.

D. Provide solar control films that do not have a masking sheet.

E. Product Standard: Comply with NFRC 302 for window film energy performance ratings.
   1. Window Film Energy Performance Certification: NFRC certified with label attached to each product package.

1.7 SUBMITTALS

A. Submit under provisions of Section [01 33 00] [_____].

B. Product Data: Submit for each product specified indicating:
   1. Physical and performance properties.
   2. Preparation and installation instructions and recommendations.
   3. Storage and handling recommendations.

C. Samples: For each type of solar control film specified, two (2) samples, 12 inches square.

D. Qualification Data: Submit documentation indicating qualifications of solar control film manufacturer.

E. Operation and Maintenance Data: Submit for solar control film to include in maintenance manuals.

F. Warranty: Submit sample special warranty specified in this section.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that has a minimum of [40] [_____] years of documented experience manufacturing solar control films similar to that used for this project.

B. Installer Qualifications: A firm that is authorized by solar control film manufacturer to install film in accordance with guidelines set forth by the manufacturer.

C. Source Limitations: Obtain each type of solar control film from same manufacturer.

D. Mockups: Build mockups to verify selections made under sample submittals and to evaluate surface preparation techniques and application workmanship.
   1. Construct mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at project site to discuss methods and procedures relating to installation of the solar control films.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle materials in manufacturer's protective packaging.

B. Store and protect materials according to manufacturer's written recommendations to prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

1.10 SITE CONDITIONS

A. Ambient Conditions: Maintain temperature, humidity, and ventilation within limits recommended by manufacturer.

1.11 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to replace films that fail within specified warranty period.
   1. Warranty Period: [15] [Insert number] years from date of original installation.

2. Warranty coverage limited to owner of property at time of installation.
3. Manufacturer's obligation is limited to furnishing replacement film for any film covered by limited warranty which manufacturer determines to be defective. Manufacturer will not be liable for installation costs of replacement film or for any special, indirect, incidental or consequential damages.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: EnerLogic Window Films manufactured by Eastman Chemical Company, 575 Maryville Centre Drive, St. Louis, MO 63141; telephone: 800-851-7781; Email: Vista-films@solutia.com; Web Site: www.enerlogicfilms.com.

B. Substitutions will not be considered.

C. Substitutions will be considered, subject to compliance with requirements of this section, under provisions of Section 01 25 00.

2.2 SOLAR CONTROL FILMS

A. Solar Control Film: Vista EnerLogic 35 Low-E Solar Control Film (VEP35SRCDF) with the following performance characteristics when applied to the interior surface of single-pane, 3-mm clear glass:
1. Total Solar Transmittance: 19 percent.
2. Total Solar Reflectance: 49 percent.
3. Total Solar Absorptance: 32 percent.
4. Visible Light Transmission: 33 percent.
5. Visible Light Reflection - Exterior: 48 percent.
6. Visible Light Reflection - Interior: 30 percent.
7. U-Value, Winter Median: 0.60.
8. Shading Coefficient: 0.28.
9. Total Solar Energy Rejected (TSER): 76 percent.
10. Emissivity: 0.07.
11. Solar Heat Gain Coefficient (SHGC): 0.24.
12. Ultraviolet Rejection: 99 percent.
13. Light-to-Solar Heat Gain Ratio (LSG): 1.38.
14. Winter Heat Loss Reduction: 42 percent.
15. Summer Solar Heat Gain Reduction: 72 percent.
16. Glare Reduction: 63 percent.
17. Thickness without Liner: 60µ.
18. Film Color: Warm neutral.
19. NFRC Certification No.: CPF-K-049.

2.3 SOLAR CONTROL FILM ACCESSORIES

A. General: Provide accessories either manufactured by or acceptable to solar control film manufacturer for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Adhesive: Water-activated, dry-adhesive system that forms a molecular bond between the film and glass. Protect adhesive from contamination by applying a release liner that will be removed and discarded at installation.

C. Cleaners, Primers, and Sealers: Types recommended by solar control film manufacturer.

D. Edge Sealant: [No edge sealant required] [Edge sealant required if within 10 kilometers (5-7 miles) of the ocean or other large body of salt water. Dow Corning 795 Clear Silicone Sealant, SpectraSeal, or similar neutral cure silicone sealant acceptable to solar control film manufacturer].

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements and for conditions affecting performance of solar control film including glass that is broken, chipped, cracked, abraded, or damaged in any way.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer’s written instructions for surface preparation.

B. Clean substrates thoroughly prior to installation. Provide additional scrubbing of perimeter area with X-100 solution.

C. Prepare substrates using methods recommended by film manufacturer to achieve the best results for the substrate under project conditions.

D. Protect window frames and surrounding surfaces to prevent damage during installation.

3.3 INSTALLATION

A. Install in accordance with manufacturer’s written instructions.

B. [No edge sealant required.] [Edge seal interior solar control films with a neutral cure silicone sealant within 10km of the ocean. Use an interior type silicone sealant with good adhesion to plastics and glass.]

C. Install film continuously, but not necessarily in one (1) continuous length. Install with no gaps or overlaps.

D. If seamed, make seams non-overlapping. [No seam sealant required.] [Seal with a 0.25-inch wide band of seam sealant in accordance with sealant manufacturer's instructions if within 10km of the ocean.]

E. Do not remove release liner from film until just before each piece of film is cut and ready for installation.

F. Custom cut to the glass with neat, square corners and edges to within 1/8-inch of the window frame. [Use X-100 solution for the application.] [Install film with Film-On mounting solution and purified water. X-100 solution should never be used as the application solution for any reason.]

G. Remove air bubbles, blisters, and other defects. Be careful to remove "fingers" to eliminate any contamination or excess water pockets. It is crucial to remove as much water as possible during installation.

H. A final squeegee pass over the entire pane using a Blue Max Blade with an extended handle design (or Thor's Hammer) is recommended.

3.4 FIELD QUALITY CONTROL

A. After installation, view film from a distance of 10 feet against a bright uniform sky or background. Film shall appear uniform in appearance with no visible streaks, wrinkles, banding, thin spots or pinholes.

B. If installed film does not meet these criteria, remove and replace with new film.

3.5 CLEANING AND PROTECTION

A. Remove excess mounting solution at finished seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended by solar control film manufacturer.

C. Replace films that cannot be cleaned.

D. Protect installed products until completion of project.

E. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

E-Saver 2016-R™

OPTIMIZED FOR RETROFIT APPLICATIONS

E-Saver 2016-R maximizes energy savings and provides the fastest payback when supplying a combination of light loading and electronic equipment, a load profile documented to be widespread in most building types. E-Saver 2016-R often reduces losses by over 70% compared to the transformer being replaced.

E-Saver 2016-R is k-rated per UL1561 and is cULus Listed and CSA Efficiency Verified for this nonlinear load profile to be compatible with the type of loads fed by most low voltage transformers today, and has been designed and tested to maintain higher efficiency and lower losses in this environment.

RETROFIT BEST PRACTICE

Replacing existing transformers cost effectively requires a multi-step best practice for the project cycle, including gathering detailed site data, field measurement of loading, losses and efficiency, a flexible design and manufacturing process that removes the many barriers associated with replacing an existing transformer, including footprint, impedance, internal terminal layout, inrush, fault and arc flash levels, as well as a measurement and verification report.

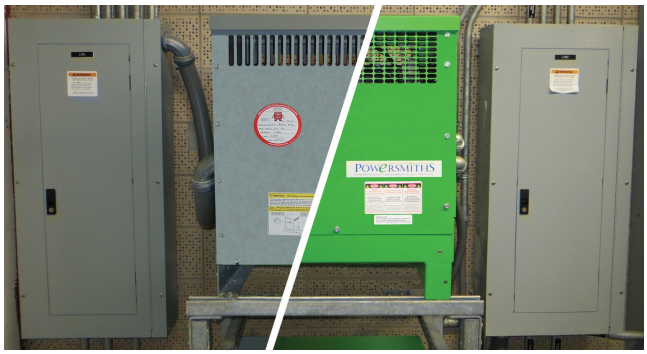
A broad selection of transformer kVA sizes enables Powersmiths retrofits to provide the best balance between installed cost, energy savings, and available capacity.

SUSTAINABILITY/GREEN BUILDING CONTRIBUTIONS

E-Saver 2016-R contributes to green building programs and carbon footprint reduction mainly through its substantial reduction in energy losses compared to legislation. Additional sustainability benefits include our ISO 14001 certified manufacturing, biodegradable packaging, optional integrated metering and ability to integrate with the Powersmiths WOW™ Sustainability Management Platform.

WARRANTY

E-Saver 2016-R has an industry leading 25-year pro-rated warranty.



45 kVA E-Saver 2016-R shown replacing an existing 45 kVA transformer. The E-Saver 2016-R was configured to fit within existing physical and electrical constraints to embed significant energy savings, reduce installation costs, and support a smooth and effective retrofit

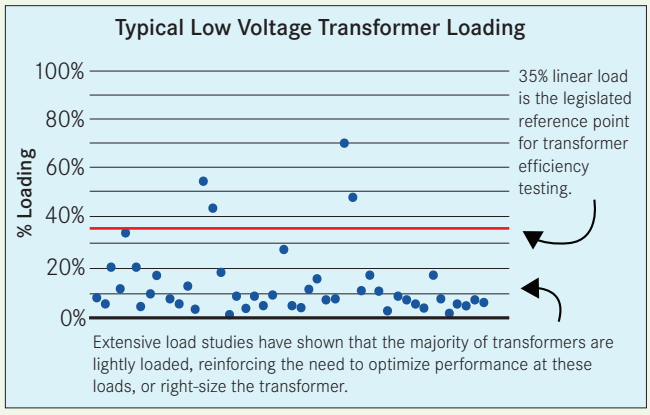
CERTIFICATIONS & TESTING

Powersmiths' certifications include UL and CSA, ISO 9001 (Quality), ISO 14001 (Environment), and our ISO 17025 Certified Efficiency Test Lab Measurement and Verification (M&V) Program enables apples-to-apples comparison of the new unit with the baseline measurements by repeating tests under an equivalent load profile and load current THD profile.

When tested according to the U.S. DOE 10 CFR Part 431, a linear load test at 35% of nameplate capacity, E-Saver 2016-R delivers on average 33% less losses than current legislation. Significantly higher savings are embedded once the E-Saver-2016-R is installed, since real world load conditions significantly lower the performance of industry standard transformers as these are not optimized for the light yet nonlinear load profile found in most applications.

INTEGRATED OPTIONS

Powersmiths offers many options, all with arc flash safety in mind, such as integrated metering and meter ports to provide information about capacity utilization, load profiles, power and energy use, lockable hinged doors, and a patented Rotatable IR Port™ to enable safe, quick, cost-effective and non-invasive thermal imaging of the live transformer.



KEY FEATURES

- Optimized for light, nonlinear load found in most applications
- Footprint, impedance, internal terminal layout, inrush, fault and arc flash levels adjusted to meet requirements
- Reduce associated transformer cooling costs
- Best practice ensures a smooth retrofit with verified savings
- Performance exceeds NEMA Premium®, CEE Tier 1, U.S. DOE 2016 legislation[1] and CSL-3
- K-rated as required by UL for today's electronic equipment
- Manufactured in a certified ISO 9001, ISO 14001 and ISO 17025 facility for quality, low environmental impact, and transformer efficiency testing

[1] U.S. Department of Energy, 10 CFR Part 431: Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule, April 2013.

TECHNICAL SPECIFICATIONS

E-Saver 2016-R is an aluminum-wound dry-type isolation transformer with a common-core, 10kV BIL, 200% rated neutral, built to NEMA ST-20, UL1561 and other applicable ANSI and IEEE standards, and is cULus Listed and CSA Efficiency Verified. All E-Saver™ models come standard in a NEMA 1 ventilated drip-proof indoor enclosure made of heavy gauge steel finished with epoxy powder coating for durability and low environmental impact with a wide variety of enclosures and options available. Both primary and secondary terminals and voltage taps (typically six 2.5%) are readily accessible by removing the front enclosure panel. E-Saver 2016-R is UL Listed for 2" clearance for ventilated openings - a significant improvement over the typical industry 6" limit, and especially important in retrofits. E-Saver 2016-R's 220°C class insulation system is NOMEX-based with an Epoxy Co-polymer impregnant with technical performance characteristics that embed lower environmental impact, long term reliability and long life expectancy. E-Saver 2016-R comes standard with 60Hz, K-4 rating, 130°C temperature rise, and carries OSHPD and IBC Seismic Certification (S_{DS}=1.5g)*. The seismic bracing option provides a higher 2.28g. E-Saver 2016-R is available in three-phase and single-phase configurations.

When tested according to the U.S. Dept. of Energy's 10 CFR Part 431, a linear load test at 35% of nameplate capacity, E-Saver 2016-R delivers on average 33% less losses, over the kVA size range, than current EPAct 2005 legislation/NEMA TP1/C802.2, and exceeds the performance requirements of U.S. DOE CSL-3, NEMA Premium®, and the new, more stringent U.S. DOE 2016 legislation[1]. E-Saver 2016-R also meets or exceeds the Consortium for Energy Efficiency CEE Tier 1 efficiency for the full kVA range.

Designs have been carefully optimized to address primary breaker inrush characteristics and manage secondary short circuit currents and arc flash levels.

Keeping noise at a minimum is key. Every Powersmiths E-Saver 2016-R is tested for noise prior to shipment ensuring each one meets NEMA ST-20. An even lower noise option is available for very sensitive environments.

ORDERING INFORMATION

kVA: Rating of unit (9-1000 kVA)
PV: Primary voltage (up to 600V)
SV: Secondary voltage (up to 347/600V)

PRODUCT & MODEL INFORMATION

E-SAVER 2016-R model no. format:
E-SAVER-E3L-KVA-PV-SV

TECHNICAL DATA

kVA	Efficiency (%)	Impedance (%Z)	Weight (lbs)	Standard Case Size (in)	Alternate Smaller Case Size (in)
15	97.90	3.0-6.0	220-270	A (18W x 17D x 27H)	17.4W x 14.5D x 25H
20	98.02	3.0-6.0	260-310	B (26W x 18D x 30H)	23W x 15.5D x 27.5H
25	98.13	3.0-6.0	300-350	B (26W x 18D x 30H)	23W x 15.5D x 27.5H
30	98.25	3.0-6.0	340-380	B (26W x 18D x 30H)	23W x 15.5D x 27.5H
45	98.40	3.0-6.0	400-440	B (26W x 18D x 30H)	25W x 16D x 29H
50	98.43	3.0-6.0	450-500	C (32W x 22D x 40H)	26.5W x 17D x 33H
63	98.52	3.0-6.0	500-550	C (32W x 22D x 40H)	26.5W x 17D x 33H
75	98.60	3.0-6.0	600-650	C (32W x 22D x 40H)	26.5W x 17D x 33H
100	98.70	3.0-6.0	675-725	C (32W x 22D x 40H)	30.5W x 20D x 33H
112.5	98.80	3.0-6.0	750-850	C (32W x 22D x 40H)	30.5W x 20D x 33H
125	98.83	3.0-6.0	875-975	D (38W x 27D x 48H)	33W x 22.5D x 38H
150	98.90	3.0-6.0	1000-1100	D (38W x 27D x 48H)	33W x 22.5D x 38H
175	98.92	3.0-6.0	1100-1200	D (38W x 27D x 48H)	34.5W x 24D x 42H
200	98.93	3.0-6.0	1175-1275	D (38W x 27D x 48H)	34.5W x 24D x 42H
225	98.95	3.0-6.0	1275-1375	D+ (38W x 32D x 52H)	34.5W x 24D x 42H
250	98.97	3.0-6.0	1400-1500	D+ (38W x 32D x 52H)	37W x 26D x 43H
300	99.02	3.0-6.0	1575-1675	D+ (38W x 32D x 52H)	37W x 26D x 43H
400	99.08	3.0-6.0	2025-2125	E+ (52W x 38D x 61H)	43W x 33D x 51H
450	99.11	3.0-6.0	2200-2300	E+ (52W x 38D x 61H)	43W x 33D x 51H
500	99.14	3.0-6.0	2475-2575	E+ (52W x 38D x 61H)	43W x 33D x 51H
600	99.18	3.0-6.0	2725-2825	F (64W x 47D x 67H)	51.4W x 37.5D x 60.6H
750	99.23	3.0-6.0	3200-3300	F (64W x 47D x 67H)	51.4W x 37.5D x 60.6H
850	99.26	3.0-6.0	3600-3800	F+ (64W x 53D x 67H)	Custom
1000	99.30	3.0-6.0	4200-4400	F+ (64W x 53D x 67H)	Custom

NOTE: The above data applies to the standard 3-phase configuration of each kVA. Selection of some options may change enclosure size and/or transformer weight. Consult factory for detailed product data sheet for these and other configurations. Efficiencies tested according to U.S. Dept. of Energy's 10 CFR Part 431, a linear load test at 35% of nameplate capacity.

AVAILABLE OPTIONS

Metering: Express Logger™, SMART™ or Cyberhawk TX™ (See product cut sheets for more info)
TLP: Twist lock port to access output voltage & CTs
N3R: NEMA 3R, ventilated enclosure
N2S: Indoor sprinkler proof enclosure
OSEC: Enclosure for outdoor public areas
OV: Enclosure for outdoor secure areas
SS: Painted stainless steel enclosure
NVI: Non-ventilated indoor enclosure
IRP: Rotatable IR Port™
HD: Hinged Door
F50: 50 Hz design
1S: Single electrostatic shield
2S: Dual electrostatic shields
3S: Triple electrostatic shields
SPD: (120/208 V OR 277/480V)
- **PRO80:** 80kA, 7 mode, Filter
- **PRO120:** 120kA, 7 mode, Filter
- **PRO200:** 200kA, 7 mode, Filter
- **PRO240:** 240kA, 7 mode Filter
- **PROXX:** Where XX is custom ID

LKS: Lug kit, screw-type
LKC: Lug kit, compression type
LI: Low inrush
COL: Custom color
TS: Thermal sensors at 170°C and 200°C
NLT: Nonlinear load test
SE: Sensitive environment, extra low noise
SB: Seismic bracing
**For Seismic certification details contact Powersmiths*
Wall-mount kit is available and sold separately

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Appendix D – Lighting Survey and Savings Calculation

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
1	1	Mens locker room	3	VN4/1F32/E	30	0.09	4,567	411	3	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.04	4,567	199	0.04	212	0.04	212
2	1	Mens locker room	4	VN4/2F32/E	59	0.22	4,567	1,078	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.10	4,567	457	0.13	621	0.13	621
3	2	Photo lab	2	TT/2FB32/E-9C	59	0.11	3,825	451	2	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	38	0.07	3,825	291	0.04	161	0.04	161
4	2	Photo lab	2	RC/1CF13	15	0.03	3,825	115	2	Philips 10 watt A lamp 2700K	-	0%	10	0.02	3,825	77	0.01	38	0.01	38
5	3	Men's Restroom	1	RC/1CF13	15	0.01	4,567	69	1	Philips 10 watt A lamp 2700K	-	0%	10	0.01	4,567	46	0.00	23	0.00	23
6	3	Men's Restroom	5	VN4/2F32/E	59	0.28	4,567	1,347	5	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.12	4,567	571	0.16	776	0.16	776
7	3	Men's Restroom	2	VN2/2F17/E	30	0.06	4,567	274	2	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.03	4,567	155	0.02	119	0.02	119
8	4	Women's Restroom	1	RC/1CF13	15	0.01	4,567	69	1	Philips 10 watt A lamp 2700K	-	0%	10	0.01	4,567	46	0.00	23	0.00	23
9	4	Women's Restroom	2	VN4/2F32/E	59	0.11	4,567	539	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	4,567	228	0.06	311	0.06	311
10	4	Women's Restroom	1	VN2/2F17/E	30	0.03	4,567	137	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	4,567	78	0.01	59	0.01	59
11	5	Hall	1	X/CFL/7	17	0.02	8,760	149	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.02	131	0.02	131
12	5	Hall	8	TT/2FB32/E	59	0.45	4,911	2,318	8	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.17	4,911	904	0.27	1,414	0.27	1,414
13	5	Hall	5	CIR/22W	20	0.10	4,911	491	0	Remove	-	0%	0	0.00	4,911	0	0.10	491	0.10	491
14	6	break room	3	TF/4F32/E	112	0.32	3,788	1,273	3	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.10	3,788	398	0.22	875	0.22	875
15	7	Road Patrol office	6	TF/4F32/E	112	0.64	3,825	2,570	6	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.20	3,825	803	0.44	1,767	0.44	1,767
16	8	Hall	3	X/CFL/7	17	0.05	8,760	447	3	LED exit sign retrofit-JAIL	-	0%	2	0.01	8,760	53	0.05	394	0.05	394
17	8	Hall	9	TT/2FB32/E	59	0.50	4,911	2,608	9	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.20	4,911	1,017	0.31	1,591	0.31	1,591
18	9	Office	2	TF/3F32/E	89	0.17	4,911	874	2	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.07	4,911	344	0.10	530	0.10	530
19	10	Women's Restroom	1	VN3/2F25/E	50	0.05	4,567	228	1	Rebuild with (2) 10.5 watt 3' LED tubes and normal power,instant start ballast	-	0%	0	0.00	4,567	0	0.05	228	0.05	228
20	11	Janitor	1	I/60	60	0.06	1,506	90	1	Philips 10 watt A lamp 2700K	-	0%	10	0.01	1,506	15	0.05	75	0.05	75
21	12	Men's Restroom	1	VN3/2F25/E	50	0.05	4,567	228	1	Rebuild with (2) 10.5 watt 3' LED tubes and normal power,instant start ballast	-	0%	0	0.00	4,567	0	0.05	228	0.05	228
22	13	equipment room	1	TS4/2F32/E	59	0.06	1,506	89	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,506	38	0.03	51	0.03	51
23	14	ID room	1	TT/2FB32/E	59	0.06	1,506	89	1	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.02	1,506	35	0.03	54	0.03	54
24	15	hall	4	TT/2FB32/E	59	0.22	4,911	1,159	4	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.09	4,911	452	0.14	707	0.14	707
25	15	Hall	2	X/CFL/7	17	0.03	8,760	298	2	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	35	0.03	263	0.03	263
26	15	Hall	2	TT/2FB32/E	59	0.11	4,911	579	2	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.04	4,911	226	0.07	354	0.07	354

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
27	16	Garage	11	VT4/2F32/E	59	0.62	2,607	1,692	11	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.26	2,607	717	0.36	975	0.36	975
28	17	office	5	TT/2FB32/E	59	0.28	1,506	444	5	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.11	1,506	173	0.17	271	0.17	271
29	18	Office	3	VT4/2F32/E	59	0.17	1,506	267	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.07	1,506	113	0.10	154	0.10	154
30	19	Office	4	TT/2FB32/E	59	0.22	1,506	355	4	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.09	1,506	139	0.14	217	0.14	217
31	20	communication	13	TT/2FB32/E	59	0.73	1,506	1,155	13	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.28	1,506	450	0.44	705	0.44	705
32	20	communication	14	I/65	65	0.86	1,506	1,370	14	Relamp with dimmable par 30 LED lamp	-	0%	12	0.16	1,506	253	0.70	1,117	0.70	1,117
33	21	Office	6	TT/2FB32/E	59	0.34	1,506	533	6	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.19	1,506	298	0.15	235	0.15	235
34	22	break room	3	TT/2FB32/E	59	0.17	3,788	670	3	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.09	3,788	375	0.07	295	0.07	295
35	22	break room	1	X/CFL/7	17	0.02	8,760	149	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.02	131	0.02	131
36	23	Office	4	TT/2FB32/E	59	0.22	1,506	355	4	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.09	1,506	139	0.14	217	0.14	217
37	24	server	3	TF/4F32/E	112	0.32	1,506	506	3	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.10	1,506	158	0.22	348	0.22	348
38	25	quartermaster	1	TF/4F32/E	112	0.11	1,506	169	1	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.03	1,506	53	0.07	116	0.07	116
39	26	equipment room	1	TS4/2F32/E	59	0.06	1,506	89	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,506	38	0.03	51	0.03	51
40	27	server rrom	1	TT/2FB32/E	59	0.06	1,506	89	1	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.02	1,506	35	0.03	54	0.03	54
41	28	reception	3	TF/4F32/E	112	0.32	1,506	506	3	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.10	1,506	158	0.22	348	0.22	348
42	29	under sheriff	2	TF/4F32/E	112	0.21	1,506	337	2	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.07	1,506	105	0.15	232	0.15	232
43	30	Office	3	TF/4F32/E	112	0.32	1,506	506	3	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.10	1,506	158	0.22	348	0.22	348
44	31	bathroom	1	VN2/2F17/E	30	0.03	4,567	137	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	4,567	78	0.01	59	0.01	59
45	32	closet	1	I/60	60	0.01	217	13	1	Philips 10 watt A lamp 2700K	-	0%	10	0.00	217	2	0.01	11	0.01	11
46	33	break room	3	TF/4F32/E	112	0.32	3,788	1,273	3	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	Wall Switch Sensor	30%	35	0.10	2,652	278	0.22	994	0.22	994
47	34	closet	1	I/60	60	0.01	217	13	1	Philips 10 watt A lamp 2700K	-	0%	10	0.00	217	2	0.01	11	0.01	11
48	35	Office	6	TF/4F32/E	112	0.64	1,506	1,012	6	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.20	1,506	316	0.44	696	0.44	696
49	36	Office	2	TF/4F32/E	112	0.21	1,506	337	2	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.07	1,506	105	0.15	232	0.15	232
50	37	Office	2	TF/4F32/E	112	0.21	1,506	337	2	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.07	1,506	105	0.15	232	0.15	232
51	38	entry	2	RC/2PL13	31	0.06	4,911	304	2	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,911	69	0.05	236	0.05	236
52	38b	entry outside under overhang	3	RC/2PL13	31	0.01	4,380	407	3	Retrofit drum fixture with 12w LED conversion kit.	-	0%	12	0.00	4,380	158	0.01	250	0.01	250
53	39	Entry	4	TT/2FB32/E	59	0.22	4,911	1,159	4	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.09	4,911	452	0.14	707	0.14	707
54	39	Entry	2	VT4/2F32/E	59	0.11	4,911	579	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	4,911	246	0.06	334	0.06	334
55	39	Bath entry	1	RC/2PL13	31	0.03	4,567	142	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,567	32	0.02	110	0.02	110

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
56	40	Women's Restroom	1	W4/2F32/E	59	0.06	4,567	269	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	4,567	114	0.03	155	0.03	155
57	40	Women's Restroom	1	VN2/2F17/E	30	0.03	4,567	137	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	4,567	78	0.01	59	0.01	59
58	41	Men's Restroom	1	W4/2F32/E	59	0.06	4,567	269	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	4,567	114	0.03	155	0.03	155
59	41	Men's Restroom	1	VN2/2F17/E	30	0.03	4,567	137	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	4,567	78	0.01	59	0.01	59
60	42	Janitor	1	TS4/2F32/E	59	0.06	1,506	89	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,506	38	0.03	51	0.03	51
61	43	generator room	4	TS4/2F32/E	59	0.22	1,506	355	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.10	1,506	151	0.13	205	0.13	205
62	44	mechanical room	7	TS4/2F32/E	59	0.39	1,506	622	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.17	1,506	264	0.23	358	0.23	358
63	44	mechanical room	1	X/CFL/7	17	0.02	8,760	149	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.02	131	0.02	131
64	45	START OF JAIL - Entry	1	TT/2FB32/E	59	0.06	8,760	517	1	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.02	8,760	201	0.03	315	0.03	315
65	46	carwash	6	VT4/2F32/E	59	0.34	8,760	3,101	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	8,760	1,524	0.17	1,577	0.17	1,577
66	47	waiting	2	VT4/2F32/E	59	0.11	8,760	1,034	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	8,760	508	0.06	526	0.06	526
67	48	hall	5	VN8/1F86/E	85	0.40	8,760	3,723	5	P-2 LED rerofit kit for 8' indirect hallway custom fixtures	-	0%	54	0.26	8,760	2,365	0.15	1,358	0.15	1,358
68	48	hall	2	VN6/1F59/E	72	0.14	8,760	1,261	2	P-2 LED rerofit kit for 6' indirect hallway custom fixtures	-	0%	42	0.08	8,760	736	0.06	526	0.06	526
69	49	waiting # 2	3	TT/2FB32/E	59	0.17	8,760	1,551	3	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.07	8,760	604	0.10	946	0.10	946
70	49	waiting # 2	1	VN4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	8,760	254	0.03	263	0.03	263
71	50	inmate entry bay	11	VT4/2F32/E	59	0.62	8,760	5,685	11	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.30	8,760	2,794	0.31	2,891	0.31	2,891
72	51	holding	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	8,760	254	0.03	263	0.03	263
73	52	central control	4	VT4/2F32/E	59	0.22	1,506	355	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	1,506	175	0.11	181	0.11	181
74	53	bath	1	VN3/2F25/E	50	0.05	4,474	224	1	Rebuild with (2) 10.5 watt 3' LED tubes and normal power,instant start ballast	-	0%	0	0.00	4,474	0	0.05	224	0.05	224
75	54	detox	1	VT4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
76	55	interview room	1	W4/4F32/E	112	0.11	4,474	501	1	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.06	4,474	259	0.05	242	0.05	242
77	56	electrical	1	I/60	60	0.01	217	13	1	Philips 10 watt A lamp 2700K	-	0%	10	0.00	217	2	0.01	11	0.01	11
78	57	captains office	3	W4/4F32/E	112	0.32	1,506	506	3	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.17	1,506	262	0.15	244	0.15	244
79	57	captains office	2	VN4/2F32/E	59	0.11	1,506	178	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	1,506	87	0.06	90	0.06	90
80	58	Office	2	W4/4F32/E	112	0.21	1,506	337	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	1,506	175	0.10	163	0.10	163
81	58b	bath	1	CIR/22W	20	0.02	4,567	91	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,567	32	0.01	59	0.01	59
82	59	processing property	3	VT4/2F32/E	59	0.17	4,474	792	3	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.08	4,474	389	0.09	403	0.09	403
83	59	processing property	2	CIR/22W	20	0.04	4,474	179	2	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	63	0.02	116	0.02	116
84	59	processing property	3	W4/4F32/E	112	0.32	4,474	1,503	3	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.17	4,474	778	0.15	725	0.15	725

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
85	60	laundry room	8	VT4/2F32/E	59	0.45	4,474	2,112	8	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.22	4,474	1,038	0.23	1,074	0.23	1,074
86	61	hall	3	TT/2FB32/E	59	0.17	8,760	1,551	3	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.07	8,760	604	0.10	946	0.10	946
87	61	hall	1	VN4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	8,760	254	0.03	263	0.03	263
88	61	hall	3	X/CFL/7	17	0.05	8,760	447	3	LED exit sign retrofit-JAIL	-	0%	2	0.01	8,760	53	0.04	394	0.04	394
89	61	hall	3	VT4/2F32/E	59	0.17	8,760	1,551	3	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.08	8,760	762	0.09	788	0.09	788
90	62	sprinkler room	1	VT4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	217	6	0.00	7	0.00	7
91	63	kitchen storage/caged server room	14	S4/2F32/E	59	0.08	217	179	14	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.04	217	88	0.04	91	0.04	91
92	64	(2) storage rooms	2	CIR/22W	20	0.00	217	9	2	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.00	217	3	0.00	6	0.00	6
93	65	kitchen	4	VT4/2F32/E	59	0.22	4,474	1,056	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,474	519	0.11	537	0.11	537
94	65	kitchen	8	TF/3F32/E	89	0.68	4,474	3,185	8	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.27	4,474	1,253	0.41	1,933	0.41	1,933
95	65	kitchen	1	VT4/1F32/E	30	0.03	4,474	134	1	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.01	4,474	65	0.01	69	0.01	69
96	65	coolers	4	I/60	60	0.02	217	52	4	Philips 10 watt A lamp 2700K	-	0%	10	0.00	217	9	0.02	43	0.02	43
97	65b	kitchen office	2	VT4/2F32/E	59	0.11	1,506	178	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	1,506	87	0.06	90	0.06	90
98	65c	toilet	1	CF42W	48	0.05	4,567	219	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,567	32	0.04	187	0.04	187
99	66	hall	8	VN8/1F86/E	85	0.65	8,760	5,957	8	P-2 LED rerofit kit for 8' indirect hallway custom fixtures	-	0%	54	0.41	8,760	3,784	0.24	2,172	0.24	2,172
100	66	hall	3	VN6/1F59/E	72	0.21	8,760	1,892	3	P-2 LED rerofit kit for 6' indirect hallway custom fixtures	-	0%	42	0.12	8,760	1,104	0.09	788	0.09	788
101	66	hall	1	x/CFL/9	21	0.02	8,760	184	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.02	166	0.02	166
102	67	nurse	5	TF/4F32/E	112	0.53	1,506	843	5	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.17	1,506	264	0.37	580	0.37	580
103	67	nurse	1	VN2/2F17/E	30	0.03	1,506	45	1	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.02	1,506	32	0.01	14	0.01	14
104	67	nurse bath	1	VN2/2F17/E	30	0.03	1,506	45	1	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.02	1,506	32	0.01	14	0.01	14
105	68	janitor	1	I/60	60	0.01	217	13	1	Philips 10 watt A lamp 2700K	-	0%	10	0.00	217	2	0.01	11	0.01	11
106	69	Office	4	TF/4F32/E	112	0.43	1,506	675	4	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.13	1,506	211	0.29	464	0.29	464
107	70	Office	2	TF/4F32/E	112	0.21	1,506	337	2	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.07	1,506	105	0.15	232	0.15	232
108	71	strip search rrom	1	VT4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
109	72	classroom/library	4	W4/4F32/E	112	0.43	4,474	2,004	4	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.22	4,474	1,038	0.21	966	0.21	966
110	72	classroom/library	6	VT4/2F32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805
111	72	classroom/library	2	VN8/1F86/E	85	0.16	4,474	761	2	P-2 LED rerofit kit for 8' indirect hallway custom fixtures	-	0%	54	0.10	4,474	483	0.06	277	0.06	277
112	72	classroom/library	1	VN4/1F32/E	30	0.03	4,474	134	1	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.01	4,474	65	0.01	69	0.01	69
113	72	closet	1	CIR/22W	20	0.00	217	4	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.00	217	2	0.00	3	0.00	3

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
114	73	visit	1	CIR/22W	20	0.02	1,506	30	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	1,506	11	0.01	20	0.01	20
115	74	non contact visits	1	CIR/22W	20	0.02	1,506	30	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	1,506	11	0.01	20	0.01	20
116	75	Office	2	CIR/22W	20	0.04	1,506	60	2	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	1,506	21	0.02	39	0.02	39
117	76	conference	2	VT4/2F32/E	59	0.11	1,506	178	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	1,506	87	0.06	90	0.06	90
118	76	conference	4	VN4/1F32/E	30	0.11	1,506	181	4	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.06	1,506	87	0.06	93	0.06	93
119	76	conference	4	I/65	65	0.25	1,506	392	0	Remove	-	0%	0	0.00	1,506	0	0.25	392	0.25	392
120	77	entry for visitation	1	TT/2FB32/E	59	0.06	4,474	264	1	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.02	4,474	103	0.03	161	0.03	161
121	78	hall	5	VN8/1F86/E	85	0.40	8,760	3,723	5	P-2 LED rerofit kit for 8' indirect hallway custom fixtures	-	0%	54	0.26	8,760	2,365	0.15	1,358	0.15	1,358
122	78	hall	0	-	0	0.00	8,760	0	0	0	-	0%	0	0.00	8,760	0	0.00	0	0.00	0
123	79	hall	2	VT4/2F32/E	59	0.11	8,760	1,034	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	8,760	508	0.06	526	0.06	526
124	79	hall	1	X/CFL/9	21	0.02	8,760	184	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.02	166	0.02	166
125	80	bathroom	1	CIR/22W	20	0.02	4,567	91	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,567	32	0.01	59	0.01	59
126	81	rec room	6	VT4/2F40/E	76	0.43	4,474	2,040	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.27	1,262	0.27	1,262
127	81	rec room	8	VT4/2F32/E	59	0.45	4,474	2,112	8	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.22	4,474	1,038	0.23	1,074	0.23	1,074
128	82	staff lounge	2	VN2/2F17/E	30	0.06	3,788	227	2	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.04	3,788	159	0.02	68	0.02	68
129	82	bath 1 and 2	7	W4/4F32/E	112	0.74	4,567	3,581	7	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.39	4,567	1,854	0.36	1,726	0.36	1,726
130	83	commisary	3	TS4/2F32/E	59	0.17	4,474	792	3	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.08	4,474	389	0.09	403	0.09	403
131	84	hall	1	X/cfl/9	21	0.02	4,474	94	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	4,474	9	0.02	85	0.02	85
132	84	hall	3	VN8/1F86/E	85	0.24	4,474	1,141	3	P-2 LED rerofit kit for 8' indirect hallway custom fixtures	-	0%	54	0.15	4,474	725	0.09	416	0.09	416
133	84	hall	2	VN6/1F59/E	72	0.14	4,474	644	2	P-2 LED rerofit kit for 6' indirect hallway custom fixtures	-	0%	42	0.08	4,474	376	0.06	268	0.06	268
134	85	panel room	1	TS4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	217	6	0.00	7	0.00	7
135	86	A-1	3	VN4/2F32/E	59	0.17	4,474	792	3	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.08	4,474	389	0.09	403	0.09	403
136	86	A-1	2	VN8/4F32/E	124	0.24	4,474	1,110	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	4,474	519	0.13	591	0.13	591
137	86	A-1	1	VN2/2F17/E	30	0.03	4,474	134	1	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.02	4,474	94	0.01	40	0.01	40
138	86	A-1	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
139	87	A-2	2	VN4/2F32/E	59	0.11	4,474	528	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	4,474	259	0.06	268	0.06	268
140	87	A-2	1	VN8/4F32/E	124	0.12	4,474	555	1	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.06	4,474	259	0.06	295	0.06	295
141	87	A-2	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
142	87	A-2	6	vt4/2f32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
143	87	A-2	1	VN2/2F17/E	30	0.03	4,474	134	1	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.02	4,474	94	0.01	40	0.01	40
144	88	flex room	4	VT4/2F32/E	59	0.22	4,474	1,056	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,474	519	0.11	537	0.11	537
145	89	jail cell	1	VT4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
146	89	jail cell	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
147	90	jail cell	1	F8T5/CW 8 WATT	8	0.00	2,738	22	1	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	11	0.00	11	0.00	11
148	90	jail cell	1	VT4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
149	90	jail cell	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
150	91	jail cell	1	F8T5/CW 8 WATT	8	0.00	2,738	22	1	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	11	0.00	11	0.00	11
151	91	hall	5	VN8/1F86/E	85	0.40	8,760	3,723	5	P-2 LED rerofit kit for 8' indirect hallway custom fixtures	-	0%	54	0.26	8,760	2,365	0.15	1,358	0.15	1,358
152	92	Closet	1	CF13W	13	0.00	217	3	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.00	217	2	0.00	1	0.00	1
153	93	Q-1	2	VN4/2F32/E	59	0.11	4,474	528	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	4,474	259	0.06	268	0.06	268
154	93	Q-1	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
155	93	Q-1	1	F8T5/CW 8 WATT	8	0.00	2,738	22	1	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	11	0.00	11	0.00	11
156	94	Q-2	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
157	94	Q-2	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
158	94	Q-2	1	F8T5/CW 8 WATT	8	0.00	2,738	22	1	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	11	0.00	11	0.00	11
159	94	Q-2	1	VN2/2F17/E	30	0.03	4,474	134	1	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.02	4,474	94	0.01	40	0.01	40
160	95	Q-3	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
161	95	Q-3	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
162	95	Q-3	1	F8T5/CW 8 WATT	8	0.00	2,738	22	1	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	11	0.00	11	0.00	11
163	95	Q-3	1	VN2/2F17/E	30	0.03	4,474	134	1	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.02	4,474	94	0.01	40	0.01	40
164	96	E-30	2	VN4/2F32/E	59	0.11	4,474	528	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	4,474	259	0.06	268	0.06	268
165	96	E-30	2	VN4/2F32/E	59	0.11	4,474	528	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	4,474	259	0.06	268	0.06	268
166	96	E-30	2	F8T5/CW 8 WATT	8	0.00	2,738	44	2	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	22	0.00	22	0.00	22
167	97	E-20	3	VN4/2F32/E	59	0.17	4,474	792	3	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.08	4,474	389	0.09	403	0.09	403
168	97	E-20	2	VN4/2F32/E	59	0.11	4,474	528	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	4,474	259	0.06	268	0.06	268
169	97	E-20	2	F8T5/CW 8 WATT	8	0.00	2,738	44	2	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	22	0.00	22	0.00	22
170	98	E-10	3	VN4/2F32/E	59	0.17	4,474	792	3	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.08	4,474	389	0.09	403	0.09	403
171	98	E-10	2	VN4/2F32/E	59	0.11	4,474	528	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	4,474	259	0.06	268	0.06	268

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
172	98	E-10	2	F8T5/CW 8 WATT	8	0.00	2,738	44	2	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	22	0.00	22	0.00	22
173	99	MS-19	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
174	100	MS-19	1	VN4/2F32/E	59	0.06	4,474	264	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	4,474	130	0.03	134	0.03	134
175	101	MS-19	1	VT4/1F32/E	30	0.03	4,474	134	1	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.01	4,474	65	0.01	69	0.01	69
176	102	ED-1	1	VT4/1F32/E	30	0.03	4,474	134	1	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.01	4,474	65	0.01	69	0.01	69
177	103	Hall	26	VT4/1F32/E	30	0.74	8,760	6,833	26	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.36	8,760	3,303	0.38	3,530	0.38	3,530
178	103	Hall	10	VT4 (2)CFT40W	72	0.68	8,760	6,307	10	Rebuild with (2)Philips 16.5 watt LED T8 4000K 4 pin, instant start -JAIL	-	0%	33	0.31	8,760	2,891	0.37	3,416	0.37	3,416
179	103	Hall	2	VT2 (1)CFT40W	46	0.09	8,760	806	2	Rebuild with (1)Philips 16.5 watt LED T8 4000K 4 pin, instant start -JAIL	-	0%	17	0.03	8,760	289	0.06	517	0.06	517
180	103	Hall	4	X/CFL/9	21	0.08	8,760	736	4	LED exit sign retrofit-JAIL	-	0%	2	0.01	8,760	70	0.07	666	0.07	666
181	104	C-10	4	VN4/2F32/E	59	0.22	4,474	1,056	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,474	519	0.11	537	0.11	537
182	104	C-10	2	VN8/4F32/E	124	0.24	4,474	1,110	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	4,474	519	0.13	591	0.13	591
183	104	C-10-MOP SINK	1	CIR/22W	20	0.00	217	4	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.00	217	2	0.00	3	0.00	3
184	104	C-10-SHOWER	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
185	104	C-10	6	VN2/2F17/E	30	0.17	4,474	805	6	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.12	4,474	564	0.05	242	0.05	242
186	104	C-10	6	VN4/2F32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805
187	104	C-10	6	F8T5/CW 8 WATT	8	0.00	2,738	131	6	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	66	0.00	66	0.00	66
188	105	C-20	4	VN4/2F32/E	59	0.22	4,474	1,056	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,474	519	0.11	537	0.11	537
189	105	C-20	2	VN8/4F32/E	124	0.24	4,474	1,110	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	4,474	519	0.13	591	0.13	591
190	105	C-20-MOP SINK	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
191	105	C-20-SHOWER	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
192	105	C-20	6	VN2/2F17/E	30	0.17	4,474	805	6	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.12	4,474	564	0.05	242	0.05	242
193	105	C-20	6	VN4/2F32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805
194	105	C-20	6	F8T5/CW 8 WATT	8	0.00	2,738	131	6	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	66	0.00	66	0.00	66
195	106	C-30	3	VN8/4F32/E	124	0.35	4,474	1,664	3	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.17	4,474	778	0.19	886	0.19	886
196	106	C-30	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
197	106	C-30-MOP SINK	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
198	106	C-30-SHOWER	4	VN2/2F17/E	30	0.11	4,474	537	4	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.08	4,474	376	0.03	161	0.03	161
199	106	C-30	4	VN4/2F32/E	59	0.22	4,474	1,056	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,474	519	0.11	537	0.11	537
200	106	C-30	4	F8T5/CW 8 WATT	8	0.00	2,738	88	4	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	44	0.00	44	0.00	44

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
201	107	C-40	3	VN8/4F32/E	124	0.35	4,474	1,664	3	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.17	4,474	778	0.19	886	0.19	886
202	107	C-40	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
203	107	C-40-MOP SINK	1	CIR/22W	20	0.02	4,474	89	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.01	58	0.01	58
204	107	C-40-SHOWER	4	VN2/2F17/E	30	0.11	4,474	537	4	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.08	4,474	376	0.03	161	0.03	161
205	107	C-40	4	VN4/2F32/E	59	0.22	4,474	1,056	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,474	519	0.11	537	0.11	537
206	107	C-40	4	F8T5/CW 8 WATT	8	0.00	2,738	88	4	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	44	0.00	44	0.00	44
207	108	OUTSIDE BATHROOM	1	CIR/22W	20	0.02	4,567	91	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,567	32	0.01	59	0.01	59
208	109	HALL	1	VT4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	8,760	254	0.03	263	0.03	263
209	109	HALL	1	X/CFL/7	17	0.02	8,760	149	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.01	131	0.01	131
210	110	H-40-SINK LIGHTS	2	VN4/4F32/E	124	0.24	4,474	1,110	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	4,474	519	0.13	591	0.13	591
211	110	H-40-SHOWERS AND BATHROOMS	5	CANOPY/1PL42	50	0.24	4,474	1,118	5	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.03	4,474	157	0.20	962	0.20	962
212	110	H-40-CLOSET	1	I/60	60	0.01	217	13	1	Philips 10 watt A lamp 2700K	-	0%	10	0.00	217	2	0.01	11	0.01	11
213	110	H-40	10	VN4/4F32/E	124	1.18	4,474	5,548	10	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.55	4,474	2,595	0.63	2,953	0.63	2,953
214	110	H-40	9	VT4/2F32/E	59	0.50	4,474	2,376	9	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.25	4,474	1,168	0.26	1,208	0.26	1,208
215	111	H-50-SINK LIGHTS	2	VN4/4F32/E	124	0.24	4,474	1,110	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	4,474	519	0.13	591	0.13	591
216	111	H-50-SHOWERS AND BATHROOMS	5	CANOPY/1PL42	50	0.24	4,474	1,118	5	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.03	4,474	157	0.20	962	0.20	962
217	111	H-50-CLOSET	1	I/60	60	0.01	217	13	1	Philips 10 watt A lamp 2700K	-	0%	10	0.00	217	2	0.01	11	0.01	11
218	111	H-50	10	VN4/4F32/E	124	1.18	4,474	5,548	10	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.55	4,474	2,595	0.63	2,953	0.63	2,953
219	111	H-50	9	VT4/2F32/E	59	0.50	4,474	2,376	9	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.25	4,474	1,168	0.26	1,208	0.26	1,208
220	112	OFFICER DESK AREA	8	VN4/4F32/E	124	0.94	8,760	8,690	8	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.44	8,760	4,065	0.50	4,625	0.50	4,625
221	113	Hall	1	VT4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	8,760	254	0.03	263	0.03	263
222	113	Hall	1	X/CFL/7	17	0.02	8,760	149	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.01	131	0.01	131
223	114	STORAGE	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	217	6	0.00	7	0.00	7
224	115	BASEMENT STAIRS #1	2	VT4 (2)CFT40W	72	0.14	8,760	1,261	2	Rebuild with (2)Philips 16.5 watt LED T8 4000K 4 pin, instant start -JAIL	-	0%	33	0.06	8,760	578	0.07	683	0.07	683
225	115	BASEMENT STAIRS #2	1	VN4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.03	8,760	254	0.03	263	0.03	263
226	115	GENERAL AREA LIGHTING	42	S4/2F32/E	59	0.25	217	538	42	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.12	217	264	0.13	273	0.13	273
227	116	MEZZANINE	2	S4/2F32/E	59	0.01	217	26	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.01	217	13	0.01	13	0.01	13
228	116	MEZZANINE	5	VT4/1F32/E	30	0.02	217	33	5	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.01	217	16	0.01	17	0.01	17
229	118	CELL BLOCK	7	VT4/2F32/E	59	0.39	4,474	1,848	7	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.19	4,474	908	0.20	939	0.20	939

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
230	118	CELL BLOCK	1	CANOPY/1PL42	50	0.05	4,474	224	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,474	31	0.04	192	0.04	192
231	118	CELL BLOCK	7	VN2/2F17/E	30	0.20	4,474	939	7	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.14	4,474	658	0.06	282	0.06	282
232	118	CELL BLOCK	7	VT4/2F32/E	59	0.39	4,474	1,848	7	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.19	4,474	908	0.20	939	0.20	939
233	118	CELL BLOCK	7	F8T5/CW 8 WATT	8	0.01	2,738	153	7	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	77	0.00	77	0.00	77
234	119	OPEN AREA CELLS	5	VN4/2F32/E	59	0.28	4,474	1,320	5	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.14	4,474	649	0.14	671	0.14	671
235	119	OPEN AREA CELLS	3	VT4/2F32/E	59	0.17	4,474	792	3	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.08	4,474	389	0.09	403	0.09	403
236	119	OPEN AREA CELLS	3	F8T5/CW 8 WATT	8	0.00	2,738	66	3	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	33	0.00	33	0.00	33
237	119	OPEN AREA CELLS	3	VN2/2F17/E	30	0.09	4,474	403	3	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.06	4,474	282	0.03	121	0.03	121
238	120	OPEN AREA CELLS	6	VN4/2F32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805
239	120	OPEN AREA CELLS	6	VT4/2F32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805
240	120	OPEN AREA CELLS	1	F8T5/CW 8 WATT	8	0.00	2,738	22	1	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	11	0.00	11	0.00	11
241	120	OPEN AREA CELLS	6	VN2/2F17/E	30	0.17	4,474	805	6	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.12	4,474	564	0.05	242	0.05	242
242	121	OPEN AREA CELLS	6	VN4/2F32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805
243	121	OPEN AREA CELLS	6	VT4/2F32/E	59	0.34	4,474	1,584	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,474	778	0.17	805	0.17	805
244	121	OPEN AREA CELLS	1	F8T5/CW 8 WATT	8	0.00	2,738	22	1	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	2,738	11	0.00	11	0.00	11
245	121	OPEN AREA CELLS	6	VN2/2F17/E	30	0.17	4,474	805	6	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.12	4,474	564	0.05	242	0.05	242
246	122	HALL	2	VN4/2F32/E	59	0.11	8,760	1,034	2	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.06	8,760	508	0.06	526	0.06	526
247	122	HALL	1	X/CFL/7	17	0.02	8,760	149	1	LED exit sign retrofit-JAIL	-	0%	2	0.00	8,760	18	0.01	131	0.01	131
248	123	OFFICER DESK AREA	8	VN4/4F32/E	124	0.94	4,911	4,872	8	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.44	4,911	2,279	0.50	2,593	0.50	2,593
249	122B	STORAGE	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	217	6	0.00	7	0.00	7
250	122C	STORAGE	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	217	6	0.00	7	0.00	7
251	124	Hall	26	VT4/1F32/E	30	0.74	4,911	3,831	26	Rebuild with (1) 12.5 watt LED tube and normal power, instant start ballast-JAIL	-	0%	15	0.36	4,911	1,851	0.38	1,979	0.38	1,979
252	124	Hall	10	VT4 (2)CFT40W	72	0.68	4,911	3,536	10	Rebuild with (2)Philips 16.5 watt LED T8 4000K 4 pin, instant start -JAIL	-	0%	33	0.31	4,911	1,621	0.37	1,915	0.37	1,915
253	124	Hall	2	VT2 (1)CFT40W	46	0.09	4,911	452	2	Rebuild with (1)Philips 16.5 watt LED T8 4000K 4 pin, instant start -JAIL	-	0%	17	0.03	4,911	162	0.06	290	0.06	290
254	124	Hall	4	X/CFL/9	21	0.08	8,760	736	4	LED exit sign retrofit-JAIL	-	0%	2	0.01	8,760	70	0.07	666	0.07	666
255	125	C-30	3	VN8/4F32/E	124	0.35	4,911	1,827	3	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.17	4,911	855	0.19	972	0.19	972
256	125	C-30	1	CIR/22W	60	0.06	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,911	34	0.05	260	0.05	260
257	125	C-30-MOP SINK	1	CIR/22W	60	0.06	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,911	34	0.05	260	0.05	260
258	125	C-30-SHOWER	4	VN2/2F17/E	30	0.11	4,911	589	4	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.08	4,911	413	0.03	177	0.03	177

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
259	125	C-30	4	VN4/2F32/E	59	0.22	4,911	1,159	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,911	570	0.11	589	0.11	589
260	125	C-30	4	F8T5/CW 8 WATT	8	0.00	4,911	157	4	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	4,911	79	0.00	79	0.00	79
261	126	C-30	3	VN8/4F32/E	124	0.35	4,911	1,827	3	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.17	4,911	855	0.19	972	0.19	972
262	126	C-30	1	CIR/22W	60	0.06	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,911	34	0.05	260	0.05	260
263	126	C-30-MOP SINK	1	CIR/22W	60	0.01	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.00	4,911	34	0.01	260	0.01	260
264	126	C-30-SHOWER	4	VN2/2F17/E	30	0.11	4,911	589	4	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.08	4,911	413	0.03	177	0.03	177
265	126	C-30	4	VN4/2F32/E	59	0.22	4,911	1,159	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,911	570	0.11	589	0.11	589
266	126	C-30	4	F8T5/CW 8 WATT	8	0.00	4,911	157	4	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	4,911	79	0.00	79	0.00	79
267	127	C-10	4	VN4/2F32/E	59	0.22	4,911	1,159	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,911	570	0.11	589	0.11	589
268	127	C-10	2	VN8/4F32/E	124	0.24	4,911	1,218	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	4,911	570	0.13	648	0.13	648
269	127	C-10-MOP SINK	1	CIR/22W	60	0.01	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.00	4,911	34	0.01	260	0.01	260
270	127	C-10-SHOWER	1	CIR/22W	60	0.06	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,911	34	0.05	260	0.05	260
271	127	C-10	6	VN2/2F17/E	30	0.17	4,911	884	6	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.12	4,911	619	0.05	265	0.05	265
272	127	C-10	6	VN4/2F32/E	59	0.34	4,911	1,738	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,911	855	0.17	884	0.17	884
273	127	C-10	6	F8T5/CW 8 WATT	8	0.00	4,911	236	6	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	4,911	118	0.00	118	0.00	118
274	128	C-10	4	VN4/2F32/E	59	0.22	4,911	1,159	4	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.11	4,911	570	0.11	589	0.11	589
275	128	C-10	2	VN8/4F32/E	124	0.24	4,911	1,218	2	Rebuild with (4) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	58	0.11	4,911	570	0.13	648	0.13	648
276	128	C-10-MOP SINK	1	CIR/22W	60	0.01	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.00	4,911	34	0.01	260	0.01	260
277	128	C-10-SHOWER	1	CIR/22W	60	0.06	4,911	295	1	Retrofit canopy fixture LED retrofit kit - 7 watts	-	0%	7	0.01	4,911	34	0.05	260	0.05	260
278	128	C-10	6	VN2/2F17/E	30	0.17	4,911	884	6	Rebuild with (2) 8.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	21	0.12	4,911	619	0.05	265	0.05	265
279	128	C-10	6	VN4/2F32/E	59	0.34	4,911	1,738	6	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.17	4,911	855	0.17	884	0.17	884
280	128	C-10	6	F8T5/CW 8 WATT	8	0.00	4,911	236	6	Retrofit fixture night light with LED retrofit kits	-	0%	4	0.00	4,911	118	0.00	118	0.00	118
281	129	STORAGE	1	TS4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	217	6	0.00	7	0.00	7
282	130	STORAGE	1	TS4/2F32/E	59	0.01	4,911	290	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	4,911	142	0.00	147	0.00	147
283	131	STORAGE	1	TS4/2F32/E	59	0.01	4,911	290	1	Rebuild with (2) 12.5 watt LED tubes and normal power, instant start ballast-JAIL	-	0%	29	0.00	4,911	142	0.00	147	0.00	147
285	231	Waiting Room	6	TF/4F32/E-2DL	59	0.34	2,000	708	6	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	27%	29	0.17	1,460	254	0.17	454	0.17	454
286	230	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
287	229	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
288	228	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
289	242	Library/Resource	2	TF/3F32/E-1DL	59	0.11	2,000	236	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	27%	38	0.07	1,460	110	0.04	127	0.04	127
290	241a	Copy Room	1	TF/3F32/E-1DL	59	0.06	2,072	122	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.04	1,450	54	0.02	68	0.02	68
291	241a	Copy Room	2	I/75	75	0.14	2,072	311	2	Philips 10 watt A lamp 2700K	Wall Switch Sensor	30%	10	0.02	1,450	29	0.12	282	0.12	282
292	241	Files and Supplies	5	TF/4F32/E-2DL	59	0.28	2,241	661	5	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	97%	29	0.14	67	10	0.14	651	0.14	651
293	237	Men's Restroom	1	S4/1F32/E	30	0.03	1,365	41	1	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.01	956	12	0.02	29	0.02	29
294	237A	Women's Restroom	1	S4/1F32/E	30	0.03	1,365	41	1	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.01	956	12	0.02	29	0.02	29
295	240	Lounge	4	TF/4F32/E-2DL	59	0.22	2,072	489	4	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.11	1,450	168	0.11	321	0.11	321
296	227	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
297	226	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
298	245	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
299	244	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
300	224	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
301	223	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
302	222	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
303	221	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
304	246	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
305	247	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
306	220	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	-	0%	29	0.06	2,311	134	0.06	139	0.06	139
307	248	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
308	219	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
309	218	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
310	217	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
311	249	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
312	215	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
313	214	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
314	213	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
315	212	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
316	239	Classroom/Boardroom/Group Therapy	3	TF/3F32/E	89	0.25	2,000	534	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	27%	38	0.11	1,460	164	0.15	370	0.15	370
317	239	Classroom/Boardroom/Group Therapy	9	CFQ13W	17	0.15	2,000	306	9	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	Wall Switch Sensor	27%	15	0.12	1,460	191	0.02	115	0.02	115

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
318	239	Classroom/Boardroom/Group Therapy	1	I/75	75	0.07	2,000	150	1	Philips 10 watt A lamp 2700K	-	0%	10	0.01	2,000	20	0.06	130	0.06	130
319	235	Observation	6	CFQ13W	17	0.01	217	22	6	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.01	217	19	0.00	3	0.00	3
320	235	Observation	1	TF/4F32/E	112	0.11	2,000	224	1	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	27%	29	0.03	1,460	42	0.08	182	0.08	182
321	211	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
322	210	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
323	209	Office	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
324	208	Directors Office (Conference)	3	TF/4F32/E-2DL	59	0.17	2,000	354	3	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	27%	29	0.08	1,460	127	0.09	227	0.09	227
325	234	Children Therapy	3	TF/4F32/E-2DL	59	0.17	2,072	367	3	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.08	1,450	126	0.09	241	0.09	241
326	207	Office	2	TF/4F32/E-3DL	30	0.06	2,311	139	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.00	45	0.00	45
327	206	Computer and Billing	2	TF/4F32/E-2DL	59	0.01	217	26	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	-	0%	29	0.01	217	13	0.01	13	0.01	13
328	233	Family Therapy	2	TF/4F32/E-2DL	59	0.11	2,072	244	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,450	84	0.06	160	0.06	160
329	233	Family Therapy	4	-	0	0.00	2,072	0	4	0	-	30%	0	0.00	1,450	0	0.00	0	0.00	0
330	205	Secretary	4	TF/4F32/E-2DL	59	0.22	3,825	903	4	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	20%	29	0.11	3,060	355	0.11	548	0.11	548
331	203A	Janitor Closet	1	CFT28W	33	0.00	217	7	1	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.00	217	3	0.00	4	0.00	4
332	203	Women's Restroom	2	S4/1F32/E	30	0.06	1,365	82	2	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.02	956	24	0.03	58	0.03	58
333	202	Men's Restroom	6	S4/1F32/E	30	0.17	1,365	246	6	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.07	956	72	0.10	174	0.10	174
334	201	Lobby	28	CFT28W	33	0.88	2,743	2,535	28	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.39	2,743	1,114	0.49	1,421	0.49	1,421
335	243	Children Waiting	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
336	232	Crisis Waiting	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
337	232	Crisis Waiting	4	CFT28W	33	0.13	2,311	305	4	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	Wall Switch Sensor	30%	15	0.06	1,618	94	0.07	211	0.07	211
338	236	Individual Therapy	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
339	236	Individual Therapy	4	CFT28W	33	0.13	2,311	305	4	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	Wall Switch Sensor	30%	15	0.06	1,618	94	0.07	211	0.07	211
340	251/252/253	2nd Floor Corridor	56	S4/1F32/E	30	1.60	2,743	4,608	56	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	-	0%	13	0.67	2,743	1,920	0.93	2,688	0.93	2,688
341	251/252/253	2nd Floor Corridor	20	CFT28W	33	0.63	2,743	1,810	20	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.28	2,743	795	0.35	1,015	0.35	1,015
342	148	DA Waiting	6	CFT28W	33	0.19	3,825	757	6	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.08	3,825	333	0.11	425	0.11	425
343	148	DA Waiting	3	S4/1F32/E	30	0.09	3,825	344	3	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	-	0%	13	0.04	3,825	143	0.05	201	0.05	201
344	147	DA Reception	2	TF/4F32/E-2DL	59	0.11	3,825	451	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	-	0%	29	0.06	3,825	222	0.06	230	0.06	230
345	146	DA Administrative Assistant	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
346	145	DA Workroom	6	TF/4F32/E-2DL	59	0.34	2,072	733	6	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.17	1,450	252	0.17	481	0.17	481

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
347	144	Assistant District Attorney / Investigator	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
348	143	Stop DWI Assistant DA	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
349	142	District Attorney	4	TF/4F32/E-2DL	59	0.22	2,311	545	4	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.11	1,618	188	0.11	358	0.11	358
350	141	Confidential Secretary	3	TF/4F32/E-2DL	59	0.17	2,311	409	3	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.08	1,618	141	0.09	268	0.09	268
351	137	DA Conference Room /Library Research Area	6	TF/4F32/E-2DL	59	0.34	2,000	708	6	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	27%	29	0.17	1,460	254	0.17	454	0.17	454
352	140	District Attorney Office	4	TF/4F32/E-2DL	59	0.22	2,311	545	4	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.11	1,618	188	0.11	358	0.11	358
353	129	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
354	138	Restroom	1	IH2/1F20/M	28	0.03	1,365	38	1	Rebuild with (1) 8.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	9	0.01	956	8	0.02	30	0.02	30
355	128	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
356	127	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
357	126	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
358	125	PB Supervisor	3	TF/4F32/E-2DL	59	0.17	2,311	409	3	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.08	1,618	141	0.09	268	0.09	268
359	135	Victim Witness Room	6	TF/3F32/E	89	0.51	2,000	1,068	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	27%	38	0.21	1,460	329	0.29	740	0.29	740
360	135	Victim Witness Room	6	I/75	75	0.43	2,000	900	6	Philips 10 watt A lamp 2700K	Wall Switch Sensor	27%	10	0.06	1,460	88	0.37	812	0.37	812
361	135	Victim Witness Room	2	CFQ13W	17	0.03	2,000	68	2	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	Wall Switch Sensor	27%	15	0.03	1,460	42	0.00	26	0.00	26
362	136	Evidence Room	1	TF/4F32/E-2DL	59	0.06	2,311	136	1	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.03	1,618	47	0.03	89	0.03	89
363	124	PB Conference Room	6	TF/3F32/E	89	0.51	2,000	1,068	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	27%	38	0.21	1,460	329	0.29	740	0.29	740
364	124	PB Conference Room	8	CFQ13W	17	0.13	2,000	272	8	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	Wall Switch Sensor	27%	15	0.11	1,460	169	0.02	103	0.02	103
365	118	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
366	117	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
367	116	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
368	115	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
369	114	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
370	122	NY SPIN	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
371	121	PB Waiting Room	4	TF/4F32/E-2DL	59	0.22	2,311	545	4	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.11	1,618	188	0.11	358	0.11	358
372	120	PB Recption Area	3	TF/4F32/E-2DL	59	0.17	2,311	409	3	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.08	1,618	141	0.09	268	0.09	268
373	113	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
374	112	PBO Offices	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
375	111	PB Director	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
376	111	PB Director	2	TF/4F32/E-2DL	59	0.01	217	26	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	-	0%	29	0.01	217	13	0.01	13	0.01	13
377	110	PB Supervisor	2	TF/4F32/E-2DL	59	0.11	2,311	273	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.06	1,618	94	0.06	179	0.06	179
378	110	PB Supervisor	1	TF/4F32/E	112	0.11	2,311	259	1	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.03	1,618	47	0.08	212	0.08	212
379	109	PB Secreterial Area	7	TF/4F32/E-2DL	59	0.39	3,825	1,580	7	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	20%	29	0.19	3,060	621	0.20	959	0.20	959
380	108	Kitchen/Break	3	TF/4F32/E-2DL	59	0.17	2,072	367	3	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.08	1,450	126	0.09	241	0.09	241
381	108	Kitchen/Break	1	TF/4F32/E-2DL	59	0.06	2,072	122	1	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	30%	29	0.03	1,450	42	0.03	80	0.03	80
382	0	Small Corridor	1	CFT28W	33	0.03	2,743	91	1	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.01	2,743	40	0.02	51	0.02	51
383	134	Grand Jury Room	8	TF/3F32/E	89	0.68	2,000	1,424	8	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	27%	38	0.29	1,460	438	0.39	986	0.39	986
384	134	Grand Jury Room	10	CFQ13W	17	0.16	2,000	340	10	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	Wall Switch Sensor	27%	15	0.14	1,460	212	0.02	128	0.02	128
385	134	Grand Jury Room	10	I/75	75	0.71	2,000	1,500	10	Philips 10 watt A lamp 2700K	Wall Switch Sensor	27%	10	0.10	1,460	146	0.62	1,354	0.62	1,354
386	151	Men's Restroom	2	S4/1F32/E	30	0.06	1,365	82	2	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.02	956	24	0.03	58	0.03	58
387	150	Women's Restroom	2	S4/1F32/E	30	0.06	1,365	82	2	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.02	956	24	0.03	58	0.03	58
388	104	STOP DWI	2	TF/4F32/E-2DL	59	0.11	3,825	451	2	Retrofit 2' x 4' troffer with (2) 12.5 watt LED tubes and normal power, instant start ballast	Wall Switch Sensor	20%	29	0.06	3,060	177	0.06	274	0.06	274
389	105	Women's Restroom	4	S4/1F32/E	30	0.11	1,365	164	4	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.05	956	48	0.07	116	0.07	116
390	106	Men's Restroom	2	S4/1F32/E	30	0.06	1,365	82	2	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.02	956	24	0.03	58	0.03	58
391	03/132/131/13	Corridor/Lobby	40	CFT28W	33	1.25	2,743	3,621	40	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.55	2,743	1,591	0.70	2,030	0.70	2,030
392	03/132/131/13	Corridor/Lobby	40	S4/1F32/E	30	1.14	2,743	3,292	40	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	-	0%	13	0.48	2,743	1,372	0.67	1,920	0.67	1,920
393	03/132/131/13	Corridor/Lobby	4	TF/2F32/E	59	0.22	2,743	647	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.10	2,743	274	0.13	373	0.13	373
394	ransfer Corrido	Corridor to Courthouse	16	S4/1F32/E	30	0.46	2,743	1,317	16	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	-	0%	13	0.19	2,743	549	0.27	768	0.27	768
395	ransfer Corrido	Corridor to Courthouse	1	CFT28W	33	0.03	2,743	91	1	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.01	2,743	40	0.02	51	0.02	51
396	Entry Vestibule	Vestible	2	CFT28W	33	0.06	8,760	578	2	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.03	8,760	254	0.04	324	0.04	324
397	Basement	Basement Open Floor Plan	7	S4/2F32/E	59	0.39	3,825	1,580	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.17	3,060	536	0.23	1,044	0.23	1,044
398	Basement	Basement Open Floor Plan	8	S4/2F32/E	59	0.45	3,825	1,805	8	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.19	3,060	612	0.26	1,193	0.26	1,193
399	Basement	Basement Open Floor Plan	7	S4/2F32/E	59	0.39	3,825	1,580	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.17	3,060	536	0.23	1,044	0.23	1,044
400	Basement	Basement Open Floor Plan	7	S4/2F32/E	59	0.39	3,825	1,580	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.17	3,060	536	0.23	1,044	0.23	1,044
401	Basement	Basement Open Floor Plan	8	S4/2F32/E	59	0.45	3,825	1,805	8	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.19	3,060	612	0.26	1,193	0.26	1,193
402	Basement	Basement Open Floor Plan	5	S4/2F32/E	59	0.28	3,825	1,128	5	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.12	3,060	383	0.16	746	0.16	746
403	Basement	Basement Open Floor Plan	8	S4/2F32/E	59	0.45	3,825	1,805	8	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.19	3,060	612	0.26	1,193	0.26	1,193
404	Basement	Basement Open Floor Plan	8	S4/2F32/E	59	0.45	3,825	1,805	8	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.19	3,060	612	0.26	1,193	0.26	1,193

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
405	Basement	Basement Open Floor Plan	10	S4/2F32/E	59	0.56	3,825	2,257	10	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.24	3,060	765	0.32	1,492	0.32	1,492
406	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
407	Garage 1	Garage Bay #1	7	TS4/2F32/E	59	0.39	2,607	1,077	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.17	2,607	456	0.23	621	0.23	621
408	Garage 2	Garage Bay #2	4	TS4/2F32/E	59	0.22	2,607	615	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.10	2,607	261	0.13	355	0.13	355
409	Breakroom	Breakroom	4	S4/2F32/E	59	0.22	2,072	489	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	25	0.10	1,450	145	0.13	344	0.13	344
410	Breakroom	Breakroom	1	S4/1F32/E	30	0.03	2,072	62	1	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	Wall Switch Sensor	30%	13	0.01	1,450	18	0.02	44	0.02	44
411	Garage 2	Garage Bay #2	8	TS4/2F32/E	59	0.45	2,607	1,231	8	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.19	2,607	521	0.26	709	0.26	709
412	Restroom	Restroom	2	S4/2F32/E	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
413	Restroom	Restroom	1	S4/1F32/E	30	0.03	1,365	41	1	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	-	0%	13	0.01	1,365	17	0.02	24	0.02	24
414	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
415	Evidence Garage	Records	5	TS4/2F32/E	59	0.28	2,607	769	5	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.12	2,607	326	0.16	443	0.16	443
416	Evidence Garage	Records	7	TS4/2F32/E	59	0.39	2,607	1,077	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.17	2,607	456	0.23	621	0.23	621
417	Evidence Garage	Flush Mounted Strips	4	S4/2F32/E	59	0.22	2,607	615	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.10	2,607	261	0.13	355	0.13	355
418	Evidence Garage	Task Lighting	3	S4/2F32/E	59	0.17	2,607	461	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.07	2,607	196	0.10	266	0.10	266
419	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
420	Garage	Main Garage	26	4LT-5	236	5.83	2,607	15,997	26	New Philips 12,000 Lumen FBX Highbay	-	0%	97	2.40	2,607	6,575	3.43	9,422	3.43	9,422
421	Garage	Main Garage - Task Lighting	3	S4/2F32/E	59	0.17	2,607	461	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.07	2,607	196	0.10	266	0.10	266
422	Garage	Mechanics Bay	14	TF/4F54/E	234	3.11	2,607	8,541	14	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	50	0.67	1,825	1,278	2.45	7,264	2.45	7,264
423	Garage	Mechanics Bay - Task Lighting	14	W4/2F32/E	59	0.78	2,607	2,154	14	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.33	2,607	913	0.45	1,241	0.45	1,241
424	Garage	Tire Shop	20	TS4/3F32/E	89	1.69	2,607	4,641	20	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.71	1,825	1,369	0.98	3,272	0.98	3,272
425	Garage	Weld Shop	30	TS4/3F32/E	89	2.54	2,607	6,961	30	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.07	2,607	2,933	1.47	4,028	1.47	4,028
426	Garage	Sign Shop	24	TS4/3F32/E	89	2.03	2,607	5,569	24	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.86	1,825	1,643	1.17	3,926	1.17	3,926
427	Garage	Corridor	3	W4/2F32/E	59	0.17	2,607	461	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.07	2,607	196	0.10	266	0.10	266
428	Garage	Break/Bar	4	W4/3F32/E	89	0.34	2,072	738	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.14	1,450	218	0.20	520	0.20	520
429	Garage	Break/Bar	5	W4/3F32/E	89	0.42	2,072	922	5	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.18	1,450	272	0.24	650	0.24	650
430	Garage	Office	2	TF/4F32/E	112	0.21	2,311	518	2	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	Wall Switch Sensor	30%	35	0.07	1,618	113	0.15	404	0.15	404
431	Garage	Office	2	TF/4F32/E	112	0.21	2,311	518	2	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	Wall Switch Sensor	30%	35	0.07	1,618	113	0.15	404	0.15	404
432	Garage	Men's Restroom	6	VT4/2F32/E	59	0.34	1,365	483	6	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.14	1,365	205	0.19	278	0.19	278
433	Garage	Stock Room 2nd Floor	12	TF/3F32/E	89	1.01	2,607	2,784	12	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.43	2,607	1,173	0.59	1,611	0.59	1,611

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
434	Garage	Stock Room 2nd Floor	2	W4/2F32/E	59	0.11	2,607	308	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	2,607	130	0.06	177	0.06	177
435	Garage	Stock Room 1st Floor	34	TF/2F32/E	59	1.91	2,607	5,230	34	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	25	0.81	1,825	1,551	1.10	3,679	1.10	3,679
436	Garage	Stock Room 1st Floor	3	W4/2F32/E	59	0.17	2,607	461	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.07	2,607	196	0.10	266	0.10	266
437	Admin Office	Stairs	1	W4/2F32/E	59	0.06	3,825	226	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	3,825	96	0.03	130	0.03	130
438	Admin Office	Highway Planning	3	W4/2F32/E	59	0.17	3,825	677	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.07	3,060	230	0.10	448	0.10	448
439	Admin Office	Highway Planning	3	W4/2F32/E	59	0.17	3,825	677	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.07	3,060	230	0.10	448	0.10	448
440	Admin Office	Highway Planning	3	W4/2F32/E	59	0.17	3,825	677	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.07	3,060	230	0.10	448	0.10	448
441	Admin Office	Joe's Office	6	W4/2F32/E	59	0.34	3,825	1,354	6	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.14	3,060	459	0.19	895	0.19	895
442	Admin Office	Kitchen/Break	2	W4/2F32/E	59	0.11	2,072	244	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	25	0.05	1,450	73	0.06	172	0.06	172
443	Admin Office	Women's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	25	0.02	956	24	0.03	57	0.03	57
444	Admin Office	1st Floor Planning	7	W4/2F32/E	59	0.39	3,825	1,580	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.17	3,060	536	0.23	1,044	0.23	1,044
445	Admin Office	1st Floor Planning	7	W4/2F32/E	59	0.39	3,825	1,580	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.17	3,060	536	0.23	1,044	0.23	1,044
446	Admin Office	1st Floor Planning	8	W4/2F32/E	59	0.45	3,825	1,805	8	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	25	0.19	3,060	612	0.26	1,193	0.26	1,193
447	Admin Office	Mop Closet	1	W4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
448	Admin Office	Men's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	25	0.02	956	24	0.03	57	0.03	57
449	Admin Office	Mechanical Room	1	IH8/2F60/ESM	123	0.01	217	27	1	Retrofit IH8 with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.01	21	0.01	21
450	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
451	Norrisville Garag	Parts Room	0	W4/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
452	Norrisville Garag	Parts Room	0	TS4/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
453	Norrisville Garag	Mechanical Shop	0	W4/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
454	Norrisville Garag	Mechanical Shop	0	W4/3F32/E	89	0.00	2,607	0	0	No Action	-	0%	89	0.00	2,607	0	0.00	0	0.00	0
455	Norrisville Garag	Mechanical Shop	0	TS4/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
456	Norrisville Garag	Hydraulic Room	0	TS4/3F32/E	89	0.00	2,607	0	0	No Action	-	0%	89	0.00	2,607	0	0.00	0	0.00	0
457	Norrisville Garag	Hydraulic Room	0	W4/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
458	Norrisville Garag	Weld Shop - Chain Hung	0	TS4/3F32/E	89	0.00	2,607	0	0	No Action	-	0%	89	0.00	2,607	0	0.00	0	0.00	0
459	Norrisville Garag	Weld Shop - Wall Hung	0	TS4/3F32/E	89	0.00	2,607	0	0	No Action	-	0%	89	0.00	2,607	0	0.00	0	0.00	0
460	Norrisville Garag	Hallway	0	W4/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
461	Norrisville Garag	Hallway	0	W4/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
462	Norrisville Garag	Front Office	0	TF/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
463	lorrisville Garag	Middle Office	0	TF/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
464	lorrisville Garag	Women's Restroom	0	TF/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
465	lorrisville Garag	Men's Restroom	0	TF/2F32/E	59	0.00	2,607	0	0	No Action	-	0%	59	0.00	2,607	0	0.00	0	0.00	0
466	lorrisville Garag	Main Garage	0	TS4/3F32/E	89	0.00	2,607	0	0	No Action	-	0%	89	0.00	2,607	0	0.00	0	0.00	0
467	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
468	DSS - Exterior	DSS - Exterior	6	HPS/400	465	0.28	4,380	12,220	6	New Philips Type III area light - 139 watts	-	0%	139	0.08	4,380	3,653	0.20	8,567	0.20	8,567
469	DSS - Exterior	DSS - Exterior	7	HPS/400	465	0.33	4,380	14,257	7	New Philips Type III area light - 139 watts	-	0%	139	0.10	4,380	4,262	0.23	9,995	0.23	9,995
470	DSS - Exterior	DSS - Exterior	10	MH/150	190	0.19	4,380	8,322	10	New Rab LED area light - 30 watts	-	0%	30	0.03	4,380	1,314	0.16	7,008	0.16	7,008
471	DSS - Exterior	DSS - Exterior	24	I/75	75	0.18	4,380	7,884	24	Philips 10 watt A lamp 2700K	-	0%	10	0.02	4,380	1,051	0.16	6,833	0.16	6,833
472	DSS - Exterior	DSS - Exterior	8	I/75	75	0.06	4,380	2,628	8	Philips 10 watt A lamp 2700K	-	0%	10	0.01	4,380	350	0.05	2,278	0.05	2,278
473	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
474	Jail - Exterior	Jail - Exterior	3	HPS/150/WP	188	0.06	4,380	2,470	3	New Rab LED wall pack - 29 watts - with photo control	-	0%	29	0.01	4,380	381	0.05	2,089	0.05	2,089
475	Jail - Exterior	Jail - Exterior	3	HPS/70	95	0.03	4,380	1,248	3	New Rab LED lantern light - white - 30 watts	-	0%	30	0.01	4,380	394	0.02	854	0.02	854
476	Jail - Exterior	Jail - Exterior	3	HPS/250/WP	295	0.09	4,380	3,876	3	New Rab LED wall pack - 37 watts	-	0%	37	0.01	4,380	486	0.08	3,390	0.08	3,390
477	Jail - Exterior	Jail - Exterior	2	HPS/150/WP	188	0.04	4,380	1,647	2	New Rab LED wall pack - 29 watts	-	0%	29	0.01	4,380	254	0.03	1,393	0.03	1,393
478	Jail - Exterior	Jail - Exterior	2	HPS/150/WP	188	0.04	4,380	1,647	2	New Rab LED wall pack - 29 watts - with photo control	-	0%	29	0.01	4,380	254	0.03	1,393	0.03	1,393
479	Jail - Exterior	Jail - Exterior	6	HPS/1000	1,100	0.66	4,380	28,908	6	New Rab LED flood light - trunnion mount - 315 watts	-	0%	315	0.19	4,380	8,278	0.47	20,630	0.47	20,630
480	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
481	fice Building - E	Office Bld Parking Lot	7	HPS/70	95	0.07	4,380	2,913	7	New Rab LED area cobra head Type III - 78 watts	-	0%	78	0.05	4,380	2,391	0.01	521	0.01	521
482	fice Building - E	Office Bld Parking Lot	31	HPS/175/CPY	215	0.67	4,380	29,193	31	Retrofit drum fixture with 12w LED conversion kit.	-	0%	12	0.04	4,380	1,629	0.63	27,563	0.63	27,563
483	fice Building - E	Office Bld Parking Lot	14	HPS/70	95	0.13	4,380	5,825	14	New Rab LED lantern light - white - 30 watts	-	0%	30	0.04	4,380	1,840	0.09	3,986	0.09	3,986
484	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
485	nance Garage -	Maintenance Garage - EXT	3	JAR/CF13TWIST	13	0.00	4,380	171	3	No Action	-	0%	13	0.00	4,380	171	0.00	0	0.00	0
486	ting Jail Parking	Office Bld Parking Lot	2	HPS/400	465	0.09	4,380	4,073	2	New Rab LED flood light - trunnion mount - 107 watts	-	0%	107	0.02	4,380	937	0.07	3,136	0.07	3,136
487	ting Jail Parking	Office Bld Parking Lot	5	HPS/70	95	0.05	4,380	2,081	5	New Rab LED lantern light - white - 30 watts	-	0%	30	0.02	4,380	657	0.03	1,424	0.03	1,424
488	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
489	lic Health - Exte	Public Health - Exterior	7	HPS/150/WP	188	0.13	4,380	5,764	7	New Rab LED wall pack - 29 watts	-	0%	29	0.02	4,380	889	0.11	4,875	0.11	4,875
490	lic Health - Exte	Public Health - Exterior	6	HPS/70	95	0.06	4,380	2,497	6	New Rab LED lantern light - white - 30 watts	-	0%	30	0.02	4,380	788	0.04	1,708	0.04	1,708
491	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
492	ans Building - Ex	Veterans - Exterior - High Cans	8	I/75	75	0.06	4,380	2,628	8	Retrofit 8" LED can with 14 watt LED can retrofit kit	-	0%	14	0.01	4,380	491	0.05	2,137	0.05	2,137
493	ans Building - Ex	Veterans - Exterior - Low Cans	9	I/75	75	0.07	4,380	2,957	9	Retrofit 8" LED can with 14 watt LED can retrofit kit	-	0%	14	0.01	4,380	552	0.05	2,405	0.05	2,405
494	ans Building - Ex	Veterans - Exterior - Flood	1	HPS/400	465	0.05	4,380	2,037	1	New Rab LED flood light - trunnion mount - 107 watts	-	0%	107	0.01	4,380	469	0.04	1,568	0.04	1,568
495	ans Building - Ex	Veterans - Exterior - Wall Packs	1	HPS/150/WP	188	0.02	4,380	823	1	New Rab LED wall pack - 29 watts - with photo control	-	0%	29	0.00	4,380	127	0.02	696	0.02	696
496	ans Building - Ex	Veterans - Exterior - Wall Pack Link to CH	1	HPS/70/WP	95	0.01	4,380	416	1	New Rab LED wall pack - 29 watts	-	0%	29	0.00	4,380	127	0.01	289	0.01	289
497	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
498	urthouse - Exter	Courthouse - Exterior	9	I/75	75	0.07	4,380	2,957	9	Philips 10 watt A lamp 2700K	-	0%	10	0.01	4,380	394	0.06	2,562	0.06	2,562
499	urthouse - Exter	Courthouse - Exterior	5	HPS/70	95	0.05	4,380	2,081	5	New Rab LED lantern light - white - 30 watts	-	0%	30	0.02	4,380	657	0.03	1,424	0.03	1,424
500	urthouse - Exter	Courthouse - Exterior	7	HPS/100	138	0.10	4,380	4,231	7	New Rab LED flood light - 20 watts	-	0%	20	0.01	4,380	613	0.08	3,618	0.08	3,618
501	urthouse - Exter	Courthouse - Exterior	2	I/75	75	0.02	4,380	657	2	Philips 10 watt A lamp 2700K	-	0%	10	0.00	4,380	88	0.01	569	0.01	569
502	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
503	0	PUBLIC HEALTH BUILDING	0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
504	0	Vestibule	1	TT/2FB31/E-9C	57	0.05	3,825	218	1	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.03	3,825	126	0.02	92	0.02	92
505	0	Waiting Area	11	TT/2FB31/E-9C	57	0.60	3,825	2,398	11	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.34	3,825	1,388	0.25	1,010	0.25	1,010
506	0	Waiting Area	6	CFQ26W	33	0.19	3,825	757	6	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.08	3,825	333	0.11	425	0.11	425
507	0	Open Cubicles	40	TF/3F32/E-1DL	59	2.24	3,825	9,027	40	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.43	3,825	5,738	0.82	3,290	0.82	3,290
508	0	Office 1	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
509	0	Office 2	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
510	0	Binder Storage	2	TF/2F32/E-18C	59	0.11	3,825	451	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	3,825	191	0.06	260	0.06	260
511	0	Office 3	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
512	0	Office 4	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
513	0	Conference Table	2	TF/3F32/E-18C	89	0.17	3,825	681	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	3,825	287	0.10	394	0.10	394
514	0	Office 5	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
515	0	Office 6	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
516	0	Lactation Room	1	TF/2F32/E-18C	59	0.06	2,311	136	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	2,311	58	0.03	79	0.03	79
517	0	Office next to Lactation	1	TF/2F32/E-18C	59	0.06	2,311	136	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	2,311	58	0.03	79	0.03	79
518	0	Office next to Lactation	1	TF/2F32/E-18C	59	0.06	2,311	136	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	2,311	58	0.03	79	0.03	79
519	0	Lab	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
520	0	Lab Office	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
521	0	Hall	2	TF/2F32/E-18C	59	0.11	2,743	324	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	2,743	137	0.06	187	0.06	187
522	0	Rest Room	3	CFQ26W	33	0.09	1,365	135	3	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.04	1,365	59	0.05	76	0.05	76
523	0	Women's Restroom	6	CFQ26W	33	0.19	1,365	270	6	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.08	1,365	119	0.11	152	0.11	152
524	0	Janitor Closet	1	CIR/22W	20	0.00	217	4	1	Retrofit drum fixture with 12w LED conversion kit.	-	0%	12	0.00	217	3	0.00	2	0.00	2
525	0	Men's Restroom	2	TT/2FB31/E-9C	57	0.11	1,365	156	2	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.06	1,365	90	0.05	66	0.05	66
526	0	Meeting Room	15	TF/3F32/E-18C	89	1.27	2,000	2,670	15	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.53	2,000	1,125	0.73	1,545	0.73	1,545
527	0	Communications Closet	1	CIR/22W	20	0.00	217	4	1	Retrofit drum fixture with 12w LED conversion kit.	-	0%	12	0.00	217	3	0.00	2	0.00	2
528	0	Storage	2	W4/2F32/E	59	0.01	217	26	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	11	0.01	15	0.01	15
529	0	Stair 1	3	W4/2F32/E	59	0.18	8,760	1,551	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.08	8,760	657	0.10	894	0.10	894
530	0	Storage	7	TT/2F17/E-Pris	33	0.02	217	50	7	P-2 2x2 LED prismatic troffer conversion kit, LW lumens (2356) 4000K	-	0%	23	0.02	217	35	0.01	15	0.01	15
531	0	Electrical	4	TS4/2F32/E	59	0.02	217	51	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	22	0.01	30	0.01	30
532	0	Closet	1	W4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
533	0	Pump Closet	1	W4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
534	0	Closet	1	W4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
535	0	Hall	3	TF/2F32/E-18C	59	0.17	2,743	486	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.07	2,743	206	0.10	280	0.10	280
536	0	Hall	4	CFQ26W	33	0.13	2,743	362	4	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.06	2,743	159	0.07	203	0.07	203
537	0	Kitchenette	5	TF/2F32/E-18C	59	0.28	3,825	1,128	5	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.12	3,825	478	0.16	650	0.16	650
538	0	Closet	1	W4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
539	0	Open Cubicles	50	TF/2F32/E-18C	59	2.80	3,825	11,284	50	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	1.19	3,825	4,781	1.62	6,503	1.62	6,503
540	0	Office 1	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
541	0	Office 2	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
542	0	Conference Area	2	TF/3F32/E-18C	89	0.17	3,825	681	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	3,825	287	0.10	394	0.10	394
543	0	Office 3	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
544	0	Office 4	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
545	0	Mechanical Room	6	TS4/2F32/E	59	0.04	217	77	6	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	217	33	0.02	44	0.02	44
546	0	File Room	3	TF/2F32/E-18C	59	0.02	217	38	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	16	0.01	22	0.01	22
547	0	Janitor Closet	1	CIR/22W	20	0.00	217	4	1	Retrofit drum fixture with 12w LED conversion kit.	-	0%	12	0.00	217	3	0.00	2	0.00	2
548	0	Women's Restroom	6	CFQ26W	33	0.19	1,365	270	6	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.08	1,365	119	0.11	152	0.11	152
549	0	Women's Restroom 2	6	CFQ26W	33	0.19	1,365	270	6	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.08	1,365	119	0.11	152	0.11	152

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
550	0	Stair 2	3	W4/2F32/E	59	0.18	8,760	1,551	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.08	8,760	657	0.10	894	0.10	894
551	0	Elevator	2	S4/2F32/E	59	0.12	8,760	1,034	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	8,760	438	0.07	596	0.07	596
552	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
553	0	COUNTY OFFICE BUILDING	0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
554	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
555	0	B12	13	TF/3F32/E-18C	89	1.10	2,311	2,674	13	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.46	2,311	1,127	0.64	1,547	0.64	1,547
556	0	Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
557	0	Server Room	4	TF/3F32/E-18C	89	0.04	217	77	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.02	217	33	0.02	45	0.02	45
558	0	B16 - Records	22	FF/4F34/M-Pris	160	3.34	2,311	8,135	22	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	1.05	2,311	2,542	2.30	5,593	2.30	5,593
559	0	B18 - Telephone	24	FF/4F34/M-Pris	160	0.38	217	833	24	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.12	217	260	0.26	573	0.26	573
560	0	B18 - Telephone	2	S4/2F40/M	94	0.02	217	41	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	11	0.01	30	0.01	30
561	0	B2 - Remote Storage	13	S4/2F40/M	94	0.12	217	265	13	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	217	71	0.09	195	0.09	195
562	0	B2 - Remote Storage	6	S4/2F32/E	59	0.04	217	77	6	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	217	33	0.02	44	0.02	44
563	0	B2 - Remote Storage	2	W4/4F32/E	112	0.02	217	49	2	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.01	217	22	0.01	27	0.01	27
564	0	Storage	4	FF/4F34/M-Pris	160	0.06	217	139	4	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.02	217	43	0.04	95	0.04	95
565	0	B25 - Public Defender	0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
566	0	Office	6	FF/4F34/M-Pris	160	0.91	2,311	2,219	6	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.29	2,311	693	0.63	1,525	0.63	1,525
567	0	B23 Office	4	FF/4F34/M-Pris	160	0.61	2,311	1,479	4	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	50	0.19	1,618	324	0.42	1,156	0.42	1,156
568	0	Office	6	FF/4F34/M-Pris	160	0.91	2,311	2,219	6	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	50	0.29	1,618	485	0.63	1,733	0.63	1,733
569	0	Office	1	S4/2F40/M	94	0.09	2,311	217	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	25	0.02	1,618	40	0.07	177	0.07	177
570	0	Office	4	FF/4F34/M-Pris	160	0.61	2,311	1,479	4	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	50	0.19	1,618	324	0.42	1,156	0.42	1,156
571	0	Open Office and Rec.	14	FF/4F34/M-Pris	160	2.13	3,825	8,568	14	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.67	3,825	2,678	1.46	5,891	1.46	5,891
572	0	Conference Room	12	FF/4F34/M-Pris	160	1.82	2,000	3,840	12	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.57	2,000	1,200	1.25	2,640	1.25	2,640
573	0	Hall	4	FF/4F34/M-Pris	160	0.61	2,743	1,756	4	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.19	2,743	549	0.42	1,207	0.42	1,207
574	0	Emergency Conference Room	21	FF/4F34/M-Pris	160	3.19	2,000	6,720	21	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	1.00	2,000	2,100	2.19	4,620	2.19	4,620
575	0	Fire Coordinator	9	FF/4F34/M-Pris	160	1.37	2,311	3,328	9	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.43	2,311	1,040	0.94	2,288	0.94	2,288
576	0	Fire Coordinator Kitchen	15	FF/4F34/M-Pris	160	2.28	2,072	4,973	15	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.71	2,072	1,554	1.57	3,419	1.57	3,419
577	0	Fire Coordinator Kitchen	2	S4/2F40/M	94	0.18	2,072	390	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	2,072	104	0.13	286	0.13	286
578	0	Hall	2	FF/4F34/M-Pris	160	0.30	2,743	878	2	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.10	2,743	274	0.21	603	0.21	603

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
579	0	Cleaning Storage	2	FF/4F34/M-Pris	160	0.03	217	69	2	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.01	217	22	0.02	48	0.02	48
580	0	Cleaning Storage	1	W4/2F40/M	94	0.01	217	20	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.01	15	0.01	15
581	0	Communication Closet	1	S4/2F40/M	94	0.01	217	20	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.01	15	0.01	15
582	0	"Conference" Office	2	FF/4F34/M-Pris	160	0.30	2,000	640	2	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	27%	50	0.10	1,460	146	0.21	494	0.21	494
583	0	Fire Storage	1	FF/4F34/M-Pris	160	0.02	217	35	1	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.01	217	11	0.01	24	0.01	24
584	0	"Bath" Storage	1	W4/2F40/M	94	0.01	217	20	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.01	15	0.01	15
585	0	"Bath" Storage	1	W4/2F40/M	94	0.01	217	20	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.01	15	0.01	15
586	0	Closet	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
587	0	Men's Restroom	2	TF/3F32/E-18C	89	0.17	1,365	243	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	30%	38	0.07	956	72	0.10	171	0.10	171
588	0	Men's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
589	0	Basement Hall	20	FF/4F34/M-Pris	160	3.04	2,743	8,778	20	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.95	2,743	2,743	2.09	6,035	2.09	6,035
590	0	Women's Restroom	4	TF/3F32/E-18C	89	0.34	1,365	486	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	1,365	205	0.20	281	0.20	281
591	0	Women's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
592	0	Mechanical Room	21	S4/2F32/E	59	0.12	217	269	21	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	217	114	0.07	155	0.07	155
593	0	Mechanical Room	1	W4/4F32/E	112	0.01	217	24	1	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.01	217	11	0.01	13	0.01	13
594	0	Boiler Room	4	W4/4F32/E	112	0.04	217	97	4	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.02	217	43	0.02	54	0.02	54
595	0	Boiler Room	1	W4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
596	0	Boiler Room Entrance	1	TT/2FB31/E-9C	57	0.01	217	12	1	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.00	217	7	0.00	5	0.00	5
597	0	Office	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
598	0	Maintenance Bench	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
599	0	Maintenance Waiting Area	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
600	0	Stair 1	9	W4/2F32/E	59	0.53	8,760	4,652	9	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.23	8,760	1,971	0.31	2,681	0.31	2,681
601	0	Employee Restroom	2	TF/3F32/E-18C	89	0.17	1,365	243	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	956	72	0.10	171	0.10	171
602	0	Employee Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
603	0	Handicap Restroom	1	TF/3F32/E-18C	89	0.08	1,365	121	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.04	956	36	0.05	86	0.05	86
604	0	118	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	1,618	121	0.10	290	0.10	290
605	0	Open Office Rec.	4	TF/3F32/E-18C	89	0.34	3,825	1,362	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	3,825	574	0.20	788	0.20	788
606	0	County Clerk Office	43	TF/3F32/E-18C	89	3.64	2,311	8,844	43	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.53	2,311	3,726	2.10	5,118	2.10	5,118
607	0	County Clerk Private Office	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
608	0	Kitchen	2	TF/3F32/E-18C	89	0.17	2,072	369	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	1,450	109	0.10	260	0.10	260
609	0	Women's Restroom outside of Clerk's Office	1	TF/3F32/E-18C	89	0.08	1,365	121	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	1,365	51	0.05	70	0.05	70
610	0	Women's Restroom outside of Clerk's Office	1	W2/1F20/M	28	0.03	1,365	38	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	1,365	23	0.01	15	0.01	15
611	0	Men's Restroom outside of Clerk's Office	1	TF/3F32/E-18C	89	0.08	1,365	121	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	1,365	51	0.05	70	0.05	70
612	0	Men's Restroom outside of Clerk's Office	1	W2/1F20/M	28	0.03	1,365	38	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	1,365	23	0.01	15	0.01	15
613	0	Employee Restroom	3	TF/3F32/E-18C	89	0.25	1,365	364	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	1,365	154	0.15	211	0.15	211
614	0	Employee Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
615	0	Employee Restroom	1	CF/23TWIST	23	0.02	1,365	31	1	Philips 10 watt A lamp 2700K	-	0%	10	0.01	1,365	14	0.01	18	0.01	18
616	0	131 B - Kevin Maintenance Off.	5	TF/3F32/E-18C	89	0.42	2,311	1,028	5	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	30%	38	0.18	1,618	303	0.24	725	0.24	725
617	0	131A - Receptionist	2	TF/3F32/E-18C	89	0.17	3,825	681	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	20%	38	0.07	3,060	230	0.10	451	0.10	451
618	0	DMV Main Waiting Area	15	TF/3F32/E-18C	89	1.27	3,825	5,106	15	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.53	3,825	2,152	0.73	2,955	0.73	2,955
619	0	DMV Employee Area	32	TF/3F32/E-18C	89	2.71	3,825	10,894	32	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.14	3,825	4,590	1.57	6,304	1.57	6,304
620	0	DMV 105	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.14	1,618	243	0.20	580	0.20	580
621	0	DMV Kitchen	2	TF/3F32/E-18C	89	0.17	2,072	369	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,072	155	0.10	213	0.10	213
622	0	DMV 107	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	1,618	121	0.10	290	0.10	290
623	0	DMV	18	TF/3F32/E-18C	89	1.52	2,311	3,702	18	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.64	2,311	1,560	0.88	2,142	0.88	2,142
624	0	Youth Services	4	TF/3F32/E-18C	89	0.34	3,825	1,362	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	20%	38	0.14	3,060	459	0.20	903	0.20	903
625	0	135 Vet Agency	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
626	0	Office 1	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	1,618	121	0.10	290	0.10	290
627	0	Office 2	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	1,618	121	0.10	290	0.10	290
628	0	Central Services	9	TF/3F32/E-18C	89	0.76	3,825	3,064	9	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	20%	38	0.32	3,060	1,033	0.44	2,031	0.44	2,031
629	0	Paper Room	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	30%	38	0.14	1,618	243	0.20	580	0.20	580
630	0	Mail Room	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	30%	38	0.14	1,618	243	0.20	580	0.20	580
631	0	Hallway	22	TF/3F32/E-18C	89	1.86	2,743	5,371	22	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.78	2,743	2,263	1.08	3,108	1.08	3,108
632	0	Atrium Main Level	33	TF/3F32/E-18C	89	2.79	2,743	8,056	33	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.18	2,743	3,394	1.61	4,662	1.61	4,662
633	0	Main Entrance Vestibule	1	TF/2F32/E-Pris	59	0.06	2,743	162	1	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.03	2,743	96	0.02	66	0.02	66
634	0	211 Civil Personnel Main Cubicle Area	11	TF/3F32/E-18C	89	0.93	3,825	3,745	11	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.39	3,825	1,578	0.54	2,167	0.54	2,167
635	0	Kitchen	2	TF/3F32/E-18C	89	0.17	2,072	369	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	1,450	109	0.10	260	0.10	260
636	0	Office 1	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	30%	38	0.07	1,618	121	0.10	290	0.10	290

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
637	0	Office 2	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	30%	38	0.07	1,618	121	0.10	290	0.10	290
638	0	Restroom	1	W2/2F20/M	56	0.05	1,365	76	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	1,365	23	0.04	53	0.04	53
639	0	Office 219	5	TF/3F32/E-18C	89	0.42	2,311	1,028	5	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Low Voltage Ceiling Sensor	30%	38	0.18	1,618	303	0.24	725	0.24	725
640	0	Conference Room	3	TF/3F32/E-18C	89	0.25	2,000	534	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	Wall Switch Sensor	27%	38	0.11	1,460	164	0.15	370	0.15	370
641	0	Electrical Room	1	TF/3F32/E-18C	89	0.01	217	19	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.00	217	8	0.01	11	0.01	11
642	0	Meeting Room	3	TF/3F32/E-18C	89	0.25	2,000	534	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,000	225	0.15	309	0.15	309
643	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
644	0	249 Planning Dept	10	TF/3F32/E-18C	89	0.85	2,311	2,057	10	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.36	2,311	867	0.49	1,190	0.49	1,190
645	0	232 Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
646	0	238	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
647	0	239	3	TF/3F32/E-18C	89	0.25	2,311	617	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,311	260	0.15	357	0.15	357
648	0	240	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
649	0	Break Room	2	TF/3F32/E-18C	89	0.17	2,072	369	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,072	155	0.10	213	0.10	213
650	0	244	9	TF/3F32/E-18C	89	0.76	2,311	1,851	9	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.32	2,311	780	0.44	1,071	0.44	1,071
651	0	248	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
652	0	Break Room	3	TF/3F32/E-18C	89	0.25	2,072	553	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,072	233	0.15	320	0.15	320
653	0	Big Office	6	TF/3F32/E-18C	89	0.51	2,311	1,234	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	2,311	520	0.29	714	0.29	714
654	0	242	3	TF/3F32/E-18C	89	0.25	2,311	617	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,311	260	0.15	357	0.15	357
655	0	Executive Session Office	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
656	0	Restroom	4	TF/3F32/E-18C	89	0.34	1,365	486	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	1,365	205	0.20	281	0.20	281
657	0	Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
658	0	County Executive	3	CFT22W-2	54	0.15	2,311	374	3	Relamp with (2) 14.5 Watt LED direct replacemnent CFL lamps-Horizontal	-	0%	29	0.08	2,311	201	0.07	173	0.07	173
659	0	Waiting Room	2	TF/3F32/E-18C	89	0.17	3,825	681	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	3,825	287	0.10	394	0.10	394
660	0	Open Office	19	TF/3F32/E-18C	89	1.61	3,825	6,468	19	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.68	3,825	2,725	0.93	3,743	0.93	3,743
661	0	Safe	1	TF/3F32/E-18C	89	0.01	217	19	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.00	217	8	0.01	11	0.01	11
662	0	Data Entry Dept	3	TF/3F32/E-18C	89	0.25	3,825	1,021	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	3,825	430	0.15	591	0.15	591
663	0	206	8	TF/3F32/E-18C	89	0.68	2,311	1,645	8	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.29	2,311	693	0.39	952	0.39	952
664	0	Office 1	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
665	0	Break Room	2	TF/3F32/E-18C	89	0.17	2,072	369	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,072	155	0.10	213	0.10	213

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
666	0	Office 2	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
667	0	Storage Closet	3	TF/3F32/E-18C	89	0.03	217	58	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.01	217	24	0.02	34	0.02	34
668	0	Small Open Office Area	6	TF/3F32/E-18C	89	0.51	3,825	2,043	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	3,825	861	0.29	1,182	0.29	1,182
669	0	Electrical Closet	1	TF/3F32/E-18C	89	0.01	217	19	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.00	217	8	0.01	11	0.01	11
670	0	Chambers	35	TF/3F32/E-18C	89	2.96	1,558	4,853	35	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.25	1,558	2,045	1.71	2,808	1.71	2,808
671	0	204 Supervisor Conference Room	10	TF/3F32/E-18C	89	0.85	2,000	1,780	10	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.36	2,000	750	0.49	1,030	0.49	1,030
672	0	Break Room	2	TF/3F32/E-18C	89	0.17	2,072	369	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,072	155	0.10	213	0.10	213
673	0	Supervisor Office	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
674	0	Supervisor Office	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
675	0	Supervisor Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
676	0	County Attorney	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
677	0	Conference Room	6	TF/3F32/E-18C	89	0.51	2,000	1,068	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	2,000	450	0.29	618	0.29	618
678	0	Office 1	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
679	0	Office 2	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
680	0	Office 3	3	TF/3F32/E-18C	89	0.25	2,311	617	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,311	260	0.15	357	0.15	357
681	0	County Supervisor	3	TF/3F32/E-18C	89	0.25	2,311	617	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,311	260	0.15	357	0.15	357
682	0	Office 1	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
683	0	Office 2	4	TF/3F32/E-18C	89	0.34	2,311	823	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	2,311	347	0.20	476	0.20	476
684	0	Women's Restroom	1	TF/3F32/E-18C	89	0.08	1,365	121	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	1,365	51	0.05	70	0.05	70
685	0	Women's Restroom	2	W4/2F32/E	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
686	0	Men's Restroom	1	TF/3F32/E-18C	89	0.08	1,365	121	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	1,365	51	0.05	70	0.05	70
687	0	Men's Restroom	1	W2/2F17/E	33	0.03	1,365	45	1	Rebuild with (2) 8.5 watt LED tubes and low power, instant start ballast	-	0%	17	0.02	1,365	23	0.02	22	0.02	22
688	0	Closet	1	TF/3F32/E-Pris	89	0.01	217	19	1	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.00	217	8	0.01	12	0.01	12
689	0	Hallway Main	27	TF/3F32/E-Pris	89	2.28	2,743	6,591	27	P-2 2x4 LED prismatic troffer conversion kit, LW lumens (4445) 4000K	-	0%	35	0.90	2,743	2,592	1.39	3,999	1.39	3,999
690	0	Stair 2	7	W4/2F32/E	59	0.41	8,760	3,618	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.18	8,760	1,533	0.24	2,085	0.24	2,085
691	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
692	0	DEPARTMENT OF SOCIAL SERVICES BLDG	0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
693	100	Vestibule	3	TT/2FB32/E-9C	59	0.17	2,743	486	3	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.09	2,743	272	0.07	214	0.07	214
694	101	Client Waiting	19	TF/2F32/E-18C	59	1.06	3,825	4,288	19	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.45	3,825	1,817	0.61	2,471	0.61	2,471

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
695	102	Passage	2	TT/2FB32/E-9C	59	0.11	2,743	324	2	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.06	2,743	181	0.05	143	0.05	143
696	104	Women's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
697	104	Women's Restroom	2	TF/2F32/E-18C	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
698	105	Men's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
699	105	Men's Restroom	2	TF/2F32/E-18C	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
700	112	Reception	6	TF/3F32/E-18C	89	0.51	3,825	2,043	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	3,825	861	0.29	1,182	0.29	1,182
701	112	Reception	4	CFT22W	27	0.10	3,825	413	4	Relamp with (1) 14.5 Watt LED direct replacemnent CFL lamps-horizontal	-	0%	15	0.06	3,825	222	0.05	191	0.05	191
702	113	Security	4	TT/2FB32/E-9C	59	0.22	2,311	545	4	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.13	2,311	305	0.10	240	0.10	240
703	111	Individual Interview	15	TF/3F32/E-18C	89	1.27	2,311	3,085	15	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.53	2,311	1,300	0.73	1,785	0.73	1,785
704	115	Employee Vestibule	4	TT/2FB32/E-9C	59	0.22	3,825	903	4	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.13	3,825	505	0.10	398	0.10	398
705	114	Stair	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
706	114	Stair	1	S4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
707	114	Stair	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
708	116	Staff Lobby	7	TT/2FB32/E-9C	59	0.39	3,825	1,580	7	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.22	3,825	884	0.17	696	0.17	696
709	117	Coat Room	1	TF/2F32/E-18C	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
710	119	Staff Women's Restroom	2	TF/2F32/E-18C	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
711	119	Staff Women's Restroom	2	W4/2F32/E	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
712	120	Staff Men's Restroom	1	TF/2F32/E-18C	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
713	120	Staff Men's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
714	121	Janitor Closet	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
715	122	Storage Closet	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
716	013	Storage	1	TF/3F32/E-18C	89	0.01	217	19	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.00	217	8	0.01	11	0.01	11
717	012	Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
718	011	Office	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
719	010	Conference Room	1	TF/3F32/E-18C	89	0.08	2,000	178	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,000	75	0.05	103	0.05	103
720	009	Office	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
721	008	Office	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
722	130	Financial Program Services West	3	TF/3F32/E-18C	89	0.25	3,825	1,021	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	3,825	430	0.15	591	0.15	591
723	130	Financial Program Services West	2	TT/2FB32/E-9C	59	0.11	3,825	451	2	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.06	3,825	252	0.05	199	0.05	199

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
724	130	Financial Program Services West	10	TF/3F32/E-18C	89	0.85	3,825	3,404	10	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.36	3,825	1,434	0.49	1,970	0.49	1,970
725	130	Financial Program Services South	38	TF/3F32/E-18C	89	3.21	3,825	12,936	38	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.35	3,825	5,451	1.86	7,486	1.86	7,486
726	130	Financial Program Services South	4	TF/3F32/E-18C	89	0.34	3,825	1,362	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	3,825	574	0.20	788	0.20	788
727	130	Financial Program Services South	1	TT/2FB32/E-9C	59	0.06	3,825	226	1	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.03	3,825	126	0.02	99	0.02	99
728	129	Receiving	2	S4/2F32/E	59	0.11	3,825	451	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	3,825	191	0.06	260	0.06	260
729	128	Supplies Storage	7	S4/2F32/E	59	0.04	217	90	7	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	217	38	0.02	52	0.02	52
730	004	Office	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
731	114	Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
732	005	Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
733	006	Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
734	007	Office	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
735	112	Mechanical	3	S4/2F32/E	59	0.02	217	38	3	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	16	0.01	22	0.01	22
736	113	Stair Alcove	1	TF/2F32/E-18C	59	0.06	2,743	162	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	2,743	69	0.03	93	0.03	93
737	113	Stair	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
738	113	Stair	1	S4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
739	113	Stair	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
740	111	Server/ File Room	10	TF/3F32/E-18C	89	0.09	217	193	10	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	217	81	0.05	112	0.05	112
741	025	Office	3	TF/3F32/E-18C	89	0.25	2,311	617	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,311	260	0.15	357	0.15	357
742	-	Hallway to Resource Room	6	TF/3F32/E-18C	89	0.51	2,743	1,465	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	2,743	617	0.29	848	0.29	848
743	-	Hallway to Resource Room	3	TT/2FB32/E-9C	59	0.17	2,743	486	3	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.09	2,743	272	0.07	214	0.07	214
744	014	Office - MH	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
745	015	Office - MH	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
746	002	Visit	2	TF/3F32/E-18C	89	0.17	3,825	681	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	3,825	287	0.10	394	0.10	394
747	003	Visit	2	TF/3F32/E-18C	89	0.17	3,825	681	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	3,825	287	0.10	394	0.10	394
748	110	Large Training Room	6	TF/3F32/E-18C	89	0.51	2,000	1,068	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	2,000	450	0.29	618	0.29	618
749	100/101	Reception and Resource Room	6	TT/2FB32/E-9C	59	0.34	3,825	1,354	6	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.19	3,825	757	0.15	597	0.15	597
750	100/101	Reception and Resource Room	39	TF/3F32/E-18C	89	3.30	3,825	13,277	39	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.39	3,825	5,594	1.91	7,683	1.91	7,683
751	100/101	Reception and Resource Room	3	TT/2FB32/E-9C	59	0.17	3,825	677	3	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.09	3,825	379	0.07	298	0.07	298
752	105	Storage	1	TF/3F32/E-18C	89	0.01	217	19	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.00	217	8	0.01	11	0.01	11

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
753	106	Access VR	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
754	107	Office - DOL	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
755	108	Office - WD	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
756	109	Office - WD	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
757	102	Training Room	6	TF/3F32/E-18C	89	0.51	2,000	1,068	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	2,000	450	0.29	618	0.29	618
758	000	Storage	1	TF/3F32/E-18C	89	0.01	217	19	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.00	217	8	0.01	11	0.01	11
759	103	Small Conference Room	3	TF/3F32/E-18C	89	0.25	2,000	534	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,000	225	0.15	309	0.15	309
760	104	Large Conference Room	6	TF/3F32/E-18C	89	0.51	2,000	1,068	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	2,000	450	0.29	618	0.29	618
761	200	Stair	1	TF/2F32/E-18C	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
762	201	Lobby	9	TF/2F32/E-18C	59	0.50	2,743	1,457	9	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.21	2,743	617	0.29	839	0.29	839
763	202	Staff Women's Restroom	2	TF/2F32/E-18C	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
764	202	Staff Women's Restroom	2	W4/2F32/E	59	0.11	1,365	161	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.05	1,365	68	0.06	93	0.06	93
765	203	Staff Men's Restroom	1	TF/2F32/E-18C	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
766	203	Staff Men's Restroom	1	W4/2F32/E	59	0.06	1,365	81	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	1,365	34	0.03	46	0.03	46
767	204	Closet	1	TF/2F32/E-18C	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
768	205	Storage	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
769	206	Storage	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
770	207	Storage	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
771	210	Staff Lounge	1	TT/2FB32/E-9C	59	0.06	2,072	122	1	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.03	2,072	68	0.02	54	0.02	54
772	210	Staff Lounge	7	TF/3F32/E-18C	89	0.59	2,072	1,291	7	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.25	2,072	544	0.34	747	0.34	747
773	210	Staff Lounge Closet	2	S4/1F32/E	30	0.01	217	13	2	Rebuild with (1) 12.5 watt LED tube and low power, instant start ballast	-	0%	13	0.00	217	5	0.00	8	0.00	8
774	211	Storage	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
775	212	Supervisor Office	3	TF/3F32/E-18C	89	0.25	2,311	617	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,311	260	0.15	357	0.15	357
776	213	Adult Services Supervisor	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
777	214	Child Services Supervisor	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
778	215	Child Services Superintendent	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
779	216	CPS Supervisor 1	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
780	217	CPS Supervisor 2	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
781	218	CPS Supervisor 3	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119

			Pre-Install (Baseline)						Post-Install (Proposed)							Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
782	219	CPS Supervisor 4	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
783	220-224	Children Services and CPS Cubicle Offices	9	TT/2FB32/E-9C	59	0.50	3,825	2,031	9	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.28	3,825	1,136	0.22	895	0.22	895
784	220-224	Children Services and CPS Cubicle Offices	67	TF/3F32/E-18C	89	5.66	3,825	22,808	67	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	2.39	3,825	9,610	3.28	13,198	3.28	13,198
785	222	Storage	4	TF/2F32/E-18C	59	0.02	217	51	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	22	0.01	30	0.01	30
786	226	Secretary	3	TF/3F32/E-18C	89	0.25	3,825	1,021	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	3,825	430	0.15	591	0.15	591
787	227	Legal 1	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
788	228	Legal 2	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
789	229	Legal 3	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
790	230	Legal 4	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
791	231	Storage	2	TF/3F32/E-18C	89	0.02	217	39	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.01	217	16	0.01	22	0.01	22
792	232	Secretary	4	TF/3F32/E-18C	89	0.34	3,825	1,362	4	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.14	3,825	574	0.20	788	0.20	788
793	233	Conference	3	TF/3F32/E-18C	89	0.25	2,000	534	3	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.11	2,000	225	0.15	309	0.15	309
794	234	Commissioner	6	TF/3F32/E-18C	89	0.51	2,311	1,234	6	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.21	2,311	520	0.29	714	0.29	714
795	235	Deputy Commissioner	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
796	245	DMA	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
797	246	DMA	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
798	247	Staff DEV	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
799	248	AV Storage	1	TF/2F32/E-18C	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
800	249	Comp Program	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
801	250	Conference	2	TF/3F32/E-18C	89	0.17	2,000	356	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,000	150	0.10	206	0.10	206
802	251	D. Acc	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
803	251	Smoking	2	TF/3F32/E-18C	89	0.17	2,311	411	2	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.07	2,311	173	0.10	238	0.10	238
804	251	Mechanical & Telephone	4	S4/2F32/E	59	0.02	217	51	4	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	22	0.01	30	0.01	30
805	251	Stair	1	TF/2F32/E-18C	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
806	236	Coordinator Office	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
807	237	Clerical Offices and Files	19	TF/3F32/E-18C	89	1.61	3,825	6,468	19	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.68	3,825	2,725	0.93	3,743	0.93	3,743
808	238	Supervisor Office	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
809	240	Training Room	16	TF/3F32/E-18C	89	1.35	2,000	2,848	16	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.57	2,000	1,200	0.78	1,648	0.78	1,648
810	241	Supplies	2	TF/2F32/E-18C	59	0.01	217	26	2	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.01	217	11	0.01	15	0.01	15

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
811	242	Accounting Supervisor	1	TF/3F32/E-18C	89	0.08	2,311	206	1	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	0.04	2,311	87	0.05	119	0.05	119
812	243/244	Accounting Area and Passage	28	TF/3F32/E-18C	89	2.37	3,825	9,532	28	Rebuild with (3) 12.5 watt LED tubes and low power, instant start ballast	-	0%	38	1.00	3,825	4,016	1.37	5,516	1.37	5,516
813	243/244	Accounting Area and Passage	21	TT/2FB32/E-9C	59	1.18	3,825	4,739	21	Rebuild with (2) 16.5 watt LED U tubes and normal power, instant start ballast-JAIL	-	0%	33	0.66	3,825	2,651	0.52	2,088	0.52	2,088
814	001	General Storage	52	S8/4F32/E	112	0.58	217	1,264	52	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.26	217	564	0.32	700	0.32	700
815	001	General Storage	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
816	002	Stair	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
817	002	Stair	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
818	003	Machine Room	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
819	004	Gas Meter Room	1	S4/2F32/E	59	0.01	217	13	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.00	217	5	0.00	7	0.00	7
820	005	Stair 2	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
821	005	Stair 2	1	W4/2F32/E	59	0.06	8,760	517	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.03	8,760	219	0.03	298	0.03	298
822	006	Telephone IDF Room	2	S8/4F32/E	112	0.02	217	49	2	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.01	217	22	0.01	27	0.01	27
823	007	Electrical Room	2	S8/4F32/E	112	0.02	217	49	2	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.01	217	22	0.01	27	0.01	27
824	008	Vestibule	1	S4/2F32/E	59	0.06	2,743	162	1	Rebuild with (2) 12.5 watt LED tubes and low power, instant start ballast	-	0%	25	0.02	2,743	69	0.03	93	0.03	93
825	009	Boiler Room	6	S8/4F32/E	112	0.07	217	146	6	Rebuild with (4) 12.5 watt LED tubes and low power, instant start ballast	-	0%	50	0.03	217	65	0.04	81	0.04	81
826	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
827	0	COURTHOUSE	0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
828	0	Crow's Nest	0	S4/2F32/E	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
829	0	Crow's Nest Bath	0	W4/2F32/E	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
830	0	Old Jury Deliberation Room	0	W4/2F32/E	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
831	0	M&W Bath	0	W4/2F32/E	59	0.00	1,365	0	0	No Action	-	0%	59	0.00	1,365	0	0.00	0	0.00	0
832	0	Stair 1	0	I/60	60	0.00	8,760	0	0	No Action	-	0%	60	0.00	8,760	0	0.00	0	0.00	0
833	0	216 Court Clerk	0	W4/2F32/E	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
834	0	216A Bath	0	I/60	60	0.00	1,365	0	0	No Action	-	0%	60	0.00	1,365	0	0.00	0	0.00	0
835	0	215	0	W4/2F32/E	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
836	0	215A	0	W4/2F32/E	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
837	0	215B	0	I/60	60	0.00	2,311	0	0	No Action	-	0%	60	0.00	2,311	0	0.00	0	0.00	0
838	0	218 Judge	0	W4/2F32/E	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
839	0	218A	0	I/60	60	0.00	2,311	0	0	No Action	-	0%	60	0.00	2,311	0	0.00	0	0.00	0

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
840	0	219A	0	I/60	60	0.00	2,311	0	0	No Action	-	0%	60	0.00	2,311	0	0.00	0	0.00	0
841	0	219B	0	I/60	60	0.00	2,311	0	0	No Action	-	0%	60	0.00	2,311	0	0.00	0	0.00	0
842	0	219C	0	I/60	60	0.00	2,311	0	0	No Action	-	0%	60	0.00	2,311	0	0.00	0	0.00	0
843	0	Storage	0	I/60	60	0.00	217	0	0	No Action	-	0%	60	0.00	217	0	0.00	0	0.00	0
844	0	214 Courtroom	0	I/60/G	60	0.00	1,558	0	0	No Action	-	0%	60	0.00	1,558	0	0.00	0	0.00	0
845	0	Vestibule	0	I/60	60	0.00	2,743	0	0	No Action	-	0%	60	0.00	2,743	0	0.00	0	0.00	0
846	0	203 Grand Jury	0	TF/2F32/E-Pris	59	0.00	1,558	0	0	No Action	-	0%	59	0.00	1,558	0	0.00	0	0.00	0
847	0	200E	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
848	0	202	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
849	0	200B	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
850	0	Break Room	0	TF/2F32/E-Pris	59	0.00	2,072	0	0	No Action	-	30%	59	0.00	1,450	0	0.00	0	0.00	0
851	0	200F	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
852	0	200 Central Jury	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
853	0	200 Central Jury	0	TF/2F32/E-Pris	59	0.00	1,558	0	0	No Action	-	0%	59	0.00	1,558	0	0.00	0	0.00	0
854	0	200C Men's Room	0	W4/2F32/E	59	0.00	1,365	0	0	No Action	-	0%	59	0.00	1,365	0	0.00	0	0.00	0
855	0	200B Women's Room	0	W4/2F32/E	59	0.00	1,365	0	0	No Action	-	0%	59	0.00	1,365	0	0.00	0	0.00	0
856	0	214B Closet	0	I/60	60	0.00	217	0	0	No Action	-	0%	60	0.00	217	0	0.00	0	0.00	0
857	0	200A Janitor Closet	0	LED LAMP	0	0.00	217	0	0	No Action	-	0%	0	0.00	217	0	0.00	0	0.00	0
858	0	216 Lobby Rotunda	0	CF/26GLOBE	11	0.00	2,743	0	0	No Action	-	0%	11	0.00	2,743	0	0.00	0	0.00	0
859	0	204 Cloak Room	0	TF/2F32/E-Pris	59	0.00	217	0	0	No Action	-	0%	59	0.00	217	0	0.00	0	0.00	0
860	0	205 Women's Room	0	W4/2F32/E	59	0.00	1,365	0	0	No Action	-	30%	59	0.00	956	0	0.00	0	0.00	0
861	0	Miscellaneous Entries	0	CFT22W	27	0.00	3,825	0	0	No Action	-	0%	27	0.00	3,825	0	0.00	0	0.00	0
862	0	Stair to Balcony	0	I/60	60	0.00	2,743	0	0	No Action	-	0%	60	0.00	2,743	0	0.00	0	0.00	0
863	0	210 Law Clerk	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
864	0	Coffee Area	0	CF/23TWIST	23	0.00	2,072	0	0	No Action	-	0%	23	0.00	2,072	0	0.00	0	0.00	0
865	0	Closet	0	I/60	60	0.00	217	0	0	No Action	-	0%	60	0.00	217	0	0.00	0	0.00	0
866	0	211 Corridor	0	TF/2F32/E-Pris	59	0.00	2,743	0	0	No Action	-	0%	59	0.00	2,743	0	0.00	0	0.00	0
867	0	206 Con. Judge	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
868	0	209 Reception	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
869	0	Library	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
870	0	208	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
871	0	Stair to First Floor	0	I/60	60	0.00	2,743	0	0	No Action	-	0%	60	0.00	2,743	0	0.00	0	0.00	0
872	0	112 Lobby	0	CF/26GLOBE	11	0.00	2,311	0	0	No Action	-	0%	11	0.00	2,311	0	0.00	0	0.00	0
873	0	111 Probation	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
874	0	100	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
875	0	100D - Secretary	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
876	0	100R County Judge Office	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
877	0	100N	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
878	0	100B	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
879	0	100M	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
880	0	101 - Surrogate Court	0	TF/2F32/E-Pris	59	0.00	1,558	0	0	No Action	-	0%	59	0.00	1,558	0	0.00	0	0.00	0
881	0	101D - Secretary	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
882	0	101D - Secretary	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	0%	59	0.00	2,311	0	0.00	0	0.00	0
883	0	101A - Library	0	TF/4F32/E-Pris	112	0.00	2,241	0	0	No Action	-	97%	112	0.00	67	0	0.00	0	0.00	0
884	0	101A - Library	0	TF/4F32/E-Pris	112	0.00	2,241	0	0	No Action	-	0%	112	0.00	2,241	0	0.00	0	0.00	0
885	0	101B - File Room	0	TF/2F32/E-Pris	59	0.00	217	0	0	No Action	-	0%	59	0.00	217	0	0.00	0	0.00	0
886	0	Stair #2 - 101B	0	TF/2F32/E-Pris	59	0.00	8,760	0	0	No Action	-	0%	59	0.00	8,760	0	0.00	0	0.00	0
887	0	101C - County Judge	0	TF/4F32/E-Pris	112	0.00	2,311	0	0	No Action	-	0%	112	0.00	2,311	0	0.00	0	0.00	0
888	0	101C - County Judge	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
889	0	101C - County Judge	0	TF/2F32/E-Pris	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
890	0	111-Probation Department	0	TF/3F32/E-Pris	89	0.00	2,311	0	0	No Action	-	0%	89	0.00	2,311	0	0.00	0	0.00	0
891	0	104 - Waiting Room	0	TF/2F32/E-Pris	59	0.00	2,000	0	0	No Action	-	27%	59	0.00	1,460	0	0.00	0	0.00	0
892	0	104 - Waiting Room	0	TF/2F32/E-Pris	59	0.00	2,000	0	0	No Action	-	27%	59	0.00	1,460	0	0.00	0	0.00	0
893	0	108- Waiting Room	0	TF/4F32/E-Pris	112	0.00	2,000	0	0	No Action	-	0%	112	0.00	2,000	0	0.00	0	0.00	0
894	0	108- Waiting Room	0	TF/2F32/E-Pris	59	0.00	2,000	0	0	No Action	-	27%	59	0.00	1,460	0	0.00	0	0.00	0
895	0	106- Family Courtroom	0	TT/2FB32/E	59	0.00	2,000	0	0	No Action	-	0%	59	0.00	2,000	0	0.00	0	0.00	0
896	0	106- Family Courtroom	0	TT/2FB32/E	59	0.00	2,000	0	0	No Action	-	27%	59	0.00	1,460	0	0.00	0	0.00	0
897	0	106- Family Courtroom	0	CFT22W-2	54	0.00	2,000	0	0	No Action	-	27%	54	0.00	1,460	0	0.00	0	0.00	0

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
898	0	106- Family Courtroom	0	CFT22W-2	54	0.00	2,000	0	0	No Action	-	27%	54	0.00	1,460	0	0.00	0	0.00	0
899	0	106A - Family Courtroom Clerk	0	W4/2F32/E	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
900	0	106A - Family Courtroom Clerk	0	W4/2F32/E	59	0.00	3,825	0	0	No Action	-	0%	59	0.00	3,825	0	0.00	0	0.00	0
901	0	106B	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	0%	59	0.00	3,825	0	0.00	0	0.00	0
902	0	106B Toilet	0	TF/2F32/E-Pris	59	0.00	1,365	0	0	No Action	-	30%	59	0.00	956	0	0.00	0	0.00	0
903	0	106 - Corridor	0	I/60	60	0.00	2,743	0	0	No Action	-	0%	60	0.00	2,743	0	0.00	0	0.00	0
904	0	106 - Corridor	0	I/60	60	0.00	2,743	0	0	No Action	-	0%	60	0.00	2,743	0	0.00	0	0.00	0
905	0	106E - Storage	0	W4/2F32/E	59	0.00	217	0	0	No Action	-	0%	59	0.00	217	0	0.00	0	0.00	0
906	0	106E - Storage	0	W4/2F32/E	59	0.00	217	0	0	No Action	-	0%	59	0.00	217	0	0.00	0	0.00	0
907	0	106D - Corridor	0	TF/2F32/E-Pris	59	0.00	2,743	0	0	No Action	-	0%	59	0.00	2,743	0	0.00	0	0.00	0
908	0	106D - Corridor	0	TF/2F32/E-Pris	59	0.00	2,743	0	0	No Action	-	0%	59	0.00	2,743	0	0.00	0	0.00	0
909	0	106F - Toilet	0	W4/2F32/E	59	0.00	1,365	0	0	No Action	-	30%	59	0.00	956	0	0.00	0	0.00	0
910	0	106G - Attorney's Room	0	W4/2F32/E	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
911	0	B-1	0	CF/26GLOBE	11	0.00	3,825	0	0	No Action	-	20%	11	0.00	3,060	0	0.00	0	0.00	0
912	0	B-2	0	TF/3F32/E-Pris	89	0.00	3,825	0	0	No Action	-	20%	89	0.00	3,060	0	0.00	0	0.00	0
913	0	B-3	0	TF/2F32/E-18C	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
914	0	B-4 Family Court	0	TF/3F32/E-18C	89	0.00	1,558	0	0	No Action	-	0%	89	0.00	1,558	0	0.00	0	0.00	0
915	0	B-5 Mens Room	0	CF/26GLOBE	11	0.00	1,365	0	0	No Action	-	0%	11	0.00	1,365	0	0.00	0	0.00	0
916	0	FC-101 & 102 Mech Room	0	S4/2F32/E	59	0.00	217	0	0	No Action	-	0%	59	0.00	217	0	0.00	0	0.00	0
917	0	FC-101 & 102 Mech Room	0	S4/2F32/E	59	0.00	217	0	0	No Action	-	0%	59	0.00	217	0	0.00	0	0.00	0
918	0	B-10 Restroom	0	TF/2F32/E-Pris	59	0.00	1,365	0	0	No Action	-	30%	59	0.00	956	0	0.00	0	0.00	0
919	0	B-11 Corridor	0	TF/3F32/E-Pris	89	0.00	2,743	0	0	No Action	-	0%	89	0.00	2,743	0	0.00	0	0.00	0
920	0	B-11 Corridor	0	TF/3F32/E-Pris	89	0.00	2,743	0	0	No Action	-	0%	89	0.00	2,743	0	0.00	0	0.00	0
921	0	B-11 Corridor	0	CFT22W-2	54	0.00	2,743	0	0	No Action	-	0%	54	0.00	2,743	0	0.00	0	0.00	0
922	0	B-14 Restroom	0	W4/2F32/E	59	0.00	1,365	0	0	No Action	-	30%	59	0.00	956	0	0.00	0	0.00	0
923	0	B-15 Surrogate Records	0	TF/2F32/E	59	0.00	2,311	0	0	No Action	-	30%	59	0.00	1,618	0	0.00	0	0.00	0
924	0	B-14 Restroom	0	S2/2F17/E	33	0.00	1,365	0	0	No Action	-	0%	33	0.00	1,365	0	0.00	0	0.00	0
925	0	B-14 Restroom	0	i/60	60	0.00	1,365	0	0	No Action	-	0%	60	0.00	1,365	0	0.00	0	0.00	0
926	0	B-16 Surrogate Court Records	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0

			Pre-Install (Baseline)						Post-Install (Proposed)								Lighting Energy Savings		Energy Savings	
Action #	Map Location #	Location Description	# of Baseline Fixtures	Pre-Install Fixture Code	Pre Watts Per Fixture	Pre KW Demand	Pre Annual Hours of Operation	Pre Kwh	# of Proposed Fixtures	Proposed Fixture Code	Proposed Ceiling / Wall Mounted Sesor (#1)	Proposed Control Savings %	Proposed Watts per Fixture	Proposed KW Demand	Proposed Annual Hours of Operation	Annual Proposed Kwh	KW Demand Saved	Kwh Saved	KW Demand Saved	Kwh Saved
927	0	B-16 Surrogate Court Records	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
928	0	B-16 Surrogate Court Records	0	TF/2F32/E-Pris	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
929	0	B-12 (Door Locked)	0	-	0	0.00	0	0	0	No Action	-	0%	0	0.00	0	0	0.00	0	0.00	0
930	0	B-17A Attorney Conference	0	TF/3F32/E	89	0.00	2,000	0	0	No Action	-	0%	89	0.00	2,000	0	0.00	0	0.00	0
931	0	B-22 Lobby	0	CFT22W-2	54	0.00	2,743	0	0	No Action	-	0%	54	0.00	2,743	0	0.00	0	0.00	0
932	0	B-19 Storage	0	TF/2F32/E	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
933	0	B-19 Storage	0	TF/2F32/E	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
934	0	B-1	0	TF/3F32/E-18C	89	0.00	3,825	0	0	No Action	-	20%	89	0.00	3,060	0	0.00	0	0.00	0
935	0	B-1	0	TF/3F32/E-18C	89	0.00	3,825	0	0	No Action	-	20%	89	0.00	3,060	0	0.00	0	0.00	0
936	0	B-11 Conference	0	TF/2F32/E	59	0.00	2,000	0	0	No Action	-	27%	59	0.00	1,460	0	0.00	0	0.00	0
937	0	B-Deputy Locker	0	TF/3F32/E-18C	89	0.00	1,365	0	0	No Action	-	30%	89	0.00	956	0	0.00	0	0.00	0
938	0	B-17A Attorney Room	0	TF/2F32/E	59	0.00	3,825	0	0	No Action	-	20%	59	0.00	3,060	0	0.00	0	0.00	0
939	0	B-15A Stair	0	TF/2F32/E-Pris	59	0.00	8,760	0	0	No Action	-	0%	59	0.00	8,760	0	0.00	0	0.00	0
940	0		0	-	0	0.00	0	0	0	0	-	0%	0	0.00	0	0	0.00	0	0.00	0
941	0	Morrisville Exterior	0	HPS/70/WP	95	0.00	4,380	0	0	No Action	-	0%	95	0.00	4,380	0	0.00	0	0.00	0
942	0	Morrisville Exterior	0	HPS/70/WP	95	0.00	4,380	0	0	No Action	-	0%	95	0.00	4,380	0	0.00	0	0.00	0
			3620			**219.73**		**890,540**	**3611**					**91.75**		**339,687**	**127.98**	**550,853**	**128**	**550,853**