

SECTION 15831

AIR CURTAINS

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\*\* NOTE TO SPECIFIER \*\* Mars Air Systems, LLC; for Mars WindGuard 14 Series air curtains for environmental control, insect control and temperature control.

.

This section is based on products manufactured by Mars Air Systems, LLC, which is located at:

 14716 South Broadway St.

 Gardena, CA 90248

 Tel: (310) 532-1555

 Tel: (800) 421-1266

 Fax: (310) 324-3030

 Email: info@marsair.com

 Web: www.marsair.com

 [click Here] for additional information.

Mars Air Systems, LLC. manufactures energy savings air curtains that make buildings more functional for work, dining, shopping and play. From manufacturing facilities, warehouses and convention centers to buy-in-bulk retail stores, restaurants and sports complexes, Mars Air Curtains can be installed over any operational door or pass-thru window. Mars Air Curtains will protect a building's inside environment from windborne dust, dirt, fumes, flying insects and extreme outside temperature conditions. Mars offers a complete line of air curtains available with a variety of heat options, color and mounting options, and a multitude of accessories to customize your air curtain for any application setting. Heating options include electric, steam, or hot water coils and gas fired duct furnaces. Not only will Mars Air Curtains improve the inside sanitation levels of your facility, but it will also reduce the operational energy costs necessary to heat and cool it.

Typical installations include retail entrances, pedestrian and vehicular openings, and large loading dock doors. Air curtains help reduce heating and cooling costs while expediting the flow of traffic from one work area to another or in and out of a building. At the same time, air curtains repel gusts of wind and minimize the entrance of windborne dust, fumes, pollutants, and flying insects.

Mars Air Curtain products meet the requirements of all North American and European Union Codes and Standards. For a complete selection guide and assistance with your air curtain configuration please visit [www.marsair.com](http://www.marsair.com). For additional information and assistance call Mars Air Systems at 800-421-1266 or 310-532-1555.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Air curtains for pedestrian entrances.
		2. Air curtains for vehicular entrances.
		3. Air curtains for large loading dock doors.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 05500 - Metal Fabrications: Concealed steel support members.
		2. Section 06100 - Rough Carpentry.
		3. Section 05410 - Load-Bearing Metal Studs.
		4. Section 07900 - Joint Sealers.
		5. Section 08110 - Steel Doors and Frames.
		6. Section 08330 - Overhead Coiling Doors.
		7. Section 15145 - Plumbing Piping: Gas piping to units.
		8. Section 15182 - Hydronic Piping: Hot water heating piping to units.
		9. Section 15184 - Steam and Condensate Piping: Steam heating piping to units.
		10. Section 16150 (20 05 00) - Equipment Wiring: Connections to building power distribution.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASTM A240 / A240M -10 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
		2. ASTM A591 / A591M -98 – Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight (Mass) Application (Withdrawn in 2005, replaced by A879/A879M).
		3. ASTM A879 / A879M -06 – Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Application Requiring Designation of the Coating Mass on Each Surface.
		4. ASTM A653 / A653M -09a – Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
		5. ARI 410-2001 – Standard for Forced-Circulation Air-cooling and Air-Heating Coils.
		6. CRN – Canadian Registration Number Coil.
		7. ANSI Z223-NFPA 54 - National Fuel Gas Code.
		8. NEC – National Electric Code.
	1. SUBMITTALS
		1. Submit under provisions of Section 01300.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.
		3. Shop Drawings: Include plans, elevations, sections, and details, indicating dimensions, tolerances, materials, fasteners, hardware, finish, piping, electrical wiring diagrams, options, and accessories.

\*\* NOTE TO SPECIFIER \*\* Delete selection samples if colors have already been selected.

* + 1. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
		2. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
		3. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
		4. Operation and Maintenance Manual: Submit manufacturer's operation and maintenance manual, including operation, maintenance, adjustment, and cleaning instructions, trouble shooting guide, parts list, and electrical wiring diagrams.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Minimum ten years documented experience producing the products specified in this Section.
		2. Installer Qualifications: Minimum five years documented experience installing products specified in this Section.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Store products in manufacturer's unopened packaging until ready for installation.
		2. Store in a dry, heated storage area until installation of products.
		3. Protect materials and finish from damage during handling and installation.
	3. SEQUENCING
		1. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
		2. Coordinate the installation of wiring and control switches for air curtains with the openings and the hardware provided for such openings.
		3. Install after doors, walls, ceilings and other adjacent surfaces are finished and painted.
	4. WARRANTY

\*\* NOTE TO SPECIFIER \*\* Select the applicable warranty from the following paragraphs as required for the unit(s) specified and delete the one not required.

* + 1. Standard five year limited parts warranty for unheated units against defects in workmanship and material.
		2. Standard eighteen-month limited parts warranty for heated units against defects in workmanship and materials.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Mars Air Systems, LLC; 14716 South Broadway St., Gardena, CA 90248. Tel: (310) 532-1555 or (800) 421-1266. Fax: (310) 324-3030. Email: info@marsair.com. Web: www.marsair.com.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01600.

\*\* NOTE TO SPECIFIER \*\* WindGuard 14 Series air curtains are available for Environmental and Flying Insect Control. They are available for openings 96 inches to 192 inches wide. Recommended installation heights for environmental separation and temperature control - interior door up to 18 feet and exterior door up to 14 feet and for flying insect control is up to 14 feet. WindGuard 14 Series air curtains for temperature control applications are typically effective to resist wind loads up to 25 mph. Note that velocities specified for each unit are based on a 60 Hz power source.

Select the type and sizes required and delete those not required. Indicate the door/opening height for each air curtain on the Drawings or on the Schedule at the end of this Section. If more than one type and/or size is required, indicate the location of each on the Drawings or on the Schedule at the end of this Section.

* 1. AIR CURTAIN ASSEMBLIES
		1. Motor Fan Assembly: Design for easy removal, assembly, repair and maintenance.
			1. Motor: Totally enclosed fan cooled (TEFC) motor with sealed lifetime pre-lubricated ball bearings.
				1. Wired for single speed operation, but inverter rated.

\*\* NOTE TO SPECIFIER \*\* Select the following paragraph(s) as required for specialty motors and delete the ones not required. Indicate the location of special use motors on the Drawings or on the Schedule at the end of this Section.

* + - * 1. Provide wash down type motors, NEC IP-54 for the locations indicated.
				2. Provide explosion proof type motors, NEC Class 1, Division 1, Group D for the locations indicated.

\*\* NOTE TO SPECIFIER \*\* Select one of the following two paragraphs and delete the ones not required. Note that Electrical Characteristics below do not include electric heater requirements. Note that all motors listed are based on 60 Hz service. For units wider than 96 inches, refer to submittal for total amps. For other voltages contact manufacturer.

* + - * 1. Electrical Characteristics: 208/230V AC, three phase; 14.2/13.0 Amp full load per motor/fan for units up to 96 inches wide.
				2. Electrical Characteristics: 460V AC, three phase; 6.5 Amp full load per motor/fan for units up to 96 inches wide.
			1. Fans: Forward curved centrifugal type, double width, and double inlet design, directly driven to an electric motor.
			2. Provide rigid mounted base between motor and frame.
			3. Factory balanced blower wheel assembly statically and dynamically.
		1. Housing: Self contained one-piece type with sufficient strength for mounting from pre-punched mounting holes at both ends to adjacent walls or ceiling without intermediate support.
			1. Size:

\*\* NOTE TO SPECIFIER \*\* Select one of the following paragraphs and delete the ones not required. Heated units are mounted inside only; coordinate with heating paragraphs if required.

* + - * 1. Unheated: 28 inches deep by 36 inches high by width of unit.
				2. Electric Heated: 36 inches deep by 28 inches high by width of unit.
				3. Hot Water/Steam Heated: Depth 42 inches single row and 44 inches double row by 28 inches high (36 inches for furnace) by width of unit plus 10 inches for manifolds.
				4. Indirect Fired Gas Heated: 74 inches deep (including transition and furnace) by 36-1/4 inches high by width of unit.
			1. Mounting:

\*\* NOTE TO SPECIFIER \*\* Select one of the following paragraphs and delete the ones not required. Heated units are mounted inside only; coordinate with heating paragraphs if required.

* + - * 1. Unheated Inside Mount.
				2. Heated Inside Mount.
				3. Unheated Outside Mount.
				4. Mount Location Indicated.
			1. Material:

\*\* NOTE TO SPECIFIER \*\* Select one of the following two paragraphs and delete the one not required.

* + - * 1. Provide 10, 12 and 14 gauge electro or hot dipped galvanized steel sheet housing conforming to ASTM A 591 and/or ASTM A 653.
				2. Provide type 304 stainless steel housing with brushed finish. ASTM A 240/A 240M.
			1. Air Inlet Grille and/or Filters: Provide air inlet grille and/or filters specified.
			2. Discharge: Provide integral discharge nozzle specified.

\*\* NOTE TO SPECIFIER \*\* Select following paragraph for sheet steel housings only. Delete entirely for stainless steel housing. Select color required for steel housing and delete the ones not required. Battleship Gray is standard.

* + - 1. Finish and Color: Provide with, no VOC, corrosion resistant polyurethane powder coated finish for sheet steel housings.
				1. Obsidian Black.
				2. Pearl White.
				3. Titanium Silver.
		1. Environmental and Flying Insect Control Air Curtains: Models for Heights to 14 feet (4267 mm).
			1. Discharge Nozzle: Adjustable air foil vanes with a plus/minus 40 degree sweep front to back.
			2. Air Velocity at Nozzle:

\*\* NOTE TO SPECIFIER \*\* Select one of the following paragraphs for the model required and delete the ones not required. If more than one type is required show the location of each type on the Drawings or on the Schedule at the end of this Section.

* + - * 1. BD 14 96-1: 107 Inch (2720 mm) Wide Units: 4500 feet/min (22.9 m/s) single 5HP motor/fan assemblies.
				2. BD 14 120-1: 131 Inch (3329 mm) Wide Units: 4500 feet/min (22.9 m/s) single 5HP motor/fan assemblies.
				3. BD 14 144-1: 155 Inch (3939 mm) Wide Units: 4500 feet/min (22.9 m/s) single 7-1/2HP motor/fan assemblies.
				4. BD 14 168-1: 179 Inch (4549 mm) Wide Units: 4500 feet/min (22.9 m/s) single 7-1/2HP motor/fan assemblies.
				5. BD 14 192-1: 203 Inch (5159 mm) Wide Units: 4500 feet/min (22.9 m/s) single 10HP motor/fan assemblies.
			1. Air Speed at Floor: Minimum of 300 fpm (1.53 m/s) at 3 feet (914 mm) from the floor.
			2. Air Inlet Grille and Filters:
				1. Location: Front.

\*\* NOTE TO SPECIFIER \*\* Select one of the following air inlet type paragraphs and delete the ones not required.

* + - * 1. Type: Fixed air intake grille.

\*\* NOTE TO SPECIFIER \*\* Include the following optional filter paragraph if required and delete if not required.

Expanded Metal: 85% open area.

* + - * 1. Type: Filter Only as follows:

\*\* NOTE TO SPECIFIER \*\* Include one of the following optional filter paragraphs as required and delete those not required.

Filter: Flat bank 2 inch, disposable.

Filter: V-bank 2 inch disposable.

Filter: V-bank 2 inch aluminum washable.

* + - * 1. Speed: 11700 cu ft/min (5522 L/s), minimum, per motor/fan assembly.
			1. Sound Pressure Level At 10 feet (3 m) From Nozzle:

\*\* NOTE TO SPECIFIER \*\* Select one of the following paragraphs and delete the ones not required. Coordinate selection with the Model specified above.

* + - * 1. Single Motor/Fan, 5HP Units: 73 dBA.
				2. Single Motor/Fan, 7-1/2HP Units: 74 dBA.
				3. Single Motor/Fan, 10HP Units: 75 dBA.

\*\* NOTE TO SPECIFIER \*\* Select the optional components required from the following paragraphs for the air curtains specified. If more than one type of air curtain or component is required, indicate the location of each curtain and the components required for each location on the Drawings or on the Schedule at the end of this Section. Contact Mars Air Systems for specialty steam and hot water heaters other than those included in the specification.

* 1. COMPONENTS
		1. Electric Heaters: Provide complete with heater control panel factory mounted to air curtain housing, and thermostat to be field installed.
			1. Temperature limit controller.
			2. Heating Coils: UL approved. Factory mounted on the intake side of the air curtain cabinet.
		2. Steam Heaters: Provide finned tube steam coils for field mounting on air intake side of the air curtain cabinet with opposite end connections.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs.

* + - 1. Output: Air curtain manufacturer's standard, one-row coils.
			2. Output: Air curtain manufacturer's standard, two-row coils.
			3. Coils: Certified in accordance with ARI 410.

\*\* NOTE TO SPECIFIER \*\* Delete all but one of the following six connections paragraphs.

* + - 1. Connections: Opposite end, horizontal.
			2. Connections: Same end, right hand, horizontal.
			3. Connections: Same end, left hand, horizontal.
			4. Connections: Opposite end, vertical.
			5. Connections: Same end, right hand, vertical.
			6. Connections: Same end, left hand, vertical.
			7. Casing: One piece unpainted galvanized steel, bolted to air curtain housing.
		1. Hot Water Heaters: Provide finned tube water coils for field mounting on air intake side of the air curtain cabinet with opposite end connections.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs.

* + - 1. Output: Air curtain manufacturer's standard, one-row coils.
			2. Output: Air curtain manufacturer's standard, two-row coils.
			3. Coils: Certified in accordance with ARI 410.

\*\* NOTE TO SPECIFIER \*\* Delete all but one of the following six connections paragraphs.

* + - 1. Connections: Opposite end, horizontal.
			2. Connections: Same end, right hand, horizontal.
			3. Connections: Same end, left hand, horizontal.
			4. Connections: Opposite end, vertical.
			5. Connections: Same end, right hand, vertical.
			6. Connections: Same end, left hand, vertical.
			7. Casing: One piece unpainted galvanized steel, bolted to air curtain housing.
		1. Gas Heaters: Provide field mounted indirect natural gas fired, power vented duct furnace, with aluminized steel heat exchanger and die-formed stainless steel insert burners; manifolds, orifices, flame sensor, and igniter easily removable as an assembly.
			1. Output: Air curtain manufacturer's standard.
			2. Standards: Complies with:
				1. Canadian Standards Association (CSA) labeled for US and Canadian application.
				2. ANSI Z223/NFPA 54 National Fuel Gas Code.
				3. CAN/CGA B149.1 Installation Codes for Natural Gas Burning Appliances and Equipment.

\*\* NOTE TO SPECIFIER \*\* Select fuel type required and delete the one not required.

* + - 1. Fuel Type: Provide orifices for:
				1. Natural gas.
				2. LP.
			2. 24 V control voltage transformer.
			3. Combination single-stage gas control system with regulated combination redundant gas valve and intermittent spark pilot with electronic flame supervision.
			4. Limit and safety controls.

\*\* NOTE TO SPECIFIER \*\* Select one of the following Motor Control Panel paragraphs as required and delete the ones not required. The first paragraph is for Unheated Units, the second is for Electric Heated Units, the third is for Steam and Hot Water Heated Units and the fourth is for Gas Heated Units.

* + 1. Motor Control Panels For Unheated Units: Recommended for units whenever a door limit switch is used to automatically start and stop the air curtain. Provide motor control panel as follows:

\*\* NOTE TO SPECIFIER \*\* Delete all but one of the following three mounting paragraphs. Motor Control Panels are remote mounted, as standard, however right or left hand mounting can be provided.

* + - 1. Mounting: Shipped loose to be remote mounted.
			2. Mounting: Factory mounted on right hand side of air curtain housing.
			3. Mounting: Factory mounted on left hand side of air curtain housing.
			4. Motor Control Panels are UL Listed and CSA Approved.
		1. Motor Control Panels For Electric Heated Units: Recommended for all units whenever a door limit switch is used to automatically start and stop the air curtain. Thermostat is included with optional motor control panel for field installation. Provide control panel as follows:

**\*\* NOTE TO SPECIFIER \*\* Motor Control Panel with integrated thermostat is optional. Delete if not required.**

* + - 1. Control Panel: Includes increased transformer for power venter(s) with integrated 24-Volt thermostat with furnace and motor controls.

**\*\* NOTE TO SPECIFIER \*\* Select the following thermostat paragraph if optional control panel paragraph is selected. Delete if not required.**

* + - 1. Thermostat: Wall-mounted, 24-Volt operation, with heater on/off selection.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two mounting paragraphs. Motor control panels on electric heated units are integrated with a heater control panel on the right side, as standard, however left hand mounting can be provided.

* + - 1. Mounting: Factory mounted on right hand side of air curtain housing.
			2. Mounting: Factory mounted on left hand side of air curtain housing.
			3. Electrical Components UL/CUL listed.
		1. Motor Control Panels For Steam and Hot Water Heated Units: Recommended for all units whenever a door limit switch is used to automatically start and stop the air curtain. Thermostat is included with optional motor control panel for field installation. Provide motor control panel as follows:

**\*\* NOTE TO SPECIFIER \*\* Motor Control Panel with integrated thermostat is optional. Delete if not required.**

* + - 1. Control Panel: Includes increased transformer for power venter(s) with integrated 110-Volt thermostat with furnace and motor controls.

**\*\* NOTE TO SPECIFIER \*\* Select the following thermostat paragraph if optional control panel paragraph is selected. Delete if not required.**

* + - 1. Thermostat: Wall-mounted, 110-Volt operation, with heater on/off selection.

**\*\* NOTE TO SPECIFIER \*\* Delete one of the following two mounting paragraphs. Motor control panels on steam and hot water heated units are integrated with a heater control panel on the right side, as standard, however left hand mounting can be provided.**

* + - 1. Mounting: Factory mounted on right hand side of air curtain housing.
			2. Mounting: Factory mounted on left hand side of air curtain housing.
		1. Motor Control Panels For Gas Heated Units: Recommended for all units whenever a door limit switch is used to automatically start and stop the air curtain. Thermostat is included with optional motor control panel for field installation. Provide motor control panel as follows:

**\*\* NOTE TO SPECIFIER \*\* Motor Control Panel with integrated thermostat is optional. Delete if not required.**

* + - 1. Control Panel: Includes increased transformer for power venter(s) with integrated 24-Volt thermostat with furnace and motor controls.

**\*\* NOTE TO SPECIFIER \*\* Select the following thermostat paragraph if optional control panel paragraph is selected. Delete if not required.**

* + - 1. Thermostat: Wall-mounted, 24-Volt operation, with heater on/off selection.

**\*\* NOTE TO SPECIFIER \*\* Delete one of the following two mounting paragraphs. Motor control panels on gas heated units are integrated with a heater control panel on the right side, as standard, however left hand mounting can be provided.**

* + - 1. Mounting: Factory mounted on right hand side of air curtain housing.
			2. Mounting: Factory mounted on left hand side of air curtain housing.
			3. Motor Control Panels are UL Listed and CSA Approved.
		1. Door-Activated Limit switch(s): Provide, field installed 250-Volts, 20 amps limit switch to control air curtain(s) as follows; Automatic on/off control, activates air curtain when door is opened and turns off when door is closed. Provide limit switch for direct control one 1 HP or up to two 1/2 HP single phase motors without a separate control panel. Provide a separate control panel for three phase motors and/or units exceeding 1 HP, 250-Volts or 20 amps controlled by a limit switch.
			1. Type: Combination plunger/roller switch for swing and sliding doors.

\*\* NOTE TO SPECIFIER \*\* Delete three of the following four paragraphs to suit enclosures for incidental contact, protection against weather and corrosive exposure and explosion proof as required.

* + - * 1. Provide limit switches with NEMA 1 (20 amps) ratings in locations indicated.
				2. Provide limit switches with NEMA 4X (10 amps) ratings in locations indicated.
				3. Provide limit switches with NEMA 4X (15 amps) ratings in locations indicated.
				4. Provide limit switches with NEMA 7 (10 amps) ratings in locations indicated.

\*\* NOTE TO SPECIFIER \*\* Edit the following two paragraphs to suit the units specified. Delete the paragraph not applicable if it is not required.

* + - 1. Operation for Unheated, Electric, Hot Water and Steam Units: Automatic on/off control, on when door is opened, off when door is closed.
			2. Operation for Gas Heated Units: Automatic on when door is opened, off after time delay period (60 seconds) after door is closed.
		1. Provide mounting hardware as required for the opening.
1. EXECUTION
	1. EXAMINATION
		1. Verify that required utilities are in correct location and are of correct capacities for specified products.
		2. Verify openings to receive air curtains are plumb, level, square, accurately aligned, correctly located, and in tolerance.
		3. Examine surfaces to receive air curtains. If surface preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. INSTALLATION

\*\* NOTE TO SPECIFIER \*\* Indicate the mounting location(s) on the Drawing or on the Schedule at the end of this Section. Units are typically wall mounted horizontally above the door opening. Units can also be suspension mounted from the ceiling or vertically mounted along side the opening. Heated units must be mounted on the inside or protected side of the opening.

* + 1. Install air curtains in accordance with approved shop drawings and manufacturer's printed installation instructions.
		2. Install air curtains plumb, level, square, true to line, and weathertight, without warp or rack.
		3. Anchor air curtains securely in place to supports.
		4. Install sheet metal flashing as specified in Section 07620.
		5. Install joint sealants as specified in Section 07920.
		6. Install electrical power as specified in Section 16100.
		7. Install door limit switches and adjust for correct operation.
		8. Provide connection to piped services and utilities as specified in Sections of Divisions 15.
	1. FIELD QUALITY CONTROL
		1. Adjust air curtains to function properly.
		2. Adjust air foil vanes located within the discharge nozzle as required for prevailing conditions at each opening.
		3. Check heated air curtain performance on a calm day by measuring air temperature 6 inches off the floor. Optimal reading is halfway between the temperature inside and outside the building.
	2. CLEANING
		1. Clean air curtains promptly after installation in accordance with manufacturer's instructions.
		2. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
		3. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.
	3. PROTECTION
		1. Protect materials and finish from damage until substantial completion.

\*\* NOTE TO SPECIFIER \*\* For facilities with multiple types and sizes of air curtains use an Air Curtain Schedule to list requirements for each size, type, HP and power requirements of air curtain(s) required. Delete if not required.

* 1. SCHEDULE
		1. Refer to Air Curtain Schedule appended to this section.

END OF SECTION