**SECTION 15834 [23 34 33] – AIR CURTAINS**

***NOTE TO SPECIFICATION AUTHOR:*** *Enable “Hidden Text” under File>Options>Display. Green text in [] indicates options that the specification author needs to select prior to completion of the Contract Document specifications. Enable “Navigation Pane” under “View” tab for easy browsing. Delete this text box after viewing.*

# PART 1 - GENERAL

## SUMMARY:

1. This section includes [electric heated/ hot water heated/ steam heated/ indirect gas heated] air curtains.

## RELATED REQUIREMENTS: ***NOTE TO SPECIFICATION AUTHOR:*** *Delete requirements not relevant to specification.*

1. Section 04 22 00 - Concrete Unit Masonry
2. Section 05 40 00 - Cold-Formed Metal Framing
3. Section 05 50 00 – Metal Fabrications
4. Section 06 10 00 - Rough Carpentry
5. Section 08 11 00 - Metal Doors and Frames
6. Section 08 33 23 – Overhead Coiling Doors
7. Section 08 41 00 - Entrances and Storefronts
8. Section 08 71 00 - Door Hardware
9. Section 09 22 16 – Non-Structural Metal Framing
10. Section 09 51 13 – Acoustical Panel Ceilings
11. Section 09 91 00 – Painting
12. Division 22 – Plumbing
13. Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC)
14. Division 26 - Electrical

## REFERENCE STANDARDS:

1. AMCA 211 - Certified Ratings Program - Product Rating Manual for Fan Air Performance.

1. AMCA 220 - Laboratory Methods of Testing Air Curtain Units for Aerodynamic Performance Ratings.
2. AMCA 222 - Application Manual for Air Curtain Units.
3. ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
4. ASHRAE 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks.
5. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
6. NSF 37 - Air Curtains for entranceways in food and foodservice establishments - ETL Sanitation
7. UL 507 - Electric Fans.
8. UL 1995 - Heating and Cooling Equipment
9. UL 2021 - Fixed and Location-Dedicated Electric Room Heaters.

## SUBMITTALS:

1. Submittals under the provisions of Section [01 33 00] are required to show full compliance with the contract documents.

### Product Data:

1. Product Data must have the specific Contract Document air curtain mark/tag on each submittal with all information associated with each unit clearly identified. Where information does not apply to the product being provided, then such information must be marked off on the submittal.
2. Rated capacities showing compliance with Contract Document requirements scheduled on drawings. Capacities including but not limited to: Airflow (CFM), discharge velocity (FPM), noise rating (dBA), motor quantity and horsepower, electrical ratings (FLA, volts/phase/hertz), outlet velocity uniformity (%), unit assembly weight (lbs.).
3. Mechanical Drawings.
4. Wiring Diagrams.
5. Standard product features.
6. Optional product features and accessories.

### Shop Drawings:

1. Provide drawings showing air curtain assembly and parts.
2. Wiring Diagrams: Power, signal, and control wiring. The wiring diagram must indicate a clear distinction between manufacturer’s factory furnished and installed wiring, and contractor furnished and installed wiring for all power, signal and control wiring and accessories.
3. Installation Instructions: Manufacturer’s installation instructions with diagrams, instructions, and manufacturer’s contact information
4. Operation and Maintenance Data: Complete documentation of manufacturer’s recommended operation and maintenance procedures for the air curtain including commissioning procedures.
5. Manufacturer’s Warranty statement for products and parts.
6. Contractor’s Warranty statement for repair and replacement of products and parts.

## QUALITY ASSURANCE:

1. Comply with all applicable ordinances, codes and standards required by the authorities having jurisdiction.
2. Comply with NFPA 70 - National Electrical Code.
3. ETL Listed (Tested in accordance with UL 1995, 4th Edition, dated October 14, 2011, including revisions through October 3, 2014, and CSA C22.2 No. 236-11, 4th Edition, dated October 14, 2011, including revisions through October 3, 2014).
4. All units tested in accordance with ANSI/AMCA 220. Unheated units shall bear AMCA Seal for Performance.
5. UL and cUL listed to comply with applicable United States and Canadian standards.
6. Hot Water/Steam coils certified to ARI standard 410 for hot water and steam heated units. ***NOTE TO SPECIFICATION AUTHOR:*** *Delete for unheated & electric heat model specifications.*
7. Obtain each type of air curtain through one (1) source from a single manufacturer.

## COORDINATION:

1. Coordinate layout and installation of air curtains, mounting system and all components associated with the air curtains with other construction.
2. Notify the architect/engineer of any coordination conflicts prior to installation of the air curtain or other associated parts and accessories so that the installation can be coordinated prior to installation.
3. Any installation commenced or completed without coordination is subject to rejection of the work and must be redone as required to meet the intent of the contract documents.

## DELIVERY, STORAGE AND HANDLING:

1. Supply air curtains in original, clearly labeled packaging as provided by the manufacturer.
2. Store and handle equipment in full accordance with the manufacturer's documented guidelines and best practices.
3. Ensure protection of units from environmental damage, including exposure to weather, extreme temperatures, and ongoing construction activities.

## WARRANTY:

1. Manufacturer’s standard warranty for replacement of parts for a period of (60 months for unheated units and 24 months for heated units) from the time of shipment from the manufacturer.
2. The warranty shall extend to and cover all parts, components, accessories, and associated equipment supplied with the air curtain, regardless of whether such parts, components, or accessories are manufactured directly by the air curtain manufacturer or by third-party suppliers.

# PART 2 - PRODUCTS

## MANUFACTURER[S]:

1. Basis-Of-Design Manufacturer: All air curtains furnished are complete factory assembled units as manufactured by Powered Aire Inc., 109 Mortensen Road, Greenville, PA – 16125

Phone: 1-888-321-2473

Website: [www.PoweredAire.com](http://www.PoweredAire.com)

1. Substitutions are not permitted. ***NOTE TO SPECIFICATION AUTHOR:*** *Replace with “Substitutions will be considered under the provisions of Section 01 60 00.” if relevant.*

## BASIC EQUIPMENT DESCRIPTION:

1. Each air curtain unit consists of a factory assembled metal casing, centrifugal fans, inlet screen, discharge nozzle, and motor(s). Additional optional accessories as specified.
2. The air curtain must be interlocked with the door, this could be by a door switch, through dry contacts in the door controller or by other means.
3. Units shall be furnished in single increments of sufficient structural strength to be supported from the top or back per manufacturer’s instructions.
4. Remote NEMA 12 Control Panel will be provided for all units.

## CASING:

1. Materials: 18 GA 304 Stainless Steel.
2. Finish: Brushed Stainless Steel.

## AIR INLET:

1. Inlet screen shall be 20 GA Perforated Steel with finish matching the case.

## AIR DISCHARGE NOZZLE:

1. Discharge nozzle shall be high efficiency discharge plenum. Air curtain creates a positive air seal with an adjustable air foil vane. The vane shall facilitate a deflection of the air stream by +/- 20 degrees.

## MOTOR[S]:

1. Type: 1.5 HP, 1800 RPM Totally Enclosed Air Over (TEAO) Motor(s), resiliently mounted, continuous duty, with integral thermal-overload protection.
2. Bearings: Heavy duty type permanently lubricated, shielded ball bearings of equal size.

## FANS:

1. Galvanized forward curved centrifugal type wheels with double inlet housing design and zinc plated hubs.

## OPTIONAL HEATING: ***NOTE TO SPECIFICATION AUTHOR:*** *Delete Section 2.7 for unheated units.*

### Electric Heat: ***NOTE TO SPECIFICATION AUTHOR:*** *Delete for unheated, hot water, steam, & indirect gas heat model specifications.*

1. Factory mounted electric heating elements mounted on Galvanized steel frame, inside the air curtain plenum on the discharge side of the blowers.
2. Helical coil with point suspension of elements.
3. [Single point] [multi-point] power connection and control wiring to the air curtain.
4. Automatic reset thermal overloads, contactor interlock and manually resettable thermal overload accessible behind air inlet screen.

### Hot Water Heat: ***NOTE TO SPECIFICATION AUTHOR:*** *Delete for unheated, steam, electric & indirect gas heat model specifications.*

1. Hot water coil factory mounted to intake of the air curtain.
2. 5/8” O.D Hot Water Supply and Return copper tubing, complying with ASTM B 75.
3. Mechanical bond Fin and Tube joint.
4. Seamless copper Header tubes with brazed joints, refer supplied coil data specification for sizes.
5. Rated for 300 psig working pressure at 250 deg F.
6. Coils tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification to ensure that all coils are leak-free.
7. Coil Connections: [Left Hand Supply/ Right Hand Supply] [Left Hand Return/ Right Hand Return].
8. Valves and Valve Controls by [Contractor][Manufacturer].

### Steam Heat: ***NOTE TO SPECIFICATION AUTHOR:*** *Delete for unheated, hot water, electric & indirect gas heat model specifications.*

1. Steam coil factory mounted to intake of the air curtain.
2. 5/8” O.D Hot Water Supply and Return copper tubing, complying with ASTM B 75.
3. Mechanical bond Fin and Tube joint.
4. Seamless copper Header tubes with brazed joints, refer supplied coil data specification for connection sizes.
5. Rated for 150 psig working pressure at 325 deg F.
6. Coils tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification to ensure that all coils are leak-free.
7. Coil Connections: [Left Hand Supply/ Right Hand Supply] [Left Hand Return/ Right Hand Return].
8. Valves and Valve Controls by [Contractor][Manufacturer].
9. Indirect Gas Heat: ***NOTE TO SPECIFICATION AUTHOR:*** *Delete for unheated, hot water, steam & electric heat model specifications.*
   1. American Gas Association (AGA) or Canadian Gas Association (CGA) labeled.
   2. Gas Heater Equipped with: Power Exhaust, Direct Spark Ignition, Electronic Flame Supervision, 24 Volt Control Transformer, Self-Diagnostic Control Board, and Gas Pressure Switches.
   3. Heater to be independently supported 2 inches from each opening of factory-installed duct transition.
   4. Duct Transition constructed with 18 GA 304 Stainless steel.
   5. Tubular Heat Exchangers construction: [Aluminized Steel/ Stainless Steel].
   6. Fuel Type: [Natural Gas/ Propane].

## ACCESSORIES: ***NOTE TO SPECIFICATION AUTHOR:*** *Optional features to include on schedule, if desired.*

1. [Filters]: Perm-A-Foam filter constructed with foam media pleated between expanded aluminum media with Aluminum frame. 1-1/2” thick metal mesh grille filter accessible behind the air inlet screen. Reusable

### Activation Options:

1. Remotely installed in the door area to activate or deactivate the air curtain unit as per door position. Includes Time delay relay to extend operation time from 1s to 100s after door closing. [Roller plunger Combo Switch/ Commercial Magnetic Door Switch/ Industrial Magnetic Door Switch/ Wobble Door Switch/ Motion Sensor].
2. Smart Controls:
3. [Smart Touch]: Complete Air Curtain control including fan speed, temperature, fan mode, heat, and other functionality via 3-1/2” Back-Lit LCD Touch display. [Panel Mounted/ Remote Mounted with Cat6 Ethernet Cable] with [Black/White] case.
4. [Smart Touch Lite]: Standard Air Curtain control including fan speed, fan mode and other basic functionality via 3-1/2” Back-Lit LCD Touch display. [Panel Mounted/Remote Mounted with Cat6 Ethernet Cable] with [Black/White] case.
5. [Thermostat]: Digital [Programmable/ Non-Programmable] Thermostat for single stage heat. [Panel Mounted/ Remote Mounted]
6. [BACnet Controller]: Compatible with common building management systems using MS/TP Connection for air curtain operation and optional fan, heat, door status monitoring.
7. Disconnect: [Panel Mounted/ Remote Mounted] [Fused/ Non-Fused] [Quick Disconnect]
8. Manual Switches: Available in single gang, double gang or triple gang boxes for remote mounted for below combinations. [Panel Mounted] [Remote Mounted Box] [Remote Mounted Decorator]
9. [Hand/OFF/Auto]: Set fans to always ON with Hand, ON as per door switch with Auto or turn OFF unit.
10. [ON/OFF]: Toggle fans ON or OFF.
11. [Heat ON/OFF]: Toggle Heat ON or OFF.
12. Temperature Sensors: [Panel Mounted/ Remote Mounted]
13. [Button type]: Flush mounted temperature sensor that can be mounted directly to air curtain or remotely. In [Stainless Steel/ White] finish.
14. [Wall mount]: Durable ABS plastic temperature sensor with BMS integration.
15. Control Valve: Fast acting control valve for Hot Water/Steam heat units preprogrammed into control panel. [Three-way operation control valve] [Two-way operation control valve] ***NOTE TO SPECIFICATION AUTHOR:*** *Delete for unheated, indirect gas heat model specifications. Steam Heated units can only be specified with Two-way operation valve.*
16. Mounting Brackets:
17. [Standard Strut Brackets]: Top mounted using struts and flush to the back.
18. [Stand-off Strut Brackets]: Top mounted using struts and offset to the back.
19. [Angle Iron/ Tubing Brackets]: Top mounted for heavier models.
20. [Welded Steel Brackets]: For extremely heavy units or large offset distances.

# PART 3 - EXECUTION

## EXAMINATION:

1. Examine the installation location where each air curtain will be installed to confirm that the installation location is in accordance with the Contract Documents and the Manufacturer’s Installation Instructions.
2. If there are any concerns regarding the installation location with respect to any aspect of the installation or performance of the air curtain notify the architect/engineer to resolve the concern.

## INSTALLATION:

1. Install each air curtain in accordance with the Installation Instructions provided by the manufacturer of the air curtain.
2. Ensure sufficient clearance is provided at the front and bottom of the air curtain for maintenance and service.
3. Install activation accessories and control switches (if present) as per drawings.

## FIELD QUALITY CONTROL:

1. Perform the following field tests and inspections and prepare test reports:
2. After installing air curtains completely, perform visual and mechanical check of individual components.
3. After electrical circuitry has been energized, start unit to confirm motor rotation and the unit operates as intended.
4. Test and adjust controls and safety.
5. Adjust air-directional vanes such that the airflow covers the door opening.
6. Contact air curtain manufacturer in case of damaged or malfunctioning controls & equipment.

## CLEANING:

1. Clean the outside of each air curtain of any dirt, debris, grease, grime, or other material.
2. Remove any loose debris, dirt or grease on the inside, which may be harmful to the air curtain operation.
3. [Remove, clean, and reinstall the cleanable air filters.] ***NOTE TO SPECIFICATION AUTHOR:*** *Only valid if Filters are selected from Section 2.9 (A).*

## DEMONSTRATION:

1. Contractor to instruct the Owner's maintenance personnel on how to adjust, operate, and maintain air curtains.

## MECHANICAL SCHEDULES:

1. Unheated:

Performance: <https://poweredaire.com/assets/downloads/air-curtain/tfd/tfd_data_table.pdf>

1. Electric Heat:

Performance: <https://poweredaire.com/assets/downloads/air-curtain/tfd-e/tfd-e_data_table.pdf>

Electrical: <https://poweredaire.com/assets/downloads/air-curtain/tfd-e/tfd-e_electrical_table.pdf>

1. Hot Water Heat:

Performance: <https://poweredaire.com/assets/downloads/air-curtain/tfd-hw/tfd_hwst_data_table.pdf>

1. Steam Heat:

Performance: <https://poweredaire.com/assets/downloads/air-curtain/tfd-st/tfd_hwst_data_table.pdf>

1. Indirect Gas Heat:

Performance: <https://poweredaire.com/assets/downloads/air-curtain/tfd-ig/tfd-ig_data_table.pdf>

END OF SECTION