SECTION 23 34 33

AIR DOORS

__Berner Models CFA__ and __CFC__ have direct drive; __Berner Models CFX__ and __CFY__ have belt drive. Air doors provide environmental separation at wall openings to control the interchange of heat, fumes, dust, and humidity. At exterior wall openings, they are generally mounted on the inside of buildings to recirculate warm air that has risen towards ceiling; they can also be used at interior openings such as doors to coolers or clean rooms. Note that air doors may not be fully effective where negative air pressure exists on one side of door. Electric heated units shall be installed indoors only and have a minimum clearance of at least 6 feet between the bottom of the unit and the floor and at least 1 inch between the sides and top of the unit and any combustible material.

Refer to product data and wind resistance charts in Berner product literature or website. Select specific models and sizes required for project and obtain data necessary to edit this document. Then, edit guide specification to include only information specific to your project. Delete or add text, select appropriate bracketed phrases, and fill in blanks as required.

Edit guide specification to include only information specific to your project. Delete or add text, select appropriate bracketed phrases, and fill in blanks as required. Go to Berner catalog or website to select specific models and sizes that are required for project and to obtain data necessary to edit this document.

Coordinate specification with information shown on project drawings and schedules. In general, drawings indicate locations of air doors and switches and special mounting requirements, while sizes and capacities of air doors and utilities should be described in specifications or schedules. Cross check mechanical and architectural drawings.

Turn on "Hidden Text" function in your word processor to display "Specifier Notes."

Selection guide is available at www.berner.com to suggest models appropriate for typical applications.

For additional information or name of Berner representative in your area, call Berner International Corporation at 800-245-4455 in U.S. or 800-242-4455 in Canada, or visit www.berner.com. A selection guide is available at www.berner.com to suggest models appropriate for typical applications.

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

A. The General Conditions, Supplementary Conditions, and Division 01 – General Requirements apply.

1.2 SECTION INCLUDES

Specifier Note: Delete items below that are not included in this section. Retain only those options in the first paragraph below that are required for a specific project. Delete all options in the first paragraph below if heated air doors are not required.

A. Air doors[, electric heated] [, hot water heated] [, steam heated] [, indirect gas heated] [, direct gas heated].

B. [Insert item description.]

1.3 RELATED REQUIREMENTS

Specifier Note: In this article, specify work specified in other sections that is related to work of this section.

A. Section 04 22 00 - Concrete Unit Masonry: Blocking or reinforcing in wall as required for attachment of air door.

B. Section 05 40 00 - Cold-Formed Metal Framing: Reinforcing in wall as required for attachment of air door.

C. Section 06 10 00 - Rough Carpentry: Blocking in wall as required for attachment of air door.

Specifier Note: If switches for air doors are mounted on door frames, retain either Section 08 11 00 or 08 41 00 below to facilitate coordination.

D. Section 08 11 00 - Metal Doors and Frames: Coordinate installation of switches.

Specifier Note: Strip doors can be used in conjunction with air doors to provide an even higher level of separation. Retain first paragraph below if required for a specific project. Consult Berner catalog for a complete list of available strip doors.

E. Section 08 38 13 - Flexible Strip Doors: Coordinate installation of strip doors with installation of air doors.

F. Section 08 41 00 - Entrances and Storefronts: Coordinate installation of switches.

G. Section 08 71 00 - Door Hardware: Coordinate with installation of hardware.

Specifier Note: Retain the first paragraph below if air door cabinets are to field painted. Protect electrical contacts and moveable parts from paint.

H. Section 09 91 00 - Painting: Field applied finishes.

Specifier Note: Retain the following paragraph if hot water heaters are used in air doors.

I. Division 22 - Plumbing: Connection of hot water supply to heater used in air doors.

Specifier Note: Retain the following paragraph if steam or gas heaters are used in air doors.

J. Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC): Connection of steam or gas supply to heater used in air doors.

K. Division 26 - Electrical: Connection of electrical service and controls.

Specifier Note: The following paragraph is a sample that may be used in this article. Add to or delete from the following as appropriate for the specific project.

L. Section [xxxxx] – [Section Title]: [Include brief description of work specified in another section that is related to the work of this section.]

1.4 REFERENCE STANDARDS

Specifier Note: Retain the following paragraph and subparagraph if steam or hot water heated units are required for a specific project.

A. Air Conditioning & Refrigeration Institute (ARI):
   1. ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.

B. Air Movement & Control Association International, Inc. (AMCA):
   1. AMCA 211 - Certified Ratings Program - Product Rating Manual for Fan Air Performance.
   2. AMCA 220 - Laboratory Methods of Testing Air Curtains for Aerodynamic Performance Ratings.
   3. AMCA 222 - Application Manual for Air Curtain Units.

C. National Electrical Manufacturers Association (NEMA):
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

Specifier Note: Retain the following paragraph and subparagraph if indirect gas heated units are required on a specific project.

D. National Fire Protection Association (NFPA):
   1. NFPA 54 - National Fuel Gas Code.

E. Underwriters Laboratories (UL):
   1. UL 507 - Electric Fans.
   2. UL 508 - Industrial Control Equipment.

1.5 SUBMITTALS

Specifier Note: In this article, specify various types of data to be furnished by the contractor before, during, or after construction. Topics included in this article are: product data, shop drawings, samples, design data, test reports, certificates, manufacturers' instructions, manufacturers' field reports, qualification statements, and closeout submittals.

A. Submit under provisions of Section [01 33 00] [_____].

B. Product Data: Submit for air doors including:
   1. Rated capacities.

2. Operating characteristics.
3. Accessories.
4. Options.

Specifier Note: Retain the last sentence in the following paragraph if specifying electric heated models in section.

C. Shop Drawings: For air door components not adequately described by product data. Show configuration of non-standard units. Include plans, elevations, sections, details, and attachments to other work. [Include wiring diagrams for power, signal, and control wiring.]

D. Operation and Maintenance Data: For air doors to include in maintenance manuals.

E. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

Specifier Note: In this article, describe qualifications, regulatory requirements, certifications, field samples, mock-ups, and pre-installation meetings.

A. Manufacturers: Firms regularly engaged in manufacture of air doors of the types and sizes required, whose products have been in satisfactory use in similar service for not less than 10 years. Provide air doors produced by a manufacturer listed in this section.

B. Source Limitations: Obtain each type of air door through one (1) source from a single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

Specifier Note: Retain the following paragraph if specifying the ambient type of air curtain in this section.

D. Comply with AMCA 211, "Certified Ratings Program - Product Rating Manual for Fan Air Performance," for airflow rate, average outlet velocity, outlet velocity uniformity, velocity projection and power rating.

E. Certification:

Specifier Note: Retain either of the following two subparagraphs to agree with type of unit selected for a project and delete the other. Retain both subparagraphs if project has both types of units.

1. Unheated Units: Test units in accordance with AMCA 220. Provide units with AMCA Certified Ratings Seal.
2. Heated Units: Test units in accordance with AMCA 220 except for inclusion of heating.

F. Comply with ARI 410 for components, construction, and rating.

1. Certify coils in accordance with ARI 410.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver air doors in factory labeled packages.

B. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

C. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of air doors that fail in materials or workmanship within specified warranty period.

Specifier Note: Retain either of the following two subparagraphs to agree with type of unit selected for a project and delete the other. Retain both subparagraphs if project has both types of units.

1. Five-year limited warranty for unheated units.
2. Two-year limited warranty for heated units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: The design for air doors is based on products manufactured by Berner International Corporation, 111 Progress Avenue, New Castle; PA, Telephone: 724-658-3551; Toll-Free Telephones: 800-245-4455 (U.S.), 800-242-4455 (Canada); Fax: 724-652-0682; email: airdoors@berner.com; Website: www.berner.com.

Specifier Note: Retain one of the following two paragraphs and delete the other.

B. Substitutions are not permitted.

C. Substitutions will be considered under provisions of Section 01 60 00.

2.2 AIR DOORS

Specifier Note: Retain model types in the following paragraph as required for specific project. Delete those that are required.

A. Acceptable Products: Berner Model [[CFA] [and] [CFC] with direct drive.] [[CFX] [and] [CFY] with belt drive.]

B. Construction: Provide factory-assembled units of sufficient structural strength to be supported from ends without intermediate support. Units shall have split cabinet with removable lower section for access to internal components.

C. Cabinet:
   1. Material: Minimum 14-gage [aluminized steel with [gray] [insert color] colored baked enamel finish] [stainless steel], all welded construction.

D. Motors: Number and horsepower of motors shall be as scheduled.

Specifier Note: Retain the first subparagraph below if specifying Models CFA or CFC; retain the second subparagraph below if specifying Models CFX or CFY.

   1. [Direct Drive: 1160 RPM, totally enclosed air over (TEAO).]
   2. [Belt Drive: 1750 RPM, totally enclosed fan cooled (TEFC).]

E. Fans: Balanced forward curved centrifugal type, double inlet, double width design, mounted in matched fan housings with aerodynamically formed air inlet venturis. Manufacture wheels and housings from galvanized steel.
   1. Drive blower wheels through flexible couplings. Support each blower wheel by two (2) permanently lubricated one (1) inch (25.4 mm) sealed ball bearings encased in vibration isolating rubber cartridges.

F. Discharge Nozzles:
   1. Provide uniform velocity across width of air door.
   2. Mount on continuous piano hinge to allow deflection of air stream ± 20 degrees without loss of discharge velocity.
   3. Aperture: 4-1/2 inches (114.3 mm) by width of air door.
   4. Vanes: 3-1/2 inches (88.9 mm) minimum height; constructed of airfoil-shaped aluminum extrusions.
   5. Includes air volume control damper.

G. Air Intake:

Specifier Note: Top air intake in the following subparagraph only available on unheated, steam/hot water heated, and direct gas fired units.

   1. Location: [Front] [Top].
   2. Screen: Expanded metal with welded frame constructed of same material used in housing.

Specifier Note: In the following paragraph, flat-faced filter rack is not available for polyester media.

H. Air Inlet Filter: [Flat-faced] [V-bank] type, [disposable] [re-cleanable aluminum] [re-cleanable polyester with aluminum frame] with hinged inlet screen.

Specifier Note: Retain the following article if heated units are required for a specific project.

2.3 HEATING ELEMENTS

A. Electric Heating Coil: UL-approved, factory-mounted, factory-wired, thermally-protected, galvanized steel frame.
   1. Automatic reset limit control, primary magnetic contactors, equipment grounding lug, power fusing, and control transformer.

B. Steam Coil: Certified in accordance with ARI 410; constructed from 5/8-inch (15.8 mm) outside diameter copper tube with aluminum fins.
   1. Characteristics: Design to operate at maximum 150-psig (1035-kPa) and 366 degrees F (185 degrees C) steam.
   2. Leak-test under water at 350-psig (2410-kPa) dry nitrogen.
   3. Factory mount coil on air intake and protect with expanded metal screen.

C. Hot Water Coil: Certified in accordance with ARI 410; constructed from 5/8-inch (15.8 mm) outside diameter copper tube with aluminum fins.
   1. Characteristics: Design to operate at maximum 250-psig (1720-kPa) and 300 degrees F (149 degrees C) hot water.
   2. Leak-test under water at 350-psig (2410-kPa) dry nitrogen.
   3. Factory mount coil on air intake and protect with expanded metal screen.

D. Indirect Gas Heater and Duct Transition:
   1. CSA Listed.
   2. Fuel Type: Provide orifices for [natural gas] [LP gas].
   3. Heat Exchanger and Burner: [Aluminized] [Stainless] steel.
   4. Characteristics: 120-volt [separate] [single point] supply voltage, power exhaust vent, 120-volt limit control, 24-volt control voltage transformer, combustion air pressure switch, spark ignited intermittent safety pilot system with electronic flame supervision.
   5. Independently support each heater at least one (1) inch (25 mm) from each opening of factory-installed duct transition. Construct duct transition from 16-gage aluminized steel with access panels spanning entire width.

E. Direct Gas Fired Heater:
   1. Fuel Type: Provide orifices for natural gas.
   2. Characteristics: Provide minimum turndown ratio of 30:1 stainless steel baffles, non-clogging orifices, ignition system, flame safeguard, gas manifold, valves, and temperature controls.
   3. Gas Manifold (Train): As required by [ANSI] [and] [FM] [and] [industrial risk insurance (IRI)].
   4. Spark ignited intermittent pilot.

2.4 CONTROLS

Specifier Note: Retain control panel for all three phase systems. 120V control voltage is standard, 24V is optional.

A. Control Panel:
   1. UL listed, industrial type, pre-wired, with components consisting of motor starter, terminal strip, motor overloads, and control transformer with [120] [24] volt fused secondary.

Specifier Note: Single power supply is standard on unheated, steam/hot water, and direct gas heated units. Separate power supply is standard on electric and indirect gas fired units, single power supply is optional.

2. [Separate] [Single] power supply.

Specifier Note: Retain the Type 4X enclosure in areas subject to corrosive or wash-down type conditions and delete the first option.

3. Enclosure: Oil-tight and dust-tight NEMA Type [4/12] [4X [polycarbonate] [stainless steel]].
4. Mounting: [Remote mounted as indicated on Drawings.] [Unit mounted [right end] [left end].]

Specifier Note: Time delay relay is required for units with indirect gas heaters and recommended at doors which have frequent opening and closing cycles. Delete the following subparagraph if this option is not selected for a specific project.

5. [Time Delay Relay: Adjustable in field from 0.1 second to 10 hour delay. Set delay for [one (1)] [insert time in minutes] minute(s) unless otherwise indicated.]

Specifier Note: Use of a disconnect switch on unit simplifies power shut-off when servicing air door. Delete the following subparagraph if this option is not selected for a specific project.

6. [Disconnect Switch: Provide lockable, [fused] [non-fused] disconnect switch in control panel.]

Specifier Note: Retain the following subparagraph if a factory installed activation device is required on a project. (START-STOP not available in conjunction with door switch.)

7. [HAND-OFF-AUTOMATIC Switch: Switch allows manual on-off operation or operation controlled by automatic door switch or time delay that activates unit when door opens and deactivates unit when door closes.]
8. [START-STOP Switch: Provide START-STOP push button operation.]
9. [ON-OFF Switch: Allows manual on-off operation.]

Specifier Note: Retain the following subparagraph to lockout heat on electric or gas heated units.

10. [HEAT-ON-OFF] [SUMMER-WINTER] switch.

Specifier Note: Retain the following paragraph for indirect gas fired heated units requiring single point power supply. Delete the following subparagraph if this option is not selected for a specific project.

B. [Dry-type distribution transformer.]

C. Remote Activation Devices:
1. [Automatic Door Switch: Switch automatically activates unit when door opens and deactivates unit when door closes.]

Specifier Note: Use the following ON-OFF-AUTOMATIC switch in conjunction an automatic door switch.

2. [HAND-OFF-AUTOMATIC Switch: Switch allows manual on-off operation or operation controlled by automatic door switch that activates unit when door opens and deactivates unit when door closes.]
3. [START-STOP Switch: Provide START-STOP push button operation.]

4. [ON-OFF Switch: Allows manual on-off operation.]

Specifier Note: Retain the following subparagraph to lockout heat on electric or gas heated units.

5. [HEAT-ON-OFF] [SUMMER-WINTER] switch.

Specifier Note: Retain the following paragraph when specifying electric or gas heated units. Delete the following subparagraph if this option is not selected for a specific project.

D. [Thermostat: Prevents operation of heater when inside air temperature exceeds desired temperature.]

Specifier Note: Retain the following paragraph to coordinate operational sequence of air door controls.

E. Sequencing: [_____.]

2.5 MOUNTING ACCESSORIES

Specifier Note: Show mounting brackets on Drawings if required.

A. Provide brackets and other mounting accessories as required to permit installation and proper functioning of air door to meet project conditions of use.

Specifier Note: Retain the required material and finish in the following paragraph and delete the other one.

B. Fabricate mounting accessories from [painted aluminized steel] [stainless steel]:

Specifier Note: Retain the applicable brackets from the list below and delete those not required for a project.

1. [Wall Brackets: [0"] [6"] [8"] [10"] [12"] [14"] [16"] [18"].]
2. [Floor Brackets.]

Specifier Note: Extension brackets in the following subparagraph are not available on control panel end of unit when control panel is factory-mounted.

3. [Extension Brackets: 12".]
4. [Tandem Brackets: For vertical installation only - maximum 30 ft tall.]

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that door frame and adjacent construction are installed correctly and are ready to receive work of this Section.

B. Verify that utilities are in correct location and are of correct capacities for specified products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

Specifier Note: Delete the optional text in the following paragraph if shop drawings are not required for a specific project.

A. Install air doors where indicated on Drawings and accordance with [shop drawings and] manufacturer's instructions. Provide clearance to permit servicing and maintenance.

B. Securely install air doors plumb, level, and as close as practical to top of opening and face of wall.

C. Install switches where indicated on Drawings.

3.3 CONNECTIONS

Specifier Note: Retain the appropriate option in the following paragraph depending on type of air door(s) retained in Part 2 - Products and delete those not used.

A. Connect air door to utilities as specified in [Division 22] [Division 23] [Division 26] sections.

3.4 FIELD QUALITY CONTROL

A. Provide a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Test and operate air door to be sure that it performs as intended.

3.5 ADJUSTING

A. Adjust fan speed to prepare installed products to perform properly.

3.6 CLEANING

A. Clean air door prior to commissioning.

B. Repair or repaint damage to finishes on exposed-to-view surfaces.

3.7 SYSTEM STARTUP

Specifier Note: Retain optional text in paragraph below if required for a specific project.

A. Test and operate air doors to ensure that they perform as intended. Adjust discharge nozzles to deflect air outward [unless otherwise required].

3.8 DEMONSTRATION

A. Demonstrate for Owner's maintenance personnel how to adjust, operate, and maintain air curtains.

END OF SECTION