

What to Look for Series Commercial Air Barrier & Air Leakage

What are the requirements?

How should it be shown on the plans?

How should it be installed in the field?

What should I be looking for?



FOAMED IN PLACE INSULATION
STRUCTURAL MTL STUD
2" POLYISO BOARD INSULATION
MOISTURE BARRIER
1" ALUMINUM HAT CHANNELS
METAL HONEYCOMB PANEL
SEALANT
SELF-SEALING BRICK TIES
BRICK VENEER

BRICK VENEER

3/8 GYPSUM WALL BOARD

TO MATCH SOFFIT PANEL

WEEP SCREED

STEEL ANGLE, RE: STRUCT.

NOTE: SEE WALL SECTION FOR SPRAY FOAM INSULATION AT DECK ABOVE

ENDING-REF EXTERIOR ELEVATIONS

ICAL LEG AT G-LAP AIR BARRIER

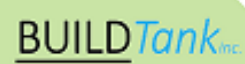
MATERIAL OVER FLASHING

24" GA BRAKE-SHAPE MTL FLASHING WITH HEMMED DRIP EDGE

ENDING-REF BUILDING S



SHUMS CODA ASSOCIATES



What are the requirements?

Commercial Air Barrier & Air Leakage

C103.2 (2018 & 2021)

- Air sealing details - 2018
- Air barrier and air sealing details, including the location of the air barrier - 2021

C402.5 - 2018

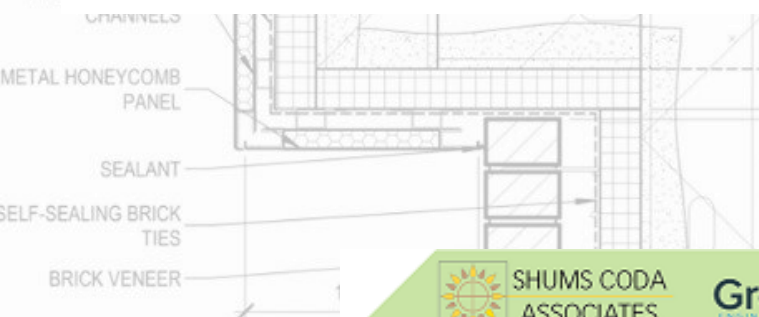
- Comply with Sections C402.5.1 - C402.5.8 or
- Perform air leakage test C402.5

C402.5 - 2021

- Comply with Sections C402.5.1—C402.5.11.1 or/and
- Perform air leakage testing

C402.5.1.2 - 2021

- Group R and group I must perform air leakage testing
- Building other than group R or group I must perform air leakage testing
 - Except: buildings larger than 5,000 sq ft in climate zone 4B
 - Except: buildings between 5,000 and 50,000 sq ft in climate zone 5B
- Buildings not performing air leakage testing must have building thermal envelope commissioning



What are the requirements?

Commercial Air Barrier & Air Leakage

C402.5.1.1

All air barriers must comply with the following:

- Continuous air barrier for all assemblies
- All joints and seams sealed
- All penetrations must be sealed— allow for contraction, expansion, vibration, resist negative/positive pressure, and stack effect
- Concealed fire sprinklers must be sealed per manufactures specs
- Lighting fixtures—IC-rated, meet air leakage rate, sealed between covering and housing

Deemed to Comply Components

Material (C402.5.1.3)

- Plywood min 3/8"
- OSB min 3/8"
- Expanded Polystyrene Insulation min 1/2"
- Foil Polyisocyanurate min 1/2"
- Closed-cell spray foam min 1.5"
- Open-cell spray foam min 4.5"
- Gypsum board min 1/2"
- Cement board min 1/2"
- Built-up roof membrane
- Modified bituminous roof membrane
- Single-ply roofing
- Portland cement/sand parge gyp plaster min 5/8"
- Cast-in-place precast concrete
- Fully grouted concrete block
- Steel or aluminum sheet
- Solid or hollow masonry—clay or shale

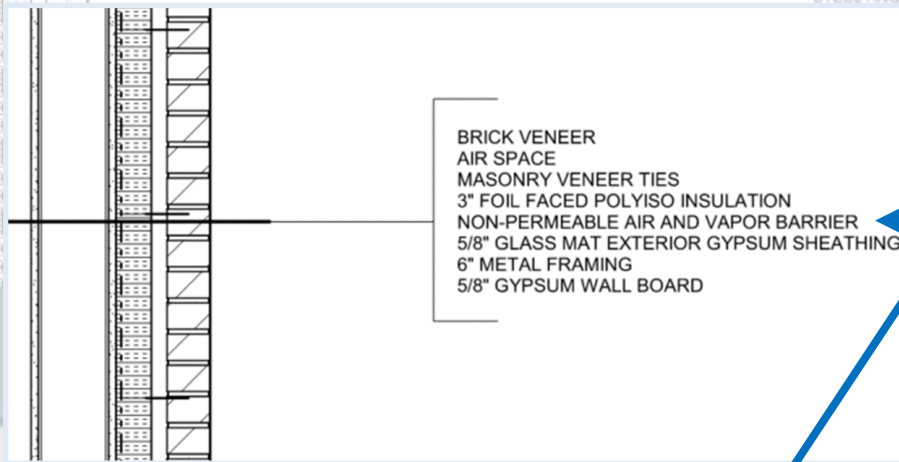
Assembly (C402.5.1.4)

- Concrete masonry walls coated with:
 - 1 coat of block filler
 - 2 coats of paint or sealer coat
- Masonry walls of clay or shale masonry units min 4" thickness
- Portland cement/sand parge, stucco, or plaster min 1/2" thick

All information for air barriers should be placed on the plans for review and installation as designed

Commercial Air Barrier & Air Leakage For Plan Review

Where the information is provided is important for compliance

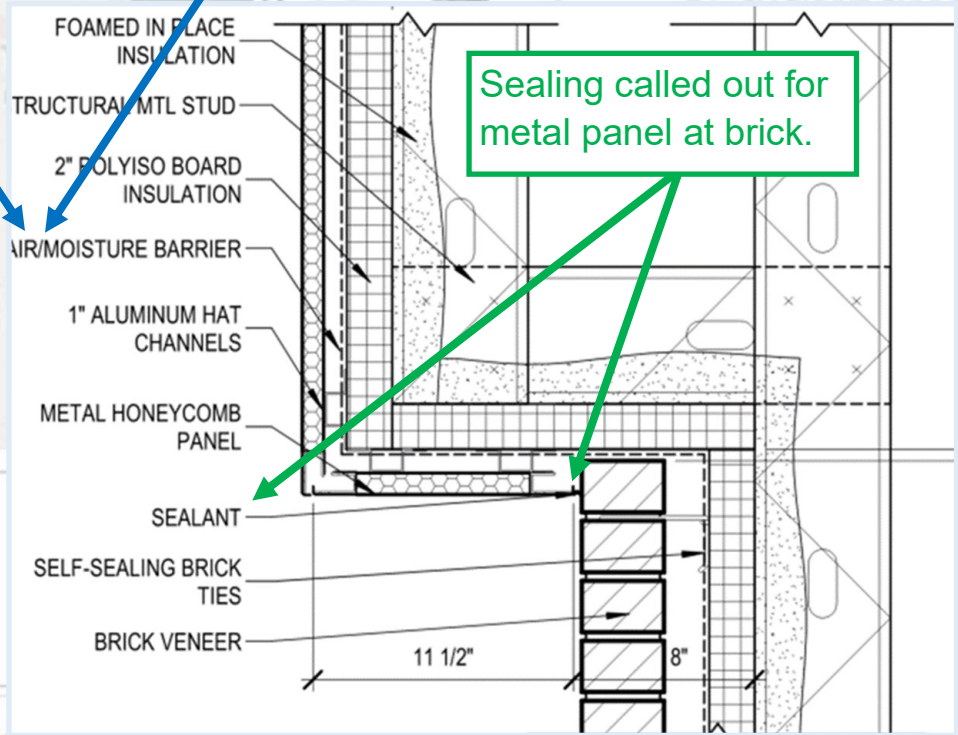


A note was provided on the plans about an air barrier, but specific information of the material or assembly was not provided.

This makes it difficult to comply with the air leakage/barrier requirements in the field. May lead to not passing the testing requirements.

A note was provided on the plans about an air barrier, but specific information of the material or assembly was not provided.

The specification manual did have the information for the joints and seams to be sealed, but not the specific material to be used as an air barrier. The information should be placed on the plans.








From the Spec Manual

- 3.03 INSTALLATION**
- A. Install materials in accordance with manufacturer's instructions.
 - B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

Commercial Air Barrier & Air Leakage For Inspection



-  • If exterior sheathing is air barrier: joints and seams have not been sealed
-  • Air barrier not continuous from roofline to exterior wall junction
-  • If weather resistive barriers has been tested and listed to be used as an air barrier: installation was not installed to the manufacturer installation instructions to be used as an air barrier
-  • Penetrations have not been sealed
-  • Sealing at windows and doors

Commercial Air Barrier & Air Leakage Fenestration Air Leakage

Fenestration can not exceed air leakage rates found in Table C402.5.2 (2018) or C402.5.4 (2021)

- Information often found in specification manual for plan review
- Information should be on NFRC certificate for inspection

2.03 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
- Glazing Rabbet: For 1 inch insulating glazing.
 - Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
 - Finish: The design intent is to match existing aluminum storefront finish.
 - Factory finish all surfaces that will be exposed in completed assemblies.
 - Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 - Finish Color: As selected by Architect from manufacturer's standard line.
 - Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view, resealed.
 - Components: Components shall be compatible with each other and with the substrate.
 - System: System shall be designed to meet the design intent.
 - Expansion/Contraction: Expansion/contraction joints shall be provided in accordance with the manufacturer's instructions.
 - Moisture: Moisture shall be prevented from entering the assembly.
 - Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 - Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel, and heel bead of glazing compound.
- B. Performance Requirements
- Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - Design Wind Loads: Comply with requirements of ASCE 7.
 - Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.
 - Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 10 psf.

Air Leakage: Without interior seal; 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.6 psf pressure difference. With interior seal, air leakage rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 6.2 psf (300 Pa).

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NATIONAL FENESTRATION RATING COUNCIL LABEL CERTIFICATE

PRODUCT LISTING FOR CODE COMPLIANCE
 LABEL CERTIFICATE ID: P-J-WTI-5943 Issuance Date: 12/8/2016
 NFRC CERTIFIED PRODUCT RATING INFORMATION: *

This is to be completed by an NFRC Approved Calculation Entity (ACE), based on information provided by the Specifying Authority and calculated in accordance with NFRC procedures.

PRODUCT LISTING:

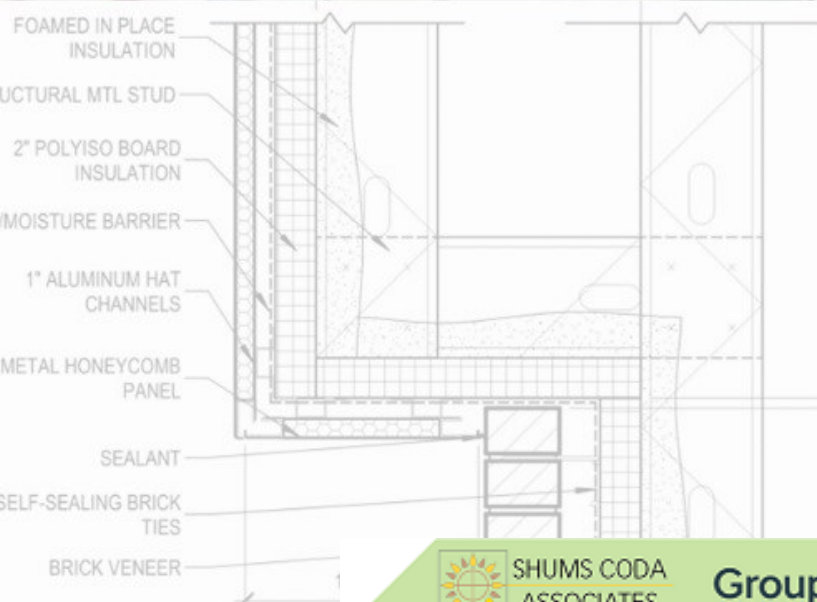
CPD ID	Product Name	Framing Ref	Glazing Ref	Spacer Ref	Total Area (ft ²)	CERTIFIED Performance Rating as NFRC Standard Size		
						U-factor**	SHGC**	V1**
Metal - Curtain wall/Storefront/Window Wall					344.44			
P-OBE-61487	3000 (2' X 4-1/2') CS, 1" IG (1/4" SNX 6/27 #2 X 1/2" AR X 1/4" CLEAR) P1 G1	FA-OBE-64398	GA-GN-12488	SA-NFC4732	344.44	0.39	0.25	0.52
Metal - Entrance Door					43.08			
P-OBE-61489	AD 375 DOOR SERIES, 1" IG (1/4" SNX 6/27 #2 X 1/2" AR X 1/4" CLEAR) P1 G1	FA-OBE-64401	GA-GN-12488	SA-NFC4732	43.08	0.46	0.17	0.34

FRAME, GLAZING and SPACER ASSEMBLIES

Framing Ref	Supplier ID	Product Type	Frame Material	Description
FA-OBE-64398	OBE	Glazed Wall System	AT	3000 (2' X 4-1/2') CS
FA-OBE-64401	OBE	Swinging Door	AT	AD 375 DOOR SERIES

Glazing Ref	Supplier ID	# Layers	Low-e	Gas Fill	Description
GA-GN-12488	GN	2	Y	Air	1" IG (1/4" SNX 6/27 #2 X 1/2" AR X 1/4" CLEAR)

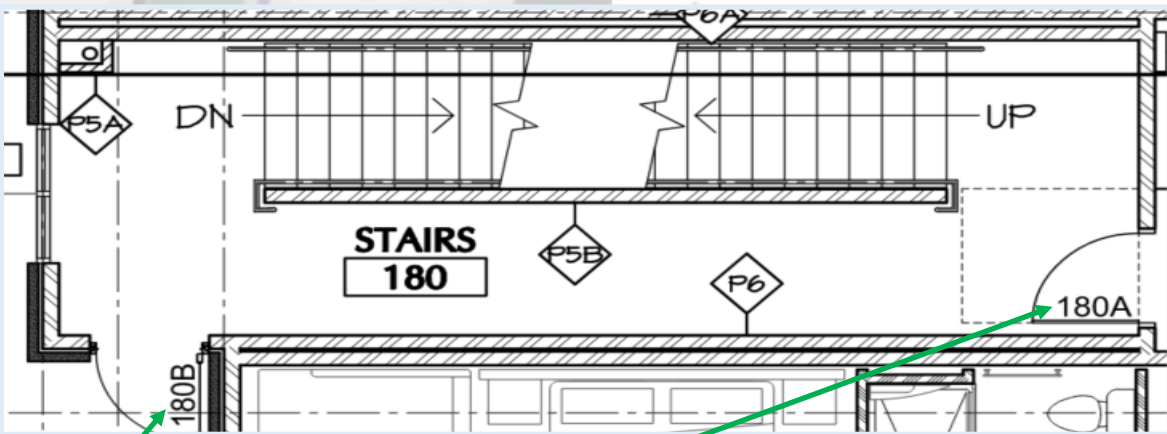
Spacer Ref	Supplier ID	Sealant Config.	Spacer Material	Description
SA-NFC4732	NFC	N/A	Not Applicable	Path 1, Group 1



Commercial Air Barrier & Air Leakage

Doors, Access Openings to Shafts, Chutes, Stairways and Elevator Lobbies

Doors and access openings from conditioned space to those listed must have a gasket or weatherstripping and comply with Section C402.5.4 (2018) or C402.5.6 (2021) with exceptions.



HEADING 8A - Pool Exterior, Stair exterior, Corridor exterior

1	CONTINUOUS HINGE	MCK-12HD	DK BRONZE ALUM	MC
1	HOTEL LOCK BATTERY OPERATED	LATCH WITH RIM PANIC	DK BRONZE	ONITY
1	CLOSER	CPS 8501	690	NO
1	THRESHOLD	2006AV	DK BRONZE	PE
1	WEATHER SEAL	290APK 48"x80"	DK BRONZE	PE



FOAME
INSULATION
STRUCTURAL MTL STUD
2" POLYISO BOARD INSULATION
MOISTURE BARRIER
1" ALUMINUM HAT CHANNELS
METAL HONEYCOMB PANEL
SEALANT
SELF-SEALING BRICK TIES
BRICK VENEER

Commercial Air Barrier & Air Leakage

Air intakes, Exhaust Openings, Stairways and Shafts

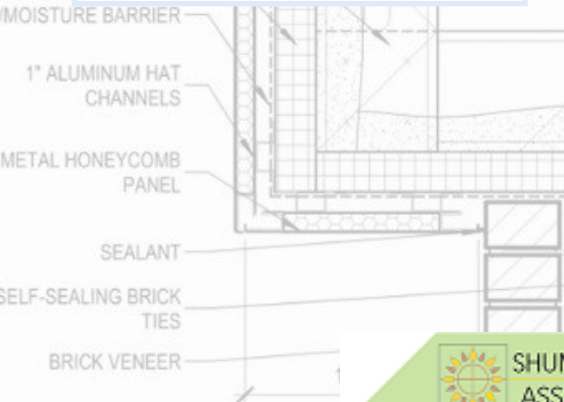
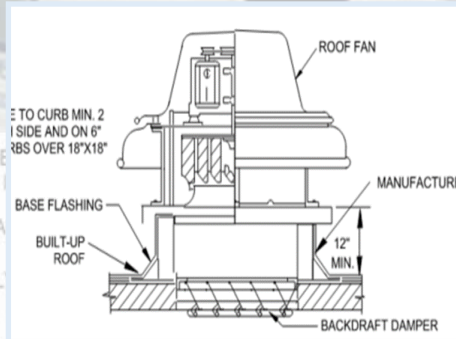
Openings that penetrate the building's thermal envelope must comply with Section C402.5.5 (2018) or C402.5.7 (2021)

- Opening must have a damper in accordance with C403.7.7
 - Dampers must be motorized with some exceptions
- Information found in the mechanical sheets for plan review
- Would be found at exterior walls, on roof, and mechanical equipment

FAN SCHEDULE										
TAG	MANUFACTURER	MODEL NUMBER	AREA SERVED	CFM	ESP (IN W.G)	WT (LBS)	MOTOR			REMARKS:
							HP	RPM	V/PH	
EF-1	GREENHECK	G-103-VG	RR/JAN/CRAWLSPACE	780	0.75	57	1/4	1725	115/1	1,2,3,5
TF-1	GREENHECK	SQ-70-VG	ELEV MACH ROOM	100	0.3	46	1/10	1725	115/1	3,4,5,6
TF-2	GREENHECK	SQ-75-VG	AV CLOSET	200	0.3	43	1/10	1725	115/1	3,4,5,6
TF-3	GREENHECK	SQ-75-VG	IT	200	0.3	43	1/10	1725	115/1	3,4,5,6

REMARKS:

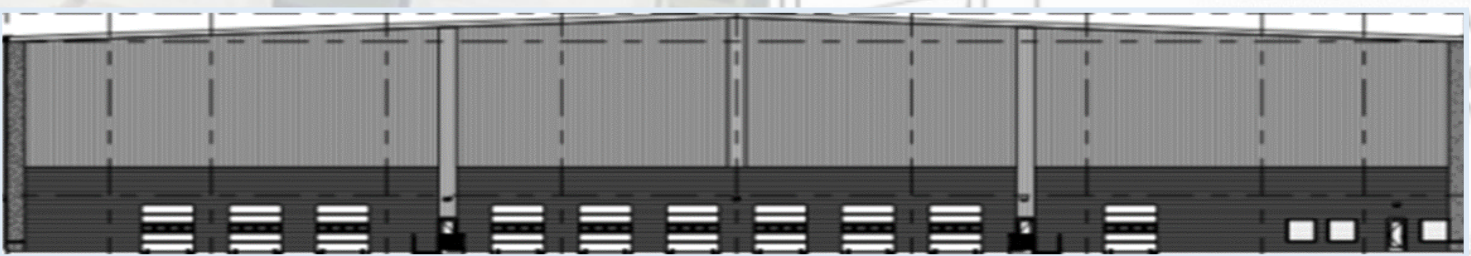
1. PROVIDE WITH BACKDRAFT DAMPER.
2. PROVIDE WITH ROOF CURB.
3. PROVIDE WITH DISCONNECT.
4. PROVIDE WITH COOLING ONLY THERMOSTAT SET AT 80 DEG F.
5. PROVIDE WITH ECM MOTOR.
6. PROVIDE WITH SPRING HANGING ISOLATORS AND BRACKETS.



Commercial Air Barrier & Air Leakage Loading Docks

Cargo and loading dock doors must comply with Section C402.5.6 (2018) or C402.5.8 (2021)

- Have weather seals that limit infiltration at top and sides of vehicles when parked in doors
- You get information from several locations for plan review
 - Floor plan for door locations and identification
 - Door schedule for hardware and design information
 - Specification manual may have specifics of calling out weather seals



DOOR SCHEDULE												
From Room: Name	DOOR ASSEMBLY		DOOR					FRAME		Side Lite Width	Hardware Set	Fire Rating
	Number	Type	Dimensions			Door Material	Door Finish	Frame Material	Frame Finish			
			Width	Height	Thickness							
	100A	C	3' - 0"	7' - 0"	1 3/4"	GLASS	CLEAR	HM	PRELAM		2.0	N/A
	100AA	V	9' - 0"	10' - 0"	2"	STEEL	PREFINISHE D	STEEL	PREFINISHE D		7.0	N/A
	100B	C	3' - 0"	7' - 0"	1 3/4"	GLASS	CLEAR	HM	ANODIZED		2.0	N/A
	100BB	V	9' - 0"	10' - 0"	2"	STEEL	PREFINISHE D	STEEL	PREFINISHE D		7.0	N/A

Set: 7.0

Doors: 100AA, 100BB, 100CC, 100EE, 100R, 100T, 100U, 100V, 100X, 100Y, 100Z

1 Hardware

Door manufacturer

OT

SECTION 083323 - OVERHEAD COILING DOORS

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire perimeter of door for a weathertight installation, unless otherwise indicated.
1. At door head, use **1/8 in (3 mm)** thick, replaceable, continuous sheet secured to inside of hood.
 2. At door jambs, use replaceable, adjustable, continuous, flexible, **1/8 in (3 mm)** thick seals of flexible vinyl, rubber, or neoprene.

Commercial Air Barrier & Air Leakage Loading Docks

Cargo and loading dock doors must comply with Section C402.5.6 (2018) or C402.5.8 (2021)

- Have weather seals that limit infiltration at top and sides of vehicles when parked in docks
- Information should be placed in the door schedule and specification manual
- Should be visible after installed



Seals at top and sides of vehicle

FOAM
UCTUR
2" PO
MOIST
1" A
METAL HONEYCOMB
PANEL
SEALANT
SELF-SEALING BRICK
TIES
BRICK VENEER



Commercial Air Barrier & Air Leakage Vestibules

Building entrances must comply with Section C402.7 (2018) or C402.9 (2021)

- Building entrance must have vestibule– some exceptions
- Self closing doors - interior and exterior doors do not open at the same time
- Revolving doors do not exempt vestibule must be installed at doors next to revolving doors

Heated or cooled vestibules comply with Section C403.4.1.4

- Must have thermostat located in vestibule
- Can only heat to 60 degrees or cooled to 85 degrees

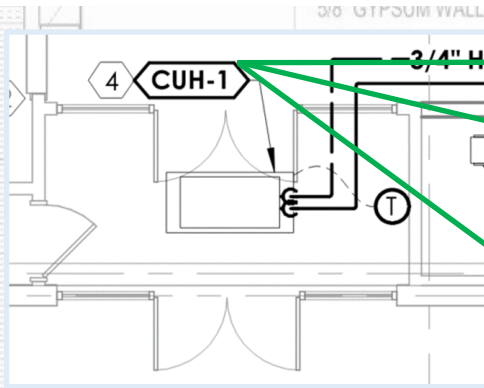
Information for plan review

- Shown on floor plan each vestibule location
- Thermostat or control shown on mechanical schedules and mechanical floor plans
- Sequence of operation may provide information including heating and cooling temperature

Information for Inspection

- Doors should open independently and the interior and exterior doors should not open at the same time
- Thermostat should be provided
- Ask about the sequence of operation set up

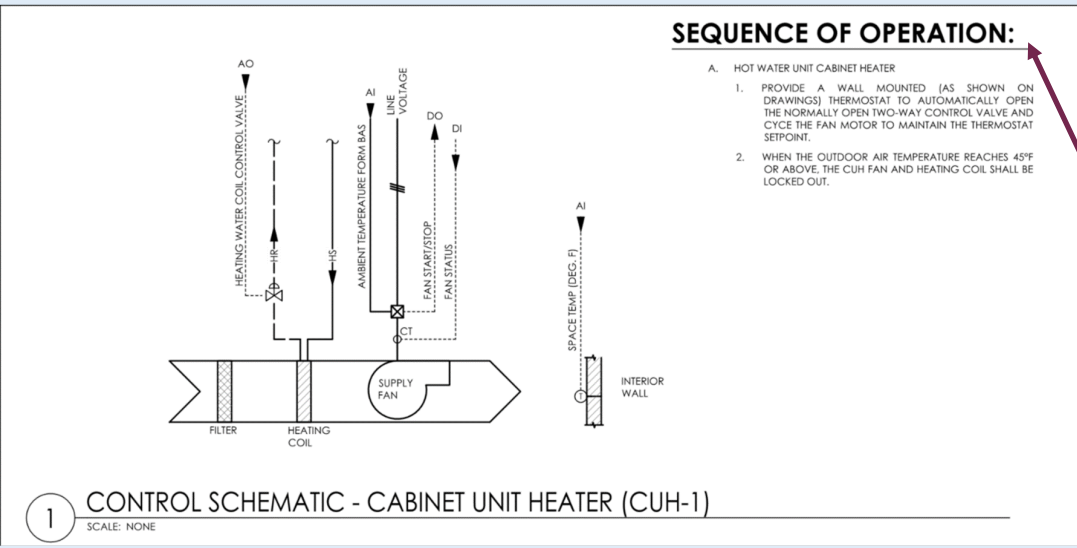
Commercial Air Barrier & Air Leakage Vestibules



CABINET HEATER SCHEDULE (HOT WATER)

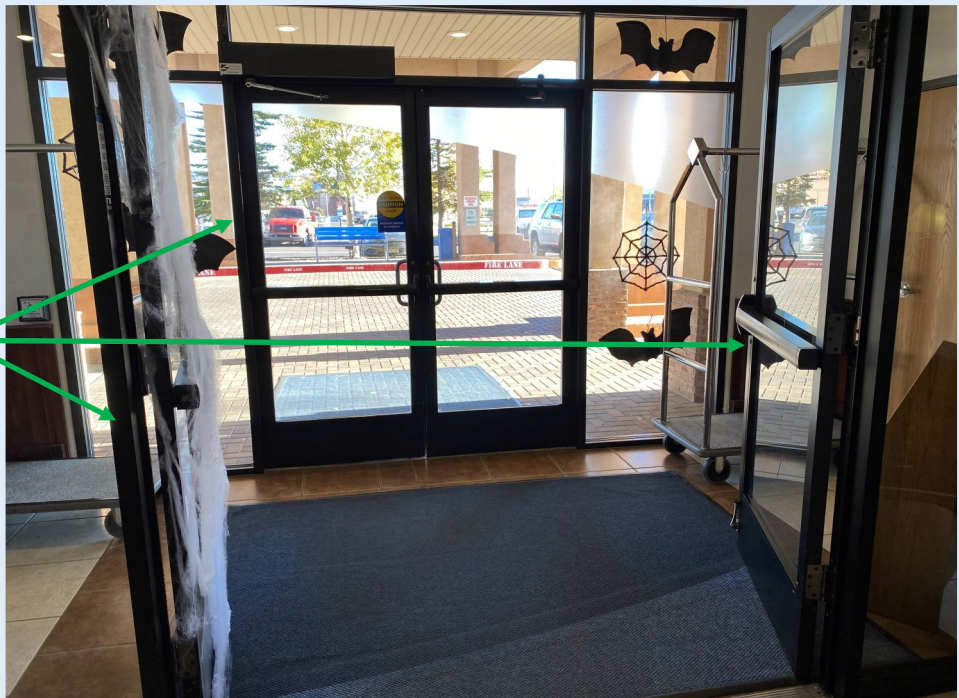
DESIGNATION	SERVICE	MANUFACTURER	MODEL	ARRANG.	RECESS DEPTH	CFM @ 5307	MBH AT S.L.	GPM	FLUID	FLUID P.D. FT. W.C.	RPM	VOLTAGE/ PHASE	MOTOR HP	HEIGHT (BAS)	NOTES
CUH-1	VESTIBULE	MODNE	CW-002	CEILING RECESSED	10"	250	10.7	0.5	30% PG	0.1	1,550	120/1	1/4	90	1.2.3.4
CUH-2	LOUNGE - S	MODNE	CW-002	CEILING RECESSED	10"	250	10.7	0.5	30% PG	0.1	1,550	120/1	1/4	90	1.2.3.4
CUH-3	LOUNGE - N	MODNE	CW-002	CEILING RECESSED	10"	250	10.7	0.5	30% PG	0.1	1,550	120/1	1/4	90	1.2.3.4
CUH-4	BKE BARN	MODNE	CW-002	CEILING EXPOSED	10"	250	10.7	0.5	30% PG	0.1	1,550	120/1	1/4	90	1.2.3.4

1. COORDINATE COLOR SELECTION WITH ARCHITECT.
 2. PROVIDE WITH ELECTRONICALLY COMMUNICATED MOTOR (ECM).
 3. PROVIDE WITH UNIT-MOUNTED THERMOSTAT.
 4. PROVIDE WITH INTEGRAL THERMAL OVERLOAD PROTECTION, AND INTEGRAL DISCONNECTING MEANS.



Missing information about the heating or cooling temperature

Vestibule provided at hotel entrance. Doors did not open at the same time. No heating was provided, so no thermostat required.



Commercial Air Barrier & Air Leakage Operable Openings Interlocking

Openings larger than 40 square feet must comply with section C402.5.11 (only in the 2021) with exceptions

- Openings interlocked with heating cooling systems to adjust permitted
 - Heating setpoint to 55 degrees
 - Cooling setpoint to 90 degrees
- Setpoints must occur within 10 minutes of opening operable opening
- Must contain controls that comply with Section C403.14

Information for plan review

- Called on floor plan– window/door schedule
- Controls shown on mechanical sheets and potentially electrical sheets

Information for inspections

- Verify that controls have been installed
- Verify they activate when the opening is opened for 10 minutes

