

TO: **BLRB Architects**
404 SW Columbia St
Bend, OR 97702

cc: MFIA Consulting Engineers

PROJECT NAME: Pilot Butte Middle School Renovation – Buildings A, E & F

We hereby submit for consideration, the following product instead of specified item for above project:

Section: 233000 Paragraph: 2.3C

Specified Item Grilles, Registers and Diffusers

Proposed Substitution: Nailor Ind. Grilles Registers and Diffusers (multiple model #'s, see attached)

Attach complete dimensional information and technical data including laboratory tests, if applicable.

Include complete information on changes to Drawings and/or specifications, which proposed substitution will require for its proper installation.

Submit with request all necessary samples and substantiating data to provide equal quality, performance, and appearance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance. Differences in quality of materials and construction shall be indicated.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitutions do not affect dimensions shown on drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.
5. The proposed substitution will have no affect on applicable codes.
6. The manufacturer's guarantee or warranties of proposed product is equivalent to; or exceeds that of the specified product.
7. Proposed substituted item will match all sizes, profiles, specifications and colors of item originally specified.

List of names and location of three similar projects on which product was used, date of installation, and Architect's name and phone number.

Project No. 1: Available upon request

Project No. 2: _____

Project No. 3: _____

**CERTIFICATION OF EQUAL
PERFORMANCE AND
ASSUMPTION OF LIABILITY
FOR EQUAL PERFORMANCE**

UNDERSIGNED ATTESTS THAT
FUNCTION AND QUALITY ARE
EQUAL TO OR SUPERIOR TO
SPECIFIED ITEMS.

FOR USE BY ARCHITECT:	
<input checked="" type="checkbox"/> Accepted	<input type="checkbox"/> Accepted as Noted
<input type="checkbox"/> Not Accepted	<input type="checkbox"/> Received Too Late
By: <u>Jakako Biken</u>	_____
Date: <u>3-8-18</u>	_____
Remarks: _____	_____
_____	_____

Submitted By: Greg Oberle _____

Signature :  _____

Title: Bid Coordinator _____

Firm: Air Repts, LLC _____

Address: 15860 SW Upper Boones Ferry Road _____

Lake Oswego, Oregon 97035 _____

Telephone: 503-620-4300 _____

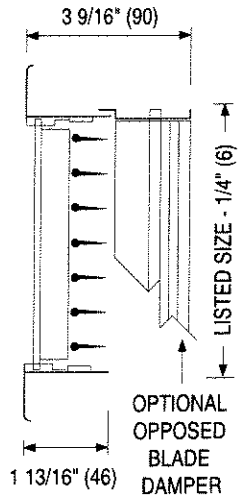
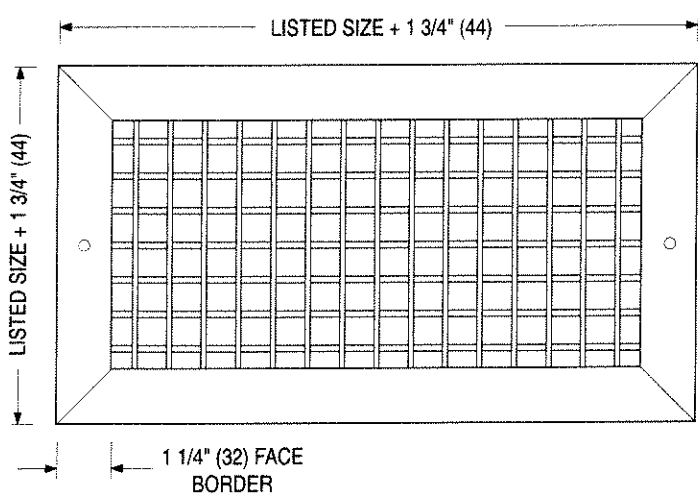
Date : 3/7/2018 _____

Above signature must be by person having authority to
legally bind his firm to the above terms.

END OF SECTION

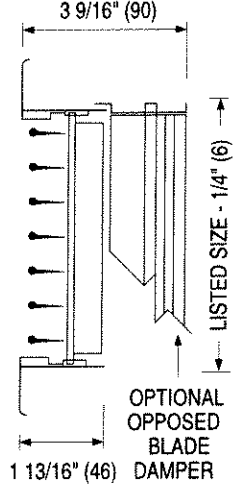
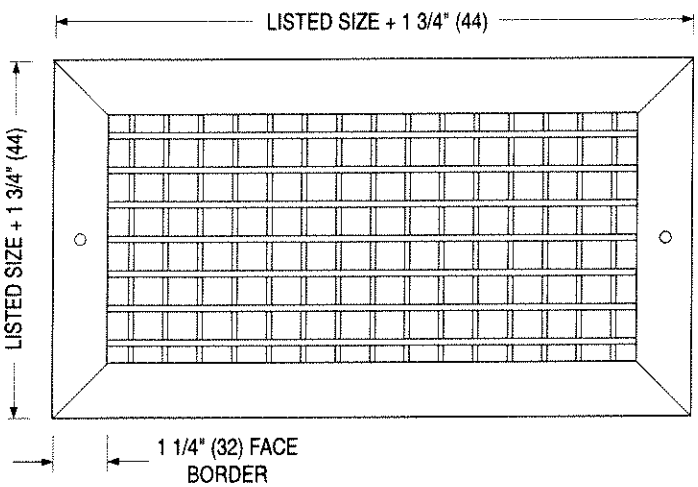


**STEEL SUPPLY GRILLES & REGISTERS
DOUBLE DEFLECTION
MODELS: 61DV(-O) AND 61DH(-O) TYPE S**



- MODEL 61DV**
Double Deflection Grille
Vertical Front Blades

- MODEL 61DV-O**
Double Deflection Register
Vertical Front Blades
(Includes O. B. Damper)



- MODEL 61DH**
Double Deflection Grille
Horizontal Front Blades

- MODEL 61DH-O**
Double Deflection Register
Horizontal Front Blades
(Includes O. B. Damper)

DESCRIPTION:

1. Construction: Corrosion-resistant steel. Roll-formed frame mechanically interlocked with mitered corners for strength. Two sets of perpendicular roll-formed 'teardrop' blades on 3/4" (19) centers provide air pattern control in two planes. Blades are individually pivoted to ensure positive positioning when adjusted to desired deflection setting.
2. Optional roll-formed steel opposed blade damper has a screw driver slot operator accessible through face of register.
3. Minimum size is 4" x 4" (102 x 102).
Maximum size is 48" x 36" (1219 x 914).
4. Type S Surface mount frame has a 1 1/4" (32) face border and a 1" (25) overlap margin.
5. Standard fastening is Type A countersunk screw holes.
6. Standard finish is AW Appliance White.

OPTIONS:

1. Finish:
 - SP Special _____
2. Fastening:
 - Type C Concealed mounting straps
 - Type D Concealed screw holes in neck
 - Type N None.
3. PF Plaster frame
4. IS Insect screen
5. Other _____

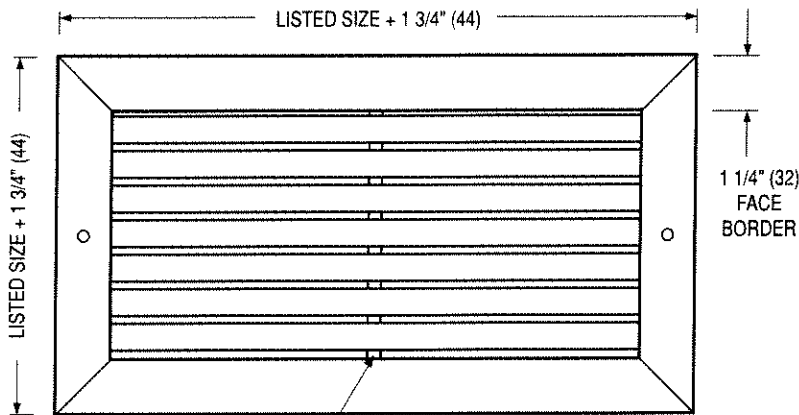
SCHEDULE TYPE:	Sidewall Supply Grille
PROJECT:	Pilot Butte Middle School
ENGINEER:	MFIA
CONTRACTOR:	

Dimensions are in inches (mm).

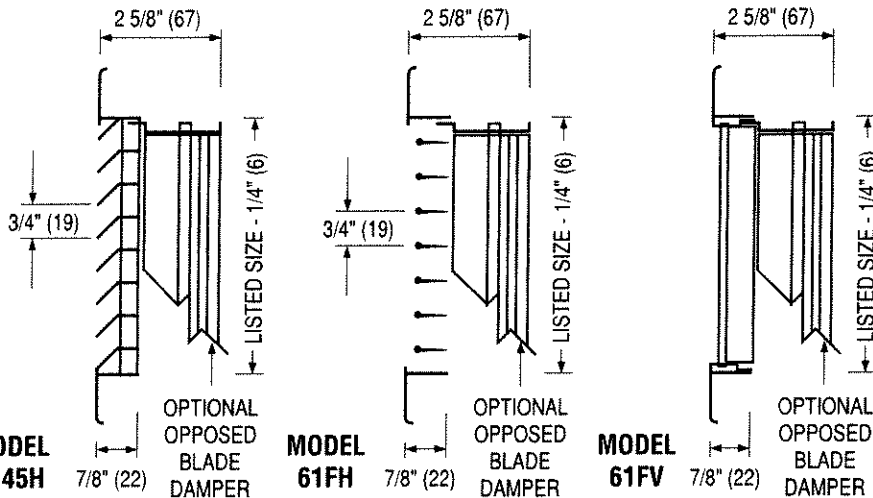
DATE	B SERIES	SUPERSEDES	DRAWING NO.
2 - 1 - 11	6100	2 - 23 - 04	6100-2



STEEL RETURN GRILLES & REGISTERS
FIXED BLADES • 3/4" (19) SPACING
MODELS: 6145H(-O), 6145V(-O), 61FH(-O)
AND 61FV(-O) TYPE S



Concealed reinforcing mullions on 45 degree models.



- MODEL 6145H**
Single Deflection Grille
Fixed 45° Horizontal Blades
- MODEL 6145H-O**
Single Deflection Register
Fixed 45° Horizontal Blades
(Includes O. B. Damper)
- MODEL 6145V**
Single Deflection Grille
Fixed 45° Vertical Blades
- MODEL 6145V-O**
Single Deflection Register
Fixed 45° Vertical Blades
(Includes O. B. Damper)
- MODEL 61FH**
Single Deflection Grille
Fixed 0° Horizontal Blades
- MODEL 61FH-O**
Single Deflection Register
Fixed 0° Horizontal Blades
(Includes O. B. Damper)
- MODEL 61FV**
Single Deflection Grille
Fixed 0° Vertical Blades
- MODEL 61FV-O**
Single Deflection Register
Fixed 0° Vertical Blades
(Includes O. B. Damper)

DESCRIPTION:

1. Construction: Corrosion-resistant steel. Roll-formed frame mechanically interlocked with reinforced mitered corners for strength. Roll-formed blades on 3/4" (19) centers are fixed at 0 or 45 degrees to match and compliment the supply grilles and registers. 45 degree model utilizes a concealed rear reinforcing mullion (max. 16" (406) centers) and a single blade pack that provides a continuous louvered appearance. 0 degree models utilize a visible face mullion when blade length exceeds 16" (406).
2. Optional roll-formed steel opposed blade damper has a screwdriver slot operator accessible through face of register.
3. Minimum size is 4" x 4" (102 x 102).
Maximum size is 48" x 36" (1219 x 914).
4. Type S Surface mount frame has a 1 1/4" (32) face border and a 1" (25) overlap margin.
5. Standard fastening is Type A countersunk screw holes.
6. Standard finish is AW Appliance White.

OPTIONS:

1. Finish:
 SP Special _____
2. Fastening:
 Type C Concealed mounting straps
 Type N None.
3. PF Plaster frame
4. IS Insect screen
5. Other _____

SCHEDULE TYPE:	Sidewall/Ceiling Ret/Exh Register
PROJECT:	Pilot Butte Middle School
ENGINEER:	MFIA
CONTRACTOR:	

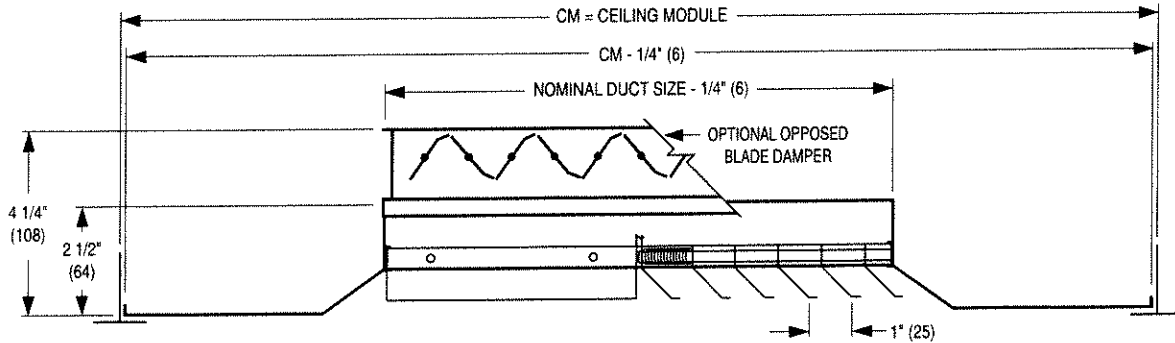
Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
2 - 1 - 11	6100	6100-3A/17-10-00	6100-3



MODULAR CORE CEILING DIFFUSER
 1, 2, 3 OR 4-WAY ADJUSTABLE DISCHARGE
 PATTERN • SQUARE NECK • STEEL
MODELS: 7500 AND 7500-O TYPE L

TYPE L LAY-IN T-BAR



If the ceiling module is more than 3" (76) larger than the neck size of the diffuser, a module sized extended panel will be added.

Ceiling Module CM			Available Duct Sizes			
Imperial Modules		Metric Modules				
Imperial Units (inches)	SI Units (mm)	SI Units (mm)				
12 x 12	305 x 305	300 x 300	6 x 6 (152 x 152)	8 x 8 (203 x 203)	9 x 9 (229 x 229)	
24 x 12	610 x 305	600 x 300				
20 x 20	508 x 508	500 x 500	6 x 6 (152 x 152) 8 x 8 (203 x 203)	9 x 9 (229 x 229) 10 x 10 (254 x 254)	12 x 12 (305 x 305) 14 x 14 (356 x 356)	15 x 15 (381 x 381)
24 x 24	610 x 610	600 x 600	6 x 6 (152 x 152) 8 x 8 (203 x 203) 9 x 9 (229 x 229)	10 x 10 (254 x 254) 12 x 12 (305 x 305) 14 x 14 (356 x 356)	15 x 15 (381 x 381) 16 x 16 (406 x 406) 18 x 18 (457 x 457)	

DESCRIPTION:

1. Material: Heavy gauge corrosion-resistant steel.
2. Model 7500 is a versatile ceiling diffuser. It consists of four spring loaded modular cores that may be simply adjusted by rotating each module after installation to provide a 1, 2, 3 or 4-way blow pattern. A tight horizontal air pattern from maximum to minimum flow makes it ideal for VAV applications.
3. Standard finish is AW Appliance White.

OPTIONS:

SQUARE NECK

- Steel opposed blade damper - Model 7500-O

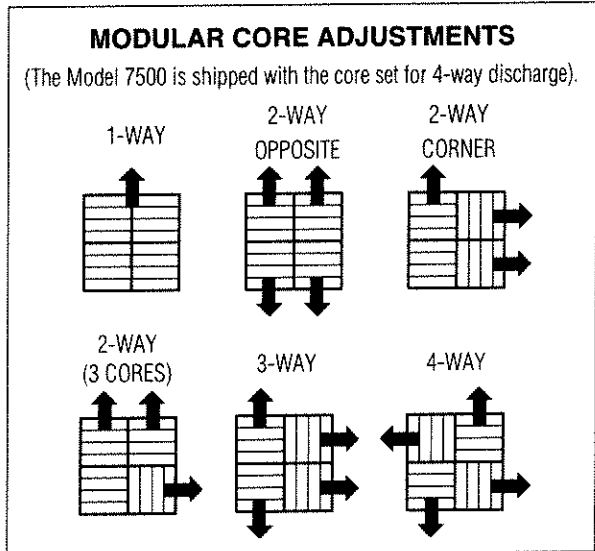
ROUND NECK

- SQR Square to round transition collar
 SQR-O Square to round transition collar for use over opposed blade damper.
 _____ round neck size (inches)

- 4275 Radial damper
 4250 Radial sliding blade damper
 4675 Butterfly damper

OPTIONAL FINISH:

- SP Special. Specify _____.



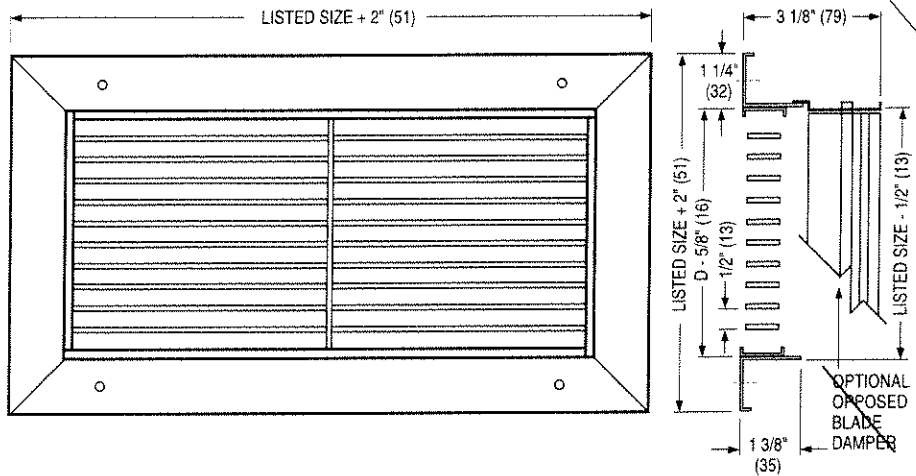
SCHEDULE TYPE:	Ceiling Diffuser
PROJECT:	Pilot Butte Middle School
ENGINEER:	MFIA
CONTRACTOR:	

Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
5 - 11 - 15	7500	11 - 30 - 12R	7500-2

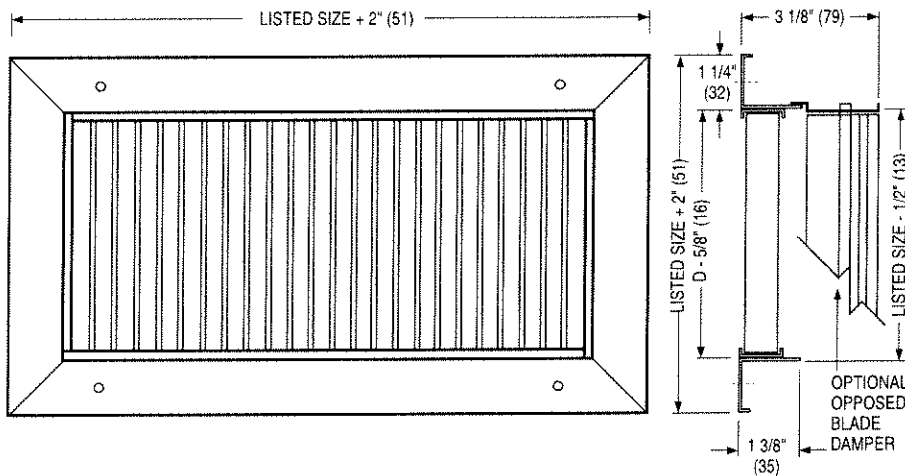


STEEL HEAVY DUTY SUPPLY GRILLES & REGISTERS • GYMNASIUM
SINGLE DEFLECTION • LOUVERED
MODELS: 61SH-HD(-O) AND 61SV-HD(-O)



MODEL 61SH-HD
 Single Deflection Grille
 Horizontal Blades

MODEL 61SH-HD-O
 Single Deflection Register
 Horizontal Blades
 (Includes O. B. Damper)



MODEL 61SV-HD
 Single Deflection Grille
 Vertical Blades

MODEL 61SV-HD-O
 Single Deflection Register
 Vertical Blades
 (Includes O. B. Damper)

DESCRIPTION:

1. Material: Heavy gauge steel.
2. Construction: A single set of 14 gauge blades on 1/2" (13) centers provide air control in a single plane. Blades are individually adjustable, 0 - 40° deflection. Frame is heavy duty 16 gauge material with welded and reinforced mitered corners.
3. The 6100-HD Series heavy duty grilles are constructed to offer the strength and rigidity required in order to withstand abuse in applications such as gymnasiums, schools, parking lots and other locations requiring strong impact resistance.
4. Optional opposed blade damper has a screwdriver slot operator accessible through the face of the register.
5. Available in duct sizes 6" x 4" (152 x 102) through 48" x 48" (1219 x 1219) maximum.

6. Fastening: Countersunk screwholes with oval head screws.
7. Standard Finish is AW Appliance White.

OPTIONS:

1. Finish:
 SP Special _____
2. Other: _____

SCHEDULE TYPE:	Heavy Duty Return Grille
PROJECT:	Pilot Butte Middle School
ENGINEER:	MFIA
CONTRACTOR:	

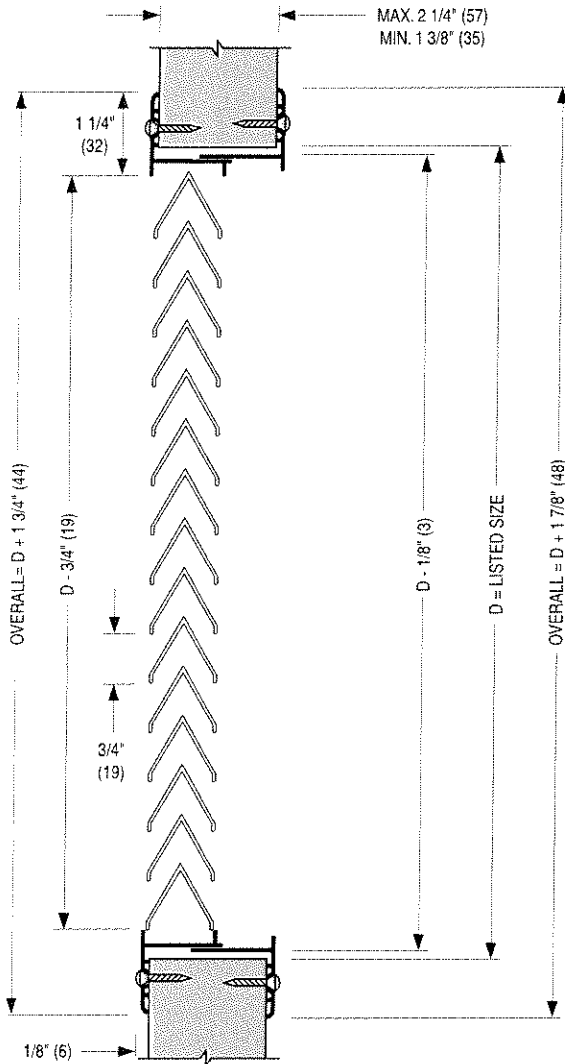
Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
2 - 1 - 11	6100	1 - 30 - 04	6100HD-1



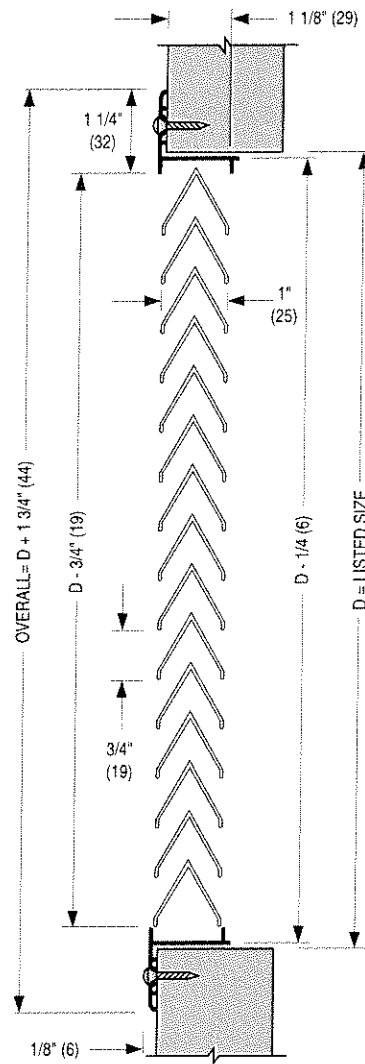
**ALUMINUM DOOR/TRANSFER GRILLES
SIGHTPROOF
MODELS: 51DGD AND 51DGS**

MODEL 51DGD (DOUBLE FLANGE)



AUXILIARY FRAME ASSEMBLY

MODEL 51DGS (SINGLE FLANGE)



CORE AND FLANGE FRAME ASSEMBLY

DESCRIPTION:

1. Construction: Extruded aluminum, heavy gauge frame, mechanically interlocked with reinforced mitered corners for strength. Heavy duty chevron louvers provide rigidity and strength and are mechanically locked in place.
2. Model Series 51DG offers a high free area with a completely sight-proof design, utilizing an inverted 'V' louver on 3/4" (19) centers. Solid construction will tolerate abuse from bumps and kicks. The 51DG Series Door Grille may also be used as a transfer grille and in place of standard design exhaust and return air grilles where it is important that the interior of the plenum or duct be concealed.

3. Minimum size is 6" x 4" (152 x 102). Maximum size is 36" x 36" (914 x 914). Available in nominal 1" (25) increments.
4. Standard fastening is Type 'A' countersunk screw holes.
5. Standard finish is AW Appliance White.

OPTIONS:

1. Finish:
 - SP Special _____
 - AL Aluminum paint
 - BK Black
 - SA Satin (Clear) Anodized.

Dimensions are in inches (mm).

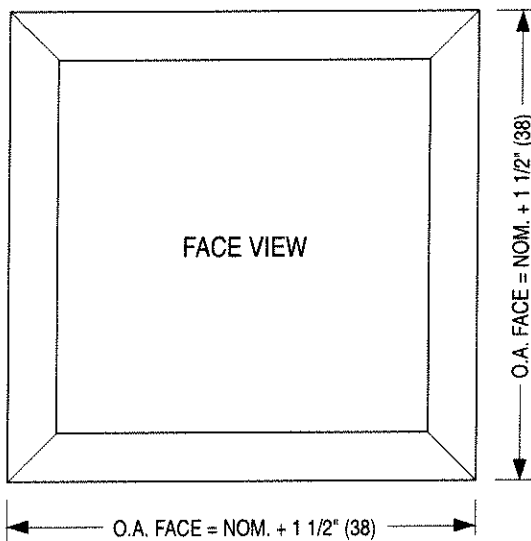
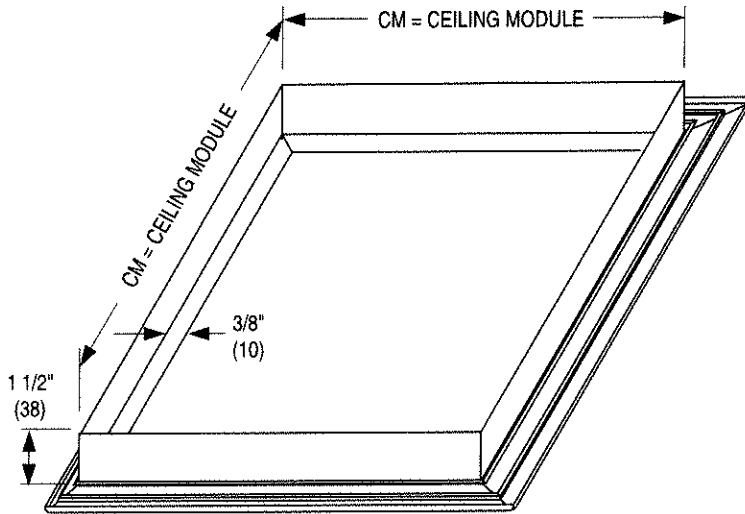
SCHEDULE TYPE:	Door/Sidewall Transfer Grilles
PROJECT:	Pilot Butte Middle School
ENGINEER:	MFIA
CONTRACTOR:	

DATE	B SERIES	SUPERSEDES	DRAWING NO.
2 - 26 - 13	5100	7 - 17 - 12	51DG-1

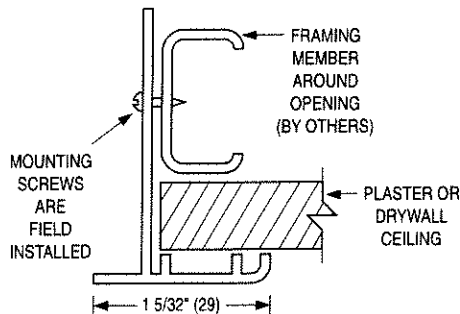


CEILING DIFFUSER ACCESSORIES
DRYWALL/PLASTER FRAME • ALUMINUM
MODEL: DFA

ALUMINUM SURFACE MOUNT ADAPTOR FRAME FOR
MODEL SERIES RNS, 4300, 4600 OR UNI LAY-IN T-BAR DIFFUSERS



TYPICAL INSTALLATION



DESCRIPTION:

The Model DFA is for mounting in finished drywall or plaster ceilings to accept any standard lay-in type diffuser.

It allows the retrofit of lay-in diffusers and simplified installation of flexible duct in surface mount applications.

Model DFA is installed quickly and easily and is suitable for variable ceiling thicknesses. Installation requires framing of the opening with "C" channel or wood for attachment with mounting screws (by others).

The finished appearance is professional and aesthetically pleasing.

Model DFA simplifies and reduces installation time compared with surface mount type diffusers.

A major benefit is that the diffuser allows ceiling access for maintenance purposes in lieu of separate access doors.

Material: Aluminum extrusion with staked and mitered corners.

Standard Finish: AW Appliance white baked enamel.

OPTIONS:

Finish:

SP Special _____

AVAILABLE CEILING MODULES:

IMPERIAL MODULES		METRIC MODULES
Imperial Units (inches)	S.I. Units (mm)	S.I. Units (mm)
12 x 12	305 x 305	300 x 300
16 x 16	406 x 406	400 x 400
20 x 20	508 x 508	500 x 500
24 x 12	610 x 305	600 x 300
24 x 24	610 x 610	600 x 600
36 x 24	914 x 610	900 x 600
48 x 12	1219 x 305	1200 x 300
48 x 24	1219 x 610	1200 x 600
60 x 12	1524 x 305	1500 x 300

CEILING OPENING = CM + 1/4" (6)

Dimensions are in inches (mm).

SCHEDULE TYPE:	Plaster Frames
PROJECT:	Pilot Butte Middle School
ENGINEER:	MFA
CONTRACTOR:	

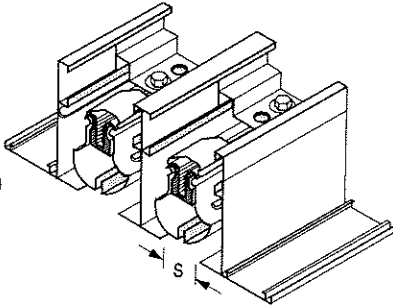
DATE	B SERIES	SUPERSEDES	DRAWING NO.
19 - 5 - 00R	ACC-DIF.	5 - 96	ACC-DFA



LINEAR SLOT DIFFUSERS
EXTRUDED ALUMINUM
MODEL SERIES: 5000
FRAME TYPES A, B, C, D

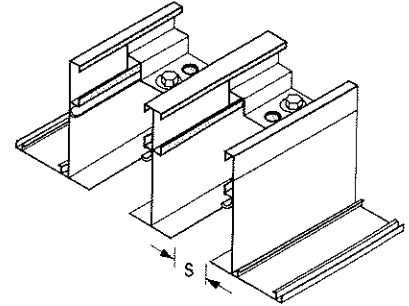
Supply Model

- 5050
(S = 1/2" [13] slot)
- 5075
(S = 3/4" [19] slot)
- 5010
(S = 1" [25] slot)
- 5015
(S = 1 1/2" [38] slot)

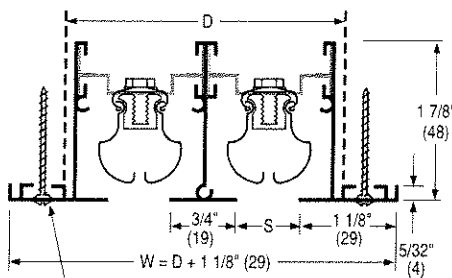


Return Model

- 5050R
(S = 1/2" [13] slot)
- 5075R
(S = 3/4" [19] slot)
- 5010R
(S = 1" [25] slot)
- 5015R
(S = 1 1/2" [38] slot)

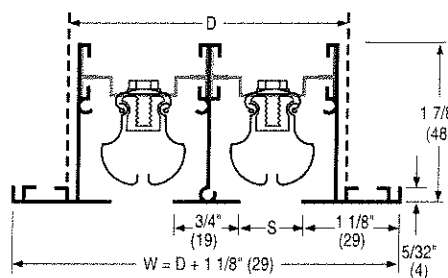


Type A
 Flange Frame / Screw Mounting



COUNTERSUNK SCREW HOLES FOR #8 SCREWS, 3/8" (10) FROM EDGE

Type B
 Flange Frame / Duct Mounting



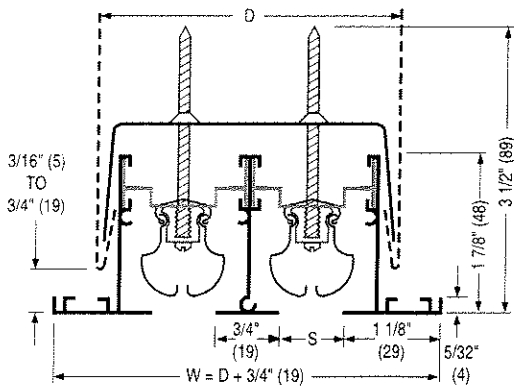
FINISH:

- AW Appliance White (Standard)
 - BC Brushed and clear coat lacquer
 - SP Special _____
- All with black pattern controllers

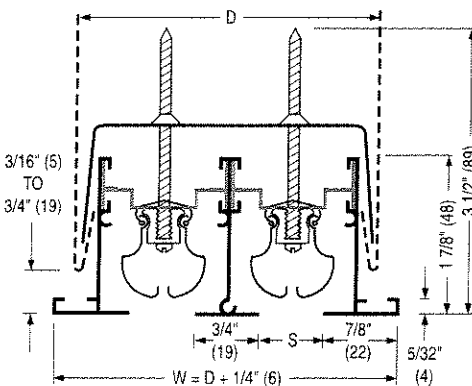
NOTES:

1. Material: Extruded aluminum frame. Corrosion-resistant steel pattern controllers.
2. The volume and direction of the discharge air can be adjusted by moving the pattern controllers.
3. Model 5000R return and the Model 5000 supply diffusers are identical except for the pattern controllers.
4. Greater than 6 foot (1829) lengths are supplied in multiple sections.
5. The maximum length of the pattern controller is 36" (914). Diffusers longer than 36" (914) are provided with multiple pattern controller sections.
6. Alignment strips on the frames and sub-frames provide superior, positive aligning.
7. Available with 1 to 10 slots.
8. Standard lengths of diffuser sections are 1, 2, 3, 4, 5 and 6 ft (305, 610, 914, 1219, 1524 and 1829).

Type C
 Flange Frame / Concealed Mounting



Type D
 Flange Frame / Concealed Mounting



SCHEDULE TYPE: Linear Slot Supply Diffuser

PROJECT: Pilot Butte Middle School

ENGINEER: MFIA

CONTRACTOR:

Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
11 - 1 - 12	5000	10 - 25 - 07	5000-1A

TO: **BLRB Architects**
404 SW Columbia St
Bend, OR 97702

cc: MFIA Consulting Engineers

PROJECT NAME: Pilot Butte Middle School Renovation – Buildings A, E & F

We hereby submit for consideration, the following product instead of specified item for above project:

Section: 237400 Paragraph: 2.1H

Specified Item Central Station Air Handlers (tag #AHU-E1, AHU-E2)

Proposed Substitution: Thermal Corp. model TS Foam Panel Construction with "Thermal Break" panels

Attach complete dimensional information and technical data including laboratory tests, if applicable.

Include complete information on changes to Drawings and/or specifications, which proposed substitution will require for its proper installation.

Submit with request all necessary samples and substantiating data to provide equal quality, performance, and appearance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance. Differences in quality of materials and construction shall be indicated.

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4. Maintenance and service parts will be locally available for the proposed substitution.
5. The proposed substitution will have no affect on applicable codes.
6. The manufacturer's guarantee or warranties of proposed product is equivalent to; or exceeds that of the specified product.
7. Proposed substituted item will match all sizes, profiles, specifications and colors of item originally specified.

List of names and location of three similar projects on which product was used, date of installation, and Architect's name and phone number.

Project No. 1: Available upon Request

Project No. 2: _____

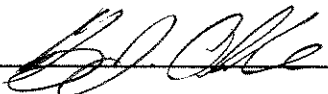
Project No. 3: _____

**CERTIFICATION OF EQUAL
PERFORMANCE AND
ASSUMPTION OF LIABILITY
FOR EQUAL PERFORMANCE**

UNDERSIGNED ATTESTS THAT
FUNCTION AND QUALITY ARE
EQUAL TO OR SUPERIOR TO
SPECIFIED ITEMS.

FOR USE BY ARCHITECT:	
<input checked="" type="checkbox"/> Accepted	<input type="checkbox"/> Accepted as Noted
<input type="checkbox"/> Not Accepted	<input type="checkbox"/> Received Too Late
By: <u>Jakako Baker</u>	
Date: <u>3-8-18</u>	
Remarks: _____	

Submitted By: Greg Oberle

Signature : 

Title: Bid Coordinator

Firm: Air Reps, LLC

Address: 15860 SW Upper Boones Ferry Road
Lake Oswego, Oregon 97035

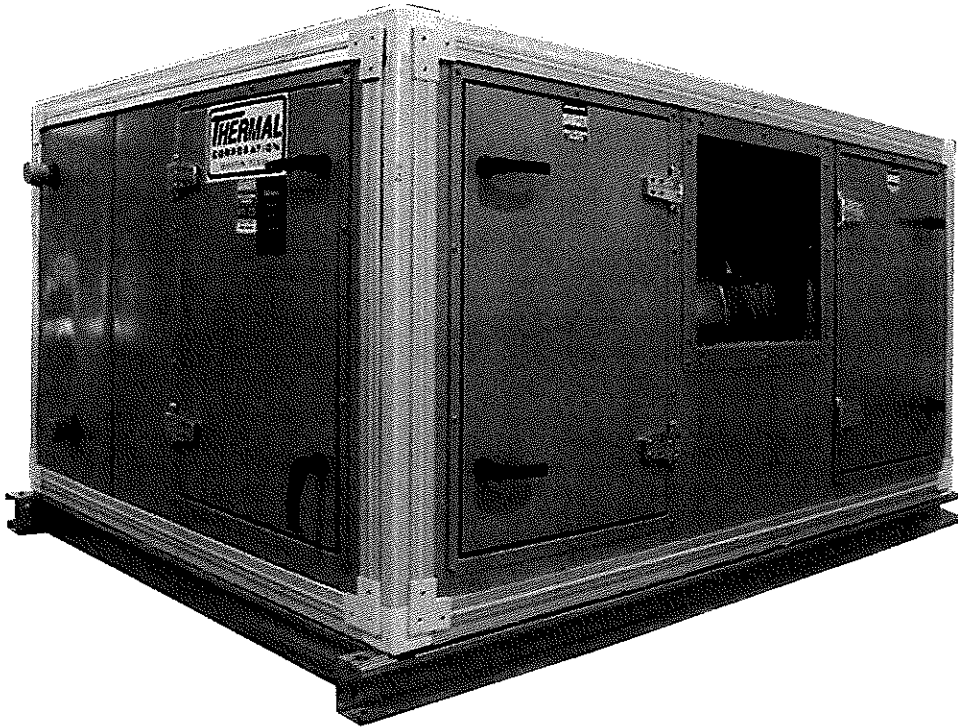
Telephone: 503-620-4300

Date : 3/7/2018

Above signature must be by person having authority to
legally bind his firm to the above terms.

END OF SECTION

TS Series: Foam Panel

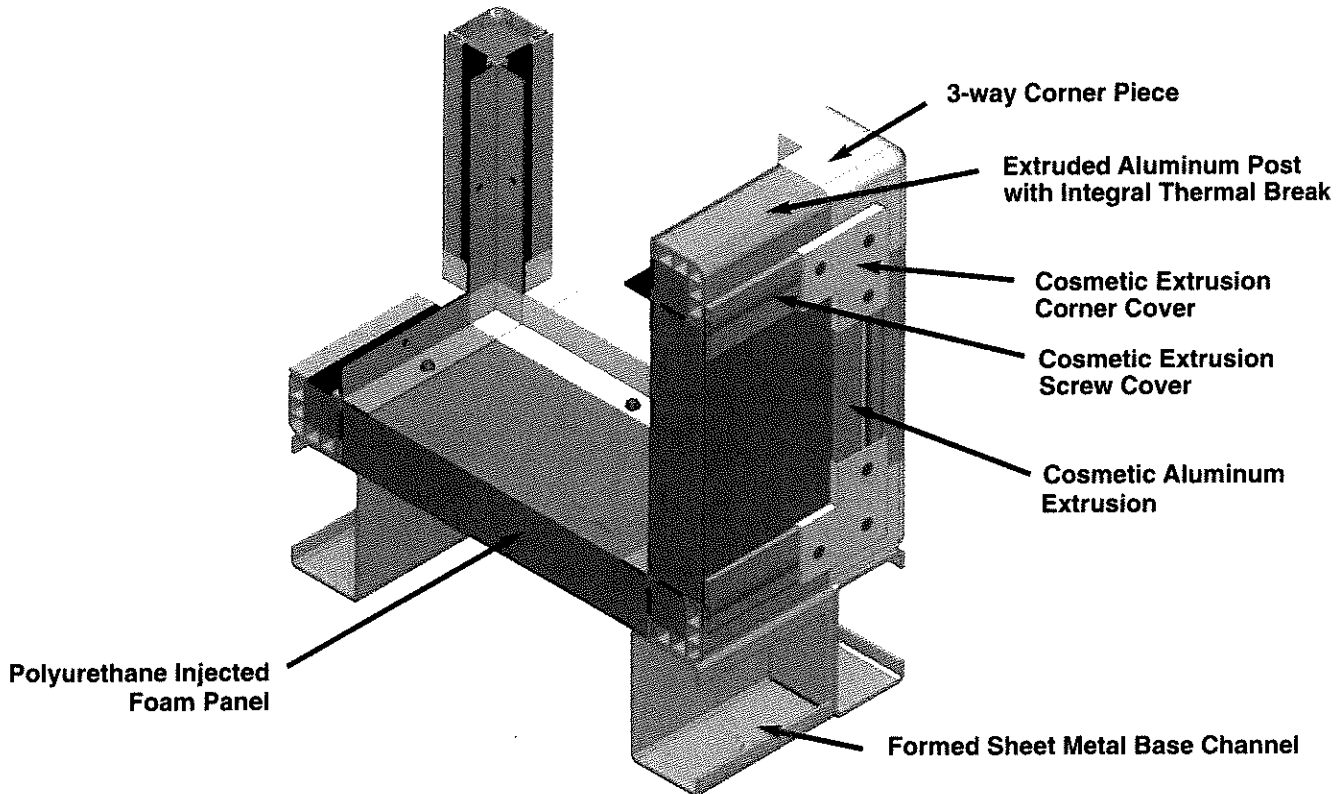


TS Series: Foam Panel

Unit Selection Guidelines

Foam Panel Construction

Thermal Corporation's T² (TS) Series (Foam Panel) style of air handlers are constructed around a unitized aluminum frame and "true thermal break" foam panel. The flexibility of the foam panel design allows it to be shipped with minimal fasteners and completely knocked down for field assembly. This feature allows for retrofit applications where maximum section size is an issue.



Construction Features:

- 28 gauge (0.6 mm) double wall pre-painted steel material with Polyurethane high thermal insulation and closed cell neoprene gasket around the frame perimeter. All panels are installed with 1/4" (6 mm) sealed fasteners internally. Panels can be removed without affecting the structural integrity of the aluminum frame structure.
- 2 3/8" (60 mm) thick double wall construction to sustain high static pressure up to 10 in. w.g. (2,500 Pa).
- Structural steel fan bases are internally spring-isolated.
- AMCA-rated forward-curved (DWDI), housed airfoil (DWDI), or plenum fans (SWSI) are available.
- Full walk-on floor construction with 2 3/8" (60 mm) thick double wall foam panel structure.
- AHRI certified coils in 1/2" (12 mm) or 5/8" (16 mm) O.D. copper tubes. 1" (25 mm) O.D. steam distributing coils are also available upon request.

Design Flexibility:

- Units are customized to your particular application.
- Wide ranges of unit sizes are available based on CFM (m³/hr.) requirement.

- Units can be designed for indoor or outdoor applications. Only indoor units are available in vertical configurations.
- Special third-party vendor items such as humidifiers, air blenders, evaporative coolers and integral face & bypass (IFB) coils can be factory mounted.
- Units can be designed with multiple fans for lower profiles or redundant.
- Full selection of air filters to meet indoor air quality standards operation.
- Outdoor units can be provided with roof curbs.

Shipping

Flatbed trailers are used to ship air handling units that are less than or equal to 108" (2743 mm) tall and 102" (2591 mm) wide. Units less than or equal to 144" (3658 mm) wide and 312" (7925 mm) in direction of airflow can be built and shipped as one piece. Demounts should be added when using these dimensions. As long as there are no shipping limitations, multiple section air handlers ship as a single factory assembled unit. Modular sections may then be demounted in the field by others. Contact factory for units which exceed 133" (3378 mm) tall or 138" (3505 mm) wide.

Indoor and Outdoor Air Handler Typical Features

GENERAL:

Flexibility

When a project demands technical requirements beyond the capability of a traditional air handler, a Flexible design is essential to providing the solution. Thermal Corporation defines Flexibility. Offering Custom Air Handling Equipment in both a horizontal and vertical configuration, complete with a variety of inlet and discharge arrangements, mechanical components and uniquely fabricated structural frames, each Thermal Air Handler is engineered to deliver results.

Horizontal configured units may be constructed for indoor or outdoor use. Each can be mounted to a floor, roof curb or even ceiling suspended. Vertical units are typically designed for indoor use and floor mounted; however, the flexibility afforded Thermal allows for unlimited possibilities. Often units with multiple fans are stacked into a configuration that reduces overall footprint and ensures the most economical use of mechanical room area. To further illustrate Thermal's engineered flexibility, all Thermal Air handlers can be constructed with one sided access, greatly increasing air handler location options.

Engineered for Longevity

Whether the Air Handling unit will be in place 50+ years, or needs to be disassembled to fit through a fixed opening, diverse structural frame construction methods ensure Thermal Corporation's Air Handlers outlast the test of time. For example, attaching double-wall panel systems to the structural frame means insulation is not exposed to the airstream, thus increasing the longevity of the insulation. Providing hinged doors in almost any location, allows internally mounted components to be accessed for service or cleaning. Internally mounted motors and drives operate in a clean environment, providing increased life spans.

Due to the flexible nature of the structural frame and the purposeful engineering of associated components, Thermal designed Air Handling Equipment will provide years of reliable performance.

COMPONENTS:

Inlet hood

Outdoor air handler's inlet section typically includes an Inlet hood. Inlet hood with available screen, protects internal components from entering rain, snow, debris and animals.

Louver

A louver is a window frame type construction with horizontal slats that are angled to admit air, but to keep out rain and debris.

Damper

Dampers used in air handling units typically are rectangle shape with multiple damper blades in parallel or opposed configurations. Air damper controls or stops the flow of air inside a duct or air handler equipment and its operation can be manual or automated.

Parallel Blade: The blades of a parallel blade damper remain parallel to each other throughout the rotation cycle. This arrangement allows the damper to direct the air as it moves through them, which can be an advantage in a mixing situation but has a higher pressure through them.

Opposed Blade: Opposed blades damper configuration has a linkage arrangement that causes pairs of blades to rotate towards each other as the damper rotates. As a result, the air stream experiences very little change in direction as it passes through the damper. When compared to a parallel blade damper with identical dimensions and the same air flow across it, an opposed blade damper will achieve a linear flow characteristic with less pressure drop.

Airfoil Blade: An extruded Aluminum airfoil blade provides a rigid assembly that is resistant to fluctuate at high velocities and helps to ensure good blade seal compression. Airfoil damper offers a lower pressure drop compare to a formed sheet metal damper configuration, which can be an advantage in overall system design.

Filter

Air filter is constructed from fibrous materials which removes solid particulates such as dust, pollen, mold and bacteria from the air. A chemical air filter consists of an absorbent or catalyst for the removal of airborne molecular contaminants. Air filters are used in applications where air quality is important, particularly in building ventilation systems. American Society of Heating, Refrigeration and Air Conditioner Engineers (ASHRAE) developed Minimum Efficiency Reporting Value (MERV) rating to evaluate air filter effectiveness. MERV values vary from 1 to 16, the higher value more efficient the filter will be in blocking air borne particles. Consider selecting an air handler with dirty filters so that, in theory, the unit will have enough horsepower to deliver the same amount of air when the filters are dirty.

- 2 in. (51 mm) or 4 in. (102 mm) flat filters
- 2 in. (51 mm) or 4 in. (102 mm) angle filters
- Side loading 6 or 12 in. (152 or 304 mm) cartridge filters with 2 in. (51 mm) pre-filters
- Side loading 21 in. (533 mm) bag filters with 2 in. (51 mm) pre-filters
- Face loading bag/cartridge filters without pre-filters
- HEPA face loading filters with or without pre-filters

Air blender

An air blender or static mixing device is constructed of several angle blades positioned in multiple circular orientations. Air blender used in HVAC equipment to prevent air stratification causes many challenges in proper design and operation of air handling units. Most notable problems are: poor temperature control, frosted coil and uneven velocity profile.

HRW

Heat recovery wheel is a rotating matrix of finely corrugated metal, operating in both opposing airstreams. When the system is in heating mode, heat is absorbed as air passes through the matrix in the exhaust airstream, during one half rotations and released during the second half rotation into the supply airstream in a continuous process.

Plate Heat Exchanger

A sandwich of plastic or metal plates with interlaced air paths. Heat is transferred between airstreams from one side of the plate to the other. The plates are typically spaced at 5/16" (4 mm) to 1/4" (6 mm) apart.

Indoor and Outdoor Air Handler Typical Features

Heat Pipe

Heat pipe is operating in both opposing air paths, using a confined refrigerant as a heat transfer medium. The heat pipe uses multiple sealed pipes mounted in a coil configuration with fins to increase heat transfer. Heat is absorbed on one side of the pipe, by evaporation of the refrigerant and released at the other side, by condensation of the refrigerant. Condensed refrigerant flows by gravity to the first side of the pipe to repeat the process.

- Wrap around Heat pipe uses for dehumidification and reheat application.
- Fixed slab heat pipe typically installed in dual air streams for continuous heating or cooling application.
- Tilt packed heat pipe has capability of modulating heat pipe slab in response to the space thermostat to control cooling and heating requirements.

Run Around coils

Two heat exchanger coils in opposing airstreams, piped together with a circulating pump uses water or a mix of water and antifreeze as the heat transfer medium. This device, although not very efficient, allows heat recovery between remote and sometimes multiple supply and exhaust airstreams.

Coil selection

Thermal air handlers have a wide selection of coils to meet your application needs. All coils have high-performance coil surface; the coil tubes are mechanically expanded into the fins for improved fin bonding and peak thermal transfer. All vent and drain connections are easily accessible. Optional copper fins and stainless steel casings are available for all coils.

Chilled water coils

These coils have headers precisely sized to minimize water pressure loss. Chilled water coils are manufactured of 0.5 in. (13 mm) OD copper tubes. These coils range from 1 to 8 rows and aluminum fins 8, 10, 12, or 14 fins per inch (314, 394, 472, or 551 fins per meter). Copper and coated fins are optional. Steel coil connectors with male pipe thread are standard.

Direct expansion coils

Coils are available in large or medium face area, with 4, 6 or 8 rows. The tubes are made of 0.375 in. (10 mm) OD copper with aluminum fins and 8, 10, 12 or 14 fins per inch (314, 394, 472 or 551 fins per meter). Copper and coated fins are available as an option. Choose from quarter, half, full, or double circuits. Most direct expansion coils have at least two splits allowing you to match a coil with one or two condensing units for independent refrigerant systems.

Hot water coils

Hot water coils are designed to provide heating capability for a complete range of applications, at a working pressure of 250 psig (18.3 bars) at 300°F (149°C). Hot water coils are offered in 1, 2 or 4 rows, with fin spacing of 8, 10, 12 or 14 fins per inch (314, 394, 472 or 551 fins per meter). Coils have aluminum fins with copper tubes (copper and coated fins are available). Hot water coils are also available with face and bypass options.

Steam coils

The steam coils are designed for a working pressure of 150 psig (11.4 bars) at 360°F (182°C). The steam coil is available in 1 or 2 rows in 1 in. (25 mm) OD copper tubes with 6, 8, 10 or 12 aluminum fins per inch (236, 314, 394 or 472 fins per meter). Steam coils are available with bypass face areas and are sloped to drain condensate. Steam coils are especially suited to applications where sub-freezing air enters the air-handling unit or where uniformity of leaving-air temperature is required.

Stainless steel Coil Drain Pan

Drain pan is sloped toward the drain to remove condensate completely. This eliminates build-up of stagnant water during shutdown periods and keeps the air handler free of odors and bacteria. Stainless steel provides an easy-to clean surface that resists corrosion.

UV Lights

UV light reduces the spread of airborne microorganisms that trigger allergy and asthma symptoms and reduces the spread of bacteria and viruses that can cause infectious diseases. It lowers energy costs by improving HVAC system heat transfer and increasing net cooling capacity. UV light continuously cleans coils, drain pan, plenum and ducts reducing or eliminating manual cleaning and the use of harmful chemicals.

Electric heat coil

Electric heat coils may be ordered for factory installation into the electric heat section. Units with electric heat are designed in accordance to the UL (Underwriters Laboratories) 1995.

Fan

Choose from airfoil, forward-curved and plenum fans based on first cost and performance requirements. As standard, pillow-block bearings are rated at 200,000 hours average life (L50) in all sizes of airfoil, forward curved and plenum fans.

• DWDI

Forward Curved Centrifugal Fan (FC) blades curve toward direction of rotation. It runs at relatively low speed and is suitable for low to medium pressure air handling applications.

Backward Inclined Centrifugal Fan (BI) blades are constructed from a flat piece of steel and curved away from direction of rotation. BI fans are suitable for high speed and pressure applications.

Airfoil Centrifugal Fan (AF) blades have aerodynamic shape construction similar to airplane wing and they are curved away from direction of rotation. AF fans are suitable for high speed and pressure applications.

• Plenum

Plenum Fan (PF) blades have aerodynamic shape construction similar to airplane wing and they are curved away from direction of rotation. Plenum fans can be used in high speed and pressure applications and they are a suitable option for limited space or multiple duct connections.

Indoor and Outdoor Air Handler Typical Features

Motor

We offer belt driven or direct drive motors in wide range of motor horse powers, voltages and standard or premium efficiencies.

- ODP

Open Drip Proof, a type of electric motor enclosure that has vents to allow air flow but to prevent liquid from entering the motor.

- TEFC

Totally Enclosed Fan Cooled, this type of motor is constructed with a small fan on the rear shaft of the motor and covered with housing. This fan draws air over internal components to remove excess heat and cool the motor.

Isolation

The blower and motor assembly in an air handler can create considerable vibration that can be transmitted via air duct system to the occupant's space. To eliminate or minimize vibration, flexible canvas isolators are installed between inlet and outlet of unit and air duct system. The rubberized canvas material allows the air handler components to vibrate without transmitting this motion to the attached ducts. The fan compartment can be further isolated by placing it on a spring suspension, which will mitigate the transfer of vibration through the floor and walls.

- Pad
- Rubber-In-Shear (RIS)
- Spring
- Duct Canvas Connect

Gas Heat (Indirect Fire)

Indirect-fired gas heater burns natural or propane gas which produces a flame that heats an internal tubes or a primary drum within the unit heater. A blower forces air over the heated chamber and the heated air are then transferred into space. These heaters are vented to the atmosphere which means that no exhaust gases from the burning of the gas enter the heated space.

- Tubular gas heater construction consists of formed tube as heat exchanger.
- Drum & tube gas heater uses a primary drum for combustion and a set of tubes for heat exchanger, which based on number of passes can be categorized as standard or high efficiency.

Humidifier

Humidifier package can be installed in HVAC equipment that improves comfort heating during cold season. A humidifier is a device that increases moisture level in a space.

Silencer

Silencers are used in HVAC system for commercial, institutional and residential buildings to reduce mechanical equipment noise transmitted through the ducting system achieving desired noise criteria in the occupied space.

Door

Thermal Corp. offers optional high performance double wall access doors with aluminum frame and viewing window for air handling units. These doors are available in Outswing rotation for sections with negative pressure which are typically located upstream of blower section and Inswing rotation for air handler with Plenum fan option or any section(s) downstream of blower with positive pressure. These types of doors will eliminate any air leakage through access doors.

Marine Light & Light Switch

Optional Marine light fixture (weather proof) may be ordered for factory installation for both inside and outside of the air handler unit. We also offer weather proof light switch with or without LED night light.

Ground Fault Circuit Interrupter (GFCI)

Optional weather proof power outlet or GFCI outlet can be installed inside or outside of equipment for convenient use.

Service Platform

Thermal Corp. fabricates and installs landing and service platforms for a custom application. These platforms provide safe access to an air handler or rooftop equipment. Custom fabricated from structural steel, the landing platform features skid resistant stair treads and safety guard rails that comply with OSHA regulations.

Components for customizing standard units

Thermal Corp. offers special third party items such as integral face and bypass (IFB) coil, Enthalpy Wheel, Plate Heat Exchanger, Heat Pipe, humidifier, air blenders and evaporative coolers which can be factory mounted.

Coils

Coil definitions

A coil, as the term is used with air-handling equipment, is a heat exchange device. A heating or cooling medium passes through the coil, where it either rejects heat to or absorbs heat from, the airstream passing over the coil, depending upon the relative temperatures of the medium and airstream.

Tube

The tube is a small-diameter pipe through which the heating or cooling medium passes as it rejects or absorbs heat. Coil tubes are generally constructed of copper but may be made of other metals.

Fin

The coil fin is a thin metal plate attached to the tube to improve the heat transfer efficiency from medium to airstream. Typically, it is made of either aluminum or copper.

Header

The header is a large diameter pipe to which several tubes are connected. It distributes the heating or cooling medium to the tubes. Headers are typically of nonferrous metal or steel.

Casing

The supporting metal structure for tubes and header is called a casing. It is usually made of galvanized steel but can be made of other materials such as stainless steel.

Inlet and outlet

These are pipe stubs on the header where the heating or cooling medium enters and leaves the coil.

In water coils, the supply inlet is the pipe stub located on the side where the air leaves the coil. The outlet is the stub on the entering air side of the coil. Such arrangement is known as counter flow. In steam coils, the inlet is always the higher stub so that condensate will drain out of the lower stub.

Finned area (face area)

The working area of the coil is defined as the width X length of the finned area through which air passes. This finned or face area does not include the casing.

Face velocity

This is the air velocity in FPM (m/s) across the finned or face area of a coil. Face velocity is determined by dividing the air volume in CFM (m³/hr.) by the coil face area in FT² (m²). The first step in selecting an air handler size is to determine the maximum allowable face velocity.

400 – 450 FPM (2.0 – 2.3 m/s):

Coils within this velocity range are commonly used for high humidity application. Air handler unit requires a larger foot print and higher cost to manufacture.

450 – 500 FPM (2.3 – 2.5 m/s):

This velocity range represents most standard HVAC application; air handler builds around these velocities have a good foot print and cost balance.

500 – 600 FPM (2.5 – 3.0 m/s):

If design conditions permit, this is the best selection for cost and space requirement.

600 – 700 FPM (3.0 – 3.6 m/s):

Best option for heating application only, since there will be no moisture carry over.

Direct expansion (DX) coils

Direct expansion coils can have two intertwined refrigerant circuits. In addition, quarter, half, full and double circuiting configurations are offered to allow optimum system performance and oil return at full and part-load operation. Circuiting selection should result in a circuit loading of 0.8 to 2.0 tons per circuit at design load. Circuit loading must be evaluated at minimum load to ensure that it does not drop below 0.6 tons per circuit. Solenoid valves may be used, if necessary, to shut off the refrigerant supply to individual expansion valves to maintain adequate coil circuit loading.

Coil Coating

Heresite Coating

Heresite is a baked phenolic that is used as a protective coating for heat transfer equipment. Heresite creates a minimal loss of thermal conductivity and has superior salt water, corrosive and chemical fumes resistance, durable finish and outstanding bond strength. It will withstand thermal shock and temperatures up to 400 degrees Fahrenheit, also operating at subzero temperatures without loss of chemical and mechanical properties.

A spray and bake process is used for blower's fan wheel and housing and multiple dipping and bake process for complete coverage of coil's fins and tubes.

Heresite coating offers an economical alternative to the use of different types of metals for corrosive environments. For example, aluminum fin coils coated with Heresite are more economical than copper fin coils and stainless steel coil casing is unnecessary since the Heresite coating is applied to the casing, as well as to the finned tubes.

Electro Coating

Electro coating is the process by which a coil is submerged in a paint/water bath where electricity is used to deposit paint onto it. In this process, the coil acts in the same way as a magnet. The coating molecules are electrically attracted to the metallic coil surfaces, meaning the entire coil is completely and uniformly to coastal marine air, industrial and urban environments.

When coils are to be subjected to ultraviolet light exposure, they receive a spray applied UV-resistant topcoat. As a result, electro coating protected from UV light degradation and film integrity is maintained.

Coil will have a flexible epoxy polymer coating uniformly applied to all coil surface areas with no material bridging between fins. The coating process will ensure complete coil encapsulation and a uniform dry film thickness on all surface areas including fin edges.

Filters

Air is contaminated in varying degrees by soil, organic matter, spores, bacteria, smoke, dust and fumes.

Air cleaning and filtration devices are required in order to create a clean work environment, reduce cleaning costs and extend the life of machinery or equipment.

Size selection

This catalog has been designed to provide a quick and accurate means of selecting and specifying an air handling unit. Start with the information you have: required airflow and preferred coil face velocity to select a nominal unit size.

Model Number Nomenclature

Prefix:

- None = Classic Welded Frame
- F = Formed Frame
- T = Tubular Frame
- T² or TS = Foam panel

Base Model Type:

- CXP = Central Plant Unit
- MXT = Multizone Unit
- HXT = Heating Unit
- RTA = Roof Top Unit
- RTAU = Roof Top Air Handler with Utility Compartment
- RTH = Roof Top Air Handler Unit
- RTHU = Roof Top Hospital Unit with Utility Compartment
- RTM = Roof Top Multizone Air Handler Unit
- RTMU = Roof Top Multizone with Utility Compartment
- RX = Energy Recovery Unit
- BBC = Belt Drive Blower Coil Unit
- DBC = Direct Drive Blower Coil Unit
- TCU = Column Unit
- FS = Fan Section
- CS = Coil Section
- FT = Filter Section
- MB = Mixing Box

X Variable:

- L = Low Pressure
- M = Medium Pressure
- H = High Pressure

Model Size Designation:

- Coil
- Number of Fans
- CFM

Orientation:

- H = Horizontal
- V = vertical
- A = 45° Angle
- V1 = Vortex Induction
- T1 = Top Inlet

Model Specific Modifier:

- S = Special
- ZD = Zone Damper
- DD = Dual Duct
- I = Indoor
- O = Outdoor
- Z = 2 Pipe (Chilled Water Coil)
- ZW = 4 Pipe (Chilled & Hot Water Coils)
- E = Electric Heat
- ZE = 2 Pipe (Chilled Water Coil with Electric Heat Coil)

Example: FCLP-500-H

F Series, Central Plant Low Pressure Unit, 5,000 CFM, Horizontally oriented.

SECTION 01 2500
SUBSTITUTIONS

01 2500-3

TO: **BLRB Architects**
404 SW Columbia St
Bend, OR 97702

cc: MFIA Consulting Engineers

PROJECT NAME: Pilot Butte Middle School Renovation – Buildings A, E & F

We hereby submit for consideration, the following product instead of specified item for above project:

Section: 238000 Paragraph: 2.2A

Specified Item Space Mounted Prop Fans (tag #CF-)

Proposed Substitution: Macroair model AE3-50 Aeratron 3-Bladed Ceiling Fans

Attach complete dimensional information and technical data including laboratory tests, if applicable.

Include complete information on changes to Drawings and/or specifications, which proposed substitution will require for its proper installation.

Submit with request all necessary samples and substantiating data to provide equal quality, performance, and appearance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance. Differences in quality of materials and construction shall be indicated.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitutions do not affect dimensions shown on drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.
5. The proposed substitution will have no affect on applicable codes.
6. The manufacturer's guarantee or warranties of proposed product is equivalent to; or exceeds that of the specified product.
7. Proposed substituted item will match all sizes, profiles, specificatio



List of names and location of three similar projects on which product v
name and phone number.

Project No. 1: Yogi Tea - Eugene, Ore - installed Nov 2017 - Mackenzie Architects, ph #503-224-9560

Project No. 2: _____

Project No. 3: _____

**CERTIFICATION OF EQUAL
PERFORMANCE AND
ASSUMPTION OF LIABILITY
FOR EQUAL PERFORMANCE**

UNDERSIGNED ATTESTS THAT
FUNCTION AND QUALITY ARE
EQUAL TO OR SUPERIOR TO
SPECIFIED ITEMS.

FOR USE BY ARCHITECT:	
_____ Accepted	_____ Accepted as Noted
<input checked="" type="checkbox"/> Not Accepted	_____ Received Too Late
By: <u>Jakako Baker</u>	
Date: <u>3-8-18</u>	
Remarks: _____	

Submitted By: Greg Oberle

Signature : 

Title: Bid Coordinator

Firm: Air Reps, LLC

Address: 15860 SW Upper Boones Ferry Road

Lake Oswego, Oregon 97035

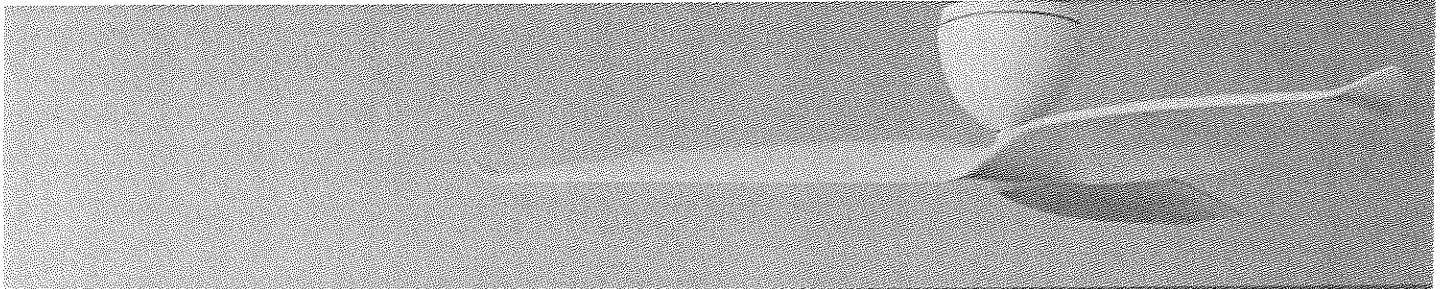
Telephone: 503-620-4300

Date : 3/7/2018

Above signature must be by person having authority to
legally bind his firm to the above terms.

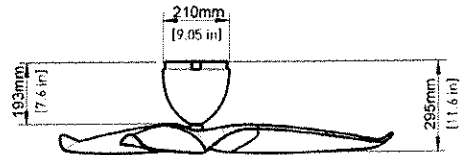
END OF SECTION

AERATRON



AERATRON FEATURES

- Patented self-balancing system eliminates wobble and vibrations
- 3D airfoil blades optimize airflow
- DC motor (AC power 100V to 240V) ceiling fan
- Remote Control with 6 speeds, reverse function and light control
- Optional 6 Watt LED Light
- Uses only 10% of the energy of a conventional ceiling fan



Note: AE2 and AE3 models have the same dimensions

DIAMETERS

Item #	Description	Diameter	Qty
AE2-43	Aeratron 2 Blade fan, Single Phase 100-240V	43 in [1.09 m]	
AE2-50		50 in [1.27 m]	
AE2-60		60 in [1.60 m]	
AE3-43	Aeratron 3 Blade fan, Single Phase 100-240V	43 in [1.09 m]	
AE3-50		50 in [1.27 m]	
AE3-60		60 in [1.52 m]	

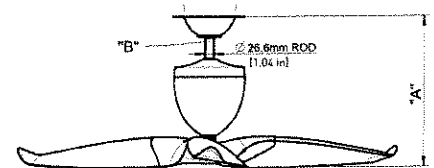
COLOR OPTIONS

Item #	Description	Qty
- W	Arctic White	
- B	Midnight Black	
- S	Platinum	
- D	Dark Walnut	
- L	Light Oak	



MOUNTING

Item #	Description	Ceiling to Fan dimension "A"	Extension rod Length "B"	Qty
--	Flush Mount	--	--	Included
AE-EXR1	Extension - 110	17.3 in [440 mm]	4.3 in [110 mm]	
AE-EXR6	Extension - 600	36.6 in [930 mm]	23.6 in [600 mm]	
AE-EXR9	Extension - 900	48.5 in [1230 mm]	35.4 in [900 mm]	



LIGHT OPTIONS

Item #	Description	Qty
AE2-LED	Aeratron 2 Blade fan, LED Light	
AE3-LED	Aeratron 3 Blade fan, LED Light	

AERATRON

BASIC SPECIFICATIONS

	AE2			AE3		
AIRFOIL DIAMETER	43 in	50 in	60 in	43 in	50 in	60 in
Airfoil Style	Variable pitch ABS Plastic with blended winglets					
Number of Airfoils	2			3		
PERFORMANCE						
Max Speed	231 RPM	200 RPM	155 RPM	207 RPM	179 RPM	133 RPM
Recommended Industry Spacing**	8 ft [2.4 m]	12 ft [3.7 m]	16 ft [4.9 m]	8 ft [2.4 m]	12 ft [3.7 m]	16 ft [4.9 m]
Max Affected Area***	144 ft ² [43.9 m ²]	225 ft ² [68.6 m ²]	400 ft ² [121.9 m ²]	144 ft ² [43.9 m ²]	225 ft ² [68.6 m ²]	400 ft ² [121.9 m ²]
WEIGHT						
Hanging Weight	11.9 lbs [5.4 kg]	12.5/12.5 lbs [5.7 kg]	12.8 lbs [5.8 kg]	13.2 lbs [6 kg]	14 lbs [6.4 kg]	14.8 lbs [6.7 kg]
MOTOR AND DRIVE TRAIN						
Motor Type	Brushless DC - Ultra High Efficiency					
Equivalent Horsepower Rating	0.03 HP					
MAX AMP DRAW						
100 - 240 VAC Single Phase	0.17A	0.17A	0.17A	0.17A	0.17A	0.17A
POWER AND CONTROLS						
Power Source	Single Phase 100-240 VAC, 50/60 Hz					
Control Options	Remote Control					
INSTALLATION						
Mounting Hardware	Flush mount					
Drop Length	Flush mount Optional drop lengths are available					
RATINGS AND COMPLIANCE						
Wash Down Duty Rating	IP44					
Certifications	UL 507, Energy Star					

*Calculation based on AMCA 230-99 equation

**Delivers 2.8-4.2 ft/s [0.4-0.8 m/s] of average air speed in the occupied space. This relates to perceived cooling or set point change of 2.4 to 4.6 F [1.3 to 2.6 C]

PROJECT

Project Information

Job Name _____

Address _____

City _____ State _____

Distributor _____

Quantity _____

Certified By

Name _____

Company _____

Address _____

City _____ State _____

Date _____