



Oregon State University

DIXON REC OFFICE IMPROVEMENT

PROJECT NUMBER: 2407-22

ITB #2023-011019

ADDENDUM NO. 1

ISSUE DATE: March 16, 2023

CONTRACT ADMINISTRATOR:

Brooke Davison, Construction Contracts Officer

Construction Contracts Administration

Email: ConstructionContracts@oregonstate.edu

This Addendum is hereby issued to inform you of the following revisions and or clarifications to the above-referenced ITB and/or the Contract Documents for the Project, to the extent they have been modified herein. Any conflict or inconsistency between this Addendum and the Solicitation Document or any previous addenda will be resolved in favor of this Addendum. Bids shall conform to this Addendum. Unless specifically changed by this Addendum, all other requirements, terms and conditions of the Solicitation Document and or Contract Documents, and any previous addenda, remain unchanged and can be modified only in writing by OSU. The following changes are hereby made:

MODIFICATIONS:

Item 1 See the attached Addendum #01 dated March 16, 2023 from Woofter Bolch Architecture.

END OF ADDENDUM NO. 1



wofter bolch architecture

107 SE Washington Street, Suite 228
Portland, Oregon 97214
wofterbolch.com

Addendum #01

From: Wofter Bolch Architecture
107 SE Washington St. Ste. 228
Portland, Oregon 97214

Project: OSU Recreation Center Improvements Projects
425 SW 26th St.
Corvallis, Oregon 97331

Owner: Oregon State University
1500 SW Jefferson Way
Corvallis, Oregon 97331

Date: March 16, 2023

RE: Addendum No. 01

The following items are hereby made part of the Bidding and Contract Documents effective this date:

Responses to Questions:

1. *Question:* Please define the areas of West Entry, Sports Program, and Fitness & Wellness Spaces. The plans show this as one consolidated area without a clear distinctions which makes it difficult to accurately breakout pricing for Base Bid A, B, & C.?

Response: Exhibit A + B have been included to more clearly illustrated the scope of work for Base Bids A, B, & C. Base Bid A includes all work in the lobby space and control desk. Base Bid B includes the wall enclosing the Sport Programs Suite and all work west of it on Level 1. Base Bid C includes all Level 1 work east of that wall.

2. *Question:* Could the design team please provide the CAD drawings for this as well? It will be helpful for accurately bidding the Integrated Interior Assemblies?

Response: Per standard policy, CAD files may be provided to the contractor that is awarded the project.

3. *Question:* What is the agency's project estimate for bonding purposes?

Response: The project estimate was intentionally not included as part of the bid package.

4. *Question:* Keynote 14 on AD1.01 notates that cabinet hardware is to be salvaged. Is this just the pulls or does it include everything such as the drawer slides, hinges & shelf brackets. Is the hardware to be reused or returned to owner?

Response: Owner requested cabinet hardware to be salvaged and returned to the owner. This includes all pulls, slides, hinges, and brackets.

5. *Question:* FEC are notated in the specifications but are not identified on the plans, can a plan be provided with the locations & mount types for any necessary FEC?

Response: Existing FEC to remain, no new FEC are anticipated unless required during permit review or inspection.

6. *Question:* Wall tags have not been provided for the Office 211P North infill, Childcare 121 South infill, Office 109C North infill, & Offices 109A-109C East Furring. Can tags please be identified for each of these walls?

Response: For infill walls assume metal stud with thickness to match existing wall w/ 5/8" Type X gyp bd each side. For furring at Offices 109A-109C see revised plan AX1.01 for wall tag.

7. *Question:* Pages AX1.01 & A5.01 have walls extending to the bottom of structure above. Can building sections & plans showing MEPF lines through new full height partitions be provided?

Response: Existing conditions of the structure and MEPF systems have been carefully reviewed and coordinated. The existing Level 2 slab is 10'-4" A.F.F. supported by a 14" deep concrete beam and 11-1/2" deep concrete joist system. Contractor to verify conditions in field and coordinate MEPF work.

8. *Question:* Is GPR required for drilling hole in 10" slab per detail 7 A5.51 or for the drilled anchors for the new HSS posts & base plates?

Response: GPR not required in this condition.

9. *Question:* Can information regarding wood species & finish system/color be provided per detail 5 A5.51?

Response: Wood species and finish/color to match existing, which is assumed to be maple veneer. See specification section 06 41 00 ARCHITECTURAL CASEWORK for initial selection sample and verification sample requirements.

10. *Question:* Are horizontal sway restraints required for new lighting fixtures over the check-in?

Response: No horizontal sway restraints are anticipated or incorporated.

11. *Question:* Keynote 1 on A1.01 say wall-mounted wood slats & suite signage are by others. Is that correct?

Response: See revised keynote #1 on A1.01 and details on A5.51.

12. *Question:* Can the spec, including tile/color, grout/color, crack membrane (if necessary), be provided for the tile infill per detail 1 on A4.51?

Response: Matching tile to be provided by the owner from overstock and installed by contractor. Grout to match existing with samples provided to architect for verification.

13. *Question:* SS-2 is called out on details 2 & 7 A4.51 but is not on the finish schedule or in the specs. Can a spec be provided?

Response: See revised Specification Section 06 41 00 - ARCHITECTURAL CASEWORK for SS-2.

Substitution Requests:

14. The following substitution requests have been accepted:

- a. Specification Section 23 36 00 – AIR TERMINAL UNITS
 - i. Type TU6-110, 111, & 112: Enviro-tec – SDR Single-Duct VAV Terminals – **accepted**.
 - ii. **See attached Substitution Request Form.**
- b. Specification Section 23 82 39 – UNIT HEATERS
 - i. Type EWH-1, 2: Ouellet – Wall Unit Heaters – **accepted**.
 - ii. **See attached Substitution Request Form.**

15. The following substitution requests were not accepted:

- a. Specification Section 09 51 23 – ACOUSTIC TILE CEILINGS
 - i. ACT-1: 2x4 Mars Acoustical Panels #88185 or #88785 – **not accepted**.

Drawing Revisions:

Refer the revised drawings for additional information.

General Sheets:

16. G0.01 – Cover Page and Drawing Index
Description of Change: No change, reissued in color.
17. G0.04 – Occupancy Safety During Construction
Description of Change: Keynotes revised.

Architectural Sheets:

18. A0.01 – List of Abbreviations and Symbols
Description of Change: Drawing symbols unhidden.
19. A1.01 – Floor Plans
Description of Change: Revised keynote #1 for clarification.
20. AX1.01 – Assemblies Plans
Description of Change: Added wall tag for furring at Offices 109A, B, & C.

21. A1.51 – Reflected Ceiling Plans

Description of Change: Hatch added to indicated areas of ACT to receive additional noise-control system and light fixture covers.

22. A6.01 – Schedules

Description of Change: Added SS-2 to Material Legend.

23. A9.01 – 3D Views

Description of Change: No change, reissued in color.

24. A9.02 – 3D Views

Description of Change: No change, reissued in color.

Electrical Sheets:

25. E110 – Lighting

Description of Changes:

- a) Change all occupancy sensors type outside of enclosed dashed area to type A as shown on revised drawing.
- b) Add switch to Sports Program and Fitness/Wellness and Administrative Suite for local controls as shown on revised drawings.
- c) Replace occupancy sensor type B to CM PDT 10 as shown on drawings.

26. E121 – Power Distribution – Level 1

Description of Change: Add power for access control doors at each suite entry as shown on drawings.

27. E601 – Schedules

Description of Change: Occupancy Sensor Schedule revised.

Specification Revisions:

28. Specification Section 09 51 23 – ACOUSTIC TILE CEILINGS

Description of Change: Revised ACT-1 edge profile to beveled tegular instead of square lay-in.

29. Specification Section 09 51 23 – ACOUSTIC TILE CEILINGS

Description of Change: Added KINETICS QuietTile Noise Control Ceiling and LightHood Fixture Covers.

30. Specification Section 06 41 00 – ARCHITECTURAL CASEWORK – 2.4 COUNTERTOPS AND DESK FRONTS

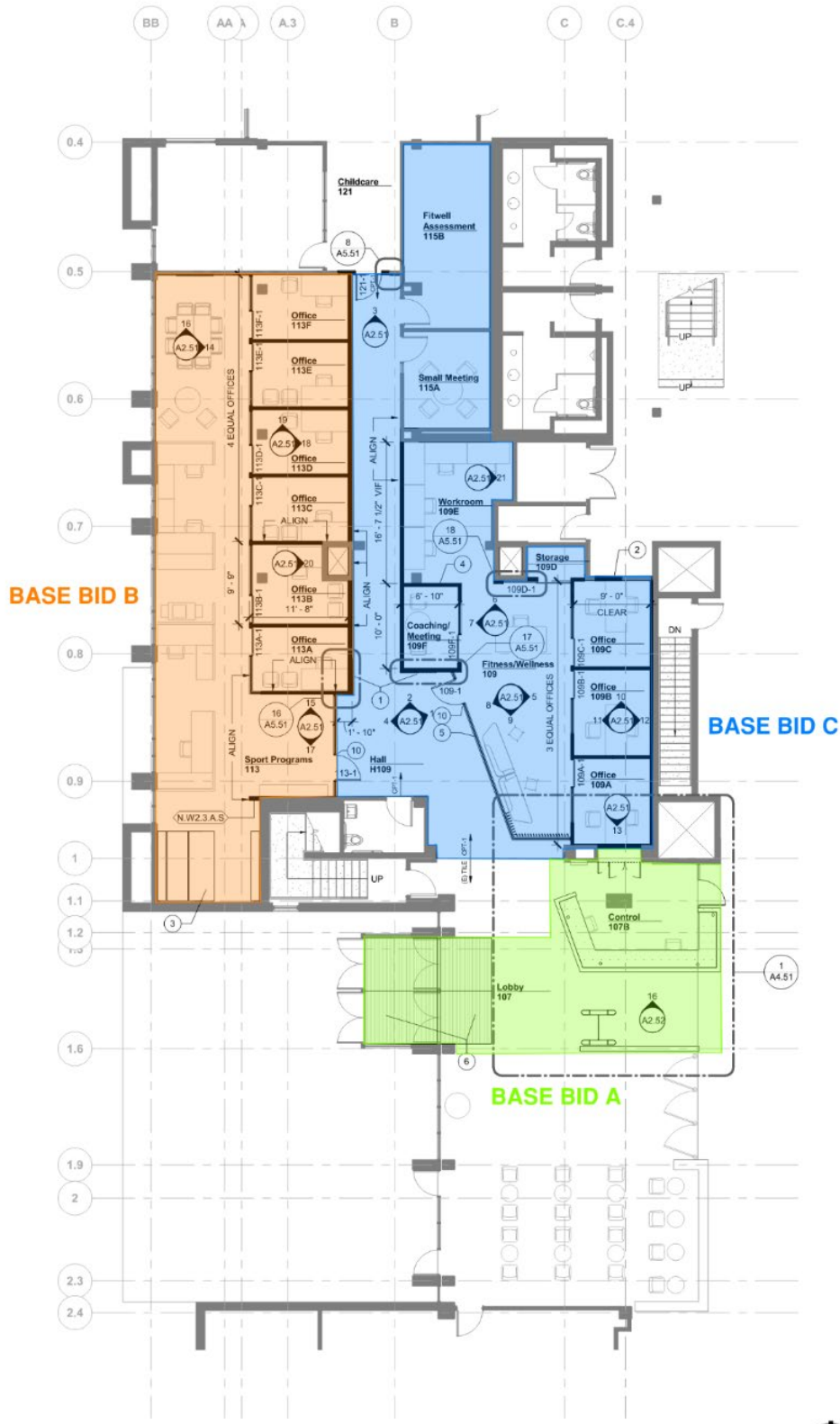
Description of Change: Added specifications for SS-2.

31. Specification Section 13 42 75 – INTEGRATED INTERIOR ASSEMBLIES –
2.3 PERFORMANCE AND DESIGN CRITERIA – L. Acoustic Attenuation

Description of Change: Revised minimum STC rating for 4” solid wall.

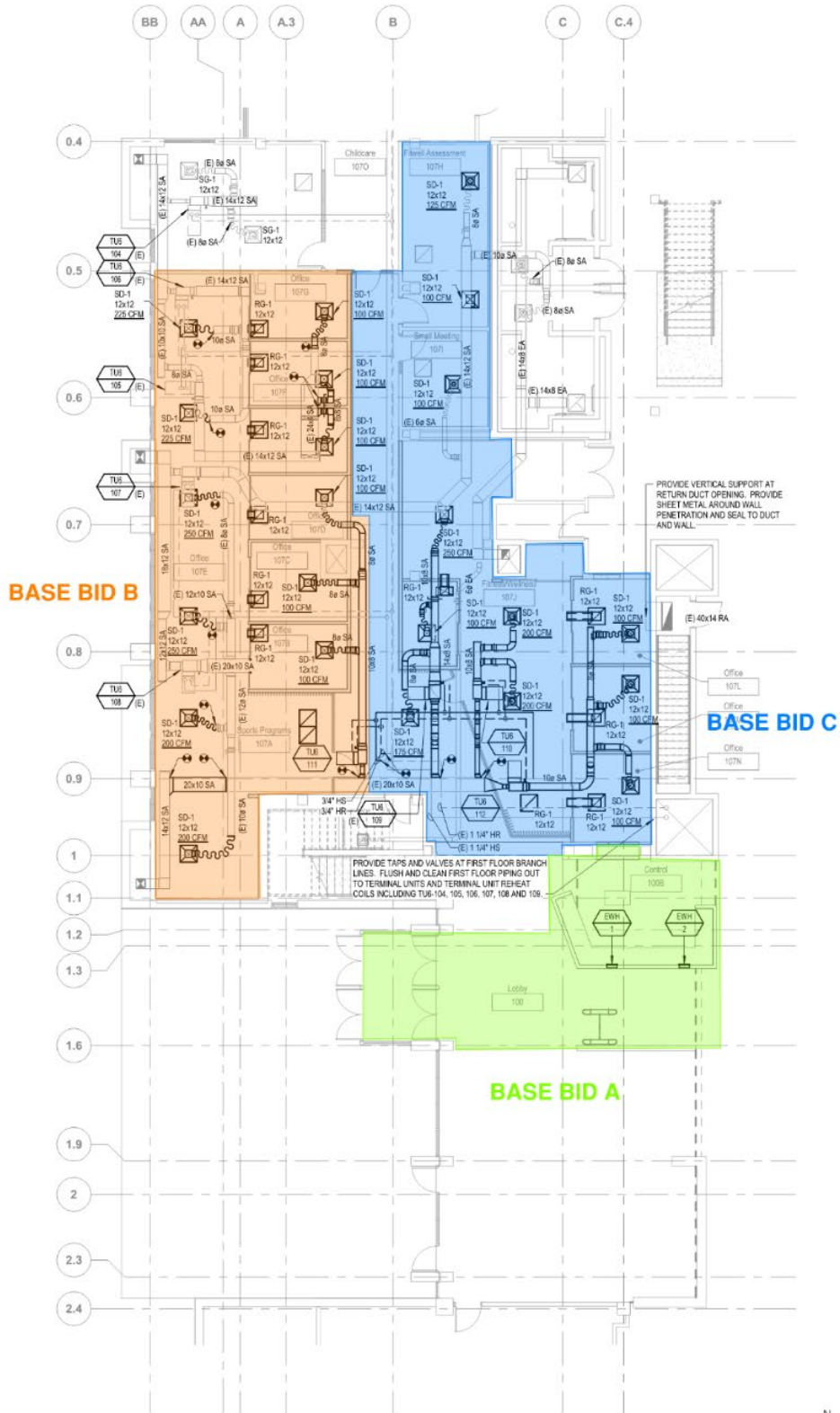
Appendix:

Exhibit A:



1 FLOOR PLAN - LEVEL 01 - WEST ENTRY AREA
1/8" = 1'-0"

Exhibit B:



**SUBSTITUTION REQUEST FORM
For Substitution Requests Prior to Bidding**

Advancement of Construction Technology
The Construction Specifications Institute

TO: Brooke Davison:ConstructionContracts@oregonstate.edu

PROJECT: OSU Dixon Rec Ctr

SPECIFIED ITEM:			
Section	Page	Paragraph	Description
23 82 39	1	2.3	Wall Unit Heaters

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: EWH-1,2 Ouellet for approved INDECCO "45" 4"5: .Rctv4."40"40, as INDECCO is manufactured by Qwngv
Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

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


1. The proposed substitution does 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 effect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item.

Submitted by:

Signature: *Erica Richardson*
 Firm: Sustainable Mechanical Systems
 Address: 7412 SW Beaverton Hillsdale Hwy., Ste. 203
Portland, OR 97225
 Date: 03/10/2023
 Telephone: 206-227-2932

For use by Design Consultant:

Accepted Accepted as noted
 Not Accepted Received too late
 By: 
 Date: 3/14/23
 Remarks: _____

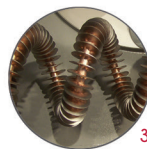
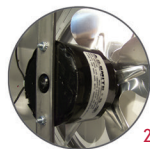
Attachments: Cut Sheet for Oulette, which is the manufacturer of approved INDECCO (23 82 38, Part 2, 2.3 2.)

OAC Commercial Wall Fan Heater



With surface mounting box

Recessed



Features

Color

- Standard: white, almond.
- Optional (upcharge applicable): metallic silver, bronze, metallic charcoal, aluminum, semi-gloss black, sand.
- Custom colors available upon request.

Finish

- Standard: epoxy/polyester powder paint.

Voltage

- 120V, 208V, 240/208V, 277V, 347V, 480V, 600V, 1 or 3-phase.

Construction

- 18-gauge steel front cover. **1**
- Bottom air outlet.
- High-limit temperature control with automatic reset.

Fan

- Closed, factory-lubricated motor. **2**
- 160 cfm fan (single unit: 55 dBA); 2 X 160 cfm fan (double unit: 58 dBA); 3 X 160 cfm fan (triple unit: 61 dBA).
- Fan delay purges heater of residual heat.

Heating element

- Durable tubular heating element with fins. **3**

Control

- Built-in thermostat included with control knob or tamperproof. **4**
- 24V relay, with or without transformer available.

Note: Thermostat is not included in heater with factory installed relay. Any remote thermostat or relay must be connected to the heater control terminal block.

Installation

- Minimum clearance from the floor and adjacent walls: 10 in. (25.4 cm).
- Adaptor for surface mounting available. **5**

Warranty

- 5-year warranty against defects.

Application

- Apartment building, commercial building, entrance way, stairwell, garage.

OAC Models

Product # ¹	Volts (ph)	Watts	BTU/hr	Weight		Unit
				lb	kg	
OACU01502-T	120 (1)	1500	5123	24.0	10.9	single
OACU02008-T	208 (1)	2000	6830	24.0	10.9	single
OACU04008-T	208 (1)	4000	13661	24.0	10.9	single
OACU04038-T	208 (3)	4000	13661	26.0	12.0	single
OACU04808-T	208 (1)	4800	16393	24.0	10.9	single
OACU05038-T	208 (3)	5000	17076	26.0	12.0	single
OACU06038-T	208 (3)	6000	20491	54.0	24.5	double
OACU08008-T	208 (1)	8000	27321	50.0	22.7	double
OACU09038-T	208 (3)	9000	30737	90.0	40.9	triple
OACU12008-T	208 (1)	12000	40982	90.0	40.9	triple
OACU12038-T	208 (3)	12000	40982	90.0	40.9	triple
OACU01500-T ²	240/208 (1)	1500/1125	5123/3842	24.0	10.9	single
OACU02000-T ²	240/208 (1)	2000/1500	6830/5123	24.0	10.9	single
OACU03000-T ²	240/208 (1)	3000/2250	10246/7684	24.0	10.9	single
OACU03030-T ²	240/208 (3)	3000/2250	10246/7684	26.0	12.0	single
OACU04000-T ²	240/208 (1)	4000/3000	13661/10246	24.0	10.9	single
OACU04030-T ²	240/208 (3)	4000/3000	13661/10246	26.0	12.0	single
OACU04800-T ²	240/208 (1)	4800/3600	16393/12295	24.0	10.9	single
OACU05030-T ²	240/208 (3)	5000/3750	17076/12807	26.0	12.0	single
OACU06000-T ²	240/208 (1)	6000/4500	20491/15368	50.0	22.7	double
OACU08000-T ²	240/208 (1)	8000/6000	27321/20491	50.0	22.7	double
OACU12000-T ²	240/208 (1)	12000/9000	40982/30737	90.0	40.9	triple
OACU01577-T	277 (1)	1500	5123	28.0	12.7	single
OACU02077-T	277 (1)	2000	6830	28.0	12.7	single
OACU03077-T	277 (1)	3000	10246	28.0	12.7	single
OACU04077-T	277 (1)	4000	13661	28.0	12.7	single
OACU04877-T	277 (1)	4800	16393	28.0	12.7	single
OACU06077-T	277 (1)	6000	20491	55.0	25.0	double
OACU08077-T	277 (1)	8000	27321	55.0	25.0	double
OACU12077-T	277 (1)	12000	40982	90.0	40.9	triple
OACU01504-T	480 (1)	1500	5123	28.0	12.7	single
OACU02004-T	480 (1)	2000	6830	28.0	12.7	single
OACU03004-T	480 (1)	3000	10246	28.0	12.7	single
OACU03034-T	480 (3)	3000	10246	30.0	14.0	single
OACU04004-T	480 (1)	4000	13661	28.0	12.7	single
OACU04034-T	480 (3)	4000	13661	30.0	14.0	single
OACU04804-T	480 (1)	4800	16393	28.0	12.7	single
OACU05034-T	480 (3)	5000	17076	30.0	14.0	single
OACU06004-T	480 (1)	6000	20491	55.0	25.0	double
OACU08004-T	480 (1)	8000	27321	55.0	25.0	double
OACU12004-T	480 (1)	12000	40982	90.0	40.9	triple
OACU12034-T	480 (3)	12000	40982	90.0	40.9	triple

¹ Built-in thermostat included with control knob or tamperproof.

² 208V = 75% of wattage at 240V.

Add "BL" for white, "AM" for almond. Upcharge available for optional colors shown in the color chart section.

OAC

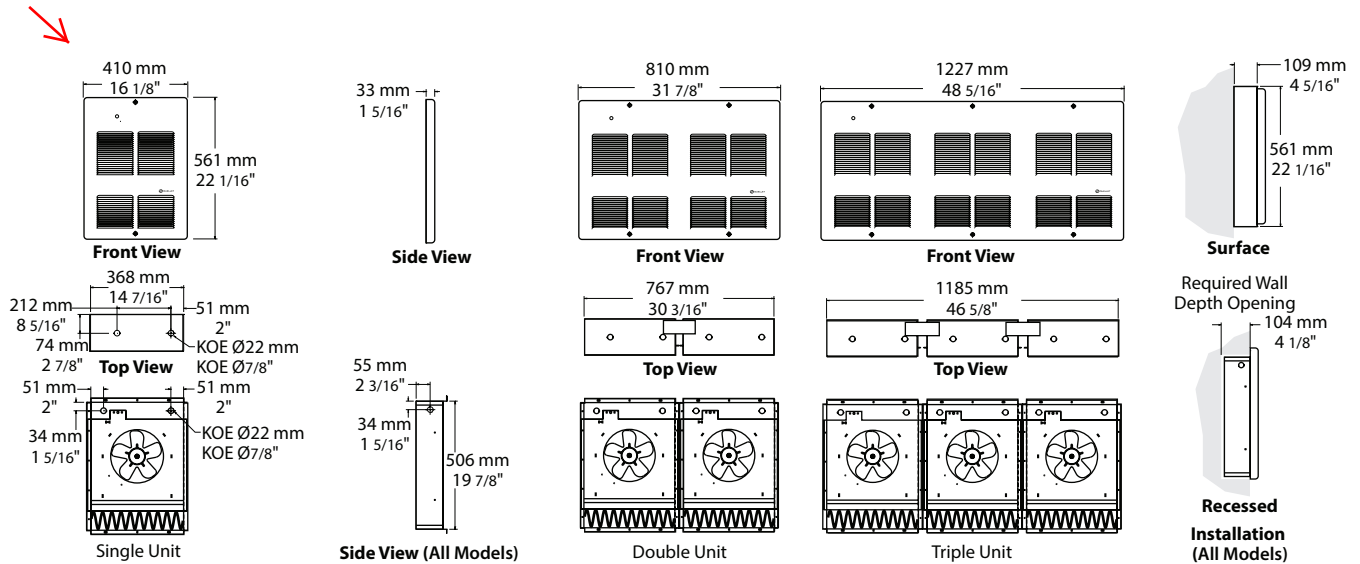
Options

Product # Kit	Product # Factory installed*	Description
KIT-OAC-BS1	-	Surface mounting box, single unit
KIT-OAC-BS1-1	-	Semi recessed 1 in. trim kit, single unit
KIT-OAC-BS1-2	-	Semi recessed 2 in. trim kit, single unit
KIT-OAC-BS2	-	Surface mounting box, double unit
KIT-OAC-BS2-1	-	Semi recessed 1 in. trim kit, double unit
KIT-OAC-BS2-2	-	Semi recessed 2 in. trim kit, double unit
KIT-OAC-BS3	-	Surface mounting box, triple unit
KIT-OAC-BS3-1	-	Semi recessed 1 in. trim kit, triple unit
KIT-OAC-BS3-2	-	Semi recessed 2 in. trim kit, triple unit
KIT-OAC-DIS20 ³	DIS20 ³	Disconnect switch, double-pole, 20A at 277V and less
KIT-OAC-DIS40 ³	DIS40 ³	Disconnect switch, triple-pole, 40A at 600V max.
KIT-OAC-DIS80 ³	DIS80 ³	Disconnect switch, triple-pole, 80A at 600V max.
-	IV	Fan switch
-	OO	On/Standby heating switch
-	R ⁴	24V control relay, without transformer
-	RT ⁴	24V control relay with transformer

* For factory installed options, add the option number to the product number. See the **Product Code** section inside the front cover.

³ For the U.S. only: The nominal current of the unit must not exceed 80% of the capacity of the disconnect.

⁴ If the built-in thermostat is not required with the 24V control relay, remove the "T" from the product number (E.g.: OACU04004-RT).



**SUBSTITUTION REQUEST FORM
For Substitution Requests Prior to Bidding**

Advancement of Construction Technology
The Construction Specifications Institute

TO: Brooke Davison:ConstructionContracts@oregonstate.edu

PROJECT: OSU Dixon Rec Ctr

SPECIFIED ITEM:

Section	Page	Paragraph	Description
23 36 00	1	2.2	Single-Duct Air Terminal Units

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: TU6-110, 111, and 112

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

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

1. The proposed substitution does 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 effect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.

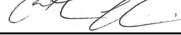
The undersigned further states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item.

Submitted by:

Signature: *Erica Richardson*
Firm: Sustainable Mechanical Systems
Address: 7412 SW Beaverton Hillsdale Hwy., Ste. 203
Portland, OR 97225
Date: 03/10/2023
Telephone: 206-227-2932

For use by Design Consultant:

Accepted Accepted as noted
 Not Accepted Received too late

By: 

Date: 3/14/23

Remarks: TU6-111 should be changed to match
TU6-112 at 300 cfm

Attachments: preliminary example submittal included; unable to make selection for TU6-111 with scheduled values.
Please check design parameters.

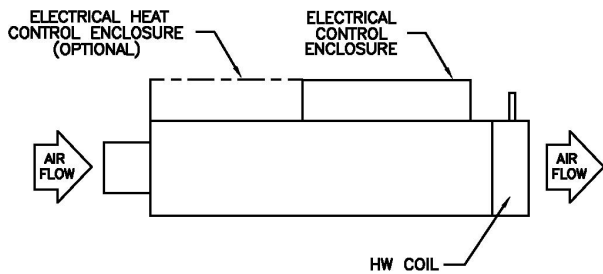
SINGLE DUCT SCHEDULE - HOT WATER HEAT

RESULTS													WATER HEAT											SOUND			RAD SOUND POWER						DIS SOUND POWER								
TAG	MFG	QTY	Elev ft	MODEL	SIZE	CONTROLS	MAX PRI CFM	MIN PRI CFM	INLET SP in. wg	MIN SP in. wg	DOWN SP in. wg	ARRANGEMENT	WEIGHT lb	HEAT CFM	EAT DEG F	LAT DEG F	CAPACITY MBH	EWT DEG F	LWT DEG F	COIL APD in. wg	WATER GPM	COIL ROWS	COIL CKTS	WPD ft. wg	Glycol Type	Glycol Pct	RAD NC	DIS NC	ATTEN METHOD	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
TU6-110	ETI	1	0	SDR	06	GENERIC	400	200	1	0.17	0.25	LH Controls / LH Coil	38	200	55	83.85	6.26	180	141	0.09	0.33	1	1	0.11	None	0	20	-	AHRI-885E	53	48	46	40	34	28	61	56	48	38	24	24
TU6-112	ETI	1	0	SDR	06	GENERIC	300	150	1	0.1	0.25	LH Controls / LH Coil	38	150	55	81.84	4.37	180	137.23	0.06	0.21	1	1	0.05	None	0	15	-	AHRI-885E	49	45	42	39	35	26	60	54	44	34	23	23

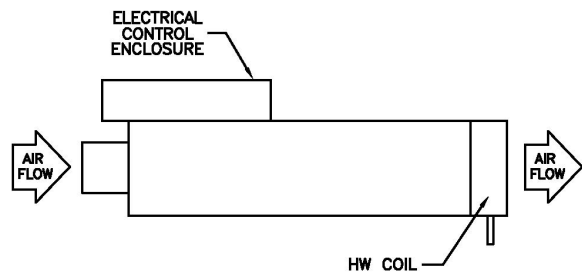
* "-" signifies a NC value (radiated or discharge) that is less than 15

* Actual coil APD shown is at max airflow, not heating airflow.xxx

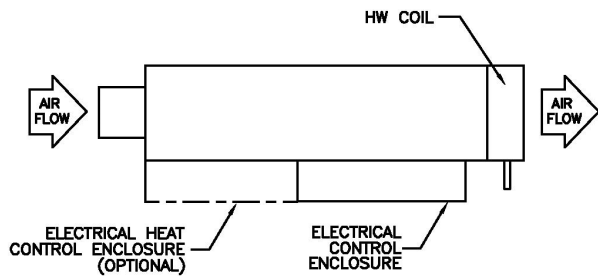
Job Name:	OSU Dixon Rec Ctr	Date:	3/10/2023
Drawing Name:	SDR Arrangements	Sales Rep:	



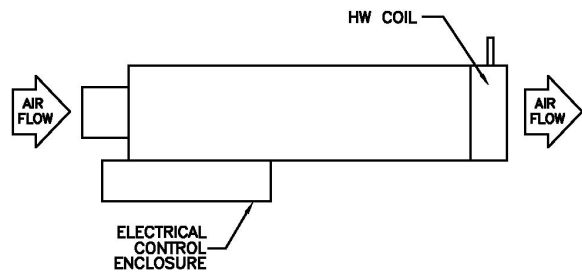
ARRANGEMENT 1
LEFT HAND CONTROL UNIT
WITH LEFT HAND COIL



ARRANGEMENT 2
LEFT HAND CONTROL UNIT
WITH RIGHT HAND COIL



ARRANGEMENT 3
RIGHT HAND CONTROL UNIT
WITH RIGHT HAND COIL



ARRANGEMENT 4
RIGHT HAND CONTROL UNIT
WITH LEFT HAND COIL

NOTES:

1. ELECTRIC HEATING CONTROL ENCLOSURE IS ON THE SAME SIDE AS STANDARD CONTROL ENCLOSURE.
2. ELECTRIC HEAT ONLY AVAILABLE ON ARRANGEMENTS 1 & 3.
3. ELECTRIC HEAT NOT AVAILABLE WITH HW COIL.

TITLE:

ARRANGEMENTS – MODEL SDR

 **ENVIRO-TEC®**
BY JOHNSON CONTROLS

DRN BY: SM	DATE: 1/21/04	SCALE: N/A	DRAWING NO.
CRD BY: KAM	DATE: 11/17/04	REV: 01	

THIS DRAWING CONTAINS PROPRIETARY DATA.
UNAUTHORIZED DISCLOSURE, REPRODUCTION OR USE
IS STRICTLY PROHIBITED WITHOUT WRITTEN PERMISSION

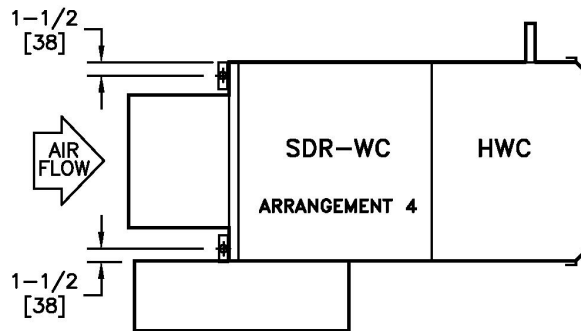
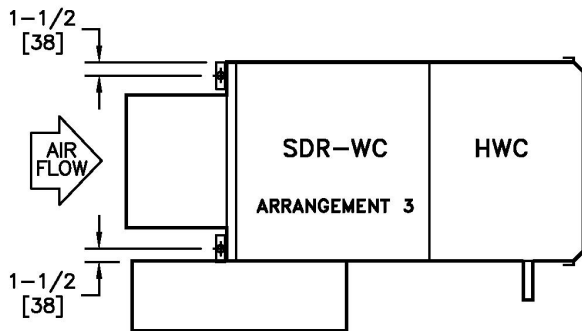
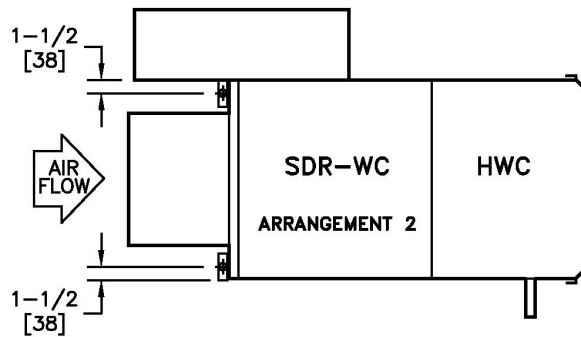
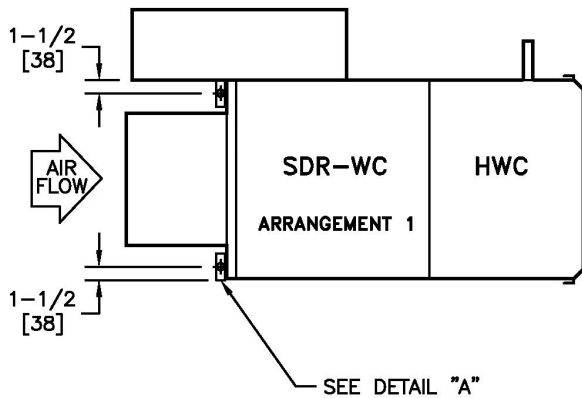
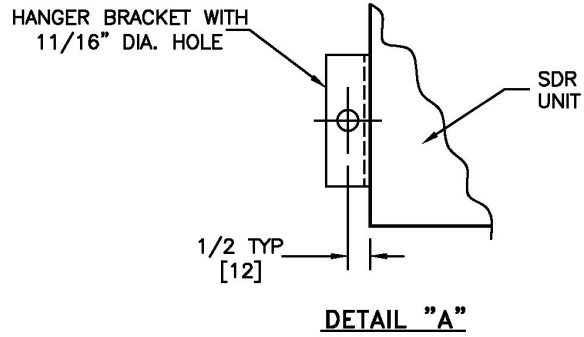
DO NOT SCALE DRAWING
DIMENSIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.
CONTACT FACTORY FOR CERTIFIED DRAWINGS.

01-80012

Job Name:	OSU Dixon Rec Ctr	Date:	3/10/2023
Drawing Name:	Model SDR, SDR-SA & SDR-EH Hanger Bracket Locations WC	Sales Rep:	


NOTES:

- All dimensions are inches [millimeters].
All dimensions are $\pm 1/4"$ [6mm].
Metric values are soft conversion.
- ENVIRO-TEC will not accept responsibility for unit support based on additional field supplied suspension devices, which are sized and designed by others.



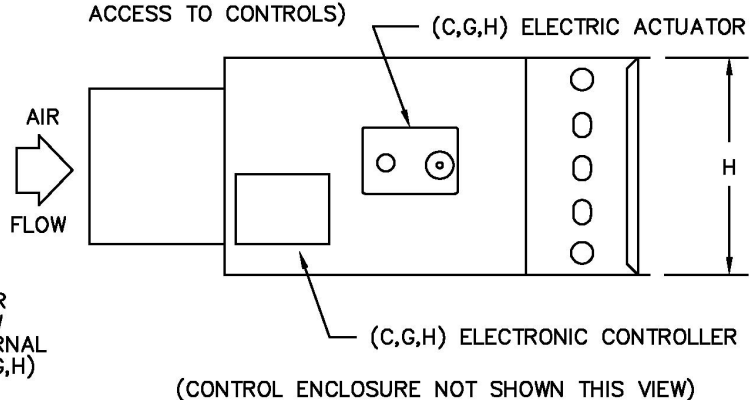
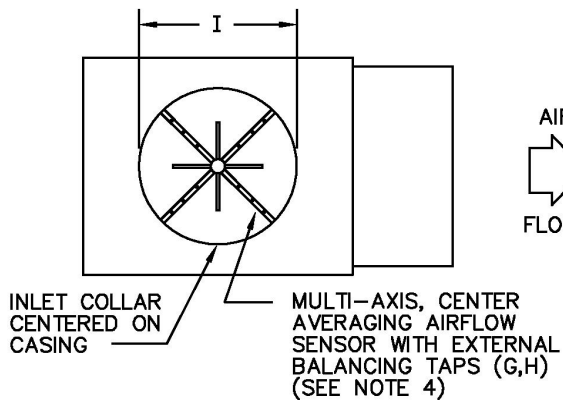
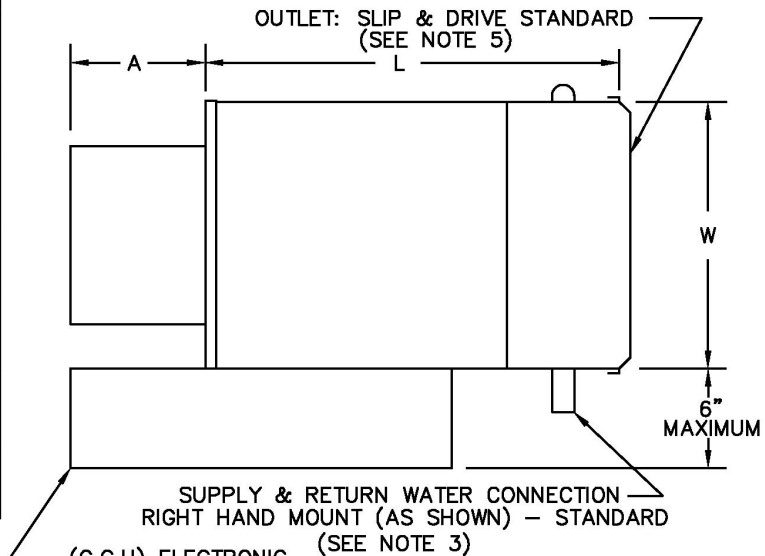
TOP VIEWS

Sht 4 of 5

TITLE:		MODEL SDR, SDR-SA & SDR-EH SINGLE DUCT TERMINAL UNIT HANGER BRACKET LOCATIONS		 ENVIRO-TEC® BY JOHNSON CONTROLS	
<small>THIS DRAWING CONTAINS PROPRIETARY DATA. UNAUTHORIZED DISCLOSURE, REPRODUCTION, OR USE IS STRICTLY PROHIBITED WITHOUT WRITTEN PERMISSION</small>		<small>DO NOT SCALE DRAWING DIMENSIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE. CONTACT FACTORY FOR CERTIFIED DRAWINGS.</small>		<small>DRN BY:</small> DI	<small>DATE:</small> 6/3/05
		<small>CKD BY:</small> HANK	<small>DATE:</small> 6/10/05	<small>SCALE:</small> NTS	<small>REV:</small> 00
				<small>DRAWING NO.</small> 01-80049	

Job Name:	OSU Dixon Rec Ctr	Date:	3/10/2023
Drawing Name:	Model SDR-WC Electronic Controls	Sales Rep:	

UNIT SIZE	W	H	L	A	I
4	10 [254]	10 [254]	15-1/2 [394]	10-1/2 [267]	3-7/8 [98]
5	10 [254]	10 [254]	15-1/2 [394]	10-1/2 [267]	4-7/8 [124]
6	10 [254]	10 [254]	15-1/2 [394]	6-1/2 [165]	5-7/8 [149]
8	12 [305]	10 [254]	15-1/2 [394]	6-1/2 [165]	7-7/8 [200]
10	14 [356]	12-1/2 [318]	17-1/2 [445]	6-1/2 [165]	9-7/8 [251]
12	16 [406]	15 [381]	17-1/2 [445]	6-1/2 [165]	11-7/8 [302]
14	20 [508]	17-1/2 [445]	21-1/2 [546]	6-1/2 [165]	13-7/8 [352]
16	24 [610]	17-1/2 [445]	21-1/2 [546]	6-1/2 [165]	15-7/8 [403]



CONSTRUCTION NOTES:

1. MATERIAL: Galvanized steel; Casing -22 gauge; Air valve casing -22 gauge.
2. INSULATION: 1/2" thick fiberglass complying with NFPA 90-A and UL 181.
3. HOT WATER COIL: Copper tubing with aluminum fins, 10 fins per inch. Supply and Return water connections: 1 Row coil: 1/2" O.D., 2 Row coil: 5/8" O.D., 3 & 4 Row coil: 7/8" O.D.. Coil to be externally insulated by others if required.
4. AIRFLOW SENSOR: Sizes 4 & 5 utilize single-axis linear averaging type.
5. INSTALLATION: A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream. B) Inlet collar & hot water coil should be externally insulated by others (in the field) if required.

NOTE: All drawings subject to change without prior notice.

(C) TEMPERATURE RESPONSIVE - SERIES SD600 (G) PRESSURE INDEPENDENT - SERIES SD700
(H) DIRECT DIGITAL PRESSURE INDEPENDENT - SERIES SD800 & SD900

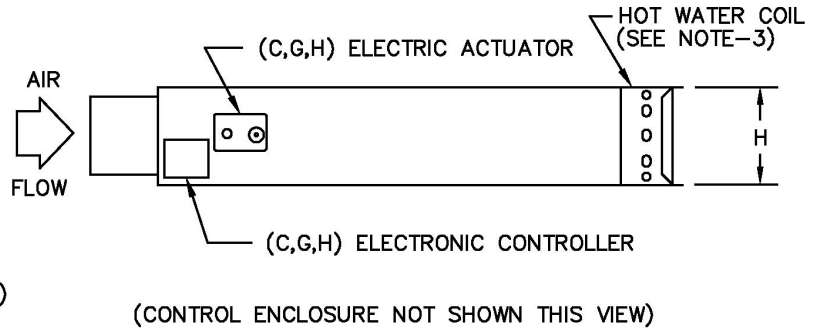
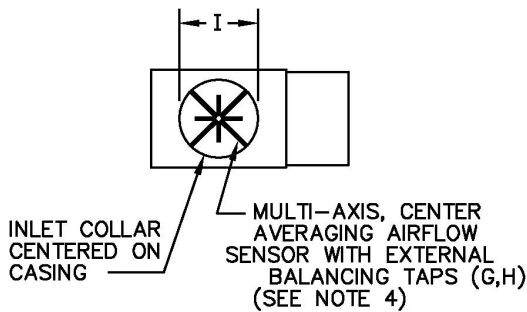
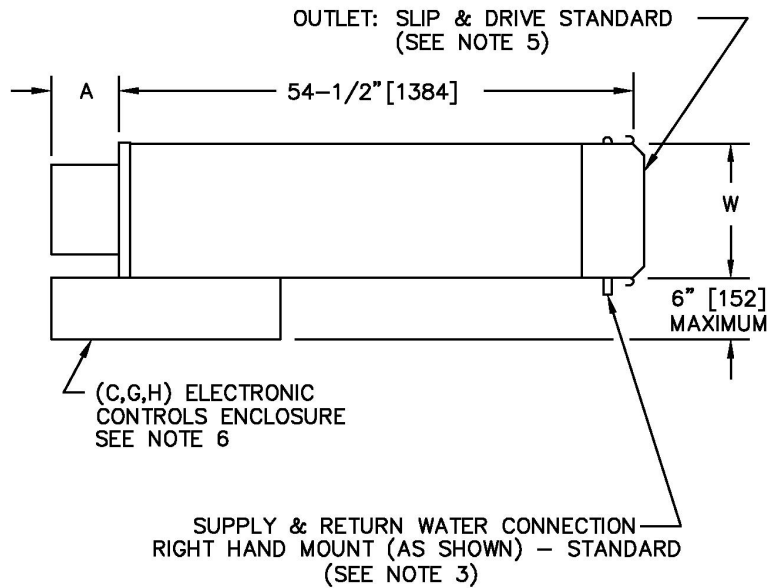
TITLE: MODEL SDR-WC SINGLE DUCT
TERMINAL UNIT
ELECTRONIC CONTROLS

ENVIRO-TEC®
BY JOHNSON CONTROLS

DRN BY: CV	DATE: 02/13/92	SCALE: N/A	DRAWING NO.
CKD BY: Chris H	DATE: 05/25/06	REV: 02	15241

Job Name:	OSU Dixon Rec Ctr	Date:	3/10/2023
Drawing Name:	Model SDR-SA-WC Electronic Controls	Sales Rep:	

UNIT SIZE	W	H	A	I
4	10" [254]	10" [254]	10-1/2" [267]	3-7/8" [98]
5	10" [254]	10" [254]	10-1/2" [267]	4-7/8" [124]
6	10" [254]	10" [254]	6-1/2" [165]	5-7/8" [149]
8	12" [305]	10" [254]	6-1/2" [165]	7-7/8" [200]
10	14" [356]	12-1/2" [318]	6-1/2" [165]	9-7/8" [251]
12	16" [406]	15" [381]	6-1/2" [165]	11-7/8" [302]
14	20" [508]	17-1/2" [445]	6-1/2" [165]	13-7/8" [352]
16	24" [610]	17-1/2" [445]	6-1/2" [165]	15-7/8" [403]



CONSTRUCTION NOTES:

1. MATERIAL: Galvanized steel; Casing -22 gauge; Air valve casing -22 gauge.
2. INSULATION: 1/2"[13] thick fiberglass complying with NFPA 90-A and UL 181.
3. HOT WATER COIL: Copper tubing with aluminum fins, 10 fins per inch. Supply and Return water connections: 1 Row coil: 1/2"[13] O.D., 2 Row coil: 5/8"[16] O.D., 3 & 4 Row coil: 7/8"[22] O.D.. Coil to be externally insulated by others if required.
4. AIRFLOW SENSOR: Sizes 4 & 5 utilize single-axis linear averaging type.
5. INSTALLATION: A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
B) Inlet collar & hot water coil should be externally insulated by others (in the field) if required.
6. Provide sufficient clearance to permit access to controls and comply with applicable codes and ordinances.

(C) DIGITAL CONTROLS BY OTHERS
(G) PRESSURE INDEPENDENT - SERIES SD7000
(H) DIRECT DIGITAL PRESSURE INDEPENDENT - SERIES SDV900

TITLE:

MODEL SDR-SA-WC
ELECTRONIC CONTROLS

ENVIRO-TEC®
BY JOHNSON CONTROLS

DRW BY: NANCE	DATE: 24 FEB 92	SCALE: NTS	DRAWING NO.
CRD BY: Chris H	DATE: 05/23/04	REV: 03	15260

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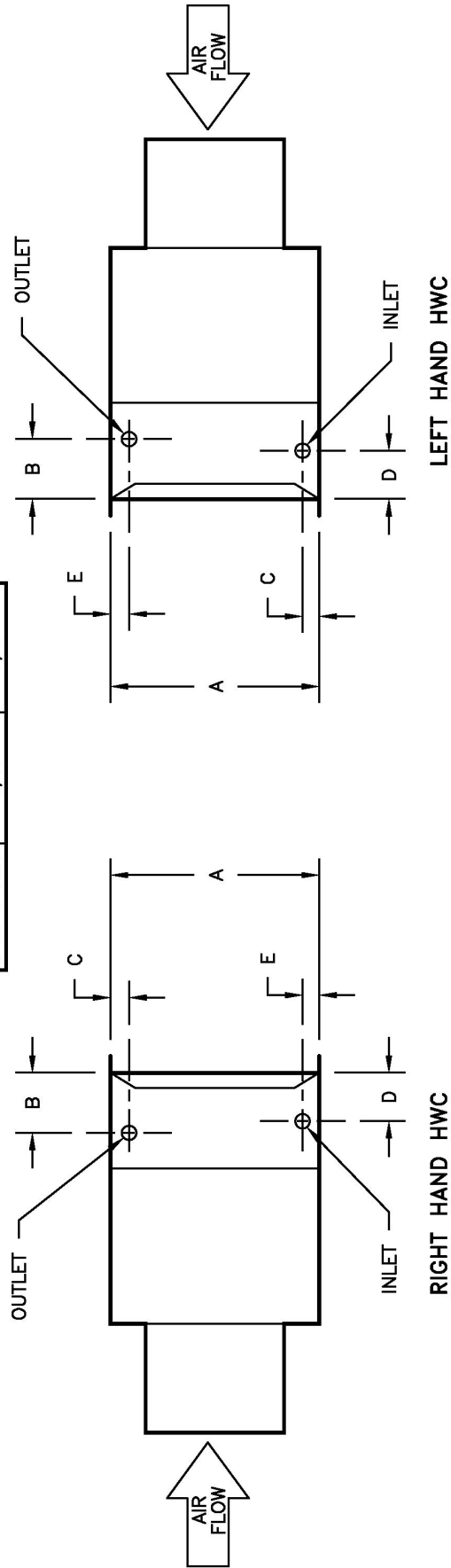
2 ROW					
UNIT SIZE	A	B	C	D	E
04-08	10-1/8"	2-3/4"	11/16"	2-3/4"	11/16"
10	12-5/8"	2-3/4"	11/16"	2-3/4"	11/16"
12	15-1/8"	2-3/4"	11/16"	2-3/4"	11/16"
14-16	17-5/8"	2-3/4"	11/16"	2-3/4"	11/16"
19-22	17-5/8"	2-3/4"	11/16"	2-3/4"	11/16"

4 ROW					
UNIT SIZE	A	B	C	D	E
04-08	10-1/8"	4-3/8"	1-3/16"	1-1/8"	1-3/16"
10	12-5/8"	4-3/8"	1-3/16"	1-1/8"	1-3/16"
12	15-1/8"	4-3/8"	1-3/16"	1-1/8"	1-3/16"
14-16	17-5/8"	4-3/8"	1-3/16"	1-1/8"	1-3/16"
19-22	17-5/8"	4-3/8"	1-3/16"	1-1/8"	1-3/16"

1 ROW					
UNIT SIZE	A	B	C	D	E
04-08	10-1/8"	2-3/16"	3/8"	2-3/16"	1"
10	12-5/8"	2-3/16"	3/8"	2-3/16"	1"
12	15-1/8"	2-3/16"	3/8"	2-3/16"	1"
14-16	17-5/8"	2-3/16"	3/8"	2-3/16"	1"
19-22	17-5/8"	2-3/16"	3/8"	2-3/16"	1"

3 ROW					
UNIT SIZE	A	B	C	D	E
04-08	10-1/8"	3-1/4"	1-3/16"	1-1/8"	1-3/16"
10	12-5/8"	3-1/4"	1-3/16"	1-1/8"	1-3/16"
12	15-1/8"	3-1/4"	1-3/16"	1-1/8"	1-3/16"
14-16	17-5/8"	3-1/4"	1-3/16"	1-1/8"	1-3/16"
19-22	17-5/8"	3-1/4"	1-3/16"	1-1/8"	1-3/16"

CONNECTION SIZES		
COIL ROWS	STANDARD	MULTI-CKT
1 ROW	1/2"	5/8"
2 ROW	5/8"	5/8"
3 & 4 ROW	7/8"	7/8"

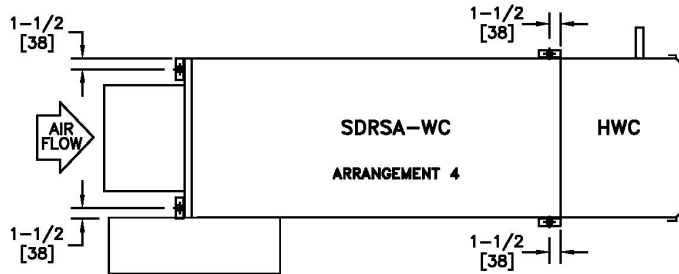
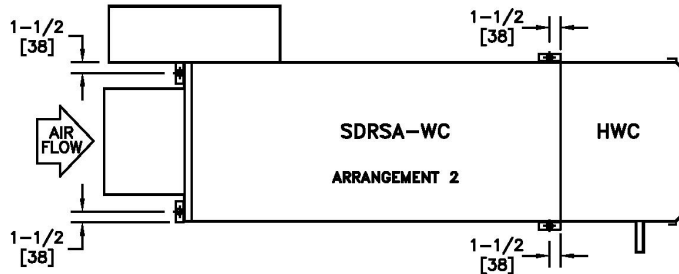
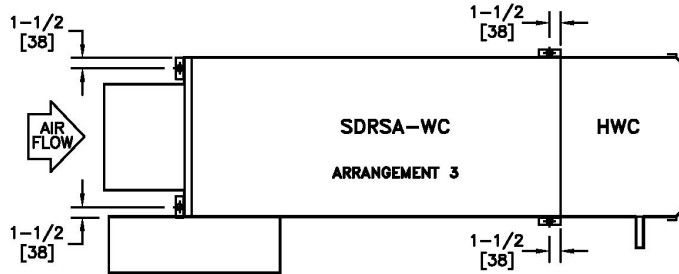
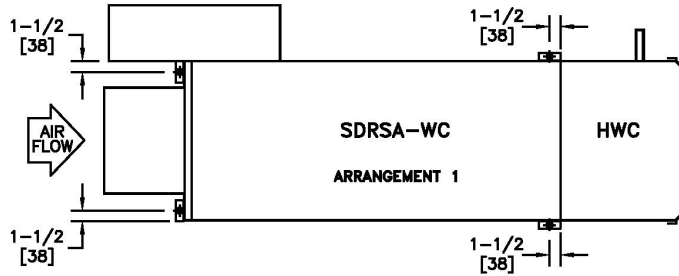
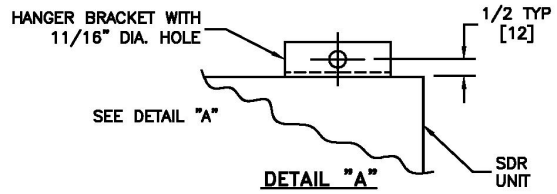


ENVIRO-TEC®		BY JOHNSON CONTROLS	
DRAWN BY: PE	DATE: 05-24-00	SCALE: 1=1	DRAWING NO.:
CRD BY: JCH	DATE: 2/28/08	REV.:	17444
SDR-WC WATER COIL CONNECTION		DO NOT SCALE DRAWING DIMENSIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE. CONTACT FACTORY FOR CERTIFIED DRAWINGS.	
THIS DRAWING CONTAINS PROPRIETARY DATA. UNAUTHORIZED DISCLOSURE, REPRODUCTION, OR USE IS STRICTLY PROHIBITED WITHOUT WRITTEN PERMISSION.			

Job Name:	OSU Dixon Rec Ctr	Date:	3/10/2023
Drawing Name:	Model SDR, SDR-SA & SDR-EH Hanger Bracket Locations SA-WC	Sales Rep:	

NOTES:

- All dimensions are Inches [millimeters].
All dimensions are $\pm 1/4"$ [6mm].
Metric values are soft conversion.
- ENVIRO-TEC will not accept responsibility for unit support based on additional field supplied suspension devices, which are sized and designed by others.



TOP VIEWS

Sht 5 of 5

TITLE		 ENVIRO-TEC [®] BY JOHNSON CONTROLS		DRAWING NO.		
MODEL SDR, SDR-SA & SDR-EH SINGLE DUCT TERMINAL UNIT HANGER BRACKET LOCATIONS				DRN BY: DI	DATE: 6/3/05	SCALE: NTS
<small>THIS DRAWING CONTAINS PROPRIETARY DATA. UNAUTHORIZED DISCLOSURE, REPRODUCTION, OR USE IS STRICTLY PROHIBITED WITHOUT WRITTEN PERMISSION.</small>		<small>DO NOT SCALE DRAWING. DIMENSIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE. CONTACT FACTORY FOR CERTIFIED DRAWINGS.</small>		CKD BY: HANK	DATE: 6/10/05	REV: 00

VAV Submittal Form - Hot Water Heat

Job Name:	OSU Dixon Rec Ctr	Date:	3/10/2023
ETI Order No:		Sales Rep:	

Tag Set	TU6-110		
Quantity	1		
Attribute	Description	Value	Value Description
acsplate	- Access plate	: stdbox	Access plate in terminal casing ←
actuatorpos	- Actuator Position	: none	None
arrngmnt	- Unit arrangement	: 1	1 - LH Controls / LH Coil
circ	- Coil circ(#)	: 1	One circuit
ctlseq	- Controls	: GENERIC	Fcty. Mtd. GENERIC
ctltype	- Control Type	: 3	Mount & wire in factory ←
Family	- Model	: SDR	Single Duct Variable Air Volume Terminal
fixedflow	- Fixed Flow Control GPM	: 0	None
fldencl	- Control Enclosure	: elect	Electronic
foil	- Foil lining	: yes	Yes ←
hgrbkt	- Hanger bracket	: yes	Yes ←
htype	- Heating Type	: 1	Water heat
hwrows	- Coil Rows (#)	: 1	1 row
mtlnose	- Metal nosing on insulation edges	: yes	Yes ←
pcvalve	- PC Valve	: none	None
pipesize	- Pipe Size	: none	None
ptports	- PT Ports	: no	None
sa	- Sound attenuator	: yes	Yes ←
size	- Unit Size	: 06	Size 6
spclinsul	- Fiberglass Options	: 3/4 inch	3/4" Fiberglass ←
stainlesshose	- Stainless Hose	: no	None
unions	- Unions	: no	None
ystrainer	- Y-Strainer Ports	: no	None

TagSet Tags:

Tag Set	TU6-112		
Quantity	1		
Attribute	Description	Value	Value Description
acsplate	- Access plate	: stdbox	Access plate in terminal casing
actuatorpos	- Actuator Position	: none	None
arrngmnt	- Unit arrangement	: 1	1 - LH Controls / LH Coil
circ	- Coil circ(#)	: 1	One circuit
ctlseq	- Controls	: GENERIC	Fcty. Mtd. GENERIC
ctltype	- Control Type	: 3	Mount & wire in factory
Family	- Model	: SDR	Single Duct Variable Air Volume Terminal
fixedflow	- Fixed Flow Control GPM	: 0	None
fldencl	- Control Enclosure	: elect	Electronic
foil	- Foil lining	: yes	Yes
hgrbkt	- Hanger bracket	: yes	Yes
htype	- Heating Type	: 1	Water heat
hwrows	- Coil Rows (#)	: 1	1 row
mtlnose	- Metal nosing on insulation edges	: yes	Yes
pcvalve	- PC Valve	: none	None
pipesize	- Pipe Size	: none	None
ptports	- PT Ports	: no	None
sa	- Sound attenuator	: yes	Yes
size	- Unit Size	: 06	Size 6
spclinsul	- Fiberglass Options	: 3/4 inch	3/4" Fiberglass
stainlesshose	- Stainless Hose	: no	None
unions	- Unions	: no	None
ystrainer	- Y-Strainer Ports	: no	None
TagSet Tags:			

CATALOG

SDR Single-Duct VAV Terminals



FEATURES AND BENEFITS

PATENTED FLOWSTAR™ SENSOR CONTROL

The air valve features the FlowStar™ airflow sensor which has brought new meaning to airflow control accuracy. The multi-axis design utilizes between 12 and 20 sensing points that sample total pressure at center points within equal concentric cross-sectional areas, effectively traversing the air stream in two planes. Each distinct pressure reading is averaged within the center chamber before exiting the sensor to the controlling device.

This sensor adds a new dimension to signal amplification. Most differential pressure sensors provide a signal equal to 1.5 times the equivalent velocity pressure signal. The FlowStar™ provides a differential pressure signal that is 2.5 to 3 times the equivalent velocity pressure signal. This amplified signal allows more accurate and stable airflow control at low airflow capacities. Low airflow control is critical for indoor air quality, reheat minimization, and preventing over cooling during light loads.

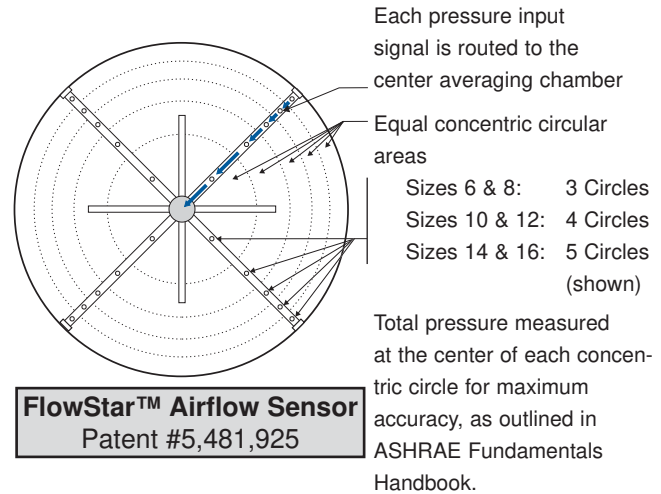
Unlike other sensors which use a large probe surface area to achieve signal amplification, the FlowStar™ utilizes an unprecedented streamline design which generates amplified signals unrivaled in the industry. The streamlined design also generates less pressure drop and noise.

The VAV schedule should specify the minimum and maximum airflow setpoints, maximum sound power levels, and maximum air pressure loss for each terminal.

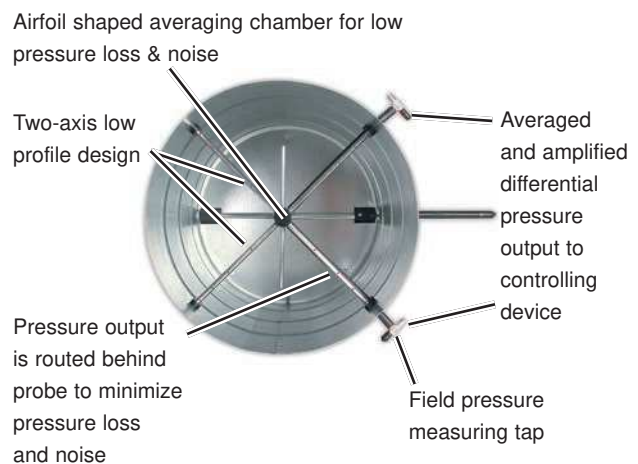
The specification for the VAV terminal must detail the required performance of the airflow sensor. For maximum building occupant satisfaction, the VAV system designer should specify the airflow sensor as suggested in the Guide Specifications of this catalog.

Using FlowStar™ sensing to amplify the airflow signal allows you to use lower minimum airflow setpoints. Many VAV controllers require a minimum differential pressure signal of 0.03 inch W.G. The airflow sensor should be able to generate this signal with only 400 to 450 FPM air velocity through the inlet collar.

Conventional airflow sensors without amplification capabilities require approximately 700 FPM to generate a 0.03 inch W.G. signal. If 700 FPM represents a 20% minimum condition, the inlet velocity would be 3500 FPM at the maximum airflow setpoint. This results in extremely noisy conditions. In addition, the airflow sensor should generate a differential pressure range of at least one inch W.G. over the operating range of the terminal unit.



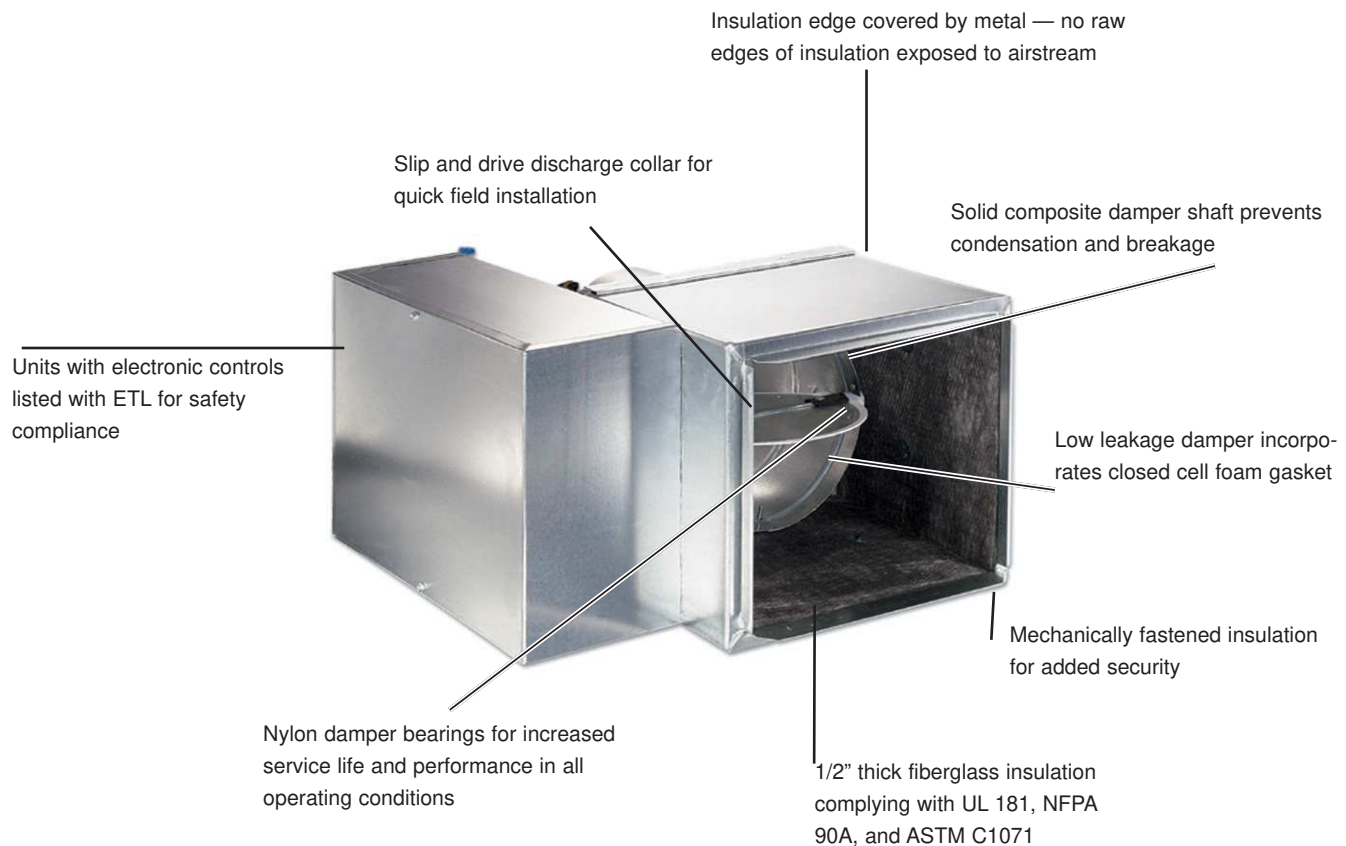
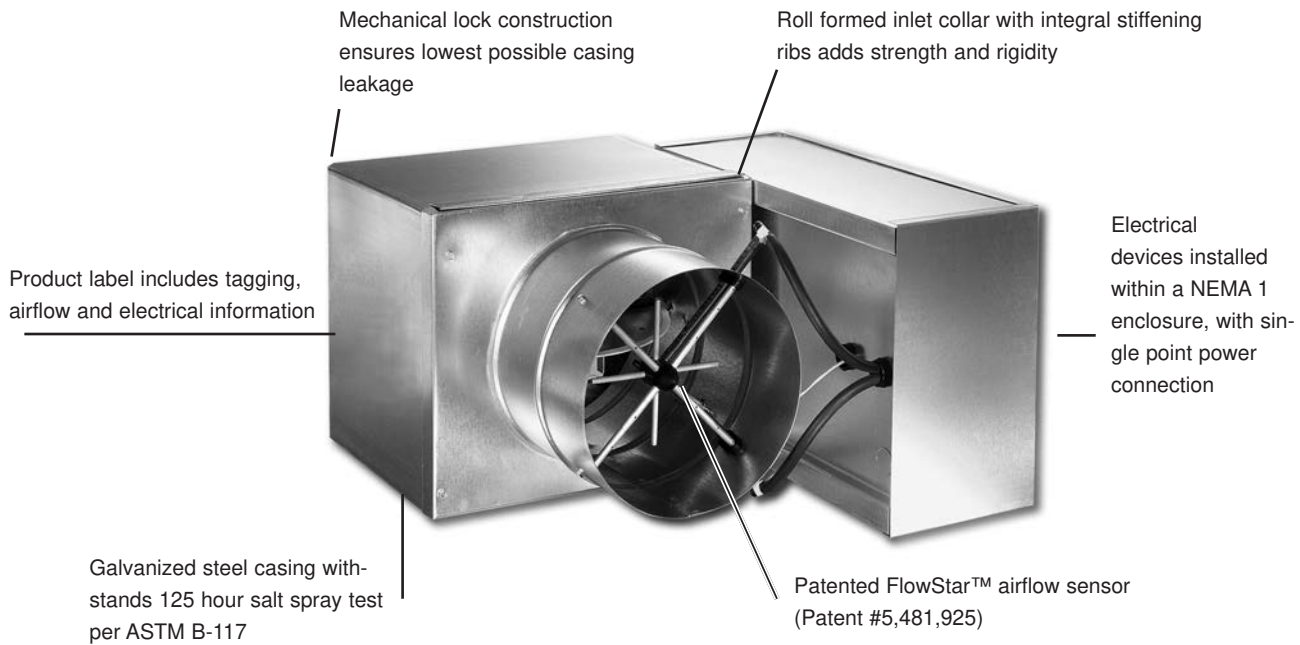
Sizes 6 & 8:	12 Sensing Points
Sizes 10 & 12:	16 Sensing Points
Sizes 14 & 16:	20 Sensing Points



STANDARD CONSTRUCTION

MODEL SDR

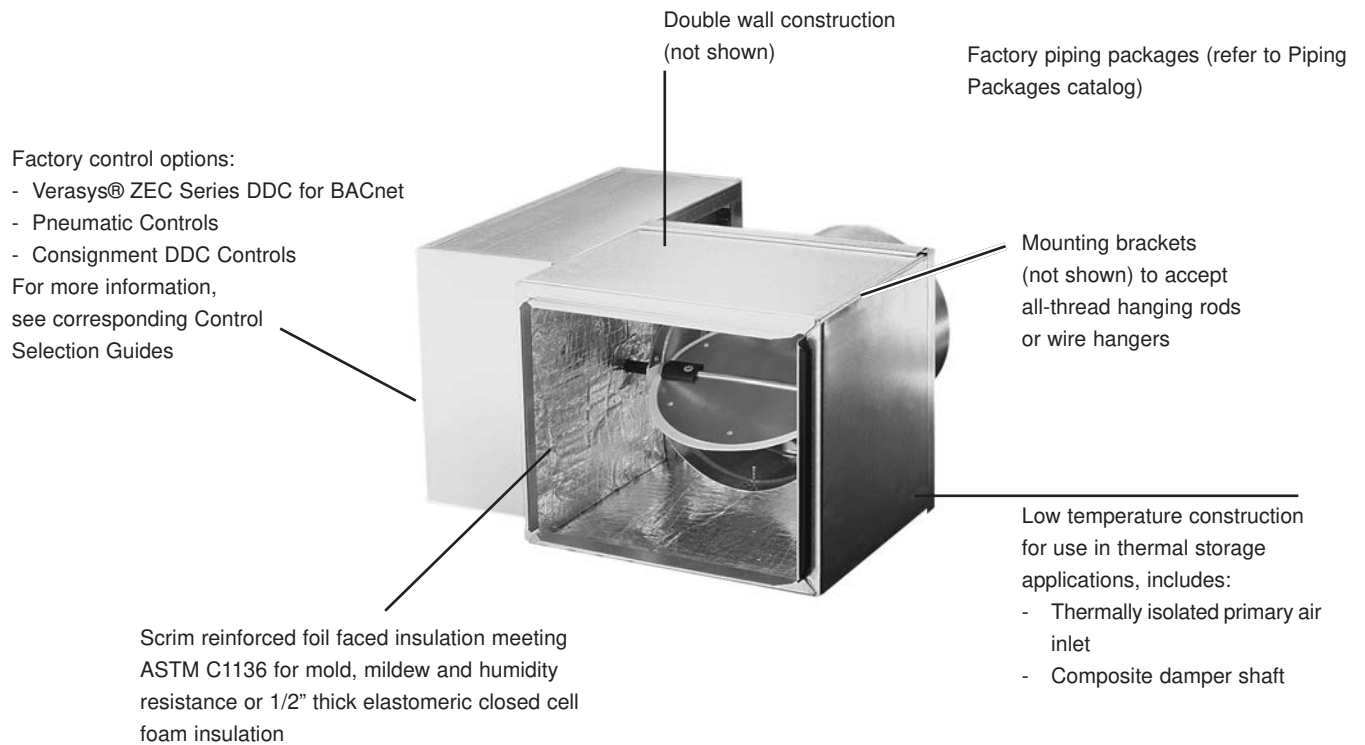
The SDR terminal incorporates many **standard** features that are expensive options for other manufacturers.



OPTIONAL CONSTRUCTION

MODEL SDR

The SDR single duct terminal is available with many optional features to meet any project requirement.



STANDARD AND OPTIONAL FEATURES

STANDARD FEATURES

Construction

- AHRI 880 certified and labeled
- 22 gauge galvanized steel casing and valve
- 1/2" thick fiberglass insulation, mechanically fastened for added security

Primary Air Valve

- Embossed rigidity rings
- Low thermal conductance damper shaft
- Position indicator on end of damper shaft
- Mechanical stops for open and closed position
- FlowStar™ center averaging airflow sensor
- Balancing tees
- Plenum-rated sensor tubing

Hot Water Coil

- Designed and manufactured by ENVIRO-TEC
- AHRI 410 certified and labeled
- 1, 2, 3 or 4 rows
- Left or right hand connections
- Tested at a minimum of 450 PSIG under water and rated at 450 PSIG working pressure at 200°F

Electrical

- cETL listed for safety compliance with UL 1996
- NEMA 1 wiring enclosure

Electric Heat

- cETL listed as an assembly for safety compliance
- Automatic reset primary and back-up secondary thermal limits
- Airflow switch
- Single point power connection
- Hinged electrical enclosure door
- Fusing per NEC

Controls

- Verasys® ZEC Series DDC for BACnet
- Pneumatic Controls

OPTIONAL FEATURES

Construction

- 20 gauge galvanized steel construction
- 3/4" and 1" insulation
- Foil faced scrim backed insulation
- 1/2" thick elastomeric closed cell foam insulation
- Double wall construction with 22 gauge liner

Hot Water Coil

- Coil access plate for cleaning coil

Electrical

- Toggle disconnect switch
- Primary and secondary transformer fusing

Electric Heat

- Proportional SSR heater control
- Door interlocking disconnect switches

Configuration Tool

- Mobile Access Portal (MAP) Gateway Tool (sold separately)

Controls

- Consignment DDC controls (factory mount and wire controls provided by others)

Piping Packages

- Factory-assembled and shipped-loose with unions for field installation
- 1/2" 2-way normally open or normally closed, two position electric motorized valves
- 24V floating point modulating control valves
- 0-10V proportional control valves
- Isolation ball valves with memory stop
- Fixed (FC) and adjustable (PICV) flow control devices
- Y-Strainers, P/T ports, 18" flexible hose

GUIDE SPECIFICATIONS

GENERAL

Furnish and install ENVIRO-TEC Model SDR Single Duct Variable Air Volume Terminal Units of the sizes and capacities as scheduled. Terminals shall be certified by AHRI and bear the AHRI 880 seal.

CONSTRUCTION

Terminals shall be constructed of not less than 22 gauge galvanized steel, able to withstand a 125 hour salt spray test per ASTM B-117. Stainless steel casings, or galvanized steel casings with a baked enamel paint finish, may be used as an alternative. The terminal casing shall be mechanically assembled (spot-welded casings are not acceptable).

Casing shall be internally lined with 1/2" thick fiberglass insulation, rated for a maximum air velocity of 5000 f.p.m. Maximum thermal conductivity shall be .24 (BTU • in) / (hr • ft² • °F). Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A. Raw insulation edges on the discharge of the unit must be covered with metal liner to eliminate flaking of insulation during field duct connections. Simple "buttering" of raw edges with an approved sealant is not acceptable.

All appurtenances including control assemblies, control enclosures, hot water heating coils, and electric heating coils shall not extend beyond the top and bottom of the unit casing. At an inlet velocity of 2000 f.p.m., the static pressure drop across the basic terminal or basic terminal with a sound attenuator shall not exceed .08" W.G. for all unit sizes.

PRIMARY AIR VALVE

The primary air valve shall consist of a minimum 22 gauge cylindrical body that includes embossment rings for rigidity. The damper blade shall be connected to a solid shaft by means of an integral molded sleeve which does not require screw or bolt fasteners. The shaft shall be manufactured of a low thermal conducting composite material, and include a molded damper position indicator visible from the exterior of the unit. The damper shall pivot in nylon bearings. The damper actuator shall be mounted on the exterior of the terminal for ease of service. The valve assembly shall include internal mechanical stops for both full open and closed positions. The damper blade seal shall be secured without use of adhesives. The air valve leakage shall not exceed 1% of maximum inlet rated airflow at 3" W.G. inlet pressure.

PRIMARY AIRFLOW SENSOR

For inlet diameters 6" or greater, the differential pressure airflow sensor shall traverse the duct along two perpendicular diameters. Cylindrically shaped inlets shall utilize the equal cross sectional area or log-linear traverse method. Single axis sensor shall not be acceptable for duct diameters 6" or larger. A minimum of 12 total pressure sensing points shall be utilized. The total pressure inputs shall be averaged using a pressure chamber located at the center of the sensor. A sensor that delivers the differential pressure signal from one end of the sensor is not acceptable. The sensor shall output an amplified differential pressure signal that is at least 2.5 times the equivalent velocity pressure signal obtained from a conventional pitot tube. The sensor shall develop a differential pressure of 0.03" w.g. at an air velocity of < 450 FPM. Documentation shall be submitted which substantiates this requirement. Balancing taps and airflow calibration charts shall be provided for field airflow measurements.

HOT WATER COIL

Single duct terminal shall include an integral hot water coil where indicated on the plans. The coil shall be manufactured by the terminal unit manufacturer and shall have a minimum 22 gauge galvanized sheet metal casing. Stainless steel casings, or galvanized steel casings with a baked enamel paint finish, may be used as an alternative. Coil to be constructed of pure aluminum fins with full fin collars maintaining accurate fin spacing and maximum tube contact. Fins shall be spaced with a minimum of 10 per inch and mechanically fixed to seamless copper tubes for maximum heat transfer.

Each coil shall be hydrostatically tested at a minimum of 450 PSIG under water, and rated for a maximum 450 PSIG working pressure at 200°F.

ELECTRIC HEATERS

Terminal shall include an integral electric heater where indicated on the plans. Heater shall be cETL listed. The heater cabinet shall be constructed of not less than 20 gauge galvanized steel. Stainless steel cabinets, or galvanized steel casings with a baked enamel paint finish, may be used as an alternative. Heater shall have a hinged access panel for entry to the controls. Electric heaters shall be factory mounted to the terminal with the heating elements located upstream of the airflow control damper to ensure uniform velocity profile over the elements. Elements located downstream of the damper are not acceptable.

GUIDE SPECIFICATIONS

A power disconnect shall be furnished to render the heater non-operational. Heater shall be furnished with all controls necessary for safe operation and full compliance with UL 1996 and National Electric Code requirements.

Heater shall have a single point electrical connection. It shall include a primary disc-type automatic reset high temperature limit, secondary high limit(s), airflow switch, Ni-Chrome elements, and fusing per UL and NEC. Heater shall have complete wiring diagram with label indicating power requirement and kW output.

SOUND ATTENUATOR

Sound attenuator shall be provided where scheduled to meet acoustical performance requirements. The attenuator and terminal unit shall be single piece construction at least 50" long. Attenuator casing shall be constructed as specified for the base terminal.

OPTIONS

Foil Faced Insulation

Insulation shall be covered with scrim backed foil facing. All insulation edges shall be covered with foil or metal nosing. Insulation shall meet ASTM C1136 for mold, mildew, and humidity resistance.

Elastomeric Closed Cell Foam Insulation

Provide Elastomeric Closed Cell Foam Insulation in lieu of standard. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Polyethylene insulation is not acceptable.

Double Wall Construction

The terminal casing shall be double wall construction using a 22 gauge galvanized metal liner covering all insulation.

Low Temperature Construction

Terminals shall be designed for use with primary airflow temperatures as low as 46°F and maximum ceiling plenum conditions of 78°F and 60% R.H. In addition to other design criteria, the primary air valve shall be thermally isolated from the terminal casing. The damper shaft shall be made from non-conducting thermoplastic composite material. Metal shafts will not be acceptable.

Piping Packages

Provide a standard factory assembled non-insulated valve piping package to consist of a 2-way, on/off, motorized electric control valve, unions, and two ball isolation valves. Control valves are piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F. Maximum operating pressure shall be 450 PSIG.

Option: Provide 24V floating point modulating control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package.

Option: Provide 0-10V proportional control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package

Option: Provide either a fixed or adjustable flow control device for each piping package.

Option: Normally Open in lieu of Normally Closed on/off valves.

Option: Provide y-strainers, and/or pressure-temperature ports for each piping package.

Piping package shall be completely factory assembled, including interconnecting pipe, and shipped separate from the unit for field installation onto the coil, so as to minimize the risk of freight damage.

CONTROLS

DDC for BACnet

Each VAV terminal unit shall be bundled with a digital controller. The controller shall be compatible with a MS/TP (Master-Slave/Token-Passing) BACnet system network. A unique network address and a BACnet site address shall be assigned to each controller, and referenced to the tagging system used on the drawings and in the schedules provided by the Project Engineer. All controllers shall be factory mounted and wired, with the controller's hardware address set, and all of the individual terminal's data pre-loaded into the controller. The terminal's data shall include, but not be limited to Max CFM, Min CFM, Heating CFM, and terminal K factor. Heating system operating data shall also be factory installed for all terminals with heat. Communications with the digital controller shall be accomplished through the MS/TP BACnet network or through a Bluetooth connector.

GUIDE SPECIFICATIONS

The digital controller shall have hardware input and output connections to facilitate the specified sequence of operation in either the network mode, or on a stand-alone basis. The terminal unit manufacturer shall coordinate, where necessary, with the Temperature Control Contractor.

Pneumatic Controls

Units shall be controlled by a pneumatic differential pressure reset volume controller. Controller shall be capable of pressure independent operation down to 0.03 inches W.G. differential pressure and shall be factory set to the specified airflow (CFM). Controller shall not exceed 11.5 scim (Standard Cubic Inches per Minute) air consumption @ 20 PSIG. Unit primary air valve shall modulate in response to the room mounted thermostat and shall maintain airflow in relation to thermostat pressure regardless of system static pressure changes. An airflow (CFM) curve shall be affixed to the terminal unit expressing differential pressure vs. CFM. Pressure taps shall be provided for field use and ease of balancing. Terminal unit manufacturer shall supply and manufacture a 5 to 10 PSIG pneumatic actuator capable of a minimum of 45 in. lbs. of torque. Actual sequence of operation is shown on the contract drawings. Terminal unit manufacturer shall coordinate, where necessary, with the Temperature Control Contractor.