Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
Fax 501-834-5416

Date: 1/17/2024
Return Request: 1/27/2024
Project: Academies of Math & Science Little Rock
Supplier: Dollar Sheet Metal
Manufacturer: Various
Submittal: Fabric Air Distribution Devices
Submittal Number: 23 37 16-01
Drawing # and Installation: Mechanical Drawings

ARCHITECT
Lewis Architects Engineers
11225 Huron Lane, Suite 104
Little Rock, AR 72211
501-223-9302

ENGINEER
Lewis Architects Engineers
11225 Huron Lane, Suite 104
Little Rock, AR 72211
501-223-9302

GENERAL CONTRACTOR
Clark Contractors
15825 Cantrell Rd.
Little Rock, AR 72223
501-223-9302

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

CSUSA PROJECT NO.
23-1028
jon@comfortar.com

DuctSox Corporation
4343 Chavenelle Road
Dubuque, Iowa 52002
866-382-8769
***.ductsox.com

Submittal

Project Name: AMS Charter School

Date Created: January 12, 2024

This document includes details on proposed products supplied by DuctSox Corporation

Project Information	
Proposal ID #	1936193
Date	January 12, 2024
Project Name:	AMS Charter School
Address	
City/St/Zip	
Phone	
Contact	
MEP Firm	
Mechanical Contractor	
Prepared By	

Note: This submittal is based on equipment and options listed on the attachment(s) and represents our interpretation of your requirements. It is the representative's responsibility to review this submittal and verify that it meets the job specifications.

Project Summary		
Qty	**Primary Tag(s)**	**Model Description**
1	Run	Round - Round

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Date Created: January 12, 2024

Round Submittal Data

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Project Notes:

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Project Name: AMS Charter School

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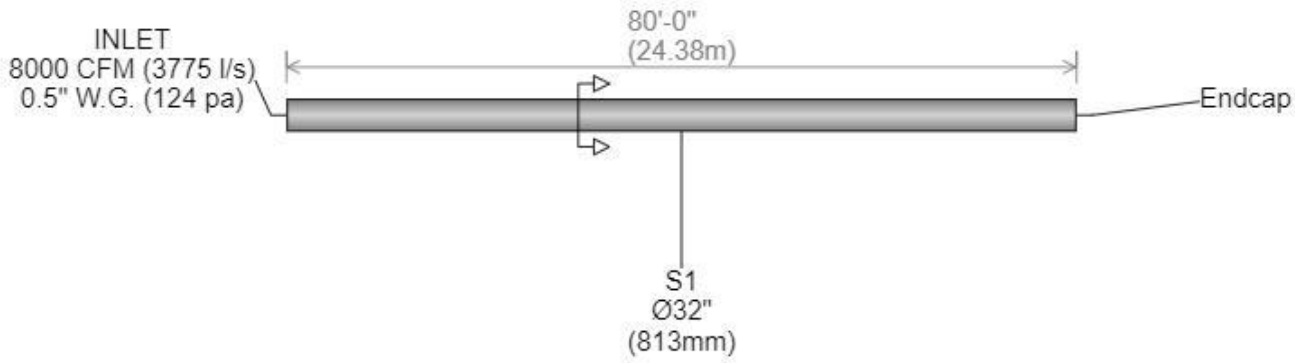
System Drawings: Run



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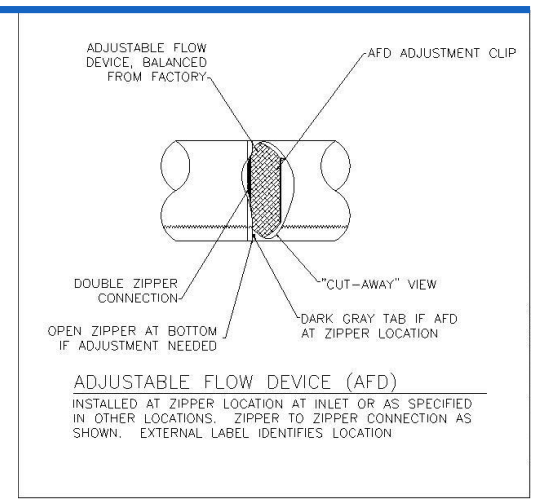

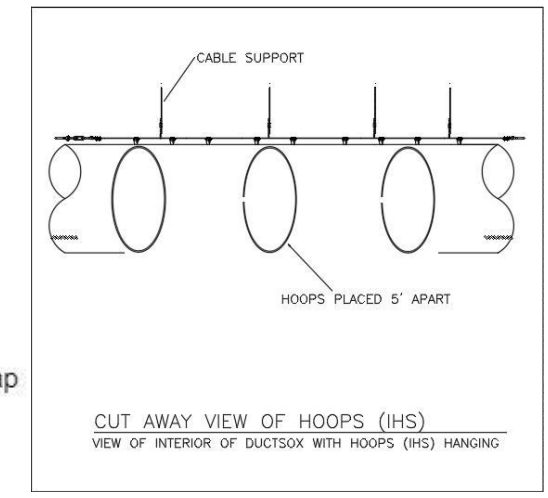

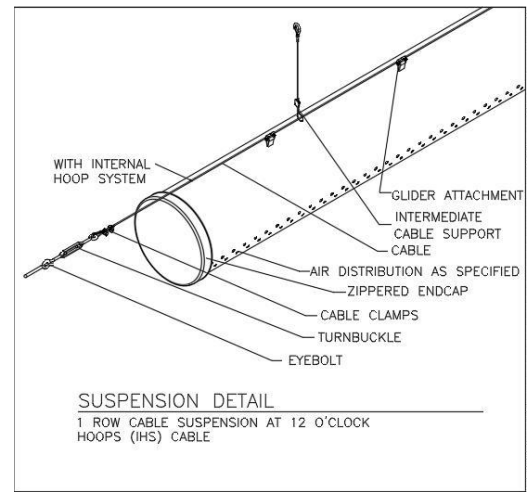

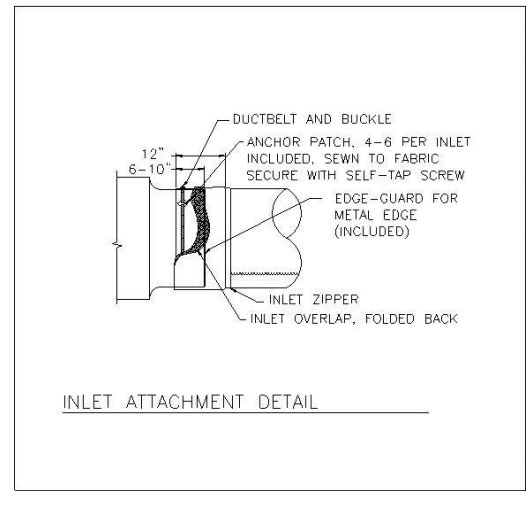

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Project Name: AMS Charter School
Date Created: January 12, 2024

Segment Details: Run

Sox Details						
ID	Label	Section Length	Center Line Length	Diameter	Fabric	Fabric Color
S1		80 ft. 0 in. (24.38 m)	80 ft. 0 in. (24.38 m)	32 in. (813 mm)	Verona	To Be Determined

Hanging Details						
ID	Label	Hardware (Y/N)	Suspension	Hardware Type	Support Type	Support Length
S1		Yes	IHS	Cable	Galvanized	5 ft (1.52 m)

Fittings Details				
ID	Label	Fitting	Diameter	Length
A1	AFD 1	AFD	32 in. (813 mm)	-

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Project Name: AMS Charter School
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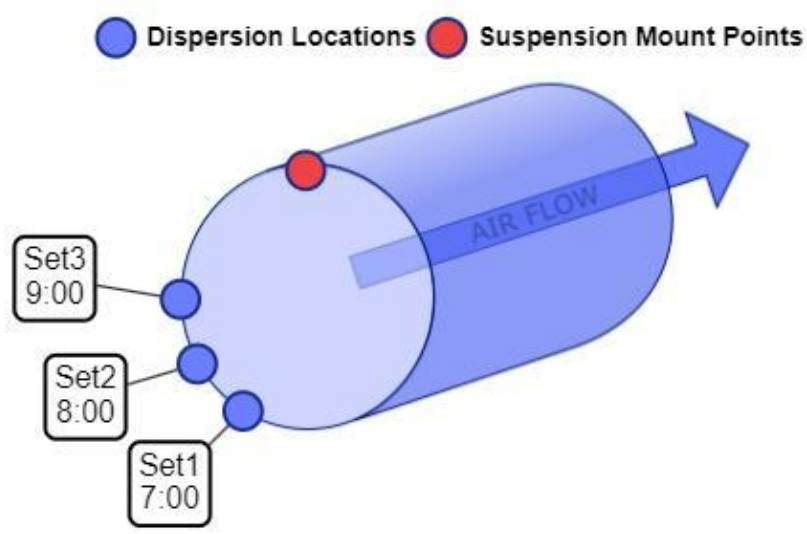
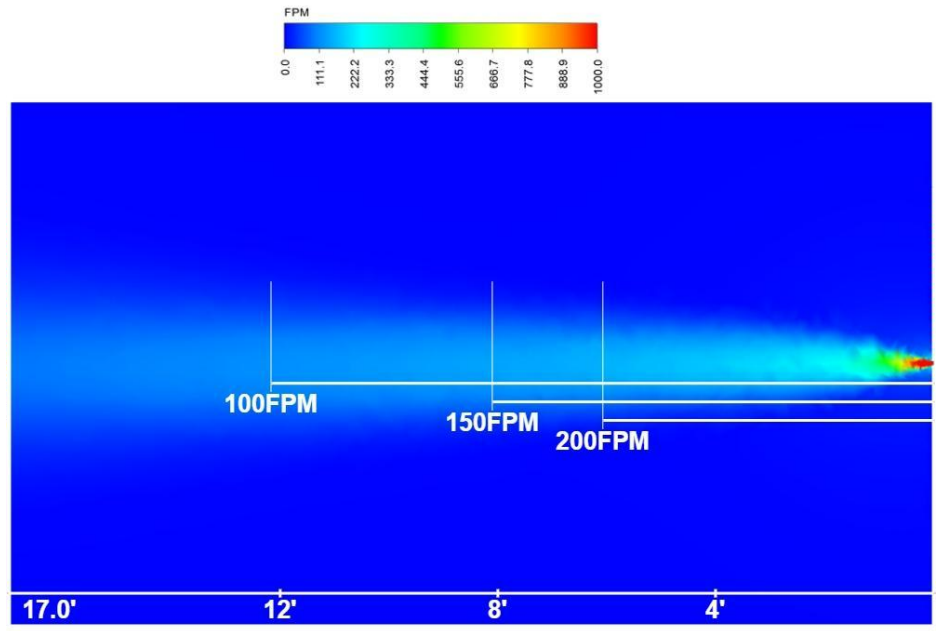
Airflow Design & CFD Analysis: Run

Section ID:	S1		
Section Label:			
Section Dispersion Airflow:	8000 CFM (3,775 l/s)		
Airflow through Fabric:	1553 CFM (733 l/s)		
Airflow through Dispersion Method:	6447 CFM (608 l/s)		
Location	**Percentage**	**Type**	**Size**
07:00	20%	Orifice	1
08:00	30%	Orifice	1.5
09:00	50%	Orifice	2.25



*Note: Reference dispersion Size for CFD performance analysis below.
If size is same, only one performance image will be displayed.

Type	Orifice
Size	1
Location	07:00
Imperial	
50 FPM:	24.33 ft
100 FPM:	12.17 ft
150 FPM:	8.11 ft
200 FPM:	6.08 ft
250 FPM:	4.87 ft
Metric	
0.254 m/s	7.42 m
0.508 m/s:	3.71 m
0.762 m/s:	2.47 m
1.016 m/s:	1.85 m
1.270 m/s:	1.48 m



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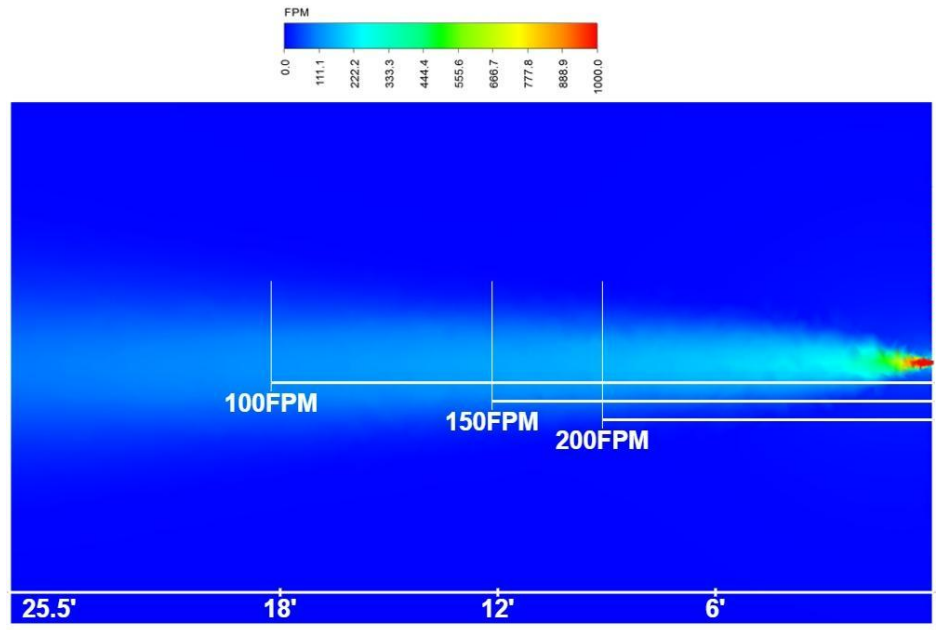
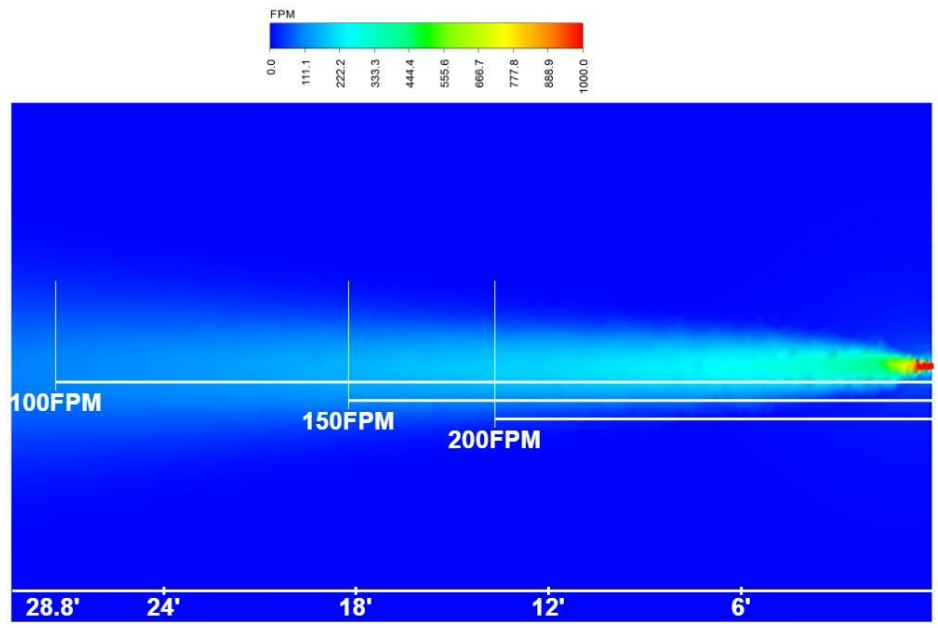
Type	Orifice
Size	1.5
Location	08:00
Imperial	
50 FPM:	36.50 ft
100 FPM:	18.25 ft
150 FPM:	12.17 ft
200 FPM:	9.13 ft
250 FPM:	7.30 ft
Metric	
0.254 m/s	11.13 m
0.508 m/s:	5.56 m
0.762 m/s:	3.71 m
1.016 m/s:	2.78 m
1.270 m/s:	2.23 m



Type	Orifice
Size	2.25
Location	09:00
Imperial	
50 FPM:	54.75 ft
100 FPM:	27.38 ft
150 FPM:	18.25 ft
200 FPM:	13.69 ft
250 FPM:	10.95 ft
Metric	
0.254 m/s	16.69 m
0.508 m/s:	8.35 m
0.762 m/s:	5.56 m
1.016 m/s:	4.17 m
1.270 m/s:	3.34 m



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Submittal

Project Name: AMS Charter School
Date Created: January 12, 2024

Verona Fabric Sheet

Qty: 1 Tag(s): Run

VERONA™ Fabric Specification Sheet
Air Porous

FABRIC

Verona™ is an all purpose, woven, air permeable, commercial grade fabric that offers best-in-class performance and features.

FEATURES & BENEFITS

- Commonly used alternative to exposed double wall duct
- Guaranteed not to condensate
- Air is able to pass through the fabric with the airflow rate controlled by the fabric weave and the internal static pressure
- Desired airflow can be delivered exclusively through the porous fabric or combined with various venting options
- Machine washable

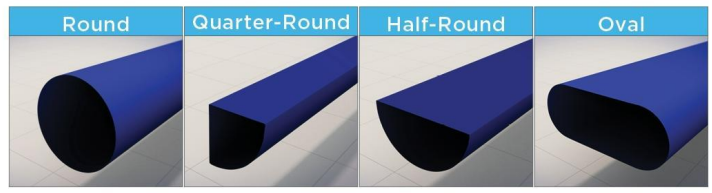
FABRIC SPECIFICATIONS

Weave:	Fire Retardant Polyester Filament/Filament Twill
Weight:	6.8 oz/yd² (231g/m²)
Porosity:	2 CFM/ft² at 0.5in w.g. (10.2L/2/m² @ 125Pa)
Codes:	Classified by Underwriters Laboratories in accordance with the requirements of: • NFPA 90A • UL 2518 • UL-C (Canada) • AS/NZS 1530.3-1999 (Australia / New Zealand)

CLASSIFIED UL
File R18856

COLOR

SHAPE



SUSPENSION WARRANTY

SkeleCore FTS	SkeleCore Pull-Tight	IHS (Hoops)	Hangers	1, 2 or 3 Row	Surface Mount
✓	✓	✓	✓	✓	✓
15 yrs	**10 yrs**			**10 yrs**	
Pro-rated 11-20yrs				Pro-rated 8-10yrs	

See full warranty sheet for application and airflow requirements

AIR DISPERSION

Air Porous	Linear Vents	Orifices	Grommets	Adjustable Nozzles	Fixed Nozzles
✓	✓	✓	✓	✓	✓

NO CONDENSATION GUARANTEED

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

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Project Name: AMS Charter School
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IHS Cable Cut Sheet

Qty: 1 **Tag(s): Run**

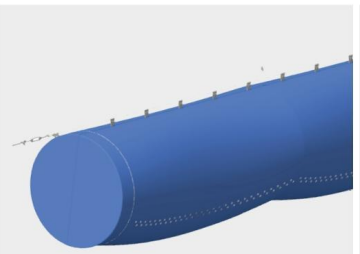
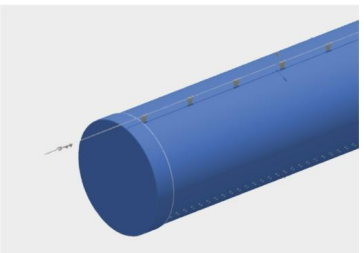
IHS | Internal Hoop System
Cable System

Easy installation with Cable. Longer life expectancy with less fabric sagging and wrinkling compared to multiple row and horizontal suspension systems. Ideal for variable air volume (VAV) applications.

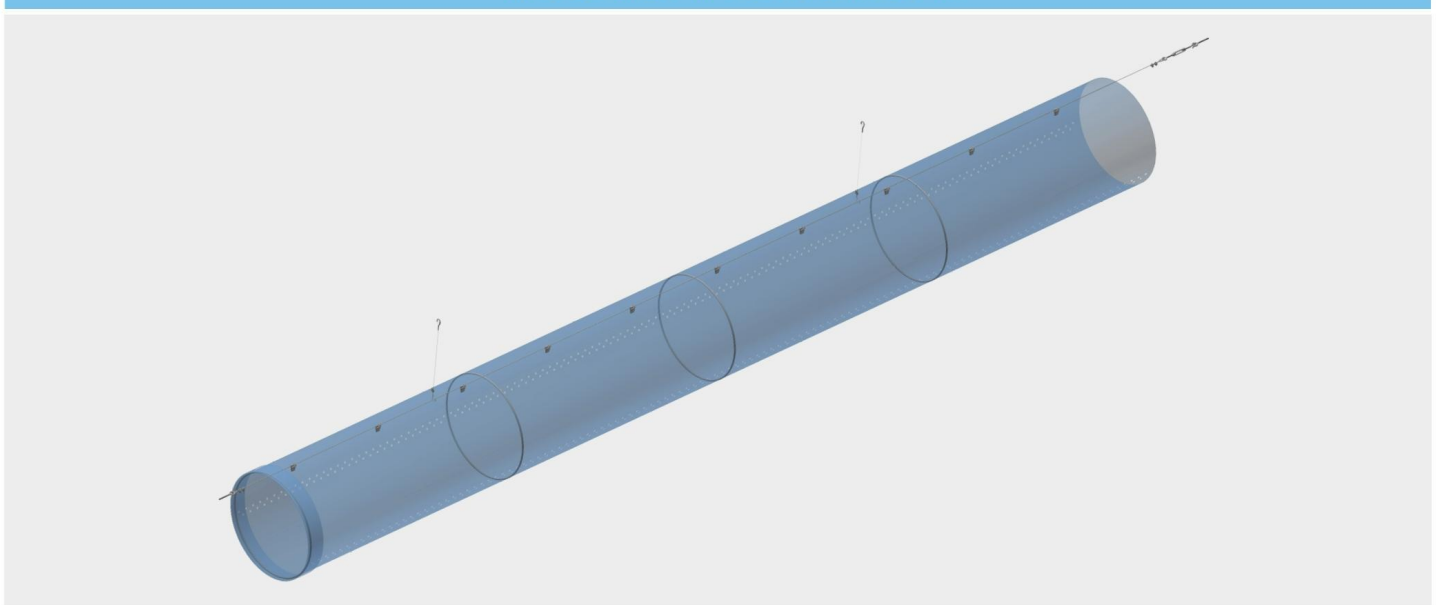
- Light weight
- Economical
- Requires anchor attachments on either end for tensioning

IHS Hoops | 5% Deflation

- 8" - 60" diameters (203mm - 1524mm)
- Fabric attached to 1 Row Cable at 12 o'clock every 12" (305mm)
- No noise at start-up with minimal fabric motion

Deflated	Inflated
	

Internal Framework



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Project Name: AMS Charter School
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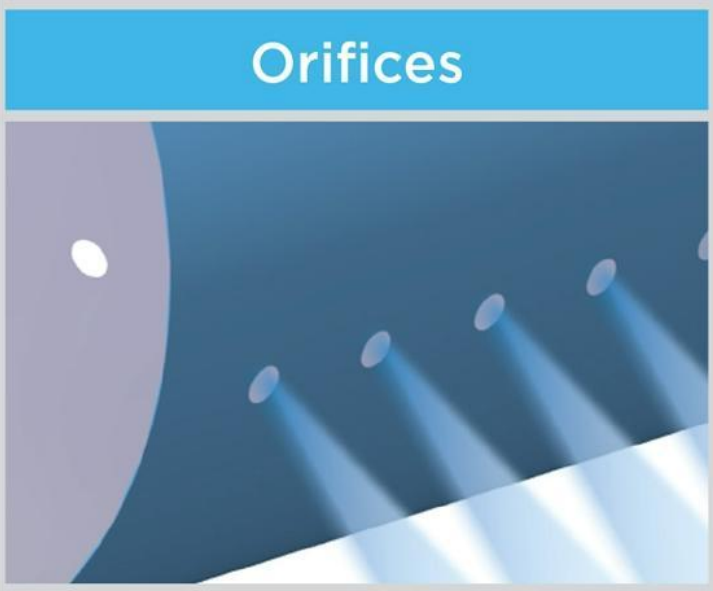
Orifices Cut Sheet

Qty: 1 Tag(s): Run



- Orifices are the standard dispersion option for non-porous fabrics
- Provides airflow throw by orifice size and pressure up to 150ft (45.7m)
- Available from .5” – 5” diameter (12.7mm - 127mm)

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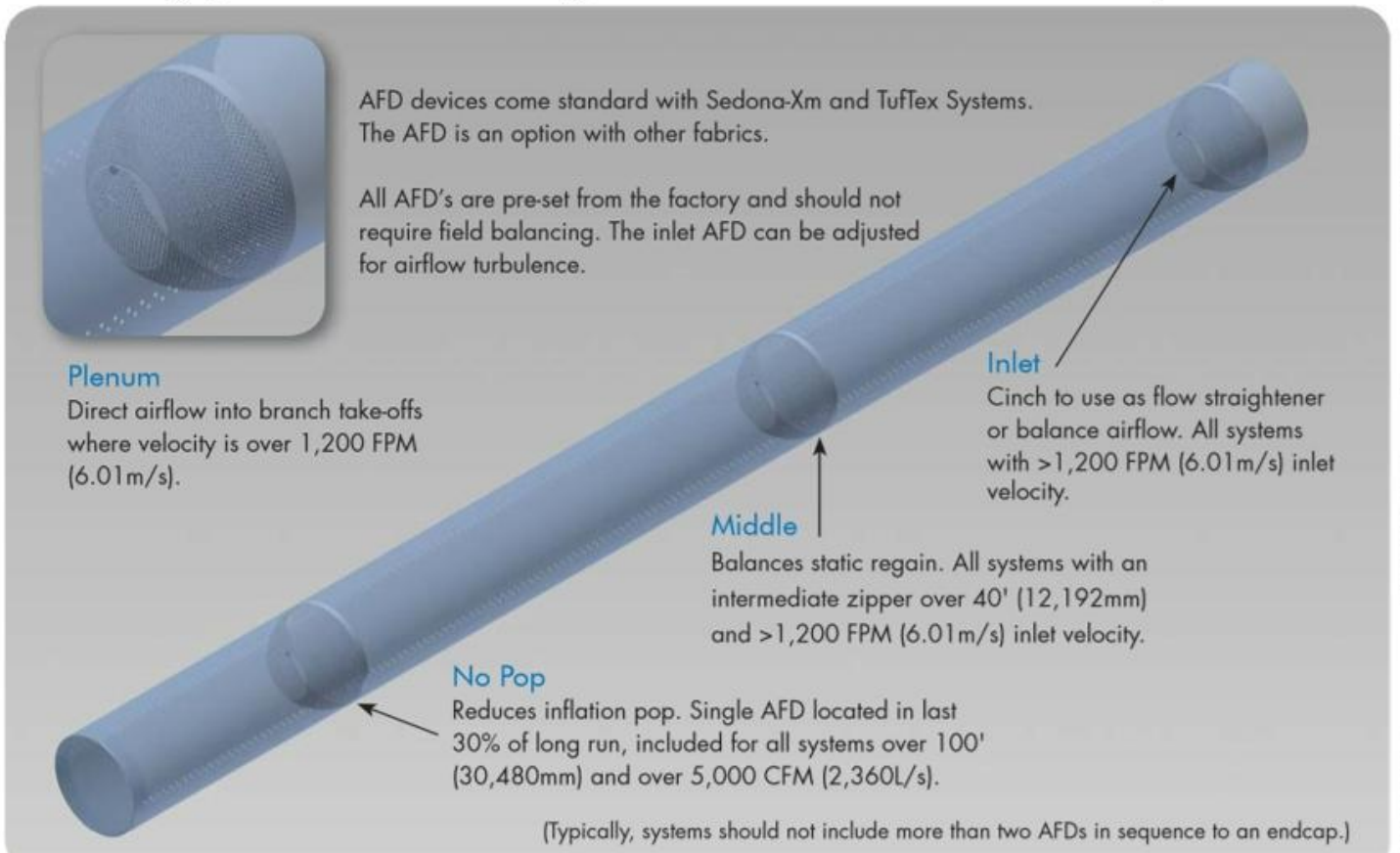
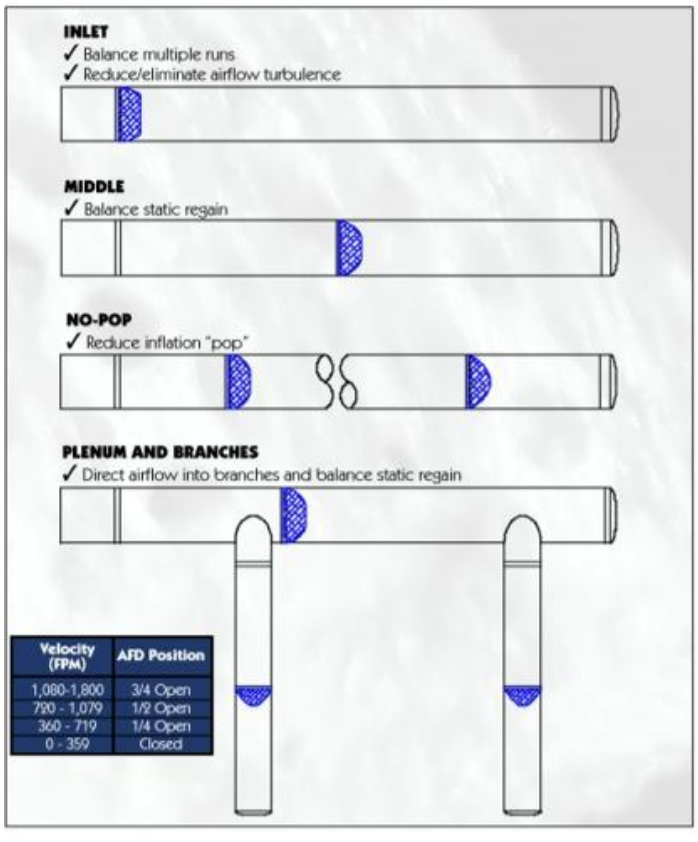
AFD Cut Sheet

Qty: 1 Tag(s): Run

The AFD is a polyester mesh cone with a factory set or field adjustable hemmed drawstring aperture for air balancing all models of DuctSox fabric air dispersion models.





Designed for retrofits as well as new systems, the AFD is easily installed or replaced for laundering in minutes by zipping or unzipping its collar between duct lengths. Besides airflow regulation, the AFD also serves as a flow straightener.

The AFD, which is available in 6 to 72-inch diameters and custom order large sizes, is made of a polyester weave with large scrim openings that don't abnormally attract HVAC system particles. For systems with mediocre or low filtration designs, the AFD can be unzipped and easily laundered. AFD cannot be used at the same connection as a DuctSox Final Filter (FF).

The AFD will be preset from the factory to the recommended setting per location, and should not require any field balancing unless otherwise noted.

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Warranty

Qty: 1 Tag(s): Run

[1]Warranty Period (in years)						
Suspension / Fabric	SkeleCore FTS	SkeleCore Pull-Tight	IHS (Hoops)	Hangers 3x1 or 4x2	1 Row | 2 Row | 3 Row	[2]Surface Mount
Sedona-Xm, TufTex	20 (Pro-rated 11-20)	15 (Pro-rated 11-15)	10			
Verona, DuraTex	15 (Pro-rated 11-15)	10			10 (Pro-rated 8-10)	
Opti-X*	15 (Pro-rated 11-15)	10				
	*5 yrs in high wash down applications					
Stat-X	10 (Pro-rated 6-10)	5	5 (Pro-rated 2.5-5)			
Rx, LabSox, Microbe-X	10 (Pro-rated 6-10)	5	1			
PolyTex, ChemSox	N/A		1			
DataSox	N/A			5		

C-Series Diffuser	D-Series Diffuser	F-Series Diffuser	V-Series Diffuser
5	1	1	1

Oval*	UnderFloor
5 *1 Year for Food Processing	5 (Pro-rated 2.5-5)

[1]Application Requirements: Airflow and static pressure per original DuctSox design in accordance with published requirements. Warranty is based on inlet velocities up to 1,600 fpm (8.12 m/s). For SkeleCore FTS, a 10 year warranty is available for inlet velocities up to 2,000 fpm (10.16 m/s). Some exceptions may apply. [2]Surface Mount represents Half-Round and Quarter-Round systems. The amount of coverage in a prorated warranty is determined using the following logic: A 20 years warranty (pro-rated years 11-20) is covered 100% for years 1 to 10. From years 11 to 20, the remaining years will be covered on a scale from 50% at 10 years and one day, reducing to 0% at the end of year 20.

DESIGN & PERFORMANCE WARRANTY

DuctSox Systems that are designed within our performance criteria, based on DuctSox submittal documents, are covered by a 1 year Design & Performance Warranty. We want to ensure the product performs consistently through the entire heating and cooling cycle for the first year of operation. To ensure a DuctSox System is designed correctly, our Inside Sales and Engineering group are available to provide design assistance.

A copy of our design manual can be requested at: www.ductsox.com/design/design-manual-request

PRODUCT WARRANTY

Our Product Warranty is for replacement or repair credit based on the amount of the warranty period remaining. The warranty is not available in the form of a cash payment, only as credit towards repair or replacement. The DuctSox Warranty covers materials, fabrication, and performance of the fabric portion of the DuctSox System only. Warranty coverage begins at the time of shipment.

Both the Design & Performance Warranty and the Product Warranty exclude damage to the fabric from improper installation, poor maintenance, abuse, abrasion, caustic chemicals, exposure to high temperature (over 180 degrees Fahrenheit, 82 degrees Celsius), fabric discoloration and shrinkage, or any unauthorized modifications to the DuctSox System. It also does not cover labor, equipment rental, or freight charges incurred as a result of executing the warranty. The DuctSox Product Warranty is non-transferable.

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Sound Data

Qty: 1 Tag(s): Run

Test Method

The samples were tested in accordance with the ASHRAE 70-2006 Standard "Method of Testing for Rating the Performance of Air Outlets and Inlets", which incorporates ADC 1062: GRD-84 Test Code for Grilles, Registers and Diffusers. Acoustical data was obtained employing a Bruel & Kjaer Pulse Digital Frequency Analyzer. The reference sound source used for this test was a calibrated Bruel & Kjaer Type 4204, which conforms to the above standard. Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data. The octave band sound power levels were plotted on graph of Noise Criteria Curves which is in the ADC Test Code. These curves are reprinted with permission from the ASHRAE Handbook and Product Directory, 1976. Each sample was installed in the reverberation room and supplied with measured volumes of air. The static pressure was measured upstream of the sample section.

Test Equipment

Equipment	Calibration Date	Due Date	S/N	Model	Asset
Pulse Analyzer	03/19/2012	03/19/2013	2519258	7539	E446
Reference Sound Source	07/19/2012	07/19/2015	2036621	4204	A230
Microphone/Pre - DF	05/03/2012	05/03/2013	2381159	4942	E449

Description of Test Specimen

A 15' diffuser section with the specified air outlets was evaluated.

Summary of Results

Noise Criteria (NC)					
		Inlet Static Pressure			
	Quantity / Linear Vent Size	0.25" wg	0.50" wg	0.75" wg	1.00" wg
2" Orifices	Quantity: 8	20	32	37	40
	Quantity: 16	20	32	37	40
3" Orifices	Quantity: 4	18	29	36	39
	Quantity: 7	18	29	36	39
2" Adjustable Nozzles	Quantity: 9	32	42	46	52
	Quantity: 19	35	44	49	53
1" Fixed Nozzles	Quantity: 44	21	32	37	40
	Quantity: 87	22	33	38	41
Linear Vents	Vent Size: 10	23	33	37	41
	Vent Size: 20	23	33	38	41
	Vent Size: 30	23	33	38	41
	Vent Size: 40	23	33	38	41
	Vent Size: 60	23	33	39	43

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Laundry Instructions

Qty: 1 Tag(s): Run

There are three different areas to consider for maintaining your DuctSox products.

Performance

DuctSox products have been refined to reduce or eliminate required maintenance. Over years of use, extensive dirt build up will have little, if any, effect on the air dispersion performance of our products.

Aesthetics

Keeping the exterior of your DuctSox looking clean may be very important to you. If this is the case, your maintenance schedule should be no different than with metal duct. Although, keeping your DuctSox looking clean can be much easier and less expensive than keeping your metal duct clean. There are a few things that may help reduce the exterior dusting of a DuctSox, including selecting a porous fabric or cycling the system once daily. The most common options for cleaning your DuctSox include vacuuming and/or using compressed air, or it can be easily removed and laundered.

Hygienic

Over its lifetime, the interior of a duct system will collect dust and/or other micro-organisms that have been known to contribute to sick building syndrome. DuctSox has a distinct advantage over metal – you can completely launder your fabric duct system. This allows you to clean both the inside and outside of your HVAC system helping to eliminate the contributors of sick building syndrome.

Overall, the laundry requirements for each space varies based on the quality of the filters in the air handling unit, the amount of dirt entrainment entering the space (on people's shoes and/or clothing), and other location related issues (e.g. near farmland). Based on our experience, average commercial space with relatively high traffic and 50% efficient filters may choose to launder their DuctSox after five to seven years. If your fabric is white, a more frequent schedule may be necessary.

Laundering Instructions

Remove the DuctSox fabric from your system, being sure to unzip all sections and taking care to record where each section was installed. Turn soiled side out before cleaning (not needed for PolyTex and ChemSox).

Fabric(s)	Laundry Instructions
Sedona-XM, Verona UnderFloor	Soak in cold water for 30 minutes. Machine wash cold (85°F) on a gentle cycle. Use mild detergent, no bleach. Rinse thoroughly (repeat cycle if water/DuctSox is still soiled). Line dry or no-heat tumble dry.
TufTex, DuraTex Opti-X, Stat-X, Rx	Machine wash warm (105°F). Use mild detergent, no bleach. Rinse thoroughly (repeat cycle if water/DuctSox is still soiled). Line dry or no-heat tumble dry.
Microbe-X	Machine wash hot (120°F). Use mild detergent. Rinse thoroughly (repeat cycle if water/DuctSox is still soiled) and tumble dry.
PolyTex, ChemSox	Spray with water to remove dust and dirt particles. Wash with soapy water and rinse clean, if needed.

If the system becomes dirty/soiled during installation, please coordinate a proper cleaning prior to completion. Exterior surface dirt can, most frequently, be blown off using a combination of a brush and compressed air.

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Code Compliance

Qty: 1 Tag(s): Run

Underwriters Laboratories (UL) 2518 is the most comprehensive compliance requirement assembled for the fabric duct industry. It ensures that our products meet a higher level of safety, quality, and performance. Additional information is available at www.ductsox.com

CLASSIFIED UL File R18856

Continued Compliance Testing

AC167 includes criterion and evaluations contained within UL181, including (Weight and Air Permeability test are outside of UL181):

Surface Burning Characteristics	25/50 flame spread / smoke generated per UL273.
Mold Growth & Humidity	Fabric sample is tested in a closed test chamber, subjected to an atmosphere saturated with water vapor, at room temperature, and under dark conditions for 60 days.
Erosion	General measure of durability of product, as tested products are subjected to 2.5x highest design air velocity, or 5,000 feet per minute. Passing samples show a decrease in loss of macroscopic particles throughout the 4 hour test.
Temperature	High Temperature: Product is tested in an oven where internal temperature of the product is maintained at not less than 265°F and the exterior is maintained at not less than 125°F for 60 days.
	Low Temperature: Product is placed in an environment saturated with water vapor and at a room temperature for 48 hrs. Product is then placed in a chamber maintained at 0°F. After 24 hrs of exposure, product is visually examined for indications of deterioration.
Pressure	Product Sample is tested to 2.5x highest design static pressure (3.01" wg), which results in pressure testing at 7.525" wg static pressure.

Continued Compliance

In addition to having the product pass the required evaluation criteria, compliance to UL2518 also includes unannounced quarterly inspections at each of our production facilities. For UL2518, inspections include review of inventory certification, and pulling random fabric samples to confirm compliance.

Air Dispersion System

ICC's reference to Air Dispersion Systems in the latest IMC:

603.17 Air dispersion systems. Air dispersion systems shall:

1. Be installed entirely in exposed locations.
2. Be utilized in systems under positive pressure.
3. Not pass through or penetrate fire-resistant-rated construction.
4. Be listed and labeled in compliance with UL2518.