Engineering and Design Manual

DUCTSOX®
Redefining Air Dispersion

ductsox.com

DSFLDM0319

About Us

Leading the industry through innovation, quality and service since 1980. DuctSox Corporation, headquartered in Dubuque, Iowa, is a manufacturer of commercial and industrial fabric air dispersion products for open ceiling architecture, critical environments, and under floor applications. Our fabric systems are an innovative and cost effective alternative to traditional metal ductwork providing precise and efficient heating, cooling, or ventilating for virtually any building application. To maintain market leadership, DuctSox offers the best products, designs, and sales support in our industry. More than maintaining our standard products, DuctSox strives to be the leader in the HVAC ductwork industry through our commitment to quality, service, and innovation. Our Products have been accepted within key industry organizations such as ASHRAE, Underwriters Laboratories (U.S. & Canada), International Code Council, and many building authorities throughout the world.

DuctSox Corporation is a subsidiary of Rite-Hite Corporation, Milwaukee, WI.

This engineering and design manual will assist you through the design process for DuctSox fabric air dispersion systems. The process involves the following key elements:

Recommended Design Options Based on Application

Application	Non-Porous Fabric Recommendations (page 2)	Porous Fabric Recommendations (page 3)	Traditional Suspension Recommendations (pages 7-8)	Internal Structure Suspension Recommendations (pages 9-11)	Design Notes / Recommendations (pages B26-B27)
ANTIMICROBIAL APPLICATIONS					
Food Processing, Lab, Kitchen, Medical	N/A	Sedona-Xm Rx Microbe-X	Stainless Steel Cable V-Track	N/A	Higher porosity fabrics distribute high volumes at lower velocities. Diffuser options also available.
CHEMICAL APPLICATIONS					
Pool, Water-Park	TufTex DuraTex	Sedona-Xm Verona	Impregnated Cable U-Track 3x1 or 4x2	IHS	Pull-Tight and FTS will rust in chlorine environment. Impregnated cable is always necessary when chlorine is present. Must wash windows to prevent condensation.
Chemical Environments	ChemSox	N/A	Stainless Steel Cable	N/A	Several hardware solutions available for various chemicals that could be present.
UNDERFLOOR APPLICATIONS					
UnderFloor	N/A	UFSox	Retention to floor support pedestals using anchor cables	N/A	UnderFloor Systems use the space beneath the raised access floor as a plenum to introduce air into the occupied space, usually through special floor-mounted diffusers.

Application	Non-Porous Fabric Recommendations (page 2)	Porous Fabric Recommendations (page 3)	Traditional Suspension Recommendations (pages 7-8)	Internal Structure Suspension Recommendations (pages 9-11)	Design Notes / Recommendations (pages B26-B27)
COMMUNITY APPLICATIONS					
Office	TufTex DuraTex	Sedona-Xm Verona	Cable, U-Track 3x1 or 4x2	IHS, Pull-Tight, FTS	Avoid blowing air downwards to avoid occupant discomfort.
Retail, Grocery	TufTex DuraTex	Sedona-Xm Verona	Cable, U-Track 3x1 or 4x2	IHS, Pull-Tight, FTS	Do not direct air toward open face coolers.
Library, Church, Gym, Classroom	TufTex DuraTex	Sedona-Xm Verona	Cable, U-Track 3x1 or 4x2	IHS, Pull-Tight, FTS	Avoid nozzles and high ISP if noise is a concern.
Auditorium, Sports Arena, Convention Center	TufTex DuraTex	Sedona-Xm Verona	Cable, U-Track 3x1 or 4x2	IHS, Pull-Tight, FTS	High throw orifices (non-porous) or nozzles (porous) may be required to completely disperse air over the full application space.
INDUSTRIAL APPLICATIONS					
Warehouse, Manufacturing	TufTex DuraTex	Sedona-Xm Verona	Cable, U-Track 3x1 or 4x2	IHS, Pull-Tight, FTS	High throw orifices (non-porous) or nozzles (porous) may be required to completely disperse air over the full application space.
DATA APPLICATIONS					
Server Room, Telecommunications	N/A	Stat-X DataSox	Cable, U-Track 3x1 or 4x2	N/A	DuctSox systems can be specifically designed for server rooms. If static discharge is not a concern, the standard fabrics can be used.
AGRICULTURE APPLICATIONS					
Animals, Plants	TufTex DuraTex PolyTex	Sedona-Xm Verona Rx	Cable, U-Track 3x1 or 4x2	IHS, Pull-Tight, FTS	PolyTex is mold resistant, easy to clean, translucent, more resistant to UV light, and will not fade.

Suspension Hardware Options

Shape	Suspension	Galvanized/ Stainless Steel Cable	Impregnated Cable	Aluminum U-Track	Stainless Steel V-Track	Aluminum C-Track
Round	1 Row | 2 Row | 3 Row	✓	✓	✓	✓	
	Hangers 3x1 | 4x2	✓	✓	✓		
	IHS	✓	✓	✓		
	Pull-Tight	✓		✓		
	FTS	✓ Direct Hang Suspension				
Half-Round & Quarter-Round	Surface Mount			✓		✓
Oval	2 Row	✓	✓	✓	✓	

Fabric Options

Air Porous Fabric

COMMONLY USED ALTERNATIVE TO EXPOSED DOUBLE WALL DUCT

This option allows air to pass through the fabric with the airflow rate controlled by the fabric weave and the internal static pressure. This results in air velocities on the surface of the product from 1 - 200 fpm (.005 - 1.016 m/s).

Air can be delivered exclusively through the porous fabric or can be combined with various venting options to achieve desired airflow.

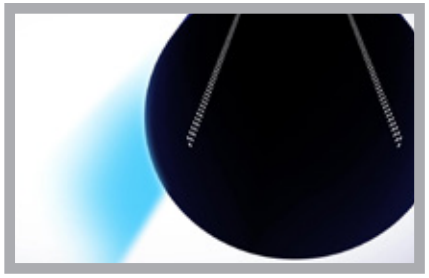
Features

- No condensation
- Reduced dust on top
- Minimal heat gain/loss
- Optional reduced air throw

Limitations

- Long lengths may disperse too much airflow through fabric

Air Porous Fabric without Venting



Air Porous Fabric with Linear Vents

Non-Porous Fabric

COMMONLY USED ALTERNATIVE TO EXPOSED SINGLE WALL DUCT/DIFFUSERS

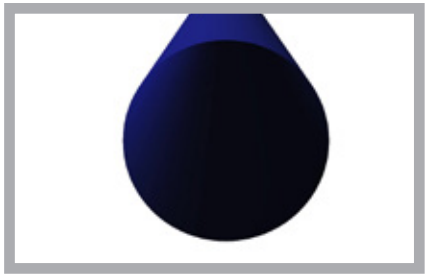
No air is able to pass through the fabric weave. Airflow is delivered through orifices and various venting options to achieve desired airflow.

Features

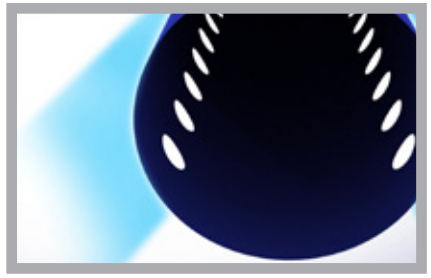
- Common choice for spot cooling, heating or ventilating
- Ideal for areas requiring extended and precise throw

Limitations

- Dust may gather on top of the unit
- Risk of condensation



Non-Porous Fabric without Venting



Non-Porous Fabric with Orifices

Fabric Types

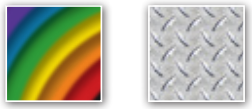
DuctSox offers a variety of premium and commercial porous, non-porous and specialty fabrics available in 7 standard colors with custom color and pattern options available. Color choices shown below are representative only, please contact the factory for sample color swatches.

Standard Colors

Black | Silver | White | Tan | Blue | Green | Red

Custom

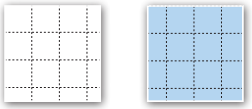
Colors | Patterns

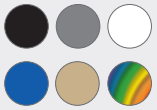


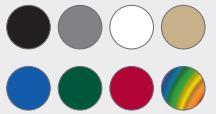
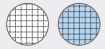
See pg 5 for details

Stat-X Only

White | Lt. Blue



Fabric Type	Specifications	Features	Color Options
	NON- POROUS FABRICS		
TufTex™	Weave: Fire Retardant Polyester, Plain Weave, Coated Weight: 8.2oz/yd² (278g/m²) Porosity: None Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518	• Non-Porous • Premium Fabric • Linear Vents, or Orifices	
DuraTex™	Weave: Fire Retardant Polyester, Plain Weave, Coated Weight: 5.5oz/yd² (186g/m²) Porosity: None Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518. Also available (by request only) to meet BS 5867 Part 2, 1980	• Non-Porous • Commercial Fabric • Linear Vents, Nozzles, or Orifices	
PolyTex™	Weave: 12 x 9 tapes/inch, HDPE Weight: 5.5oz/yd² (186g/m²) Porosity: None This product meets the Surface Burning (25 flame/50 smoke), Low Temperature, High Temperature, Pressure, Mold Growth & Humidity, and Erosion requirements of UL 2518 with the High Temperature Test limited to 160°F (71°C), UL-C (Canada)	• Non-Porous	◯ Clear

Fabric Type	Specifications	Features	Color Options
	AIR POROUS FABRICS		
Sedona-Xm™	Weave: Fire Retardant Polyester, Filament/Filament Twill *55% Recycled Content (*Available upon request, may require additional lead time and cost) Weight: 6.8oz/yd² (231g/m²) Porosity: 2 CFM/ft² @ 0.5in w.g. (10.2L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518	• Air Porous • Premium Fabric • Active Antimicrobial (up to 10 washes) • Linear Vents, Nozzles, or Orifices	
Verona™	Weave: Fire Retardant Polyester, Filament/Filament Twill Weight: 6.8oz/yd² (231g/m²) Porosity: 2 CFM/ft² @ 0.5in w.g. (10.2L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518; UL-C (Canada); BS 5867 Part 2, 1980; GB8624-2006; DIN 4102-1	• Air Porous • Commercial Fabric • Linear Vents, Nozzles, or Orifices	
Microbe-X™	Weave: Fire Retardant Polyester, Filament/Filament Twill Weight: 6.2oz/yd² (210g/m²) - 6.9oz/yd² (234g/m²) Porosity: 6, 13, 29 CFM/ft² @ 0.5in w.g. (30.5, 66, 147L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518	• Air Porous • Specialty Fabric • Active Antimicrobial (up to 30 washes) • Linear Vents	
Stat-X™	Weave: Filament Polyester with Interwoven Electro Static Dissipative (ESD) Yarns Weight: 2.9oz/yd² (98g/m2) Porosity: 2.5 CFM/ft² @ 0.5in w.g. (12.7L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518; UL-C (Canada)	• Air Porous • Static Dissipative • Specialty Fabric • Linear Vents or Nozzles	
Rx™	Weave: Fire Retardant Polyester, Filament, Non-Linting *Up to 50% Recycled Content (*Available upon request, may require additional lead time and cost) Weight: 5.4oz/yd² (183g/m²) to 6.3oz/yd² (214g/m²) Porosity: 50, 100, and 165 CFM/ft² @ 0.5in w.g. (254, 508, and 839 L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518	• Air Porous • Specialty Fabric • Active Antimicrobial (up to 10 washes) • Surround Flow or Select Flow • Linear Vents	

SPECIALTY FABRICS

Fabric Type	Specifications	Features	Color Options
ChemSox™	Weave: 12 x 9 tapes/inch, HDPE Weight: 5.5oz/yd² (186g/m²) Porosity: None This product meets the Surface Burning (25 flame/50 smoke), Low Temperature, High Temperature, Pressure, Mold Growth & Humidity, and Erosion requirements of UL 2518 with the High Temperature Test limited to 160°F (71°C), UL-C (Canada)	• Non-Porous	Clear
DataSox™	Weave: Filament Polyester with Interwoven Electro Static Dissipative (ESD) Yarns Weight: 2.9oz/yd² (98g/m²) to 6.3oz/yd² (214g/m²) Porosity: 2.5 CFM/ft² @ 0.5in w.g. (12.7L/s/m² @ 125Pa) to 200 CFM/ft² @ 0.5in w.g. (1049L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518	• Air Porous • Static Dissipative • Blended Fabrics • Adjustable Nozzles	
DT 200™	Weave: Fire Retardant Polyester, Filament, Non-Linting, Coated, Micro-Perforated Weight: 4.8oz/yd² (163g/m²) Porosity: 200 CFM/ft² @ 0.5in w.g. (1049L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518. Also available (by request only) to meet BS 5867 Part 2, 1980	• Air Porous • Specialty Fabric • Micro-Perforated	
LabSox™	Weave: Fire Retardant Polyester, Filament, Non-Linting *Up to 50% Recycled Content (*Available upon request, may require additional lead time and cost) Weight: 5.4oz/yd² (183g/m²) to 6.3oz/yd² (214g/m²) Porosity: 50, 100, and 165 CFM/ft² @ 0.5in w.g. (254, 508, and 839 L/s/m² @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518	• Air Porous • Specialty Fabric • Active Antimicrobial (up to 10 washes) • Linear Vents	
UFSox™	Weave: Fire Retardant Polyester, Filament/Filament Twill Weight: 6.8oz/yd² (231g/m²) Porosity: 2 CFM/ft² @ 0.5in w.g. (10.2L/s/m2 @ 125Pa) Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90A and UL 2518; UL-C (Canada); BS 5867 Part 2, 1980; GB 8624-2006; DIN 4102-1	• Air Porous • Commercial Fabric • Linear Vents	

Customization

Metal ductwork systems will scratch, dent and over time their paint will peel requiring maintenance to repaint. DuctSox fabrics are forgiving meaning they will not scratch or dent. Unlike metal ductwork, DuctSox fabric comes in a variety of standard colors, patterns, and custom colors direct from the factory and can be personalized with company logos, mascots, taglines, and patterns.

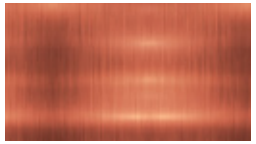
NEW

Patterns & Custom Colors

Custom decorated design or match your own custom color.

Sample Patterns:

Coffee House



Copper

Team Pride

Company Brand

Child

Carbon Fiber

Full-Color Logos

This option includes custom color or multi-color logos, lettering and images.

1-Color Logos

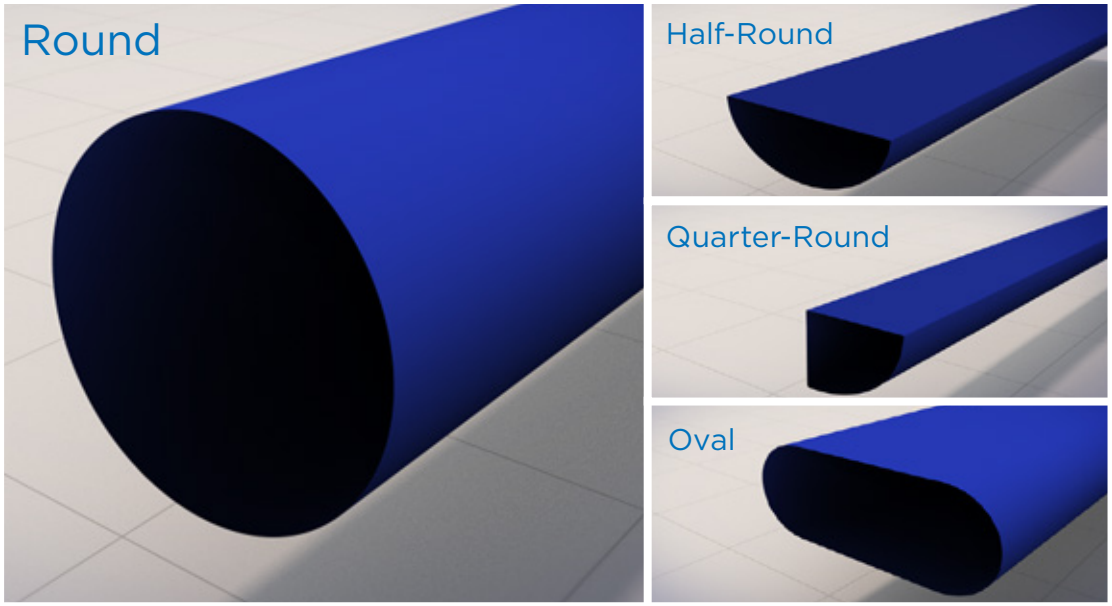
Used for lettering, simple one-color logos and images.

"To use images protected by trademark or copyright in a design, we first need permission from the owner or trademark holder. If permission is not able to be obtained, we can remove those parts of the design or our printshop can help you design something original."

Shape Options

Before selecting how the DuctSox System will be suspended, the Shape must first be decided. This is based on the airflow and space required for your application. DuctSox fabrics can conform to any space and for added customization are available in multiple shapes. Round configurations include; Round, Half-Round, Quarter-Round, Oval and UnderFloor. Diffuser configurations include the C-Series, D-Series and V-Series.

Round Configurations



Round

Traditional option perfect for both open and finished architecture with a wide variety of customizable options

Half-Round & Quarter-Round

Surface mount option for applications with finished ceilings or specialty airflow requirements

Oval

Ideal for applications with a low head room or when obstructions, such as machinery that cannot be moved, are in the path of the ductwork

Diffusers

C-Series

Drop plenum diffuser providing 360 degrees of even air dispersion plus the many added advantages of being made from fabric. Typically used in spaces that can't use ductwork for physical or financial reasons.

D-Series

Designed specifically for applications commonly associated with a fume hood or other airflow sensitive environments such as laboratories, kitchens, clean rooms and other critical environments.

V-Series

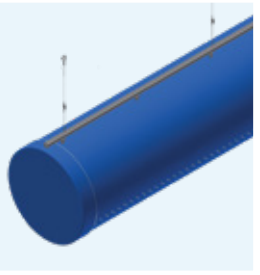
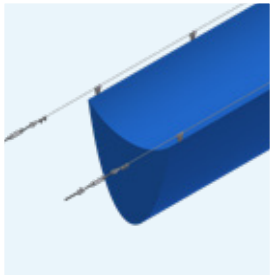
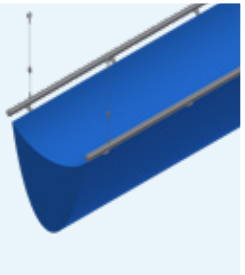
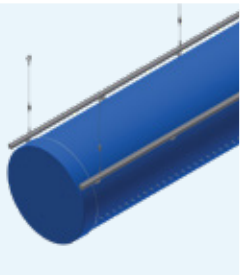
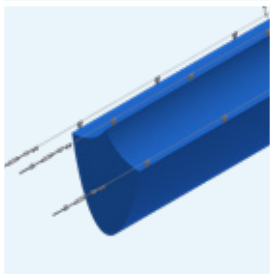
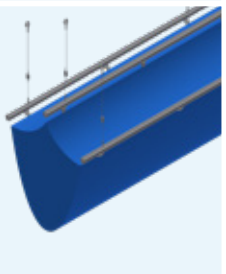
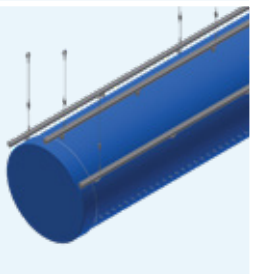
Directional displacement diffuser engineered to create optimum airflow patterns favorable for labs, healthcare and other air flow sensitive environments.

Suspension Options

1 Row | 2 Row | 3 Row

Available with Track or Cable

Easy installation & maintenance with lowest initial cost compared to other suspension systems.

	Cable	Track	Inflated
1 Row **100% Deflation** • Up to 30in diameter (762mm) • Fabric suspended at 12 o'clock * Disruptive noise & fabric motion at start-up			
2 Row **45% Deflation** • Up to 60in diameter (1524mm) • Fabric suspended at 10 & 2 o'clock * Noticeable noise & fabric motion at start-up			
3 Row **17% Deflation** • 62in diameter (1574mm) and up • Fabric suspended at 10, 12 & 2 o'clock * Minor noise & fabric motion at start-up			

Sizing

Straight	Fittings
1600 fpm	1400 fpm

Sound Sensitive
1000 fpm

*Duct sizing tables can be found in the appendix

Cable

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

Track

- 8 ft (2.4m) long stock pieces
- Best for multiple elevation changes or fittings
- Hangs from ceiling drops eliminating the need for anchor attachments at each end

Hangers: 3x1 | 4x2
Available with Track or Cable

Simple installation with Track or Cable. External hanger supports easily detach for maintenance.

3 x 1 Hangers

17% Deflation

- Up to 48in diameter (1219mm)
- Powder coated aluminum hangers
- 1 row Track or Cable at 12 o'clock
- Fabric connection points located at 10, 12 & 2 o'clock

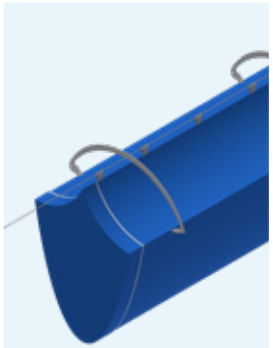
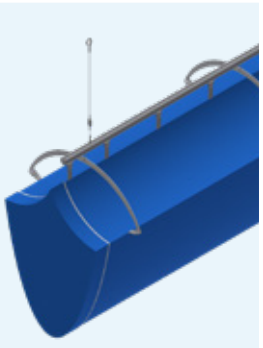
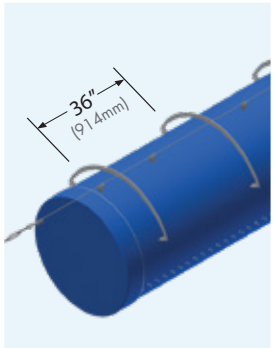
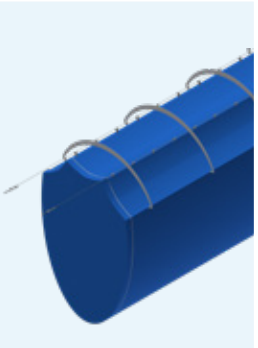
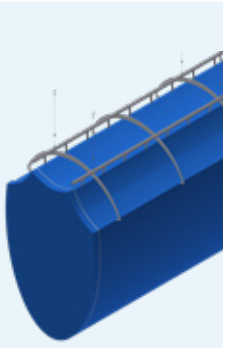
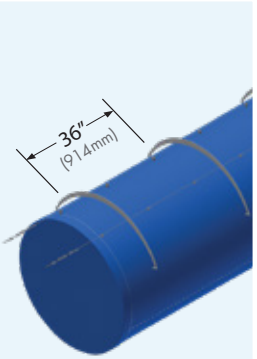
* Minor noise at start-up with noticeable fabric motion

4 x 2 Hangers

12% Deflation

- 50in - 60in diameters (1270mm - 1524mm)
- Powder coated aluminum hangers
- 2 row Track or Cable at 11 & 1 o'clock
- Fabric connection points located at 10, 11, 1 & 2 o'clock

* Minor noise at start-up with noticeable fabric motion

Cable	Track	Inflated
		
		

Sizing

Straight	Fittings
1600 fpm	1400 fpm

Sound Sensitive
1000 fpm

*Duct sizing tables can be found in the appendix

Cable

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

Track

- 8 ft (2.4m) long stock pieces
- Best for multiple elevation changes or fittings
- Hangs from ceiling drops eliminating the need for anchor attachments at each end

IHS | Internal Hoop System

Available with Track or Cable

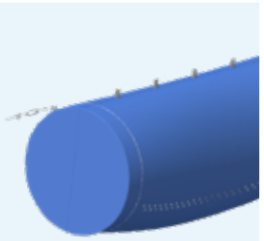
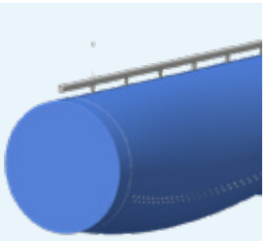
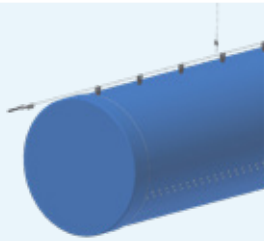
Easy installation with Track or Cable. Longer life expectancy with less fabric sagging and wrinkling compared to multiple row and horizontal suspension systems. Ideal for variable air volume (VAV) applications.

IHS

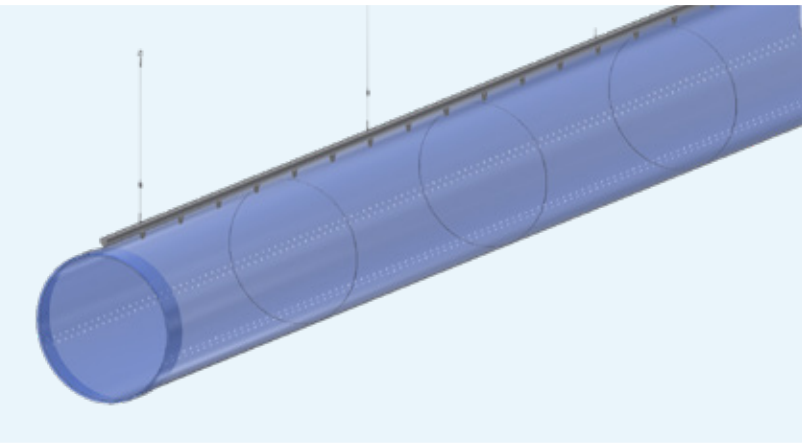
1 - 5% Deflation

- Up to 60in diameter (1524mm)
- Fabric attached to 1 row Track or Cable at 12 o'clock every 12in (305mm)

* No noise at start-up with minimal fabric motion

Cable	Track	Inflated
		

Detail of Internal Hoops



Sizing

Straight	Fittings
1600 fpm	1400 fpm

Sound Sensitive
1000 fpm

*Duct sizing tables can be found in the appendix

Cable

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

Track

- 8 ft (2.4m) long stock pieces
- Best for multiple elevation changes or fittings
- Hangs from ceiling drops eliminating the need for anchor attachments at each end

SkeleCore™ Pull-Tight | Internal Framework System

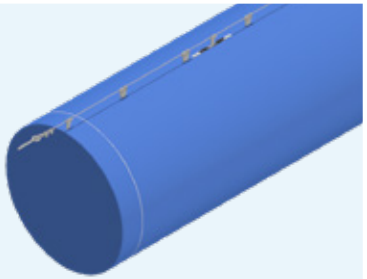
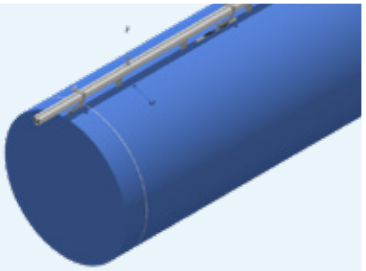
Available with Track or Cable

A combination of internal hoops and tensioning baskets are used to help maintain fabric shape and retention Easily installed using a suspended 1 row cable or track suspension system and is tensioned "externally" utilizing a cable (or track) lock. Pull-Tight systems improve start-up performance and aesthetics (no sagging/wrinkles) along with a longer life expectancy when compared to multiple row, horizontal suspension systems. Ideal for VAV applications.

Pull-Tight

< 1% Deflation

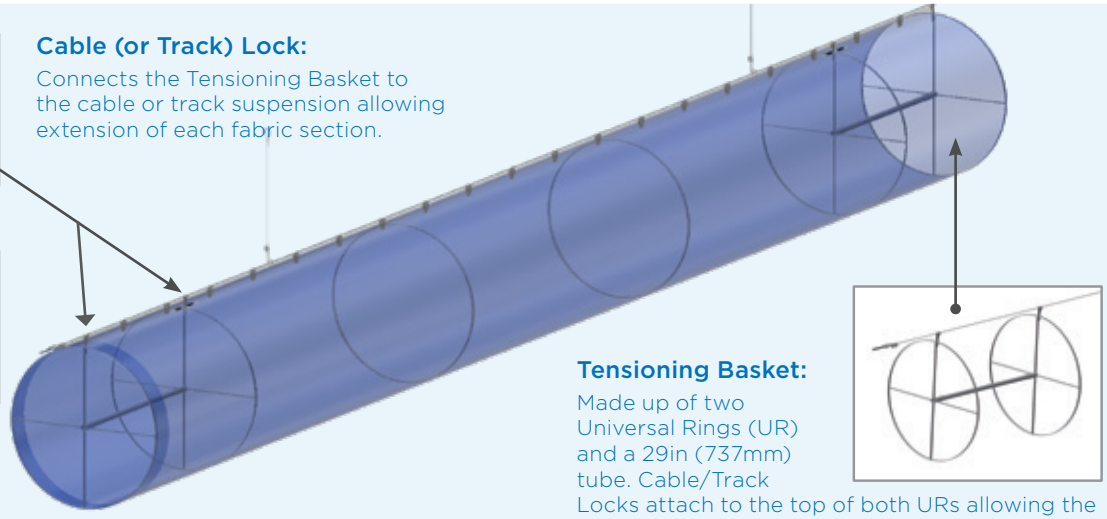
- up to 60in diameter (1524mm)
- Fabric attached to 1 row Track or Cable at 12 o'clock every 12in (305mm)
- * No inflation noise or fabric motion at start-up
- * Warranty is reduced when velocities are over 1600

Cable	Track
	

Cable Lock

Track Lock

Cable (or Track) Lock:
Connects the Tensioning Basket to the cable or track suspension allowing extension of each fabric section.



Tensioning Basket:
Made up of two Universal Rings (UR) and a 29in (737mm) tube. Cable/Track Locks attach to the top of both URs allowing the section to be tensioned to smooth wrinkling and improve appearance when the AHU is off.

Sizing

Straight
1600 fpm

Fittings
1400 fpm

Consult factory for velocities up to
Straight: 1800 fpm | Fittings: 1600 fpm

Cable

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

Track

- 8 ft (2.4m) long stock pieces
- Best for multiple elevation changes or fittings
- Hangs from ceiling drops eliminating the need for anchor attachments at each end

SkeleCore™ FTS | Internal Fabric Tensioning System

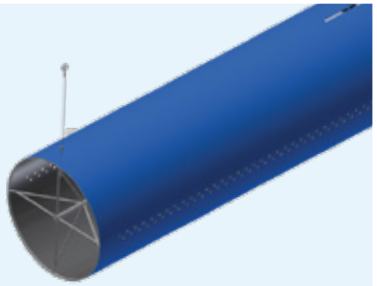
Patented air dispersion system that tensions the fabric the full circumference and entire length of the system. SkeleCore FTS maintains the same appearance with or without any air pressure in the duct and improves aesthetics by eliminating fabric sag and wrinkling. Ideal when higher aesthetic value is desired, when unit cycling is frequent, or when systems are designed with variable air volume (VAV). SkeleCore FTS features a unique metal-to-metal direct hang cable method which is the **SAFEST** suspension in textile ducting. Fabric longevity is extended by minimizing system movement.

FTS

0% Deflation

- 8in (203mm) diameter and greater
- Metal-to-metal direct hang cable method with vertical drops every 6ft (1.83m)
- * No inflation noise or fabric motion at start-up
- * Warranty is reduced when velocities are over 1600

No Change in Form



Sizing

Straight
1600 fpm

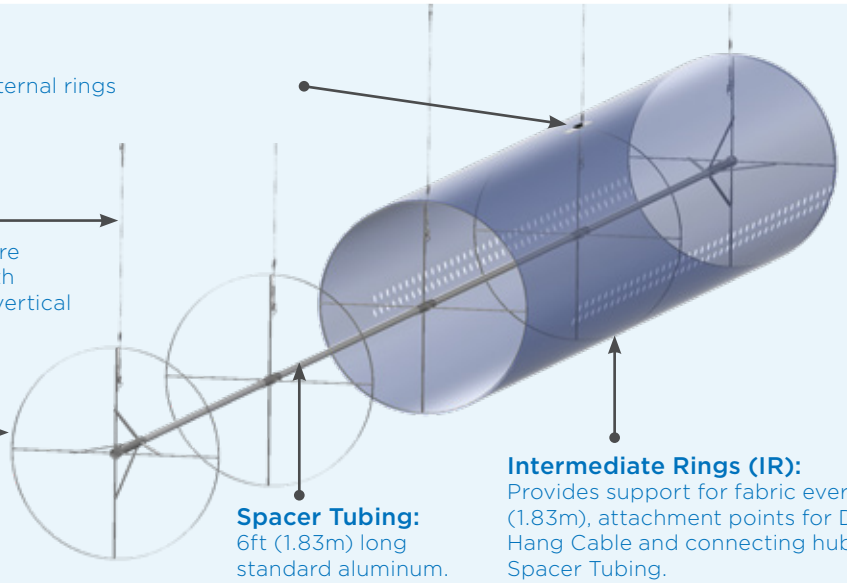
Fittings
1400 fpm

Consult factory for velocities up to
Straight: 2000 fpm
Fittings: 1800 fpm

Zipper Access:
Direct Hang Cable is attached to internal rings through zipper access.

Direct Hang Cable:
Standard 5ft (1.52m) galvanized wire drops spaced every 6ft (1.83m) with Gripple™ Hanger System for easy vertical adjustment.

Cylindrical Tensioning Rings (CTR):
Provides easy adjustment of up to 5in (127 mm) of fabric take up per section. Tensioned sections can be as long as 42ft (12.5m).



Spacer Tubing:
6ft (1.83m) long standard aluminum.

Intermediate Rings (IR):
Provides support for fabric every 6ft (1.83m), attachment points for Direct Hang Cable and connecting hubs for Spacer Tubing.

Jumbo FTS

0% Deflation

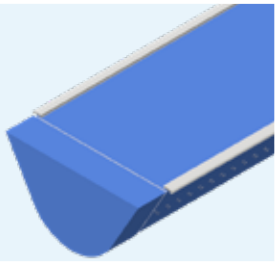
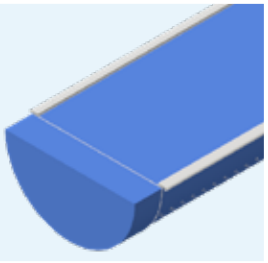
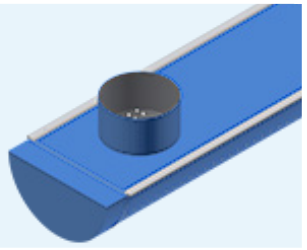
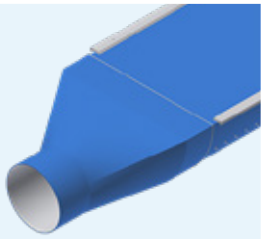
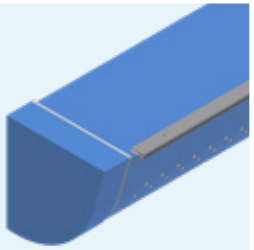
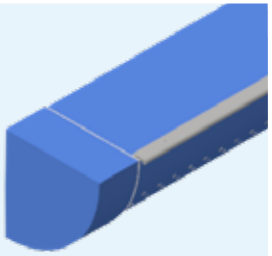
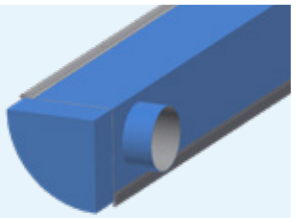
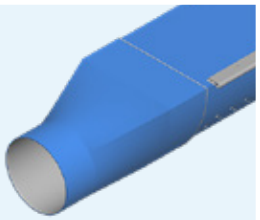
Larger-scale version of the patented FTS. Sizes available from 50in (1270mm) and up.

The Jumbo Series is perfect for High Bay Areas including:

- Aircraft Hangars
- Convention Centers
- Sporting Venues
- Maintenance

Surface Mount : Half-Round | Quarter Round

For application with finished ceilings or specialty airflow requirements. Where the DuctSox will be mounted against a flat surface (wall, ceiling, or both), the Surface Mount products feature flexibility for shape, configuration, and inlet position (top, side, and end).

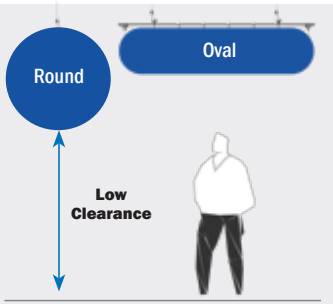
	Deflated	Inflated	Top/Side Inlet	End Inlet
Half-Round **1-5% Deflation** • Up to 40in diameter (1016mm) • 2 row Track at 3 & 9 o'clock • Fabric supported to track with cord-in attachment * Minimal inflation noise or fabric motion at start-up				
Quarter-Round **1-5% Deflation** • Up to 40in diameter (1016mm) • 2 row Track at 6 & 9 o'clock • Fabric supported to track with cord-in attachment * Minimal inflation noise or fabric motion at start-up			Sizing: 1000 fpm 	Sizing: 1400 fpm 

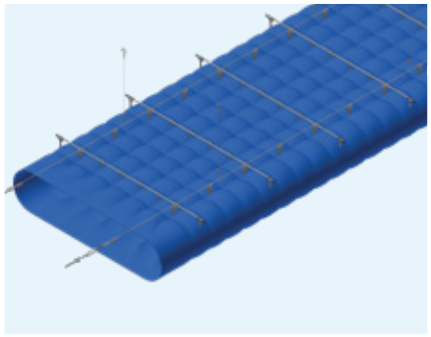
Oval : Available with Track or Cable

Ideal for applications with low head room or when obstructions, such as machinery or equipment that cannot be moved.

Oval

- Save from 13in up to 27in (330mm up to 686mm) in head room space compared to round DuctSox
- Sized from 11in x 47in (279mm - 1041mm) to 22in x 93in (559mm - 2362mm)
- Track or Cable both used in combination with fiberglass rods





Sizing

Straight
1600 fpm

Fittings
1400 fpm

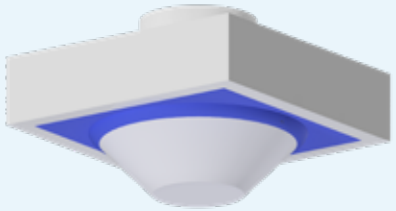
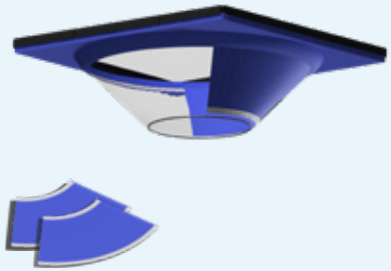
Diffusers : C-Series

Drop plenum diffuser providing 360 degrees of even air dispersion plus the many added advantages of being made from fabric. Typically used in spaces that can't use ductwork for physical or financial reasons. See Appendix for additional information.

C-Series	30° Angle	Flat
• 360° Airflow coverage • Available in 8 sizes, up to 50 ton, with 2 throw options • Flat or 30° angle diffusion with round or square top inlet • Square top inlets have edge seal to prevent leakage • No risk of condensation		

Diffusers : V-Series

The V-Series fabric diffuser is a displacement diffuser designed to enhance control of potentially hazardous airborne contaminants commonly found in laboratories and healthcare facilities. Each of the V-Series diffusers will come with occlusion panels that can be field installed to direct airflow as required for the space to create a sweeping motion through the space towards the fume hoods or other exhaust locations. See Appendix for additional information.

V-Series	Metal Pan	Occlusion Panels
• 360° Airflow coverage • 24in x 24in (610mm x 610mm) with a 10in (254mm) inlet • Two Occlusion Panels included • Once installed each Occlusion Panel will cover 25% of the dispersion area. • Directional displacement • Supports low flow environments • Operating as low as 2 air changes per hour (ACH)		

Diffusers: D-Series

Designed specifically for applications commonly associated with a fume hood or other airflow sensitive environments such as laboratories, kitchens, clean rooms and other critical environments.

Metal Pan

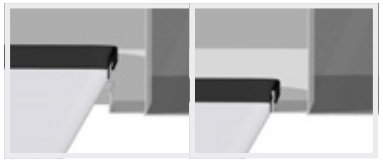
- 24in x 24in (610mm x 610mm) units tested up to 500 CFM (236 L/s)
- 24in x 48in (610mm x 1219mm) units tested up to 1,000 CFM (472 L/s) per unit

All Fabric

- 24in x 24in (610mm x 610mm) units tested up to 500 CFM (236 L/s)
- 24in x 48in (610mm x 1219mm) units tested up to 1,000 CFM (472 L/s) per unit

Universal Retrofit

- 24in x 24in (610mm x 610mm) units tested up to 500 CFM (236 L/s)
- 24in x 48in (610mm x 1219mm) units tested up to 1,000 CFM (472 L/s) per unit

Clip Face	Snap Frame
	
	
	
	

Air Dispersion

Throw: Airflow Direction

Each DuctSox system is 100% custom made; this allows unlimited flexibility in designing the locations of linear vents, nozzles, or orifices. Some of the options when designing outlet orientations are:

4&8, 5&7, and 6 o'clock

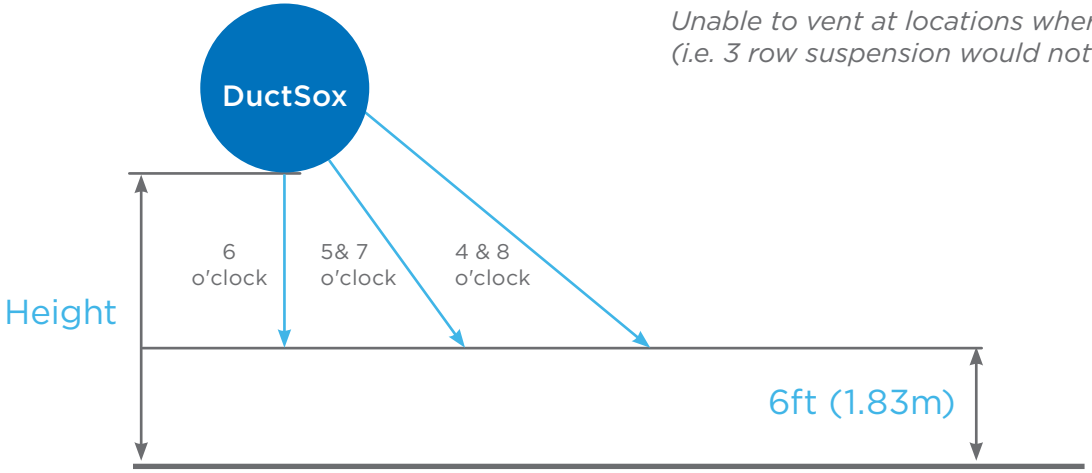
Primarily chosen for applications with heating and/or cooling, but can also be used for ventilating. These orientations direct the exiting air downward and/or outward from the DuctSox. Throw requirements can be critical in these locations because the air is delivered more directly towards the occupied space.

11&1, 10&2, and 3&9 o'clock

Primarily chosen for only cooling or ventilating, these orientations either direct the exiting air upward and/or outward from the DuctSox. Throw requirements focus on reaching the exterior walls or filling the gaps between parallel runs.

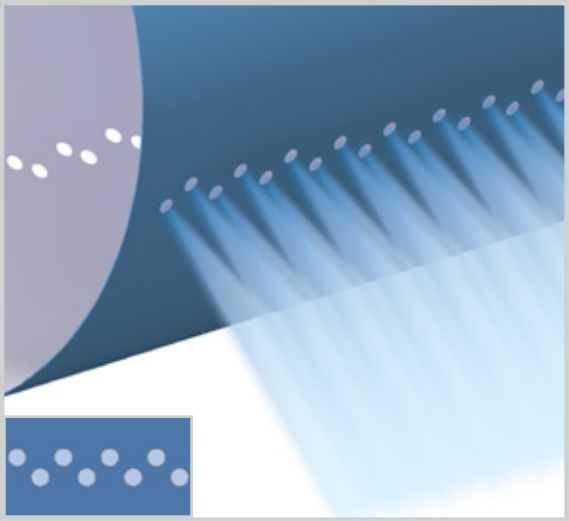
Notes: It is recommend to not place vents closer than 1 full o'clock of each other as the air throws can entrain and may create longer throws.

Unable to vent at locations where the suspension is attached.
(i.e. 3 row suspension would not allow for venting at 10, 12 and 2 o'clock)



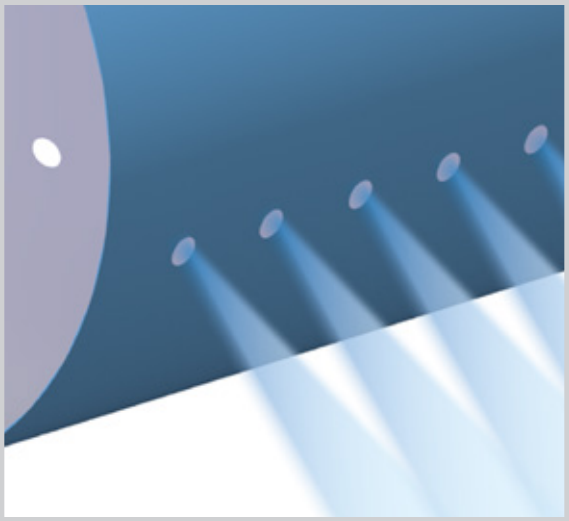
Dispersion Options

Linear Vents



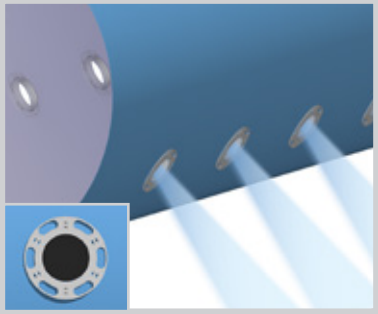
- Linear vents are the standard dispersion option for porous fabrics and provides a gentle airflow through precision cut vent patterns
- The hole pattern increases with vent size
- Available in 1 CFM per ft (1.55 (L/s)/m) increments for maximum accuracy
- Airflow throw up to 90ft (27.43m)
- Typically used in high occupancy spaces where air diffusion and mixing are of high importance

Orifices



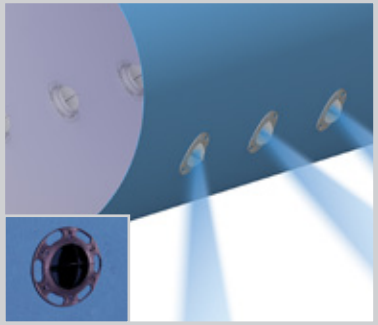
- Orifices are the standard dispersion option for non-porous fabrics
- Provides airflow throw by orifice size and pressure up to 150ft (45.7m)
- Available from .5in – 5in diameter (12.7mm - 127mm)

Grommets



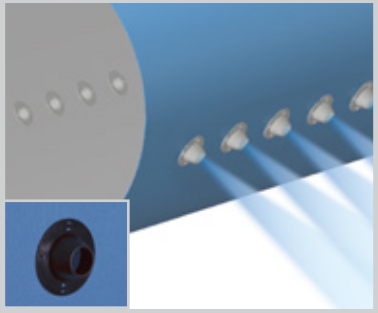
- Grommets are used in porous fabrics when greater throw than linear vents will typically allow (due to air released via porosity)
- Available in 2in and 3in diameters (51 mm and 76.2mm)
- Not available for TufTex and PolyTex

Adjustable Nozzles



- Adjustability of throw with 360 degree rotation and 10 different angle settings, including a closed setting
- Beneficial for controlling condensation issues
- Building Codes limit the quantity that can be used per system
- Available in 2in and 3in diameters (51 mm and 76.2mm)
- Not available for TufTex and PolyTex

Fixed Nozzles



- Provides jet-type airflow
- Constant flow of air or closed off
- Aftermarket plugs are available to cap off the airflow
- Building Codes limit the quantity that can be used per system
- Only available in 1in diameter (25.4mm)
- Not available for TufTex and PolyTex

Options

AFD
Adjustable Flow Device

Airflow control is critical in HVAC air dispersion. DuctSox's patented zip-in Adjustable Flow Device (AFD) is an added option that offers variable resistance to balance static regain, balance airflow to branches, reduce turbulence, and reduce abrupt start-ups.

AFDs are preset from the factory and can be custom adjusted in the field to meet system performance requirements.

Plenum
Direct airflow into branch take-offs where velocity is over 1,200 fpm (6.01m/s).

Middle
Balances static regain. All systems with an intermediate zipper over 40ft (12,192mm) and >1,200 fpm (6.01m/s) inlet velocity.

No Pop
Reduces inflation pop. Single AFD located in last 30% of long run, included for all systems over 100ft (30,480mm) and over 5,000 CFM (2,360L/s).

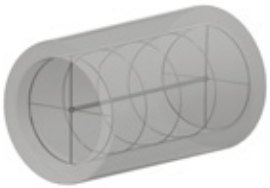
Typically, systems should not include more than three AFDs in sequence to an endcap

Silencer™
Fabric Sound Attenuator

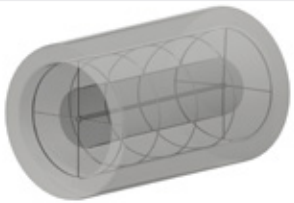
The Silencer can be used in place of a metal silencer or acoustically-lined ducting to absorb or prevent incoming noise from reaching the occupied space

- Depending on noise absorption required, the Silencer is available with or without an internal bullet and available in diameters 12in to 30in (305mm - 762mm)
- Can be customized to match your DuctSox System's fabric type and color
- May contribute to LEED points as described in LEED v4 Reference Guide for Buildings and Construction.

Without Bullet



With Bullet



Warranty

[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)	
Stat-X	10 (Pro-rated 6-10)	5	5 (Pro-rated 2.5-5)			
Rx, LabSox	10 (Pro-rated 6-10)	5	1			
Microbe-X, PolyTex, ChemSox	10 (Pro-rated 6-10)	5	1			
DataSox	N/A			5		

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

Diffusers: D-Series, V-Series	1
Diffusers: C-Series	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.

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 warranty is not transferable.

Code Compliance

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

The following sections contain additional reference charts and information that you may find useful when designing your DuctSox System

Frequently Asked Questions

General Questions

What is a DuctSox air dispersion system?

DuctSox Products are fabric ductwork and diffuser systems used for providing precise and efficient heating, cooling, or ventilating for virtually any building application. DuctSox systems discharge air through a combination of porous fabrics, engineered orifices, and linear vents and are a cost-effective, aesthetically attractive alternative to exposed metal ductwork and diffusers. Each system is 100% custom made, starting from the engineering design to the manufactured product.

How is a DuctSox system different than a traditional metal duct system?

Different than conventional metal, fabric products are custom engineered and manufactured for each project. DuctSox designs can be simple straight systems or very complex layouts; incorporating fittings such as radius elbows, Ts, transitions, or any combination. Sections are zippered together to form extended lengths.

What is the number one advantage a DuctSox air dispersion system has versus a traditional metal duct system?

Even and efficient air dispersion. Because the air is distributed along the entire length of duct, a DuctSox system uniformly disperses the air, eliminating hot and cold spots in the space.

What are other advantages of a DuctSox air dispersion system?

In addition to better air dispersion, a DuctSox system is lightweight, will not scratch or dent, easier to install than metal duct, requires minimal balancing, and is a green product.

Can a DuctSox fabric system design be simpler than a traditional metal duct system?

Yes. Because the entire DuctSox system is a diffuser, air can be supplied to the occupied space in a more efficient pattern. DuctSox systems may be designed with fittings similar to metal ductwork, including many standard zippered fittings and unlimited customization to match any application requirements.

Why does a DuctSox air dispersion system perform better than a traditional metal duct system?

In open ceiling architecture, traditional metal duct systems discharge through side-mounted metal diffusers, usually spaced a few feet apart. The air is directed to specific zones resulting in less efficient mixing of air in the occupied space and often causing drafting and hot or cold spots. With a DuctSox system, the air is discharged more uniformly along the entire length of the DuctSox system providing consistent and uniform air dispersion in the occupied space.

Is a DuctSox system more energy efficient than a metal duct system?

Yes. A two-year long study performed by the Mechanical Engineering Department at the Iowa State University, "Thermal Comparison Between Ceiling Diffusers and Fabric Ductwork Diffusers for Green Buildings," proved textile duct brings the room to set point 24.6% quicker and more uniformly versus metal duct/diffusers. This results in reduced mechanical equipment runtime, thus saving energy in the process. Visit www.ductsox.com/media-library to see a copy of the energy report.

Is a DuctSox system less expensive than a traditional metal system?

Yes. A DuctSox system will typically be 10% less material cost than a comparable metal system and 50% to 70% less time to install. The savings are in the labor time required to install DuctSox versus an equivalent metal system. Metal systems may require ten times more labor (man hours) to install versus fabric. Additionally, savings increase with diameter. The labor time required to install a 60in (1524mm) diameter DuctSox is nearly the same as a 20in (508mm) diameter DuctSox. That is not true for metal. The cost savings of air porous DuctSox are even more dramatic when compared to double wall spiral metal, or premium materials-aluminum, stainless, or PVC coated.

What DuctSox sizes are kept in stock?

Only raw materials are stocked. Every DuctSox system is 100% custom designed for each application.

What are the standard lead times for a DuctSox system?

A complete, custom designed DuctSox system usually ships within 4 weeks after an approved drawing and PO has been received. Expedited options may also be available. Consult factory for details.

Is DuctSox considered a green product?

Yes. The green advantages of a DuctSox system include: improved air quality, reduced solid waste, lower construction costs, lower operating costs, improved productivity, comfortable environment, less packaging, minimal job-site waste, quiet air delivery, uniform air dispersion, and better ventilation effectiveness.

Can alterations be made once the DuctSox are in the field?

Field modifications of the DuctSox systems are not covered under warranty. Any added orifices, cut sections, zippers added or removed will void the warranty, but the system can be sent back to our manufacturing facility to modify the system appropriately.

Does the HVAC industry accept DuctSox air dispersion products?

Yes. DuctSox products have been accepted within key industry organizations such as ASHRAE, ISHRAE, Underwriters Laboratories (U.S. & Canada), International Code Council, British Standards, DIN Standards, and is accepted by many local building authorities throughout the world. To maintain industry leadership, DuctSox engineers work closely with building code and HVAC engineering organizations to establish standards for fabric air dispersion systems that serve as templates for future building designs.

Are DuctSox systems fire retardant?

DuctSox fabrics meet the National Fire Protective Agency specification, NFPA 90A Flame and Smoke spread test. DuctSox products have been tested to meet this specification by Underwriters Laboratories UL2518, British Standards BS 5867 Part 2, 1980, GB 8624-2006, and DIN GB8624.

At what temperatures can DuctSox operate?

DuctSox systems have been tested and approved for use up to 180 degrees Fahrenheit (82 degrees Celsius). To meet AC167 requirement, the product is tested in an oven where internal temperature of the product is maintained at not less than 265 degrees Fahrenheit (129.4 degrees Celsius) and the exterior is maintained at not less than 125 degrees Fahrenheit (51.7 degrees Celsius) for 60 days.

Are DuctSox easy to launder or clean?

Yes. DuctSox systems can be easily removed and laundered. DuctSox systems are designed with zippered sections for ease of handling and are sized to fit into industrial washing machines.

What is the warranty of a DuctSox System?

DuctSox systems can carry a warranty up to 20 years depending on the suspension and fabric selection. There is also a performance guarantee for the first year of operation. This ensures that the system performs as designed and shown on the submittal drawings.

What is the expected lifespan of a DuctSox system?

DuctSox systems carry up to a 20-year warranty depending on which options are selected, but under proper operating conditions, the systems can last decades beyond the warranty.

Does DuctSox assist with system design?

Yes. DuctSox has a fully staffed engineering department that can help you with all phases of design at no additional cost.

Does DuctSox provide CFD (Computational Fluid Dynamics) modeling for projects?

We can. CFD analysis can be very useful when evaluating performance in your application. However, depending on the complexity of the report, it can also be expensive.

Where are your CFD models?

We have generic CFD models of our air dispersion options available upon request. Custom CFD analysis is available for an extra charge.

Can you use this system for return air?

Yes. Our Skelecore FTS suspension system is required for return air to prevent the duct from collapsing. The standard codes and compliance terms do not currently cover this by ASHRAE, so it requires clearance from local building code authorities.

Explain the various building codes that apply to DuctSox.

DuctSox systems are considered air dispersion systems and not actual duct, are intended for use in exposed applications, and are meant to condition the space in which they are located and not as a transfer duct. The major standard that DuctSox materials and systems follow is UL2518. This standard ensures our systems are as fire/smoke resistant, mold resistant, erosion resistant, temperature resistant, and pressure resistant as specified. For further information, please see our "building codes & compliance" white paper on our website.

How do you connect the fabric to the metal? Is there a collar? What size does the metal need to be to allow the fabric to fit over it?

There is a belt that cinches around a metal inlet collar along with several patches designed and reinforced for screws to lock the inlet belt down onto the collar in addition to the belt. DuctSox systems are oversized by a half inch so they fit over metal at the inlet.

What information is needed to get a quote for a DuctSox product?

For the most accurate quote and recommendation from your local rep the following project information is requested; General layout if available, shape desired, air volume, to determine duct size, inlet static pressure, velocity requirement, fabric type/application, desired suspension, and hanging height.

How do I go about getting a quote on a DuctSox system?

DuctSox has reps located worldwide available to provide product support, pricing, and to place orders.

Performance Questions

Are there static pressure requirements for DuctSox systems?
Standard design is 0.50in w.g. (125 Pa), but the full range is from 0.25in w.g. (62 Pa) to 3.1in w.g. (772 Pa). With FTS, Pull-Tight, and IHS suspensions, it is sometimes acceptable to operate below 0.25in w.g.(on a case by case basis).

Can orifices provide the same performance as nozzles?
Yes. Orifices are just as durable and cost less than using nozzles. Adjustable nozzles are recommended when the air needs to be directed for spot cooling or to cover a corner or hard to reach locations. Nozzles have quantity restrictions based on building codes whereas Orifices do not.

What radii are DuctSox elbows fabricated in?
DuctSox elbows are fabricated standard with a 1.5 x diameter centerline, but can also be made smaller under certain circumstances to be 1.0 x diameter centerline radius.

How are the throws determined for each system?
Throws are calculated assuming isothermal conditions. The primary influence of throw is static pressure. Throws are shown at 150, 100, and 50 fpm terminal velocities on submittal drawings.

What is the distance between the top of the DuctSox and the horizontal cable? 1.5in (38.1mm)

How tight to the ceiling can you install the horizontal cable or suspended track?
Track systems can be flush mounted to the ceiling and cable systems can be hung within an inch of the ceiling.

What is the difference between porous and non-porous fabric?
Porous fabrics allow air to leak through the fabric along the entire length of the duct, and prevents condensation similar to insulated or double walled duct. Non-porous fabric doesn't allow air to leak and only releases air via vents cut into the duct.

Can DuctSox still be used if I have and inlet velocity of 2000 fpm but use a variable flow?
Yes. In order to operate properly with 2000 fpm at the inlet, our Skelecore FTS suspension must be used. This prevents the duct from deflating with an internal skeleton that holds the fabric in tension. This is perfect for variable flow because it doesn't require the usual minimum of 0.25in w.g. of static pressure to fully inflate the duct.

What sizes do DuctSox come in?
Depending on the suspension, DuctSox systems can be sized anywhere from 6in (152mm) diameter and up.

How do you size a DuctSox?
DuctSox systems are sized based on air velocity within the duct. Straight runs are sized at 1600 fpm. Runs with fittings are sized at 1400 fpm. For sound sensitive applications, systems are sized at 1000 fpm.

Can DuctSox lay out the same as spiral ductwork?
Yes, but DuctSox systems can be redesigned to be more simple than traditional metal designs due to more efficient dispersion options.

What are the noise levels of DuctSox compared to metal ducts?
DuctSox systems are comparable to metal systems. We offer a fabric sound attenuator and special design criteria to meet sound requirements.

Detailed Application Recommendations

Food Processing

Food processing typically requires stainless steel hardware components and suspension that is easy to wash off. Stainless steel V-Track does not allow water to pool or gather and is great for applications where wash-downs are regularly done. Traditional cable or track suspension is the easiest to remove the duct for laundering. Sedona-Xm and Microbe-X fabrics should be used if food is being processed in the space due to their antimicrobial properties. If all of the air needs to be distributed through the porosity, Microbe-X fabric should be selected.

Pool

Pools typically use Sedona-Xm or Verona fabric to prevent condensation. Non-porous options may be used if this is not a concern. Impregnated cable is also required to prevent corrosion and breakdown of the hardware. IHS is the only internal structure that can withstand a pool's corrosive environment and is offered up to 60in diameter. Pools are typically designed without ducts running over the water, and instead are designed to run around the pool for easier access and maintenance. Air generally is not blown over 30 fpm at the water's surface to avoid causing discomfort for people in the space and increased evaporation rates of chemicals in the water.

Medical, Kitchen, or Lab

These types of applications usually require very controlled, precise airflow. Rx and Microbe-X fabrics distribute higher volumes of air at low velocities which allow fume hoods, exhaust fans, or sensitive equipment to properly function. Sedona-Xm is another antimicrobial solution when the air is not required to be distributed only through the porosity.

Office

Suspensions with internal structure are more aesthetically pleasing and should be considered for low ceiling clearance as these product lines reduce fabric sagging. Vents are typically not blowing down onto occupants and instead should be directed at 3 & 9 o'clock unless the hang height is significantly higher than a typical office space.

Chemical Environments

ChemSox fabric is our most corrosive resistant fabric and will not fade or visibly deteriorate like other fabrics may when introduced to certain chemical environments. Stainless steel or impregnated cable should be used (depending on what chemicals are present) when galvanized steel will not hold up in the given environment. Discuss the chemicals being used in the application with your sales rep, as we may be able to use our standard fabric in the space.

Industrial

Higher throws or process directed dispersion tend to be desirable in these applications. Internal structure can help when space is limited and there is not room for the duct to sag. TufTex or DuraTex tend to be the most popular for these applications. If there are any spot cooling needs, adjustable nozzles are an easy solution to target very specific locations with a high throw.

Retail, Grocery Store, Restaurant

Aesthetics in areas with customers could benefit from internal structure options (IHS, Pull-Tight, and FTS). Air is typically not directed towards open faced coolers as it may prevent them from adequately cooling the products in them. Verona and Sedona-Xm are commonly used in these applications.

Library, Church, Classroom, Community Center

Noise may be a concern for these spaces. Designing at a low inlet static pressure, low inlet velocity, and avoiding the use of nozzles will help reduce duct generated noise. The use of a sound attenuator (Silencer™) may also help reduce unit noise and is currently available in 12in to 30in diameters. Verona and Sedona-Xm are more commonly used in these applications but are not always required.

Data Center

Stat-X is a fabric specifically designed with anti-static, Electro Static Dissipative (ESD) yarns running through it to alleviate the risk of electrical discharge causing damage to equipment. DataSox are specifically designed for server rooms and deliver large volumes of air to the equipment at the optimal velocity, reducing electricity consumption. Traditional fabric types can be used in these spaces as well but may build up static.

Auditorium, Sports Arena, Convention Center

For the diameter size typically needed for these applications it is encouraged to use a suspension with internal structure to keep ducts aesthetically pleasing whether the unit is on or off. These applications tend to be hung at very high elevations and often require large orifices or grommets to provide proper airflow in the space. If there are very long, small diameter runs, it is recommended to use TufTex or DuraTex. These fabrics are non-porous and will only disperse air out of the venting cut into the duct.

Animals, Plants

If fabrics are exposed to direct sunlight and/or UV lights in these applications, PolyTex is the best choice as it withstands UV better, and does not show fading or discoloration. PolyTex is translucent enough to allow some light to pass through to plants if needed. If UV light is not a concern, any other fabric can be used. Nozzles are a popular choice to meet particular airflow requirements for specific plants. For applications that require lower air velocities Rx fabrics, Microbe-X and Sedona-Xm should be used to release large volumes of air without drying out or hitting plants at a high velocity and inhibit mold growth.

Other Applications

Outdoor or other partially exposed applications may need to take UV exposure and wind into account. DuctSox are not currently rated for wind, but in some cases additional supports are recommended to prevent swaying. PolyTex is the best at withstanding UV exposure without breaking down.

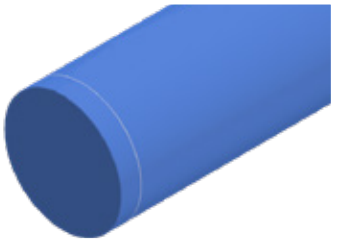
Temporary structures such as tents and other portable shelters typically use traditional cable suspension as it is the simplest to assemble and tear down.

Underfloor

UnderFloorSox (UFSox) is a fabric air dispersion system that improves airflow dispersion within the Underfloor Air Distribution (UFAD) plenum. Uniform temperature within the plenum reduce instances where in floor diffusers are exposed to higher or lower temperatures improving employee comfort.

Duct Sizing

Round



The DuctSox system diameter is based on the airflow rate and inlet conditions at the beginning of the fabric system.

(See page C27 for Sizing Chart)

1. First, find the column with the maximum Inlet Velocity you would like to stay under considering the following guidelines.

DIA = [(CFM x 4 x 144) / (Pi x Inlet Vel.)]^0.5
DIA = [(L/s x 4 x 1000) / (Pi x Inlet Vel.)]^0.5

- Applications that are noise-sensitive: **Maximum = 1,000 fpm (5.1 m/s)**
- Fittings: **Maximum = 1,400 fpm (7.1 m/s)**
- Straight Runs: **Maximum = 1,600 fpm (8.1 m/s)**
- SkeleCore FTS: **Maximum = *2,000 fpm (10.2 m/s)**

*Please consult the DuctSox design team. Velocities over 1400 fpm for fittings and 1600 fpm for straight sections will reduce the warranty.

2. Then, move down that column until you find the airflow rate that just exceeds the rate for your system.
3. Finally, move to the left in that row and your minimum DuctSox diameter will be indicated in-line with your rate.

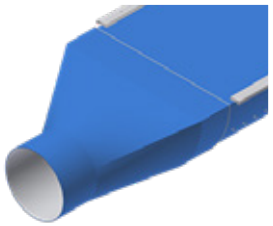
If the required diameter is too large for the space, consider splitting the airflow into multiple runs.

Round - Sizing Chart

Diameter		Inlet Velocity							
		1000 fpm	5.1 m/s	1400 fpm	7.1 m/s	1600 fpm	8.1 m/s	2000 fpm	10.2 m/s
in	mm	CFM	L/sec	CFM	L/sec	CFM	L/sec	CFM	L/sec
8	203	349	165	489	231	559	264	698	329
10	254	545	257	764	360	873	412	1091	515
12	305	785	371	1100	519	1257	593	1571	741
14	356	1069	505	1497	706	1710	807	2138	1009
16	406	1396	659	1955	923	2234	1054	2793	1318
18	457	1767	834	2474	1168	2827	1334	3534	1668
20	508	2182	1030	3054	1441	3491	1647	4363	2059
22	559	2640	1246	3696	1744	4224	1993	5280	2492
24	610	3142	1483	4398	2076	5027	2372	6283	2965
26	660	3687	1740	5162	2436	5899	2784	7374	3480
28	711	4276	2018	5986	2825	6842	3229	8552	4036
30	762	4909	2317	6872	3243	7854	3707	9817	4633
32	813	5585	2636	7819	3690	8936	4217	11170	5272
34	864	6305	2976	8827	4166	10088	4761	12610	5951
36	914	7069	3336	9896	4670	11310	5338	14137	6672
38	965	7876	3717	11026	5204	12601	5947	15752	7434
40	1016	8727	4119	12217	5766	13963	6590	17453	8237
42	1067	9621	4541	13470	6357	15394	7265	19242	9081
44	1118	10559	4983	14783	6977	16895	7973	21118	9967
46	1168	11541	5447	16157	7625	18466	8715	23082	10893
48	1219	12566	5931	17593	8303	20106	9489	25133	11861
50	1270	13635	6435	19090	9009	21817	10296	27271	12870
52	1321	14748	6960	20647	9744	23597	11136	29496	13921
54	1372	15904	7506	22266	10508	25447	12010	31809	15012

Diameter		Inlet Velocity							
		1000 fpm	5.1 m/s	1400 fpm	7.1 m/s	1600 fpm	8.1 m/s	2000 fpm	10.2 m/s
in	mm	CFM	L/sec	CFM	L/sec	CFM	L/sec	CFM	L/sec
56	1422	17104	8072	23946	11301	27367	12916	34208	16145
58	1473	18348	8659	25687	12123	29356	13855	36696	17318
60	1524	19635	9267	27489	12973	31416	14827	39270	18533
62	1575	20966	9895	29352	13853	33545	15832	41932	19789
64	1626	22340	10543	31276	14761	35744	16869	44680	21087
66	1676	23758	11213	33262	15698	38013	17940	47517	22425
68	1727	25220	11903	35308	16664	40352	19044	50440	23805
70	1778	26725	12613	37415	17658	42761	20181	53451	25226
72	1829	28274	13344	39584	18682	45239	21350	56549	26688
74	1880	29867	14096	41814	19734	47787	22553	59734	28191
76	1930	31503	14868	44104	20815	50405	23789	63006	29736
78	1981	33183	15661	46456	21925	53093	25057	66366	31321
80	2032	34907	16474	48869	23064	55851	26359	69813	32948
82	2083	36674	17308	51343	24231	58678	27693	73347	34616
84	2134	38485	18163	53878	25428	61575	29060	76969	36325
86	2184	40339	19038	56474	26653	64542	30461	80678	38076
88	2235	42237	19934	59132	27907	67579	31894	84474	39867
90	2286	44179	20850	61850	29190	70686	33360	88357	41700
92	2337	46164	21787	64630	30502	73862	34859	92328	43574
94	2388	48193	22745	67470	31842	77109	36391	96386	45489
96	2438	50265	23723	70372	33212	80425	37956	100531	47445
98	2489	52382	24721	73334	34610	83811	39554	104763	49443
100	2540	54542	25741	76358	36037	87266	41185	109083	51481

Half-Round: End Inlet



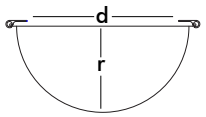
Choosing Half-Round Inlet and system diameters are slightly different than standard Round DuctSox.

1. Determine the airflow rate through the End Inlet.
2. Use the table to the right to determine Inlet diameter (as a round cross section) and the Half-Round size.

   A. First, find the column with the maximum Inlet Velocity you would like to stay under considering the following guidelines:

   - Applications that are noise-sensitive: **Maximum = 1,000 fpm (5.1 m/s)**
   - Fittings: **Maximum = 1,400 fpm (7.1 m/s)**
   - Straight Runs: **Maximum = 1,600 fpm (8.1 m/s)**

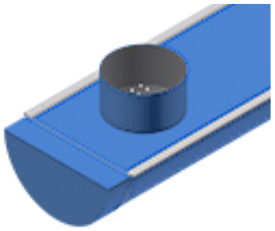
   B. Then, move down that column until you find the airflow rate that just exceeds the rate for your system.



   C. Finally, move to the left in that row and your Half-Round size **(d= diameter, r= radius)** and the Inlet diameter will be indicated in-line with your airflow rate.

Round Inlet Diameter		Half-Round Size		Maximum Inlet Velocity					
in	mm	in	mm	1000 fpm	5.1 m/s	1400 fpm	7.1 m/s	1600 fpm	8.1 m/s
		(d x r)	(d x r)	CFM	L/s	CFM	L/s	CFM	L/s
6	152	8 x 4	203 x 102	175	82	244	115	279	131
8	203	10 x 5	254 x 127	273	128	382	180	436	205
10	254	12 x 6	305 x 152	393	185	550	259	628	295
10	254	14 x 7	356 x 178	535	251	748	352	855	402
12	305	16 x 8	406 x 203	698	328	977	459	1117	525
14	356	18 x 9	457 x 229	884	415	1237	581	1414	665
16	406	20 x 10	508 x 254	1091	513	1527	718	1745	820
16	406	22 x 11	559 x 279	1320	620	1848	869	2112	993
18	457	24 x 12	610 x 305	1571	738	2199	1034	2513	1181
20	508	26 x 13	660 x 330	1844	867	2581	1213	2950	1387
20	508	28 x 14	711 x 356	2138	1005	2993	1407	3421	1608
22	559	30 x 15	762 x 381	2454	1153	3436	1615	3927	1846
24	610	32 x 16	813 x 406	2793	1313	3910	1838	4468	2100
26	660	34 x 17	864 x 432	3153	1482	4414	2075	5044	2371
26	660	36 x 18	914 x 457	3534	1661	4948	2326	5655	2658
28	711	38 x 19	965 x 483	3938	1851	5513	2591	6301	2961
30	762	40 x 20	1016 x 508	4363	2051	6109	2871	6981	3281

Half-Round: Top Inlet



Choosing Half-Round Inlet and system diameters are slightly different than standard Round DuctSox.

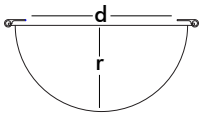
1. Determine the airflow rate through the Top Inlet.

   Note: *If there could be multiple Top Inlets feeding a Half-Round system or if the Top Inlet is not in the middle of the length of the system, please contact the DuctSox factory design team.*

2. Use the table to the right to determine Inlet diameter (as a round cross section) and the Half-Round size.

   A. First, find the column noting the maximum Inlet Velocity for Top Inlet systems: **Maximum = 1,000 fpm (5.1 m/s)**. Then, move down that column until you find the airflow rate that just exceeds the rate for your system.

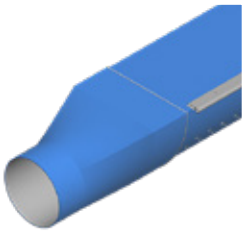
   B. Finally, move to the left in that row and your Half-Round size **(d= diameter, r= radius)** and the Inlet diameter will be indicated in-line with your airflow rate.



3. Use the table to the right to determine the minimum Top Inlet diameter knowing the required Half-Round size.

Round Inlet Transition Diameter		Half-Round Size		Maximum Inlet Velocity	
in	mm	in	mm	1000 fpm	5.1 m/s
		(d x r)	(d x r)	CFM	L/sec
6	152	8 x 4	203 x 102	196	93
6	152	10 x 5	254 x 127	196	93
8	203	12 x 6	305 x 152	349	165
10	254	14 x 7	356 x 178	545	257
12	305	16 x 8	406 x 203	785	371
14	356	18 x 9	457 x 229	1069	505
16	406	20 x 10	508 x 254	1396	659
18	457	22 x 11	559 x 279	1767	834
20	508	24 x 12	610 x 305	2182	1030
22	559	26 x 13	660 x 330	2640	1246
24	610	28 x 14	711 x 356	3142	1483
26	660	30 x 15	762 x 381	3687	1740
28	711	32 x 16	813 x 406	4276	2018
30	762	34 x 17	864 x 432	4909	2317
32	813	36 x 18	914 x 457	5585	2636
34	864	38 x 19	965 x 483	6305	2976
36	914	40 x 20	1016 x 508	7069	3336

Quarter-Round: End Inlet



Choosing Quarter-Round Inlet and system diameters are slightly different than standard Round DuctSox.

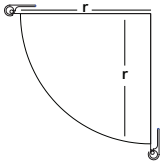
1. Determine the airflow rate through the End Inlet.
2. Use the table to the right to determine Inlet diameter (as a round cross section) and the Quarter-Round size.

   A. First, find the column with the maximum Inlet Velocity you would like to stay under considering the following guidelines:

   - Applications that are noise-sensitive: **Maximum = 1,000 fpm (5.1 m/s)**
   - Fittings: **Maximum = 1,400 fpm (7.1 m/s)**
   - Straight Runs: **Maximum = 1,600 fpm (8.1 m/s)**

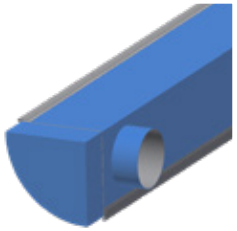
   B. Then, move down that column until you find the airflow rate that just exceeds the rate for your system.

   C. Finally, move to the left in that row and your Quarter-Round size (quarter circle cross-section) and the Inlet diameter will be indicated in-line with your airflow rate.



End Inlet Diameter		Quarter-Round Size		Maximum Inlet Velocity					
in	mm	in	mm	1000 fpm	5.1 m/s	1400 fpm	7.1 m/s	1600 fpm	8.1 m/s
		(r x r)	(r x r)	CFM	L/s	CFM	L/s	CFM	L/s
8	203	4 x 4	102 x 102	87	41	122	57	140	66
10	254	5 x 5	127 x 127	136	64	191	90	218	102
12	305	6 x 6	152 x 152	196	92	275	129	314	148
14	356	7 x 7	178 x 178	267	125	374	176	428	201
16	406	8 x 8	203 x 203	349	164	489	230	559	263
18	457	9 x 9	229 x 229	442	208	619	291	707	332
20	508	10 x 10	254 x 254	545	256	764	359	873	410
22	559	11 x 11	279 x 279	660	310	924	434	1056	496
24	610	12 x 12	305 x 305	785	369	1100	517	1257	591
26	660	13 x 13	330 x 330	922	433	1290	606	1475	693
28	711	14 x 14	356 x 356	1069	502	1497	704	1710	804
30	762	15 x 15	381 x 381	1227	577	1718	807	1963	923
32	813	16 x 16	406 x 406	1396	656	1955	919	2234	1050
34	864	17 x 17	432 x 432	1576	741	2207	1037	2522	1185
36	914	18 x 18	457 x 457	1767	830	2474	1163	2827	1329
38	965	19 x 19	483 x 483	1969	925	2757	1296	3150	1481
40	1016	20 x 20	508 x 508	2182	1026	3054	1435	3491	1641

Quarter-Round: Top/Side Inlet



Choosing Quarter-Round Inlet and system diameters are slightly different than standard Round DuctSox.

1. Determine the airflow rate through the Top/Side Inlet.

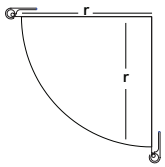
   Note: If there will be multiple Top/Side Inlets feeding a Quarter-Round system or if the Top/Side Inlet is not in the middle of the length of the system, please contact the DuctSox factory design team.

2. Use the table to the right to determine Inlet diameter (as a round cross section) and the Quarter-Round size.

   A. First, find the column noting the maximum Inlet Velocity for Top Inlet systems: **Maximum = 1,000 fpm (5.1 m/s)**.

   B. Then, move down that column until you find the airflow rate that just exceeds the rate for your system.

   C. Finally, move to the left in that row and your minimum Quarter-Round size (quarter circle cross-section) and the Inlet diameter will be indicated in-line with your rate.

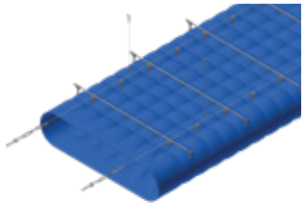


4. Use the table to the right to determine the minimum Top/Side Inlet diameter knowing the required Quarter-Round size.

Top/Side Inlet Diameter		Quarter-Round Size		Maximum Inlet Velocity	
in	mm	in	mm	1000 fpm	5.1 m/s
		(r x r)	(r x r)	CFM	L/sec
6	152	8 x 8	203 x 203	196	93
6	152	10 x 10	254 x 254	196	93
8	203	12 x 12	305 x 305	349	165
10	254	14 x 14	356 x 356	545	257
12	305	16 x 16	406 x 406	785	371
14	356	18 x 18	457 x 457	1069	505
16	406	20 x 20	508 x 508	1396	659
18	457	22 x 22	559 x 559	1767	834
20	508	24 x 24	610 x 610	2182	1030
22	559	26 x 26	660 x 660	2640	1246
24	610	28 x 28	711 x 711	3142	1483
26	660	30 x 30	762 x 762	3687	1740
28	711	32 x 32	813 x 813	4276	2018
30	762	34 x 34	864 x 864	4909	2317
32	813	36 x 36	914 x 914	5585	2636
34	864	38 x 38	965 x 965	6305	2976
36	914	40 x 40	1016 x 1016	7069	3336

Oval

The DuctSox system diameter is based on the airflow rate and inlet conditions at the beginning of the fabric system.



1. First, find the column with the maximum Inlet Velocity you would like to stay under considering the following guidelines:

DIA = [(CFM x 4 x 144) / (Pi x Inlet Vel.)]^0.5

DIA = [(L/s x 4 x 1000) / (Pi x Inlet Vel.)]^0.5

- Applications that are noise-sensitive:
  Maximum = 1,000 fpm (5.1 m/s)
- Fittings:
  Maximum = 1,400 fpm (7.1 m/s)
- Straight Runs:
  Maximum = 1,600 fpm (8.1 m/s)

2. Then, move down that column until you find the airflow rate that just exceeds the rate for your system.
3. Finally, move to the left in that row and your minimum DuctSox diameter will be indicated in-line with your airflow rate.
4. If the required diameter is too large for the space, consider splitting the airflow into multiple runs.

Diameter				Maximum Inlet Velocity					
Size (w x h)		Equivalent Round		1000 fpm	5.1 m/s	1400 fpm	7.1 m/s	1600 fpm	8.1 m/s
in	mm	in	mm	CFM	L/s	CFM	L/s	CFM	L/s
47 x 11	1190 x 280	24	610	3142	1483	4398	2076	5027	2373
50.75 x 12	1290 x 300	26	660	3687	1740	5162	2436	5899	2784
54.75 x 12.75	1390 x 320	28	711	4276	2018	5986	2826	6842	3229
58.5 x 13.75	1490 x 350	30	762	4909	2317	6872	3244	7854	3707
62.25 x 14.75	1580 x 370	32	813	5585	2636	7819	3691	8936	4218
66.25 x 15.5	1680 x 390	34	864	6305	2976	8827	4166	10088	4762
70 x 16.5	1780 x 420	36	914	7069	3336	9896	4671	11310	5338
73.75 x 17.25	1870 x 440	38	965	7876	3717	11026	5204	12601	5948
77.75 x 18.25	1970 x 460	40	1016	8727	4119	12217	5767	13963	6590
81.5 x 19	2070 x 480	42	1067	9621	4541	13470	6358	15394	7266
85.25 x 20	2170 x 510	44	1118	10559	4984	14783	6978	16895	7974
89.25 x 21	2270 x 530	46	1168	11541	5447	16157	7626	18466	8716
93 x 21.75	2360 x 550	48	1219	12566	5931	17593	8304	20106	9490

Diffuser Sizing

C-Series Diffusers

Sizing Information:

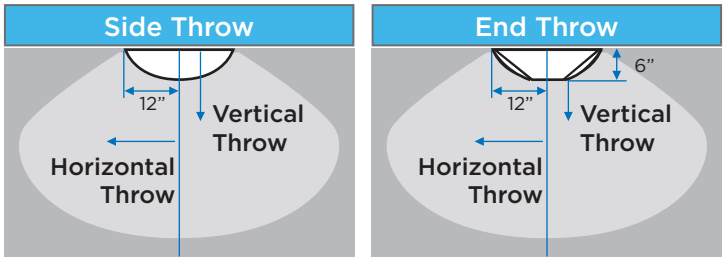
Size (ton)	Nominal CFM at 0.5in SP	Sq. Inlet Size (in)	Top Dia. (in)	Depth (in)	30° Bottom Dia. (in)	Throw Options	0.5in SP 150 fpm	0.5in SP 100 fpm	0.5in SP 50 fpm	NC Level
50	20,000	54	94	20	70	Regular Throw	38	57	91	70
						Extended Throw	61	91	146	
40	16,000	48	86	20	62	Regular Throw	38	57	91	63
						Extended Throw	61	91	146	
30	12,000	42	78	15	60	Regular Throw	38	57	91	56
						Extended Throw	61	91	146	
25	10,000	38	72	15	54	Regular Throw	38	57	91	51
						Extended Throw	61	91	146	
20	8,000	34	66	15	48	Regular Throw	38	57	91	46
						Extended Throw	61	91	146	
15	6,000	30	60	15	42	Regular Throw	38	57	91	43
						Extended Throw	61	91	146	
10	4,000	24	52	15	34	Regular Throw	34	51	82	40
						Extended Throw	53	80	128	
5	2,000	18	44	15	26	Regular Throw	19	28	45	37
						Extended Throw	28	43	69	

D-Series Diffusers: 24in x 24in

Metal Pan | Universal Retrofit

Panel Size		Inlet Diameter
Width (in)	Length (in)	(in)
24	24	10

Throw distance (ft) is measured from the center of the device.



Rx 165																	
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			END Horizontal Throw (fpm)			END Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	100	75	50	100	75	50
250	458	0.13	0.11	< 15	-	-	1.1	-	-	-	-	-	-	-	-	-
313	574	0.19	0.17	< 15	-	1.1	1.6	1.3	1.6	1.3	-	-	-	-	-	0.8
375	688	0.25	0.22	< 15	-	1.4	1.7	1.3	1.6	2.8	-	-	-	-	-	0.9
438	803	0.32	0.28	18	-	1.4	1.9	1.3	1.6	4.0	-	-	0.6	-	-	1.1
500	917	0.38	0.33	23	0.5	1.1	2.6	1.3	1.6	6.3	-	-	1.1	-	0.8	1.2
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved												

DT 200																	
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			END Horizontal Throw (fpm)			END Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	100	75	50	100	75	50
250	458	0.075	0.062	< 15	-	2.5	3.3	-	-	1.1	-	1.1	3.3	-	1.0	1.3
313	574	0.119	0.098	15	2.3	3.5	5.0	-	1.0	1.3	1.0	1.3	3.3	1.0	1.3	1.3
375	688	0.172	0.142	15	2.8	3.5	5.8	1.0	1.3	1.3	1.3	1.8	4.0	1.1	1.3	1.3
438	803	0.236	0.196	17	3.3	4.3	5.8	1.3	1.3	1.5	1.3	2.6	4.0	1.1	1.3	1.5
500	917	0.309	0.257	21	3.3	5.0	7.3	1.3	1.3	1.5	2.0	3.0	4.5	1.1	1.3	1.5
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved												

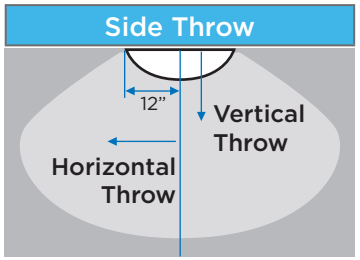
Units were tested in accordance with ASHRAE Standard 70-1991 “Method of Testing for Rating the Performance of Air Outlets and Inlets.” Independent testing was performed to establish performance data. Test data was prepared by an independent ETL certified laboratory. Due to the uniform dispersion method, in some instances the scheduled terminal velocities were not attainable within 6” of the fabric face.

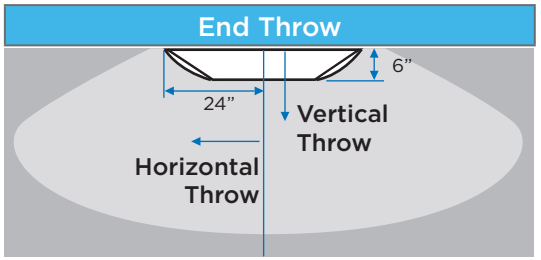
D-Series Diffusers: 24in x 48in

Metal Pan | Universal Retrofit

Panel Size		Inlet Diameter
Width (in)	Length (in)	(in)
24	48	12

Throw distance (ft) is measured from the center of the device.





Rx 165										
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50
500	637	0.14	0.12	< 15	-	-	-	-	-	-
625	796	0.19	0.16	< 15	0.5	1.0	3.0	0.5	0.6	1.3
750	955	0.26	0.21	18	1.0	1.3	3.0	0.6	1.0	2.8
875	1114	0.34	0.27	21	1.3	2.8	4.2	0.7	2.0	4.0
1000	1273	0.43	0.33	26	1.5	3.5	5.5	0.8	2.8	5.3
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved					

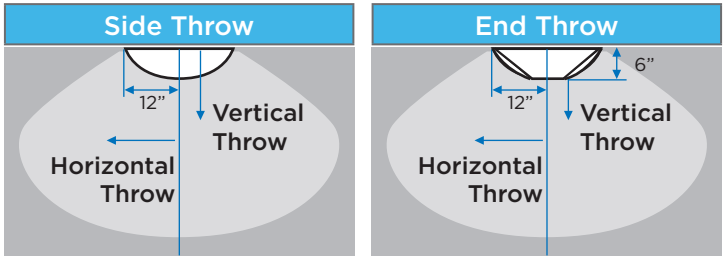
DT 200																
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			END Horizontal Throw (fpm)			END Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	100	75	50	100	75	50
500	637	0.092	0.067	15	-	-	-	-	-	1.1	2.0	2.3	2.7	-	-	1.0
625	796	0.141	0.102	16	-	-	-	-	-	1.1	2.2	2.4	2.8	-	-	1.1
750	955	0.202	0.145	21	-	-	1.8	-	1.1	1.3	2.5	2.8	4.3	-	1.0	1.2
875	1114	0.271	0.194	26	-	1.0	2.0	-	1.1	1.3	2.6	3.0	5.5	-	1.0	1.2
1000	1273	0.351	0.250	30	-	1.8	2.1	1.0	1.1	1.3	2.6	3.0	5.5	-	1.0	1.2
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved											

Units were tested in accordance with ASHRAE Standard 70-1991 “Method of Testing for Rating the Performance of Air Outlets and Inlets.” Independent testing was performed to establish performance data. Test data was prepared by an independent ETL certified laboratory. Due to the uniform dispersion method, in some instances the scheduled terminal velocities were not attainable within 6” of the fabric face.

D-Series Diffusers: 24in x 24in
All Fabric

Panel Size		Inlet Diameter
Width (in)	Length (in)	(in)
24	24	12

Throw distance (ft) is measured from the center of the device.



Rx 165																	
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			END Horizontal Throw (fpm)			END Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	100	75	50	100	75	50
175	223	0.057	0.057	< 20	-	-	-	-	-	-	-	-	-	-	-	-
250	318	0.098	0.092	< 20	-	-	-	-	-	-	-	-	1.6	-	-	0.7
325	414	0.147	0.036	< 20	-	-	-	-	-	-	-	1.8	3.5	-	0.7	1.3
400	509	0.202	0.186	< 20	-	-	-	-	-	-	-	0.4	1.8	-	1.0	1.3
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved												

DT 200																	
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			END Horizontal Throw (fpm)			END Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	100	75	50	100	75	50
175	223	0.036	0.033	< 20	-	-	-	-	-	-	-	-	-	-	-	-
250	318	0.069	0.063	< 20	-	-	0.6	-	-	1.7	-	-	0.8	-	-	1.1
325	414	0.112	0.101	< 20	0.6	0.8	0.9	1.1	1.6	2.4	-	1.1	2.5	-	1.3	> 3.5
400	509	0.164	0.148	< 20	0.8	0.8	0.9	1.4	1.7	2.5	1.1	1.5	2.5	1.5	2.5	> 3.5
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved												

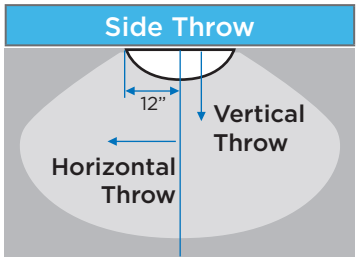
Units were tested in accordance with ASHRAE Standard 70-1991 “Method of Testing for Rating the Performance of Air Outlets and Inlets.” Independent testing was performed to establish performance data. Test data was prepared by an independent ETL certified laboratory. Due to the uniform dispersion method, in some instances the scheduled terminal velocities were not attainable within 6” of the fabric face.

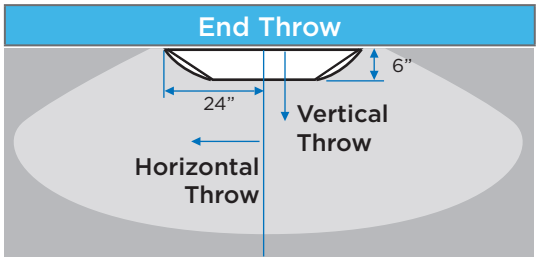
D-Series Diffusers: 24in x 48in

All Fabric

Panel Size		Inlet Diameter
Width (in)	Length (in)	(in)
24	48	14

Throw distance (ft) is measured from the center of the device.





DT 200																	
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			END Horizontal Throw (fpm)			END Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	100	75	50	100	75	50
300	382	0.049	0.044	< 20	-	-	-	-	-	-	-	-	2.0	-	-	0.3
425	541	0.084	0.074	< 20	-	-	-	-	-	-	-	-	2.7	-	-	0.6
550	700	0.126	0.109	< 20	-	-	2.5	-	-	1.0	-	2.0	3.5	-	0.9	0.8
675	859	0.169	0.148	< 20	-	-	5.0	-	-	1.4	2.6	3.5	4.7	0.4	0.9	1.3
800	1019	0.226	0.191	21	-	20.	4.0	-	0.7	1.4	3.4	4.0	6.0	0.5	0.9	1.3
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved												

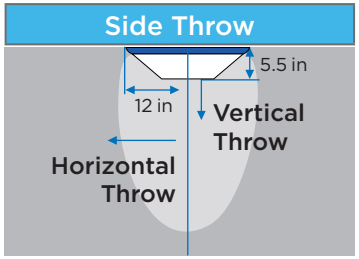
DT 200																	
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			END Horizontal Throw (fpm)			END Vertical Throw (fpm)		
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	100	75	50	100	75	50
300	382	0.031	0.026	< 20	-	-	-	-	-	-	2.0	2.3	2.7	-	-	1.0
425	541	0.058	0.048	< 20	-	-	-	-	-	-	2.2	2.4	2.8	-	-	1.1
550	700	0.094	0.077	< 20	-	-	1.9	-	-	0.7	2.5	2.8	4.3	-	1.0	1.2
675	859	0.118	0.097	< 20	-	1.6	1.9	-	0.4	0.5	2.6	3.0	5.5	-	1.0	1.2
800	1019	0.186	0.151	23	-	-	0.3	-	-	1.3	2.6	3.0	5.5	-	1.0	1.2
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved												

Units were tested in accordance with ASHRAE Standard 70-1991 “Method of Testing for Rating the Performance of Air Outlets and Inlets.” Independent testing was performed to establish performance data. Test data was prepared by an independent ETL certified laboratory. Due to the uniform dispersion method, in some instances the scheduled terminal velocities were not attainable within 6” of the fabric face.

V-Series Diffusers

Panel Size		Inlet Diameter
Width (in)	Length (in)	(in)
24	24	10

Throw distance (ft) is measured from the center of the device.



Standard V-Series											
Isothermal Airflow	Neck Velocity	Pt Total Pressure	Ps Static Pressure	NC Noise Criteria	SIDE Horizontal Throw (fpm)			SIDE Vertical Throw (fpm)			
CFM	(fpm)	(in w.g.)	(in w.g.)		100	75	50	100	75	50	
50	92	0.061	0.0605	< 15	-	-	-	-	-	1.75	
150	275	0.235	0.2305	19	-	-	-	3.4	4.7	5.9	
250	458	0.443	0.4304	22	-	-	1.32	5.2	6	6.75	
Noise Criteria (NC) values based on a 10 dB room absorption.					(-) Velocity Levels Not Achieved						

Units were tested in accordance with ASHRAE Standard 70-1991 "Method of Testing for Rating the Performance of Air Outlets and Inlets." Independent testing was performed to establish performance data. Test data was prepared by an independent ETL certified laboratory. Due to the uniform dispersion method, in some instances the scheduled terminal velocities were not attainable within 6" of the fabric face.

Air Dispersion

Throw: Airflow Direction

Each DuctSox system is 100% custom made; this allows unlimited flexibility in designing the locations of linear vents, nozzles, or orifices. Some of the options when designing outlet orientations are:

4&8, 5&7, and 6 o'clock

Primarily chosen for applications with heating and/or cooling, but can also be used for ventilating. These orientations direct the exiting air downward and/or outward from the DuctSox. Throw requirements can be critical in these locations because the air is delivered more directly towards the occupied space.

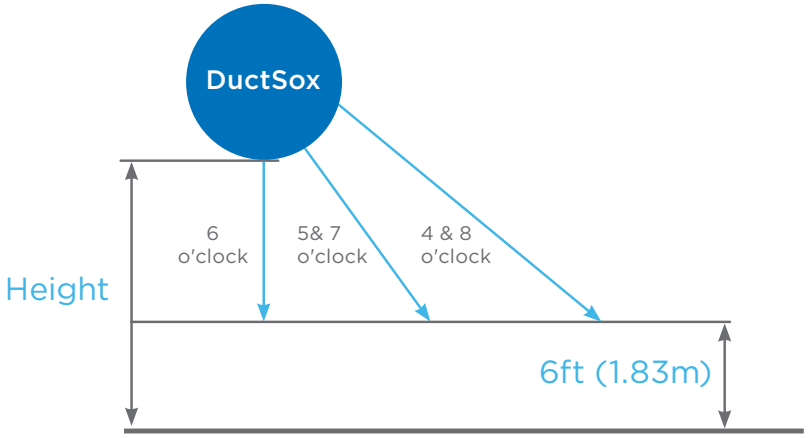
4 & 8 o'clock:	(Height – 6ft) x 2.00 = Throw required	(Height – 1.83m) x 2.00 = Throw required
4:30 & 7:30:	(Height – 6ft) x 1.41 = Throw required	(Height – 1.83m) x 1.41 = Throw required
5 & 7 o'clock:	(Height – 6ft) x 1.16 = Throw required	(Height – 1.83m) x 1.16 = Throw required
6 o'clock:	(Height – 6ft) x 1.00 = Throw required	(Height – 1.83m) x 1.00 = Throw required

11&1, 10&2, and 3&9 o'clock

Primarily chosen for only cooling or ventilating, these orientations either direct the exiting air upward and/or outward from the DuctSox. Throw requirements focus on reaching the exterior walls or filling the gaps between parallel runs.

Notes: It is recommend to not place vents closer than 1 full o'clock of each other as the air throws can entrain and may create longer throws.

Unable to vent at locations where the suspension is attached. (i.e. 3 row suspension would not allow for venting at 10, 12 and 2 o'clock)



Linear Vents: Performance Table

Linear Vents were developed as a low maintenance vent option. The hole patterns grow larger as vent size increases. Available in 1 CFM per ft (1.55 (L/s)/m) increments for maximum accuracy.

1. Calculate airflow through fabric
2. Calculate total vent size (TVS)
3. Select vent sizes (VS + VS = TVS)
4. Specify vent orientation

$$Q_{vent} = Q_{Total} - Q_{Fabric}$$

Key:
Length (FT)(m)
AP (inch w.g.)(Pa)
Q_{vent} (CFM)(L/s)

Example:
TVS = 100 cfm/ft (154.8(L/s)/m)

Vent Sizes:
40 + 40 + 20 = 100 cfm/ft
(61.9 +61.9+ 31.0= 154.8(L/s)/m)

I-P VERSION

$$TVS = \frac{Q_{Vent}}{(Length) \times \sqrt{(AP/0.5)}}$$

SI VERSION

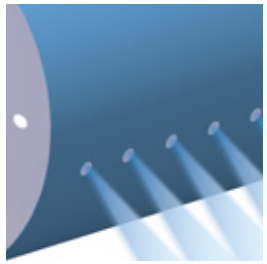
$$TVS = \frac{Q_{Vent}}{(Length) \times \sqrt{(AP/24.42)}}$$

I-P AND SI VERSION

TVS = (VS1+VS2+...)

Vent Size	Average Pressure		Airflow		Terminal Velocity					
					150 fpm	0.8 m/s	100 fpm	0.5 m/s	50 fpm	0.3 m/s
	in w.g.	Pa	CFM/lnft	(L/s)/m	ft	m	ft	m	ft	m
5	0.25	62	3.5	5.42	4	1.2	5	1.5	9	2.7
	0.5	125	5	7.74	5	1.5	8	2.4	12	3.7
	0.75	187	6.1	9.45	6	1.8	9	2.7	15	4.6
	1	249	7.1	10.99	7	2.1	11	3.4	17	5.2
10	0.25	62	7.1	10.99	6	1.8	9	2.7	15	4.6
	0.5	125	10	15.49	9	2.7	13	4.0	21	6.4
	0.75	187	12.2	18.89	11	3.4	16	4.9	26	7.9
	1	249	14.1	21.83	12	3.7	19	5.8	30	9.1
15	0.25	62	10.6	16.41	8	2.4	12	3.7	18	5.5
	0.5	125	15	23.23	11	3.4	16	4.9	26	7.9
	0.75	187	18.4	28.49	13	4.0	20	6.1	32	9.8
	1	249	21.2	32.83	15	4.6	23	7.0	37	11.3
20	0.25	62	14.1	21.83	9	2.7	14	4.3	22	6.7
	0.5	125	20	30.97	13	4.0	20	6.1	31	9.4
	0.75	187	24.5	37.94	16	4.9	24	7.3	38	11.6
	1	249	28.3	43.82	18	5.5	28	8.5	44	13.4
30	0.25	62	21.2	32.83	12	3.7	18	5.5	29	8.8
	0.5	125	30	46.46	17	5.2	26	7.9	41	12.5
	0.75	187	36.7	56.83	21	6.4	31	9.4	50	15.2
	1	249	42.4	65.66	24	7.3	36	11.0	58	17.7
40	0.25	62	28.3	43.82	15	4.6	22	6.7	36	11.0
	0.5	125	40	61.94	21	6.4	31	9.4	50	15.2
	0.75	187	49	75.88	26	7.9	39	11.9	62	18.9
	1	249	56.6	87.65	30	9.1	45	13.7	71	21.6
50	0.25	62	35.4	54.82	18	5.5	26	7.9	42	12.8
	0.5	125	50	77.43	24	7.3	33	10.1	60	18.3
	0.75	187	61.2	94.77	30	9.1	46	14.0	73	22.3
	1	249	70.7	109.48	35	10.7	53	16.2	84	25.6
60	0.25	62	42.4	65.66	19	5.8	28	8.5	45	13.7
	0.5	125	60	92.91	26	7.9	39	11.9	63	19.2
	0.75	187	73.5	113.82	32	9.8	48	14.6	77	23.5
	1	249	84.9	131.47	37	11.3	56	17.1	89	27.1

Orifices: Performance Table



Airflow throw by orifice size & pressure, up to 150 ft (45720mm). Orifice size and orientation based on required air throw distance

Select orifice size and orientation based on throw that best fits the environment. Lower pressures result in improved efficiency, lower noise, and extended service life.

To calculate the total number of orifices, divide airflow volume by the airflow per orifice (listed CFM).

NOTE: Grommets for Sedona-Xm and Verona are only available in 2in (51mm) and 3in (76mm) diameters. Grommets are required for porous fabrics when longer throws are desired.

Unless customized spacing is required, the orifice spacing is determined by evenly spacing the orifices along the length of the DuctSox system. All systems include a standard 2 ft (0.61m) void (no orifices) near the beginning.

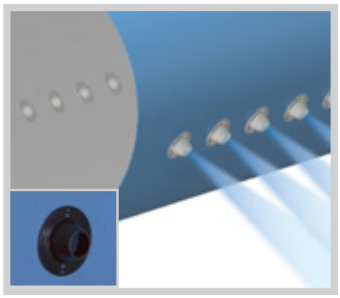
If there are too many orifices to fit within the length, then an alternating orifice pattern may have to be chosen.

Vent Size		Average Pressure		Airflow		Terminal Velocity					
						150 fpm	0.8 m/s	100 fpm	0.5 m/s	50 fpm	0.3 m/s
in	mm	in w.g.	Pa	CFM/lnft	(L/s)/m	ft	m	ft	m	ft	m
0.5	12.7	0.25	62	1.64	2.54	3	0.9	4	1.2	8	2.4
		0.5	125	2.32	3.59	4	1.2	6	1.8	11	3.4
		0.75	187	2.84	4.40	5	1.5	7	2.1	14	4.3
		1	249	3.27	5.06	5	1.5	8	2.4	16	4.9
		1.25	311	3.67	5.68	6	1.8	9	2.7	18	5.5
1	25.4	0.25	62	6.56	10.16	5	1.5	8	2.4	16	4.9
		0.5	125	9.28	14.37	8	2.4	11	3.4	23	7.0
		0.75	187	11.37	17.61	9	2.7	14	4.3	28	8.5
		1	249	13.12	20.32	11	3.4	16	4.9	32	9.8
		1.25	311	14.67	22.72	12	3.7	18	5.5	36	11.0
2	50.8	0.25	62	26.25	40.65	11	3.4	16	4.9	32	9.8
		0.5	125	37.12	57.48	15	4.6	23	7.0	45	13.7
		0.75	187	45.46	70.40	19	5.8	28	8.5	56	17.1
		1	249	52.49	81.28	21	6.4	32	9.8	64	19.5
		1.25	311	58.69	90.88	24	7.3	36	11.0	72	21.9
2.5	63.5	0.25	62	41.01	63.51	13	4.0	20	6.1	40	12.2
		0.5	125	58	89.82	19	5.8	28	8.5	57	17.4
		0.75	187	71.03	109.99	23	7.0	35	10.7	69	21.0
		1	249	82.02	127.01	27	8.2	40	12.2	80	24.4
		1.25	311	91.7	142.00	30	9.1	45	13.7	90	27.4
3	76.2	0.25	62	59.06	91.46	16	4.9	24	7.3	48	14.6
		0.5	125	83.52	129.34	23	7.0	34	10.4	68	20.7
		0.75	187	102.29	158.40	28	8.5	42	12.8	83	25.3
		1	249	118.11	182.90	32	9.8	48	14.6	96	29.3
		1.25	311	132.06	204.50	36	11.0	54	16.5	108	32.9
4	101.6	0.25	62	104.99	162.58	21	6.4	32	9.8	64	19.5
		0.5	125	148.48	229.93	30	9.1	45	13.7	91	27.7
		0.75	187	181.85	281.60	37	11.3	56	17.1	111	33.8
		1	249	209.98	325.17	43	13.1	64	19.5	128	39.0
		1.25	311	234.76	363.54	48	14.6	72	21.9	144	43.9
5	127	0.25	62	164.05	254.04	27	8.2	40	12.2	80	24.4
		0.5	125	232	359.27	38	11.6	57	17.4	113	34.4
		0.75	187	284.14	440.01	46	14.0	69	21.0	139	42.4
		1	249	328.09	508.07	53	16.2	80	24.4	160	48.8
		1.25	311	366.82	568.04	60	18.3	90	27.4	179	54.6

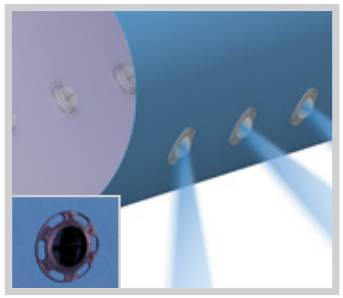
Nozzles: Performance Tables

Provides jet-type airflow. Type, location, and quantity based on airflow requirements.

Available in a variety of colors.



Fixed Nozzles



Adjustable Nozzles

Fixed Nozzles: 1in diameter (25.4mm)

Average Pressure		Airflow		Throw					
				150 fpm	0.76 m/s	100 fpm	0.51 m/s	50 fpm	0.25 m/s
In w.g.	Pa	CFM/ lnft	(L/s)/m	ft	m	ft	m	ft	m
0.25	62.21	4.90	2.31	5	1.5	7	2.1	14	4.3
0.50	124.42	6.90	3.26	7	2.1	10	3.0	20	6.1
0.75	186.63	8.50	4.01	8	2.4	12	3.7	24	7.3
1.00	248.84	9.70	4.58	9	2.7	14	4.3	28	8.5
1.25	311.05	10.90	5.14	10	3.0	15	4.6	31	9.4

Adjustable Nozzles: 2in diameters (51mm)

Average Pressure		Airflow		Throw					
				150 fpm	0.76 m/s	100 fpm	0.51 m/s	50 fpm	0.25 m/s
In w.g.	Pa	CFM/ lnft	(L/s)/m	ft	m	ft	m	ft	m
0.25	62.21	23.28	10.99	10	3.0	15	4.6	30	9.1
0.50	124.42	32.92	15.54	14	4.3	21	6.4	43	13.1
0.75	186.63	40.32	19.03	17	5.2	26	7.9	52	15.8
1.00	248.84	46.56	21.98	20	6.1	30	9.1	61	18.6
1.25	311.05	52.06	24.57	23	7.0	34	10.4	68	20.7

Adjustable Nozzles: 3in diameters (76.2mm)

Average Pressure		Airflow		Throw					
				150 fpm	0.76 m/s	100 fpm	0.51 m/s	50 fpm	0.25 m/s
In w.g.	Pa	CFM/ lnft	(L/s)/m	ft	m	ft	m	ft	m
0.25	62.21	58.43	27.58	16	4.9	24	7.3	48	14.6
0.50	124.42	82.62	39.00	23	7.0	34	10.4	68	20.7
0.75	186.63	101.19	47.76	28	8.5	42	12.8	83	25.3
1.00	248.84	116.85	55.15	32	9.8	48	14.6	96	29.3
1.25	311.05	130.66	61.67	36	11.0	54	16.5	108	32.9

Friction Loss (FL)

Similar to metal ducts, fabric air dispersion systems have frictional loss (FL) along straight sections of duct and fittings. The losses, however, are much less than a traditional metal layout with duct diameters that decrease with reducing transitions due to lower overall duct air velocities. FL is directly related to the duct diameter and duct velocity. As the air is dispersed along the constant diameter duct length, the duct velocity decreases and thus the FL decreases.

Straight Friction Loss

To estimate FL of an incremental section of a textile air dispersion system that is uniformly dispersing 100% of the inlet air throughout its length, use the following steps:

1. Find the FL of the straight section of duct with 100% of airflow passing through the entire length. An air duct calculator (Ductulator), the ASHRAE Duct Fitting Database, or commonly used equations for metal duct in the ASHRAE Fundamentals Handbook, chapter 21: Duct Design, can be used. [fabric air dispersion system absolute roughness e = 0.0004 ft (0.11 mm), fabric air dispersion systems with SkeleCore FTS internal frame absolute roughness e = 0.0056 ft (1.69 mm)]

2. Multiply the calculated FL for a duct with 100% conveyance by a factor of 0.35 to find the FL for a system that disperses 100% of the incoming air. 35% of the FL is a close approximation to convert the FL of a duct with zero air dispersion to a duct that has 100% uniform air dispersion.

Example: A 24in (610 mm) diameter duct conveying 5025 CFM (2371 L/s) of air will have a friction loss of 0.06in w.g. (15 Pa) per 50ft (15m) of duct. A fabric air dispersion system that is equally dispersing all of the air over 50ft (15m) would have a friction loss of approximately 0.021in w.g. (5Pa). That same dispersion system with the SkeleCore FTS has a friction loss of approximately 0.035in w.g. (9Pa).

Fitting Friction Loss

The friction loss of DuctSox fabric fittings can be best estimated by selecting the closest match of metal fittings from the ASHRAE Duct Fitting Database and using that pressure loss.

The AFD pressure loss, when used to balance out the effects of static regain, needs to be estimated by multiplying the SPR by 0.5. So, if your system being designed has an inlet velocity of 1400 fpm (7.1 m/s), then the SPR is equal to (1400/4005)2 = 0.12in w.g. [(7.1/1.291) 2 = 30 Pa]. The estimated FL for the AFD is then 0.12/2 = 0.06in w.g. (30/2 =15 Pa).

Static Air Pressure Calculation

The Average Pressure (AP) is the average static pressure from inlet to endcap and is utilized for calculating the air dispersion through fabric, linear vents, nozzles and orifices. The AP of a fabric duct with equal air dispersion can be approximated by the equation:

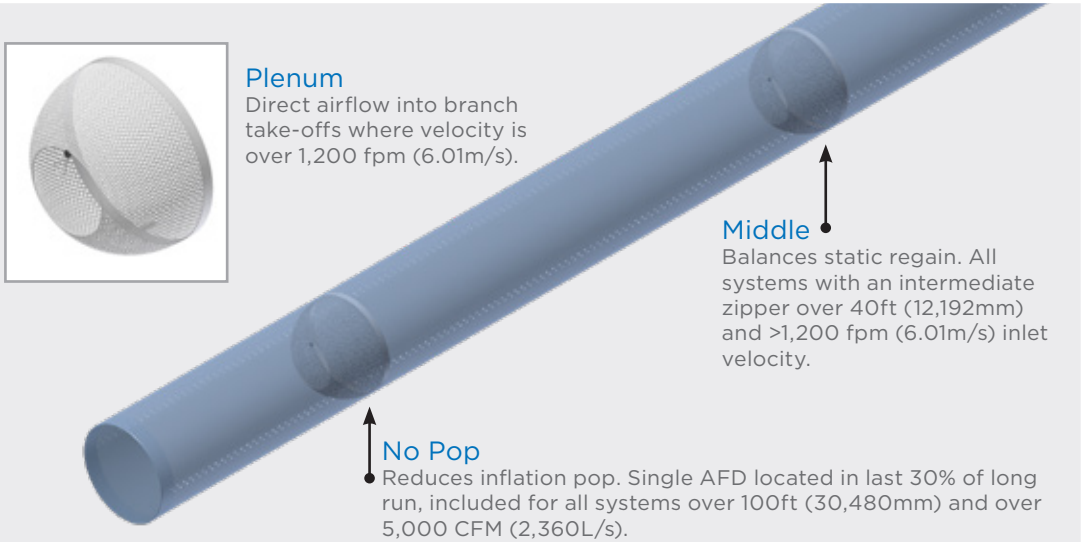
AP = ISP + .65 * (VP – FL)

If the Inlet Static Pressure (ISP) and Static Pressue Regain (SPR) are added and Friction Loss (FL) subtracted, the resulting number will be the accumulated static pressure at the endcap. In most cases, the maximum static pressure of the system:

Endcap SP = Maximum SP = ISP + SPR - FL

Adjustable Flow Device (AFD)

Airflow control is critical in HVAC air dispersion. The patented zip-in Adjustable Flow Device (AFD) offers variable resistance to balance static regain, balance airflow to branches, reduce turbulence, and reduce abrupt start-ups. AFDs are preset from the factory and can be custom adjusted in the field to meet system performance requirements.



Typically, systems should not include more than three AFDs in sequence to an endcap

Sound Data

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 15ft diffuser section with the specified air outlets was evaluated.

See page D41 for testing results

Sound Testing Results

Noise Criteria (NC)					
Dispersion Option	Quantity / Linear Vent Size	Inlet Static Pressure			
		0.25in w.g.	0.50in w.g.	0.75in w.g.	1.0in w.g.
2 inch Orifices	Quantity: 16	20	32	37	40
3 inch Orifices	Quantity: 7	18	29	36	39
2 inch Adjustable Nozzles	Quantity: 9	32	42	46	52
	Quantity: 19	35	44	49	53
1 inch 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

The DuctSox Approach

DuctSox provides unique cost-effective ventilation solutions through a process that is:

Responsive > Consultative > Adaptable

For more information, go to www.ductsox.com or call us at 1-866-382-8769.

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