



FABRIC DUCTING&DIFFUSERS

Technical data

Contents

1. OPERATION OF FABRIC DUCTING & DIFFUSERS	3
1.1. Air Outlet from a Diffuser	3
1.2. Air Entry into Negative Pressure (extract) Ducting	6
1.3. Air Transfer Ducting	6
2. PRIMARY CHARACTERISTICS OF PRIHODA PRODUCTS	7
2.1. Cross Section	7
2.2. Dimension	8
2.3. Length	8
2.4. Pressure	9
2.5. Type of Endings	9
3. INSTALLATION	10
4. DESIGN FEATURES	12
4.1. Products for special use	12
Membrane Diffuser	
Negative Pressure Ducting	
Insulated Ducting	
Double ducting	
Defrost Damper	
Antistatic Design	
Combined Halfround Section	
4.2. Solutions for large ranges of air currents	15
Small Nozzles	
Big Nozzles	
4.3. Products with configurable parameters	16
Adjustable Length Fabric Duct	
Adjustable Arch	
Adjustable Perforation	
Moveable Adapter	
Air Diffuser Lantern	
4.4. Solutions of problems with air flows	18
Equalisers	
Pockets	
Damper	
Diffuser for Intensive Cooling	
Antideflector	
4.5. Appearance improvement	20
Tensioner in the profile	
End Tensioning	
Arcs	
Tyres	
Internal tensioning system	
Printing	
Office design	
4.6. Mounting simplification	22
Winch	
5. MATERIAL	23
5.1. Important Benefits	23
5.2. How to Choose a Suitable Fabric	24
6. MAINTENANCE AND WARRANTY	25
7. EXAMPLES OF APPLICATIONS	26
8. FREQUENTLY ASKED QUESTIONS	29
9. 5+5+5	31

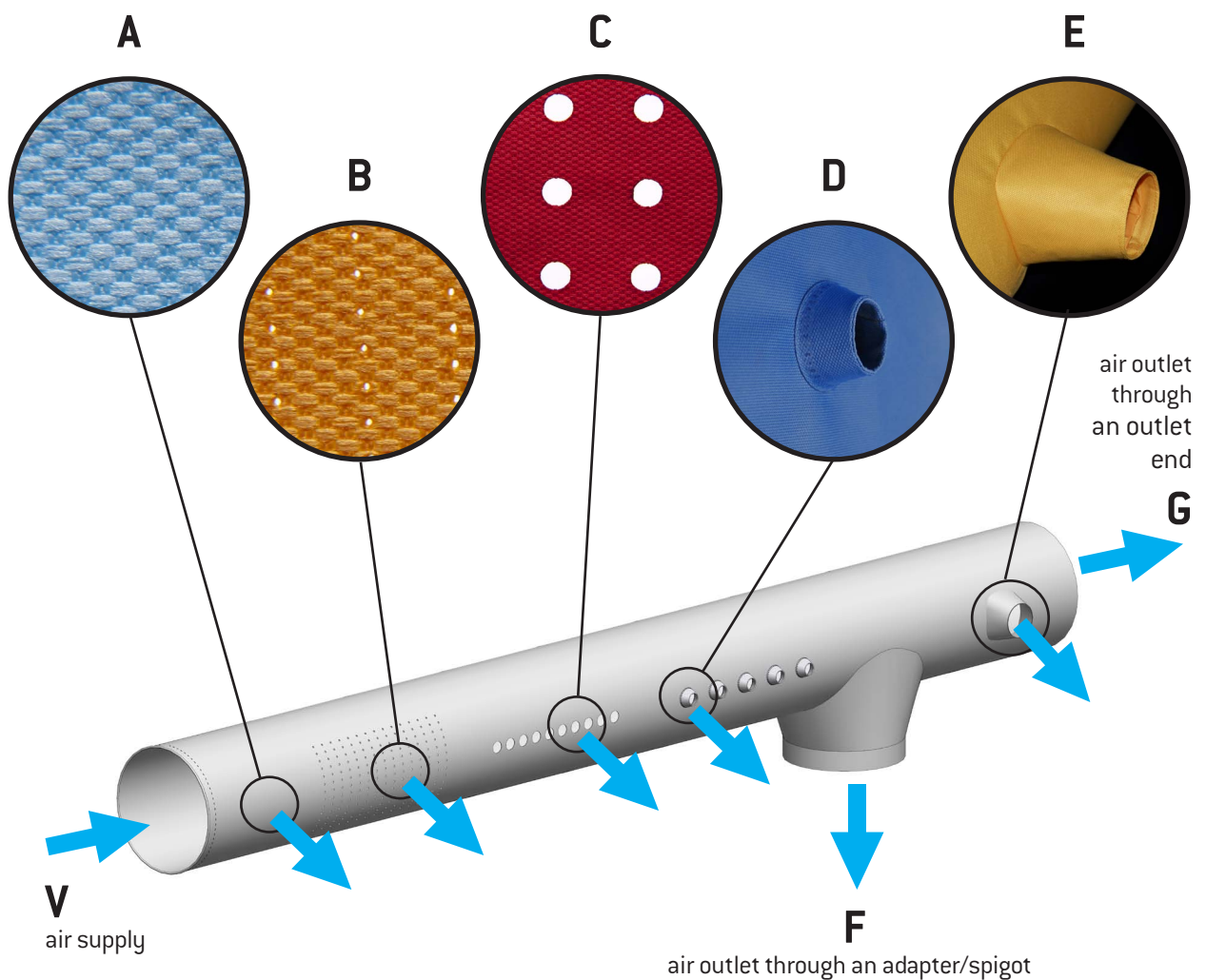
1. Operation of Fabric Ducting & Diffuser

Prihoda products are usually acting as both supply air ducting (air transfer) as well as air distribution/diffusion into the occupied zone. We supply both types of system, (1) positive pressure distribution systems (supply air) and (2) negative pressure (extract /return air) ducting for exhausting air from rooms.

1.1. Air Outlet from a Diffuser

Supply air [see V below] flowing into the diffuser through either end or an inlet spigot, can exit the diffuser in any of the following methods:

- A - through the permeable fabric material
- B - through microperforations – either 0.2 mm or 0.4 mm laser cut holes in the fabric
- C - through perforations – laser cut holes with a diameter greater than 4 mm
- D - through small fabric nozzles
- E - through big fabric nozzles
- F - through an adapter/outlet spigot – air is diverted to another system/area
- G - through an outlet end – air leads to another system/area



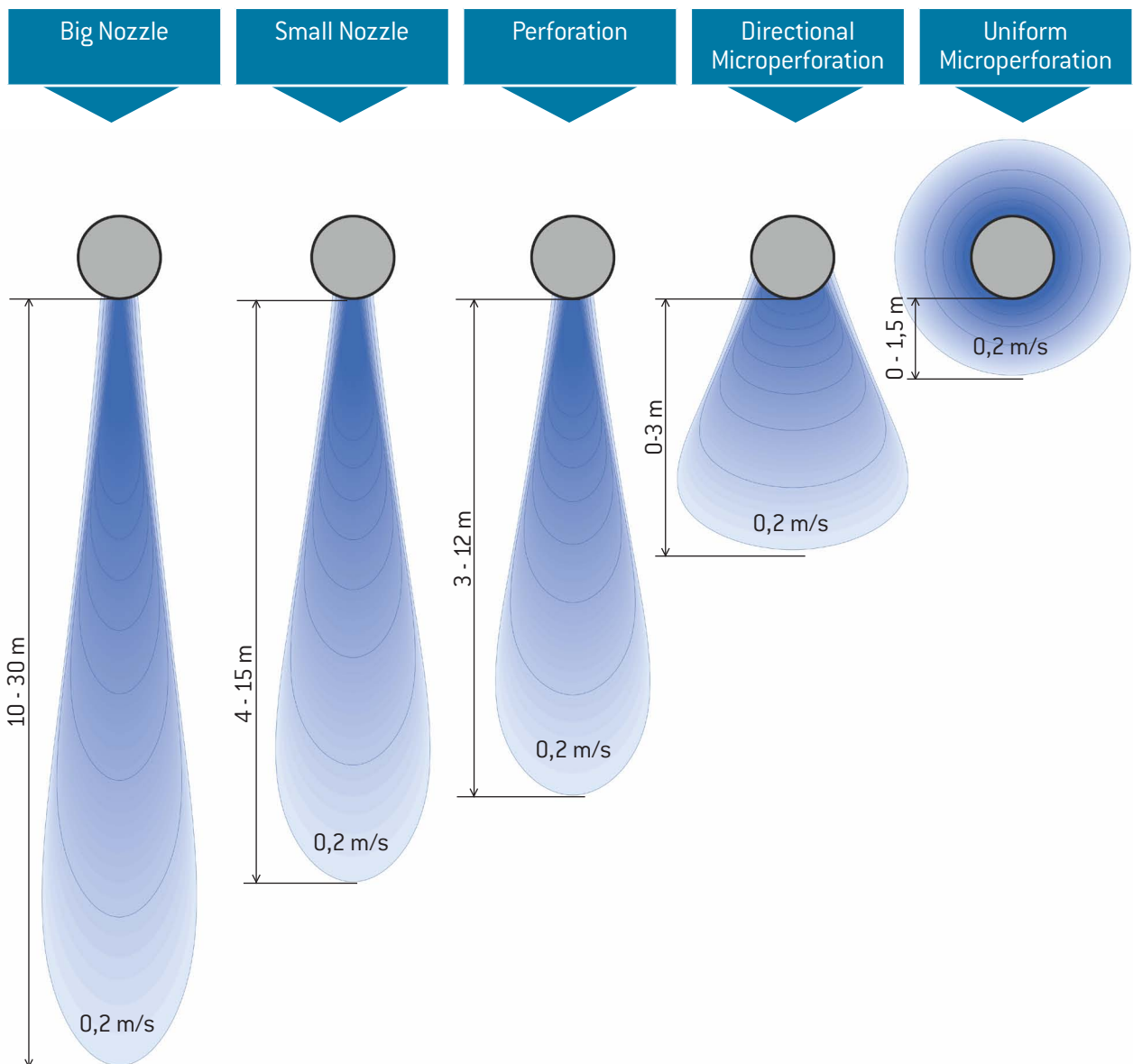
It always holds true that: $V = A + B + C + D + E + F + G$

(certain values of A, B, C, D, E, F, G may be zero)

Supply air is delivered through fabric diffusers using almost any diameter of laser cut perforation in any position on the duct circumference. This combination of any size and position of perforations provides an almost infinite number of design variations. The range of possibilities begins with low velocity diffusion and continues up to long-distance targeted air supply. Small perforations with a diameter of 0.2 or 0.4 mm, which we refer to as microperforations, are designed mainly for use as low velocity air diffusion. We use a series of 4 mm diameter or larger holes, which we call perforations, to provide directed air supply. When calculating the air travel distance, the supply air to room temperature difference must be considered.

Fabric Diffusers are a universal air distribution tool and cover the entire range of air delivery patterns. We achieve the requested air distribution by selecting the correct air outlet method. We can combine the air outlet methods on a single diffuser duct in any pattern or ratio we wish.

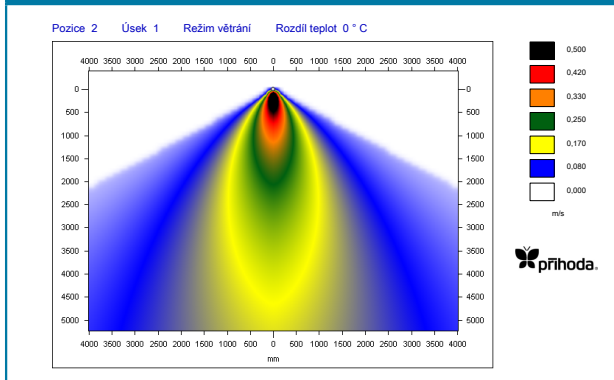
Airflow Travel Distance from Fabric Diffusers



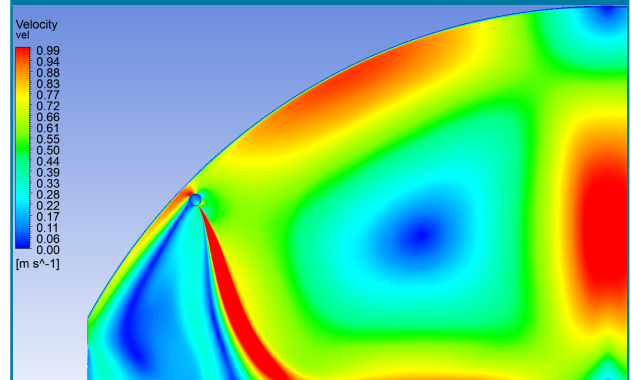
Travel distance varies depending upon available static pressure and temperature difference.

The air velocity at various distances from the diffuser can be calculated by our 'in house' design software which is being constantly refined and takes into account all associated design influences. These include specifically, positive pressure in the diffuser, position and dimensions of outlet openings, and temperature difference. In cases where the air velocity cannot be reliably calculated by the software (due to complex interaction of multiple air flows for example) we can provide these calculations by means of our Fluent software.

Airflow patterns created by PRIHODA design software

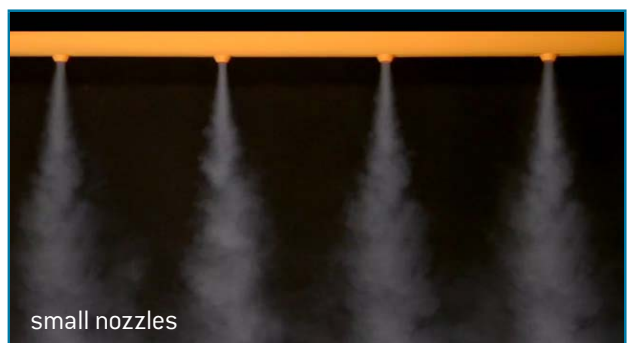
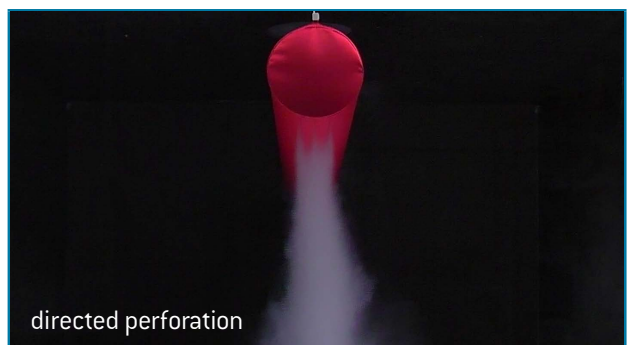


Airflow pattern created by Prihoda using Fluent Software



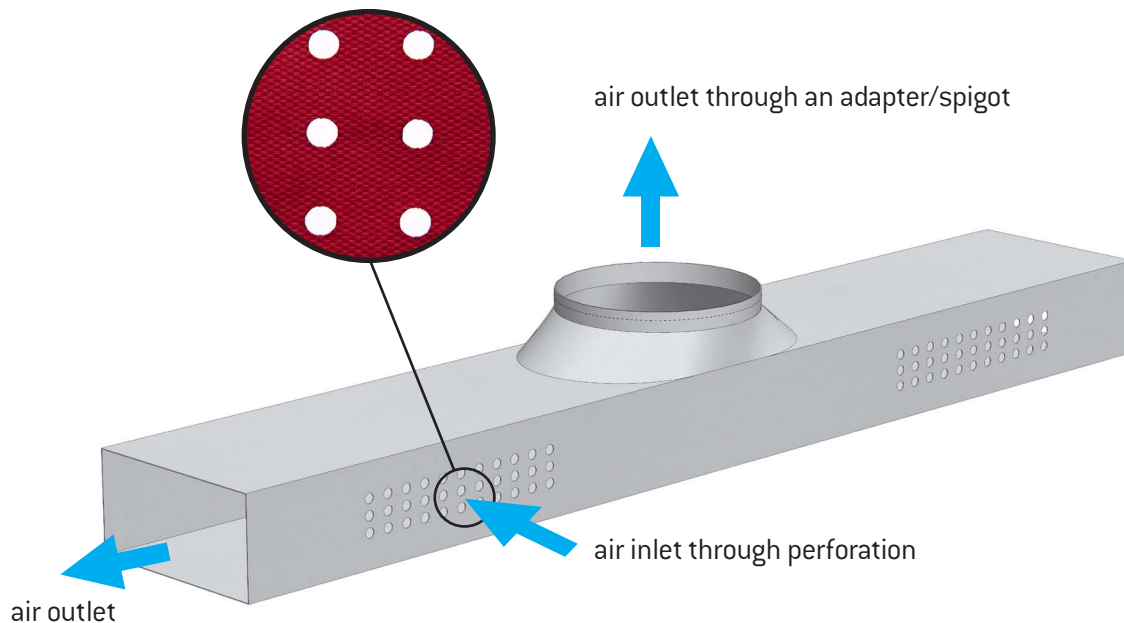
In general, Prihoda Fabric Diffusers operate at similar air flow velocities to traditional ducting. The maximum speed within the duct is dictated by aerodynamic noise in relation to the place of use. A further velocity limitation may be needed due to flow turbulence, which can cause vibration of the fabric. Specific conditions of flow, static pressure and weight of the fabric used must be taken into account.

Examples of airflow patterns created using smoke tests in the PRIHODA R&D centre



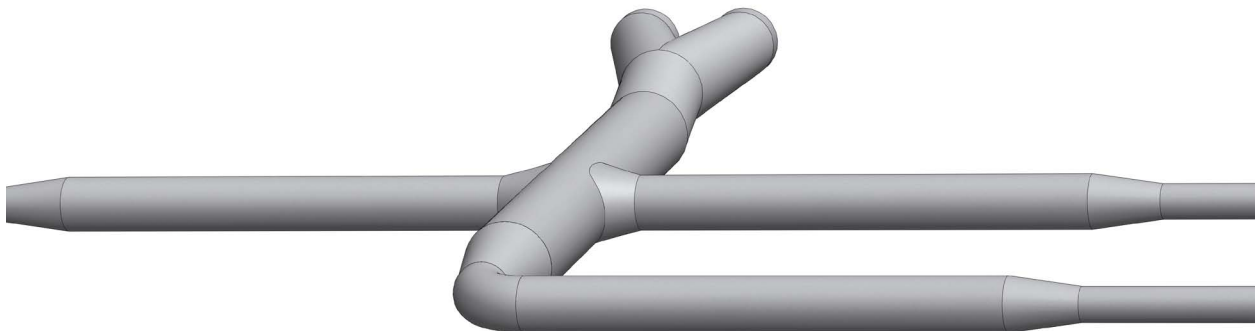
1.2. Air Entry into Negative Pressure (extract) Ducting

Perforations are used to allow extract air into negative pressure ducting.



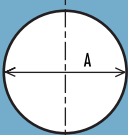
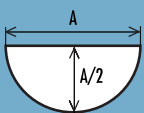
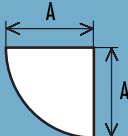
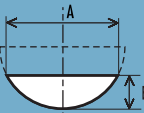
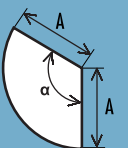
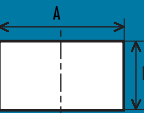
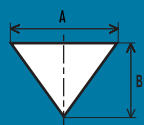
1.2. Air Transfer Ducting

Ducting made from impermeable fabric or insulated ducting transports air to the destination WITHOUT diffusion. We have the technical ability to design and manufacture, branches, bends and other fittings for any situation.



2. Primary Characteristics of Prihoda Products

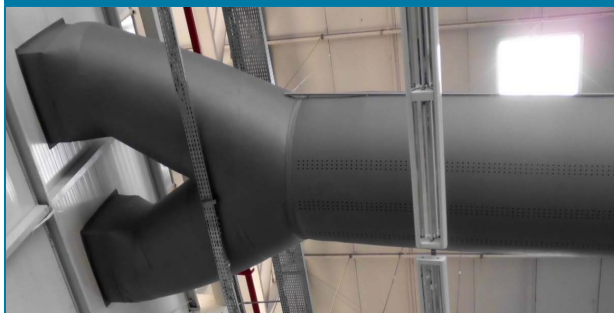
2.1. Cross Section

POSITIVE PRESSURE ONLY	C	CIRCULAR		The standard shape, easy maintenance, preferentially recommended.
	H	HALF-ROUND		For use where there is not enough space for circular diffuser and aesthetic applications.
	Q	QUARTER-ROUND		For use where there is not enough space for circular diffuser, in aesthetic applications and if the diffuser is to be installed in the corner of a room.
	SG	SEGMENT		For use where there is not enough height for a half-round diffuser.
	SC	SECTOR		Available If the room corner construction requires a different shape to quarter round.
OVER PRESSURE AND NEGATIVE PRESSURE	S	SQUARE		This shape requires a special suspension structure (provided) to clamp and support all corners.
	T	TRIANGULAR		The triangular shape is maintained by placing a heavy weight at the bottom of the duct to maintain tension on the walls of the material.

We also make fabric transitions to adapt and join different shapes together.

In the case of Square and Triangular ducts the shape partially deforms upon duct inflation, due to positive pressure or negative pressure and the flexibility of the material.

Connecting of diffuser to air inlet



Half-round diffuser



2.2. Dimension

We manufacture fabric ducting and diffusers of all dimensions from 100 mm to 2000 mm, each designed to specific requirements. The duct inlets and connection spigots are always manufactured 10–15 mm larger than the specified size / diameter for ease of connection.

Standard manufacturing dimensions (other sizes are available):

100, 125, 160, 200, 250, 315, 400, 500, 630, 710, 800, 900, 1 000, 1 120, 1 250, 1 400, 1 600, 1 800, 2 000

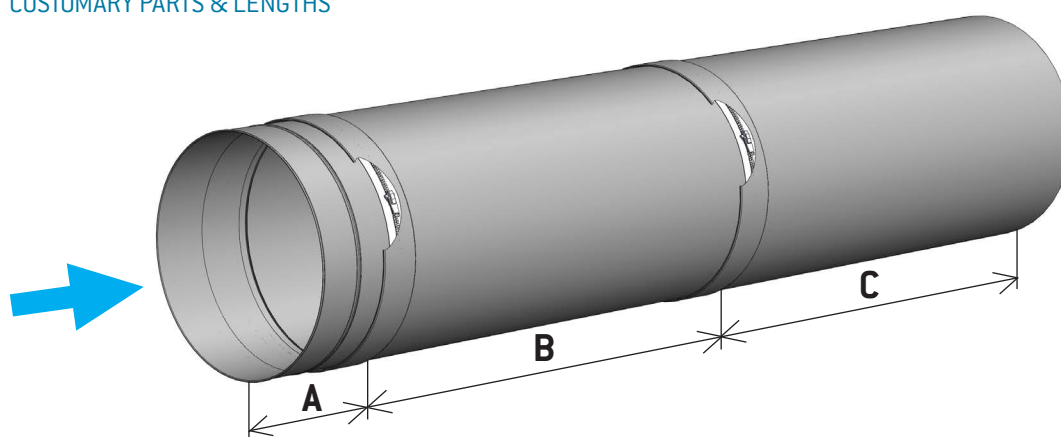
Shape	Dimension (values A,B)
circular	diameter (A)
half-round	diameter (A)
quarter-round	radius (A)
segment	width, height (A,B)
sector	radius (A)
square	length of edges (A,B)
triangular	base, height (A,B)

2.3. Length

Determining the length of Fabric Ducting & Diffusers depends primarily on the availability of space.

We can manufacture a fabric diffuser to deliver the same air volume whether the duct is short or long, the precise design depends on the material type, perforation designs and system pressure.

CUSTOMARY PARTS & LENGTHS



A - Beginning (edge /zip) – length 100 mm - 200 mm

B - Continuous part (zip/zip) – length 5000 mm –10000 mm, these are multiplied to create the correct duct length

C - Blind part (zip/end) – length from 100 mm to 11000 mm

- Individual parts are connecting with zippers; the number of zippers (or the distance between them) is flexible and can be specified by the customer.

- Only the overall length in mm (A + B + C) is provided in the specification, the ducting and diffusers are separated into segments during production.

Long circular diffusers



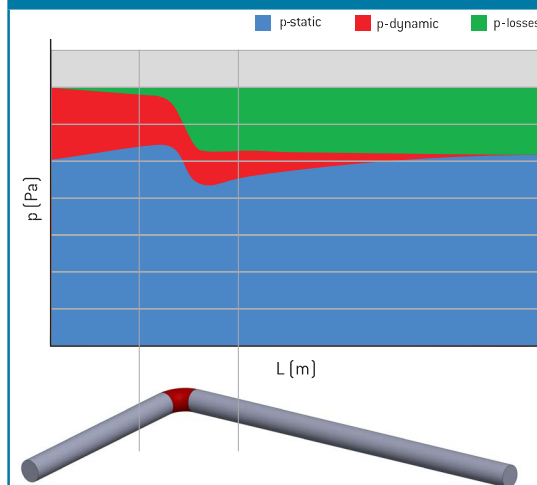
Short diffusers „segment“



2.4. Pressure

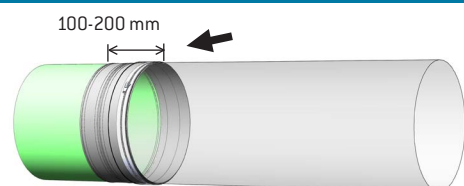
Pressure losses of Fabric Ducting & Diffusers are very similar to those in the traditional ducting. Calculating a more complex fabric distribution system is achieved using similar methods to those for sheet metal ducting. The minimum static pressure necessary to keep the correct shape of a Fabric Duct or Diffuser depends upon the weight of the fabric used. A minimum of 20 Pa is sufficient for light materials and 50 Pa necessary for medium and heavy ones. The pressure distribution along Fabric Diffusers is different from traditional sheet metal ducting because with declining airflow longitudinal velocity decreases. To verify the design of your fabric distribution system, please contact us.

Pressure distribution in a Fabric Diffuser

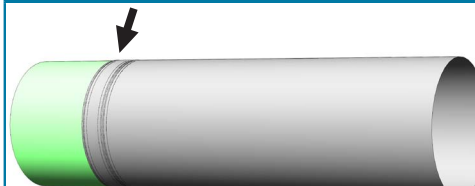


2.5. Types of Ending

F BEGINNING (WITH ZIP)



H HEM (WITHOUT ZIP)



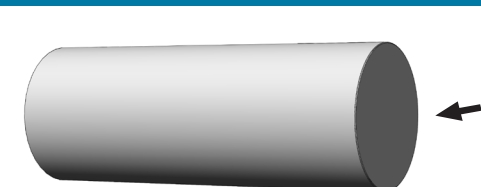
WOUT OUTER WING



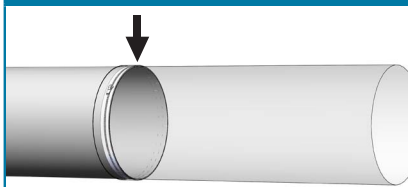
WIN INNER WING



B BLANK END








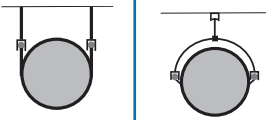





Z ZIP



S STITCHED



3. Installation

Installation no.	Cross section view	Type of suspension	Additional accessories designation [see overview chart below]	
0	without mounting material and hooks or enlarged strips			
1		wire	D, F, K, M	
2		wire	D, F, K, M	
3		profile, velcro	A, B, C, G, J, L, H	
4		profile	B, C, G	
5		suspended profile	A, B, C, G, I, D, E, F, K, L, M	
6		suspended profile	A, C, G, I, D, E, F, K, L, M	N
7		tensioner	D, F, H can be added to all other installation types	
8		profiles, velcro	A (always used for triangular shaped ducts), B, C, G, L, H, J	
9		profiles	A, D, E, F, K, L, M	
10		profiles	A, L	
11		profiles	A, E, K, L, M	

<p>Hook</p> 	<p>Aluminium profile</p> 	<p>Plastic coated wire (galv.) and galvanized mounting material</p> 
<p>Enlarged strip [A]</p>  <p>A</p>	<p>Plastic profile [B]</p>  <p>B</p>	<p>Aluminium profile with hangers [C]</p>  <p>C</p>
<p>Plastic coated wire (galv., stain.) and stainless mount. m. [D, F]</p>  <p>D, F</p>	<p>Threaded bar [E]</p>  <p>E</p>	<p>Profile connectors</p> 
<p>Stainless profile [G]</p>  <p>G</p>	<p>Tensioner at blank end [H]</p>  <p>H</p>	<p>Reinforced aluminium profile [I]</p>  <p>I</p>
<p>Velcro [J]</p>  <p>J</p>	<p>Galvanized chain [K]</p>  <p>K</p>	<p>Screw tensioner in the profile [L]</p>  <p>L</p>
<p>Gripple hangers - upper parts [M]</p>  <p>M</p>	<p>Gripple hangers - lower part [M]</p>  <p>M</p>	<p>Arch hanger of profiles [N]</p>  <p>N</p>

4. Design Features

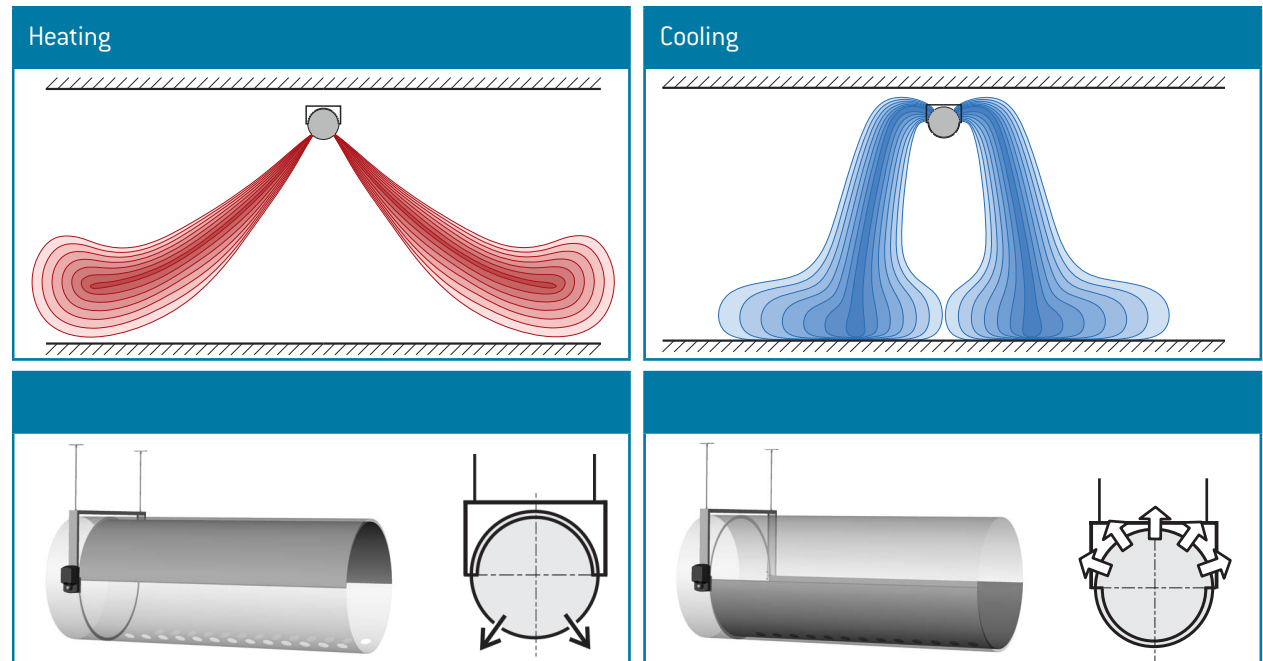
We offer a solution for every situation. Everything is tested by our qualified developers in a modern testing chamber. All products are custom-made and we are ready to meet your specific requirements for specific equipment or designs which are not listed here. Feel free to contact us.

4.1. Products for special use

Membrane Diffuser

Diffuser for two different supply air modes

This combines two types of diffuser into one. The membrane flap is a lightweight non permeable material sewn all along the duct length. The membrane is attached to a two position motor. In heating mode the motor moves the membrane to cover the cooling diffusers located at the top of the duct, the supply air exits the heating perforations on the bottom of the duct. In cooling mode the motor moves the membrane to cover the heating perforations at the bottom of the duct and the cool supply air leaves the perforations at the top of the duct. The membrane allows two totally different diffusion styles in one duct.

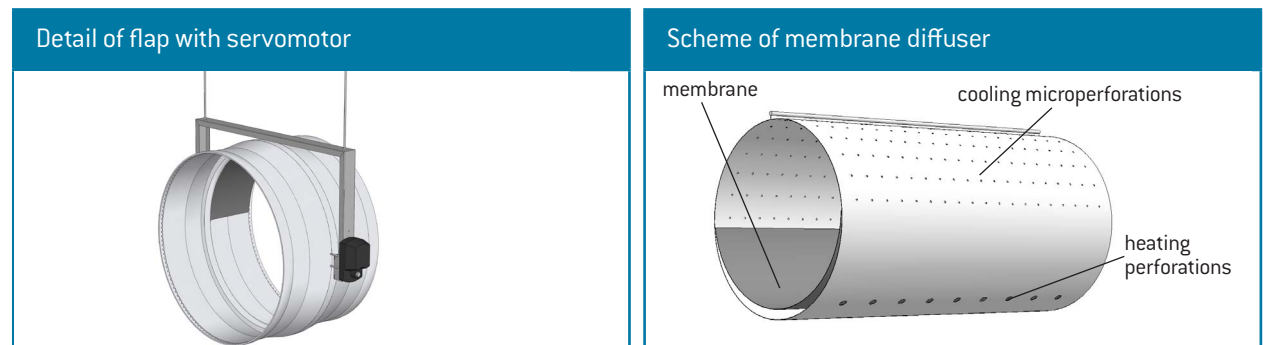


FLAP

Used for switching between the two modes. It is made from either standard or flame retardant material, depending upon the duct specification; the internal spigot and external frame are made from galvanized steel. The length is always 400 mm. The flap includes a 220 V or 24 V servo motor.

DIFFUSER

The membrane always covers one half of the diffuser and leaves the other open to supply air.



Negative Pressure Ducting

Fabric Ducting for removing air

We supply these only in square or triangular cross-sections. Because taught fabric is essential for extract ducting we tension the walls using a combination of suspension profiles, tensioning bolts and threaded bar. Air is drawn into the duct through perforations that can be positioned on any side and anywhere along the length of the duct. To ensure equal extract rates we can adjust the perforation diameters or the gaps between the perforations progressively along the duct. We anticipate our negative pressure ducts will be used where regular and/or thorough cleaning is required. Negative pressure fabric ducting is easily disassembled from the suspension system and unzipped into smaller washable parts. If the NMI material is used (containing a silver nanolayer), the ducting is antibacterial.

IMPORTANT NOTE: For fabrics NMS, NMI, NMR only

Square fabric negative pressure ducting with a stretching structure and a detail of possible cross sections

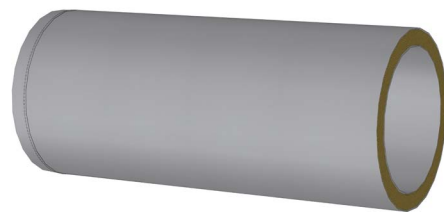


Insulated Ducting

Thermal insulation and noise dampener

Used for decreasing temperature loss during transfer of conditioned air to the diffusers. A 40mm thick, loose fibre, insulating polyester material is sewn between two layers of fabric ducting material. All of our fabric ducting materials are available for use as the outer layer of the insulated duct allowing an easy match with other parts of the system. The manufacturing process compresses the original 40 mm loose insulation layer by 20 mm, reducing the finished product wall thickness. The maximum duct heat transfer coefficient is $1.8 \text{ W/m}^2/\text{K}$. Insulated duct is manufactured as standard in 2000 mm zipped lengths and starts from $\varnothing 250 \text{ mm}$ upwards. Insulated ducting also acts as an excellent noise dampener, absorbing and reducing in duct noise vibration, contact us for specific details.

Insulated Ducting

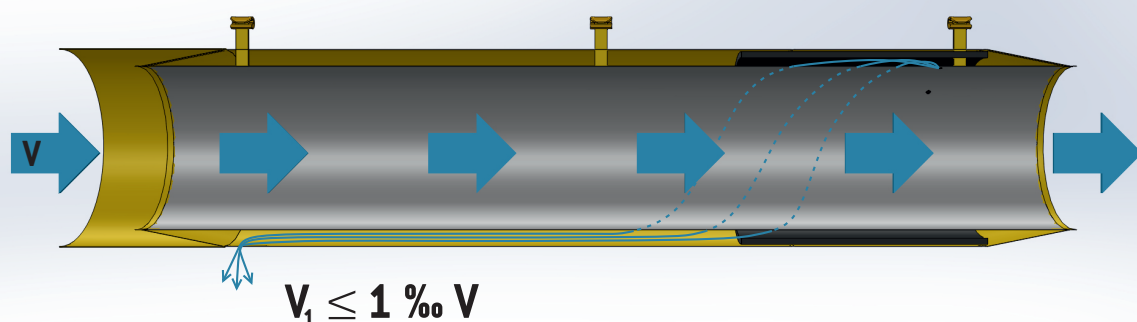


Double Ducting

Prevention of condensation

Condensation is mostly prevented by the use of double ducting. The interlayer is maintained in the correct position by a negligible flow of air (about 1 % of the ducting flow). The heat transfer coefficient reaches up to $3.5 \text{ W/m}^2/\text{K}$.

Principle of Double ducting

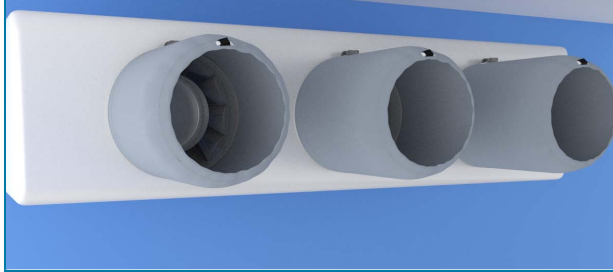


Defrost Damper

Faster and more efficient cooler defrosting

The Defrost Damper (DeDa) collapses over the evaporator fan face, blocking off the front of the cooler, this stops unwanted fan rotation and speeds up the process of defrosting. Made of NLW fabric, which ensures proper coverage of the cooler and has a hydrophobic treatment to prevent frosting.

Defrost Damper on a cooler with fans running [1]



Defrost Damper on a cooler with fans not running [2]



1. Whilst the fan runs the damper is open and supply air is flowing, although the air volume is slightly reduced by the damper. The precise reduction in volume depends upon the airflow curve of the fan and the construction of the damper.

2. When the fan stops, the damper deflates and hangs down over the fan spigot. This stops fan rotation, where moving air still passes through the cooler, rotating the fan blade, which creates a faster and more efficient defrost cycle.

3. There is an adjustable cord with a buckle at the end of damper, which allows for adjustment of the outlet diameter. During commissioning it is important to adjust the cord to balance the damper so that there is no vibration or movement, whilst trying to minimise pressure drop.

Detail of adjustable cord on the outlet [3]



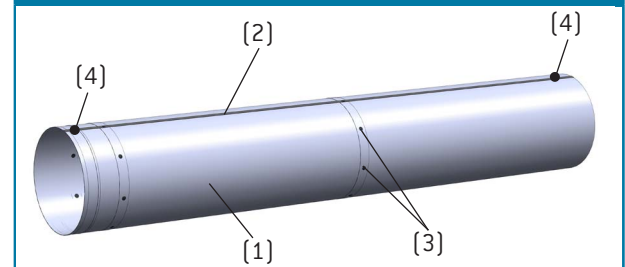
Antistatic Design

Antistatic design is intended for rooms, where a build up or uncontrolled discharge of static electricity must be avoided. Our Antistatic system consists of 4 measures:

1. A conductive fabric (PMI and NMI conform as we add a conductive weave)
2. A highly conductive strip installed all along the length of the duct
3. All zippers are equipped with metal joints
4. Earthing points at the ends of the duct

Removal of electrical energy build up

Antistatic duct design features

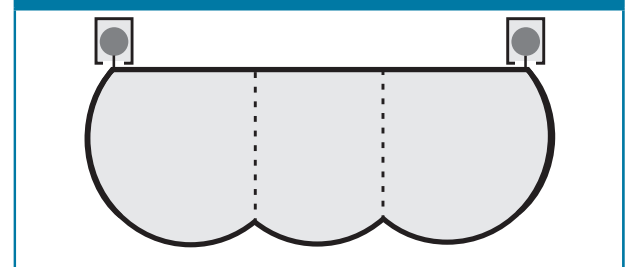


Combined half-round section

This is a combination of several half-round diffusers sewn together side-by-side. It enables higher air volumes with a relatively small duct height.

High flow rate at low diffuser height

Example of combined half-round section



4.2. Solutions for long airflow distance

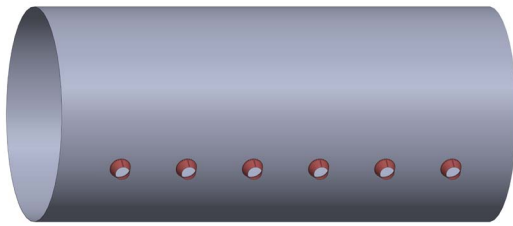
Small Nozzles

For directed air patterns and long airflow distance

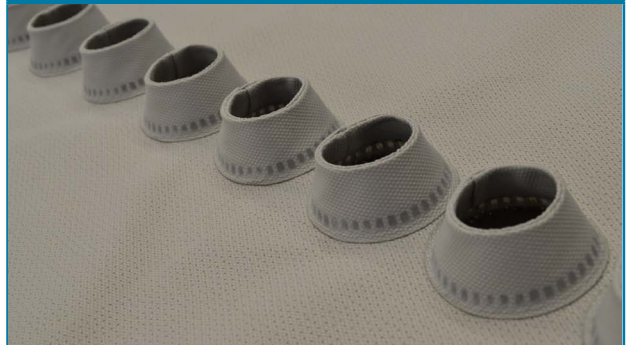
Small nozzles allow directed air patterns. Airflow is extended by circa 25 % in comparison to standard perforations and deflection minimized. The small nozzles exist in three diameters 20, 30 and 40 mm and in two variants, industrial and premium.

IMPORTANT NOTE: for fabric PMS, NMS, PMI, PMIre, NMI, NMR only

Typical arrangement of small nozzles on the diffuser



Row of small nozzles



Small nozzle - industrial



Small nozzle - premium

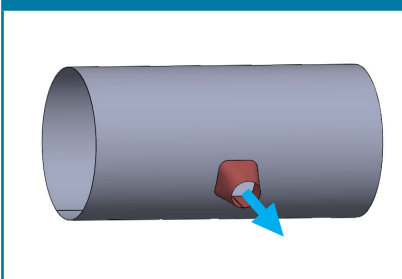


Big Nozzles

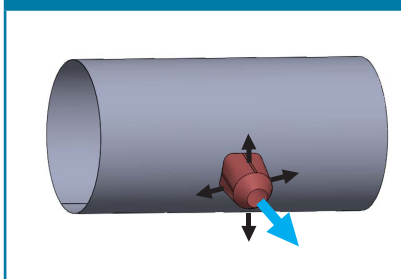
For Maximum airthrow distances

Our big nozzles (larger diameter) allow the longest airthrow distances. Range can exceed 20m depending upon static pressure and temperature difference. Nozzles can be fixed, adjustable or directed. Each of the nozzles has a very similar visual design; the adjustable nozzle may be directed as desired up to $\pm 45^\circ$ using four belts which are hidden beneath an aesthetic fabric hem. An adjustable damper is sewn into every nozzle to allow variable flows.

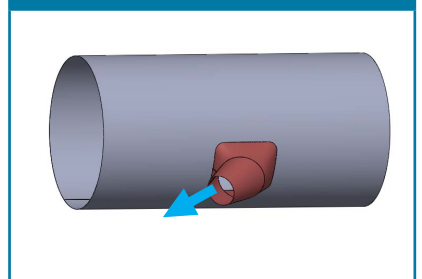
Fixed nozzle



Adjustable nozzle



Directed nozzle



4.3. Products with adjustable parameters

Adjustable Length Fabric Duct

Option of changing the duct length during assembly

Eight adjustable tie belts are sewn along the length of the circular duct. By adjusting (tightening or loosening) all eight belts, we can manually adjust the duct length to suit the installation requirements.

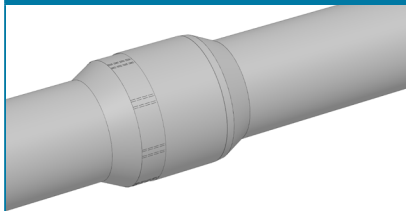
IMPORTANT NOTES:

- An adjustable duct with the maximum length of 1500 mm can be reduced to 500 mm.
- The diameter of the adjustable section must be increased by 25 % to maintain permissible acceptable ΔP .
- Only available for circular ducts with a diameter greater than \varnothing 250 mm.
- Only from PMI, PMS, NMI, NMS, PLI, PLS, NLI, NLS materials.
- Adjustable ducts cannot be manufactured with enlarged cord suspension.

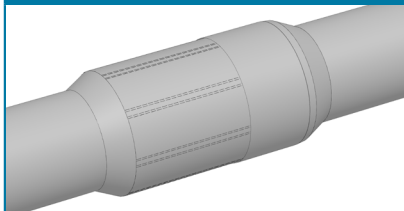
Close-up view of the tie belt



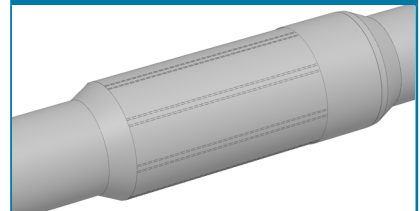
Length 500



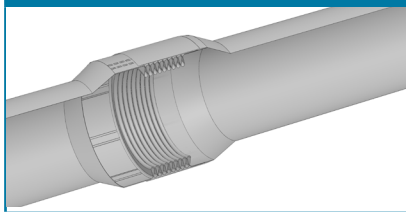
Length 1000



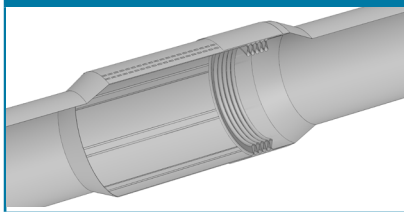
Length 1500



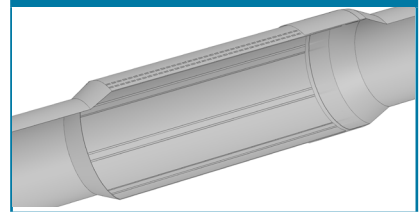
Length 500 – sectional view



Length 1000 – sectional view



Length 1500 – sectional view



Adjustable Bend

Bend angle may be adjusted during assembly

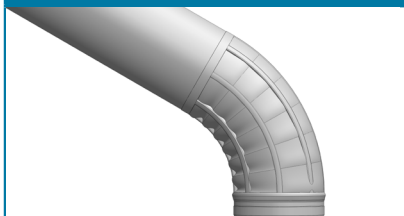
Eight adjustable tie belts (same as in adjustable length) are sewn along the length of the circular duct.

Shortening a particular belt turns the bend in that direction. The final bend angle is achieved by adjusting the belts on certain sides of the duct to their appropriate lengths.

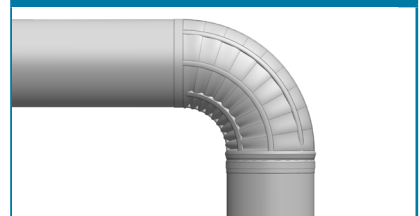
30°



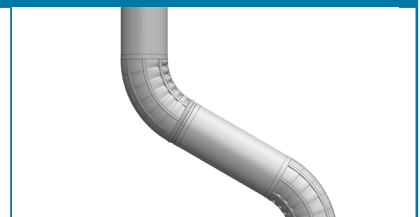
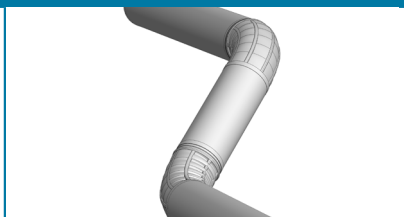
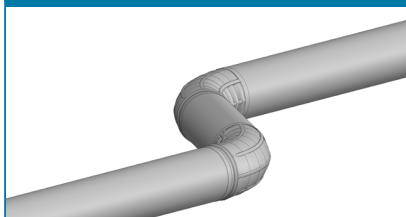
60°



90°



Placing two adjustable bends together makes it easy to avoid unmovable obstacles

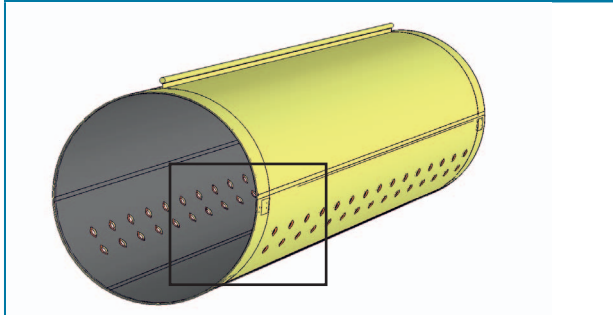


Adjustable Perforation

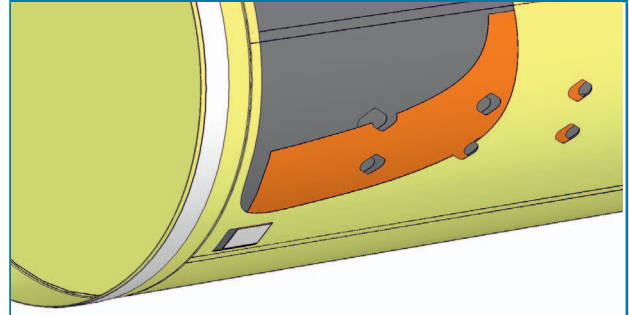
Setting airflow

Our original innovation allows for manual adjustment of the diffuser hole size and airflow. The pictures below describe the operation - actual diffuser sizes and hole patterns are completely variable depending upon the project requirements. The chosen position is retained using velcro.

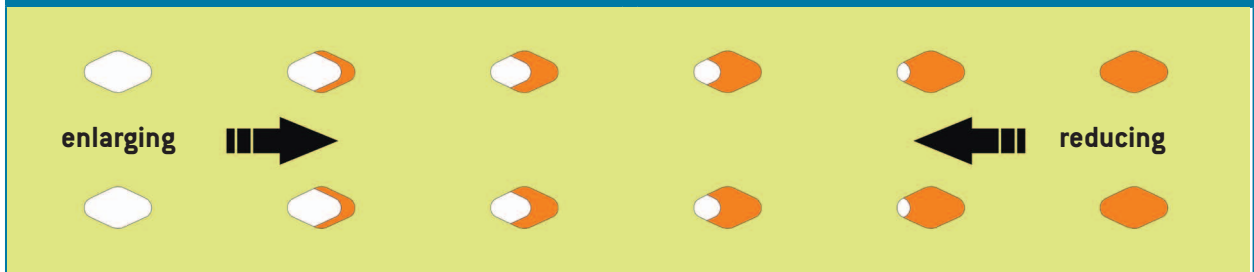
Diffuser with adjustable perforation



The part with perforation is made of three layers of fabric



The middle layer of fabric can be shifted lengthwise and the required position fixed by velcro

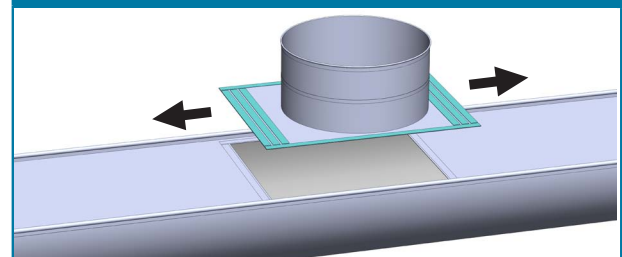


Moveable Inlet Adapter

Change of adapter position

Inlet Spigots on the flat roof of a half-round or quarter-round diffuser can be specified as moveable, these inlets can be adjusted by as much as 80 mm. The moveable inlet adapter can be helpful in cases where the supply air inlet into the Fabric Duct is slightly out of an agreed position.

The extension is attached by Velcros

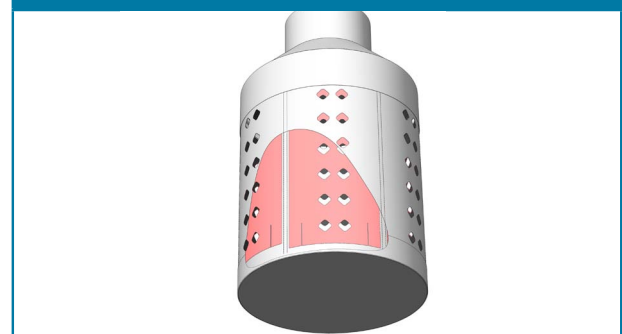


Air Diffuser Lantern

Simple configuration and direction of air flow

Our Lantern diffuser is designed to distribute air at high level, most often from units installed on the roof. It may only be installed in a vertical position. The air is blown horizontally in one to six directions. Vertical sliding strips are used to regulate the flow rate.

The lantern consists of 3 layers

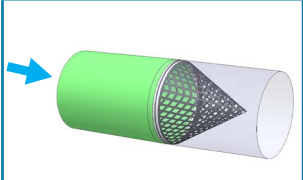
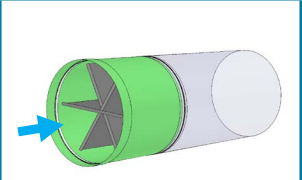
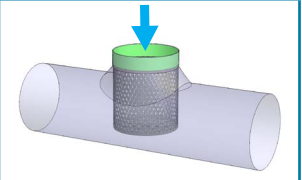
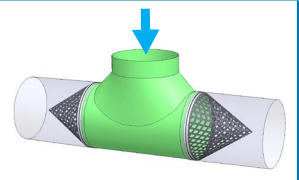

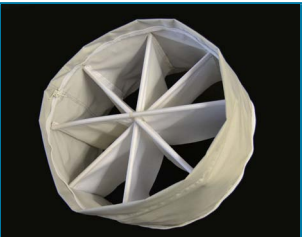
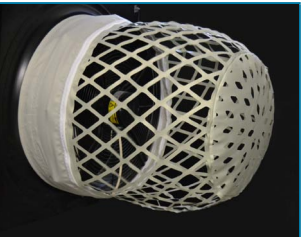



4.4. Solutions of problems with air flows

Equalisers

Airflow turbulence reduction

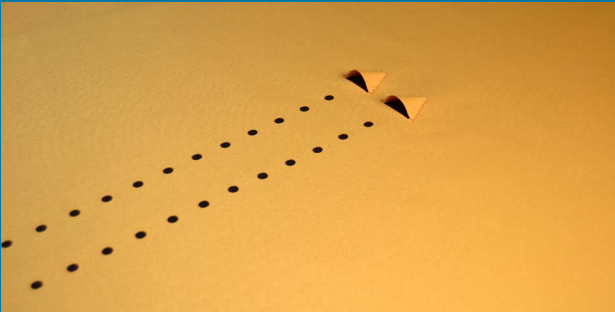
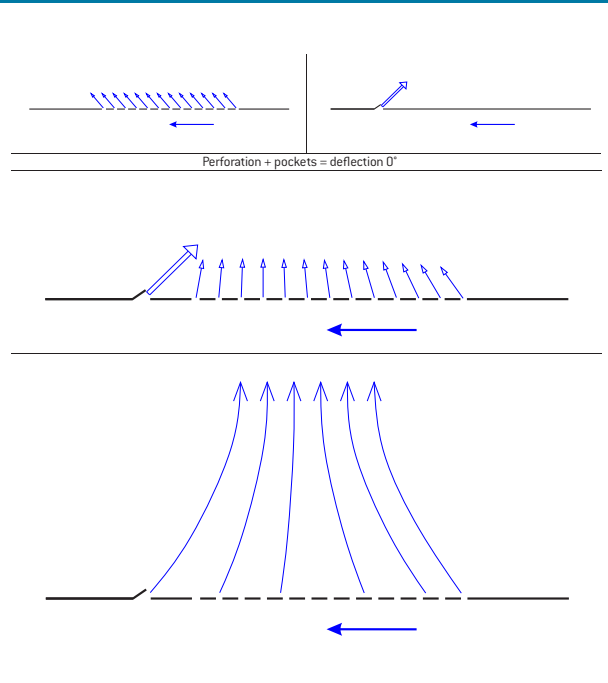
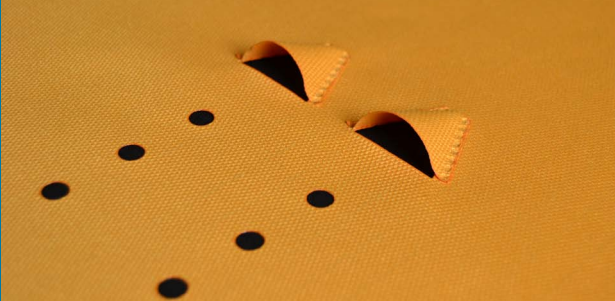
Equalisers are used downstream of the supply fan or inlet spigot. Their function is to reduce air turbulence and duct movement, however their use must be planned as they increase pressure drop.

EQ	EQS (star)	EQP (pot)	EQT (T-shape)
perforated fabric cone	star-shaped fabric sewn into the diffuser	cylinder sewn from a perforated fabric	Tee shaped equaliser
			
			

Pockets

Solution for deflection of flows from perforation

Fabric pockets are designed to remove the deflection of air leaving from the perforation. The solution is based on interaction of two air flows of similar momentum. Discharge from the last hole in the row is directed at a certain angle using a fabric pocket and balances the air deflection from perforation.

Fabric pockets on the diffuser	Function of Fabrics Pocket
	
Detail of fabric pockets	
	

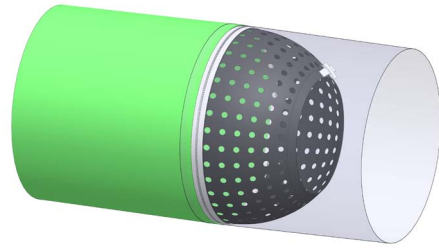
Damper

The Damper is a short cone made of perforated fabric. The inlet of the damper is normal duct diameter whilst the outlet can be adjusted to a smaller diameter, by use of an adjustable belt. Maximum opening of the damper outlet results in zero pressure loss, whilst fully closing the outlet provides the highest local pressure drop. The damper setting can be adjusted at any time by opening a zip on the duct circumference. By installing a damper part way along the duct one can equalise the static pressure within the duct and therefore the air flowing from each point along the duct. We also use dampers to provide flow control through Fabric Nozzles and outlet spigots to other parts of a system.

- Not available in the U.S. and Canada

Equalising static pressure within a duct

Damper

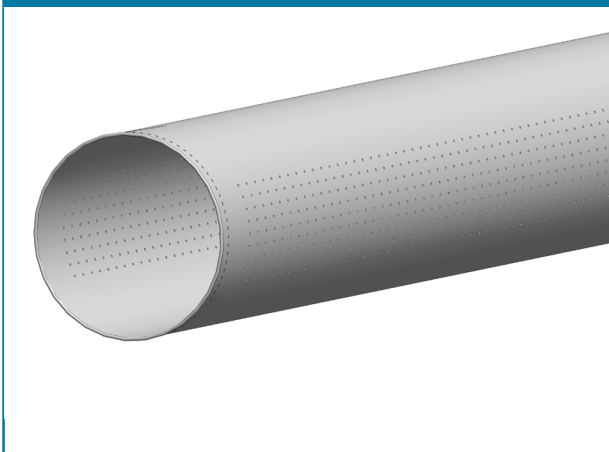


Diffuser for Intensive Cooling

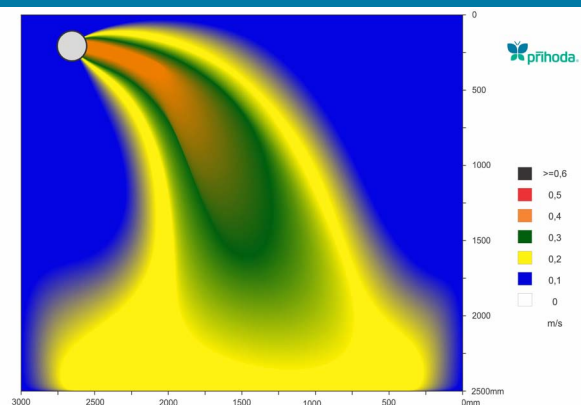
For cooling with a high temperature difference

For cooling applications with a $\Delta t \geq 6^\circ \text{K}$ we recommend using horizontal air patterns from the Fabric Duct. This can be achieved by placing the micro-perforations in a band on either side of the duct at 90° and 270° . The horizontal airflow pattern must achieve a specific speed in order to prevent premature downward deflection. With sufficient outlet speed (provided by static pressure) it is possible to introduce 400 W of cooling capacity per 1 m duct length, whilst maintaining a velocity below 0.2 m/s in the occupied zone. The air flow patterns are detailed in the illustrations below, please contact our authorized representatives for specific applications.

Microperforation 90° , 270°



Airflow patterns, microperforation 90° , 165 Pa



Anti-deflector

Prevents the deflection of airflow (micro-perforation)

Anti-deflector prevents the deflection of airflow from fabrics micro-perforated with holes larger than the thickness of the fabric. It is made of a fine mesh and covers the diffuser from inside. Our calculation software recommends its use whenever deflection could occur.

Detail of diffuser with anti-deflector



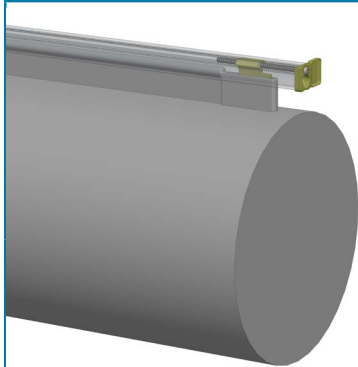
4.5. Appearance improvement

Tensioner in the profile

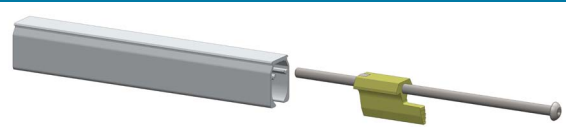
Straightening of small wrinkles

Screw tensioners slide into the profile and are used to remove wrinkles and creases in the fabric. The flexibility of the fabric allows it to stretch by up to 0.5 %. Pre-stretched diffusers are therefore manufactured 0.5 % shorter than specified and the true length is achieved when tensioning. The installation procedure is specified in the assembly instructions included in all deliveries.

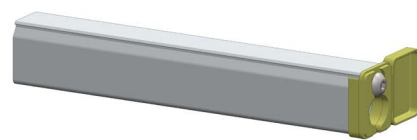
Principle of tensioner in the profile



Screw with slider



Plug



IMPORTANT NOTE: We recommend using tensioners whenever possible in all aluminium profile installations.

End Tensioning

Stretches the whole length of the diffuser

Anchored into the wall in the axis of the diffuser



Anchored into the wall or ceiling

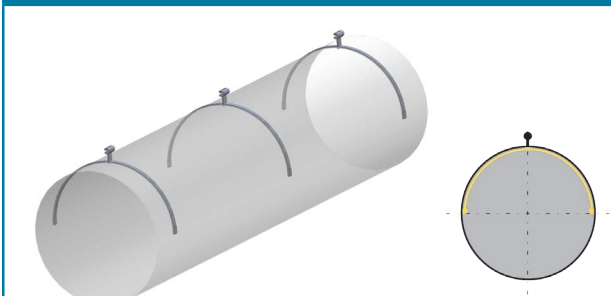


Arcs

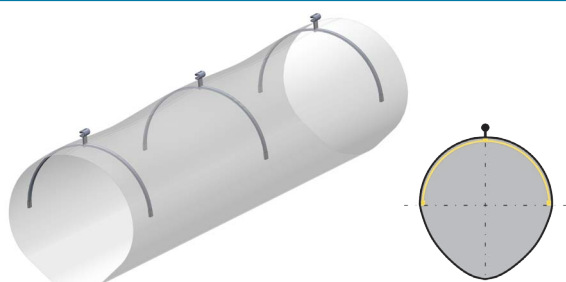
Prevents sagging of the diffuser without air supply

Used for improving ducting/diffuser shape without air inlet. Arcs ends are inserted into pockets sewn on the internal ducting wall; they are fastened in the middle by a Velcro attachment. They are disassembled during maintenance. It provides a cheaper alternative to tyres.

Inflated diffuser with arcs



Diffuser with arcs without air supply



Tyres

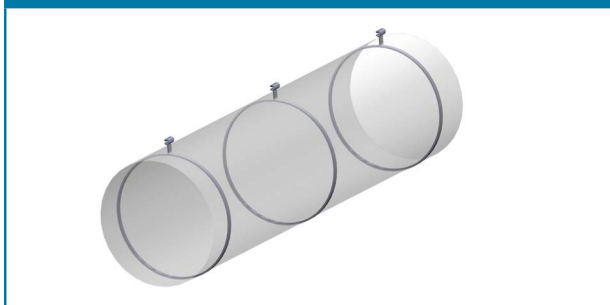
Keeps the shape even without the air supply

Can be manufactured from:

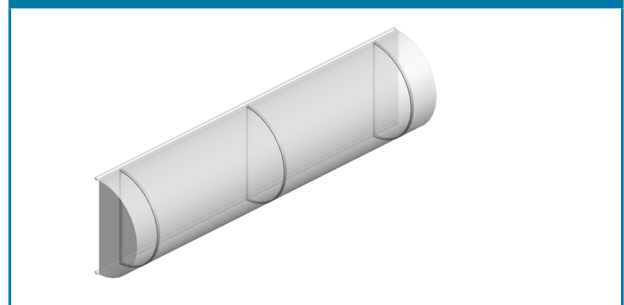
1. Flat aluminium profiles - no deformation of shape, for all diameters
 2. Heat resistant plastic:
 - Deformation of shape up to 20 %
 - With PMI, NMI, PMS, NMS, PLI, NLI, PLS, NLS, NLF, NMF, NMR, NLW fabrics – diameters 400 – 1250 mm
 - With NHE fabrics and insulated ducting – diameters 400 – 710 mm
 3. Stainless steel rod – no deformation of shape, for all diameters
- Other than round shapes, can be made of aluminium only.

They are installed internally or externally with a standard spacing of 500 mm, fastened with Velcro and disassembled during maintenance.

Circular diffuser with tyres



Half-round diffuser with tyres

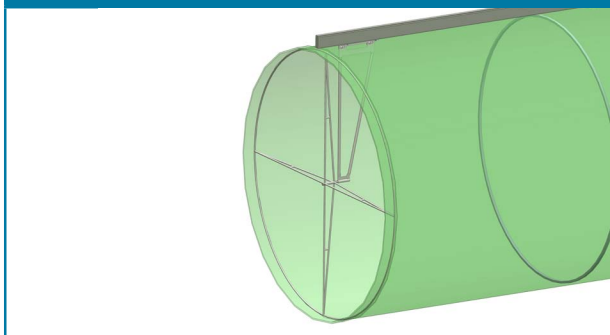


Internal tensioning system

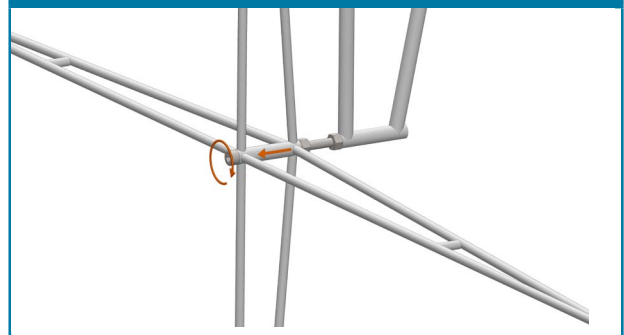
Perfectly straightens the shape

The internal tensioning system allows holding the same shape of ducting with or without air supply. It consists of consoles with tensioning rings, which are put into the aluminium profile. The right stretching the whole ducting will be reached by tightening the axial thread of the tensioning ring. The standard reinforcing rings are a part of the system.

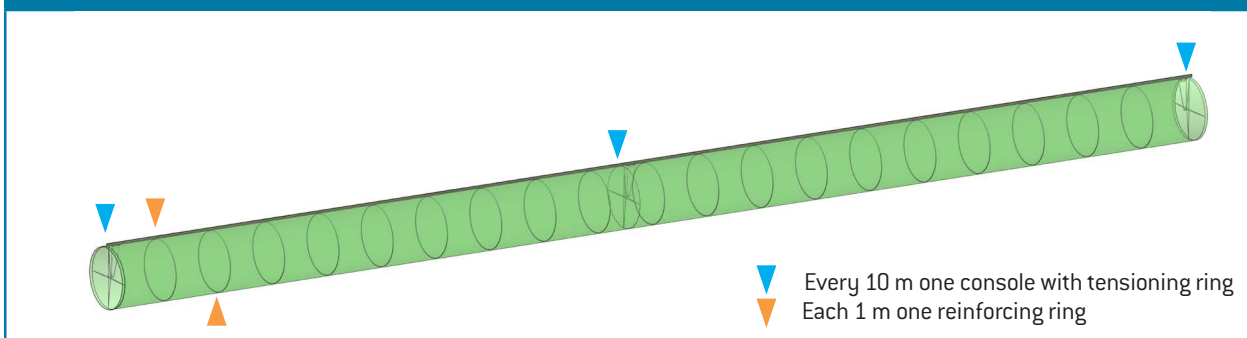
Internal tensioning console with tensioning ring



Detail of tensioning rings



Internal tensioning system



Printing

The diffuser surface can be used for advertisement

Advertisement or a logo can be printed on the fabric. Similarly, part identification can be added to make the installation or maintenance easier.



Office design

Details for improved appearance

Products marked in this way contain several details to improve their appearance. These include namely plastic reinforcement of the blinding, transversal profiles and enlarged strips for blinding of non-circular shapes and stitching with minimum number of longitudinal seams.

4.6. Mounting simplification

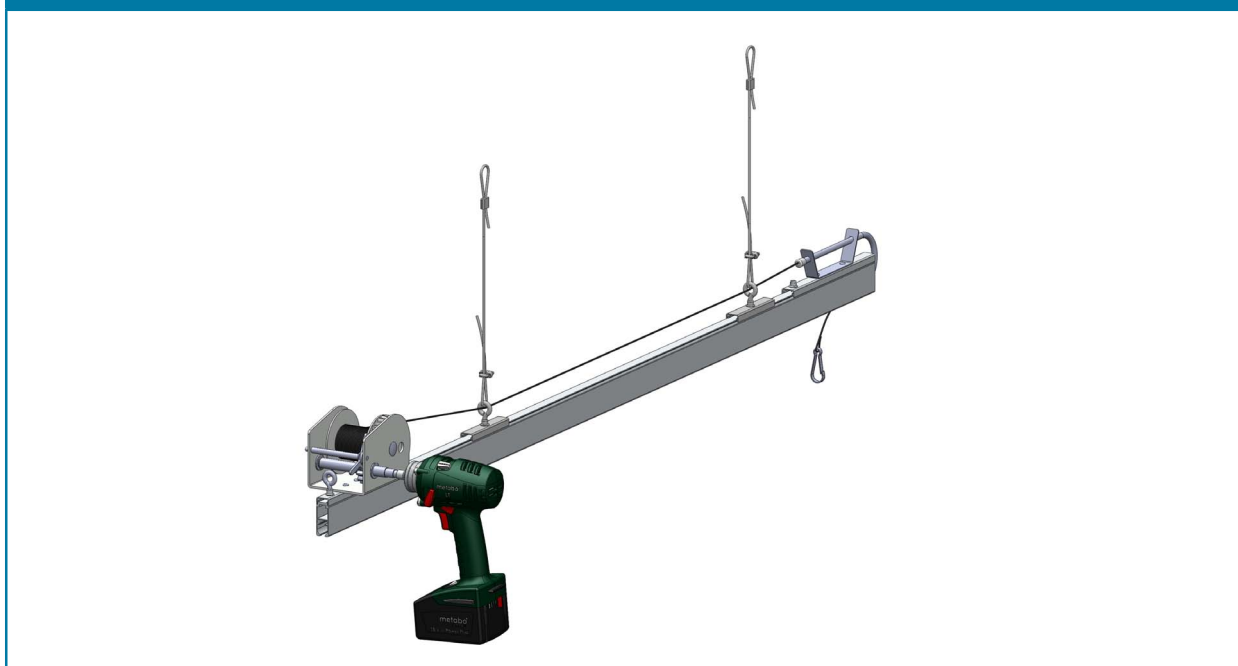
Winch

Mounting and demounting from one place

The whole Fabric Duct can be installed from one end of the installation using a Prihoda winch. This significantly simplifies installation and removal. This system is particularly useful where the fabric ducts are mounted over swimming pools or technical machinery where access is limited.

CONDITIONS OF USE: The winch system is suitable for installations 5, 5D, 5F, 5I, 5DI, 5FI exclusively.

Winch winding using approved site tools



5. Material

5.1. Important Benefits

As a company PŘÍHODA s.r.o. places tremendous importance on the quality of the materials used. In every case we use specially developed materials that have been subjected to extensive development testing in order to achieve maximum performance benefits for our customers. The PMI/PMIre/NMI fabrics provide all the benefits listed below as part of our standard design (at no additional cost).

High rigidity and strength	Our basic PMS/NMS/PMI/PMIre/NMI fabrics demonstrate optimum rigidity of 1800 N/10mm in the texture and 1000 N/10mm in the weave. These parameters make tearing of the material in normal use almost impossible.
High fire resistance	The PMI/NMI/PMS/NMS fabrics are certified to European standard EN 13501-1 with excellent results. In this test our fabrics achieve B-s1,d0 classification, which means prevention of spread of fire, minimum smoke production and no burning drops. NHE fabrics in fact meet class A requirements. PMI/NMI/PLI/NLI/PMS fabrics are also certified to US norm UL 723.
Negligible fibre shedding	Due to the use of endless fibres, ALL of our fabrics can be used in cleanrooms up to ISO Class 4. Independent laboratory tests demonstrate that there is practically no particle shedding from our material during operation.
Antistatic effect	Woven carbon fibre in PMI/PMIre/NMI materials removes any build up of electric charge from the surface of the fabric.
Antibacterial effect	We utilise a special treatment which guarantees that no bacteria can survive if settled on to our fabric. This treatment remains effective after multiple washing. Tests for the European standards found that after TEN washes there was no reduction in the efficacy of the treatment. This allows us to offer a 10 year warranty on the basis of our minimal maintenance requirements (see the following point).
Easy to maintain	Our fabrics which are manufactured using endless fibres are very effective and minimize settlement of impurities from the supply air. This supply air is distributed through the diffuser perforations, and the Fabric Ducts remain relatively clean inside (in a normal environment). They do not require any other maintenance than outer dusting. Washing is normally only required for either hygiene or aesthetic reasons.
Stable Appearance	Thanks to our endless fibre technology, the appearance of the fabric does not change over time, or with multiple washing cycles, unlike materials made of basic fibres. Our PMI/PMIre/NMI/PMS/NMS materials remain aesthetic after many maintenance cycles.

Designation	Permeability	Weight	Material	Characteristic									
PMS/NMS	yes/no	medium	100 % polyester	●	B	●	●	●	●	9	●	●	●
PMI/NMI	yes/no	medium	100 % polyester	●	B	●	●	●	●	9	●	●	●
PMIre	yes	medium	100 % recycled polyester	●	B	●	●	●	●	4	●	●	●
PLS/NLS	yes/no	light	100 % polyester	●	E	●	●	●	●	9	●	●	●
PLI/NLI	yes/no	light	100 % polyester	●	B	●	●	●	●	9	●	●	●
NLF	no	light	100 % polyethylene	●	●	●	●	●	●	1	●	●	●
NMF	no	medium	100 % polyester +2x PVC	●	B	●	●	●	●	4	●	●	●
NHE	no	heavy	100 % fibre glass+ 2x polyurethane	●	A	●	●	●	●	7	●	●	●
NMR	no	medium	100 % polyester	●	B	●	●	●	●	1	●	●	●
NLW (only for DeDa)	no	light	85 % polyester, 15 % nylon	●	E	●	●	●	●	1	●	●	●
NMT	no	medium	90 % PVC + 10 % polyester	●	C	●	●	●	●	1	●	●	●
				<div> ● always ● upon request ● impossible </div> <div> antibacterial fire resistance (class) antistatic high strength machine washable suitable for clean rooms number of standard colours special colours water repellent </div>									

5.2. How to Choose a Suitable Fabric

1. What level of fire resistance do you need?

Our fabrics have 3 levels of fire resistance.

Peak fire resistance	Increased fire resistance	Low fire resistance
Specified using the letter “E”, as in „Excellent” means an entirely non combustible material. Within this class, we only use fabrics constructed from fibreglass with a polyurethane coating. These are however non permeable and more fragile than polyester fabrics of medium weight. This fabric [NHE] is in class A2-s1, d0 as per EN 13501-1.	Specified using the letter “I”, as in “Increased” means practically non combustible and very low smoke production. These materials meet the requirements for use in majority of spaces. These materials [PMI, PMIre, NMI, NMR, PMS, NMS, NLI, PLI] comply with requirements for use in a vast majority of rooms and are in class B1-s1, d0 as per EN 13501-1.	Specified using the letter “S”, as „standard” or “F”, as in “foil” or T as translucent are less fire resistant. They can be used in rooms where an increased fire resistance is not required. These fabrics [NLW, NMT, NLS, PLS] are in classes C,D,E as per EN 13501-1. The foil [NLF] hasn’t got any fire resistance.

2. What are your demands for rigidity and cleaning ability?

Fabrics are divided in 3 categories by weight.

Light [L]	Medium [M]	Heavy [H]
Diffusers made from these materials only require 20 Pa of static pressure to achieve good inflation. However, they are light weight and have lower rigidity and increased risk of tearing if used out of specification. All our lightweight materials can be machine washed with the exception of NLF.	These fabrics have a mass between 180 and 350 g/m2. They display the highest rigidity and anti-tear resistance. The minimum static pressure required for good inflation is 40 Pa. All of our medium weight materials can be machine washed.	It is the fabric [NHE] coated by polyurethane and that’s why it can be impermeable only. It must not be washed in washing machine but can be dry or water cleaned manually. A minimal static pressure for inflation is 50 Pa.

3. Do you need a permeable fabric?

Permeable material prevents condensation occurring on the duct when cooling below dew point.

4. Do you want a totally sustainable product? We can offer recycled material.

All of our products are environmentally friendly for many reasons. Furthermore we can offer 100% recycled material PMIre. We work with a global textile manufacturer, Unifi, to supply REPREEVE recycled fiber that is made from post-consumer plastic bottles. Thanks to recycled fibres is our product totally sustainable. This product also looks and performs identically to our original Prihoda PMI. PMIre is flame retardant, antibacterial and cleanroom quality material and we have it in four stock colours WH, LG, DG and BL. Just 1 m2 of prihoda recycled fabric saves 13 bottles from landfill.

5. What colour do you want?

Most of our materials are available from stock in the range of 9 colours detailed below (shades may vary). None standard (special) colours are available, but require longer delivery timescales.

RAL 9016	PANTONE 135 [RAL 1017]	PANTONE 420 [RAL 7035]	PANTONE 424 [RAL 7037]	PANTONE 341 [RAL 6024]	PANTONE 187 [RAL 3001]	PANTONE 2915 [RAL 5012]	PANTONE 7462 [RAL 5005]	PANTONE 419 [RAL 9017]
								
WH	YE	LG	DG	GR	RE	LB	BL	BC

Please ask for a sample book if you wish to see or match a precise colour or shade.

6. Maintenance and Warranty

All our ducting&diffusers are made from high quality and highly resistant materials without natural fibre additives. The material used is specified within the technical description of your order. Diffusers/ducting made of fabrics PMS, PMI, PLS, PLI, NMS, NMI, NLI, NLS, NMR, NLW can be washed as normal in a common/industrial washing machine. Diffusers/ducting made of NMF, NHE, and NLF materials must be washed by hand. If the diffuser/ducting is equipped with tyres, arcs or tensioning systems, these fixed components need to be taken out before washing.

Washing Procedure:

1. Very dusty diffusers clean first by means of vacuum cleaner (pressurized air, soft brush).
2. Wash in washing machine with industrial washing detergents (dosing as per supplier recommendation), at 40 °C, we recommend spinning at 400 rpm and intensive rinsing. According to the contamination level cycle of washing can be repeated or a stronger detergent used. Use an adequate detergent for hand washing. The diffusers, which are not machine washable, can be usually effectively cleaned by vacuum cleaner, floor cloth or water stream.
3. Add disinfection into the wash if required at the place of installation. The chemicals of the disinfection must not affect the fabric (see the washing symbols), detergents dosing as per supplier's recommendation.
4. Dry the diffusers well after washing and install. The air passing through the diffuser can be used to dry the fabric.

Legend for symbols

	Machine wash at max. temperature of 40°C, normal mechanical action, normal rinse, normal spin cycle.
	Light mechanical action, rinse at falling temperature, light spin, gentle machine wash, max. temperature 40°C.
	Hand wash only, do not machine wash, max. temperature 40°C, handle gently.
	Do not bleach product.
	Product may be dried in rotary drum drier at reduced drying temperature.
	Do not dry the product in a rotary drum drier.
	Iron at a max. temperature of 110°C, use caution when steam ironing.
	Do not iron product; steaming and steam processing is prohibited.
	Do not dry clean product, do not remove spots using organic solvents.
	The product is safe to dry clean using perchlorethylene and all solvents specified under the symbol F.

Any maintenance must strictly follow the washing label symbols sewn into every section.

pos01-part01-of02

OP 142250

High Tech-CM.1351

NMI 100% polyester



PŘÍHODA s.r.o.

Tailor-made
Air Ducting&Diffuser

Za Radnicí 476
CZ 539 01 Hlinsko
tel.: +420 469 311 856
fax: +420 469 311 856
info@přihoda.com
www.přihoda.com

Made in EU - Czechia
in September 2014

- ☐ Number of the position, part
- ☐ Order number at PŘÍHODA
- ☐ Identification by customer
- ☐ Material
- ☐ Treatment symbols

☐ Manufacturer

☐ Where and when it has been made

Warranty Period

10 year	fabrics PMS/NMS/PMI/PMIre/NMI/NMR
2 year	membrane diffuser, servomotors, fabrics NMF/NLF/NHE/ NMT
2 year (max. 50 washing cycles)	fabrics PLS/NLS/PLI/NLI/NLW
12 months	All other items not mentioned above, unwoven accessories (zips, hooks, etc), printing, assembly and accessories

The warranty period is deemed to start on the day of sale. For warranty to be valid all installation and maintenance instructions must be followed, in addition to good practice for the maintenance of the supply air units. Additionally, supply air must be filtered to at least EU3 and the ducts washed or cleaned every 12 months. Chemicals used which may have an adverse affect on the material or ancilleries will invalidate the warranty. Dripping water can be coloured by the fabric colour.

Special conditions for printed diffusers.

1. Ambient Temperature within the range +10°C to + 40°C.
2. Do not iron.

7.

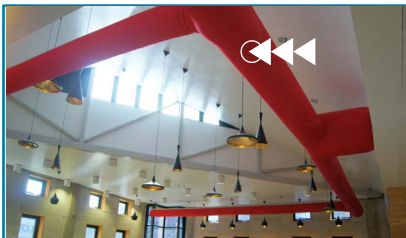
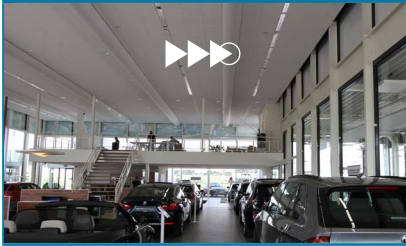
Examples of Applications

Food processing industry

The first fabric diffusers were used in the food industry. Sanitary regulations require that all food processing devices should be easily sanitised and cleaned. Out of all the air distribution system options, this condition is only met by Fabric Ducting. Fabric Ducts are perfectly clean after washing and a disinfecting agent can also destroy any pathogens that may resist the antibacterial treatment. Fabrics made of endless fibres, developed especially for Prihoda's textile diffusers, are very smooth and do not allow the build up of impurities. This unique and special feature distinguishes them from diffusers made of staple fibres that continuously trap dust and can represent a sanitary risk.



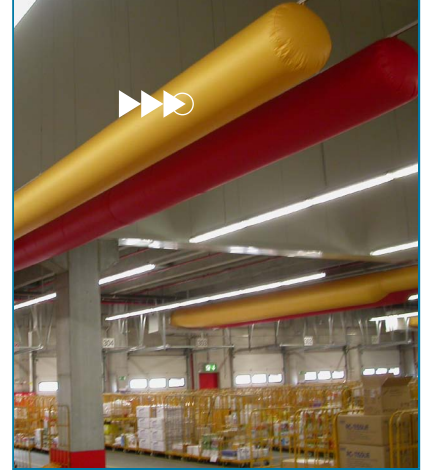
Supermarkets, exhibition and large retail areas



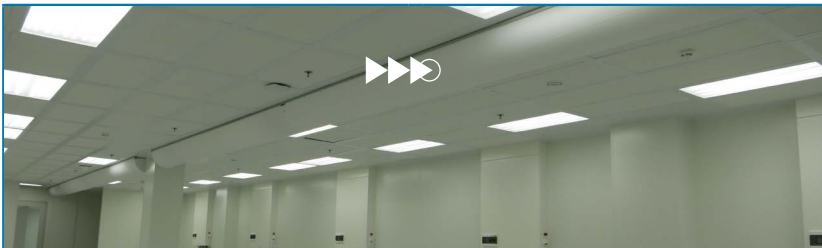
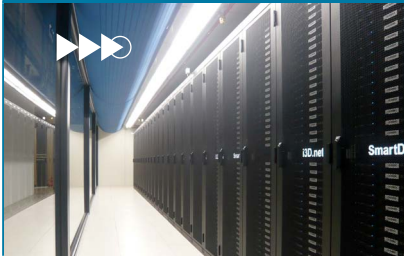
For large retail areas we can provide supply air through laser cut perforations or nozzles, whichever suits the application best. Experience over many years shows that Fabric ducting & diffusers offers a substantially better, more uniform air pattern than can be achieved with traditional systems, whilst also offering substantial cost savings. The wide range of 9 stock colours allows for many different aesthetic designs whilst the Fire Resistance of our fabrics meet all world wide standards.

Food Stores, Low Temperature Production Areas

In large cold stores Prihoda Fabric Ducting distribution systems provide uniform air distribution, ensuring maintenance of stable product temperatures and temperature zones. In production zones with large amounts of people working in low temperatures, high air velocity will be a major cause of discomfort and may cause a higher sickness or absence rate. Fabric ducts and diffusers disperse cold air without causing draughts, and create comfortable, low velocity environments for workers.



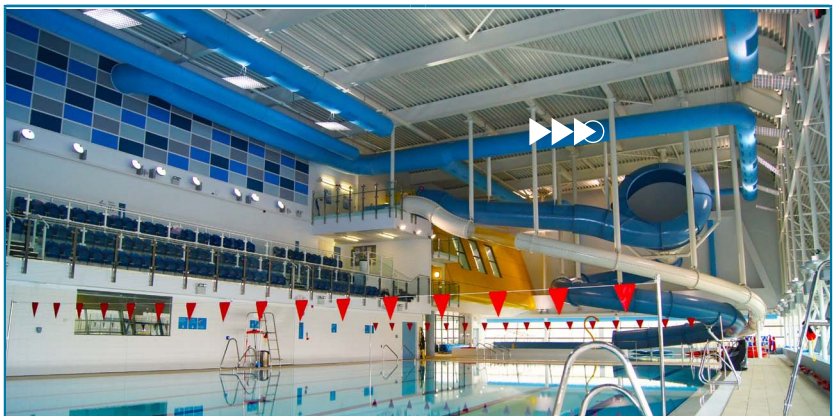
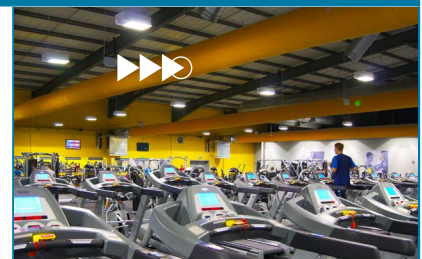
Chemical, Textile and Electronics Industries



Prihoda Fabric Ducting air distribution is a perfect solution for any industrial operation. Prihoda Fabric Ducts provide uniform low velocity air distribution or targeted air patterns, at unbeatably low costs. Over 100 suspension solutions make it possible to choose a convenient installation style for any application, easily accommodating most suspended and formed ceiling types. Contaminated production environments may require the use of fabrics with larger laser cut perforations.

Pools, Sports Halls and Fitness Centres

Large sports facilities are a typical application for Prihoda Fabric Ducting & Diffusers, we are able to create a large range of diffusion air patterns to suit any project. Whilst our many installations at sports and fitness centres provide comfortable cooling air movement for customers 'working out'. In these applications low ceiling heights are often encountered, where half round fabric ducts make an aesthetic and functional low cost installation solution. Swimming Pools are a major user of Fabric Ducts, where the fabric material copes easily with the harsh environment at a fraction of the cost of treated and insulated rigid systems. The bright colours available revive and enhance many swimming pool interiors.

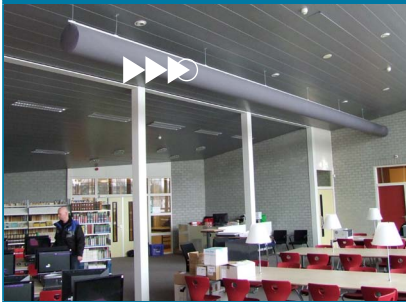


Kitchens

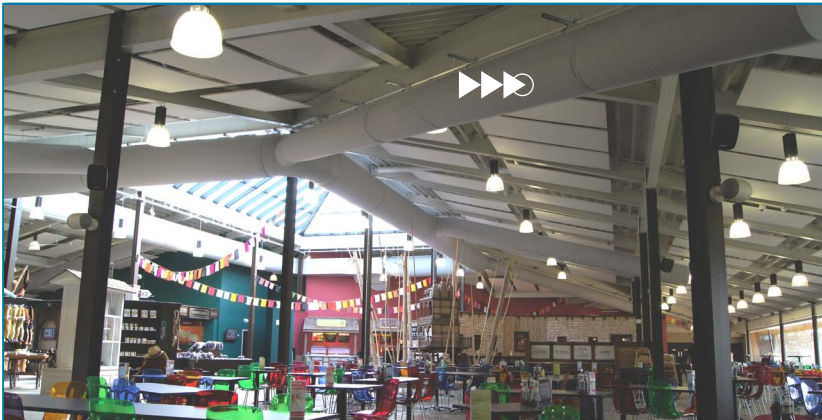
Space in kitchens is usually minimal, and their extreme load with heat and vapours requires intense ventilation. Prihoda Fabric Ducts disperse high volumes of air uniformly into this environment without creating draughts. The fabric material used is resistant to steams and vapours and maintenance is very quick and easy. Compared to a traditional stainless steel installation Fabric Ducting is a much lower purchase, installation and maintenance cost and easily achieves sanitary and hygiene demands due to its cleanability.



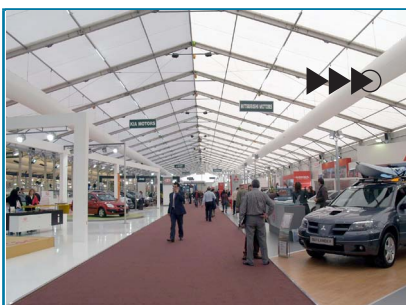
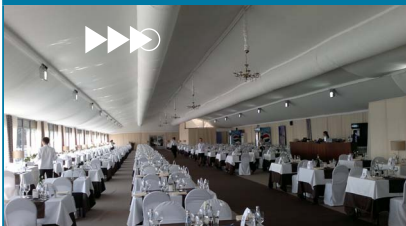
Offices, Restaurants, Cinemas etc.



Higher aesthetic demands can be satisfied by the multiple colour and shapes available with Prihoda Fabric Ducting air distribution. Correctly manufactured and perfectly installed fabric diffusers become an elegant part of an interior. Air diffusion through Fabric Ducting provides similar results to chilled beams or perforated ceilings, however although the performance is similar, Fabric Ducting is available at a much lower capital cost. Unlike the traditional diffusers, embedded in soffits, our broadly diffused solutions do not cause any local heat discomfort. Experience has demonstrated that employees in such equally distributed and cooled offices are significantly more comfortable.



Temporary Installations

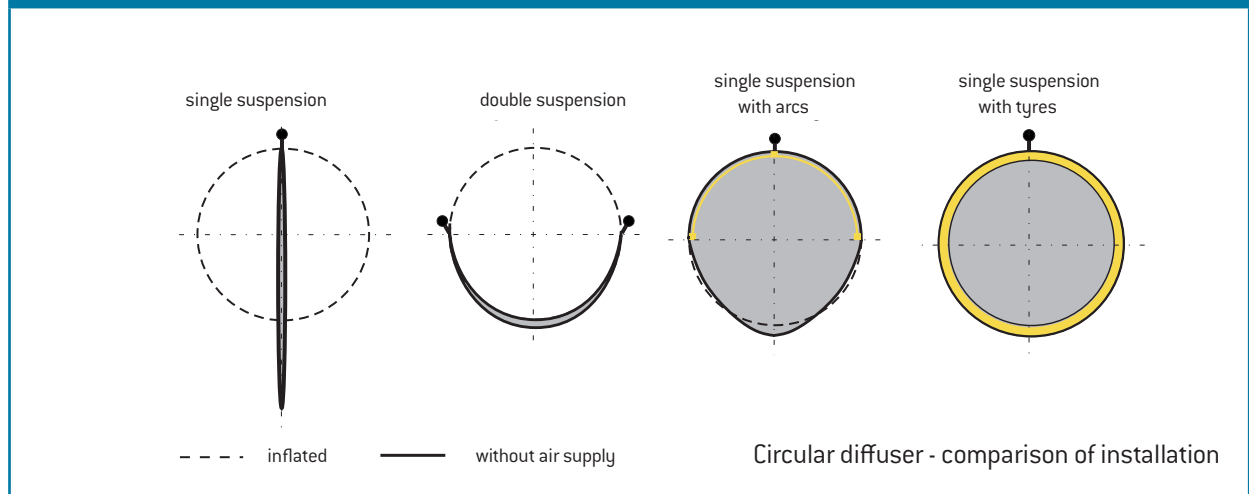


The benefits of using Prihoda Fabric Ducting and distribution systems for cooling or heating of large scale tents or other temporary structures are self evident. Light weight roof structures can easily support fabric ducting and diffusers weighing from 100 to 400 g/m². Installation is very quick, using the supporting wires and hooks provided as part of the system. Top quality materials allow multiple repeated use. Cooling or heating using a large AHU and Fabric Ducting diffusing all along the structure, is much more economical than simply blowing the air into a space. Specifically with heating the warm air rises quickly creating a high temperature zone high in the ceiling and enormous heat loss. In cooling, with air diffused through Fabric Ducting intense airflow causes local air current and draughts; whilst elsewhere zones with insufficient cooling develop. Both cases are successfully resolved by a properly designed Fabric Ducting distribution system.

8.

Frequently Asked Questions

1. What does a Fabric Duct look like when the fan is switched off?



2. Is it possible to use Fabric Ducting for extract (exhaust air)?

PŘÍHODA s.r.o. were the first manufacturer worldwide to introduce negative pressure ducting onto the market. It is made with a square or triangular shape. The principal is based on sufficient stretching of all ducting walls by means of a tensioning system. The construction enables simple disassembly and re-installation. Laser cut perforations are used to allow the air into the duct.

3. What is the service-life duration of Prihoda Fabric Ducts?

This is not a short term solution. Diffusers made from good quality fabrics will last for fifteen years or longer. Light fabrics (approx. 100 g/m²) with maximum permitted number of 50 washing procedure or the cheap, (usually polyethylene foils susceptible to tearing) may have limited durability.

4. What is the pressure loss of a Fabric Duct?

In a well designed straight diffuser there is an almost constant static pressure throughout. The fabric perforation is calculated based on the average value of the static pressure. In other words, the diffuser is designed based on the external static pressure of the system. Shaped pieces (bends) and turbulence equalisers present certain pressure loss which needs to be taken into consideration. Loss caused by friction is usually minimal due to the decreasing air speed inside the diffuser. The minimum utilisable pressure is 50 Pa, however light material will inflate from 20Pa.

5. What do you do with diffusers when they get clogged by dust or other contamination?

All of our products are easy to clean. Most of our fabric allow washing in a washing machine. Diffusers with perforations (holes larger than 4mm) will never get completely clogged by contamination. Our diffusers with Micro-perforations have considerably longer (more than double) period of operation between maintenance cycles than permeable fabric. usually cleaning is only necessary due to hygiene or aesthetic reasons. Each part of our system separated by zippers has a unique washing label which identifies its position and any washing instructions.

6. Can Fabric Ducts get mouldy?

Mould can form on any kind of material if it is moist and unventilated. This goes also for most of our fabrics, including those with antibacterial finishing. Only one our fabric - NMF - is mildew resistant. Never store moist diffusers and do not keep them out of operation for long periods of time, especially in moist atmosphere. Mould can cause indelible marks on the fabric.

7. Is it possible to use square or rectangular diffusers?

PŘÍHODA s.r.o. has developed a special construction which enables use of a quadrangular cross-section. The principal is based on stretching the fabric in transverse and longitudinal direction by means of a tensioning system. The construction enables simple disassembly and re-installation. Fabric ducting with quadrangular cross-section can be assembled directly on the ceiling or suspended in the area.

8. Does the Fabric Duct function as a filter at the same time?

If permeable materials are used, the fabric functions as a filter for the part of the transferred air that goes through the fabric. As the fabric contamination gradually increases, the pressure loss grows and the air flow decreases. Therefore, it is necessary to wash the fabric. We consider the utilisation of microperforated or laser cut perforated fabric to be by far the best solution. Although perforated fabrics do not function as filters they do not change the pressure loss value and the number of necessary washing procedures significantly drops. We are a manufacturer of distribution (not filtering) ducts and diffusers.

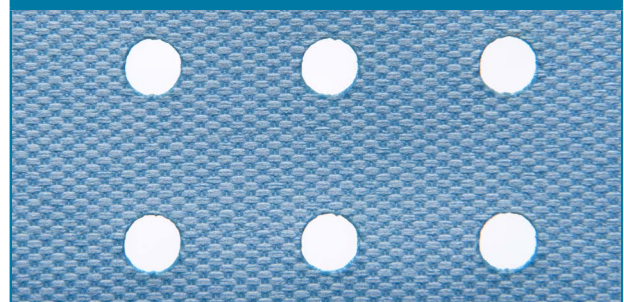
9. Why doesn't PRIHODA use plastic nozzles or slots?

Use of plastic nozzles or longitudinal slots were a historical necessity. These tools used to enable certain air distribution patterns, the nozzles in addition protected the frayed edges of the holes. When we began to use laser technology that allows cutting of accurate holes with sealed margins, they became redundant. Correctly designed rows of laser cut holes fulfil the same purpose, whilst being cheaper and more aesthetic. We use fabric nozzles for longest air flow and vertical outlet of air, never plastic nozzles. Our fabric nozzles are light weight and sonic welded to the material they will not fall out of the duct or damage the duct through friction during washing.

microperforation



perforation



10. Why doesn't PRIHODA use more permeable fabrics?

We use permeable materials to avoid condensation where supply air temperature is below dew point. However, we only have material of a single permeability value. It is very low and serves just to prevent condensation. Distribution of air is done exclusively using holes (perforation or microperforation or a combination of both) and adjusted holes (nozzles, pockets). Our product portfolio also includes non permeable materials, which are often useful in other situations.

9. 5+5+5

5 for Fabric Ducting&Diffusers

Economy & Speed

The cost saving when using Prihoda Fabric Duct against traditional sheet steel rigid duct can be as much as 70% especially when you take into account the cost of conventional diffusers, cost of transport, and much longer installation times and commissioning. Installation and/or removal take a fraction of the time needed for conventional systems.

Hygiene

Cleaning is simple, the ducts are easy to remove and cleaned in conventional washing machines, once cleaned and disinfected Fabric Ducts are 100% clean, much more than can be guaranteed with traditional rigid systems.

Ecology

Prihoda Fabric Ducts & Diffusers are environmentally-friendly, requiring much less energy than manufacturing, transporting and installing heavy traditional rigid systems. We can offer also diffusers made from 100% recycled material.

Technique

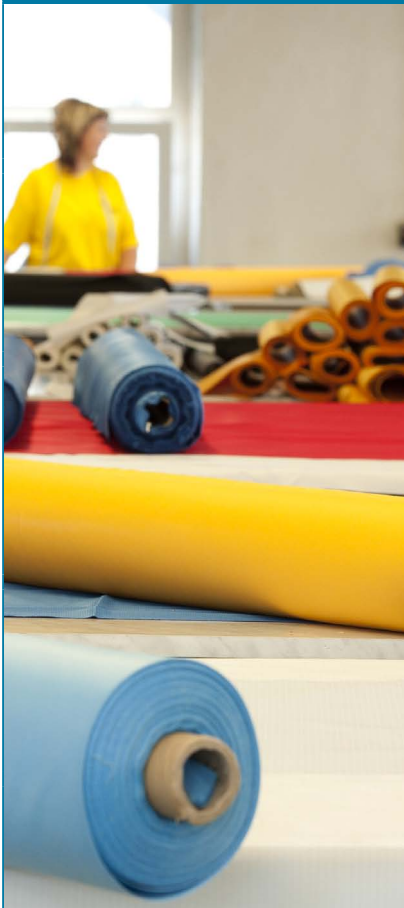
Design and positioning of distribution inlets and spigots is optimal, as is their size. An inexhaustible number of air distribution methods can be achieved from draught free right through to high velocity targeted air patterns with a long throw.

Aesthetics

Various colour and shape combinations exist to satisfy most aesthetic demands, the product can blend into, or become a tasteful part of the buildings interior.



5 for PRIHODA`s Fabrics



Optimum Strength

Through our own long-term development, we have optimised the mass of our textiles to circa 200 to 220 g. The textile strength moderately exceeds the seam strength, which is ideal. Greater strength or heavier materials do not in any way benefit customers as the strength of a product is limited by the strength of the seams.

Negligible Outlet of Particles

Because we use endless fibres, all of our fabrics can be used in Clean Rooms up to ISO Class 4. Independent laboratory tests have demonstrated almost zero particle emissions from Prihoda materials in operation. Thanks to endless fibres, the appearance of the fabric will not change even after multiple washing cycles, unlike materials made from staple fibres.

Antibacterial Effect

Our special antibacterial treatment guarantees elimination of all bacteria in direct contact with the material. This treatment is unaffected by multiple washing. After ten washing cycles the Prihoda antibacterial material still conforms to the requirements of the relevant international standard, which means realistically a lifetime guarantee considering the low frequency of washing required with our fabrics. This applies to PMI/ NMI/NMR fabrics.

High Fire Resistance

Our Prihoda PMI/NMI/PMS/NMS/NMR fabrics are certified in accordance with EN 13501-1 with excellent results. Prihoda material achieve classification B-s1,d0. (excellent fire resisting performance B, low smoke emissions S1, zero moulten, flaming drips d0) This far exceeds the requirements of UL 723 norms in the U.S. Our range of products also includes class A2 - textiles made from fibre glass.

Antistatic Design

Our material includes interwoven carbon fibres which make our Prihoda PMI, NMI and NMR textiles more electrically conductive. The voltage between the Fabric Ducts and the building structure is zero when properly earthed/grounded.

5 for PRIHODA

Best Price/Quality Ratio

We offer the best ratio between price and quality. Our very reasonable prices do not mean any compromise on quality. We hold ourselves responsible for the products we deliver, their proper operation and long service life are a priority for us.

Experience, Knowledge & Technical Support

This is the only product we manufacture and we focus constantly in its improvement. Our engineers verify carefully every technical detail in our specialised test room. Every order placed has had engineers check its technical parameters prior to manufacture and delivery.

Innovations

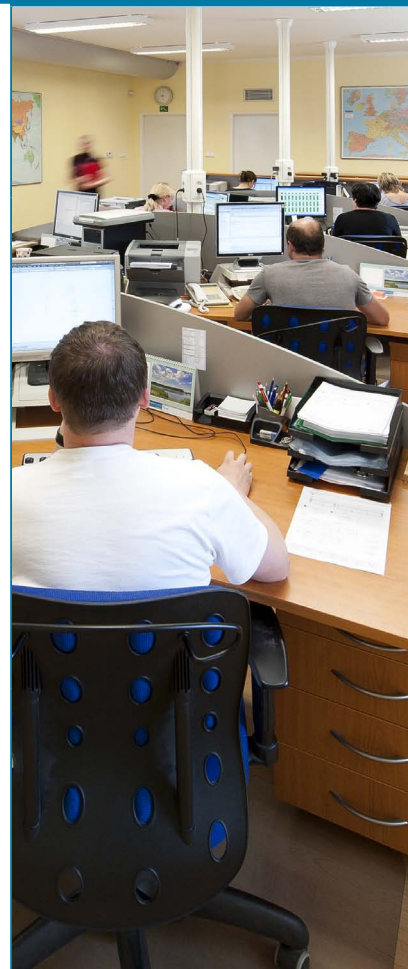
Every year we launch several new ideas on to the market as a natural consequence of the enthusiasm and creativity of our teams. We do not consider anything finished, everything can be improved. For example microperforation of fabrics, is our unique technology.

Long Warranty Period

Because of the highest quality materials and manufacturing techniques, we are able to provide a ten-year warranty.

Speed

Despite manufacturing mostly bespoke items, we are still able to meet very demanding delivery timescales, thanks to our excellent work organisation. For instance, in 2014 we realized more than 5000 orders in over 60 states all over the world. More than 99% of these deliveries were dispatched within our confirmed delivery timescales. The delivery time in order-based production did not exceed 3 weeks throughout the year; a range of orders was produced within an express delivery time of 1 week.



PRIHODA holds certificates for:

- quality management system ISO 9001
- environmental management system ISO 14001



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