Technical specifications

VENTAFLEX® air ducts insulated
Facts and figures for application

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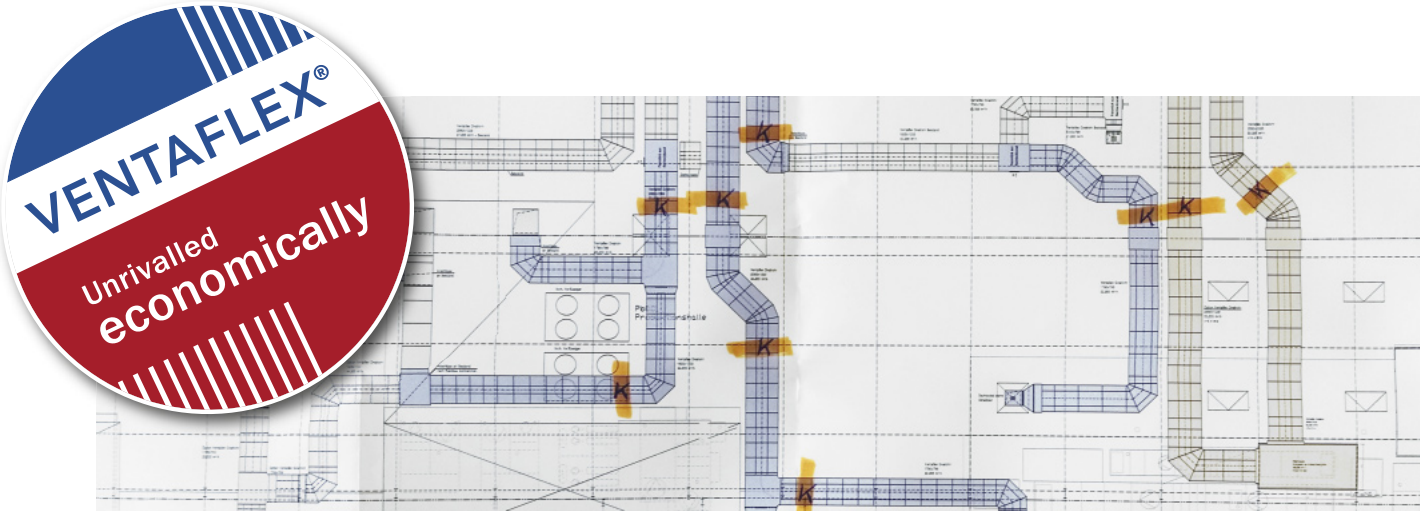
More efficiency in air conduction



Our demand on ourselves

A good idea only has continuance if it is permanently making progress and research, current legislation and experience are meticulously collected and taken into account during this process. In order to meet the increasing quality standards we apply refined examination procedures at VENTAFLEX® again and again. Thus no component leaves the production without having gone through different company tests. Furthermore one part of the critical review phase are our “Practice Reports”, which show various VENTAFLEX® solutions on the basis of specific projects and have exemplary character for planners.

Quality management

Regular internal quality checks and special certifications by independant institutions guarantee continuous quality of our products and the eligibility for special application areas – e.g. for the hygiene sector.

Argumentation aid

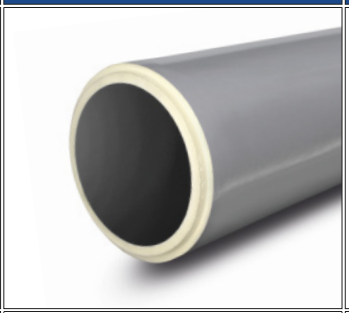
On the basis of documented specifications it is illustrated which advantages VENTAFLEX® air ducts offer at different applications under various conditions.

Content	Page

Personal consulting at VENTAFLEX® under +49 (0) 2505 - 93 829-0

03. 2020

Quick-Check Air Guidance

Comparison:	VENTAFLEX® air ducts highly insulating PUR rigid foam	Spiral duct stainless steel	Spiral duct galvanized sheet steel
Features of the different air ducts			
Time saving at installation	●●● finished insulated air ducts	– has to be insulated on-site	– has to be insulated on-site
Tightness	●●● certified*	●●	●●
Chemical resistance	●●●	●	●●●
Thermal protection	●●●	●	●
Weight saving	●●●	●	–
Application in the hygiene sector f.e. food industry, sports facilities, laboratories, hospitals	●●● certified*	–	●●●
Cleaning	●●●	●●	●●

*The VENTAFLEX® air ducts are certified according to EN 16798-3 class ATC2/ tightness class D and according to VDI 6022
Legend: ● = average ●● = good ●●● = excellent – = not sufficient or not existent

Check list: Planning with VENTAFLEX® products

By compliance with certain planning principles a construction with VENTAFLEX® air ducts and the consequently resulting order is very easy. If the following information and headwords are considered beforehand, this can be very helpful for the planning and respectively the order.

Planning principles before ordering	Done Yes	No
Match duct system to project.		
Break parts list up for VENTAFLEX® molded parts.		
Check to what extent the components 2/3 m can be prefabricated at the VENTAFLEX® production. (For duct joints having been sealed at the plant no further connection clamps are required.)		
We recommend to use a compensator for longer duct sections (greater than 15 m). This does not apply for underground installation. See catalog page 2.23 and 3.18.		
For special components (respectively connection ventilation unit to VENTAFLEX® air duct system) like transfer (round to square) an installation drawing has to be made by the contractor.		
VentaSnap connecting clamp: installation instruction has to be taken into account.		

The ventilation system in general				Done Yes	No
Volume flow in the system (in m^3/h)					
Components of the ducts (single length)	2 m	3 m	fitting length		
Ducts (pieces)	1 m				
Air velocity max. 10 m/s					

Application roof installation			Done Yes	No
Wind loads	wind zone	speed km/h		
VentaFix mounting clamp (pieces)				
Linear expansion (compensator needed, pieces)				
Roof duct (specify roof inclination in degree)				
For the calculation of the statics	(weight advantage e.g. duct ø 920 mm = 16,0 Kg see page 2.1) consideration at the planning of the mounting			

Application underground installation	Done Yes	No
LavantusGrip connecting clamps		
Embedding into the ground (at least 30 cm covering with filling sand)		
Distance between the ducts (minimum distance 30 cm - 50 cm)		
Wall collar		
Duct connections Duct joints have to be free of contamination, sand, grease etc …		
IndividuIndividual statics calculation (in the implementation planning)		

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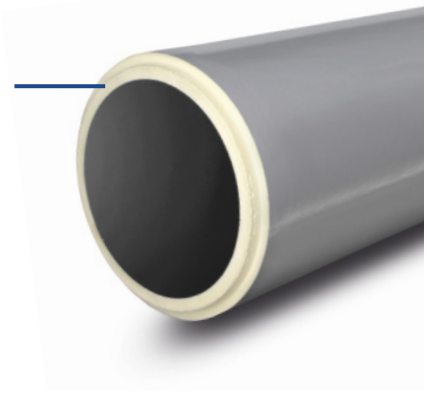
VENTAFLEX® air duct insulated versus conventional duct

Structure and thermal insulation by comparison

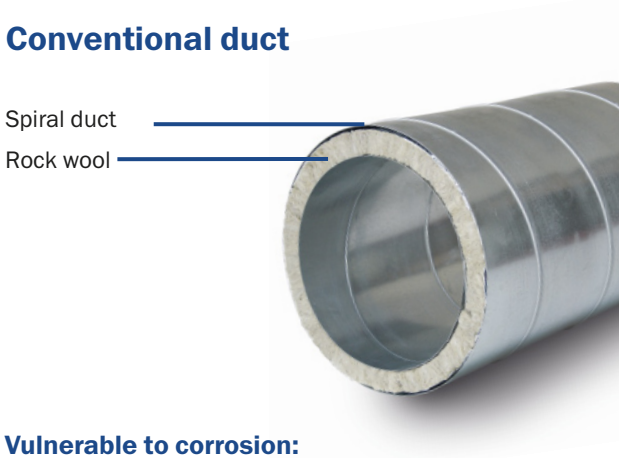
VENTAFLEX® air duct insulated

Highly insulated PUR rigid foam, inner- and outer coating with GRP



No corrosion:
visually appealing and durable

Conventional duct

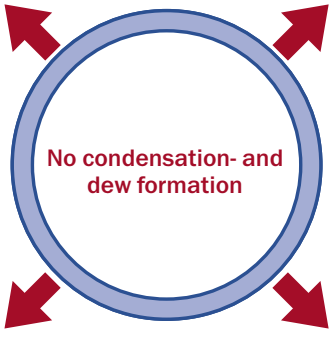


Vulnerable to corrosion:
therefore quickly unsightly and defective

Thermal conductivity by comparison

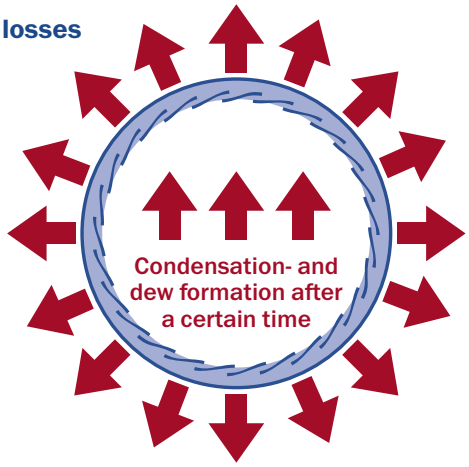
VENTAFLEX® air duct insulated

Above average high insulation values WLG 022 – almost no thermal losses



Conventional duct

High thermal losses



Heat permeability: U-value

The U-value is a measure for the heat transition through a component and is specified in W/(m²K). With the U-value it is also expressed, which thermal output per m² innersurface of the VENTAFLEX® air duct is needed to maintain the temperature in the ventilation system.

The smaller the U-value, the better, because less heat is guided through the component

Formular:

$$R = \frac{d}{\lambda}$$

$$U = \frac{1}{R}$$

U-value unit = W/(m²K)

Thermal resistance R unit = (m²K)/W
d = material thickness in meter (m)
= Lambda W/(mK) (thermal conductivity of building materials) WLG

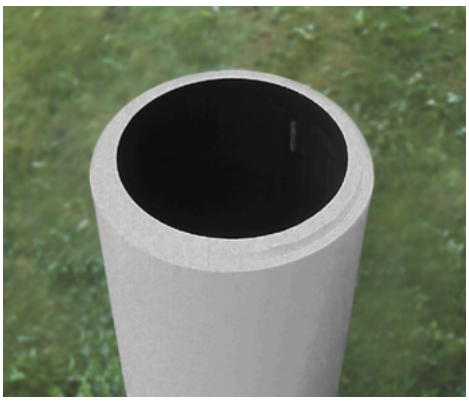
Example:

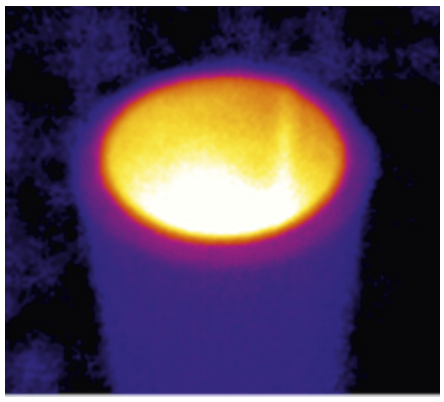
VENTAFLEX® air duct with a material thickness of 50 mm and thermal conductivity of the building material PUR foam is 0,022 W/(mK)

$$R = \frac{0{,}05\ m}{0{,}022\ W/(mK)} = 2{,}27\ (m^2K/W)$$

$$U = \frac{1}{2{,}27\ (m^2K)/W} = 0{,}44 W/(m^2K)$$

The U-value for the VENTAFLEX® ducts with a wall thickness of 50 mm is 0,44 W/(m²K).





The thermo camera shows the thermal protection of the VENTAFLEX® air ducts.
The ducts are made of PUR rigid foam in the core. This makes for ideal insulation values (WLG 022).

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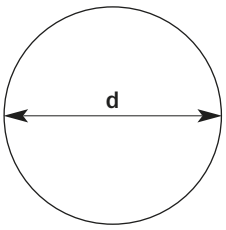
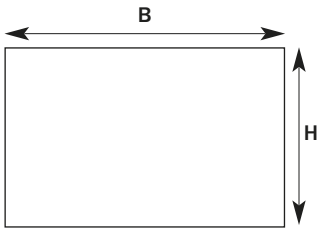
Duct- and sewer frictional loss

1. Calculation of the frictional pressure loss



$$\Delta pv = \lambda \cdot \frac{L}{d} \cdot \frac{\rho}{2} \cdot w^2$$



$$\Delta pv = \lambda \cdot \frac{L}{d_h} \cdot \frac{\rho}{2} \cdot w^2$$

$$d_h = \frac{L \cdot B \cdot H}{B + H}$$

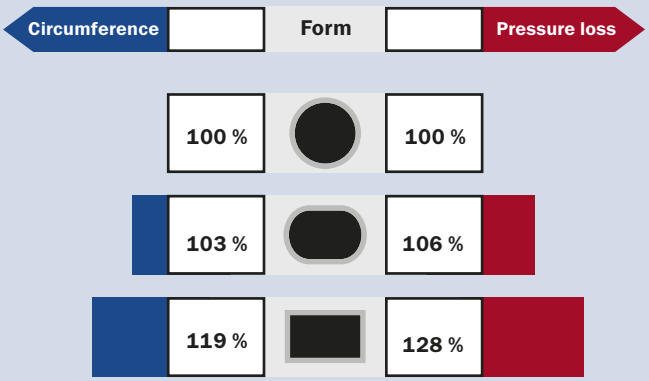
2. Parameters

p = Pressure loss
= coefficient of duct friction (VENTAFLEX® GRP coating ...)
L = duct length in [m]
d = diameter respectively dh = hydraulic diameter in[m]
= air density in [kg/m³]
w = flow velocity in [m/s]

3. Comparison of the pressure losses

Round and oval air ducts are clearly more streamlined than square air ducts. Thus round air ducts have 20% less surface than square channels with the same performance.
Due to lower pressure losses a small fan can be used. When installing VENTAFLEX® air ducts round or oval operating costs are sustainably saved.

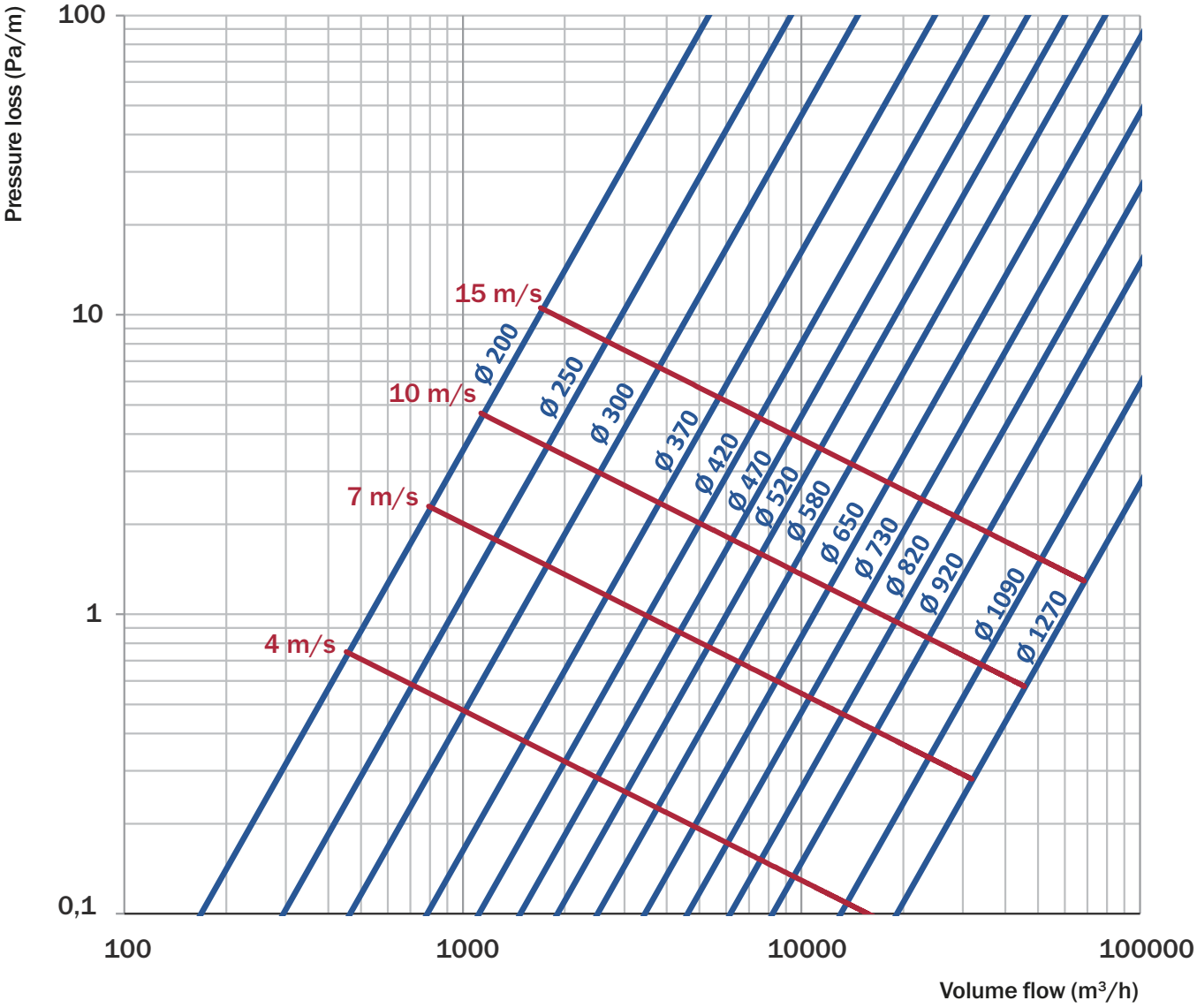
Comparison: Form of the duct and pressure loss



Influence of the duct form on material consumption (weight/ statics) and pressure loss (energy consumption/ operating costs) at the same cross-section area

Pressure loss insulated air duct round

For information regarding other duct forms and molded parts please contact us.



Permitted pressures for VENTAFLEX® Products

Name	Series	Overpressure/pa	Negative pressure/pa
VENTAFLEX® air duct	200 – 900	5.000	5.000
VENTAFLEX® air duct oval	500 – 1250	1.000	1.000
Square air channels		on request	
Square molded parts		on request	

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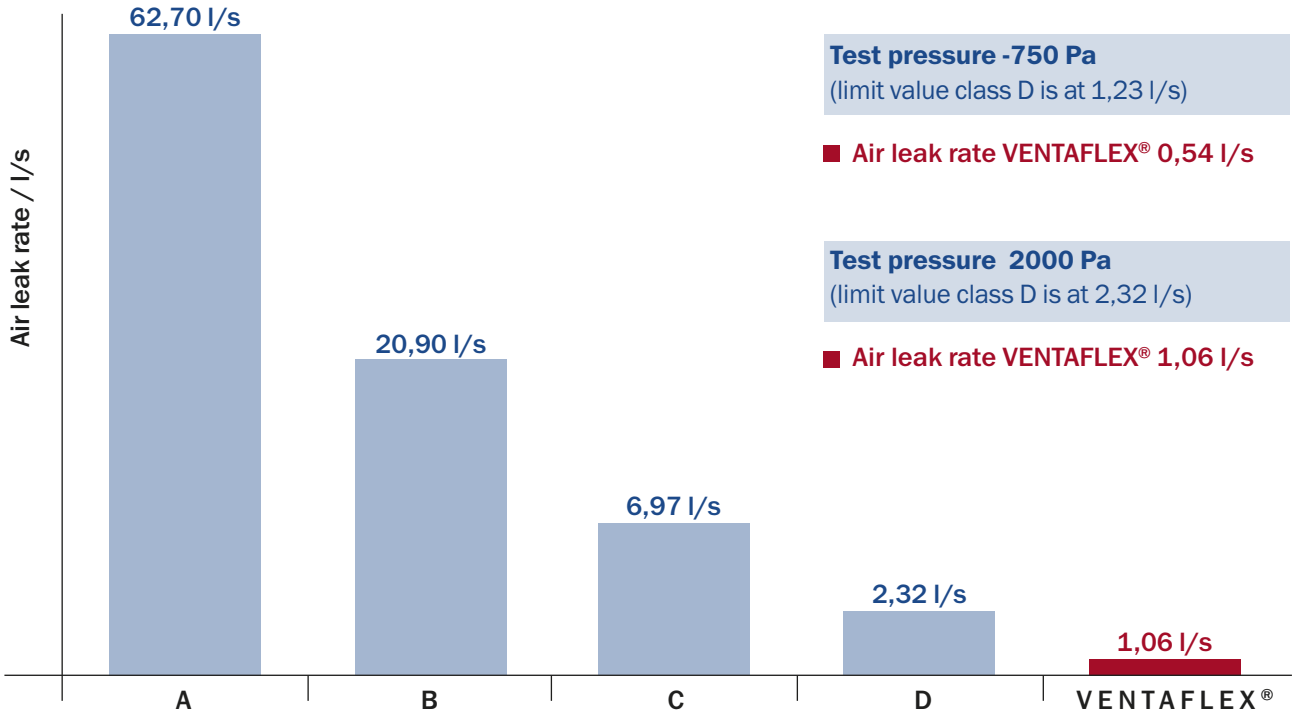
Tightness air duct round

Limit values of the air leak rate according to EN 13779 and EN 16798-3

Air tightness class		Limit value of the air leak rate	Negative for all tightness classes	Positive at tightness class 1	Positive at tightness class 2	Positive at tightness class 3
EN 13779	EN 16798-3					
A	ATC 5	0,027 x $Pt^{0,65}$	200	400	1000	2000
B	ATC 4	0,009 x $Pt^{0,65}$	500	400	1000	2000
C	ATC 3	0,003 x $Pt^{0,65}$	750	400	1000	2000
D	ATC 2	0,001 x $Pt^{0,65}$	750	400	1000	2000
Air tightness class VENTAFLEX® D+		**< 0,0004 x $Pt^{0,65}$**	**750**	**400**	**1000**	**2000**
	ATC 1	0,00033 x $Pt^{0,65}$	750	400	1000	2000

Leakage test according to EN 12237 examined surface 16,6 m²



The results of VENTAFLEX® air ducts for the limit value class D are more than twice as good as necessary.

Ventilation systems in the hygiene sector

Certifications by the Berlin Institution for air hygiene

For the areas in which cleanliness and easy cleaning play a role – like e.g. in the food processing industry, research, pharmaceutical industry and care facilities, swimming pools or high-tech – VENTAFLEX® ducts show clean room character. They satisfy highest hygienic requirements, especially because of the germ-resistant surfaces, the avoidance of condensate due to exceptionally good insulation and easy cleaning because of the smooth and resistant GRP-surfaces. Many realised big projects from the hygiene sector can be found as Practise Reports on our website.

FURTHER CERTIFICATIONS	VDI guideline 6022 (D) SWKI VA104-01 (CH) DIN 1946-4 (D) SWKI 99-3 (CH) ÖNORM H 6020 (AT) VDI 3803 (D) ÖNORM H 6021 (AT) DIN EN 13779 (EU)

Hygiene-requirements at RLT systems according to VDI6022

Requirement levels	Packaging ex works	Protection during transportation	Protection at storage at construction site	Cleaning at construction site	Sealing of the air duct opening
Minimum requirement	no	no	yes	yes	yes
Recommendation	yes	yes	yes	yes	yes

Hygiene protection packaging

Upon request our products can additionally be packed with a special self-adhesive foil. The price for this hygiene packaging is available on request.

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Durability

Chemical resistance

GRP is resistant against solvents, plasticisers, fuel, mineral oil, diluted acids and alkalis: moreover against the influence of exhaust gases or aggressive industrial atmosphere.

This is only an extract of the substance table – upon request you can get information about further resistances.

Substances (selection, more upon request)	Concentration	Resistance at 20-30 °C
Acetone		○ ○
Ammoniac		● ● ●
Petrol		● ● ●
Grease		● ● ●
Formaldehyde		○ ○
Ocean water		● ● ●
Lactic acid		○ ○
Mineral oil		● ● ●
Sodium Chloride	saturated	● ● ●
Phosphoric acid	10 % aqueous diluted	● ● ●
Turpentine		○ ○
Citric acid		● ● ●

● ● ● **resistant** ○ ○ **conditionally resistant**

Further properties

Electrical conductivity	10e -12 S/m
Microbial inertness	certified according to standards VDI 6022
Erosion and emission of particles	certified according to EN 13401

Temperature resistance

PUR rigid foam is characterized by high mechanical strength and good dimensional stability in the building industry for temperature ranges from -40 to +60°C (long-term capacity). A short-term capacity up to +80°C is possible.

Organic resistance

PUR rigid foam does not rot, is mould- and decay resistant and physiologically harmless for the applications coming into question. Polyurethane rigid foam reacts chemically neutral.

Thermal expansion behaviour

Length change = expansion coefficient x initial length x temperature change

Example:

Expansion coefficient Ventaflex duct	= 0,00005 1/K
Initial length	= 1000 mm
Temperature change	= 20 K
0,00005 1/K x 1000 mm x 20 K	**= 1 mm**

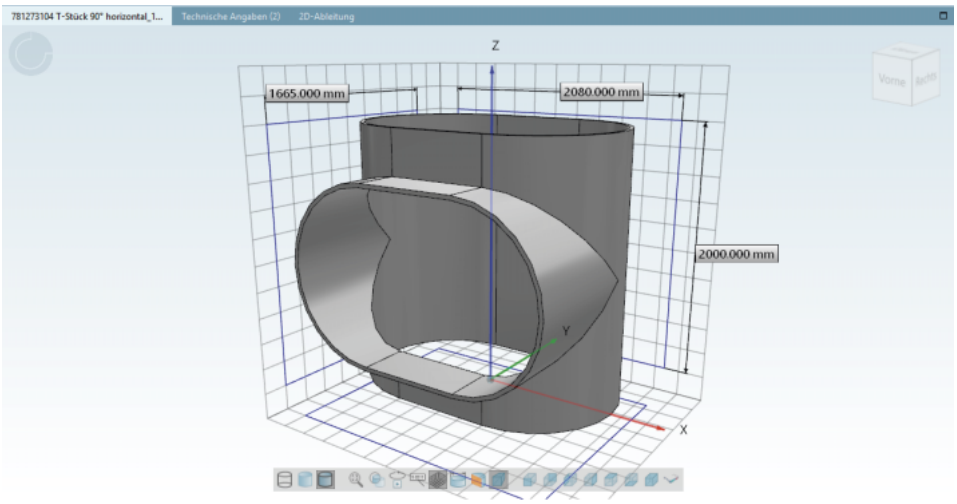
Expansion 1mm per 1m duct length at 20 °C temperature change

Planning and service

BIM/ CAD-models

VENTAFLEX® products now in 3D (Multi CAD product catalog data) – usable for all planners and architects working with BIM

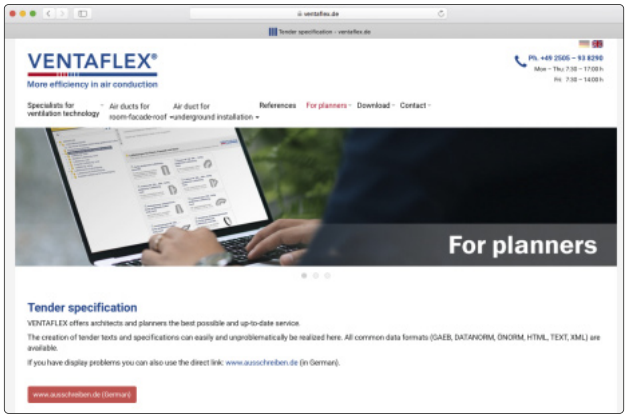
3D CAD-models are available in over 100 different file formats like for example: Revit, CATIA, Inventor, SolidWorks, Creo Parametric, NX, AutoCAD or Solid Edge



3D Multi CAD drawings
+ append points
+ 2D dimensional drawings
+ measurement charts
+ PDF data sheets
+ supplies

Tender documents

The preparation of tenders and specifications can be done comfortably and easily with the templates from the download area.



So simple and convenient

Download BIM ready drawings + tender documents directly from our website: www.ventaflex/downloads.de

Any questions?
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Fire protection

Classification of fire behaviour according to DIN EN 13501-1: 2010-01

Classification report 20160939/01 by the MPA Dresden GmbH:
The VENTAFLEX® air ducts have the classification “E”. A contribution of the VENTAFLEX® system to fire emergence or – expansion is not to be expected when using a suitable firewall or fire dampers.

From the classification report of the fire behaviour for the VENTAFLEX® air ducts it arises that GRP/ PU GRP compounds don’t continue to burn independantly and are not dripping. Upon request you can get the complete classification and test report.

Application area
This classification is valid for construction products with a wall thickness of ⩾ 49mm as well as for free-standing/ free-hanging applications with a distance of ⩾ 80mm to other laminar construction products. Appearing cutting edges respectively joints have to be closed.

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