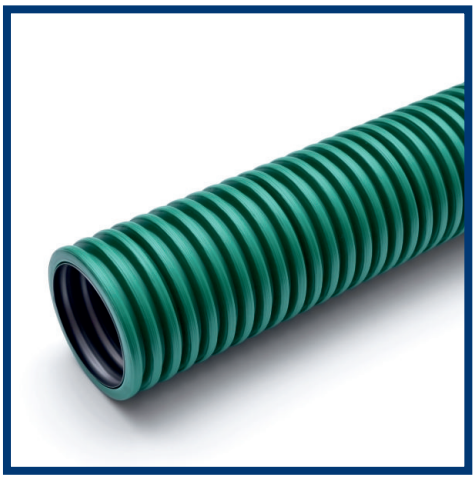
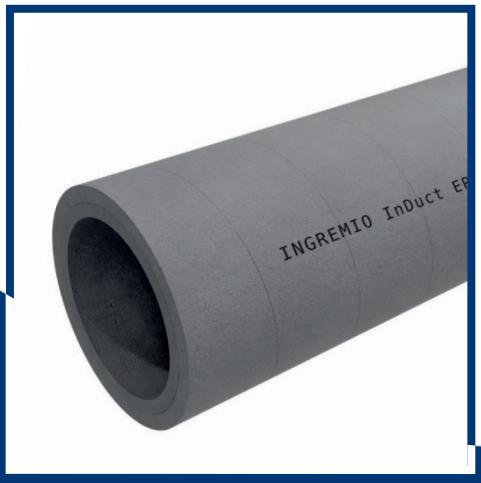
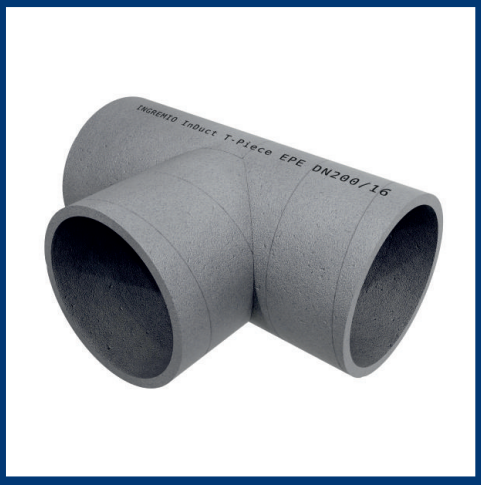
MODERN TECHNICAL IDEA

inGremio®







INDUCT EPE
AIRFLEX SPECTRA-1000 LS0H
BLACKFLEX SPECTRA-1000
BLACKFLEX SPECTRA-200
NAVIFLEX SPECTRA-200

SPECTRA
ANTIMICROBIAL PROTECTION FOR POLYMERS

PRODUCTS FOR THE VENTILATION INDUSTRY

The Ingremio InDuct EPE rigid ventilation duct system is designed for building applications in mechanical ventilation, air conditioning, and heat pump installations. The system is made of expanded, closed-cell EPE polyethylene foam, characterized by high flexibility, elasticity, resistance to cracks, mechanical strength and excellent impact strength. Thanks to this, the InDuct EPE system is deformable, allowing the ducts to be adapted to specific installation conditions. The system is distinguished by excellent insulating properties in terms of thermal and acoustic conductivity. Thanks to its insulating properties, the system minimizes heat loss, which improves energy efficiency and reduces heating costs. Thanks to the soft structure of foamed EPE polyethylene, both ducts and accessories effectively reduce noise generated during air transport, even at high flow rates - noise related to air movement and fan operation is suppressed, which translates into higher acoustic comfort in rooms. The operating temperature range of -30°C to +60°C allows the InDuct EPE system to be used in the most demanding climatic conditions. The system is completely resistant to moisture and most chemical compounds. It does not absorb water, does not degrade under the influence of moisture, and therefore also works perfectly in environments with increased humidity, such as industrial facilities and rooms with increased hygiene requirements. High ageing resistance compared to other cheaper materials translates into a longer service life of the system and its constant parameters throughout the entire period of operation.

The precise construction of the InDuct EPE system pipes and accessories, as well as mechanical resistance, ensure high tightness of the system during operation, which translates into minimizing the risk of water vapor condensation inside the installation. This is particularly important in the context of preventing the formation of mold and fungi, which translates into maintaining a healthy and comfortable microclimate in the rooms.

A wide range of available InDuct EPE system variants allows for precise adjustment of the system to various installation needs. Different diameters – 125mm, 160 mm, 180 mm and 200 mm – and different wall thicknesses – 16 mm, 25 mm and 41 mm – enable optimal adaptation to the specifics of a given installation. This solution ensures maximum system efficiency, allowing for effective air flow and minimising energy losses.

The InDuct EPE system is distinguished by its simple processing and ease of installation. The elements can be easily cut and connected using sleeves and connection bands, without the need for complicated tools or specialist skills. This solution is suitable for both professional installers and individual users. The modular design, including straight sections, 90° and 45° elbows and "T" connectors, allows for flexible adaptation of the installation to various configurations.

The system is easily dismantled, which allows for cleaning the ducts and maintaining them in optimal condition throughout their service life. Advanced production technology makes the InDuct EPE system environmentally friendly – the material from which it is made does not contain any hazardous chemicals, is approved for contact with food and can be fully recycled.

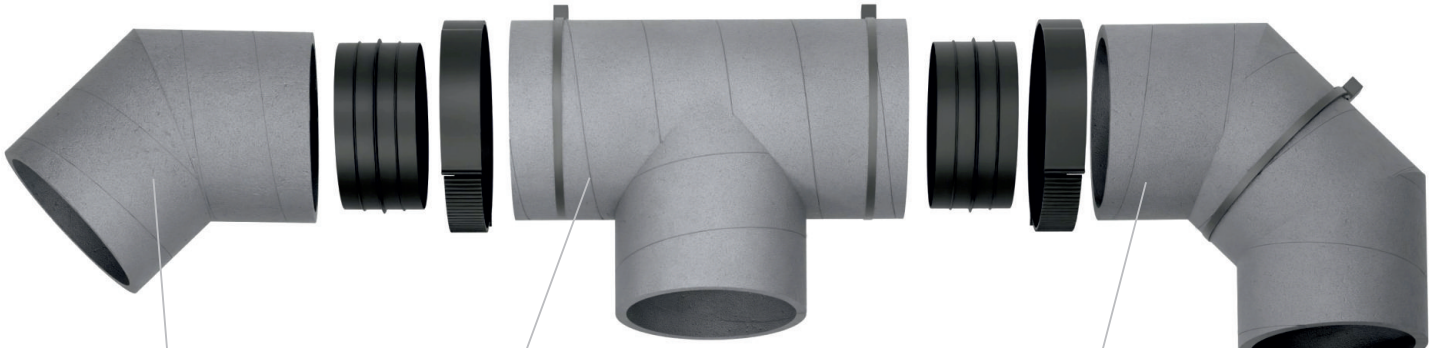
INDUCT EPE PIPE

Application: Air transport for ventilation, heating, cooling
Material: Closed-cell EPE polyethylene foam
Duct length: 2000 mm
Wall thickness: 16 mm, 25 mm, 41 mm
Available diameters: 125mm, 160 mm, 180 mm, 200 mm

EASY TO INSTALL
3 WALL THICKNESS
AVAILABLE IN 4 DIAMETERS
EXCELLENT ACOUSTIC PROPERTIES
IMPACT STRENGTH
WATER AND MOISTURE RESISTANCE
DEFORMABLE DUCT
°C
OPERATING TEMPERATURE -30°C / +60°C
E
REACTION TO FIRE CLASS E

NEW PRODUCT

SYSTEM INDUCT EPE



TEE CONNECTOR

The EPE ventilation tee connector is a practical solution for distributing air flow. The use of couplers and ties guarantees a tight and stable connection.

90° ELBOW

90° elbow for connecting EPE ventilation pipes, available in four diameters and three wall thicknesses, connected using connectors and clamps. Ensures tightness and easy assembly.

45° ELBOW

45° elbow for connecting EPE ducts, available in four diameters and wall thicknesses, enables solid connection of ventilation pipes using connectors and clamps. It guarantees durability, tightness and ease of installation.

CONNECTOR

To ensure a tight connection of the InDuct EPE system have, been designed a dedicated connectors of the system, which are available in four sizes: 125mm, 160mm, 180mm and 200mm.

CLAMP BAND

A clamping band for pipes, elbows and tees available in twelve sizes, additionally secures the connection and improves the aesthetics of the connection. The bands have a special design that allows easy assembly and disassembly, which allows for convenient cleaning of the installation.

BRACKETS

EPE pipe mounting brackets guarantee stable installation and their simple design allows for quick and easy use. Mounting can be either with an expansion bolt or with an 8mm threaded rod.

DUCT REDUCTION

The InDuct EPE ventilation duct reduction allows you to connect ventilation systems of different diameters. It will work very well in all heat recovery installations.

OUTER REDUCTION COVER

The outer cover of the InDuct EPE ventilation duct reducer provides additional protection and improves the aesthetics of the connection.

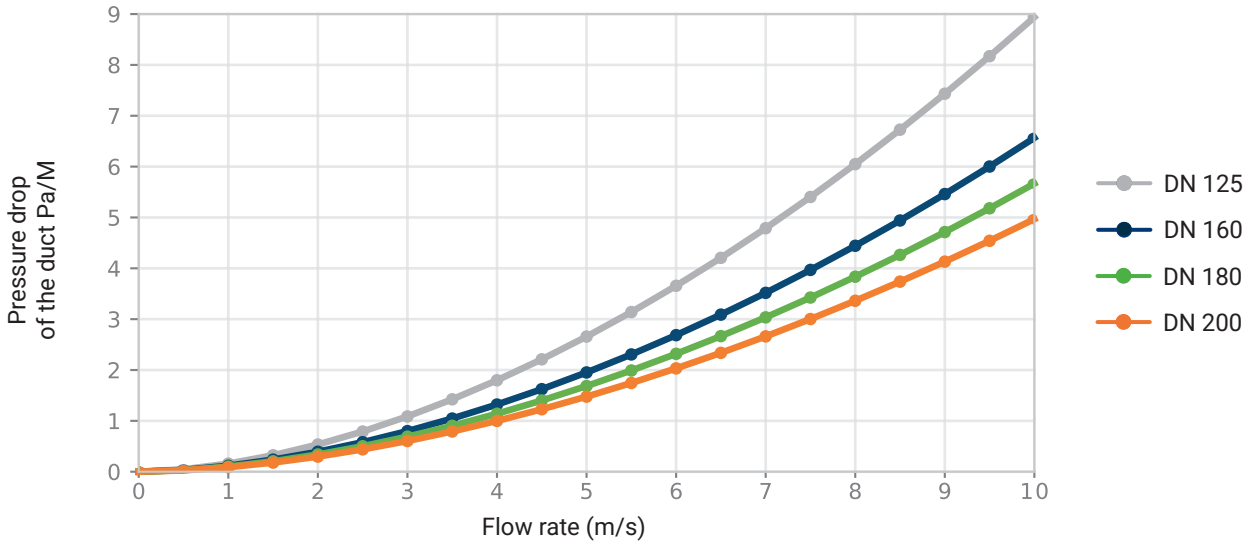
HOLDING BAND

A clamp used to permanently attach the system to walls and ceilings.

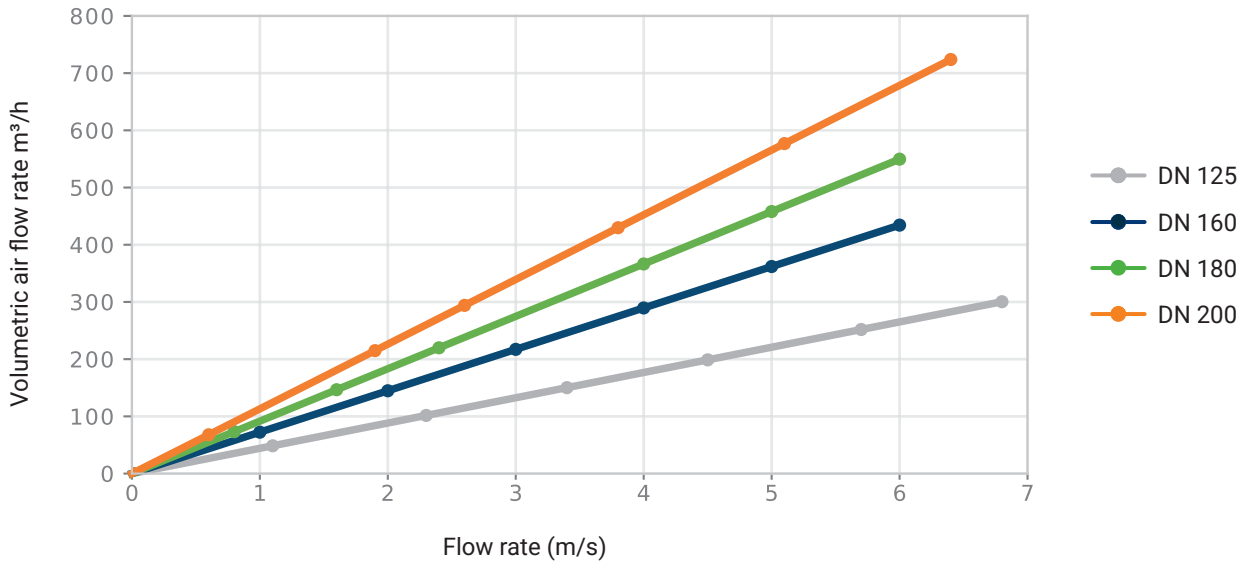
AVAILABLE DIMENSIONS OF PIPES, ELBOWS AND TEES

Nominal diameters (mm)	Inner diameter (mm)	Outer diameters (mm)	Wall thickness (mm)
125	125	157	16
125	125	175	25
125	125	207	41
160	160	192	16
160	160	210	25
160	160	242	41
180	180	212	16
180	180	230	25
180	180	262	41
200	200	232	16
200	200	250	25
200	200	282	41

DEPENDENCE OF PRESSURE DROP ON AIR VELOCITY



AIR FLOW DEPENDENCE ON AIR SPEED



VENTILATION DUCTS WITH ANTIBACTERIAL, ANTIFUNGAL AND ANTISTATIC PROPERTIES

The Airflex Spectra-1000 ventilation ducts are used for air transfer in ventilation and recuperation systems in residential, public and industrial buildings.

The internal wall is entirely made of antibacterial and antifungal material, which protects the ducts from colonisation by undesirable and dangerous for people microorganisms. The material of which the ducts are made was developed by Ingremio and is protected by patents. It was created in cooperation with scientific centres in the course of a research project, during which high effectiveness for different types of bacteria and fungi was confirmed. The material contains silver, copper and other microbiologically active compounds in the polymer matrix so that they do not undergo migration, ionisation and elution. The virtual absence of biologically active compounds migration from the polymer has been confirmed in the laboratory tests that were performed in significantly more aggressive environments compared to these of ventilation systems. The substances used ensure in practice an indefinite bactericidal and fungicidal effect and prevent the formation of defensive mechanisms by bacteria and fungi regardless of air temperature and humidity. The composition of the materials used is entirely safe for people, animals and plants. Moreover, all materials used are approved for food contact.

The ducts are characterised by very high flexibility, so that they can be freely shaped, bent at very small radii (according to the permissible bending radii) and adapt to the installation conditions, without the need for additional fasteners and fittings.

The duct structure ensures mechanical compression strength over 500 N, which allows for their pouring over with structural concrete while performing construction works.

The internal duct wall also has an antistatic effect, which reduces settling and accumulation of dust in the ducts. The smooth internal surface allows for high air flows with low-pressure losses, contributing to the low energy consumption of the entire system. It also makes it easier to clean the ducts if necessary. The double-wall structure of the ventilation ducts with a properly profiled internal wall and closed air voids to a large extent suppresses the entry of noise caused by air flowing inside and thermally insulates.

The Airflex Spectra-1000 ventilation ducts are available in a wide range of diameters, which allows for optimal selection to meet the requirements of the ventilation system and construction conditions. The duct ends are secured and sealed during the production process. The entire coil is protected with foil, which prevents possible contamination during transport and storage.

According to the Regulation of the Minister of Infrastructure on technical conditions to be met by buildings and their location, the Airflex Spectra type ventilation ducts should be installed in single-family buildings which are not subject to requirements concerning reaction to fire.

AIRFLEX SPECTRA-1000

Reaction to fire class: **D-s2,d2** (PN-EN 13501-1:2019-02)
Compression strength: **500N** (PN-EN 61386-24)
Impact resistance: **N** (PN-EN 61386-24)
Longitudinal stiffness: **flexible ducts** (3 x DN PN-EN 13180:2004)
Working temperatures: **STL -15°C to STH +50°C** (PN-EN 17192:2019)
Material: **modified polyethylene** (HDPE-mod.) **approved for food contact**

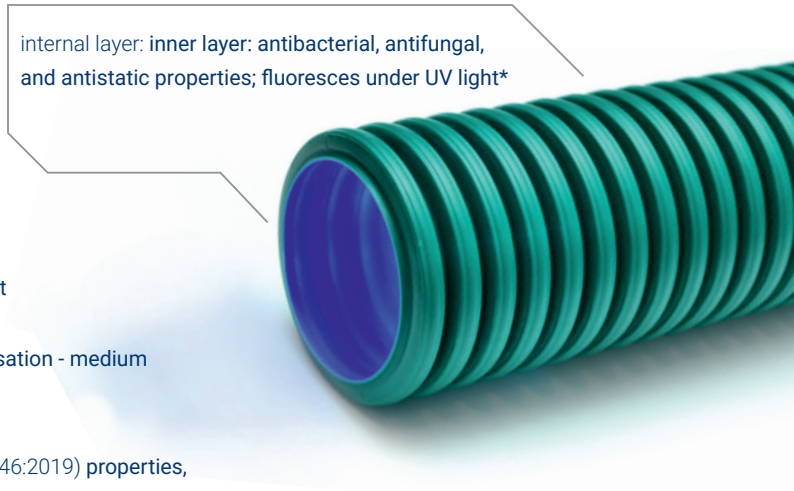
External layer:

Properties: **high impact strength and mechanical resistance, UV stabilisation - medium**
Colour: **green**

Internal layer:

Properties: **Antibacterial** (ISO 22196:2011) **and antifungal** (PN-EN ISO 846:2019) **properties, antistatic, smooth surface, fluoresces under UV light**
Global migration (average): **< 0,5 mg/dm2** (PN-EN 1186-3:2005 and PN-EN 1186-14:2005)
Colour: **silver**

internal layer: **inner layer: antibacterial, antifungal, and antistatic properties; fluoresces under UV light***



D — REACTION TO FIRE CLASS
HIGH IMPACT STRENGTH
Ag, Cu, +
ANTIFUNGAL PROPERTIES
ANTIBACTERIAL PROPERTIES
ANTISTATIC PRODUCT

AVAILABLE PIPE DIAMETERS

Nominal dimension DN (mm)	Inner diameter (mm)	Outer diameter (mm)	Minimum bending radius* (m)	Lengths of sections (m)
50	40	50,5	0,11	50
63	52	63,2	0,15	50
75	61	76,2	0,17	50
90	75	90,6	0,25	50
110	93	110,7	0,33	50
160	136	161	0,40	25 / 2
200	176	201,5	0,55	25 / 2

* temperature above 10°C

AIR FLOW CAPACITY (m^3/h)

Nominal dimension DN (mm)	Air velocity (m/s)						
	0,5	**1,0**	**1,5**	**2,0**	**3,0**	**4,0**	**5,0**
50	2,3	4,5	6,8	9,0	13,6	18,1	22,6
63	3,9	7,8	11,7	15,6	23,4	31,2	39,0
75	5,3	10,5	15,8	21,0	31,6	42,1	52,6
90	7,8	15,7	23,5	31,4	47,1	62,8	78,5
110	12,2	24,5	36,7	48,9	73,4	97,8	122,3
160	26,1	52,3	78,4	104,6	156,9	209,2	261,5
200	44,0	88,1	132,1	176,2	264,2	352,3	440,4

VENTILATION DUCTS WITH ANTIBACTERIAL, ANTIFUNGAL AND ANTISTATIC PROPERTIES

The BlackFlex Spectra 200 ventilation ducts are used for air transfer in ventilation and recuperation systems in residential, public and industrial buildings.

The internal wall is entirely made of material with antibacterial and antifungal properties. The material of which the ducts are made was developed by Ingremio and is protected by patents. It was created in cooperation with scientific centres in the course of a research project, during which high effectiveness for different types of bacteria and fungi was confirmed. The material contains silver, copper and other microbiologically active compounds in the polymer matrix so that they do not undergo migration, ionisation and elution. The virtual absence of biologically active compounds migration from the polymer has been confirmed in the laboratory tests that were performed in significantly more aggressive environments compared to these of ventilation systems. The substances used ensure in practice an indefinite bactericidal and fungicidal effect and prevent the formation of defensive mechanisms by bacteria and fungi regardless of air temperature and humidity. The composition of the materials used is entirely safe for people, animals and plants. Moreover, all materials used are approved for food contact.

The ducts are characterised by very high flexibility, so that they can be freely shaped, bent at very small radii (according to the permissible bending radii) and adapt to the installation conditions, without the need for additional fasteners and fittings.

The duct structure ensures mechanical compression strength over 500 N, which allows for their pouring over with structural concrete while performing construction works.

The internal duct wall also has an antistatic effect, which reduces settling and accumulation of dust in the ducts. The smooth internal surface allows for high air flows with low-pressure losses, contributing to the low energy consumption of the entire system. It also makes it easier to clean the ducts if necessary. The double-wall structure of the ventilation ducts with a properly profiled internal wall and closed air voids to a large extent suppresses the entry of noise caused by air flowing inside and thermally insulates.

The BlackFlex Spectra 200 ventilation ducts are available in a wide range of diameters, which allows for optimal selection to meet the requirements of the ventilation system and construction conditions. The duct ends are secured and sealed during the production process. The entire coil is protected with foil, which prevents possible contamination during transport and storage.

BLACKFLEX SPECTRA 200

internal layer: inner layer: antibacterial, antifungal, and antistatic properties; fluoresces under UV light*

Reaction to fire class: D-s2,d2 (PN-EN 13501-1:2019-02)

Compression strength: 500N (PN-EN 61386-24)

Impact resistance: N (PN-EN 61386-24)

Longitudinal stiffness: flexible ducts (3 x DN PN-EN 13180:2004)

Material: modified polyethylene (HDPE-mod.) approved for food contact

External layer:

Properties: high impact strength and mechanical resistance, UV stabilisation - medium

Colour: black

Internal layer:

Properties: Material with antibacterial and antifungal properties, antistatic, smooth surface.

Global migration (average): < 0,5 mg/dm2 (PN-EN 1186-3:2005 and PN-EN 1186-14:2005)

Colour: transparent

D — REACTION TO FIRE CLASS

HIGH IMPACT STRENGTH

Ag, Cu, + — ANTIBACTERIAL, ANTIFUNGAL PROPERTIES

ANTISTATIC PRODUCT

AVAILABLE PIPE DIAMETERS

Nominal dimension DN (mm)	Inner diameter (mm)	Outer diameter (mm)	Minimum bending radius* (m)	Lengths of sections (m)
50	40	50,5	0,11	50
63	52	63,2	0,15	50
75	61	76,2	0,17	50
90	75	90,6	0,25	50
110	93	110,7	0,33	50
160	136	161	0,40	25 / 2
200	176	201,5	0,55	25 / 2

* temperature above 10°C

AIR FLOW CAPACITY (m^3/h)

Nominal dimension DN (mm)	Air velocity (m/s)						
	0,5	**1,0**	**1,5**	**2,0**	**3,0**	**4,0**	**5,0**
50	2,3	4,5	6,8	9,0	13,6	18,1	22,6
63	3,9	7,8	11,7	15,6	23,4	31,2	39,0
75	5,3	10,5	15,8	21,0	31,6	42,1	52,6
90	7,8	15,7	23,5	31,4	47,1	62,8	78,5
110	12,2	24,5	36,7	48,9	73,4	97,8	122,3
160	26,1	52,3	78,4	104,6	156,9	209,2	261,5
200	44,0	88,1	132,1	176,2	264,2	352,3	440,4

VENTILATION DUCTS WITH ANTIBACTERIAL, ANTIFUNGAL AND ANTISTATIC PROPERTIES

The GreyFlex Spectra 200 ventilation ducts are used for air transfer in ventilation and recuperation systems in residential, public and industrial buildings.

The internal wall is entirely made of material with antibacterial and antifungal properties. The material of which the ducts are made was developed by Ingremio and is protected by patents. It was created in cooperation with scientific centres in the course of a research project, during which high effectiveness for different types of bacteria and fungi was confirmed. The material contains silver, copper and other microbiologically active compounds in the polymer matrix so that they do not undergo migration, ionisation and elution. The virtual absence of biologically active compounds migration from the polymer has been confirmed in the laboratory tests that were performed in significantly more aggressive environments compared to these of ventilation systems. The substances used ensure in practice an indefinite bactericidal and fungicidal effect and prevent the formation of defensive mechanisms by bacteria and fungi regardless of air temperature and humidity. The composition of the materials used is entirely safe for people, animals and plants. Moreover, all materials used are approved for food contact.

The ducts are characterised by very high flexibility, so that they can be freely shaped, bent at very small radii (according to the permissible bending radii) and adapt to the installation conditions, without the need for additional fasteners and fittings.

The duct structure ensures mechanical compression strength over 500 N, which allows for their pouring over with structural concrete while performing construction works.

The internal duct wall also has an antistatic effect, which reduces settling and accumulation of dust in the ducts. The smooth internal surface allows for high air flows with low-pressure losses, contributing to the low energy consumption of the entire system. It also makes it easier to clean the ducts if necessary. The double-wall structure of the ventilation ducts with a properly profiled internal wall and closed air voids to a large extent suppresses the entry of noise caused by air flowing inside and thermally insulates.

The GreyFlex Spectra 200 ventilation ducts are available in a wide range of diameters, which allows for optimal selection to meet the requirements of the ventilation system and construction conditions. The duct ends are secured and sealed during the production process. The entire coil is protected with foil, which prevents possible contamination during transport and storage.

GREYFLEX SPECTRA 200

Reaction to fire class: **flammable duct F** (PN-EN 13501-1:2019-02)
Compression strength: **500N** (PN-EN 61386-24)
Impact resistance: **N** (PN-EN 61386-24)
Longitudinal stiffness: **flexible ducts** (3 x DN PN-EN 13180:2004)
Material: **modified polyethylene** (HDPE-mod.) **approved for food contact**

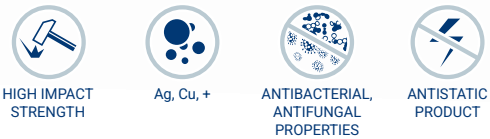
External layer:

Properties: **high impact strength and mechanical resistance, UV stabilisation - medium**
Colour: **grey**

Internal layer:

Properties: **Material with antibacterial and antifungal properties, antistatic, smooth surface.**
Global migration (average): **< 0,5 mg/dm2** (PN-EN 1186-3:2005 and PN-EN 1186-14:2005)
Colour: **white**

internal layer: **inner layer: antibacterial, antifungal, and antistatic properties; fluoresces under UV light***



AVAILABLE PIPE DIAMETERS

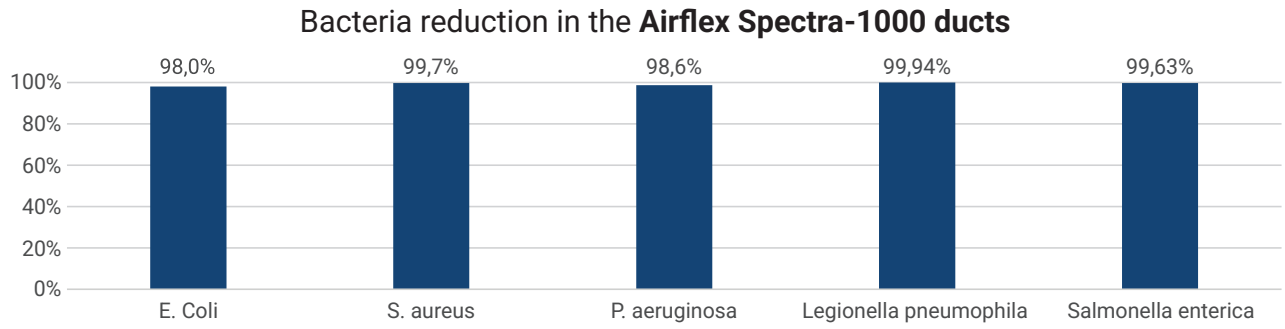
Nominal dimension DN (mm)	Inner diameter (mm)	Outer diameter (mm)	Minimum bending radius* (m)	Lengths of sections (m)
50	40	50,5	0,11	50
63	52	63,2	0,15	50
75	61	76,2	0,17	50
90	75	90,6	0,25	50
110	93	110,7	0,33	50
160	136	161	0,40	25 / 2
200	176	201,5	0,55	25 / 2

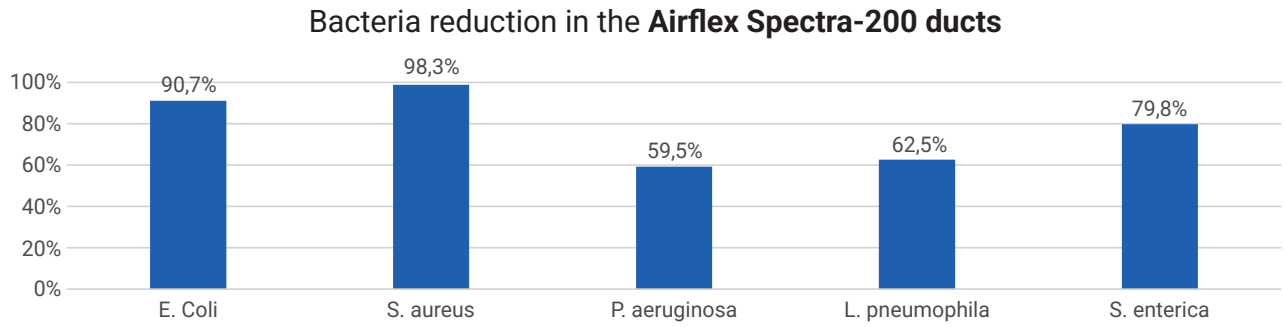
* temperature above 10°C

AIR FLOW CAPACITY (m^3/h)

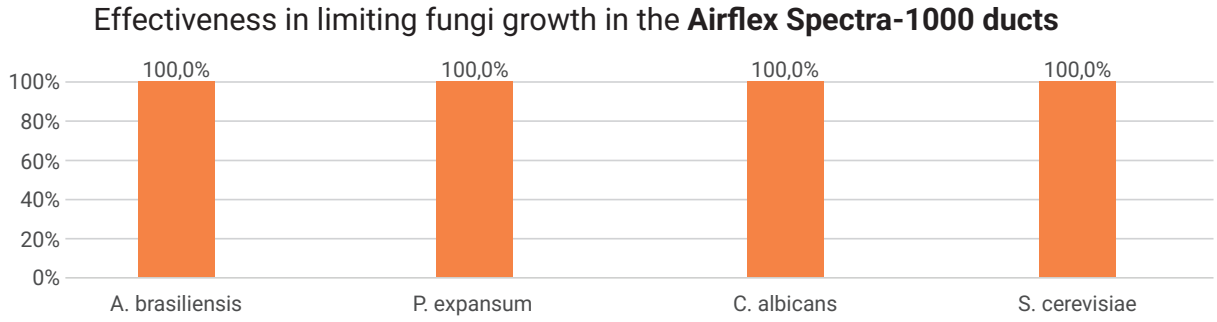
Nominal dimension DN (mm)	Air velocity (m/s)						
	0,5	**1,0**	**1,5**	**2,0**	**3,0**	**4,0**	**5,0**
50	2,3	4,5	6,8	9,0	13,6	18,1	22,6
63	3,9	7,8	11,7	15,6	23,4	31,2	39,0
75	5,3	10,5	15,8	21,0	31,6	42,1	52,6
90	7,8	15,7	23,5	31,4	47,1	62,8	78,5
110	12,2	24,5	36,7	48,9	73,4	97,8	122,3
160	26,1	52,3	78,4	104,6	156,9	209,2	261,5
200	44,0	88,1	132,1	176,2	264,2	352,3	440,4

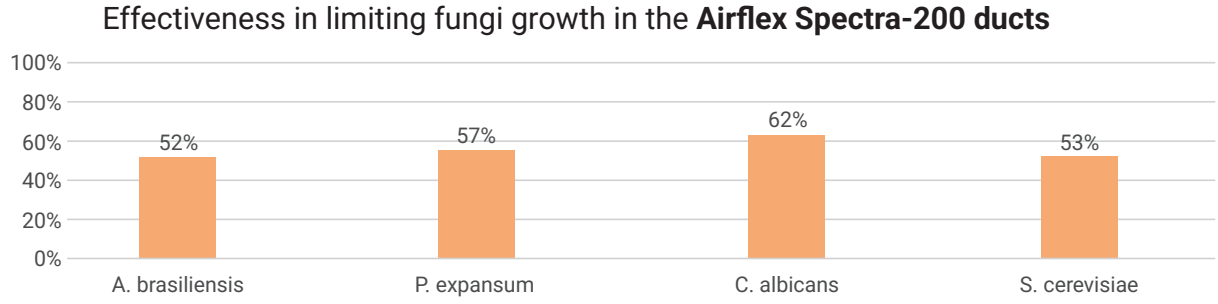
COMPARISON OF MICROBIOLOGICAL PROTECTION PROPERTIES





Test of antibacterial properties of the polymer material in a 24 h test. The graph shows the bacteria reduction degree after 24 h contact with the Airflex Spectra sample.

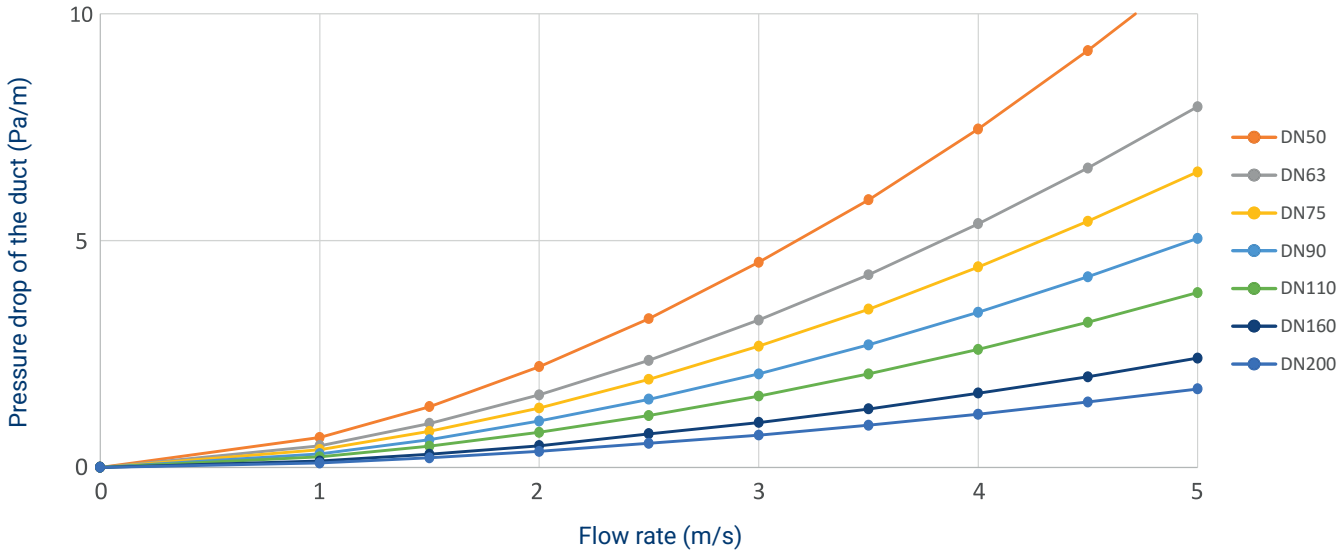




Test of fungistatic properties of the polymeric material in a 28-day test. The presented values may include a deviation resulting from the applied measurement method (0.1%).

The antibacterial and fungistatic properties tests were performed according to ISO 22196:2011 and PN-EN ISO 846:2019 in the following accredited microbiological laboratory: Łukasiewicz - Institute for Engineering of Polymer Materials & Dyes/ TB Laboratory in Toruń. The microbiologically active compounds migration test was performed according to PN-EN1186-3:2005 and PN-EN1186-14:2005 standards in J.S. Hamilton Poland accredited laboratory. The reaction to fire tests of the Airflex Spectra-1000 HFFR ducts were performed according to PN-EN 61386-24 standard in accredited Sychta Laboratory. The products hold the PZH Hygiene Certificate.

DEPENDENCE OF THE SPECIFIC PRESSURE DROP ON THE AIR VELOCITY IN AIRFLEX, BLACKFLEX AND GREYFLEX DUCTS



ACCESSORIES

CONNECTORS – MKD

For every Airflex Spectra dimension, the HDPE female connectors in black are available. The female connectors provide a fast, durable and disconnection-resistant duct connection.

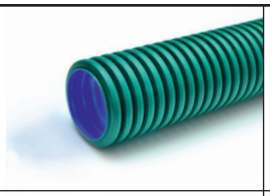
GASKETS - UKD

Specially designed gaskets guarantee a tight ducts connection and the system low energy consumption.

CAPS - ZKD

The caps protect the ducts from all contamination during transport, storage and installation.

PROPERTY COMPARISON

The criteria	 AirFlex Spectra-1000 LS0H	 BlackFlex Spectra-200	 GreyFlex Spectra-200
Antistaticity	★★★★★	★★★★★	★★★★★
Antibacterial properties	★★★★★	★★★☆☆	★★★☆☆
Antifungal properties	★★★★★	★★★☆☆	★★★☆☆
Fluoridating layer Inside	★★★★★	★★★☆☆	★★★☆☆
Reaction to fire	★★★☆☆	★★★☆☆	★★★☆☆
Research, approvals, certificates, declarations	★★★★★	★★★☆☆	★★★☆☆
Possibility to produce a different color from the RAL palette	★★★★★	☆☆☆☆☆	★★★★★
Guarantee	30 years*	30 years*	30 years*

* Warranty period for ducts installed in places not exposed to UV radiation

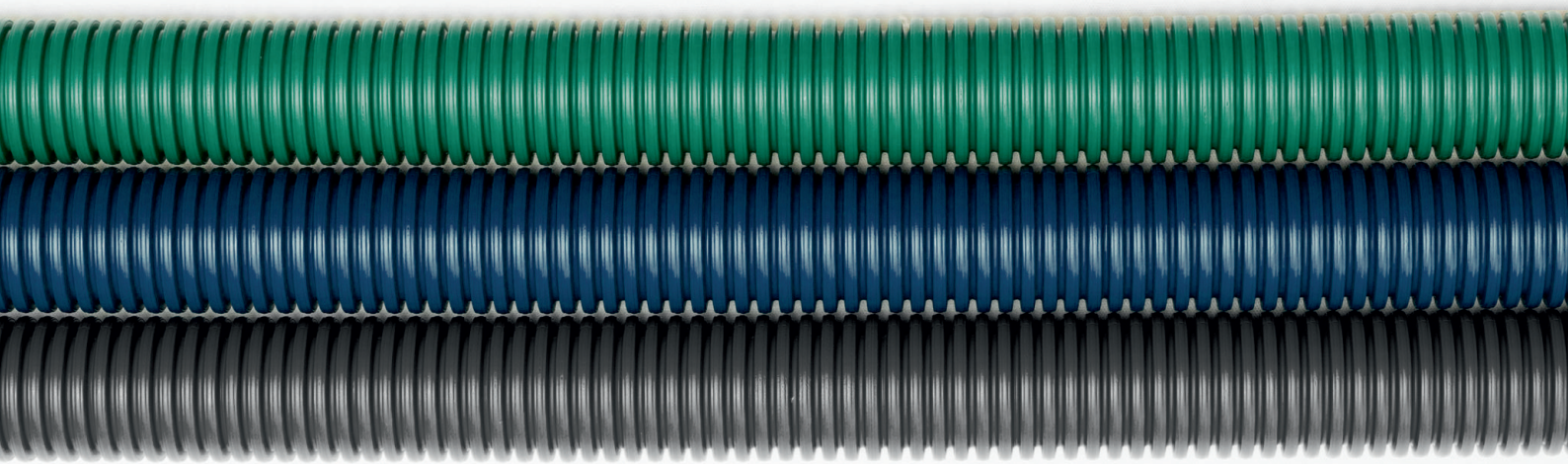
AVAILABLE PIPE DIAMETERS

Nominal dimension DN (mm)	Inner diameter (mm)	Outer diameter (mm)	Minimum bending radius* (m)	Lengths of sections (m)
50	40	50,5	0,11	50
63	52	63,2	0,15	50
75	61	76,2	0,17	50
90	75	90,6	0,25	50
110	93	110,7	0,33	50
160	136	161	0,40	25 / 2
200	176	201,5	0,55	25 / 2

* temperature above 10°C

AIR FLOW CAPACITY (m^3/h)

Nominal dimension DN (mm)	Air velocity (m/s)						
	0,5	**1,0**	**1,5**	**2,0**	**3,0**	**4,0**	**5,0**
50	2,3	4,5	6,8	9,0	13,6	18,1	22,6
63	3,9	7,8	11,7	15,6	23,4	31,2	39,0
75	5,3	10,5	15,8	21,0	31,6	42,1	52,6
90	7,8	15,7	23,5	31,4	47,1	62,8	78,5
110	12,2	24,5	36,7	48,9	73,4	97,8	122,3
160	26,1	52,3	78,4	104,6	156,9	209,2	261,5
200	44,0	88,1	132,1	176,2	264,2	352,3	440,4



NOTES & COMMENTS

INGREMIO BRACIA KOTULSCY
Spółka Komandytowo-Akcyjna
ul. Laskowska 93
PL 32-329 Bolesław
phone +48 882 080 622
www.ingremio.pl
e-mail: hvac@ingremio.pl