



Air Duct Systems

2004–2007

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With your requirements in focus



Lindab is an international Group of companies that develops, produces and markets products and system solutions made from thin sheet metal within the business areas Ventilation (ventilation components and complete indoor climate solutions) and Profile (building components and complete constructions systems made of steel). The head office is situated in Grevie, near Båstad on the beautiful Bjäre peninsula, in southwestern Sweden.

Complete solutions for a good indoor climate

The core operation of the Ventilation business area is the Air Duct Systems product area. We offer a complete product range incorporating unique technical solutions. A number of product and service areas have been added around this central product range which, together with our IT solutions, make it possible for us to supply complete system solutions for ventilation.

A good indoor climate is far from a matter of course for everyone, even though it should be

an entirely natural part of our everyday lives. The indoor climate has now come up on the agenda in public debate. A good indoor climate means clean, fresh air, and this puts the focus on the ventilation system. This places demands on our customers, and we can help satisfying these demands.

Air and sound technology

The research and development work we carry out, including in our air and sound laboratories, ensures continuous product development as well as safeguarding the quality of our products' functions and properties. This also provides us with the potential to supply correct and advanced documentation for our products.

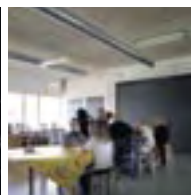
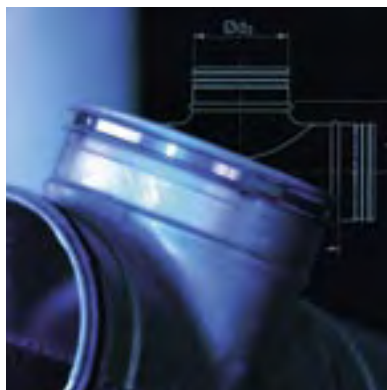
All in all, this means that we are well equipped to meet the market's needs for systems and components that provide the air quality and the comfortable and productive indoor climate that is increasingly being demanded.

Product Range

1

Air Duct Systems

The Air Duct Systems product area consists of a range of circular ducts and fittings, complemented by e.g. rectangular duct products and hoods. The products are used for the construction of ventilation systems and are the business area's core business.



2

3

Indoor Climate

The Indoor Climate product area includes three product programs - Comfort, Climate and Acoustics - all contributing to create a pleasant, healthy and productive indoor climate.

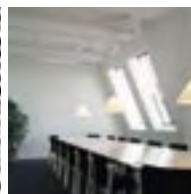
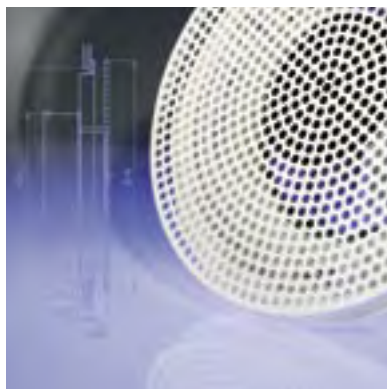


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Comfort includes products for supplying and extracting air to and from a ventilated area - such as diffusers, grilles and VAV systems - in order to achieve the required demands for the indoor climate.

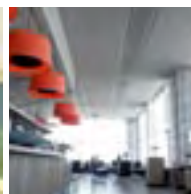
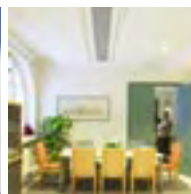
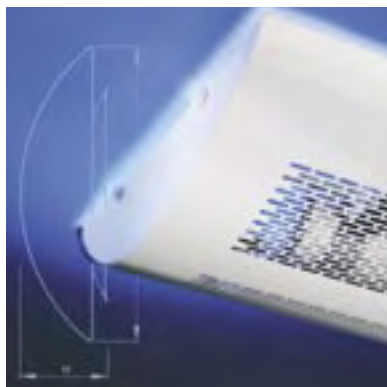


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Climate - Products use water for achieving the required indoor climate, such as chilled beams, chilled panels, induction units, heating panels and regulation equipment.



10

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Acoustics is a complete range of silencers which provide the basis for a quiet and pleasant ventilation system.

ITline

ITline is a software package for the design, calculation, quantification and planning of complete ventilation and indoor climate systems.

Ventilation Accessories

Some of our markets offer a network of branches, or One Stop Shops, where we keep a wide assortment of our standard products on stock, as well as all the tools and accessories needed for installation of ventilation equipment.

At Lindab branch shops we aim to offer our customers everything they need, all collected at one place.

ITline

1

Time is an essential factor in the dimensioning, design and calculation work for a ventilation system. The faster and more freely you can move between the different procedures and software packages, in your capacity as planner, the sooner you can hand over the finished work.

2

Here at Lindab we know that your time is expensive. We offer a large range of intelligent and rational tools that make your day-to-day work easier. In short, this gives you the opportunity to develop optimal, reliable ventilation solutions in the shortest possible time.

3

CADvent

An object-oriented AutoCAD® application with a complete toolbox for drawing, dimensioning, calculation, quantification and presentation of complete heating, ventilation and sanitation installations.

4

- Fast and easy to use, both in 2D and 3D
- The design functions cover dimensioning and calculation and include the market's most extensive and advanced toolbox
- Makes it possible for the engineer quickly and easily to be able to implement radical design alterations to a ventilation system, with automatic updating of the information
- Quantification functions for included materials - in total or per level/zone
- Attractive and accurate presentation of cross-sections and layouts

5

6

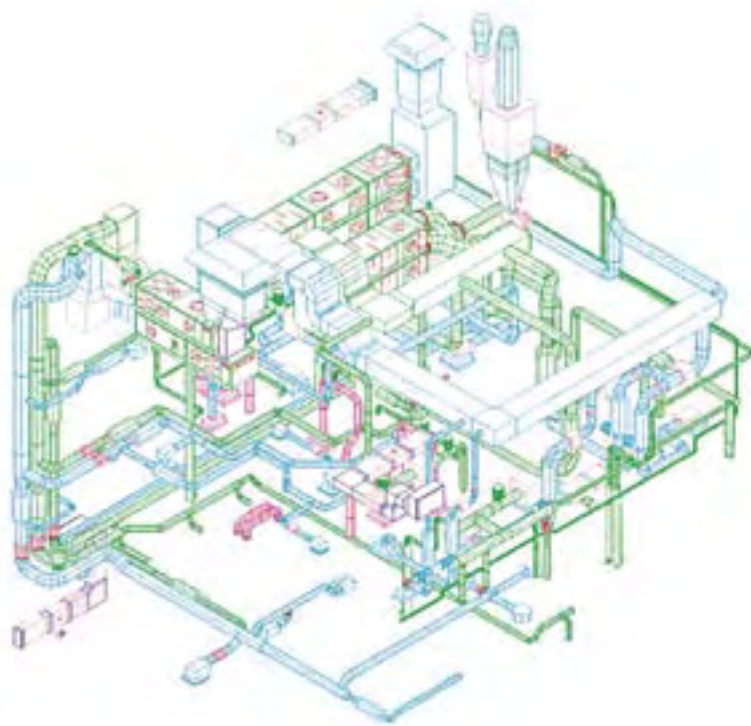
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- Database for the most commonly occurring products on the market - complies with Swedish standard for replacement of information
- 4D - linked to our project planning system, we include time - the fourth dimension - in the project. This provides the potential for delivery planning, suborder schedule and optimised project management

DIMcomfort

Product selection and dimensioning program for Lindab's inlet and outlet air devices, low-speed devices and gratings. Based on user-governed requirements, the program suggests suitable product alternatives.

- Can be used as a separate product selection program and can also be connected to CADvent
- Facilitates a rapid choice of devices and gratings
- Provides correct dimensioning and positioning of the products
- Provides calculation support for sound and temperature, as well as simulation of air flows from devices
- Potential to produce printouts of selected products
- Adjustment of inlet and outlet air flows in order to optimise the comfort level for those using the room
- Can be downloaded from www.lindab.com



DIMsilencer

Product selection and dimensioning program for Lindab's silencers that supplies detailed calculation support for effective soundproofing of duct systems. Based on user-governed requirements, the program suggests suitable product alternatives.

- Can be used as a separate product selection program and can also be connected to CADvent
- Rapid choice of silencers that satisfy stipulated requirements
- The values for our silencers are measured according to Swedish standard
- Complete system calculation from unit to room
- Fast and easy to alter requirements and conditions in order to find alternative solutions
- Potential to produce printouts of selected silencers
- Can be downloaded from www.lindab.com

Our new version of DIMsilencer is more user friendly, contains new measurement values measured according to a new standard, and has a built-in room module that makes it possible to conduct noise calculations adapted to the conditions in the room.

TEKNOsim

Our climate simulation program for indoor climates is very easy to use and can be used in all stages of the construction process. Finished constructions for walls, windows, ceilings and floors, as well as other functions, are selected from a database via dialogue boxes.

The program is general, i.e. you can choose whether the program is to dimension our products or not. When calculating the required cooling power, you can choose between air cooling (100% convection) or one of Lindab's products (a mixture of radiation and convection).

In addition to calculating the power requirement or resulting temperatures (air and operational), TEKNOsim also calculates the PPD index. The results are reported in both diagram and text form. All results can easily be transferred to other Windows programs, such as Word or Excel.

Can be downloaded from www.lindab.com



Training and support

We offer training and support on all our software:

- Basic introductory course
- Support during installation and start-up
- Further training on our software
- Seminars held at your company

Please feel free to register for one or our training sessions. Additional information is available at www.lindab.com or contact us via itcenter@lindab.com

Our IT solutions are there to make your work easier and more efficient. From project to finished building - fast, simple and reliable!

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General information and theory



Lindab

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General information and theory**2**

Safe

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Silencers

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Roof hoods

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Other circular products

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Dimensions

Designations and examples

These designations and dimensions of ducts and fittings are adapted to CEN standards.

Lengths are given in mm.

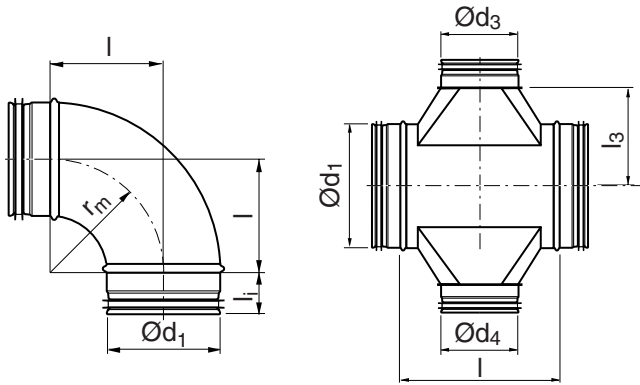
Angles are given in degrees.

Fittings with $\text{Ød}_1 - \text{Ød}_4$ fit inside ducts and fittings with Ød .

Duct and female dimension Ød

Connector dimension $\text{Ød}_1, \text{Ød}_2, \text{Ød}_3, \text{Ød}_4$

Sheet metal thickness t



Installation length l, l_1, l_2, l_3

Bend radius r_m

Insertion length l_i

Eccentricity cc

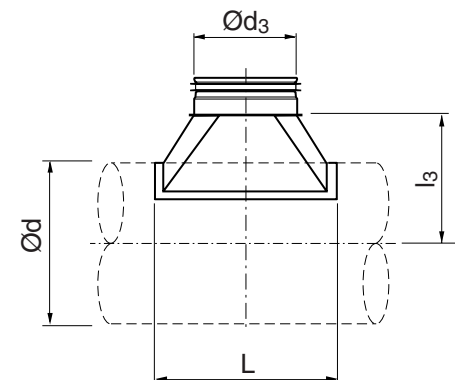
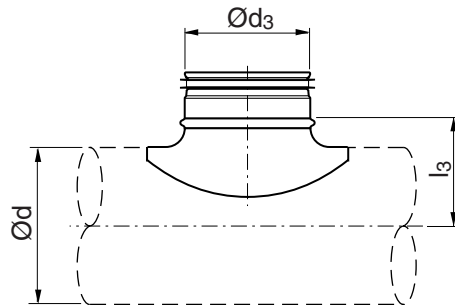
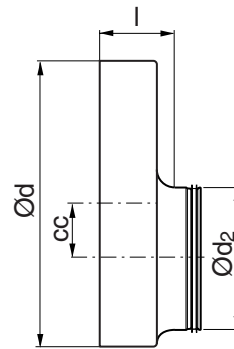
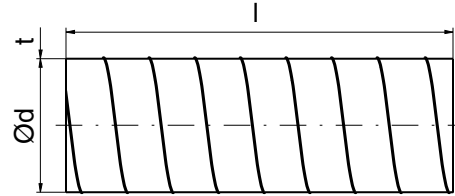
Component length L

Circumference O

Cross-sectional area A

Mass m

Linear mass m_l



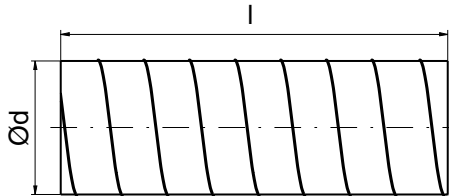


Tolerances

Bold face denotes standard dimensions.

Standard face denotes intermediate dimensions.

Ducts



According to EN1506

Ød nom	Tolerance range
63	63,0 – 63,5
80	80,0 – 80,5
100	100,0 – 100,5
112	112,0 – 112,5
125	125,0 – 125,5
140	140,0 – 140,6
150	150,0 – 150,6
160	160,0 – 160,6
180	180,0 – 180,7
200	200,0 – 200,7
224	224,0 – 224,8
250	250,0 – 250,8
280	280,0 – 280,9
300	300,0 – 300,9
315	315,0 – 315,9
355	355,0 – 356,0
400	400,0 – 401,0
450	450,0 – 451,1
500	500,0 – 501,1
560	560,0 – 561,2
600	600,0 – 601,2
630	630,0 – 631,2
710	710,0 – 711,6
800	800,0 – 801,6
900	900,0 – 902,0
1000	1000,0 – 1002,0
1120	1120,0 – 1122,5
1250	1250,0 – 1252,5
1400	1400,0 – 1402,8
1500	1500,0 – 1502,9
1600	1600,0 – 1603,1

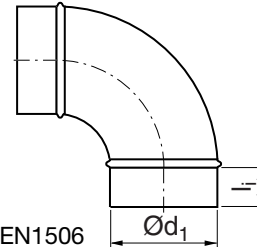
Length

l, l ₁ , l ₃ , etc	Tolerance
0-15	+0 -2
16-100	+0 -5
101-	+0 -10
L	±5

Angle

α	Tolerance
	±2°

Fittings



According to EN1506

Ød ₁ , d ₂ , d ₃ , d ₄ nom	Tolerance range	l _i nom
63	61,8 – 62,3	40
80	78,8 – 79,3	40
100	98,8 – 99,3	40
112	110,8 – 111,3	40
125	123,8 – 124,3	40
140	138,7 – 139,3	40
150	148,7 – 149,3	40
160	158,7 – 159,3	40
180	178,6 – 179,3	40
200	198,6 – 199,3	40
224	222,5 – 223,3	40
250	248,5 – 249,3	60
280	278,4 – 279,3	60
300	298,4 – 299,3	60
315	313,4 – 314,3	60
355	353,3 – 354,3	60
400	398,3 – 399,3	80
450	448,2 – 449,3	80
500	498,2 – 499,3	80
560	558,1 – 559,3	80
600	598,1 – 599,3	80
630	628,1 – 629,3	80
710	708,0 – 709,3	100
800	798,0 – 799,3	100
900	897,9 – 899,3	100
1000	997,9 – 999,3	120
1120	1117,8 – 1119,3	120
1250	1247,8 – 1249,3	120
1400	1397,3 – 1398,8	150
1500	1496,9 – 1498,5	150
1600	1596,5 – 1598,2	150

Weight

±10%

Sheet metal thickness

As in sheet metal standard EN 10143:1993.



Material

Sheet metal grade

Fittings and ducts in the standard Lindab range are made from hot dip galvanized steel sheet with a yield point in tension of 200 N/mm², and the zinc coating shall at least comply with Z 275.

Surface treatment of class Z 275 means 275 g zinc/m², double sided. Z 275 thus specifies the total amount of zinc on both sides of a 1 m² sheet. The thickness can thus be calculated as follows

$$\text{Zinc thickness} = \frac{\text{zinc weight}}{\text{no. of sides} \times \text{zinc density}} =$$

$$= \frac{0,275}{2 \cdot 7140} \cdot 10^6 = 19 \mu\text{m}$$

Sheet metal thicknesses

Other thicknesses of sheet metal can be supplied. You will have to expect some changes to the product range, however. For example, an increase in thickness in the ducts of 0,5 mm means that the internal diameter falls by 1,0 mm, which means in turn that standard fittings do not fit, and will have to be specially made for these ducts.

Material

- The following material is used in the standard range:
- Ducts and hand made fittings are made with material to EN 10142 – Fe PO2 G Z 275 MA–C.
- Pressed fittings are made with material to EN 10142 – Fe PO2 G Z 275 MA–C and EN 10142 – Fe PO6 G Z 275 MB–C

Other material can also be supplied, for example

- **Stainless steel** to EN 1.4436 or AISI 316 or EN 1.4301 or AISI 304. Some fittings which are normally pressed have to be hand made and swaged together.
- **Aluminium** to ISO/DIS 209-1. Some fittings which are normally pressed have to be hand made and swaged together.
- **Plastic coated products**

Ducts are made from "Plastisol" as standard, i.e. hot dip galvanized steel sheet Z 275, with an internal and external coating, 100 µm thick, of polyvinyl chloride (PVC).

Fittings are made, as standard, from hot dip galvanized steel sheet Z 275 and then powder coated internally and externally with a mixed powder consisting of epoxy and polyester (PE) to a thickness of 80 µm.

Ducts can also be supplied with an optional coating of epoxy + PE. This can be done either both internally and externally, or only on the inside or outside. Powder-coated ducts eliminate the risk of differing shades in colour between ducts and fittings.

Standard colours are white NCS S0502-Y 30 gloss units according to Gardner 60° and brown NCS S7010-Y70R 45 gloss units.

NOTE! For ducts of Ø<100, the maximum length is 1,5 m for internal coating.

Fittings can optionally be coated on only the inside or outside.

Powder coating can be optionally obtained in thicknesses of up to 200 µm.

- **Aluzink** with surface treatment to AZ 185 means 185 g aluzink/m² double sided. Some fittings which are normally pressed have to be fabricated and swaged together.



Material

Temperature limits for our materials

The shadowed fields denote standard versions.

Product	Material/type	Operation			
		Continual		Intermittent	
		Temperature limit			
		min °C	max °C	min °C	max °C
Pressed and seam welded	Galvanized steel sheet metal		200 ¹		250 ²
	Aluminium sheet metal		200 ³		300
	Stainless steel sheet metal		500		700
	PVC coated sheet steel metal		80		120
	PE-/EP coated products		150		200
Swaged, spot welded and/or blind interlocked joint	Aluzink sheet metal		315		
	Mastic	-40	70		
Safe gasket and damper blade seals	EPDM rubber	-30	100	-50	120
	Silicone rubber	-70	150	-90	200
Foam rubber seal	EPDM rubber	-30	100	-50	120
Foam plastic gasket	Polyester	-40	70		
Damper shaft bearings	Polyamide	-30	150	-50	200
	Brass		300		
Damper actuator	Electric	-30	50		
	Pneumatic	-5	60		
Duct filter	Polyester		120		
Drain hose	Ethylene vinyl acetate and polyethylene	-45	65		
Insulation	Glass wool		200		
	Rock wool		700		
Silencer	Polyester		130		180

¹ Discoloration occurs at about 200 °C in galvanized steel. This is mostly an appearance problem and does not mean impaired corrosion protection in a normal environment.

² If the temperature rises to about 300 °C, the adhesion of the zinc is impaired, which means poorer corrosion protection.

³ Aluminium sheet will soften after a couple of years at 200 °C.



The SI system

Units

The SI system (Système International d'Unités) is used in this catalogue, in accordance with international practice. Units may be given in the "technical system" in diagrams and tables, in parallel with the SI system.

Some basic units

For length	metre	m
For mass	kilogramme	kg
For time	second	s
For electric current	ampere	A
For temperature	kelvin	K

Some derived units

For frequency	hertz	Hz	1 Hz = 1/s
For force	newton	N	1 N = 1 kg · m/s ²
For pressure, mechanical stress	pascal	Pa	1 Pa = 1 N/m ²
For energy, work	joule	J	1 J = 1 N · m
For power	watt	W	1 W = 1 J/s
For electric potential, electric tension	volt	V	1 V = 1 W/A

Some additional units

For time	minute	min	1 min = 60 s
	hour	h	1 h = 3 600 s = 60 min
For flat angles	degree	°	1° = 1/360 of a circle
For volume	litre	l	1 l = 1 000 cm ³ = 1 dm ³

Some multiple prefixes

Index	Designation	Des.	Example	
10 ¹²	tera	T	1 terajoule	1 TJ
10 ⁹	giga	G	1 gigawatt	1 GW
10 ⁶	mega	M	1 megavolt	1 MV
10 ³	kilo	k	1 kilometre	1 km
10 ²	hecto	h	1 hectogramme	1 hg
10 ¹	deca	da	1 decalumen	1 dalm
10 ⁻¹	deci	d	1 decimetre	1 dm
10 ⁻²	centi	c	1 centimetre	1 cm
10 ⁻³	milli	m	1 milligramme	1 mg
10 ⁻⁶	micro	μ	1 micrometre	1 μm
10 ⁻⁹	nano	n	1 nanohenry	1 nH
10 ⁻¹²	pico	p	1 picofarad	1 pF



The SI system

Conversion factors

Tables for conversion to other dimensions are given for some of the units commonly used in the industry.

Pressure, p

Pa pascal N/m ²	mm wc mm Aq mm H ₂ O	mm Hg (at 20 °C)	in wg " wg in wc	psi(g) ibf/in ²	bar
1	0,102	0,007 53	0,004 02	0,000 145	0,000 010 0
9,79	1	0,073 7	0,039 4	0,001 42	0,000 097 9
133	13,6	1	0,534	0,019 3	0,001 33
249	25,4	1,87	1	0,036 1	0,002 49
6 895	704	51,9	27,7	1	0,068 9
100 000	10 215	753	402	14,5	1

Length, l

in inch	ft foot	yd yard	m metre	mile
1	0,083 3	0,027 8	0,025 4	0,000 015 8
12,0	1	0,333	0,305	0,000 189
36,0	3,00	1	0,914	0,000 568
39,4	3,28	1,09	1	0,000 621
63 360	5 280	1 760	1 609	1

Area, A

in ² sq in	ft ² sq ft	yd ² sq yd	m ² sq metre	ar	ha hectare
1	0,006 94	0,000 772	0,000 645	0,000 006 45	0,000 000 064 5
144	1	0,111	0,092 9	0,000 929	0,000 009 29
1 296	9,00	1	0,836	0,008 36	0,000 083 6
1 550	10,8	1,20	1	0,010 0	0,000 100
155 000	1 076	120	100	1	0,010 0
15 500 031	107 639	11 960	10 000	100	1

Volume, V

in ³ cu in	l litre	US gal gallon	UK gal gallon	ft ³ cu ft	yd ³ cu yd	m ³ cubic metre
1	0,016 4	0,004 33	0,003 60	0,000 579	0,000 021 4	0,000 016 4
61,0	1	0,264	0,220	0,035 3	0,001 31	0,001 00
231	3,79	1	0,833	0,134	0,004 95	0,003 79
277	4,55	1,20	1	0,161	0,005 95	0,004 55
1 728	28,3	7,48	6,23	1	0,037 0	0,028 3
46 656	765	202	168	27,0	1	0,765
61 024	1 000	264	220	35,3	1,31	1

Velocity, v

ft/min fpm	km/h Bz	ft/s	mile/h mph	knot kn	m/s
1	0,018 3	0,016 7	0,011 4	0,009 87	0,005 08
54,7	1	0,911	0,621	0,540	0,278
60,0	1,10	1	0,682	0,592	0,305
88,0	1,61	1,47	1	0,869	0,447
101	1,85	1,69	1,15	1	0,514
197	3,60	3,28	2,24	1,94	1



The SI system

Conversion factors

Volume flow, q_v

ft ³ /h cfh	l/min	m ³ /h	ft ³ /min cfm	l/s	m ³ /s
1	0,472	0,028 3	0,016 7	0,007 87	0,000 007 87
2,12	1	0,060 0	0,035 3	0,016 7	0,000 016 7
35,3	16,7	1	0,589	0,278	0,000 278
60,0	28,3	1,70	1	0,472	0,000 472
127	60,0	3,60	2,12	1	0,001 00
127 133	60 000	3 600	2 119	1 000	1

Mass, m

oz ounce	lb pound	kg kilogramme
1	0,062 5	0,028 3
16,0	1	0,454
35,3	2,20	1

Mass flow, q_m

lb/min	kg/s
1	0,007 56
132	1

Density, ρ

kg/m ³	lb/ft ³	g/cm ³	lb/in ³
1	0,062 4	0,001 00	0,000 036 1
16,0	1	0,016 0	0,000 579
1 000	62,4	1	0,036 1
27 680	1 728	27,7	1

Force, F

N newton	lbf pound-force	kp kilopond
1	0,225	0,102
4,45	1	0,454
9,81	2,20	1

Torque, M

lbf · in	Nm	lbf · ft	kpm
1	0,113	0,083 3	0,011 5
8,85	1	0,738	0,102
12,0	1,36	1	0,138
86,8	9,81	7,23	1

Energy, work, E

J joule Nm, Ws	Btu British thermal unit	kcal kilocalorie	kWh
1	0,000 948	0,000 239	0,000 000 278
1 055	1	0,252	0,000 293
4 187	3,97	1	0,001 16
3 600 000	3 412	860	1



The SI system

Conversion factors

Power, P

Btu/h	W watt Nm/s, J/s	kcal/h	hk metric horsepower	hp UK, US horsepower
1	0,293	0,252	0,000 398	0,000 393
3,41	1	0,860	0,001 36	0,001 34
3,97	1,16	1	0,001 58	0,001 56
2 510	735	632	1	0,986
2 544	746	641	1,01	1

Temperature difference, temperature change, ΔT for K; $\Delta \theta$ for $^{\circ}\text{C}$

K kelvin	$^{\circ}\text{F}$ degree Fahrenheit	$^{\circ}\text{C}$ degree Celsius
1	1,80	1,00
0,556	1	0,556
1,00	1,80	1

Associated temperatures

K	$^{\circ}\text{F}$	$^{\circ}\text{C}$	Physical state
0,00	-460	-273	Absolute zero
255	0,00	-17,8	Mixture of sal ammoniac and snow
273	32,0	0,00	Melting point of ice
293	68,0	20,0	Standard atmospheric temperature
311	100	37,8	Normal temperature of human body
373	212	100	Boiling point of water

Conversion between temperatures

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 5/9 \quad ^{\circ}\text{C} = \text{K} - 273,15$$

$$^{\circ}\text{F} = ^{\circ}\text{C} \times 9/5 + 32 \quad \text{K} = ^{\circ}\text{C} + 273,15$$

Greek letters

Greek letters are used in technical and scientific texts to denote physical units.

Minor variations in the shapes of the letters can be tolerated, on condition that this does not cause any risk of confusion.

Name	Lower case	Upper case
alfa	α	A
beta	β	B
gamma	γ	Γ
delta	δ	Δ
epsilon	ϵ	E
zeta	ζ	Z
eta	η	H
teta	θ	Θ
jota	ι	I
kappa	κ	K
lambda	λ	Λ
my	μ	M

Name	Lower case	Upper case
ny	ν	N
ksi	ξ	Ξ
omikron	$\omicron$	O
pi	π	Π
ro	ρ	P
sigma	σ	Σ
tau	τ	T
ypsilon	υ	Y
fi	ϕ	Φ
ki	χ	X
psi	ψ	Ψ
omega	ω	Ω

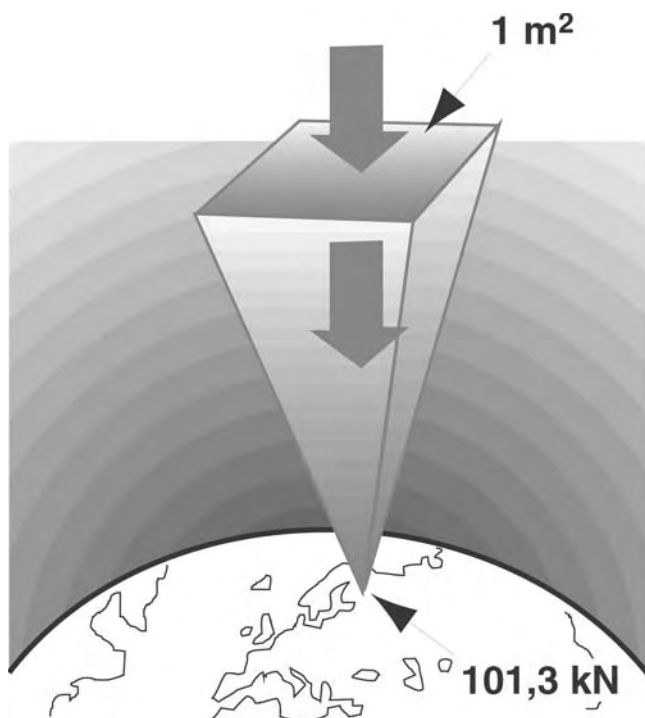


Pressure

**Total pressure =
dynamic pressure + static pressure**

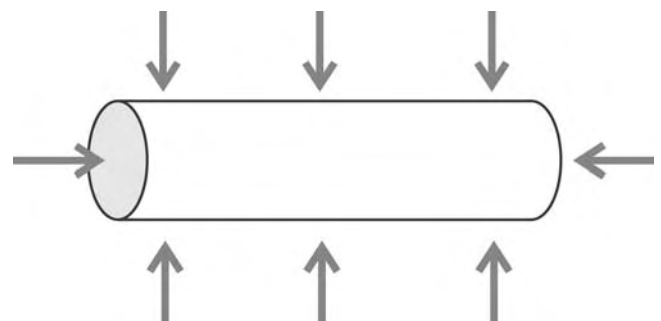
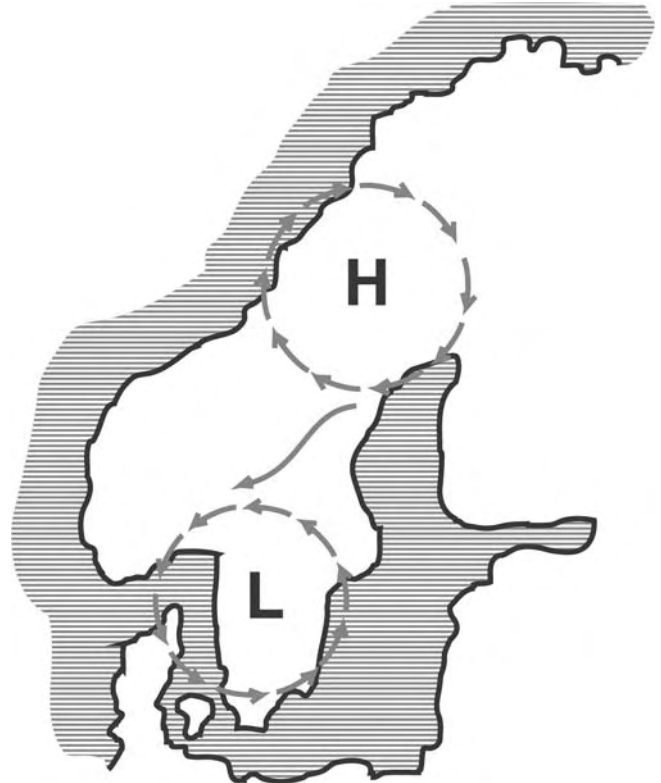
The **static pressure** in the atmosphere varies with the weather - high pressure or low pressure - and with the height above sea level. The standard pressure, atmospheric pressure at sea level is:

101,3 kPa = 1,013 bar = 1013 mbar
(= 1 atm = 760 mm Hg)



At one particular point, such as in a ventilation duct, the static pressure comes from all sides.

In a ventilation system, the static pressure is related to the ambient atmospheric pressure outside the duct system; the static pressure can thus be positive - higher than ambient atmospheric, or negative - lower than ambient atmospheric pressure.

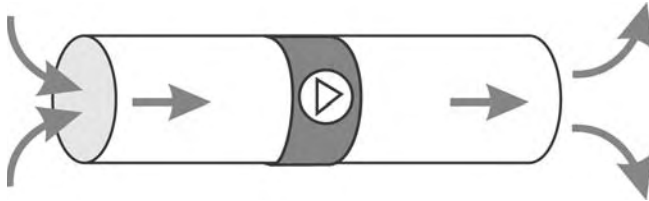




Pressure

Pressure drop

If you produce a static pressure difference in an open duct system, you can get the air to flow from a point of higher pressure to a point of lower pressure - from the atmosphere via the inlet grating to the suction side of the fan, and from the supply side of the fan via the supply terminals back to the atmosphere. The pressure difference is converted into kinetic energy.



Dynamic pressure is a measure of the kinetic energy of the moving air. The connection between pressure and energy is easy to see if you use SI system units

$\text{Pa} = \text{N/m}^2 = \text{Nm/m}^3 = \text{J/m}^3$ i.e. energy (in J) per unit volume (in m^3) of the flowing air.

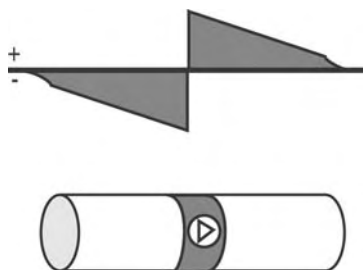
The dynamic pressure depends on

$$p_d = \rho \cdot \frac{\bar{v}^2}{2} \text{ with the units}$$

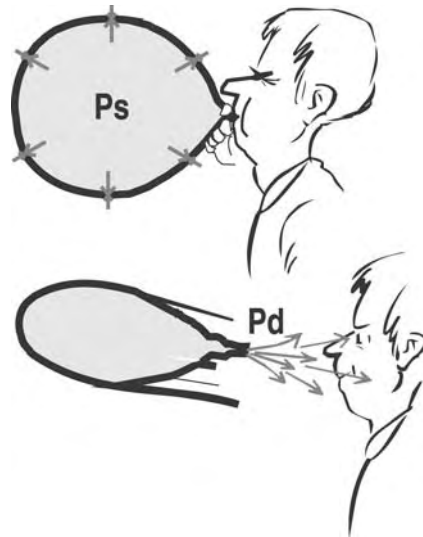
$$\frac{\text{kg}}{\text{m}^3} \cdot \left(\frac{\text{m}}{\text{s}}\right)^2 = \frac{\text{kg}}{\text{m}^3} \cdot \frac{\text{m}^2}{\text{s}^2} = \frac{\text{kgm}}{\text{s}^2} \cdot \frac{\text{m}}{\text{m}^3} = \text{N} \cdot \frac{1}{\text{m}^2} = \frac{\text{N}}{\text{m}^2} = \text{Pa}$$

Flow in a duct system is normally not free of loss. Friction losses occur and the air is forced to change direction. It requires pressure (i.e. energy) to manage both dynamic and static pressure - the sum of these two is referred to as total pressure.

$$p_t = p_s + p_d$$



Since p_s will be negative in relation to atmospheric pressure (on the suction side of the fan), this means that p_t will also be negative if the total of p_s and p_d is negative.



Pressure drop and flow losses

In a ventilation system, you want to get air moving! Clean air is to be supplied to the occupancy zone and polluted air must leave the room, process or machine. Energy is needed to move the air, which is added via the fan, which gets the air moving.

In order to flow through a duct system, air has to overcome two types of flow resistances or pressure drops:

- **friction loss** between the flowing air and the duct walls.
- **single loss** when the air changes direction or speed.

Friction loss (also known as the R value) is expressed in the

$$\text{unit Pa/m} \Delta p_f = \frac{\lambda}{d_h} \cdot \rho \frac{\bar{v}^2}{2}$$

where

Δp_f = friction loss per metre (Pa/m)

λ = friction factor related to duct material and surface roughness

d_h = hydraulic diameter of the duct, the diameter of a circular duct which gives the same friction pressure drop at the same flow velocity as a rectangular duct

$$d_h = \frac{2 \cdot a \cdot b}{a + b}$$

where a and b are duct sides

For a circular duct, $d_h = d$

ρ = air density (kg/m^3)

$\bar{v}$ = average velocity of the air (m/s)



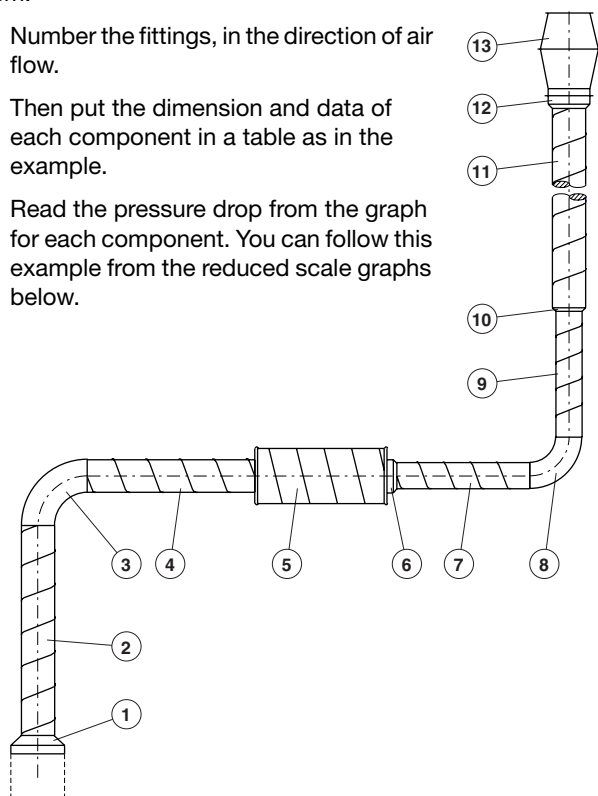
Pressure

Pressure drop calculation

Fan pressure capacity required

Let us do a pressure drop calculation for a simple duct system!

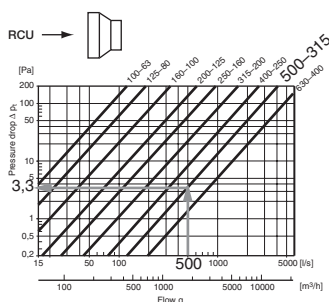
- Number the fittings, in the direction of air flow.
- Then put the dimension and data of each component in a table as in the example.
- Read the pressure drop from the graph for each component. You can follow this example from the reduced scale graphs below.



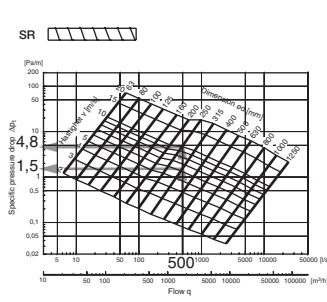
No	Flow l/s	Component Denom.	Dimension Ø mm	Length m	Pressure drop Pa/m	Pressure drop Pa
1	500	RCU	500-315	-	-	3,3
2	"	SR	315	2	1,5	3,0
3	"	BSU 90°	315	-	-	5,5
4	"	SR	315	1,6	1,5	2,4
5	"	SLCBU 100	315/1200	1,2	-	42,0
6	"	RCFU	315-250	-	-	5,0
7	"	SR	250	1,5	4,8	7,2
8	"	BSU	250	-	-	14,0
9	"	SR	250	1,2	4,8	5,8
10	"	RCU	315-250	-	-	6,0
11	"	SR	315	3,5	1,5	5,3
12	"	RCFU	400-315	-	-	2,0
13	"	HF	400	-	-	22,0
Total pressure drop (sum of rows 1 – 13) = 123,4						

Add up the pressure drops on the far right of the table. Then select a suitable fan which gives the required flow $q = 500$ l/s and a total pressure rise of $p_t = 125$ Pa.

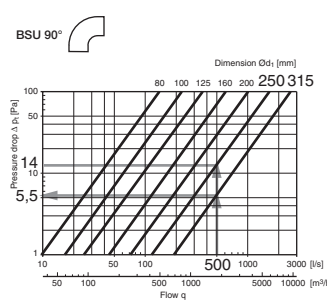
1



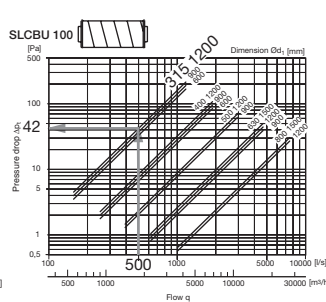
2 4 7 9 11



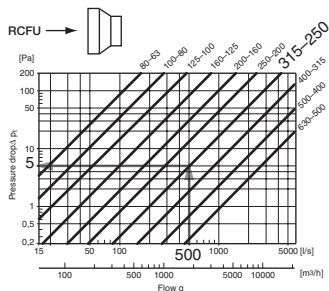
3 8



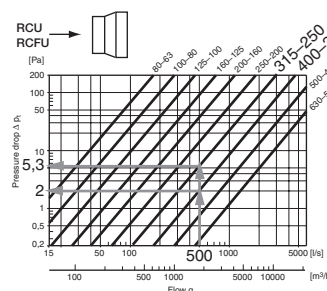
5



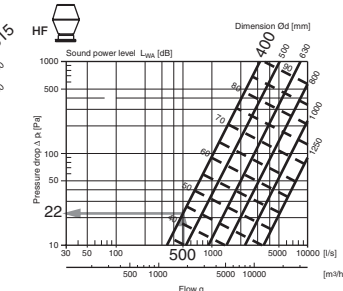
6



10 12



13





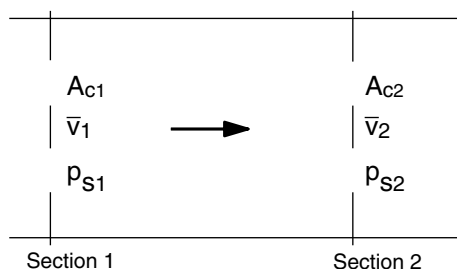
Pressure

Prerequisites

In order to correctly dimension a duct system you need information about the total pressure drops of the fittings.

The total pressure drop Δp_t (Pa) between two sections, 1 and 2, in a duct system is defined by

$$p_t = p_{t1} - p_{t2} = (p_{s1} + p_{d1}) - (p_{s2} + p_{d2})$$



where $p_d = \frac{\rho \cdot \bar{v}^2}{2}$ and $\bar{v} = \frac{q}{A_c}$

It is assumed in pressure drop calculation of ventilation ducts that:

- incompressible flow, i.e. air density does not change
- isothermal relationship, i.e. no exchange of heat between the duct and its surroundings occurs
- no changes in potential energy, i.e. height differences between the various sections of the duct system are neglected

Designations used

l	=	length	m (mm)
a	=	long side	m (mm)
b	=	short side	m (mm)
r	=	radius	m (mm)
d	=	diameter	m (mm)
d_h	=	hydraulic diameter	m (mm)
A_c	=	cross sectional area	m ²
p_A	=	atmospheric pressure	mbar
p_s	=	static pressure	Pa
p_d	=	dynamic pressure	Pa
p_t	=	total pressure	Pa
Δp	=	pressure drop	Pa
Δp_t	=	total pressure drop	Pa
ϑ	=	temperature	°C
$\bar{v}$	=	air velocity (average)	m/s
q	=	air flow	m ³ /s
ρ	=	density	kg/m ³
α	=	angle	°
φ	=	relative humidity	%
λ	=	friction number	
R	=	coefficient of friction	Pa/m
ζ	=	resistance number	
ν	=	kinematic viscosity	m ² /s

The total pressure drops for the most common fittings are shown in graphs, as a function of air flow (or velocity in some cases).

The basic data for the graphs comes from measurements and calculations done at our laboratories. Some graphs are taken from literature.

The graphs apply to air under standard conditions.

ν	=	15,1 · 10 ⁻⁶ m ² /s
ϑ	=	20 °C
ρ	=	1,2 kg/m ³
φ	=	65 %
p_A	=	1013,2 mbar

For air of other density (ρ_{other}) the flow ($q_{other\_density}$) is obtained from the formula

$$q_{other\_density} = q_{graph} \cdot \sqrt{\frac{1,2}{\rho_{other}}}$$



Sound

Ventilation does not have to be noisy!

If you use your common sense, and construct your air treatment system with consideration and good components, you can often avoid problems and complaints.

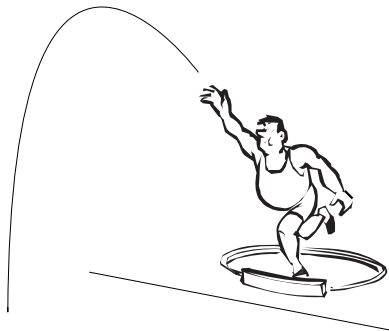
Fans make noise, this is something you can not do a lot about. But you can prevent the noise from getting into the areas connected to the fan system - you can absorb and damp the noise on the way.

This description does not claim to teach you how to calculate and attenuate noise in a ventilation system - there are books available on this.

Source

Waves on water

We throw a stone onto completely calm water.



Waves in air

We fire a starter's gun.



This description only aims at providing information about a few simple rules and hints, which together with common sense can be enough for simple installations.

You must have some basic knowledge about how and where noise is generated, transmitted and attenuated in the system, to be able to choose the correct principle and correct components. To take a simple analogy: noise transmission consists of waves in a medium, i.e. air, which we can not see. This is very similar to the way waves spread on water.

Let us examine the analogy, to make the comparison clearer:

Distribution

Waves on water

Waves on water spread out in increasing concentric circles from the centre, where the stone hit the water.



Waves in air

Sound waves spread out in the air, in all directions, in an increasing ball from the centre, i.e. the gun.





Sound

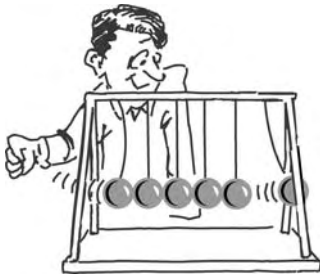
Energy transport

Waves on water

Kinetic energy is transmitted from molecule to molecule in the water. They bounce against each other. Molecules move back and forwards. Energy spreads from the source.

Waves in air

Kinetic energy is transmitted from molecule to molecule in the air. They bounce against each other, and move back and forwards. Energy spreads from the source.



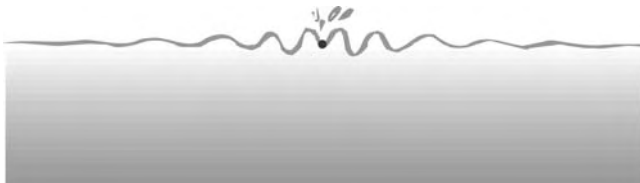
Distance

Waves on water

When waves depart from the centre, where the stone hit, the wave height becomes lower and lower, until they are invisible. The water is calm again.

Waves in air

When sound waves depart from the source, the starter's gun, wave movement drops off and the sound becomes weaker and weaker until it can no longer be heard.



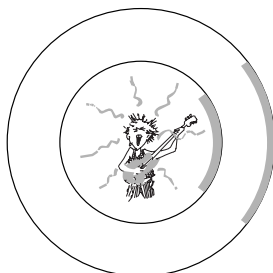
Intensity

Waves on water

The energy which started the wave propagation, or the power needed to keep it going, is distributed across an increasing area as the distance, the radius, increases.

Waves in air

The energy which started the wave propagation, or the power needed to keep it going, is distributed across an increasing volume as the distance, the radius, increases.



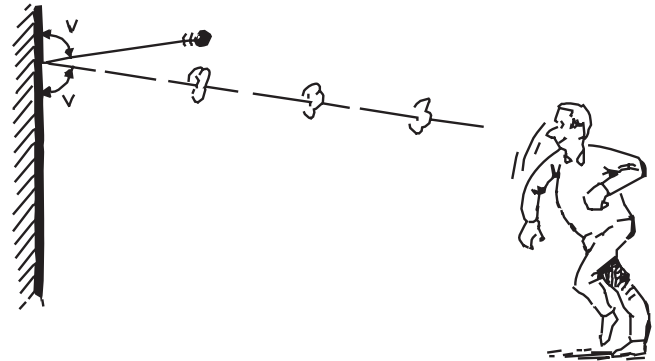
Obstruction in the way

Waves on water

If waves in water encounter the side of a boat or jetty, they will be reflected at the same angle as they met the obstruction.

Waves in air

If waves in air encounter a wall, they will be reflected at the same angle as they met the obstruction.



In the same way as when you bounce a ball on the wall.

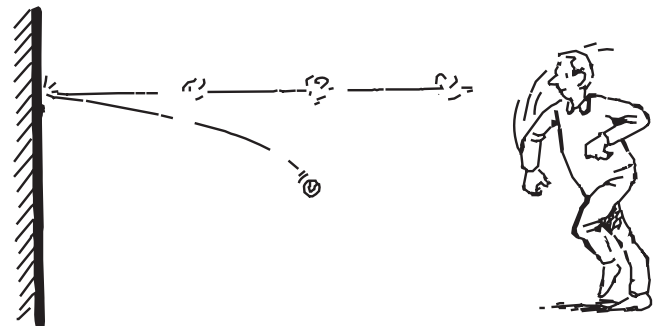
Energy loss

Waves on water

The reflected wave height is lower than the incident wave. Some of the kinetic energy is absorbed in the collision with the jetty side (and is converted into heat).

Waves in air

The reflected wave movement is lower than the incident wave. Some of the kinetic energy is absorbed in the collision with the wall (and is converted into heat)



The ball moves more slowly when it bounces back than when it hits the wall.



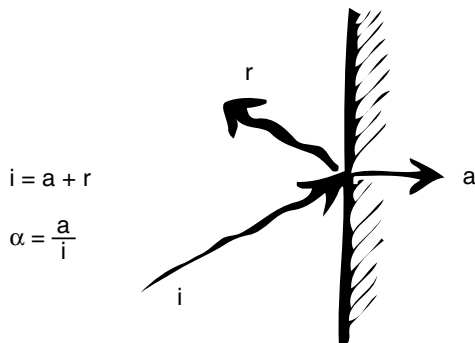
Sound

Sound can be absorbed

When sound waves meet a soft, porous wall (mineral wool etc.), the vibrating molecules penetrate the surface layer, and are then braked by friction against the material fibres.

The part of the energy which is thus absorbed is converted to heat in the material, and the rest is reflected back into the room. This type of damping, where the sound is braked by the soft surface layer, is referred to as porous absorption.

The sound absorption ability of different materials varies. This property is expressed as the sound absorption factor α of the material.



If nothing is absorbed, everything is reflected, then $a = 0$ which makes $\alpha = 0$:

$$i = 0 + r\alpha = \frac{0}{i} = 0$$

If nothing is reflected, everything is absorbed, then $r = 0$ which makes $\alpha = 1$:

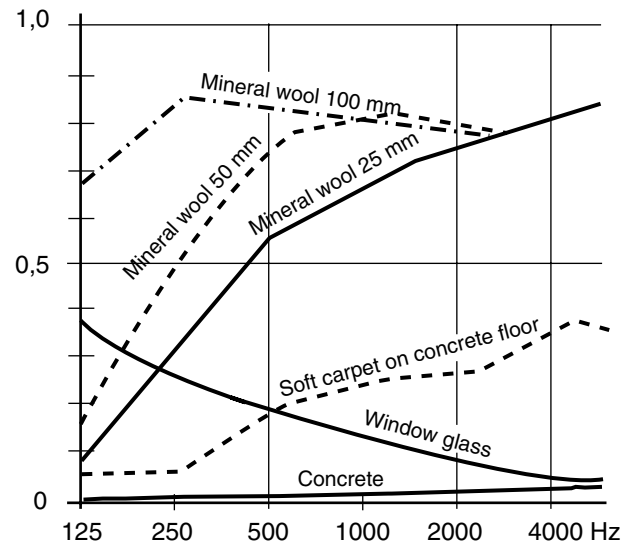
$$i = a + 0\alpha = \frac{a}{a} = 1$$

An open window can be said to have $\alpha = 1$, all sound from the room which arrives at the window disappears out!

In hard materials, such as concrete or marble surfaces, virtually no sound energy is absorbed, everything is reflected and the α value is near to zero. In rooms with hard surfaces, the sound bounces for a long time before it dies out. The room has a long reverberation time and we get a strong, unpleasant echo. The sound level caused by normal sound sources becomes high.

In soft materials, such as thick mineral wool boards, the opposite happens. The α value is close to 1. Sometimes, excessively damped, soft rooms are unsuitable "You can't hear what you say". Avoid extremes - the reverberation time in a room should be chosen to suit the activities there.

α -value



Sound, in a ventilation system, moves just as easily with or against the direction of flow.

Sound which moves through a duct system will be damped in several ways. Let us start off with bare metal duct walls.

Metal walls also absorb - but not much

When the metal duct walls are hit by the sound wave, they will start to vibrate at the same frequency as the sound.

The movements are normally very small, and hardly visible to the naked eye (it is often easier to feel the vibration, with your fingertips on the sheet metal).

What happens is the same as when a window vibrates when a heavy truck passes by on the street.

The duct panels and the window will then function as **membrane dampers** - boards which are made to vibrate by the incident sound energy. But this movement is not without friction, since it is braked by both the bending strength of the sheet, and (mostly) by the connection around the edges of the sheet. As previously, with the porous damper, some of the energy is converted into heat - the sound which remains has become weaker and has been damped.

Given the same free duct area, a circular, spiral seamed duct is stiffer than a rectangular one and will thus provide less damping.

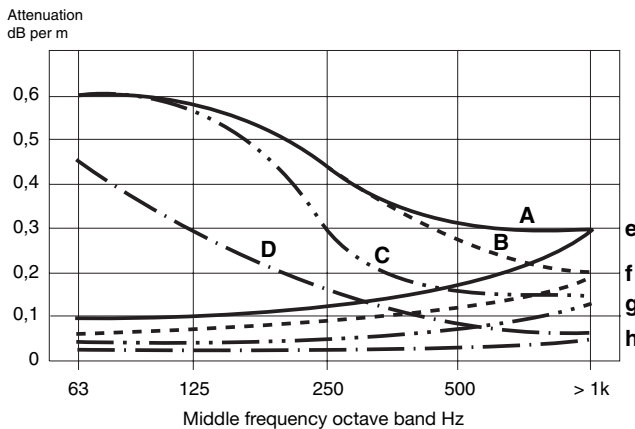
As shown in the illustration on the next page, damping in unlined ducts is relatively modest. For this reason, it is normally ignored when the noise in the installation is calculated, it is instead used as the margin of safety.

Attenuation in straight sheet metal ducts (1 mm sheet metal thickness)



Sound

Attenuation in straight sheet metal ducts (1 mm sheet metal thickness)

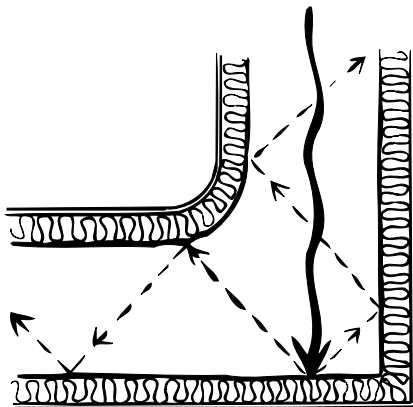


Duct dimensions				
Rectangular sheet metal ducts				
□ 75-200	200-400	400-800	800-1000	
A —————	B - - - - -	C	D	
Circular sheet metal ducts				
Ø75-200	200-400	400-800	800-1600	
e —————	f - - - - -	g	h	

Absorption is more effective

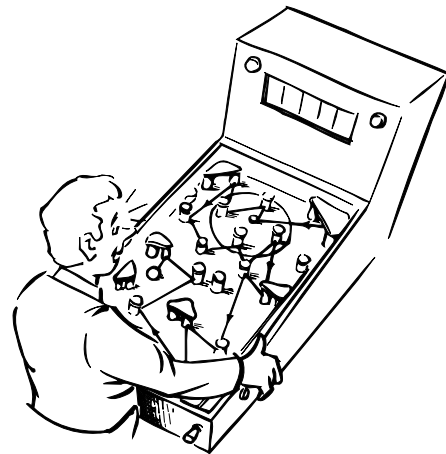
The damping becomes more effective if we put absorbent material into the duct system. The way that sound is damped was described above, part of the sound energy is absorbed by the absorption material which is hit by the sound.

If the sound waves bounce enough times against porous surfaces, the remaining sound energy, the kinetic energy which makes your eardrums vibrate, will be so low that it does not cause annoyance!

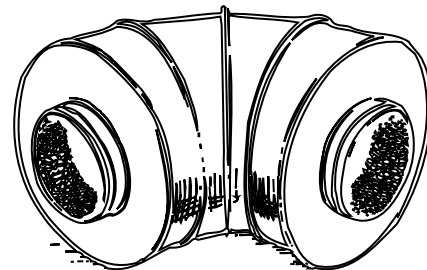


Where should you put the absorption material in the ducts?

The answer is obvious - where the material comes into contact with the greatest number of sound waves. Noise which travels along a long, unlined, straight duct will be directed by reflection against the duct walls. Absorption material here is of less use than if it is put in a bend, a suction or pressure plenum chamber or in a straight duct just after a fan, or anywhere where we have "turbulent sound flow". The more times sound bounces against the soft sides, the more useful the material becomes.



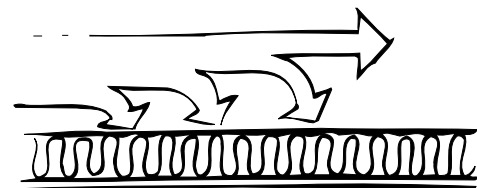
Why the curved silencer BSLCU is so effective!



Straight silencers concentrate the absorption material

There is a complement to the description of sound waves above. When the sound waves travel along a porous surface, they will be deflected towards the duct walls. This deflection is called, "diffraction".

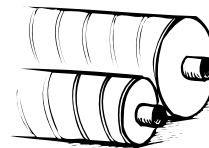
This, and the way that sound propagation is disturbed by turbulence, gives that straight silencers can have high attenuation.





Sound

As we can see from the values for SLCU 50 and SLCU 100, damping varies with a few simple rules:



To attenuate low frequencies (< 500 Hz) thicker absorption material is needed. – SLCU 100 is more efficient than SLCU 50.

SLCU 50

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
80	300	5	5	8	15	28	29	23	16
80	600	5	7	12	26	41	50	48	24
80	900	5	9	17	37	50	50	50	32
80	1200	6	11	21	49	50	50	50	40
100	300	2	2	6	14	21	25	20	11

SLCU 100

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
80	300	10	8	10	16	21	27	24	16
80	600	12	13	19	27	37	50	46	24
80	900	14	18	28	38	50	50	50	33
80	1200	16	23	37	49	50	50	50	42
100	300	5	4	11	14	18	24	20	11

To attenuate high frequencies (> 500 Hz), thinner absorption material is sufficient. – SLCU 50 is just as effective as SLCU 100.

SLCU 50

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
80	300	5	5	8	15	28	29	23	16
80	600	5	7	12	26	41	50	48	24
80	900	5	9	17	37	50	50	50	32
80	1200	6	11	21	49	50	50	50	40
100	300	2	2	6	14	21	25	20	11

SLCU 100

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
80	300	10	8	10	16	21	27	24	16
80	600	12	13	19	27	37	50	46	24
80	900	14	18	28	38	50	50	50	33
80	1200	16	23	37	49	50	50	50	42
100	300	5	4	11	14	18	24	20	11

The longer way the sound has to pass over the absorption surface the higher the attenuation. Long silencers have higher attenuation than short ones. – SLCU with l = 600 attenuates more than SLCU with l = 300.

SLCU 50

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
80	300	5	5	8	15	28	29	23	16
80	600	5	7	12	26	41	50	48	24
80	900	5	9	17	37	50	50	50	32
80	1200	6	11	21	49	50	50	50	40
100	300	2	2	6	14	21	25	20	11

NOTE!

The attenuation is not directly proportional to the length. The reason for this is that you get an extra attenuation at cross section area changes, and all silencers have two of them irrespective of their length.

The shorter distance between the absorbing surfaces the higher the attenuation. Silencers with small diameter attenuates more than big ones. – SLCU Ø 80 attenuates more than SLCU Ø 250.

SLCU 50

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
80	300	5	5	8	15	28	29	23	16
80	600	5	7	12	26	41	50	48	24
80	900	5	9	17	37	50	50	50	32
80	1200	6	11	21	49	50	50	50	40
100	300	2	2	6	14	21	25	20	11
250	600	3	2	7	13	17	16	8	6
250	900	3	4	8	20	26	23	10	8
250	1200	4	5	9	26	35	30	12	10
315	600	0	2	6	11	14	9	4	5

SLCU 100

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
80	300	10	8	10	16	21	27	24	16
80	600	12	13	19	27	37	50	46	24
80	900	14	18	28	38	50	50	50	33
80	1200	16	23	37	49	50	50	50	42
100	300	5	4	11	14	18	24	20	11
250	900	7	7	15	18	25	23	10	9
250	1200	7	9	20	25	34	30	13	11
315	600	1	4	7	9	12	10	5	6
315	900	2	6	12	14	19	15	7	8
315	1200	2	8	16	18	26	21	9	10
400	600	1	5	5	5	7	4	4	4

SLCBU 100

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz							
		63	125	250	500	1k	2k	4k	8k
315	600	4	6	10	16	22	28	27	18
315	900	5	7	16	23	30	38	32	22
315	1200	7	9	23	30	38	47	37	25
400	600	4	5	7	9	13	16	15	13

For the same reason, an extra baffle gives higher attenuation than a silencer of the same diameter, but without a baffle. – SLCBU 100 attenuates more than SLCU 100.

Sound

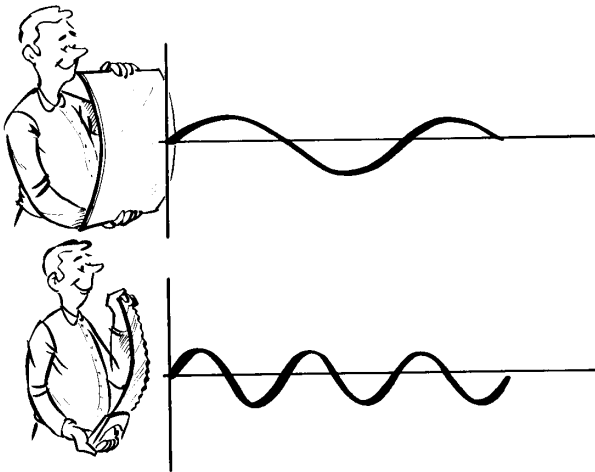
Noise frequency influences the choice of silencer

As we see in the tables above, the damping ability varies with the frequency of sound. Before we look at the choice of silencers, it could be a good idea to describe the concept of frequency in greater detail.

A sound source influences the surrounding air, and makes it vibrate. The character of the sound depends on the variations in pressure which occur in the air.

Let us assume that the sound source is a vibrating plate - the changes in pressure, or the sound will then have the same frequency as the vibrations in the plate. The strength of the sound will depend on the amount that the plate vibrates, i.e. the amplitude of the movement. Let us start off with that:

If there is only one note, of a single frequency, the pressure will vary sinusoidally, so a pure note is referred to as a sine wave.



The characteristics of sound propagation are:

- frequency (f), which is measured in hertz, **Hz**, (s^{-1}), (and specifies the number of times a second that a new sound wave arrives).
- wave length (λ , "lambda"), which is measured in metres, **m**, (and specifies the distance between two similar points on the curve).

and

- speed of sound (c) which is measured in **m/s**, (and specifies the speed of movement of the sound wave).

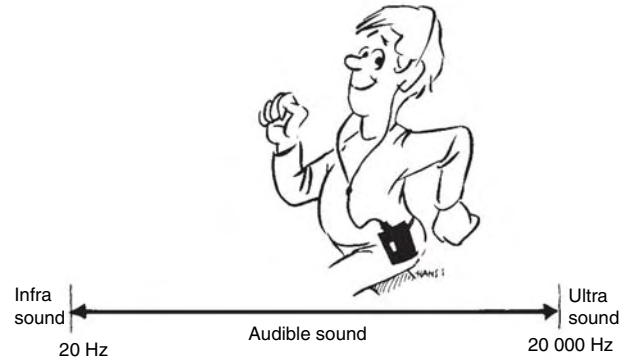
These three variables have the following relationship:

$$c = f \cdot \lambda$$

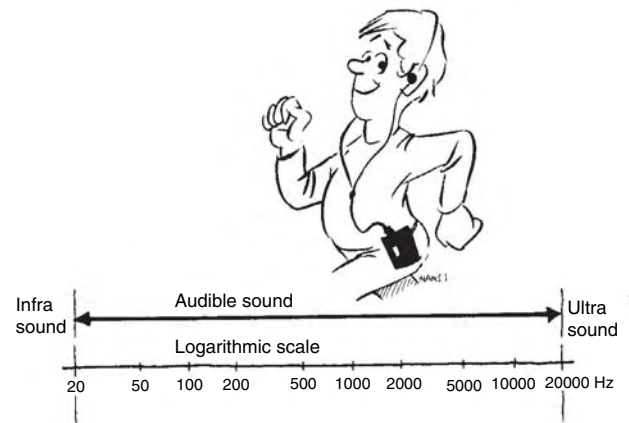
The speed of sound in air is also a function of pressure and temperature.

At normal air pressure and + 20 °C is $c \approx 340$ m/s.

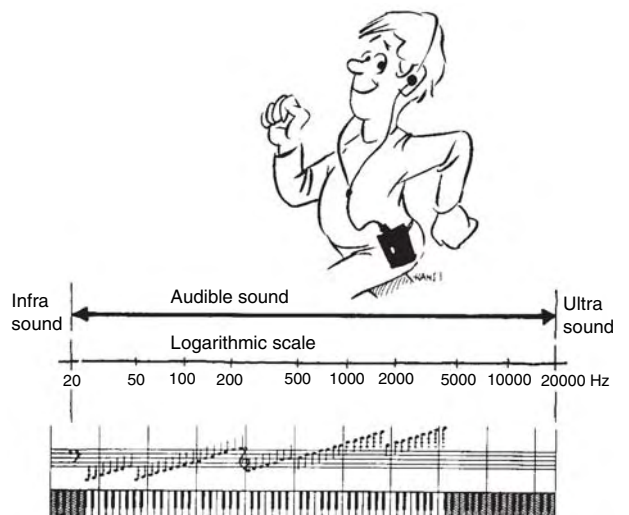
A young person with normal hearing can hear sounds at frequencies from 20-20 000 Hz, i.e. (in air) at wavelengths ranging from 17 m (at 20 Hz) to app. 17 mm (at 20 kHz).



We perceive changes in sound frequency on a logarithmic scale, i.e. it is the relative frequency and not the difference in Hz which determines how a change in note is perceived. A doubling of frequency is perceived as being the same, irrespective of whether it is a change from 100 to 200 Hz, 1000 to 2000 Hz or 10 to 20 kHz.



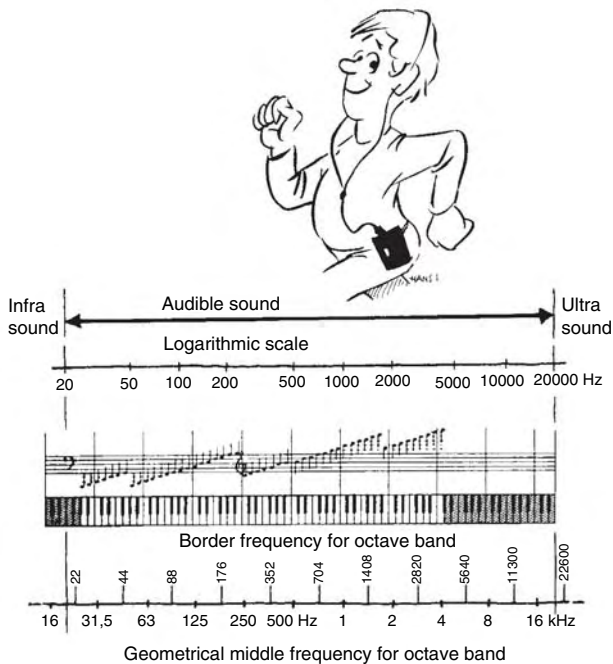
The logarithmic scale is usually sub-divided into octaves, i.e. in scales where the top note is twice the frequency of the bottom note. This has been customary in music for a long time.





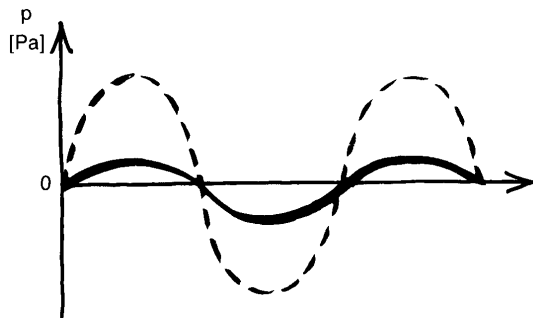
Sound

And in engineering.



The concept of decibel

The stronger the sound is, the harder the particles of air will bump into each other.



Sound pressure changes in the audible area can vary within very wide limits. Some sounds are so weak that we can not hear them. The so-called **audible limit** varies with frequency and is 20 μPa at about 1000 Hz.

Other sounds are so loud that we risk hearing damage. The **pain limit**, the sound pressure which causes pain in your ears also varies with frequency, but is about 20 Pa at 1000 Hz. This means that it is a million times louder than the weakest sound we can perceive.

We also perceive changes in sound pressure on a logarithmic scale. A **sound level concept** using the **decibel (dB)** as the unit, has been created to express comparable values.

The **dB** unit, which is used in many different applications, is generally defined as: $10 \cdot \log (X/X_0)$, where X is the unit measured, i.e. the sound pressure, and X_0 is a reference level expressed in the same units. The relationship of X/X_0 is thus dimensionless. The reference level from which the dB unit is

specified, is given instead. This means that you generally express the level in **dB (above X_0)**.

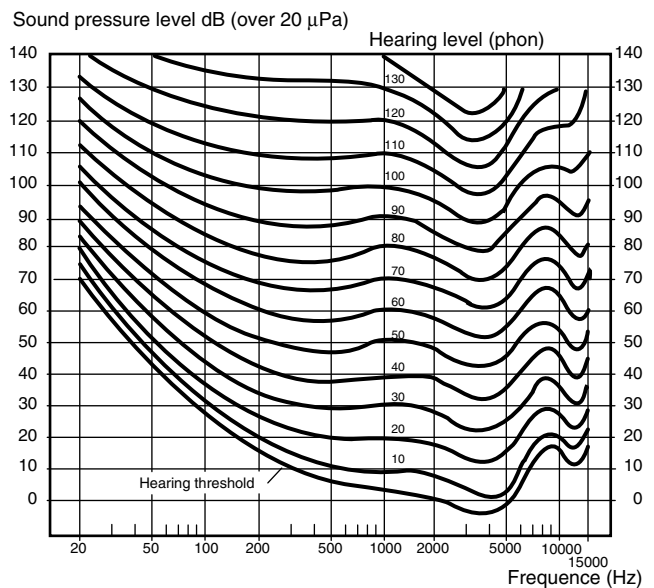
Our perception of sound

We react differently to two sounds which have the same sound pressure level and different frequencies.



Curves which describe how people normally perceive sounds of varying strength and frequency have been constructed through experiments on large numbers of volunteers. These so-called **hearing level curves** are designated by the sound pressure level for each curve at a frequency of 1 kHz. The unit used for the curves is the **phon**.

Hearing level curves

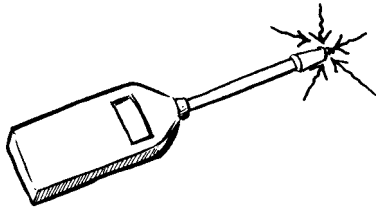


Example:

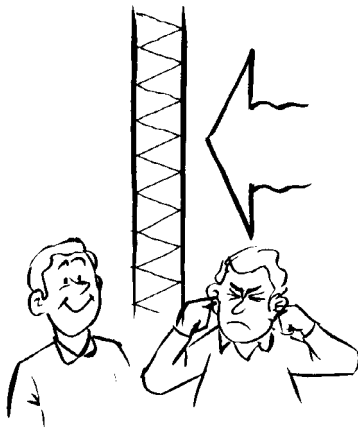
The sound pressure level 70 dB at 50 Hz is normally perceived as being as loud as 50 dB at 1000 Hz.

Sound

Sound levels

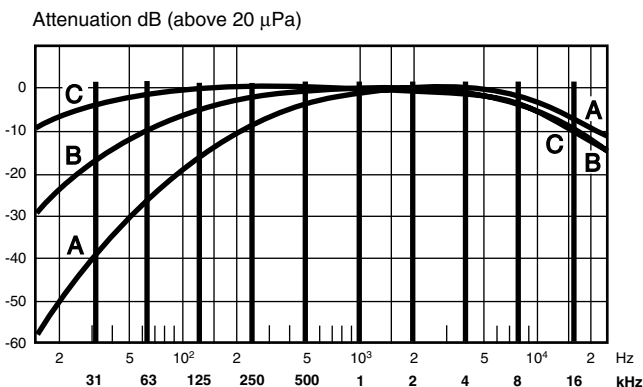


Several methods are used to compare the disturbance caused by two different sounds, and where the perception of the ear to noise has been modelled.



The simplest way is to compare their “weighted” sound levels. The incoming sound is filtered in an electronic filter to reduce the components, mostly the low-frequency components, where the ear is not so sensitive, and amplify the components between 1 and 4 kHz, where we are most sensitive.

Sound meters usually have three electronic filters, A-, B- and C-filter. The A-filter is mostly used these days, where the result, the “weighted” **sound level**, is expressed in **dB (A)**.



Choosing silencers

The fan is the primary sound source in a ventilation system, but intrusive noise can also be caused by an unsuitable choice of duct components and terminal units:

$$L_w = 40 + 10 \cdot \log q + 20 \cdot \log p_t \text{ dB (above 1 pW)}$$

q = air flow (in m³/s) through the fan

p_t = total pressure rise (in Pa) in the fan

40 = “specific noise power level” which considers the efficiency of the fan at its point of operation, and the SI units for q and p_t .

The noise generated in the fan must be attenuated in the duct system, at some point before the room terminal unit. Some of the attenuation is “natural”, examples are given above. This attenuation is often not enough, and additional silencers can be put in the duct system - in the main channel near the fan to damp the fan noise to all the duct branches or in the branch ducts only to damp particularly sensitive rooms.

Low air speeds should be selected in the ducts, to avoid disturbing noise in the rooms.

- At a given air speed, a doubling of that speed corresponds to a 12 dB increase in noise levels.

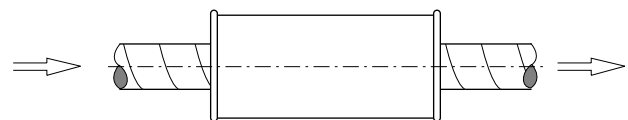
Low air speeds also cut operating costs.

- At a given air speed, the fan power required increases as the square of the air speed.

In this example, calculation has shows that the existing attenuation in the duct system is not enough. The table shows that more attenuation is needed. What to choose?

Example

Duct Ø315



	63	125	250	500	1k	2k	4k	8k	
Before	X	X	X	X	X	X	X	X	dB
After	X	X	X	X	X	X	X	X	dB
Difference	1	4	8	13	20	16	7	7	dB

Lindab has a large range of silencers with varying characteristics and dimensions. Let us see what might fit!



Sound

SLCU 50	63	125	250	500	1k	2k	4k	8k
600	0	2	6	11	14	9	4	5
900	1	3	7	16	22	12	6	7
1200	1	3	8	22	30	16	7	9

←

This is the narrowest silencer, so the longest one, 1200 mm, should be selected to meet the requirements. The deviation in the 125 Hz band, 1 dB, is small and will not be noticeable.

This is one of the possible alternatives!

SLCU 100	63	125	250	500	1k	2k	4k	8k
600	1	4	7	9	12	10	5	6
900	2	6	12	14	19	15	7	8
1200	2	8	16	18	26	21	9	10

←

This silencer has a thicker layer of absorbing material (100 mm instead of 50 mm) and thus has better low frequency damping, but also has a larger external diameter than SLCU 50. To meet the requirements, you should choose the longer one, 900 mm. The deviations in the 500 and 1k Hz bands, 1 dB, are small and will not be noticeable. This is another of the possible alternatives.

SLCBU 100	63	125	250	500	1k	2k	4k	8k
600	4	6	10	16	22	28	27	18
900	5	7	16	23	30	38	32	22
1200	7	9	23	30	38	47	37	25

←

This silencer has the same thickness of absorbing material as SLCU 100 (100 mm) but also has a 100 mm thick baffle which increases damping (but also the pressure drop across the silencer). You only have to choose the shortest one, 600 mm, to meet the requirements by a wide margin. The silencer manages all the octave bands by a wide margin. This is still another possible alternative.

The final choice of alternatives is determined by other considerations:

- **SLCU 50 1200**
if there is space lengthways, (but perhaps tight at the sides).
- **SLCU 100 900**
shorter, but needs more room at the sides.
- **SLCBU 100 600**
If the lengthways space is limited and if the slight increase in total pressure drop is not important - e.g. in a branch duct where part of the available pressure has to be restricted anyway when the air flows are adjusted.

Decide how safe the values in the sound calculation are, and choose a silencer with the corresponding margin of safety. It is always more expensive and more difficult to add damping afterwards, if it was not installed from the beginning. If the users ever become dissatisfied with the noise, it is difficult to get them to change their views!

You can find the products under Silencers at page 129.



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Bends

Overview bends – ordinary

	Short radius $r_m \approx 0,6 \cdot d_1$		Normal radius $r_m \approx 1 \cdot d_1$		Long radius $r_m \approx 1,5 \cdot d_1$	
$\varnothing d_1$	Pressed and seam welded	Segmented and lockseamed	Pressed and seam welded	Segmented and lockseamed	Pressed and seam welded	Segmented and lockseamed
63						
80	BKU 90°		BU 90° BU 60° BU 45° BU 30° BU 15°		BSU 90° BSU 45°	
100						
125						
160						
200		BKFU 90°		BFU 90° BFU 60° BFU 45° BFU 30° BFU 15°		BSFU 90° BSFU 45°
250						
315						
400						
500						
630						
800						
1000						
1250						



Overview bends – others

	Short radius $r_m \approx 0,6 \bullet d_1$	Normal radius $r_m \approx 1 \bullet d_1$					
$\varnothing d_1$	Pressed and seam welded	Pressed and seam welded	Segmented and lock-seamed	Pressed and seam welded	Segmenterad and lock-seamed	Pressed and seam welded	Pressed and seam welded
63							
80	BKMU 90°	BKCU 90°		BBKCU 90°		BU GJUT	BSIU GJUT
100							
125							
160							
200							
250							
315							
400			BFKCU 90°		BFBKCU 90°		
	Female end	Clearing stud at side		Clearing stud at back		Female end and nail flange	Air valve socket and nail flange





T-pieces and saddle

Overview T-pieces – ordinary

	Short installation length	Normal installation length	
Ød ₁	Pressed and seam welded	Pressed and seam welded	Segmented and lockseamed
63	TCPU KORT	TCPU	TCU TU
80			
100			
125			
160			
200			
250			
315			
400			
500			
630			
800			
1000			
1250			



Overview saddle and T-pieces

Normal installation length	
Pressed and seam welded	Segmented and lockseamed
PSU	TSTCU TSTU



Overview T-pieces – others

	Short installation length	Normal installation length	
Ød ₁	Pressed and seam welded	Pressed and seam welded	Pressed and seam welded
63	TCPU GIPS	TCPU GJUT	
80			
100			
125			TCSIU GJUT
160			
200			
250			
315			
400			
	Female end	Female end and nail flange	Air valve socket and nail flange





The Safe system

The Safe-system

- Safe is a quickly assembled system for round ventilation ducts.
- Safe is type approved to class D by SITAC, no. 1358/88.
- The complete programme has dimensions according to Eurovent 2/3 and Swedish Standard SS-EN 1506.
- The system is based on a double-lipped, factory-installed seal made from EPDM rubber. The moulding, which can withstand rough handling, and is almost insensitive to temperature changes, gives a very air-tight seal.

Advantages of the Safe-system

- Quick assembly.
- Factory fitted seal with no loose fittings.
- Can be twisted and adjusted with tightness unaffected.
- Installation without sealant or solvents.
- Can be used in all climates.
- Seal moulding remains tight from 5 000 Pa negative pressure to 3 000 Pa positive pressure. Duct resistance to collapse differs from these pressures, and is noted on page 41.
- Type approved to sealing class D.

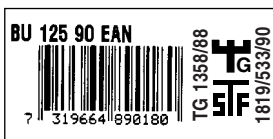
Type approval

Approval no 1358/88 means that the Safe-system complies with the requirements for tightness class D without any demand for pressure testing after installation.

The approval is only valid on condition that all fittings are marked by us in accordance with the example and are installed in accordance with the accompanying installation instruction.

Marking

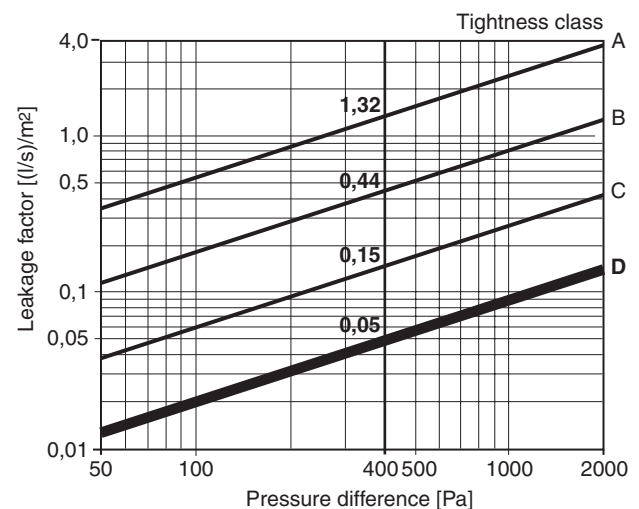
Each individual product is marked with a special label or stamped in the metal.



Tightness

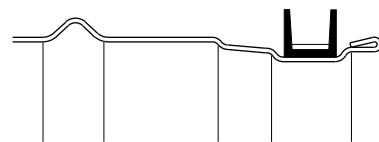
A duct system will never be "completely tight". The system will normally have some leaks at joints between ducts and fittings. The leakage will also increase as the pressure difference between the in- and outside of the duct sides increases.

The leakage factor in (l/s)/m² is always specified in relation to the pressure difference in Pa. (The unit (l/s)/m² denotes the leakage flow in l/s in or out of the system in relation to its duct area in m².) The graph below shows the leakage factor for the sealing classes A–D as a function of the pressure difference.



The graph shows that sealing class D is 3 times better than class C, which in turn is 3 times better than class B etc. Class D thus entails demands on not only the seal moulding but also the fittings and how well the system is installed.

This is one reason why we have given all fittings a turned-over edge and have given still more fittings a stop bead. This gives us stable products which are better suited to withstand handling on site at the same time as the risk of skewed assembly falls.



Turned-over edge design



The Safe system

Economy – Tightness

Present-day stringent demands for interior climate entail expensive air treatment. Leakage leads to uneconomical operation, adjustment difficulties and over-dimensioned equipment. For this reason, it is important that ventilation systems are very well sealed, to keep overall costs down. This is why official requirements for sealing vary with the size and use of systems.

Inspection/Testing

In order to make Safe comply with the requirements of sealing class D, we have constant inspection procedures where we do daily sampling. Inspection is done on goods received from sub-contractors and our own production of ducts and fittings.

Goods reception inspection complies with Swedish Standard for testing methods and batch acceptance levels. The inspection points include:

1. Inspection of seal moulding inner diameter. This is particularly important for ageing resistance of the rubber. The greater the load on the rubber, either stretching or pressure, the faster the rubber ages, causing brittleness and cracking.
2. The seal moulding profile is measured in a profile projector, where the dimensions of the seal moulding are checked against agreed tolerances.
3. The seal moulding material is tested by accelerated ageing in heat oven.

Manufacturing inspection is logged. The inspection includes a diameter check of ducts and fittings, a check of the groove where the seal moulding has been fixed, and a check of its fixing. Pressure testing is done in our air laboratory, to check the leakage flow from our products. This does not give the whole picture, however, so the best inspection of the Safe system is the pressure testing that The Swedish National and Testing Institute undertakes on randomly sampled products. In all these pressure tests, the Safe system has always exceeded the relevant sealing requirements.

Fittings

Products under the Safe insert and fittings with Safe seals under the Silencer, Dampers and measure units, and Isol inserts are included in the type approval for sealing class D. In addition, some fittings, under the Other circular products insert, are included.

A handful of fittings with the Safe seal can only manage up to tightness class C. This is marked on each of these products.

Fittings in this catalogue with a “U” in their designations have Safe seals, with only a few exceptions.

Degreased

Fittings can be supplied degreased on the inside, to order.

Dimensions

Almost all products in the Safe-programme can also be delivered in intermediate dimensions. For further information see page 11.

Negative pressure

At big negative pressure there is a risk for a ventilation system to collapse. This risk is greater the bigger dimensions you have.

In order to increase the strength of *the ducts* you can e.g. increase their sheet metal thickness. This is a simple way but the effect is rather small. It exists other ways with higher result. For bigger dimensions then the ducts may be stronger than the fittings.

In order to increase the strength of *the fittings* other ways than thicker sheet metal thickness are more suitable.

Lindab has experience and knowledge about this and is willing to offer help at special cases. We can, as special, deliver duct systems that can withstand at least 5 000 Pa negative pressure.



The Safe system

Design

Our Safe seal system is based on a U-shaped profile of solid rubber. The seal moulding rests in a groove at the end of the fitting and is fixed with a steel strap.

As standard are Safe-fittings always supplied with an EPDM (ethylene-propylene rubber) seal moulding. The material has been chosen due to its long service life and the best possible resistance to ozone and UV radiation. It is also highly tolerant to temperature variations. Under normal conditions, the moulding can withstand:

-30 °C to +100 °C continuous
-50 °C to +120 °C intermittent

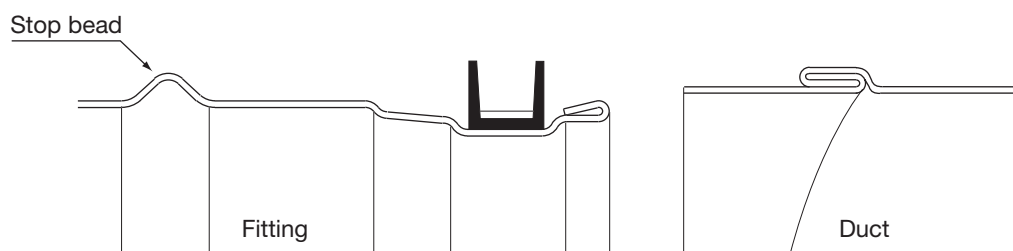
As special for installations which demand high temperature tolerance and somewhat higher oil resistance, Safe fittings can be supplied with a special silicone rubber moulding. This moulding is recognized by its blue colour. Temperature tolerance:

-70 °C to +150 °C continuous
-90 °C to +200 °C intermittent

When fittings are installed in ducts, the seal moulding lips will be bent backwards. This means that the seal will be better at withstanding negative pressure than positive pressure, since the negative pressure will tend to press the lips harder against the duct walls. The following pressure differences must not be exceeded, to cope with tightness class D.

Positive pressure in duct 3000 Pa
Negative pressure in duct 5000 Pa

Both Swedish and European standards allow a greater tolerance range between the duct and matching fittings as the diameter increases. In order to achieve maximum sealing for all dimensions, we have chosen to use successively bigger seal mouldings as duct dimensions increase.





The Safe system

Resistance of seal mouldings to various substances

The table below gives a basic guide to how the rubber is affected by various substances.

A figure for each type of rubber indicates its suitability.

4	Scarcely affected	Recommended
3	Lightly affected	Normally usable
2	Strongly affected	Only useable in certain cases
1	Badly affected	Unsuitable
–	No information	

	EPDM	Sili- cone		EPDM	Sili- cone		EPDM	Sili- cone
A			Ethylene chloride	1	–	Oxalic acid	4	3
Acetaldehyde	4	4	Ethyl glycol, cellosolve	3	–	Ozone	4	4
Acetic acid dilute 30%	4	3	Ethyl chloride	4	1	Oxygen	4	4
crystalline acetic acid	4	3	Ethane, ethylene	1	–			
Acetic anhydride	3	2				P		
Acetone	4	3	F			Palmitinic acid	3	–
Acetylene	3	3	Fluoric silicate	4	2	Paraffin (kerosine)	1	1
Aluminium salts (non-oxidizing)	4	4	Formic acid	4	2	Perchloroethylene	1	3
Alun	4	4	Formaldehyde, formalin	4	–	Perchloric acid	3	1
Ammonia, liquid	4	1	Freon, see CFC			Petrol (gasoline), 65 octane	1	1
Ammonia gas, cold	4	4	Furan, furfuran	2	–	Petrol (gasoline), 100 octane	1	1
Ammonia gas, hot 65 °C	3	3	Furfural	3	–	Petroleum ether	1	1
Ammonium hydroxide, dil. ammonia	3	3				Petroleum oils high aromatic content	1	1
Ammonium salts (non-oxidising)	4	3	G			low aromatic content	1	3
Amyl acetate	4	1	Glucose	4	4	Phenol	3	2
Aniline	3	–	Glycerine, glycerol	4	4	Phosphoric acid 45%	4	1
Aniline dyes	4	–	Green liquor, white liquor	4	3	Phosphoric acid 85%	4	1
Animal fats	2	3				Plating solutions without chromium	4	3
Arsenic acid	4	4	H			Potassium hypochlorite,		
Asphalt	1	1	Heating oil	1	2	pH 7 below 10 g/l	4	1
			Hydraulic oil, mineral oil based	1	3	over 10 g/l	3	1
B			Hydraulic oil, phosphate ester based	4	4	Potassium hydroxide, potash	4	3
Barium salts (non-oxidizing)	4	4	Hydrogen	4	4	Potassium salts (non-oxidizing)	4	3
Beer	4	4	Hydrogen peroxide 3%	4	4	Propane, LPG	1	1
Benzene, bensol	1	1	30% 20 °C	4	4	Propanol, Propyl alcohol	4	4
Black liquor	1	–	90% 20 °C	2	4			
Black water, waste water	4	3	Hydrochloric acid dilute	4	1	R		
Bleaching liquor, see Potassium hypochlorite			conc 37% room temp	4	1	Radioactive radiation	3	2
Borax	4	3	conc 37% 70 °C	2	1	Rape seed oil (canola oil)	4	4
Boric acid	4	4	Hydrogen sulphide dry, room temp	4	4	Rosin oil	1	1
Bromide, liquid	–	1	damp, room temp	4	2			
Bromic acid	4	1	damp, hot	3	1	S		
Butane	1	4	Hydrofluosilicic acid	4	1	Salicylic acid	4	4
Butanol, butyl alcohol	4	3	Hydrofluoric acid 50%	4	1	Sodium salts (non-oxidizing)	4	4
Butter oils	1	1	Hydrofluoric acid, conc.	4	1	Sodium hydroxide, sodium hydrate	4	2
Butyl acetate	4	1				Sodium hypochlorite max 10 g/l free Cl	4	–
			I			over 10 g/l free Cl	3	–
C			Iodine	–	–	Sugar solutions	4	4
Caustic soda, sodium hydroxide	4	2	Iron salts (non-oxidizing)	4	3	Styrene	1	1
Calcium salts (non-oxidizing)	4	3				Sulphur, melted	4	4
Cellosolve, ethylene glycol	3	–	L			Sulphur dioxide, dry gas	4	3
Cellosolve acetate	3	–	Lactic acid	4	4	Sulphur chloride	1	–
Chlorine gas dry	2	–	Lead salts (non-oxidizing)	4	2	Sulphuric acid 60% room temp.	4	1
damp	2	–	Linseed oil	3	4	60% 50 °C	4	1
Chlorine solutions 0,1 g/l free chlorine	4	–	Liquid manure	4	3	60-75% 50 °C	3	1
0,1-1 g/l free chlorine	4	–	LPG (Propane/butane)	1	1	75-80% 50 °C	2	1
1-10 g/l free chlorine	3	–				85-96% 50 °C	1	1
over 10 g/l free chlorine	2	–	M			fuming, Oleum	1	1
Chlorine sulphate acid	1	1	Magnesium salts (non-oxidizing)	4	4	Sulphurous acid	4	1
Chromic acid	2	2	Manganese salts (non-oxidizing)	4	4	Sulphur trioxide, dry gas	3	2
CFC (e.g. Freon) 11	1	1	Mercury	4	4			
12	3	1	Mercury salts (non-oxidizing)	4	4	T		
13	4	–	Methanol, methyl alcohol, wood alcohol	4	4	Tar	1	2
21	1	–	Methylene chloride	1	1	Tannic acid	4	1
22	4	1	Methyl chloride	2	1	Terpentine, terpenes	1	1
31	4	–	Methyl ethyl ketone MEK	4	–	Toluene, toluol	1	1
32	4	–	Methyl isobutyl ketone	3	2	Trichlorethane, "thinner"	1	2
112	1	–	Methyl isopropyl ketone	3	2	Transformer oil mineral oil based	1	3
113	1	1	Milk	4	4	chlorated hydrocarbon	1	1
114	4	1				V		
115	4	–	N			Vegetable oils	4	4
Copper salts (non-oxidizing)	4	4	Natural gas	1	4			
Citric acid	4	4	Nickel salts (non-oxidizing)	4	4	W		
			Nitrobenzene, Nitrobenzol	2	1	Water fresh	4	4
D			Nitric acid 20% room temp.	4	–	distilled	4	4
Detergent	4	4	20% 50 °C	3	1	salt	4	4
Diesel oil	1	2	40% 50 °C	3	1	fresh & dist. 100 °C	4	2
Dilutin (White spirit)	1	1	50% 50 °C	2	1	White spirit (Dilutin)	1	1
Developing solutions	3	–	60% room temp.	2	1	Wine	4	4
			70% room temp.	1	1			
E			red fuming	1	1	X		
Ethanol, ethyl alcohol	4	4	Nitrogen	4	4	Xylene, xylol	1	1
"Ether", diethyl ether, ethyl ether	2	–	Nitrous gases	2	2			
Ethyl acetate	3	2				Z		
Ethylene glycol	4	3	O			Zinc salts (non-oxidizing)	4	4
			Olive oil	3	3			
			Oleic acid	4	–			



Circular duct

SR



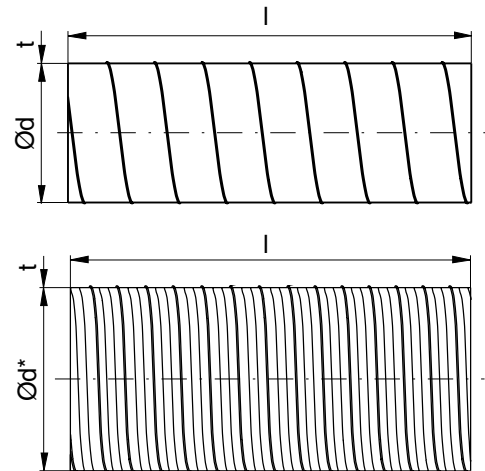
Description

Circular duct.

Ordering example

	SR	200	3000
Product			
Dimension Ød			
Length l			

Dimensions



Ød stand nom	O πd m	A $\pi d^2/4$ m ²	t stand mm	l stand mm	m _l stand kg/m
63	0,198	0,003	0,5	3000	0,89
80	0,251	0,005	0,5	3000	1,01
100	0,314	0,008	0,45	3000	1,14
112	0,352	0,010	0,5	3000	1,42
125	0,393	0,012	0,5	3000	1,57
140	0,440	0,015	0,5	3000	1,76
150	0,471	0,018	0,5	3000	1,89
160	0,503	0,020	0,5	3000	2,02
180	0,565	0,025	0,5	3000	2,26
200	0,628	0,031	0,5	3000	2,56
224	0,704	0,039	0,6	3000	3,42
250*	0,785	0,049	0,5	3000	3,18
280	0,880	0,062	0,6	3000	4,28
300*	0,942	0,071	0,6	3000	4,58
315*	0,990	0,078	0,6	3000	4,81
355*	1,115	0,099	0,6	3000	5,41
400*	1,257	0,126	0,6	3000	6,56
450*	1,414	0,159	0,7	3000	9,83
500*	1,571	0,196	0,7	3000	9,54
560*	1,759	0,246	0,8	3000	12,2
600*	1,885	0,283	0,7	3000	13,1
630*	1,979	0,312	0,7	3000	12,0
710*	2,231	0,396	0,8	3000	15,5
800*	2,513	0,503	0,8	3000	17,4
900*	2,827	0,636	0,9	3000	21,7
1000*	3,142	0,785	0,9	3000	24,1
1120*	3,519	0,985	0,9	3000	27,0
1250*	3,927	1,227	0,9	3000	30,2
1400*	4,398	1,539	1,25	3000	48,0
1500*	4,712	1,767	1,25	3000	51,4
1600*	5,027	2,011	1,25	3000	54,8

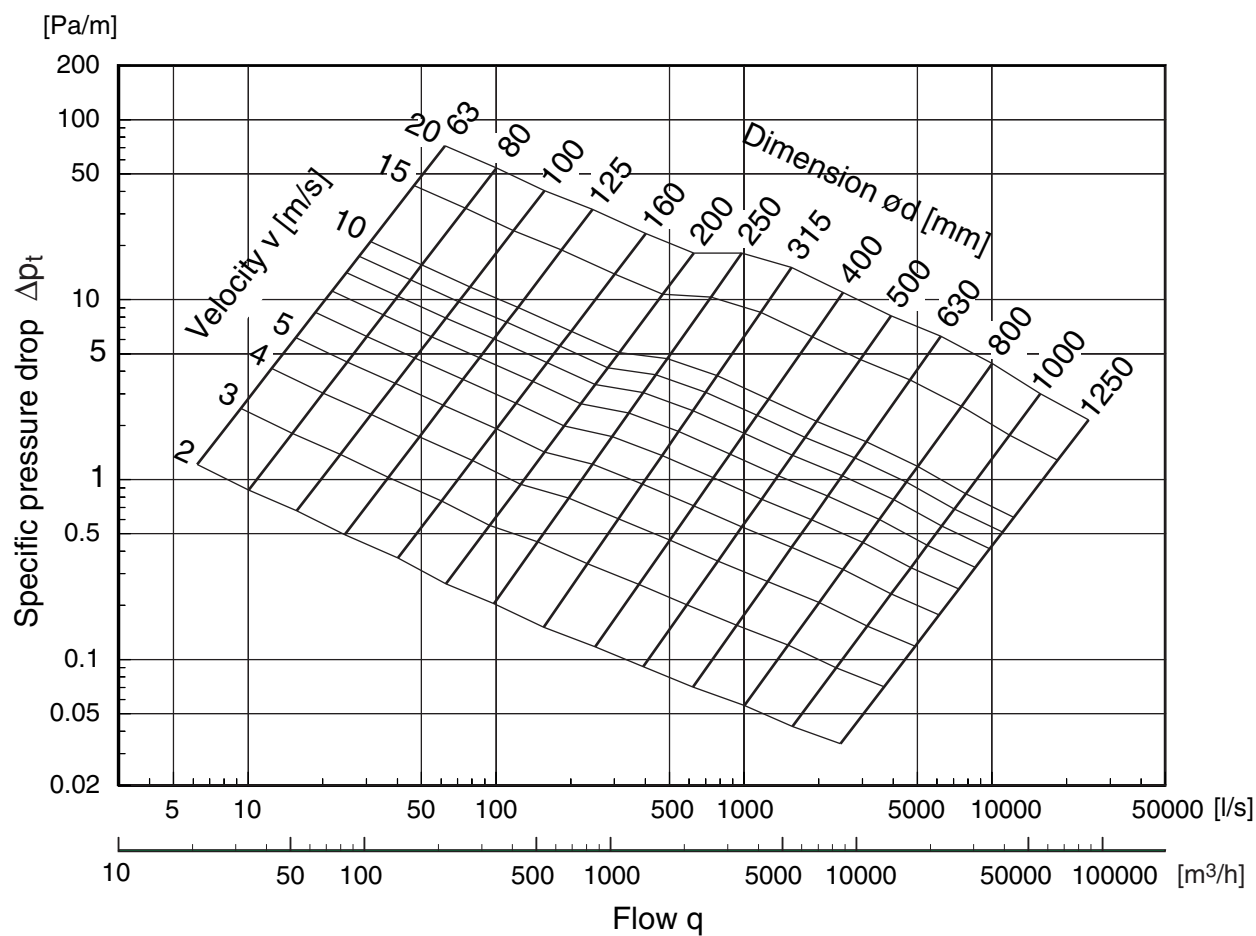
* With outturned stiffening corrugation



Circular duct

SR

Technical data





Circular duct

SR

Special versions

We can supply ducts with the following special designs:

- In intermediate dimensions, see page 11.
- Extra tight, with nitrile rubber seal in the lock seam
- In other sheet metal thicknesses

Extra tight, with seam seal

When extremely good sealing is required in the spiral seam, the ducts can also be supplied with a special rubber seal in the seam.

This seal is very effective at stopping leakage of vegetable oils and greases, and most petroleum products including white spirit.

Other sheet metal thicknesses

If extra stability is needed in ducts, because of high negative pressure etc., they can be supplied with thicker sheet metal than standard. Remember that the thickness increase always reduces the inner diameter. Fittings for such special ducts must be specified separately and sometimes have to be made specially.

Reinforcement corrugations

Ducts of Ø250 mm and above are normally given stiffening corrugations to increase radial stiffness.

Strength

Positive pressure

In case of high positive pressure, the seal moulding lips will first start to whistle. At considerably higher pressure, the joints between the ducts will be forced apart. If you manage to fix the connections very well, the ducts will burst at their seams at even higher pressure. The high pressures needed for this to happen are not relevant to ventilation installations.

Negative pressure

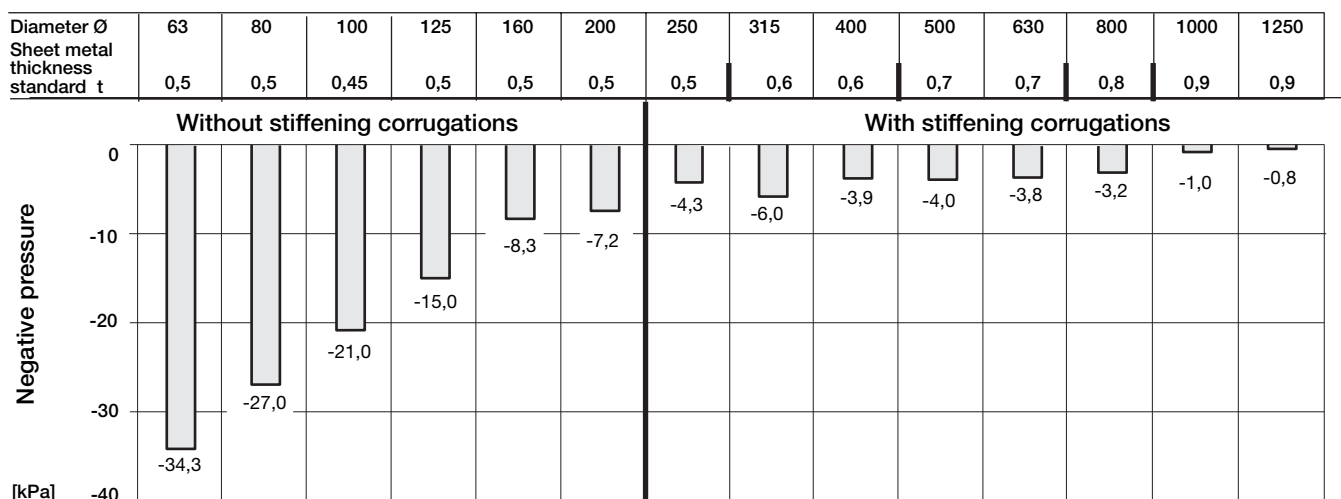
In installations with high negative pressure, there is a risk that the ducts could collapse.

This phenomenon is referred to as buckling, and can suddenly happen at the weakest point in the system. Buckling wanders along the duct, which can be completely flattened. The weakest point is frequently a "transport dent" on a duct. For this reason, only use undamaged ducts in systems which are close to the critical pressure!

Sealing

The ability of the seal moulding to seal is different from these pressures, and is noted on page 35.

Collapsing pressure for duct SR



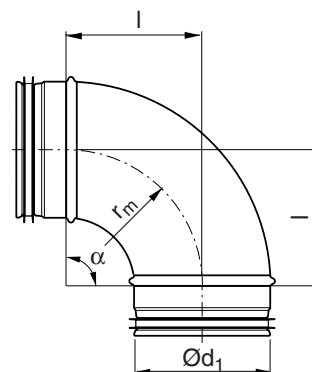


Bend

BU 90°



Dimensions



$$r_m \approx 1 \cdot d_1$$

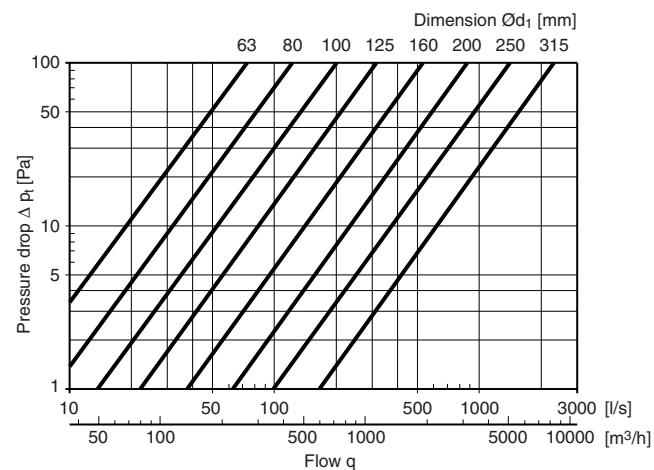
Description

Pressed and seam welded bend.

Ordering example

	BU	100	90
Product			
Dimension $\text{O}d_1$			
Angle α			

Technical data



$\text{O}d_1$ nom	l mm	m kg
63	110	0,20
80	105	0,26
100	100	0,31
112	120	0,39
125	125	0,48
140	135	0,66
150	150	0,66
160	160	0,74
180	180	1,02
200	200	1,30
224	225	1,55
250	250	2,06
280	260	2,50
300	300	2,80
315	315	3,06



Bend

BU 60°



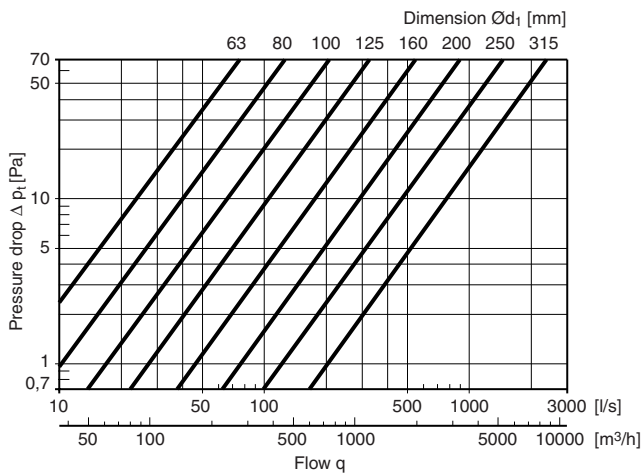
Description

Pressed and seam welded bend.

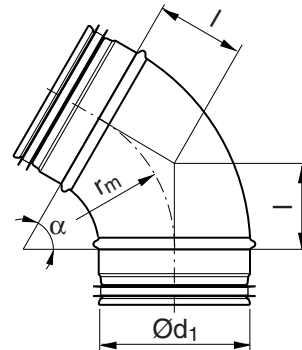
Ordering example

	BU	100	60
Product			
Dimension Ød ₁			
Angle α			

Technical data



Dimensions



$$r_m \approx 1 \cdot d_1$$

Ød ₁ nom	l mm	m kg
63	64	0,30
80	58	0,32
100	58	0,33
112	69	0,37
125	72	0,33
140	78	0,51
150	87	0,50
160	92	0,56
180	104	0,79
200	115	0,95
224	130	1,10
250	144	1,30
280	159	1,50
300	173	1,60
315	182	1,70

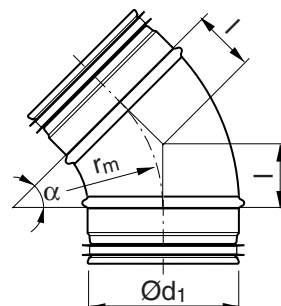


Bend

BU 45°



Dimensions



$$r_m \approx 1 \cdot d_1$$

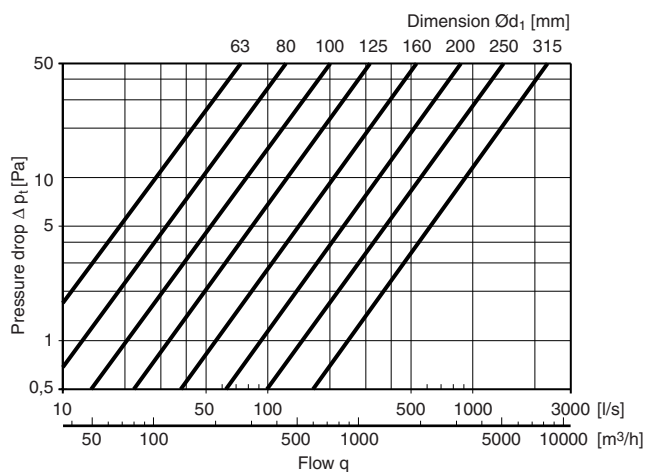
Description

Pressed and seam welded bend.

Ordering example

	BU	100	45
Product			
Dimension Ød ₁			
Angle α			

Technical data



Ød ₁ nom	l mm	m kg
63	46	0,16
80	41	0,17
100	41	0,21
112	81	0,24
125	52	0,29
140	56	0,43
150	62	0,42
160	66	0,55
180	76	0,65
200	83	0,80
224	93	0,95
250	103	1,22
280	95	1,50
300	108	1,70
315	130	1,90



Bend

BU 30°



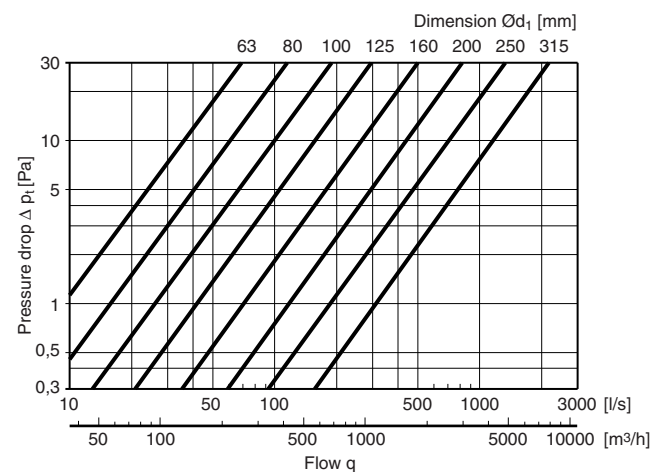
Description

Pressed and seam welded bend.

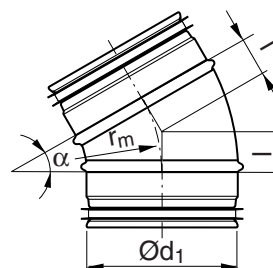
Ordering example

	BU	100	30
Product			
Dimension $\varnothing d_1$			
Angle α			

Technical data



Dimensions



$$r_m \approx 1 \cdot d_1$$

$\varnothing d_1$ nom	l mm	m kg
63	29	0,13
80	27	0,15
100	27	0,18
112	30	0,21
125	33	0,20
140	36	0,36
150	40	0,35
160	43	0,32
180	48	0,51
200	54	0,62
224	60	0,83
250	67	1,05
280	74	1,30
300	80	1,50
315	84	1,60

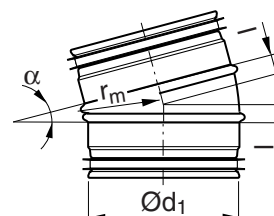


Bend

BU 15°



Dimensions



$$r_m \approx 1 \cdot d_1$$

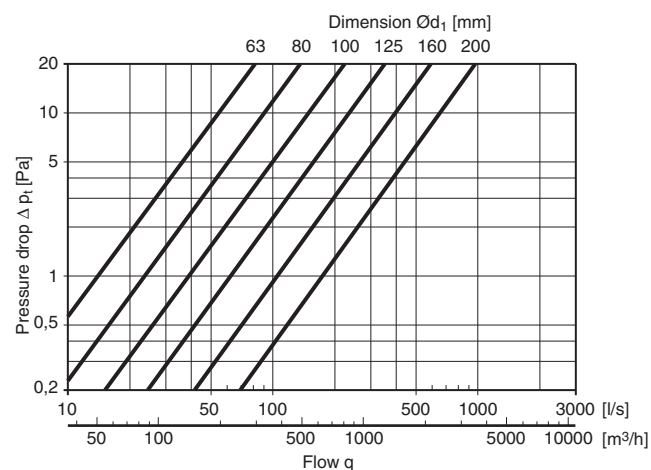
Description

Pressed and seam welded bend.

Ordering example

	BU	160	15
Product			
Dimension $\text{Ø}d_1$			
Angle α			

Technical data



$\text{Ø}d_1$ nom	l mm	m kg
63	14	0,09
80	13	0,11
100	13	0,15
112*	25	0,29
125	16	0,24
140*	18	0,29
150*	20	0,27
160	21	0,33
180*	24	0,37
200	26	0,47
224*	30	0,56

* Segmented and lockseamed



Bend – lockseamed

BFU 90°



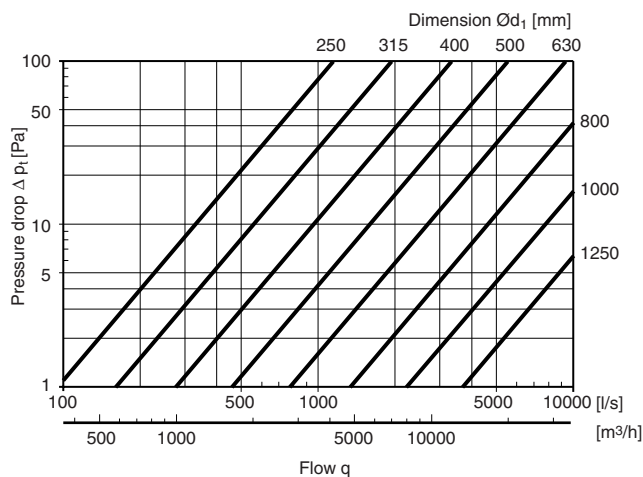
Description

Segmented and lockseamed bend.

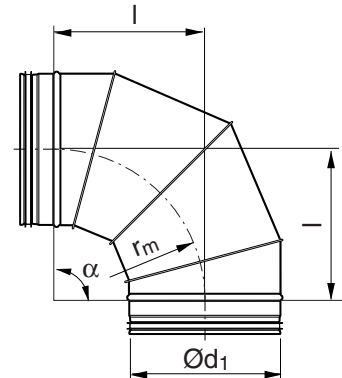
Ordering example

	BFU	315	90
Product			
Dimension $\text{Ø}d_1$			
Angle α			

Technical data



Dimensions



$$r_m \approx 1 \cdot d_1$$

$\text{Ø}d_1$ nom	l mm	m kg
250	250	2,20
280	280	2,50
300	300	2,70
315	315	3,00
355	355	3,75
400	400	5,64
450	450	7,00
500	500	8,20
560	560	10,1
600	600	11,7
630	630	12,9
710	710	19,8
800	800	26,0
900	900	33,6
1000	1000	42,0
1120	1120	52,6
1250	1250	64,0



Bend – lockseamed

BFU 60°



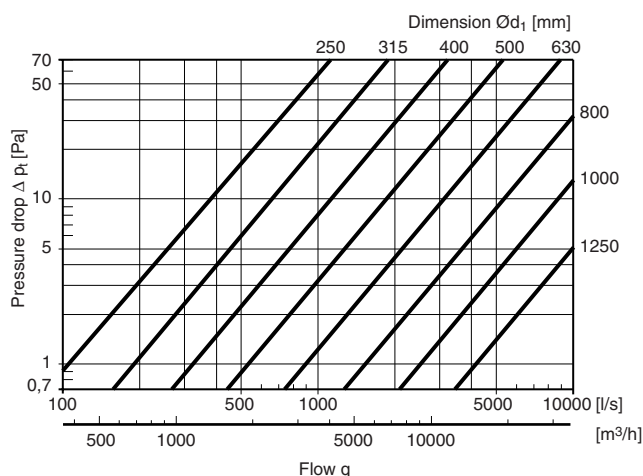
Description

Segmented and lockseamed bend.

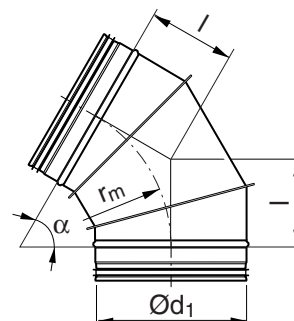
Ordering example

Product **BFU** **315** **60**
 Dimension $\varnothing d_1$
 Angle α

Technical data



Dimensions



$$r_m \approx 1 \cdot d_1$$

$\varnothing d_1$ nom	l mm	m kg
250	144	1,48
280	162	1,80
300	173	2,00
315	182	2,20
355	205	2,80
400	231	3,47
450	260	4,70
500	289	6,00
560	323	7,40
600	346	8,60
630	364	9,20
710	410	11,3
800	462	14,8
900	520	19,3
1000	577	24,2
1120	647	30,1
1250	722	36,6



Bend – lockseamed

BFU 45°



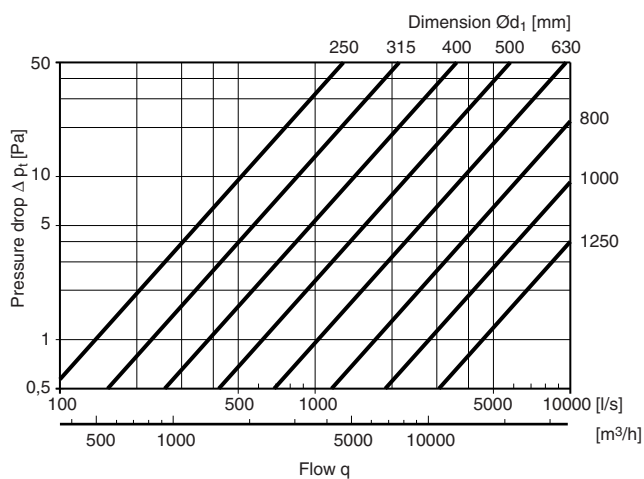
Description

Segmented and lockseamed bend.

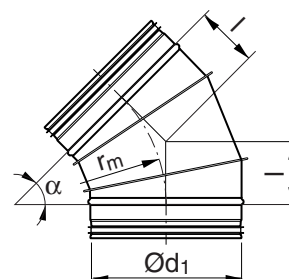
Ordering example

	BFU	250	45
Product			
Dimension Ød ₁			
Angle α			

Technical data



Dimensions



$$r_m = 1 \cdot d_1$$

Ød ₁ nom	l mm	m kg
250	104	1,26
280	116	1,54
300	124	1,77
315	130	1,90
355	147	2,26
400	166	2,96
450	186	4,00
500	207	4,90
560	232	6,10
600	249	6,80
630	261	7,49
710	294	11,3
800	331	15,0
900	373	16,8
1000	414	19,5
1120	464	28,5
1250	518	38,0

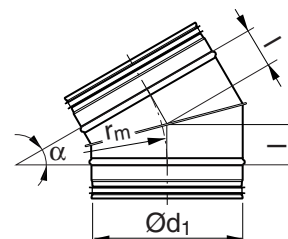


Bend – lockseamed

BFU 30°



Dimensions



$$r_m = 1 \cdot d_1$$

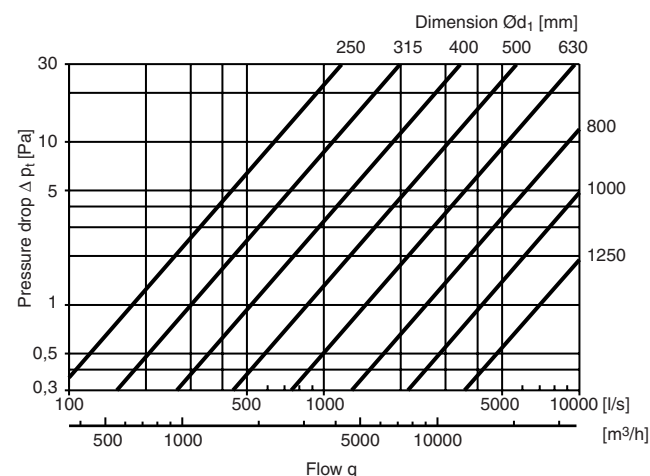
Description

Segmented and lockseamed bend.

Ordering example

Product	BFU	315	30
Dimension Ød ₁			
Angle α			

Technical data



Ød ₁ nom	l mm	m kg
250	67	1,00
280	75	1,10
300	80	1,30
315	84	1,42
355	95	1,70
400	107	2,27
450	121	3,00
500	134	3,70
560	150	4,60
600	161	5,10
630	169	5,60
710	190	8,60
800	214	11,0
900	241	10,9
1000	268	13,4
1120	300	16,1
1250	335	19,0



Bend – lockseamed

BFU 15°



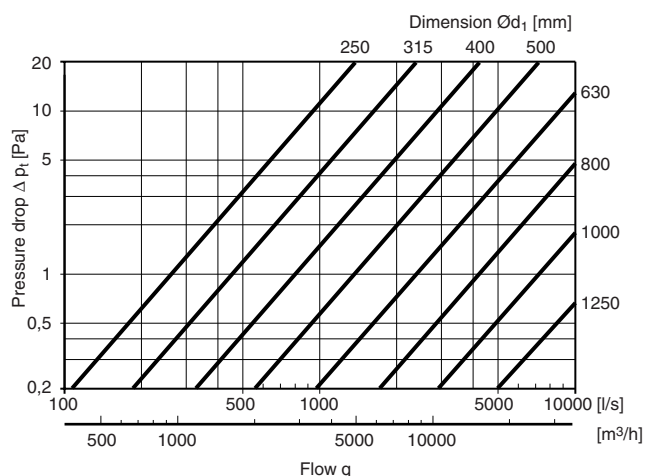
Description

Segmented and lockseamed bend.

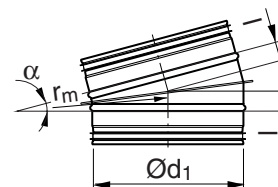
Ordering example

	BFU	400	15
Product			
Dimension $\varnothing d_1$			
Angle α			

Technical data



Dimensions



$$r_m = 1 \cdot d_1$$

$\varnothing d_1$ nom	l mm	m kg
250	33	0,65
280	37	0,77
300	39	0,85
315	41	0,91
355	47	1,41
400	53	1,70
450	59	2,20
500	66	2,65
560	74	3,30
600	79	3,70
630	83	4,00
710	93	5,80
800	105	7,00
900	118	8,50
1000	132	10,4
1120	147	12,5
1250	165	14,5

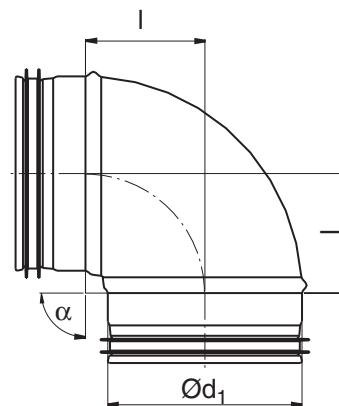


Bend – short

BKU 90°



Dimensions



Description

Pressed and seam welded bend with short installation length.

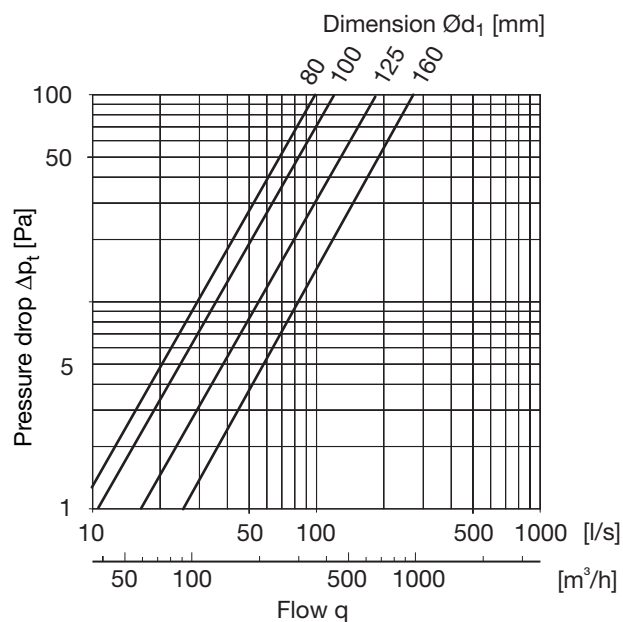
Ordering example

	BKU	100	90
Product			
Dimension $\text{Ø}d_1$			
Angle α			

$\text{Ø}d_1$ nom	l mm	m kg
80	80	0,14
100	62	0,22
125	79	0,31
160*	94	0,64

* With a seam in the middle

Technical data





Bend – short, lockseamed

BKFU 90°



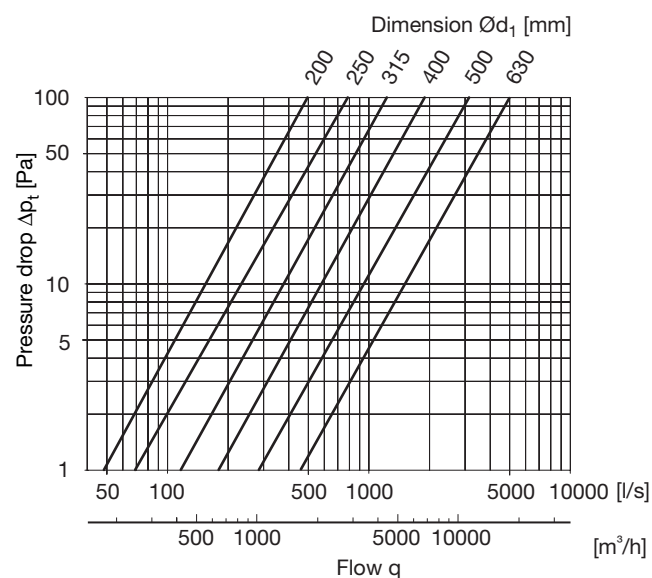
Description

Segmented and lockseamed bend with short installation length.

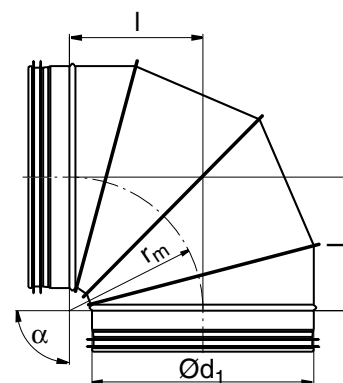
Ordering example

	BKFU	315	90
Product			
Dimension $\varnothing d_1$			
Angle α			

Technical data



Dimensions



$$r_m \approx 0,6 \cdot d_1$$

$\varnothing d_1$ nom	l mm	m kg
200	158	1,18
250	180	1,64
315	220	2,49
400	255	3,61
500	315	6,30
630	397	9,45

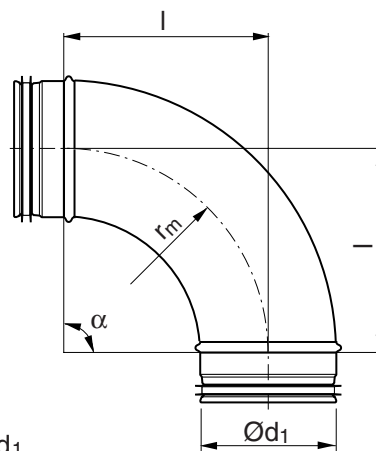


Bend – long

BSU 90°



Dimensions



$$r_m \approx 1,5 \cdot d_1$$

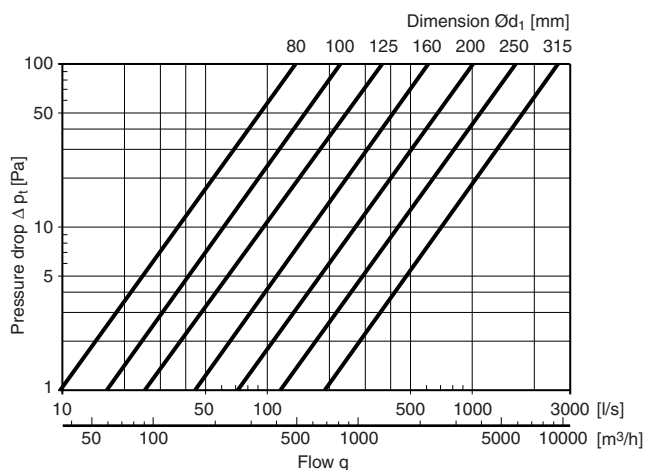
Description

Pressed and seam welded bend.

Ordering example

Product	BSU	160	90
Dimension $\text{Ø}d_1$			
Angle α			

Technical data



$\text{Ø}d_1$ nom	l mm	m kg
80	120	0,35
100	150	0,50
125	190	0,79
150	225	0,95
160	240	1,14
180	270	1,50
200	300	1,80
224	340	2,40
250	375	3,20
300	450	6,20
315	450	6,72



Bend – long

BSU 45°



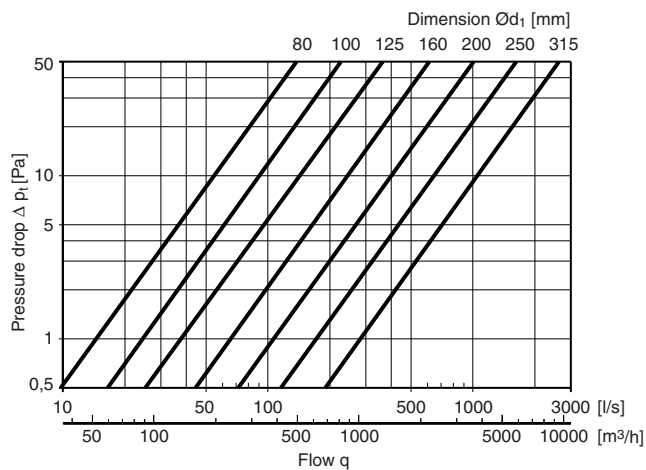
Description

Pressed and seam welded bend.

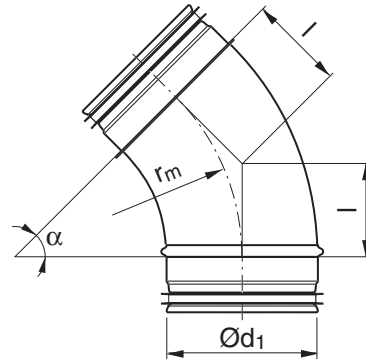
Ordering example

	BSU	125	45
Product			
Dimension Ød ₁			
Angle α			

Technical data



Dimensions



$$r_m \approx 1,5 \cdot d_1$$

Ød ₁ nom	l mm	m kg
80	50	0,18
100	62	0,26
125	79	0,41
150	93	0,49
160	100	0,59
180	112	0,77
200	124	0,82
224	141	1,23
250	155	1,64
280	174	1,97
300	186	3,16
315	186	3,42

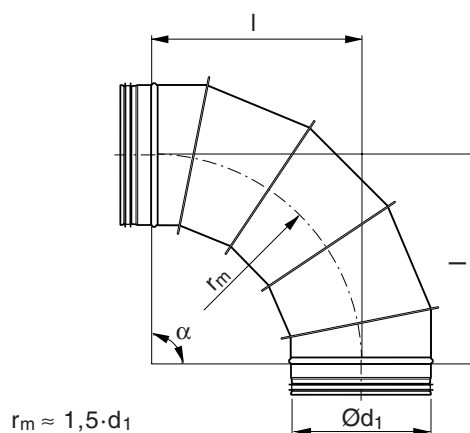


Bend – long, lockseamed

BSFU 90°



Dimensions



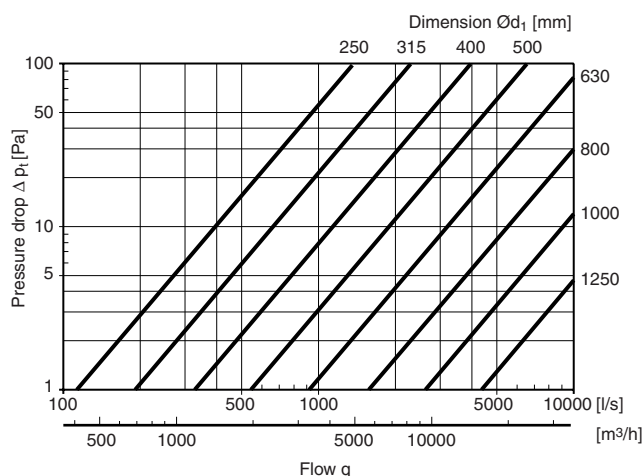
Description

Segmented and lockseamed bend.

Ordering example

Product	BSFU	315	90
Dimension $\text{Ø}d_1$			
Angle α			

Technical data



$\text{Ø}d_1$ nom	l mm	m kg
250	375	2,70
280	420	3,33
300	450	3,60
315	473	4,20
355	533	4,60
400	600	8,30
450	675	10,2
500	750	11,9
560	840	15,2
600	900	17,0
630	945	18,8
710	1065	22,7
800	1200	26,9
900	1350	39,3
1000	1500	47,7
1120	1680	63,0
1250	1875	78,5



Bend – long, lockseamed

BSFU 45°



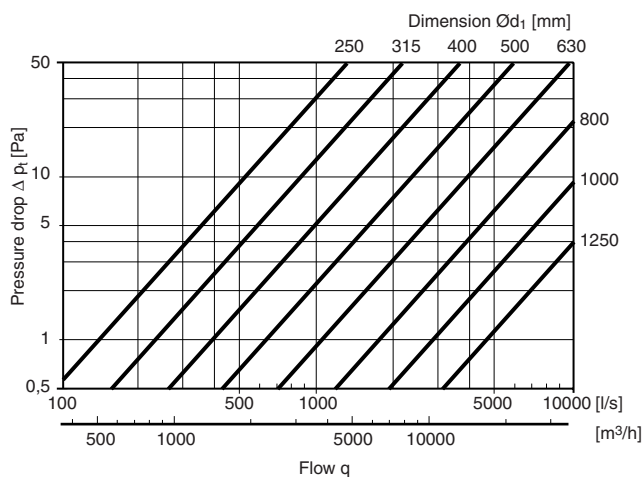
Description

Segmented and lockseamed bend.

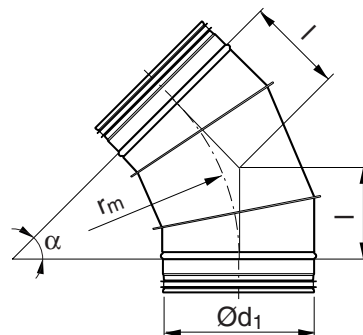
Ordering example

	BSFU	315	45
Product			
Dimension Ød ₁			
Angle α			

Technical data



Dimensions



$$r_m = 1,5 \cdot d_1$$

Ød ₁ nom	l mm	m kg
250	155	1,60
280	174	1,81
300	186	2,00
315	196	2,26
355	221	2,60
400	249	4,50
450	280	5,53
500	311	6,60
560	348	7,95
600	373	8,80
630	391	9,50
710	441	11,1
800	497	13,1
900	559	18,9
1000	621	23,9
1120	696	29,6
1250	777	36,1



Bend – Casting-in programme BKMU 90°



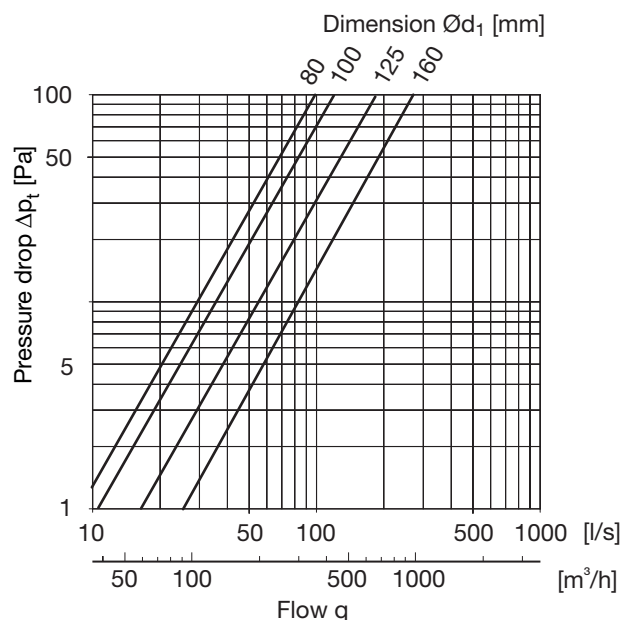
Description

Pressed and seam welded bend with short installation length and female end.

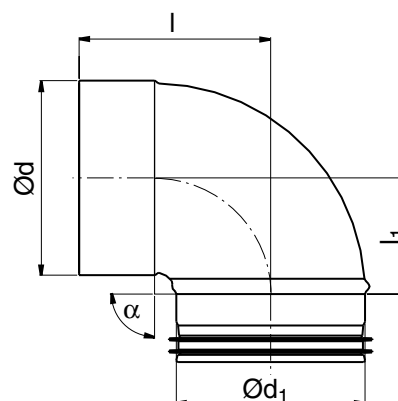
Ordering example

	BKMU	100	90
Product			
Dimension $\varnothing d_1$			
Angle α			

Technical data



Dimensions



$\varnothing d_1$ nom	$\varnothing d$ mm	l mm	l_1 mm	m kg
80	80	123	80	0,13
100	100	105	62	0,21
125	125	120	79	0,31
160*	160	136	94	0,63

* With a seam in the middle



Cleaning bends

BKCU 90°, BFKCU 90°



Description

Pressed and seam welded bend with separate branch for cleaning.

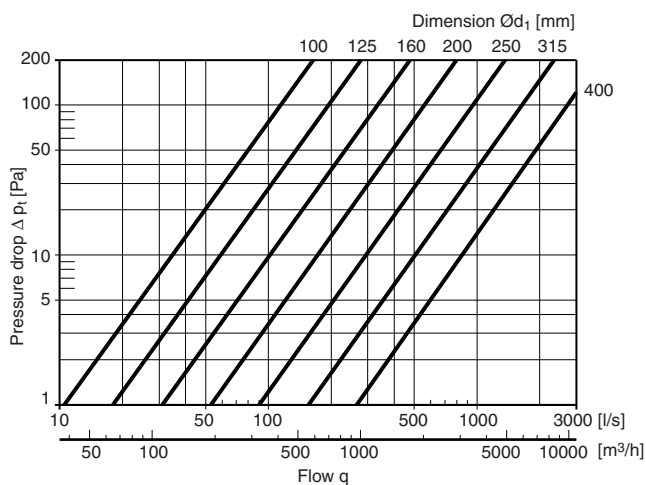
The stud is fitted with a Safe take-off and fits an inspection cap.

The design gives a lower pressure drop than the equivalent design using a T-piece. The stud can also be used as the connection for an SR duct.

Ordering example

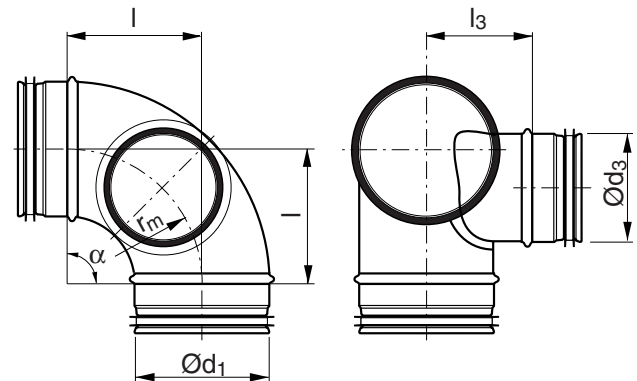
	BKCU	200	160
Product			
Dimension $\text{Ø}d_1$			
Dimension $\text{Ø}d_3$			

Technical data



The graph applies to a cleaning bend with cleaning cap. Pressure drop is independent of take-off dimension ($\text{Ø}d_3 \leq \text{Ø}d_1$).

Dimensions



$$r_m \approx 1 \cdot d_1$$

$\text{Ø}d_1$ nom	$\text{Ø}d_3$ nom	l mm	l₃ mm	m kg
100	100	100	75	0,41
112	100	120	85	0,50
125	100	125	90	0,59
125	125	125	90	0,66
140	125	135	100	0,75
150	125	150	105	0,78
160	125	160	110	0,97
160	160	160	110	0,97
180	160	180	120	1,18
200	160	200	130	1,40
200	200	200	130	1,44
224	200	225	140	1,78
250	200	250	155	2,19
250	250	250	150	2,28
280	250	280	165	2,65
300	250	300	175	2,95
315	250	315	180	3,30
315	315	315	180	3,30
355*	315	350	200	5,50
400*	315	400	220	7,53
400*	400	400	220	7,25

* Segmented and lockseamed. Designated BFKCU 90°



Cleaning bends BBKCU 90°, BFBKCU 90°



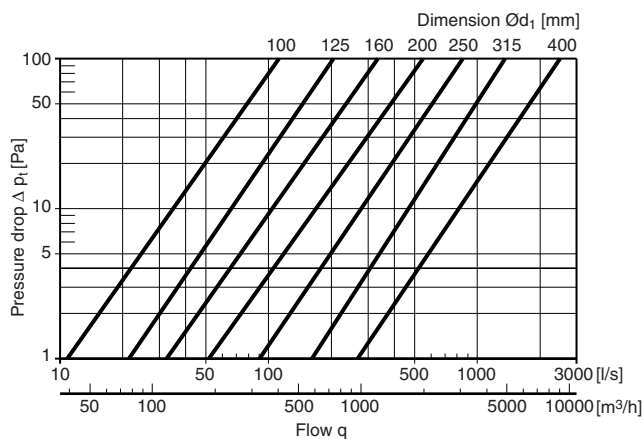
Description

Pressed and seam welded bend with separate branch for cleaning.
The stud is fitted with a Safe take-off and fits an inspection cap.

Ordering example

	BBKCU	200	160
Product			
Dimension $\varnothing d_1$			
Dimension $\varnothing d_3$			

Technical data



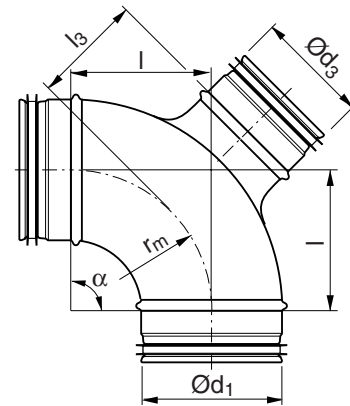
The graph applies to a cleaning bend with cleaning cap EPFH and with the same dimension of take-off and main duct ($\varnothing d_3 = \varnothing d_1$).

The pressure drop is about 30% lower for cleaning cap KCU and $\varnothing d_3 = \varnothing d_1$.

The pressure drop is about 30% lower for cleaning cap EPFH and one step smaller take-off dimension ($\varnothing d_3 < \varnothing d_1$).

The pressure drop is about 50% lower for cleaning cap KCU and one step smaller take-off dimension ($\varnothing d_3 < \varnothing d_1$).

Dimensions



$$r_m \approx 1 \cdot d_1$$

$\varnothing d_1$ nom	$\varnothing d_3$ nom	l mm	l ₃ mm	m kg
100	100	100	75	0,42
112	100	120	78	0,51
125	100	125	78	0,58
125	125	125	83	0,58
140	125	135	90	0,75
150	125	150	90	0,77
160	125	160	100	0,97
160	160	160	105	0,96
180	160	180	108	1,20
200	160	200	125	1,40
200	200	200	125	1,45
224	200	225	128	1,90
250	200	250	150	2,30
250	250	250	150	2,40
280	250	280	148	2,75
300	250	300	148	3,10
315	250	315	183	3,45
315	315	315	183	3,45
355*	315	350	180	5,60
400*	315	400	225	7,30
400*	400	400	225	7,00

* Segmented and lockseamed. Designated BFBKCU 90°



Bend – Casting-in programme

BU



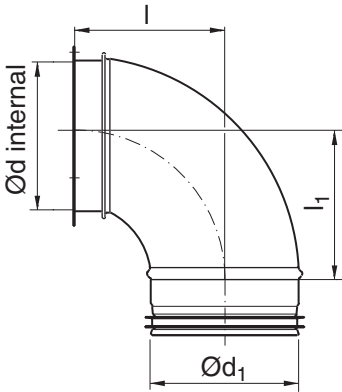
Description

Short installation length with female end and nail flange with pre-punched holes.

Ordering example

	BU	100	90	GJUT
Product				
Dimension Ød ₁				
Angle				
Specification				

Dimensions



Ød ₁ nom	Ød mm	l mm	l ₁ mm	m kg
80	80	90	80	0,24
100	100	100	100	0,32
125	125	120	125	0,42
160	160	150	160	0,57



Bend – Casting-in programme

BSIU



Description

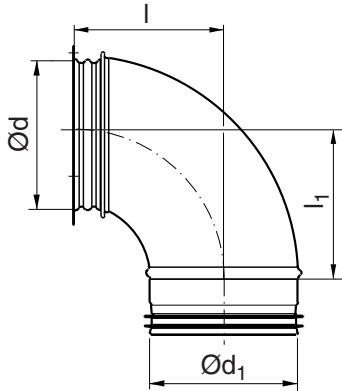
Short installation length with air valve socket and nail flange with pre-punched holes.

Fits air valve KGEB etc.

Ordering example

	BSIU	100	90	GJUT
Product				
Dimension $\varnothing d_1$				
Angle				
Specification				

Dimensions



$\varnothing d_1$ nom	$\varnothing d$ nom	l mm	l_1 mm	m kg
100	92	100	92	0,30
125	117	125	122	0,41
160	152	160	157	0,51



Reducer

RCU



Description

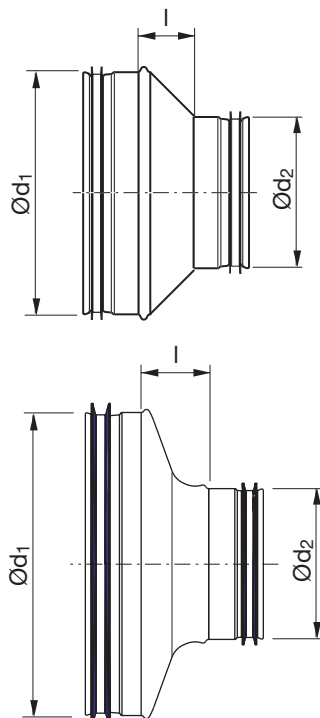
Pressed, concentric reducer to meet demands for short installation length with low pressure drop and low internal noise generation.

Pressure drop, see graphs on pages 65–66.

Ordering example

	RCU	200	100
Product			
Dimension Ød ₁			
Dimension Ød ₂			

Dimensions



Dimensions

Ød ₁ nom	Ød ₂ nom	l mm	m kg
80	63	18	0,12
100	63	27	0,16
100*	80	26	0,18
125*	80	38	0,16
125*	100	27	0,21
150	100	36	0,17
150*	125	31	0,15
160	80	52	0,30
160*	100	46	0,17
160*	125	35	0,22
160	150	20	0,25
180	100	55	0,24
180	125	40	0,37
180	150	27	0,29
180	160	20	0,26
200*	100	46	0,22
200*	125	55	0,30
200	150	37	0,37
200*	160	39	0,29
200	180	23	0,34
224	150	48	0,53
224	160	44	0,53
224	180	32	0,47
224	200	24	0,45
250	125	70	0,62
250	150	62	0,60
250*	160	60	0,46
250	180	47	0,59
250*	200	42	0,46
250	224	29	0,57
300	200	59	0,73
300	250	34	0,71
315	160	91	0,86
315	200	74	0,83
315*	250	50	0,65
355	250	69	1,08
355	315	33	0,99
400	200	118	1,37
400	250	94	1,38
400	315	54	1,29
500**	250	128	2,30
500	315	95	1,90
500	400	68	1,76
630**	315	160	3,37
630**	400	118	3,17
630**	500	68	2,89

* With stream-lined transition

** Hand made



Reducer

RCFU



Description

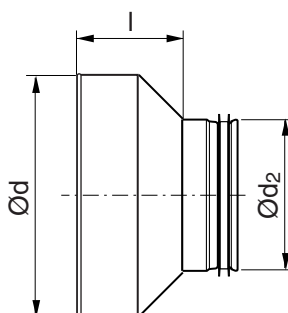
Pressed, concentric reducer with female coupling, with a 45° angle to meet demands for short installation length with low pressure drop and low internal noise generation. Ød fits outside another fitting.

Pressure drop, see graphs on pages 65–66.

Ordering example

	RCFU	200	100
Product			
Dimension Ød			
Dimension Ød ₂			

Dimensions



Dimensions

Ød nom	Ød ₂ nom	l mm	m kg
80	63	57	0,11
100	63	66	0,14
100* ¹	80	61	0,16
125* ¹	80	73	0,16
125* ¹	100	64	0,14
150	100	78	0,16
150* ¹	125	66	0,17
160*	80	92	0,24
160* ¹	100	83	0,16
160* ¹	125	71	0,20
160*	150	57	0,25
180	100	98	0,24
180	125	85	0,31
180	150	68	0,24
180	160	66	0,27
200* ¹	100	84	0,23
200* ¹	125	90	0,27
200*	150	75	0,34
200* ¹	160	73	0,26
200*	180	63	0,32
224	150	92	0,45
224	160	87	0,49
224	180	76	0,46
224	200	66	0,45
250*	125	133	0,57
250*	150	122	0,56
250* ¹	160	117	0,40
250*	180	107	0,55
250* ¹	200	103	0,42
250*	224	89	0,53
300	200	119	0,68
300	250	94	0,66
315*	160	153	0,82
315*	200	134	0,77
315* ¹	250	108	0,65
355	250	136	1,04
355	315	97	0,89
400*	200	196	1,31
400*	250	174	1,37
400*	315	133	1,20
500**	250	208	2,12
500**	315	185	2,09
500**	400	150	1,95
630**	315	240	2,76
630**	400	198	2,72
630**	500	148	2,69

* With turned-over edge

** Hand made

¹ With stream-lined transition



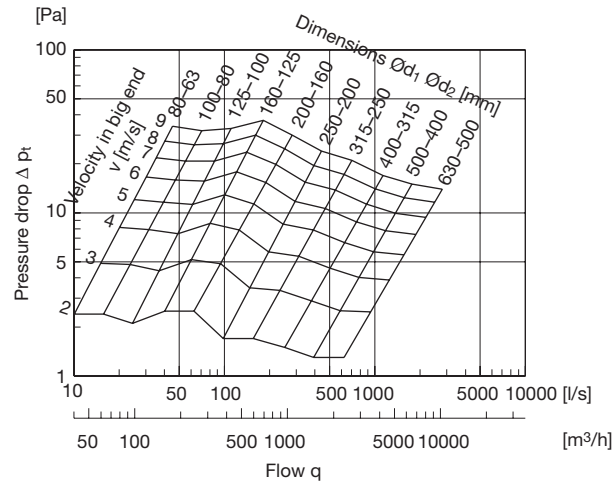
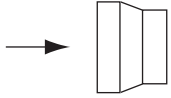
Reducers

RCU, RCFU

Technical data

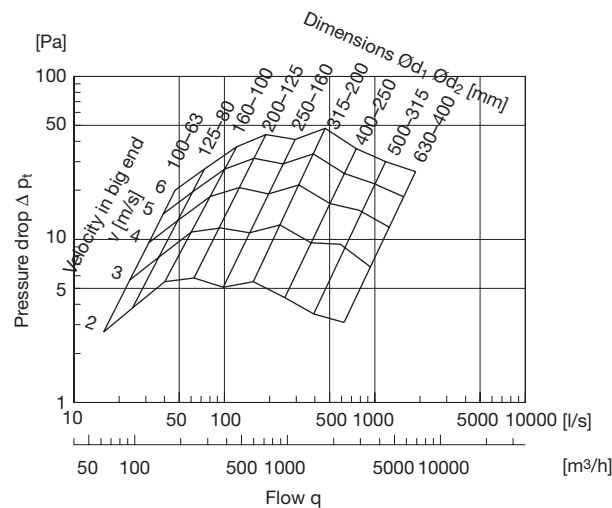
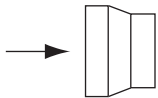
RCU, RCFU

1 dimension step



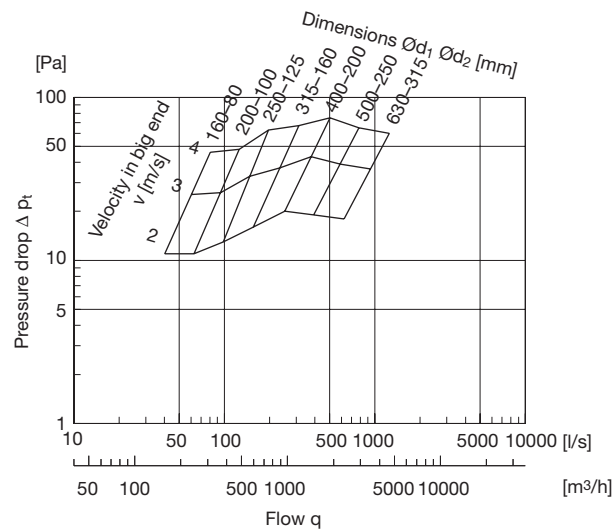
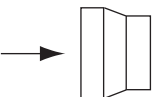
RCU, RCFU

2 dimension steps



RCU, RCFU

3 dimension steps



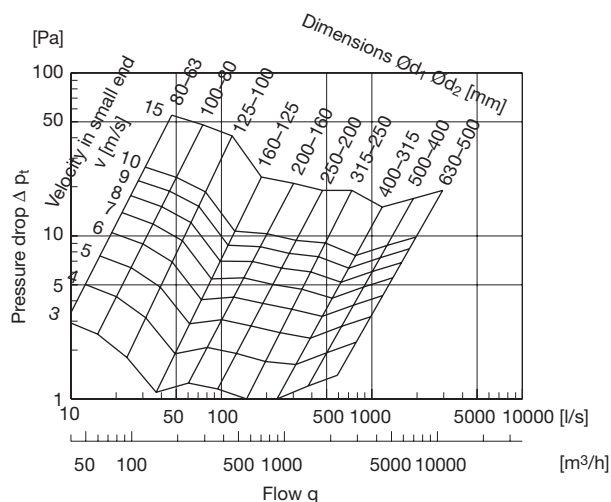
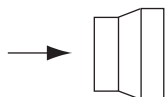


Reducers

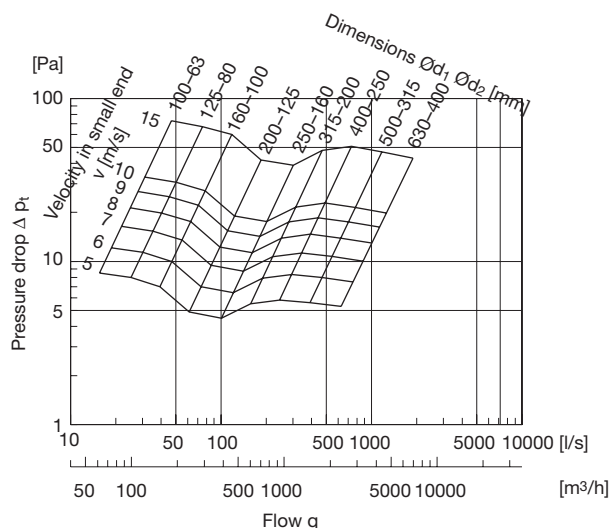
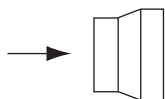
RCU, RCFU

Technical data

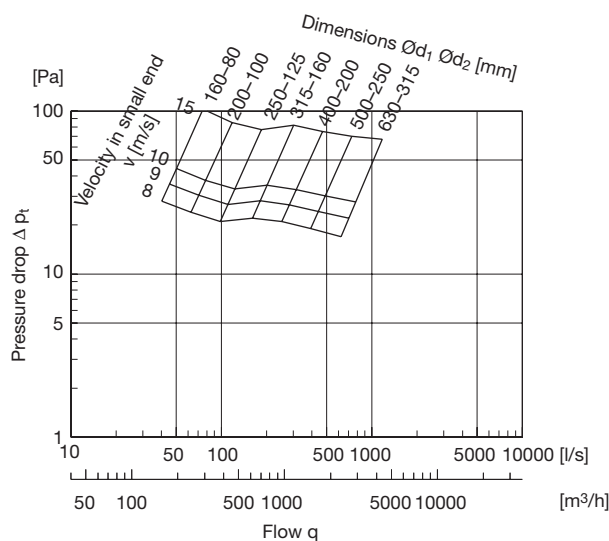
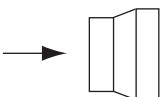
RCU, RCFU
1 dimension step



RCU, RCFU
2 dimension steps



RCU, RCFU
3 dimension steps





Reducer

RU



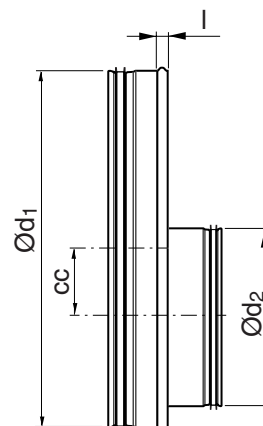
Description

Short, eccentric reducer to achieve extremely short installation length.

Ordering example

	RU	500	250
Product			
Dimension Ød ₁			
Dimension Ød ₂			

Dimensions



Ød ₁ nom	Ød ₂ nom	cc mm	l mm	m kg
400	200	75	12	1,42
400	224	63	12	1,48
400	250	50	12	1,54
400	280	35	12	1,53
400	300	25	12	1,52
400	315	18	12	1,51
400	355	10	12	1,13
450	250	75	4	1,76
450	280	60	4	1,75
450	300	50	4	1,74
450	315	43	4	1,73
450	355	23	4	1,64
450	400	15	4	1,31
500	250	100	12	1,98
500	280	85	12	1,97
500	300	75	12	1,96
500	315	68	12	1,95
500	355	48	12	1,87
500	400	25	12	1,92
500	450	15	12	1,46
560	315	98	4	2,29
560	355	78	4	2,21
560	400	55	4	2,26
560	450	30	4	1,80
560	500	20	4	1,70
600	315	118	4	2,63
600	355	98	4	2,54
600	400	75	4	2,60
600	450	50	4	2,14
600	500	25	4	2,56
600	560	10	4	1,87
630	315	133	4	2,85
630	355	113	4	2,77



Reducer

RU

Ød ₁ nom	Ød ₂ nom	cc mm	l mm	m kg
630	400	90	4	2,82
630	450	65	4	2,36
630	500	40	4	2,78
630	560	25	4	2,09
630	600	5	4	1,90
710	400	130	4	3,43
710	450	105	4	2,97
710	500	80	4	3,39
710	560	50	4	2,70
710	600	30	4	2,51
710	630	15	4	2,48
800	400	175	4	4,06
800	450	150	4	3,60
800	500	125	4	4,02
800	560	95	4	3,33
800	600	75	4	3,14
800	630	60	4	3,75
800	710	20	4	3,06
900	500	175	4	5,30
900	560	145	4	4,58
900	600	125	4	4,36
900	630	110	4	4,95
900	710	70	4	4,20
900	800	25	4	4,01
1000	500	225	4	6,52
1000	560	195	4	5,80
1000	600	175	4	5,58
1000	630	160	4	6,17
1000	710	120	4	5,42
1000	800	75	4	5,23
1000	900	25	4	4,94
1120	630	222	4	7,59
1120	710	182	4	6,84
1120	800	137	4	6,64
1120	900	87	4	6,36
1120	1000	37	4	5,46
1250	630	287	4	9,69
1250	710	247	4	8,94
1250	800	202	4	8,74
1250	900	152	4	8,46
1250	1000	102	4	7,56
1250	1120	42	4	7,53



Reducer

RFU



Description

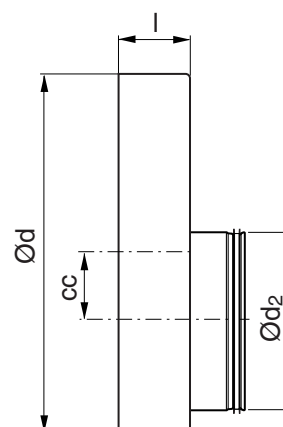
Short, eccentric reducer with female end to achieve extremely short installation length.

Ød fits outside another fitting.

Ordering example

	RFU	630	315
Product			
Dimension Ød			
Dimension Ød ₂			

Dimensions



Ød nom	Ød ₂ nom	cc mm	l mm	m kg
400*	200	75	80	1,33
400*	200	75	80	1,33
400	224	63	80	1,39
400*	250	50	80	1,44
400	280	35	80	1,43
400	300	25	80	1,43
400*	315	18	80	1,42
400	355	10	80	0,99
450	250	75	80	1,76
450	280	60	80	1,75
450	300	50	80	1,74
450	315	43	80	1,73
450	355	23	80	1,69
450	400	15	80	1,31
500	250	100	80	2,09
500	280	85	80	2,08
500	300	75	80	2,07
500	315	68	80	2,06
500	355	48	80	1,98
500	400	25	80	2,03
500	450	15	80	1,57
560	315	98	80	2,39
560	355	78	80	2,32
560	400	55	80	2,36
560	450	30	80	1,90
560	500	20	80	1,80
600	315	118	80	2,62
600	355	98	80	2,54
600	400	75	80	2,59
600	450	50	80	2,53
600	500	25	80	2,54
600	560	10	80	1,86
630	315	133	80	2,79



Reducer

RFU

Ød nom	Ød ₂ nom	cc mm	l mm	m kg
630	355	113	80	2,71
630	400	90	80	2,76
630	450	65	80	2,30
630	500	40	80	2,72
630	560	25	80	2,03
630	600	5	80	1,84
710	400	130	100	3,72
710	450	105	100	2,76
710	500	80	100	3,18
710	560	50	100	2,49
710	600	30	100	2,30
710	630	15	100	2,44
800	400	175	100	3,76
800	450	150	100	3,30
800	500	125	100	3,72
800	560	95	100	3,03
800	600	75	100	2,84
800	630	60	100	3,44
800	710	20	100	2,76
900	500	175	100	6,14
900	560	145	100	5,42
900	600	125	100	5,20
900	630	110	100	5,74
900	710	70	100	5,04
900	800	25	100	4,84
1000	500	225	100	7,34
1000	560	195	100	6,42
1000	600	175	100	6,40
1000	630	160	100	6,99
1000	710	120	100	6,24
1000	800	75	100	6,04
1000	900	25	100	5,76
1120	630	222	120	9,09
1120	710	182	120	8,34
1120	800	137	120	8,14
1120	900	87	120	7,86
1120	1000	37	120	6,96
1250	630	287	120	11,0
1250	710	247	120	10,3
1250	800	202	120	10,0
1250	900	152	120	9,76
1250	1000	102	120	8,86
1250	1120	42	120	8,83

* With turned-over edge



Reducers

RCLU, RLU



RCLU

Description

RCLU

Long, concentric, hand made reducer with approx. 18° angle.

Pressure drop, see graphs on pages 74–75.

RLU

Long, tangential, hand made reducer with approx. 35° angle.

Dimensions are otherwise adapted to DIN 24147 section 4.

Ordering example

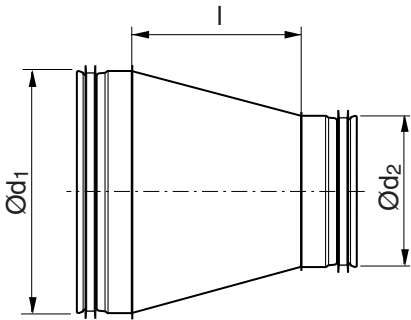
	RCLU	200	160
Product			
Dimension Ød ₁			
Dimension Ød ₂			



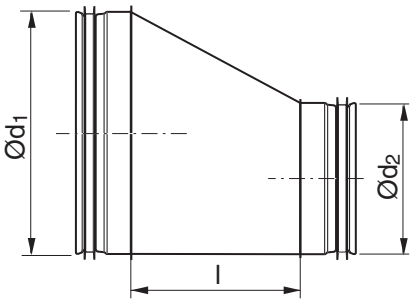
RLU

Dimensions

RCLU



RLU



Ød ₁ nom	Ød ₂ nom	l mm	m kg
80	63	53	0,14
100	63	81	0,20
100	80	58	0,18
112	63	97	0,23
112	80	74	0,22
112	100	47	0,20
125	63	115	0,28
125	80	92	0,26
125	100	64	0,24



Reducers

RCLU, RLU

Ød ₁ nom	Ød ₂ nom	l mm	m kg
125	112	48	0,23
140	63	136	0,33
140	80	112	0,32
140	100	85	0,30
140	112	69	0,28
140	125	51	0,27
150	63	150	0,37
150	80	126	0,36
150	100	99	0,34
150	112	82	0,32
150	125	64	0,30
150	140	44	0,28
160	63	163	0,43
160	80	140	0,42
160	100	112	0,40
160	112	96	0,38
160	125	78	0,36
160	140	57	0,34
160	150	44	0,32
180	80	167	0,51
180	100	140	0,49
180	112	123	0,47
180	125	106	0,46
180	140	85	0,43
180	150	71	0,41
180	160	58	0,41
200	80	195	0,61
200	100	167	0,59
200	112	151	0,57
200	125	133	0,55
200	140	112	0,53
200	150	99	0,51
200	160	85	0,50
200	180	58	0,46
224	100	200	0,72
224	112	184	0,70
224	125	166	0,68
224	140	145	0,65
224	150	132	0,64
224	160	118	0,63
224	180	90	0,58
224	200	63	0,53
250	100	236	0,94
250	112	220	0,92
250	125	202	0,90
250	140	181	0,89
250	150	167	0,87
250	160	154	0,87
250	180	126	0,80
250	200	99	0,75
250	224	66	0,67

Ød ₁ nom	Ød ₂ nom	l mm	m kg
280	125	243	1,10
280	140	222	1,08
280	150	209	1,06
280	160	195	1,05
280	180	167	1,00
280	200	140	0,95
280	224	107	0,87
280	250	71	0,84
300	125	270	1,25
300	140	250	1,22
300	150	236	1,20
300	160	222	1,20
300	180	195	1,15
300	200	167	1,09
300	224	135	1,02
300	250	99	0,98
300	280	58	0,86
315	125	291	1,36
315	140	270	1,33
315	150	257	1,32
315	160	243	1,31
315	180	216	1,26
315	200	188	1,21
315	224	155	1,13
315	250	119	1,09
315	280	78	0,97
315	300	51	0,88
355	160	298	1,84
355	180	270	1,77
355	200	243	1,71
355	224	210	1,61
355	250	174	1,56
355	280	133	1,41
355	300	106	1,30
355	315	85	1,21
400	160	365	2,44
400	180	337	2,38
400	200	310	2,31
400	224	277	2,23
400	250	241	2,20
400	280	200	2,01
400	300	172	1,90
400	315	152	1,86
400	355	97	1,55
450	200	378	2,99
450	224	346	2,90
450	250	310	2,85
450	280	269	2,70
450	300	241	2,59
450	315	221	2,50
450	355	166	2,24



Reducers

RCLU, RLU

Ød ₁ nom	Ød ₂ nom	l mm	m kg
450	400	109	2,64
500	200	447	3,66
500	224	414	3,56
500	250	378	3,51
500	280	337	3,36
500	300	310	3,25
500	315	289	3,16
500	355	234	2,89
500	400	177	2,69
500	450	109	2,37
560	250	461	4,47
560	280	420	4,32
560	300	392	4,21
560	315	371	4,11
560	355	317	3,85
560	400	260	3,66
560	450	191	2,70
560	500	122	2,86
600	250	516	5,10
600	280	475	4,96
600	300	447	4,84
600	315	427	4,76
600	355	372	4,49
600	400	315	4,29
600	450	246	3,96
600	500	177	3,49
600	560	95	2,94
630	250	557	5,60
630	280	516	5,46
630	300	488	5,34
630	315	468	5,25
630	355	413	4,99
630	400	356	4,79
630	450	287	4,46
630	500	219	4,00
630	560	136	3,43
630	600	81	2,97
710	355	528	7,11
710	400	471	6,92
710	450	402	6,60
710	500	333	6,12
710	560	251	5,57
710	600	196	5,10
710	630	155	4,72
800	400	594	8,81
800	450	526	8,49
800	500	457	8,02
800	560	375	7,46
800	600	320	6,99
800	630	279	6,62

Ød ₁ nom	Ød ₂ nom	l mm	m kg
800	710	174	6,21
900	450	663	10,8
900	500	594	10,3
900	560	512	9,78
900	600	457	9,31
900	630	416	8,94
900	710	311	8,53
900	800	187	7,18
1000	500	732	13,1
1000	560	649	12,5
1000	600	594	12,0
1000	630	553	11,7
1000	710	448	11,2
1000	800	325	9,91
1000	900	187	8,17
1120	560	814	16,4
1120	600	759	15,9
1120	630	718	15,5
1120	710	613	15,1
1120	800	490	13,8
1120	900	352	12,1
1120	1000	215	10,3
1250	600	938	20,1
1250	630	897	19,7
1250	710	792	19,3
1250	800	668	17,9
1250	900	531	16,2
1250	1000	393	14,4
1250	1120	229	12,2

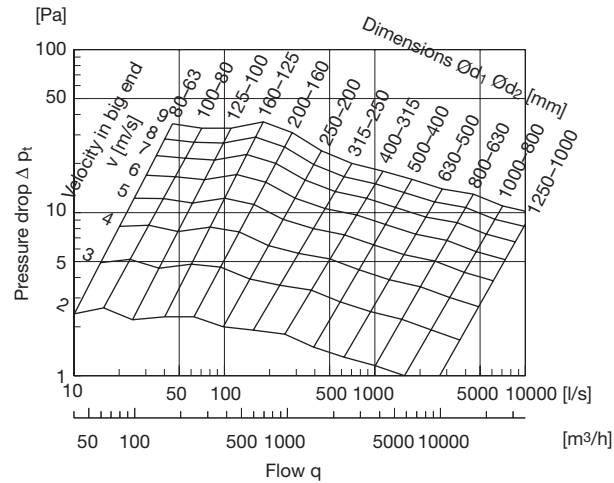
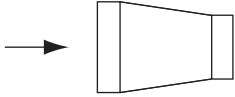


Reducer

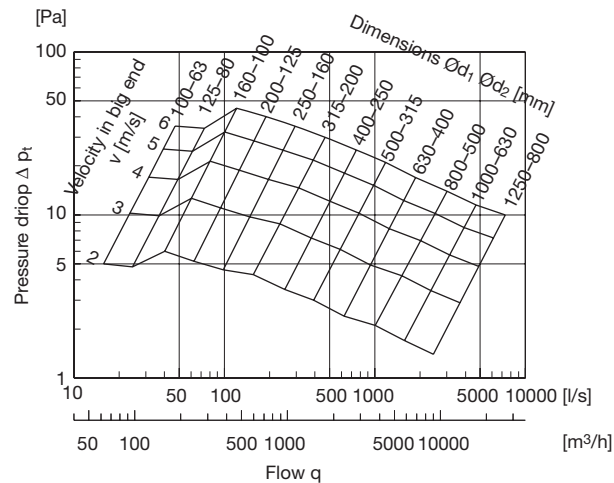
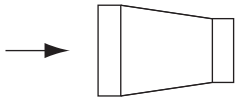
RCLU

Technical data

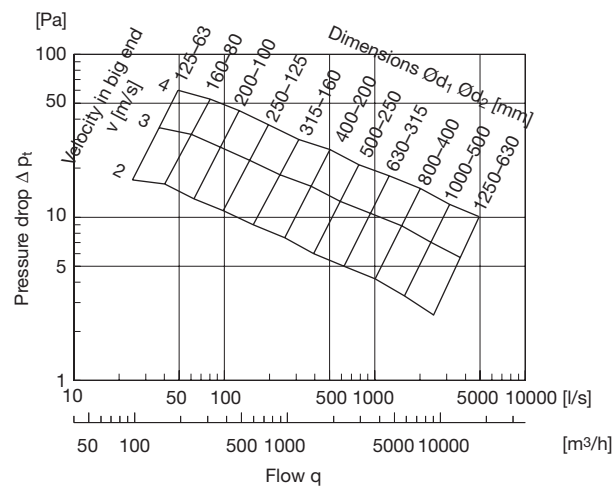
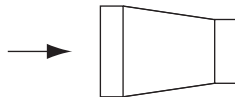
RCLU 1 dimension step



RCLU 2 dimension steps



RCLU 3 dimension steps





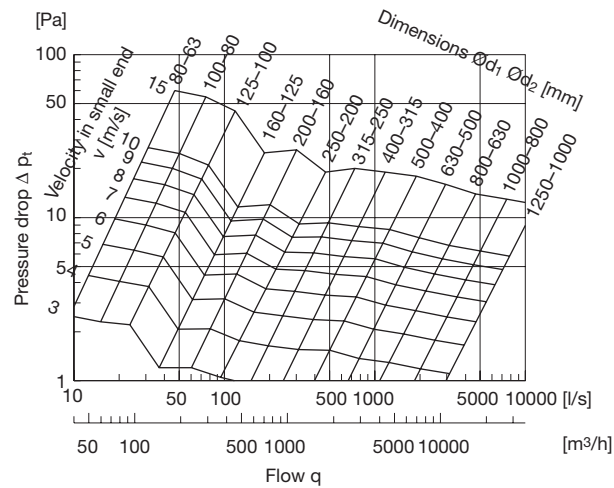
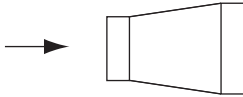
Reducer

RCLU

Technical data

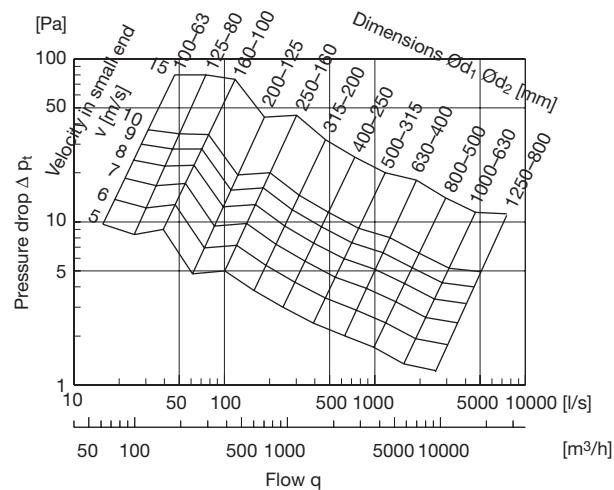
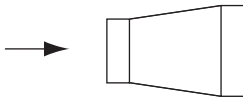
RCLU

1 dimension step



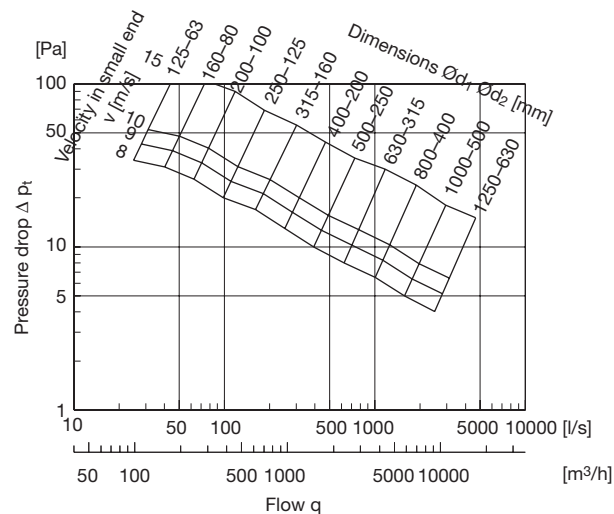
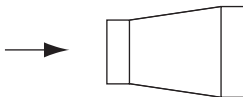
RCLU

2 dimension steps



RCLU

3 dimension steps



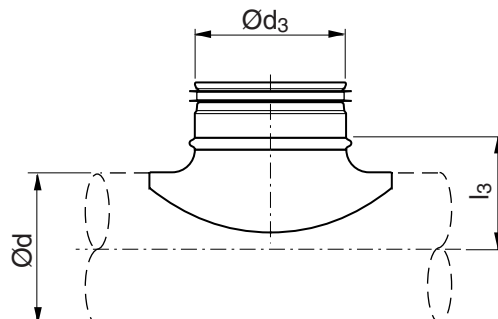


Saddle

PSU



Dimensions



Description

Pressed saddle with aerodynamic flow radius facing the branch.

Pressure drop, see graphs on pages 82–83.

Some PSUs are pressed with one and the same tool, and fit several dimensions of main pipe.

Ordering example

	PSU	200	125
Product			
Dimension Ød			
Dimension Ød ₃			

Ød nom	Ød ₃ nom	l ₃ mm	m kg
63	63	42	0,09
80	63	50	0,09
80	80	52	0,13
100	63	60	0,09
100	80	60	0,14
100	100	65	0,18
112	63	66	0,09
112	80	68	0,13
112	100	71	0,18
112*	112	81	0,21
125	63	73	0,08
125	80	75	0,13
125	100	78	0,18
125*	112	88	0,21
125	125	83	0,25
140	80	82	0,13
140	100	85	0,18
140*	112	95	0,21
140*	125	95	0,22
140	140	90	0,25
150	80	87	0,10
150	100	90	0,18
150	125	95	0,18
150	140	95	0,25
150	150	95	0,25
160	80	92	0,10
160	100	95	0,18
160	125	100	0,18
160	140	100	0,25
160	150	100	0,32
160	160	105	0,26
180	80	102	0,09
180	100	105	0,19



Saddle

PSU

Ød nom	Ød ₃ nom	l ₃ mm	m kg
180	125	110	0,25
180	140	110	0,25
180	150	110	0,22
180	160	115	0,27
180	180	115	0,48
200	80	112	0,09
200	100	115	0,19
200	125	115	0,25
200	140	120	0,25
200	150	120	0,22
200	160	125	0,27
200	180	125	0,45
200	200	125	0,39
224	80	124	0,12
224	100	127	0,18
224	125	132	0,23
224	140	132	0,29
224	150	132	0,21
224	160	137	0,24
224	180	137	0,41
224	200	137	0,47
224	224	137	0,64
250	80	137	0,12
250	100	140	0,18
250	125	145	0,23
250	140	145	0,29
250	150	145	0,21
250	160	150	0,24
250	180	150	0,41
250	200	150	0,47
250	224	150	0,63
250	250	150	0,80
280	80	155	0,12
280	100	155	0,12
280	125	160	0,23
280	140	160	0,27
280	150	160	0,21
280	160	165	0,24
280	180	165	0,40
280	200	165	0,46
280	224	165	0,58
280*	250	165	0,77
280*	280	165	0,59
300	80	162	0,12
300	100	165	0,12
300	125	170	0,23
300	140	170	0,27
300	150	170	0,21
300	160	175	0,24
300	180	175	0,40
300	200	175	0,46

Ød nom	Ød ₃ nom	l ₃ mm	m kg
300	224	175	0,58
300	250	175	0,71
300*	280	175	0,59
300	300	175	1,13
315	80	170	0,12
315	100	173	0,12
315	125	178	0,23
315	140	178	0,27
315	150	178	0,21
315	160	182	0,24
315	180	182	0,40
315	200	182	0,46
315	224	182	0,58
315	250	182	0,71
315*	280	182	0,95
315	300	182	1,10
315	315	182	1,22
355	100	193	0,12
355	125	198	0,23
355	140	198	0,27
355	150	198	0,21
355	160	203	0,24
355	180	203	0,40
355	200	203	0,44
355	224	203	0,58
355	250	203	0,65
355*	280	203	0,89
355	300	203	0,94
355*	315	203	1,12
355*	355	203	0,90
400	100	215	0,12
400	125	220	0,23
400	150	220	0,24
400	160	225	0,24
400	200	225	0,44
400	224	225	0,54
400	250	225	0,65
400*	280	225	0,83
400	300	225	0,94
400	315	225	1,03
400*	355	225	1,42
400	400	225	1,87
450	100	240	0,12
450	125	245	0,23
450	150	245	0,24
450	160	250	0,25
450	200	250	0,42
450	224	250	0,54
450	250	250	0,67
450*	280	250	0,77
450	300	250	0,83



Saddle

PSU

Ød nom	Ød ₃ nom	l ₃ mm	m kg
450	315	250	0,94
450*	355	250	1,01
450	400	250	1,81
450*	450	250	1,58
500	100	265	0,12
500	125	270	0,23
500	150	270	0,24
500	160	275	0,25
500	200	275	0,42
500	224	275	0,54
500	250	275	0,67
500	300	275	0,83
500	315	275	0,93
500*	355	275	1,01
500	400	275	1,75
500*	450	275	1,45
500*	500	290	1,87
560	100	295	0,12
560	125	300	0,23
560	160	305	0,25
560	200	305	0,42
560	224	305	0,54
560	250	305	0,67
560	300	305	0,83
560	315	305	0,93
560*	355	305	1,06
560	400	305	1,75
560*	450	305	1,37
560*	500	320	1,75
560*	560	320	2,24
600	100	315	0,12
600	125	320	0,23
600	160	325	0,31
600	200	325	0,40
600	224	325	0,54
600	250	325	0,65
600	300	325	0,83
600	315	325	0,93
600*	355	325	0,94
600	400	325	1,49
600*	450	325	1,34
600*	500	340	1,60
600*	560	340	2,09
600*	600	340	2,47
630	100	330	0,12
630	125	335	0,23
630	160	340	0,31
630	200	340	0,40

Ød nom	Ød ₃ nom	l ₃ mm	m kg
630	224	340	0,54
630	250	340	0,83
630	300	340	0,55
630	315	340	0,93
630*	355	340	0,80
630	400	340	1,49
630*	450	340	1,82
630*	500	355	1,53
630*	560	355	2,09
630*	600	355	2,35
630*	630	355	2,53

* Hand made



T-piece

TCPU



Description

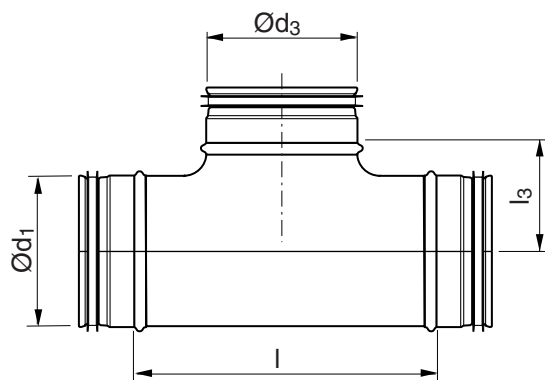
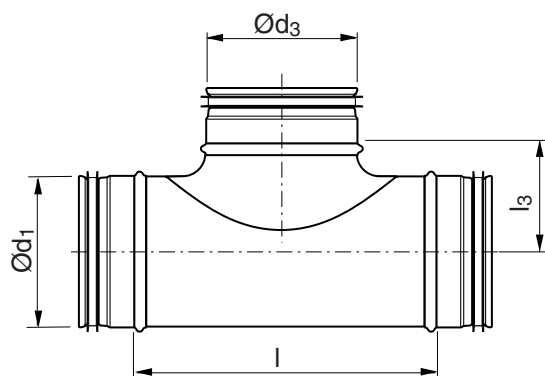
T-piece built with PSU saddle or a fully pressed top section.

Pressure drop, see graphs on pages 82–83.

Ordering example

	TCPU	250	160
Product			
Dimension $\varnothing d_1$			
Dimension $\varnothing d_3$			

Dimensions



$\varnothing d_1$ nom	$\varnothing d_3$ nom	l mm	l ₃ mm	m kg
63	63	125	42	0,26
80	63	125	50	0,31
80	80	140	52	0,36
100	63	125	60	0,35
100	80	103	65	0,23
100	100	130	65	0,32
112	63	125	66	0,41
112	80	140	68	0,47
112	100	175	71	0,55
112	112*	175	56	0,57
125	63	125	73	0,44
125	80	97	75	0,34
125	100	130	78	0,37
125	112	175	78	0,61
125	125	165	83	0,44
140	80	140	82	0,56
140	100	175	85	0,65
140	112	175	85	0,67
140	125*	215	70	0,76
140	140	230	90	0,78
150	80	140	87	0,58
150	100	175	90	0,69
150	125	215	95	0,76
150	140	230	95	0,82



T-piece

TCPU

1

2

3

4

5

6

7

8

9

10

11

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
150	150	260	95	0,94
160	80	140	92	0,59
160	100	130	95	0,46
160	125	166	100	0,53
160	140	230	100	0,87
160	150	260	100	0,99
160	160	209	105	0,63
180	80	140	102	0,92
180	100	175	105	0,80
180	125	215	110	0,91
180	140	230	110	0,96
180	150	260	110	1,08
180	160	260	115	1,06
180	180	285	115	1,44
200	80	140	112	0,77
200	100	175	115	0,88
200	125	215	115	1,02
200	140	230	120	1,07
200	150	260	120	1,19
200	160	209	125	0,67
200	180	285	125	1,35
200	200	249	125	1,21
224	80	140	124	0,85
224	100	175	127	1,01
224	125	215	132	1,14
224	140	230	132	1,20
224	150	260	132	1,29
224	160	260	137	1,28
224	180	285	137	1,46
224	200	346	137	1,69
250	80	156	137	1,13
250	100	175	140	1,22
250	125	220	145	1,48
250	140	230	145	1,48
250	150	255	145	1,55
250	160	256	150	1,58
250	180	306	150	1,79
250	200	306	150	1,78
250	224	350	150	2,09
250	250	296	150	1,65
280	80	156	155	1,25
280	100	175	155	1,37
280	125	220	160	1,56
280	140	230	160	1,63
280	150	255	160	1,72
280	160	256	165	1,75
280	180	306	165	1,97
280	200	306	165	2,01
280	224	350	165	2,27
280	250*	350	140	2,44
280	280*	390	140	2,67

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
300	80	156	162	1,36
300	100	175	165	1,47
300	125	220	170	1,68
300	140	230	170	1,74
300	150	255	170	1,86
300	160	256	175	1,87
300	180	306	175	2,12
300	200	306	175	2,15
300	224	350	175	2,41
300	250	350	175	2,50
300	280*	390	150	2,53
300	300	430	175	3,55
315	80	156	170	1,43
315	100	175	173	1,50
315	125	220	178	1,76
315	140	230	178	1,82
315	150	355	178	2,38
315	160	256	182	1,96
315	180	306	182	2,21
315	200	306	182	2,14
315	224	350	182	2,51
315	250	350	182	2,59
315	280	390	182	3,00
315	300	430	182	3,21
315	315	363	182	2,20
355	100	175	193	1,73
355	125	220	198	1,96
355	140	230	198	2,03
355	150	255	198	2,46
355	160	256	203	2,45
355	180	306	203	2,81
355	200	306	203	2,82
355	224	350	203	3,13
355	250	350	203	3,18
355	280*	390	178	3,63
355	300	430	203	3,87
355	315	455	203	4,06
355	355*	470	203	5,14
400	100	175	215	2,27
400	125	225	220	2,81
400	160	266	225	3,02
400	200	300	225	3,37
400	224	350	225	3,74
400	250	350	225	3,79
400	280*	390	200	4,23
400	300	430	225	4,47
400	315	415	225	4,42
400	355*	470	225	5,04
400	400	510	225	6,20
450	100	175	240	2,76
450	125	225	245	3,15



T-piece

TCPU

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
450	160	266	250	3,38
450	200	300	250	3,75
450	224	350	250	4,16
450	250	350	250	4,23
450	280*	390	225	4,64
450	300	430	250	4,89
450	315	415	250	4,82
450	355	470	250	5,16
450	400	510	250	5,81
450	450*	550	225	6,99
500	100	175	265	3,06
500	125	225	270	3,35
500	160	266	275	3,77
500	200	300	275	4,14
500	250	350	275	4,68
500	300	430	275	5,36
500	315	415	275	5,30
500	355	470	275	5,70
500	400	510	275	6,34
500	450*	550	250	6,56
500*	500	552	290	8,27
560	100	175	295	3,59
560	125	225	300	3,92
560	160	266	305	4,41
560	200	300	305	4,78
560	250	350	305	5,38
560	300	430	280	5,86
560	315	415	305	6,06
560	355	470	305	6,57
560	400	510	305	7,08
560	450*	550	280	7,38
560	500*	552	280	7,57
560	560*	610	280	9,69
600	100	175	315	3,83
600	125	225	320	4,19
600	160	266	325	4,73
600	200	300	325	5,10
600	250	350	325	5,73
600	300*	430	300	6,36
600	315	415	325	6,46
600	355*	470	300	6,98
600	400	510	325	7,43
600	450*	550	300	7,84
600	500*	552	300	7,91
600	560*	610	300	8,76
600	600*	650	300	10,8
630	100	175	330	4,03
630	125	225	335	4,41
630	160	266	340	4,99
630	200	300	340	5,35

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
630	250	350	340	6,00
630	300*	450	315	7,23
630	315	415	340	6,77
630	355*	470	315	7,18
630	400	510	340	7,69
630	450*	555	315	8,24
630*	500	552	340	8,44
630	560*	610	315	9,11
630	600*	650	315	9,58
630*	630	680	340	11,3

* Built with PSU saddle, without radius



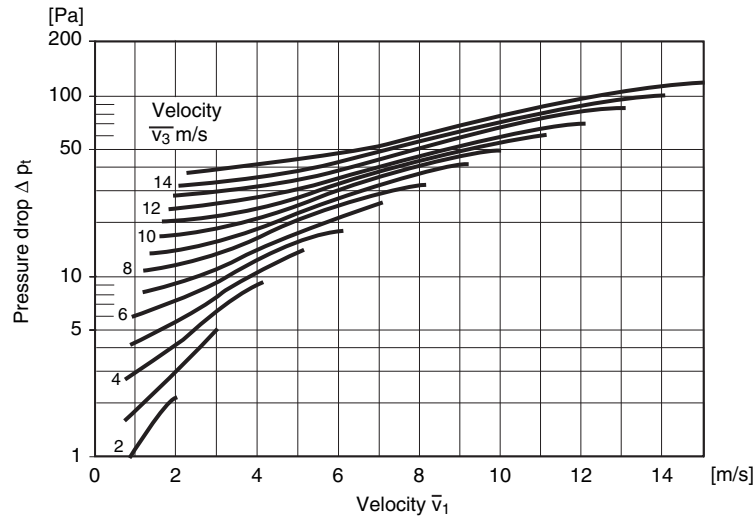
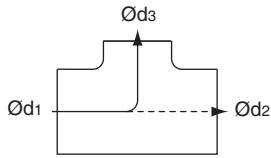
T-piece and saddle

TCPU, PSU

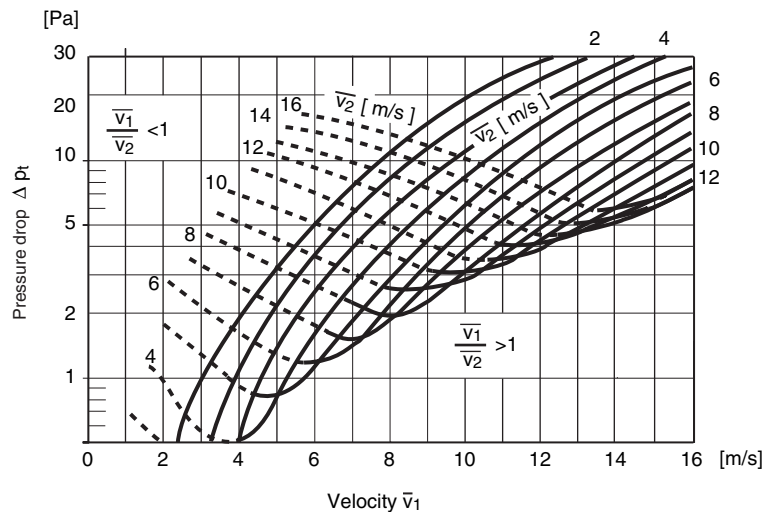
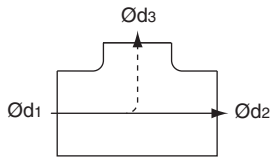
Technical data

Supply air

Diverging flow

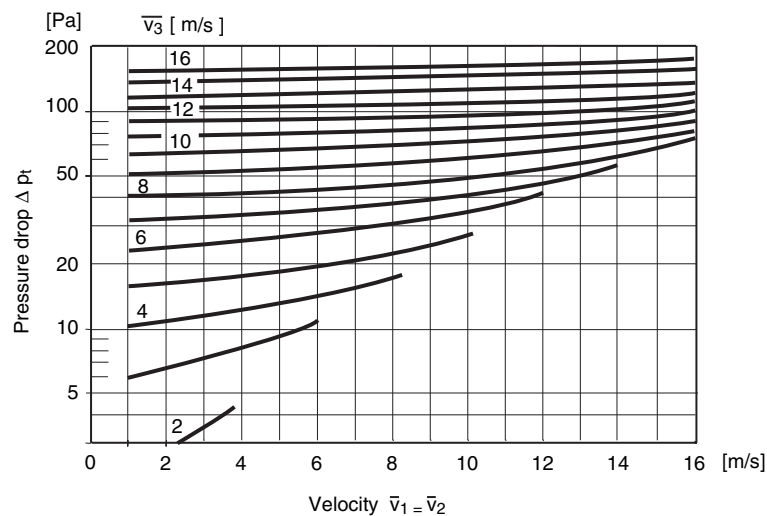
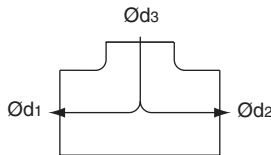


Diverging flow



The diagram is also applicable to reduction in Ød_2 .

Diverging flow





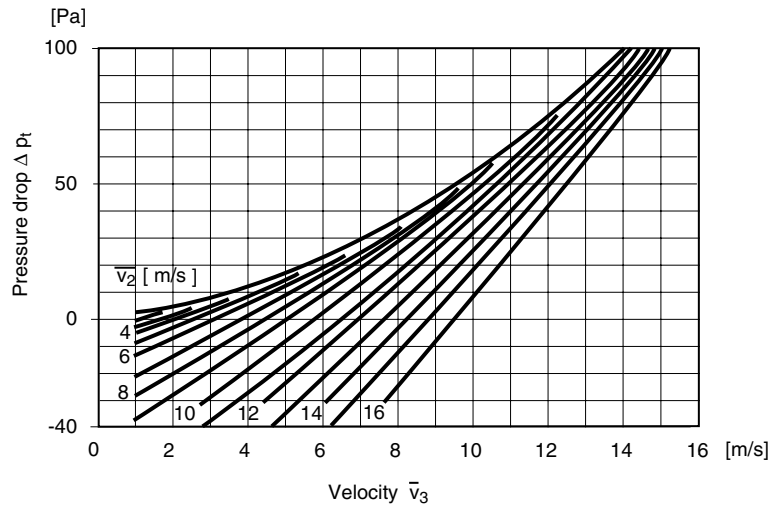
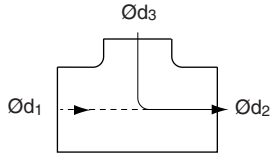
T-piece and saddle

TCPU, PSU

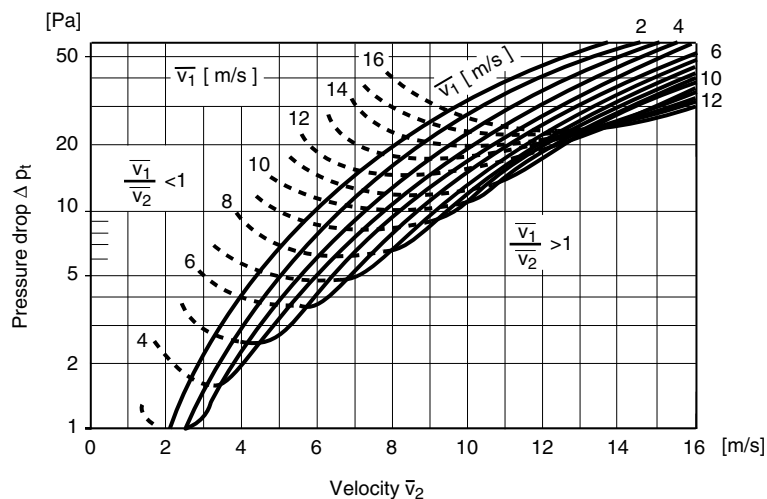
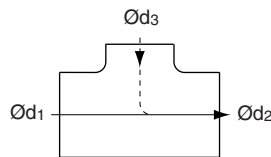
Technical data

Exhaust air

Converging flow

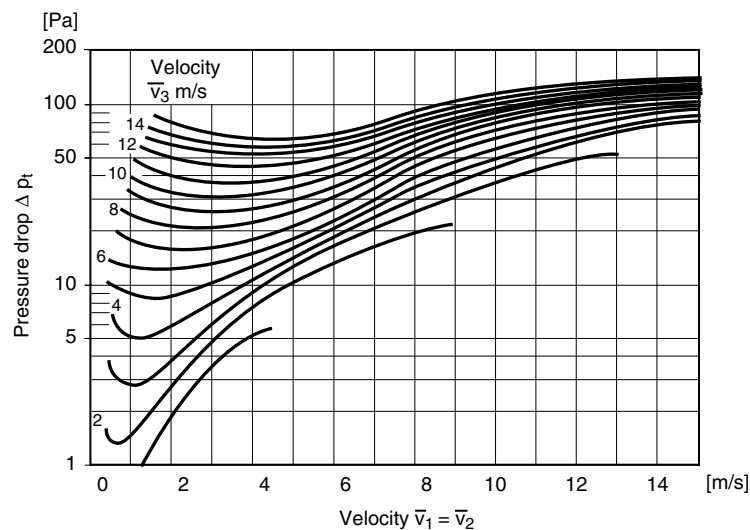
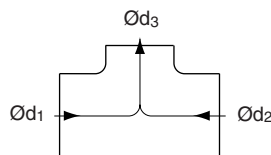


Converging flow



The diagram is also applicable to reduction in Ød_1 .

Converging flow





T-piece – Casting-in programme TCSIU

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Description

Short branch with air valve socket and nail flange with pre-punched holes.

Fits air valve KGEB etc.

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Ordering example

	TCSIU	100	100	GJUT
Product				
Dimension $\varnothing d_1$				
Branch $\varnothing d_3$				
Specification				

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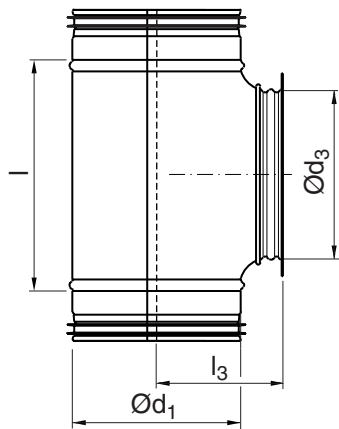
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Dimensions



$\varnothing d_1$ nom	$\varnothing d_3$ mm	l mm	l_3 mm	m kg
100	92	130	90	0,31
125	92	130	105	0,52
125	117	165	105	0,67
160	152	229	132	1,02



T-piece – Casting-in programme

TCPU



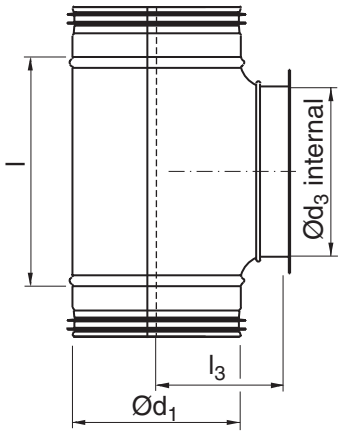
Description

Short branch with female end and nail flange with pre-punched holes.

Ordering example

	TCPU	100	100	GJUT
Product				
Dimension $\varnothing d_1$				
Branch $\varnothing d_3$				
Specification				

Dimensions



$\varnothing d_1$ nom	$\varnothing d_3$ mm	l mm	l_3 mm	m kg
80*	80	140	80	0,38
100	100	130	90	0,30
125	100	130	100	0,49
125	125	165	100	0,59
160	160	229	117	0,90

* Made with saddle PS



T-piece – Casting-in programme

TCPU



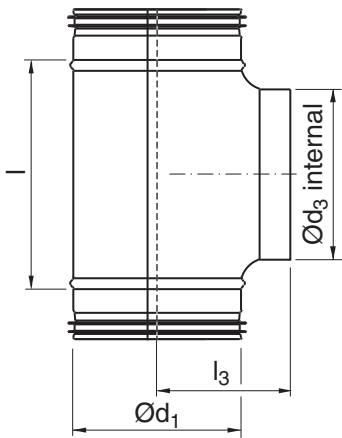
Description

Short branch with female end.

Ordering example

	TCPU	100	100	GIPS
Product				
Dimension $\varnothing d_1$				
Branch $\varnothing d_3$				
Specification				

Dimensions



$\varnothing d_1$ nom	$\varnothing d_3$ mm	l mm	l_3 mm	m kg
80*	80	140	80	0,33
100	100	130	85	0,27
125	100	130	100	0,44
125	125	165	100	0,53
160	160	229	117	0,82

* Made with saddle PS



T-piece – Casting-in programme

TCPU



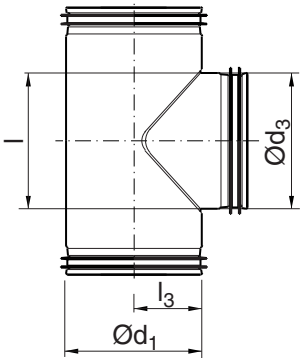
Description

Short branch and short installation lengths.

Ordering example

	TCPU	100	100	KORT
Product				
Dimension Ød ₁				
Branch Ød ₃				
Specification				

Dimensions



Ød ₁ nom	Ød ₃ mm	l mm	l ₃ mm	m kg
100	100	100	50	0,35
125	125	125	63	0,50
160	160	160	80	0,66



T-pieces

TCU, TU



TCU



TU

Description

TCU

Centric –

- with hand made T-piece TSTCU.

TU

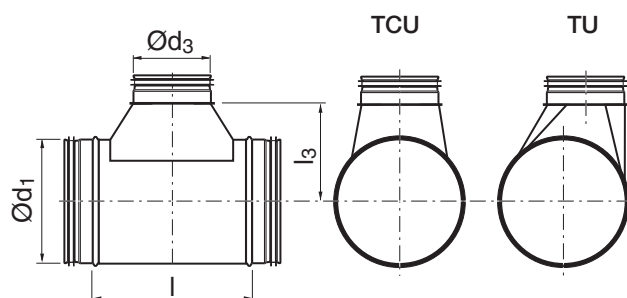
Tangential –

- with hand made T-piece TSTU.

Ordering example

	TCU	400	250
Product			
Dimension Ød ₁			
Dimension Ød ₃			

Dimensions



Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
63	63	178	77	0,28
63	80	195	77	0,33
63	100	215	77	0,38
80	63	178	85	0,34
80	80	195	85	0,38
80	100	215	85	0,44
80	112	225	85	0,48
80	125	240	85	0,53
100	63	178	95	0,41
100	80	195	95	0,45
100	100	215	95	0,49
100	112	225	95	0,52
100	125	240	95	0,56
100	140	260	100	0,63
100	150	270	100	0,63
100	160	280	100	0,68
112	63	178	100	0,50
112	80	195	100	0,54
112	100	215	100	0,59
112	112	225	100	0,60
112	125	240	100	0,65
112	140	260	105	0,71
112	150	270	105	0,74
112	160	280	105	0,77
112	180	300	105	0,83
125	63	178	110	0,51
125	80	195	110	0,55
125	100	215	110	0,59
125	112	225	110	0,61
125	125	240	110	0,65
125	140	260	115	0,72
125	150	270	115	0,75
125	160	280	115	0,77
125	180	300	115	0,85
125	200	335	130	1,01
140	63	178	115	0,60



T-pieces

TCU, TU

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
140	80	195	115	0,65
140	100	215	115	0,69
140	112	225	115	0,72
140	125	240	115	0,75
140	140	260	120	0,81
140	150	270	120	0,85
140	160	280	120	0,88
140	180	300	120	0,95
140	200	335	135	1,09
140	224	360	135	1,19
150	63	178	120	0,59
150	80	195	120	0,65
150	100	215	165	0,70
150	112	225	120	0,75
150	125	240	120	0,80
150	140	260	125	0,86
150	150	270	125	0,89
150	160	280	125	0,92
150	180	300	125	0,99
150	200	335	140	1,17
150	224	360	140	1,24
150	250	385	140	1,40
160	63	178	125	0,58
160	80	195	125	0,65
160	100	215	125	0,72
160	112	225	125	0,76
160	125	240	125	0,82
160	140	260	130	0,89
160	150	270	130	0,91
160	160	280	130	0,93
160	180	300	130	1,04
160	200	335	145	1,21
160	224	360	145	1,30
160	250	385	145	1,52
180	63	178	135	0,69
180	80	195	135	0,76
180	100	215	135	0,82
180	112	225	135	0,87
180	125	240	135	0,90
180	140	260	140	1,00
180	150	270	140	1,03
180	160	280	140	1,07
180	180	300	140	1,12
180	200	335	155	1,32
180	224	360	155	1,41
180	250	385	155	1,58
180	280	425	165	1,98
200	63	178	145	0,74
200	80	195	145	0,95
200	100	215	145	0,87
200	112	225	145	0,92
200	125	240	145	0,96
200	140	260	150	1,07
200	150	270	150	1,10

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
200	160	280	150	1,12
200	180	300	150	1,19
200	200	335	165	1,42
200	224	360	165	1,50
200	250	385	165	1,68
200	280	425	175	2,06
200	300	445	175	2,19
200	315	460	175	2,11
224	63	178	160	0,83
224	80	195	160	0,90
224	100	215	160	0,98
224	112	225	160	1,02
224	125	240	160	1,08
224	140	260	165	1,18
224	150	270	165	1,22
224	160	280	165	1,25
224	180	300	165	1,33
224	200	335	180	1,54
224	224	360	180	1,61
224	250	385	180	1,94
224	280	425	190	2,21
224	300	445	190	2,33
224	315	460	190	2,42
224	355	510	200	2,80
250	63	178	170	1,05
250	80	195	170	0,99
250	100	215	170	1,20
250	112	225	170	1,12
250	125	240	170	1,30
250	140	260	175	1,29
250	150	270	175	1,34
250	160	280	175	1,49
250	180	300	175	1,46
250	200	335	190	1,80
250	224	360	190	1,76
250	250	385	190	2,09
250	280	425	200	2,36
250	300	445	200	2,49
250	315	460	200	2,55
250	355	510	210	2,97
250	400	555	210	3,56
280	80	195	185	1,10
280	100	215	185	1,20
280	112	225	185	1,24
280	125	240	185	1,32
280	140	260	190	1,43
280	150	270	190	1,48
280	160	280	190	1,53
280	180	300	190	1,62
280	200	335	205	1,85
280	224	360	205	1,96
280	250	385	205	2,27
280	280	425	215	2,51
280	300	445	215	2,65



T-pieces

TCU, TU

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Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
280	315	460	215	2,75
280	355	510	225	3,13
280	400	555	225	3,74
280	450	605	225	4,14
300	80	195	195	1,18
300	100	215	195	1,27
300	112	225	195	1,34
300	125	240	195	1,40
300	140	260	200	1,52
300	150	270	200	1,59
300	160	280	200	1,64
300	180	300	200	1,74
300	200	335	215	2,01
300	224	360	215	2,10
300	250	385	215	2,44
300	280	425	225	2,64
300	300	445	225	2,77
300	315	460	225	2,87
300	355	510	235	3,28
300	400	555	235	3,81
300	450	605	235	4,29
315	80	205	205	1,22
315	100	225	205	1,33
315	112	235	205	1,38
315	125	250	205	1,46
315	140	270	210	1,63
315	150	280	210	1,69
315	160	290	210	1,72
315	180	310	210	1,87
315	200	345	225	2,09
315	224	370	225	2,28
315	250	395	225	2,60
315	280	435	235	2,85
315	300	455	235	2,90
315	315	470	235	3,08
315	355	520	245	3,44
315	400	565	245	3,99
315	450	615	245	4,31
315	500	670	250	4,68
355	100	225	225	1,67
355	112	235	225	1,76
355	125	250	225	1,89
355	140	270	230	2,09
355	150	280	230	2,18
355	160	290	230	2,26
355	180	310	230	2,42
355	200	345	245	2,79
355	224	370	245	2,97
355	250	395	245	3,45
355	280	435	245	3,78
355	300	455	255	3,89
355	315	470	255	3,96
355	355	520	265	4,44
355	400	565	265	5,07

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
355	450	615	265	5,50
355	500	670	270	5,99
355	560	730	270	6,51
400	100	225	245	1,90
400	112	235	245	1,97
400	125	250	245	2,11
400	140	270	250	2,31
400	150	280	250	2,40
400	160	290	250	2,50
400	180	310	250	2,68
400	200	345	265	3,04
400	224	370	265	3,30
400	250	395	265	3,84
400	280	435	275	4,16
400	300	455	275	4,38
400	315	470	275	4,43
400	355	520	285	4,85
400	400	565	285	5,54
400	450	615	285	5,99
400	500	670	290	6,59
400	560	730	290	7,11
400	600	770	290	7,47
400	630	800	290	7,73
450	125	250	270	2,26
450	140	270	275	2,52
450	150	280	275	2,62
450	160	290	275	2,73
450	180	310	275	2,94
450	200	345	290	3,41
450	224	370	290	3,66
450	250	395	290	4,26
450	280	435	300	4,72
450	300	455	300	4,89
450	315	470	300	5,02
450	355	520	310	5,50
450	400	565	310	6,19
450	450	615	310	6,44
450	500	670	315	7,16
450	560	730	315	7,78
450	600	770	315	8,19
450	630	800	315	8,50
450	710	880	315	9,85
500	125	250	295	2,56
500	140	270	300	2,79
500	150	280	300	2,90
500	160	290	300	3,70
500	180	310	300	3,18
500	200	345	315	3,73
500	224	370	315	3,87
500	250	395	315	4,57
500	280	435	325	4,99
500	300	455	325	5,18
500	315	470	325	5,32
500	355	520	335	5,89



T-pieces

TCU, TU

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
500	400	565	335	6,75
500	450	615	335	7,15
500	500	670	340	7,81
500	560	730	340	8,60
500	600	770	340	9,19
500	630	800	340	9,41
500	710	880	340	11,5
500	800	970	340	11,8
560	200	345	345	4,07
560	224	370	345	4,33
560	250	395	345	5,03
560	280	435	355	5,56
560	300	455	355	5,77
560	315	470	355	5,93
560	355	520	365	6,56
560	400	565	365	7,52
560	450	615	365	8,01
560	500	670	370	8,56
560	560	730	370	9,21
560	600	770	370	9,80
560	630	800	370	10,3
560	710	880	370	12,1
560	800	970	370	13,7
560	900	1090	370	15,6
600	200	345	365	4,34
600	224	370	365	4,62
600	250	395	365	5,37
600	280	435	375	5,93
600	300	455	375	6,15
600	315	470	375	6,32
600	355	520	385	6,99
600	400	565	385	8,01
600	450	615	385	8,55
600	500	670	390	9,16
600	560	730	390	9,63
600	600	770	390	10,5
600	630	800	390	10,7
600	710	880	390	12,6
600	800	970	390	14,1
600	900	1090	390	16,1
630	200	355	380	4,56
630	224	380	380	4,84
630	250	405	380	5,62
630	280	445	390	6,21
630	300	465	390	6,44
630	315	480	390	6,62
630	355	530	400	7,23
630	400	575	400	8,48
630	450	625	400	8,95
630	500	680	405	9,72
630	560	740	405	10,2
630	600	780	405	10,4
630	630	810	405	10,8
630	710	890	405	12,9

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
630	800	980	405	14,4
630	900	1100	405	16,4
630	1000	1200	405	18,3
710	250	455	420	6,34
710	280	495	420	7,00
710	300	515	430	7,26
710	315	530	430	7,46
710	355	580	440	8,24
710	400	625	440	9,49
710	450	675	440	10,1
710	500	730	445	10,9
710	560	790	445	11,6
710	600	830	445	12,1
710	630	860	445	12,3
710	710	940	445	14,1
710	800	1030	445	15,7
710	900	1150	445	17,8
710	1000	1250	445	19,8
710	1120	1370	445	23,2
800	250	455	465	8,49
800	280	495	475	9,46
800	300	515	475	9,80
800	315	530	475	9,99
800	355	580	485	11,1
800	400	625	485	12,6
800	450	675	485	13,4
800	500	730	490	14,6
800	560	790	490	15,3
800	600	830	490	15,8
800	630	860	490	16,5
800	710	940	490	18,0
800	800	1030	490	19,5
800	900	1150	490	21,5
800	1000	1250	490	22,6
800	1120	1370	490	27,6
800	1250	1500	490	30,8
900	315	530	525	11,5
900	355	580	535	12,8
900	400	625	535	15,0
900	450	675	535	15,7
900	500	730	540	16,9
900	560	790	540	18,2
900	600	830	540	19,0
900	630	860	540	19,6
900	710	940	540	22,2
900	800	1030	540	23,8
900	900	1150	540	26,1
900	1000	1250	540	29,1
900	1120	1370	540	34,1
900	1250	1500	540	38,5
1000	315	530	575	12,7
1000	355	580	585	14,1
1000	400	625	585	16,1
1000	450	675	585	17,3



T-pieces

TCU, TU

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Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
1000	500	730	590	18,4
1000	560	790	590	20,1
1000	600	830	590	21,0
1000	630	860	590	22,0
1000	710	940	590	24,7
1000	800	1030	590	26,8
1000	900	1150	590	29,1
1000	1000	1250	590	31,8
1000	1120	1370	590	37,4
1000	1250	1500	590	42,5
1120	500	730	650	20,5
1120	560	790	650	22,3
1120	600	830	650	23,3
1120	630	860	650	24,1
1120	710	940	650	27,5
1120	800	1030	650	29,9
1120	900	1150	650	32,9
1120	1000	1250	650	35,0
1120	1120	1370	650	40,0
1120	1250	1500	650	45,3
1250	500	730	715	22,9
1250	560	790	715	24,6
1250	600	830	715	25,8
1250	630	860	715	26,7
1250	710	940	715	30,4
1250	800	1030	715	33,1
1250	900	1150	715	36,5
1250	1000	1250	715	39,2
1250	1120	1370	715	43,9
1250	1250	1500	715	48,4



X-piece

XCU



Description

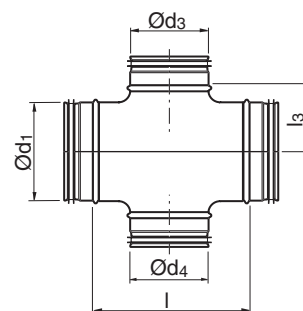
Centric –

- fully pressed or
- with saddle PSU or
- with hand made T-piece TSTCU

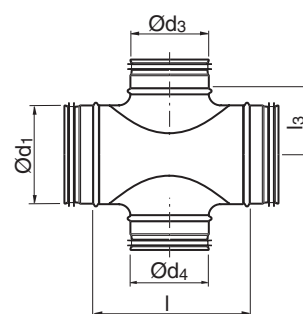
Ordering example

	XCU	400	250
Product			
Dimension Ød ₁			
Dimension Ød ₃ , Ød ₄			

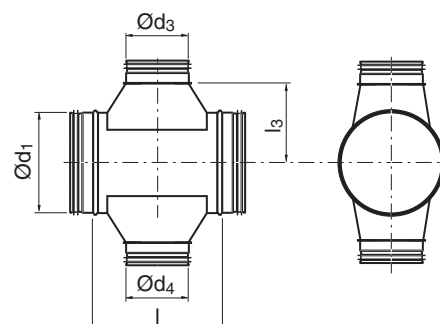
Dimensions



Centric – fully pressed



* Centric – with saddle PSU



** Centric – with hand made T-piece TSTCU

Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
63*	63	125	42	0,38
80*	63	125	50	0,31
80*	80	140	52	0,36
100*	63	125	60	0,35
100*	80	126	65	0,43
100	100	130	65	0,37
112	63	125	66	0,68
112	80	140	68	0,73
112	100	175	71	0,77
112	112	225	100	0,80
125*	63	125	73	0,44
125*	80	146	75	0,51
125*	100	175	78	0,45
125	112	225	110	0,77
125	125	165	83	0,57



X-piece

XCU

Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
140	63	178	115	0,79
140	80	140	82	0,79
140	100	175	85	0,86
140	112	225	115	0,88
140	125	240	115	0,92
140	140	230	90	0,99
150	63	178	120	0,67
150	80	140	87	0,77
150	100	175	90	0,86
150	112	225	120	0,90
150	125	215	95	0,96
150	140	230	95	1,03
150	150	260	95	1,08
160**	63	178	125	0,62
160*	80	140	92	0,59
160*	100	175	95	0,91
160	112	225	125	0,89
160*	125	215	100	0,91
160	140	230	100	1,05
160	150	260	100	1,08
160	160	209	105	0,67
180	63	178	135	0,79
180	80	140	102	0,88
180	100	175	105	0,97
180	112	225	135	1,01
180	125	215	110	1,08
180	140	230	110	1,18
180	150	260	110	1,21
180	160	260	115	1,26
180	180	285	115	1,33
200**	63	178	145	0,83
200*	80	140	112	0,77
200*	100	175	115	0,88
200	112	200	145	1,05
200*	125	215	115	1,02
200	140	230	120	1,22
200	150	260	120	1,26
200*	160	260	125	0,77
200	180	285	125	1,36
200	200	249	125	1,70
224	63	178	160	0,91
224	80	140	124	0,99
224	100	175	127	1,09
224	112	200	160	1,14
224	125	215	132	1,22
224	140	230	132	1,33
224	150	260	132	1,38
224	160	260	137	1,42
224	180	285	137	1,50
224	200	346	137	1,81
224	224	346	137	1,83

Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
250**	63	178	170	0,99
250*	80	156	137	1,13
250*	100	175	140	1,22
250	112	200	170	1,24
250*	125	220	145	1,48
250	140	230	145	1,45
250	150	255	145	1,50
250*	160	256	150	1,58
250	180	306	150	1,65
250*	200	306	150	1,78
250	224	350	150	1,98
250	250	296	150	1,78
280	80	156	152	1,20
280	100	175	155	1,31
280	112	200	185	1,37
280	125	220	160	1,46
280	140	230	160	1,59
280	150	255	160	1,65
280	160	256	165	1,71
280	180	306	165	1,81
280	200	306	165	2,08
280	224	350	165	2,19
280	250	385	205	2,57
280	280	425	215	2,86
300	80	156	162	1,29
300	100	175	165	1,38
300	112	200	195	1,47
300	125	220	170	1,53
300	140	230	170	1,66
300	150	255	170	1,76
300	160	256	175	1,82
300	180	306	175	1,93
300	200	306	175	2,27
300	224	350	175	2,34
300	250	350	175	2,75
300	280	425	225	2,95
300	300	445	225	3,12
315*	80	156	170	1,43
315*	100	175	173	1,50
315	112	200	205	1,49
315*	125	220	178	1,76
315	140	230	178	1,81
315	150	255	178	1,90
315*	160	256	182	1,96
315	180	306	182	2,13
315*	200	306	182	2,14
315	224	350	182	2,61
315*	250	350	182	2,59
315	280	435	235	3,26
315	300	430	182	3,26
315	315	363	182	3,73



X-piece

XCU

Ød ₁ nom	Ød ₃ . Ød ₄ nom	l mm	l ₃ mm	m kg
355	100	175	193	1,74
355	112	200	225	1,85
355	125	220	198	2,03
355	140	230	198	2,29
355	150	255	198	2,40
355	160	256	203	2,50
355	180	306	203	2,71
355	200	306	203	3,15
355	224	350	203	3,37
355	250	350	203	3,96
355	280	435	245	4,33
355	300	430	203	4,43
355	315	470	255	4,48
355	355	520	265	5,09
400*	100	175	215	2,27
400	112	200	245	2,05
400*	125	225	220	2,81
400	140	270	250	2,47
400	150	255	220	2,60
400*	160	266	225	3,02
400	180	310	250	2,95
400*	200	300	225	3,37
400	224	350	225	3,71
400*	250	350	225	3,79
400	280	435	275	4,68
400	300	430	225	4,97
400*	315	415	225	4,42
400	355	470	225	5,42
400*	400	510	225	6,20
450	125	225	245	2,30
450	140	270	275	2,62
450	150	255	245	2,76
450	160	266	250	2,90
450	180	310	275	3,17
450	200	300	250	3,75
450	224	350	250	4,06
450	250	350	250	4,79
450	280	435	300	5,33
450	300	430	250	5,54
450	315	415	250	5,68
450	355	525	310	6,19
450	400	510	250	6,96
450	450	615	310	7,08
500*	125	225	270	3,35
500	140	270	300	2,91
500	150	255	270	3,04
500*	160	266	275	3,77
500	180	310	300	3,35
500*	200	300	275	4,14
500	224	350	275	4,12
500*	250	350	275	4,68

Ød ₁ nom	Ød ₃ . Ød ₄ nom	l mm	l ₃ mm	m kg
500	280	435	325	5,42
500	300	430	275	5,64
500*	315	415	275	5,30
500	355	470	275	6,45
500*	400	510	275	6,34
500	450	615	335	7,86
500**	500	670	340	8,69
560	200	300	305	4,30
560	224	350	305	4,59
560	250	350	305	5,41
560	280	435	355	6,01
560	300	430	305	6,25
560	315	415	305	6,43
560	355	520	365	7,15
560	400	510	305	8,28
560	450	615	365	8,82
560	500	670	370	9,35
560	560	730	370	10,1
600	200	300	325	4,59
600	224	350	325	4,89
600	250	350	325	5,75
600	280	430	325	6,38
600	300	430	325	6,64
600	315	415	325	6,83
600	355	510	325	7,59
600	400	510	325	8,78
600	450	615	385	9,38
600	500	670	390	10,0
600	560	730	390	10,4
600	600	770	390	11,7
630*	200	300	340	5,35
630	224	350	340	5,12
630*	250	350	340	6,00
630	280	445	390	6,67
630	300	430	340	6,93
630*	315	415	340	6,77
630	355	530	400	7,74
630*	400	510	340	7,69
630	450	625	400	9,78
630**	500	680	405	10,7
630	560	740	405	11,0
630	600	780	405	11,1
630**	630	810	405	11,6
710	250	455	420	6,78
710	280	495	420	7,52
710	300	515	430	7,82
710	315	530	430	8,05
710	355	580	440	8,91
710	400	625	440	10,4
710	450	675	440	11,1
710	500	730	445	12,0



X-piece

XCU

1

2

3

4

5

6

7

8

9

10

11

Ød ₁ nom	Ød ₃ . Ød ₄ nom	l mm	l ₃ mm	m kg
710	560	790	445	12,7
710	600	830	445	13,2
710	630	860	445	13,4
710	710	940	445	15,5
800**	250	455	465	7,08
800	280	495	475	8,10
800	300	515	475	8,42
800**	315	530	475	8,54
800	355	580	485	9,60
800**	400	625	485	11,1
800	450	675	485	11,9
800**	500	730	490	13,3
800	560	790	490	13,7
800	600	830	490	14,2
800**	630	860	490	15,2
800	710	940	490	16,3
800**	800	1030	490	17,9
900	315	530	525	11,9
900	355	580	535	13,2
900	400	625	535	16,0
900	450	675	535	16,5
900	500	730	540	17,9
900	560	790	540	19,2
900	600	830	540	20,1
900	630	860	540	20,7
900	710	940	540	23,7
900	800	1030	540	25,1
900	900	1150	540	27,8
1000**	315	530	575	13,0
1000	355	580	585	14,3
1000**	400	625	585	16,6
1000	450	675	585	17,9
1000**	500	730	590	19,0
1000	560	790	590	21,0
1000	600	830	590	22,1
1000**	630	860	590	23,4
1000	710	940	590	26,4
1000**	800	1030	590	28,5
1000	900	1150	590	31,0
1000**	1000	1250	590	34,3
1120	500	730	650	21,4
1120	560	790	650	23,1
1120	600	830	650	24,3
1120	630	860	650	25,2
1120	710	940	650	29,1
1120	800	1030	650	31,7
1120	900	1150	650	35,4
1120	1000	1250	650	37,3
1120	1120	1370	650	43,5
1250**	500	730	715	23,4

Ød ₁ nom	Ød ₃ . Ød ₄ nom	l mm	l ₃ mm	m kg
1250	560	790	715	25,3
1250	600	830	715	26,6
1250**	630	860	715	27,6
1250	710	940	715	31,9
1250**	800	1030	715	34,9
1250	900	1150	715	39,1
1250**	1000	1250	715	41,9
1250	1120	1370	715	47,1
1250**	1250	1500	715	52,6

* Centric – with saddle PSU

** Centric – with han made T-piece TSTCU



X-piece

XU



Description

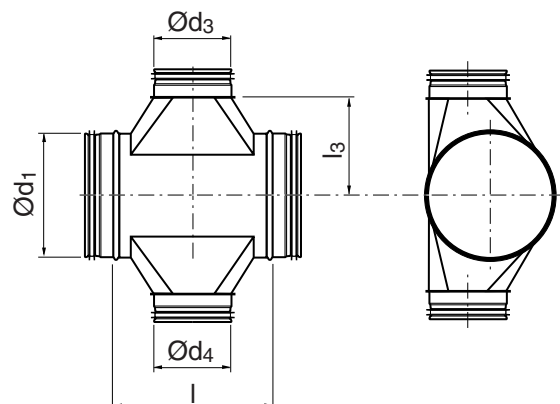
Tangential –

- with hand made T-piece TSTU

Ordering example

	XU	400	250
Product			
Dimension Ød ₁			
Dimension Ød ₃ , Ød ₄			

Dimensions



Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
80	63	178	85	0,46
100	63	178	95	0,54
100	80	195	95	0,58
112	63	178	100	0,68
112	80	195	100	0,73
112	100	215	100	0,77
125	63	178	110	0,65
125	80	195	110	0,70
125	100	215	110	0,75
125	112	225	110	0,77
140	63	178	115	0,79
140	80	195	115	0,79
140	100	215	115	0,86
140	112	225	115	0,88
140	125	240	115	0,92
150	63	178	120	0,67
150	80	195	120	0,77
150	100	215	120	0,86
150	112	225	120	0,90
150	125	240	120	0,96
150	140	260	125	1,03
160	63	178	125	0,62
160	80	195	125	0,72
160	100	215	125	0,82
160	112	225	125	0,89
160	125	240	125	0,97
160	140	260	130	1,05
160	150	270	130	1,08
180	63	178	135	0,79
180	80	195	135	0,88
180	100	215	135	0,97
180	112	225	135	1,01
180	125	240	135	1,08
180	140	260	140	1,18
180	150	270	140	1,21
180	160	280	140	1,26
200	63	178	145	0,83
200	80	195	145	0,91
200	100	215	145	1,00



X-piece

XU

Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
200	112	225	145	1,05
200	125	240	145	1,11
200	140	260	150	1,22
200	150	270	150	1,26
200	160	280	150	1,30
200	180	300	150	1,36
224	63	178	160	0,91
224	80	195	160	0,99
224	100	215	160	1,09
224	112	225	160	1,14
224	125	240	160	1,22
224	140	260	165	1,33
224	150	270	165	1,38
224	160	280	165	1,42
224	180	300	165	1,50
224	200	335	180	1,81
250	63	178	170	0,99
250	80	195	170	1,08
250	100	215	170	1,19
250	112	225	170	1,24
250	125	240	170	1,31
250	140	260	175	1,45
250	150	270	175	1,50
250	160	280	175	1,55
250	180	300	175	1,65
250	200	335	190	1,95
250	224	360	190	1,98
280	80	195	185	1,20
280	100	215	185	1,31
280	112	225	185	1,37
280	125	240	185	1,46
280	140	260	190	1,59
280	150	270	190	1,65
280	160	280	190	1,71
280	180	300	190	1,81
280	200	335	205	2,08
280	224	360	205	2,19
280	250	385	205	2,57
300	80	195	195	1,29
300	100	215	195	1,38
300	112	225	195	1,47
300	125	240	195	1,53
300	140	260	200	1,66
300	150	270	200	1,76
300	160	280	200	1,82
300	180	300	200	1,93
300	200	335	215	2,27
300	224	360	215	2,34
300	250	385	215	2,75
300	280	425	225	2,95
315	80	205	205	1,31
315	100	225	205	1,44
315	112	235	205	1,49
315	125	250	205	1,59
315	140	270	210	1,81
315	150	280	210	1,90
315	160	290	210	1,91

Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
315	180	310	210	2,13
315	200	345	225	2,35
315	224	370	225	2,61
315	250	395	225	2,97
315	280	435	235	3,26
315	300	455	235	3,26
355	100	225	250	1,74
355	112	235	250	1,85
355	125	250	250	2,03
355	140	270	230	2,29
355	150	280	230	2,40
355	160	290	230	2,50
355	180	310	230	2,71
355	200	345	245	3,15
355	224	370	245	3,37
355	250	395	245	3,96
355	280	435	245	4,33
355	300	455	255	4,43
355	315	470	255	4,48
400	100	225	245	1,99
400	112	235	245	2,05
400	125	250	245	2,24
400	140	270	250	2,47
400	150	280	250	2,60
400	160	290	250	2,72
400	180	310	250	2,95
400	200	345	265	3,35
400	224	370	265	3,71
400	250	395	265	4,37
400	280	435	275	4,68
400	300	455	275	4,97
400	315	470	275	4,99
400	355	520	285	5,42
450	125	250	270	2,30
450	140	270	275	2,62
450	150	280	275	2,76
450	160	290	275	2,90
450	180	310	275	3,17
450	200	345	290	3,75
450	224	370	290	4,06
450	250	395	290	4,79
450	280	435	300	5,33
450	300	455	300	5,54
450	315	470	300	5,68
450	355	520	310	6,19
450	400	565	310	6,96
500	125	250	295	2,65
500	140	270	300	2,91
500	150	280	300	3,04
500	160	290	300	3,14
500	180	310	300	3,35
500	200	345	315	4,05
500	224	370	315	4,12
500	250	395	315	4,99
500	280	435	325	5,42
500	300	455	325	5,64
500	315	470	325	5,80



X-piece

XU

Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
500	355	520	335	6,45
500	400	565	335	6,81
500	450	615	335	7,86
560	200	345	345	4,30
560	224	370	345	4,59
560	250	395	345	5,41
560	280	435	355	6,01
560	300	455	355	6,25
560	315	470	355	6,43
560	355	520	365	7,15
560	400	565	365	8,28
560	450	615	365	8,82
560	500	670	370	9,35
600	200	345	365	4,59
600	224	370	365	4,89
600	250	395	365	5,75
600	280	435	375	6,38
600	300	455	375	6,64
600	315	470	375	6,83
600	355	520	385	7,59
600	400	565	385	8,78
600	450	615	385	9,38
600	500	670	390	10,0
600	560	730	390	10,4
630	200	355	380	4,81
630	224	380	380	5,12
630	250	405	380	6,01
630	280	445	390	6,67
630	300	465	390	6,93
630	315	480	390	7,13
630	355	530	400	7,74
630	400	575	400	9,36
630	450	625	400	9,78
630	500	680	405	10,7
630	560	740	405	11,0
630	600	780	405	11,1
710	250	455	420	6,78
710	280	495	420	7,52
710	300	515	430	7,82
710	315	530	430	8,05
710	355	580	440	8,91
710	400	625	440	10,4
710	450	675	440	11,1
710	500	730	445	12,0
710	560	790	445	12,7
710	600	830	445	13,2
710	630	860	445	13,4
800	250	455	465	7,08
800	280	495	475	8,10
800	300	515	475	8,42
800	315	530	475	8,54
800	355	580	485	9,60
800	400	625	485	11,1
800	450	675	485	11,9
800	500	730	490	13,3
800	560	790	490	13,7
800	600	830	490	14,2

Ød ₁ nom	Ød ₃ , Ød ₄ nom	l mm	l ₃ mm	m kg
800	630	860	490	15,2
800	710	940	490	16,3
900	315	530	525	11,9
900	355	580	535	13,2
900	400	625	535	16,0
900	450	675	535	16,5
900	500	730	540	17,9
900	560	790	540	19,2
900	600	830	540	20,1
900	630	860	540	20,7
900	710	940	540	23,7
900	800	1030	540	25,1
1000	315	530	575	13,0
1000	355	580	585	14,3
1000	400	625	585	16,6
1000	450	675	585	17,9
1000	500	730	590	19,0
1000	560	790	590	21,0
1000	600	830	590	22,1
1000	630	860	590	23,4
1000	710	940	590	26,4
1000	800	1030	590	28,5
1000	900	1150	590	31,0
1120	500	730	650	21,4
1120	560	790	650	23,1
1120	600	830	650	24,3
1120	630	860	650	25,2
1120	710	940	650	29,1
1120	800	1030	650	31,7
1120	900	1150	650	35,4
1120	1000	1250	650	37,3
1250	500	730	715	23,4
1250	560	790	715	25,3
1250	600	830	715	26,6
1250	630	860	715	27,6
1250	710	940	715	31,9
1250	800	1030	715	34,9
1250	900	1150	715	39,1
1250	1000	1250	715	41,9
1250	1120	1370	715	47,1



T-pieces

TSTCU, TSTU



TSTCU



TSTU

Description

Hand made T-piece.

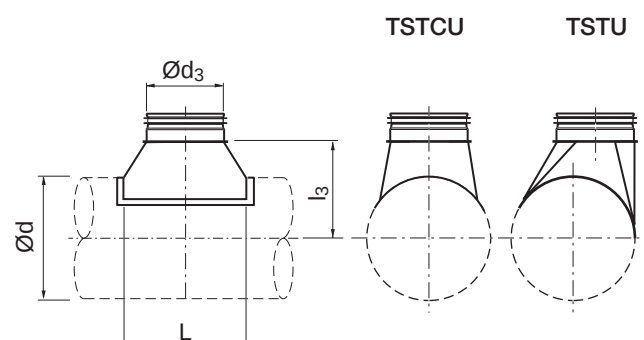
TSTCU = centric T-piece

TSTU = tangential T-piece

Ordering example

Product **TSTCU** **400** **250**
 Dimension Ød
 Dimension Ød₃

Dimensions



Ød nom	Ød ₃ nom	L mm	l ₃ mm	m kg
63	63	128	77	0,12
63	80	145	77	0,15
63	100	165	77	0,20
80	63	128	85	0,12
80	80	145	85	0,16
80	100	165	85	0,21
80	112	175	85	0,24
80	125	190	85	0,29
100	63	128	95	0,13
100	80	145	95	0,16
100	100	165	95	0,20
100	112	175	95	0,22
100	125	190	95	0,25
100	140	210	100	0,30
100	150	220	100	0,30
100	160	230	100	0,36
112	63	128	100	0,18
112	80	145	100	0,21
112	100	165	100	0,25
112	112	175	100	0,27
112	125	190	100	0,30
112	140	210	105	0,34
112	150	220	105	0,37
112	160	230	105	0,39
112	180	250	105	0,43
125	63	128	110	0,14
125	80	145	110	0,17
125	100	165	110	0,21
125	112	175	110	0,23
125	125	190	110	0,27
125	140	210	115	0,31
125	150	220	115	0,33
125	160	230	115	0,35
125	180	250	115	0,41
125	200	285	130	0,50
140	63	128	115	0,18
140	80	145	115	0,22
140	100	165	115	0,26
140	112	175	115	0,28



T-pieces

TSTCU, TSTU

Ød nom	Ød ₃ nom	L mm	l ₃ mm	m kg
140	125	190	115	0,31
140	140	210	120	0,36
140	150	220	120	0,38
140	160	230	120	0,40
140	180	250	120	0,45
140	200	285	135	0,53
140	224	310	135	0,59
150	63	128	120	0,14
150	80	145	120	0,19
150	100	165	120	0,24
150	112	175	120	0,27
150	125	190	120	0,31
150	140	210	125	0,37
150	150	220	125	0,39
150	160	230	125	0,43
150	180	250	125	0,47
150	200	285	140	0,57
150	224	310	140	0,64
150	250	335	140	0,77
160	63	128	125	0,10
160	80	145	125	0,15
160	100	165	125	0,22
160	112	175	125	0,25
160	125	190	125	0,29
160	140	210	130	0,35
160	150	220	130	0,38
160	160	230	130	0,41
160	180	250	130	0,47
160	200	285	145	0,57
160	224	310	145	0,65
160	250	335	145	0,85
180	63	128	135	0,16
180	80	145	135	0,20
180	100	165	135	0,25
180	112	175	135	0,27
180	125	190	135	0,31
180	140	210	140	0,36
180	150	220	140	0,39
180	160	230	140	0,43
180	180	250	140	0,49
180	200	285	155	0,62
180	224	310	155	0,69
180	250	335	155	0,82
180	280	375	165	1,02
200	63	128	145	0,14
200	80	145	145	0,18
200	100	165	145	0,23
200	112	175	145	0,25
200	125	190	145	0,29
200	140	210	150	0,34
200	150	220	150	0,37
200	160	230	150	0,40
200	180	250	150	0,46
200	200	285	165	0,64
200	224	310	165	0,66
200	250	335	165	0,79
200	280	375	175	1,00
200	300	395	175	1,09
200	315	410	175	1,13
224	63	128	160	0,15

Ød nom	Ød ₃ nom	L mm	l ₃ mm	m kg
224	80	145	160	0,18
224	100	165	160	0,23
224	112	175	160	0,25
224	125	190	160	0,29
224	140	210	165	0,35
224	150	220	165	0,37
224	160	230	165	0,40
224	180	250	165	0,47
224	200	285	180	0,63
224	224	310	180	0,67
224	250	335	180	0,84
224	280	375	190	1,01
224	300	395	190	1,11
224	315	410	190	1,18
224	355	460	200	1,44
250	63	128	170	0,15
250	80	145	170	0,18
250	100	165	170	0,23
250	112	175	170	0,26
250	125	190	170	0,29
250	140	210	175	0,35
250	150	220	175	0,38
250	160	230	175	0,41
250	180	250	175	0,47
250	200	285	190	0,62
250	224	310	190	0,68
250	250	335	190	0,89
250	280	375	200	1,03
250	300	395	200	1,12
250	315	410	200	1,13
250	355	460	210	1,46
250	400	505	210	1,83
280	80	145	185	0,20
280	100	165	185	0,24
280	112	175	185	0,27
280	125	190	185	0,31
280	140	210	190	0,36
280	150	220	190	0,39
280	160	230	190	0,42
280	180	250	190	0,49
280	200	285	205	0,60
280	224	310	205	0,69
280	250	335	205	0,86
280	280	375	215	1,03
280	300	395	215	1,12
280	315	410	215	1,19
280	355	460	225	1,44
280	400	505	225	1,80
280	450	555	225	2,11
300	80	145	195	0,20
300	100	165	195	0,24
300	112	175	195	0,28
300	125	190	195	0,30
300	140	210	200	0,35
300	150	220	200	0,40
300	160	230	200	0,43
300	180	250	200	0,49
300	200	285	215	0,63
300	224	310	215	0,70
300	250	335	215	0,86



T-pieces

TSTCU, TSTU

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Ød nom	Ød ₃ nom	L mm	l ₃ mm	m kg
300	280	375	225	1,03
300	300	395	225	1,13
300	315	410	225	1,20
300	355	460	235	1,45
300	400	505	235	1,73
300	450	555	235	2,10
315	80	145	205	0,19
315	100	165	205	0,24
315	112	175	205	0,26
315	125	190	205	0,31
315	140	210	210	0,40
315	150	220	210	0,44
315	160	230	210	0,45
315	180	250	210	0,56
315	200	285	225	0,63
315	224	310	225	0,79
315	250	335	225	0,92
315	280	375	235	1,11
315	300	395	235	1,19
315	315	410	235	1,32
315	355	460	245	1,53
315	400	505	245	1,80
315	450	555	245	2,01
315	500	610	250	2,24
355	100	165	225	0,23
355	112	175	225	0,28
355	125	195	225	0,36
355	140	210	230	0,45
355	150	220	230	0,50
355	160	230	230	0,55
355	180	250	230	0,65
355	200	285	245	0,82
355	224	310	245	0,95
355	250	335	245	1,16
355	280	375	245	1,36
355	300	395	255	1,47
355	315	410	255	1,55
355	355	460	265	1,91
355	400	505	265	2,18
355	450	555	265	2,46
355	500	610	270	2,77
355	560	670	270	3,11
400	100	165	245	0,26
400	112	175	245	0,28
400	125	195	245	0,36
400	140	210	250	0,44
400	150	220	250	0,50
400	160	230	250	0,55
400	180	250	250	0,66
400	200	285	265	0,78
400	224	310	265	0,97
400	250	335	265	1,19
400	280	375	275	1,34
400	300	395	275	1,52
400	315	410	275	1,56
400	355	460	285	1,89
400	400	505	285	2,29
400	450	555	285	2,58
400	500	610	290	2,96
400	560	670	290	3,29

Ød nom	Ød ₃ nom	L mm	l ₃ mm	m kg
400	600	710	290	3,51
400	630	740	290	3,68
450	125	190	270	0,28
450	140	210	275	0,40
450	150	220	275	0,46
450	160	230	275	0,52
450	180	250	275	0,64
450	200	285	290	0,84
450	224	310	290	0,98
450	250	335	290	1,22
450	280	375	300	1,46
450	300	395	300	1,58
450	315	410	300	1,68
450	355	460	310	1,98
450	400	505	310	2,39
450	450	555	310	2,60
450	500	610	315	3,08
450	560	670	315	3,48
450	600	710	315	3,74
450	630	740	315	3,94
450	710	820	315	4,70
500	125	190	295	0,35
500	140	210	300	0,43
500	150	220	300	0,48
500	160	230	300	0,52
500	180	250	300	0,60
500	200	285	315	0,84
500	224	310	315	0,86
500	250	335	315	1,13
500	280	375	325	1,29
500	300	395	325	1,42
500	315	410	325	1,52
500	355	460	335	1,85
500	400	505	335	2,26
500	450	555	335	2,74
500	500	610	340	3,28
500	560	670	340	3,83
500	600	710	340	4,25
500	630	740	340	4,35
500	710	820	340	5,74
500	800	910	340	6,91
560	200	285	345	0,78
560	224	310	345	0,90
560	250	335	345	1,12
560	280	375	355	1,34
560	300	395	355	1,47
560	315	410	355	1,57
560	355	460	365	1,98
560	400	505	365	2,38
560	450	555	365	2,78
560	500	610	370	3,27
560	560	670	370	3,85
560	600	710	370	4,26
560	630	740	370	4,58
560	710	820	370	5,71
560	800	910	370	6,34
560	900	1030	370	8,45
600	200	285	365	0,81
600	224	310	365	0,93
600	250	335	365	1,14



T-pieces

TSTCU, TSTU

Ød nom	Ød ₃ nom	L mm	l ₃ mm	m kg
600	280	375	375	1,37
600	300	395	375	1,50
600	315	410	375	1,59
600	355	460	385	1,93
600	400	505	385	2,39
600	450	555	385	2,81
600	500	610	390	3,29
600	560	670	390	3,86
600	600	710	390	4,54
600	630	740	390	4,58
600	710	820	390	5,69
600	800	910	390	6,79
600	900	1030	390	8,36
630	200	285	380	0,83
630	224	310	380	0,95
630	250	335	380	1,16
630	280	375	390	1,39
630	300	395	390	1,52
630	315	410	390	1,62
630	355	460	400	1,86
630	400	505	400	2,51
630	450	555	400	2,83
630	500	610	405	3,42
630	560	670	405	3,87
630	600	710	405	4,27
630	630	740	405	4,45
630	710	820	405	5,68
630	800	910	405	6,76
630	900	1030	405	8,30
630	1000	1130	405	9,71
710	250	335	420	1,26
710	280	375	420	1,50
710	300	395	430	1,64
710	315	410	430	1,74
710	355	460	440	2,08
710	400	505	440	2,61
710	450	555	440	3,01
710	500	610	445	3,52
710	560	670	445	4,11
710	600	710	445	4,52
710	630	740	445	4,81
710	710	820	445	6,00
710	800	910	445	7,10
710	900	1030	445	8,69
710	1000	1130	445	10,2
710	1120	1250	445	12,4
800	250	335	465	1,08
800	280	375	475	1,44
800	300	395	475	1,57
800	315	410	475	1,61
800	355	460	485	2,00
800	400	505	485	2,50
800	450	555	485	2,88
800	500	610	490	3,59
800	560	670	490	3,93
800	600	710	490	4,32
800	630	740	490	4,94
800	710	820	490	5,73
800	800	910	490	6,99
800	900	1030	490	8,32

Ød nom	Ød ₃ nom	L mm	l ₃ mm	m kg
800	1000	1130	490	8,61
800	1120	1250	490	11,9
800	1250	1380	490	14,0
900	315	410	525	2,00
900	355	460	535	2,43
900	400	505	535	3,41
900	450	555	535	3,59
900	500	610	540	4,24
900	560	670	540	5,01
900	600	710	540	5,56
900	630	740	540	5,99
900	710	820	540	7,50
900	800	910	540	9,03
900	900	1030	540	11,2
900	1000	1130	540	13,3
900	1120	1250	540	16,4
900	1250	1380	540	19,7
1000	315	410	575	1,95
1000	355	460	585	2,36
1000	400	505	585	2,97
1000	450	555	585	3,54
1000	500	610	590	3,99
1000	560	670	590	5,02
1000	600	710	590	5,66
1000	630	740	590	6,34
1000	710	820	590	7,67
1000	800	910	590	9,31
1000	900	1030	590	11,8
1000	1000	1130	590	14,2
1000	1120	1250	590	17,7
1000	1250	1380	590	21,5
1120	500	610	650	4,25
1120	560	670	650	5,07
1120	600	710	650	5,66
1120	630	740	650	6,12
1120	710	820	650	7,75
1120	800	910	650	9,45
1120	900	1030	650	12,2
1120	1000	1130	650	14,3
1120	1120	1250	650	17,9
1120	1250	1380	650	21,7
1250	500	610	715	4,28
1250	560	670	715	5,11
1250	600	710	715	5,71
1250	630	740	715	6,18
1250	710	820	715	7,83
1250	800	910	715	9,55
1250	900	1030	715	12,5
1250	1000	1130	715	14,5
1250	1120	1250	715	18,2
1250	1250	1380	715	22,0



Take-off

ILRU

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4

Description

Take-off with radius.

5

Ordering example

	ILRU	250
Product		
Dimension Ød ₁		

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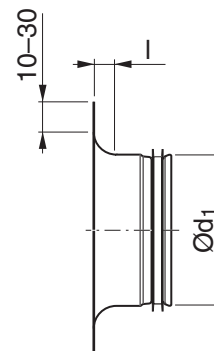
8

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Dimensions



Ød ₁ nom	l mm	m kg
63	10	0,07
80	12	0,10
100	15	0,11
125	20	0,14
140	20	0,22
150	20	0,24
160	25	0,19
180	25	0,30
200	25	0,26
224	25	0,46
250	25	0,57
300	25	0,68
315	25	0,72
355	25	0,53
400	25	0,97
500	25	1,35
630	25	1,77



Take-off

ILU



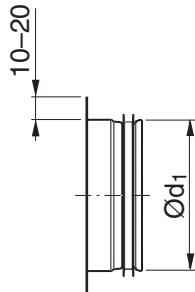
Description

Take-off without radius.

Ordering example

	ILU	200
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ nom	m kg
63	0,06
80	0,08
100	0,07
112	0,10
125	0,11
140	0,15
150	0,15
160	0,16
180	0,19
200	0,21
224	0,36
250	0,36
280	0,30
300	0,36
315	0,54
355	0,41
400	0,58
450	0,71
500	0,83
560	0,96
600	0,99
630	1,13
710	1,58
800	2,11
900	2,70
1000	3,23
1120	4,10
1250	4,55



Take-off

ILF

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Description

Take-off without radius. With female end – fits outside a Safe fitting.

5

Ordering example

Product ILF 200
 Dimension Ød

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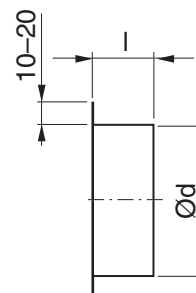
8

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Dimensions

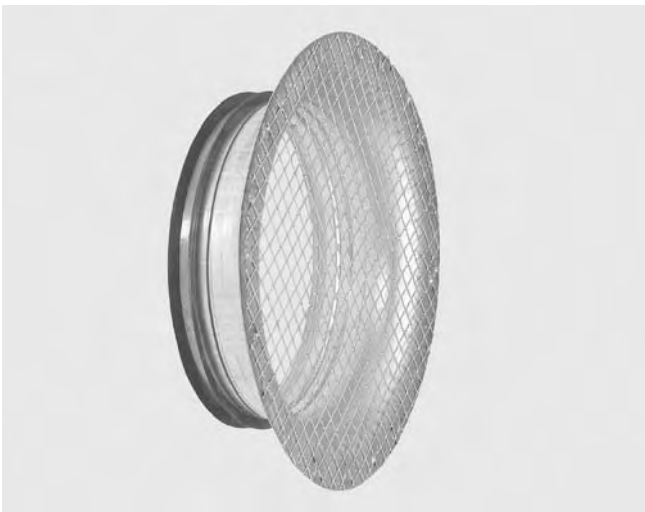


Ød nom	l mm	m kg
63	45	0,06
80	45	0,08
100	45	0,06
112	45	0,10
125	45	0,08
140	45	0,15
150	45	0,15
160	45	0,16
180	45	0,19
200	45	0,21
224	45	0,26
250	65	0,31
280	65	0,30
300	65	0,41
315	65	0,46
355	65	0,41
400	90	0,58
450	90	0,71
500	90	0,83
560	90	0,96
600	90	0,99
630	90	1,13



Take-off with mesh

ILRNU



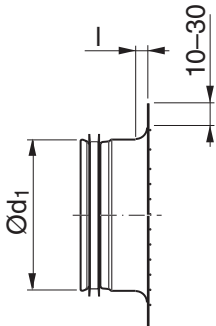
Description

To terminate an inlet duct.
With radius. Mesh size 10 × 10 mm

Ordering example

	ILRNU	200
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ nom	l mm	m kg
63	10	0,07
80	12	0,11
100	15	0,16
125	20	0,21
140	20	0,24
150	20	0,27
160	25	0,22
180	25	0,34
200	25	0,39
224	25	0,51
250	25	0,64
300	25	0,77
315	25	0,83
355	25	0,89
400	25	1,14
500	25	1,61
630	25	2,19



Take-off with mesh

ESNU

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Description

To terminate an inlet duct.
Mesh size 10 × 10 mm.

5

Ordering example

	ESNU	200
Product		
Dimension Ød ₁		

6

7

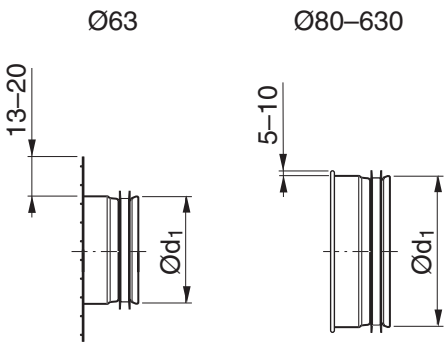
8

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11

Dimensions



Ød ₁ nom	m kg
63	0,06
80	0,09
100	0,10
112	0,12
125	0,13
140	0,17
150	0,16
160	0,17
180	0,21
200	0,25
224	0,31
250	0,38
280	0,37
300	0,51
315	0,57
355	0,54
400	0,75
450	0,92
500	1,09
560	1,26
600	1,34
630	1,55



Take-off with mesh

EPNF



Description

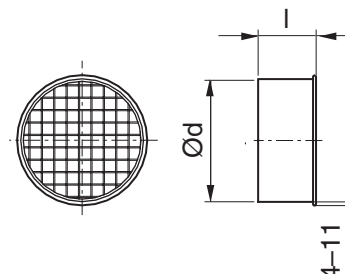
To terminate an inlet duct. With female end – fits outside a Safe fitting.

Mesh size 10 × 10 mm.

Ordering example

	EPNF	250
Product		
Dimension Ød		

Dimensions



Ød nom	l mm	m kg
80	48	0,07
100	48	0,09
112	48	0,10
125	48	0,11
140	48	0,13
150	48	0,14
160	48	0,15
180	48	0,17
200	48	0,19
224	48	0,22
250	68	0,34
280	68	0,38
300	68	0,42
315	68	0,44
355	68	0,50
400	93	0,69
450	93	0,81
500	93	0,92
560	93	1,07
600	93	1,16
630	93	1,23



Take-off with mesh and cone ILKNU 50

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Description

To terminate an inlet duct.
Mesh size 10 × 10 mm.

5

Ordering example

	ILKNU	200	50
Product			
Dimension Ød ₁			
Cone heigh, nominal			

6

7

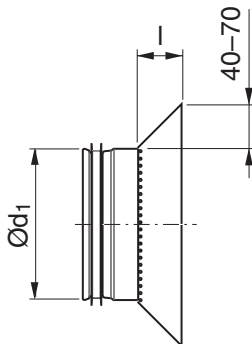
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Dimensions



Ød ₁ nom	l mm	m kg
100	50	0,15
125	50	0,22
160	50	0,25
200	50	0,32
250	53	0,65
315	68	0,89
400	50	1,00
500	50	1,24
630	40	1,43
800	50	1,79



Take-off with mesh and cone ILKNU 100



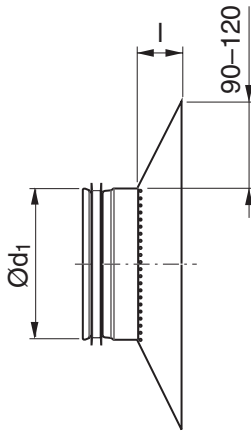
Description

To terminate an inlet duct.
Mesh size 10 × 10 mm.

Ordering example

	ILKNU	200	100
Product			
Dimension Ød ₁			
Cone heigh, nominal			

Dimensions



Ød ₁ nom	l mm	m kg
100	100	0,48
125	95	0,54
160	98	0,68
200	100	0,99
250	100	1,23
315	93	1,43
400	100	1,73
500	105	2,14
630	115	2,87
800	100	4,21



Take-off with mesh and cone ILKNF 50

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Description

To terminate an inlet duct. With female end – fits outside a Safe fitting.

Mesh size 10 × 10 mm.

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Ordering example

	ILKNF	200	50
Product			
Dimension Ød			
Cone heigh, nominal			

6

7

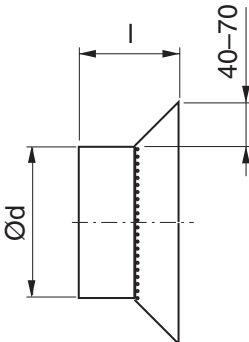
8

9

10

11

Dimensions



Ød nom	l mm	m kg
100	92	0,15
125	92	0,22
160	92	0,25
200	92	0,32
250	115	0,65
315	130	0,89
400	132	1,00
500	132	1,24
630	122	1,43
800	152	1,79



Take-off with mesh and cone ILKNF 100



Description

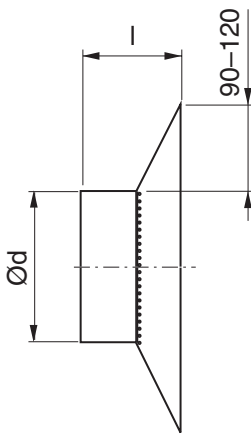
To terminate an inlet duct. With female end – fits outside a Safe fitting.

Mesh size 10 × 10 mm.

Ordering example

	ILKNF	200	100
Product			
Dimension Ød			
Cone heigh, nominal			

Dimensions



Ød nom	l mm	m kg
100	142	0,48
125	137	0,54
160	140	0,68
200	142	0,99
250	162	1,23
315	155	1,43
400	182	1,73
500	187	2,14
630	197	2,87
800	202	4,21



Coupling

NPU

1

2

3



Description

Coupling connector for joining circular ducts.

Ordering example

Product	NPU	200
Dimension Ød ₁		

5

6

7

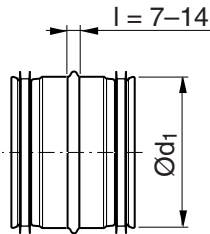
8

9

10

11

Dimensions



Ød ₁ nom	m kg
63	0,07
80	0,09
100	0,12
112	0,14
125	0,15
140	0,16
150	0,18
160	0,19
180	0,25
200	0,30
224	0,30
250	0,52
280	0,56
300	0,64
315	0,66
355	0,76
400	1,10
450	1,34
500	1,52
560	1,90
600	2,10
630	2,24
710	2,65
800	3,10
900	4,52
1000	5,30
1120	7,03
1250	7,70



Expanding coupling

NPEU



Description

Expanding coupling, intended for installation of ventilation ducts and components of larger dimensions. The coupling makes installation easier and can also be used between circular ducts and fittings without a rubber seal.

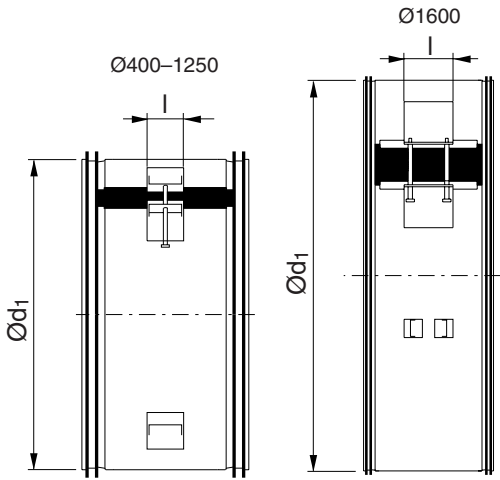
The coupling is expanded by means of a threaded bolt, socket no. 13.

Can achieve maximum tightness class C.

Ordering example

	NPEU	630
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ nom	l mm	m kg
355	45	1,24
400	45	1,64
450	45	1,83
500	45	2,50
560	45	2,95
600	45	3,15
630	45	3,30
710	45	4,30
800	45	4,81
900	45	5,40
1000	45	8,48
1120	45	10,8
1250	45	12,1
1400	120	15,2
1500	120	16,4
1600	120	17,5

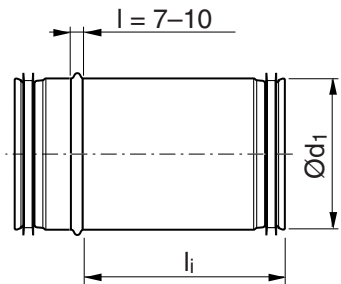


Slide-in coupling

SKNPU



Dimensions



Description

Slide-in coupling intended for greater flexibility when joining SR ducts.

Other applications could be:

- To eliminate the accurate cutting of ducts which the ordinary NPU connector requires in some cases.
- To add a piece of duct to a system to replace a damaged piece of duct.

Ordering example

Product **SKNPU** **200**
Dimension Ød₁

Ød ₁ nom	l _i mm	m kg
80	133	0,18
100	133	0,22
112	133	0,24
125	133	0,28
140	133	0,31
150	133	0,33
160	133	0,36
180	133	0,40
200	133	0,56
224	133	0,62
250	172	0,90
280	172	1,00
300	172	1,10
315	172	1,16
355	172	1,30
400	170	2,07
450	170	2,33
500	170	2,60



Slide-in coupling

SNPU



Description

Slide-in coupling intended for greater flexibility when joining SR ducts.

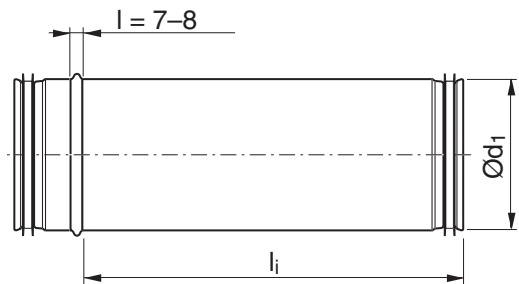
Other applications could be:

- To eliminate the accurate cutting of ducts which the ordinary NPU connector requires in some cases.
- To add a piece of duct to a system to replace a damaged piece of duct.

Ordering example

	SNPU	200
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ nom	l _i mm	m kg
100	395	0,51
112	395	0,55
125	395	0,65
140	395	0,72
150	395	0,76
160	395	0,83
180	395	0,93
200	395	1,28
224	395	1,41
250	395	1,66
280	395	1,85
300	395	2,01
315	395	2,12

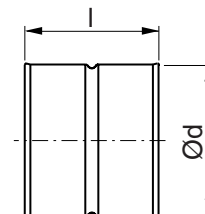


Female coupling

MF



Dimensions



Description

Female coupling for joining fittings.

Ordering example

Product	MF	200
Dimension Ød		

Ød nom	l mm	m kg
63*	95	0,06
80*	95	0,08
100*	95	0,10
112	95	0,11
125*	95	0,13
140	95	0,17
150*	95	0,18
160*	95	0,20
180	95	0,22
200*	95	0,25
224	95	0,27
250*	140	0,42
280	130	0,50
300	130	0,51
315*	140	0,54
355	130	0,62
400*	180	0,96
450	170	1,17
500*	180	1,46
560	170	1,57
600	170	1,65
630	170	1,74
710	210	1,96
800	210	2,24
900	210	4,00
1000	210	4,43
1120	250	5,90
1250	250	6,52

* With turned-over edge



Slide-in female coupling

SKMF



Description

Slide-in female coupling, intended to add fittings to an existing system.

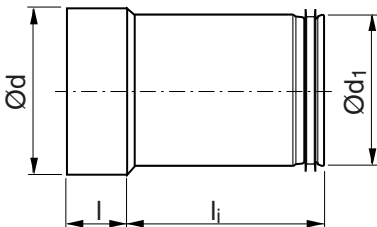
Other applications could be:

- To extend the distance between a T-piece and a cleaning cover, to get it outside any insulation.
- To take up the often varying distance between the stub on an air supply terminal and the duct junction.
- To facilitate the access when inspecting and cleaning the duct system.

Ordering example

	SKMF	200
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ nom	l mm	l _i mm	m kg
80	130	40	0,16
100	130	40	0,20
112	130	40	0,23
125	130	40	0,25
140	130	40	0,28
150	130	40	0,30
160	130	40	0,32
180	130	40	0,36
200	130	40	0,50
224	130	40	0,56
250	185	60	0,88
280	185	60	0,99
300	185	60	1,07
315*	185	60	1,12
355*	185	60	1,27
400*	240	80	2,67
450**	242	80	3,04
500**	242	80	3,37

* With stiffening bead

** Design with lockseam

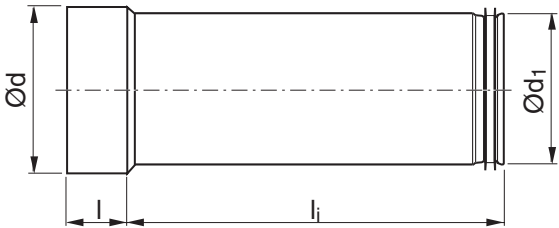


Slide-in female coupling

SMFU



Dimensions



Description

Slide-in female coupling, intended to add fittings to an existing system.

Other applications could be:

- To extend the distance between a T-piece and a cleaning cover, to get it outside any insulation.
- To take up the often varying distance between the stub on an air supply terminal and the duct junction.
- To facilitate the access when inspecting and cleaning the duct system.

Ordering example

	SMFU	200
Product		
Dimension Ød ₁		

Ød ₁ nom	l mm	l _i mm	m kg
100	405	40	0,51
112	405	40	0,59
125	405	40	0,64
140	405	40	0,71
150	405	40	0,76
160	405	40	0,81
180	405	40	0,92
200	405	40	1,26
224	405	40	1,41
250	405	60	1,64
280	405	60	1,84
300	405	60	1,98
315*	405	60	2,07

* With stiffening bead



End caps and cleaning covers

Cleaning of duct systems

Some duct units have parts which more or less block the duct system, and thus obstruct or prevent cleaning of it. Such units are silencers with baffles, most dampers and some flow measurement units.

You can choose one of the following approaches, to permit cleaning at such units:

- d You can install cleaning covers such as KCU (page 126), EPFH (page 124), KCRU (page 128) or KC (page 284) on each side of the unit.
- e You can use sealing clamp SVK (page 282) to make it easy to remove the unit from the system.
- f You can use slide-in coupling SKMF (page 119) to make it easy to remove the unit from the system.
NOTE! To prevent the system from inadvertently coming apart during operation, locate the slide-in coupling **upstream** of the unit, seen from the direction of the air flow.
- g You can locally switch over to Transfer to make it easy to remove the unit from the system.

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2

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11



End cap

EPF

1

2

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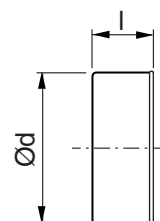
Description

End cap, which fits outside a Safe fitting.

Ordering example

Product	EPF	250
Dimension Ød		

Dimensions



Ød nom	l mm	m kg
63	40	0,04
80*	48	0,07
100*	48	0,11
112	48	0,10
125*	48	0,14
140	48	0,16
150	48	0,14
160*	48	0,17
180	48	0,24
200*	46	0,21
224	46	0,35
250*	68	0,50
280	60	0,61
300	60	0,63
315*	60	0,67
355	60	0,84
400*	91	1,17
450	80	1,48
500**	80	1,81
560	80	2,14
600	80	2,37
630**	80	2,54
710	100	3,00
800**	100	3,54
900	100	6,10
1000**	100	7,30
1120	120	9,40
1250**	120	11,3

* With turned-over edge

** Hand made



End cap

ESU



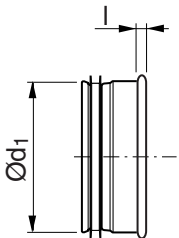
Description

End cap, which fits inside SR duct.

Ordering example

	ESU	160
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ nom	l mm	m kg
63	4	0,08
80	10	0,08
100	10	0,12
112	4	0,13
125	10	0,14
140	10	0,19
150	10	0,17
160	10	0,24
180	10	0,28
200	10	0,32
224	10	0,40
250	10	0,37
280	4	0,62
300	10	0,70
315	10	0,80
355	12	0,91
400	12	1,26
450	4	1,48
500	12	2,00
560	4	2,04
600	4	2,38
630	4	2,90
710	4	3,21
800	4	5,00
900	4	5,26
1000	4	9,25
1120	4	7,92
1250	4	10,0



Cleaning cover

EPFH



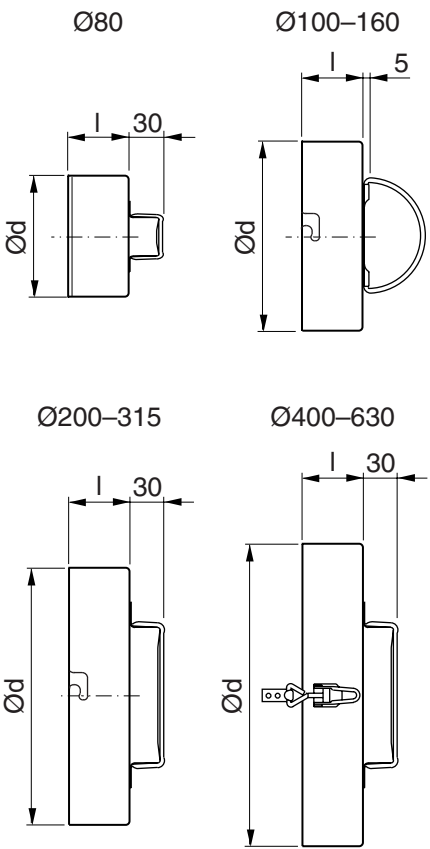
Description

Cleaning cover, which fits outside a Safe fitting.
 Dimensions Ø100–315 have notches for bayonet locking, in order to be better fixed in ducts with positive pressure. You must then add two rivets to the fitting.
 Dimensions Ø400–630 have eccentric locks in order to be better fixed in ducts with positive pressure. You must then mount the hooks of the locks in the fitting.

Ordering example

Product	EPFH	250
Dimension Ød		

Dimensions



Ød nom	l mm	m kg	Handle	Locking
80	48	0,09	1 fixed small	–
100	40	0,15	1 folding	bayonet
125	40	0,17	1 folding	bayonet
160	40	0,22	1 folding	bayonet
200	40	0,32	1 fixed	bayonet
250	60	0,55	2 fixed	bayonet
315	60	0,74	2 fixed	bayonet
400	80	1,26	2 fixed	eccenter
500	80	1,87	2 fixed	eccenter
630	80	2,71	2 fixed	eccenter



Cleaning cover

ESHU



Description

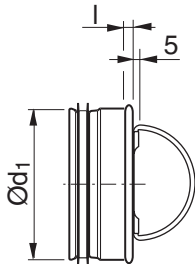
Cleaning cover, which fits inside an SR duct.

Ordering example

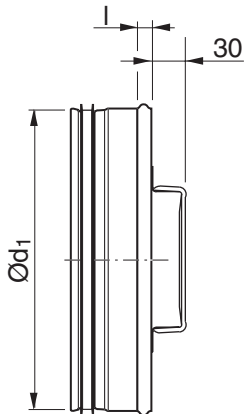
Product	ESHU	160
Dimension Ød ₁		

Dimensions

Ø100–160



Ø200–630



Ød ₁ nom	l mm	m kg	Handle
100	10	0,17	1 folding
112	4	0,18	1 folding
125	10	0,19	1 folding
140	10	0,24	1 folding
150	10	0,22	1 folding
160	10	0,29	1 folding
180	10	0,32	1 fixed
200	10	0,36	1 fixed
224	10	0,44	1 fixed
250	10	0,58	2 fixed
280	4	0,70	2 fixed
300	10	0,78	2 fixed
315	10	0,88	2 fixed
355	10	0,99	2 fixed
400	12	1,34	2 fixed
500	12	1,72	2 fixed
630	4	2,62	2 fixed



Cleaning cover

KCU

1

2

3



4

Description

Cleaning cover which fits outside a Safe fitting.

The cover is held in place by spring clips against the inside of the Safe fitting. This does not apply to Ø400 which is held in place by two eccentric locks.

5

The cover is loosened by pulling it straight outwards, and is installed in the opposite manner (but not Ø400). There are one or two handles to help in the process.

6

Δp in the table gives the maximum positive pressure the cleaning cover can withstand when installed from beneath.

Ordering example

7

Product **KCU**
Dimension Ød **250**

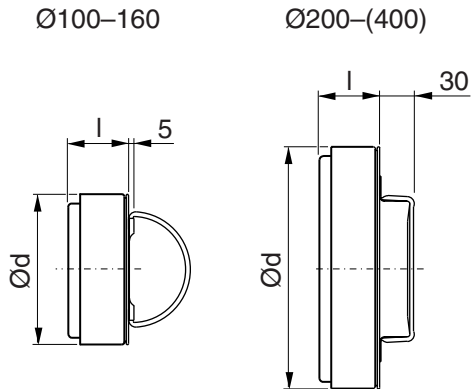
8

9

10

11

Dimensions



Ød nom	Δp Pa	l mm	m kg	Handle
100	>3400	40	0,30	1 folding
125	>3400	40	0,40	1 folding
160	>3400	40	0,60	1 folding
200	>3400	40	0,80	1 fixed
250	>3400	60	1,28	2 fixed
315	2600	60	1,81	2 fixed
400	>10000	90	2,82	2 fixed



Cleaning cover

KCIVU



Description

Cleaning cover which fits outside a Safe fitting.

The cover is held in place by spring clips against the inside of the Safe fitting. This does not apply to Ø400 which is held in place by two eccentric locks.

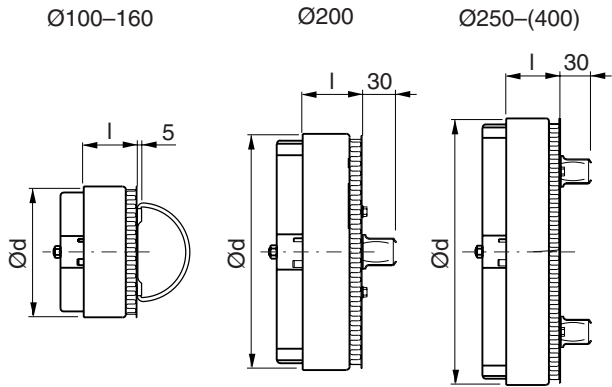
The cover is loosened by pulling it straight outwards, and is installed in the opposite manner (but not Ø400). There are one or two handles to help in the process.

Δp in the table gives the maximum positive pressure the cleaning cover can withstand when installed from beneath.

Ordering example

	KCIVU	250
Product		
Dimension Ød		

Dimensions



Ød nom	Δp Pa	l mm	m kg	Handle
100	>3400	50	0,43	1 folding
125	>3400	50	0,62	1 folding
160	>3400	50	1,00	1 folding
200	>3400	50	1,41	1 fixed
250	>3400	70	2,25	2 fixed
315	2600	70	3,30	2 fixed
400	>10000	100	5,00	2 fixed



Cleaning cover

KCRU

1

2

3



4

Description

Cleaning cover which complies with the requirements for cleaning covers in Swedish Standard SS 2645.

5

The hatch is held in place by a tension strap with adjustable eccentric lock. This offers a quick and simple opening and closing. A built-in handle also aids handling.

Can achieve maximum tightness class C.

6

Ordering example

KCRU 250

Product

Dimension Ød₁

7

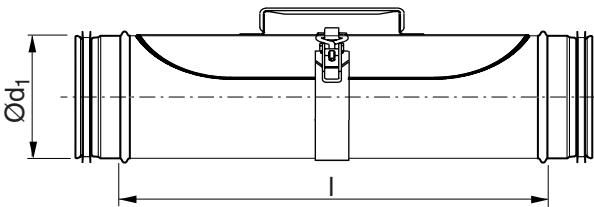
8

9

10

11

Dimensions



Ød ₁ nom	l mm	m kg
100	480	1,06
125	480	1,30
160	480	1,80
200	480	2,00
250	480	2,92
315	480	4,10
400	480	5,51



Silencers



Lindab	1
General information and theory	2
Safe	3
Silencers	4
Dampers and Measure units	5
Roof hoods	6
Other circular products	7
Isol	8
Transfer	9
Rectangular	10
Index	11



Content – Silencers

1

Circular straight



SLCU 50	133
SLCU 100	134
SLGU 100	135
SLGU 150	136
SLCBU 100.....	137
SLBGU 100.....	138

2

Circular straight low-built



LRCA	139
LRBCB.....	140

3

Circular curved



BSLCU 50.....	141
BSLCU 100.....	142

4

Exhaust air terminal device



SLKNU 50.....	143
SLKNU 100.....	144

5

6

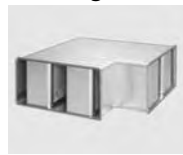
Rectangular straight



DLD.....	145
DLDR	146
DLDY	156

7

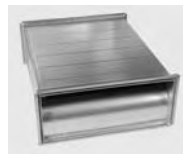
Rectangular angled



BDLD	167

8

Rectangular straight low-built



LRLB.....	176

9

10

11



Overwiev silencers – circular connection

	Straight				Curved		Straight	
	Circular outer sheet casing		Rectangular outer sheet casing		Circular outer sheet casing		Circular outer sheet casing	
Ød ₁			Baffle					
63								
80								
100								
125	SLCU 50	SLCU 100 SLGU 100	SLGU 150	LRCA	BSLCU 50	BSLCU 100	SLKNU 50	SLKNU 100
160								
200								
250								
315				LRBCB				
400			SLCBU 100 SLBGU 100					
500								
630								
800								
1000								
1250								
				Low built			Cone and net	



Overwiev silencers – rectangular connection

	Straight				Curved
	Rectangular outer sheet casing				
a × b	Baffle				
all	DLD	DLDY	DLDR	LRLB	BDLD
			Cleaning cover	Low built	



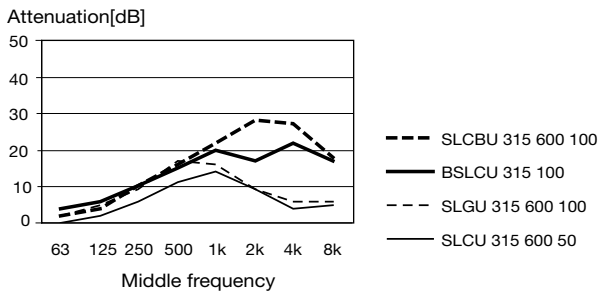


General

The silencers are of the absorption silencer type.

The damping ability of absorption silencers is affected by the geometric design of the silencer and the type of damping material chosen.

Silencer comprises a total of 17 such variants, with different properties. The graph below summarises the attenuation of some types of silencer.



More information about damping in duct systems, and dimensioning and calculation examples can be found on page 26.

Method of measurement

The silencers are tested in accordance with ISO 7235 "Acoustics - Measurement procedures for ducted silencers - Insertion loss, flow noise and total pressure loss".

Design

The straight types consist of an outer and inner sheet casing. The space between them is filled with mineral wool of varying type and density. The rectangular ones consist in principle of an outer sheet casing and baffles.

The outer sheet casing of the circular curved silencers are built as a segmented bend, BFU.

Baffles, one or more, for better noise attenuation, exist in SLCBU, SLBGU, LRBCB and in the rectangular silencers.

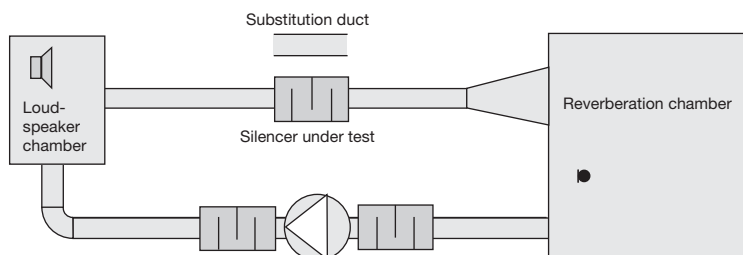
The tear of fibre is prevented since all exposed surfaces are lined.

The connections of the circular types are supplied with a Safe-gasket. The rectangular have guide joins.

Cleaning of duct systems

Silencers with baffles have parts which block the duct system to a greater or lesser extent, and thus obstruct or prevent cleaning of the duct system.

Please refer to page 121.





Description

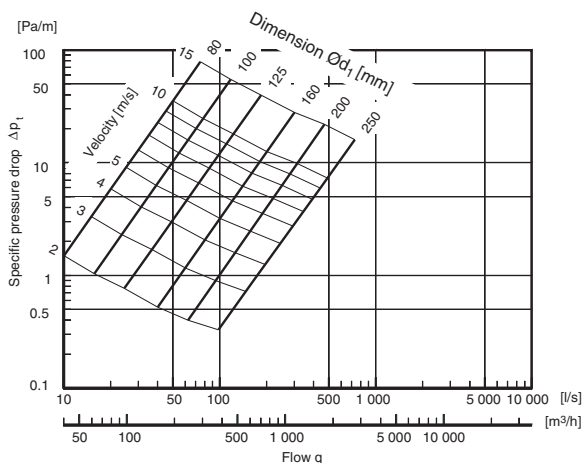
Insulation thickness 50 mm.

For general information about the silencer's design, please refer to page 132.

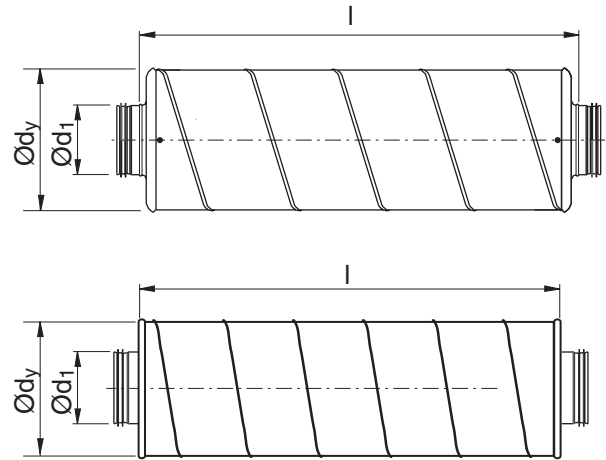
Ordering example

	SLCU	125	600	50
Product				
Dimension $\varnothing d_1$				
Length, nominal				
Insulation thickness				

Technical data



Dimensions



$\varnothing d_1$ nom	Längd nom	Attenuation in dB for centre frequency Hz								$\varnothing d_2$ mm	l mm	m kg
		63	125	250	500	1k	2k	4k	8k			
80	300	5	5	8	15	28	29	23	16	190	300	1,92
80	600	5	7	12	26	41	50	48	24	190	600	3,14
80	900	5	9	17	37	50	50	50	32	190	900	4,61
80	1200	6	11	21	49	50	50	50	40	190	1200	5,73
100	300	2	2	6	14	21	25	20	11	210	360	2,28
100	600	4	3	11	24	36	49	34	17	210	660	4,09
100	900	5	4	15	34	50	50	48	23	210	960	5,18
100	1200	6	5	19	45	50	50	50	29	210	1260	6,46
125	300	2	2	6	13	16	20	15	10	235	365	2,66
125	600	3	3	9	23	30	40	22	14	235	665	4,39
125	900	4	4	12	33	45	50	30	17	235	965	6,20
125	1200	5	5	15	43	50	50	38	21	235	1265	7,47
160	300	1	2	4	10	12	15	8	8	270	375	2,98
160	600	2	3	7	19	27	29	14	11	270	675	5,37
160	900	2	4	10	28	42	43	20	15	270	975	7,48
160	1200	2	5	13	37	50	50	26	19	270	1275	9,23
200	300	1	2	5	8	10	11	5	5	325	300	4,11
200	600	2	3	7	16	21	23	9	8	325	600	6,90
200	900	2	4	8	24	32	34	13	10	325	900	9,74
200	1200	3	5	10	31	43	45	18	13	325	1200	12,0
250	600	3	2	7	13	17	16	8	6	365	600	8,55
250	900	3	4	8	20	26	23	10	8	365	900	11,7
250	1200	4	5	9	26	35	30	12	10	365	1200	15,0
315	600	0	2	6	11	14	9	4	5	465	600	11,8
315	900	1	3	7	16	22	12	6	7	465	900	16,3
315	1200	1	3	8	22	30	16	7	9	465	1200	21,1
400*	600	0	3	4	6	8	4	4	4	508	600	18,9
400*	900	1	3	5	10	13	7	5	6	508	900	24,3
400*	1200	1	4	7	14	19	10	7	8	508	1200	26,7

* Supplied with two loose couplings



Description

Insulation thickness 100 mm.

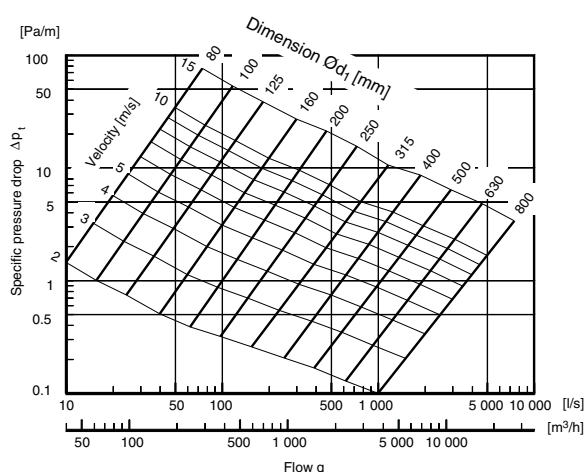
Good attenuation in 125 and 250 Hz bands.

For general information about the silencer's design, please refer to page 132.

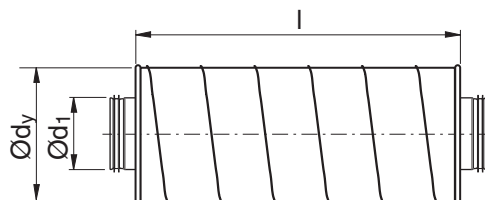
Ordering example

	SLCU	200	600	100
Product				
Dimension $\varnothing d_1$				
Length l				
Insulation thickness				

Technical data



Dimensions



$\varnothing d_1$ nom	l mm	Attenuation in dB for centre frequency Hz								$\varnothing d_2$ mm	m kg
		63	125	250	500	1k	2k	4k	8k		
80	300	10	8	10	16	21	27	24	16	295	4,28
80	600	12	13	19	27	37	50	46	24	295	7,05
80	900	14	18	28	38	50	50	50	33	295	8,93
80	1200	16	23	37	49	50	50	50	42	295	11,6
100	300	5	4	11	14	18	24	20	11	325	4,53
100	600	8	8	18	25	34	46	38	19	325	7,26
100	900	11	11	25	36	50	50	50	26	325	11,2
100	1200	14	14	32	47	50	50	50	33	325	13,4
125	300	5	4	9	11	16	19	15	10	325	5,17
125	600	7	7	16	20	28	37	24	14	325	7,54
125	900	9	10	22	29	41	50	33	18	325	10,8
125	1200	12	13	29	38	50	50	42	22	325	14,6
160	300	4	3	6	8	11	14	9	8	365	5,69
160	600	5	6	13	16	23	28	15	12	365	9,48
160	900	6	9	20	24	34	42	21	16	365	13,0
160	1200	8	12	27	32	46	50	28	20	365	17,4
200	300	4	4	6	6	9	11	6	6	410	7,69
200	600	5	6	11	14	19	22	10	8	410	10,6
200	900	6	9	17	21	29	33	14	11	410	15,3
200	1200	7	11	22	29	38	45	18	13	410	19,4
250	600	6	5	10	11	16	16	8	7	465	10,7
250	900	7	7	15	18	25	23	10	9	465	18,0
250	1200	7	9	20	25	34	30	13	11	465	22,9
315	600	1	4	7	9	12	10	5	6	510	14,7
315	900	2	6	12	14	19	15	7	8	510	19,8
315	1200	2	8	16	18	26	21	9	10	510	25,8
400*	600	1	5	5	5	7	4	4	4	625	20,6
400*	900	3	7	8	9	13	7	5	6	625	30,0
400*	1200	4	8	12	13	19	10	6	7	625	38,1
500*	900	2	4	7	8	10	5	3	5	735	34,6
500*	1200	3	7	10	12	14	7	4	6	735	44,7
630*	900	2	4	5	7	6	4	3	4	880	44,3
630*	1200	2	6	8	10	9	4	4	5	880	54,5
800*	1200	2	3	6	7	4	3	4	4	1030	76,2
800*	1500	2	5	8	10	6	4	4	5	1030	93,2

* Supplied with two loose couplings



Description

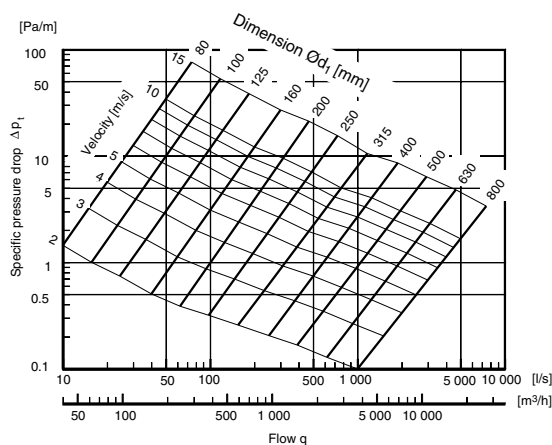
Insulation thickness 100 mm.

For the general information about the silencer's design, please refer to page 132.

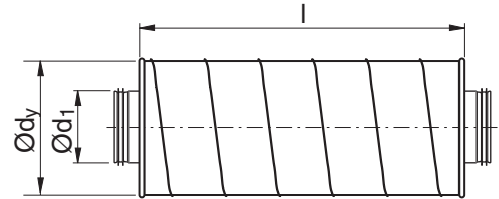
Ordering example

	SLGU	250	900	100
Product				
Dimension $\varnothing d_1$				
Length l				
Insulation thickness				

Technical data



Dimensions

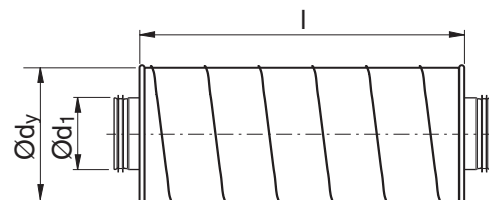


$\varnothing d_1$ nom	l mm	Attenuation in dB for centre frequency Hz								$\varnothing d_y$ mm	m kg
		63	125	250	500	1k	2k	4k	8k		
80	300	4	8	11	17	25	30	28	15	295	3,00
80	600	6	15	23	34	50	50	50	25	295	5,30
80	900	9	22	35	50	50	50	50	36	295	7,60
100	300	2	7	10	15	20	25	21	13	310	3,40
100	600	4	13	20	28	40	49	36	20	310	6,10
100	900	7	20	30	41	50	50	50	27	310	8,80
125	300	1	7	9	16	19	19	15	10	325	3,20
125	600	3	11	17	26	38	38	25	15	325	5,90
125	900	4	15	25	36	50	50	35	20	325	8,50
125	1200	6	19	33	46	50	50	45	25	325	11,2
160	300	1	6	9	14	16	14	10	7	365	4,20
160	600	3	8	15	23	29	29	17	11	365	7,50
160	900	4	11	21	32	43	44	25	14	365	10,7
160	1200	5	14	27	41	50	50	32	18	365	14,0
200	600	3	7	14	21	24	21	12	9	410	10,6
200	900	5	10	20	33	38	30	16	11	410	15,3
200	1200	6	12	26	45	50	40	20	13	410	20,0
250	600	3	5	11	17	19	15	8	7	465	12,2
250	900	4	8	17	27	30	21	11	9	465	17,7
250	1200	5	10	23	37	41	26	14	11	465	23,2
315	600	2	5	9	17	16	9	6	6	510	14,1
315	900	3	6	14	23	24	13	8	8	510	20,5
315	1200	4	8	18	29	32	17	10	11	510	26,8
400*	900	4	5	10	11	14	7	6	8	615	27,4
400*	1200	5	6	13	16	17	9	7	9	615	35,9
400*	1500	5	8	15	20	20	11	8	11	615	44,3
500*	900	3	5	10	11	9	5	6	7	735	31,4
500*	1200	3	6	14	16	13	7	7	9	735	41,0
500*	1500	4	7	17	21	17	9	7	11	735	50,6
630*	900	3	4	7	8	5	4	4	5	880	39,9
630*	1200	3	5	11	12	8	5	5	7	880	51,9
630*	1500	3	6	14	16	11	6	6	9	880	64,0
800*	1200	2	3	9	8	5	4	5	5	1030	68,7
800*	1500	2	4	11	12	6	5	6	6	1030	84,7

* Supplied with two loose couplings



Dimensions



Description

Insulation thickness 150 mm.

Used when you need particularly good attenuation at low frequencies (125 and 250 Hz). Otherwise equivalent to SLGU 100.

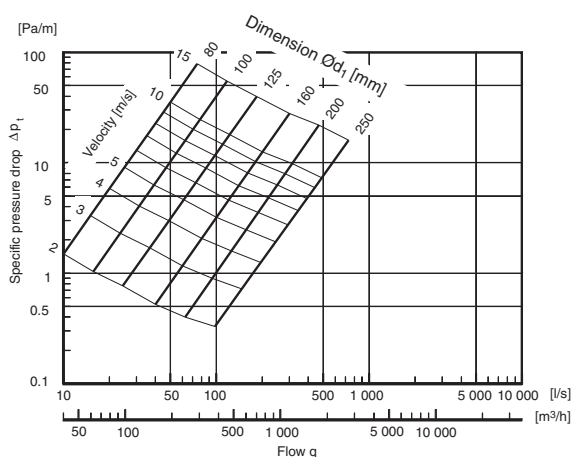
For general information about the silencer's design, please refer to page 132.

Ordering example

Product **SLGU** **160** **900** **150**
 Dimension Ød_1
 Length l
 Insulation thickness

Ød_1 nom	l mm	Attenuation in dB for centre frequency Hz								Ød_y mm	m kg
		63	125	250	500	1k	2k	4k	8k		
80	900	15	30	41	50	50	50	50	34	410	13,6
100	900	10	26	36	48	50	50	48	26	410	14,1
125	900	8	20	31	45	49	49	36	19	465	15,9
125	1200	13	30	38	48	50	50	45	24	465	20,9
160	900	6	15	25	38	48	45	23	14	465	16,7
160	1200	11	21	31	47	50	50	30	16	465	22,1
200	900	8	15	23	33	38	30	16	11	510	19,7
200	1200	10	19	28	43	49	39	21	13	510	25,9
250	900	8	12	19	27	31	21	11	10	580	22,6
250	1200	9	15	26	36	41	26	14	11	580	29,8

Technical data





Circular straight silencer

SLCBU 100



Description

Insulation thickness 100 mm.

Provided with a 100 mm thick baffle. This gives very good attenuation across the entire range.

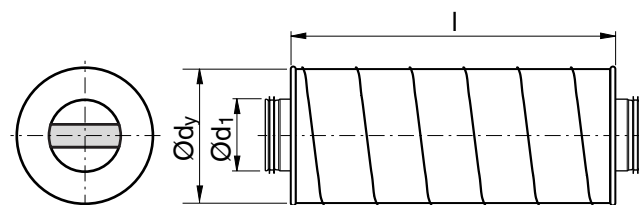
Used where very good attenuation is needed and SLCU 100 is not enough. Specially suitable for large dimensions.

For general information about the silencer's design, please refer to page 132.

Ordering example

	SLCBU	400	900	100
Product				
Dimension $\varnothing d_1$				
Length l				
Insulation thickness				

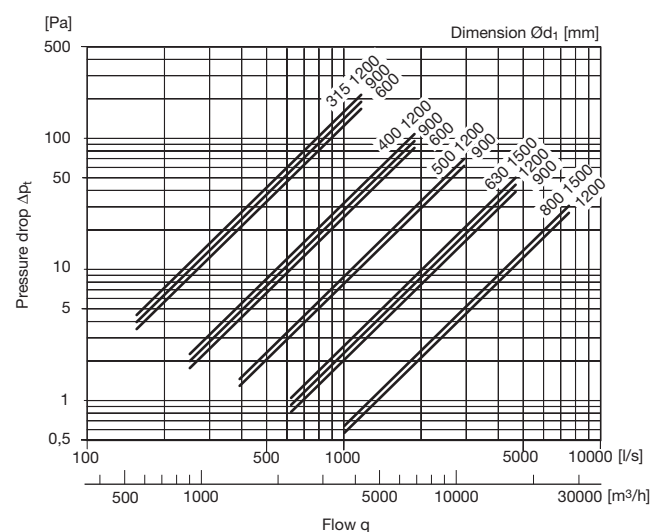
Dimensions



$\varnothing d_1$ nom	l mm	Attenuation in dB for centre frequency Hz								$\varnothing d_2$ mm	m kg
		63	125	250	500	1k	2k	4k	8k		
315	600	4	6	10	16	22	28	27	18	510	16,7
315	900	5	7	16	23	30	38	32	22	510	22,6
315	1200	7	9	23	30	38	47	37	25	510	29,3
400*	600	4	5	7	9	13	16	15	13	625	22,5
400*	900	5	7	12	16	22	26	20	16	625	32,7
400*	1200	6	10	18	23	31	36	25	19	625	41,7
500*	900	4	6	9	12	17	20	15	13	735	37,8
500*	1200	4	8	13	18	24	28	17	16	735	48,8
630*	900	3	6	6	9	13	13	11	10	880	48,0
630*	1200	3	8	10	13	18	18	12	12	880	59,3
630*	1500	4	10	13	17	23	22	13	13	880	70,4
800*	1200	2	4	8	10	13	12	9	8	1030	81,8
800*	1500	2	5	11	12	17	15	10	10	1030	100

* Supplied with two loose couplings

Technical data



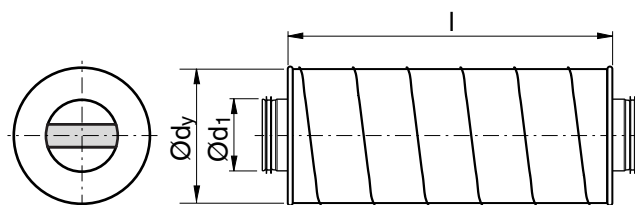


Circular straight silencer with baffle

SLBGU 100



Dimensions



Description

Insulation thickness 100 mm.

Provided with a 100 mm thick baffle. This gives very good attenuation across the entire range.

Used where very good attenuation is needed and SLGU 100 is not enough. Specially suitable for large dimensions.

For general information about the silencer's design, please refer to page 132.

Ordering example

SLBGU 400 1200 100

Product

Dimension Ød₁

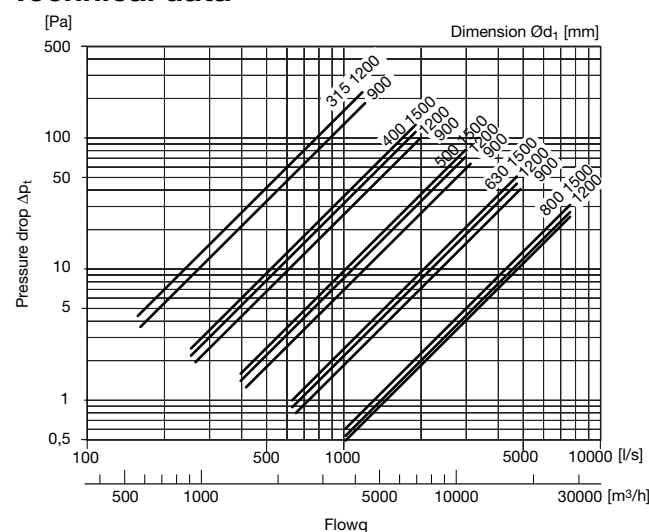
Length l

Insulation thickness

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz								Ød _y mm	m kg
		63	125	250	500	1k	2k	4k	8k		
315	900	6	9	20	34	39	44	34	22	510	23,0
315	1200	7	12	27	39	50	50	45	27	510	30,3
400*	900	4	6	13	22	24	26	20	17	625	29,9
400*	1200	6	9	19	29	33	35	24	19	625	39,5
400*	1500	7	12	25	38	42	44	29	22	625	48,7
500*	900	4	6	13	17	19	19	12	12	735	34,3
500*	1200	4	8	19	24	26	26	17	15	735	45,1
500*	1500	4	9	25	31	33	33	20	18	735	55,7
630*	900	3	4	10	12	14	12	10	10	880	43,2
630*	1200	3	7	14	17	18	17	12	12	880	56,7
630*	1500	4	8	19	23	23	20	14	14	880	69,9
800*	1200	2	4	11	12	13	11	9	8	1030	74,3
800*	1500	2	5	15	17	16	14	10	9	1030	91,6

* Supplied with two loose couplings

Technical data





Circular straight low-built silencer LRCA



Description

Silencer with low installation height.

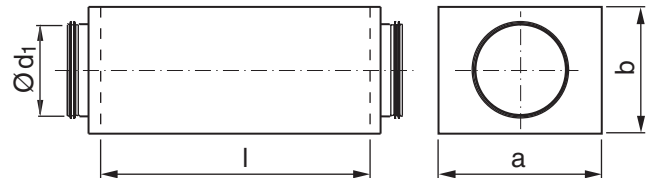
LRCA has a bowl-shaped mineral wool insulation with a fibre cloth in order to prevent tear of mineral wool.

Can achieve maximum tightness class C.

Ordering example

		LRCA	125	1000
Product				
Dimension $\varnothing d_1$				
Length l				

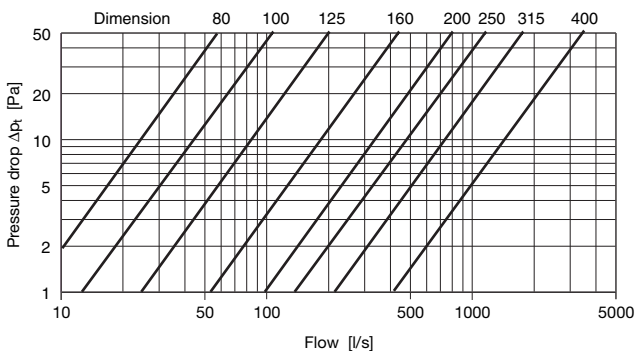
Dimensions



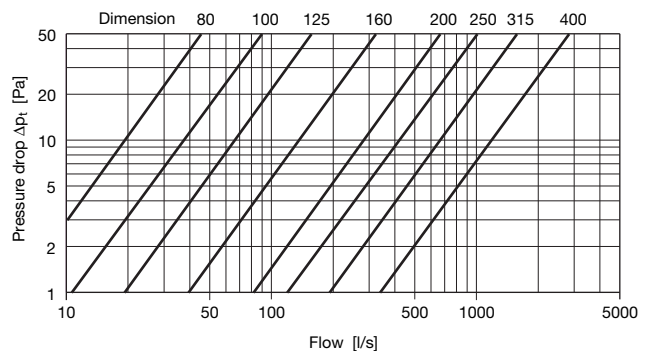
Ød ₁ nom	l mm	a mm	b mm	Attenuation in dB for centre frequency Hz										m kg
				63	125	250	500	1000	2000	4000	8000			
100	500	210	158	8	12	12	23	44	45	30	18	3,17		
100	1000	210	158	17	18	25	41	50	50	50	32	5,55		
125	500	239	181	8	9	11	21	36	36	23	14	3,85		
125	1000	239	181	17	14	21	38	50	50	45	23	6,89		
160	500	275	218	6	7	10	18	28	24	13	10	4,40		
160	1000	275	218	9	10	19	36	50	49	24	17	7,90		
200	500	328	254	5	6	9	16	22	17	7	7	5,74		
200	1000	328	254	11	13	15	30	46	36	14	12	10,1		
250	500	390	308	5	4	8	16	19	13	6	6	7,24		
250	1000	390	308	11	7	14	31	41	26	12	9	13,0		
315	500	453	372	3	4	7	13	15	8	4	5	9,15		
315	1000	453	372	8	8	13	26	33	18	9	9	16,4		
400	500	546	460	2	3	6	10	10	5	5	5	12,7		
400	1000	546	460	6	6	12	20	24	11	7	8	21,6		

Technical data

Length 500 mm



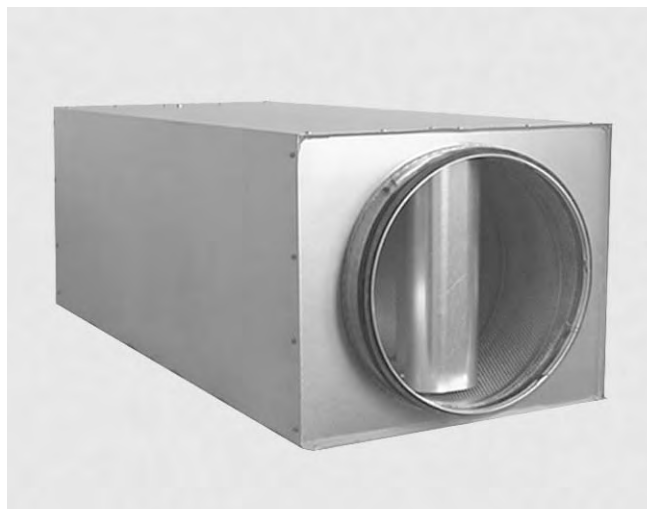
Length 1000 mm



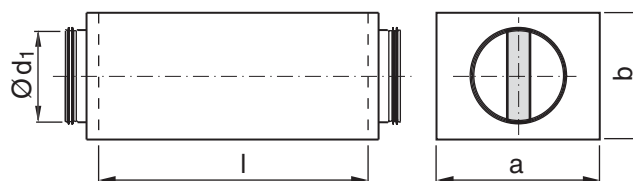


Circular straight low-built silencer with baffle

LRBCB



Dimensions



Description

Baffle silencer with low installation height.

Inner pipe of perforated sheet metal.
A fibre cloth prevents tear of mineral wool.
Can achieve maximum tightness class C.

The baffle has an approved surface lining that can withstand cleaning with rotating plastic brush.

Ordering example

LRBCB 500 1200

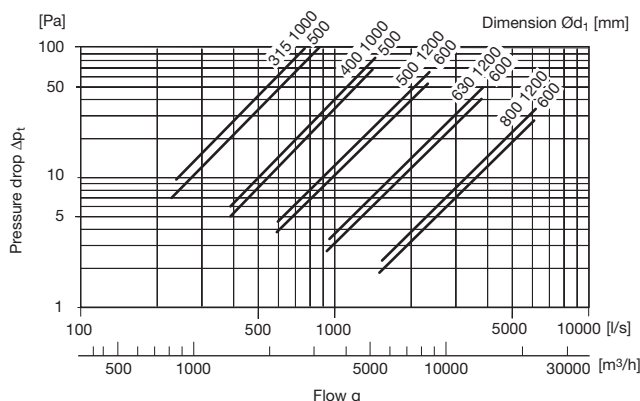
Product

Dimension Ød_1

Length l

Ød_1 nom	l mm	a mm	b mm	Attenuation in dB for centre frequency Hz								m kg
				63	125	250	500	1000	2000	4000	8000	
315	500	453	372	5	5	7	15	28	19	14	14	10,6
315	1000	453	372	9	6	13	27	45	36	23	21	19,4
400	500	546	460	5	4	6	13	21	13	11	10	14,0
400	1000	546	460	6	5	10	22	39	25	17	15	24,3
500	600	700	600	5	4	9	17	17	12	10	9	24,1
500	1200	700	600	6	6	15	28	32	21	15	13	41,4
630	600	810	710	3	3	7	16	11	9	7	7	29,5
630	1200	810	710	5	5	13	26	24	15	11	10	50,4
800	600	980	880	2	2	6	12	9	7	5	5	38,4
800	1200	980	880	3	4	11	14	11	9	7	6	63,7

Technical data





Circular curved silencer

BSLCU 50



Description

General

Lack of space is a frequent problem in air treatment installations. This means that it is often difficult to find enough straight lengths to install a straight silencer.

This problem can be eliminated by installing a curved silencer.

For the same length, it mostly has better attenuation than the equivalent straight silencer. In particular, you get better attenuation at high frequencies (4 and 8 kHz).

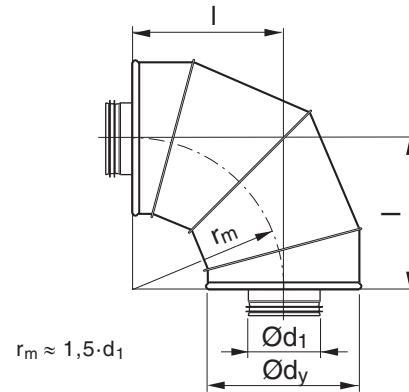
Insulation thickness 50 mm.

For general information about the silencer's design, please refer to 132.

Ordering example

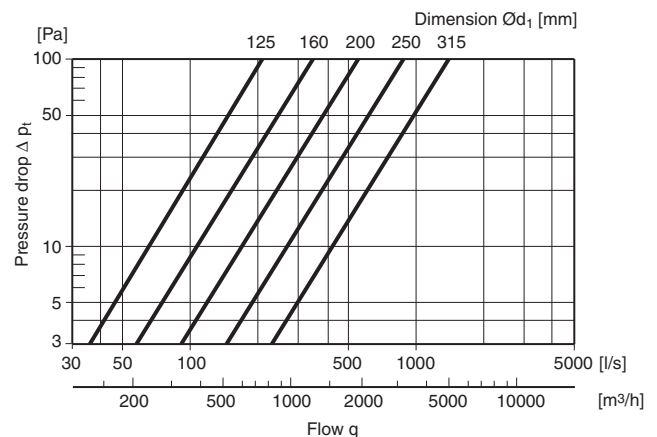
	BSLCU	200	50
Product			
Dimension Ød ₁			
Insulation thickness			

Dimensions



Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz								Ød _y mm	m kg
		63	125	250	500	1k	2k	4k	8k		
125	200	3	2	6	14	29	30	31	24	235	3,32
160	240	4	3	6	14	26	34	30	25	270	4,00
200	305	3	3	8	20	26	32	30	25	310	5,64
250	370	2	2	6	17	29	28	24	22	365	9,74
315	370	1	3	7	13	15	15	14	12	465	14,2

Technical data



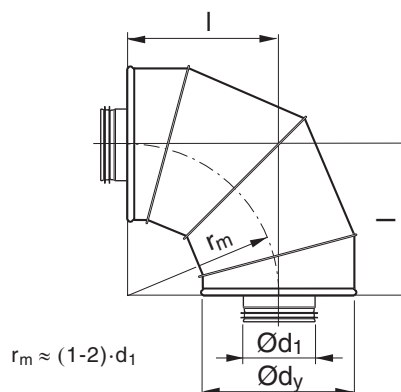


Circular curved silencer

BSLCU 100



Dimensions



Description

General

Lack of space is a frequent problem in air treatment installations. This means that it is often difficult to find enough straight lengths to install a straight silencer.

This problem can be eliminated by installing a curved silencer.

For the same length, it mostly has better attenuation than the equivalent straight silencer. In particular, you get better attenuation at high frequencies (4 and 8 kHz).

Insulation thickness 100 mm.

For general information about the silencer's design, please refer to page 132.

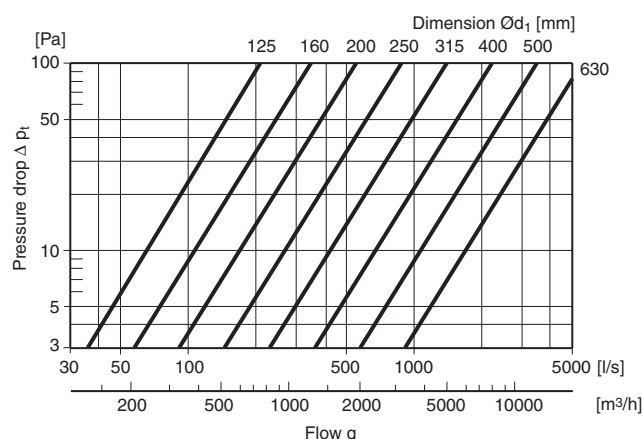
Ordering example

	BSLCU	200	100
Product			
Dimension Ød ₁			
Insulation thickness			

Ød ₁ nom	l mm	Attenuation in dB for centre frequency Hz								Ød _y mm	m kg
		63	125	250	500	1k	2k	4k	8k		
125	260	7	6	17	22	28	38	33	26	325	6,93
160	280	4	6	13	17	25	33	26	25	365	8,01
200	325	2	5	14	19	29	24	25	22	410	10,6
250	370	3	5	11	15	28	22	26	21	465	14,4
315	375	2	4	10	15	20	17	22	17	510	17,6
400*	420	2	4	8	13	13	13	14	13	615	26,9
500*	510	1	4	9	13	10	13	13	12	735	38,5
630*	610	2	6	13	12	11	12	13	12	880	57,7

* Supplied with two loose couplings

Technical data





Description

SLKNU is an exhaust air terminal device consisting of a silencer with 50 mm insulation and conical inlet with net.

Material and surface treatment

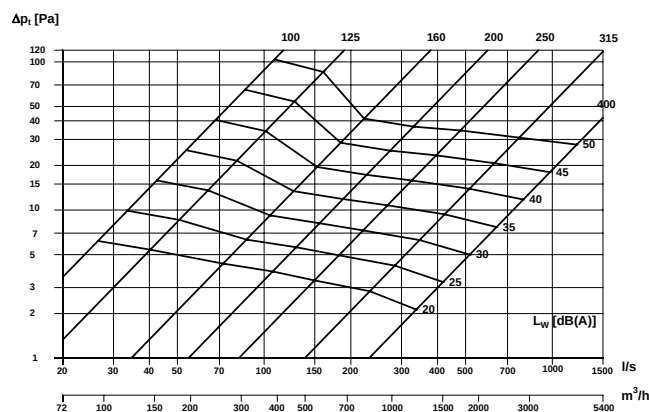
SLKNU is manufactured from galvanized sheet metal and is as standard delivered non-painted. The device can also be painted to order.

Ordering example

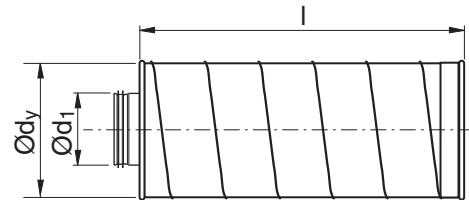
	SLKNU	125	600	50
Product				
Dimension $\varnothing d_1$				
Length, nominal				
Insulation thickness				

Capacity

Air flow q [l/s] and [m³/h], total pressure Δp_t [Pa] and sound pressure level L_W [dB(A)] is read in the graph.



Dimensions



Self attenuation ΔL

The device's self attenuation from duct to room inclusive end reflexion.

$\varnothing d_1$ nom	Length nom	Attenuation in dB at middle frequency Hz								$\varnothing d_y$ mm	l mm	m kg
		63	125	250	500	1k	2k	4k	8k			
100	300	2	2	6	14	21	25	20	11	210	382	2,32
100	600	4	3	11	24	36	49	34	17	210	682	4,27
100	900	5	4	15	34	50	50	48	23	210	982	5,51
100	1200	6	5	19	45	50	50	50	29	210	1282	6,94
125	300	2	2	6	13	16	20	15	10	235	382	2,69
125	600	3	3	9	23	30	40	22	14	235	682	4,59
125	900	4	4	12	33	45	50	30	17	235	982	6,56
125	1200	5	5	15	43	50	50	38	21	235	1282	8,00
160	300	1	2	4	10	12	15	8	8	270	382	2,99
160	600	2	3	7	19	27	29	14	11	270	682	5,57
160	900	2	4	10	28	42	43	20	15	270	982	7,87
160	1200	2	5	13	37	50	50	26	19	270	1282	9,82
200	300	1	2	5	8	10	11	5	5	325	379	4,03
200	600	2	3	7	16	21	23	9	8	325	679	6,82
200	900	2	4	8	24	32	34	13	10	325	979	9,66
200	1200	3	5	10	31	43	45	18	13	325	1279	11,9
250	600	3	2	7	13	17	16	8	6	365	693	8,43
250	900	3	4	8	20	26	23	10	8	365	993	11,6
250	1200	4	5	9	26	35	30	12	10	365	1293	14,9
315	600	0	2	6	11	14	9	4	5	465	701	11,4
315	900	1	3	7	16	22	12	6	7	465	1001	16,0
315	1200	1	3	8	22	30	16	7	9	465	1301	21,0
400*	600	0	3	4	6	8	4	4	4	508	655	18,9
400*	900	1	3	5	10	13	7	5	6	508	955	24,3
400*	1200	1	4	7	14	19	10	7	8	508	1255	26,7

* Supplied with one loose coupling

Sound power level L_{Wok}

Sound power level $L_{Wok} = L_W + K_{ok}$

$\varnothing d_1$ mm	Correction, K_{ok} , in dB at middle frequency Hz							
	63	125	250	500	1k	2k	4k	8k
100	5	-11	-17	-15	-9	-2	-15	-22
125	9	-9	-14	-12	-8	-3	-13	-21
160	3	-14	-18	-14	-9	-2	-13	-20
200	12	-9	-12	-9	-5	-4	-16	-21
250	7	-8	-13	-10	-4	-5	-16	-22
315	20	-8	-14	-12	-7	-4	-17	-27
400	11	-3	-8	-10	-10	-2	-19	-28

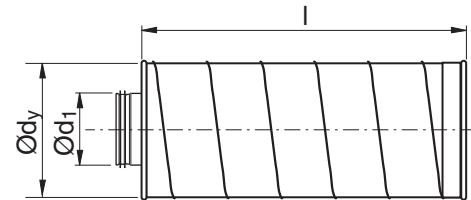


Exhaust air terminal device

SLKNU 100



Dimensions



Self attenuation ΔL

The device's self attenuation from duct to room inclusive end reflexion.

Description

SLKNU is an exhaust air terminal device consisting of a silencer with 100 mm insulation and conical inlet with net.

Material and surface treatment

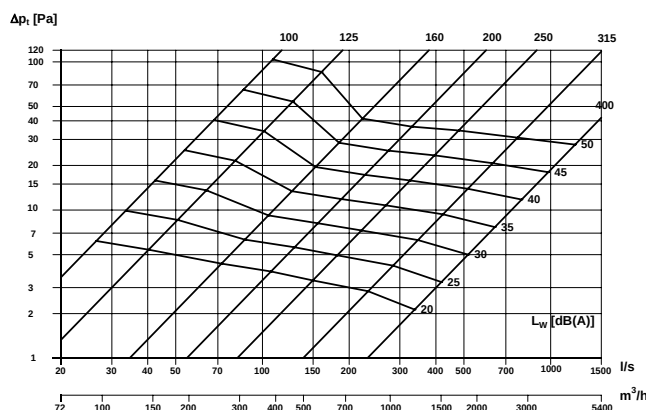
SLKNU is manufactured from galvanized sheet metal and is as standard delivered non-painted. The device can also be painted to order.

Ordering example

	SLKNU	200	600	100
Product				
Dimension Ød_1				
Length, nominal				
Insulation thickness				

Capacity

Air flow q [l/s] and [m³/h], total pressure Δp_t [Pa] and sound pressure level L_w [dB(A)] is read in the graph.



Ød_1 nom	Length nom	Attenuation in dB at middle frequency Hz								Ød_y mm	l mm	m kg
		63	125	250	500	1k	2k	4k	8k			
100	300	5	4	11	14	18	24	20	11	325	432	4,31
100	600	8	8	18	25	34	46	38	19	325	732	7,04
100	900	11	11	25	36	50	50	50	26	325	1032	11,0
100	1200	14	14	32	47	50	50	50	33	325	1332	13,2
125	300	5	4	9	11	16	19	15	10	325	427	4,94
125	600	7	7	16	20	28	37	24	14	325	727	7,31
125	900	9	10	22	29	41	50	33	18	325	1027	11,6
125	1200	12	13	29	38	50	50	42	22	325	1327	14,4
160	300	4	3	6	8	11	14	9	8	325	439	5,40
160	600	5	6	13	16	23	28	15	12	325	739	9,19
160	900	6	9	20	24	34	42	21	16	325	1039	12,7
160	1200	8	12	27	32	46	50	28	20	325	1339	17,1
200	300	4	4	6	6	9	11	6	6	410	434	7,37
200	600	5	6	11	14	19	22	10	8	410	734	10,3
200	900	6	9	17	21	29	33	14	11	410	1034	14,9
200	1200	7	11	22	29	38	45	18	13	410	1334	19,0
250	600	6	5	10	11	16	16	8	7	465	749	10,3
250	900	7	7	15	18	25	23	10	9	465	1049	17,6
250	1200	7	9	20	25	34	30	13	11	465	1349	22,5
315	600	1	4	7	9	12	10	5	6	510	735	14,3
315	900	2	6	12	14	19	15	7	8	510	1035	19,4
315	1200	2	8	16	18	26	21	9	10	510	1335	25,4
400*	600	1	5	5	5	7	4	4	4	625	702	20,2
400*	900	3	7	8	9	13	7	5	6	625	1002	29,6
400*	1200	4	8	12	13	19	10	6	7	625	1302	37,7

* Supplied with one loose coupling

Sound power level L_{Wok}

Sound power level $L_{Wok} = L_w + K_{ok}$

Ød_1 mm	Correction, K_{ok} , in dB at middle frequency Hz							
	63	125	250	500	1k	2k	4k	8k
100	5	-11	-17	-15	-9	-2	-15	-22
125	9	-9	-14	-12	-8	-3	-13	-21
160	3	-14	-18	-14	-9	-2	-13	-20
200	12	-9	-12	-9	-5	-4	-16	-21
250	7	-8	-13	-10	-4	-5	-16	-22
315	20	-8	-14	-12	-7	-4	-17	-27
400	11	-3	-8	-10	-10	-2	-19	-28



Rectangular straight silencer

DLD



Description

DLD has a conventional design with dimensions that not exceed the corresponding connection dimensions. The silencer can be manufactured in all standard duct sizes.

For low-built solutions, see LRLB page 176.

Design

DLD has an outer sheet casing of trapezoidal corrugated sheet metal for stability and reduced risk of natural oscillation.

DLD is designed for low air resistance with baffle combinations that attenuate particularly low-frequency noise well. The type of insulation material has been developed to provide good noise properties, low weight and to be cleanable.

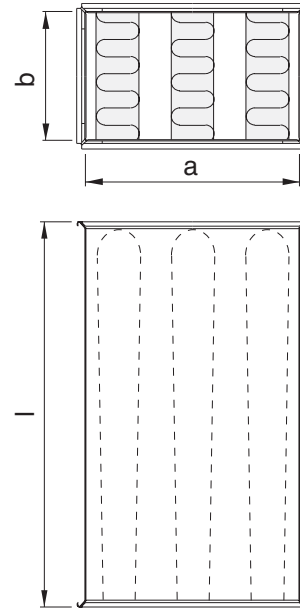
DLD meets the requirements of air tightness class C.

Tools for dimensioning and planning

The software CADvent and DIMsilencer offer features for dimensioning and selection of products in an environment with 3D modelling. Computerised planning can be conducted with automatic presentation of noise levels, pressure drop etc.

Published data as per ISO 7235.

Dimensions



Ordering example

	DLD	800 × 600	650	1015	TRA
Product					
Width × height a × b					
Length l					
Code					
Accessories					

If alternative material is required, this shall be stated when ordering, e.g. aluminium zinc (AZ185) and stainless acid-proof steel.

The silencer is also available with the following accessories/options.

TRA	= Non-insulated inspection hatch.
TRB	= Hatch intended for external insulation.*
TRC	= Hatch intended for external insulation.*
TP	= Absorbent lined with perforated sheet.
AIA	= 50 mm fire protection insulation. Note! a and b dimensions increase by 100 mm.
AIB	= 100 mm fire protection insulation. Note! a and b dimensions increase by 200 mm.

The dimension of the hatches is adapted for cleaning and inspection of all baffle spacings.

Manual dimensioning see pages 147–151.

Insertion attenuation see pages 152–155.

* Specify insulation thickness when ordering.



Rectangular straight silencer

DLDR



Description

DLDR has a conventional design with dimensions that not exceed the corresponding connection dimensions. The silencer can be manufactured in all standard duct sizes.

The silencer is provided with cleaning hatch and removable baffles.

Design

DLDR has an outer sheet casing of trapezoidal corrugated sheet metal for stability and reduced risk of natural oscillation.

DLDR is designed for low air resistance with baffle combinations that attenuate particularly low-frequency noise well. The type of insulation material has been developed to provide good noise properties, low weight and to be cleanable.

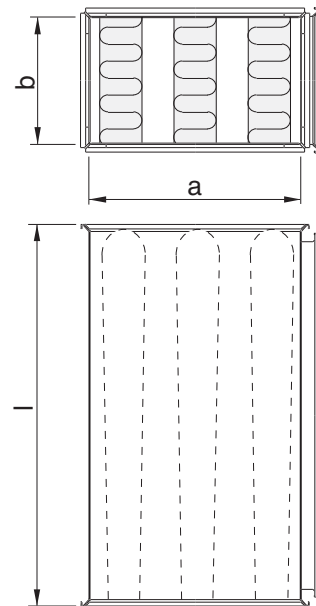
DLDR meets the requirements of air tightness class C.

Tools for dimensioning and planning

The software CADvent and DIMsilencer offer features for dimensioning and selection of products in an environment with 3D modelling. Computerised planning can be conducted with automatic presentation of noise levels, pressure drop etc.

Published data as per ISO 7235.

Dimensioner



Ordering example

	DLDR	800 × 600	750	1015	1	TRB
Product						
Width × height a × b						
Length l						
Code						
Alternative for placing of hatch (Alt 1 on top, alt 2 on side, alt 3 on bottom.)						
Accessories						

If alternative material is required, this shall be stated when ordering, e.g. aluminium zinc (AZ185) and stainless acid-proof steel.

The silencer is also available with the following accessories/options.

TRB	= Hatch intended for external insulation.*
TRC	= Hatch intended for external insulation.*
TP	= Absorbent lined with perforated sheet.
AIA	= 50 mm fire protection insulation. Note! a and b dimensions increase by 100 mm.
AIB	= 100 mm fire protection insulation. Note! a and b dimensions increase by 200 mm.

The dimension of the hatches is adapted for cleaning and inspection of all baffle spacings.

Manual dimensioning see pages 147–151.

Insertion attenuation see pages 152–155.

* Specify insulation thickness when ordering.



Rectangular straight silencers

DLD/DLDR

Manual designing for DLD and DLDR

A number of silencers can be designed manually, for more combinations of silencers and faster calculations use DIMsilencer. Manual method of calculation is shown below:

A Specify connection dimensions and flow-type location of the silencer.

Width	800	mm
Height	1000	mm
Length	1250	mm
Location	Exhaust air	

DLD-800-1000-1250-1016

B Specify the sound power level before the silencer.
Read the insertion attenuation from the tables on pages 152–155.
Calculate the sound power level after the silencer irrespective of the air flow (self generated noise).

Insertion attenuation

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Resistance number	Self generated noise number inlet
Sound power level before silencer	72	73	73	64	62	59	52	44		
Attenuation from table pages 152–155	3	9	16	23	23	17	12	9	2,8	2,7
Sound power level after silencer without self generated noise	69	64	57	41	39	42	40	35		

C Determine the pressure drop with help of the graph on page 149 and table on page 150.
In this case we have straight ducts before and after the silencer.

Pressure drop

	Area	0,8 m ²	Air flow	400 l/s
Graph on page 149, use resistance number, area and air velocity	Air velocity	5 m/s	Pressure drop	42 Pa
Correction at disturbance according table on page 150	Factor	1	Pressure drop after correction	42 Pa

D Determine the self generated noise from the silencer at present air flow.
Calculate the sound power level after the silencer inclusive the self generated noise.

Self generated noise

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
Graph on page 151, use resistance number and air velocity	59	55	54	51	48	45	41	35
Correction for gross cross section area	-1	-1	-1	-1	-1	-1	-1	-1
Self generated noise	58	54	53	50	47	44	40	34
Sound power level after the silencer	69	64	58	51	48	46	43	38
(Logarithmical addition of self generated noise and sound power level after the silencer without self generated noise)								



Rectangular straight silencers

DLD/DLDR

The following table can be used for own manual calculations in accordance with the example on the previous page.

Designing table for DLD and DLDR

With		mm
Height		mm
Length		mm
Location		

Insertion attenuation

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Resistance number	Self generated noise number inlet
Sound power level before silencer										
Attenuation from table pages 152–155										
Sound power level after silencer without self generated noise										

Pressure drop

	Area	m ²	Air flow	l/s
Graph on page 149, use resistance number, area and air velocity	Air velocity	m/s	Pressure drop	Pa
Correction at disturbance according table on page 150	Factor		Pressure drop after correction	Pa

Self generated noise

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
Graph on page 151, use resistance number and air velocity								
Correction for gross cross section area								
Self generated noise								
Sound power level after the silencer								
(Logarithmical addition of self generated noise and sound power level after the silencer without self generated noise)								



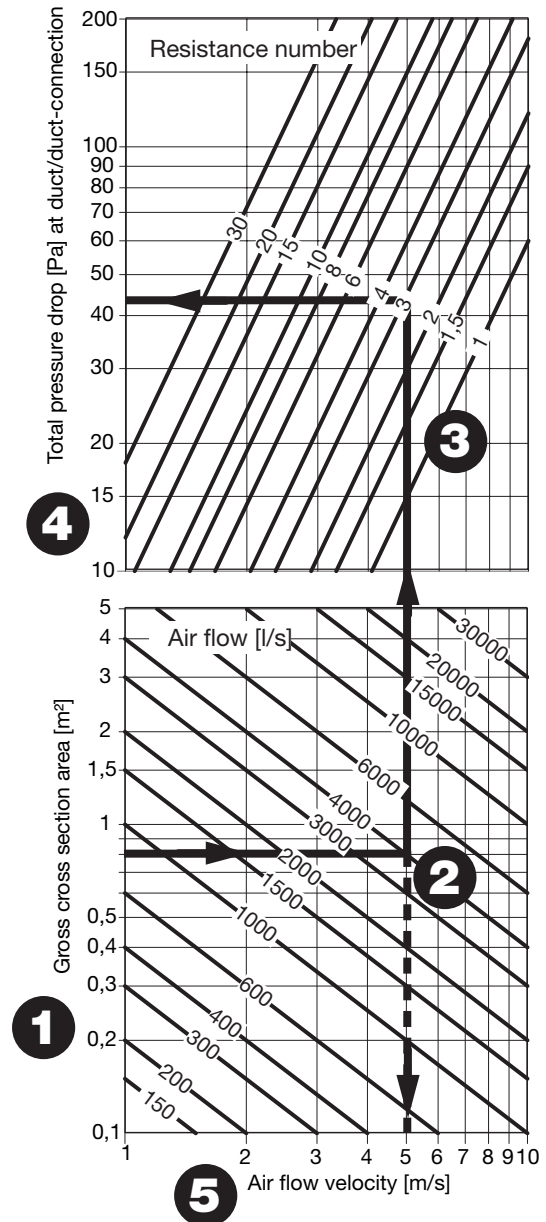
Rectangular straight silencers

DLD/DLDR

Pressure drop

Follow the directions below and the adjoining graph.

- ❶ Calculate the gross cross section area $a \times b$ in m^2 .
- ❷ Go horizontal in the graph to the present air flow, l/s.
- ❸ Go up to the resistance number achieved from the tables on pages 152–155.
- ❹ Read the pressure drop over the silencer, at straight duct connection before and after the silencer, (factor 1,0). For other modes of connection see the table for correction on page 150.
- ❺ Air flow velocity, which is used at the calculation of the self generated noise, can be read here.





Rectangular straight silencers

DLD/DLDR

Pressure drop

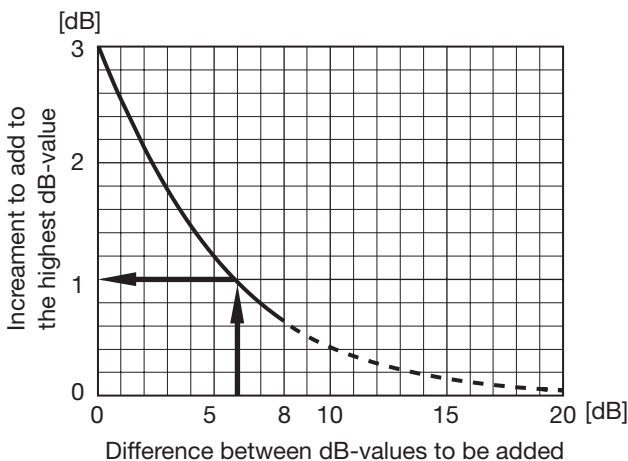
Present pressure drop = Read pressure drop × below factor

D = The largest connection side (a or b) of the silencer.

The table contains of a selection of the most common disturbance cases.

Before the silencer				Silencer	After the silencer				Factor
Distance before the silencer					Distance after the silencer				
3xD	2xD	1xD	0xD		0xD	1xD	2xD	3xD	
Duct				Silencer	Duct				1,0
				Silencer	Duct				1,1
				Silencer	Duct				1,2
				Silencer	Duct				1,4
				Silencer	Duct				1,5
Duct				Silencer					1,2
Duct				Silencer					1,3
				Silencer					1,3
				Silencer					1,4
				Silencer					1,5
				Silencer					1,6
				Silencer					1,7
				Silencer					1,8
				Silencer					1,9
				Silencer					2,0
Chamber				Silencer	Duct branch				2,0
Duct				Silencer	Chamber				3,0
Chamber				Silencer	Chamber				3,5

Logarithmic addition



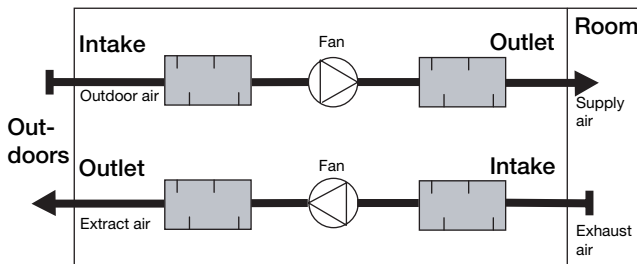


Rectangular straight silencers

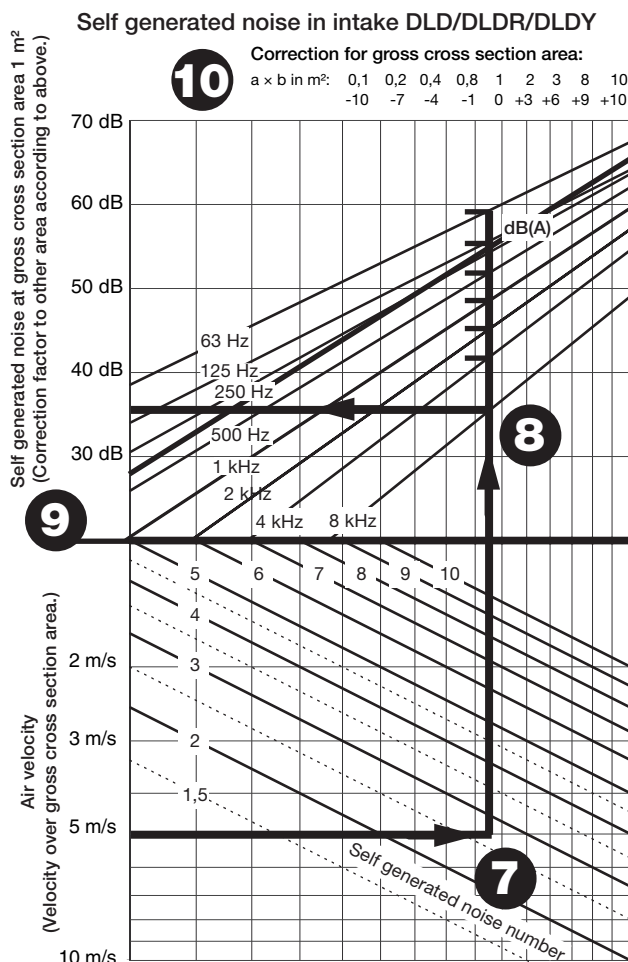
DLD/DLDR

Self generated noise per frequency band

- 6 Decide from the location of the silencer whether it is the supply or exhaust graph that shall be used. (Rule of memory - the side that leads away from the fan, i.e. at supply air the outlet graph is used and at exhaust air the in-take graph.)



- 7 Go horizontally into the present graph, at present air velocity, to the self generated noise number.
- 8 Then go vertically up to the crossing of the different frequency band lines.
- 9 Read the self generated noise, at gross cross section area 1 m², for each frequency band straight out to the left. In the example only the 8000 Hz-reading is shown.
- 10 Add or subtract the correction for the present gross cross section area.



Sound power level after the silencer

The sound power level after the silencer can be calculated for all frequencies by a logarithmical addition of:

"The self generated noise" and "The sound power level before the silencer".

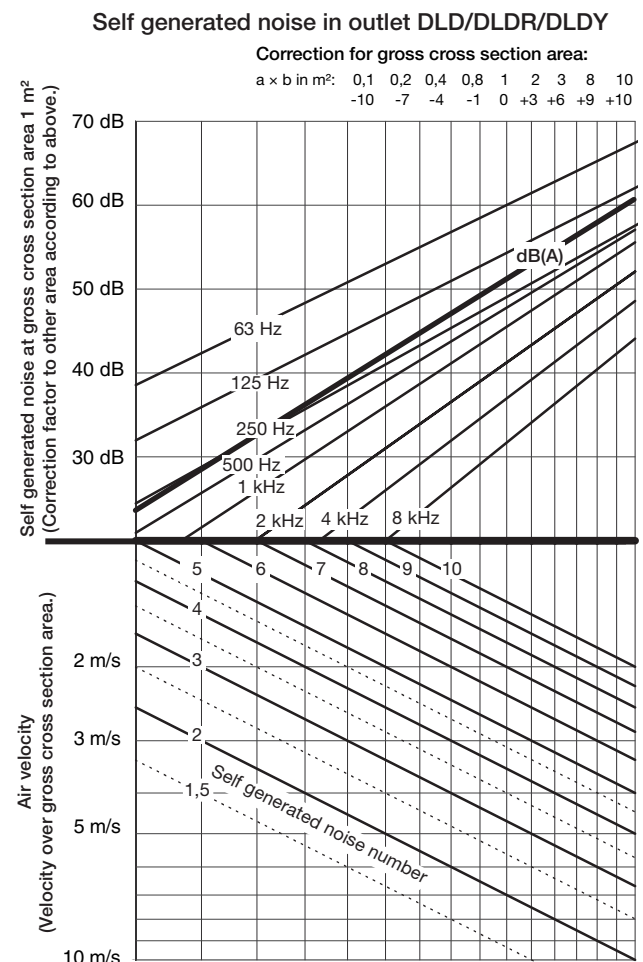
The shown example gives at 8000 Hz:

$$\text{Self generated noise} = 35 \text{ dB} - 1 \text{ dB} = 34 \text{ dB}$$

Sound power level before the silencer - the attenuation:
44 dB - 9 dB = 35 dB

Logarithmic addition of 34 and 35 = 36 dB

(See graph for logarithmical addition on page 150).





Rectangular straight silencers

DLD/DLDR

Width a mm	Code	Length l mm		Static insertion attenuation / octave band [dB]								Resistance number	Self generated noise number Intake	Self generated noise number Outlet
		DLD	DLDR	63	125	250	500	1000	2000	4000	8000			
400	1009	650	750	2	4	7	11	10	9	7	5	1,0	2,0	1,6
400	1010	650	750	2	6	9	14	13	11	8	6	2,5	2,7	2,0
400	1011	650	750	3	8	12	19	19	14	11	9	6,9	4,0	2,7
400	1009	1250	1350	2	7	12	18	18	13	10	7	1,2	2,0	1,6
400	1010	1250	1350	3	9	16	23	23	17	12	9	2,8	2,7	2,0
400	1011	1250	1350	5	13	22	31	32	24	17	13	8,0	4,0	2,7
400	1009	1850	1950	2	10	18	25	26	18	13	9	1,3	2,0	1,6
400	1010	1850	1950	4	13	23	32	33	24	16	12	3,2	2,7	2,0
400	1011	1850	1950	6	18	32	43	46	34	23	17	9,1	4,0	2,7
500	1013	650	750	2	6	8	12	10	9	7	5	2,2	2,5	2,0
500	1014	650	750	3	7	10	15	13	11	8	6	4,7	3,3	2,5
500	1013	1250	1350	3	10	15	20	18	13	10	7	2,4	2,5	2,0
500	1014	1250	1350	5	12	19	25	23	17	12	9	5,3	3,3	2,5
500	1013	1850	1950	4	13	22	28	26	18	13	9	2,6	2,5	2,0
500	1014	1850	1950	6	17	28	35	33	24	16	12	5,9	3,3	2,5
600	1012	650	750	2	6	9	17	19	14	11	9	3,1	3,0	2,0
600	1014	650	750	4	9	14	23	29	23	18	14	15,3	6,0	3,0
600	1017	650	750	3	7	10	13	10	9	7	5	3,8	3,0	2,4
600	1012	1250	1350	3	9	17	28	32	24	17	13	3,8	3,0	2,0
600	1014	1250	1350	5	15	27	38	50	40	29	22	19,1	6,0	3,0
600	1017	1250	1350	5	12	18	21	18	13	10	7	4,1	3,0	2,4
600	1012	1850	1950	3	13	25	39	46	34	23	17	4,4	3,0	2,0
600	1014	1850	1950	7	21	39	53	60	57	39	29	22,9	6,0	3,0
600	1017	1850	1950	6	17	26	30	26	18	13	9	4,5	3,0	2,4
700	1012	650	750	2	5	8	13	13	11	8	6	1,6	2,3	1,8
700	1013	650	750	3	7	11	18	19	14	11	9	4,8	3,5	2,3
700	1012	1250	1350	2	8	14	22	23	17	12	9	1,9	2,3	1,8
700	1013	1250	1350	4	11	20	30	32	24	17	13	5,7	3,5	2,3
700	1012	1850	1950	3	11	21	30	33	24	16	12	2,2	2,3	1,8
700	1013	1850	1950	5	16	29	42	46	34	23	17	6,5	3,5	2,3
800	1014	650	750	2	4	7	11	10	9	7	5	1,0	2,0	1,6
800	1015	650	750	2	7	11	21	25	19	15	12	6,1	4,0	2,3
800	1016	650	750	2	6	9	14	13	11	8	6	2,5	2,7	2,0
800	1017	650	750	3	8	12	19	19	14	11	9	6,9	4,0	2,7
800	1014	1250	1350	2	7	12	18	18	13	10	7	1,2	2,0	1,6
800	1015	1250	1350	3	11	21	36	44	33	24	18	7,6	4,0	2,3
800	1016	1250	1350	3	9	16	23	23	17	12	9	2,8	2,7	2,0
800	1017	1250	1350	5	13	22	31	32	24	17	13	8,0	4,0	2,7
800	1014	1850	1950	2	10	18	25	26	18	13	9	1,3	2,0	1,6
800	1015	1850	1950	4	15	31	50	60	46	32	24	9,1	4,0	2,3
800	1016	1850	1950	4	13	23	32	33	24	16	12	3,2	2,7	2,0
800	1017	1850	1950	6	18	32	43	46	34	23	17	9,1	4,0	2,7
800	1014	2450	2550	3	12	23	32	33	23	15	11	1,5	2,0	1,6
800	1016	2450	2550	5	17	31	41	43	30	20	15	3,5	2,7	2,0
800	1017	2450	2550	8	23	42	56	60	43	29	22	10,3	4,0	2,7
900	1017	650	750	2	5	7	11	10	9	7	5	1,5	2,3	1,8
900	1018	650	750	4	9	14	23	29	23	18	14	15,3	6,0	3,0
900	1019	650	750	3	7	10	14	13	11	8	6	3,5	3,0	2,3
900	1020	650	750	4	9	13	19	19	14	11	9	9,4	4,5	3,0
900	1017	1250	1350	3	8	14	19	18	13	10	7	1,7	2,3	1,8
900	1018	1250	1350	5	15	27	38	50	40	29	22	19,1	6,0	3,0
900	1019	1250	1350	4	11	18	24	23	17	12	9	4,0	3,0	2,3
900	1020	1250	1350	6	15	24	32	32	24	17	13	10,8	4,5	3,0
900	1017	1850	1950	3	12	20	27	26	18	13	9	1,9	2,3	1,8
900	1018	1850	1950	7	21	39	53	60	57	39	29	22,9	6,0	3,0
900	1019	1850	1950	5	15	26	34	33	24	16	12	4,4	3,0	2,3
900	1020	1850	1950	8	20	35	45	46	34	23	17	12,2	4,5	3,0
900	1017	2450	2550	4	15	27	34	33	23	15	11	2,1	2,3	1,8
900	1018	2450	2550	9	26	51	60	60	60	50	37	26,7	6,0	3,0
900	1019	2450	2550	6	20	34	43	43	30	20	15	4,9	3,0	2,3
900	1020	2450	2550	10	26	45	58	60	43	29	22	13,6	4,5	3,0
1000	1019	650	750	3	7	12	20	21	16	13	10	6,5	4,0	2,5



Rectangular straight silencers

DLD/DLDR

Width a mm	Code	Length l mm		Static insertion attenuation / octave band [dB]								Resi- stance number	Self generated noise number Intake	Self generated noise number Outlet
		DLD	DLDR	63	125	250	500	1000	2000	4000	8000			
1000	1020	650	750	2	6	8	12	10	9	7	5	2,2	2,5	2,0
1000	1021	650	750	3	7	10	15	13	11	8	6	4,7	3,3	2,5
1000	1022	650	750	5	10	14	20	19	14	11	9	12,2	5,0	3,3
1000	1019	1250	1350	4	12	21	33	37	28	20	15	7,8	4,0	2,5
1000	1020	1250	1350	3	10	15	20	18	13	10	7	2,4	2,5	2,0
1000	1021	1250	1350	5	12	19	25	23	17	12	9	5,3	3,3	2,5
1000	1022	1250	1350	7	16	25	33	32	24	17	13	13,9	5,0	3,3
1000	1019	1850	1950	5	17	31	46	53	39	27	20	9,1	4,0	2,5
1000	1020	1850	1950	4	13	22	28	26	18	13	9	2,6	2,5	2,0
1000	1021	1850	1950	6	17	28	35	33	24	16	12	5,9	3,3	2,5
1000	1022	1850	1950	9	23	37	46	46	34	23	17	15,7	5,0	3,3
1000	1019	2450	2550	7	22	41	59	60	50	34	25	10,4	4,0	2,5
1000	1020	2450	2550	5	17	29	36	33	23	15	11	2,9	2,5	2,0
1000	1021	2450	2550	8	22	37	45	43	30	20	15	6,4	3,3	2,5
1000	1022	2450	2550	12	29	49	60	60	43	29	22	17,4	5,0	3,3
1100	1017	650	750	2	5	7	12	12	10	8	6	1,4	2,2	1,7
1100	1018	650	750	2	6	11	20	23	18	14	11	5,0	3,7	2,2
1100	1022	650	750	4	9	14	24	25	19	15	12	13,6	5,5	3,1
1100	1023	650	750	3	6	9	12	10	9	7	5	2,9	2,8	2,2
1100	1024	650	750	4	8	11	15	13	11	8	6	6,2	3,7	2,8
1100	1017	1250	1350	2	8	13	20	21	16	11	8	1,6	2,2	1,7
1100	1018	1250	1350	3	11	20	33	41	30	22	16	6,2	3,7	2,2
1100	1022	1250	1350	6	15	26	39	44	33	24	18	16,3	5,5	3,1
1100	1023	1250	1350	4	11	17	21	18	13	10	7	3,2	2,8	2,2
1100	1024	1250	1350	6	14	21	26	23	17	12	9	6,8	3,7	2,8
1100	1017	1850	1950	2	11	20	28	30	21	15	11	1,8	2,2	1,7
1100	1018	1850	1950	4	15	29	47	58	42	29	22	7,4	3,7	2,2
1100	1022	1850	1950	8	21	38	55	60	46	32	24	19,1	5,5	3,1
1100	1023	1850	1950	5	15	24	29	26	18	13	9	3,5	2,8	2,2
1100	1024	1850	1950	7	19	30	36	33	24	16	12	7,5	3,7	2,8
1100	1017	2450	2550	3	14	26	37	39	27	18	13	2,0	2,2	1,7
1100	1018	2450	2550	5	19	38	60	60	55	37	27	8,5	3,7	2,2
1100	1022	2450	2550	10	27	50	60	60	60	40	30	21,9	5,5	3,1
1100	1023	2450	2550	6	19	32	37	33	23	15	11	3,8	2,8	2,2
1100	1024	2450	2550	9	24	40	46	43	30	20	15	8,2	3,7	2,8
1200	1019	650	750	2	4	7	11	10	9	7	5	1,0	2,0	1,6
1200	1020	650	750	2	6	9	17	19	14	11	9	3,1	3,0	2,0
1200	1024	650	750	3	8	12	19	19	14	11	9	6,9	4,0	2,7
1200	1026	650	750	5	11	17	25	29	23	18	14	29,7	8,0	4,0
1200	1027	650	750	3	7	10	13	10	9	7	5	3,8	3,0	2,4
1200	1019	1250	1350	2	7	12	18	18	13	10	7	1,2	2,0	1,6
1200	1020	1250	1350	3	9	17	28	32	24	17	13	3,8	3,0	2,0
1200	1024	1250	1350	5	13	22	31	32	24	17	13	8,0	4,0	2,7
1200	1026	1250	1350	8	19	32	41	50	40	29	22	36,5	8,0	4,0
1200	1027	1250	1350	5	12	18	21	18	13	10	7	4,1	3,0	2,4
1200	1019	1850	1950	2	10	18	25	26	18	13	9	1,3	2,0	1,6
1200	1020	1850	1950	3	13	25	39	46	34	23	17	4,4	3,0	2,0
1200	1024	1850	1950	6	18	32	43	46	34	23	17	9,1	4,0	2,7
1200	1026	1850	1950	11	27	47	58	60	57	39	29	43,2	8,0	4,0
1200	1027	1850	1950	6	17	26	30	26	18	13	9	4,5	3,0	2,4
1200	1019	2450	2550	3	12	23	32	33	23	15	11	1,5	2,0	1,6
1200	1020	2450	2550	4	17	33	51	60	43	29	22	5,0	3,0	2,0
1200	1024	2450	2550	8	23	42	56	60	43	29	22	10,3	4,0	2,7
1200	1027	2450	2550	8	21	34	38	33	23	15	11	4,8	3,0	2,4
1300	1019	650		2	5	8	15	15	12	10	7	2,2	2,6	1,9
1300	1020	650		3	7	12	22	27	20	16	12	7,3	4,3	2,4
1300	1023	650		3	7	10	16	15	12	9	7	4,3	3,3	2,4
1300	1025	650		4	9	14	21	21	16	13	10	12,7	5,2	3,3
1300	1019	1250		2	9	16	24	27	20	14	11	2,6	2,6	1,9
1300	1020	1250		4	12	22	36	48	35	25	19	9,1	4,3	2,4
1300	1023	1250		4	11	19	26	26	19	14	10	4,9	3,3	2,4
1300	1025	1250		7	16	26	36	37	28	20	15	14,8	5,2	3,3



Rectangular straight silencers

DLD/DLDR

Width a mm	Code	Length l mm		Static insertion attenuation / octave band [dB]								Resistance number	Self generated noise number Intake	Self generated noise number Outlet
		DLD	DLDR	63	125	250	500	1000	2000	4000	8000			
1300	1019	1850		3	12	23	34	39	28	19	14	3,0	2,6	1,9
1300	1020	1850		5	16	32	50	60	50	34	26	11,0	4,3	2,4
1300	1023	1850		5	16	28	36	37	26	18	13	5,4	3,3	2,4
1300	1025	1850		9	22	38	50	53	39	27	20	17,0	5,2	3,3
1300	1019	2450		4	15	30	44	50	36	24	18	3,4	2,6	1,9
1300	1020	2450		6	21	42	60	60	60	44	32	12,8	4,3	2,4
1300	1023	2450		7	21	36	47	48	34	23	17	6,0	3,3	2,4
1300	1025	2450		11	28	50	60	60	50	34	25	19,2	5,2	3,3
1400	1022	650		2	5	8	13	13	11	8	6	1,6	2,3	1,8
1400	1025	650		3	7	11	18	19	14	11	9	4,8	3,5	2,3
1400	1026	650		3	6	9	13	12	10	8	6	2,9	2,8	2,2
1400	1028	650		4	8	12	18	16	13	10	8	7,2	4,0	2,8
1400	1030	650		6	11	16	25	25	19	15	12	24,0	7,0	4,0
1400	1022	1250		2	8	14	22	23	17	12	9	1,9	2,3	1,8
1400	1025	1250		4	11	20	30	32	24	17	13	5,7	3,5	2,3
1400	1026	1250		4	10	17	22	21	16	11	8	3,3	2,8	2,2
1400	1028	1250		5	14	22	29	29	21	15	11	8,2	4,0	2,8
1400	1030	1250		9	19	31	42	44	33	24	18	28,5	7,0	4,0
1400	1022	1850		3	11	21	30	33	24	16	12	2,2	2,3	1,8
1400	1025	1850		5	16	29	42	46	34	23	17	6,5	3,5	2,3
1400	1026	1850		5	15	25	31	30	21	15	11	3,7	2,8	2,2
1400	1028	1850		7	19	32	41	41	30	20	15	9,2	4,0	2,8
1400	1030	1850		12	27	45	59	60	46	32	24	33,0	7,0	4,0
1400	1022	2450		3	14	27	39	43	30	20	15	2,4	2,3	1,8
1400	1025	2450		6	20	38	53	60	43	29	22	7,4	3,5	2,3
1400	1026	2450		6	19	32	40	39	27	18	13	4,0	2,8	2,2
1400	1028	2450		9	25	42	53	53	38	26	19	10,2	4,0	2,8
1500	1021	650		2	4	7	12	12	9	7	6	1,3	2,1	1,7
1500	1022	650		2	6	9	17	19	14	11	9	3,1	3,0	2,0
1500	1027	650		2	6	8	12	10	9	7	5	2,2	2,5	2,0
1500	1029	650		3	7	10	15	13	11	8	6	4,7	3,3	2,5
1500	1030	650		5	10	14	20	19	14	11	9	12,2	5,0	3,3
1500	1022	1250		3	9	17	28	32	24	17	13	3,8	3,0	2,0
1500	1027	1250		3	10	15	20	18	13	10	7	2,4	2,5	2,0
1500	1029	1250		5	12	19	25	23	17	12	9	5,3	3,3	2,5
1500	1030	1250		7	16	25	33	32	24	17	13	13,9	5,0	3,3
1500	1021	1850		2	10	19	28	29	21	14	10	1,7	2,1	1,7
1500	1022	1850		3	13	25	39	46	34	23	17	4,4	3,0	2,0
1500	1027	1850		4	13	22	28	26	18	13	9	2,6	2,5	2,0
1500	1029	1850		6	17	28	35	33	24	16	12	5,9	3,3	2,5
1500	1030	1850		9	23	37	46	46	34	23	17	15,7	5,0	3,3
1500	1021	2450		3	13	25	35	38	26	18	13	1,9	2,1	1,7
1500	1022	2450		4	17	33	51	60	43	29	22	5,0	3,0	2,0
1500	1027	2450		5	17	29	36	33	23	15	11	2,9	2,5	2,0
1500	1029	2450		8	22	37	45	43	30	20	15	6,4	3,3	2,5
1500	1030	2450		12	29	49	60	60	43	29	22	17,4	5,0	3,3
1600	1023	650		2	4	7	11	10	9	7	5	1,0	2,0	1,6
1600	1024	650		2	5	9	15	16	13	10	8	2,3	2,7	1,9
1600	1025	650		2	7	11	21	25	19	15	12	6,1	4,0	2,3
1600	1032	650		4	9	12	17	15	12	9	7	7,5	4,0	2,9
1600	1023	1250		2	7	12	18	18	13	10	7	1,2	2,0	1,6
1600	1024	1250		3	9	16	25	28	21	15	11	2,8	2,7	1,9
1600	1025	1250		3	11	21	36	44	33	24	18	7,6	4,0	2,3
1600	1032	1250		6	14	22	28	26	19	14	10	8,4	4,0	2,9
1600	1023	1850		2	10	18	25	26	18	13	9	1,3	2,0	1,6
1600	1024	1850		3	12	23	35	40	29	20	15	3,2	2,7	1,9
1600	1025	1850		4	15	31	50	60	46	32	24	9,1	4,0	2,3
1600	1032	1850		8	20	32	39	37	26	18	13	9,3	4,0	2,9
1600	1023	2450		3	12	23	32	33	23	15	11	1,5	2,0	1,6
1600	1024	2450		4	16	31	45	52	37	25	18	3,6	2,7	1,9
1600	1025	2450		5	20	40	60	60	60	40	30	10,6	4,0	2,3
1600	1032	2450		10	26	42	50	48	34	23	17	10,2	4,0	2,9



Rectangular straight silencers

DLD/DLDR

Width a mm	Code	Length l mm		Static insertion attenuation / octave band [dB]								Resi- stance number	Self generated noise number Intake	Self generated noise number Outlet
		DLD	DLDR	63	125	250	500	1000	2000	4000	8000			
1800	1026	650		2	5	7	13	13	10	8	6	1,5	2,3	1,7
1800	1033	650		4	10	15	24	27	20	16	12	16,2	6,0	3,3
1800	1035	650		4	9	13	19	19	14	11	9	9,4	4,5	3,0
1800	1036	650		3	7	10	13	10	9	7	5	3,8	3,0	2,4
1800	1026	1250		2	8	14	21	22	16	12	9	1,7	2,3	1,7
1800	1033	1250		6	16	27	40	48	35	25	19	19,7	6,0	3,3
1800	1035	1250		6	15	24	32	32	24	17	13	10,8	4,5	3,0
1800	1036	1250		5	12	18	21	18	13	10	7	4,1	3,0	2,4
1800	1026	1850		3	11	20	29	31	22	15	11	1,9	2,3	1,7
1800	1033	1850		8	22	40	56	60	50	34	26	23,2	6,0	3,3
1800	1035	1850		8	20	35	45	46	34	23	17	12,2	4,5	3,0
1800	1036	1850		6	17	26	30	26	18	13	9	4,5	3,0	2,4
1800	1026	2450		3	14	26	38	41	28	19	14	2,2	2,3	1,7
1800	1033	2450		11	29	53	60	60	60	44	32	26,6	6,0	3,3
1800	1035	2450		10	26	45	58	60	43	29	22	13,6	4,5	3,0
1800	1036	2450		8	21	34	38	33	23	15	11	4,8	3,0	2,4
2000	1027	650		2	4	7	11	10	9	7	5	1,0	2,0	1,6
2000	1029	650		2	6	10	18	21	16	13	10	4,0	3,3	2,1
2000	1032	650		2	6	9	14	13	11	8	6	2,5	2,7	2,0
2000	1033	650		3	7	12	20	21	16	13	10	6,5	4,0	2,5
2000	1039	650		5	10	14	20	19	14	11	9	12,2	5,0	3,3
2000	1027	1250		2	7	12	18	18	13	10	7	1,2	2,0	1,6
2000	1029	1250		3	10	19	31	37	27	20	15	4,9	3,3	2,1
2000	1032	1250		3	9	16	23	23	17	12	9	2,8	2,7	2,0
2000	1033	1250		4	12	21	33	37	28	20	15	7,8	4,0	2,5
2000	1039	1250		7	16	25	33	32	24	17	13	13,9	5,0	3,3
2000	1027	1850		2	10	18	25	26	18	13	9	1,3	2,0	1,6
2000	1029	1850		4	14	27	43	52	38	26	20	5,8	3,3	2,1
2000	1032	1850		4	13	23	32	33	24	16	12	3,2	2,7	2,0
2000	1033	1850		5	17	31	46	53	39	27	20	9,1	4,0	2,5
2000	1039	1850		9	23	37	46	46	34	23	17	15,7	5,0	3,3
2000	1027	2450		3	12	23	32	33	23	15	11	1,5	2,0	1,6
2000	1029	2450		5	18	36	55	60	49	33	24	6,7	3,3	2,1
2000	1032	2450		5	17	31	41	43	30	20	15	3,5	2,7	2,0
2000	1033	2450		7	22	41	59	60	50	34	25	10,4	4,0	2,5
2000	1039	2450		12	29	49	60	60	43	29	22	17,4	5,0	3,3
2200	1031	650		2	5	7	12	12	10	8	6	1,4	2,2	1,7
2200	1033	650		2	6	11	20	23	18	14	11	5,0	3,7	2,2
2200	1036	650		3	8	13	23	26	19	16	12	10,1	4,9	2,8
2200	1038	650		3	7	10	15	14	11	9	7	3,9	3,1	2,3
2200	1040	650		3	6	9	12	10	9	7	5	2,9	2,8	2,2
2200	1042	650		4	8	11	15	13	11	8	6	6,2	3,7	2,8
2200	1031	1250		2	8	13	20	21	16	11	8	1,6	2,2	1,7
2200	1033	1250		3	11	20	33	41	30	22	16	6,2	3,7	2,2
2200	1036	1250		5	13	24	38	45	34	24	18	12,3	4,9	2,8
2200	1038	1250		4	11	18	25	25	18	13	10	4,5	3,1	2,3
2200	1040	1250		4	11	17	21	18	13	10	7	3,2	2,8	2,2
2200	1042	1250		6	14	21	26	23	17	12	9	6,8	3,7	2,8
2200	1031	1850		2	11	20	28	30	21	15	11	1,8	2,2	1,7
2200	1033	1850		4	15	29	47	58	42	29	22	7,4	3,7	2,2
2200	1036	1850		6	19	35	53	60	48	33	24	14,5	4,9	2,8
2200	1038	1850		5	16	27	35	35	25	17	13	5,0	3,1	2,3
2200	1040	1850		5	15	24	29	26	18	13	9	3,5	2,8	2,2
2200	1042	1850		7	19	30	36	33	24	16	12	7,5	3,7	2,8
2200	1031	2450		3	14	26	37	39	27	18	13	2,0	2,2	1,7
2200	1033	2450		5	19	38	60	60	55	37	27	8,5	3,7	2,2
2200	1036	2450		8	24	46	60	60	60	41	31	16,8	4,9	2,8
2200	1038	2450		6	20	35	45	46	32	22	16	5,5	3,1	2,3
2200	1040	2450		6	19	32	37	33	23	15	11	3,8	2,8	2,2
2200	1042	2450		9	24	40	46	43	30	20	15	8,2	3,7	2,8



Rectangular straight silencer

DLDY



Description

DLDY is fitted with built-in side baffles located outside the fitting dimensions. The products can be manufactured in all standard duct sizes.

For low-built solutions, see LRLB page 176.

Design

DLDY has an external shell of trapezoidal corrugated sheet for stability and reduced risk of natural oscillation. DLDY is designed for low air resistance with baffle combinations that dampen particularly low-frequency noise well. The type of insulation material is Lindtec which has been developed to provide good noise properties, low weight and to be cleanable.

DLDY meets the requirements of air tightness class C.

Tools for dimensioning and planning

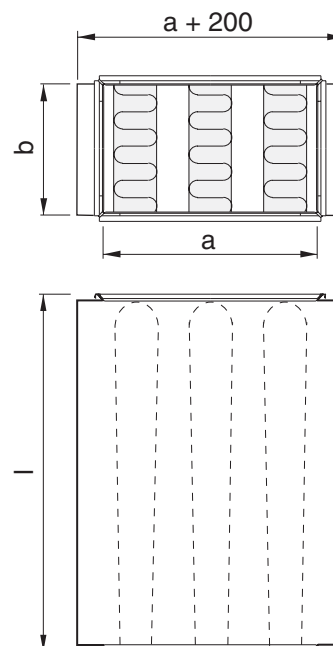
The software DIMsilencer is recommended for fast choice of silencer or a complete and fast sound calculation of the duct system.

The software CADvent offers dimensioning in an environment with 3D-modelling.

Computerised planning can be conducted with automatic presentation of noise levels, pressure drop etc.

Published data as per ISO 7235.

Dimensioner



Ordering example

	DLDY	800 × 600	650	2015	TRA
Product					
Width × height a × b					
Length l					
Code					
Accessories					

If alternative material is required, this shall be stated when ordering, e.g. aluminium zinc (AZ185) and stainless acid-proof steel.

The silencer is also available with the following accessories/options.

TRA	= Non-insulated inspection hatch.
TRB	= Hatch intended for external insulation.*
TRC	= Hatch intended for external insulation.*
TP	= Absorbent covered with perforated sheet.
AIA	= 50 mm fire protection insulation. Note! a and b measures increase by 100 mm.
AIB	= 100 mm fire protection insulation. Note! a and b measures increase by 200 mm.

The dimension of the hatches is adapted for cleaning and inspection of all baffle spacings.

Manual dimensioning see pages 157–161.

Insertion attenuation see pages 162–166.

* Specify insulation thickness when ordering.



Rectangular straight silencer

DLDY

Manual designing for DLDY

A number of silencers can be designed manually, for more combinations of silencers and faster calculations use DIMsilencer. Manual method of calculation is shown below:

A Specify connection dimensions and flow-type location of the silencer.

Width	800	mm
Height	1000	mm
Length	1250	mm
Location	Exhaust air	

DLDY-800-1000-1250-2016

B Specify the sound power level before the silencer. Read the insertion attenuation from the tables on pages 162–166. Calculate the sound power level after the silencer irrespective of the air flow (self generated noise).

Insertion attenuation

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Resistance number	Self generated noise number inlet
Sound power level before silencer	72	73	73	64	62	59	52	44		
Attenuation from table pages 162–166	3	11	19	31	35	26	19	14	2,8	2,7
Sound power level after silencer without self generated noise	69	62	54	33	27	33	33	30		

C Determine the pressure drop with help of the graph on page 159 and table on page 160. In this case we have straight ducts before and after the silencer.

Pressure drop

	Area	0,8 m ²	Air flow	400 l/s
Graph on page 159, use resistance number, area and air velocity	Air velocity	5 m/s	Pressure drop	42 Pa
Correction at disturbance according table on page 160	Factor	1	Pressure drop after correction	42 Pa

D Determine the self generated noise from the silencer at present air flow. Calculate the sound power level after the silencer inclusive the self generated noise.

Self generated noise

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
Graph on page 161, use resistance number and air velocity	59	55	54	51	48	45	41	35
Correction for gross cross section area	-1	-1	-1	-1	-1	-1	-1	-1
Self generated noise	58	54	53	50	47	44	40	34
Sound power level after the silencer (Logarithmical addition of self generated noise and sound power level after the silencer without self generated noise)	59	63	57	50	47	44	41	35



Rectangular straight silencer

DLDY

The following table can be used for own manual calculations in accordance with the example on the previous page.

Designing table for DLDY

With		mm
Height		mm
Length		mm
Location		

Insertion attenuation

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Resistance number	Self generated noise number inlet
Sound power level before silencer										
Attenuation from table pages 162–166										
Sound power level after silencer without self generated noise										

Pressure drop

	Area m ²	Air flow l/s
Graph on page 159, use resistance number, area and air velocity	Air velocity m/s	Pressure drop Pa
Correction at disturbance according table on page 160	Factor	Pressure drop after correction Pa

Self generated noise

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
Graph on page 161, use resistance number and air velocity								
Correction for gross cross section area								
Self generated noise								
Sound power level after the silencer (Logarithmical addition of self generated noise and sound power level after the silencer without self generated noise)								



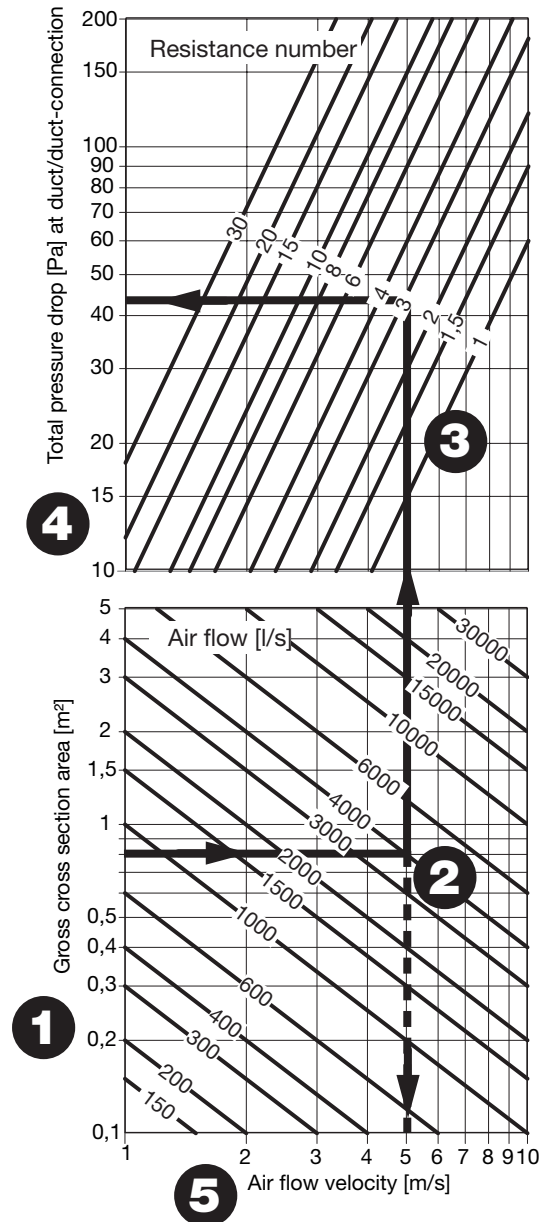
Rectangular straight silencer

DLDY

Pressure drop

Follow the directions below and the adjoining graph.

- ❶ Calculate the gross cross section area $a \times b$ in m^2 .
- ❷ Go horizontal in the graph to the present air flow, l/s.
- ❸ Go up to the resistance number achieved from the tables on pages 162–166.
- ❹ Read the pressure drop over the silencer, at straight duct connection before and after the silencer, (factor 1,0). For other modes of connection see the table for correction on page 160.
- ❺ Air flow velocity, which is used at the calculation of the self generated noise, can be read here.





Rectangular straight silencer

DLDY

Pressure drop

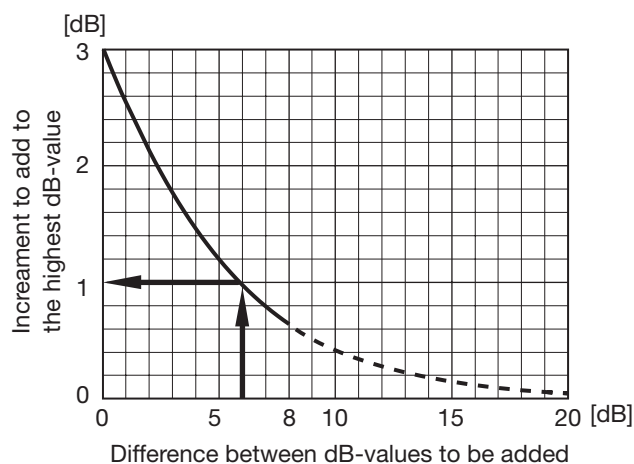
Present pressure drop = Read pressure drop × below factor

D = The largest connection side (a or b) of the silencer.

The table contains of a selection of the most common disturbance cases.

Before the silencer				Silencer	After the silencer				Factor
Distance before the silencer					Distance after the silencer				
3xD	2xD	1xD	0xD		0xD	1xD	2xD	3xD	
Duct				Silencer	Duct				1,0
				Silencer	Duct				1,1
				Silencer	Duct				1,2
				Silencer	Duct				1,4
				Silencer	Duct				1,5
Duct				Silencer					1,2
Duct				Silencer					1,3
				Silencer					1,3
				Silencer					1,4
				Silencer					1,5
				Silencer					1,6
				Silencer					1,7
				Silencer					1,8
				Silencer					1,9
				Silencer					2,0
Chamber				Silencer	Duct branch				2,0
Duct				Silencer	Chamber				3,0
Chamber				Silencer	Chamber				3,5

Logarithmic addition



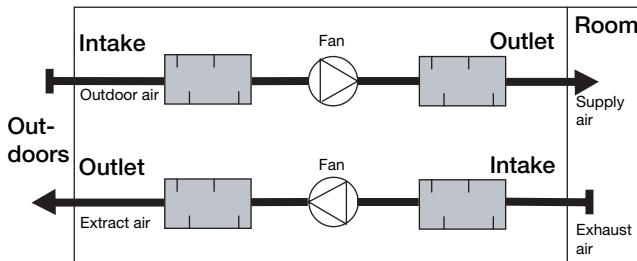


Rectangular straight silencer

DLDY

Self generated noise per frequency band

- 6 Decide from the location of the silencer whether it is the supply or exhaust graph that shall be used. (Rule of memory - the side that leads away from the fan, i.e. at supply air the outlet graph is used and at exhaust air the in-take graph.)



- 7 Go horizontally into the present graph, at present air velocity, to the self generated noise number.
- 8 Then go vertically up to the crossing of the different frequency band lines.
- 9 Read the self generated noise, at gross cross section area 1 m², for each frequency band straight out to the left. In the example only the 8000 Hz-reading is shown.
- 10 Add or subtract the correction for the present gross cross section area.

Sound power level after the silencer

The sound power level after the silencer can be calculated for all frequencies by a logarithmical addition of:

"The self generated noise" and "The sound power level before the silencer".

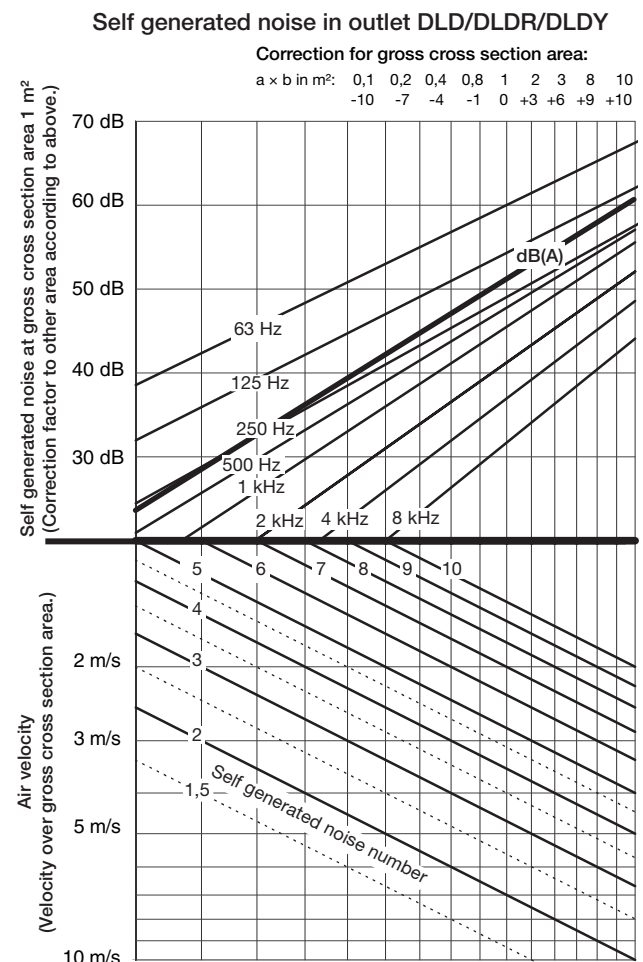
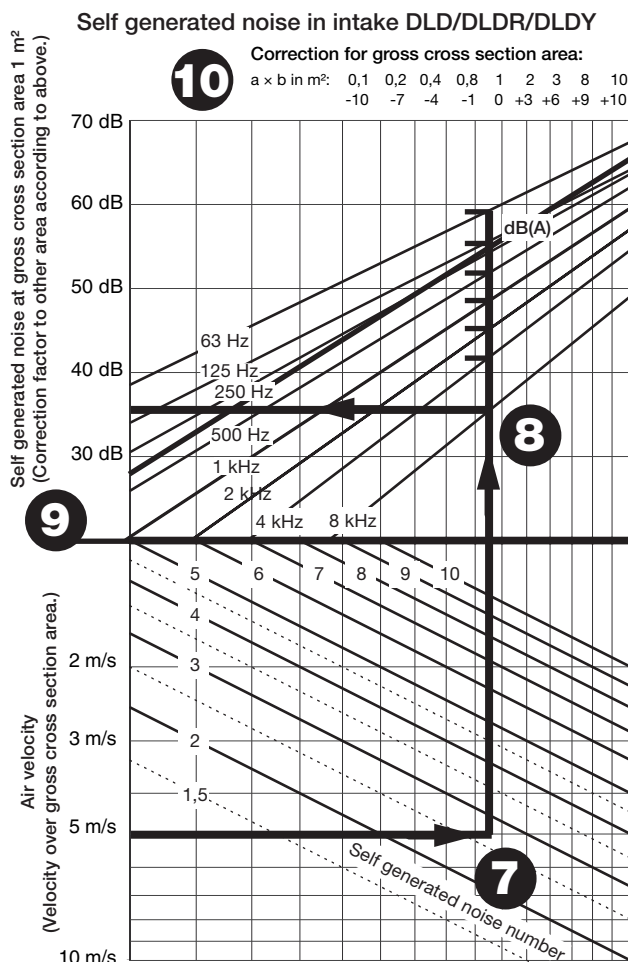
The shown example gives at 8000 Hz:

$$\text{Self generated noise} = 35 \text{ dB} - 1 \text{ dB} = 34 \text{ dB}$$

Sound power level before the silencer - the attenuation:
44 dB - 14 dB = 30 dB

Logarithmic addition of 34 and 30 = 35 dB

(See graph for logarithmical addition on page 160).





Rectangular straight silencer

DLDY

Width a mm	Code	Length l mm	Static insertion attenuation / octave band [dB]								Resi- stance number	Self generated noise number Intake	Self generated noise number Outlet
			63	125	250	500	1000	2000	4000	8000			
400	2009	650	2	5	9	18	21	16	13	10	1,0	2,0	1,6
400	2010	650	3	7	11	23	26	20	16	12	2,5	2,7	2,0
400	2009	1250	2	9	16	30	36	27	19	14	1,2	2,0	1,6
400	2010	1250	4	12	21	38	46	34	25	19	2,8	2,7	2,0
400	2009	1850	3	12	24	43	51	38	26	19	1,3	2,0	1,6
400	2010	1850	5	16	31	53	60	49	33	25	3,2	2,7	2,0
500	2012	650	2	5	9	17	17	13	10	8	1,1	2,0	1,7
500	2013	650	3	7	11	20	21	16	13	10	2,2	2,5	2,0
500	2014	650	4	9	14	25	26	20	16	12	4,7	3,3	2,5
500	2012	1250	3	9	16	28	29	22	16	12	1,2	2,0	1,7
500	2013	1250	4	12	20	34	36	27	19	14	2,4	2,5	2,0
500	2014	1250	6	15	26	41	46	34	25	19	5,3	3,3	2,5
500	2012	1850	4	13	24	39	42	31	21	16	1,3	2,0	1,7
500	2013	1850	5	16	30	47	51	38	26	19	2,6	2,5	2,0
500	2014	1850	8	21	38	58	60	49	33	25	5,9	3,3	2,5
600	2012	650	2	6	11	22	28	21	17	13	3,1	3,0	2,0
600	2013	650	2	5	7	13	12	10	8	6	0,6	1,7	1,5
600	2015	650	2	6	9	15	14	11	9	7	1,1	2,0	1,7
600	2016	650	3	7	11	18	17	13	10	8	2,0	2,4	2,0
600	2017	650	4	9	13	22	21	16	13	10	3,8	3,0	2,4
600	2012	1250	3	11	20	36	49	36	26	19	3,8	3,0	2,0
600	2013	1250	2	8	14	22	22	16	12	9	0,7	1,7	1,5
600	2015	1250	3	10	16	25	25	18	13	10	1,2	2,0	1,7
600	2016	1250	4	12	20	30	29	22	16	12	2,2	2,4	2,0
600	2017	1250	6	15	24	36	36	27	19	14	4,1	3,0	2,4
600	2012	1850	4	15	30	50	60	51	35	26	4,4	3,0	2,0
600	2013	1850	3	11	20	30	31	22	15	11	0,7	1,7	1,5
600	2015	1850	4	14	24	36	36	26	18	13	1,3	2,0	1,7
600	2016	1850	6	17	29	42	42	31	21	16	2,4	2,4	2,0
600	2017	1850	8	21	35	50	51	38	26	19	4,5	3,0	2,4
700	2012	650	2	5	9	18	20	15	12	9	1,6	2,3	1,8
700	2013	650	3	8	12	23	28	21	17	13	4,8	3,5	2,3
700	2016	650	3	6	9	14	12	10	8	6	1,1	2,0	1,8
700	2017	650	3	7	10	16	14	11	9	7	1,9	2,3	2,0
700	2012	1250	3	9	17	30	35	26	19	14	1,9	2,3	1,8
700	2013	1250	4	13	23	38	49	36	26	19	5,7	3,5	2,3
700	2016	1250	4	10	16	24	22	16	12	9	1,2	2,0	1,8
700	2017	1250	5	12	19	27	25	18	13	10	2,0	2,3	2,0
700	2012	1850	3	12	24	41	50	36	25	19	2,2	2,3	1,8
700	2013	1850	6	18	34	53	60	51	35	26	6,5	3,5	2,3
700	2016	1850	5	14	24	33	31	22	15	11	1,3	2,0	1,8
700	2017	1850	6	17	28	38	36	26	18	13	2,2	2,3	2,0
800	2016	650	2	6	10	19	20	15	12	9	2,5	2,7	2,0
800	2017	650	4	9	14	24	28	21	17	13	6,9	4,0	2,7
800	2019	650	3	6	9	13	11	9	7	5	1,2	2,0	1,8
800	2016	1250	3	11	19	31	35	26	19	14	2,8	2,7	2,0
800	2017	1250	6	15	26	40	49	36	26	19	8,0	4,0	2,7
800	2019	1250	4	11	16	22	19	14	10	8	1,2	2,0	1,8
800	2016	1850	4	15	28	44	50	36	25	19	3,2	2,7	2,0
800	2017	1850	7	20	37	56	60	51	35	26	9,1	4,0	2,7
800	2019	1850	5	15	24	31	27	19	13	10	1,3	2,0	1,8
800	2016	2450	5	19	36	56	60	47	31	23	3,5	2,7	2,0
800	2017	2450	9	26	49	60	60	60	44	33	10,3	4,0	2,7
800	2019	2450	6	19	31	40	35	24	16	12	1,4	2,0	1,8
900	2015	650	2	4	7	13	13	10	8	6	0,7	1,8	1,5
900	2017	650	2	6	9	15	15	12	10	7	1,5	2,3	1,8
900	2019	650	3	7	11	20	20	15	12	9	3,5	3,0	2,3
900	2020	650	4	10	15	25	28	21	17	13	9,4	4,5	3,0
900	2015	1250	2	7	13	21	22	16	12	9	0,8	1,8	1,5
900	2017	1250	3	9	16	26	27	20	14	11	1,7	2,3	1,8
900	2019	1250	4	12	21	33	35	26	19	14	4,0	3,0	2,3



Rectangular straight silencer

DLDY

Width a mm	Code	Length l mm	Static insertion attenuation / octave band [dB]								Resi- stance number	Self generated noise number Intake	Self generated noise number Outlet
			63	125	250	500	1000	2000	4000	8000			
900	2020	1250	7	16	28	41	49	36	26	19	10,8	4,5	3,0
900	2015	1850	2	10	19	29	32	23	16	12	0,9	1,8	1,5
900	2017	1850	4	13	24	36	39	28	19	14	1,9	2,3	1,8
900	2019	1850	6	17	30	46	50	36	25	19	4,4	3,0	2,3
900	2020	1850	9	23	41	58	60	51	35	26	12,2	4,5	3,0
900	2015	2450	3	13	24	38	41	29	19	14	1,0	1,8	1,5
900	2017	2450	4	17	31	46	50	36	24	18	2,1	2,3	1,8
900	2019	2450	7	22	40	59	60	47	31	23	4,9	3,0	2,3
900	2020	2450	11	30	53	60	60	60	44	33	13,6	4,5	3,0
1000	2015	650	1	4	6	11	11	9	7	5	0,5	1,7	1,4
1000	2018	650	2	5	8	13	13	10	8	6	1,1	2,0	1,7
1000	2020	650	3	6	10	16	15	12	10	7	2,2	2,5	2,0
1000	2021	650	4	8	12	20	20	15	12	9	4,7	3,3	2,5
1000	2022	650	5	11	16	25	28	21	17	13	12,2	5,0	3,3
1000	2015	1250	2	6	11	18	19	14	10	7	0,6	1,7	1,4
1000	2018	1250	3	8	14	22	22	16	12	9	1,2	2,0	1,7
1000	2020	1250	4	11	18	27	27	20	14	11	2,4	2,5	2,0
1000	2021	1250	5	14	23	34	35	26	19	14	5,3	3,3	2,5
1000	2022	1250	8	18	30	42	49	36	26	19	13,9	5,0	3,3
1000	2015	1850	2	9	17	26	27	19	13	10	0,7	1,7	1,4
1000	2018	1850	3	12	21	31	32	23	16	12	1,3	2,0	1,7
1000	2020	1850	5	15	26	38	39	28	19	14	2,6	2,5	2,0
1000	2021	1850	7	19	33	47	50	36	25	19	5,9	3,3	2,5
1000	2022	1850	11	25	44	59	60	51	35	26	15,7	5,0	3,3
1000	2015	2450	2	12	22	33	35	24	16	12	0,7	1,7	1,4
1000	2018	2450	4	15	28	40	41	29	19	14	1,4	2,0	1,7
1000	2020	2450	6	19	34	49	50	36	24	18	2,9	2,5	2,0
1000	2021	2450	9	25	44	60	60	47	31	23	6,4	3,3	2,5
1000	2022	2450	14	33	57	60	60	60	44	33	17,4	5,0	3,3
1100	2018	650	2	7	12	22	29	22	17	13	5,0	3,7	2,2
1100	2019	650	2	5	7	12	11	9	7	5	0,8	1,8	1,6
1100	2021	650	2	6	9	14	13	10	8	6	1,5	2,2	1,8
1100	2023	650	3	7	10	17	15	12	10	7	2,9	2,8	2,2
1100	2024	650	4	9	13	21	20	15	12	9	6,2	3,7	2,8
1100	2018	1250	3	11	22	36	50	38	27	20	6,2	3,7	2,2
1100	2019	1250	2	8	13	20	19	14	10	7	0,9	1,8	1,6
1100	2021	1250	3	10	16	23	22	16	12	9	1,6	2,2	1,8
1100	2023	1250	5	12	19	28	27	20	14	11	3,2	2,8	2,2
1100	2024	1250	6	15	24	35	35	26	19	14	6,8	3,7	2,8
1100	2018	1850	4	16	32	50	60	53	37	27	7,4	3,7	2,2
1100	2019	1850	3	11	19	27	27	19	13	10	1,0	1,8	1,6
1100	2021	1850	4	13	23	32	32	23	16	12	1,8	2,2	1,8
1100	2023	1850	6	17	28	39	39	28	19	14	3,5	2,8	2,2
1100	2024	1850	9	21	36	49	50	36	25	19	7,5	3,7	2,8
1100	2018	2450	5	20	42	60	60	60	46	34	8,5	3,7	2,2
1100	2019	2450	3	14	25	35	35	24	16	12	1,0	1,8	1,6
1100	2021	2450	5	17	31	42	41	29	19	14	1,9	2,2	1,8
1100	2023	2450	7	22	37	50	50	36	24	18	3,8	2,8	2,2
1100	2024	2450	11	27	47	60	60	47	31	23	8,2	3,7	2,8
1200	2023	650	2	5	8	12	11	9	7	5	1,1	2,0	1,7
1200	2024	650	4	8	13	23	25	19	15	11	6,9	4,0	2,7
1200	2025	650	3	7	9	14	13	10	8	6	2,0	2,4	2,0
1200	2027	650	4	8	11	17	15	12	10	7	3,8	3,0	2,4
1200	2023	1250	3	9	14	20	19	14	10	7	1,2	2,0	1,7
1200	2024	1250	5	14	24	39	43	32	23	17	8,0	4,0	2,7
1200	2025	1250	4	11	17	24	22	16	12	9	2,2	2,4	2,0
1200	2027	1250	5	13	21	29	27	20	14	11	4,1	3,0	2,4
1200	2023	1850	4	12	21	29	27	19	13	10	1,3	2,0	1,7
1200	2024	1850	7	20	36	54	60	45	31	23	9,1	4,0	2,7
1200	2025	1850	5	15	25	34	32	23	16	12	2,4	2,4	2,0
1200	2027	1850	7	19	31	40	39	28	19	14	4,5	3,0	2,4



Rectangular straight silencer

DLDY

	Width a mm	Code	Length l mm	Static insertion attenuation / octave band [dB]							Resi- stance number	Self generated noise number Intake	Self generated noise number Outlet
				63	125	250	500	1000	2000	4000			
1	1200	2023	2450	4	16	28	37	35	24	16	1,4	2,0	1,7
	1200	2024	2450	9	25	47	60	60	59	39	10,3	4,0	2,7
	1200	2025	2450	6	20	33	43	41	29	19	2,5	2,4	2,0
	1200	2027	2450	9	24	40	52	50	36	24	4,8	3,0	2,4
2	1300	2018	650	2	4	7	12	12	10	8	0,8	1,9	1,5
	1300	2021	650	2	6	9	15	15	12	9	1,8	2,4	1,9
	1300	2022	650	3	8	13	23	29	22	17	7,8	4,3	2,6
	1300	2023	650	3	7	11	19	19	15	12	4,3	3,3	2,4
	1300	2026	650	3	7	10	15	13	10	8	2,6	2,6	2,2
	1300	2018	1250	2	7	13	20	21	15	11	0,9	1,9	1,5
3	1300	2021	1250	3	9	16	25	26	19	14	2,0	2,4	1,9
	1300	2022	1250	5	13	24	38	50	38	27	9,4	4,3	2,6
	1300	2023	1250	5	12	21	32	34	25	18	4,9	3,3	2,4
	1300	2026	1250	5	12	19	25	22	16	12	2,8	2,6	2,2
	1300	2018	1850	2	10	18	28	30	21	15	1,0	1,9	1,5
4	1300	2021	1850	4	13	24	35	37	27	18	2,2	2,4	1,9
	1300	2022	1850	6	19	36	53	60	53	37	11,0	4,3	2,6
	1300	2023	1850	6	17	31	45	49	36	24	5,4	3,3	2,4
	1300	2026	1850	6	17	27	35	32	23	16	3,0	2,6	2,2
	1300	2018	2450	3	13	24	36	39	27	18	1,1	1,9	1,5
	1300	2021	2450	4	17	31	45	48	34	23	2,5	2,4	1,9
	1300	2022	2450	8	24	47	60	60	60	46	12,6	4,3	2,6
5	1300	2023	2450	7	22	41	58	60	46	31	6,0	3,3	2,4
	1300	2026	2450	8	22	36	45	41	29	19	3,2	2,6	2,2
	1400	2021	650	1	4	6	11	11	9	7	0,6	1,8	1,5
	1400	2022	650	2	5	8	15	17	13	10	1,6	2,3	1,8
	1400	2026	650	3	7	10	17	16	13	10	2,9	2,8	2,2
	1400	2028	650	4	9	13	22	22	17	13	7,2	4,0	2,8
6	1400	2029	650	3	7	9	13	11	9	7	1,9	2,3	2,0
	1400	2021	1250	2	7	12	18	19	14	10	0,7	1,8	1,5
	1400	2022	1250	2	8	15	26	29	21	15	1,9	2,3	1,8
	1400	2026	1250	4	11	19	28	28	21	15	3,3	2,8	2,2
	1400	2028	1250	6	15	25	36	38	28	20	8,2	4,0	2,8
	1400	2029	1250	4	11	17	22	19	14	10	2,0	2,3	2,0
7	1400	2021	1850	2	9	17	26	26	19	13	0,8	1,8	1,5
	1400	2022	1850	3	12	23	36	41	30	21	2,2	2,3	1,8
	1400	2026	1850	5	16	27	39	40	29	20	3,7	2,8	2,2
	1400	2028	1850	8	21	36	51	54	40	27	9,2	4,0	2,8
	1400	2029	1850	5	15	25	30	27	19	13	2,2	2,3	2,0
	1400	2021	2450	2	12	22	33	34	24	16	0,9	1,8	1,5
8	1400	2022	2450	3	15	30	46	54	38	26	2,4	2,3	1,8
	1400	2026	2450	6	20	36	50	52	37	25	4,0	2,8	2,2
	1400	2028	2450	10	27	47	60	60	52	35	10,2	4,0	2,8
	1400	2029	2450	7	20	32	39	35	24	16	2,3	2,3	2,0
	1500	2021	650	2	5	8	14	14	11	9	1,3	2,1	1,7
9	1500	2022	650	2	6	10	19	22	17	13	3,1	3,0	2,0
	1500	2027	650	3	6	9	15	14	11	9	2,2	2,5	2,0
	1500	2029	650	3	8	12	19	18	14	11	4,7	3,3	2,5
	1500	2030	650	5	11	15	25	25	19	15	12,2	5,0	3,3
	1500	2021	1250	2	8	14	23	25	19	14	1,5	2,1	1,7
	1500	2022	1250	3	10	19	32	39	29	21	3,8	3,0	2,0
10	1500	2027	1250	4	10	17	25	24	18	13	2,4	2,5	2,0
	1500	2029	1250	5	13	22	31	31	23	16	5,3	3,3	2,5
	1500	2030	1250	8	18	28	41	43	32	23	13,9	5,0	3,3
	1500	2021	1850	3	11	21	33	36	26	18	1,7	2,1	1,7
	1500	2022	1850	4	14	27	45	56	41	28	4,4	3,0	2,0
	1500	2027	1850	5	14	25	34	34	25	17	2,6	2,5	2,0
	1500	2029	1850	7	19	32	43	44	32	22	5,9	3,3	2,5
11	1500	2030	1850	10	25	41	58	60	45	31	15,7	5,0	3,3
	1500	2021	2450	3	14	27	42	47	33	22	1,9	2,1	1,7
	1500	2022	2450	5	18	36	58	60	53	35	5,0	3,0	2,0



Rectangular straight silencer

DLDY

Width a mm	Code	Length l mm	Static insertion attenuation / octave band [dB]								Resi- stance number	Self generated noise number Intake	Self generated noise number Outlet
			63	125	250	500	1000	2000	4000	8000			
1500	2027	2450	6	19	33	44	45	31	21	16	2,9	2,5	2,0
1500	2029	2450	8	24	42	56	57	41	28	20	6,4	3,3	2,5
1500	2030	2450	13	32	55	60	60	59	39	29	17,4	5,0	3,3
1600	2023	650	2	4	7	13	13	10	8	6	1,0	2,0	1,6
1600	2024	650	2	5	9	17	19	15	12	9	2,3	2,7	1,9
1600	2025	650	3	7	12	22	29	22	18	13	6,1	4,0	2,3
1600	2028	650	2	6	8	13	12	10	8	6	1,7	2,3	1,9
1600	2030	650	3	7	10	16	15	12	9	7	3,4	2,9	2,3
1600	2032	650	4	9	13	21	19	15	12	9	7,5	4,0	2,9
1600	2023	1250	2	7	13	21	23	17	12	9	1,2	2,0	1,6
1600	2024	1250	3	9	17	29	34	25	18	13	2,8	2,7	1,9
1600	2025	1250	4	12	22	36	50	38	27	21	7,6	4,0	2,3
1600	2028	1250	3	10	16	22	21	15	11	8	1,9	2,3	1,9
1600	2030	1250	5	12	19	27	26	19	14	10	3,7	2,9	2,3
1600	2032	1250	7	15	25	34	34	25	18	14	8,4	4,0	2,9
1600	2023	1850	2	10	19	30	32	23	16	12	1,3	2,0	1,6
1600	2024	1850	3	13	25	40	48	35	24	18	3,2	2,7	1,9
1600	2025	1850	5	16	32	50	60	54	37	28	9,1	4,0	2,3
1600	2028	1850	4	13	23	31	30	21	15	11	2,0	2,3	1,9
1600	2030	1850	6	17	28	38	37	27	18	14	4,1	2,9	2,3
1600	2032	1850	9	22	36	48	49	36	24	18	9,3	4,0	2,9
1600	2023	2450	3	13	26	38	42	29	20	14	1,5	2,0	1,6
1600	2024	2450	4	16	33	52	60	45	30	22	3,6	2,7	1,9
1600	2025	2450	6	21	43	60	60	60	47	35	10,6	4,0	2,3
1600	2028	2450	5	17	30	40	39	27	18	13	2,2	2,3	1,9
1600	2030	2450	7	22	37	49	48	34	23	17	4,4	2,9	2,3
1600	2032	2450	11	28	47	60	60	46	31	23	10,2	4,0	2,9
1800	2026	650	2	5	8	14	15	12	9	7	1,5	2,3	1,7
1800	2027	650	2	6	10	19	22	16	13	10	3,1	3,0	2,0
1800	2032	650	3	7	10	17	17	13	10	8	3,5	3,0	2,3
1800	2034	650	3	6	9	13	11	9	7	6	2,0	2,4	2,0
1800	2035	650	4	9	14	23	23	18	14	11	9,4	4,5	3,0
1800	2036	650	3	8	11	16	14	11	9	7	3,8	3,0	2,4
1800	2026	1250	2	8	15	24	26	19	14	11	1,7	2,3	1,7
1800	2027	1250	3	10	18	32	38	28	20	15	3,8	3,0	2,0
1800	2032	1250	4	12	19	28	29	21	15	12	4,0	3,0	2,3
1800	2034	1250	4	10	16	22	20	15	10	8	2,2	2,4	2,0
1800	2035	1250	6	16	26	38	41	30	22	16	10,8	4,5	3,0
1800	2036	1250	5	13	20	26	24	18	13	10	4,1	3,0	2,4
1800	2026	1850	3	11	21	34	38	27	19	14	1,9	2,3	1,7
1800	2027	1850	4	14	27	44	54	40	27	20	4,4	3,0	2,0
1800	2032	1850	5	16	28	40	41	30	21	15	4,4	3,0	2,3
1800	2034	1850	5	15	24	31	28	20	14	10	2,4	2,4	2,0
1800	2035	1850	9	22	38	53	58	42	29	22	12,2	4,5	3,0
1800	2036	1850	7	18	29	37	34	25	17	13	4,5	3,0	2,4
1800	2026	2450	3	14	28	43	49	35	23	17	2,2	2,3	1,7
1800	2027	2450	4	18	35	57	60	51	34	25	5,0	3,0	2,0
1800	2032	2450	7	21	37	51	54	38	26	19	4,9	3,0	2,3
1800	2034	2450	6	19	32	39	36	25	17	12	2,5	2,4	2,0
1800	2035	2450	11	28	50	60	60	55	37	27	13,6	4,5	3,0
1800	2036	2450	8	23	38	47	45	31	21	16	4,8	3,0	2,4
2000	2027	650	2	4	7	12	12	10	8	6	1,0	2,0	1,6
2000	2028	650	2	5	9	16	17	13	11	8	2,0	2,5	1,8
2000	2029	650	2	6	11	20	24	18	14	11	4,0	3,3	2,1
2000	2035	650	3	8	13	21	22	17	13	10	6,9	4,0	2,7
2000	2038	650	3	7	9	13	11	9	7	5	2,3	2,5	2,1
2000	2039	650	5	10	15	24	23	18	14	11	12,2	5,0	3,3
2000	2027	1250	2	7	13	21	22	16	12	9	1,2	2,0	1,6
2000	2028	1250	2	9	16	26	30	22	16	12	2,3	2,5	1,8
2000	2029	1250	3	10	20	34	42	31	22	17	4,9	3,3	2,1
2000	2035	1250	5	14	23	36	39	29	21	16	8,0	4,0	2,7



Rectangular straight silencer

DLDY

Width a mm	Code	Length l mm	Static insertion attenuation / octave band [dB]								Resi- stance number	Self generated noise number Intake	Self generated noise number Outlet
			63	125	250	500	1000	2000	4000	8000			
2000	2038	1250	4	11	17	22	19	14	10	7	2,5	2,5	2,1
2000	2039	1250	8	17	28	39	41	30	22	16	13,9	5,0	3,3
2000	2027	1850	2	10	19	29	31	22	15	11	1,3	2,0	1,6
2000	2028	1850	3	12	23	37	43	31	21	16	2,6	2,5	1,8
2000	2029	1850	4	15	29	48	60	44	30	22	5,8	3,3	2,1
2000	2035	1850	7	19	34	50	56	41	28	21	9,1	4,0	2,7
2000	2038	1850	6	16	25	30	26	19	13	10	2,7	2,5	2,1
2000	2039	1850	10	24	40	55	58	42	29	22	15,7	5,0	3,3
2000	2027	2450	3	13	25	37	40	28	19	14	1,5	2,0	1,6
2000	2028	2450	4	16	31	47	55	40	27	20	3,0	2,5	1,8
2000	2029	2450	5	19	38	60	60	57	38	28	6,7	3,3	2,1
2000	2035	2450	8	25	45	60	60	53	35	26	10,3	4,0	2,7
2000	2038	2450	7	20	33	39	34	24	16	12	2,9	2,5	2,1
2000	2039	2450	13	31	53	60	60	55	37	27	17,4	5,0	3,3
2200	2030	650	1	4	6	11	10	9	7	5	0,8	1,8	1,5
2200	2031	650	2	5	8	14	14	11	9	7	1,4	2,2	1,7
2200	2032	650	2	6	9	17	19	15	12	9	2,5	2,8	1,9
2200	2038	650	3	7	11	17	17	13	10	8	3,9	3,1	2,3
2200	2041	650	4	10	14	24	24	18	15	11	11,2	4,9	3,1
2200	2042	650	4	9	12	18	17	13	10	8	6,2	3,7	2,8
2200	2030	1250	2	7	12	18	18	14	10	7	0,9	1,8	1,5
2200	2031	1250	2	8	14	23	25	18	13	10	1,6	2,2	1,7
2200	2032	1250	3	9	17	29	33	25	18	13	3,0	2,8	1,9
2200	2038	1250	4	12	20	29	29	22	16	12	4,5	3,1	2,3
2200	2041	1250	7	16	27	39	42	31	23	17	13,0	4,9	3,1
2200	2042	1250	6	14	23	30	29	21	15	12	6,8	3,7	2,8
2200	2030	1850	2	9	17	26	26	18	13	9	1,0	1,8	1,5
2200	2031	1850	3	11	21	32	35	25	17	13	1,8	2,2	1,7
2200	2032	1850	3	13	25	40	47	35	24	18	3,5	2,8	1,9
2200	2038	1850	5	16	29	40	42	31	21	16	5,0	3,1	2,3
2200	2041	1850	9	22	39	55	60	44	30	23	14,8	4,9	3,1
2200	2042	1850	8	20	33	43	41	30	21	15	7,5	3,7	2,8
2200	2030	2450	2	12	23	33	34	23	16	11	1,1	1,8	1,5
2200	2031	2450	3	14	27	41	46	32	22	16	2,0	2,2	1,7
2200	2032	2450	4	17	33	52	60	45	30	22	4,0	2,8	1,9
2200	2038	2450	7	21	38	52	55	39	26	19	5,5	3,1	2,3
2200	2041	2450	11	29	51	60	60	57	38	29	16,6	4,9	3,1
2200	2042	2450	10	26	43	55	54	38	26	19	8,2	3,7	2,8

Curved rectangular silencer

BDLD



Description

BDLD is a curved rectangular silencer with conventional design with width and height dimensions that doesn't exceed the present connection dimensions. The silencer can be produced in all normally existing duct dimensions.

Design

BDLD has an external shell of trapezoidal corrugated sheet metal for stability and reduced risk of oscillation. BDLD is designed for low pressure drop with baffle combinations that attenuate especially low frequencies well. The type of insulation material is developed to provide good sound properties, low weight and to be cleanable.

BDLD meets the requirements of air tightness class C.

Tools for dimensioning and planning

The software DIMsilencer is recommended for fast choice of silencer or a complete and fast sound calculation of the duct system.

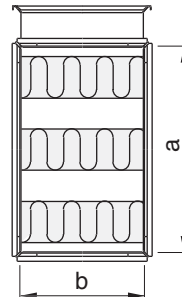
The software CADvent offers dimensioning in an environment with 3D-modelling.

Computerised planning can be conducted with automatic presentation of noise levels, pressure drop etc.

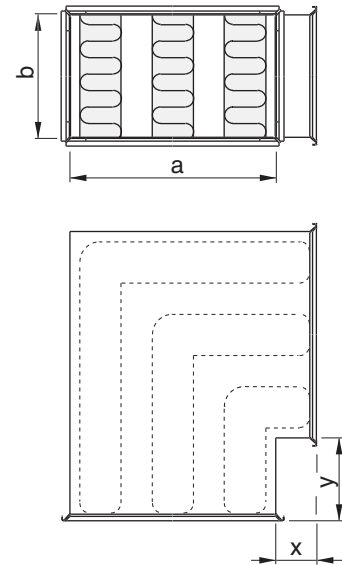
Published data as per ISO 7235.

Dimensions

Vertical mounting



Horizontal mounting



Ordering example

	BDLD	800 x 600	150-150	3015	TRA
Product					
Width x height a x b					
Leg length x , y					
Code					
Accessories					

If alternative material is required, this shall be stated when ordering, e.g. aluminium zinc (AZ185) and stainless acid-proof steel.

The silencer is also available with the following accessories/options.

TRA	= Non-insulated inspection hatch.
TRB	= Hatch intended for external insulation.*
TRC	= Hatch intended for external insulation.*
TP	= Absorbent covered with perforated sheet.
AIA	= 50 mm fire protection insulation. Note! a and b measures increase by 100 mm.
AIB	= 100 mm fire protection insulation. Note! a and b measures increase by 200 mm.

The dimension of the hatches is adapted for cleaning and inspection of all baffle spacings.

Manual dimensioning see pages 168–172.
Insertion attenuation see pages 173–175.

* Specify insulation thickness when ordering.



Curved rectangular silencer

BDLD

Manual designing for BDLD

A number of silencers can be designed manually, for more combinations of silencers and faster calculations use DIMsilencer. Manual method of calculation is shown below:

A Specify connection dimensions and flow-type location of the silencer.

Width	800	mm
Height	1000	mm
Leg length	150	mm
Location	Exhaust air	

BDLD-800-1000-150-3008

B Specify the sound power level before the silencer.
Read the insertion attenuation from the tables on pages 173–175.
Calculate the sound power level after the silencer irrespective of the air flow (self generated noise).

Insertion attenuation

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Resistance number	Self generated noise number inlet
Sound power level before silencer	72	73	73	64	62	59	52	44		
Attenuation from table pages 173–175	3	10	17	17	16	16	17	17	1,8	1,6
Sound power level after silencer without self generated noise	69	63	56	47	46	43	35	27		

C Determine the pressure drop with help of the graph on page 170 and table on page 171.
In this case we have straight ducts before and after the silencer.

Pressure drop

	Area	0,8 m ²	Air flow	400 l/s
Graph on page 170, use resistance number, area and air velocity	Air velocity	5 m/s	Pressure drop	28 Pa
Correction at disturbance according table on page 171	Factor	1	Pressure drop after correction	28 Pa

D Determine the self generated noise from the silencer at present air flow.
Calculate the sound power level after the silencer inclusive the self generated noise.

Self generated noise

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
Graph on page 172, use resistance number and air velocity	59	56	49	46	44	40	36	28
Correction for gross cross section area	-1	-1	-1	-1	-1	-1	-1	-1
Self generated noise	58	55	48	45	43	39	35	27
Sound power level after the silencer (Logarithmical addition of self generated noise and sound power level after the silencer without self generated noise)	69	64	57	49	48	44	38	30



Curved rectangular silencer

BDLD

The following table can be used for own manual calculations in accordance with the example on the previous page.

Designing table for DLDY

With		mm
Height		mm
Leg length		mm
Location		

Insertion attenuation

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Resistance number	Self generated noise number inlet
Sound power level before silencer										
Attenuation from table pages 173–175										
Sound power level after silencer without self generated noise										

Pressure drop

	Area m ²	Air flow l/s
Graph on page 170, use resistance number, area and air velocity	Air velocity m/s	Pressure drop Pa
Correction at disturbance according table on page 171	Factor	Pressure drop after correction Pa

Self generated noise

	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
Graph on page 172, use resistance number and air velocity								
Correction for gross cross section area								
Self generated noise								
Sound power level after the silencer (Logarithmical addition of self generated noise and sound power level after the silencer without self generated noise)								



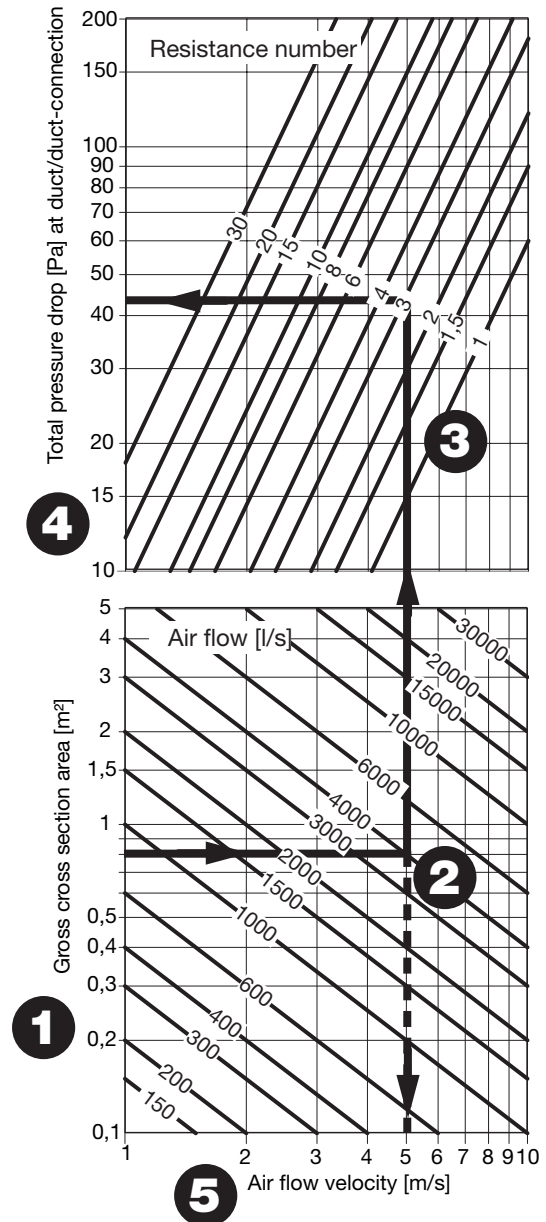
Curved rectangular silencer

BDLD

Pressure drop

Follow the directions below and the adjoining graph.

- 1 Calculate the gross cross section area $a \times b$ in m^2 .
- 2 Go horizontal in the graph to the present air flow, l/s.
- 3 Go up to the resistance number achieved from the tables on pages 173–175.
- 4 Read the pressure drop over the silencer, at straight duct connection before and after the silencer, (factor 1,0). For other modes of connection see the table for correction on page 171.
- 5 Air flow velocity, which is used at the calculation of the self generated noise, can be read here.





Curved rectangular silencer

BDLD

Pressure drop

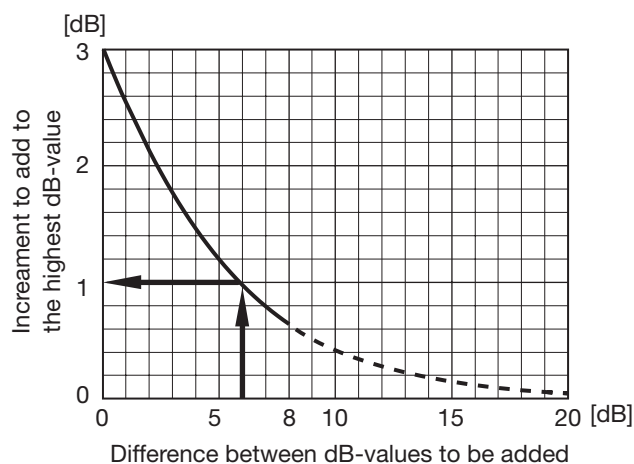
Present pressure drop = Read pressure drop × below factor

D = The largest connection side (a or b) of the silencer.

The table contains of a selection of the most common disturbance cases.

Before the silencer				Silencer	After the silencer				Factor
Distance before the silencer					Distance after the silencer				
3xD	2xD	1xD	0xD		0xD	1xD	2xD	3xD	
Duct				Silencer	Duct				1,0
				Silencer	Duct				1,1
				Silencer	Duct				1,2
				Silencer	Duct				1,4
				Silencer	Duct				1,5
Duct				Silencer					1,2
Duct				Silencer					1,3
				Silencer					1,3
				Silencer					1,4
				Silencer					1,5
				Silencer					1,6
				Silencer					1,7
				Silencer					1,8
				Silencer					1,9
				Silencer					2,0
Chamber				Silencer	Duct branch				2,0
Duct				Silencer	Chamber				3,0
Chamber				Silencer	Chamber				3,5

Logarithmic addition



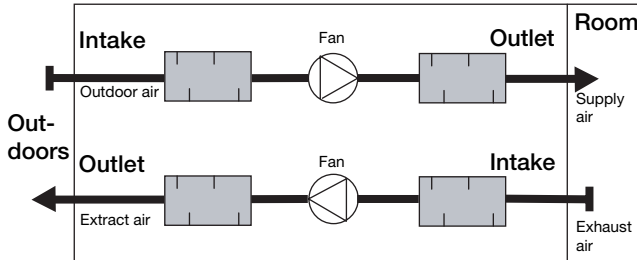


Curved rectangular silencer

BDLD

Self generated noise per frequency band

- 6 Decide from the location of the silencer whether it is the supply or exhaust graph that shall be used. (Rule of memory - the side that leads away from the fan, i.e. at supply air the outlet graph is used and at exhaust air the in-take graph.)



- 7 Go horizontally into the present graph, at present air velocity, to the self generated noise number.
- 8 Then go vertically up to the crossing of the different frequency band lines.
- 9 Read the self generated noise, at gross cross section area 1 m², for each frequency band straight out to the left. In the example only the 8000 Hz-reading is shown.
- 10 Add or subtract the correction for the present gross cross section area.

Sound power level after the silencer

The sound power level after the silencer can be calculated for all frequencies by a logarithmical addition of:

"The self generated noise" and "The sound power level before the silencer".

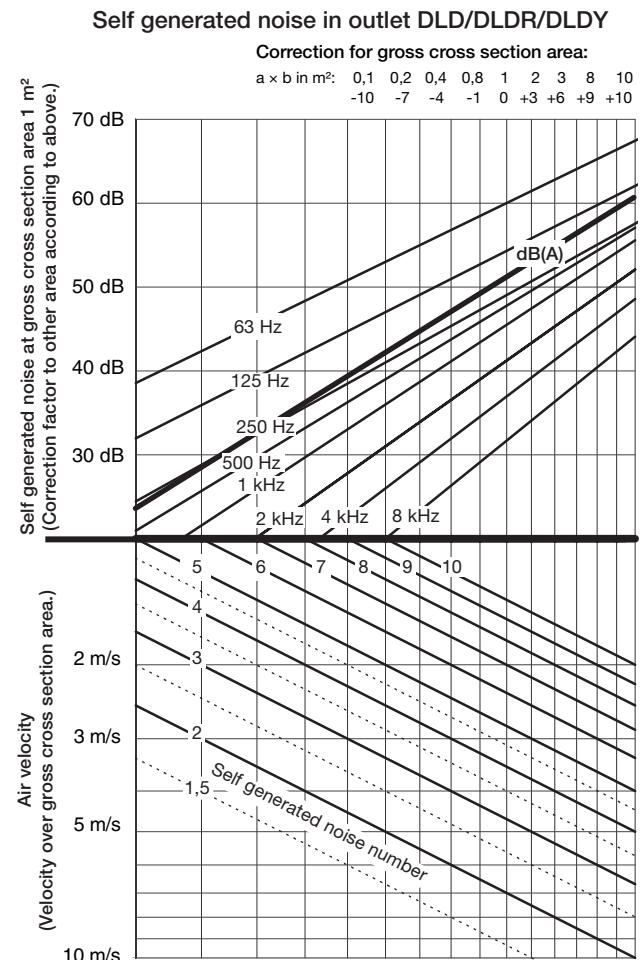
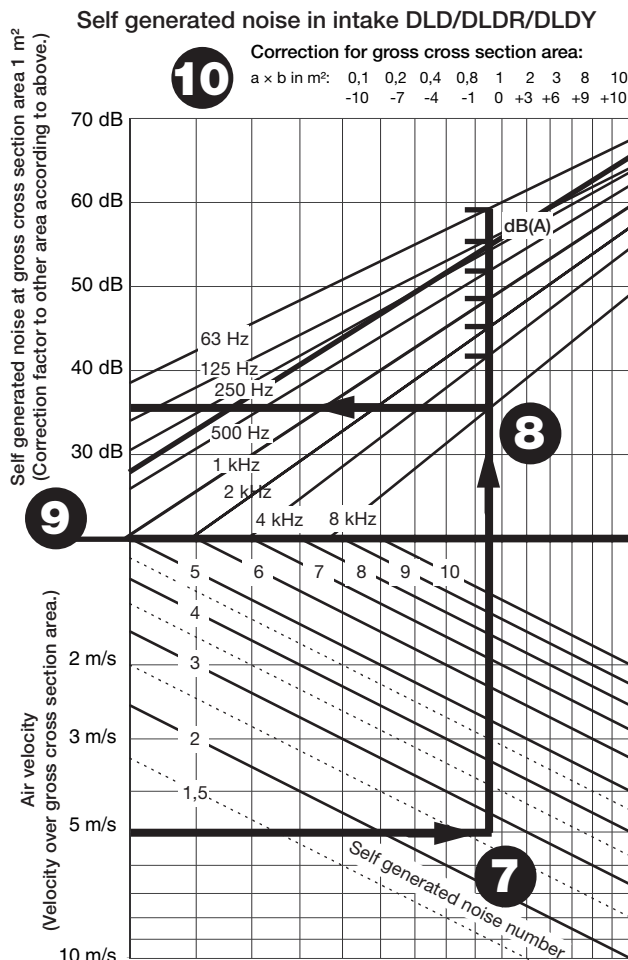
The shown example gives at 8000 Hz

$$\text{Self generated noise} = 28 \text{ dB} - 1 \text{ dB} = 27 \text{ dB}$$

Sound power level before the silencer - the attenuation:
44 dB - 17 dB = 27 dB

Logarithmic addition of 27 and 27 = 30 dB

(See graph for logarithmical addition on page 171).





Curved rectangular silencer

BDLD

Width a mm	Code	Leg length (x+y)/2 mm	Static insertion attenuation / octave band [dB]								Resistance number	Self generated noise number Intake/ Outlet
			63	125	250	500	1000	2000	4000	8000		
400	3006	150	1	6	16	17	17	14	13	15	3,3	2,0
400	3009	150	1	7	12	12	13	12	11	12	3,3	2,0
400	3010	150	1	8	14	14	14	13	12	13	7,1	2,7
400	3006	300	1	8	20	23	25	20	17	17	3,6	2,0
400	3009	300	1	8	15	16	17	14	13	13	3,4	2,0
400	3010	300	2	10	18	19	20	16	14	15	7,4	2,7
400	3006	450	1	9	23	29	34	26	21	20	3,8	2,0
400	3009	450	2	10	19	20	22	17	14	14	3,5	2,0
400	3010	450	2	12	22	24	26	20	17	16	7,6	2,7
500	3006	150	1	7	15	15	15	14	13	14	2,0	1,7
500	3007	150	2	8	21	22	20	17	17	19	6,0	2,5
500	3014	150	2	11	15	15	15	14	13	14	12,4	3,3
500	3006	300	1	8	18	19	21	18	16	16	2,1	1,7
500	3007	300	2	10	25	29	31	27	23	23	6,7	2,5
500	3014	300	3	13	20	21	21	18	16	16	12,8	3,3
500	3006	450	2	9	20	24	27	22	18	18	2,2	1,7
500	3007	450	3	12	29	35	42	36	29	27	7,5	2,5
500	3014	450	4	16	25	26	27	22	18	18	13,2	3,3
600	3006	150	2	7	14	14	14	14	14	14	1,5	1,5
600	3007	150	2	9	19	19	18	16	17	18	3,3	2,0
600	3008	150	3	11	26	27	24	20	20	22	9,6	3,0
600	3006	300	2	8	17	17	18	16	15	16	1,5	1,5
600	3007	300	2	10	23	25	27	23	20	21	3,6	2,0
600	3008	300	4	13	30	34	34	29	26	27	11,1	3,0
600	3006	450	2	9	19	21	23	19	17	17	1,6	1,5
600	3007	450	3	12	26	31	36	29	24	23	3,8	2,0
600	3008	450	4	15	34	40	45	39	33	31	12,7	3,0
700	3008	150	3	9	18	18	17	16	16	18	2,3	1,8
700	3011	150	4	12	22	22	20	18	19	20	8,0	2,8
700	3012	150	3	11	17	17	16	16	16	17	5,0	2,3
700	3008	300	3	11	21	22	23	21	19	20	2,4	1,8
700	3011	300	4	14	27	29	31	26	23	24	8,7	2,8
700	3012	300	4	13	21	22	22	20	18	19	5,2	2,3
700	3008	450	3	12	24	27	30	25	22	22	2,5	1,8
700	3011	450	5	16	31	36	41	34	28	27	9,4	2,8
700	3012	450	4	15	25	27	28	24	21	20	5,4	2,3
800	3008	150	3	10	17	17	16	16	17	17	1,8	1,6
800	3009	150	4	11	22	21	19	19	19	21	3,3	2,0
800	3012	150	4	12	20	20	18	18	18	20	4,7	2,3
800	3015	150	6	16	26	26	23	21	22	23	19,2	4,0
800	3008	300	3	11	20	21	21	20	19	19	1,8	1,6
800	3009	300	4	13	25	27	28	25	23	23	3,6	2,0
800	3012	300	4	14	24	26	26	23	22	22	5,0	2,3
800	3015	300	7	19	31	34	33	30	27	28	21,1	4,0
800	3008	450	3	12	23	25	27	23	21	20	1,9	1,6
800	3009	450	4	14	28	33	37	31	27	26	3,8	2,0
800	3012	450	5	16	28	31	33	28	25	24	5,3	2,3
800	3015	450	8	21	37	41	44	40	33	32	22,9	4,0
900	3008	150	3	10	17	16	15	16	17	17	1,5	1,5
900	3010	150	5	13	25	25	22	21	22	23	4,5	2,3
900	3011	150	7	15	30	31	26	23	25	27	9,6	3,0
900	3013	150	5	13	19	18	17	17	18	19	3,3	2,0
900	3008	300	3	11	19	19	20	19	18	19	1,5	1,5
900	3010	300	5	15	29	31	32	29	27	27	5,0	2,3
900	3011	300	7	17	34	38	37	33	31	32	11,1	3,0
900	3013	300	5	14	22	23	23	21	21	21	3,5	2,0
900	3008	450	3	12	22	23	24	22	20	20	1,6	1,5
900	3010	450	6	16	33	38	43	37	31	31	5,5	2,3
900	3011	450	7	19	38	44	47	42	37	36	12,7	3,0



Curved rectangular silencer

BDLD

Witdth a mm	Code	Leg lenght (x+y)/2 mm	Static insertion attenuation / octave band [dB]								Resistance number	Self generated noise number Intake/ Outlet
			63	125	250	500	1000	2000	4000	8000		
900	3013	450	5	16	26	28	29	25	23	23	3,6	2,0
1000	3009	150	5	12	20	19	18	18	19	20	2,0	1,7
1000	3010	150	6	13	24	23	20	20	21	23	3,3	2,0
1000	3011	150	7	15	28	28	24	23	24	26	6,0	2,5
1000	3014	150	9	18	32	32	27	24	26	29	19,2	4,0
1000	3009	300	5	13	23	23	23	22	22	22	2,1	1,7
1000	3010	300	6	15	27	29	29	27	25	26	3,6	2,0
1000	3011	300	7	16	32	35	35	32	30	30	6,7	2,5
1000	3014	300	10	21	37	39	37	34	32	33	22,0	4,0
1000	3009	450	5	14	25	27	29	26	24	24	2,2	1,7
1000	3010	450	6	16	31	35	38	33	29	28	3,8	2,0
1000	3011	450	7	18	36	41	45	42	36	35	7,5	2,5
1000	3014	450	10	24	42	46	48	43	39	38	24,8	4,0
1200	3010	150	6	13	19	17	17	18	19	20	1,5	1,5
1200	3011	150	7	14	22	21	19	20	21	22	2,1	1,7
1200	3012	150	8	15	26	24	21	22	24	25	3,3	2,0
1200	3014	150	11	18	34	34	28	26	29	31	9,6	3,0
1200	3018	150	12	21	34	34	28	26	29	31	19,2	4,0
1200	3010	300	6	14	21	21	21	21	21	21	1,5	1,5
1200	3011	300	7	15	25	25	25	24	24	24	2,3	1,7
1200	3012	300	8	17	29	30	30	28	27	28	3,6	2,0
1200	3014	300	11	20	38	41	38	36	35	36	11,1	3,0
1200	3018	300	13	24	39	41	38	36	35	36	22,0	4,0
1200	3010	450	6	15	24	24	25	24	23	22	1,6	1,5
1200	3011	450	7	16	28	30	31	29	27	26	2,4	1,7
1200	3012	450	8	18	32	36	39	34	31	31	3,8	2,0
1200	3014	450	11	22	42	47	49	45	41	40	12,7	3,0
1200	3018	450	14	27	44	48	49	45	41	40	24,8	4,0
1400	3012	150	8	15	21	19	18	20	22	22	1,6	1,6
1400	3013	150	9	16	24	22	20	22	23	25	2,3	1,8
1400	3014	150	10	17	27	26	22	23	26	27	3,3	2,0
1400	3015	150	12	19	31	30	25	25	28	30	5,0	2,3
1400	3016	150	13	20	35	34	28	27	30	33	8,0	2,8
1400	3020	150	16	24	36	36	29	28	31	34	19,2	4,0
1400	3022	150	11	20	23	21	19	21	23	24	5,0	2,3
1400	3012	300	8	16	24	23	23	23	23	24	1,7	1,6
1400	3013	300	9	17	27	27	26	26	26	27	2,4	1,8
1400	3014	300	10	19	31	32	31	30	29	30	3,6	2,0
1400	3015	300	12	20	35	36	35	34	33	33	5,5	2,3
1400	3016	300	14	22	39	41	38	37	36	37	9,2	2,8
1400	3020	300	17	27	41	43	39	38	37	38	22,0	4,0
1400	3022	300	11	22	27	26	25	25	25	25	5,2	2,3
1400	3012	450	8	17	26	27	27	26	25	25	1,8	1,6
1400	3013	450	9	19	30	32	33	31	29	29	2,5	1,8
1400	3014	450	10	20	34	38	39	36	33	32	3,8	2,0
1400	3015	450	12	22	39	42	46	42	38	37	6,1	2,3
1400	3016	450	14	24	43	47	49	46	42	41	10,4	2,8
1400	3020	450	17	29	46	50	50	47	44	43	24,8	4,0
1400	3022	450	11	24	31	31	31	29	28	27	5,4	2,3
1600	3013	150	9	16	23	20	19	21	23	24	1,8	1,6
1600	3015	150	11	18	28	26	22	24	26	28	3,3	2,0
1600	3016	150	13	20	31	30	25	26	28	30	4,7	2,3
1600	3017	150	14	21	35	34	27	28	31	33	7,1	2,7
1600	3023	150	10	20	21	19	17	20	22	22	3,3	2,0
1600	3025	150	17	26	33	32	26	27	30	32	19,2	4,0
1600	3013	300	9	17	25	24	24	24	25	25	1,8	1,6
1600	3015	300	12	20	31	32	31	30	30	31	3,6	2,0
1600	3016	300	13	21	35	36	35	34	33	34	5,2	2,3
1600	3017	300	15	23	39	40	38	37	36	37	8,0	2,7



Curved rectangular silencer

BDLD

Width a mm	Code	Leg length (x+y)/2 mm	Static insertion attenuation / octave band [dB]								Resistance number	Self generated noise number Intake/ Outlet
			63	125	250	500	1000	2000	4000	8000		
1600	3023	300	11	21	24	23	22	23	23	23	3,4	2,0
1600	3025	300	18	29	39	40	37	36	36	36	21,1	4,0
1600	3013	450	9	18	28	28	29	28	27	27	1,9	1,6
1600	3015	450	12	21	35	38	40	36	34	33	3,8	2,0
1600	3016	450	13	23	39	43	46	42	38	38	5,7	2,3
1600	3017	450	15	25	43	47	49	46	42	42	9,0	2,7
1600	3023	450	11	23	27	27	26	26	25	25	3,5	2,0
1600	3025	450	19	32	45	47	48	46	41	40	22,9	4,0
1800	3014	150	9	16	23	21	19	21	23	24	1,9	1,6
1800	3016	150	11	18	28	26	22	24	26	28	3,3	2,0
1800	3019	150	16	22	37	37	29	29	32	35	9,6	3,0
1800	3026	150	12	21	23	21	19	21	23	24	4,5	2,3
1800	3027	150	14	23	28	26	22	24	26	28	9,6	3,0
1800	3030	150	15	25	27	25	22	23	26	27	11,8	3,3
1800	3014	300	9	17	26	25	25	25	25	26	2,0	1,6
1800	3016	300	12	20	31	32	31	30	30	31	3,6	2,0
1800	3019	300	16	24	41	43	40	38	38	39	11,1	3,0
1800	3026	300	12	23	27	26	24	25	25	26	4,7	2,3
1800	3027	300	15	26	33	33	31	30	30	31	10,1	3,0
1800	3030	300	16	27	32	32	30	29	29	30	12,5	3,3
1800	3014	450	9	19	28	29	30	29	28	27	2,1	1,6
1800	3016	450	12	21	35	38	40	36	34	33	3,8	2,0
1800	3019	450	16	26	46	50	50	48	45	44	12,7	3,0
1800	3026	450	12	24	30	30	30	28	28	27	4,9	2,3
1800	3027	450	16	28	38	40	40	36	34	33	10,7	3,0
1800	3030	450	16	30	37	38	37	35	33	32	13,1	3,3
2000	3016	150	9	17	24	22	19	22	24	24	2,0	1,7
2000	3018	150	11	18	28	26	22	24	26	28	3,3	2,0
2000	3019	150	13	19	30	29	24	25	28	30	4,4	2,2
2000	3020	150	14	20	33	32	26	27	30	32	6,0	2,5
2000	3021	150	15	22	36	36	28	28	32	34	8,4	2,9
2000	3026	150	18	25	37	37	29	29	32	35	19,2	4,0
2000	3029	150	16	24	30	28	24	25	28	29	12,4	3,3
2000	3016	300	9	18	26	26	25	25	26	26	2,1	1,7
2000	3018	300	12	20	31	32	31	30	30	31	3,6	2,0
2000	3019	300	13	21	34	35	35	33	33	33	4,8	2,2
2000	3020	300	14	22	37	39	37	36	36	36	6,7	2,5
2000	3021	300	15	24	40	42	39	38	38	38	9,7	2,9
2000	3026	300	19	28	42	44	40	38	38	39	22,0	4,0
2000	3029	300	16	27	35	36	34	32	32	33	13,3	3,3
2000	3016	450	10	19	29	30	31	29	28	28	2,2	1,7
2000	3018	450	12	21	35	38	40	36	34	33	3,8	2,0
2000	3019	450	13	23	38	42	46	41	37	37	5,3	2,2
2000	3020	450	14	24	41	45	48	46	41	40	7,5	2,5
2000	3021	450	16	25	44	49	50	47	44	43	11,0	2,9
2000	3026	450	19	31	47	51	50	48	45	44	24,8	4,0
2000	3029	450	17	29	41	43	44	40	37	36	14,2	3,3

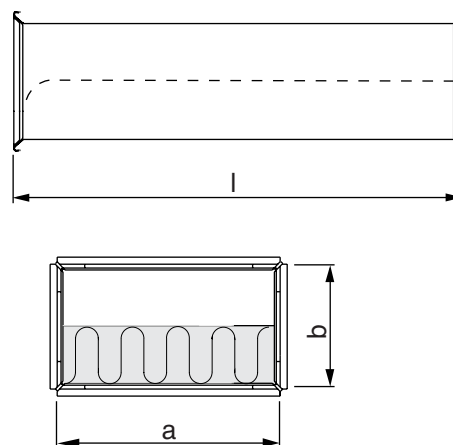


Low silencer

LRLB



Dimensions



Description

Rectangular silencer with low installation height.

Insulation with surface cover which can be cleaned with a rotating brush.

The silencer is provided with a joining profile at each end.

Ordering example

		LRLB	600	200	950
Product					
Width	a				
Height	b				
Length	l				

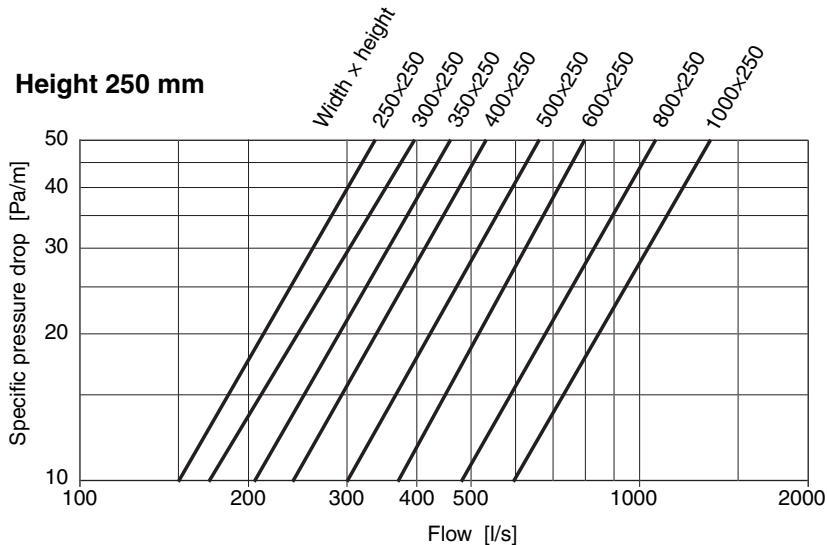
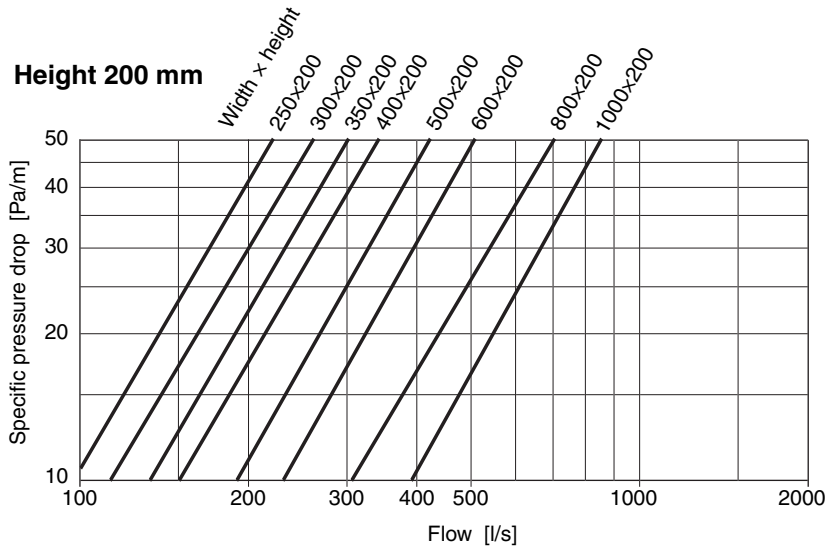
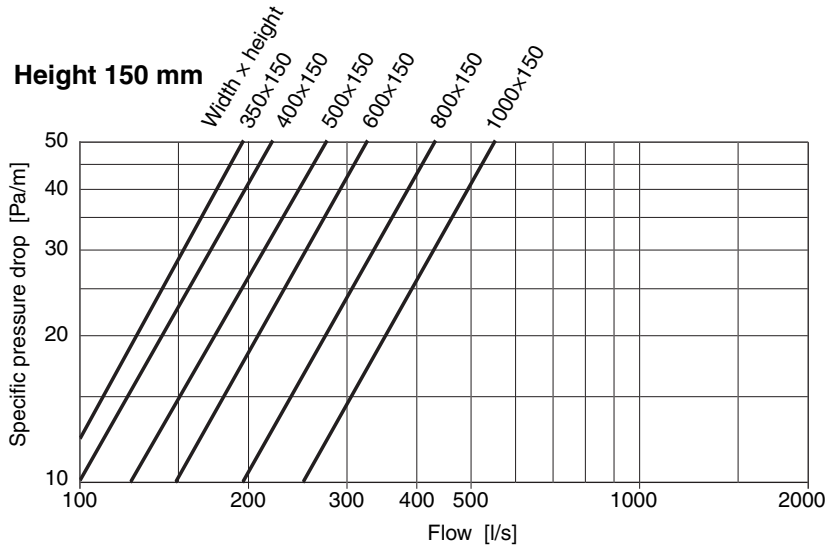
			Attenuation in dB for centre frequency Hz								Self gener- ated noise number Intake/ Outlet
a mm	b mm	l mm	63	125	250	500	1000	2000	4000	8000	
350-1000	150	650	3	7	15	19	20	17	16	14	3
350-1000	150	950	3	9	21	28	30	28	23	19	3
350-1000	150	1250	4	12	26	35	40	37	29	22	3
200-1000	200	650	4	6	11	13	15	14	12	12	2,5
200-1000	200	950	5	9	16	21	23	20	15	14	2,5
200-1000	200	1250	6	11	20	28	31	26	17	15	2,5
250-1000	250	650	5	8	10	13	12	11	10	9	2,5
250-1000	250	950	6	10	15	19	18	15	12	11	2,5
250-1000	250	1250	6	12	19	25	22	18	14	12	2,5
300-1000	300	650	4	8	11	15	12	13	11	10	3
300-1000	300	950	5	10	15	19	17	19	15	13	3
300-1000	300	1250	6	13	18	23	21	22	17	15	3
350-1000	350	650	4	7	7	11	10	9	8	7	2,3
350-1000	350	950	5	9	10	14	13	11	9	8	2,3
350-1000	350	1250	5	11	13	18	17	14	10	9	2,3
400-1000	400	650	3	6	6	10	12	14	12	11	1,9
400-1000	400	950	4	8	9	15	19	20	15	12	1,9
400-1000	400	1250	6	10	12	20	25	24	17	14	1,9



Low silencer

LRLB

Technical data





Low silencer

LRLB

Technical data

1

2

3

4

5

6

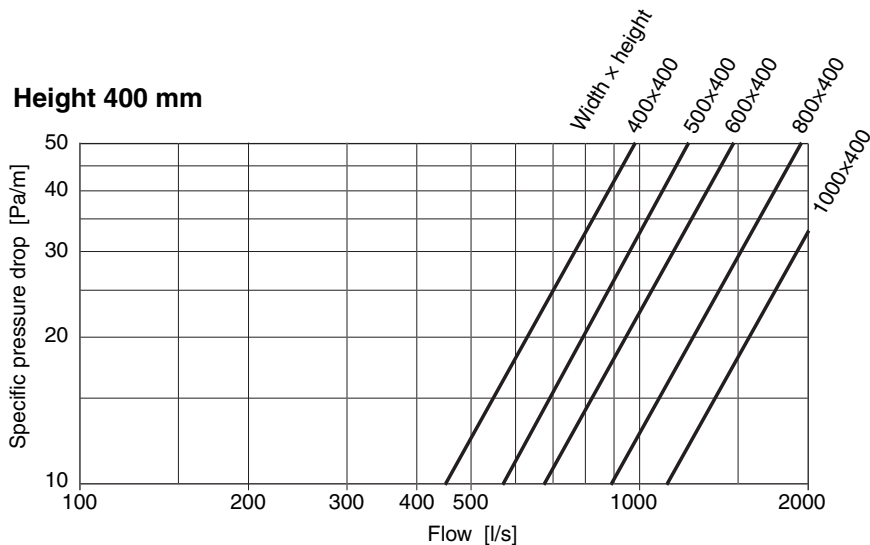
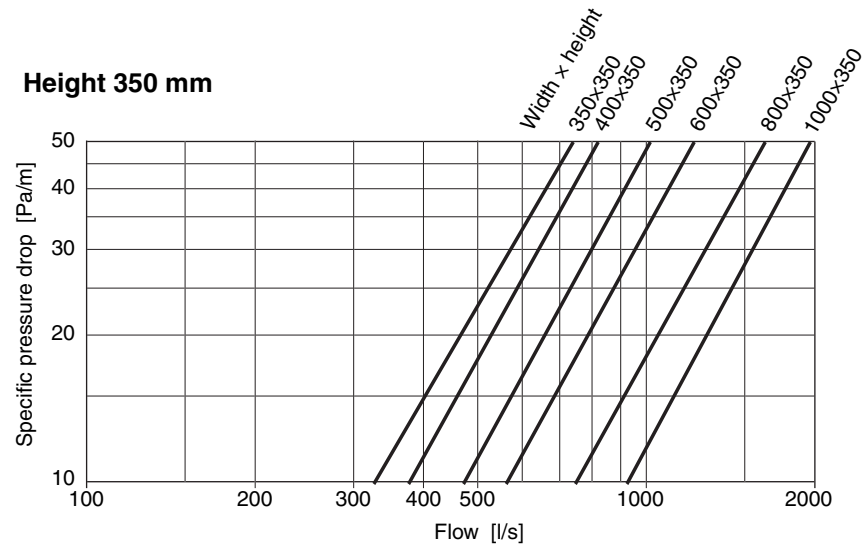
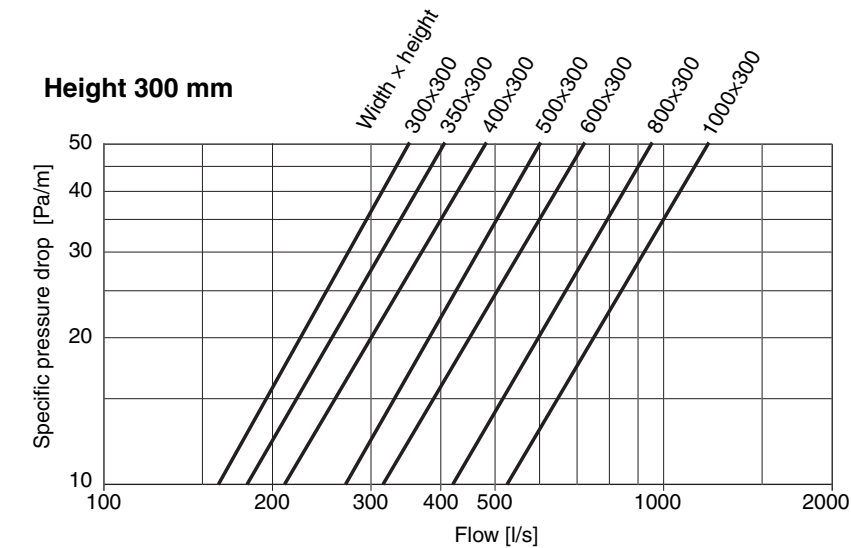
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Dampers and Measure units



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Content – Dampers and Measure units

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Content – Dampers

Tightness classes

Tightness class				
0	1	2	3	4
To regulate		To shut-off		
DRU DSU Ø63–315 PSDRU TDRU TASU DAU DA2EU DAVU	DSU Ø400–1000 TDSU	TATU TATBU	DTPU Ø400–630 DTPU Ø80–315	DTU Ø400–630 DTHU Ø400–630 DTBU Ø400–630 DTBCU Ø400–630 DTU Ø80–315 DTHU Ø80–315 DTBU Ø80–315 DTBCU Ø80–315

Summary, motorized dampers

This is the standard range. Other combinations of dampers and motors can be ordered.

Motor	Forward Return	el el	el el	el el	el spring	el spring	el el	el el	press. air spring	press. air spring	press. air spring
	Regulating	2 set-points	2 set-points	2 set-points	2 set-points	2 set-points	2 set-points	continuous	2 set-points	2 set-points	2 set-points
	Denomination	LM 24A-F LM 230A-F	NM 24A-F NM 230A-F	SM 24A SM 230A	LF 24 LF 230	AF 24 AF 230	LM 24A LM 230A	LM 24A-SR	AK 31 P	AK 41 P	AK 42 P
Original damper		Motorized damper									
DTU		DTBU Ø80–315	DTBU Ø400–500	DTBU Ø630	DTBCU Ø80–315	DTBCU Ø400–630			DTPU Ø80–200	DTPU Ø250–315	DTPU Ø400–630
TATU			TATBU Ø100–400								
DAU							DA2EU Ø80–315	DAVU Ø80–315			

Accessories to be used at installation of damper motors on site

Motor	Damper type	
	Normal damper with knob and normal spindle	DTHU damper with KOMHY and long spindle
Belimo LM	LÖMOK + VREDF 15 60	– (Motor fits directly)
Belimo NM	LÖMOK + VREDF 15 100 or KOMHY + VREDF 15 60	– (Motor fits directly)
Belimo SM	KOMHY + VREDF 15 60	– (Motor fits directly)
Belimo LF	KOMHY + VREDF 15 100	– (Motor fits directly)
Belimo AF	KOMHY + VREDF 15 100	– (Motor fits directly)
Sauter AK 31 P	KOMHY + VREDF 15 100 + MSATS AK 31 P	MSATS AK 31 P
Sauter AK 41 P	KOMHY + VREDF 15 100 + MSATS AK 41 P	MSATS AK 41 P
Sauter AK 42 P	Special shelf + VREDF 15 100 + MSATS AK 42 P	Motor does not fit



General

Dampers for different purposes are used in a ventilation system

Regulating dampers are used to balance the plant so that the wanted air flow is achieved.

The damper blade is normally designed so that a certain flow of air can always leak through, even if the damper is closed. This makes the sensitivity to angle changes less than for a shut-off damper.

Dampers are available in both manual and automatic versions. The manual dampers are adjusted when the installation is commissioned, and are cheaper than the automatic ones. On the other hand, manual dampers need many more hours of adjustment, and means of flow measurement. For this reason, some dampers have measuring nozzles. In large systems, or where pressure variations occur, it is better to use automatic dampers. These are also referred to as constant flow dampers.

Shut-off dampers are used to save energy, to prevent the spread of poisonous gas etc. These dampers often have rubber seals on the damper blade. The damper can either be designed as a straight piece of ducting, or as a T-piece to switch the air flow from one duct to another. The blade is normally either fully open or fully closed.

Tightness

Two types of tightness are applicable to dampers:

1 Tightness to the environment

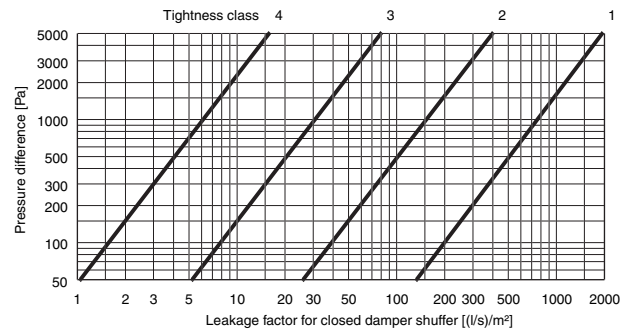
This specifies the magnitude of the air leakage through joints and leaks in the duct sides in relation to the duct surface. This leakage is classified into tightness classes A, B, C and D.

Most dampers can be used in installations/systems which require them to maintain tightness class D. Please refer to the Safe section.

2 Tightness past a closed damper shutter

This refers to the amount of air leaking past the closed blade, in relation to shutter area. This relationship is classified into five sealing classes 0–4. There is no tightness requirement for class 0. The classes 0 and 1 are regulating dampers. The highest class, tightness class 4, refers to very tight shut-off dampers.

Tightness past the closed damper blade



Motorized dampers

Dampers can be supplied ex works with actuators installed. Various types of actuators are available, both electric and pneumatic.

Material

Standard

Bushings are made from polyamide. The bushings can withstand constant temperatures of up to 150 °C.

Special

If a higher corrosivity class is required, the dampers can be supplied with a polyester coating, or made from aluminium or stainless steel. The blades can be provided with silicone rubber seals for higher temperature operation. The dampers can then withstand constant temperatures of 150 °C and 200 °C intermittent. In these cases, please contact Lindab.

Blade setting

DRU and DSU dampers of dimensions Ø63–160 are supplied with their blades completely open, to facilitate adjustment preparations. Dampers of other dimensions are supplied with closed blades to prevent transport damage.

Cleaning of duct system

Most dampers have components which obstruct the duct system to a greater or lesser extent, and thus obstruct or prevent cleaning.

Please refer to page 121.



Regulating damper

DRU

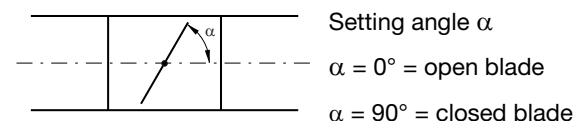


Description

Regulating damper

Has a turning, cut-off blade. The blade is stepless adjustable 0–90°. The damper admits an insulation thickness of approx. 50 mm.

The blade is designed to generate a minimum of noise. The noise is approx. the same as for a perforated blade. But the blade is less sensitive to clogging since it lacks perforations.



Ø 80-630

The noise generation is measured at the Swedish National Testing and Research Institute in a reverberation room in accordance with ISO 5135 and ISO 3741.

- The blade is set with a handle in a protective cup.
- The blade angle is read from an embossed scale on the edge of the cup.
- The blade is locked with two screws, type Pozidriv (PZD2).
- The cup can be completed with the special insulation cup IK for insulation thicker than 50 mm.
- The damper is also available prepared for motor.
- The damper is also available with motor.

Ø 400-630

- Have a strong handle.

Ø 500-630

- Have reinforced blade.
- Have reinforced stop beads.

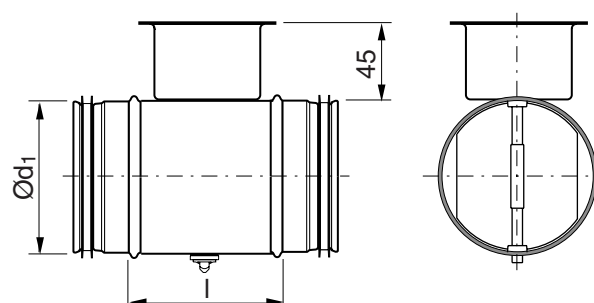
Ø 800-1000

- Have further reinforced handle.
- Have further reinforced blade.
- Have reinforced shaft.
- Have reinforced locking with strong wing nut.

Reinforced blade



Dimensions



Ød ₁ nom	l mm	m kg	Sealing class past closed blade
80	100	0,34	0
100	100	0,40	0
112	100	0,43	0
125	100	0,46	0
140	100	0,54	0
150	100	0,60	0
160	100	0,65	0
180	100	0,69	0
200	100	0,80	0
224	100	0,90	0
250	100	1,28	0
280	100	1,40	0
300	100	1,62	0
315	100	1,70	0
355	100	2,01	0
400	100	2,82	0
450	100	3,70	0
500	115	4,70	0
560	115	5,51	0
600	115	5,90	0
630	115	6,21	0
800	230	18,2	0
1000	230	24,4	0

Ordering example

	DRU	125
Product		
Dimension Ød ₁		



Regulating damper

DRU

Technical data

Pressure drop graphs with noise data for dimensioning

The solid curves show the pressure drop, Δp_t , over the damper as a function of flow q , and setting angle α .

The dashed curves give the A-weighted sound power data, L_{WA} , in dB to the duct.

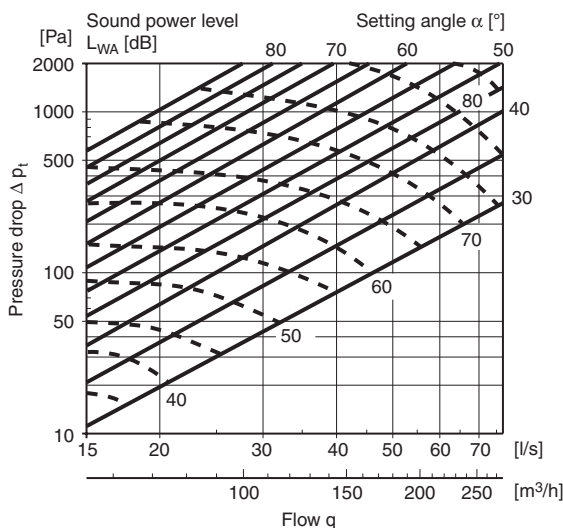
Example

Given Dimension Ø100
 Flow 60 l/s
 Pressure drop 200 Pa

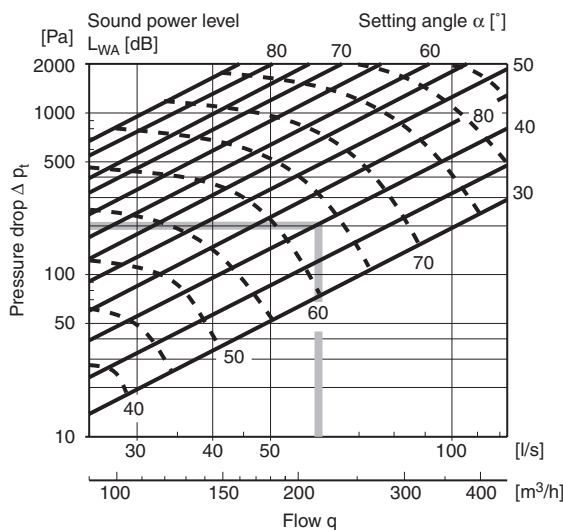
Obtained from graph

Setting angle 40°
 Sound power level 63 dB (A)

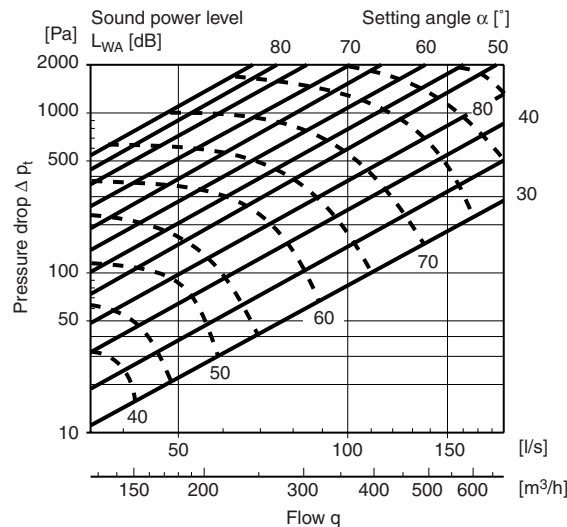
Ø80



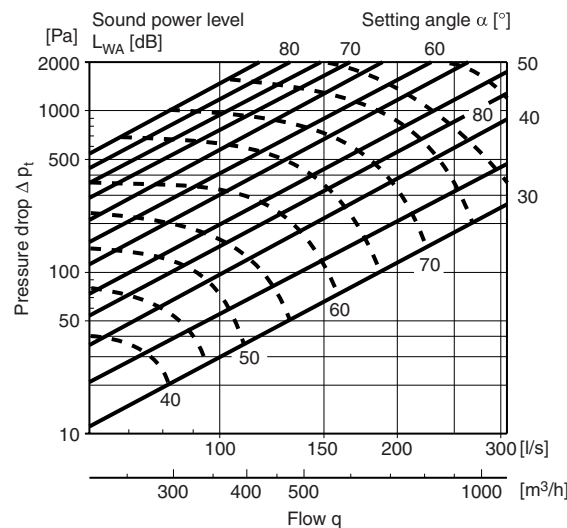
Ø100



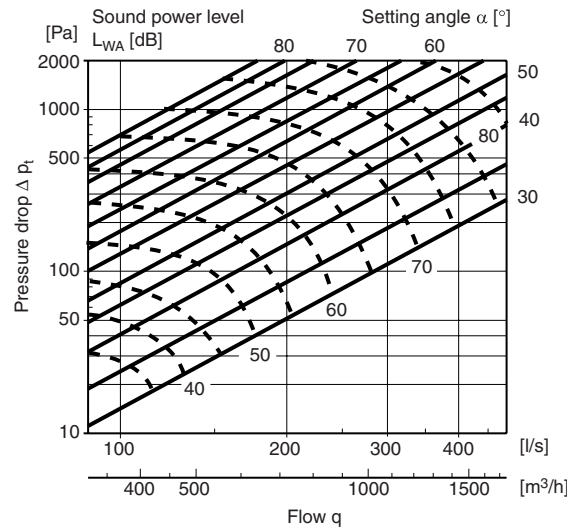
Ø125



Ø160



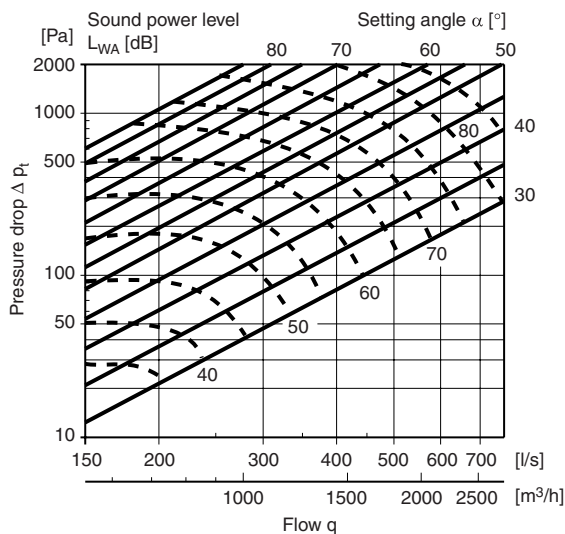
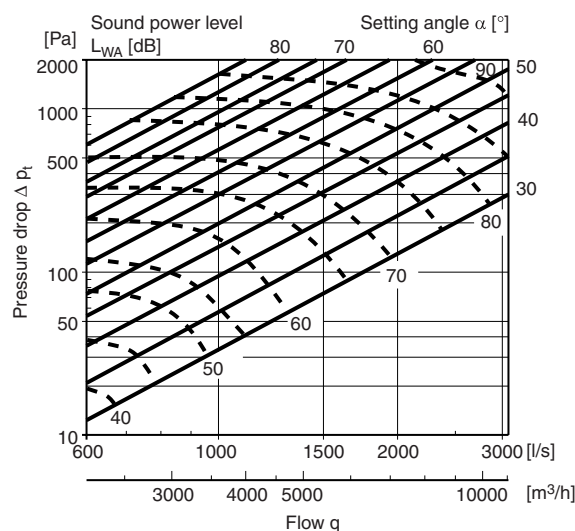
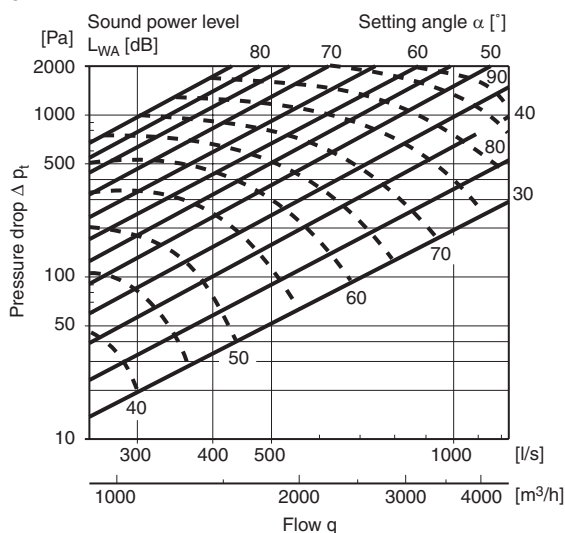
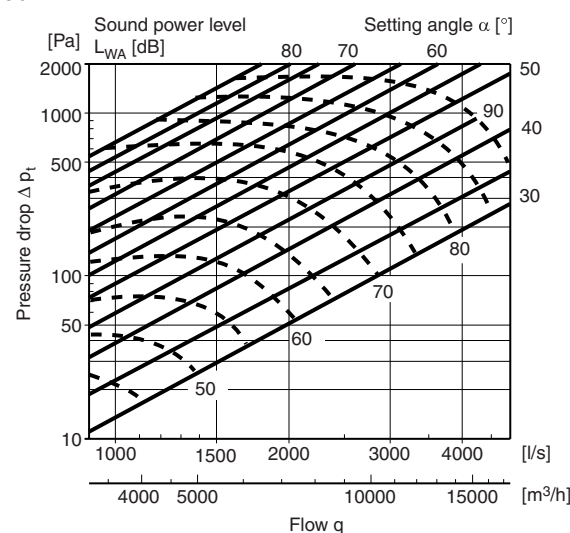
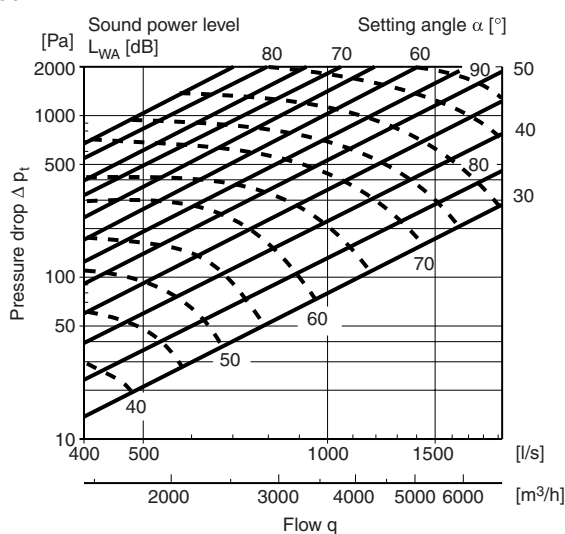
Ø200





Regulating damper

DRU

Ø250

Ø500

Ø315

Ø630

Ø400




Regulating damper

DRU

Sound data for DRU

Sound power level L_{Wv} [dB] to duct in the octave bands 1–8, 63–8000 Hz, as a function of dimension, flow and pressure drop.

The methods ISO 5135 and ISO 3741 have been used to measure these sound values, as recommended by the Swedish National Testing and Research Institute.

Ød ₁	Pressure drop [Pa]	Velocity app. 3 [m/s]								Velocity app. 6 [m/s]								Velocity app. 9 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 15 [l/s]								Flow 30 [l/s]								Flow 45 [l/s]							
	500	65	65	65	65	59	55	49	46	67	67	67	67	60	57	50	47	70	70	70	70	63	60	53	49
	300	63	63	60	60	54	48	42	36	66	66	63	63	56	50	44	38	70	70	67	67	60	54	47	40
	200	63	63	60	54	51	43	34	29	65	65	62	56	53	44	35	30	70	70	67	60	57	48	38	32
	100	55	60	53	48	43	30	23	15	59	65	57	51	46	32	24	16	66	72	63	57	51	36	27	18
	50	56	54	47	43	36	25	16	9	59	59	52	47	40	27	17	10	-	-	-	-	-	-	-	-
100		Flow 25 [l/s]								Flow 50 [l/s]								Flow 75 [l/s]							
	500	67	64	64	57	54	48	48	48	72	68	68	62	59	52	52	52	78	75	75	67	64	57	57	57
	300	62	61	60	54	51	45	42	42	68	68	68	59	56	50	47	47	75	74	73	65	61	54	51	51
	200	58	58	58	50	48	40	37	37	65	65	64	57	54	45	42	42	74	73	73	64	59	50	47	46
	100	58	55	53	46	41	34	26	24	68	66	62	54	48	40	31	29	79	75	71	62	56	46	36	33
	50	55	53	48	42	35	26	22	18	69	67	60	53	44	33	28	22	-	-	-	-	-	-	-	-
125		Flow 40 [l/s]								Flow 80 [l/s]								Flow 120 [l/s]							
	500	71	68	65	59	56	50	50	47	76	73	70	63	60	53	53	50	83	79	76	68	65	58	58	54
	300	66	66	60	55	52	46	43	40	73	73	67	60	57	51	48	44	79	79	72	66	62	55	52	48
	200	65	62	57	51	46	41	38	38	74	71	65	59	53	47	43	43	82	78	71	65	58	51	48	48
	100	64	59	53	47	39	34	29	27	77	70	63	55	47	40	35	32	84	78	70	61	51	45	39	35
	50	63	54	50	41	36	27	25	20	80	68	60	51	43	34	32	26	-	-	-	-	-	-	-	-
160		Flow 60 [l/s]								Flow 120 [l/s]								Flow 180 [l/s]							
	500	68	67	64	59	55	53	52	51	72	71	68	62	59	55	54	53	78	77	74	67	63	60	59	58
	300	63	62	59	55	52	49	46	45	67	66	64	58	55	52	49	48	75	75	71	65	61	58	54	54
	200	61	58	56	50	48	42	40	40	68	65	62	56	53	47	44	44	76	73	69	63	59	53	50	50
	100	59	54	50	45	40	35	33	31	70	64	60	53	48	42	39	38	77	73	69	61	54	48	45	44
	50	54	50	46	37	33	29	25	25	69	64	58	48	42	37	32	32	-	-	-	-	-	-	-	-
200		Flow 100 [l/s]								Flow 200 [l/s]								Flow 300 [l/s]							
	500	70	64	61	55	52	52	55	55	75	68	65	59	55	55	59	59	83	76	72	65	61	61	65	65
	300	67	62	56	50	48	45	48	48	74	68	62	55	52	51	53	52	84	78	71	64	61	57	60	60
	200	62	57	55	47	44	42	42	42	71	65	62	53	50	48	47	47	83	76	71	62	58	55	54	54
	100	57	52	48	41	39	36	34	34	69	64	58	50	47	44	42	42	83	76	69	59	56	53	50	50
	50	51	45	41	36	32	32	28	28	63	56	51	44	39	39	34	34	-	-	-	-	-	-	-	-
250		Flow 150 [l/s]								Flow 300 [l/s]								Flow 450 [l/s]							
	500	69	66	59	53	50	54	53	52	71	67	61	56	53	56	55	54	78	75	68	61	58	61	60	59
	300	63	61	55	50	47	46	48	47	66	63	57	51	48	47	51	48	75	72	65	59	55	55	59	55
	200	59	57	52	46	44	41	44	44	63	60	55	49	46	44	46	46	72	69	63	57	55	54	54	53
	100	56	52	45	41	38	36	34	31	63	57	51	45	43	40	38	35	75	69	60	56	52	49	45	42
	50	52	48	40	38	34	30	28	24	61	56	47	45	40	38	33	28	-	-	-	-	-	-	-	-
315		Flow 250 [l/s]								Flow 500 [l/s]								Flow 750 [l/s]							
	500	68	65	59	53	50	50	53	50	74	71	65	58	55	55	58	55	82	78	71	64	60	60	54	60
	300	62	59	54	49	46	45	49	43	69	66	60	54	51	51	54	48	78	74	68	61	57	57	61	54
	200	60	55	50	45	43	40	43	40	70	64	58	52	49	48	49	46	79	72	66	59	58	57	56	52
	100	54	52	45	41	38	36	36	31	66	63	55	50	47	46	44	39	76	72	64	57	54	52	50	44
	50	49	49	43	38	34	32	30	24	64	64	56	49	45	42	40	32	-	-	-	-	-	-	-	-
400		Flow 400 [l/s]								Flow 800 [l/s]								Flow 1200 [l/s]							
	500	79	73	67	62	57	60	59	58	82	75	68	65	59	62	61	60	88	81	74	70	62	66	65	64
	300	72	66	60	54	51	51	51	51	77	70	64	58	56	55	54	54	84	77	70	63	62	61	60	60
	200	67	62	56	50	48	48	48	45	74	68	62	56	53	52	52	49	82	75	68	61	60	59	58	54
	100	61	56	49	44	42	39	39	34	72	66	58	53	49	47	46	40	83	76	67	60	58	55	53	47
	50	57	52	44	39	37	35	34	26	72	67	56	50	47	44	44	33	-	-	-	-	-	-	-	-
500		Flow 600 [l/s]								Flow 1200 [l/s]								Flow 1800 [l/s]							
	500	84	77	70	64	63	62	61	60	85	78	71	65	64	63	62	61	91	84	76	68	67	68	68	67
	300	77	70	64	58	54	54	58	58	80	74	67	60	57	57	60	60	88	80	73	66	62	62	66	66
	200	71	65	59	53	50	50	50	47	77	70	64	58	56	55	54	51	85	78	72	65	63	61	60	57
	100	63	58	53	47	46	44	42	37	72	66	60	55	53	51	49	43	82	75	70	63	60	57	55	50
	50	59	52	47	44	42	38	38	31	71	63	57	54	51	46	46	37	-	-	-	-	-	-	-	-
630		Flow 1000 [l/s]								Flow 2000 [l/s]								Flow 3000 [l/s]							
	500	88	80	73	69	66	64	63	62	90	83	75	71	68	67	65	64	96	88	80	76	72	72	70	68
	300	82	75	69	65	62	61	58	55	84	77	70	67	63	62	61	56	92	84	77	73	69	68	68	61
	200	78	72	65	62	59	55	55	49	80	74	67	64	60	57	57	50	89	82	75	71	67	63	63	56
	100	71	66	59	54	50	46	45	40	78	71	66	59	56	49	47	44	90	82	76	68	63	58	55	50
	50	66	58	53	48	43	40	39	30	77	68	62	57	51	45	48	36	-	-	-	-	-	-	-	-



Regulating damper

DRU

Ød ₁	Pressure drop [Pa]	Velocity app. 12[m/s]								Velocity app. 15[m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 60 [l/s]								Flow 75 [l/s]							
	500	75	75	75	75	68	64	56	53	80	80	80	80	72	68	60	56
	300	75	75	71	71	64	57	50	43	79	79	75	75	68	60	53	45
	200	75	75	71	65	61	51	41	34	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 100 [l/s]								Flow 120 [l/s]							
	500	84	81	80	72	68	62	61	61	88	85	84	76	72	65	64	64
	300	81	80	79	70	67	59	56	55	86	85	84	74	70	62	59	58
	200	80	80	79	69	66	55	51	51	-	-	-	-	-	-	-	-
125	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 160 [l/s]								Flow 180 [l/s]							
	500	89	85	81	73	69	62	62	58	91	87	83	75	71	63	63	59
	300	86	86	79	71	68	60	56	53	89	88	81	73	69	62	58	54
160	200	89	85	78	70	63	56	52	52	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 240 [l/s]								Flow 300 [l/s]							
	500	84	84	80	72	68	65	65	65	89	89	85	77	73	69	69	69
200	300	81	81	78	70	67	63	59	59	87	87	83	76	72	68	64	64
	200	84	80	77	69	66	58	55	55	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 400 [l/s]								Flow 450 [l/s]							
	500	90	82	78	72	67	66	71	70	93	85	81	73	71	70	74	73
250	300	92	84	78	71	67	63	67	66	95	87	81	72	68	66	69	68
	200	90	83	79	69	65	62	61	60	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 600 [l/s]								Flow 750 [l/s]							
	500	87	83	76	68	64	68	68	68	94	90	82	74	70	74	74	74
315	300	84	80	73	67	65	64	62	61	91	87	80	72	70	69	72	68
	200	82	79	72	64	63	63	62	61	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 1000 [l/s]								Flow 1200 [l/s]							
	500	89	85	77	69	68	67	69	65	92	88	80	72	71	70	72	68
400	300	85	81	74	66	64	64	66	59	89	85	78	70	68	68	70	62
	200	86	79	72	65	63	62	64	58	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 1600 [l/s]								Flow 1800 [l/s]							
	500	95	87	79	75	67	71	70	69	98	90	82	78	70	74	73	72
500	300	91	83	76	69	67	66	65	64	94	86	79	71	70	69	68	67
	200	89	82	75	69	67	64	63	60	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 2400 [l/s]								Flow 3000 [l/s]							
	500	96	88	80	72	70	73	72	71	102	94	85	78	75	77	77	76
630	300	93	85	78	70	66	66	70	70	99	91	83	74	70	70	74	74
	200	91	84	76	70	68	66	65	61	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 4000 [l/s]								Flow 4500 [l/s]							
	500	103	95	86	82	77	77	76	73	107	98	90	85	81	81	80	76
630	300	100	91	83	79	75	75	74	66	105	96	88	83	79	79	79	70
	200	98	90	82	78	74	70	70	62	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Damper with flow meter

IRIS



Description

The IRIS damper with flow meter offers measurement of the air flow. Stable function, even in the case of air flow disturbances.

- Low noise level
- Works independent of flow direction
- Can be opened 100%, making the ducts easy to clean
- Tightness class C
- Retains the set position without locking. However, dimension 80 must be locked with locking screws.

Install the IRIS damper at a suitable distance from sources of disturbance. See technical data at page 190. The IRIS damper must not be loaded with the weight of adjoining ducts. This applies particularly in the case of vertical installation.

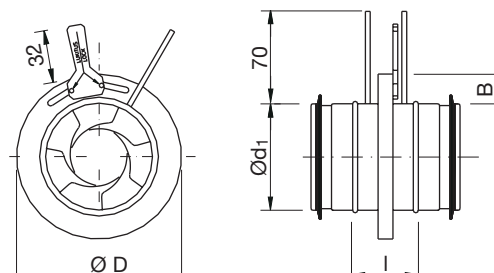
The control panels form a measuring flange that facilitates measurement of the airflow.

The pressure drop recorded over the device's measuring nozzles gives the air flow, either with the aid of the measurement graph or calculating using the k-factor.

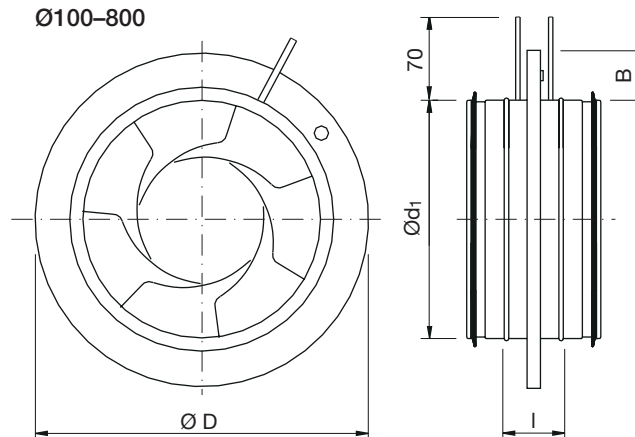
Measurement graphs and k-factors can be found on the device and at www.lindab.com. The air flow is adjusted using the adjustment nut (handle at size 80).

Dimensions

Ø80



Ø100-800



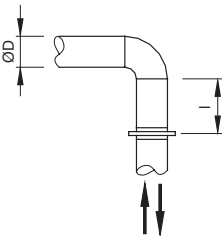
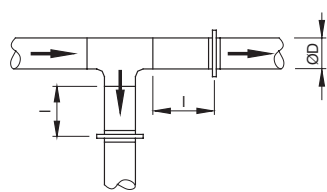
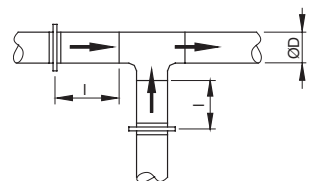
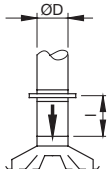
Ød ₁ nom	ØD mm	B mm	I mm	m kg
80	125	22	50	0,5
100	165	32	60	0,6
125	188	32	60	0,9
160	230	35	60	1,2
200	285	42	60	1,7
250	335	42	60	2,3
315	410	47	70	3,7
400	525	62	70	6,7
500	655	77	70	9,8
630	815	92	70	15,8
800	1015	107	70	25,0

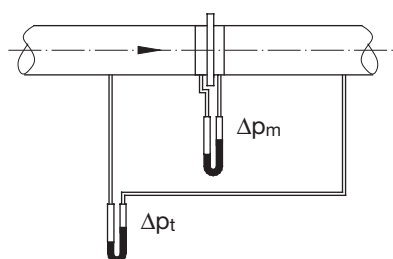


Damper with flow meter

IRIS

Technical data

1	l_1 = straight duct	Method error $\pm 7\%$
2		$l \geq 1 D$
3		$l \geq 4 D$
4		$l \geq 2 D$
5	With an ideal flow, the method error is 5%.	
6		$l \geq 2 D$



Designations

q	air flow	l/s
L_{p10A}	sound pressure level at equivalent sound absorption area of 10 m ² (Room damping 4 dB)	
L_W	sound output level	$dB(A)$
K_{oct}	correction	dB
Δp_t	total pressure drop	Pa
v	mean air flow velocity	m/s

Sound correction K_{oct} [dB]

$\varnothing d_1$ nom	Octave band, mean frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
80	10	16	12	9	5	-1	-6	-23
100	25	21	16	9	4	-6	-12	-25
125	17	17	13	7	1	-4	-6	-17
160	19	18	14	6	-1	-6	-13	-25
200	20	17	12	5	-2	-5	-14	-26
250	16	12	8	3	1	-4	-17	-32
315	24	12	5	0	1	-2	-13	-27
400	15	9	6	2	-1	-4	-9	-13
500	14	7	4	1	-1	-4	-8	-11
630	15	7	3	2	-1	-5	-9	-11
800	9	5	3	3	-1	-6	-10	-13
Tol. $\pm$	6	3	2	2	2	2	2	3

The sound output levels in the duct for each octave band are obtained by adding the corrections K_{oct} from the adjoining table to the sound pressure level L_{p10A} , dB(A), which is found in the dimensioning diagrams, in accordance with the formula:

$$L_{Woct} = L_{p10A} + K_{oct}$$

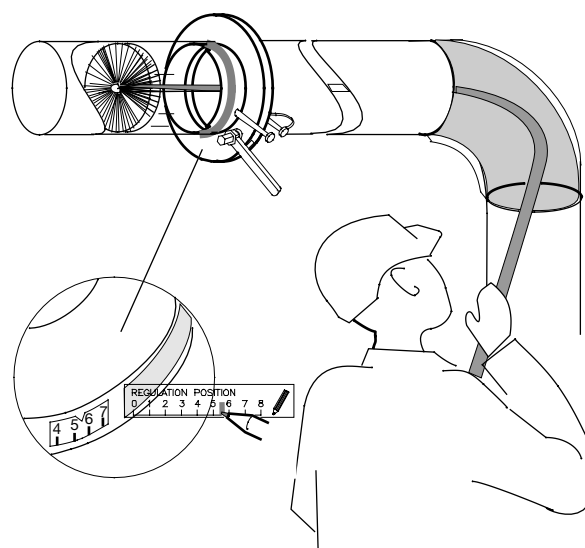
The correction K_{oct} is an average value in IRIS's working range.

Please note that the sound pressure levels reported in graphs take into consideration a room damping of 4 dB in the room that the damper is serving.

When calculating the sound output level as described above, however, the damper's sound output to the duct is obtained. This means that, in the sound calculation, the room damping shall be deducted when entering the room.

The dB(A) value in the graphs is only there to check the approximate sound pressure level.

Cleaning



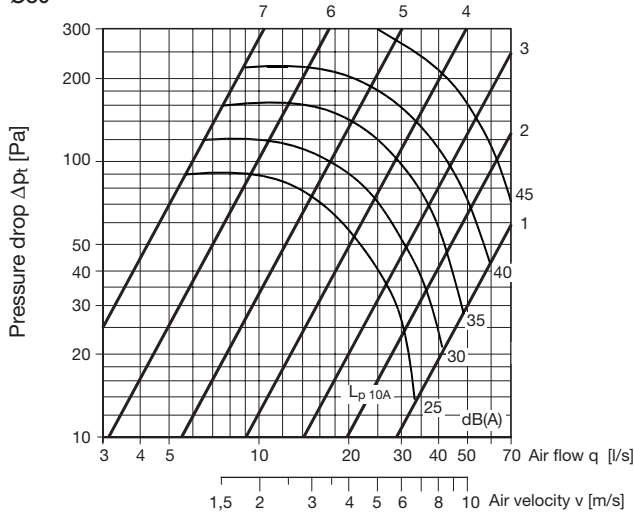


Damper with flow meter

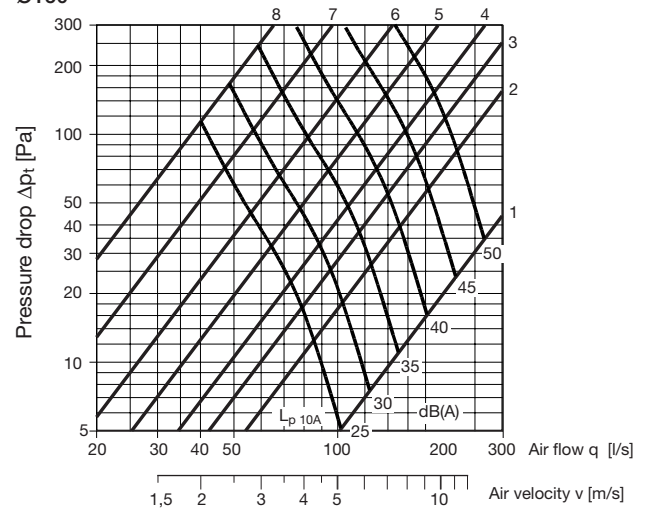
IRIS

Pressure drop graph with sound data for dimensioning

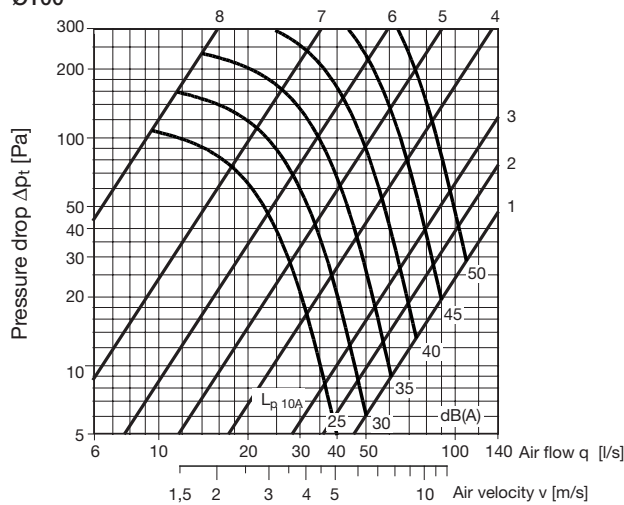
Ø80



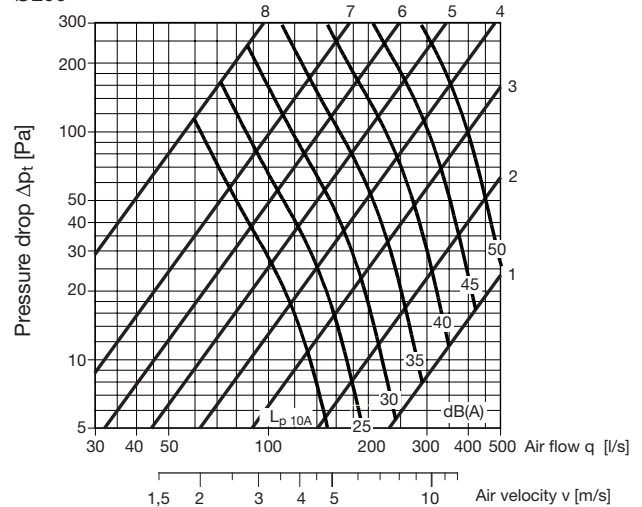
Ø160



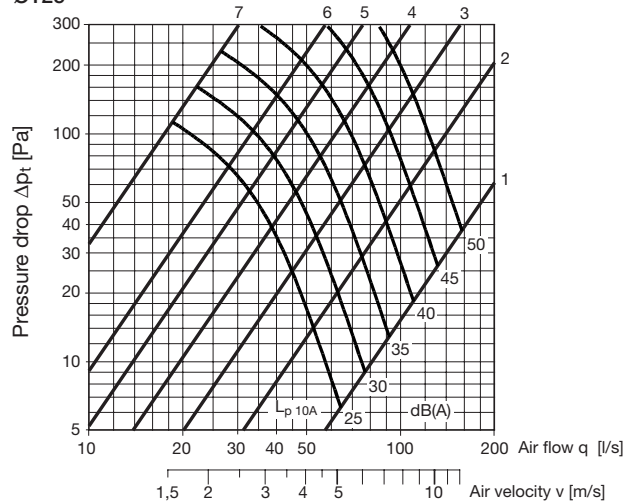
Ø100



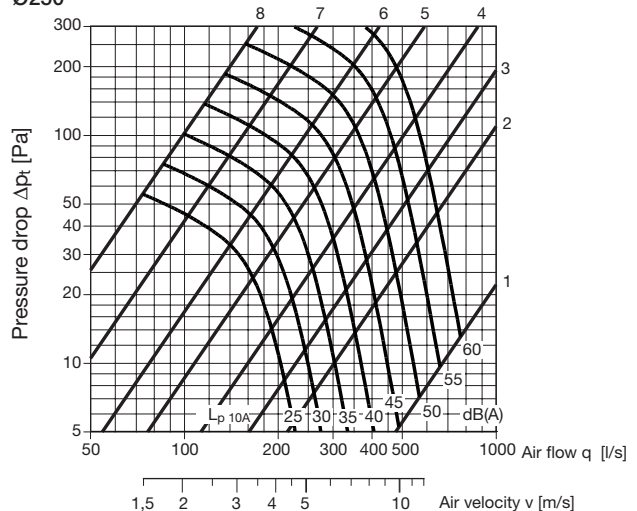
Ø200



Ø125



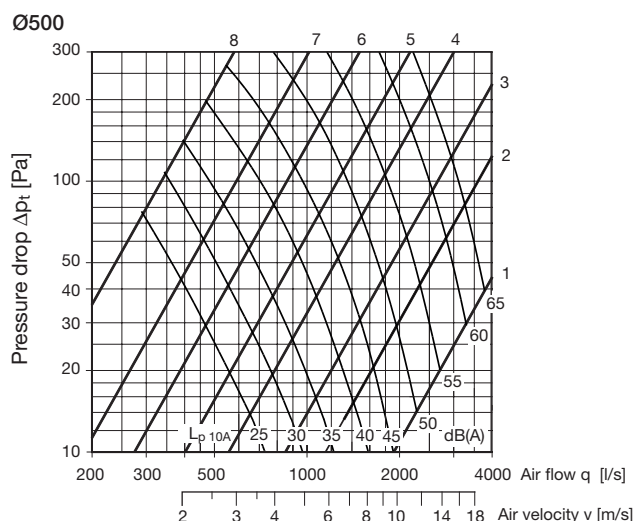
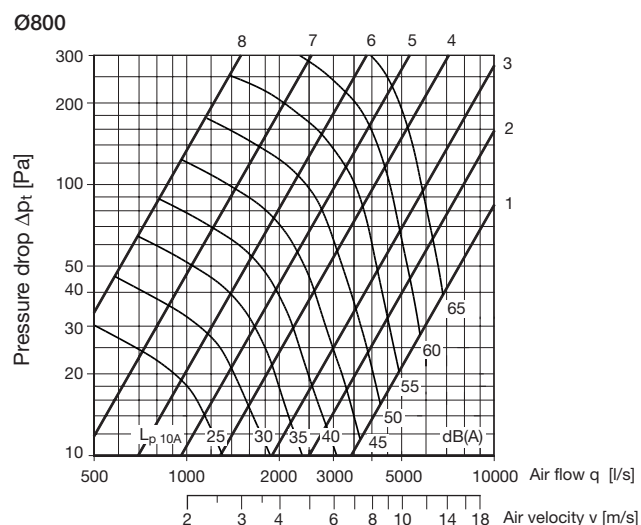
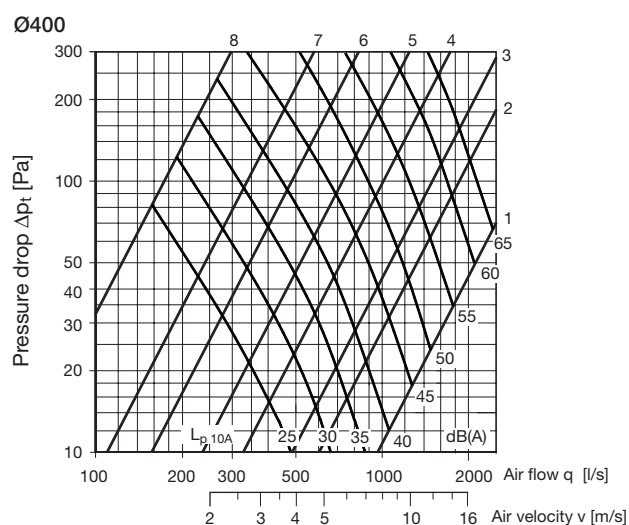
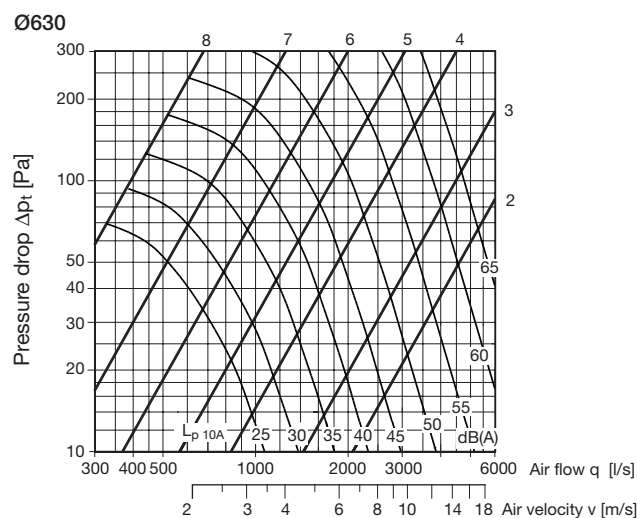
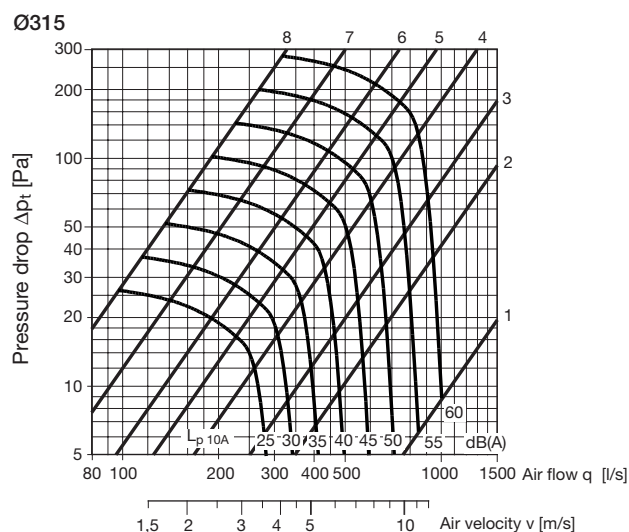
Ø250





Damper with flow meter

IRIS





Shut-off damper

DSU

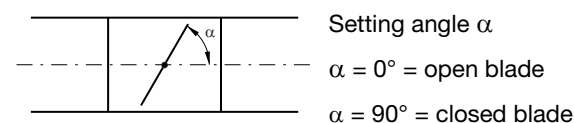


Description

Shut-off damper

Has a turning, circular blade. The blade is stepless adjustable 0-90°. The damper is used when you have lower demands for shut-off capacity. The damper admits an insulation thickness of approx. 50 mm.

The damper can on occasions be used for regulation.



Ø 80-630

- The blade is set with a handle in a protective cup.
- The blade angle is read from an embossed scale on the edge of the cup.
- The blade is locked with two screws, type Pozidriv (PZD2).
- The cup can be completed with the special insulation cup IK for insulation thicker than 50 mm.
- The damper is also available prepared for motor.
- The damper is also available with motor.

Ø 400-630

- Have a strong handle.

Ø 500-630

- Have reinforced blade.
- Have reinforced stop beads.

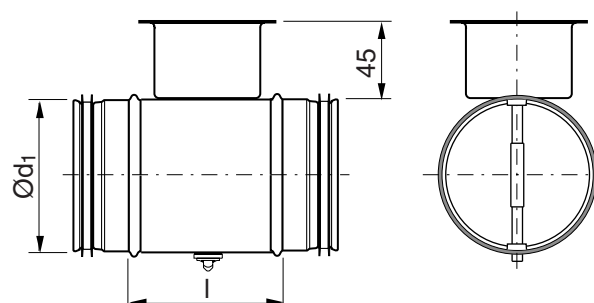
Ø 800-1000

- Have further reinforced handle.
- Have further reinforced blade.
- Have reinforced shaft.
- Have reinforced locking with strong wing nut.

Reinforced blade



Dimensions



Ød ₁ nom	l mm	m kg	Sealing class past closed blade
63	100	0,30	0
80	100	0,35	0
100	100	0,40	0
112	100	0,44	0
125	100	0,49	0
140	100	0,54	0
150	100	0,57	0
160	100	0,67	0
180	100	0,73	0
200	100	0,86	0
224	100	1,10	0
250	100	1,31	0
280	100	1,51	0
300	100	1,65	0
315	100	1,81	0
355	100	2,00	0
400	100	2,91	1
450	100	3,90	1
500	115	4,92	1
560	115	6,01	1
600	115	6,40	1
630	115	6,92	1
800	230	19,0	1
1000	230	30,0	1

Ordering example

Product	DSU	160
Dimension Ød ₁		



Shut-off damper

DSU

Technical data

Pressure drop graphs with noise data for dimensioning

The solid curves show the pressure drop, Δp_t , over the damper as a function of flow q , and setting angle α .

The dashed curves give the A-weighted sound power data, L_{WA} , in dB to the duct.

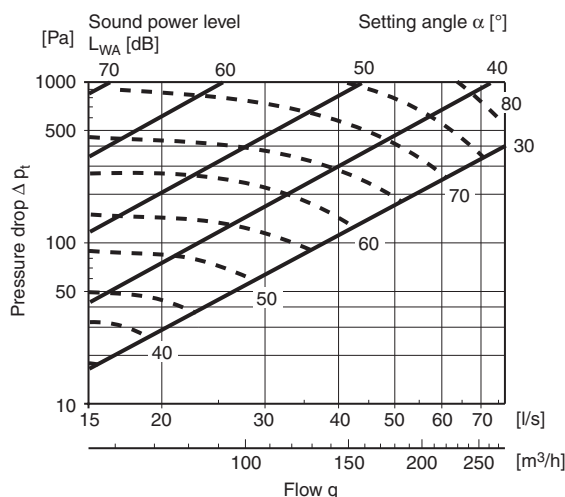
Example

Given Dimension $\varnothing 100$
Flow 60 l/s
Pressure drop 200 Pa

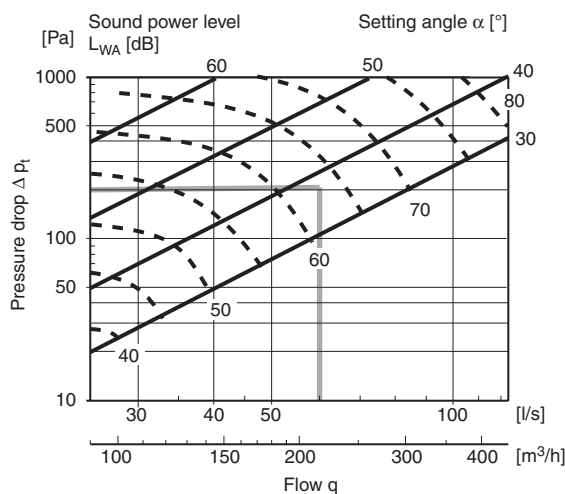
Obtained from graph

Setting angle 40°
Sound power level 63 dB (A)

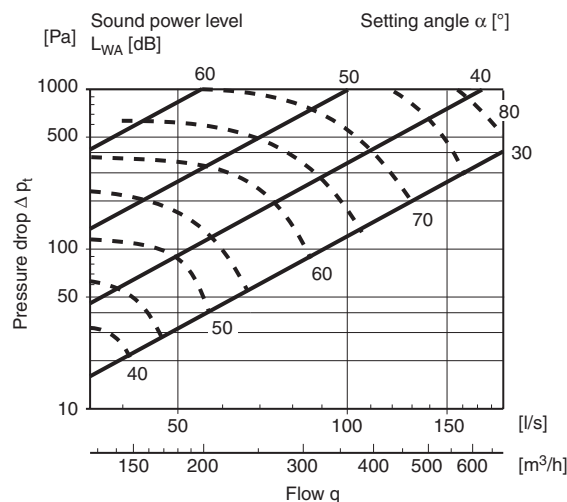
$\varnothing 80$



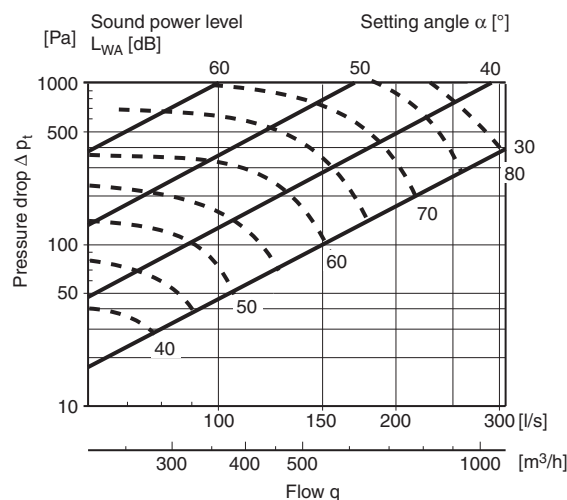
$\varnothing 100$



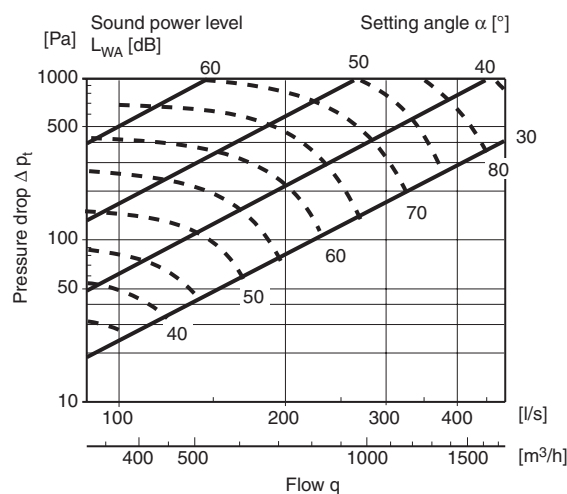
$\varnothing 125$



$\varnothing 160$



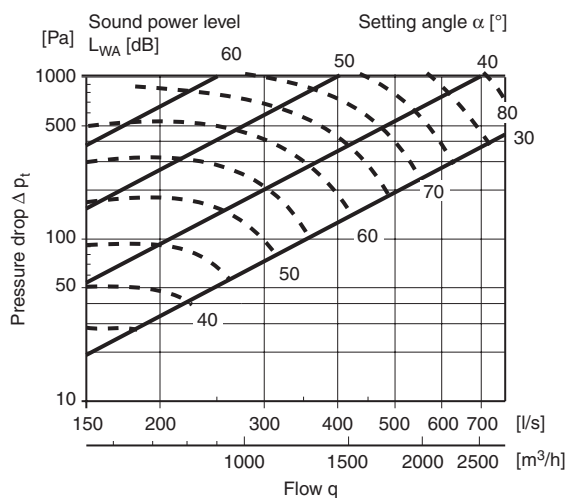
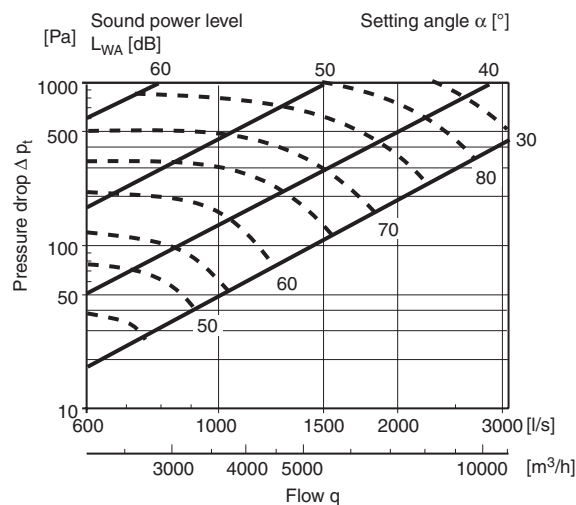
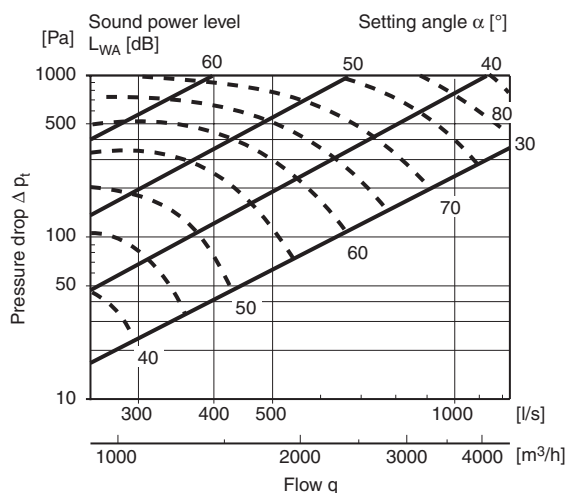
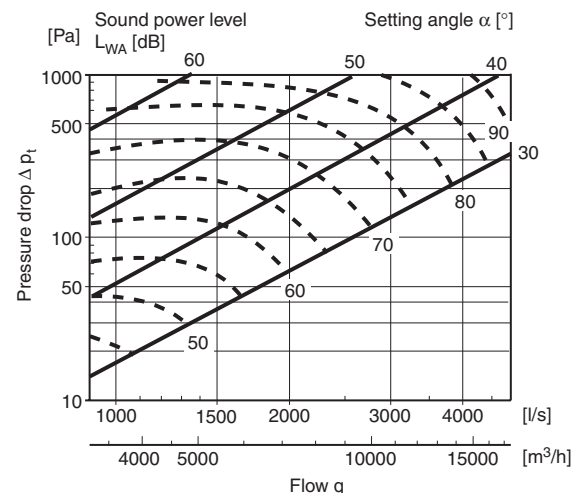
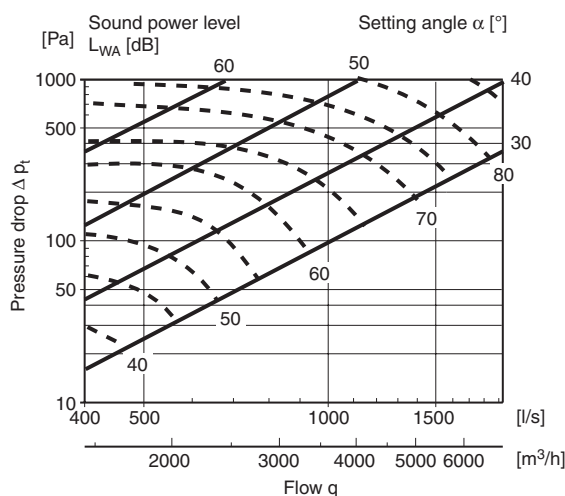
$\varnothing 200$





Shut-off damper

DSU

Ø250

Ø500

Ø315

Ø630

Ø400




Shut-off damper

DSU

Sound data for DRU

Sound power level L_{wv} [dB] to duct in the octave bands 1–8, 63–8000 Hz, as a function of dimension, flow and pressure drop.

The methods ISO 5135 and ISO 3741 have been used to measure these sound values, as recommended by the Swedish National Testing and Research Institute.

Ød ₁	Pressure drop [Pa]	Velocity app. 3 [m/s]								Velocity app. 6 [m/s]								Velocity app. 9 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 15 [l/s]								Flow 30 [l/s]								Flow 45 [l/s]							
	500	65	65	65	65	59	55	49	46	67	67	67	67	60	57	50	47	70	70	70	70	63	60	53	49
	300	63	63	60	60	54	48	42	36	66	66	63	63	56	50	44	38	70	70	67	67	60	54	47	40
	200	63	63	60	54	51	43	34	29	65	65	62	56	53	44	35	30	70	70	67	60	57	48	38	32
	100	55	60	53	48	43	30	23	15	59	65	57	51	46	32	24	16	66	72	63	57	51	36	27	18
	50	56	54	47	43	36	25	16	9	59	59	52	47	40	27	17	10	-	-	-	-	-	-	-	-
100		Flow 25 [l/s]								Flow 50 [l/s]								Flow 75 [l/s]							
	500	67	64	64	57	54	48	48	48	72	68	68	62	59	52	52	52	78	75	75	67	64	57	57	57
	300	62	61	60	54	51	45	42	42	68	68	68	59	56	50	47	47	75	74	73	65	61	54	51	51
	200	58	58	58	50	48	40	37	37	65	65	64	57	54	45	42	42	74	73	73	64	59	50	47	46
	100	58	55	53	46	41	34	26	24	68	66	62	54	48	40	31	29	79	75	71	62	56	46	36	33
	50	55	53	48	42	35	26	22	18	69	67	60	53	44	33	28	22	-	-	-	-	-	-	-	-
125		Flow 40 [l/s]								Flow 80 [l/s]								Flow 120 [l/s]							
	500	71	68	65	59	56	50	50	47	76	73	70	63	60	53	53	50	83	79	76	68	65	58	58	54
	300	66	66	60	55	52	46	43	40	73	73	67	60	57	51	48	44	79	79	72	66	62	55	52	48
	200	65	62	57	51	46	41	38	38	74	71	65	59	53	47	43	43	82	78	71	65	58	51	48	48
	100	64	59	53	47	39	34	29	27	77	70	63	55	47	40	35	32	84	78	70	61	51	45	39	35
	50	63	54	50	41	36	27	25	20	80	68	60	51	43	34	32	26	-	-	-	-	-	-	-	-
160		Flow 60 [l/s]								Flow 120 [l/s]								Flow 180 [l/s]							
	500	68	67	64	59	55	53	52	51	72	71	68	62	59	55	54	53	78	77	74	67	63	60	59	58
	300	63	62	59	55	52	49	46	45	67	66	64	58	55	52	49	48	75	75	71	65	61	58	54	54
	200	61	58	56	50	48	42	40	40	68	65	62	56	53	47	44	44	76	73	69	63	59	53	50	50
	100	59	54	50	45	40	35	33	31	70	64	60	53	48	42	39	38	77	73	69	61	54	48	45	44
	50	54	50	46	37	33	29	25	25	69	64	58	48	42	37	32	32	-	-	-	-	-	-	-	-
200		Flow 100 [l/s]								Flow 200 [l/s]								Flow 300 [l/s]							
	500	70	64	61	55	52	52	55	55	75	68	65	59	55	55	59	59	83	76	72	65	61	61	65	65
	300	67	62	56	50	48	45	48	48	74	68	62	55	52	51	53	52	84	78	71	64	61	57	60	60
	200	62	57	55	47	44	42	42	42	71	65	62	53	50	48	47	47	83	76	71	62	58	55	54	54
	100	57	52	48	41	39	36	34	34	69	64	58	50	47	44	42	42	83	76	69	59	56	53	50	50
	50	51	45	41	36	32	32	28	28	63	56	51	44	39	39	34	34	-	-	-	-	-	-	-	-
250		Flow 150 [l/s]								Flow 300 [l/s]								Flow 450 [l/s]							
	500	69	66	59	53	50	54	53	52	71	67	61	56	53	56	55	54	78	75	68	61	58	61	60	59
	300	63	61	55	50	47	46	48	47	66	63	57	51	48	47	51	48	75	72	65	59	55	55	59	55
	200	59	57	52	46	44	41	44	44	63	60	55	49	46	44	46	46	72	69	63	57	55	54	54	53
	100	56	52	45	41	38	36	34	31	63	57	51	45	43	40	38	35	75	69	60	56	52	49	45	42
	50	52	48	40	38	34	30	28	24	61	56	47	45	40	38	33	28	-	-	-	-	-	-	-	-
315		Flow 250 [l/s]								Flow 500 [l/s]								Flow 750 [l/s]							
	500	68	65	59	53	50	50	53	50	74	71	65	58	55	55	58	55	82	78	71	64	60	60	54	60
	300	62	59	54	49	46	45	49	43	69	66	60	54	51	51	54	48	78	74	68	61	57	57	61	54
	200	60	55	50	45	43	40	43	40	70	64	58	52	49	48	49	46	79	72	66	59	58	57	56	52
	100	54	52	45	41	38	36	36	31	66	63	55	50	47	46	44	39	76	72	64	57	54	52	50	44
	50	49	49	43	38	34	32	30	24	64	64	56	49	45	42	40	32	-	-	-	-	-	-	-	-
400		Flow 400 [l/s]								Flow 800 [l/s]								Flow 1200 [l/s]							
	500	79	73	67	62	57	60	59	58	82	75	68	65	59	62	61	60	88	81	74	70	62	66	65	64
	300	72	66	60	54	51	51	51	51	77	70	64	58	56	55	54	54	84	77	70	63	62	61	60	60
	200	67	62	56	50	48	48	48	45	74	68	62	56	53	52	52	49	82	75	68	61	60	59	58	54
	100	61	56	49	44	42	39	39	34	72	66	58	53	49	47	46	40	83	76	67	60	58	55	53	47
	50	57	52	44	39	37	35	34	26	72	67	56	50	47	44	44	33	-	-	-	-	-	-	-	-
500		Flow 600 [l/s]								Flow 1200 [l/s]								Flow 1800 [l/s]							
	500	84	77	70	64	63	62	61	60	85	78	71	65	64	63	62	61	91	84	76	68	67	68	68	67
	300	77	70	64	58	54	54	58	58	80	74	67	60	57	57	60	60	88	80	73	66	62	62	66	66
	200	71	65	59	53	50	50	50	47	77	70	64	58	56	55	54	51	85	78	72	65	63	61	60	57
	100	63	58	53	47	46	44	42	37	72	66	60	55	53	51	49	43	82	75	70	63	60	57	55	50
	50	59	52	47	44	42	38	38	31	71	63	57	54	51	46	46	37	-	-	-	-	-	-	-	-
630		Flow 1000 [l/s]								Flow 2000 [l/s]								Flow 3000 [l/s]							
	500	88	80	73	69	66	64	63	62	90	83	75	71	68	67	65	64	96	88	80	76	72	72	70	68
	300	82	75	69	65	62	61	58	55	84	77	70	67	63	62	61	56	92	84	77	73	69	68	68	61
	200	78	72	65	62	59	55	55	49	80	74	67	64	60	57	57	50	89	82	75	71	67	63	63	56
	100	71	66	59	54	50	46	45	40	78	71	66	59	56	49	47	44	90	82	76	68	63	58	55	50
	50	66	58	53	48	43	40	39	30	77	68	62	57	51	45	48	36	-	-	-	-	-	-	-	-



Shut-off damper

DSU

Ød ₁	Pressure drop [Pa]	Velocity app. 12 [m/s]								Velocity app. 15 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 60 [l/s]								Flow 75 [l/s]							
	500	75	75	75	75	68	64	56	53	80	80	80	80	72	68	60	56
	300	75	75	71	71	64	57	50	43	79	79	75	75	68	60	53	45
	200	75	75	71	65	61	51	41	34	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 100 [l/s]								Flow 120 [l/s]							
	500	84	81	80	72	68	62	61	61	88	85	84	76	72	65	64	64
	300	81	80	79	70	67	59	56	55	86	85	84	74	70	62	59	58
	200	80	80	79	69	66	55	51	51	-	-	-	-	-	-	-	-
125	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 160 [l/s]								Flow 180 [l/s]							
	500	89	85	81	73	69	62	62	58	91	87	83	75	71	63	63	59
	300	86	86	79	71	68	60	56	53	89	88	81	73	69	62	58	54
160	200	89	85	78	70	63	56	52	52	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 240 [l/s]								Flow 300 [l/s]							
	500	84	84	80	72	68	65	65	65	89	89	85	77	73	69	69	69
200	300	81	81	78	70	67	63	59	59	87	87	83	76	72	68	64	64
	200	84	80	77	69	66	58	55	55	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 400 [l/s]								Flow 450 [l/s]							
	500	90	82	78	72	67	66	71	70	93	85	81	73	71	70	74	73
250	300	92	84	78	71	67	63	67	66	95	87	81	72	68	66	69	68
	200	90	83	79	69	65	62	61	60	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 600 [l/s]								Flow 750 [l/s]							
	500	87	83	76	68	64	68	68	68	94	90	82	74	70	74	74	74
315	300	84	80	73	67	65	64	62	61	91	87	80	72	70	69	72	68
	200	82	79	72	64	63	63	62	61	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 1000 [l/s]								Flow 1200 [l/s]							
	500	89	85	77	69	68	67	69	65	92	88	80	72	71	70	72	68
400	300	85	81	74	66	64	64	66	59	89	85	78	70	68	68	70	62
	200	86	79	72	65	63	62	64	58	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 1600 [l/s]								Flow 1800 [l/s]							
	500	95	87	79	75	67	71	70	69	98	90	82	78	70	74	73	72
500	300	91	83	76	69	67	66	65	64	94	86	79	71	70	69	68	67
	200	89	82	75	69	67	64	63	60	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 2400 [l/s]								Flow 3000 [l/s]							
	500	96	88	80	72	70	73	72	71	102	94	85	78	75	77	77	76
630	300	93	85	78	70	66	66	70	70	99	91	83	74	70	70	74	74
	200	91	84	76	70	68	66	65	61	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 4000 [l/s]								Flow 4500 [l/s]							
	500	103	95	86	82	77	77	76	73	107	98	90	85	81	81	80	76
630	300	100	91	83	79	75	75	74	66	105	96	88	83	79	79	79	70
	200	98	90	82	78	74	70	70	62	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Shut-off damper

DTU



Description

Shut-off damper

Has a turning circular blade with an EPDM-rubber seal which tightens against the inside of the damper when closed. The blade can be adjusted in a 0-90° angle by the handle in the cup, and the blade angle can be read from an embossed scale on the edge of the cup. It is locked with two Pozidriv screws (PZD2).

The damper can be used for regulating at rare occasions.

The cup permits about 50 mm of insulation to be used. If more insulation is needed, add the special insulation cup IK.

The torque needed for motorising is given in the adjacent table. The torque specified is the maximum value for a non-pressurized damper.

- Ø ≥ 400 – have a strong handle
- Ø ≥ 500 – have a reinforced stop bead to prevent ovality during transport and installation
- have a reinforced blade

Motorizing

We can supply pre-installed motors/actuators of the On/Off type for damper DTU. Electric motors are available with or without spring return. Pneumatic motors are only available with spring return.

The torque needed for the motorizing is given in the adjacent table. The torque specified is the maximum value for a non-pressurized damper.

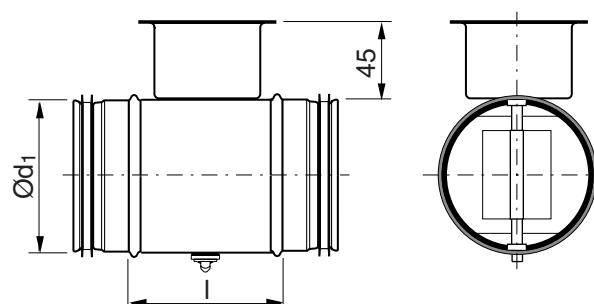
Ordering example

	DTU	200
Product		
Dimension Ød ₁		

Reinforced blade



Dimensions



Ød ₁ nom	I mm	(M) Nm	m kg	Sealing class past closed blade
80	100	1,0	0,30	4
100	100	1,0	0,38	4
112	100	1,0	0,48	4
125	100	1,0	0,53	4
140	100	1,0	0,60	4
150	100	1,0	0,63	4
160	100	1,0	0,74	4
180	100	1,0	0,82	4
200	100	1,0	1,04	4
224	100	1,5	1,27	4
250	100	1,5	1,52	4
280	100	2,0	1,77	4
300	100	2,0	1,96	4
315	100	2,0	2,14	4
355	100	4,0	2,44	4
400	100	6,0	3,65	4
450	100	7,0	4,84	4
500	115	8,0	6,07	4
560	115	9,0	7,47	4
600	115	10,0	8,11	4
630	115	10,0	8,80	4



Shut-off damper

DTU

Technical data

Pressure drop graphs with noise data for dimensioning

The solid curves show the pressure drop, Δp_t , over the damper as a function of flow q , and setting angle α .

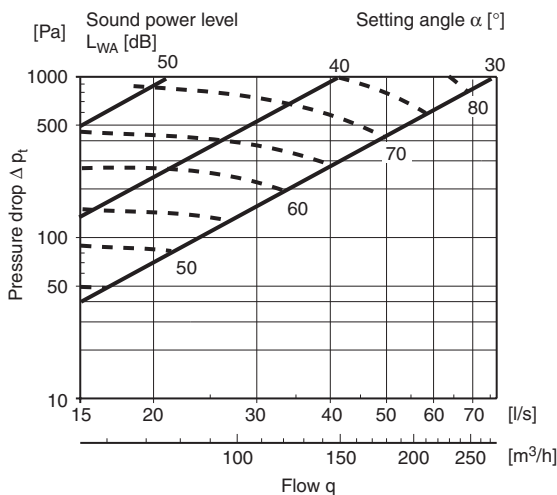
The dashed curves give the A-weighted sound power data, L_{WA} , in dB to the duct.

Example

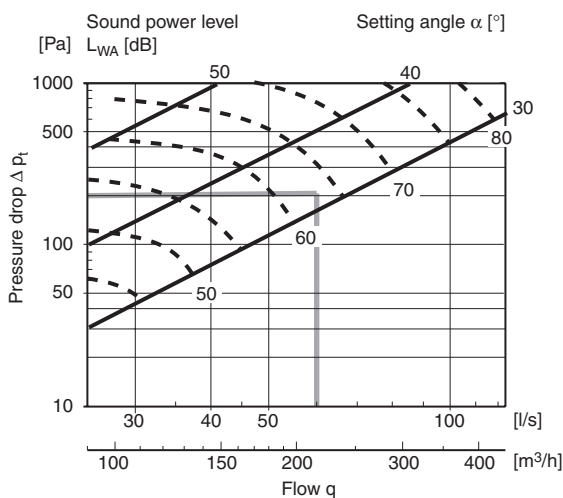
Given Dimension Ø100
 Flow 60 l/s
 Pressure drop 200 Pa

Obtained from graph
 Setting angle 40°
 Sound power level 63 dB (A)

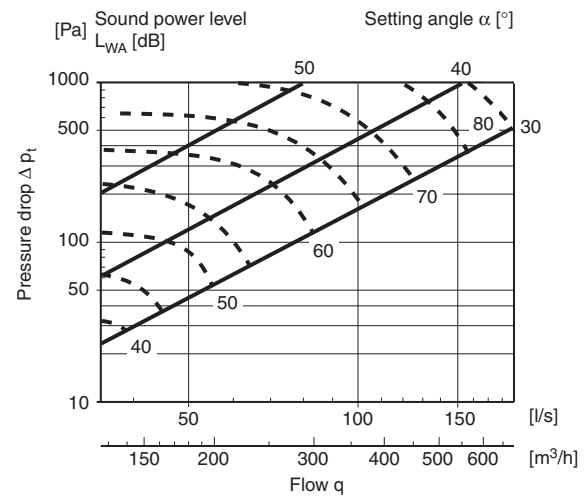
Ø80



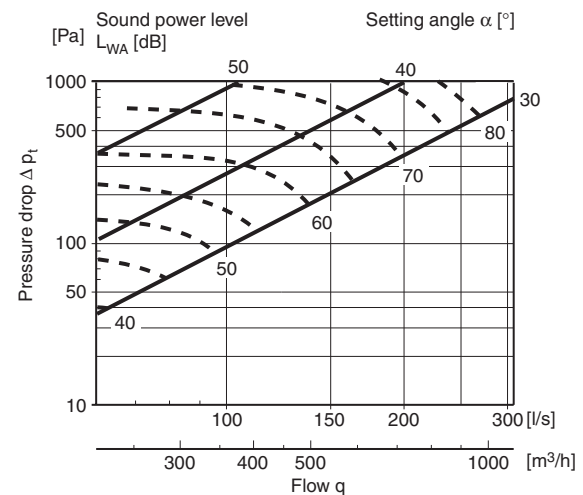
Ø100



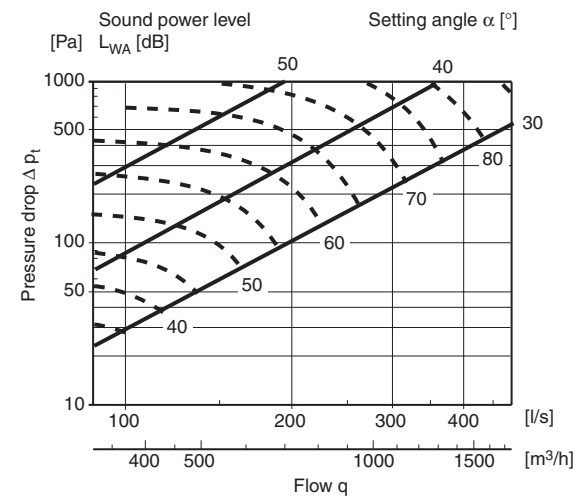
Ø125



Ø160



Ø200

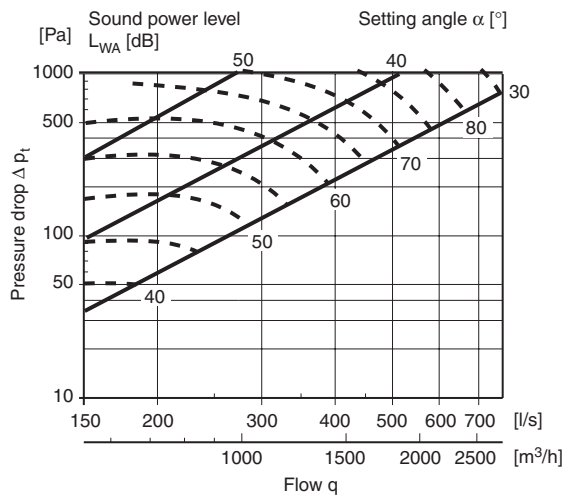




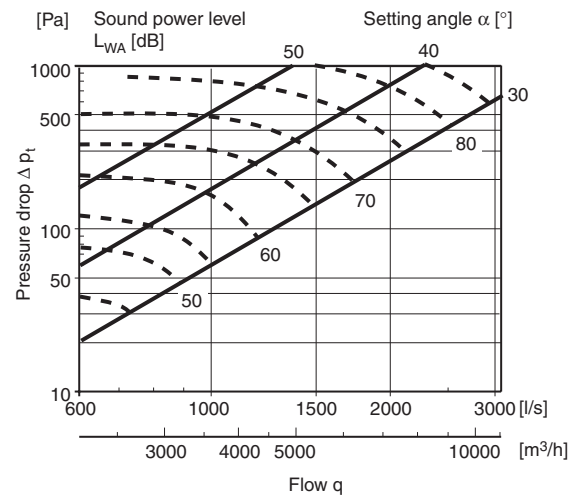
Shut-off damper

DTU

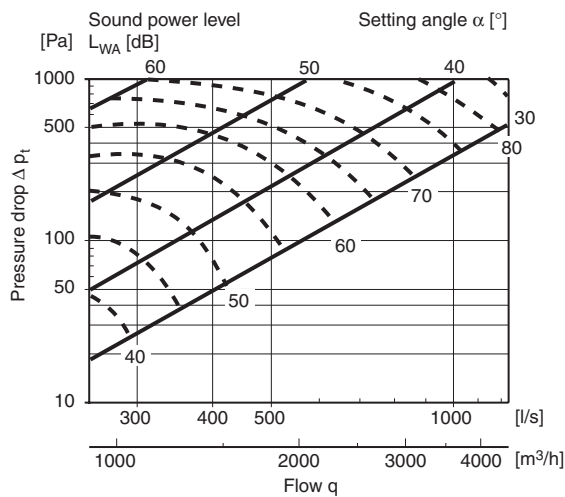
Ø250



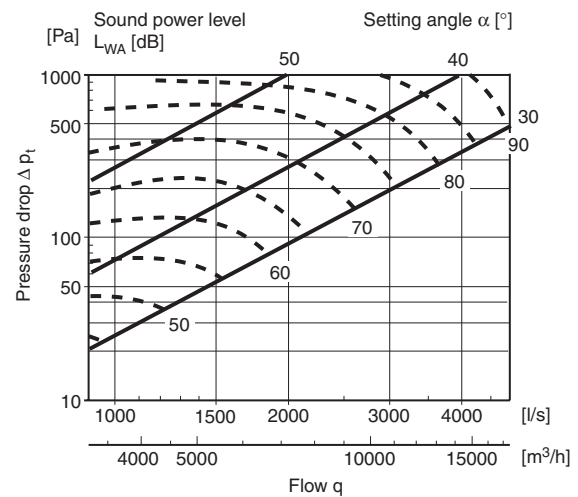
Ø500



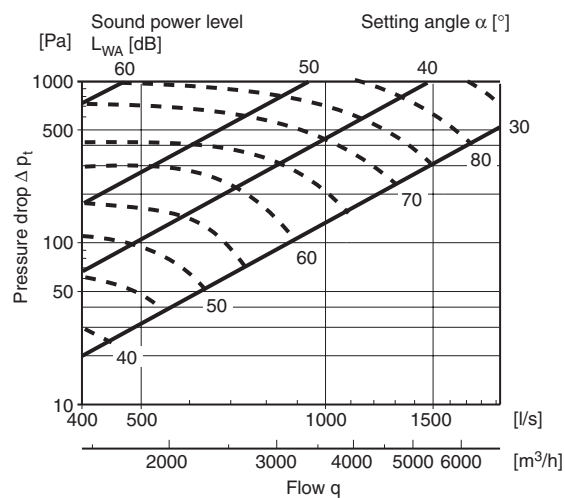
Ø315



Ø630



Ø400





Shut-off damper

DTU

Sound data for DRU

Sound power level L_{wv} [dB] to duct in the octave bands 1–8, 63–8000 Hz, as a function of dimension, flow and pressure drop.

The methods ISO 5135 and ISO 3741 have been used to measure these sound values, as recommended by the Swedish National Testing and Research Institute.

Ød ₁	Pressure drop [Pa]	Velocity app. 3 [m/s]								Velocity app. 6 [m/s]								Velocity app. 9 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 15 [l/s]								Flow 30 [l/s]								Flow 45 [l/s]							
	500	65	65	65	65	59	55	49	46	67	67	67	67	60	57	50	47	70	70	70	70	63	60	53	49
	300	63	63	60	60	54	48	42	36	66	66	63	63	56	50	44	38	70	70	67	67	60	54	47	40
	200	63	63	60	54	51	43	34	29	65	65	62	56	53	44	35	30	70	70	67	60	57	48	38	32
	100	55	60	53	48	43	30	23	15	59	65	57	51	46	32	24	16	66	72	63	57	51	36	27	18
	50	56	54	47	43	36	25	16	9	59	59	52	47	40	27	17	10	-	-	-	-	-	-	-	-
100		Flow 25 [l/s]								Flow 50 [l/s]								Flow 75 [l/s]							
	500	67	64	64	57	54	48	48	48	72	68	68	62	59	52	52	52	78	75	75	67	64	57	57	57
	300	62	61	60	54	51	45	42	42	68	68	68	59	56	50	47	47	75	74	73	65	61	54	51	51
	200	58	58	58	50	48	40	37	37	65	65	64	57	54	45	42	42	74	73	73	64	59	50	47	46
	100	58	55	53	46	41	34	26	24	68	66	62	54	48	40	31	29	79	75	71	62	56	46	36	33
	50	55	53	48	42	35	26	22	18	69	67	60	53	44	33	28	22	-	-	-	-	-	-	-	-
125		Flow 40 [l/s]								Flow 80 [l/s]								Flow 120 [l/s]							
	500	71	68	65	59	56	50	50	47	76	73	70	63	60	53	53	50	83	79	76	68	65	58	58	54
	300	66	66	60	55	52	46	43	40	73	73	67	60	57	51	48	44	79	79	72	66	62	55	52	48
	200	65	62	57	51	46	41	38	38	74	71	65	59	53	47	43	43	82	78	71	65	58	51	48	48
	100	64	59	53	47	39	34	29	27	77	70	63	55	47	40	35	32	84	78	70	61	51	45	39	35
	50	63	54	50	41	36	27	25	20	80	68	60	51	43	34	32	26	-	-	-	-	-	-	-	-
160		Flow 60 [l/s]								Flow 120 [l/s]								Flow 180 [l/s]							
	500	68	67	64	59	55	53	52	51	72	71	68	62	59	55	54	53	78	77	74	67	63	60	59	58
	300	63	62	59	55	52	49	46	45	67	66	64	58	55	52	49	48	75	75	71	65	61	58	54	54
	200	61	58	56	50	48	42	40	40	68	65	62	56	53	47	44	44	76	73	69	63	59	53	50	50
	100	59	54	50	45	40	35	33	31	70	64	60	53	48	42	39	38	77	73	69	61	54	48	45	44
	50	54	50	46	37	33	29	25	25	69	64	58	48	42	37	32	32	-	-	-	-	-	-	-	-
200		Flow 100 [l/s]								Flow 200 [l/s]								Flow 300 [l/s]							
	500	70	64	61	55	52	52	55	55	75	68	65	59	55	55	59	59	83	76	72	65	61	61	65	65
	300	67	62	56	50	48	45	48	48	74	68	62	55	52	51	53	52	84	78	71	64	61	57	60	60
	200	62	57	55	47	44	42	42	42	71	65	62	53	50	48	47	47	83	76	71	62	58	55	54	54
	100	57	52	48	41	39	36	34	34	69	64	58	50	47	44	42	42	83	76	69	59	56	53	50	50
	50	51	45	41	36	32	32	28	28	63	56	51	44	39	39	34	34	-	-	-	-	-	-	-	-
250		Flow 150 [l/s]								Flow 300 [l/s]								Flow 450 [l/s]							
	500	69	66	59	53	50	54	53	52	71	67	61	56	53	56	55	54	78	75	68	61	58	61	60	59
	300	63	61	55	50	47	46	48	47	66	63	57	51	48	47	51	48	75	72	65	59	55	55	59	55
	200	59	57	52	46	44	41	44	44	63	60	55	49	46	44	46	46	72	69	63	57	55	54	54	53
	100	56	52	45	41	38	36	34	31	63	57	51	45	43	40	38	35	75	69	60	56	52	49	45	42
	50	52	48	40	38	34	30	28	24	61	56	47	45	40	38	33	28	-	-	-	-	-	-	-	-
315		Flow 250 [l/s]								Flow 500 [l/s]								Flow 750 [l/s]							
	500	68	65	59	53	50	50	53	50	74	71	65	58	55	55	58	55	82	78	71	64	60	60	54	60
	300	62	59	54	49	46	45	49	43	69	66	60	54	51	51	54	48	78	74	68	61	57	57	61	54
	200	60	55	50	45	43	40	43	40	70	64	58	52	49	48	49	46	79	72	66	59	58	57	56	52
	100	54	52	45	41	38	36	36	31	66	63	55	50	47	46	44	39	76	72	64	57	54	52	50	44
	50	49	49	43	38	34	32	30	24	64	64	56	49	45	42	40	32	-	-	-	-	-	-	-	-
400		Flow 400 [l/s]								Flow 800 [l/s]								Flow 1200 [l/s]							
	500	79	73	67	62	57	60	59	58	82	75	68	65	59	62	61	60	88	81	74	70	62	66	65	64
	300	72	66	60	54	51	51	51	51	77	70	64	58	56	55	54	54	84	77	70	63	62	61	60	60
	200	67	62	56	50	48	48	48	45	74	68	62	56	53	52	52	49	82	75	68	61	60	59	58	54
	100	61	56	49	44	42	39	39	34	72	66	58	53	49	47	46	40	83	76	67	60	58	55	53	47
	50	57	52	44	39	37	35	34	26	72	67	56	50	47	44	44	33	-	-	-	-	-	-	-	-
500		Flow 600 [l/s]								Flow 1200 [l/s]								Flow 1800 [l/s]							
	500	84	77	70	64	63	62	61	60	85	78	71	65	64	63	62	61	91	84	76	68	67	68	68	67
	300	77	70	64	58	54	54	58	58	80	74	67	60	57	57	60	60	88	80	73	66	62	62	66	66
	200	71	65	59	53	50	50	50	47	77	70	64	58	56	55	54	51	85	78	72	65	63	61	60	57
	100	63	58	53	47	46	44	42	37	72	66	60	55	53	51	49	43	82	75	70	63	60	57	55	50
	50	59	52	47	44	42	38	38	31	71	63	57	54	51	46	46	37	-	-	-	-	-	-	-	-
630		Flow 1000 [l/s]								Flow 2000 [l/s]								Flow 3000 [l/s]							
	500	88	80	73	69	66	64	63	62	90	83	75	71	68	67	65	64	96	88	80	76	72	72	70	68
	300	82	75	69	65	62	61	58	55	84	77	70	67	63	62	61	56	92	84	77	73	69	68	68	61
	200	78	72	65	62	59	55	55	49	80	74	67	64	60	57	57	50	89	82	75	71	67	63	63	56
	100	71	66	59	54	50	46	45	40	78	71	66	59	56	49	47	44	90	82	76	68	63	58	55	50
	50	66	58	53	48	43	40	39	30	77	68	62	57	51	45	48	36	-	-	-	-	-	-	-	-



Shut-off damper

DTU

Ød ₁	Pressure drop [Pa]	Velocity app. 12 [m/s]								Velocity app. 15 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 60 [l/s]								Flow 75 [l/s]							
	500	75	75	75	75	68	64	56	53	80	80	80	80	72	68	60	56
	300	75	75	71	71	64	57	50	43	79	79	75	75	68	60	53	45
	200	75	75	71	65	61	51	41	34	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 100 [l/s]								Flow 120 [l/s]							
	500	84	81	80	72	68	62	61	61	88	85	84	76	72	65	64	64
	300	81	80	79	70	67	59	56	55	86	85	84	74	70	62	59	58
	200	80	80	79	69	66	55	51	51	-	-	-	-	-	-	-	-
125	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 160 [l/s]								Flow 180 [l/s]							
	500	89	85	81	73	69	62	62	58	91	87	83	75	71	63	63	59
	300	86	86	79	71	68	60	56	53	89	88	81	73	69	62	58	54
160	200	89	85	78	70	63	56	52	52	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 240 [l/s]								Flow 300 [l/s]							
	500	84	84	80	72	68	65	65	65	89	89	85	77	73	69	69	69
200	300	81	81	78	70	67	63	59	59	87	87	83	76	72	68	64	64
	200	84	80	77	69	66	58	55	55	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 400 [l/s]								Flow 450 [l/s]							
250	500	90	82	78	72	67	66	71	70	93	85	81	73	71	70	74	73
	300	92	84	78	71	67	63	67	66	95	87	81	72	68	66	69	68
	200	90	83	79	69	65	62	61	60	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
315		Flow 600 [l/s]								Flow 750 [l/s]							
	500	87	83	76	68	64	68	68	68	94	90	82	74	70	74	74	74
	300	84	80	73	67	65	64	62	61	91	87	80	72	70	69	72	68
	200	82	79	72	64	63	63	62	61	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
400	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 1000 [l/s]								Flow 1200 [l/s]							
	500	89	85	77	69	68	67	69	65	92	88	80	72	71	70	72	68
	300	85	81	74	66	64	64	66	59	89	85	78	70	68	68	70	62
	200	86	79	72	65	63	62	64	58	-	-	-	-	-	-	-	-
500	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 1600 [l/s]								Flow 1800 [l/s]							
	500	95	87	79	75	67	71	70	69	98	90	82	78	70	74	73	72
630	300	91	83	76	69	67	66	65	64	94	86	79	71	70	69	68	67
	200	89	82	75	69	67	64	63	60	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Flow 2400 [l/s]								Flow 3000 [l/s]							
800	500	96	88	80	72	70	73	72	71	102	94	85	78	75	77	77	76
	300	93	85	78	70	66	66	70	70	99	91	83	74	70	70	74	74
	200	91	84	76	70	68	66	65	61	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1000		Flow 4000 [l/s]								Flow 4500 [l/s]							
	500	103	95	86	82	77	77	76	73	107	98	90	85	81	81	80	76
	300	100	91	83	79	75	75	74	66	105	96	88	83	79	79	79	70
	200	98	90	82	78	74	70	70	62	-	-	-	-	-	-	-	-
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Shut-off damper with motor shelf DTHU



Description

Shut-off damper with motor shelf KOMHY

Consists of a DTU damper with a KOMHY combined motor shelf added. The damper has no knob, and has a longer spindle to avoid the need for extension spindle VREDF. The damper is designed to have a motor added on site.

Motorizing

The motor shelf is provided with suitable fixing holes for Belimo's LM, NM SM and AF motors, and for Sauter's pneumatic actuators AK 31 P and AK 41 P.

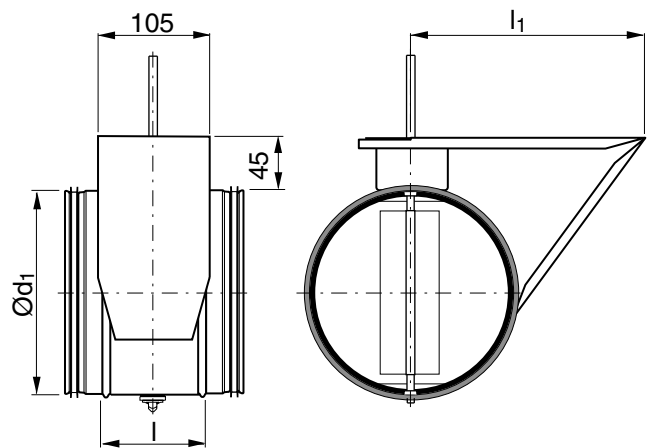
NOTE! AK 42 P does not fit this damper. The torque needed for motorizing is given in the adjacent table.

Also the dampers DRU and DSU can be ordered in this version.

Ordering example

	DTHU	200
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ nom	l mm	l ₁ mm	(M) Nm	m kg	Sealing class past closed blade
80	100	230	1,0	0,67	4
100	100	230	1,0	0,75	4
112	100	230	1,0	0,85	4
125	100	230	1,0	0,90	4
140	100	230	1,0	0,97	4
150	100	230	1,0	1,00	4
160	100	230	1,0	1,11	4
180	100	230	1,0	1,19	4
200	100	230	1,0	1,41	4
224	100	230	1,5	1,64	4
250	100	230	1,5	1,89	4
280	100	230	2,0	2,14	4
300	100	230	2,0	2,33	4
315	100	230	2,0	2,51	4
355	100	230	4,0	2,81	4
400	100	230	6,0	4,02	4
450	100	230	7,0	5,21	4
500	115	230	8,0	6,44	4
560	115	230	9,0	7,84	4
600	115	230	10,0	8,48	4
630	115	315	10,0	9,17	4



Damper with flow meter

IRIS-M



Description

The motor-driven IRIS-M damper with flow meter is suitable for systems, where it should be possible to increase the air flow or lower it to the basic level. Examples of such systems are conference rooms and public areas.

The damper is adjustable to three positions as required, and has outlets for flow measurement.

The IRIS-M damper can be used alone or in pairs. The basic air flow and the increased air flow can be adjusted stepless in conjunction with the balancing of the duct system.

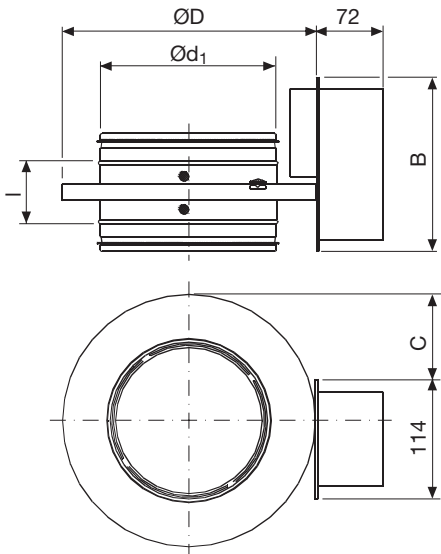
In order to maintain the balance between the supply and the exhaust air flows, a slave regulator can be installed, which follows the position of the master regulator in cascade. The basic air flow and the increased air flow can be set in the master and the slave regulators independently of each other.

The cascade signal is tied to the set positions for basic air flow and increased air flow in the master and the slave regulators. When the master regulator is closed (0%), the cascade signal is 4 mA, and the slave regulator is also closed (0%). When the master regulator is open (100%), the cascade signal is 20 mA, and the slave regulator is also fully open (100%).

In the intermediate positions, the cascade signal and the slave regulator's relative position follows linearly according to the position of the master regulator.

The cleaning switch only affects the relevant IRIS-M damper. The signal regarding the cleaning position is not transmitted from the master regulator to the slave regulator.

Dimensions



Ød ₁ nom	ØD mm	B mm	C mm	l	m kg
100	163	167	43	53	2,0
125	188	167	56	53	2,2
160	231	167	77	54	2,4
200	284	167	104	55	2,9
250	331	167	128	58	3,6
315	407	167	164	58	5,0

Installation and connection

The mechanical installation takes place in the same way as in the version without the motor. Detailed installation instructions are supplied with the product delivery.

IRIS-M is delivered pre-assembled and does not need to be dismantled during installation. The installation potentiometers and the cleaning switch that are required during installation and the cleaning of the duct, as well as the connection blocks, are easily accessible when you remove the window from the motor cover. For air flow measurement and requisite disturbance distances, see IRIS without motor.



Damper with flow meter

IRIS-M

Technical data

Construction

IRIS-M consists of an IRIS regulating damper and a motor. IRIS-M differs from the version without the motor, as the regulating damper is supplied with a gear drive on the outer edge of the damper flange and as manual adjustment of the setting is not possible.

Material and surface treatment

The motor cover is made of hot-dip galvanised steel plate. The seals are made of expanded rubber and the window of transparent plexiglas (PETG). Inside the cover are the motor as well as the electronics for motor control, position indication and receipt of the reference value. The cable bushings are made of rubber (type TET 3-5).

Adjustment and control

The motor-driven regulate and measure damper IRIS-M is supplied with two adjustment potentiometers for stepless adjustment of openings, corresponding to the damper's min. and max. positions. In the min. and max. positions, the air flow for basic air flow and increased air flow are adjusted in this sequence.

The motor control is also supplied with a cleaning switch making it possible to open the damper to 100%, which means that the duct can easily be cleaned.

The position of the IRIS-M damper can be steered between basic air flow and increased air flow in three different ways: with the manual control unit which has three positions and stepless adjustment of the centre position; with stepless signal 0–10 V, 2–10 V or 4–20 mA.

The manual three-position switch is intended for use as an increasing switch in each room as required. With the switch it is possible to select the pre-set basic air flow, the operating air flow or the increased air flow.

The voltage and current signals can be used in systems that are connected e.g. to building automation.

With regard to mechanical durability, IRIS-M can be used as an actuator in control circuits with one control function per hour on average.

Sound correction K_{Oct} [dB]

$\varnothing d_1$ nom	Octave band, mean frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
100	25	21	16	9	4	-6	-12	-25
125	17	17	13	7	1	-4	-6	-17
160	19	18	14	6	-1	-6	-13	-25
200	20	17	12	5	-2	-5	-14	-26
250	16	12	8	3	1	-4	-17	-32
315	24	12	5	0	1	-2	-13	-27
Tol. ±	6	3	2	2	2	2	2	3

The sound output levels in the duct for each octave band are obtained by adding the corrections K_{Oct} from the adjoining table to the sound pressure level L_{p10A} , dB(A), which is found in the dimensioning diagrams, in accordance with the formula:

$$L_{W\text{Oct}} = L_{p10A} + K_{\text{Oct}}$$

The correction K_{Oct} is an average value in IRIS-M's working range.

Please note that the sound pressure levels reported in graphs take into consideration a room damping of 4 dB in the room that the damper is serving.

When calculating to the sound output level as described above, however, the damper's sound output to the duct is obtained.

This means that, in the sound calculation, the room damping shall be deducted when entering the room.

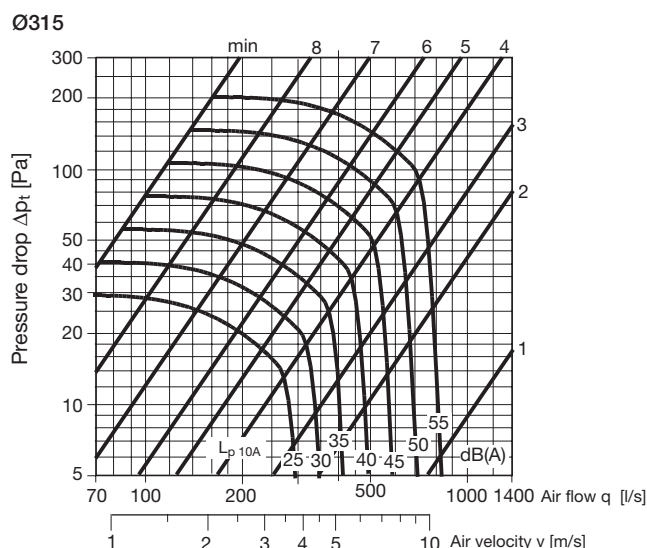
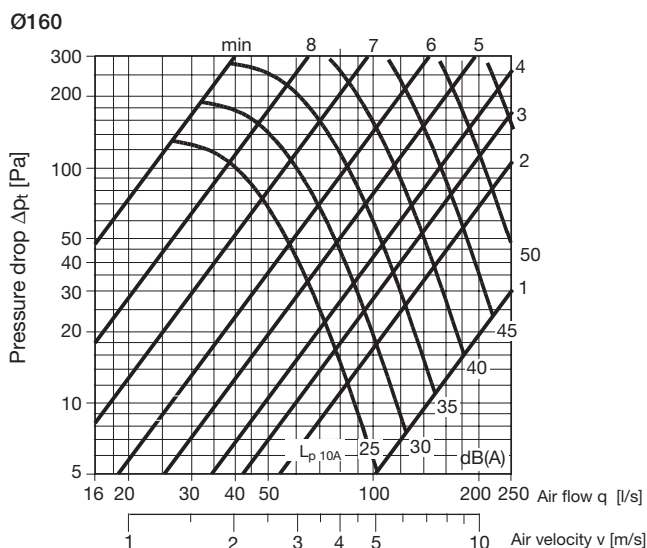
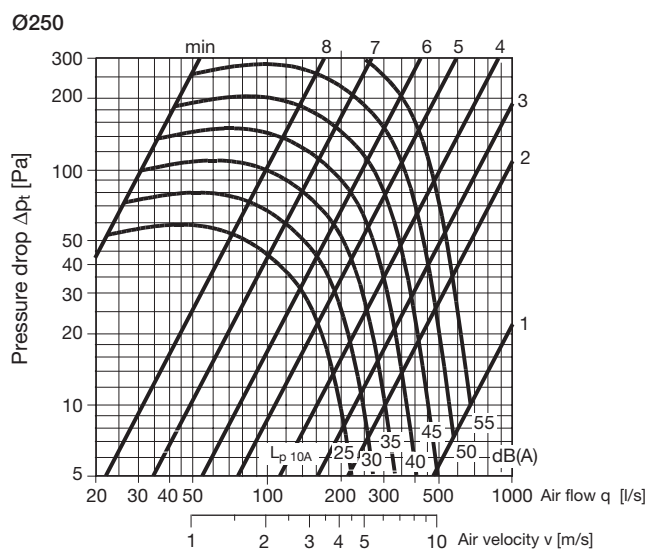
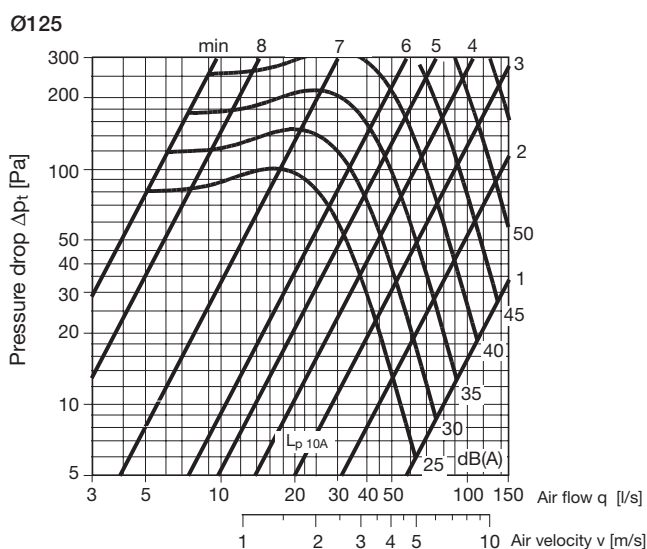
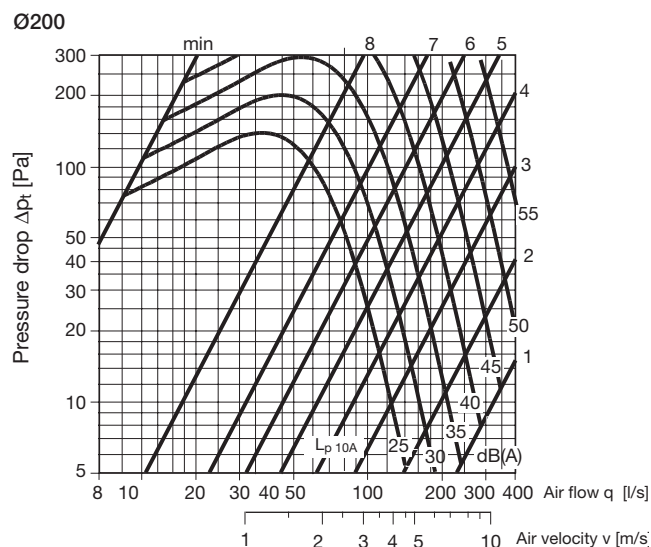
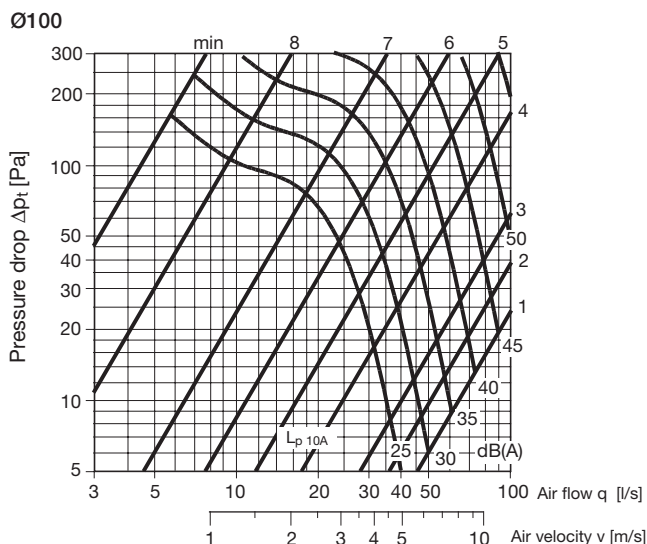
The dB(A) value in the graphs is only there to check the approximate sound pressure level.



Damper with flow meter

IRIS-M

Pressure drop graph with sound data for dimensioning



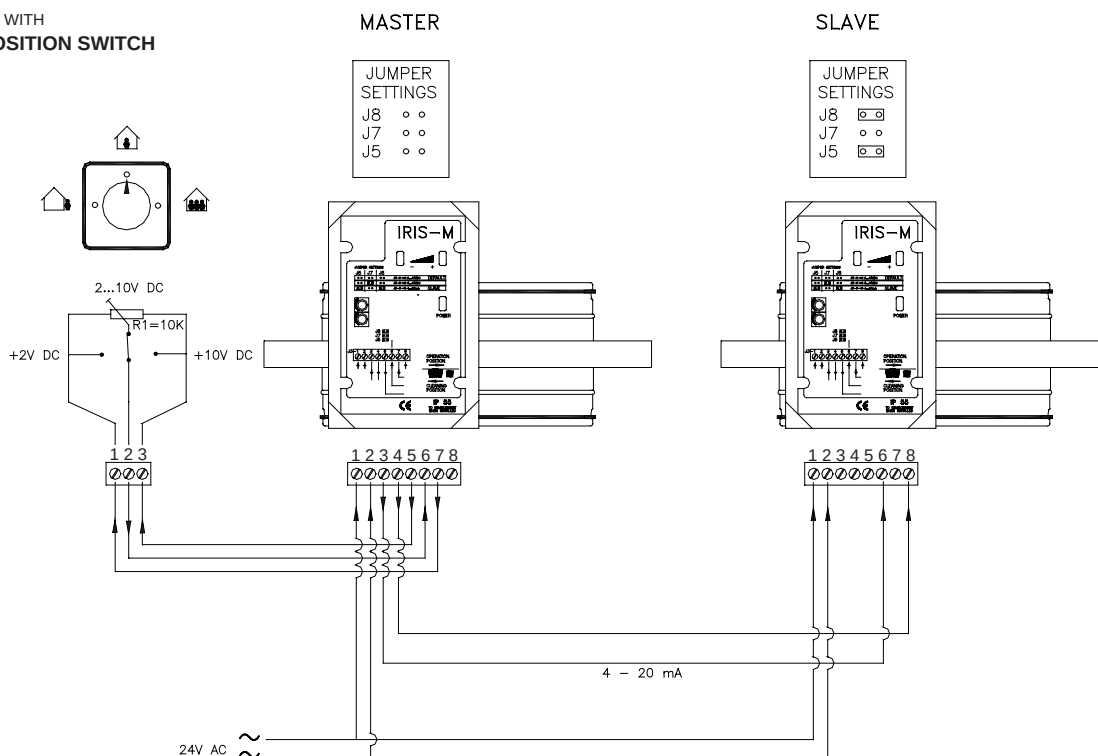


Damper with flow meter

IRIS-M

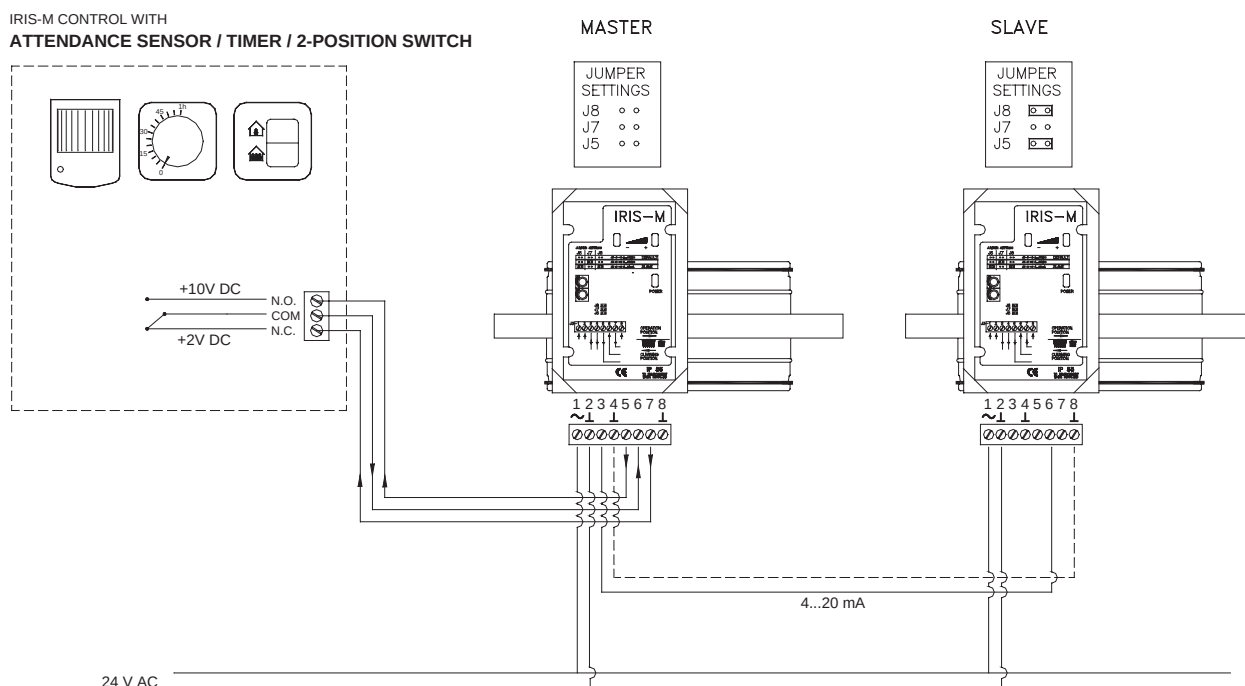
Wiring diagram

IRIS-M CONTROL WITH
MANUAL 3-POSITION SWITCH



ELECTRICAL CONNECTION VIA SAFETY TRANSFORMER

IRIS-M CONTROL WITH
ATTENDANCE SENSOR / TIMER / 2-POSITION SWITCH



ELECTRICAL CONNECTION VIA SAFETY TRANSFORMER

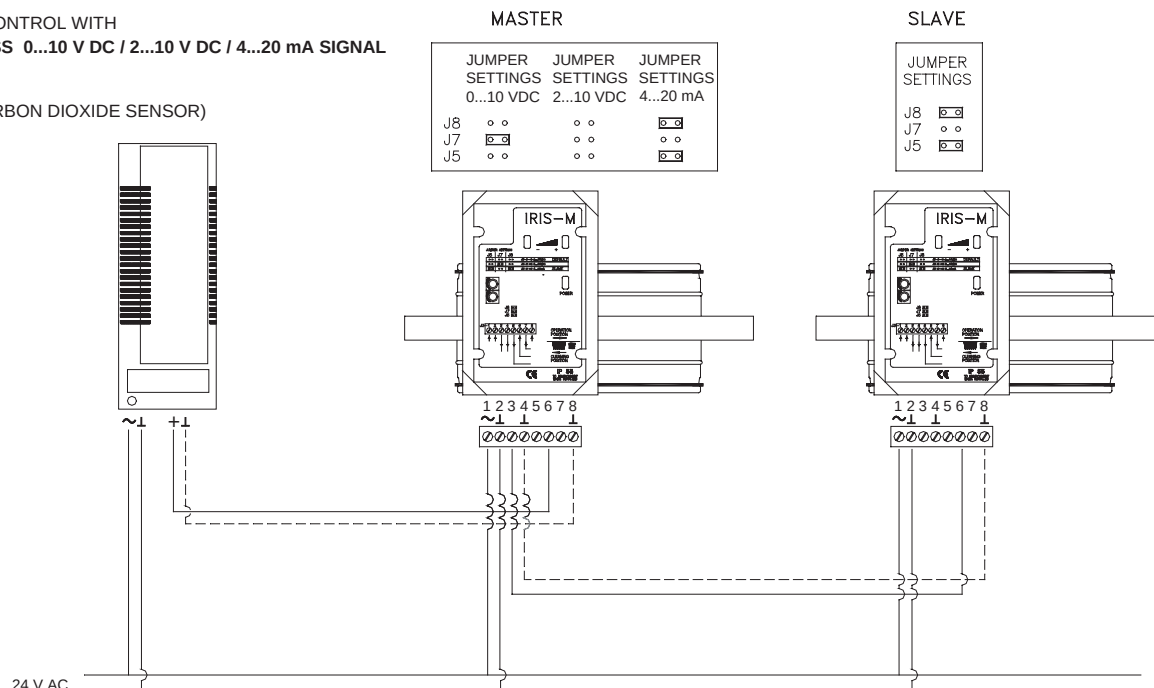


Damper with flow meter

IRIS-M

IRIS-M CONTROL WITH
STEPLESS 0...10 V DC / 2...10 V DC / 4...20 mA SIGNAL

(E.G. CARBON DIOXIDE SENSOR)



ELECTRICAL CONNECTION VIA SAFETY TRANSFORMER

Actuator's technical data

Supply voltage	24 V AC (safety voltage, PELV)
Dimensioning output	4,5 VA
Control signal	0-10 V, 2-10 V, 4-20 mA
Change-over time from open to closed position	1-3 minutes
Sound level	Motor's sound level less than 32 dB(A)
Electrical safety class	III (safety voltage, PELV)
Protection form	IP55
Ambient temperature	-25 °C to +50 °C
Storage temperature	-40 °C to +50 °C
Humidity	10-90 % (no condensation)
Electromagnetic compatibility	89/336/EY
Machine safety	98/37/EY
Service	Service-free
Estimated lifetime	100 000 cycles

Ventilation system

The function of IRIS-M is pressure-dependent. The system should be designed in such a way that a constant pressure is maintained in the ducts with sufficient accuracy.

Designations

q	air flow	[l/s]
L _{p10A}	sound pressure level with a 10 m ² Sabine room damping (=4 dB)	[dB(A)]
L _{Woct}	sound output level in the duct	[dB]
K _{oct}	correction	[dB]
Δp _t	total pressure drop	[Pa]
v	mean air flow velocity	[m/s]

Choice of regulating and measure damper

IRIS-M is selected on the basis of the desired sound pressure level as well as the air flows for basic air flow and increased air flow. The operating flow can be adjusted stepless with the aid of the potentiometer located under the front panel of the control switch.



Motorized shut-off damper

DTBU



Description

Shut-off damper with electric motor – LM 24 A-F or LM 230 A-F

Consists of a DTU damper with a 24 or 230 V electric motor added.

The motor is controlled by a single-pole breaking contact. The motor has overload protection and stops automatically when the blade has reached its end stop. The stops can be continually adjusted. Although the current is connected, the motor is not damaged if blocked.

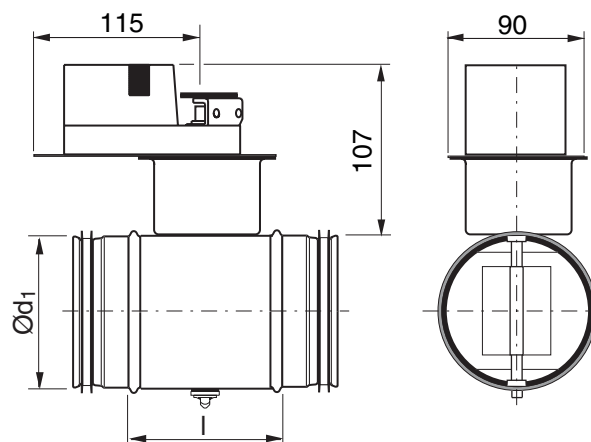
The spindle and motor can be disconnected from each other via a release button on the motor housing.

In outdoor installation, the motor should be protected from direct UV radiation.

The motor is installed at a distance from the damper, which makes it easy to insulate the ventilation duct.

Also the dampers DRU and DSU can be ordered with motor.

Dimensions



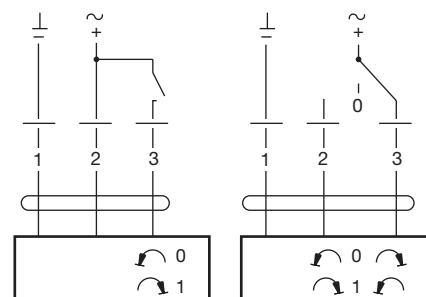
Ød ₁ nom	l mm	m kg	Sealing class past closed blade
80	100	1,00	4
100	100	1,08	4
125	100	1,23	4
160	100	1,44	4
200	100	1,74	4
250	100	2,22	4
315	100	2,84	4

Ordering example

Product	DTBU	125	24	LMF
Dimension Ød ₁				
Voltage				
Motor type				

Technical data for the motors

	LM 24 A-F	LM 230 A-F
Power supply	AC 19,2–28,8 V, 50/60 Hz DC 19,2–28,8 V	AC 65–265 V, 50/60 Hz
Power consumption	1 W	1,5 W
For wire sizing	2 VA	4 VA
Connection	Cable 1 m, 3x0,75 mm ²	Cable 1 m, 3x0,75 mm ²
Operating angle	Max. 95°, adjustable 0–100%	Max. 95°, adjustable 0–100%
Torque at rated voltage	Min. 5 Nm	Min. 5 Nm
Direction of rotation	Switch selectable 0 ↺ or 1 ↻	Switch selectable 0 ↺ or 1 ↻
Position indication	Mechanical	Mechanical
Running time for 95°	150 s	150 s
Sound power level	Max. 35 dB (A)	Max. 35 dB (A)
Protection class	III Safety extra-low voltage	II Safety insulated
Protection type	IP 54	IP 54
Ambient temperature range	-30 to +50°C	-30 to +50°C
Ambient moisture	95 % RH	95 % RH





Motorized shut-off damper

DTBU



Description

Shut-off damper with electric motor – NM 24 A-F or NM 230 A-F

Consists of a DTU damper with a 24 or 230 V electric motor added.

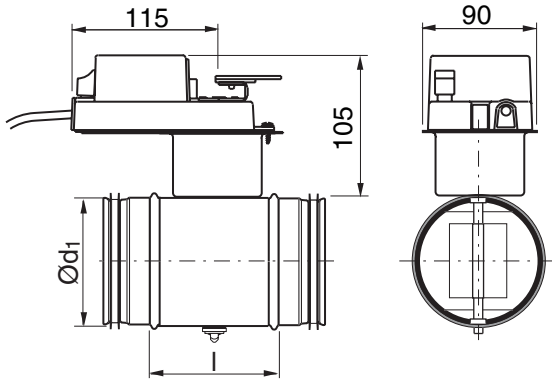
The motor is controlled by a single-pole breaking contact. The motor has overload protection and stops automatically when the blade has reached its end stop. The stop can be continually adjusted. Although the current is connected, the motor is not damaged if blocked.

The spindle and motor can be disconnected from each other via a release button on the motor housing.

In outdoor installation, the motor should be protected from direct UV radiation.

The motor is installed at a distance from the damper, which makes it easy to insulate the ventilation duct.

Dimensions



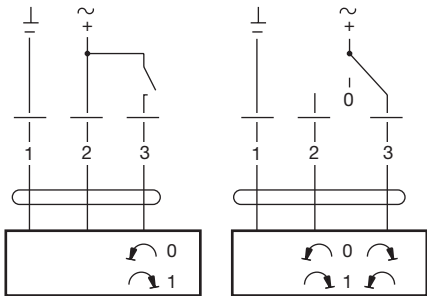
Ød ₁ nom	l mm	m kg	Sealing class past closed blade
400	100	4,59	4
500	115	7,29	4

Ordering example

	DTBU	400	24	NMF
Product				
Dimension Ød ₁				
Voltage				
Motor type				

Technical data for the motors

	NM 24 A-F	NM 230 A-F
Power supply	AC 19,2–28,8 V, 50/60 Hz DC 19,2–28,8 V	AC 85–265 V, 50/60 Hz
Power consumption	1,5 W	2,5 W
For wire sizing	3,5 VA	6 VA
Connection	Cable 1 m, 3x0,75 mm ²	Cable 1 m, 3x0,75 mm ²
Operating angle	Max. 95°, adjustable 0–100%	Max. 95°, adjustable 0–100%
Torque at rated voltage	Min. 10 Nm	Min. 10 Nm
Direction of rotation	Switch selectable 0 ↺ or 1 ↻	Switch selectable 0 ↺ or 1 ↻
Position indication	Mechanical	Mechanical
Running time for 95°	150 s	150 s
Sound power level	Max. 35 dB (A)	Max. 35 dB (A)
Protection class	III Safety extra-low voltage	II Safety insulated
Protection type	IP 54	IP 54
Ambient temperature range	-30 to +50°C	-30 to +50°C
Ambient moisture	95 % RH	95 % RH





Motorized shut-off damper

DTBU



Description

Shut-off damper with electric motor – SM 24 A or SM 230 A

Consists of a DTU damper with a 24 or 230 V electric motor added.

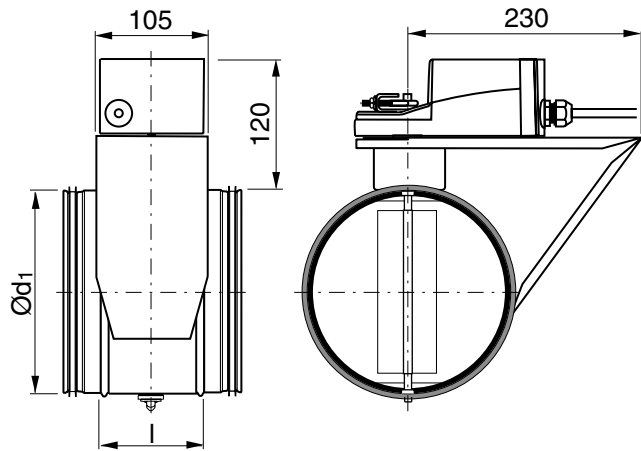
The motor is controlled by a single-pole breaking contact. The motor has overload protection and stops automatically when the blade has reached its end stop. The stop can be continually adjusted. Although the current is connected, the motor is not damaged if blocked.

The spindle and motor can be disconnected from each other via a release button on the motor housing.

In outdoor installation, the motor should be protected from direct UV radiation.

The motor is installed at a distance from the damper, which makes it easy to insulate the ventilation duct.

Dimensions



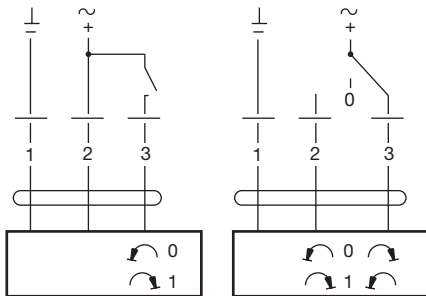
Ød ₁ nom	l mm	m kg	Sealing class past closed blade
630	115	10,5	4

Ordering example

	DTBU	630	24	SM
Product				
Dimension Ød ₁				
Voltage				
Motor type				

Technical data for the motors

	SM 24 A	SM 230 A
Power supply.....	AC 19,2–28,8 V, 50/60 Hz DC 19,2–28,8 V	AC 85–265 V, 50/60 Hz
Power consumption.....	2 W	2,5 W
For wire sizing.....	4 VA	6 VA
Connection.....	Cable 1 m, 3x0,75 mm ²	Cable 1 m, 3x0,75 mm ²
Operating angle.....	Max. 95°, adjustable 0–100%	Max. 95°, adjustable 0–100%
Torque at rated voltage.....	Min. 20 Nm	Min. 20 Nm
Direction of rotation.....	Switch selectable 0 ↺ or 1 ↻	Switch selectable 0 ↺ or 1 ↻
Position indication.....	Mechanical	Mechanical
Running time for 95°.....	150 s	150 s
Sound power level.....	Max. 35 dB (A)	Max. 35 dB (A)
Protection class.....	III Safety extra-low voltage	II Safety insulated
Protection type.....	IP 54	IP 54
Ambient temperature range.....	-30 to +50°C	-30 to +50°C
Ambient moisture.....	95 % RH	95 % RH





Motorized shut-off damper

DTBCU



Description

Shut damper with spring return motor – LF 24 or LF 230

Consists of a DTU damper with a 24 or 230 V electric motor added.

The motor is controlled by a single-pole breaking contact. The motor has overload protection and stops automatically when the blade has reached its end stop. Although the current is connected, the motor is not damaged if blocked.

When system voltage is connected, the motor starts and tensions the return spring at the same time. The motor stops at its end position and is not damaged by blockage, although system voltage remains.

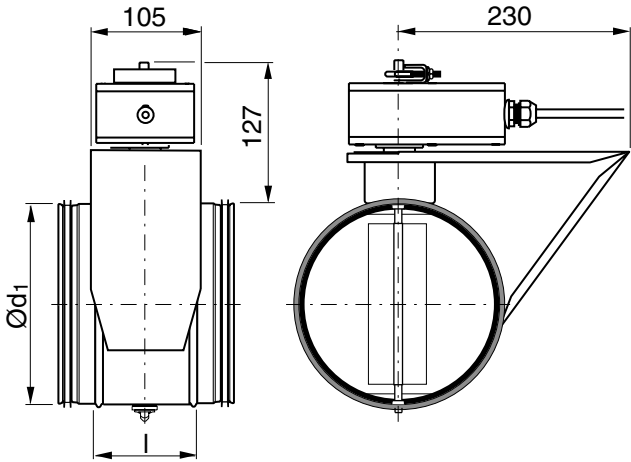
When the power is cut, the damper closes when the drive motor freewheels and the return spring pulls the blade back to its original position.

If you want the damper to open instead of close, you can undo the two nuts on the spindle clamp, turn the spindle 90° and tighten the nuts again.

In outdoor installation, the motor should be protected from direct UV radiation.

The motor is installed at a distance from the damper, which makes it easy to insulate the ventilation duct.

Dimensions



Ød ₁ nom	l mm	24 V m kg	230 V m kg	Sealing class past closed blade
80	100	2,07	2,22	4
100	100	2,15	2,30	4
125	100	2,30	2,45	4
160	100	2,51	2,66	4
200	100	2,81	2,96	4
250	100	3,29	3,44	4
315	100	3,91	4,06	4

Ordering example

	DTBCU	250	24	LF
Product				
Dimension Ød ₁				
Voltage				
Motor type				



Motorized shut-off damper

DTBCU



Description

Shut-off damper with spring return motor – AF 24 or AF 230

Consists of a DTU damper with a 24 or 230 V electric motor added.

The motor is controlled by a single-pole breaking contact. The motor has overload protection and stops automatically when the blade has reached its end stop. Although the current is connected, the motor is not damaged if blocked.

When system voltage is connected, the motor starts and tensions the return spring at the same time. The motor stops at its end position and is not damaged by blockage, although system voltage remains.

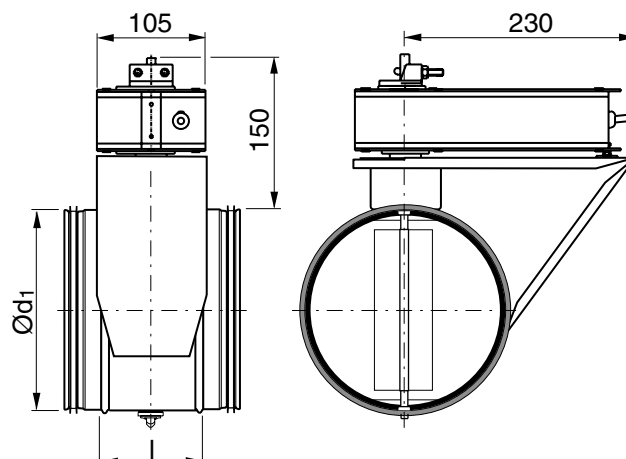
When the power is cut, the damper closes when the drive motor freewheels and the return spring pulls the blade back to its original position.

If you want the damper to open instead of close, you can undo the two nuts on the spindle clamp, turn the spindle 90° and tighten the nuts again.

In outdoor installation, the motor should be protected from direct UV radiation.

The motor is installed at a distance from the damper, which makes it easy to insulate the ventilation duct.

Dimensions



Ød ₁ nom	l mm	24 V m kg	230 V m kg	Sealing class past closed blade
400	100	7,02	7,32	4
500	115	9,44	9,74	4
630	115	11,2	11,5	4

Ordering example

	DTBCU	400	24	AF
Product				
Dimension Ød ₁				
Voltage				
Motor type				

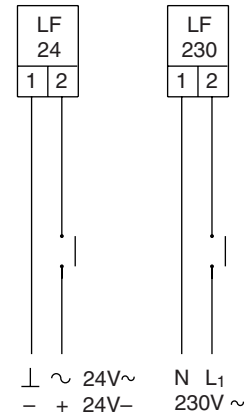


Motorized shut-off damper

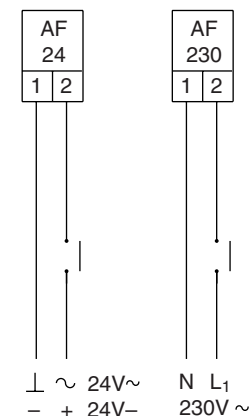
DTBCU

Technical data for the motors

	LF 24	LF 230
Power supply.....	24 V~ ±20% 50/60 Hz 24 V- ±10%	230 V~ ±14% 50/60 Hz
Power consumption		
– during opening.....	5 W	5 W
– stand-by	2,5 W	3 W
For wire sizing	7 VA	7 VA
Connection.....	Cable 1 m, 2×0,75 mm ²	Cable 1 m, 2×0,75 mm ²
Operating angle, adjustable	Mech. limited to 95°	Mech. limited to 95°
Torque at rated voltage		
– motor	Min. 4 Nm	Min. 4 Nm
– return spring	Min. 4 Nm	Min. 4 Nm
Direction of rotation.....	Optional through right or left-hand installation L/R	Optional through right or left-hand installation L/R
Position indication	Mechanical	Mechanical
Running time		
– motor	40–75 s (0–4 Nm)	40–75 s (0–4 Nm)
– return spring	app. 20 s	app. 20 s
Protection class.....	IP 54	IP 54
Ambient temperature range	-30 to +50°C	-30 to +50°C
Sound power level		
– motor	max 50 dB (A)	max 50 dB (A)
– return spring	app. 62 dB (A)	app. 62 dB (A)
Length × width × height	155 × 98 × 82 mm	155 × 98 × 82 mm
Weight	1,4 kg	1,6 kg



	AF 24	AF 230
Power supply.....	24 V~ ±20% 50/60 Hz 24 V- ±10%	230 V~ ±14% 50/60 Hz
Power consumption		
– during opening.....	5 W	6,5 W
– stand-by	1,5 W	2,5 W
For wire sizing	10 VA	11 VA
Connection.....	Cable 1 m, 2×0,75 mm ²	Cable 1 m, 2×0,75 mm ²
Operating angle, adjustable	Mech. limited to 95°	Mech. limited to 95°
Torque at rated voltage		
– motor	Min. 15 Nm	Min. 15 Nm
– spring bias	Min. 15 Nm	Min. 15 Nm
Direction of rotation.....	Optional through right or left-hand installation L/R	Optional through right or left-hand installation L/R
Position indication	Mechanical	Mechanical
Running time		
– motor	app. 150 s	app. 150 s
– return spring	app. 16 s	app. 16 s
Protection class.....	IP 54	IP 54
Ambient temperature range	-30 to +50°C	-30 to +50°C
Sound power level		
– motor	max 50 dB (A)	max 50 dB (A)
– return spring	app. 62 dB (A)	app. 62 dB (A)
Length × width × height	248 × 98 × 92,5 mm	248 × 98 × 92,5 mm
Weight	3,0 kg	3,3 kg





Motorized shut-off damper

DTPU



Description

Shut-off damper with pneumatic actuator

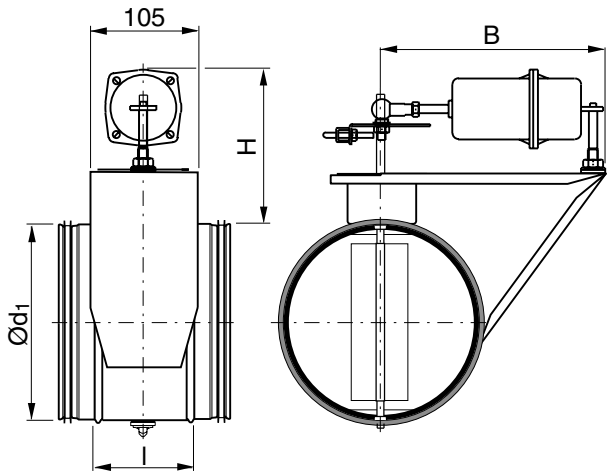
Consists of a DTU damper with a pneumatic actuator installed. The actuator consists of a glass-reinforced polyamide housing with an internal rolling diaphragm to which the spindle is fixed.

When air pressure rises, the actuator spindle is forced out and operates the blade via a lever. When air pressure falls, the actuator spindle retracts under the tension of the return spring. The damper blade is closed when delivered, and the actuator fully retracted.

Ordering example

	DTPU	200	AK31
Product			
Dimension Ød ₁			
Motor type			

Dimensions



Ød ₁ nom	I mm	H mm	B mm	m kg	Sealing class past closed blade
80	100	144	230	1,07	3
100	100	144	230	1,15	3
125	100	144	230	1,30	3
160	100	144	230	1,51	3
200	100	144	230	1,81	3
250	100	160	230	2,39	3
315	100	160	230	3,01	3
400	100	195	325	5,42	3
500	115	195	325	7,84	3
630	115	195	325	10,6	3

Technical data for the actuators

Dimension.....	AK 31 P Ø80–200
Air connection.....	Nozzle Ø4 mm
Volume of free air required for full stroke	0,3 l _n
Power pressure max.....	150 kPa (1,5 bar)
Ambient temperature range.....	-5 to +60°C
Weight	0,3 kg

AK 41 P Ø250–315
1/8"
0,5 l _n
150 kPa (1,5 bar)
-10 to +70°C
0,5 kg

AK 42 P Ø400–630
1/8"
1,7 l _n
150 kPa (1,5 bar)
-10 to +70°C
1,4 kg

Running time 0 – 90 °

At power pressure 90 kPa	10 s
At power pressure 150 kPa	1 s
At spring return.....	2 s

10 s
1 s
2 s

10 s
1 s
2 s

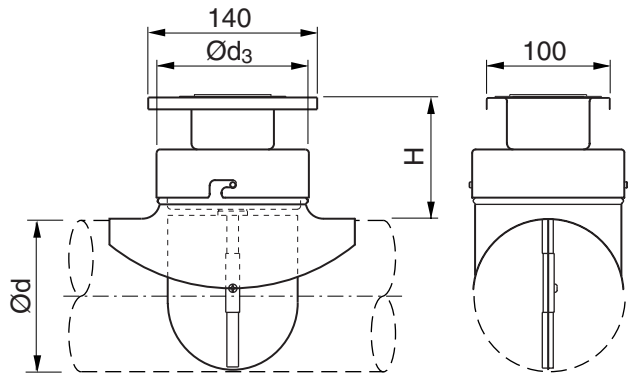


Cleaning regulating damper

PSDRU



Dimensions



Description

Cleaning regulating damper

Consists of a KCU cleaning cover with a blade similar to the DRU and a PSU collar saddle in whose branch the cleaning cover is fixed.

The branch is provided with a Safe seal.

Since it is easy to remove the cleaning cover together with the blade, it is easy to inspect and clean the ventilation system. The original pressure balance in the system is not affected since the blade and cleaning cover retain their mutual positions which they were given during balancing. The damper can be used to advantage, to complete an existing ventilation system.

Ød ₁ nom	Ød ₃	H mm	m kg	Sealing class past closed blade
100	100	100	0,70	0
125	125	105	0,95	0
160	160	110	1,30	0
200	200	110	1,75	0
250	250	120	2,60	0
315	315	120	3,80	0
400	400	175	5,70	0

Ordering example

Product	PSDRU	160
Dimension Ød		



Cleaning regulating damper

TDRU



Description

Cleaning regulating damper

Consists of a KCU cleaning cover with a blade similar to the DRU and a TCPU T-piece in whose branch the cleaning cover is fixed.

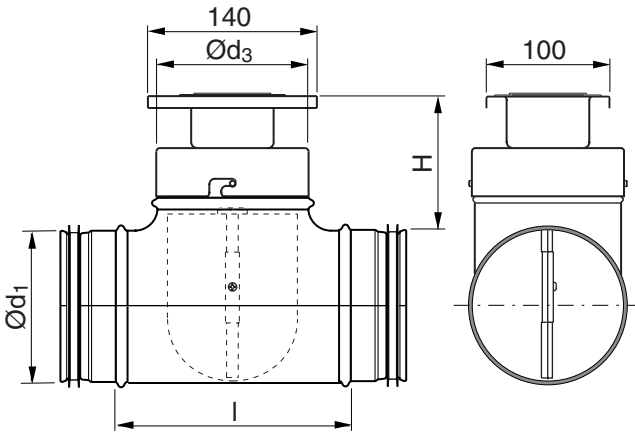
The branch is provided with a Safe seal.

Since it is easy to remove the cleaning cover together with the blade, it is easy to inspect and clean the ventilation system. The original pressure balance in the system is not affected since the blade and cleaning cover retain their mutual positions which they were given during balancing.

Ordering example

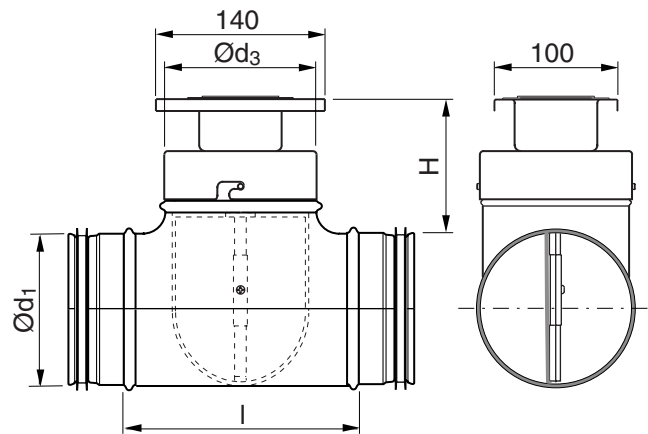
	TDRU	160
Product		
Dimension Ød ₁		

Dimensions



Ød ₁ Ød ₃ nom	I mm	H mm	m kg	Sealing class past closed blade
100 100	130	100	0,71	0
125 125	165	105	1,28	0
160 160	229	110	1,80	0
200 200	281	110	2,80	0
250 250	296	120	3,51	0
315 315	363	120	4,03	0
400 400	510	175	9,30	0

TDSU



Since it is easy to remove the cleaning cover together with the blade, it is easy to inspect and clean the ventilation system. The original pressure balance in the system is not affected since the blade and cleaning cover retain their mutual positions which they were given during balancing.

Product	TDSU	160
Dimension Ød ₁		

Ød ₁ Ød ₃ nom	l mm	H mm	m kg	Sealing class past closed blade
100 100	130	100	0,75	1
125 125	165	105	1,33	1
160 160	229	110	2,00	1
200 200	281	110	2,80	1
250 250	296	120	3,71	1
315 315	363	120	4,33	1
400 400	510	175	9,90	1



Alternating shut-off damper

TASU

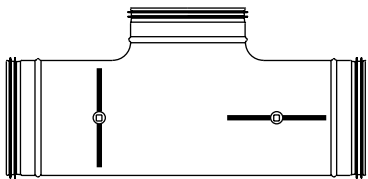
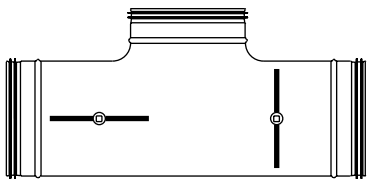


Description

Alternating shut-off damper

Consists of an extended T-piece and two linked DSU dampers.

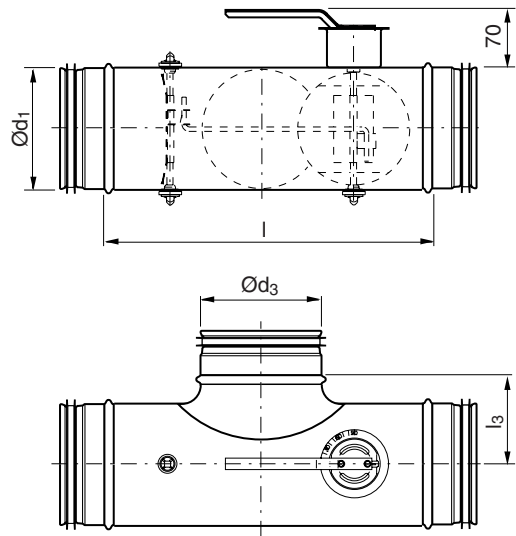
Can be used for "by pass" ducts. It thereby replaces two conventional dampers + two couplings + one T-piece and is 20–30% shorter.



Ordering example

	TASU	160	160
Product			
Dimension $\varnothing d_1$			
Dimension $\varnothing d_3$			

Dimensions



$\varnothing d_1$	$\varnothing d_3$	l	l ₃	m	Sealing class past closed blade
nom		mm	mm	kg	
100	100	280	65	1,10	0
125	125	345	83	1,50	0
160	160	385	105	2,00	0
200	200	425	125	2,80	0
250	250	520	150	4,10	0
315	315	585	182	5,90	0
400	400	645	225	8,30	0



Alternating shut-off damper

TATU

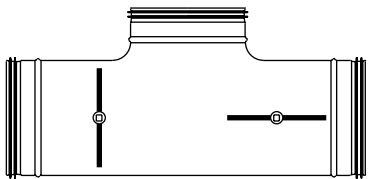
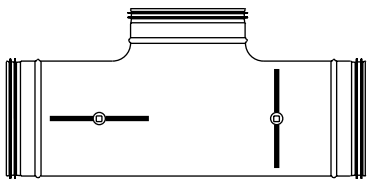


Description

Alternating shut-off damper

Consists of an extended T-piece and two linked DTU dampers.

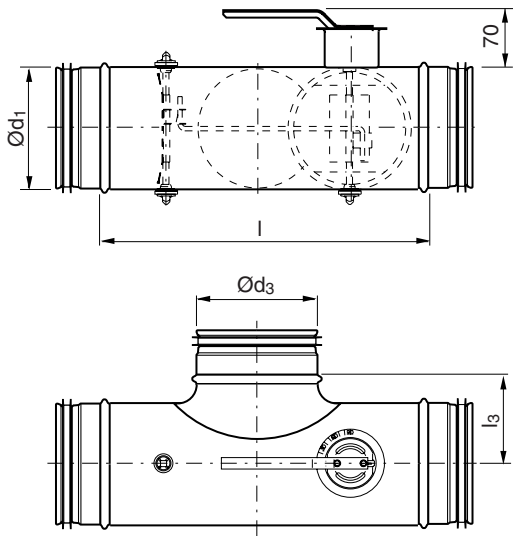
Can be used for "by pass" ducts. It thereby replaces two conventional dampers + two couplings + one T-piece and is 20–30% shorter.



Ordering example

	TATU	160	160
Product			
Dimension $\varnothing d_1$			
Dimension $\varnothing d_3$			

Dimensions



$\varnothing d_1$ nom	$\varnothing d_3$ nom	l mm	l ₃ mm	m kg	Sealing class past closed blade
100	100	280	65	1,20	2
125	125	345	83	1,60	2
160	160	385	105	2,20	2
200	200	425	125	3,15	2
250	250	520	150	4,50	2
315	315	585	182	6,60	2
400	400	645	225	9,80	2



Motorized alternating shut-off damper

TATBU



Description

Alternating shut-off damper with electric motor – NM 24 A-F or NM 230 A-F

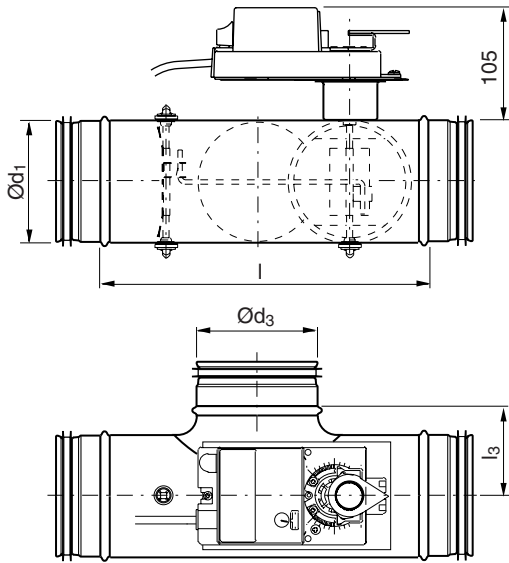
Consists of an extended T-piece with two linked DTU dampers and a 24 or 230 V electric motor installed.

Can be used for “by pass” ducts. This means that it replaces two conventional dampers + two couplings + one T-piece and is 20–30% shorter.

Ordering example

	TATBU	400	24	NMF
Product				
Dimension Ød ₁				
Voltage				
Motor type				

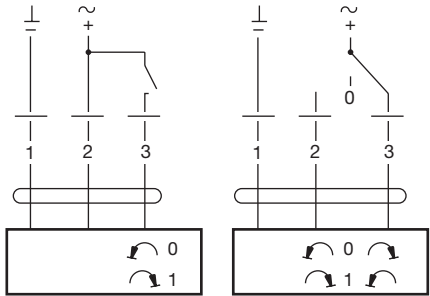
Dimensions



Ød ₁ nom	Ød ₃	l mm	l ₃ mm	m kg	Sealing class past closed blade
100	100	280	65	2,00	2
125	125	345	83	2,40	2
160	160	385	105	3,00	2
200	200	425	125	3,90	2
250	250	520	150	5,20	2
315	315	585	182	7,40	2
400	400	645	225	10,6	2

Technical data for the motors

	NM 24 A-F	NM 230 A-F
Power supply	AC 19,2–28,8 V, 50/60 Hz DC 19,2–28,8 V	AC 85–265 V, 50/60 Hz
Power consumption	1,5 W	2,5 W
For wire sizing	3,5 VA	6 VA
Connection	Cable 1 m, 3x0,75 mm ²	Cable 1 m, 3x0,75 mm ²
Operating angle	Max. 95°, adjustable 0–100%	Max. 95°, adjustable 0–100%
Torque at rated voltage	Min. 10 Nm	Min. 10 Nm
Direction of rotation	Switch selectable 0 ↺ or 1 ↻	Switch selectable 0 ↺ or 1 ↻
Position indication	Mechanical	Mechanical
Running time for 95°	150 s	150 s
Sound power level	Max. 35 dB (A)	Max. 35 dB (A)
Protection class	III Safety extra-low voltage	II Safety insulated
Protection type	IP 54	IP 54
Ambient temperature range	-30 to +50°C	-30 to +50°C
Ambient moisture	95 % RH	95 % RH

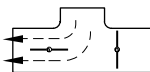
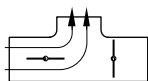




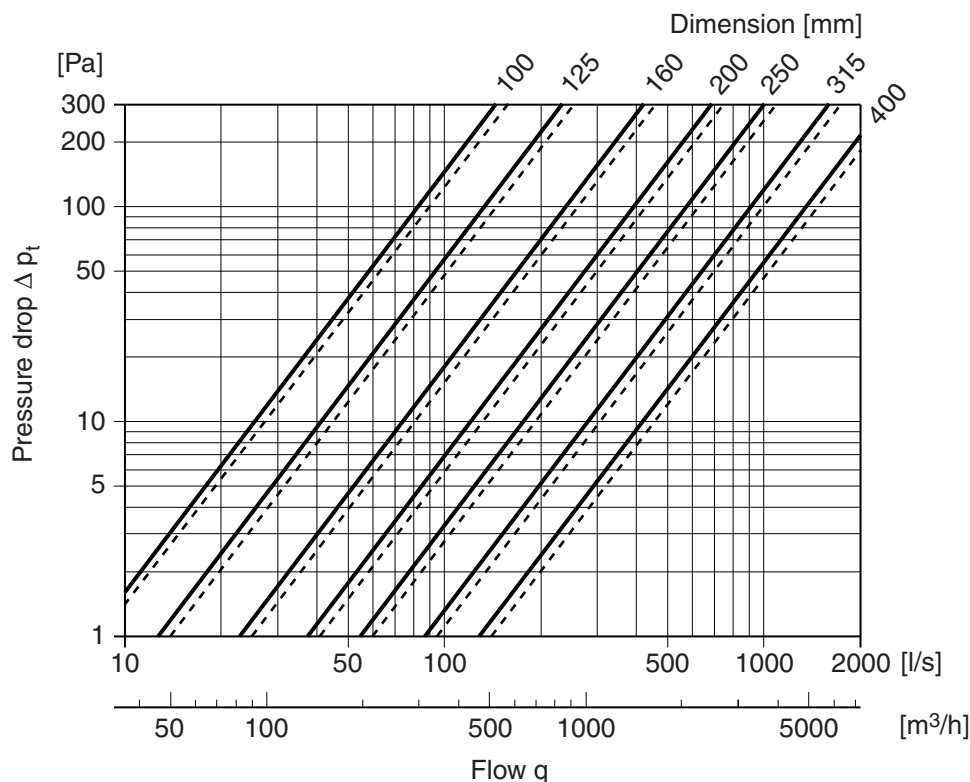
Motorized alternating shut-off dampers

TASU, TATU, TATBU

Technical data



The dashed pressure drop curves refer to this flow direction.





Constant-/variable flow dampers

DAU, DA2EU, DAVU

Summary

- DAU - manual single flow unit
- DA2EU - motorized twin flow unit
- DAVU - motorized variable flow unit
- Diameters Ø 80–315
- Flow range 15–830 l/s (54–2988 m³/h)
- Pressure range 50–1000 Pa (over the unit)
- Independent of mounting direction
- Handles 50 mm duct insulation
- Available preinsulated

Function

The constant flow damper is an automatic damper, which at varying pressures wholly mechanical and independent of external energy sources maintains a set flow constant. The force, needed for regulation, is taken from the passing air stream. The air stream across the blade attempts to close it and generates a closing torque. This is balanced by an opposed opening force from a spring. The greater the pressure across the blade the more it closes. A bellow eliminates oscillations, which could occur at unfavourable conditions of operation.

Types

The following types exists:

- DAU – one flow unit – with knob and arrow for manual setting of one flow.
- DA2EU – two flows unit – with electric motor for switching between two flows.
- DAVU – variable flow unit – with electric motor for continuous setting of one flow.

Material

Housing and damper blade are of galvanized sheet metal and shaft is of stainless steel.

Temperature

Working range: +5 to +70 °C.

Insulation

The units can handle 50 mm duct insulation without the scale or the motor being hidden.

The units can be ordered with an external insulation and an outer sheet metal shell for lower sound radiation to the surroundings, see pages 314–315.

Regulating accuracy

The units are calibrated from factory within their whole working range. In this the units keep the flow constant within approximately ± 5 to $\pm 10\%$ of the set flow. Greater deviations occur at the lower flows, especially for small sizes.

Disturbance tolerance

In order to achieve the stated accuracy for the pre-set flow a straight distance of at least **3xd before** and at least **1,5xd after** the units are required. A mounting close to a source of disturbance (bend, saddle etc.) decreases the regulation accuracy and the flow may diverge from the set value.

Change of direction

The units are independent of their mounting direction and one may deviate from the specified direction and mount them in any direction without affecting the accuracy.

Combinations

The units can be mounted together with e.g. a motorized shut off damper DTBU, see page 209. Constant flow damper combined with shut off damper can with advantage be used in groups at installations where you want:

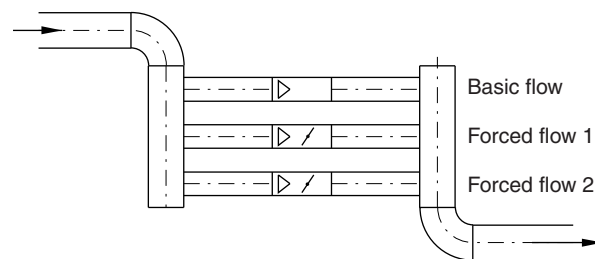
- two flows, that lies too far away from each other for a two flow unit to handle

or

- more than two flows

Presume: Basic flow	= 80 l/s
Forced flow 1	= 100 l/s
Forced flow 2	= 150 l/s

Four flows will then be possible: 80, 180, 230 and 330 l/s.





Constant-/ variable flow dampers

DAU, DA2EU, DAVU

Technical data

Pressure and flow ranges and sound to duct

The graphs show A-weighted sound power level, L_{WA} [dB], to duct. These curves are intended for brief comparison. For more accurate calculation, please use the tables on pages 226–227.

Example

Given: Diameter 125 mm
Flow 70 l/s
Pressure drop 200 Pa

The graph gives:

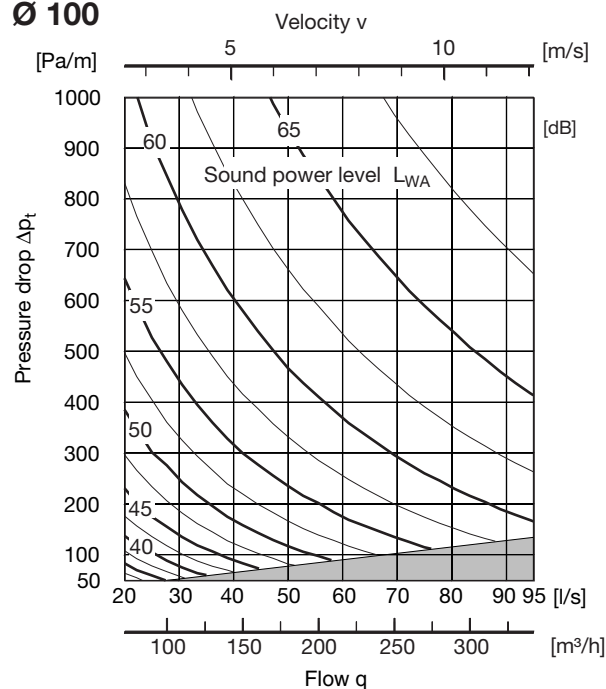
A-weighted sound
power level approx. 57 dB

The table gives:

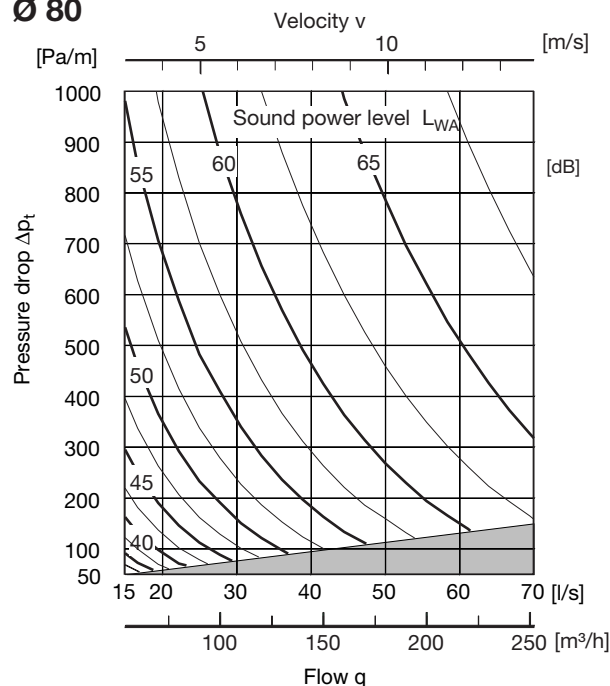
Sound power level as below

Centre frequency [Hz]	63	125	250	500	1 k	2 k	4 k	8 k
Sound power level [dB]	52	52	49	49	49	51	51	46

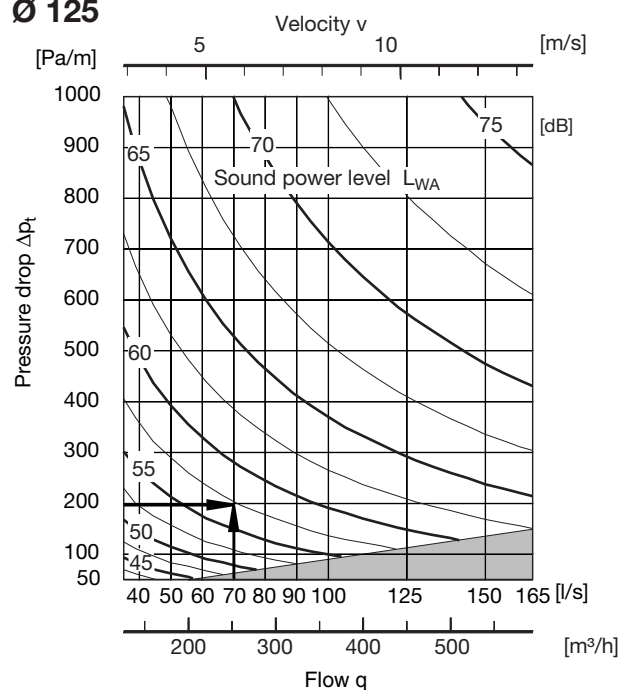
Ø 100



Ø 80



Ø 125





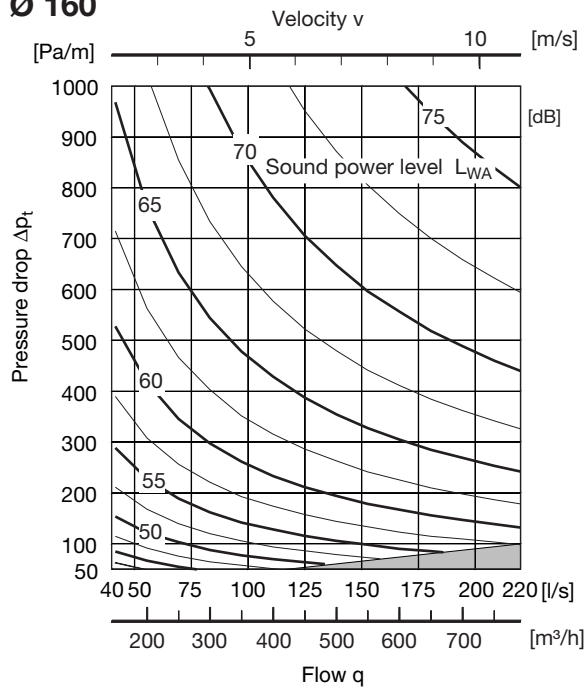
Constant-/ variable flow dampers

DAU, DA2EU, DAVU

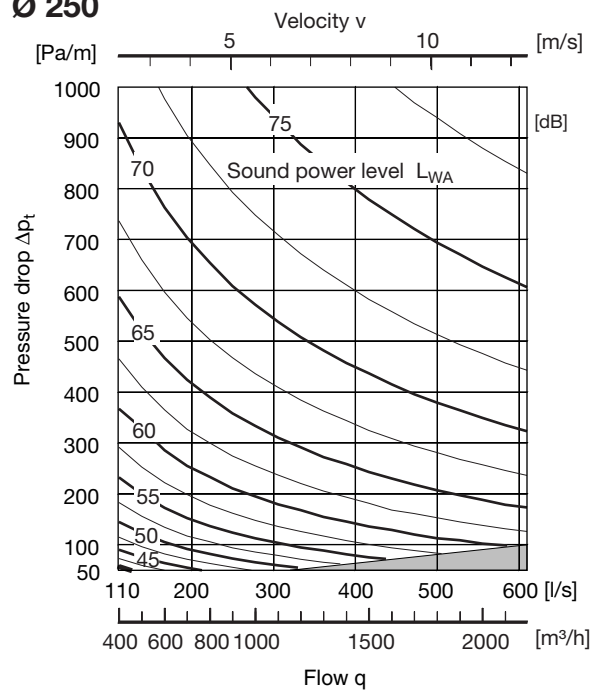
Technical data

Pressure and flow ranges and sound to duct

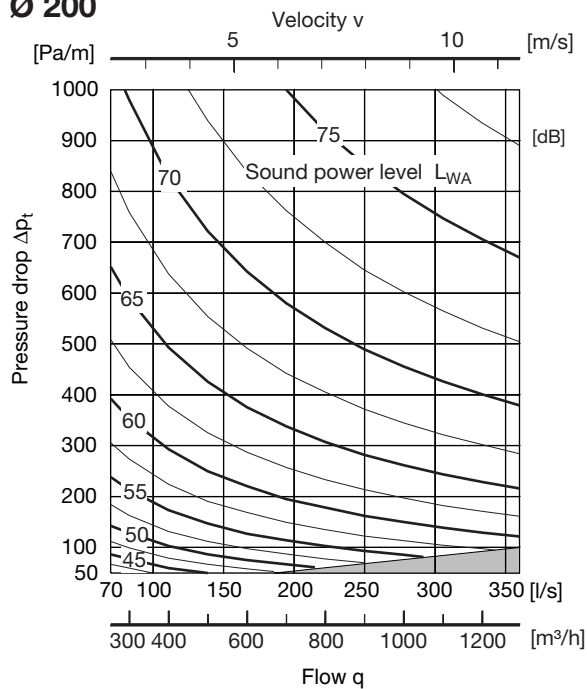
Ø 160



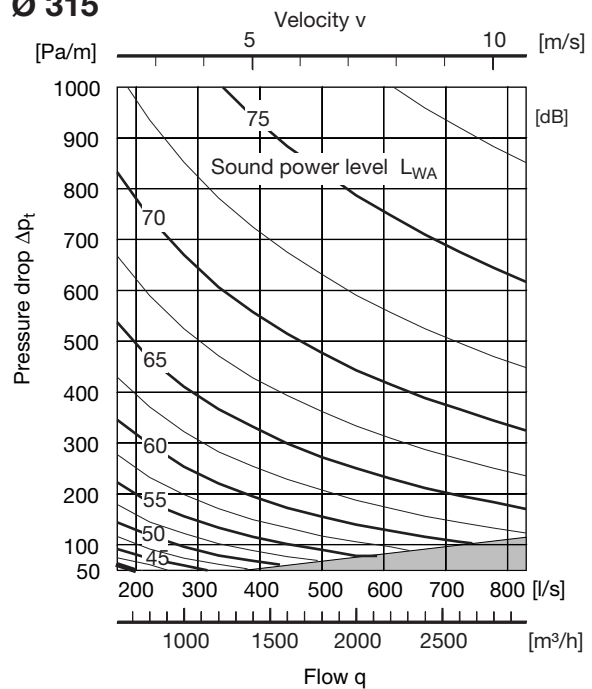
Ø 250



Ø 200



Ø 315





Constant-/ variable flow dampers

DAU, DA2EU, DAVU

Technical data

Sound to duct

Sound power level, L_W [dB], to duct in octave bands 1–8, 63–8000 Hz, as function of diameter, pressure drop and flow.

Ød ₁	Pressure drop [Pa]	Velocity approx. 2,5 [m/s]								Velocity approx. 6 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
		Flow 15 [l/s]								Flow 30 [l/s]							
80	1000	51	49	44	44	46	49	49	44	56	56	53	53	53	55	55	50
	500	45	43	38	38	40	43	43	38	51	51	49	49	49	51	50	46
	200	37	35	30	30	32	35	35	30	45	45	43	43	43	45	44	40
	100	32	30	25	25	27	30	30	25	41	41	39	39	39	41	40	35
	50	26	24	19	19	21	24	24	19	–	–	–	–	–	–	–	–
		Flow 20 [l/s]								Flow 45 [l/s]							
100	1000	56	53	48	48	50	53	54	48	59	59	57	57	57	59	58	53
	500	49	46	41	41	43	47	47	42	54	54	51	51	51	53	53	48
	200	39	37	31	31	33	37	37	32	47	47	44	44	45	47	46	41
	100	34	31	26	26	28	32	32	27	42	42	39	39	40	42	41	36
	50	26	24	18	18	20	24	24	19	–	–	–	–	–	–	–	–
		Flow 30 [l/s]								Flow 70 [l/s]							
125	1000	60	58	52	52	54	58	58	53	64	64	62	62	62	64	63	59
	500	54	52	46	46	48	52	52	47	59	59	56	57	57	59	58	53
	200	46	44	38	38	40	44	44	39	52	52	49	49	49	51	51	46
	100	40	38	32	32	34	38	38	33	46	46	44	44	44	46	45	40
	50	34	32	26	26	28	32	32	27	–	–	–	–	–	–	–	–
		Flow 40 [l/s]								Flow 120 [l/s]							
160	1000	62	59	52	52	55	59	60	54	67	67	65	65	65	67	66	61
	500	56	53	47	47	49	53	54	48	61	61	59	59	59	61	60	55
	200	49	46	39	39	42	46	47	41	53	53	51	51	51	53	52	47
	100	43	40	33	33	36	40	41	35	48	48	46	46	46	48	47	42
	50	37	34	27	27	30	34	35	29	–	–	–	–	–	–	–	–
		Flow 70 [l/s]								Flow 180 [l/s]							
200	1000	66	63	57	57	59	63	63	58	69	69	66	66	66	68	68	63
	500	59	56	50	50	53	57	57	52	62	62	60	60	60	62	61	57
	200	50	47	41	41	43	47	47	42	54	54	51	51	52	54	53	48
	100	43	40	34	34	36	40	40	35	47	47	45	45	45	47	46	42
	50	37	34	28	28	30	34	34	29	–	–	–	–	–	–	–	–
		Flow 110 [l/s]								Flow 300 [l/s]							
250	1000	67	64	59	59	61	65	65	60	70	70	67	68	67	69	69	64
	500	60	57	51	51	53	57	57	52	63	63	61	61	61	63	62	57
	200	50	47	41	41	43	47	47	42	55	55	53	53	53	54	54	49
	100	43	40	34	34	36	40	40	35	49	49	47	47	47	48	48	43
	50	35	32	26	26	28	32	33	27	43	43	40	41	40	42	42	37
		Flow 170 [l/s]								Flow 470 [l/s]							
315	1000	69	66	60	60	62	66	67	61	70	70	68	68	68	70	69	65
	500	61	58	52	52	54	58	59	53	64	64	62	62	62	64	63	59
	200	50	47	41	41	44	48	48	43	56	56	54	54	54	56	55	50
	100	42	40	34	34	36	40	40	35	50	50	47	47	47	49	49	44
	50	35	32	26	26	29	33	33	28	–	–	–	–	–	–	–	–



Constant-/variable flow dampers

DAU, DA2EU, DAVU

Technical data

Sound to duct

Ød ₁	Pressure drop [Pa]	Velocity approx. 9 [m/s]								Velocity approx. 12 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
		Flow 45 [l/s]								Flow 70 [l/s]							
80	1000	58	59	59	59	58	59	58	53	61	64	65	65	63	63	61	57
	500	55	56	55	55	54	55	54	50	59	61	62	62	60	60	59	55
	200	50	51	51	51	50	51	50	45	55	58	59	59	57	57	55	51
	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Flow 70 [l/s]								Flow 95 [l/s]							
100	1000	61	62	61	62	61	62	61	56	62	64	65	65	63	63	62	58
	500	56	58	57	57	56	57	56	51	59	60	61	61	59	60	58	54
	200	51	52	51	51	50	51	50	46	53	55	56	56	54	54	53	49
	100	47	48	47	47	46	47	46	42	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Flow 110 [l/s]								Flow 165 [l/s]							
125	1000	66	67	67	67	66	67	66	61	68	71	71	72	70	70	68	64
	500	61	62	62	62	61	62	61	56	63	66	66	67	65	65	63	59
	200	54	55	55	55	54	55	54	49	57	59	60	60	58	58	57	52
	100	50	51	50	50	49	50	49	45	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Flow 180 [l/s]								Flow 220 [l/s]							
160	1000	69	70	69	69	68	69	68	64	70	71	71	71	70	71	69	65
	500	63	64	63	63	62	63	62	58	64	66	66	66	64	65	64	59
	200	55	56	56	56	55	56	55	50	56	58	58	58	57	57	56	52
	100	50	51	50	50	49	50	49	45	51	52	52	52	51	52	50	46
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Flow 280 [l/s]								Flow 360 [l/s]							
200	1000	70	71	71	71	70	71	70	65	71	73	73	73	72	72	71	67
	500	64	65	64	64	63	64	63	59	65	67	67	67	65	66	65	60
	200	56	57	56	56	55	56	55	51	57	58	59	59	57	58	56	52
	100	50	51	50	50	49	50	49	45	51	53	53	53	52	52	51	47
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Flow 450 [l/s]								Flow 600 [l/s]							
250	1000	71	72	71	71	70	71	70	66	72	73	74	74	72	73	71	67
	500	65	66	65	65	64	65	64	60	66	68	69	69	67	67	66	62
	200	57	58	57	57	56	57	56	52	58	60	61	61	59	59	58	54
	100	51	52	52	52	51	52	51	46	54	55	56	56	54	55	53	49
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		Flow 700 [l/s]								Flow 830 [l/s]							
315	1000	71	72	72	72	71	72	71	66	72	73	73	73	72	73	71	67
	500	66	67	66	66	65	66	65	61	66	67	67	68	66	67	66	61
	200	58	59	59	59	58	59	58	53	59	60	60	60	59	60	58	54
	100	52	53	53	53	52	53	52	47	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–



Constant-/ variable flow dampers

DAU, DA2EU, DAVU

Technical data

Pressure and flow ranges and sound to the surroundings

The graphs show A-weighted sound power level, L_{WA} [dB], to the surroundings.

Example:

Given: Diameter 125 mm
Flow 70 l/s
Pressure drop 200 Pa

The graph gives:

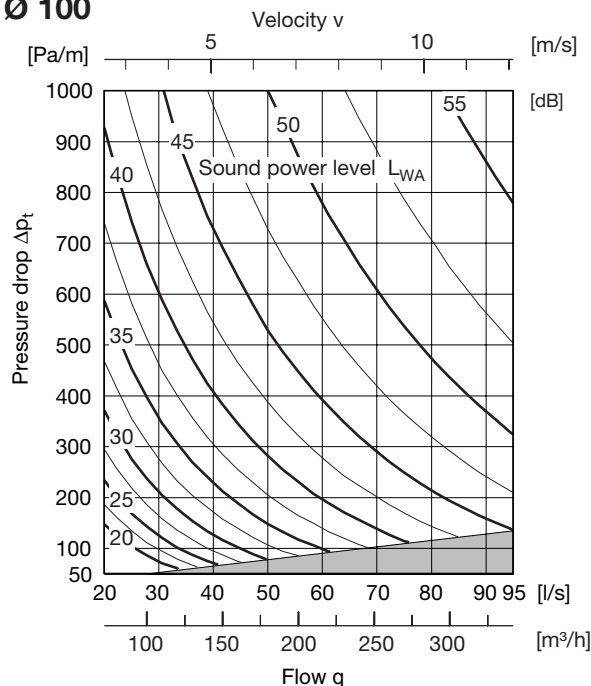
A-weighted sound
power level approx. 40 dB

The A-weighted sound **pressure** level in the middle of the room becomes approx. 8 dB lower than these graph values.

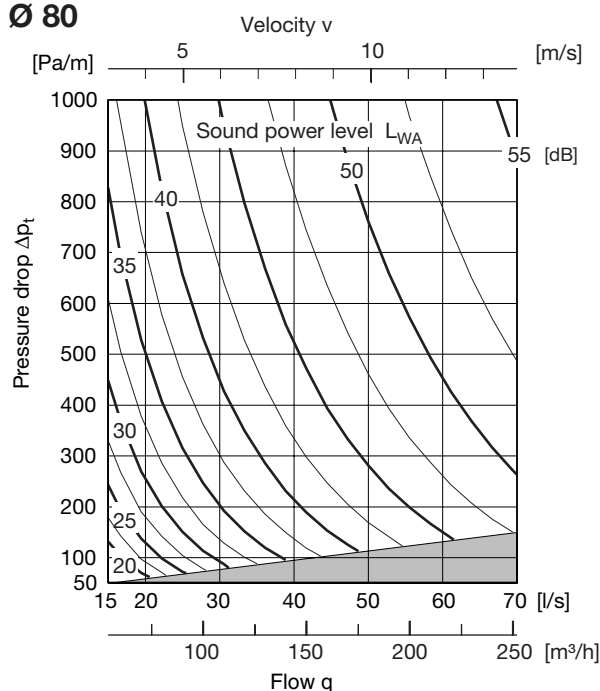
With insulation shell around the unit the sound **pressure** level in the middle of the room becomes approx. 26 dB lower than the graph values on condition that also the connected ducts are attenuated (insulated) to the same extent.

Still lower sound **pressure** level can be achieved with additional constructional sound attenuation measures (false ceiling, high room attenuation).

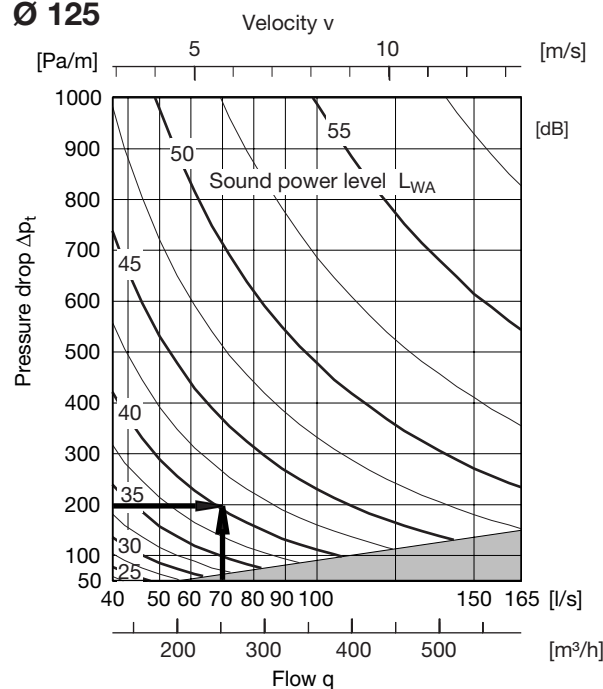
Ø 100



Ø 80



Ø 125





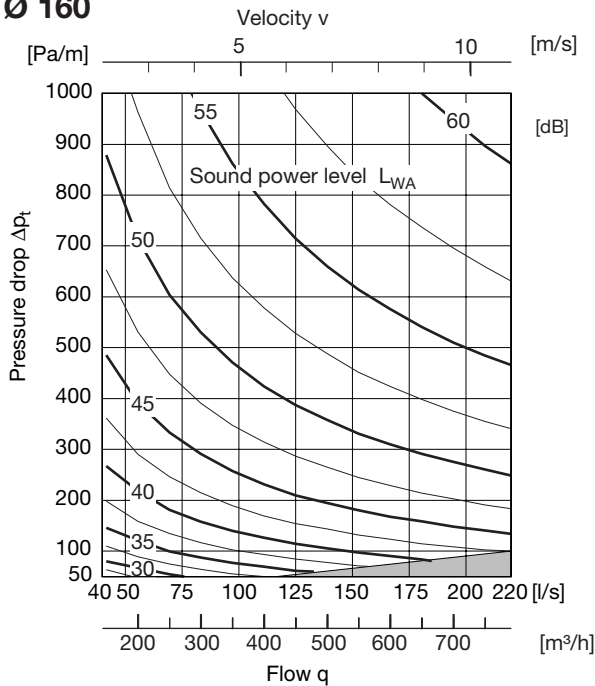
Constant-/ variable flow dampers

DAU, DA2EU, DAVU

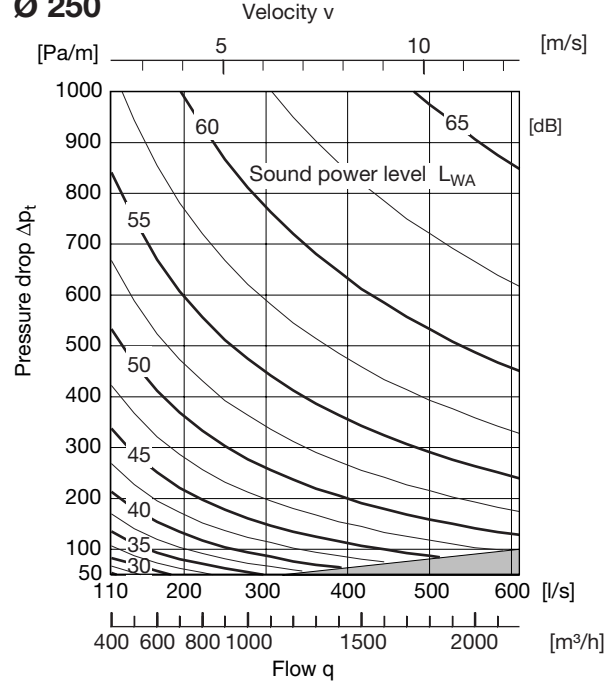
Technical data

Pressure and flow ranges and sound
to the surroundings

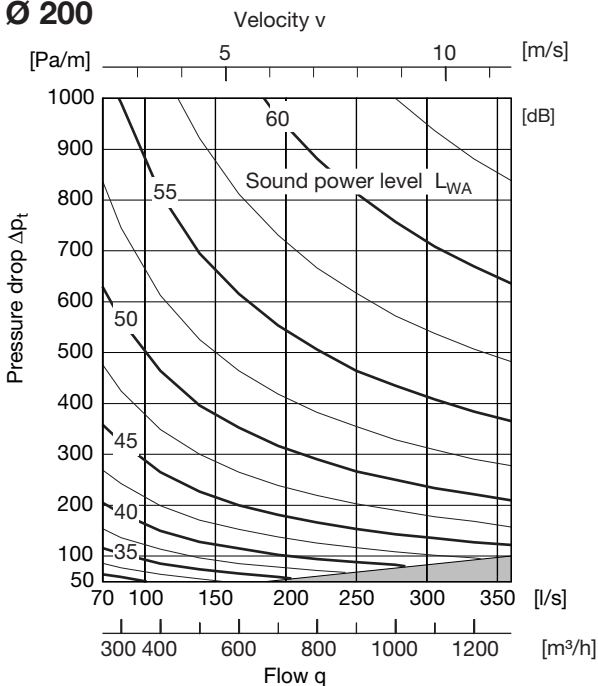
Ø 160



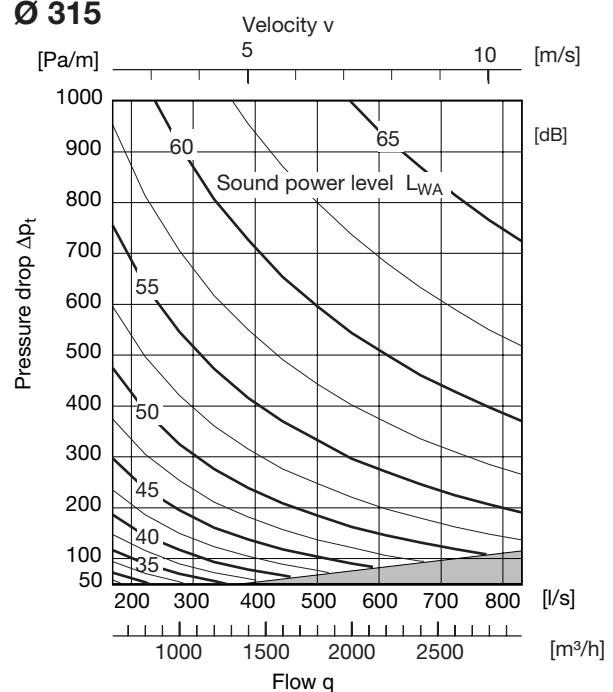
Ø 250



Ø 200



Ø 315





Constant-/variable flow damper

DAU



Description

Constant flow damper with manual setting of one flow
DAU is a constant flow damper, which facilitates balancing of ventilation systems and gives correct flow from the start.

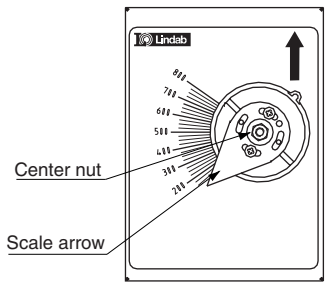
The unit compensates for e.g. connection and disconnection of system parts, clogging of filters and ducts, thermal lift forces, wind effects, window opening etc.

A special mounting, measuring, balancing and maintenance instruction exists for this product.

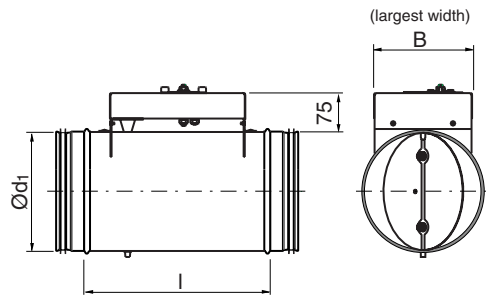
Technical data

Flow setting

The flow is set by loosening the central nut and via the knob turning the scale arrow so it points at the wanted flow on the scale. Then the locking nut is tightened.



Dimensions



Ød ₁ nom	l mm	B mm	m kg	Tightness class across closed blade
80	240	132	1,35	0
100	240	132	1,40	0
125	240	135	1,65	0
160	240	170	1,85	0
200	268	210	2,26	0
250	290	260	3,35	0
315	332	325	4,75	0

Ordering example

Product **DAU** **125**
Dimension Ød₁



Constant-/variable flow damper DA2EU



Description

Constant flow damper with electric motor for switching between two flows

DA2EU is a constant flow damper, which facilitates balancing of ventilation systems and gives correct flow from the start. The unit compensates for e.g. connection and disconnection of system parts, clogging of filters and ducts, thermal lift forces, wind effects, window opening etc.

The motors shall be completed with a switch. The switch can in turn be controlled either manually with timer, with on/off-thermostat, with attendance transmitter or similar.

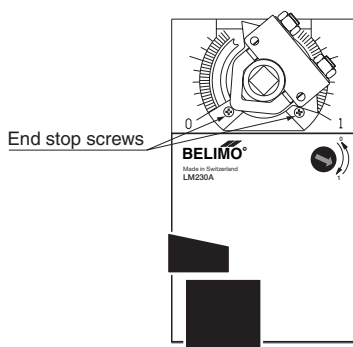
A special mounting, measuring, balancing and maintenance instruction exists for this product.

Technical data

Flow setting

The two flows are set by moving the end stoppers screws.

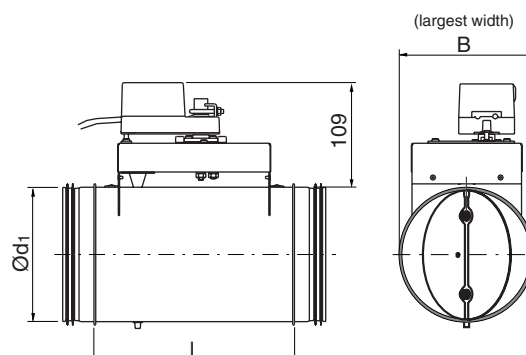
At delivery the screws are set at largest possible distance.



Technical data for the motors

Power supply	LM 24 A AC 19,2–28,8 V, 50/60 Hz DC 19,2–28,8 V	LM 230 A AC 65–265 V, 50/60 Hz
Power consumption	1 W	1,5 W
For wire sizing	2 VA	4 VA
Connection	Cable 1 m, 3x0,75 mm ²	Cable 1 m, 3x0,75 mm ²
Operating angle	Max. 95°, adjustable 0–100%	Max. 95°, adjustable 0–100%
Torque at rated voltage	Min. 5 Nm	Min. 5 Nm
Direction of rotation	Switch selectable 0 ↺ or 1 ↻	Switch selectable 0 ↺ or 1 ↻
Position indication	Mechanical	Mechanical
Running time for 95°	150 s	150 s
Sound power level	Max. 35 dB (A)	Max. 35 dB (A)
Protection class	III Safety extra-low voltage	II Safety insulated
Protection type	IP 54	IP 54
Ambient temperature range	-30 to +50°C	-30 to +50°C
Ambient moisture	95 % RH	95 % RH

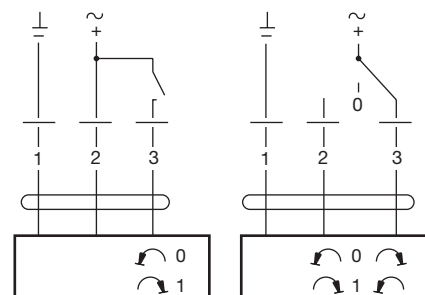
Dimensions



Ød ₁ nom	l mm	B mm	m kg	Tightness class across closed blade
80	240	132	1,95	0
100	240	132	2,00	0
125	240	135	2,25	0
160	240	170	2,45	0
200	268	210	2,86	0
250	290	260	3,95	0
315	332	325	5,35	0

Ordering example

Product	DA2EU	125	24	LM
Dimension Ød ₁				
Motor voltage				
Motor type				





Constant-/variable flow damper

DAVU



Description

Constant flow damper with electric motor for continuous setting of one flow

DAVU is a constant flow damper, which facilitates balancing of ventilation systems and gives correct flow from the start. The unit compensates for e.g. connection and disconnection of system parts, clogging of filters and ducts, thermal lift forces, wind effects, window opening etc.

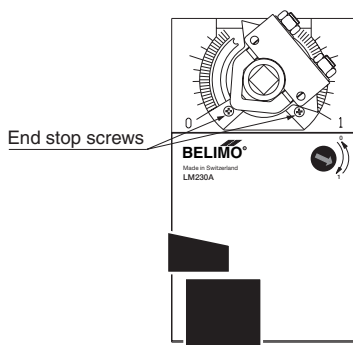
The motor shall be completed with control signal transmitter e.g. an external potentiometer or a proportionally regulating thermostat. A special mounting, measuring, balancing and maintenance instruction exists for this product.

Technical data

Flow setting

The two flows are set by moving the end stoppers screws.

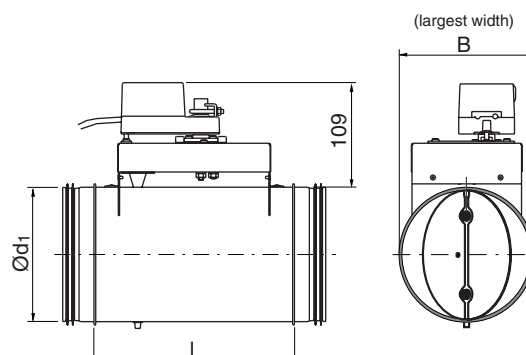
At delivery the screws are set at largest possible distance.



Technical data for the motor

Power supply.....	LM 24 A-SR AC 19,2–28,8 V, 50/60 Hz DC 19,2–28,8 V
Power consumption.....	1 W
For wire sizing	2 VA
Connection	Cable 1 m, 4x0,75 mm ²
Operating angle	Max. 95°, adjustable 0–100%
Torque at rated voltage	Min. 5 Nm
Direction of rotation	Switch selectable 0/1
Position at Y=0 V	Switch selectable 0 or 1
Position indication.....	Mechanical
Running time for 95°	150 s
Sound power level.....	Max. 35 dB (A)
Protection class	III Safety extra-low voltage
Protection type.....	IP 54
Ambient temperature range.....	-30 to +50°C
Ambient moisture.....	95 % RH

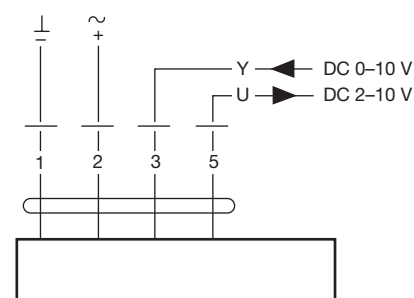
Dimensions



Ød ₁ nom	l mm	B mm	m kg	Tightness class across closed blade
80	240	132	1,95	0
100	240	132	2,00	0
125	240	135	2,25	0
160	240	170	2,45	0
200	268	210	2,86	0
250	290	260	3,95	0
315	332	325	5,35	0

Ordering example

	DAVU	125	24	LMSR
Product				
Dimension Ød ₁				
Motor voltage				
Motor type				



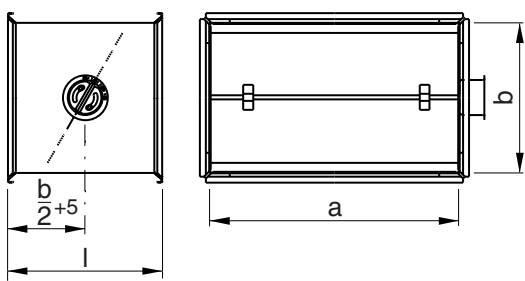


Regulating damper

LKSR



Dimensions



Description

Rectangular regulating damper

Consists of a duct with trapezoid corrugations and a turning blade. Blade angle can be adjusted 0–90° using the knob in the cup, and blade angle is read from an embossed scale on the edge of the cup. Locking is done by two Pozidriv screws (PZD2).

Please refer to page 183 for general information about dampers.

The damper is provided with a joining profile at each end. The length is normally $b + 10$, but the damper can also be ordered in special lengths.

The cup allows an insulation thickness of 50 mm. If thicker insulation is needed, add the special insulation cup IK to the damper.

Please refer to page 254 for general information about accessories.

Ordering example

	LKSR	500	300	1
Product				
Side in mm	a			
Knob side in mm	b			
Normal length in mm				
$l = b + 10$	1			



Regulating damper

DRUI



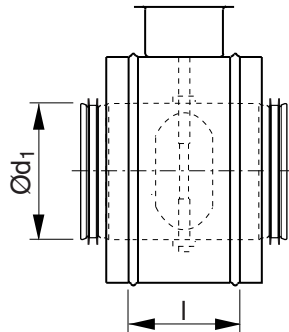
Description

Preinsulated regulating damper of DRU type.

Ordering example

	DRUI	125	30
Product			
Dimension Ød ₁			
Type			

Dimensions



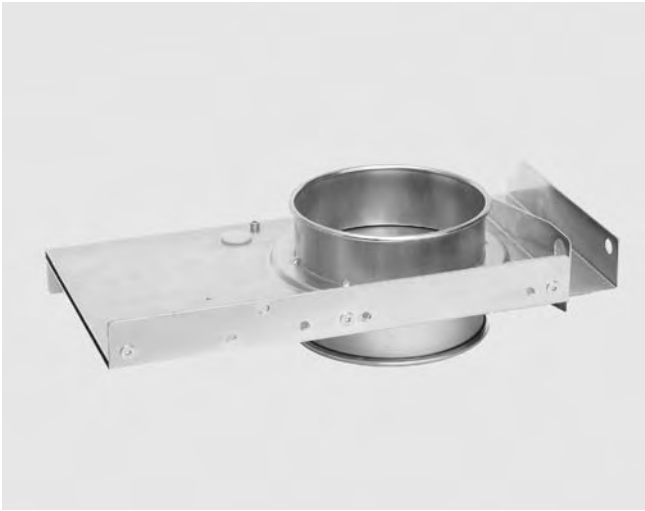
Ød ₁ nom	l mm	m type 30 kg	m type 50 kg	Sealing class past closed blade
100	100	1,00	1,25	0
125	100	1,16	1,44	0
160	100	1,43	1,70	0
200	100	1,84	2,17	0
250	100	2,76	3,24	0
315	100	3,40	3,94	0
400	100	5,33	6,15	0
500	115	6,72	7,68	0





Sliding damper – manual

SKHTR



Description

Manual shut-off sliding damper with transfer joint

The damper meets the requirements for tightness class 4.

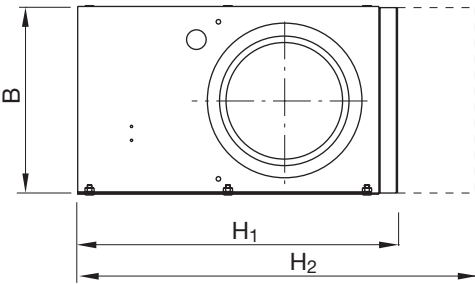
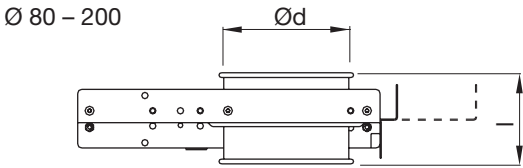
The damper meets the requirements for tightness class C only in fully closed or fully opened position.

Ordering example

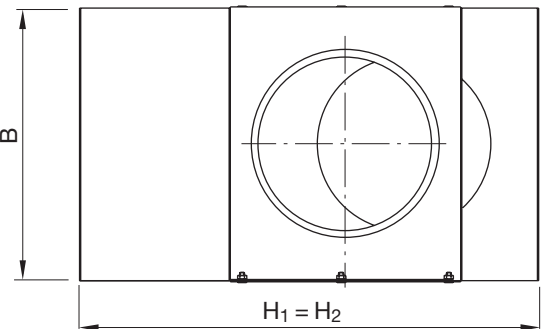
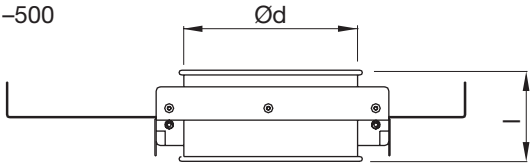
Product	SKHTR	200
Dimension Ød		

Dimensions

Ø 80 – 200



Ø 224 – 500



Ød nom	H ₁ mm	H ₂ mm	B mm	l mm	m kg
80	250	330	160	125	2,7
100	290	390	180	125	3,0
125	340	465	205	125	3,6
140	390	530	230	125	4,5
150	390	540	230	125	4,5
160	410	570	240	125	4,7
180	490	670	280	125	5,6
200	490	690	280	125	5,6
224*	585	585	345	165	10,2
250*	585	585	370	165	12,2
300*	730	730	420	165	18,1
315*	730	730	435	165	19,0
350*	800	800	470	165	22,5
400*	905	905	520	165	26,1

* Has through blade

SKPTR



Technical data

Ordering example

237



Damper with flow meter

FMDRU



Description

Applications

The flow meter is suitable both for setting up and for continuous flow measurement. It is intended for permanent installation and must therefore be specified at the design stage.

Design

The flow meter consists of two reducers joined together, with measurement nozzles. Each nozzle has a removable plastic plug which prevents dirt from entering. It also eliminates air leakage when measurement is not done.

The unit permits insulation of up to 100 mm thickness to be installed without concealing the measurement nozzles or the label plate. The plate can be rotated for best legibility, irrespective of the way the unit is installed and can easily be removed, to be located away from the unit.

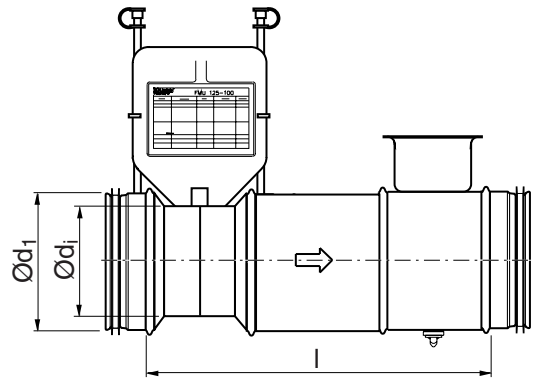
The unit also contains a regulating damper DRU to allow balancing. The cup around the damper knob allows insulation up to 50 mm thick to be used. If thicker insulation is needed, add the special insulation cup IK.

The unit has components which partly block the duct system. You can use one of the tips on page 121 to facilitate cleaning.

Ordering example

	FMDRU	160	125
Product			
Dimension $\varnothing d_1$			
Dimension $\varnothing d_i$			

Dimensions



$\varnothing d_1$ nom	$\varnothing d_i$ nom	l mm	m kg
80	63	300	0,78
100	80	300	0,94
125	100	310	1,21
160	125	315	1,52
200	160	380	2,20
250	200	440	3,31
315	250	570	4,92
400	315	660	7,81
500	400	845	12,0
630	500	1030	18,2

Flow meters with reductions of two dimension steps can be obtained, to give higher reading pressure in the measurement nozzles. This entails higher pressure drop and noise generation, however.

Advantages

- Has low pressure drop due to good aerodynamic design.
- Has low noise generation due to good aerodynamic design.
- Suitable for use with insulation.



Damper with flow meter

FMDRU

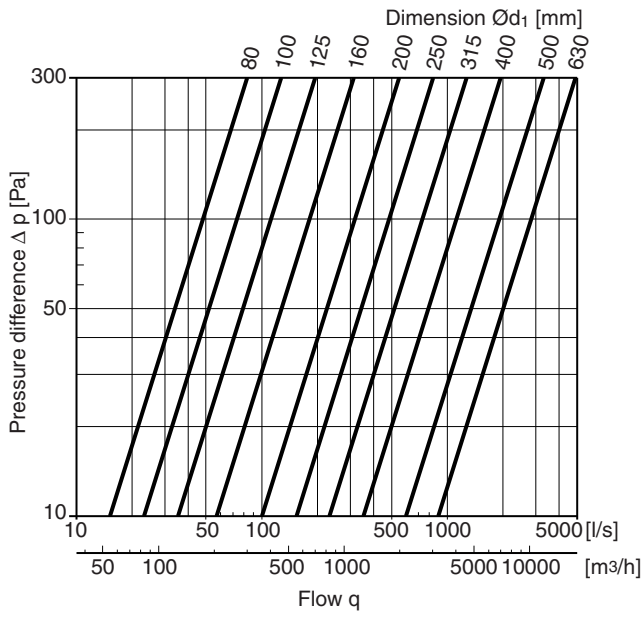
Technical data

Sound

Sound generation has been measured at the Swedish National Testing and Research Institute in an reverberation room, in accordance with ISO 5135 and ISO 3741.

Flow graph for balancing

The graph show the flow, q , as a function of the pressure difference in the measurement nozzles. Flow data for dimensioning differs from this graph.

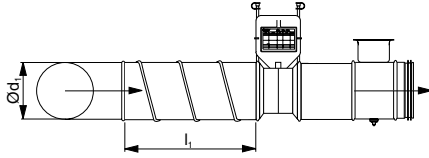


Measurement function

Measure pressure difference, Δp , between the measurement nozzles, and use the equation on the units plate to derive the duct flow.

Measurement accuracy

If the velocity profile is asymmetric, the measurement values can differ from the ideal values. For this reason, the flow meter should never be located right up to any flow disturbance. The method error in the table below will differ, depending on the distance to the flow disturbance.

l_1 = straight distance before meter	Method error m_2	
Type of disturbance	5%	10%
A 90° bend		
	$2 \cdot d_1$	$1 \cdot d_1$
l_2 = straight distance after meter	$1 \cdot d_1$	$1 \cdot d_1$





Damper with flow meter

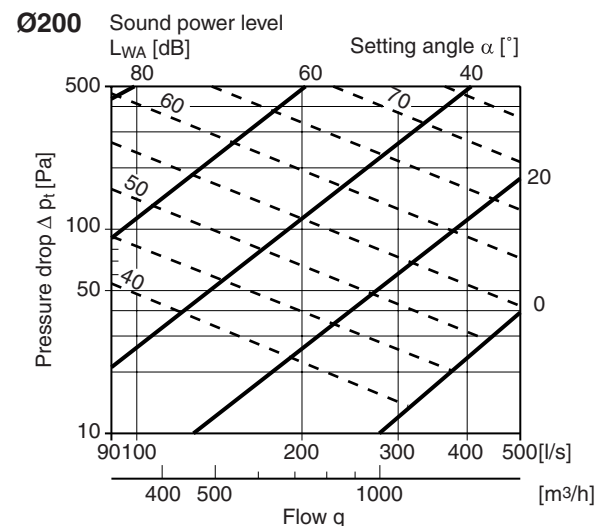
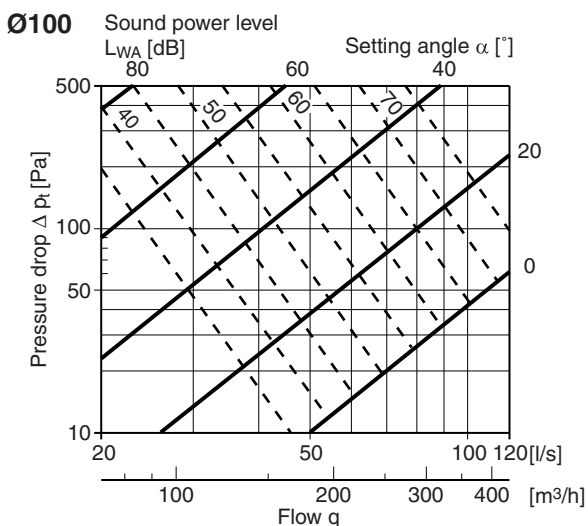
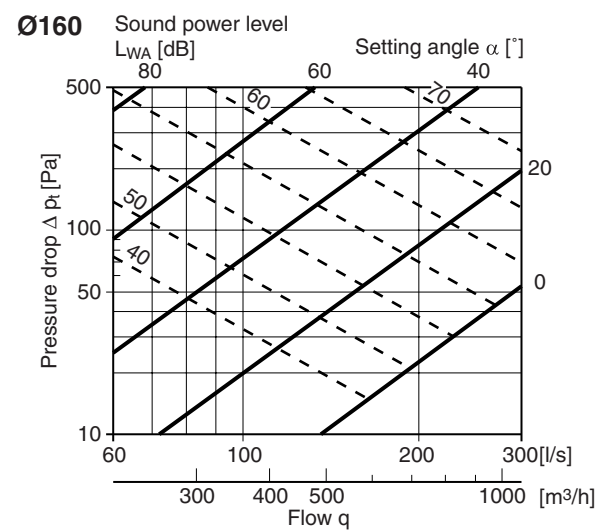
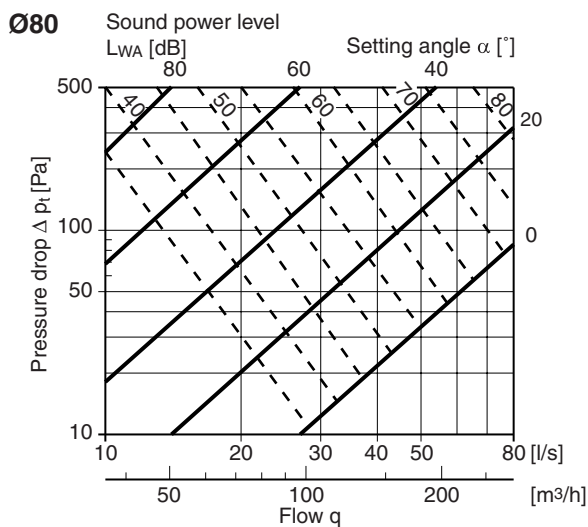
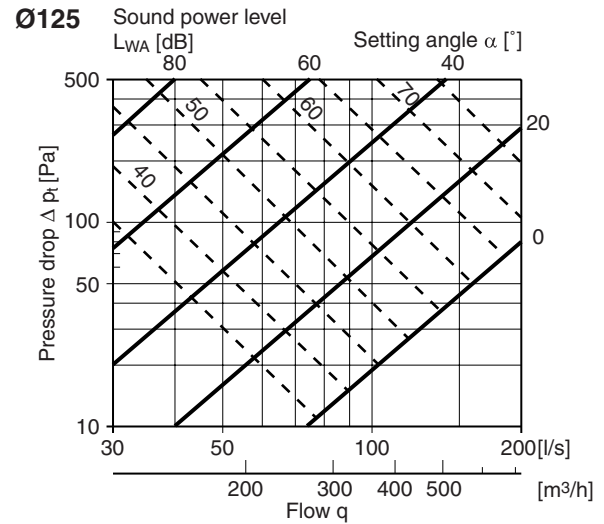
FMDRU

Pressure drop graphs with sound data for dimensioning

The solid lines show the pressure drop, Δp_t , across the unit as a function of flow, q .

The dashed lines give the A-weighted sound power data, L_{WA} , in dB to the duct.

Flow data for balancing differs from these graphs.

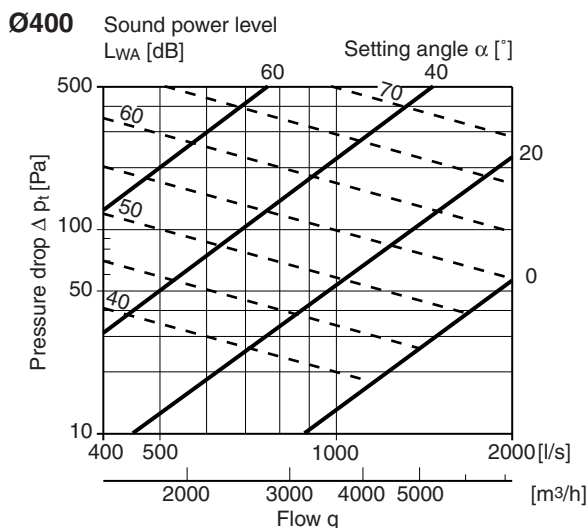
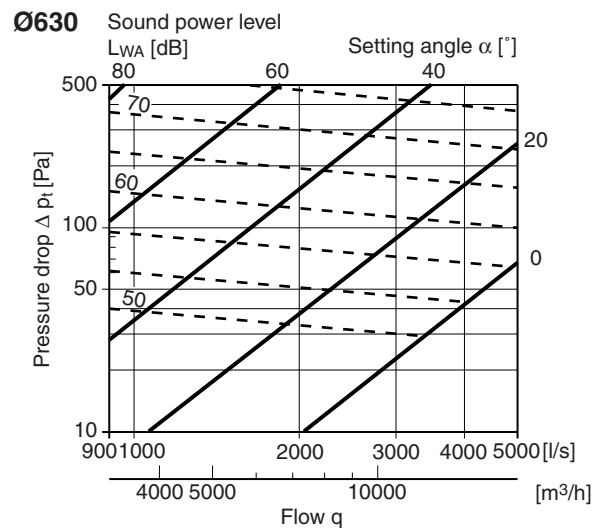
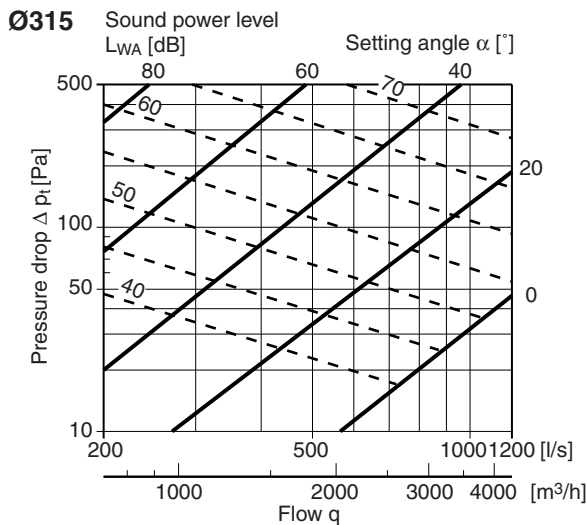
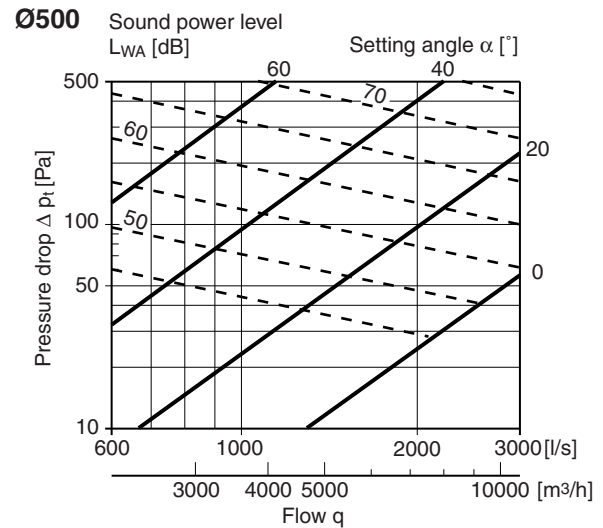
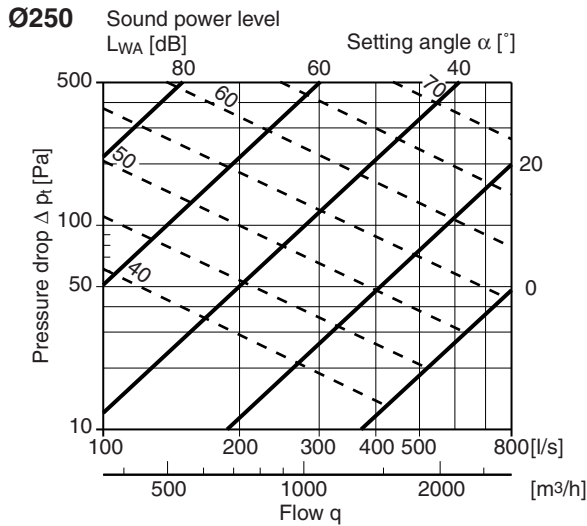




Damper with flow meter

FMDRU

Pressure drop graphs with sound data for dimensioning





Damper with flow meter

FMDRU

Sound generation

Ød ₁	Pressure drop [Pa]	Velocity app. 5 [m/s]								Velocity app. 10 [m/s]								Velocity app. 15 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 25 [l/s]								Flow 50 [l/s]								Flow 75 [l/s]							
	500	64	65	62	59	57	56	52	51	68	76	76	70	64	61	59	56	71	80	80	73	67	63	61	58
	300	61	62	58	55	52	50	45	43	65	75	75	67	61	57	53	49	68	79	77	68	63	58	55	52
	200	59	60	56	51	47	46	40	38	63	75	74	64	58	53	48	44	67	78	75	64	59	54	51	47
	100	56	56	51	45	40	38	30	28	59	74	72	59	52	47	40	35	63	76	71	58	53	48	42	38
50	52	52	47	40	33	30	21	18	56	73	71	54	47	41	32	26	Pressure drop exceeds 50 [Pa]								
100		Flow 40 [l/s]								Flow 80 [l/s]								Flow 120 [l/s]							
	500	64	63	62	58	56	55	53	54	67	76	76	69	63	60	61	61	70	81	82	70	66	64	64	64
	300	61	60	58	54	51	50	46	46	65	76	76	65	59	55	56	56	68	81	80	65	62	60	60	59
	200	59	58	55	51	47	46	40	40	62	75	75	62	55	51	52	53	65	81	79	61	58	57	56	55
	100	56	54	51	45	40	40	31	30	59	75	75	57	49	44	46	46	62	81	78	54	52	51	50	49
50	52	50	46	39	34	33	22	20	55	75	74	52	43	37	39	40	Pressure drop exceeds 50 [Pa]								
125		Flow 60 [l/s]								Flow 120 [l/s]								Flow 180 [l/s]							
	500	66	64	62	59	56	56	54	53	72	76	75	68	63	60	61	59	75	81	79	71	66	63	63	61
	300	63	61	58	55	51	51	47	45	69	75	73	65	59	56	55	53	73	79	76	67	62	59	58	56
	200	61	59	56	51	47	47	42	40	67	74	71	62	56	52	50	49	71	78	74	63	58	55	53	51
	100	57	55	51	46	41	40	33	30	64	72	69	57	50	45	43	41	67	76	70	57	52	49	46	43
50	53	51	46	40	35	32	25	21	60	71	66	51	44	38	36	34	Pressure drop exceeds 50 [Pa]								
160		Flow 100 [l/s]								Flow 200 [l/s]								Flow 300 [l/s]							
	500	66	63	61	57	54	54	53	52	77	78	73	67	63	59	59	58	80	81	76	71	66	62	61	59
	300	63	60	57	53	50	49	47	45	75	77	70	63	59	54	54	53	78	79	72	67	62	57	55	53
	200	61	58	55	50	47	45	42	40	74	75	68	60	56	50	49	48	76	77	69	64	58	53	50	48
	100	58	54	50	45	41	38	34	31	71	73	64	55	51	43	42	41	74	74	63	59	53	46	42	39
50	55	51	45	39	36	31	26	23	69	71	60	50	46	36	34	33	71	71	58	54	47	39	34	31	
200		Flow 150 [l/s]								Flow 300 [l/s]								Flow 450 [l/s]							
	500	71	68	65	61	58	58	57	55	75	77	70	63	60	54	54	53	80	82	78	71	67	65	66	63
	300	67	64	60	57	53	53	50	47	74	75	68	60	56	50	49	48	77	79	74	67	63	60	60	57
	200	65	61	57	53	49	49	45	42	71	73	68	61	56	53	52	50	74	77	71	63	58	56	55	52
	100	60	56	52	48	43	41	36	32	66	69	64	55	50	46	45	42	70	71	66	57	52	50	48	44
50	55	52	46	42	37	34	28	23	62	66	60	50	44	38	37	34	65	69	61	50	46	41	40	35	
250		Flow 250 [l/s]								Flow 500 [l/s]								Flow 750 [l/s]							
	500	69	66	64	61	57	59	58	56	79	76	72	67	62	61	64	63	83	81	76	72	65	64	67	66
	300	66	63	60	58	53	54	53	49	77	73	68	63	57	56	59	58	81	77	72	68	60	59	61	60
	200	64	60	57	55	49	50	49	44	75	70	65	60	53	52	54	53	78	74	69	65	56	55	57	55
	100	60	56	52	50	43	44	41	34	72	65	59	54	47	45	47	46	75	69	63	60	50	48	50	47
50	56	51	47	45	37	37	34	25	69	61	54	49	40	38	39	38	71	64	58	55	43	41	42	39	
315		Flow 400 [l/s]								Flow 800 [l/s]								Flow 1200 [l/s]							
	500	76	71	67	62	60	60	60	57	82	79	74	68	66	64	65	63	86	83	77	71	68	66	69	64
	300	72	67	62	58	55	55	54	49	78	75	69	64	61	58	49	57	82	79	72	66	63	61	62	58
	200	69	64	59	55	51	50	48	44	74	72	66	60	57	54	54	51	78	75	69	62	59	56	57	53
	100	63	58	53	49	45	43	39	34	69	66	60	54	51	46	46	43	73	67	62	56	52	51	49	44
50	58	52	47	43	39	36	30	24	63	61	54	48	44	38	38	34	67	64	56	49	45	41	41	36	
400		Flow 600 [l/s]								Flow 1200 [l/s]								Flow 1800 [l/s]							
	500	78	71	66	61	58	59	59	55	83	78	72	67	65	64	65	62	88	82	76	71	68	67	68	64
	300	73	67	61	57	54	54	53	48	77	73	67	62	60	59	59	56	84	78	71	66	64	62	63	58
	200	69	63	58	54	51	50	48	43	73	69	63	58	56	54	54	51	80	74	67	63	60	58	59	53
	100	63	56	51	48	45	43	39	34	65	62	56	52	50	47	46	42	74	68	60	56	54	50	52	45
50	56	50	45	43	40	36	31	25	58	55	49	45	43	39	38	34	68	62	54	50	48	43	45	37	
500		Flow 1000 [l/s]								Flow 2000 [l/s]								Flow 3000 [l/s]							
	500	81	75	69	64	61	63	63	59	87	81	73	68	67	66	67	64	91	84	76	71	69	68	72	66
	300	76	70	64	60	57	57	57	51	82	75	67	63	62	60	61	58	86	79	70	66	64	62	64	59
	200	73	66	61	57	54	52	51	45	78	71	63	59	57	55	56	53	82	74	66	62	59	57	59	54
	100	66	59	53	51	48	45	42	35	71	64	55	53	51	47	47	44	75	62	58	55	52	52	51	45
50	60	53	47	45	42	37	33	26	65	56	48	46	44	38	39	35	69	60	51	49	45	40	43	36	
630		Flow 1500 [l/s]								Flow 3000 [l/s]								Flow 4500 [l/s]							
	500	88	81	74	68	66	67	67	62	91	84	75	70	70	69	70	66	93	86	77	71	71	70	76	67
	300	82	75	68	63	61	60	60	54	85	78	69	65	65	62	63	59	87	80	71	65	65	63	66	60
	200	78	71	64	59	57	55	54	47	80	73	64	61	60	57	58	53	82	75	66	60	60	57	60	54
	100	70	63	56	53	51	46	43	36	72	65	56	54	53	48	48	43	73	67	58	52	51	48	51	44
50	63	56	49	46	44	38	33	25	64	57	48	47	46	39	39	33	65	59	50	44	43	38	42	34	



Damper with flow meter

FMDU



Description

Applications

The meter is suitable both for setting up and for continuous flow measurement. It is intended for permanent installation and must therefore be specified at the design stage.

Design

The meter consists of a regulating shutter and a centrally located measurement plate. Each measurement nozzle has a removable plastic plug which prevents dirt from entering. It also eliminates air leakage when measurement is not done.

The unit permits insulation of up to 50 mm thickness to be installed without concealing the measurement nipples or the label plate.

The plate can be rotated for best legibility, irrespective of the way the unit is installed and can easily be removed, to be located away from the unit.

The cup around the damper knob allows insulation up to 50 mm thick to be used. If thicker insulation is needed, add the special insulation cup IK.

The unit has components which partly block the duct system. You can use one of the tips on page 121 to facilitate cleaning.

Advantages

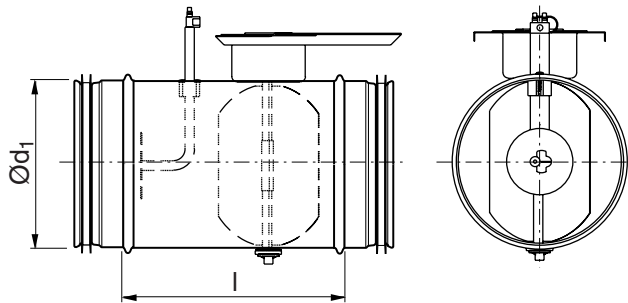
- Short installation length.
- Suitable for use with insulation.

Ordering example

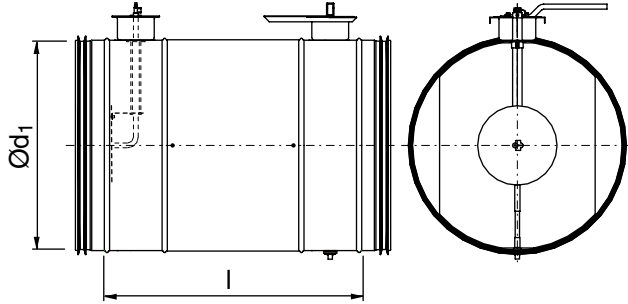
	FMDU	200
Product		
Dimension Ød ₁		

Dimensions

Ø 80–315



Ø 400–630



Ød ₁ nom	l mm	m kg
80	165	0,66
100	165	0,76
125	165	0,88
160	165	1,08
200	230	1,44
250	275	2,10
315	275	2,65
400	450	6,10
500	520	11,4
630	570	16,0



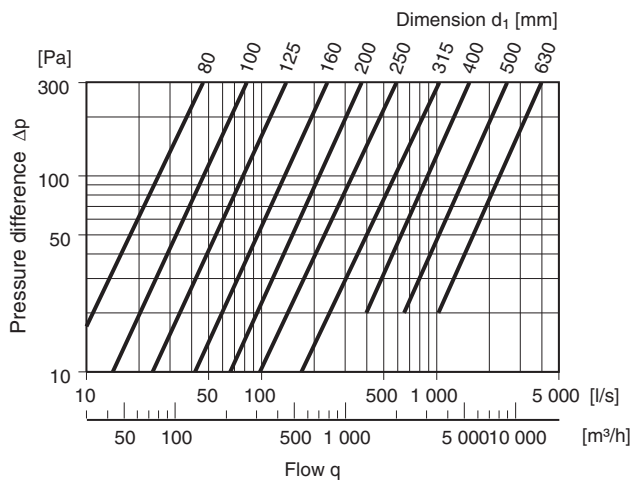
Damper with flow meter

FMDU

Technical data

Flow graph for balancing

The curves show the flow, q , as a function of the pressure difference in the measurement nozzles. Flow data for dimensioning differs from this graph.



Measurement function

By measuring the pressure difference, Δp , between the measurement nozzles, you can derive the flow in the duct by means of the equation on the units plate.

Measurement accuracy

If the velocity profile is asymmetric, the measurement values can differ from the ideal values. For this reason, the flow meter should never be located right up to any flow disturbance. The method error in the table below will differ, depending on the distance to the flow disturbance.

l_1 = straight distance before meter	Method error m_2	
Type of disturbance	5%	10%
A 90° bend 	$6 \cdot d_1$	$0 \cdot d_1$
A branch 	$6 \cdot d_1$	$4 \cdot d_1$
l_2 = straight distance after meter	$0 \cdot d_1$	$0 \cdot d_1$



Damper with flow meter

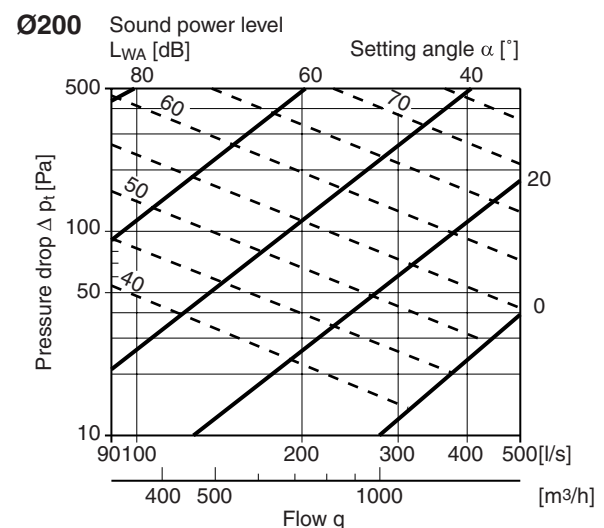
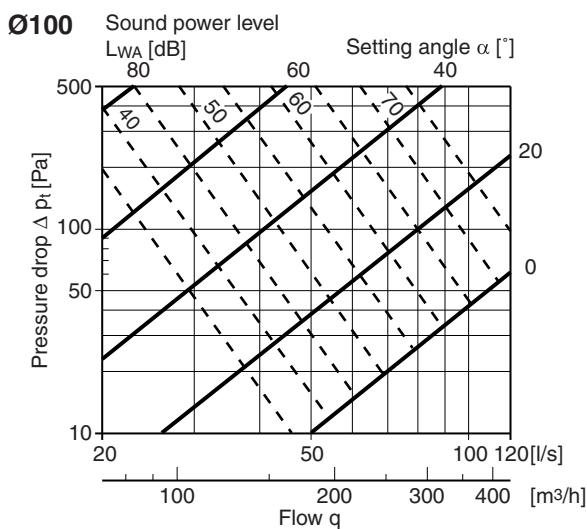
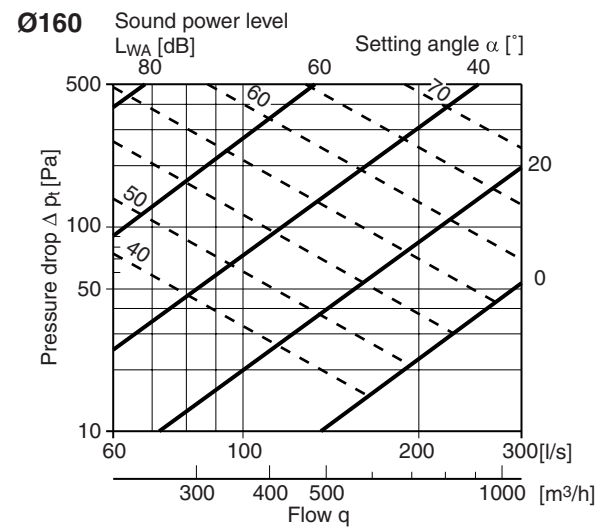
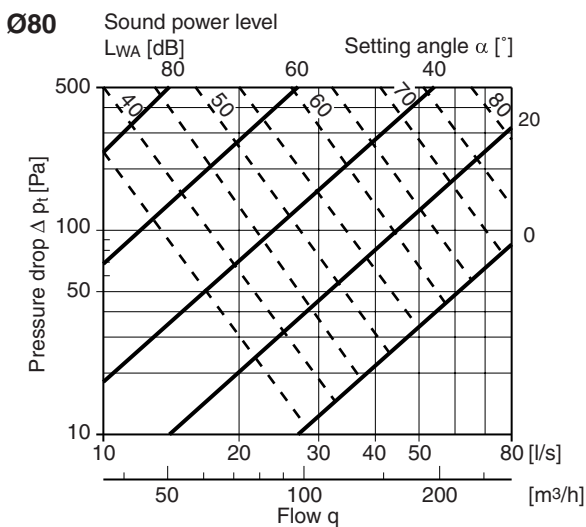
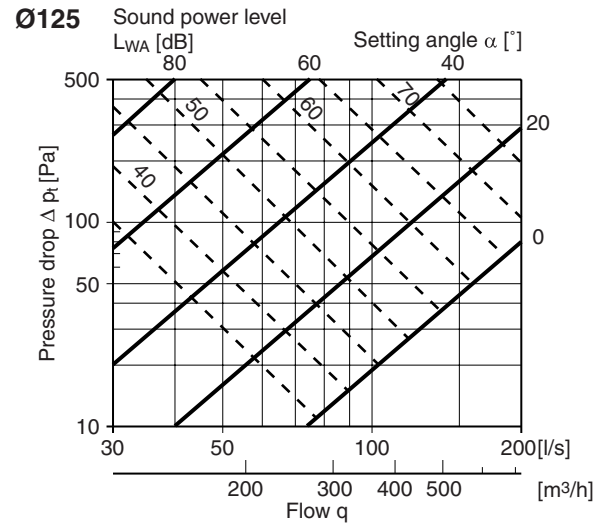
FMDU

Pressure drop graphs with sound data for dimensioning

The solid lines show the pressure drop, Δp_t , across the unit as a function of flow, q .

The dashed lines give the A-weighted sound power data, L_{WA} , in dB to the duct.

Flow data for balancing differ from these graphs.

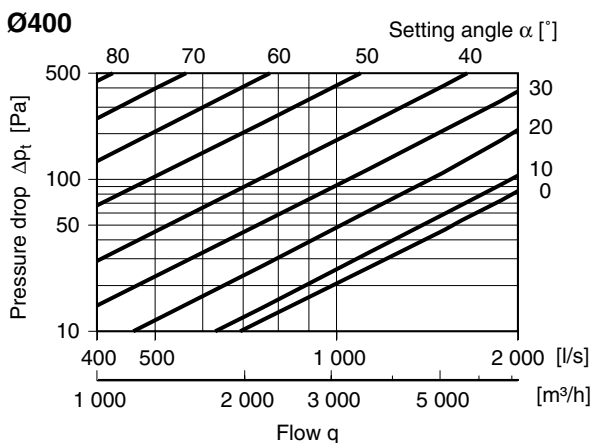
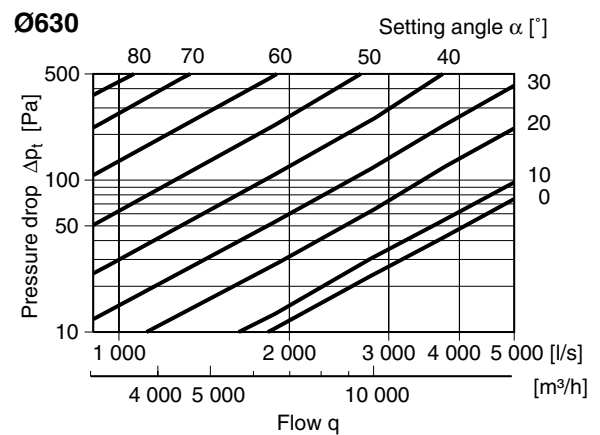
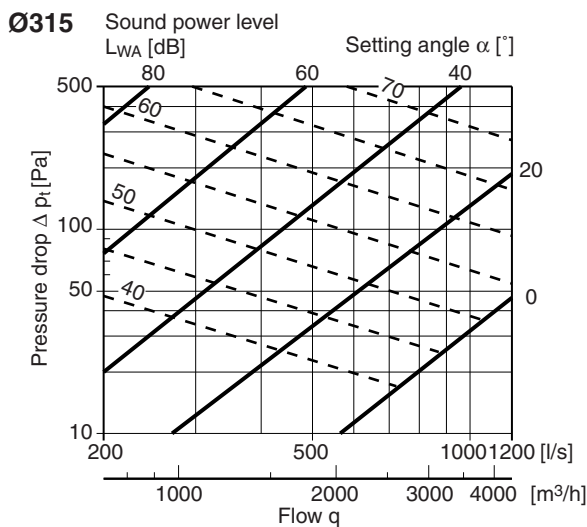
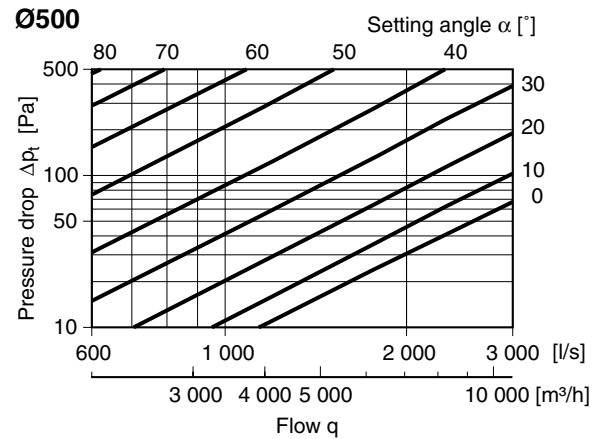
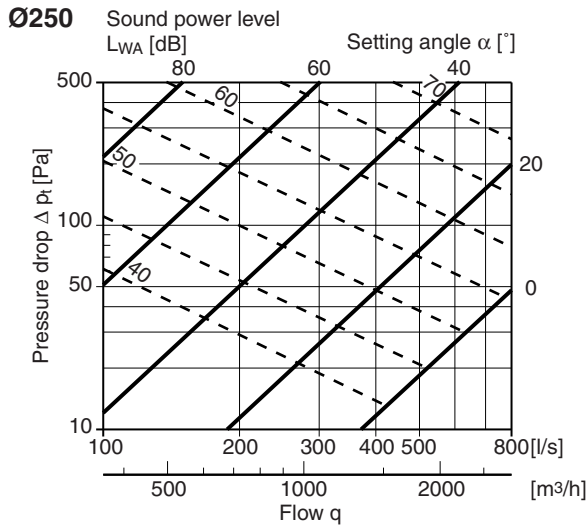




Damper with flow meter

FMDU

Pressure drop graphs with sound data for dimensioning





Damper with flow meter

FMDU

Sound generation

Ød ₁	Pressure drop [Pa]	Velocity app. 5 [m/s]								Velocity app. 10 [m/s]								Velocity app. 15 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 25 [l/s]								Flow 50 [l/s]								Flow 75 [l/s]							
	500	64	65	62	59	57	56	52	51	68	76	76	70	64	61	59	56	71	80	80	73	67	63	61	58
	300	61	62	58	55	52	50	45	43	65	75	75	67	61	57	53	49	68	79	77	68	63	58	55	52
	200	59	60	56	51	47	46	40	38	63	75	74	64	58	53	48	44	67	78	75	64	59	54	51	47
	100	56	56	51	45	40	38	30	28	59	74	72	59	52	47	40	35	63	76	71	58	53	48	42	38
	50	52	52	47	40	33	30	21	18	56	73	71	54	47	41	32	26	Pressure drop exceeds 50 [Pa]							
100		Flow 40 [l/s]								Flow 80 [l/s]								Flow 120 [l/s]							
	500	64	63	62	58	56	55	53	54	67	76	76	69	63	60	61	61	70	81	82	70	66	64	64	64
	300	61	60	58	54	51	50	46	46	65	76	76	65	59	55	56	56	68	81	80	65	62	60	60	59
	200	59	58	55	51	47	46	40	40	62	75	75	62	55	51	52	53	65	81	79	61	58	57	56	55
	100	56	54	51	45	40	40	31	30	59	75	75	57	49	44	46	46	62	81	78	54	52	51	50	49
	50	52	50	46	39	34	33	22	20	55	75	74	52	43	37	39	40	Pressure drop exceeds 50 [Pa]							
125		Flow 60 [l/s]								Flow 120 [l/s]								Flow 180 [l/s]							
	500	66	64	62	59	56	56	54	53	72	76	75	68	63	60	61	59	75	81	79	71	66	63	63	61
	300	63	61	58	55	51	51	47	45	69	75	73	65	59	56	55	53	73	79	76	67	62	59	58	56
	200	61	59	56	51	47	47	42	40	67	74	71	62	56	52	50	49	71	78	74	63	58	55	53	51
	100	57	55	51	46	41	40	33	30	64	72	69	57	50	45	43	41	67	76	70	57	52	49	46	43
	50	53	51	46	40	35	32	25	21	60	71	66	51	44	38	36	34	Pressure drop exceeds 50 [Pa]							
160		Flow 100 [l/s]								Flow 200 [l/s]								Flow 300 [l/s]							
	500	66	63	61	57	54	54	53	52	77	78	73	67	63	59	59	58	80	81	76	71	66	62	61	59
	300	63	60	57	53	50	49	47	45	75	77	70	63	59	54	54	53	78	79	72	67	62	57	55	53
	200	61	58	55	50	47	45	42	40	74	75	68	60	56	50	49	48	76	77	69	64	58	53	50	48
	100	58	54	50	45	41	38	34	31	71	73	64	55	51	43	42	41	74	74	63	59	53	46	42	39
	50	55	51	45	39	36	31	26	23	69	71	60	50	46	36	34	33	71	71	58	54	47	39	34	31
200		Flow 150 [l/s]								Flow 300 [l/s]								Flow 450 [l/s]							
	500	71	68	65	61	58	58	57	55	75	77	70	63	60	54	54	53	80	82	78	71	67	65	66	63
	300	67	64	60	57	53	53	50	47	74	75	68	60	56	50	49	48	77	79	74	67	63	60	60	57
	200	65	61	57	53	49	49	45	42	71	73	68	61	56	53	52	50	74	77	71	63	58	56	55	52
	100	60	56	52	48	43	41	36	32	66	69	64	55	50	46	45	42	70	71	66	57	52	50	48	44
	50	55	52	46	42	37	34	28	23	62	66	60	50	44	38	37	34	65	69	51	50	46	41	40	35
250		Flow 250 [l/s]								Flow 500 [l/s]								Flow 750 [l/s]							
	500	69	66	64	61	57	59	58	56	79	76	72	67	62	61	64	63	83	81	76	72	65	64	67	66
	300	66	63	60	58	53	54	53	49	77	73	68	63	57	56	59	58	81	77	72	68	60	59	61	60
	200	64	60	57	55	49	50	49	44	75	70	65	60	53	52	54	53	78	74	69	65	56	55	57	55
	100	60	56	52	50	43	44	41	34	72	65	59	54	47	45	47	46	75	69	63	60	50	48	50	47
	50	56	51	47	45	37	37	34	25	69	61	54	49	40	38	39	38	71	64	58	55	43	41	42	39
315		Flow 400 [l/s]								Flow 800 [l/s]								Flow 1200 [l/s]							
	500	76	71	67	62	60	60	57		82	79	74	68	66	64	65	63	86	83	77	71	68	66	69	64
	300	72	67	62	58	55	55	54	49	78	75	69	64	61	58	49	57	82	79	72	66	63	61	62	58
	200	69	64	59	55	51	50	48	44	74	72	66	60	57	54	54	51	78	75	69	62	59	56	57	53
	100	63	58	53	49	45	43	39	34	69	66	60	54	51	46	46	43	73	67	62	56	52	51	49	44
	50	58	52	47	43	39	36	30	24	63	61	54	48	44	38	38	34	67	64	56	49	45	41	41	36



Flow meter

FMU



Description

Applications

The meter is suitable both for setting up and for continuous flow measurement. It is intended for permanent installation and must therefore be specified at the design stage.

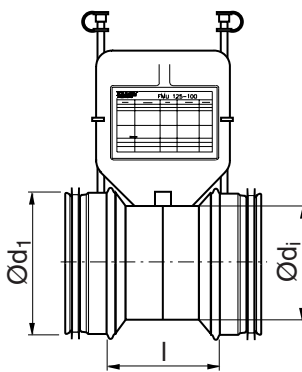
Design

The meter consists of two reductions joined together, with measurement nozzles. Each nozzle has a removable plastic plug which prevents dirt from entering. It also eliminates air leakage when measurement is not done.

The unit permits insulation of up to 100 mm thickness to be installed without concealing the measurement nozzles or label plate. The plate can be rotated for best legibility, irrespective of the way the fitting is installed and can easily be removed, to be located away from the unit.

Flow meters with reductions of two dimension steps can be obtained, to give higher reading pressure in the measurement nozzles. This entails higher pressure drop and noise generation, however.

Dimensions



Ød ₁ nom	Ød _i nom	l mm	m kg
80	63	110	0,33
100	80	120	0,42
125	100	111	0,48
160	125	123	0,62
200	160	129	0,83
250	200	131	1,15
315	250	195	1,81
400	315	206	2,60
500	400	275	3,92
630	500	355	6,38

Advantages

- Has low pressure drop due to good aerodynamic design.
- Has low noise generation due to good aerodynamic design.
- Does not obstruct duct cleaning.
- Suitable for use with insulation.

Ordering example

	FMU	160	125
Product			
Dimension Ød ₁			
Dimension Ød _i			



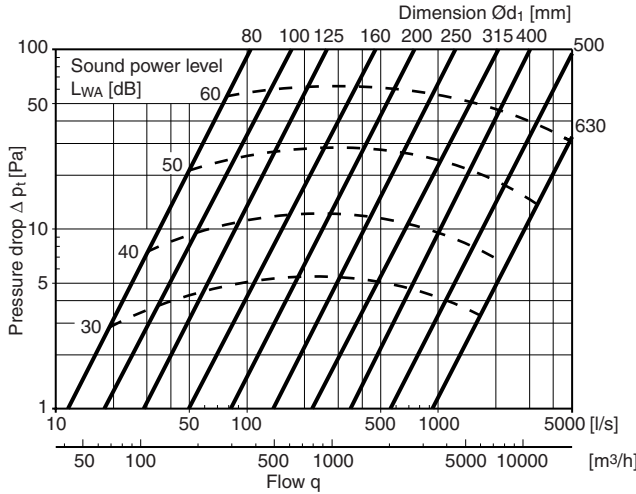
Flow meter

FMU

Technical data

Pressure drop graph with sound data for dimensioning

The solid lines give the pressure drop, Δp , as a function of flow, q . The dashed lines give the A-weighted sound power data, L_{WA} , in dB to the duct. Flow data for balancing differ from this graph.

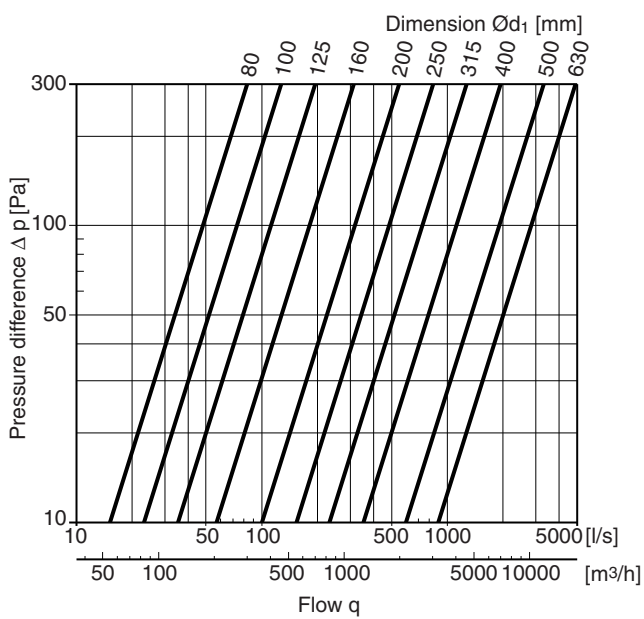


Sound

Sound generation has been measured at the Swedish National Testing and Research Institute in reverberation room, in accordance with ISO 5135 and ISO 3741.

Flow graph for balancing

The curves show the flow, q , as a function of the pressure difference in the measurement nozzles. Flow data for dimensioning differ from this graph.

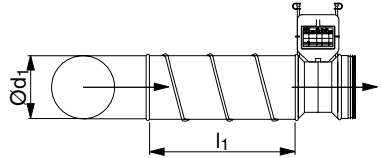
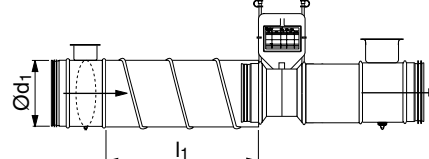


Measurement function

By measuring the pressure difference, Δp , between the measurement nozzles, you can derive the flow in the duct by means of the equation on the units plate.

Measurement accuracy

If the velocity profile is asymmetric, the measurement values can differ from the ideal values. For this reason, the flow meter should never be located right up to any flow disturbance. The method error in the table below will differ, depending on the distance to the flow disturbance.

l_1 = straight distance before meter	Method error m_2	
Type of disturbance	5%	10%
A 90° bend		
	2· d_1	1· d_1
A rotary damper (45°). Shaft in line with measurement nozzles		
	4· d_1	3· d_1
l_2 = straight distance after meter	1· d_1	1· d_1



Flow meter

FMU

Sound data

Ød ₁	Velocity app. 5 [m/s]								Velocity app. 10 [m/s]								Velocity app. 15 [m/s]							
	Centre frequency [Hz]								Centre frequency [Hz]								Centre frequency [Hz]							
	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80	Flow 25 [l/s]								Flow 50 [l/s]								Flow 75 [l/s]							
	49	45	42	33	22	14	11	11	54	56	56	51	42	34	29	21	68	62	61	59	54	44	41	34
100	Flow 40 [l/s]								Flow 80 [l/s]								Flow 120 [l/s]							
	50	45	39	30	18	6	2	7	51	59	54	48	38	30	22	16	60	64	62	59	50	43	38	34
125	Flow 60 [l/s]								Flow 120 [l/s]								Flow 180 [l/s]							
	45	40	33	24	11	1	1	8	53	55	50	42	34	26	21	16	61	62	61	53	45	38	35	33
160	Flow 100 [l/s]								Flow 200 [l/s]								Flow 300 [l/s]							
	41	39	31	24	13	0	0	3	58	54	50	42	34	27	19	15	66	64	61	52	46	41	35	31
200	Flow 150 [l/s]								Flow 300 [l/s]								Flow 450 [l/s]							
	41	36	32	23	7	0	0	4	55	52	47	39	30	27	20	17	64	62	58	48	42	38	34	31
250	Flow 250 [l/s]								Flow 500 [l/s]								Flow 750 [l/s]							
	44	37	31	22	17	15	17	17	64	53	48	39	28	27	26	22	72	64	58	49	44	40	39	29
315	Flow 400 [l/s]								Flow 800 [l/s]								Flow 1200 [l/s]							
	51	35	29	19	14	10	5	6	64	55	46	38	34	31	32	28	72	65	57	48	45	42	42	41
400	Flow 600 [l/s]								Flow 1200 [l/s]								Flow 1800 [l/s]							
	46	37	30	22	19	14	9	7	64	58	47	41	40	40	37	30	75	69	59	53	51	52	51	46
500	Flow 1000 [l/s]								Flow 2000 [l/s]								Flow 3000 [l/s]							
	54	40	29	24	22	15	8	5	64	58	47	41	40	40	37	30	75	69	59	53	51	52	51	46
630	Flow 1500 [l/s]								Flow 3000 [l/s]								Flow 4500 [l/s]							
	53	43	32	28	25	19	14	10	68	61	50	44	43	45	42	35	78	73	62	56	54	58	57	48



Measuring bend

MBU



Description

Applications

The measuring bend is suitable both for balancing and for continuous flow measurement. It is intended for permanent installation and must therefore be specified at the design stage. The measuring bend is a good choice, since bends are normally used in all installations.

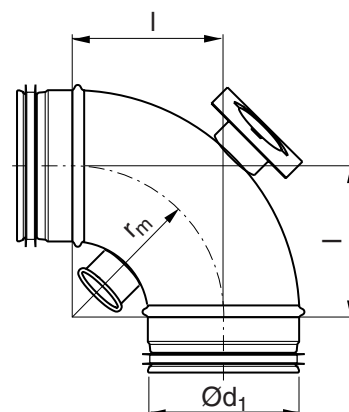
Design

The measuring bend consists of a pressed and seam welded 90° Safe bend with measurement nozzles on the inner and outer radii. The nozzles are asymmetrically located on the centreline, for manufacturing reasons. Each nozzle has a removable plastic plug which prevents dirt from entering. It also eliminates air leakage when measurement is not done.

The unit allows insulation of up to 50 mm thickness to be installed without concealing the measurement nozzle or the label plate. The plate can be rotated for best legibility, irrespective of the way the unit is installed and can easily be removed, to be located away from the unit. If thicker insulation is needed, add the insulation cup IK to the standard cup.

Thanks to the robust design of the standard cup, the measurement nozzles are securely protected both before and after installation.

Dimensions



$$r_m \approx 1 \cdot d_1$$

Ød ₁ nom	l mm	m kg
100	100	0,40
112	120	0,51
125	125	0,60
140	135	0,82
150	150	0,80
160	160	1,02
180	175	1,20
200	200	1,40
224	225	1,73
250	250	2,00
280	275	2,71
300	300	3,02
315	315	3,20

Advantages

- Has a double function – both as bend and as flow meter.
- Does not increase pressure drop, compared with a standard Safe bend.
- Does not cause any noise, due to projecting components in the duct.
- Does not obstruct duct cleaning.

Ordering example

	MBU	315	90
Product			
Dimension Ød ₁			
Angle α			



Measuring bend

MBFU



Description

Applications

The measuring bend is suitable both for balancing and for continuous flow measurement. It is intended for permanent installation and must therefore be specified at the design stage. The measuring bend is a good choice, since bends are normally used in all installations.

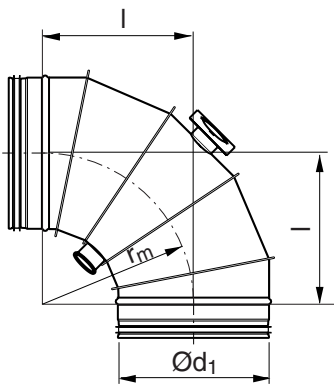
Design

The measuring bend consists of a segmented and lockseamed 90° Safe bend with measuring nozzles on the inner and outer radii. The nozzles are asymmetrically located on the centreline, for manufacturing reasons. Each nozzle has a removable plastic plug which prevents dirt from entering. It also eliminates air leakage when measurement is not done.

The unit allows insulation of up to 50 mm thickness to be installed without concealing the measurement nozzle or the label plate. The plate can be rotated for best legibility, irrespective of the way the unit is installed and can easily be removed, to be located away from the unit. If thicker insulation is needed, add the insulation cup IK to the standard cup.

Thanks to the robust design of the standard cup, the measurement nozzles are securely protected both before and after installation.

Dimensions



$$r_m \approx 0,9 \cdot d_1$$

Ød ₁ nom	l mm	m kg
355	328	3,93
400	360	5,82
450	413	7,18
500	454	8,38
560	506	10,3
600	540	11,9
630	566	13,1

Advantages

- Has a double function – both as a bend and as a meter.
- Does not increase pressure drop, compared with a standard Safe bend.
- Does not cause any noise, due to projecting components in the duct.
- Does not obstruct duct cleaning.

Ordering example

	MBFU	500	90
Product			
Dimension Ød ₁			
Angle α			

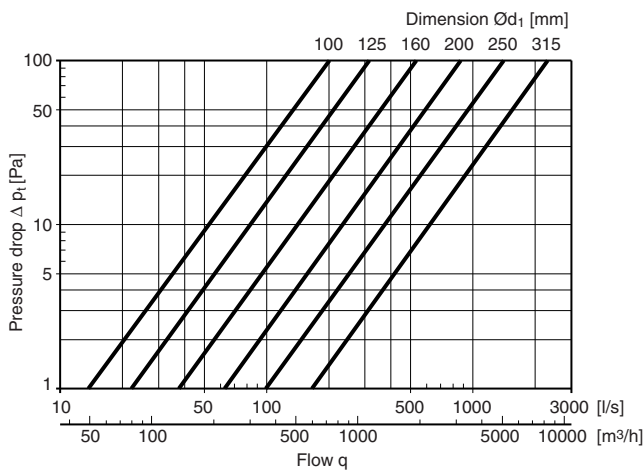


Measuring bends

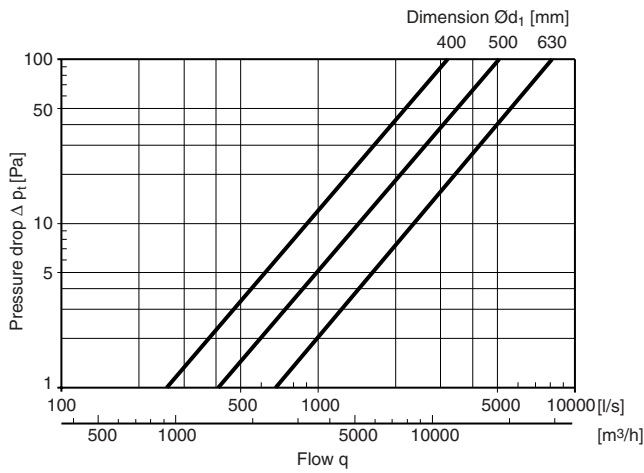
MBU, MBFU

Technical data

Pressure drop graph for dimensioning of MBU

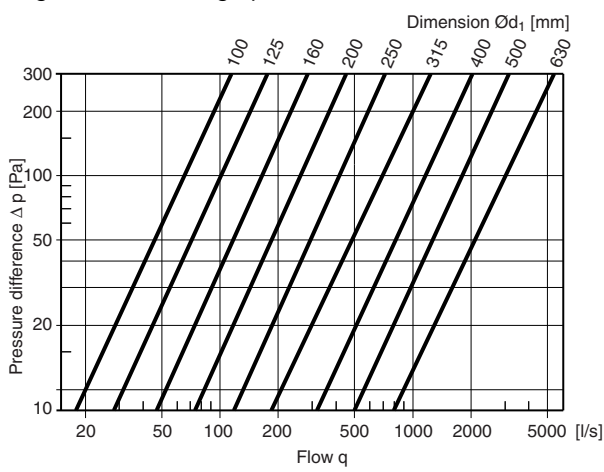


Pressure drop graph for dimensioning of MBFU



Flow graph for balancing

The curves show the flow, q , as a function of the pressure difference in the measurement nipples. Flow data for dimensioning differ from this graph.



Measurement function

By measuring the pressure difference, Δp , between the inner and outer bend radii, you can derive the flow in the duct by means of the equation on the units plate.

Measurement accuracy

If the velocity profile is asymmetric, the measurement values can differ from the ideal values. For this reason, the measuring bend should never be located right up to any flow disturbance. The method error, as shown in the table below will differ, depending on the distance to the flow disturbance.

l_1 = straight distance before measuring bends. Type of disturbance	Method error m_2	
	5%	10%
A 90° bend 	$8,5 \cdot d_1$	$4,5 \cdot d_1$
A rotary damper (45°). Shaft in line with the measurement nozzles 	$9,0 \cdot d_1$	$6,0 \cdot d_1$
l_2 = straight distance after measuring bend	$2 \cdot d_1$	$2 \cdot d_1$





Accessories

1



2

3



4

5



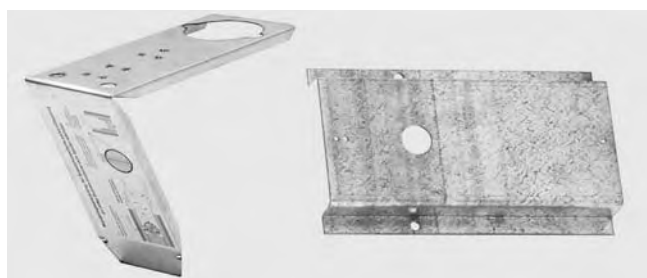
6

7



8

9

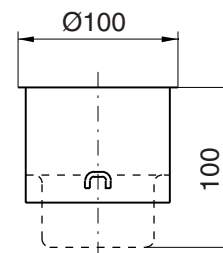


10

11

Insulation cup IK

If the insulation is thicker than 50 mm, there is a risk that the insulation will cover the knob cup and make it difficult to find or use. The insulation cup allows about 100 mm of insulation to be used at the same time as it gives good access to the damper knob. It is quick and easy to fit - just snap it over the edge of the cup. It fits all Lindab dampers with cup, both circular and rectangular.



Handle DRHTG

Strong handle to facilitate setting. Suits all manual dampers.

Assembly kit MSATS AK 31

Kit for installing a Sauter AK 31 P pneumatic actuator. The kit contains all components needed.

Assembly kit MSATS AK 41

Kit for installing a Sauter AK 41 P pneumatic actuator. The kit contains all components needed.

Assembly kit MSATS AK 42

Kit for installing a Sauter AK 42 P pneumatic actuator. The kit contains all components needed.

Extension spindle VREDF 8 35

With a 35 mm long and $\square$ 8x8 mm spindle. Fixed to the knob with 2 self-tapping screws.

Extension spindle VREDF 15 60

With a 60 mm long and $\varnothing$ 15 mm spindle. Used for motorising standard dampers. Fits Belimo's LM, NM and AM motors. Fixed to the knob with 2 self-tapping screws.

Extension spindle VREDF 15 100

With a 100 mm long and $\varnothing$ 15 mm spindle. Used for motorising standard dampers. Fits Belimo's NM, AM, LF and AF motors and Sauter's AK 31 P and AK 41 P actuators. Fixed to the knob with 2 self-tapping screws.

Installation shelf KOMHY

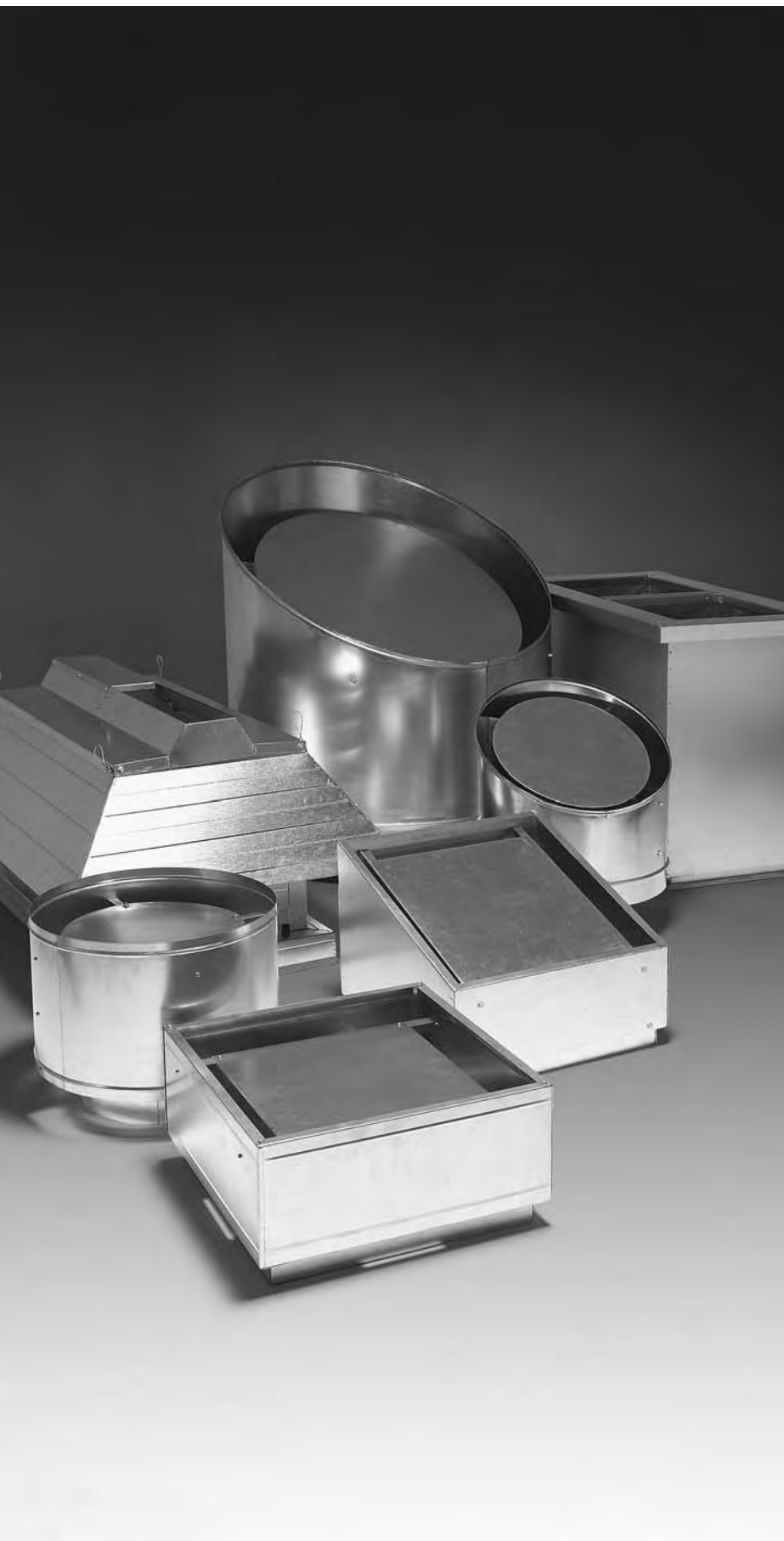
Fits Belimo's LM, NM, AM, LF and AF motors and Sauter's AK 31 P and AK 41 P actuators. Thread it over the edge of the cup and blind rivet it to the damper body.

Installation shelf LÖMOK

Fits Belimo's LM and NM motors. Screwed to the edge of the cup.



Roof hoods

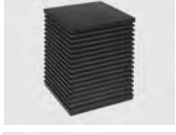


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Roof hoods

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4		HN 262
		HF 263
5		VHL 264
		HRR 266
6		HVR 267
7		LHR 268
8		HKOMR 270

Roof transitions

9		TGR 272
10		TGKOMR 274



Roof hoods

Choice

Extract air – All Lindab's roof hoods are suitable for use as extract air hoods. When choosing extract air hood, the architectural design is important to ensure that the hood is in harmony with the rest of the building. Our range includes ribbed hoods, rectangular and circular roof hoods, models that are available with inclines adapted to the angle of the roof, as well as products with a horizontal profile, of course. If a high extract velocity and long ejection distance are required, choose our HN and HF roof hoods.

Outdoor air – Out of Lindab's range of roof hoods, HN and HF are not suitable as outdoor air hoods. When choosing outdoor air hoods, too, the architectural design is important to ensure that it is in harmony with the rest of the building. Lindab's range of outdoor air hoods includes the same design as for extract air hoods (see above).

Connection options – Connection to a sleeve, flange or directly to the roof through connection must always be specified where these alternatives are possible. The recommended roof through connection is specified for each hood.

Dimensioning

Extract air – If high extract velocities are not required, as low a pressure drop as possible is desirable. The pressure drop should not exceed 100 Pa in order to minimise self-generated noise emissions and energy consumption.

Outdoor air – When outdoor air hoods are used, there is always a risk of water and snow entering the duct. In order to minimise this risk, the velocity over the free area must not exceed 2 m/s.

Location – When locating roof hoods, the design of the roof should be taken into consideration to ensure that there are no 'snow pockets'. The hoods must also be positioned so that extract fumes from vehicles etc. cannot be drawn into the outdoor air hood. In the same way, it is necessary to avoid short-circuits arising between outdoor air and extract air. If there is a risk of short-circuits, our combination hood HKO-MR should be chosen in the first instance.

Noise – To avoid self-generated noise emissions, the pressure drop must not exceed 100 Pa. At this pressure drop, self-generated noise emissions are so low that they do not need to be added to the fan noise. To calculate noise to the surrounding environment, the calculation example shown to the right can be used.

Version

Material – Lindab's roof hoods are manufactured as follows.

Galvanised sheet metal, aluzink sheet AZ185, stainless steel sheet 2343, and painted as detailed below.

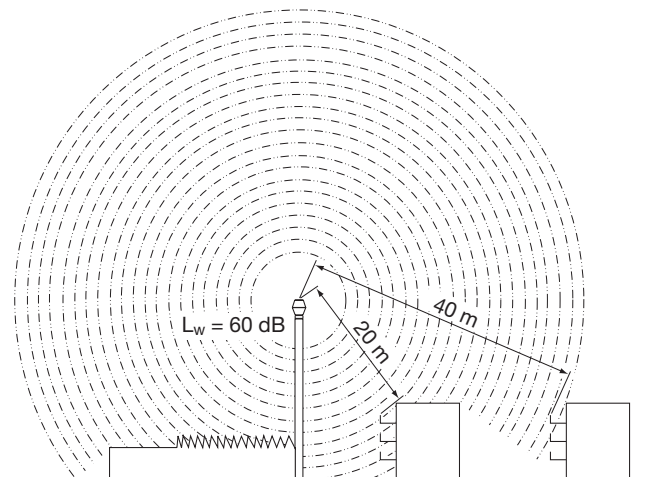
With these alternatives we cover up to and including corrosion class C5.

Painting – We have 3 standard colours (see below) but can also supply other colours to specification.

Standard colours – Black 015 RAL 9005, brick red 742 RAL 8004, zinc grey 244 RAL 7001.

However, this does not apply to VHL and LHR, where black RAL 9005 and grey RAL 7024 are the standard colours.

Noise dispersion outdoors without obstacle



L_w = Sound power level radiated from sound source [dB]
 r = Distance from sound source to point of listening [m]
 L_p = Sound pressure level at point of listening [dB]
 Q = Direction factor [-]
 1 = in free field, far from all surfaces
 2 = on one surface
 4 = in the corner between two surfaces
 8 = in the corner between three surfaces

$$L_p = L_w - 10 \cdot \log \left(\frac{4 \cdot \pi \cdot r^2}{Q} \right)$$

$$L_p = 60 - 10 \cdot \log \left(\frac{4 \cdot \pi \cdot 20^2}{1} \right) = 23 \text{ dB}$$

$$L_p = 60 - 10 \cdot \log \left(\frac{4 \cdot \pi \cdot 40^2}{1} \right) = 17 \text{ dB}$$

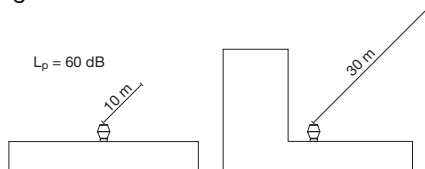


Roof hoods

Example – Noise from roof hood

Conditions – A level of 60 dB(A) has been measured 10 metres from an existing roof hood, the noise output level of which we do not know.

This is now to be moved, and we want to know the sound pressure level 30 metres from its new location closer to a vertical wall surface. We assume that the noise from the fan is unchanged in the two cases.



First you extract the sound power level L_W from the equation above.

$$L_W = L_p + 10 \cdot \log \left(\frac{4 \cdot \pi \cdot r^2}{Q} \right)$$

$$L_W = 60 + 10 \cdot \log \left(\frac{4 \cdot \pi \cdot 10^2}{2} \right) = 88 \text{ dB}$$

I.e. the radiated sound power level L_W from the hood = 88 dB.

$$L_p = L_W - 10 \cdot \log \left(\frac{4 \cdot \pi \cdot r^2}{Q} \right)$$

$$L_p = 88 - 10 \cdot \log \left(\frac{4 \cdot \pi \cdot 30^2}{4} \right) = 53 \text{ dB}$$

I.e. the sound pressure level at 30 m distance from the new location is 53 dB.



Roof hood

H



Description

Circular roof hood intended for outdoor air and extract air. The hood is designed for location above the roof with or without a roof through connection. Can also be supplied with a pest-proof mesh.

H is manufactured as standard from galvanised steel sheet Z275, but is also available in aluminium zinc AZ 185, stainless acid-resistant steel 2343 or painted.

H in dimensions 100 – 315 has a sleeve connection as standard and fits on the outside of ventilation ducts.

Dimensions 400 – 1250 are supplied with flange connection (including counter-flange) as standard. They are also supplied with twistable lifting and anchoring eyelets. An individual anchoring eyelet must not be subjected to forces in excess of 1 500 N.

All dimensions can also be obtained with connections that fit directly to the roof through connection TGR.

Ordering example

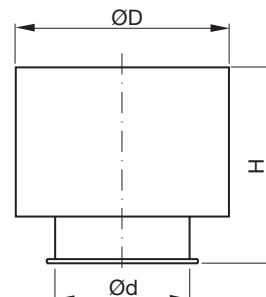
	H	315	1
Product			
Dimension Ød			
Connection options			
Sleeve (standard 100 – 315)			1
Flange (standard 400 – 1250)			2
Transition piece to roof through connection		3-15	

Specify size of roof through connection according to the measurement table to the right.

Specify separately if the hood is to be supplied with a pest-proof mesh from the factory.

Standard colours, see page 257.

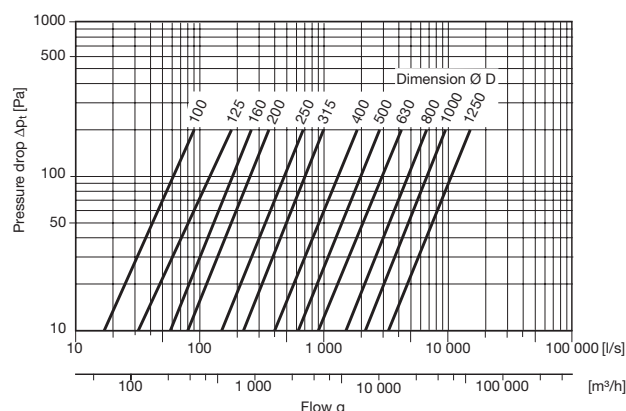
Dimensions



					Roof through connection TGR	
Ød nom	ØD mm	H mm	Free area m²	m kg	50 mm	100 mm
					Size	
100	160	185	0,008	0,70	3	3
125	200	210	0,012	1,00	3	4
160	250	235	0,020	1,30	3	4
200	315	305	0,031	2,20	3	4
250	400	355	0,049	3,60	4	5
315	500	450	0,078	5,30	5	6
400	700	500	0,126	16,0	5	6
500	900	600	0,196	27,8	6	7
630	1100	750	0,312	41,9	8	9
800	1400	950	0,503	74,0	9	10
1000	1700	1150	0,785	107	11	12
1250	2100	1500	1,230	246	14	15

Technical data

Outdoor air/extract air





Roof hood

HV



Description

Circular roof hood with angled upper side intended for outdoor air and extract air. The hood is designed for location above the roof with or without a roof through connection. Can also be supplied with a pest-proof mesh.

HV is manufactured as standard from galvanised steel plate Z275, but is also available in aluminium zinc AZ 185, stainless acid-resistant steel 2343 or painted.

HV is available with different angles in order to be in harmony with the architectural design of the building.

HV in dimensions 100 – 315 has a sleeve connection as standard and fits on the outside of ventilation ducts.

Dimensions 400 – 1250 are supplied with flange connection (including counter-flange) as standard. They are also supplied with twistable lifting and anchoring eyelets. An individual anchoring eyelet must not be subjected to forces in excess of 1 500 N.

All dimensions can also be obtained with connections that fit directly to the roof through connection TGR.

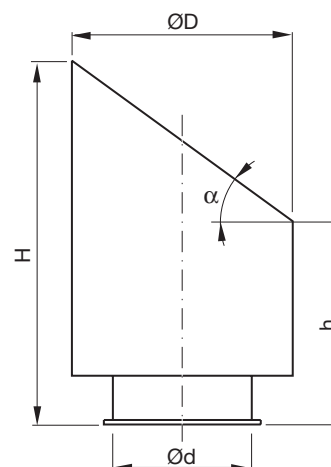
Ordering example

	HV	315	1
Product			
Dimension Ød			
Connection options			
Sleeve (standard 100 – 315)		1	
Flange (standard 400 – 1250)		2	
Transition piece to roof through connection		3-15	

Specify size of roof through connection according to the measurement table to the right.

Specify separately if the hood is to be supplied with a pest-proof mesh from the factory and if a special angle is required. Standard colours, see page 257.

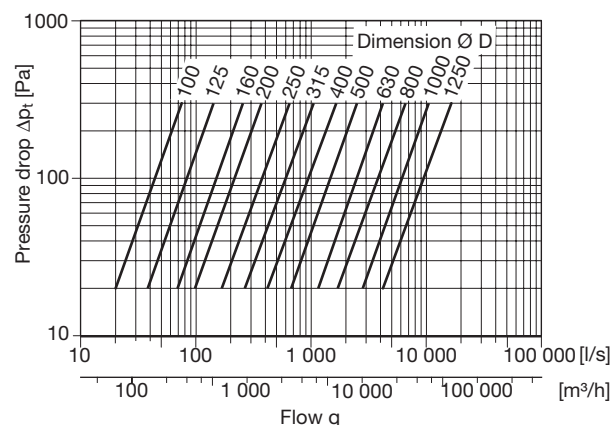
Dimensions



Ød nom	ØD mm	h mm	H mm	α °	Free area m²	m kg	Roof through connection TGR	
							50 mm Size	100 mm Size
100	160	179	339	38	0,008	1,00	3	3
125	205	209	410	45	0,010	2,80	3	4
160	260	249	480	43	0,018	2,50	3	4
200	325	314	580	40	0,025	4,10	3	4
250	405	370	680	38	0,045	6,00	4	5
315	510	463	830	36	0,070	10,8	5	6
400	650	557	1000	32	0,113	21,9	5	6
500	810	670	1200	30	0,175	33,2	6	7
630	1025	813	1460	30	0,292	51,7	8	9
800	1300	1054	1850	30	0,450	105	9	10
1000	1620	1430	2400	30	0,700	164	11	12
1250	2030	1808	3000	30	0,967	263	14	15

Technical data

Outdoor air/extract air



Roof hood

HU



Description

For air exit above roof.

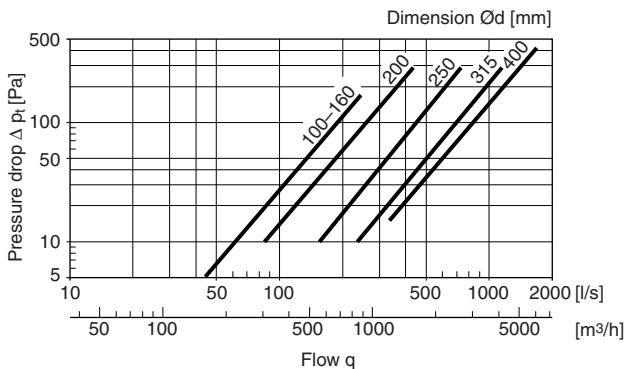
Provided with a female connection which fits outside a ventilation duct.

Ordering example

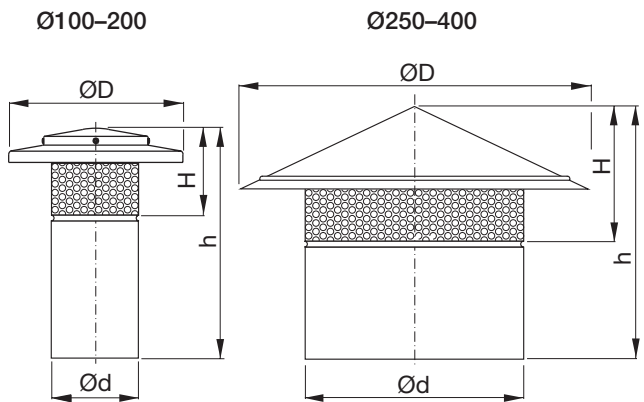
Product **HU** **160**
Dimension Ød

Technical data

Extract air



Dimensions



Ød nom	ØD mm	H mm	h mm	m kg	Roof through connection TGR	
					50 mm Size	100 mm Size
100	200	99	264	0,51	3	3
125	225	102	267	0,65	3	4
160	260	105	270	0,81	3	4
200	315	114	273	1,09	3	4
250	400	156	291	1,45	4	5
315	500	185	303	1,99	5	6
400	600	226	344	2,70	5	6



Roof hood

HN



Description

Ventilation hood for air exit above roof, suitable for both industrial and comfort ventilation. The air is ejected in an upwards-directed jet. This avoids contaminating the air in the vicinity of the hood, and soiling of the area around the hood. The ejection is so effective that you can install a fresh air inlet in the immediate vicinity of the hood, without any special precautions.

The hood is made of galvanised sheet steel, and can also be supplied in other materials such as stainless steel, aluzinc and painted in various colours, to special order. It has a net over the opening and an internal rain funnel to collect rain-water and snow, which is drained out of the hood through a hose. The hose can withstand temperatures of between -45 and +65 °C.

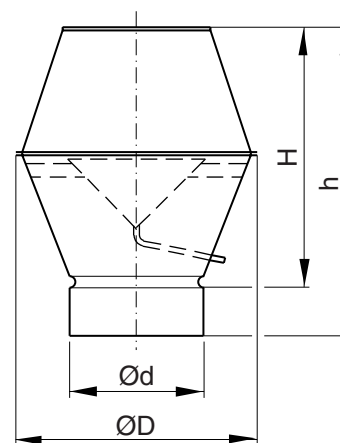
The hood has a female connection, which fits outside a ventilation duct. The hood can be ordered with other connections, however.

As special delivery the hood can be supplied with three anchoring wire-loops.

Ordering example

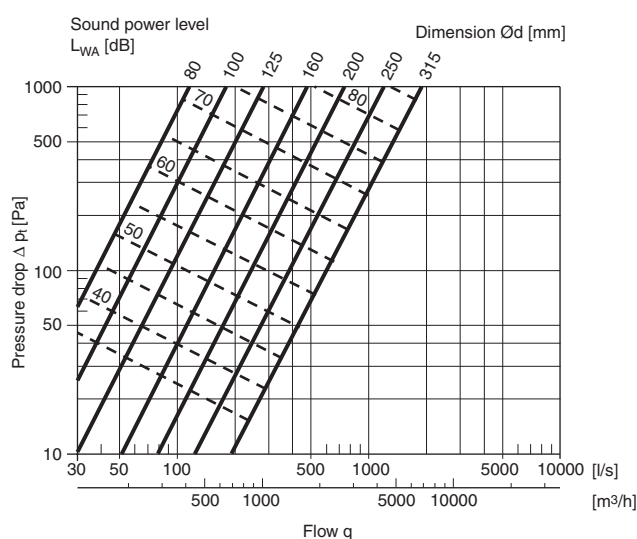
Product **HN**
Dimension Ød **315**

Dimensions



Ød nom	ØD mm	H mm	h mm	m kg	Roof through connection TGR	
					50 mm Size	100 mm
80	130	160	310	0,66	3	3
100	180	220	360	0,96	3	3
125	225	240	380	1,26	3	4
160	280	340	475	1,95	3	4
200	345	420	555	2,92	3	4
250	430	505	640	4,31	4	5
315	550	620	755	6,75	5	6

Technical data





Roof hood

HF



Description

Ventilation hood for air exit above roof, suitable for both industrial and comfort ventilation. The air is ejected in an upwards-directed jet. This avoids contaminating the air in the vicinity of the hood, and soiling of the area around the hood. The ejection is so effective that you can install a fresh air inlet in the immediate vicinity of the hood, without any special precautions.

The hood is made of galvanised sheet steel, and can also be supplied in other materials such as stainless steel, aluzinc and painted in various colours, to special order. It has a net over the opening and an internal rain funnel to collect rain-water and snow, which is drained out of the hood through a hose. The hose can withstand temperatures of between -45 and +65 °C.

The hood has a flange connection, which includes a mating flange. The hood can be ordered with other connections, however.

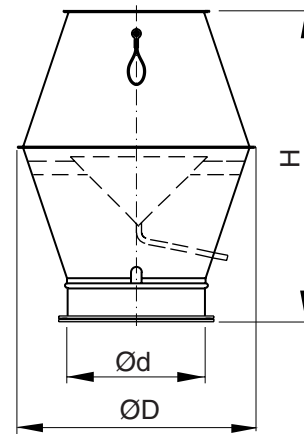
To avoid damage to the net in the opening the hood is supplied with transport protection. This must be removed before the hood is taken into service.

The hood is delivered with three turnable lifting and anchoring wire-loops. A single wire-loop shall not be exposed for forces exceeding 1500 N.

Ordering example

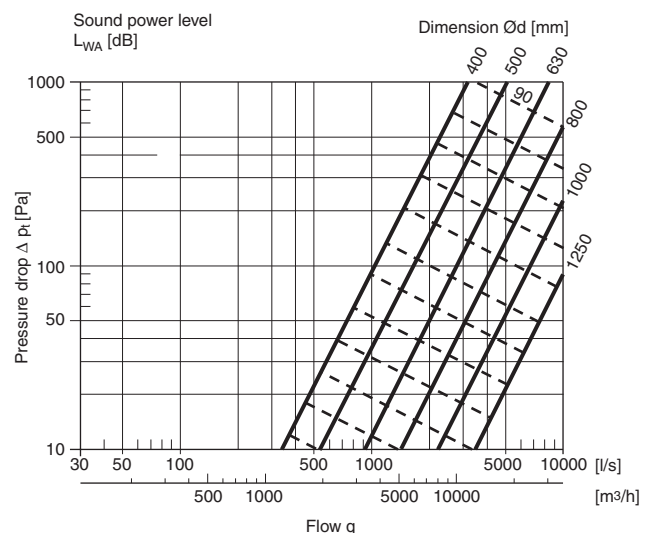
Product **HF** **630**
Dimension Ød

Dimensions



Ød nom	ØD mm	H mm	m kg	Roof through connection TGR	
				50 mm Size	100 mm Size
400	685	905	11,1	5	6
500	855	1055	20,0	6	7
630	1075	1295	38,0	8	9
800	1360	1640	63,0	9	10
1000	1600	2110	89,1	11	12
1250	2020	2615	118	14	15

Technical data





Roof hood

VHL



Description

VHL roof hood with ribs is specially developed to achieve an architecturally correct way of terminating outdoor air intakes and extract air ejectors on the roof. The ribbed hood is supplied as standard in galvanised form, but are also available painted.

VHL can be installed with duct dimensions corresponding to Ød or ØD.

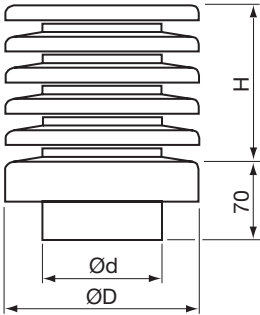
When connecting to the roof through connection TGR, the special transition piece TGR-VHL must be used (see page 272).

Ordering example

	VHL	125	200
Product			
Dimension Ød			
Dimension ØD			

Standard colours, see page 257.

Dimensions



Ød nom	ØD mm	H mm	Free area m²	m kg	Roof through connection TGR	
					50 mm	100 mm
100	160	110	0,019	1,00	3	3
125	200	145	0,033	1,50	3	4
160	250	180	0,055	2,00	3	4
200	315	250	0,100	2,90	3	4
250	315	250	0,125	3,20	4	5
315	400	290	0,182	6,40	5	6
400	500	370	0,306	10,1	5	6
500	630	410	0,441	15,9	6	7

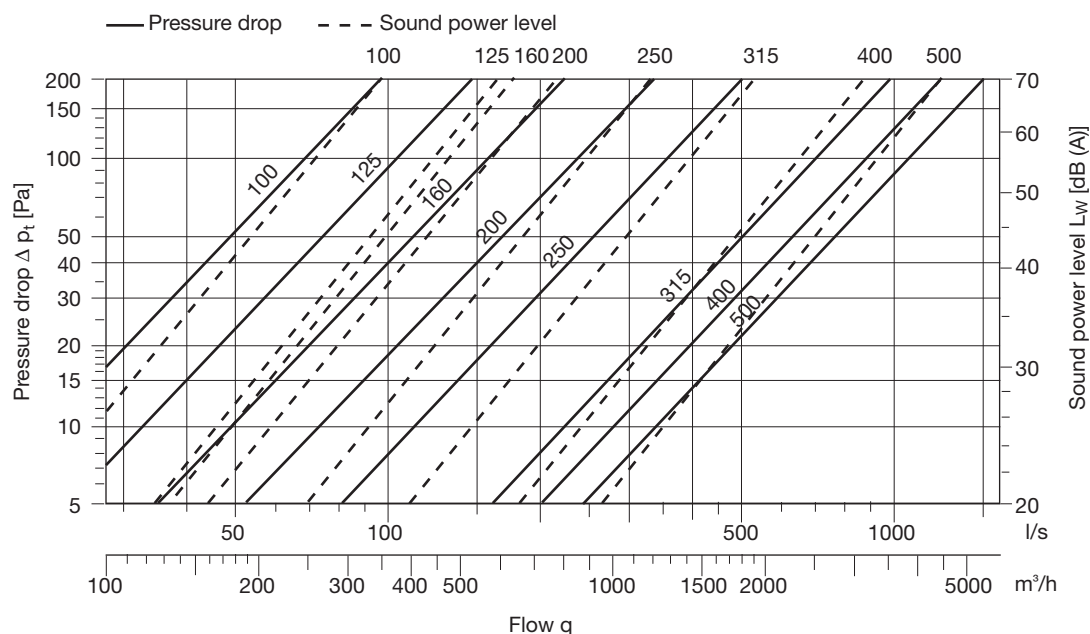


Roof hood

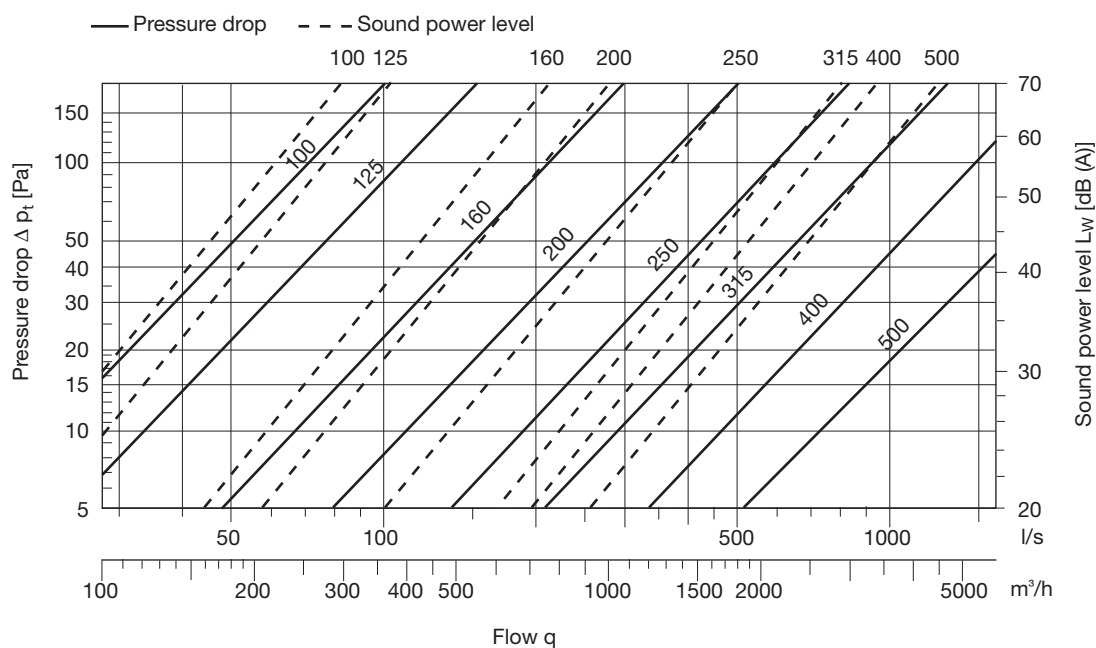
VHL

Technical data

Outdoor air



Extract air





Roof hood

HRR



Description

Rectangular roof hood intended for outdoor air and extract air. HRR is designed for positioning above the outer roof on the roof through connection.

Can also be supplied with a pest-proof mesh.

HRR is manufactured as standard from galvanised steel sheet Z275, but is also available in aluminium zinc AZ 185, stainless, acid-resistant steel 2343 or painted.

Sizes 7 and 9 are supplied with four twistable lifting and anchoring wire-loops. An individual anchoring eyelet must not be subjected to forces in excess of 1 500 N.

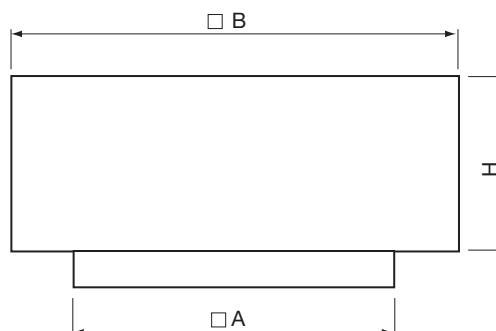
Ordering example

Product	HRR	4
Size		

Specify separately if the hood is to be supplied with a pest-proof mesh from the factory.

Standard colours, see page 257.

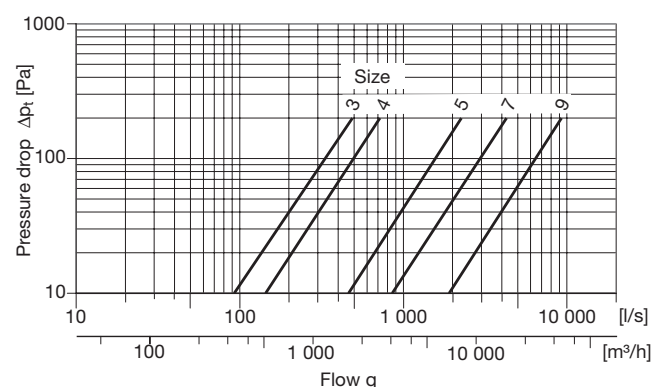
Dimensions



Size	A mm	B mm	H mm	Free area m ²	m kg	Roof through connection TGR	
						50 mm	100 mm
3	400	450	150	0,045	5,00	3	3
4	500	550	205	0,100	7,80	4	4
5	600	750	300	0,260	11,9	5	5
7	800	1050	450	0,500	27,2	7	7
9	1000	1350	575	0,720	48,4	9	9

Technical data

Outdoor air/extract air





Roof hood

HVR



Description

Rectangular roof hood with angled upper side intended for outdoor air and extract air. HVR is designed for positioning above the outer roof on the roof through connection.

Can also be supplied with a pest-proof mesh.

HVR is manufactured as standard from galvanised steel sheet Z275, but is also available in aluminium zinc AZ 185, stainless, acid-resistant steel 2343 or painted.

HVR is available with different angles in order to be in harmony with the architectural design of the building.

Sizes 7 and 9 are supplied with four twistable lifting and anchoring wire-loops. An individual anchoring eyelet must not be subjected to forces in excess of 1 500 N.

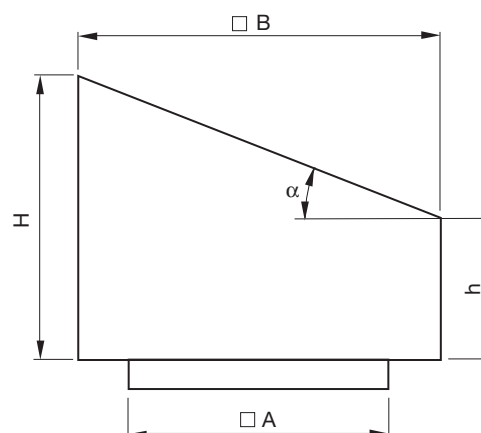
Ordering example

	HVR	4
Product		
Size		

Specify separately if the hood is to be supplied with a pest-proof mesh from the factory and if a special angle is required.

Standard colours, see page 257.

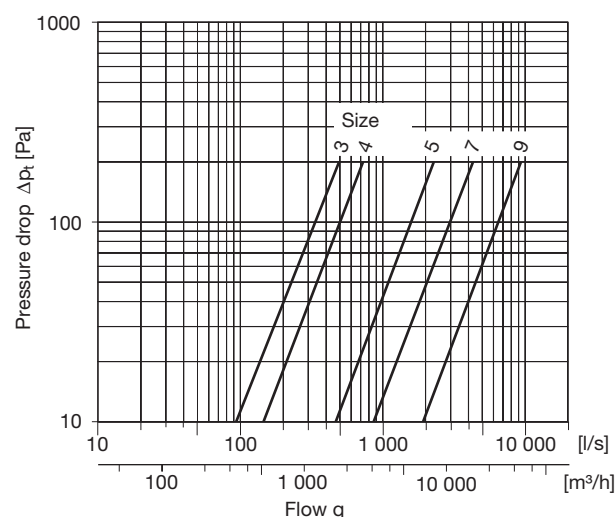
Dimensions



Size	□ A mm	□ B mm	h mm	H mm	α °	Free area m ²	m kg	Roof through connection TGR	
								50 mm	100 mm
3	400	450	150	410	30	0,045	6,40	3	3
4	500	550	205	525	30	0,100	9,90	4	4
5	600	750	300	735	30	0,260	17,0	5	5
7	800	1050	450	1060	30	0,500	34,3	7	7
9	1000	1350	575	1360	30	0,720	67,5	9	9

Technical data

Outdoor air/extract air



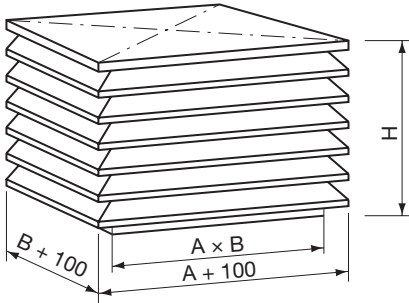


Roof hood

LHR



Dimensions



A x B = Duct dimensions

Description

LHR is a rectangular roof hood with ribs that is used for both outdoor air and extract air.

The hood is supplied as standard in galvanised form, but is also available painted.

LHR is supplied as standard with LS joint for guiding.

When connecting to the roof through connection TGR, the special transition piece TGR-LHR must be used. (see page 272)

Ordering example

	LHR	300	300
Product			
A			
B			

Standard colours, see page 257.

						Roof through connection TGR	
A mm	B mm	H mm	Number of ribs n	Free area m ²	m kg	50 mm	100 mm
						Size	
300	300	370	5	0,216	5,4	4	5
400	400	430	6	0,384	8,7	5	6
500	500	490	7	0,600	12,6	6	7
600	600	490	7	0,720	15,1	7	8
700	700	550	8	1,008	20,2	8	9
800	800	610	9	1,344	25,9	9	10
900	900	670	10	1,728	32,4	10	11
1000	1000	730	11	2,160	47,4	11	12
1100	1100	790	12	2,640	56,9	12	13
1200	1200	790	12	2,880	62,1	13	14
1300	1300	850	13	3,432	72,1	14	15
1400	1400	910	14	4,032	84,5	15	16
1500	1500	970	15	4,680	97,0	16	–

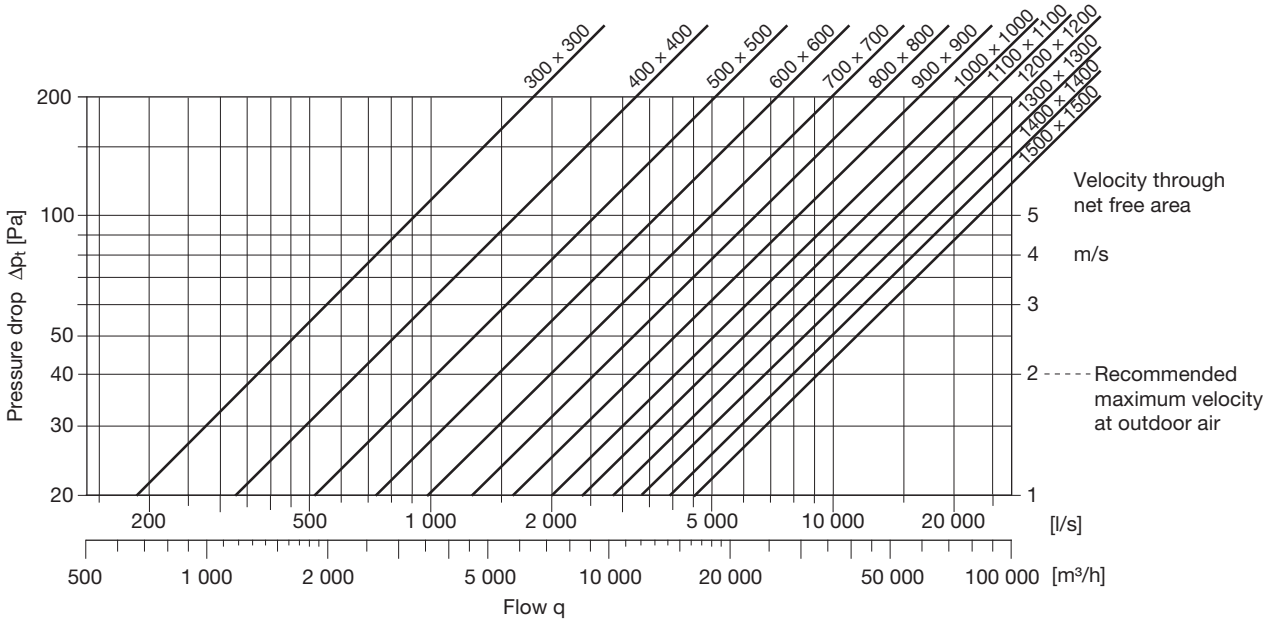


Roof hood

LHR

Technical data

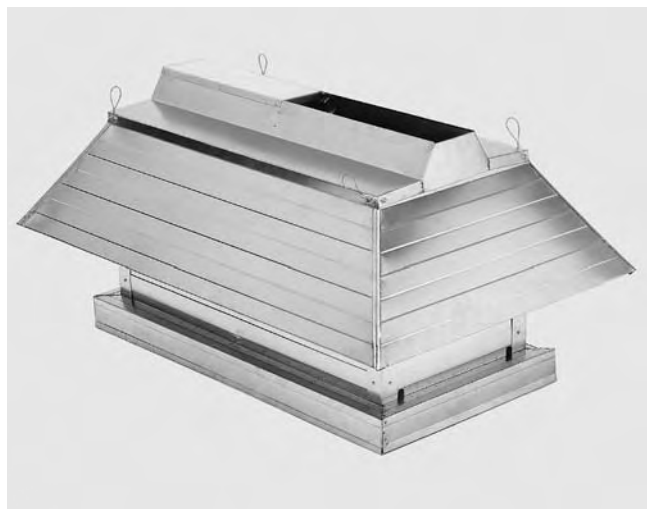
Outdoor air/extract air



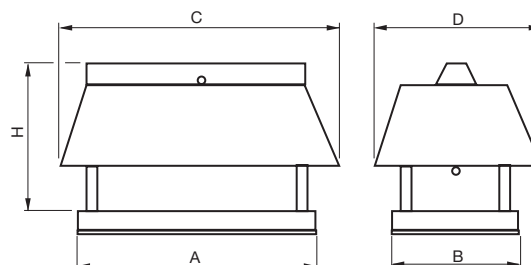


Roof hood

HKOMR



Dimensions



Description

Combi-hood intended for outdoor air intake and the expelling of extract air.

HKOMR is designed for location above the roof with or without a roof through connection.

The intake and extract sections are separated with an internal wall.

The intake section is protected against precipitation with a roof and pest-proof mesh. The extract section has a high-speed device and water-collection vessel. This part is also available with a pest-proof mesh. Air short circuit is prevented by the air intake's roof and the extract's high-speed device that ensures a long ejection distance.

HKOMR is manufactured as standard from galvanised steel sheet Z275, but is also available in aluminium zinc AZ 185, stainless, acid-resistant steel 2343 or painted.

HKOMR is produced as standard for installation on Lindab's roof through connection TKGOMR, but can also be supplied with an adapted connection hose for guiding directly on to the duct.

Ordering example

	HKOMR	3
Product		
Size		

Alternatives that should be specified separately if required:

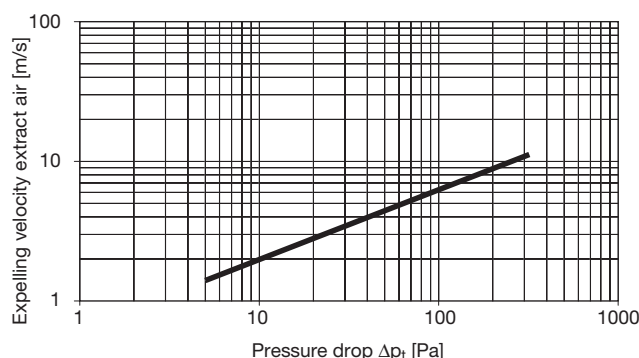
- With pest-proof mesh on the extract section
- With adapted connection hose for guiding directly into the duct.

Standard colours, see page 257.

Size	A mm	B mm	C mm	D mm	H mm
2	750	400	850	500	580
3	950	500	1050	600	580
4	1150	600	1450	900	670
5	1350	700	1650	1000	740
6	1550	800	1850	1100	830
8	1950	1000	2450	1500	890
10	2350	1200	2850	1700	1060
12	2750	1400	3350	2000	1240
14	3150	1600	3850	2300	1640

Size	Free area		
	outdoor air m ²	extract air m ²	m kg
2	0,112	0,031	16,7
3	0,163	0,061	23,1
4	0,235	0,101	36,6
5	0,403	0,165	50,3
6	0,614	0,260	65,9
8	1,131	0,425	102
10	1,574	0,630	148
12	2,409	1,062	244
14	4,790	1,341	370

Technical data

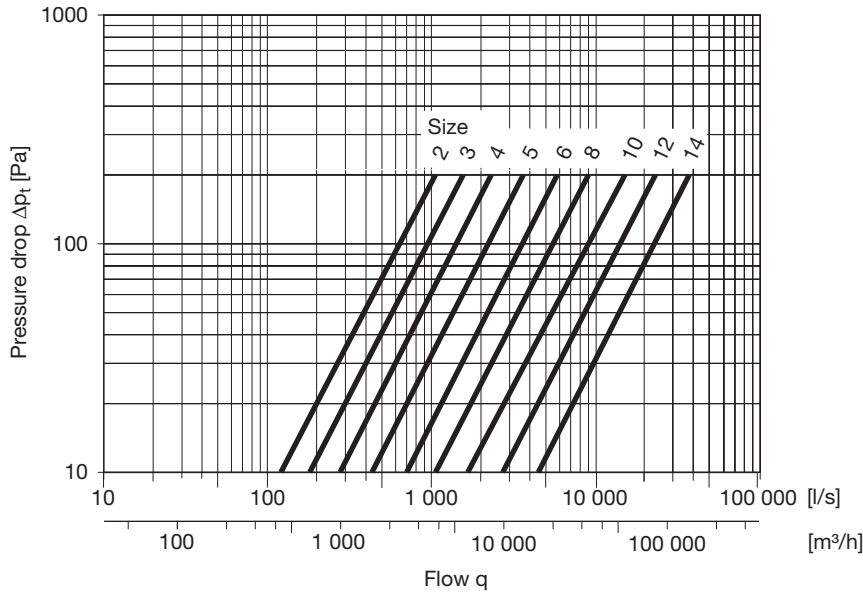




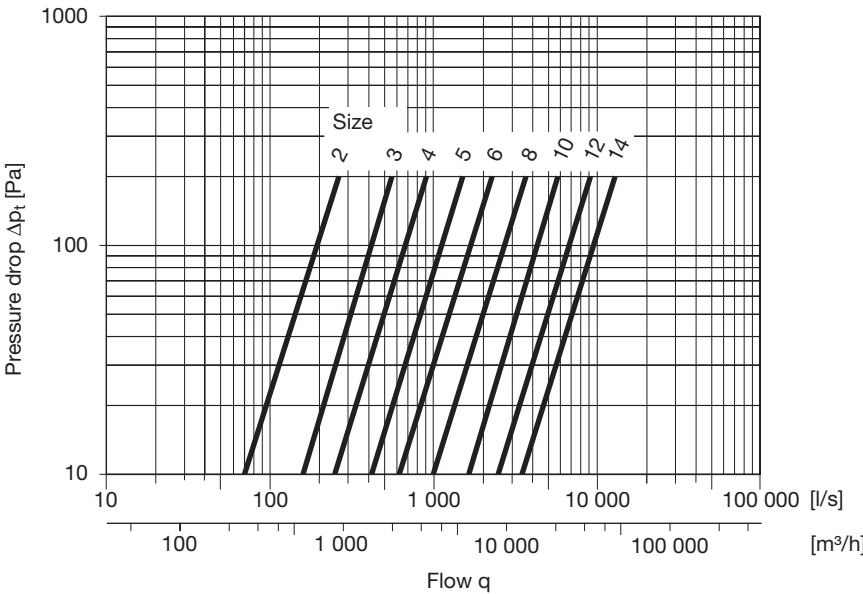
Roof hood

HKOMR

Outdoor air



Extract air



1

2

3

4

5

6

7

8

9

10

11



Roof transition

TGR



Beskrivning

Intended for connection to roof hood and roof fan. Available with various types of insulation for condensation or fire protection. Two fixing profiles are supplied to suit the roof pitch.

The upper connection in sizes 100-315 suits roof hood HN, for example.

The upper connection in sizes 400-1200 is supplied without flange and is made so that you can use the enclosed mating flange from roof hood HF for instance.

TGR can as addition be provided with two through-connections for electric power and control voltage.

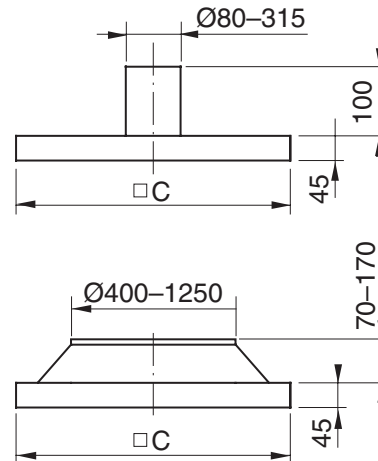
TGR is manufactured as standard from galvanized steel sheet Z275, but is also available in aluminium zinc AZ 185, stainless, acid-resistant steel 2343 or painted.

The duct connection is supplied with LS joint for guiding.

Dimensions

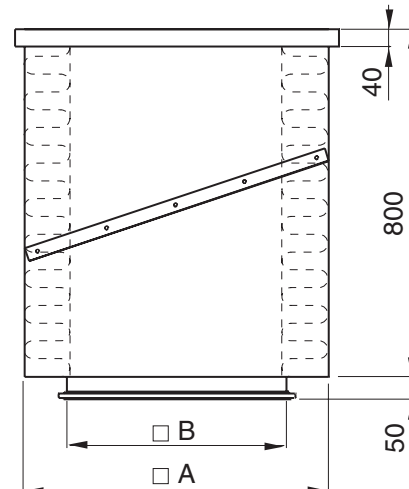
TGR-ÖA

– Upper connection



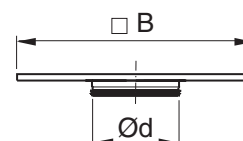
The □ C-measure of the upper connection (TGR-ÖA) shall fit the □ A-measure of the roof transition (TGR).

TGR



TGR-NA

– Lower connection



The □ B-measure of the lower connection (TGR-NA) shall fit the □ B-measure of the roof transition (TGR).



Roof transition

TGR

Dimensions

Size	B mm			C mm	Weight kg	
	A mm	50 mm insul.	100 mm insul.		50 mm insul.	100 mm insul.
3	300	200	100	400	16,9	21,9
4	400	300	200	500	22,9	30,1
5	500	400	300	600	29,7	39,2
6	600	500	400	700	37,4	49,6
7	700	600	500	800	43,9	58,4
8	800	700	600	900	50,3	67,1
9	900	800	700	1000	59,2	78,8
10	1000	900	800	1100	65,9	87,9
11	1100	1000	900	1200	72,7	97,0
12	1200	1100	1000	1300	82,6	110,3
13	1300	1200	1100	1400	99,1	129,9
14	1400	1300	1200	1500	124,8	159,1
15	1500	1400	1300	1600	138,9	177,2
16	1600	1500	1400	1700	153,8	196,3

Hole punching dimensions (A + 20 mm) × (A + 20 mm)

Ordering example

	TGR	3	1	2	1
Product					
Size					
Type of insulation					
Fire protection 50 mm		1			
Fire protection 100 mm			2		
Condensation 50 mm				3	
Internal cladding of insulation					
Zink plated steel		1			
Zink plated perf. steel			2		
Aluzink sheet metal AZ 185				3	
Aluzink sheet metal AZ185 perf.					4
Stainless steel 2343					5
Stainless steel perf. 2343					6
No internal cladding (Only applicable at condensation insulation)					7
External material					
Zink plated steel		1			
Aluzink sheet metal AZ 185			2		
Stainless steel 2343				3	

Accessories

Upper connection	TGR-ÖA	3	125	1
Product				
Size				
Hood dimension				
Material				
Zink plated steel		1		
Aluzink sheet metal AZ 185			2	
Stainless steel 2343			3	

Lower connection	TGR-NA	3	125	1	50
Product					
Size					
Connection dimension					
Material					
Zink plated steel		1			
Aluzink sheet metal AZ 185			2		
Stainless steel 2343			3		
Insulation thickness					

Upper connection only for roof hood VHL

	TGR-VHL	-	3	-	125
Product					
Size					
Hood dimension					

Upper connection only for roof hood LHR

	TGR-LHR	-	5	-	400	-	400
Product							
Size							
A mm							
B mm							



Roof transition

TGKOMR



Description

Roof transition adapted for combi-hood HKOMR. The transition is produced with 50 mm fire or condensation insulation.

At connection to circular duct two lower connections TGR-NA are used. The roof transition is manufactured as standard in galvanised steel plate, but is available in stainless steel 2343, aluminium zinc AZ 185 or painted.

Two angle brackets are supplied for adaptation to the relevant roof incline.

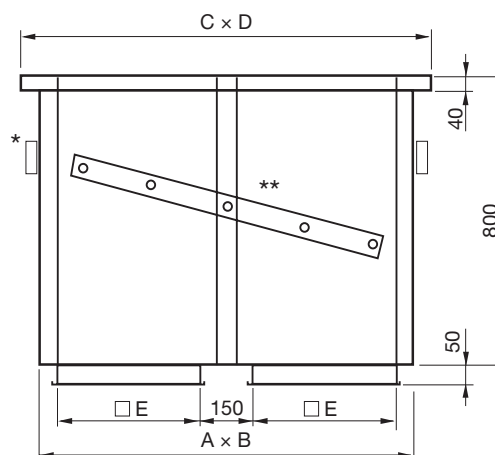
Sizes and dimensions according to drawing and table, but is available in extended version which is specified separately. The duct connections are supplied with LS joints for guiding.

Ordering example

		TGR	3	1	2	1
Product						
Size						
Type of insulation						
Fire protection 50 mm			1			
Condensation 50 mm			2			
Internal cladding of insulation						
Zink plated steel			1			
Zink plated perf. steel			2			
Aluzink sheet metal AZ 185			3			
Aluzink sheet metal AZ185 perf.			4			
Stainless steel 2343			5			
Stainless steel perf. 2343			6			
No internal cladding (Only applicable at condensation insulation)			7			
External material						
Zink plated steel			1			
Aluzink sheet metal AZ 185			2			
Stainless steel 2343			3			

Standard colours see page 257.

Dimensions



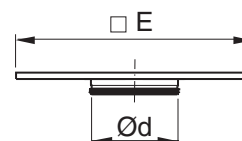
Size	A mm	B mm	C mm	D mm	E mm	m kg
2	650	300	740	390	200	32,5
3	850	400	940	490	300	43,5
4	1050	500	1140	590	400	54,3
5	1250	600	1340	690	500	72,4
6	1450	700	1540	790	600	84,5
8	1850	900	1940	990	800	113
10	2250	1100	2340	1190	1000	138
12	2650	1300	2740	1390	1200	190
14	3050	1500	3140	1590	1400	251

Hole punching dimensions = $(A + 20) \times (B + 20)$

* and ** are alternative positions for angle brackets

TGKOMR-NA

– Lower connection



The $\square$ E-measure of the lower connection (TGKOMR-NA) shall fit the $\square$ E-measure of the roof transition (TGKOMR).

Tillbehör

Lower connection	TGKOMR-NA - 3 - 125 - 1
Product	
Size	
Connection diameter	
Material	
Zink plated steel	1
Aluzink sheet metal AZ 185	2
Stainless steel 2343	3



Other circular products



Lindab	1
General information and theory	2
Safe	3
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Dampers and Measure units	5
Roof hoods	6
Other circular products	7
Isol	8
Transfer	9
Rectangular	10
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Content – Other circular products

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Jet for air entry nozzle



DY 278

Plenum or distribution chamber



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RAM 280

Duct filter



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Duct support



FA 290

Air valve socket



RAM GJUT 291

Wall stubs



TVILU.....292

TVIL 293



Air entry nozzle

IMSKU



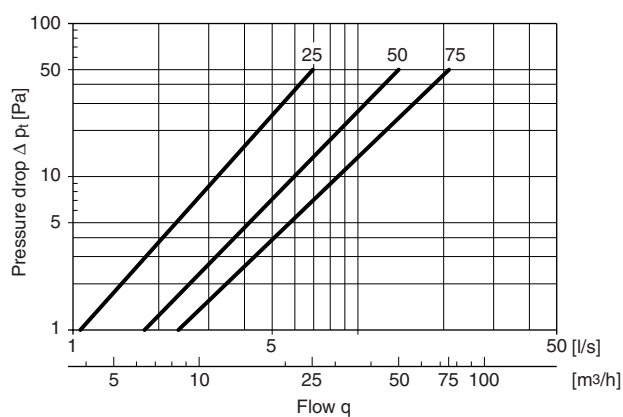
Description

Used for ducting in bomb shelters, and is dimensioned for the air volumes specified by the Civil Defence Board regulations.

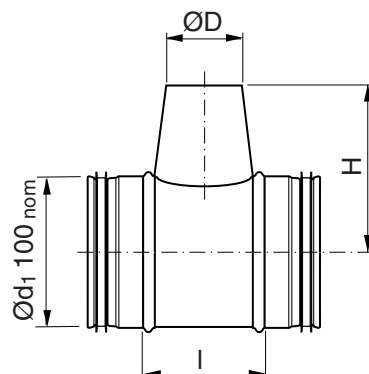
Ordering example

	IMSKU	75
Product		
Size		

Technical data



Dimensions



Size nom	ØD nom	l mm	H mm	m kg
25	35	85	95	0,31
50	50	110	110	0,38
75	60	110	110	0,39

Size nom	q _{max} m³/h	Maximum no. of persons
25	25	10
50	50	20
75	75	30



Jet for air entry nozzle

DY



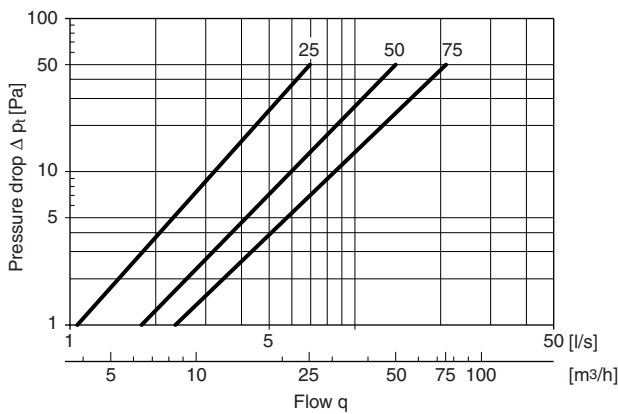
Description

Used for ducting in bomb shelters, and is dimensioned for the air volumes specified by the Civil Defence Board regulations.

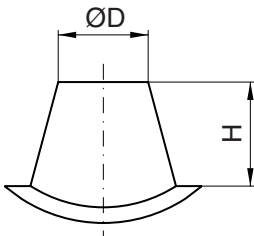
Ordering example

Product	DY	75
Size		

Technical data



Dimensions



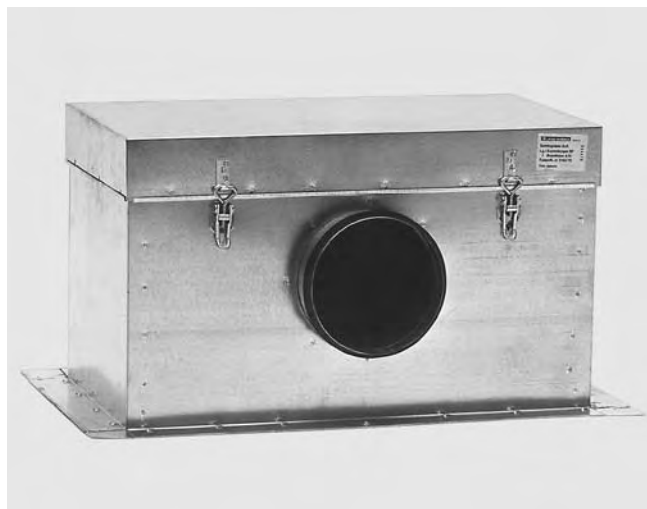
Size nom	ØD nom	H mm	m kg
25	35	45	0,04
50	50	60	0,09
75	60	60	0,10

Size nom	q _{max} m³/h	Maximum no. of persons
25	25	10
50	50	20
75	75	30



Plenum or distribution chamber

SLRU



Description

Intended for installation beneath joists, for collection or distribution of connected ducts underneath. The number of ducts for each size is noted in the table.

The plenum or distribution chamber is clad internally with fire protection insulation of 50 or 100 mm thickness. The insulation is protected by perforated sheet metal steel against damages from cleaning procedures.

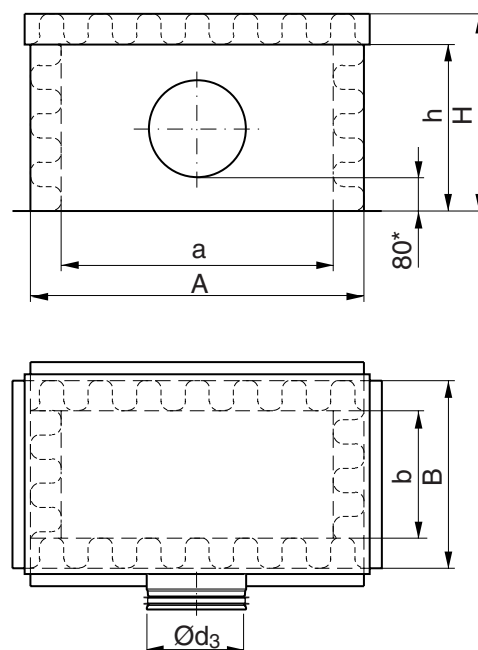
The chamber has a simply removable lid.

Ordering example

	SLRU	50	600
Product			
Insulation thickness			
Measure a			

Dimensions

Dimensions



Standard sizes

				Insulation thickness								Maximum no. of connected ducts					
				50 mm				100 mm				Ød _{nom}					
a*	b*	h*	Ød ₃ nom	A*	B*	H*	m kg	A*	B*	H*	m kg	63	80	100	125	160	200
210	210	300	160	310	310	355	7,23	410	410	405	14,3	1	1	1	1	1	1
450	210	300	160	550	310	355	10,6	650	410	405	19,9	3	3	3	2	2	2
600	210	300	200	700	310	355	12,8	800	410	405	23,7	4	4	4	4	3	2
800	210	300	200	900	310	355	15,7	1000	410	405	28,5	5	5	5	5	4	3
1000	210	300	200	1100	310	355	18,5	1200	410	405	33,1	7	7	6	6	5	4
1200	210	300	200	1300	310	355	21,4	1400	410	405	37,8	8	8	8	8	6	5

* Tolerance ±5 mm

Other dimensions can be made to special order.



Casting-in frame

RAM



Description

Used to locate plenum or distribution chamber SLRU in.

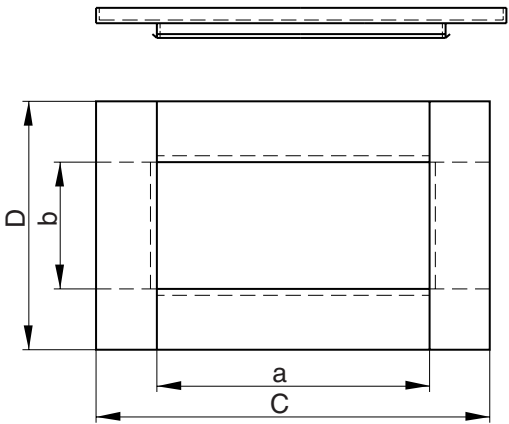
The chamber is locked to the frame with folding flaps.

Other dimensions can be made to order.

Ordering example

	RAM	600	50
Product			
Dimension a			
Insulation thickness			

Dimensions



Standard sizes		Insulation thickness					
		50 mm			100 mm		
a mm	b mm	C mm	D mm	m kg	C mm	D mm	m kg
210	210	410	410	1,80	510	510	2,96
450	210	650	410	2,35	750	510	3,69
600	210	800	410	2,65	900	510	4,14
800	210	1000	410	3,16	1100	510	4,75
1000	210	1200	410	3,62	1300	510	5,35
1200	210	1400	410	4,08	1500	510	5,96



Duct filter

STR



Description

The duct filter fits in all fittings with a Safe-groove. To install the filter in a T-piece means a simple mounting and replacing.

The special tapered shape gives 4–5 times larger filter area than the equivalent duct cross section area, giving lower pressure drop and longer exchange intervals than the equivalent flat filter.

Standard filter class is G4, but class F5 is optionally available. The diagram shows the pressure drop across a clean filter, including T-piece. The filter can be used to twice this pressure drop. It is a good idea to dimension the system for the average value.

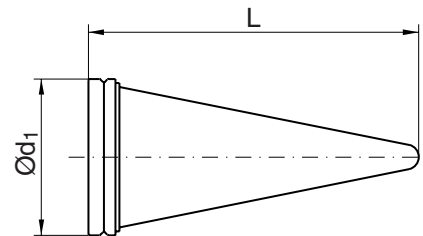
$$\Delta p_{t \text{ dim}} = 1,5 \cdot \Delta p_{t \text{ clean}}$$

Max temperature = 120 °C

Highest recommended air speed in the duct.

Filter class	v_{max} (m/s)
G4	10
F5	4,5

Dimensions

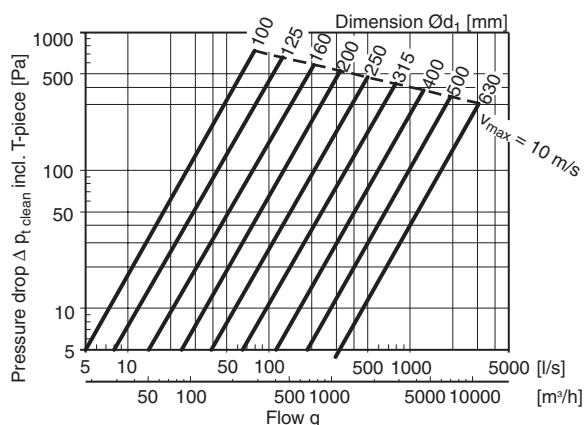


Ød ₁ nom	L mm	Tolerance mm	Area m ²	m kg
100	220	±20	0,04	0,04
125	260	±20	0,05	0,08
160	340	±20	0,09	0,12
200	420	±25	0,14	0,16
250	540	±30	0,22	0,23
315	670	±30	0,34	0,36
400	860	±35	0,55	0,59
500	1100	±50	0,89	0,72
630	1350	±50	1,37	0,91

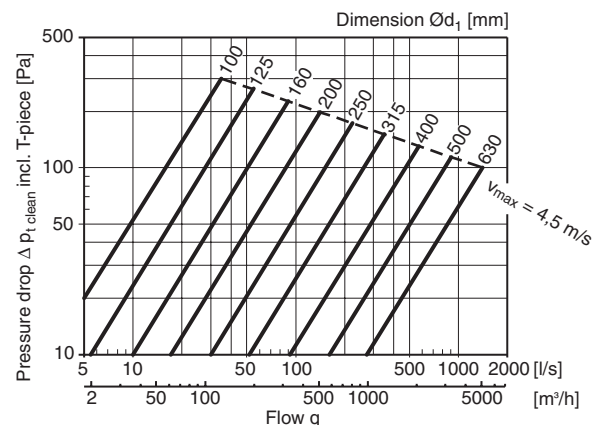
Ordering example

	STR	200	G4
Product			
Dimension Ød ₁			
Filter class			

Filter class G4



Filter class F5





Sealing clamp

SVK



Description

Removable sealing clamp made from galvanised sheet steel. Coated internally with a thick EPDM foam rubber seal.

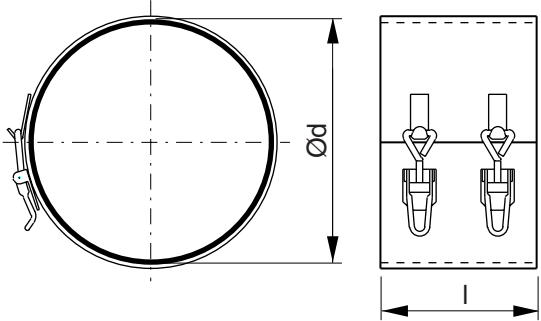
The sealing clamp can join two ducts together, fitting to duct or duct to fitting.

The sealing clamp is very useful when you want to be able to remove a fitting or a unit from a ventilation system, and can also be used to advantage for repairing a duct system.

Ordering example

	SVK	100
Product		
Dimension Ød		

Dimensions



Ød nom	l mm	m kg
80	130	0,30
100	130	0,34
125	130	0,40
160	130	0,46
200	130	0,59
250	190	0,94
315	190	1,17
400	250	1,42
500	250	1,75



End cap

EP



Description

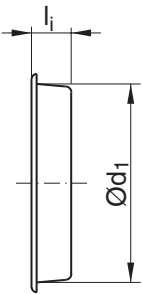
Fits inside a duct.

Ordering example

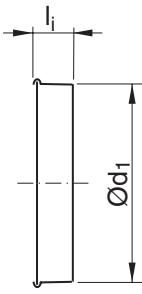
	EP	160
Product		
Dimension Ød ₁		

Dimensions

Ø 63–500



Ø 630–1250



Ød ₁ nom	l _i mm	m kg
63	20	0,03
80	21	0,05
100	23	0,09
125	20	0,09
160	22	0,14
200	20	0,19
250	26	0,27
315	21	0,51
400	20	0,76
500	20	1,22
630*	80	2,41
800*	100	4,87
1000*	100	7,09
1250*	120	15,5

* Hand made





Cleaning cover

KC



Description

Intended for use with fittings which do not have a Safe gasket. The cover is retained by spring clips which press against the inside of the fitting. It is released by pulling it straight out, and installed by pressing it in. There are one or two handles to help.

The gasket is made from EPDM rubber.

Δp in the table specifies the maximum positive pressure the cleaning cover can withstand without coming loose, when installed from below.

Can manage up to tightness class C.

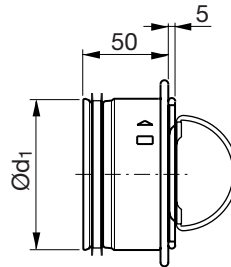
The corresponding Safe component (of different design) is designated KCU and only fits inside Safe components. Please refer to page 126.

Ordering example

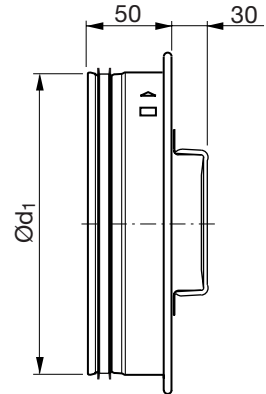
	KC	200
Product		
Dimension $\varnothing d_1$		

Dimensions

$\varnothing 100-160$



$\varnothing 200-315$



$\varnothing d_1$ nom	Δp Pa	m kg	Handle
100	>3400	0,29	1 folding
125	>3400	0,38	1 folding
160	>3400	0,57	1 folding
200	>3000	0,94	1 fixed
250	>2300	1,76	2 fixed
315	1600	1,86	2 fixed



Flat bar flange

FL

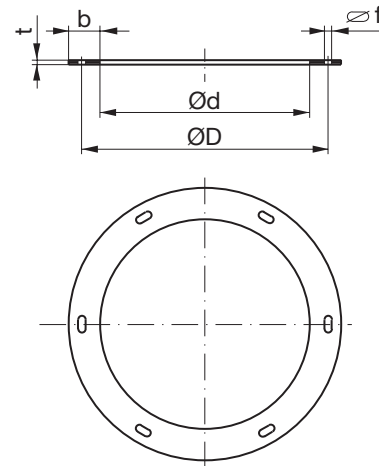


Description

Heavy flange made from flat bar which then is hot dip galvanised. Dimensions comply with the German standard, DIN 24 154 parts 2 and 5. It suits both spirally swaged and lengthways swaged ducts. Oval bolt holes facilitate assembly.

Other dimensions and hole spacings can be provided for large orders.

Dimensions



Ordering example

Product	FL	200
Dimension ØD ₁		

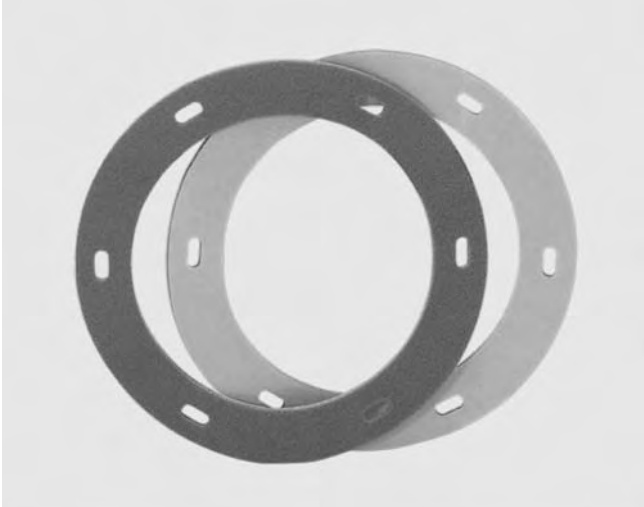
Dimensions

Ød			ØD		 f mm	Bolts to DIN 601			b × t mm	m kg			
nom mm	real mm	tolerance mm	real mm	tolerance mm		quantity pcs	dim	L mm					
80	82,5	+1,0 -0,0	108	±1,0	7,0 × 16	4	M6	16	25 × 3	0,18			
100	102		129							0,22			
112	114		141							0,25			
125	127		155							0,30			
140	142	+1,5 -0,0	176	±1,0	7,0 × 16	6	M6	20	30 × 4	0,49			
150	152		184							0,52			
160	162		194							0,55			
180	182		213							0,60			
200	203		235							0,70			
224	227		259							0,74			
250	253		286							0,81			
280	283	+1,5 -0,0	322	±1,5	9,5 × 20	8	M8	20	35 × 5	1,31			
300	303		341							1,40			
315	318		356							1,47			
355	358		395							1,63			
400	404	+2,0 -0,0	438	±1,5	11,5 × 24	12	M10	25	50 × 6	1,80			
450	454		487							2,02			
500	504		541							2,35			
560	564		605			16				40 × 5	2,81		
600	604		644								3,00		
630	634		674								3,15		
710	714		751								3,54		
800	804		837			24					3,90		
900	904		934								4,39		
1000	1005		1043								4,89		
1120	1125		1174			32					25	50 × 6	8,36
1250	1255		1311										9,32
1400	1407		1465										10,4
1600	1607		1637							11,8			



Gasket for flat bar flange

FLPACK



Description

Used to seal joints between flat bar flanges FL. Made from cross-linked polythene with closed cells and tape on one side.

Recommended operation temperature is -60°C to +80°C.

The gasket is placed on the mating face of each flange, or between flange edges on ducts, please refer to the assembly instruction.

Dimensions up to dim Ø1250, as FL page 285.

Properties

Resistant to

- ageing excellent
- ozone very good
- uv radiation limited
- oils and petrochemicals excellent
- aliphatic oils excellent
- aromatic solvents very good
- ketones..... very good
- chlorated solvents very good
- dilute acids excellent
- detergent excellent

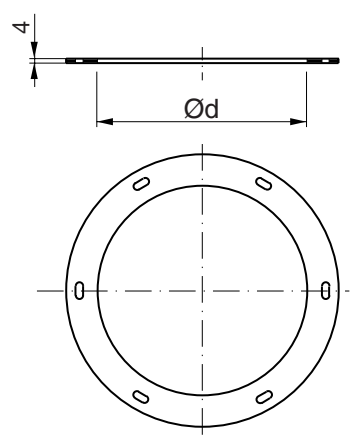
Grades:

excellent – very good – good – limited – poor

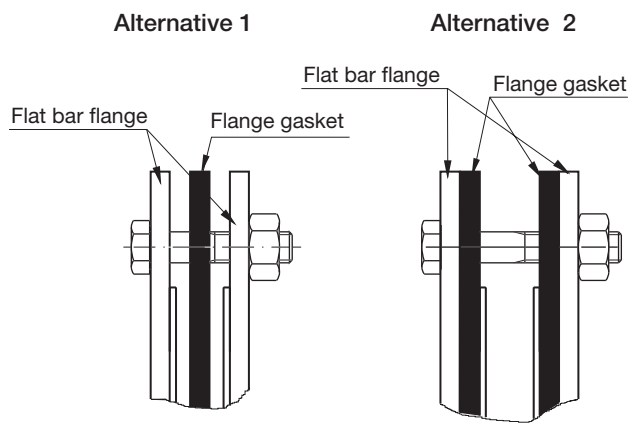
Ordering example

Product	FLPACK	200
Dimension Ød nom		

Dimensions



Assembly instruction





Suspension clamp

UV

1

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Description

At insulated duct it is recommended that the suspension clamp is mounted inside the insulation.

5

Ordering example

	UV	200
Product		
Dimension Ød		

6

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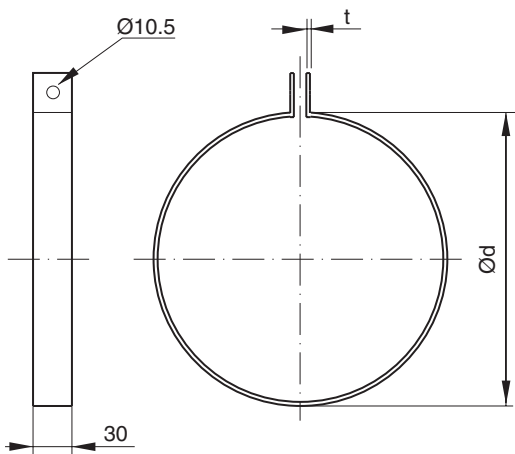
8

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Dimensions



Ød nom	t mm	m kg
63	1,25	0,09
80	1,25	0,11
100	1,25	0,13
125	1,25	0,16
160	1,25	0,20
200	1,25	0,24
250	1,25	0,30
315	1,25	0,36
400	1,25	0,47
500	1,25	0,58
630	1,25	0,73
800	1,25	0,92
1000	1,25	1,15
1250	1,25	1,43



Suspension clamp

UVH



Description

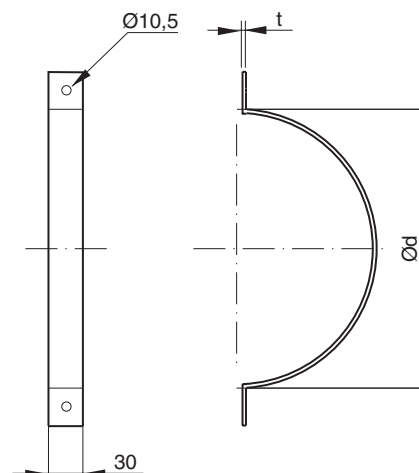
At insulated duct it is recommended that the suspension clamp is mounted inside the insulation.

Ordering example

	UVH	200
Product		
Dimension Ød		

N.B. Is sold in pairs.

Dimensions

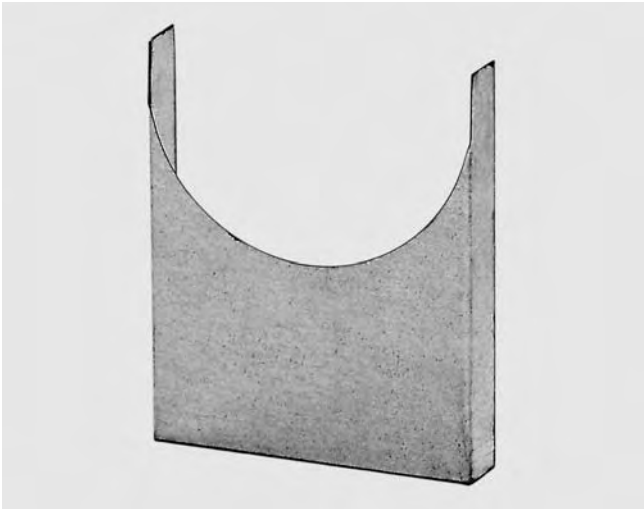


Ød nom	t mm	m kg
80	2,00	0,07
100	2,00	0,08
125	2,00	0,10
160	2,00	0,12
200	2,00	0,14
250	2,00	0,17
315	2,00	0,21
400	2,00	0,27
500	2,00	0,33
630	2,00	0,41
800	2,00	0,51
1000	2,00	0,64
1250	2,00	0,79



Duct support

FA



Description

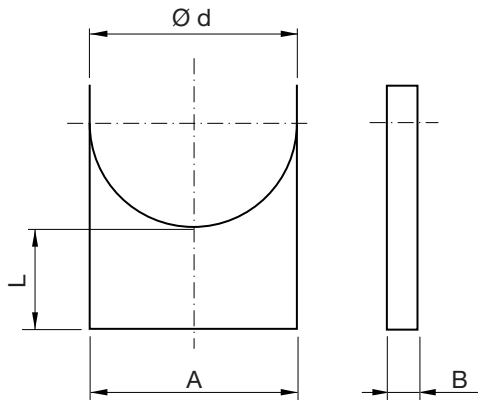
Used to fix ducts standing on joists.

Is provided with fixing holes in the base.

Ordering example

Product	FA	250
Dimension Ød		

Dimensions



Ød nom	A mm	B mm	L mm	m kg
63	66	30	100	0,09
80	83	30	100	0,11
100	103	30	100	0,13
125	128	30	100	0,15
160	163	30	100	0,19
200	203	30	100	0,29
250	253	30	100	0,36
315	318	30	100	0,46
400	403	30	100	0,59
500	503	30	100	0,76
630	633	30	100	1,02

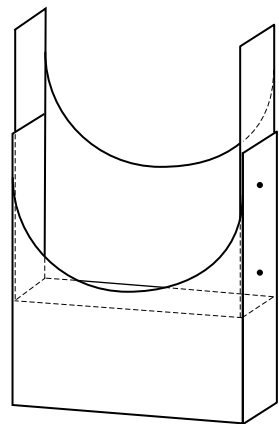
Varying height can be arranged by installing two duct supports, one inside the other.

These can be locked with two self-tapping screws on each short side.

The L dimension can then vary:

for Ø 63–250 between 100 and 200 mm,

for Ø 315–630 between 100 and 250 mm.





Casting-in programme – Air valve socket

RAM



Description

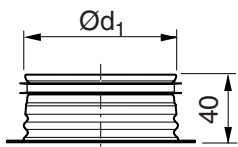
With nail flange.

Fits air valve KGEB etc.

Ordering example

	RAM	100	GJUT
Product			
Dimension Ød ₁			
Specification			

Dimensions



Ød ₁ nom	m kg
100	0,09
125	0,11
160	0,16

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Casting-in programme – Wall stub TVILU

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Description

With Safe connection.

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Ordering example

Product	TVILU	100
Dimension Ød ₁		

6

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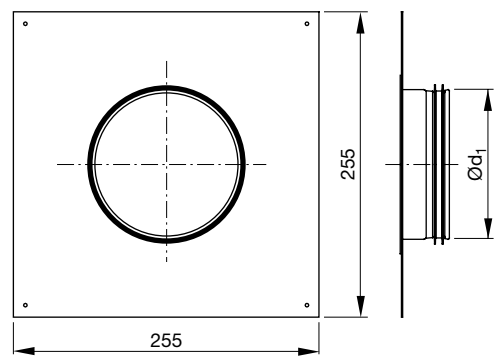
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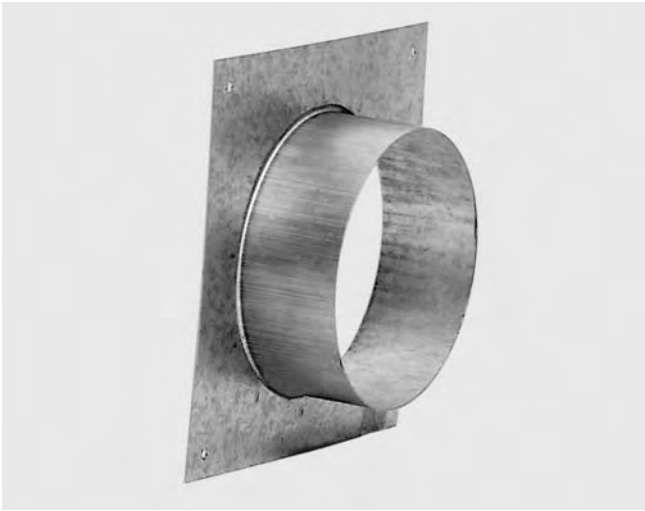
Dimensioner



Ød ₁ nom	m kg
100	0,29
125	0,31
160	0,32



Casting-in programme – Wall stub TVIL



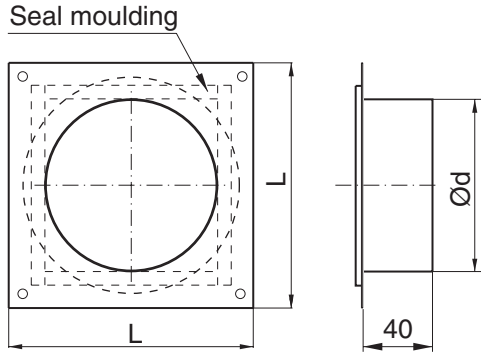
Description

With female end.

Ordering example

Product	TVIL	100
Dimension Ød		

Dimensions



Ød nom	L mm	m kg
100	150	0,15
125	180	0,20



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Dahlerups Pakhus, Köpenhamn, Danmark



Isol



Lindab	1
General information and theory	2
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Content – Isol

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Circular duct



SRI 298

2

Bends



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 BFUI 45° 300
 BFUI 30° 301

3

Reducers



RCLUI 302

4



RCFUI 303

5

T-piece



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6

Take-off



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Coupling



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Female coupling



MFI 308

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End cap



ESUI 309

Cleaning covers



EPFUI 310



KCRUI 311

Sealing clamp



SVK 312

Regulating damper



See chapter
 Dampers and Measure units
 DRUI 235



General

Isol is the name for our pre-insulated ducts and fittings, intended for both indoor and outdoor use. The system is based on sheet steel inner and outer sheaths with rock wool insulation in between.

The nominal size Ø100–500 always refers to the inner duct diameter, irrespective of the type in question.

There are two types to choose from, type 30 and type 50.

Insulation

Type 30 Insulation thickness is 30 mm. Used in restricted spaces or to beat condensation.

Type 50 Insulation thickness is 50 mm. Used when you want the best insulation capability.

Inner sheath

The inner sheath is made from standard units from the Safe-programme. This means that adequate properties are the same as for the corresponding Safe-units.

Outer sheath

The outer sheath is supplied as standard with hot dip galvanised steel sheet Z 275. It can also be made in plastic coated galvanised steel sheet, stainless steel or alu-zink to special order.

Joints

When installation is done outdoors, it is important to have a diffusion-proof outer sheath. For this reason, use the special sealing clamp SVK, which gives good mechanical strength and good sealing at the joints. The sealing material consists of long-life EPDM rubber.

Duct fixing

The Isol-system is normally mounted on straps, in the same way as other duct systems.

Heat/cold

Graphs of theoretically estimated power loss in a straight duct.

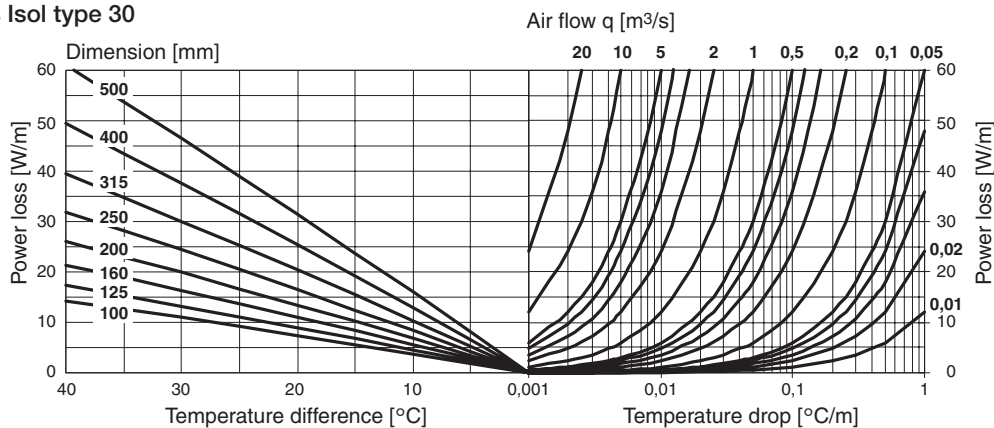
Background

Transported air $t_1 = 20\text{ }^{\circ}\text{C}$

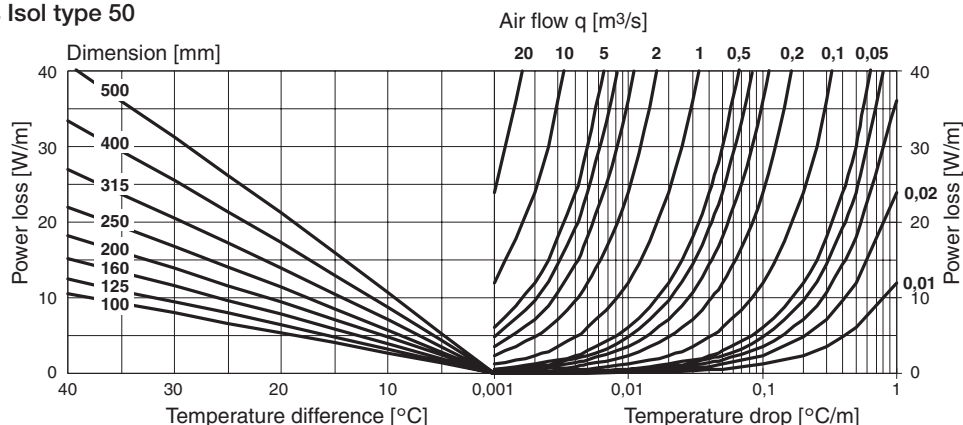
Heat transfer coefficient between outer sheath and surrounding air at 10 [m/s] $\alpha_y = 30\text{--}40\text{ [W/(m}^2\cdot^{\circ}\text{C)]}$

Ambient temperature $t_2 = -20\text{ to }+20\text{ }^{\circ}\text{C}$

Power loss Isol type 30



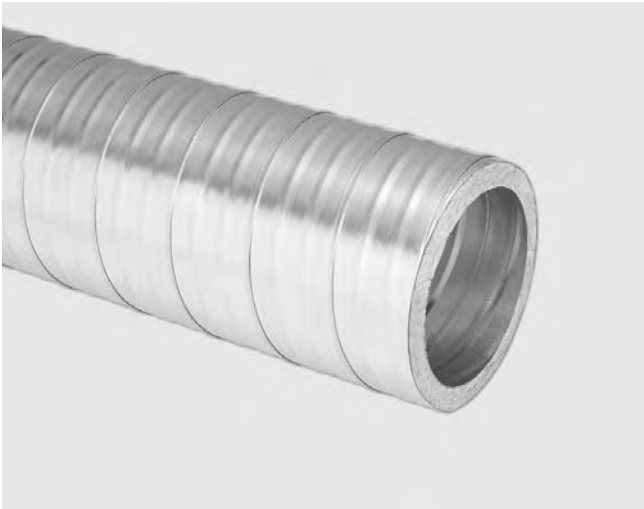
Power loss Isol type 50





Circular duct

SRI



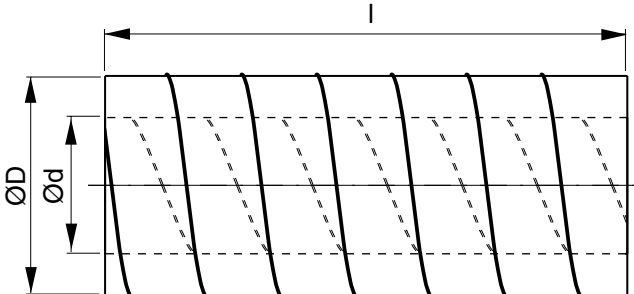
Description

Circular duct.

Ordering example

	SRI	125	3000	30
Product				
Dimension Ød				
Length in mm				
Type				

Dimensions



Type 30

Ød nom	ØD mm	l stand m	m _l kg/m
100	160	3	4,52
125	180	3	5,29
160	224	3	7,23
200	260	3	8,70
250*	315*	3	10,6
315*	375*	3	13,8
400*	460*	3	20,6
500*	560*	3	26,7

Type 50

Ød nom	ØD mm	l stand m	m _l kg/m
100	200	3	6,19
125	224	3	7,44
160	260	3	9,29
200	300	3	11,1
250*	355*	3	13,3
315*	415*	3	19,6
400*	500*	3	23,2
500*	600*	3	31,3

* With external stiffening corrugation



Bend

BFUI 90°



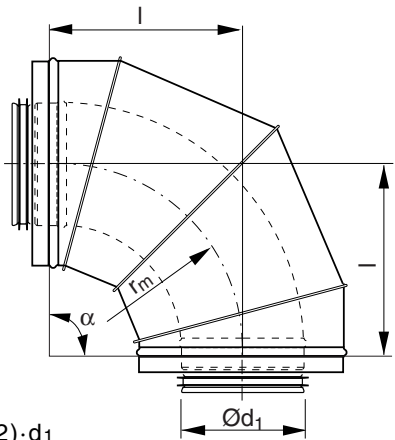
Description

Segmented and lockseamed bend.

Ordering example

	BFUI	200	90	30
Product				
Dimension Ød ₁				
Angle α				
Type				

Dimensions



$$r_m \approx (1-2) \cdot d_1$$

Ød ₁ nom	l type 30 mm	l type 50 mm	m type 30 kg	m type 50 kg
100	160	200	1,84	2,93
125	190	190	2,25	3,44
160	240	240	3,92	4,88
200	200	300	4,17	6,86
250	352	352	7,63	9,74
315	315	315	9,63	11,6
400	400	400	15,5	18,6
500	500	500	22,4	26,1



Bend

BFUI 45°



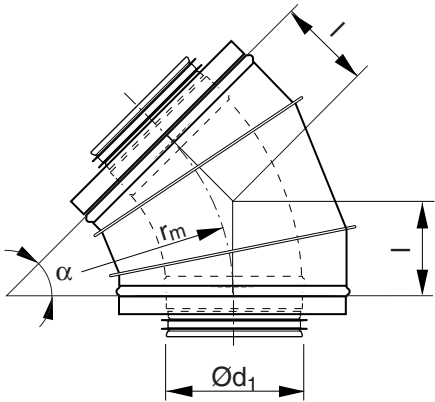
Description

Segmented and lockseamed bend.

Ordering example

	BFUI	250	45	30
Product				
Dimension Ød ₁				
Angle α				
Type				

Dimensions



$$r_m \approx (1-2) \cdot d_1$$

Ød ₁ nom	l type 30 mm	l type 50 mm	m type 30 kg	m type 50 kg
100	66	83	0,94	1,55
125	79	79	1,40	1,68
160	100	100	2,28	2,49
200	83	124	2,53	3,34
250	136	136	4,14	4,90
315	145	145	4,75	5,55
400	188	188	7,73	8,97
500	224	224	11,4	12,9



Bend

BFUI 30°



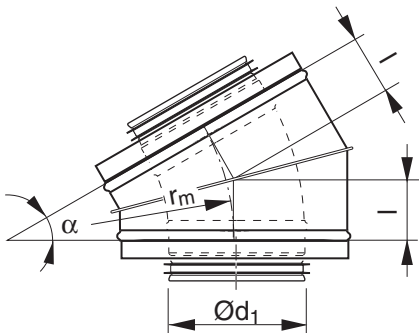
Description

Segmented and lockseamed bend.

Ordering example

	BFUI	315	30	50
Product				
Dimension Ød ₁				
Angle α				
Type				

Dimensions



$$r_m \approx (0,8-2) \cdot d_1$$

Ød ₁ nom	l type 30 mm	l type 50 mm	m type 30 kg	m type 50 kg
100	43	54	0,76	1,03
125	47	60	0,93	1,35
160	60	67	1,54	1,95
200	54	54	2,20	2,67
250	69	69	3,15	3,65
315	83	83	3,57	4,48
400	99	99	5,90	6,90
500	105	105	8,57	10,1





Reducer

RCLUI



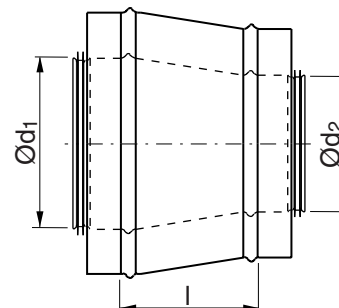
Description

Long, hand made reducer with appr. 20° angle.

Ordering example

	RCLUI	400	250	50
Product				
Dimension Ød ₁				
Dimension Ød ₂				
Type				

Dimensions



Ød ₁ nom	Ød ₂ nom	l type 30 mm	l type 50 mm	m type 30 kg	m type 50 kg
125	100	64	64	0,68	0,87
160	100	112	112	0,98	1,24
160	125	78	78	0,89	1,11
200	100	167	167	1,51	1,90
200	125	133	133	1,30	1,66
200	160	85	85	1,16	1,42
250	125	202	202	2,24	2,82
250	160	154	154	2,07	2,54
250	200	99	99	1,85	2,24
315	160	243	243	3,08	3,78
315	200	188	188	2,79	3,43
315	250	119	119	2,60	3,15
400	200	310	310	4,76	5,87
400	250	241	241	5,64	6,69
400	315	152	152	3,94	4,77
500	250	378	378	7,67	9,26
500	315	289	289	6,68	8,06
500	400	177	177	5,62	6,78



Reducer

RCFUI



Description

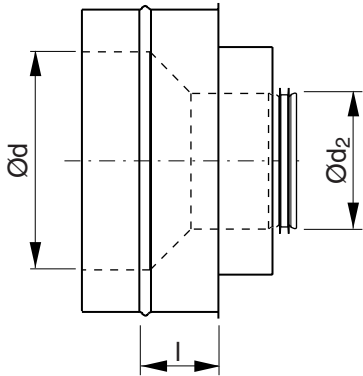
Short, concentric reducer with one female end.

$\varnothing d$ fits over a fitting and $\varnothing d_2$ fits inside a duct.

Ordering example

	RCFUI	250	160	50
Product				
Dimension $\varnothing d$				
Dimension $\varnothing d_2$				
Type				

Dimensions



$\varnothing d$ nom	$\varnothing d_2$ nom	l type 30 mm	l type 50 mm	m type 30 kg	m type 50 kg
125	100	82	82	0,69	0,93
160	100	97	97	0,85	1,11
160	125	66	66	0,82	1,04
200	100	118	118	1,15	1,46
200	125	106	106	1,12	1,44
200	160	86	86	1,10	1,37
250	125	150	150	1,78	2,23
250	160	133	133	1,74	2,21
250	200	112	112	1,72	2,15
315	160	168	168	2,32	2,87
315	200	148	148	2,26	2,81
315	250	143	143	2,50	3,14
400	200	203	203	3,75	4,59
400	250	198	198	3,14	4,08
400	315	165	165	3,91	4,81
500	250	248	248	5,71	6,90
500	315	215	215	5,47	6,62
500	400	193	193	5,69	6,92



T-piece

TCUI



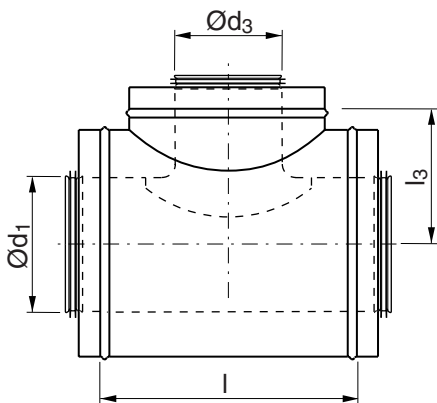
Description

Centric T-piece.

Ordering example

	TCUI	315	250	50
Product				
Dimension Ød ₁				
Dimension Ød ₃				
Type				

Dimensions



Dimensions

Type 30

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
100	100	200	92	1,77
125	100	200	102	1,98
125	125	230	112	2,25
160	100	200	124	2,45
160	125	230	134	2,70
160	160	260	128	3,21
200	100	200	142	2,83
200	125	230	152	3,19
200	160	260	145	3,62
200	200	300	145	4,32
250	100	200	180	3,80
250	125	230	180	4,22
250	160	260	180	4,80
250	200	300	170	5,44
250	250	350	187	6,76
315	100	200	192	4,47
315	125	230	205	4,96
315	160	260	210	5,60
315	200	300	200	6,27
315	250	350	217	7,68
315	315	415	210	10,0
400	100	200	242	5,91
400	125	230	252	6,54
400	160	260	247	7,22
400	200	300	247	8,20
400	250	350	259	9,73
400	315	415	279	12,5
400	400	500	282	14,3
500	100	200	292	8,25
500	125	230	302	9,08
500	160	260	297	9,91
500	200	300	297	11,0
500	250	350	309	12,8
500	315	415	296	16,4
500	400	500	332	18,3
500	500	600	342	21,4



T-piece

TCUI

Dimensions

Type 50

Ød ₁ nom	Ød ₃ nom	l mm	l ₃ mm	m kg
100	100	250	134	2,86
125	100	250	131	3,21
125	125	274	146	3,49
160	100	250	149	3,72
160	125	274	149	4,05
160	160	310	149	4,54
200	100	250	169	4,30
200	125	274	169	4,67
200	160	310	169	5,33
200	200	350	169	5,97
250	100	250	194	5,60
250	125	274	194	6,03
250	160	310	194	6,79
250	200	350	194	7,53
250	250	400	192	9,16
315	100	250	227	6,51
315	125	274	227	7,01
315	160	310	227	7,86
315	200	350	227	8,58
315	250	400	222	10,4
315	315	465	222	12,7
400	100	250	269	8,38
400	125	274	269	9,00
400	160	310	269	10,0
400	200	350	269	11,0
400	250	400	264	13,1
400	315	465	264	15,9
400	400	550	269	17,6
500	100	250	319	11,3
500	125	274	319	12,2
500	160	310	319	13,4
500	200	350	319	14,5
500	250	443	314	18,1
500	315	465	314	20,7
500	400	550	314	22,5
500	500	650	349	27,0

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Take-off

ILUI

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Description

Take-off with radius 2–4 mm.

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Ordering example

	ILUI	160	50
Product			
Dimension Ød ₁			
Type			

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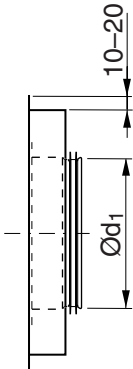
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Dimensions



Ød ₁ nom	m type 30 kg	m type 50 kg
100	0,24	0,32
125	0,28	0,37
160	0,37	0,47
200	0,47	0,58
250	0,68	0,81
315	0,91	1,05
400	1,37	1,58
500	1,79	2,04



Coupling

NPUI



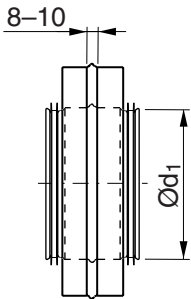
Description

Coupling for joining of SRI ducts.

Ordering example

	NPUI	125	30
Product			
Dimension Ød ₁			
Type			

Dimensions



Ød ₁ nom	m type 30 kg	m type 50 kg
100	0,23	0,26
125	0,27	0,30
160	0,34	0,36
200	0,47	0,50
250	0,92	0,97
315	1,14	1,18
400	1,97	2,05
500	2,64	2,72

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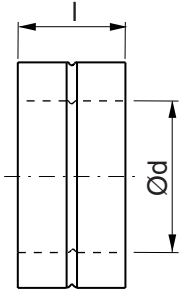


Female coupling

MFI



Dimensions



Description

Female coupling for joining of fittings.

Ordering example

	MFI	100	50
Product			
Dimension Ød			
Type			

Ød nom	l type 30 mm	l type 50 mm	m type 30 kg	m type 50 kg
100	90	90	0,43	0,58
125	90	90	0,49	0,68
160	90	90	0,68	0,85
200	90	90	0,79	1,01
250	130	130	1,41	1,76
315	130	130	1,68	2,08
400	170	170	3,00	3,64
500	170	170	3,88	4,62



End cap

ESUI



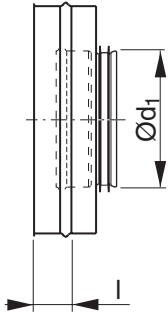
Description

End cap which fits inside a duct.

Ordering example

	ESUI	160	30
Product			
Dimension Ød ₁			
Type			

Dimensions



Ød ₁ nom	L type 30 mm	L type 50 mm	m type 30 kg	m type 50 kg
100	38	58	0,56	0,81
125	38	58	0,65	0,95
160	38	58	0,94	1,25
200	38	58	1,19	1,58
250	38	58	1,76	2,26
315	38	58	2,44	3,04
400	38	58	3,93	4,77
500	38	58	5,32	6,41



Cleaning cover

EPFUI



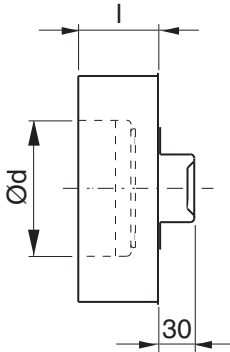
Description

Cleaning cover which fits outside a fitting.

Ordering example

	EPFUI	400	50
Product			
Dimension Ød			
Type			

Dimensions



Ød nom	l type 30 mm	l type 50 mm	m type 30 kg	m type 50 kg
100	70	90	0,50	0,73
125	70	90	0,60	0,88
160	70	90	0,83	1,13
200	70	90	1,03	1,41
250	90	110	1,71	2,24
315	90	110	2,29	2,94
400	110	130	3,81	4,71
500	110	130	5,40	6,55



Cleaning cover

KCRUI



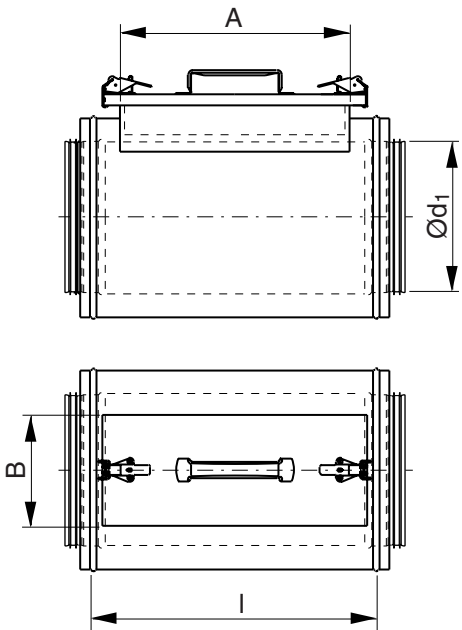
Description

Inspection cover which fits at a duct. The hatch is easy to open, with eccentric lock.

Ordering example

	KCRUI	250	50
Product			
Dimension Ød ₁			
Type			

Dimensions



Ød ₁ nom	A mm	B mm	I mm	m type 30 kg	m type 50 kg
200	300	100	360	4,69	5,70
250	300	100	360	6,45	7,71
315	400	200	460	7,97	9,38
400	400	200	460	11,7	13,6
500	400	200	460	13,0	15,2



Sealing clamp

SVK



Description

Removable sealing clamp to be installed outside the outer sheath.

The inside of the sealing clamp is covered with a thick layer of cellular EPDM rubber.

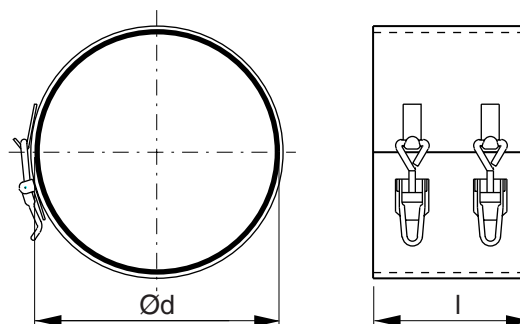
Ordering example

	SVK	315
Product		
Dimension Ød		

The table below specifies the sealing clamp SVK, with diameter d, which is used on each nominal diameter d₁, of Isol.

Isol Ød ₁ nom	Isol type 30 Use SVK Ød	Isol type 50 Use SVK Ød
100	160	200
125	180	224
160	224	260
200	260	300
250	315	355
315	375	415
400	460	500
500	560	600

Dimensions



Ød nom	l mm	m kg
80*	130	0,30
100*	130	0,34
125*	130	0,40
160	130	0,46
180	130	0,52
200	130	0,59
224	130	0,75
250*	190	0,94
260	190	0,98
300	190	1,12
315	190	1,17
355	190	1,30
375	190	1,35
400*	250	1,42
415	250	1,49
460	250	1,60
500	250	1,75
560	250	2,00
600	250	2,20

* Only used in the Safe programme



Transfer



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Description

Transfer – the duct system which is quick and easy to assemble and take apart

Transfer is the circular duct system with tension clips for quick assembly and disassembly. The system is supplied as standard with clips in dimensions Ø80 to Ø500 and with FL flanges in dimensions Ø560 to Ø900. Please refer to page 285.

Dust explosions

There is always a risk of dust explosion in installations where finely-divided material is transported.

A dust explosion occurs when a critical mixture of finely divided material and air is ignited and burns rapidly with consequent rapid expansion and pressure rise. A common cause of ignition is a spark from electrostatic discharge. Dust and sawdust extraction installations must be designed to minimise sources of fire and explosion.

Noise

In particle transport systems, where the pressure difference between in- and outside is big and where a little leakage may cause noise, the joints ought to be taped if low noise levels are required.

Applications

The duct system is suitable for

- Particle transportation from woodworking, such as saw mills, carpenters, furniture manufacturers and craft workshops.
- Comfort ventilation.
- Extraction systems for better working environment.
- Plasma cutters.
- Specially designed ventilation plants where you have extra demands for form, colour and appearance.

Please contact Lindab if you need other applications or to transport other materials, and if there are special operation circumstances.

Mountings

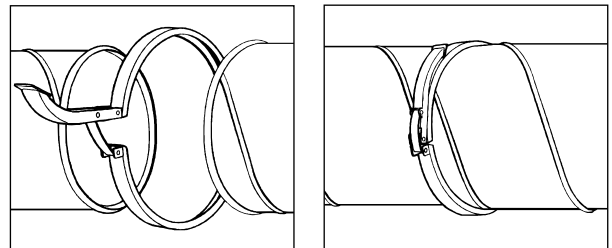
The types of mountings and their distances shall be chosen so that no sagging occurs in the system, and as justified for safe installation.

Maintenance

The duct system does not normally need any maintenance, but regular checks for wear should be made.

Advantages of the Transfer system

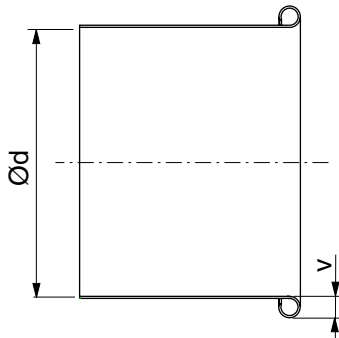
- Facilitates inspection and cleaning thanks to quick and simple disassembly.
- Facilitates environmental checking of the duct system.
- Rational joining, without screws or blind rivets.
- Has well-protected seal mouldings inside the clips.
- Can be twisted and adjusted after installation.
- Gives straight assembly.
- Does not have any sharp edges in the joints, since the bead is swaged directly on the fittings.
- Is highly suitable for transporting light material by means of air (chip extraction).
- Thanks to the bead, components are round and stiff.
- Does not require couplings.
- Transition pieces available for the Safe systems etc.
- Has lower pressure drop than the Safe system.
- Quick and easy to assemble and disassemble.





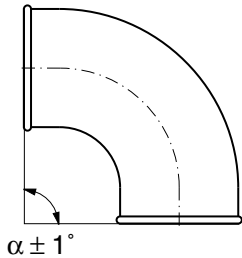
General

Dimensions of ducts and fittings



Ød nom	Ød mm	v mm
80	78	6
100	98	6
125	123	6
140	138	6
150	148	6
160	158	6
180	178	8
200	198	8
224	224	8
250	250	8
300	300	10
315	315	10
350	350	10
400	400	10
450	450	10
500	500	10
560–900 with flanges		

Angle tolerances





Spiral swaged duct

SRTR



Description

Circular spiral swaged duct with projecting seam.

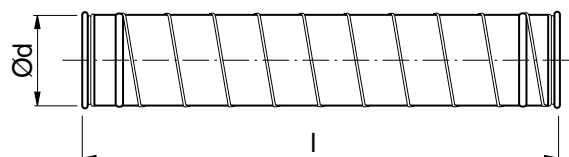
The duct has end stubs swaged on, with Transfer beads at each end.

Please refer to pages 39–41 for technical data about ducts.

Ordering example

	SRTR	200	3000
Product			
Dimension Ød			
Length l			

Dimensions



Ød nom	t std mm	500 mm	1000 mm	1500 mm	2000 mm	3000 mm	6000 mm
Weight for standard lengths, kg							
80	0,5	0,60	1,20	1,80	2,40	3,60	7,20
100	0,45	0,74	1,37	2,11	2,74	4,11	8,22
125	0,5	0,90	1,80	2,70	3,60	5,40	10,8
140	0,5	1,00	2,00	3,00	4,00	6,00	12,0
150	0,5	1,10	2,20	3,30	4,40	6,60	13,2
160	0,5	1,20	2,30	3,50	4,60	6,90	13,8
180	0,5	1,30	2,60	3,90	5,20	7,80	15,6
200	0,5	1,40	2,90	4,30	5,80	8,70	17,4
224	0,6	1,90	3,80	5,80	7,70	11,5	23,0
250	0,5	1,80	3,60	5,40	7,20	10,8	21,6
300	0,6	2,60	5,20	7,80	10,4	15,6	31,2
315	0,6	2,80	5,50	8,30	11,0	16,5	33,0
350	0,6	3,10	6,20	9,30	12,4	18,6	37,2
400	0,6	3,50	7,00	10,5	14,0	21,0	42,0
450	0,6	3,90	7,80	11,7	15,6	23,4	46,8
500	0,7	5,10	10,2	15,2	20,3	30,5	60,9
560*	0,8	11,7	18,2	24,7	31,2	44,2	83,3
600*	0,8	12,5	19,5	26,5	33,4	47,4	89,2
630*	0,7	11,3	17,6	23,9	30,2	42,8	80,6
710*	0,8	14,8	23,0	31,2	39,4	55,9	105
800*	0,8	16,5	25,7	35,1	44,4	63,0	119
900*	0,8	17,8	28,3	38,8	49,2	70,2	133

* Supplied with flange FL



Slide-on stub

TSRTR



Description

Slide-on stub for installation in ducts of type SR.

After the duct has been shortened/fitted, add sealant etc between the swaged seams on the slide-on stub, after which the slide-on stub is inserted into the duct. The two swaged seams guide and retain the slide-on stub.

To finish off, the edge of the stub is swaged, both to remove the sharp edge of the transition and to fix the slide-on stub.

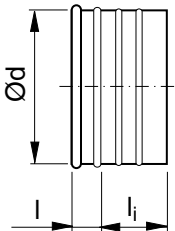
Please refer to the shortening instruction on page 323.

Is also used as transition piece OTRTH between Transfer and flexible hose THVTR. See page 359.

Ordering example

	TSRTR	200
Product		
Dimension Ød		

Dimensions



Ød nom	t mm	l mm	li mm	m kg
80	0,7	18	44	0,10
100	0,7	18	44	0,10
125	0,7	18	44	0,20
140	0,7	18	44	0,20
150	0,7	18	44	0,20
160	0,7	18	44	0,20
180	0,7	20	37	0,30
200	0,7	20	37	0,30
224	0,7	20	37	0,30
250	0,7	20	37	0,30
300	0,9	22	32	0,40
315	0,9	22	32	0,50
350	0,9	22	32	0,50
400	0,9	22	32	0,70
450	0,9	22	32	0,80
500	0,9	22	32	0,90



Slide-on stub

ILRTR



Description

Slide-on stub for installation in ducts of type SR in dimension range Ø560–900 where flange FL is used for joining.

After the duct has been shortened/fitted, add sealant etc between the swaged seams on the slide-on stub, after which the slide-on stub is inserted into the duct. The two swaged seams guide and retain the slide-on stub.

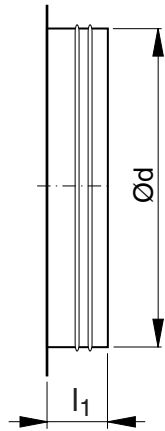
To finish off, the edge of the stub is swaged to both remove the sharp edge of the transition, and to fix the slide-on stub.

Please refer to the shortening instruction on page 323.

Ordering example

	ILRTR	800
Product		
Dimension Ød		

Dimensions



Ød nom	l ₁ mm	m kg
560	80	0,90
600	80	1,00
630	80	1,00
710	100	1,40
800	100	2,00
900	100	2,20

1

2

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11



Lengthways swaged duct

LRTR



Description

Circular lengthways swaged duct with projecting seam.

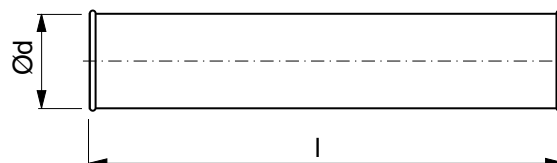
Ordering example

	LRTR	200	2000
Product			
Dimension Ød			
Length l			

Technical data

Ød nom	t std mm	1000 mm Max permissible static negative pressure, kPa	2000 mm	3000 mm
80	0,6	36,0	26,0	
100	0,6	34,0	25,0	
125	0,6	32,0	24,0	
140	0,6	29,0	21,0	
150	0,6	25,0	18,0	
160	0,6	22,0	16,0	
180	0,7	21,0	15,5	
200	0,7	21,0	15,0	
224	0,7	20,0	14,5	
250	0,7	19,5	14,0	10,0
300	0,7	18,5	13,5	9,5
315	0,7	18,0	13,0	9,0
350	0,7	16,0	12,0	8,0
400	0,9	19,0	14,0	8,5
450	0,9	16,0	12,0	7,0
500	0,9	14,0	10,0	6,0

Dimensions



Ød nom	t std mm	500 mm	1000 mm	1500 mm	2000 mm	3000** mm
Weight for standard lengths, kg						
80	0,6	0,70	1,30			
100	0,6	0,80	1,68	2,50	3,40	
125	0,6	1,00	2,09	3,10	4,20	
140	0,6	1,10	2,29	3,40	4,60	
150	0,6	1,20	2,49	3,70	5,00	
160	0,6	1,30	2,69	4,00	5,40	
180	0,7	1,80	3,60	5,40	7,20	
200	0,7	1,90	3,89	5,80	7,80	
224	0,7	2,20	4,40	6,60	8,80	
250	0,7	2,40	4,88	7,30	9,80	14,6
300	0,7	2,90	5,88	8,80	11,8	17,6
315	0,7	3,10	6,20	9,30	12,4	18,6
350	0,7	3,50	7,00	10,5	14,0	21,0
400	0,9	4,70	9,40	14,1	18,8	28,2
450	0,9	5,30	10,6	15,9	21,2	31,8
500	0,9	5,90	11,8	17,7	23,6	35,4
560*	0,9	11,8	18,4	25,0		
600*	0,9	12,6	19,7	26,7		
630*	0,9	13,2	20,7	27,1		
650*	0,9	13,6	21,3	28,9		
710*	0,9	14,9	23,3	31,6		
750*	0,9	15,7	24,6	33,4		
800*	0,9	16,6	26,1	35,5		
900*	0,9	18,8	29,4	40,0		

* Supplied with flange FL

** All 3 metre long pipes are made of 0,9 mm thick sheet metal



Slide-on stub

PTR



Description

Slide-on stub for installation in ducts of type LRTR.

After the duct has been shortened/fitted the slide-on stub is inserted into the duct, after which the slide-on stub is sealed and fixed with putty or an sealing clamp such as MFK.

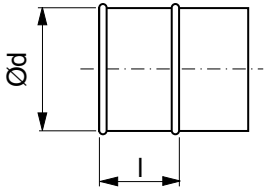
Turn the join during assembly, to face away from the direction of air flow.

Please refer to the shortening instruction on page 323.

Ordering example

	PTR	200
Product		
Dimension Ød		

Dimensions



Ød nom	t mm	l mm	m kg
80	0,5	58	0,20
100	0,5	58	0,20
125	0,5	58	0,30
140	0,5	58	0,30
150	0,5	58	0,40
160	0,5	58	0,40
180	0,5	53	0,40
200	0,5	53	0,40
224	0,5	53	0,40
250	0,5	53	0,30
300	0,9	49	0,60
315	0,9	49	0,40
350	0,9	49	0,80
400	0,9	49	1,20
450	0,9	49	1,30
500	0,9	49	1,50





Telescopic duct

TLTR



Description

Used where it is necessary to adjust duct length when standard lengths are not sufficient.

Unit parts TLTR 1 and TLTR 2 can also be delivered individually.

TLTR 2 can be used as an ordinary duct.

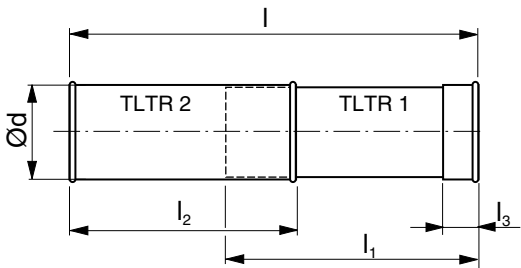
TLTR 1 fits inside all ducts of types SRTR Ø80–200 and LRTR Ø80–500.

The special pipe TLSR fits internally in duct SRTR Ø224–500.

Ordering example

Product	TLTR	200
Dimension Ød		

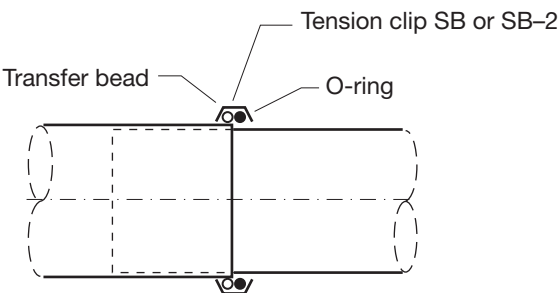
Dimensions



Ød nom	t mm	l ₁ , l ₂ mm	l ₃ mm	l _{min} mm	l _{max} mm	m kg
80	0,7	220	30	250	410	0,80
100	0,7	220	30	250	410	0,90
125	0,7	220	30	250	410	1,10
140	0,7	220	60	280	410	1,20
150	0,7	220	30	250	410	1,30
160	0,7	220	30	250	410	1,40
180	0,7	220	30	250	410	1,60
200	0,7	350	30	380	670	2,70
224	0,7	350	30	380	670	3,00
250	0,7	350	30	380	670	3,40
300	0,7	350	60	410	670	4,10
315	0,7	350	30	380	670	4,30
350	0,7	350	60	410	670	4,80
400	0,9	350	60	410	670	6,60
450	0,9	350	60	410	670	7,40
500	0,9	350	60	410	670	8,20

Seal the joint after assembly by using either:

- Sealant or tape
- O-ring + tension clip SB or SB-2

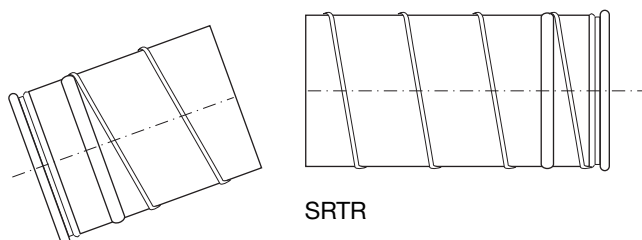




Instruction for shortening for length adaptation of Transfer ducts

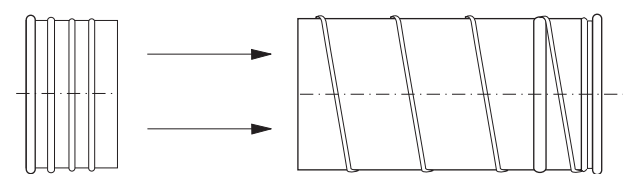
Spiral swaged duct SRTR

Adaption with fixed length



SRTR

Shorten the duct to the desired length. Also consider the installation length of the slide-on stub.

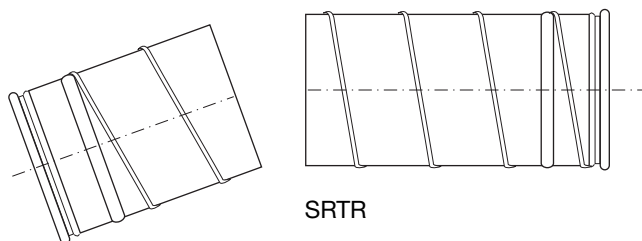


TSRTTR

SRTR shortened

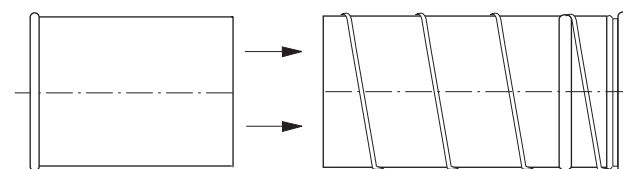
Install slide-on stub TSRTTR (please refer to page 318).

Adaption with flexible length



SRTR

Shorten the duct to the desired length. Also consider the installation length of the slide-on stub.



TLTR 1/TLSR

SRTR shortened

Install telescopic duct

For Ø80–200 use TLTR-1 (page 322)

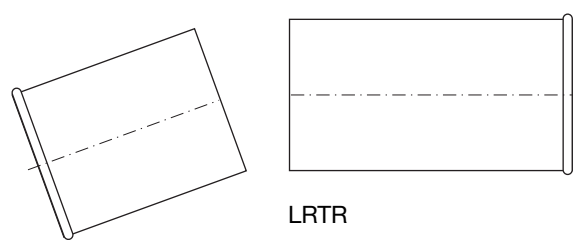
For Ø224–500 use TLSR (page 322)

Remember to

Turn the duct so that the joint does not point towards the direction of the air flow.

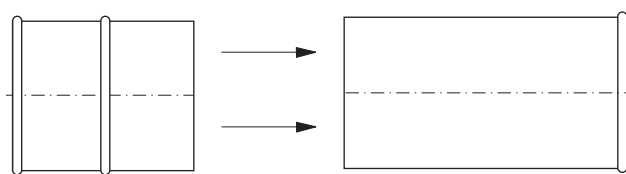
Lengthways swaged duct LRTR

Adaption with fixed length



LRTR

Shorten the duct to the desired length. Also consider the installation length of the slide-on stub.

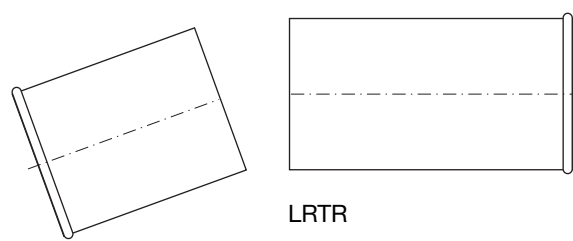


PTR

LRTR shortened

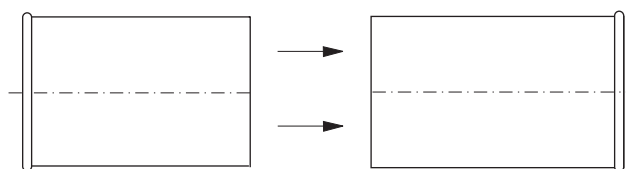
Install slide-on stub PTR (please refer to page 321).

Adaption with flexible length



LRTR

Shorten the duct to the desired length. Also consider the installation length of the slide-on stub.



TLTR 1

LRTR shortened

Install telescopic duct

Use TLTR-1 (page 322)

Remember to

Turn the duct so that the joint does not point towards the direction of the air flow.



Bend

BTR 90°



Description

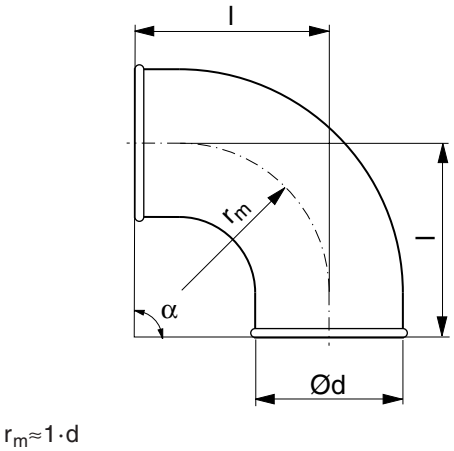
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BTR	125	90
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1 \cdot d$$

Ød nom	t mm	r _m mm	l mm	m kg
80	0,5	100	135	0,31
100	0,5	100	130	0,30
125	0,5	125	155	0,50
140	0,7	135	165	0,70
150	0,7	150	180	0,69
160	0,6	160	190	0,77
180	0,7	180	205	1,00
200	0,7	200	252	1,40
224	0,7	225	277	1,60
250	0,7	250	302	2,00
300	0,7	300	346	2,70
315	0,7	315	361	3,30



Bend

BSTR 90°



Description

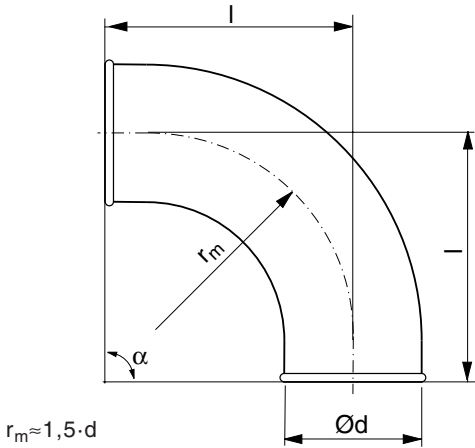
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BSTR	160	90
Product			
Dimension Ød			
Angle α			

Dimensions



Ød nom	t mm	r _m mm	l mm	m kg
80	0,7	120	150	0,40
100	0,6	150	180	0,50
125	0,7	190	220	0,80
150	0,7	225	255	1,10
160	0,7	240	270	1,20
180	0,7	270	295	1,60
200	0,6	300	352	1,63
224	0,7	340	392	2,40
250	0,7	375	427	3,20
300	0,7	450	496	3,00
315	0,7	470	516	5,00



Bend

BSFTR 90°



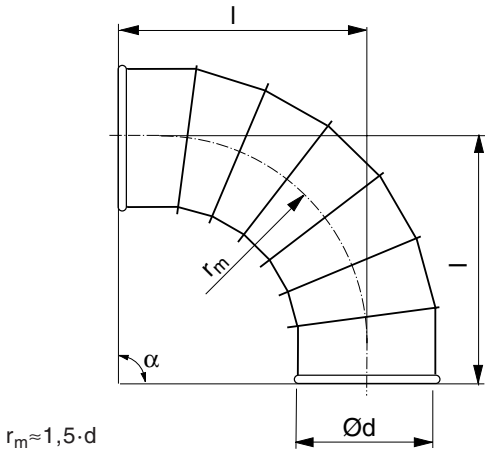
Description

Segmented and swaged bend.

Ordering example

	BSFTR	250	90
Product			
Dimension Ød			
Angle α			

Dimensions



Ød nom	t mm	r _m mm	l mm	m kg
200	0,7	300	387	3,40
224	0,7	336	423	4,20
250	0,7	375	462	4,90
300	0,7	450	531	6,40
315	0,7	472	553	7,10
350	0,7	525	606	9,00
400	0,9	600	681	13,1
450	0,9	675	756	16,2
500	0,9	750	831	19,5
560*	0,9	840	875	29,3
600*	0,9	900	935	32,7
630*	0,9	945	980	37,3
650*	0,9	975	1010	41,4
710*	0,9	1065	1100	47,0
750*	0,9	1125	1160	51,1
800*	0,9	1200	1235	54,5
900*	0,9	1350	1385	74,8

* Supplied with flange FL



Bend

BTR 60°



Description

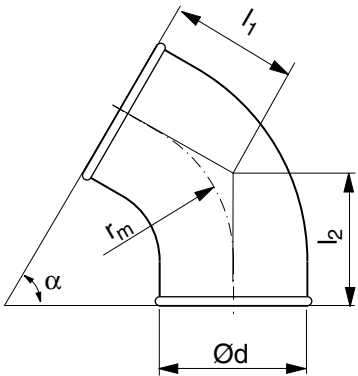
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BTR	125	60
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1 \cdot d$$

Ød nom	t mm	r _m mm	l ₁ mm	l ₂ mm	m kg
80	0,5	100	88	114	0,20
100	0,5	100	88	88	0,20
125	0,6	125	102	102	0,25
140	0,7	135	108	134	0,50
150	0,7	150	117	143	0,51
160	0,6	160	122	148	0,51
180	0,7	180	129	156	0,80
200	0,7	200	167	167	1,00
224	0,7	225	182	182	1,20
250	0,7	250	196	196	1,40
300	0,7	300	219	219	1,60
315	0,7	315	228	228	1,70

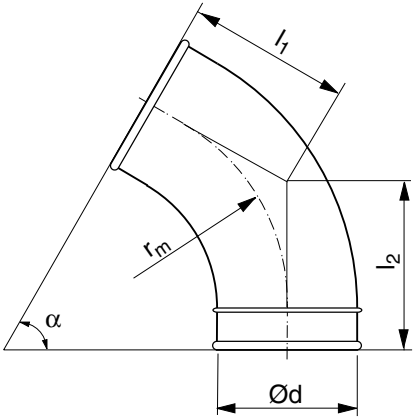


Bend

BSTR 60°



Dimensions



$$r_m \approx 1,5 \cdot d$$

Description

Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

Product	BSTR	250	60
Dimension Ød			
Angle α			

Ød nom	t mm	r _m mm	l ₁ mm	l ₂ mm	m kg
80	0,7	120	99	125	0,30
100	0,6	150	117	143	0,40
125	0,7	190	140	166	0,60
150	0,7	225	160	186	0,70
160	0,7	240	169	195	0,80
180	0,7	270	181	208	1,20
200	0,6	300	225	225	1,13
224	0,7	340	248	248	1,70
250	0,7	375	269	269	1,90
300	0,7	450	306	306	2,40
315	0,7	470	317	317	2,50



Bend

BSFTR 60°



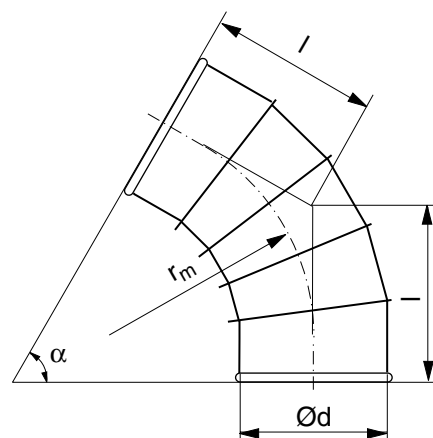
Description

Segmented and swaged bend.

Ordering example

	BSFTR	250	60
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1,5 \cdot d$$

Ød nom	t mm	r _m mm	l mm	m kg
200	0,7	300	260	2,30
224	0,7	336	281	2,70
250	0,7	375	304	3,10
300	0,7	450	341	4,20
315	0,7	472	354	4,60
350	0,7	525	384	5,60
400	0,9	600	427	8,10
450	0,9	675	471	10,1
500	0,9	750	514	12,1
560*	0,9	840	520	20,8
600*	0,9	900	555	23,5
630*	0,9	945	581	24,6
650*	0,9	975	598	27,2
710*	0,9	1065	650	36,4
750*	0,9	1125	685	40,4
800*	0,9	1200	728	42,3
900*	0,9	1350	814	45,1

* Supplied with flange FL



Bend

BTR 45°



Description

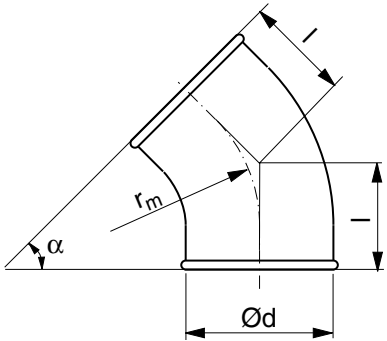
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BTR	125	45
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1 \cdot d$$

Ød nom	t mm	r _m mm	l mm	m kg
80	0,5	100	71	0,20
100	0,5	100	71	0,30
125	0,5	125	82	0,30
140	0,7	135	86	0,40
150	0,7	150	92	0,43
160	0,7	160	96	0,50
180	0,7	180	110	0,68
200	0,6	200	135	0,80
224	0,7	225	145	1,00
250	0,7	250	156	1,00
300	0,7	300	170	1,60
315	0,7	315	176	1,70



Bend

BSTR 45°



Description

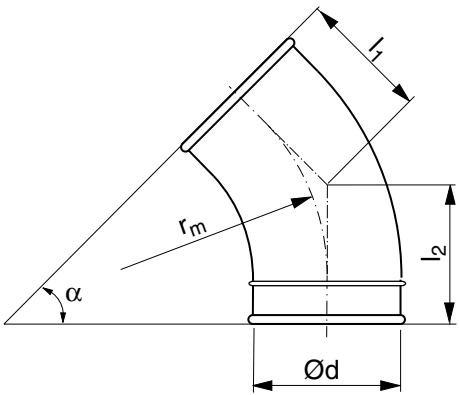
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BSTR	200	45
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1,5 \cdot d$$

Ød nom	t mm	r _m mm	l ₁ mm	l ₂ mm	m kg
80	0,7	120	80	106	0,20
100	0,6	150	92	118	0,30
125	0,7	190	109	135	0,40
150	0,7	225	123	149	0,50
160	0,7	240	129	155	0,60
180	0,7	270	137	164	0,90
200	0,6	300	176	176	0,88
224	0,7	340	193	193	1,60
250	0,7	375	207	207	1,60
300	0,7	450	232	232	2,30
315	0,7	470	241	241	2,40



Bend

BSFTR 45°



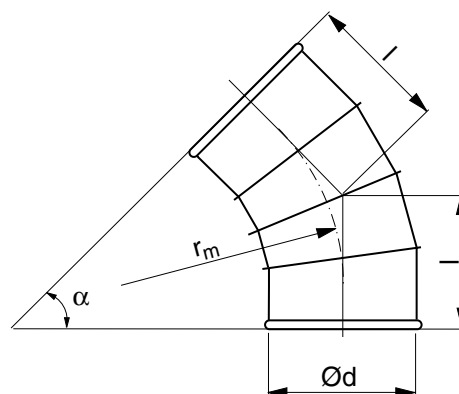
Description

Segmented and swaged bend.

Ordering example

	BSFTR	250	45
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1,5 \cdot d$$

Ød nom	t mm	r _m mm	l mm	m kg
200	0,7	300	211	1,90
224	0,7	336	226	2,20
250	0,7	375	242	2,50
300	0,7	450	267	3,40
315	0,7	472	277	3,70
350	0,7	525	298	4,50
400	0,9	600	330	6,50
450	0,9	675	361	7,90
500	0,9	750	392	9,40
560*	0,9	840	383	16,7
600*	0,9	900	408	18,5
630*	0,9	945	426	20,1
650*	0,9	975	439	22,3
710*	0,9	1065	476	26,4
750*	0,9	1125	501	28,6
800*	0,9	1200	532	31,8
900*	0,9	1350	594	34,9

* Supplied with flange FL



Bend

BTR 30°



Description

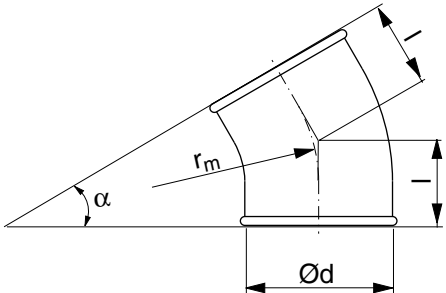
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BTR	125	30
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1 \cdot d$$

Ød nom	t mm	r _m mm	l ₁ mm	l ₂ mm	m kg
80	0,5	100	57	57	0,20
100	0,5	100	57	57	0,20
125	0,6	125	63	63	0,25
140	0,7	140	68	68	0,40
150	0,7	150	70	70	0,34
160	0,7	160	73	73	0,50
180	0,7	180	73	73	0,60
200	0,7	200	106	106	0,80
224	0,7	225	112	112	0,90
250	0,7	250	119	119	1,10
300	0,7	300	126	126	1,40
315	0,7	315	130	130	1,50



Bend

BSTR 30°



Description

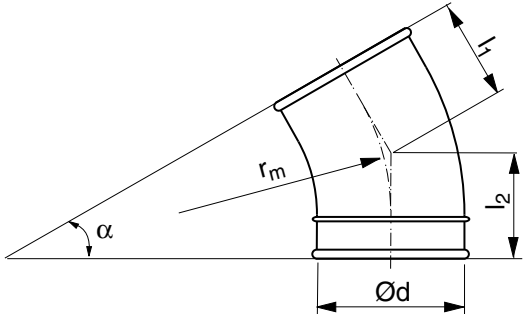
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BSTR	160	30
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1,5 \cdot d$$

Ød nom	t mm	r _m mm	l ₁ mm	l ₂ mm	m kg
80	0,7	120	62	88	0,20
100	0,6	150	70	96	0,30
125	0,7	190	81	107	0,30
150	0,7	225	90	116	0,50
160	0,7	240	94	120	0,50
180	0,7	270	97	124	0,70
200	0,6	300	132	132	0,79
224	0,7	340	143	143	1,30
250	0,7	375	152	152	1,50
300	0,7	450	167	167	2,20
315	0,7	470	172	172	2,20



Bend

BSFTR 30°



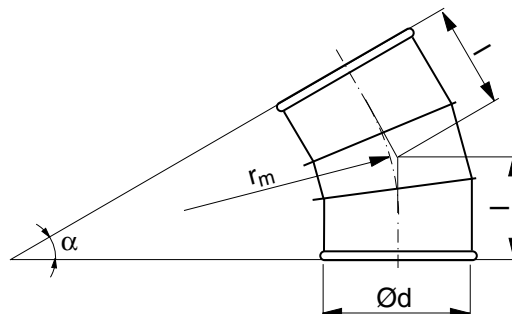
Description

Segmented and swaged bend.

Ordering example

	BSFTR	250	30
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1,5 \cdot d$$

Ød nom	t mm	r _m mm	l mm	m kg
200	0,7	300	167	1,50
224	0,7	336	177	1,70
250	0,7	375	187	1,90
300	0,7	450	202	2,50
315	0,7	472	208	2,80
350	0,7	525	222	3,40
400	0,9	600	242	4,90
450	0,9	675	262	5,80
500	0,9	750	282	6,80
560*	0,9	840	260	12,7
600*	0,9	900	276	14,5
630*	0,9	945	288	15,7
650*	0,9	975	296	18,4
710*	0,9	1065	320	20,2
750*	0,9	1125	336	21,5
800*	0,9	1200	357	24,9
900*	0,9	1350	397	29,6

* Supplied with flange FL



Bend

BTR 15°



Description

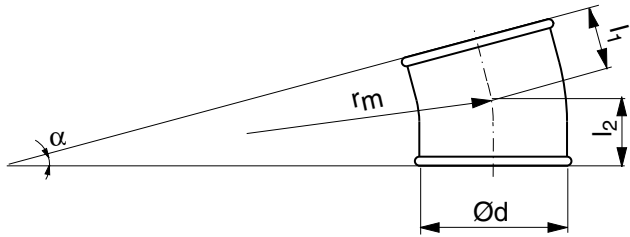
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BTR	125	15
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1 \cdot d$$

Ød nom	t mm	r _m mm	l ₁ mm	l ₂ mm	m kg
80	0,5	100	43	69	0,10
100	0,5	100	43	43	0,20
125	0,7	125	46	46	0,20
140	0,7	140	74	74	0,30
150	0,7	150	76	76	0,26
160	0,7	160	51	51	0,20
180	0,7	180	76	76	0,40
200	0,7	200	78	78	0,60
224	0,7	225	81	81	0,60



Bend

BSTR 15°



Description

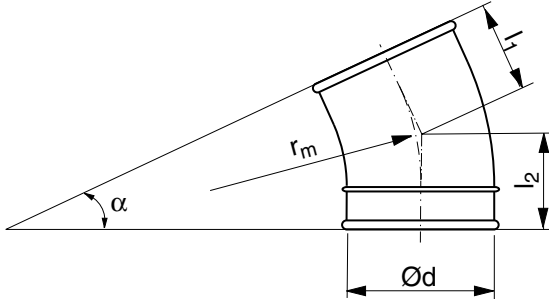
Pressed and seam welded bend.

Some dimensions are made with a swaged-on beaded end.

Ordering example

	BSTR	315	15
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1,5 \cdot d$$

Ød nom	t mm	r _m mm	l ₁ mm	l ₂ mm	m kg
80	0,7	120	46	72	0,10
100	0,6	150	50	76	0,20
125	0,7	190	55	81	0,40
150	0,7	225	60	86	0,40
160	0,7	240	62	88	0,40
180	0,7	270	61	88	0,50
200	0,6	300	91	91	0,62
224	0,7	340	97	97	0,90
250	0,7	375	101	101	0,90
300	0,7	450	105	105	1,30
315	0,7	470	108	108	1,30



Bend

BSFTR 15°



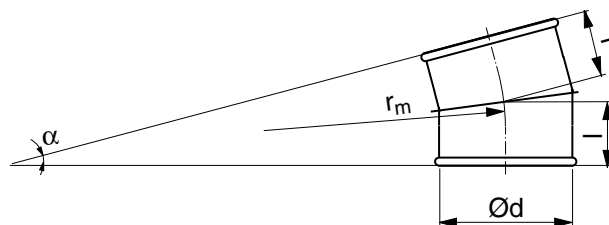
Description

Segmented and swaged bend.

Ordering example

	BSFTR	250	15
Product			
Dimension Ød			
Angle α			

Dimensions



$$r_m \approx 1,5 \cdot d$$

Ød nom	t mm	r _m mm	l mm	m kg
200	0,7	300	126	1,10
224	0,7	336	131	1,30
250	0,7	375	136	1,50
300	0,7	450	140	2,00
315	0,7	472	143	2,40
350	0,7	525	150	2,90
400	0,9	600	160	4,50
450	0,9	675	170	5,40
500	0,9	750	180	6,20
560*	0,9	840	146	11,8
600*	0,9	900	153	13,4
630*	0,9	945	159	15,6
650*	0,9	975	163	16,4
710*	0,9	1065	175	18,3
750*	0,9	1125	183	19,6
800*	0,9	1200	193	22,4
900*	0,9	1350	213	26,3

* Supplied with flange FL



Reducer

RCLTR



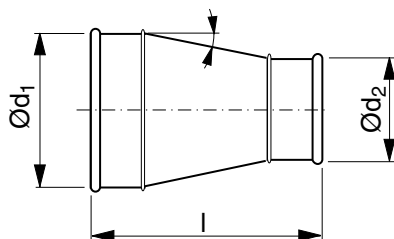
Description

Long, concentric reducer with about 18° angle.

Ordering example

	RCLTR	250	160
Product			
Dimension $\varnothing d_1$			
Dimension $\varnothing d_2$			

Dimensions



Dimensions

$\varnothing d_1$ nom	$\varnothing d_2$ nom	t mm	l mm	m kg
100	80	0,7	162	0,30
125	80	0,7	196	0,40
125	100	0,7	168	0,40
140	80	0,7	216	0,60
140	100	0,7	189	0,40
140	125	0,7	155	0,40
150	80	0,7	230	0,60
150	100	0,7	203	0,60
150	125	0,7	168	0,40
150	140	0,7	148	0,40
160	80	0,7	244	0,70
160	100	0,7	216	0,60
160	125	0,7	182	0,50
160	140	0,7	161	0,60
160	150	0,7	148	0,40
180	100	0,7	239	0,60
180	125	0,7	205	0,60
180	140	0,7	184	0,60
180	150	0,7	170	0,60
180	160	0,7	157	0,50
200	125	0,7	232	0,80
200	140	0,7	211	0,70
200	150	0,7	198	0,70
200	160	0,7	184	0,60
200	180	0,7	152	0,50
224	140	0,7	244	1,00
224	150	0,7	231	1,00
224	160	0,7	217	0,80
224	180	0,7	184	0,80
224	200	0,7	157	0,70
250	140	0,7	280	1,30
250	150	0,7	266	1,30
250	160	0,7	253	1,10
250	180	0,7	220	1,00
250	200	0,7	193	1,00
250	224	0,7	160	1,00
300	150	0,7	332	1,70
300	160	0,7	318	1,70
300	180	0,7	286	1,70
300	200	0,7	258	1,50
300	224	0,7	226	1,40
300	250	0,7	190	1,40
315	160	0,7	339	1,60
315	180	0,7	307	1,60
315	200	0,7	279	1,50
315	224	0,7	246	1,40
315	250	0,7	210	1,40
315	300	0,7	139	1,30



Reducer

RCLTR

1

2

3

4

5

6

7

8

9

10

11

Ød ₁ nom	Ød ₂ nom	t mm	l mm	m kg
350	180	0,7	361	2,00
350	200	0,7	334	2,00
350	224	0,7	301	2,10
350	250	0,7	265	1,90
350	300	0,7	194	1,70
350	315	0,7	173	1,40
400	180	0,7	428	2,80
400	200	0,7	401	2,80
400	224	0,7	368	3,00
400	250	0,7	332	2,60
400	300	0,7	260	2,70
400	315	0,7	240	2,30
400	350	0,7	185	2,00
450	200	0,7	469	3,50
450	224	0,7	437	3,80
450	250	0,7	401	3,30
450	300	0,7	329	3,40
450	315	0,7	309	2,90
450	350	0,7	254	2,60
450	400	0,9	197	2,80
500	224	0,7	505	4,30
500	250	0,7	469	4,00
500	300	0,7	398	4,00
500	315	0,7	377	3,80
500	350	0,7	322	3,40
500	400	0,9	265	3,60
500	450	0,9	197	3,20
560*	250	0,7	578	8,20
560*	300	0,9	506	8,00
560*	315	0,7	485	7,80
560*	350	0,7	431	7,60
560*	400	0,9	374	7,40
560*	450	0,9	305	7,00
560*	500	0,9	236	6,50
600*	300	0,9	561	8,60
600*	315	0,7	541	8,60
600*	350	0,7	486	8,20
600*	400	0,9	429	8,20
600*	450	0,9	360	7,70
600*	500	0,9	291	7,20
600*	560	0,9	235	6,40
630*	315	0,7	582	8,60
630*	350	0,7	527	8,00
630*	400	0,9	470	7,90
630*	450	0,9	401	7,40
630*	500	0,9	333	7,00
630*	560*	0,9	276	9,30
630*	600*	0,9	221	8,80
650*	350	0,9	547	8,40
650*	400	0,9	490	8,30

Ød ₁ nom	Ød ₂ nom	t mm	l mm	m kg
650*	450	0,9	421	7,80
650*	500	0,9	353	7,40
650*	560*	0,9	296	9,70
650*	600*	0,9	241	9,20
650*	630*	0,9	221	9,00
710*	400	0,9	605	9,60
710*	450	0,9	536	9,20
710*	500	0,9	467	8,70
710*	560*	0,9	411	11,1
710*	600*	0,9	356	10,6
710*	630*	0,9	315	10,2
750*	450	0,9	566	9,60
750*	500	0,9	497	9,10
750*	560*	0,9	441	11,5
750*	600*	0,9	386	11,0
750*	630*	0,9	345	10,6
750*	650*	0,9	325	10,4
750*	710*	0,9	290	10,0
800*	500	0,9	591	11,0
800*	560*	0,9	535	13,4
800*	600*	0,9	480	12,9
800*	630*	0,9	439	12,5
800*	650*	0,9	419	12,1
800*	710*	0,9	354	11,6
800*	750*	0,9	325	11,2
900*	560*	0,9	697	17,7
900*	600*	0,9	642	17,0
900*	630*	0,9	601	16,5
900*	650*	0,9	570	16,1
900*	710*	0,9	516	15,3
900*	750*	0,9	450	14,9
900*	800*	0,9	392	13,8

* Supplied with flange FL



T-piece

TVTR 30°



Description

T-piece.

Ordering example

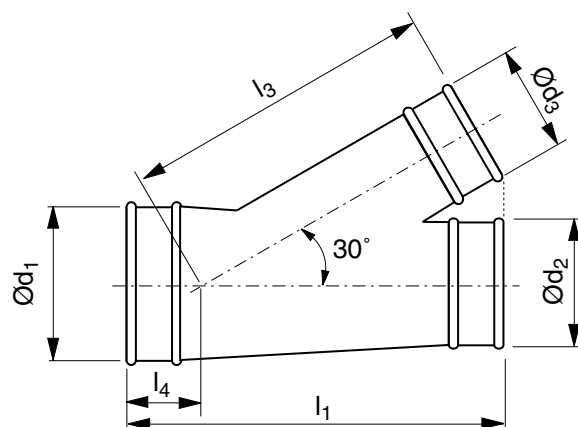
	TVTR	315	200	200
Product				
Dimension Ød ₁				
Dimension Ød ₂				
Dimension Ød ₃				

NB

To save space, the adjacent table only contains a limited selection from our range – the T-pieces where all dimensions Ød₁, Ød₂ and Ød₃ are equal in size. Other dimensions are available to special order.

In all combinations, the installation length l₁ is only governed by the branch diameter Ød₃. For example, all T-pieces with Ød₃ = 200 have installation length l₁ = 589 mm.

Dimensions



Ød ₁ nom	Ød ₂ nom	Ød ₃ nom	t mm	l ₁ mm	l ₃ mm	l ₄ mm	m kg
80	80	80	0,7	358	263	109	0,90
100	100	100	0,7	398	301	112	1,20
125	125	125	0,7	448	347	116	1,60
140	140	140	0,7	478	375	118	1,80
150	150	150	0,7	498	394	119	2,00
160	160	160	0,7	518	413	120	2,30
180	180	180	0,7	549	445	119	2,80
200	200	200	0,7	589	482	121	3,40
224	224	224	0,7	637	527	124	4,20
250	250	250	0,7	689	576	128	4,90
300	300	300	0,7	777	662	129	7,00
315	315	315	0,7	807	690	131	7,30
350	350	350	0,7	960	755	177	9,00
400	400	400	0,9	1060	848	184	14,0
450	450	450	0,9	1160	842	190	16,9
500	500	500	0,9	1260	1035	197	20,1
560*	560*	560*	0,9	1520	1245	275	26,0
600*	600*	600*	0,9	1600	1320	280	29,0
630*	630*	630*	0,9	1660	1376	284	31,0
650*	650*	650*	0,9	1700	1413	287	34,0
710*	710*	710*	0,9	1820	1525	295	41,0
750*	750*	750*	0,9	1900	1600	301	45,0
800*	800*	800*	0,9	2000	1693	307	51,0
900*	900*	900*	0,9	2200	1879	321	64,0

* Supplied with flange FL



X-piece

XVTR 30°



Description

X-piece.

Ordering example

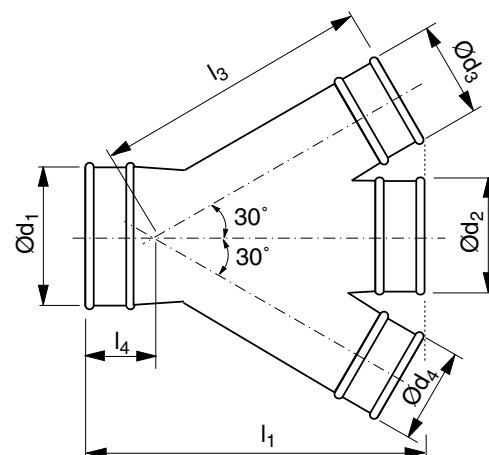
	XVTR	400	200	160	160
Product					
Dimension Ød ₁					
Dimension Ød ₂					
Dimension Ød ₃					
Dimension Ød ₄					

NB

To save space, the adjacent table only contains a limited selection from our range – the X-pieces where all dimensions Ød₁, Ød₂ and Ød₃/Ød₄ are equal in size. Other dimensions are available to special order.

In all combinations, the installation length l₁ is only governed by the larger branch diameter Ød₃/Ød₄. For example, all X-pieces with Ød₃ = 160 and Ød₄ = 200 have installation length l₁ = 589 mm.

Dimensions



Ød ₁ nom	Ød ₂ nom	Ød ₃ , Ød ₄ nom	t mm	l ₁ mm	l ₃ mm	l ₄ mm	m kg
80	80	80	0,7	358	263	109	1,10
100	100	100	0,7	398	301	112	1,40
125	125	125	0,7	448	347	116	1,80
140	140	140	0,7	478	375	118	2,10
150	150	150	0,7	498	394	119	2,30
160	160	160	0,7	518	413	120	2,60
180	180	180	0,7	549	445	119	3,20
200	200	200	0,7	589	482	121	4,00
224	224	224	0,7	637	527	124	4,90
250	250	250	0,7	689	576	128	5,80
300	300	300	0,7	777	662	129	8,80
315	315	315	0,7	807	690	131	9,30
350	350	350	0,7	960	755	177	11,2
400	400	400	0,9	1060	848	184	18,8
450	450	450	0,9	1160	842	190	22,2
500	500	500	0,9	1260	1035	197	26,8
560*	560*	560*	0,9	1520	1245	275	34,0
600*	600*	600*	0,9	1600	1320	280	39,0
630*	630*	630*	0,9	1660	1376	284	41,0
650*	650*	650*	0,9	1700	1413	295	46,0
710*	710*	710*	0,9	1820	1525	295	54,0
750*	750*	750*	0,9	1900	1600	301	60,0
800*	800*	800*	0,9	2000	1693	307	68,0
900*	900*	900*	0,9	2200	1879	321	85,0

* Supplied with flange FL



Y-piece

YVTR 30°



Description

Y-piece.

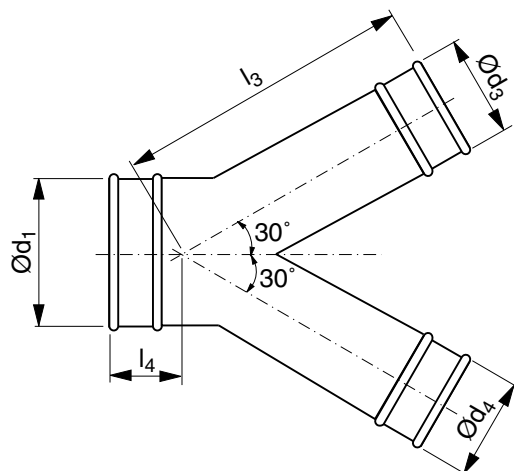
Ordering example

	YVTR	400	160	160
Product				
Dimension Ød ₁				
Dimension Ød ₃				
Dimension Ød ₄				

NB

To save space, the adjacent table only contains a limited selection from our range – the Y-pieces where all dimensions Ød₁, Ød₃ and Ød₄ are equal in size. Other dimensions are available to special order.

Dimensions



Ød ₁ nom	Ød ₃ , Ød ₄ nom	t mm	l ₃ mm	l ₄ mm	m kg
80	80	0,7	191	65	0,70
100	100	0,7	213	67	0,80
125	125	0,7	242	71	0,90
140	140	0,7	259	73	1,10
150	150	0,7	270	74	1,20
160	160	0,7	281	75	1,30
180	180	0,7	304	73	1,60
200	200	0,7	327	76	2,00
224	224	0,7	354	79	2,50
250	250	0,7	383	82	2,90
300	300	0,7	440	82	4,40
315	315	0,7	457	84	4,70
350	350	0,7	497	89	5,40
400	400	0,9	554	96	9,00
450	450	0,9	610	102	10,8
500	500	0,9	667	109	13,1
560*	560*	0,9	735	155	17,0
600*	600*	0,9	780	160	19,5
630*	630*	0,9	814	164	20,5
650*	650*	0,9	837	167	23,0
710*	710*	0,9	905	195	27,0
750*	750*	0,9	951	201	30,0
800*	800*	0,9	1007	207	38,0
900*	900*	0,9	1121	221	47,0

* Supplied with flange FL



Saddle

PSVTR 30°



Description

Saddle.

The saddle is fixed with two sealing clamps MFK.

This product should not be installed with screws or blind rivets when used in chip extraction installations.

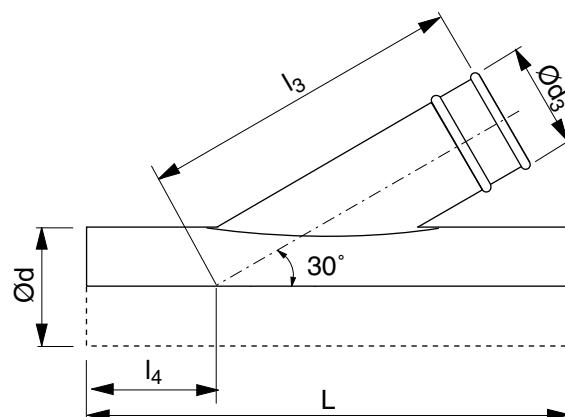
Ordering example

	PSVTR	400	160
Product			
Dimension Ød			
Dimension Ød ₃			

NB

To save space, the adjacent table only contains a limited selection from our range – the saddles where all dimensions Ød and Ød₃ are equal in size. Other dimensions are available to special order.

Dimensions



Ød nom	Ød ₃ nom	t mm	L mm	l ₃ mm	l ₄ mm	m kg
80	80	0,7	410	221	136	0,50
100	100	0,7	450	263	138	0,60
125	125	0,7	500	317	142	0,80
140	140	0,7	530	349	144	0,90
150	150	0,7	550	370	145	1,00
160	160	0,7	570	391	146	1,20
180	180	0,7	610	434	149	1,50
200	200	0,7	650	477	152	1,70
224	224	0,7	700	528	156	2,10
250	250	0,7	750	584	159	2,40
300	300	0,7	850	690	165	3,10
315	315	0,7	880	722	167	3,60
350	350	0,7	950	797	172	5,60
400	400	0,9	1050	904	179	6,50
450	450	0,9	1150	1010	185	8,20
500	500	0,9	1250	1117	192	9,80
560	560*	0,9	1370	1245	200	11,2
600	600*	0,9	1450	1330	205	13,8
630	630*	0,9	1510	1394	209	14,0
650	650*	0,9	1550	1437	212	16,0
710	710*	0,9	1670	1565	220	18,0
750	750*	0,9	1750	1651	225	21,0
800	800*	0,9	1850	1757	232	24,0
900	900*	0,9	2050	1971	245	28,0

* Supplied with flange FL



Collar saddle

PSTR



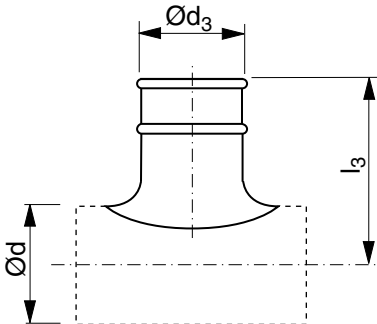
Description

Collar saddle.

Ordering example

	PSTR	400	160
Product			
Dimension Ød			
Dimension Ød ₃			

Dimensions



Ød nom	Ød ₃ nom	t mm	l ₃ mm	m kg
80	80	0,6	143	0,20
100	80	0,6	156	0,20
100	100	0,6	131	0,30
125	80	0,6	166	0,20
125	100	0,6	144	0,30
125	125	0,6	149	0,40
140	80	0,6	173	0,20
140	100	0,6	176	0,40
140	125	0,6	121	0,30
140	140	0,6	181	0,50
150	80	0,6	178	0,20
150	100	0,6	181	0,40
150	125	0,6	186	0,50
150	140	0,6	186	0,50
150	150	0,6	186	0,50
160	80	0,6	183	0,20
160	100	0,6	161	0,30
160	125	0,6	166	0,40
160	140	0,6	191	0,50
160	150	0,6	191	0,50
160	160	0,6	171	0,50
180	80	0,6	193	0,20
180	100	0,6	196	0,40
180	125	0,6	201	0,50
180	140	0,6	201	0,50
180	150	0,6	201	0,50
180	160	0,6	206	0,60
180	180	0,6	202	0,90
200	80	0,6	203	0,20
200	100	0,6	181	0,30
200	125	0,6	181	0,40
200	140	0,6	211	0,50
200	150	0,6	211	0,50



Collar saddle

PSTR

Ød nom	Ød ₃ nom	t mm	l ₃ mm	m kg
200	160	0,6	191	0,50
200	180	0,6	212	0,90
200	200	0,6	212	1,00
224	80	0,6	215	0,20
224	100	0,6	218	0,40
224	125	0,6	223	0,50
224	140	0,6	223	0,50
224	150	0,6	223	0,50
224	160	0,6	228	0,60
224	180	0,6	224	0,80
224	200	0,6	224	0,80
224	224	0,6	224	1,00
250	80	0,6	228	0,30
250	100	0,6	206	0,40
250	125	0,6	211	0,40
250	140	0,6	236	0,50
250	150	0,6	236	0,50
250	160	0,6	241	0,60
250	180	0,6	237	0,90
250	200	0,6	237	0,90
250	224	0,6	237	1,20
250	250	0,6	257	1,30
300	80	0,6	201	0,20
300	100	0,6	201	0,20
300	125	0,6	201	0,30
300	140	0,6	201	0,40
300	150	0,6	201	0,40
300	160	0,6	201	0,40
300	180	0,6	197	0,60
300	200	0,6	197	0,60
300	224	0,6	197	0,70
300	250	0,6	197	0,80
315	80	0,6	261	0,30
315	100	0,6	264	0,40
315	125	0,6	244	0,40
315	140	0,6	269	0,50
315	150	0,6	269	0,50
315	160	0,6	273	0,50
315	180	0,6	273	0,90
315	200	0,6	269	0,90
315	224	0,6	269	0,90
315	250	0,6	289	1,10
315	300	0,6	259	1,50
315	315	0,6	283	1,90
350	100	0,6	226	0,30
350	125	0,6	226	0,30
350	140	0,6	226	0,40
350	150	0,6	226	0,40
350	160	0,6	226	0,40
350	180	0,6	222	0,60
350	200	0,6	222	0,70

Ød nom	Ød ₃ nom	t mm	l ₃ mm	m kg
350	224	0,6	222	0,70
350	250	0,6	222	0,80
350	300	0,6	216	0,90
350	315	0,6	216	1,10
350	350	0,6	216	1,60
400	125	0,6	311	0,40
400	140	0,6	251	0,30
400	150	0,6	311	0,40
400	160	0,6	316	0,50
400	180	0,6	247	0,40
400	200	0,6	312	0,90
400	224	0,6	312	0,90
400	250	0,6	332	1,10
400	300	0,6	301	1,10
400	315	0,6	326	1,60
400	350	0,6	326	1,90
400	400	0,7	321	2,40
450	100	0,6	331	0,40
450	125	0,6	336	0,50
450	140	0,6	276	0,40
450	150	0,6	336	0,40
450	160	0,6	341	0,50
450	180	0,6	272	0,40
450	200	0,6	337	0,90
450	224	0,6	337	0,90
450	250	0,6	357	1,10
450	300	0,6	266	1,00
450	315	0,6	351	1,50
450	400	0,7	371	2,30
450	450	0,7	266	1,40
500	100	0,6	356	0,40
500	125	0,6	361	0,50
500	140	0,6	301	0,30
500	150	0,6	361	0,40
500	160	0,6	366	0,50
500	180	0,6	297	0,50
500	200	0,6	362	0,90
500	224	0,6	322	0,70
500	250	0,6	382	1,10
500	300	0,6	291	0,90
500	315	0,6	376	1,50
500	350	0,7	291	1,70
500	400	0,7	396	2,30
500	450	0,7	291	1,50
500	500	0,7	291	1,70
560	250	0,7	412	1,50
560	300	0,7	321	1,30
560	315	0,7	406	1,90
560	350	0,7	381	2,00
560	400	0,9	426	3,10
560	450	0,9	321	2,70



Collar saddle

PSTR

Ød nom	Ød ₃ nom	t mm	l ₃ mm	m kg
560	500	0,9	321	3,10
560	560*	0,9	321	5,70
600	300	0,7	341	1,40
600	315	0,7	426	1,90
600	350	0,7	341	1,70
600	400	0,9	446	3,10
600	450	0,9	341	2,70
600	500	0,9	341	3,30
600	560*	0,9	341	5,80
600	600*	0,9	341	6,30
630	315	0,7	441	2,10
630	350	0,7	356	1,80
630	400	0,9	461	3,30
630	450	0,9	356	2,80
630	500	0,9	356	3,50
630	560*	0,9	356	5,90
630	600*	0,9	356	6,40
630	630*	0,9	356	6,80
650	350	0,7	366	1,90
650	400	0,9	366	2,60
650	450	0,9	366	2,90
650	500	0,9	366	3,60
650	560*	0,9	366	6,00
650	600*	0,9	366	6,50
650	630*	0,9	366	6,90
650	650*	0,9	366	7,20
710	400	0,9	396	3,00
710	450	0,9	396	3,10
710	500	0,9	396	3,80
710	560*	0,9	396	6,10
710	600*	0,9	396	6,70
710	630*	0,9	396	7,10
710	650*	0,9	396	7,40
710	710	0,9	396	8,50
750	450	0,9	416	3,20
750	500	0,9	416	3,80
750	560*	0,9	416	6,20
750	600*	0,9	416	6,70
750	630*	0,9	416	7,10
750	650*	0,9	416	7,40
750	710*	0,9	416	8,60
750	750*	0,9	416	9,00
800	500	0,9	441	3,80
800	560*	0,9	441	6,30
800	630*	0,9	441	7,30
800	650*	0,9	441	7,70
800	710*	0,9	441	8,70
800	750*	0,9	441	9,20
800	800*	0,9	441	10,1
900	560*	0,9	491	6,60
900	600*	0,9	491	7,20

Ød nom	Ød ₃ nom	t mm	l ₃ mm	m kg
900	630*	0,9	491	7,60
900	650*	0,9	491	8,00
900	710*	0,9	491	9,10
900	750*	0,9	491	9,70
900	800*	0,9	491	10,6
900	900*	0,9	491	12,2

* Supplied with flange FL

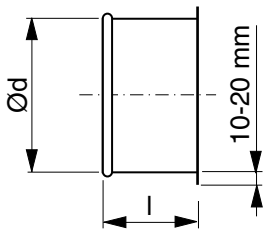


Take-off

ILTR



Dimensions



Description

Take-off.

Ordering example

Product	ILTR	315
Dimension Ød		

Ød nom	t mm	l mm	m kg
80	0,7	50	0,10
100	0,7	50	0,10
125	0,7	50	0,20
140	0,7	50	0,20
150	0,7	50	0,20
160	0,7	50	0,20
180	0,7	45	0,20
200	0,7	45	0,20
224	0,7	45	0,30
250	0,7	45	0,40
300	0,9	40	0,40
315	0,9	40	0,50
350	0,9	40	0,50
400	0,9	40	0,70
450	0,9	40	0,80
500	0,9	40	0,90



End cover

EPTR



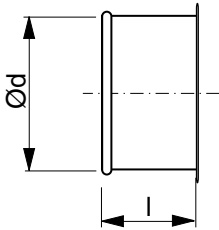
Description

End cover.

Ordering example

	EPTR	315
Product		
Dimension Ød		

Dimensions



Ød nom	t mm	l mm	m kg
80	0,7	56	0,30
100	0,7	56	0,40
125	0,7	56	0,40
140	0,7	56	0,40
150	0,7	56	0,50
160	0,7	56	0,60
180	0,7	52	0,60
200	0,7	52	0,80
224	0,7	52	0,80
250	0,7	52	0,80
300	0,9	46	0,90
315	0,9	46	1,00
350	0,9	46	1,00
400	0,9	46	1,40
450	0,9	46	1,60
500	0,9	46	1,80
560*	0,9	70	5,40
600*	0,9	70	6,10
630*	0,9	70	6,30
650*	0,9	70	6,70
710*	0,9	90	7,80
750*	0,9	90	8,30
800*	0,9	90	9,00
900*	0,9	90	10,7

* Supplied with flange FL



Transition piece

OUTR



Description

Coupling between Transfer and Safe systems.

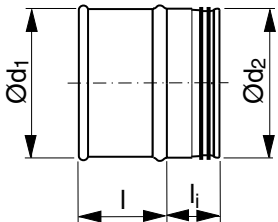
Ordering example

OUTR 315

Product

Dimension Ød

Dimensions



Ød ₁ nom	Ød ₂ nom	t mm	l mm	l _i mm	m kg
80	80	0,7	40	40	0,15
100	100	0,7	40	40	0,15
125	125	0,7	40	40	0,20
140	140	0,7	40	40	0,20
150	150	0,7	40	40	0,30
160	160	0,7	40	40	0,30
180	180	0,7	40	40	0,30
200	200	0,7	40	40	0,30
224	224	0,7	40	40	0,40
250	250	0,7	60	60	0,40
300	300	0,7	46	60	0,70
315	315	0,7	46	60	0,50
350	355	0,9	46	60	0,80
400	400	0,9	46	80	1,20
450	450	0,9	46	80	1,40
500	500	0,9	46	80	1,60



Transition piece

MFTR



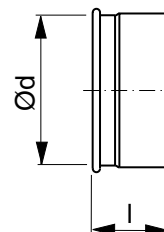
Description

Coupling with female end between Transfer and Safe systems.

Ordering example

	MFTR	315
Product		
Dimension Ød		

Dimensions



Ød nom	t mm	l mm	m kg
80	0,7	62	0,10
100	0,7	62	0,10
125	0,7	62	0,20
140	0,7	62	0,20
150	0,7	62	0,20
160	0,7	62	0,20
180	0,7	58	0,20
200	0,7	58	0,20
224	0,7	58	0,30
250	0,7	76	0,30
300	0,9	106	0,70
315	0,9	73	0,30
400	0,9	126	1,20
450	0,9	126	1,40
500	0,9	126	1,60



Transition piece

OTR



Description

Coupling between Transfer and other joining systems.

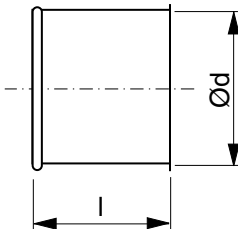
Ød = dimension for Transfer.

The l-measure depends on the other joining system used.

Ordering example

Product **OTR 200**
Dimension Ød

Dimensions



Ød nom	t mm
80	0,5
100	0,5
125	0,5
140	0,5
150	0,5
160	0,5
180	0,5
200	0,5
224	0,5
250	0,5
300	0,9
315	0,9
350	0,9
400	0,9
450	0,9
500	0,9



Transition piece

LORTR



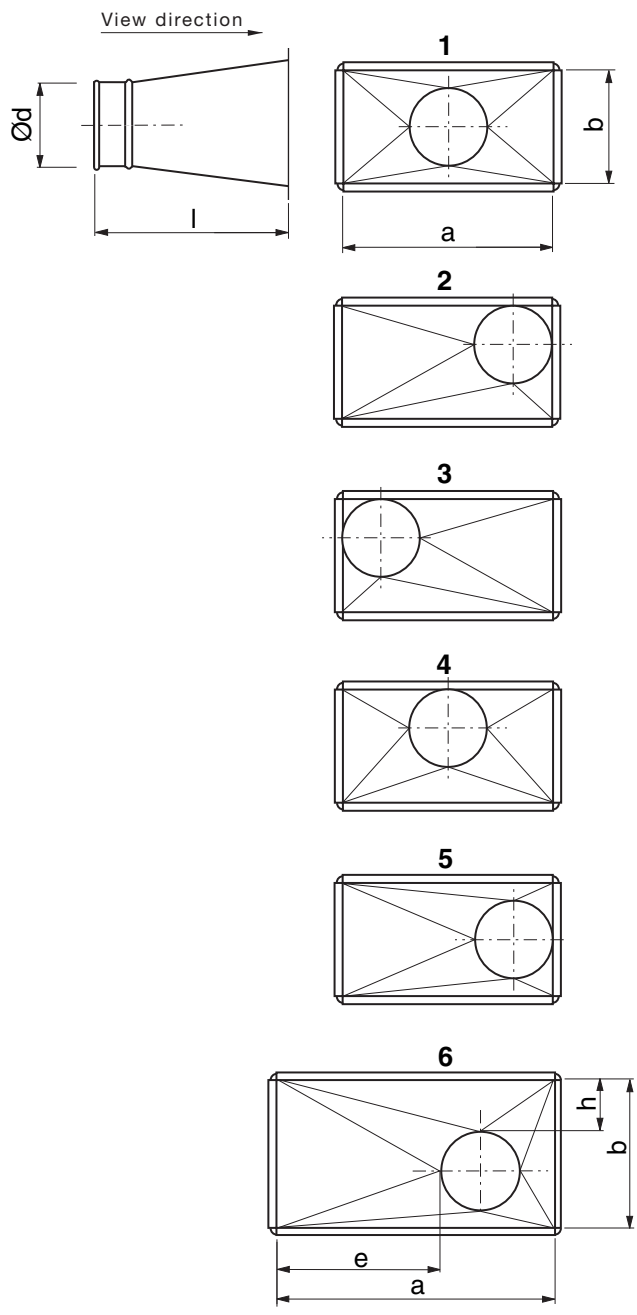
Description

Coupling between Transfer and rectangular connection.
The measures e and h only need to be specified for alternative 6. A negative value for e, for example, means that e is outside side a.

Ordering example

	LORTR	500	300	160	1
Product					
Largest side	a				
Smallest side	b				
Diameter in mm	Ød				
The alt. displacements are seen from the circular end 1 – 6					

Dimensions



a, b largest side mm	l mm
100– 350	300
351– 750	450
751– 1200	600



Extraction hood

SH



Description

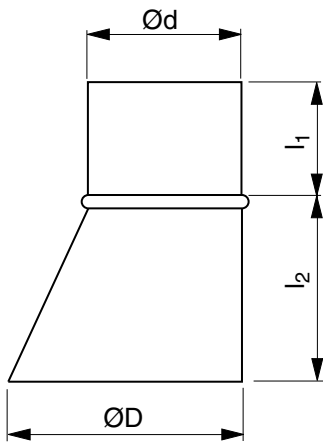
Extraction hood for all types of extraction.

Available in two standard sizes with various accessories such as a damper, net and magnet.

Ordering example

Product	SH	160
Dimension Ød		

Dimensions



Ød nom	ØD mm	l ₁ mm	l ₂ mm	m kg
80	160	80	95	0,31
160*	315	120	155	1,00

* Supplied with handle



Extraction hood

SHTR



Description

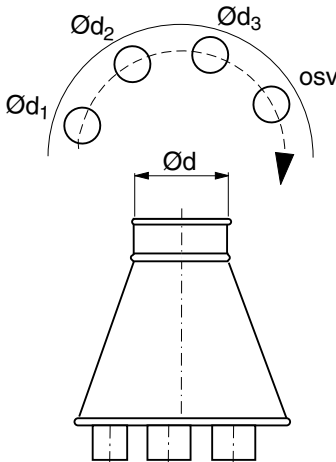
Extraction hood.

To order, specify $\varnothing d$ and dimensions for stubs $\varnothing d_1$, $\varnothing d_2$, $\varnothing d_3$ etc. and the sequence they should be located on the pitch circle.

Ordering example

	SHTR	250	xxx - xxx - xxx
Product			
Dimension $\varnothing d$			
Dimension $\varnothing d_1$, $\varnothing d_2$, $\varnothing d_3$			

Dimensions



$\varnothing d$ nom	t mm
80	0,7
100	0,7
125	0,7
140	0,7
150	0,7
160	0,7
180	0,7
200	0,7
224	0,7
250	0,7
300	0,7
315	0,7
350	0,7
400	0,9
450	0,9
500	0,9



Extraction hood

SPTR



Description

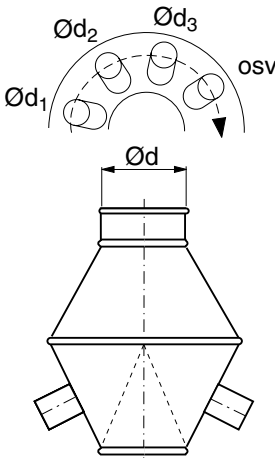
Extraction hood.

To order, specify $\varnothing d$ and dimensions for stubs $\varnothing d_1$, $\varnothing d_2$, $\varnothing d_3$ etc. and the sequence they should be located on the pitch circle.

Ordering example

	SPTR	315	xxx - xxx - xxx
Product			
Dimension $\varnothing d$			
Dimension $\varnothing d_1$, $\varnothing d_2$, $\varnothing d_3$			

Dimensions



$\varnothing d$ nom	t mm
80	0,7
100	0,7
125	0,7
140	0,7
150	0,7
160	0,7
180	0,7
200	0,7
224	0,7
250	0,7
300	0,7
315	0,7
350	0,7
400	0,9
450	0,9
500	0,9



Waste extractor

GSTR



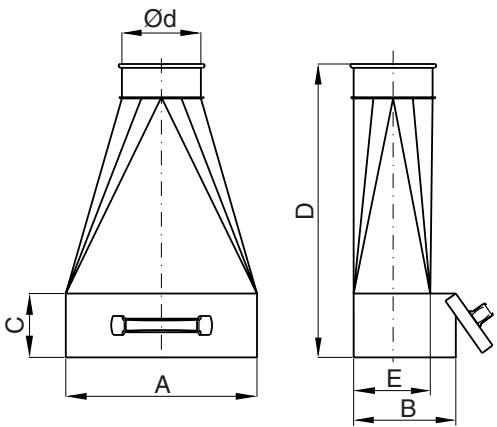
Description

Used for extraction of chips etc. Is to be placed up to a wall.

Ordering example

	GSTR	125
Product		
Dimension Ød		

Dimensions



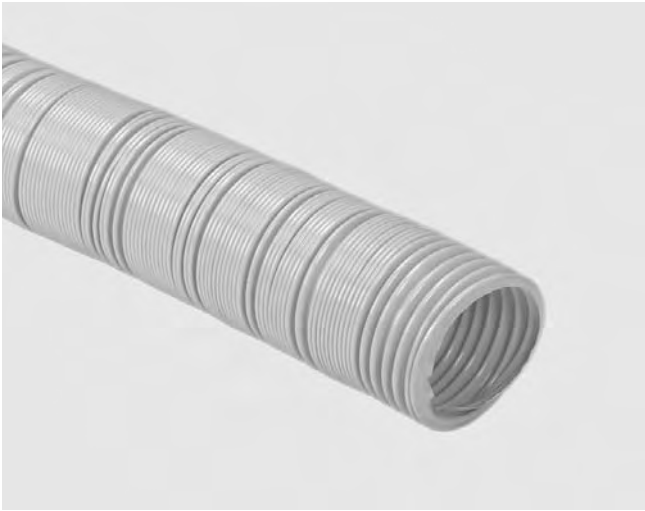
Ød nom	A mm	B mm	C mm	D mm	E mm
100	300	165	100	460	120
125	300	165	100	460	120
160	300	165	100	460	120

- 1
- 2
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Flexible hose

THTR



Description

Light, flexible hose built on a bright steel spiral. Transparent with a light bluish tone.

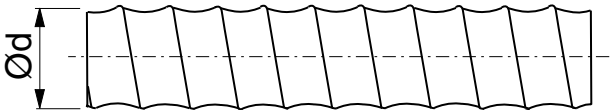
Material polyester – polyurethane
Temperature range -40 to +100 °C

Fits standard fitting dimensions.

Ordering example

	THTR	160
Product		
Dimension Ød		

Dimensions



Ød mm	Min. bending radius mm	Max. permissible negative pressure kPa	m _l kg/m
80	80	14,5	0,50
100	100	12,0	0,60
125	125	10,0	0,70
140	140	8,0	0,80
150	150	7,8	0,90
160	160	7,5	0,90
180	180	6,5	1,00
200	200	6,2	1,10
250	250	5,0	1,40



Flexible hose

THVTR



Description

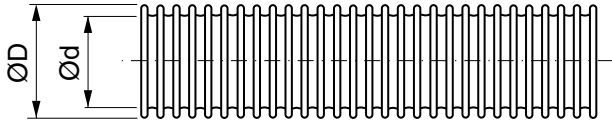
Flexible hose, non-spiral, profiled wall construction, extruded ethylene-vinyl-acetate. The design means that the hose has an almost completely smooth interior under high vacuum, with consequent low pressure drop. This is because the open ridges on the inside of the hose are compressed at negative pressure.

Colour blue
Temperature range -45 to +65 °C

Ordering example

Product **THVTR** **100**
Dimension Ød

Dimensions



Ød mm	ØD mm	Min. bending radius mm	Max. permissible negative pressure kPa	l m	m _l kg/m
25	31	66	50	30	0,20
32	41	82	50	30	0,30
38	48	93	50	30	0,40
45	56	111	50	30	0,50
50	61	122	50	30	0,60
63	76	160	50	30	0,80
76	91	188	50	15	1,10
100	115	252	50	15	1,50

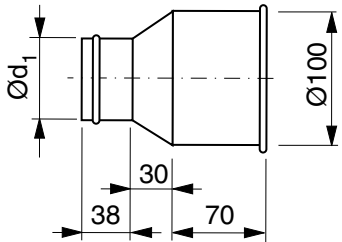


Transition piece

OTRTH



Dimensions



Description

Coupling between Transfer and flexible hose THVTR.

Ordering example

Product	OTRTH	50
Dimension Ød ₁		

Ød ₁ mm	m kg
25	0,19
32	0,20
38	0,20
45	0,20
50	0,21
63	0,21
76	0,22
80-250	Use TSRTR, page 318



Clip

SB



Description

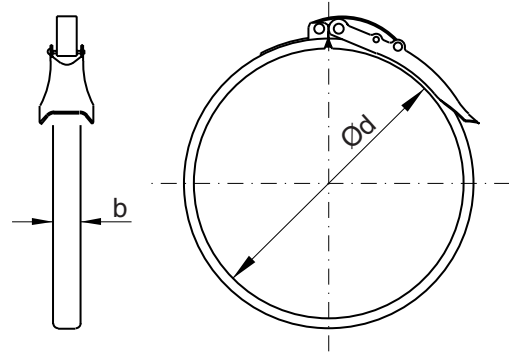
The clip is provided with a rubber gasket. The clip handles can be secured against inadvertent opening by means of a lock pin.

Temperature range -30 to +75 °C continuous
-40 to +85 °C intermittent

Ordering example

	SB	400
Product		
Dimension Ød		

Dimensions



Ød mm	b mm	m kg
80	14	0,10
100	14	0,10
125	14	0,10
140	14	0,10
150	14	0,10
160	14	0,10
180	19	0,20
200	19	0,30
224	19	0,30
250	19	0,30
300	25	0,40
315	25	0,50
350	25	0,60
400	25	0,60
450	25	0,70
500	25	0,80



Clip

SB-2



Description

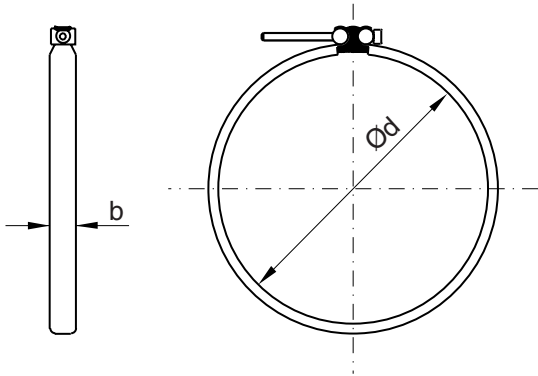
The clip is provided with a rubber gasket. The clip is tensioned by means of a hexagonal socket cap screw. Suitable for tightening with a screw tightener.

Temperature range -30 to +75 °C continuous
-40 to +85 °C intermittent

Ordering example

	SB-2	200
Product		
Dimension Ød		

Dimensions



Ød mm	b mm	Key size mm	m kg
80	14	3	0,10
100	14	3	0,10
125	14	3	0,10
140	14	3	0,10
150	14	3	0,10
160	14	3	0,10
180	19	3	0,20
200	19	3	0,30
224	19	3	0,30
250	19	3	0,30
300	25	5	0,40
315	25	5	0,50
350	25	5	0,60
400	25	5	0,60
450	25	5	0,70
500	25	5	0,80



Sealing clamp

MFK



Description

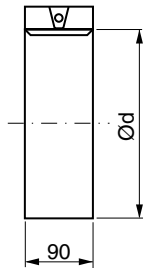
The inside of the sealing clamp is clad with longlife resistant EPDM rubber.

Used for sealing joints on slide-on stub PTR and saddle PSVTR.

Ordering example

	MFK	200
Product		
Dimension Ød		

Dimensions



Ød mm	m kg
80	0,30
100	0,30
125	0,40
140	0,40
150	0,50
160	0,50
180	0,50
200	0,50
224	0,60
250	0,60
300	0,60
315	0,70
350	0,70
400	0,80
450	1,10
500	1,20





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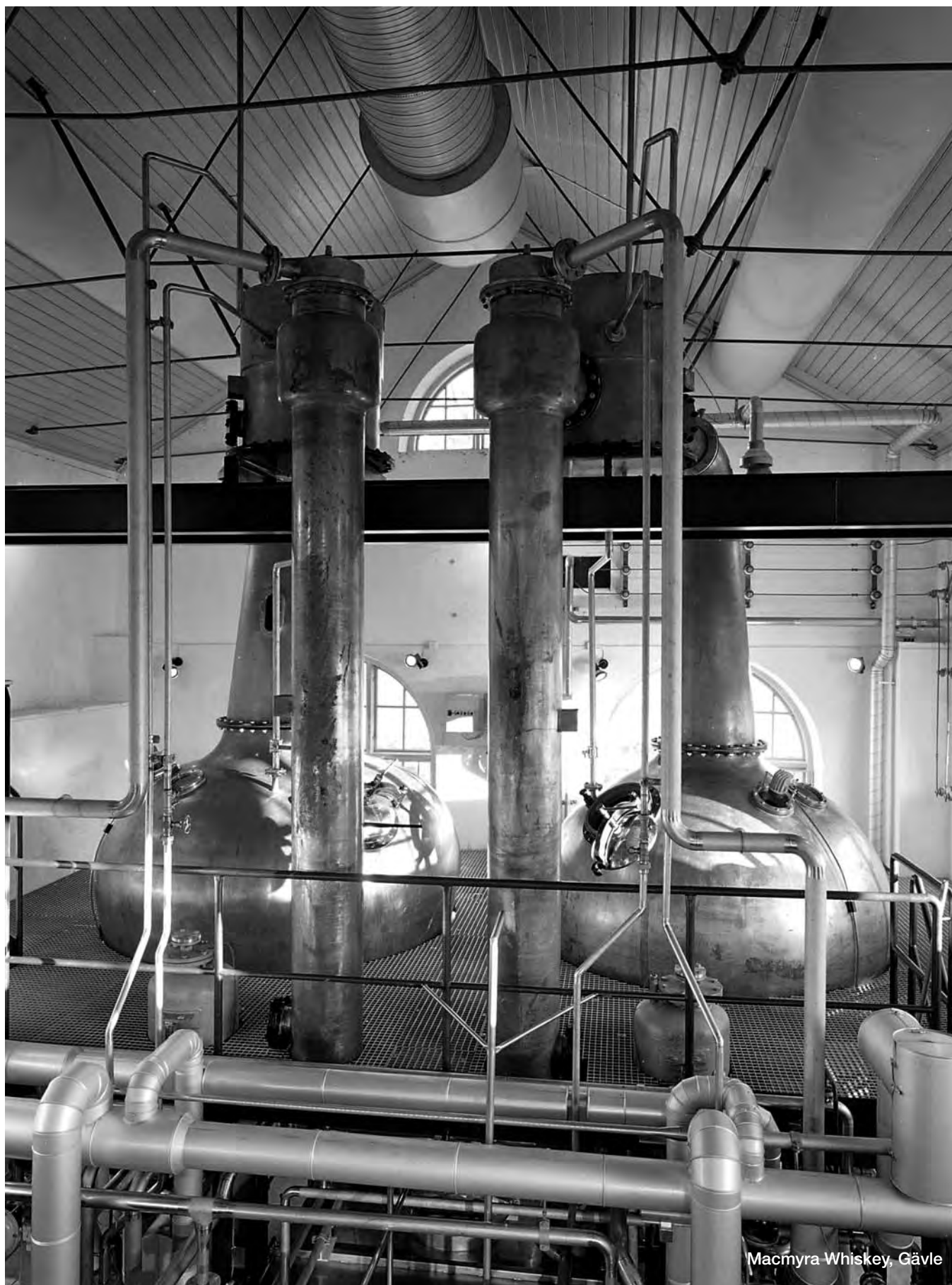
7

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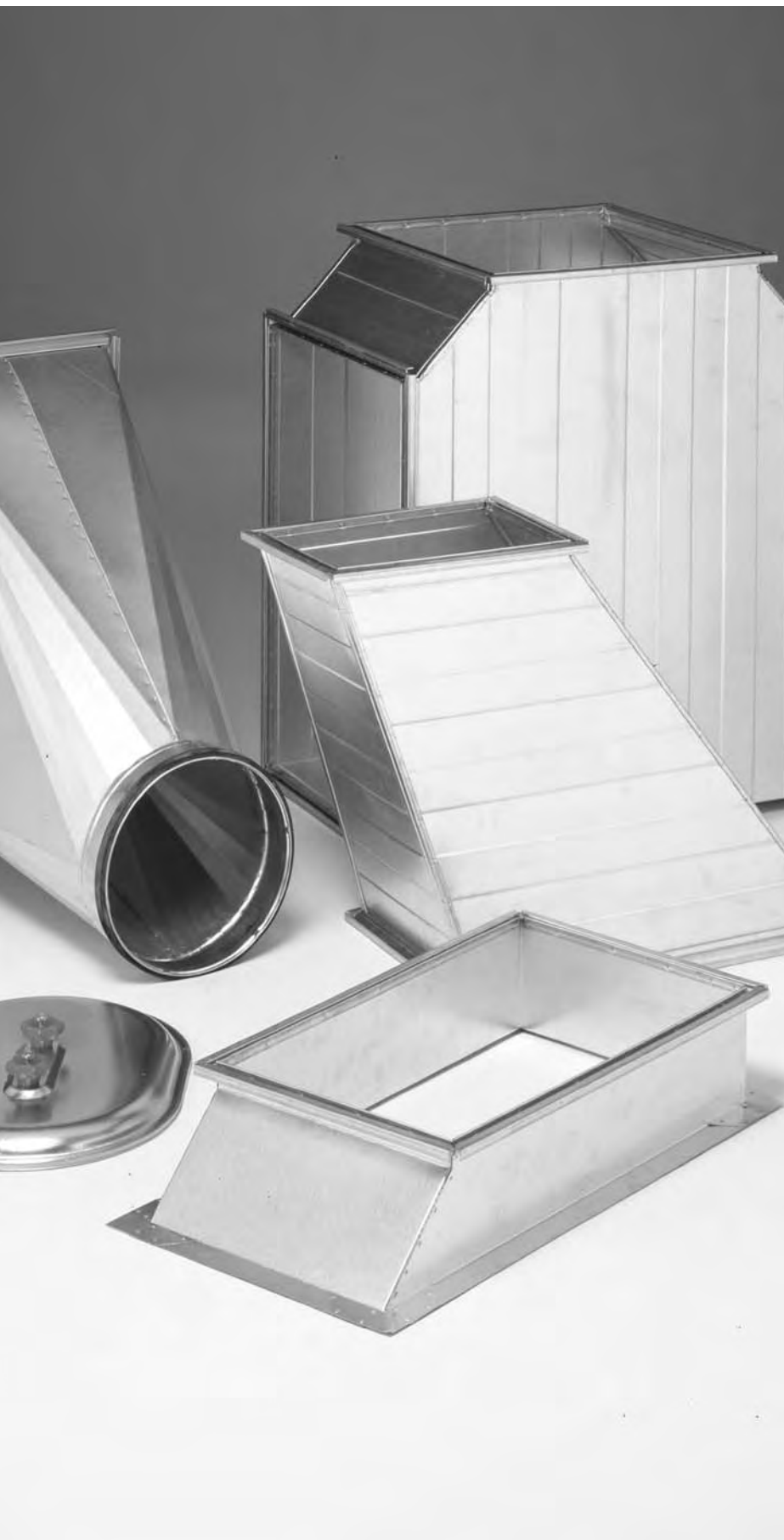
11



Macmyra Whiskey, Gävle



Rectangular



Lindab	1
General information and theory	2
Safe	3
Silencers	4
Dampers and Measure units	5
Roof hoods	6
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Content – Rectangular

Rectangular duct



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Bends



LBR 371



LBXR 372

S-bend



LBSR 373

Taper



LDR 374

Rect-to-round transition



LFR 375

Collars



LTR 376



LTRSR 377

T-piece



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End cover



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Cleaning covers



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IPF 381

Joining parts



Joining profile LS 1 382



Joining profile LS 11 382



Seal moulding LS 21 382



Seal moulding LS 31 382



Slide profile LS 3 382



Inner corner LS 4 382



Outer corner LS 5 382

Damper

See chapter
Dampers and Measure units
LKSR 234

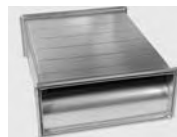
Circular straight low-built silencers

See chapter Silencers
LRCA 139
LRBCB 140

Rectangular straight silencers

See chapter Silencers
DLD 145
DLDR 146
DLDY 156

Rectangular straight low-built silencers

See chapter Silencers
LRLB 176



General

Some products might differ slightly from country to country. Please contact your local Lindab store for correct information.

Rectangular consists of rectangular ducts, fittings and silencers with dimensions in accordance with SS-EN 1505 when not otherwise specified. All fittings and ducts are made of hot-dip galvanized steel sheet Z 275. If higher corrosion protection is needed, alu-zinc or stainless steel can be used.

A joining profile is mounted at the end of every fitting and duct. Self-tapping screws are only needed on insulated ducts, to fix the insulation rails. The screws are then concealed in the insulation, out of harm's way. A common guide moulding, LS3 and two seal mouldings, LS31 or LS21 are needed to join components. So pre-cut mouldings and an adequate length of seal moulding are supplied in each delivery. Seals are made from temperature resistant polythene. Recommended temperature range is -70 to +80°C.

Support distances of ducts and components must never exceed 2400 mm for any dimension. Nor may there be more than one joint between two supports. The support must be located max. 500 mm from a joint.

Non-standard ducts and duct components can be tendered on request. Please enclose a dimensioned sketch if possible.

Tightness

Ducts and fittings maintain tightness class C. This only applies on condition that the products are installed in accordance with the installation instruction.

Please refer to page 35–36 for more information about sealing classes and offucuk requirements.

Strength

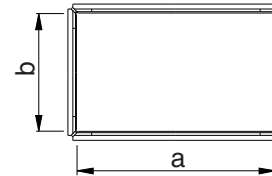
Standard ducts and duct components can withstand positive and negative pressures of 1000 Pa.

Larger ducts and fittings are reinforced by U-shaped profiles and integrated corner joints.

Dimensions and weights

The “l”-measures given in the tables are the overall installation dimensions of products. The following tolerances apply, depending on duct or fitting dimensions.

a and b are the internal duct or fitting dimensions.



Tolerances for dimensions a and b

when $a + b \leq 1200$: $+0$ mm
 -4 mm

when $a + b > 1200$: $+0$ mm
 -6 mm

Tolerances for “l”-measures ± 5 mm

Hydraulic diameter d_h

The diameter of a circular duct which gives the same pressure drop at the same air velocity as in the rectangular duct.

$$d_h = \frac{4 \cdot A_c}{O} = \frac{2 \cdot a \cdot b}{a + b}$$

Equivalent diameter d_e

The diameter of a circular duct which gives the same pressure drop at the same air flow as in the rectangular duct.

Insulated ducts

Insulated ducts can be made in the following designs:

- Internally condensation and heat insulated with Lindtec®
- Internally insulated, clad with solid sheet metal
- Internally insulated, clad with perforated sheet metal
- Internal fire protection insulation 50 and 100 mm



General

Technical data for standard sizes

Cross-sectional area, A_c [m²]

b \ a	200	250	300	400	500	600	800	1000	1200	1400	1600	1800	2000
100	0,02	0,03	0,03	0,04									
150	0,03	0,04	0,05	0,06	0,08	0,09							
200	0,04	0,05	0,06	0,08	0,10	0,12	0,16						
250		0,06	0,08	0,10	0,13	0,15	0,20	0,25					
300			0,09	0,12	0,15	0,18	0,24	0,30	0,36				
400				0,16	0,20	0,24	0,32	0,40	0,48	0,56	0,64		
500					0,25	0,30	0,40	0,50	0,60	0,70	0,80	0,90	1,00
600						0,36	0,48	0,60	0,72	0,84	0,96	1,08	1,20
800							0,64	0,80	0,96	1,12	1,28	1,44	1,60
1000								1,00	1,20	1,40	1,60	1,80	2,00
1200									1,44	1,68	1,92	2,16	2,40

$$A_c = a \times b$$

Circumference, O [m]

b \ a	200	250	300	400	500	600	800	1000	1200	1400	1600	1800	2000
100	0,6	0,7	0,8	1,0									
150	0,7	0,8	0,9	1,1	1,3	1,5							
200	0,8	0,9	1,0	1,2	1,4	1,6	2,0						
250		1,0	1,1	1,3	1,5	1,7	2,1	2,5					
300			1,2	1,4	1,6	1,8	2,2	2,6	3,0				
400				1,6	1,8	2,0	2,4	2,8	3,2	3,6	4,0		
500					2,0	2,2	2,6	3,0	3,4	3,8	4,2	4,6	5,0
600						2,4	2,8	3,2	3,6	4,0	4,4	4,8	5,2
800							3,2	3,6	4,0	4,4	4,8	5,2	5,6
1000								4,0	4,4	4,8	5,2	5,6	6,0
1200									4,8	5,2	5,6	6,0	6,4

$$O = 2 \times (a + b)$$

Hydraulic diameter, d_h [mm]

b \ a	200	250	300	400	500	600	800	1000	1200	1400	1600	1800	2000
100	133	143	150	160									
150	171	188	200	218	231	240							
200	200	222	240	267	286	300	320						
250		250	273	308	333	353	381	400					
300			300	343	375	400	436	462	480				
400				400	444	480	533	571	600	622	640		
500					500	545	615	667	706	737	762	783	800
600						600	686	750	800	840	873	900	923
800							800	889	960	1018	1067	1108	1143
1000								1000	1091	1167	1231	1286	1333
1200									1200	1292	1371	1440	1500

$$d_h = 4 \times A_c / O = 2 \times a \times b / (a + b)$$



General

Equivalent diameter, d_e [mm]

b \ a	200	250	300	400	500	600	800	1000	1200	1400	1600	1800	2000
100	152	169	183	207									
150	189	210	229	260	287	310							
200	219	244	267	305	337	366	414						
250		274	299	344	381	414	470	518					
300			328	378	421	458	521	575	621				
400				438	489	534	610	675	732	783	829		
500					547	599	688	763	829	888	941	991	1036
600						657	757	842	916	982	1043	1098	1150
800							876	978	1068	1148	1221	1289	1351
1000								1095	1199	1292	1376	1454	1527
1200									1314	1419	1514	1602	1684

$$d_e = 2 \times b \times (\pi^{2-n} \times (1 + a/b)^{1+n}/(a/b)^3)^{1/(n-5)}$$

where $n = 1/(1,05 \times \log(\text{Re}) - 0,45)$

where $\text{Re} = v_m \times d_h/\nu$

where $v_m = 5 \text{ m/s}$

and $\nu = 0,000\,000\,101\,312 \times t + 0,010\,013\,001\,375\,72$

where $t = 20^\circ\text{C}$

Specific weight, m_l [kg/m]

b \ a	200	250	300	400	500	600	800	1000	1200	1400	1600	1800	2000
100	5	6	6	8									
150	6	6	7	9	10	12							
200	6	7	8	10	11	13	16						
250		8	9	10	12	14	17	21					
300			10	11	13	14	17	22	25				
400				13	14	16	19	23	27	31	44		
500					16	17	21	25	28	33	46	50	55
600						19	22	27	30	34	48	53	57
800							25	30	33	37	53	57	62
1000								34	38	42	58	62	67
1200									41	45	62	67	72

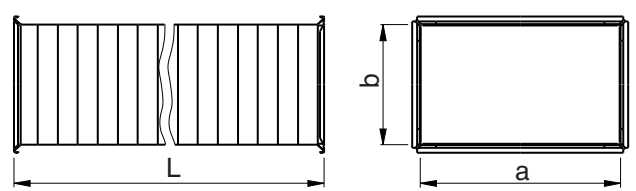


Duct

LKR



Dimensions



Description

Straight duct, stiffened with transverse trapezoid corrugations, which reduces the risk of noise generation. Larger dimensions have stiffening profiles. Installation height of these profiles is 23 mm.

When a or $b \leq 1200$, standard lengths are 2400 or 1250 mm. If a or $b > 1200$, standard length is 1250 mm. Other lengths can be ordered.

Ducts are normally supplied with a joining profile at each end, but can also be supplied as a flexible piece, where the joining profile on one end is not fixed. Also available with an end cover fixed by joining profiles.

Ordering example

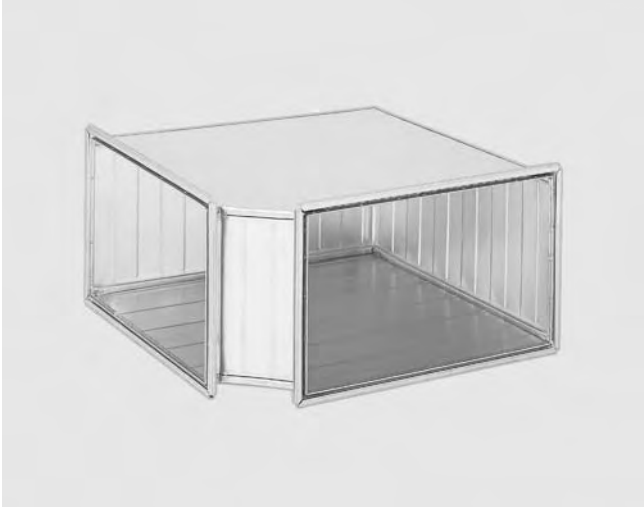
	LKR	500	300	1	1
Product					
Largest side	a				
Smallest side	b				
L = 2400 mm*	1				
L = 1250 mm	2				
L < 2400 mm	L				
LS-joint at both ends	1				
LS-joint at one end.					
Loose joint included.	2				
LS-joint at one end.					
End cover on joining profiles at other end.	3				
End covers on joining profiles at both ends.	4				
LS-joint at one end.					
No loose joint included.	5				

* applies when a or $b \leq 1200$ mm



Bend

LBR



Description

Bend with sharp outer corner, stiffened with trapezoid corrugation.

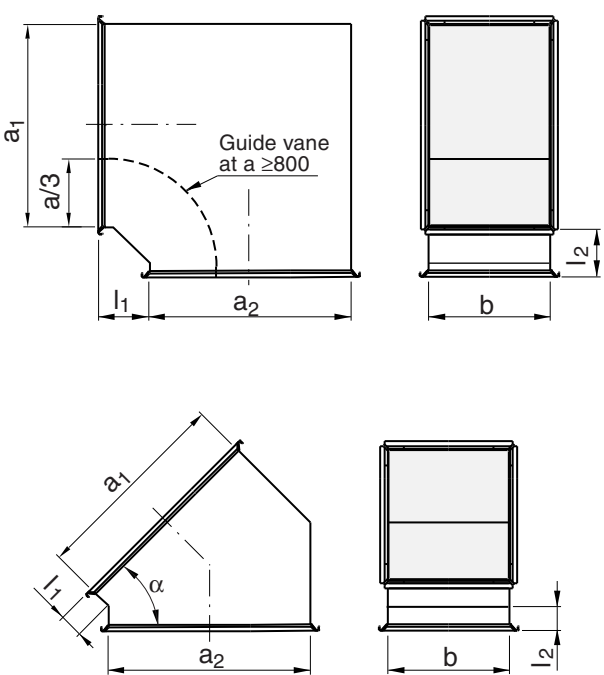
The bend is delivered with 90° or 45° angles and joining profile LS at both ends. Other leg lengths and angles can also be ordered.

Standard design $l_1 = l_2 = 125 \text{ mm}$.

Ordering example

	LBR	500	300	500	1	1	1
Product							
Form side	a_1						
Curved side	b						
Form side	a_2						
90°	1						
45°	2						
Angle	α						
125 mm	1						
Leg length	l_1						
125 mm	1						
Leg length	l_2						

Dimensions



1
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Bend

LBXR



Description

Bend with rounded outer corner, stiffened with trapezoid corrugations.

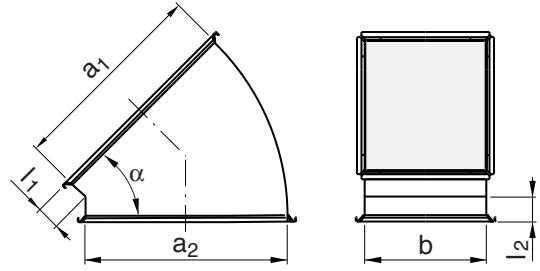
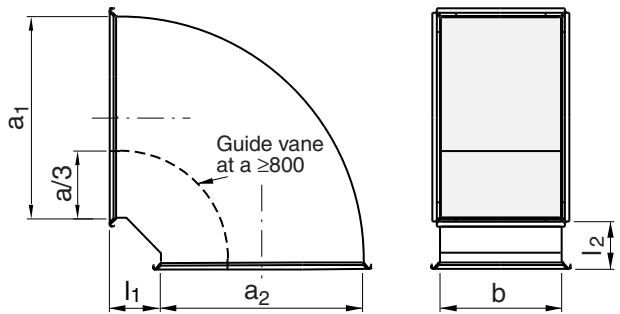
The bend is delivered with 90° or 45° angles and joining profiles at both ends. Other leg lengths and angles can also be ordered.

Standard design $l_1 = l_2 = 125$ mm.

Ordering example

	LBXR	500	300	500	1	1	1
Product							
Form side	a_1						
Curved side	b						
Form side	a_2						
90°	1						
45°	2						
Angle	a						
125 mm	1						
Leg length	l_1						
125 mm	1						
Leg length	l_2						

Dimensions





S-bend

LBSR



Description

Used for deflections of the duct system, for example where ducts cross.

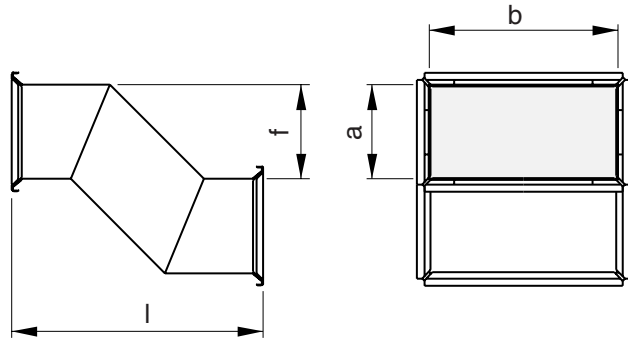
Has a joining profile at both ends, and is stiffened by trapezoid corrugations.

A special relationship is needed between the a-dimension, fall f and length l for the LBSR to retain its cross-sectional area and not restrict the air flow. For this reason, standard lengths and standard drops have been prepared.

Ordering example

	LBSR	300	600	300	400
Product					
Form side	a				
Curved side	b				
Fall	f				
Length	l				

Dimensions



a mm	l std mm	f std mm
100	400	300
150	400	300
200	400	300
250	400	300
300	400	300
350	400	300
400	500	400
450	500	400
500	600	400
600	700	400
700	800	500
800	900	500
900	1000	500
1000	1100	500
1100	1200	500
1200	1300	500
1300	1400	500
1400	1500	500
1500	1600	500
1600	1700	500
1800	1900	500
2000	2100	500





Taper

LDR



Description

The taper is used as transition between different duct dimensions. The larger dimensions are available with offsets as in the coded sketches.

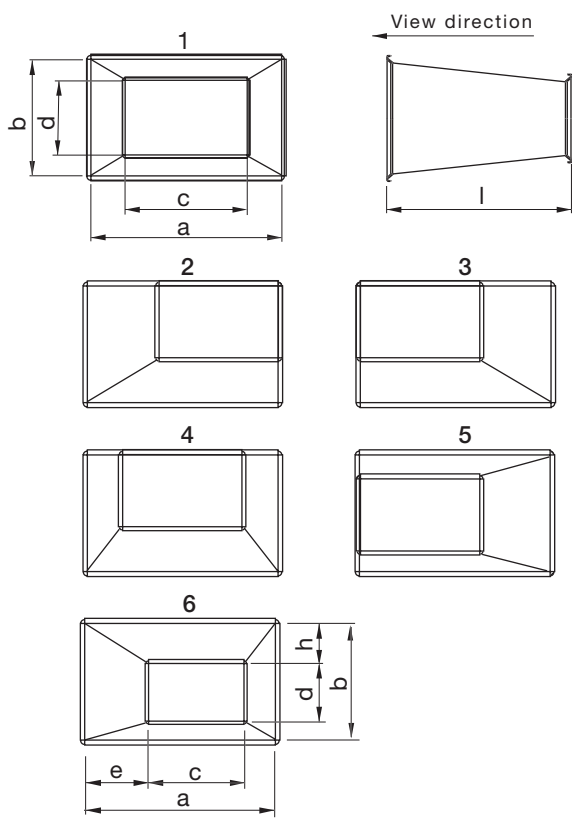
Dimension changes have a joining profile at both ends, and are stiffened by trapezoid corrugations.

Measures e and h only need to be given for alternative 6. Negative values for e, for example, mean that e is outside side a.

Ordering example

	LDR	500	300	300	200	1	450
Product							
Large end	a						
Large end	b						
Small end	c						
Small end	d						
The alternative displacements are seen from the cxd end	1 – 6						
Length	l						

Dimensions



a mm	l std mm
100	300
150	300
200	300
250	300
300	300
350	300
400	450
450	450
500	450
600	450
700	450
800	600
900	600
1000	600
1100	600
1200	600
1300	600
1400	600
1500	600
1600	600
1800	600
2000	600



Rect-to-round transition

LFR



Description

Rect-to-round transition are used between rectangular and circular ducts. The rectangular connection has joining profiles and the circular connection has Safe seal.

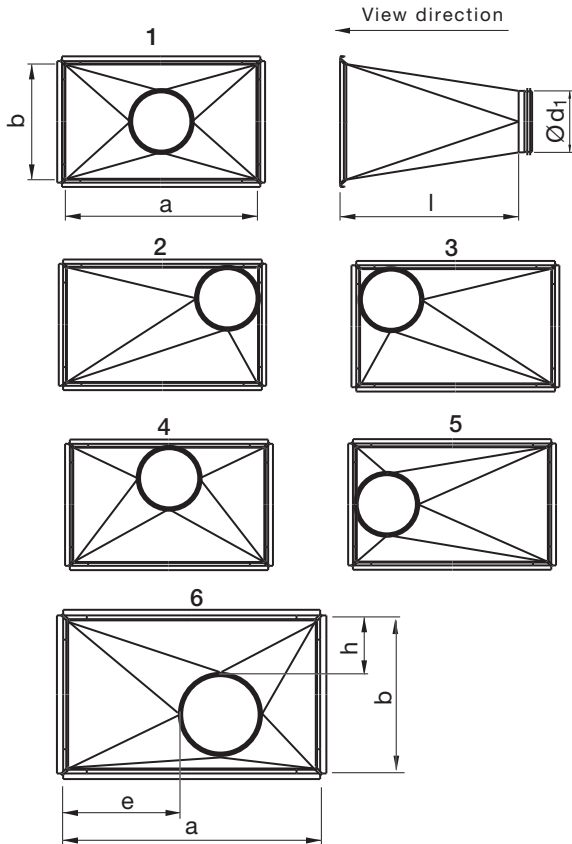
The rectangular connection is available with offsets as in the coded sketches.

Measures e and h only need to be given for alternative 6. Negative values for e, for example, mean that e is outside side a.

Ordering example

	LFR	500	300	160	1	450
Product						
Largest side		a				
Smallest side		b				
Diameter		Ød1				
The alternative displacements are seen from the circular end		1 – 6				
Length		l				

Dimensions



a mm	l std mm
100	300
150	300
200	300
250	300
300	300
350	300
400	450
450	450
500	450
600	450
700	450
800	600
900	600
1000	600
1100	600
1200	600
1300	600
1400	600
1500	600
1600	600
1800	600
2000	600





Collar

LTR

1

2

3



4

Description

The collar is used for connection to rectangular duct. The smaller joint end is provided with joining profiles. The larger one has an edge, for fixing with blind rivets or self-tapping screws, but can also be given a folding tab to facilitate assembly.

5

Ordering example

	LTR	500	300	125	v
Product					
Form side	a				
Curved side	b				
Length					
Option					
Fixing with folding tab					

6

7

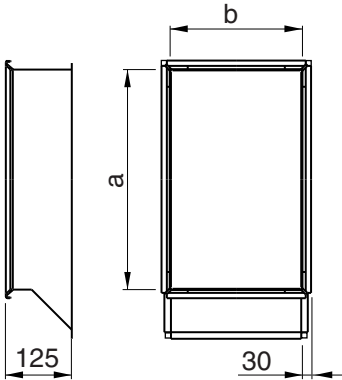
8

9

10

11

Dimensions





Collar on circular duct

LTRSR



Description

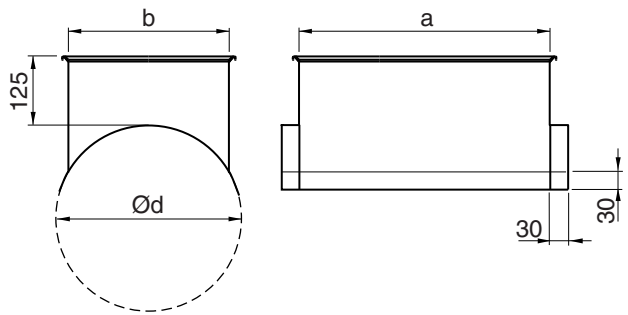
The collar is used for connection to circular duct. The rectangular end is provided with joining profiles. The rounded end has an edge, for fixing with blind rivets or self-tapping screws.

Other lengths can also be supplied.

Ordering example

	LTRSR	600	300	400	125
Product					
Side	a				
Side	b				
Diameter	Ød				
Length					

Dimensions



1
2
3
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9
10
11



T-piece

LTROR



Description

A T-piece which is provided with joining profiles and is stiffened with trapezoid corrugations.

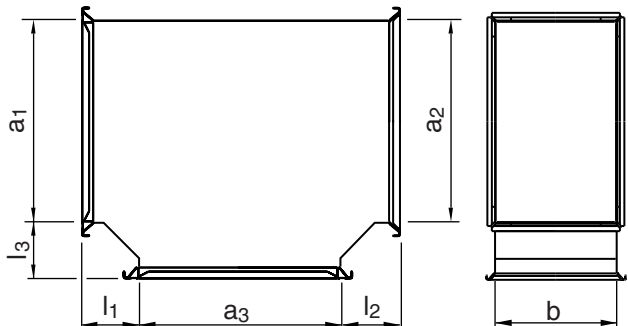
Standard design $l_1 = l_2 = l_3 = 125$ mm.

Other leg lengths can also be supplied.

Ordering example

	LTROR	600	600	800	400	1	1	1
Product								
Side	a_1							
Side	a_2							
Side	a_3							
Side	b							
125 mm	1							
Leg length	l_1							
125 mm	1							
Leg length	l_2							
125 mm	1							
Leg length	l_3							

Dimensions





End cover

LEPR



Description

Used as end cover in duct.

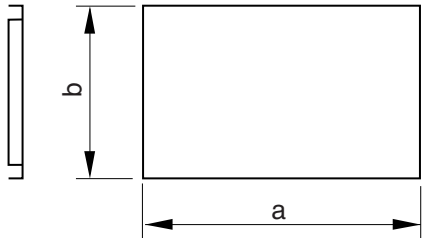
The edges are folded up all round, to fit joining profiles.

The end cover is stiffened with trapezoid corrugations.

Ordering example

	LEPR	500	300
Product			
Largest side	a		
Smallest side	b		

Dimensions



1

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11



Cleaning cover

LKCR



Description

The cleaning cover is also used as an inspection hatch for rectangular ducts. To the cleaning cover belongs a fixing frame, which is attached to the rectangular duct. This is normally done with blind rivets through the folded-down edge of the done frame. It can also be provided with folding tabs on request.

It is easy to remove the cleaning cover from the fixing frame by using over-centre catches. In the insulated versions, the inner side will always be in level with the innermost boundary line of the duct, irrespective of whether the duct is insulated internally or externally. Insulation thickness refers to the thickness of the neighbouring duct insulation, to which the cleaning cover shall adapt.

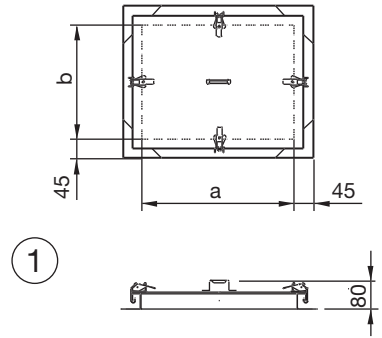
The cover should not be placed closer than 50 mm from the nearest side of the rectangular duct.

More information about cleaning covers is available on page 121.

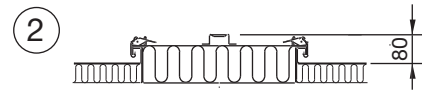
Ordering example

	LKCR	500	300	2	50	v
Product						
Largest side	a					
Smallest side	b					
Non-insulated duct	Type 1					
Internally insulated duct	Type 2					
Externally insulated duct	Type 3					
Duct insulation thickness	30 mm (Type 2)					
Duct insulation thickness	40 mm (Type 3)					
Duct insulation thickness	50 mm (Type 2)					
Duct insulation thickness	70 mm (Type 2, 3)					
Duct insulation thickness	100 mm (Type 2)					
Duct insulation thickness	120 mm (Type 2)					
Duct insulation thickness	140 mm (Type 3)					
Option						
Fixing with folding tabs						

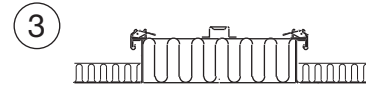
Dimensions



Non-insulated duct



Internally insulated duct



Externally insulated duct



Cleaning cover

IPF



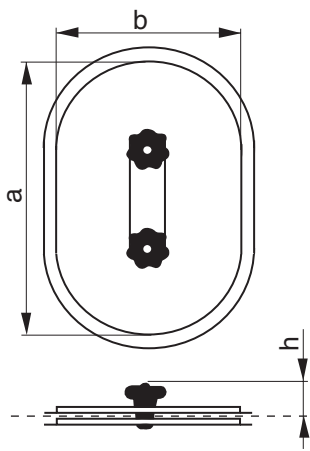
Description

Cleaning cover without fixing frame. Easy to install and remove.

Ordering example

	IPF	300	200
Product			
Largest side	a		
Smallest side	b		

Dimensions



a mm	b mm	h mm
300	200	50
400	300	50
500	400	70

a and b are dimensions of hole

1
2
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4
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9
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11

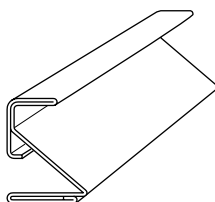


Joining parts

Description

Joining profile LS 1

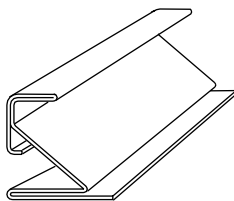
Joining profile designed to be fixed to the duct by embossing with a special pincers. It is sealed to the duct by special factory-applied seam putty. Profile height is app. 20 mm. Normally supplied in 5 m lengths.



Specific weight: 0,40 kg/m

Joining profile LS 11

Joining profile designed to be spot welded to the duct. It is sealed to the duct by special factory-applied seam putty. Profile height is app. 20 mm. Normally supplied in 5 m lengths.

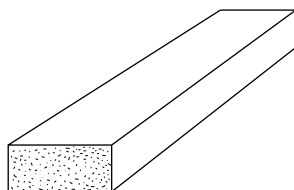


Specific weight: 0,47 kg/m

Seal moulding LS 21

The seal moulding is intended to be installed in each joining profile.

Made from polythene foam.
Supplied in 10 m coils.



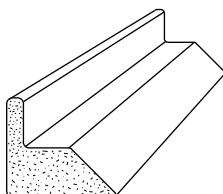
Seal moulding LS 31

The seal moulding is intended to be installed in each joining profile.

Made from polythene foam.

Included as standard with all orders.

Supplied in 250 m in cartons.

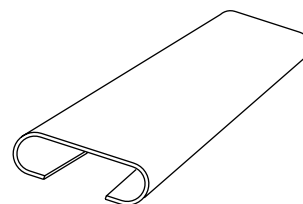


Slide profile LS 3

Used to join two ducts or fittings which both have joining profiles.

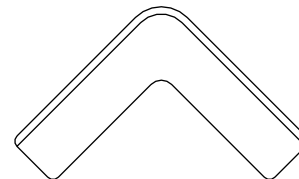
Normally supplied in 5 m lengths.

Specific weight: 0,20 kg/m



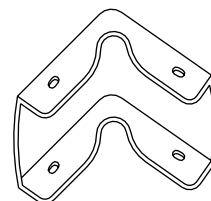
Inner corner LS 4

Used to keep the seal moulding in place and give the ventilation duct stiffness and stability.



Outer corner LS 5

Used outside the slide profile to protect the seal moulding and stiffen the joint. Gives a neat finish.



Other joining methods

If you do not want to fix ducts or duct components together with slide mouldings, as described above, we can meet your needs. You must then specify the particular method of joining you want, in plain language. For example: blind rivet edge 25 mm, flat bar flange to a particular standard, or equivalent.



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