

**General**

If the noise level of a fan exceeds the required level, additional measures can be taken to reduce it. The use of attenuators, working on the principle of absorption, is a very effective method. This type of attenuator offers high damping figures creating only low additional resistances.

HELIOS offer attenuators that are optimal to the HELIOS fan range. Circular and rectangular attenuators are available in virtually any size. All attenuators can of course be used together with fans by others.

HELIOS attenuators are made from galvanised steel, fitted with high quality mineral wool, covered against air flow with scrim to prevent erosion.

**Technical information**

**Attenuation**

The amount of attenuation is determined using the principle of comparison. It compares the noise reduction within a pipe or ducting with and without the attenuator.

When measuring without an attenuator, it is replaced by a straight piece of rigid, noise hard ducting. The attenuation is calculated to:

$$D_e = L_o - L_m \text{ dB}$$

$L_o$ : Sound level without attenuator

$L_m$ : Sound level with attenuator

The efficiency of an attenuator is largely dependent on the frequency of the sound source, therefore the attenuation is stated over the octave spectrum. Low frequency noise is more difficult to attenuate than high frequency. Therefore a larger or more resistive attenuator is required.

It is necessary to know the noise spectrum of a fan (octave or tierce spectrum) to choose an attenuator. When selecting an attenuator for a system the attenuating effect of other components like bends, transformation pieces etc. must be considered in addition to the noise level of the fan.

To avoid regeneration of noise through the air speed over the duct surface the air velocity should be minimised.

**Fast selection of an attenuator**

For easy estimating of a rectangular or circular attenuator the average attenuation figure is given in the red underlined column (right hand column) of the attenuator's table. This figure is to be deducted from the sound power level ( $L_{WA \text{ total}}$ ) of the fan.

The result is the sound power level ( $L_{WA \text{ reduced}}$ ) of the fan, reduced by attenuation. The difference with this selection method (if compared to the frequency band calculation) it is an approximation. More exactly values can be reached using the calculation to the octave band.

**Example:**

**Given:**

Fan model VARD 225/2

**Chosen:** Circular attenuator RSD 225/600 (length = 600 mm)

Sound power level of fan

$$L_{WA \text{ total}} = 81 \text{ dB(A)}$$

Average attenuation figure for attenuator

$$\text{reduction} = 15 \text{ dB(A)}$$

= reduced sound power level

$$L_{WA \text{ reduced}} = 66 \text{ dB(A)}$$

**Key**

$L_{WA \text{ total}}$  = Sound power level of the fan in dB(A) (from table above fan's performance curve).

**Average attenuation** = calculated attenuation figure of the attenuator in dB(A) (red column in the attenuator's table).

$L_{WA \text{ reduced}}$  = reduced sound level in dB(A) using an attenuator.

**Sound level calculation**

To calculate the relevant sound level the attenuator sound reduction must be subtracted from the fan sound level. This should be done in frequency bands. For better attenuation several attenuators of the same diameter can be installed one after another.

**Rectangular attenuator KSD**

**Specification – Installation**

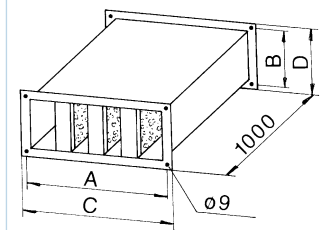
Casing made from galvanised steel with flanges to fit the fan's dimensions. To be installed in-line with ducting on inlet or exhaust. To reduce vibration transmission from the fan, a flexible connector (accessories VS or VS...Ex) should be installed between fan/attenuator and ducting.

**Pressure drop**

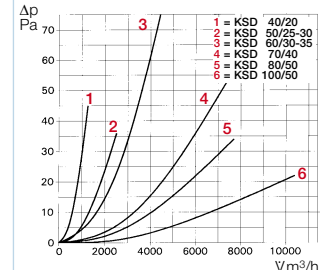
The attenuator will add an additional resistance to the duct system (see chart), which must be considered when selecting a fan. The figures shown refer to an equal inlet into the attenuator. Turbulences from the fan's exhaust can be reduced if 1 metre of straight ducting is fitted between fan and attenuator. Otherwise allow for a higher resistance.



Dimensions in mm see table



Pressure loss KSD



Type	Ref. No.	Duct size in mm	Dimensions in mm				Nominal weight kg	Attenuation $D_e$ dB							Average attenuation
			A	B	C	D		125	250	500	1000	2000	4000	8000	
KSD 400/200	8728	400/200	420	220	443	240	13	8	11	23	31	31	26	18	<u>17</u>
KSD 500/250..	8729	500/250-300	520	270/320	540	340	16.5	6	9	19	25	25	20	15	<u>14</u>
KSD 600/300..	8730	600/300-350	620	320/370	640	390	20	7	10	21	28	28	23	16	<u>12</u>
KSD 700/400	8731	700/400	720	420	740	440	25	6	8	18	24	24	20	14	<u>12</u>
KSD 800/500	8732	800/500	820	520	840	540	31	7	9	19	26	26	21	15	<u>14</u>
KSD 1000/500	8733	1000/500	1020	520	1040	540	35	5	7	16	21	21	17	12	<u>11</u>

**Flexible circular attenuator FSD**

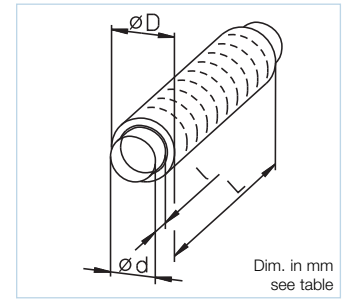
**Specification – Installation**

Robust flexible aluminium ducting with inner perforated face retaining the resin bounded attenuation packing of 50 mm thickness. Spigotted on both ends to fit into nominal size ducting or to be fixed with pipe clamp connectors BM on fan or ducting. The flexible body allows an easier installation.

**Pressure drop**

The pressure drop is 4 times the equivalent normal rigid ducting value.

**FSD**



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Type	Ref. No.	L	Dimensions in mm			Attenuation in dB at Hz				Nominal weight kg	Average attenuation
			ø D	ø d	l	250	500	1000	2000		
FSD 100	0676	1000	210	99.5	60	17	33	48	40	1.1	25
FSD 125	0677	1000	240	124.5	60	13	27	47	22	1.5	20
FSD 160	0678	1000	262	159.5	60	12	26	45	20	2.0	19
FSD 200	0679	1000	313	199.5	60	10	22	31	10	2.5	16
FSD 250	0680	1000	363	249.5	85	8	15	26	8	3.2	12
FSD 315	0681	1000	418	314.5	85	7	15	25	8	4.2	11
FSD 355	0682	1000	464	354.5	85	5	13	19	8	4.7	9
FSD 400	0683	1000	514	399.5	90	5	13	19	8	5.3	9

**Spigotted circular attenuator SRSD**

**Specification – installation**

Robust casing made from galvanised steel with inner perforated face retaining the 50 mm thick mineral wool lining. Spigotted on both ends to fit into nominal size ducting or to be fixed with pipe clamp connectors (accessory BM).

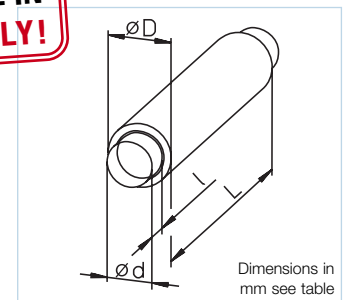
**Pressure drop**

The pressure drop is twice the normal rigid ducting value.

**SRSD**



**AVAILABLE IN THE UK ONLY!**



Type	Ref. No.	L	Dimensions in mm			Attenuation in dB at Hz						Nominal weight kg	Average attenuation
			D	d	l	250	500	1000	2000	4000	8000		
SRSD 100/ 300	8901	300	202	98	40	8	13	20	23	20	12	2.6	11
SRSD 100/ 600	8902	600	202	98	40	12	20	37	47	36	17	4.7	18
SRSD 100/ 900	8903	900	202	98	40	15	29	44	50	42	25	6.7	27
SRSD 100/1200	8904	1200	202	98	40	20	33	42	46	44	29	8.8	31
SRSD 125/ 300	8905	300	227	123	40	7	13	20	21	19	12	2.9	11
SRSD 125/ 600	8906	600	227	123	40	12	22	36	44	32	26	5.3	20
SRSD 125/ 900	8907	900	227	123	40	14	26	44	46	35	22	7.7	24
SRSD 125/1200	8908	1200	227	123	40	16	33	47	53	46	29	10.1	31
SRSD 150/ 300	8909	300	252	148	40	5	10	15	22	16	9	3.3	8
SRSD 150/ 600	8910	600	252	148	40	8	15	31	34	22	12	6.0	13
SRSD 150/ 900	8911	900	252	148	40	10	25	43	49	26	18	8.7	23
SRSD 150/1200	8912	1200	252	148	40	13	29	49	52	30	18	11.4	27
SRSD 160/ 300	8913	300	262	158	40	5	10	15	22	16	9	3.4	8
SRSD 160/ 600	8914	600	262	158	40	8	15	31	34	22	12	6.2	13
SRSD 160/ 900	8915	900	262	158	40	10	25	43	49	26	18	9.1	23
SRSD 160/1200	8916	1200	262	158	40	13	29	49	52	30	18	11.9	27
SRSD 200/ 300	8917	300	302	198	40	3	7	15	16	10	6	3.9	5
SRSD 200/ 600	8918	600	302	198	40	7	14	30	26	15	11	7.3	12
SRSD 200/ 900	8919	900	302	198	40	8	20	42	41	18	15	10.6	18
SRSD 200/1200	8920	1200	302	198	40	10	26	48	51	22	16	14.0	24
SRSD 250/ 300	8921	300	327	223	40	2	6	15	13	10	4	4.6	4
SRSD 250/ 600	8922	600	327	223	40	6	12	25	18	10	7	8.6	10
SRSD 250/ 900	8923	900	327	223	40	8	16	30	27	12	9	12.6	14
SRSD 250/1200	8924	1200	327	223	40	11	22	36	38	18	12	16.6	20
SRSD 315/ 300	8925	300	417	313	40	2	5	14	12	8	4	5.5	3
SRSD 315/ 600	8926	600	417	313	40	6	10	18	13	10	6	10.3	8
SRSD 315/ 900	8927	900	417	313	40	7	15	22	17	12	9	15.2	13
SRSD 315/1200	8928	1200	417	313	40	9	20	29	21	15	12	20.0	18
SRSD 400/ 300	8929	300	502	398	40	6	4	11	10	6	4	6.6	2
SRSD 400/ 600	8930	600	502	398	40	5	10	14	11	8	6	12.6	8
SRSD 400/ 900	8931	900	502	398	40	7	13	19	14	10	8	18.5	11
SRSD 400/1200	8932	1200	502	398	40	8	18	24	20	14	7	24.5	16

**■ Specification – Installation**

Casing made of galvanised steel, acoustically lined with high quality mineral wool covered with cloth to prevent erosion. Acoustic lining retained by perforated steel sheet. Dimensions and tapped flange holes of all sizes fit fan's nominal diameter (R 20). Tapped holes in accordance to DIN 24155, Pt. 2.

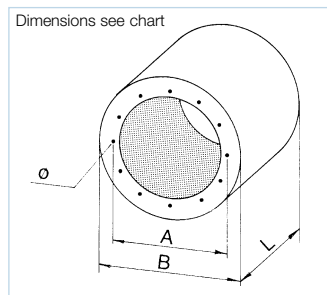
**■ Isolation standard**

To increase the attenuation, several attenuators can be installed in-line.

**■ Pressure drop**

The resistance of the RSD attenuators is very low. When designing the system consider twice the pressure drop of rigid ducting.

**RSD**



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Type Nominal-ø	Ref. No.	Basic length	L	Dimensions in mm			Hole ø	Nominal weight kg	Isolation standard D <sub>e</sub> dB								Average attenuation
				A	B				125	250	500	1000	2000	4000	8000		
RSD 225/ 300	8734	1	300	259	404		6 x M 6	7	2	5	9	14	13	8	6	8	
RSD 225/ 600	8735	2	600	259	404		6 x M 6	12	4	10	17	27	25	17	14	15	
RSD 225/ 900	8736	3	900	259	404		6 x M 6	17	7	13	25	33	31	20	16	20	
RSD 250/ 300	8737	1	300	286	404		6 x M 6	7	3	5	8	8	9	7	5	8	
RSD 250/ 600	8738	2	600	286	404		6 x M 6	12	5	10	16	24	19	14	10	15	
RSD 250/ 900	8739	3	900	286	404		6 x M 6	16	6	12	22	28	21	15	11	18	
RSD 280/ 400	8740	1	400	322	454		8 x M 8	10	4	5	8	14	9	8	6	8	
RSD 280/ 800	8741	2	800	322	454		8 x M 8	18	7	9	16	28	18	17	14	14	
RSD 280/1200	8742	3	1200	322	454		8 x M 8	25	9	12	23	37	23	20	16	18	
RSD 315/ 400	8743	1	400	356	504		8 x M 8	11	3	3	7	13	8	7	5	5	
RSD 315/ 800	8744	2	800	356	504		8 x M 8	19	6	8	14	26	16	12	9	12	
RSD 315/1200	8745	3	1200	356	504		8 x M 8	28	9	12	21	36	18	17	14	18	
RSD 355/ 400	8746	1	400	395	564		8 x M 8	13	3	4	7	11	7	6	4	6	
RSD 355/ 800	8747	2	800	395	564		8 x M 8	23	6	7	13	22	14	12	8	11	
RSD 355/1200	8748	3	1200	395	564		8 x M 8	33	8	11	17	29	18	15	10	17	
RSD 400/ 400	8749	1	400	438	564		12 x M 8	12	3	4	6	9	7	5	3	6	
RSD 400/ 800	8750	2	800	438	564		12 x M 8	21	6	6	12	18	13	12	8	9	
RSD 400/1200	8751	3	1200	438	564		12 x M 8	30	7	10	14	22	18	13	9	15	
RSD 450/ 400	8752	1	400	487	634		12 x M 8	17	4	5	8	10	8	7	5	8	
RSD 450/ 800	8753	2	800	487	634		12 x M 8	27	6	7	13	18	13	12	9	11	
RSD 450/1200	8754	3	1200	487	634		12 x M 8	38	8	10	18	23	17	14	10	15	
RSD 500/ 600	8755	1	600	541	714		12 x M 8	27	4	5	9	11	9	9	6	8	
RSD 500/ 900	8756	2	900	541	714		12 x M 8	36	6	8	14	16	13	13	9	12	
RSD 500/1200	8757	3	1200	541	714		12 x M 8	45	8	11	22	24	17	16	12	17	
RSD 560/ 600	8758	1	600	605	804		8 x M 10	32	3	5	9	9	8	8	6	8	
RSD 560/1200	8759	2	1200	605	804		8 x M 10	52	6	10	19	19	16	13	10	15	
RSD 630/ 600	8760	1	600	674	900		8 x M 10	44	3	5	8	8	8	7	5	8	
RSD 630/1200	8761	2	1200	674	900		8 x M 10	68	5	10	16	15	15	11	8	15	
RSD 710/ 600	8762	1	600	751	1000		8 x M 10	51	3	5	7	7	7	6	4	8	
RSD 710/1200	8763	2	1200	751	1000		8 x M 10	80	5	10	14	13	13	10	7	15	
RSD 800/ 600	8764	1	600	837	1100		12 x M 10	57	2	5	7	6	6	5	4	8	
RSD 800/1200	8765	2	1200	837	1100		12 x M 10	88	5	9	13	11	11	9	6	14	
RSD 900/ 900	8766	1	900	934	1220		12 x M 10	82	2	4	10	9	6	5	4	6	
RSD 900/1800	8767	2	1800	934	1220		12 x M 10	135	4	9	21	17	13	9	8	14	
RSD 1000/ 900	8768	1	900	1043	1350		12 x M 10	96	2	4	8	7	5	4	3	6	
RSD 1000/1800	8769	2	1800	1043	1350		12 x M 10	157	4	7	16	14	10	7	6	11	
RSD 1120/ 900	8770	1	900	1174	1350		12 x M 10	81	2	3	7	6	4	3	3	5	
RSD 1120/1800	8771	2	1800	1174	1350		12 x M 10	136	3	6	14	11	8	6	5	9	
RSD 1250/ 900	8772	1	900	1311	1460		12 x M 10	86	1	2	5	4	3	2	2	3	
RSD 1250/1800	8773	2	1800	1311	1460		12 x M 10	146	2	4	11	9	7	5	4	6	