ONLINE SELECTION TOOL
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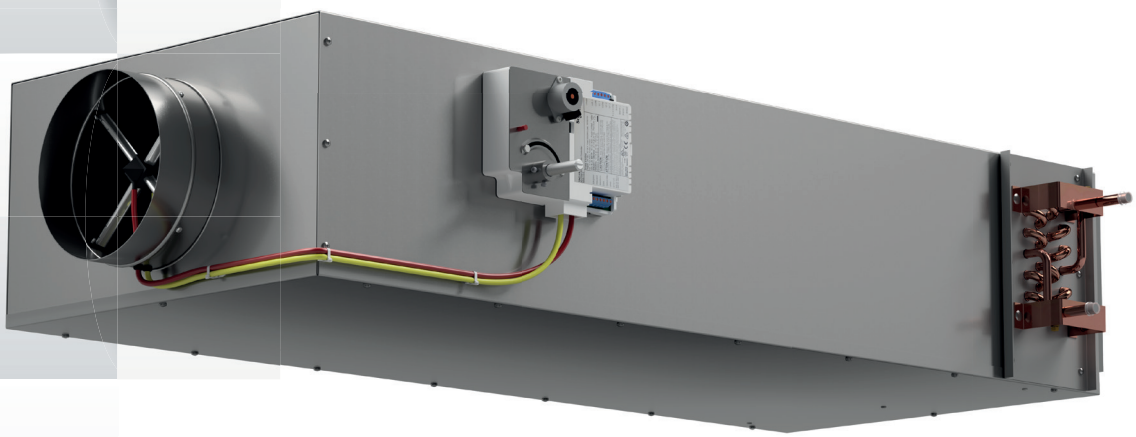


AIR VOLUME CONTROL TERMINALS

FOR LOW NOISE REQUIREMENTS | WITH INTEGRAL SOUND ATTENUATOR

NS TYPE

BARCOL-AIR
AIR DISTRIBUTION

Composition type designation:

N - S - O - R - E - O - B

Ordering example:

N	S	O	R	E	O	B	2	0	0	R	1	0	0	0
See above							Model			Handing controls & Heater	Reheat capacity			

N Position 1: **Product group**

N = air volume control terminals

S Position 2: **Function**

O = not applicable
S = VAV or CAV terminal with integral sound attenuator
1 = non standard, specify separately

O Position 3: **Controls (manufacturer)**

O = controls specified seperately

R Position 4: **Outlet**

O = not applicable
D = rectangular outlet and integral sound attenuation
E = circular outlet and integral sound attenuation
F = 4 circular outlets and integral sound attenuation
K = rectangular outlet, integral sound attenuation and provision for integral hot water reheat coil
L = circulair outlet, integral sound attenuation and provision for integral hot water reheat coil
M = 4 cirular outlets, integral sound attenuation and provision for integral hot water reheat coil
R = rectangular outlet, integral sound attenuation and provision for integral electric reheat coil
S = circular outlet, integral sound attenuation and provision for integral electric reheat coil
T = 4 circular outlets with integral sound attenuation and provision for integral electric reheat coil
1 = non standard, specify separately

E Position 5: **Reheat coil**

O = without reheat
A = 1-row hot water reheat coil
B = 2-row hot water reheat coil
D = 4-row hot water reheat coil
E = 1-stage 230VAC/1-phase electric reheat coil
F = 2-stage 230VAC/1-phase electric reheat coil
G = 3-stage 230VAC/1-phase electric reheat coil
H = 1-stage 400VAC/3-phase electric reheat coil
J = 2-stage 400VAC/3-phase electric reheat coil
T = 230VAC-1ph, modulating control (Thyristor)
V = 400VAC-3ph, modulating control (Thyristor)
1 = non standard, specify separately

O Position 6: **Controls (type & function)**

O = not applicable
R = return/extract application

B Position 7: **Sensor**

O = not applicable
B = Flo-Cross®, 2 x 12 point averaging and signal amplifying air flow sensor (standard)
1 = non standard, specify separately

Ordering information:

Standard terminals:

- quantity of terminals
- complete 7 digit code
- terminal size or model
- air volume setting (V_{max}, V_{min} etc)
- control handing (standard right side)
- if applicable, electric reheat coil capacity

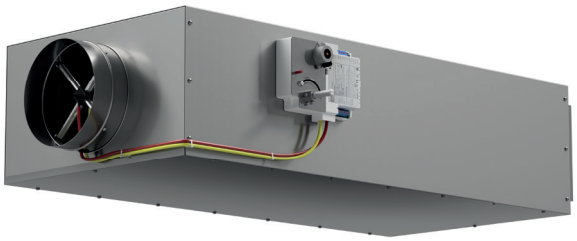
Non standard terminals:

- for non standard terminals a full description and/or drawing are requested

Ordering codes "Specials"

NS....B - FL = Flange connection 30 mm for rectangular outlet

Type NS.....



Application

Type NS rectangular pressure-independent VAV and CAV air volume control terminals are designed particularly for systems with low noise criteria and for the accurate measurement and control of air volumes courtesy of the patented airflow sensor type Flo-Cross®.
In CAV application, the terminals maintain the required constant airflow independent to the inlet static pressure.

In VAV application, the terminals control the air volume to the room, depending on the cooling load required thus saving energy consumption in both cooling and heating applications.

Alternatively VAV terminals are ideal to be used for CO_2 control. Dependent of the indoor air quality, always the correct amount of fresh air will be supplied to the room. Off course the primary air handling system need to be suitable for this.

The VAV or CAV terminals can be used either for supply or return air applications in new or refurbishment projects.
The terminals can optionally be supplied with a distribution plenum and a built-in hot water or electric reheat coil.

Features:
- Pressure independent control functions.
- Compact design; one-piece construction.
- Volume control range 100% down to 10%
- Low pressure loss over the terminal.
- Factory fitted in-built distribution plenum with built-in hot water or electric reheat coil.
- Low leakage damper, less than 2% of Vnom at 750 Pa.
- Very low noise production.
- Suitable for all control functions (VAV, CAV,shut-off, etc.) to maximise system energy savings.
- Flo-Cross® 2 x 12 points averaging and signal amplifying airflow sensor, better than 2,5% accuracy even with irregular duct approach.
- Maintenance free.

Technical information

Casing:
Air-tight construction made of galvanized sheet steel; casing leakage rate to Class II VDI 3803 / DIN 24 194. Duct-sleeve connections at the in- and outlet are suitable for DIN 24 145 or DIN 24 146 connections.

Insulation:
The terminal is supplied with 25 mm thermal and acoustical insulation (30 kg/m³) complying to: NFPA90A and 90B surface burning characteristics, BS476 part 6 and 7 fire propagation, UL 181 class 0 surface spread of flame and UL 94 HF1 flamability.
Special version insulation for hospital application on request.

Damper:
Damper blade: made of steel with neoprene gasket (low leakage).
Damper shaft: aluminium, ø12 mm with self lubricating POM bearings.

Flo-Cross®:
Extruded aluminium construction with nylon core + feet.

Distribution plenum:
Made of galvanized sheet steel with 13 mm internal isolation.
'Octopus' plenum with standard multiple outlet (4 x circular) outlet construction.
Optional single, double, triple or six circular outlets possible.
Outlet spigots are made of flame retardant polymer and optionally can be provided with volume control dampers made of galvanized sheet steel.

Reheat coil:
Choice of 1-, 2- or 4-row hot water reheat coil or electric reheat coil (230VAC/1-phase or 400VAC/3-phase).
More detailed technical information can be found in the separate NO documentation.

Controls:
Suitable for use with pneumatic, analogue electronic or DDC controllers. Controls can be factory fitted, wired and calibrated. Controls enclosure (galvanized sheet steel) can be provided optionally.

Specify as:

Example:
Supply and install, variable air volume terminals with integral sound attenuator and distribution plenum with 4 circular outlets, constructed from galvanized sheet steel. The casing leakage rate shall be classified according to class II, VDI 3803/DIN 24 194 and the duct-sleeve connections shall be suitable for DIN 24 145 or DIN 24 146 respectively. The VAV terminals shall have a low leakage damper blade with neoprene gasket and an aluminium damper shaft with self lubricating POM bearings.
A centre averaging airflow sensor with at least 2 x 12 test points and amplified signal air flow sensor, type Flo-Cross® shall control the airflow with an accuracy not less than 2.5 %.
The terminals shall be supplied with 1-row hot water reheat coil.

The controller shall be I/A Series, DDC controller: LonMark® compatible, type MNL-V2RVx or BACnet® compatible typ MNB-V2.

Controls must be factory fitted, wired and calibrated according to the following requirements.

Maximum air volume 250 l/s
Minimum air volume 60 l/s
Heating min. air volume 120 l/s
(in case of reheat)
Terminal size 200 mm
Max. pressure loss 38 Pa
Max. discharge sound index < NC20
(@250Pa Δ p)
Max. radiated sound index < NC20
(@250Pa Δ p)

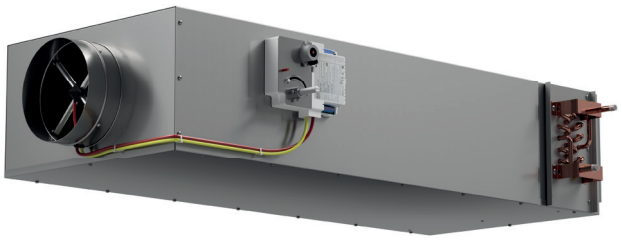
Ordering example: type – model – handing = NSOMAOB – 200R-0000

Manufacturer: Barcol-Air, the Netherlands

Installation Instructions:

The Barcol-Air VAV terminals shall be installed

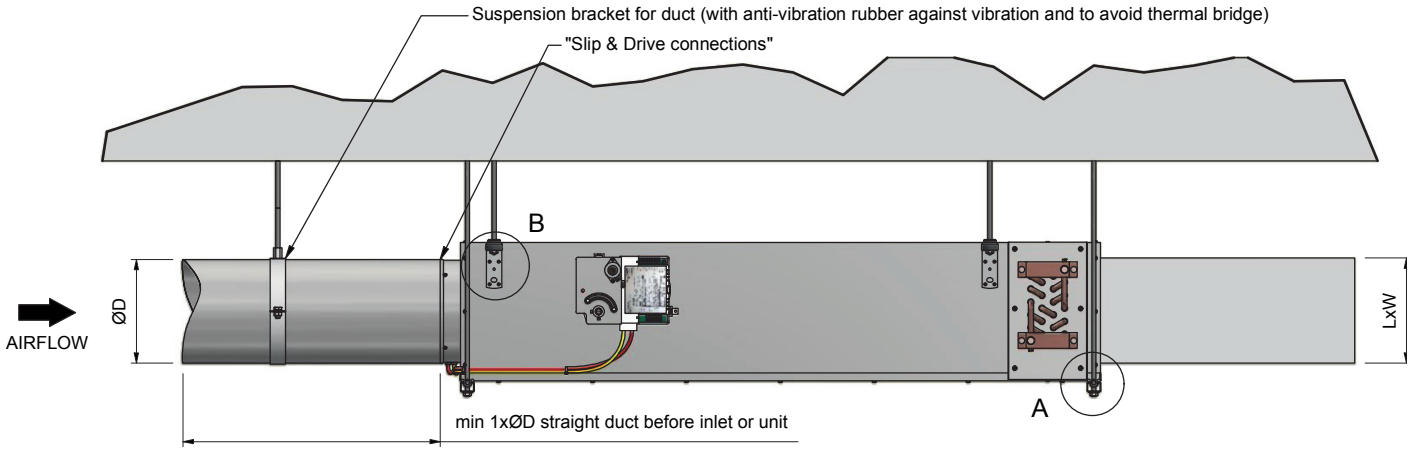
Type NS.....



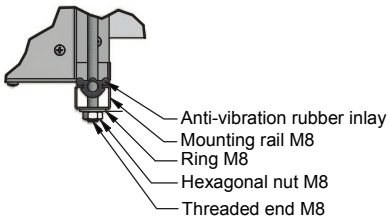
using at least two support brackets (DIN-rail or L-profile), with anti-vibration rubber under the terminal. Each of these brackets shall be fixed with two threaded rods to the ceiling slab above.

This installation method:
1 Shall prevent the body of the VAV terminal from high mechanical tension, which could damage the construction and performance of the terminal.
2 Shall prevent torsion on the VAV terminals, which could cause malfunction of the damper blades.
3 Provides some flexibility to the final location of the VAV terminals.
4 Use at least 1x diameter straight duct length before the VAV inlet.
5 Additional manual volume control dampers (VCD's) before the inlet are not required / recommended!!
6. All connections shall be thermally isolated.
7. Pressure sensing tubes of Flo-Cross® airflow sensor shall not be "kinked" or otherwise obstructed by the external duct insulation.

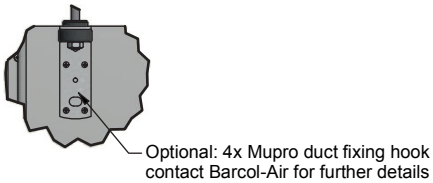
Optional 4 x Mupro fixing hooks can be used (see drawing).



View A (Standard mounting)

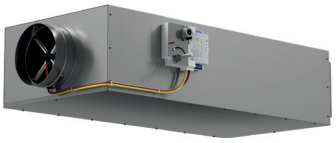


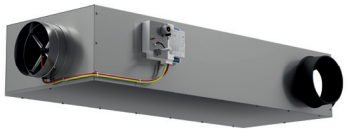
View B (Optional mounting)

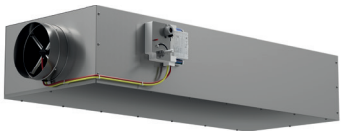


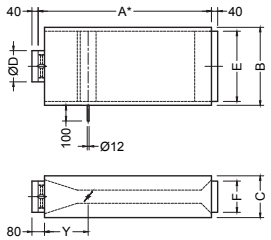
Air volume control terminals for low noise requirements

Dimensions

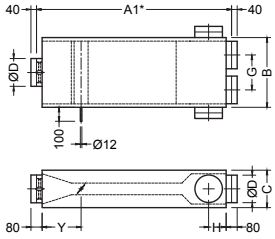








Type NSODOOB



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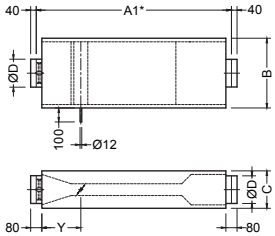

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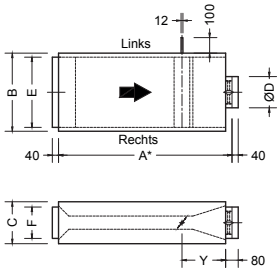


Type NSODORB

Dimensions

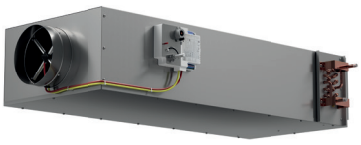
Model	100	125	160	200	250	315	355	400
A*	1110	1110	1110	1110	1110	1310	1310	1410
A1*	1400	1400	1400	1400	1500	1750	1850	1950
A2*	1260	1260	1260	1260	1260	1410	1410	1510
A3*	1550	1550	1550	1550	1650	1850	1950	2050
A4*	1540	1540	1575	1615	1765	2080	2220	2365
A5*	1690	1690	1725	1765	1915	2180	2320	2465
B	330	330	400	500	600	740	820	910
C	228	228	248	268	318	408	408	458
ØD	98	123	158	198	248	313	353	398
E	275	275	350	450	550	690	770	850
F	170	170	175	200	250	330	330	380
G	180	180	215	255	305	370	410	455
H	125	125	125	125	175	200	225	250
X	330	330	330	330	430	480	530	580
X1	352	352	352	352	452	502	552	602
X2	510	510	545	585	735	850	940	1035
X3	532	532	567	607	757	872	962	1057
Y	268	268	268	268	333	430	430	460

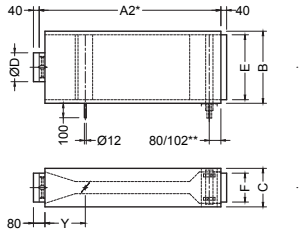
Notes:
1. All dimensions in mm.
*2. * = Installed length.*
*3. ** = Size varies with a 1-/2-row or 4-row hot water reheat coil.*

Kv Value

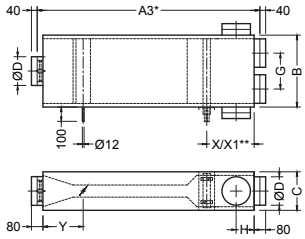
Model	100	125	160	200	250	315	355	400
Kv (l/s / Pa)	5,5	8,5	15,0	24,9	35,4	58,9	74,3	92,6

Flow = Kv x √ΔPfc
ΔPfc = Flo-Cross® signal
If ΔPfc = 30 Pa and VAV size = 160
Flow = 15,0 x √30 = 82 l/s

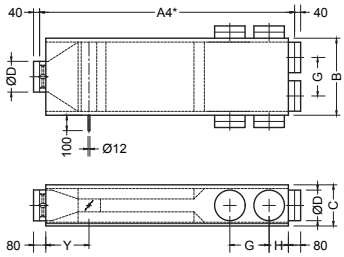




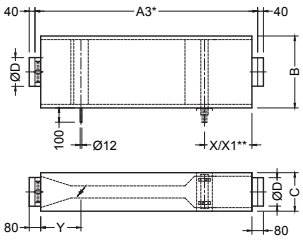
Type NSOK . OB



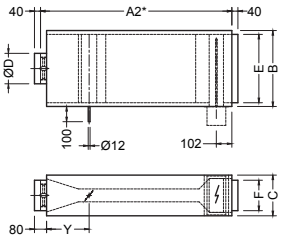
Type NSOM . OB



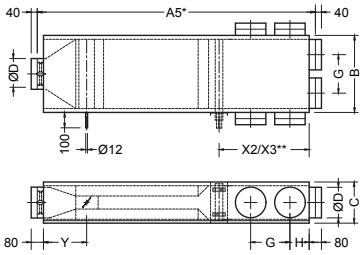
Type NSOFOOB-3006



Type NSOL . OB



Type NSOR . OB



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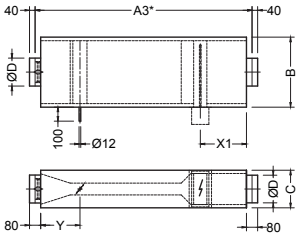
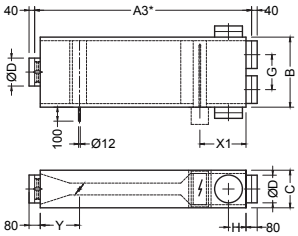
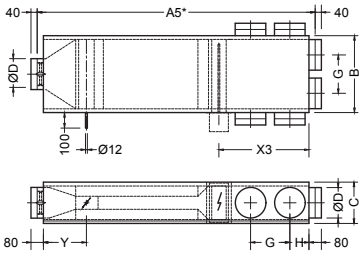


Type NSOS . OB



Type NSOT . OB

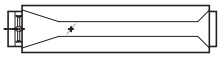


Type NSOTEOB-3006

Air volume control terminals for low noise requirements

Sound data

Type NSODOOB NSODORB
NSOEOOB



Sound data Δ p = 125 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 125 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	22	18	-	-	-	-	--	--	--	-	19	-	-	-	-	--	--	--
	4	29	62	106	1	29	28	-	-	-	-	--	--	--	22	23	-	-	18	-	--	--	--
	6	44	94	160	2	33	33	20	17	-	-	--	--	--	26	26	17	18	20	-	--	--	--
	8	59	125	213	4	35	37	24	20	-	-	--	--	--	28	28	19	20	21	-	--	--	--
	10	74	156	266	6	37	40	26	22	-	-	--	--	--	30	29	21	22	22	-	--	--	--
	12	89	188	320	9	38	42	28	24	-	-	--	--	--	32	30	22	24	23	-	--	--	--
125	2	23	49	84	1	29	25	-	-	-	-	--	--	--	24	18	-	-	-	-	--	--	--
	4	47	99	168	2	36	35	22	-	-	-	--	--	--	29	23	21	-	-	-	--	--	--
	6	70	149	253	5	40	40	27	19	-	-	--	--	--	31	25	24	-	-	-	--	--	--
	8	94	198	337	8	42	44	31	22	-	-	--	--	--	33	27	26	18	17	-	--	--	--
	10	117	248	421	13	44	47	34	24	-	-	--	--	--	34	28	27	20	18	-	--	--	--
	12	140	296	504	19	45	49	36	26	-	-	21	--	--	36	30	28	22	19	-	--	--	--
160	2	39	82	139	0	35	31	-	-	-	-	--	--	--	30	20	-	-	-	-	--	--	--
	4	78	164	279	2	39	38	24	-	-	-	--	--	--	37	30	19	-	-	-	--	--	--
	6	116	246	418	3	42	41	31	18	-	-	--	--	--	41	35	25	-	-	-	--	--	--
	8	155	328	558	6	43	44	36	23	-	-	--	--	--	44	40	30	21	-	-	--	--	--
	10	194	410	697	10	44	46	39	26	-	-	--	--	--	46	43	34	26	21	-	22	--	--
	12	232	491	835	14	45	47	42	29	18	-	--	--	--	48	45	37	30	25	18	24	--	--
200	2	61	129	219	0	30	21	-	-	-	-	--	--	--	28	-	-	-	-	-	--	--	--
	4	122	258	439	2	34	28	18	-	-	18	--	--	--	36	23	-	-	-	-	--	--	--
	6	183	387	658	4	37	32	24	-	-	21	--	--	--	40	29	-	-	-	-	--	--	--
	8	244	516	878	8	38	34	29	20	-	22	--	--	--	43	33	22	-	-	-	--	--	--
	10	305	645	1097	12	39	36	32	23	17	23	--	--	--	45	36	25	21	18	-	--	--	--
	12	366	775	1318	18	40	37	35	26	18	24	--	--	--	47	39	28	25	22	-	21	--	--
250	2	96	203	345	1	28	21	-	-	-	-	--	--	--	17	-	-	-	-	-	--	--	--
	4	192	406	690	5	36	33	19	-	-	-	--	--	--	25	23	-	-	-	-	--	--	--
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	12	575	1218	2070	41	46	49	45	43	39	33	22	--	--	37	35	23	22	23	18	--	--	--
315	2	153	324	550	1	-	-	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	306	648	1101	4	34	30	-	-	-	-	--	--	--	30	22	-	-	-	-	--	--	--
	6	459	971	1651	8	44	39	25	23	18	-	--	--	--	37	28	-	-	-	-	--	--	--
	8	612	1295	2202	15	51	45	33	32	25	-	21	--	--	42	32	22	-	-	-	--	--	--
	10	764	1619	2752	23	56	50	39	39	31	17	26	--	22	47	35	26	19	17	-	--	--	--
	12	917	1942	3301	34	60	53	44	44	35	20	30	25	26	50	38	29	23	20	-	23	--	--
355	2	195	412	701	1	25	20	-	-	-	-	--	--	--	27	20	-	-	-	-	--	--	--
	4	389	824	1401	5	42	35	-	-	-	-	--	--	--	40	30	19	-	-	-	--	--	--
	6	584	1236	2102	12	52	44	27	22	19	20	22	--	--	47	36	26	-	-	-	--	--	--
	8	779	1649	2803	22	59	51	35	31	26	25	29	24	26	52	40	31	18	-	-	25	--	21
	10	973	2061	3503	34	64	55	41	38	31	28	34	30	32	56	43	35	22	20	-	29	24	26
	12	1168	2473	4205	49	69	59	46	43	36	31	38	36	36	60	46	39	26	22	-	32	28	30
400	2	248	524	891	1	17	20	-	-	-	-	--	--	--	20	23	-	-	-	-	--	--	--
	4	495	1049	1783	4	35	36	23	-	21	24	--	--	--	33	33	21	-	-	-	--	--	--
	6	743	1573	2674	8	45	45	35	30	32	31	--	--	--	40	39	28	-	19	-	--	--	--
	8	990	2097	3565	15	52	51	43	39	39	36	25	--	21	46	43	34	21	22	-	22	--	--
	10	1238	2621	4456	23	57	56	49	46	44	39	30	23	26	50	46	38	26	25	-	25	--	21
	12	1485	3145	5346	33	61	60	53	51	49	42	34	28	30	53	49	41	29	27	-	28	21	24

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
2. Lw in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".
3. The discharge sound power levels Lw are measured in free space and including end reflection.
4. The discharge sound pressure levels are determined with the assumptions as mentioned in table 1 for downstream ductwork including a diffuser with insulated plenum box.
5. The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and suspended ceiling absorption.
6. Lp values are including a room absorption of 10 dB/Oct.
7. dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
8. Δps is static pressure drop across VAV air volume control terminal with damper fully open.
9. For non standard applications and/or selections, please contatct our technical staff.

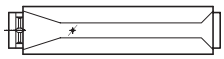
Table 1: Assumptions for additional attenuation

Hz	125	250	500	1K	2K	4K
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	8	11	20	27	28	22	dB
125	7	10	19	26	27	21	dB
160	6	9	18	24	25	19	dB
200	5	10	16	22	23	20	dB
250	6	13	19	26	22	15	dB
315	6	12	19	25	21	17	dB
355	6	12	19	25	21	17	dB
400	5	11	15	19	19	14	dB

Type NSODOOB NSODORB NSOEOOB



Sound data Δ p = 250 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 250 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	25	24	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	29	62	106	1	32	31	20	-	-	-	--	--	--	25	20	-	-	20	-	--	--	--
	6	44	94	160	2	36	35	24	21	-	-	--	--	--	30	25	-	19	22	-	--	--	--
	8	59	125	213	4	39	38	27	24	-	-	--	--	--	35	29	20	23	25	-	--	--	--
	10	74	156	266	6	42	41	30	27	-	-	--	--	--	38	33	23	26	27	-	--	--	--
	12	89	188	320	9	44	43	32	29	-	-	21	--	--	42	37	27	29	29	-	--	--	--
125	2	23	49	84	1	30	32	19	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	47	99	168	2	37	39	26	17	-	-	--	--	--	25	20	18	-	-	-	--	--	--
	6	70	149	253	5	42	43	30	22	-	-	20	--	--	31	26	24	-	-	-	--	--	--
	8	94	198	337	8	45	46	34	25	-	-	23	--	20	35	30	28	19	17	-	--	--	--
	10	117	248	421	13	47	49	36	27	19	-	26	20	23	39	34	32	22	19	-	--	--	--
	12	140	296	504	19	50	51	39	30	21	-	28	23	26	42	37	35	25	22	-	--	--	--
160	2	39	82	139	0	33	32	24	-	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	78	164	279	2	40	38	31	20	-	-	--	--	--	35	33	22	-	-	-	--	--	--
	6	116	246	418	3	44	43	35	24	-	-	21	--	--	41	39	27	21	19	-	--	--	--
	8	155	328	558	6	47	46	38	27	-	-	24	--	20	45	43	32	24	21	-	21	--	--
	10	194	410	697	10	50	48	41	30	18	-	27	20	23	49	47	35	28	23	17	25	--	21
	12	232	491	835	14	52	51	43	32	20	17	29	23	26	52	50	39	30	25	19	28	22	25
200	2	61	129	219	0	34	32	24	-	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	122	258	439	2	41	39	31	23	18	-	--	--	--	36	32	18	-	17	-	--	--	--
	6	183	387	658	4	45	43	35	28	22	20	22	--	--	42	38	24	20	20	17	--	--	--
	8	244	516	878	8	48	46	38	31	25	23	25	--	21	46	42	28	24	22	18	21	--	--
	10	305	645	1097	12	51	49	41	33	28	25	28	21	23	50	46	32	27	24	20	25	--	20
	12	366	775	1318	18	53	51	43	36	30	28	30	23	26	53	49	35	30	26	21	28	21	24
250	2	96	203	345	1	36	33	26	23	21	-	--	--	--	28	21	-	-	-	-	--	--	--
	4	192	406	690	5	43	40	33	30	28	23	--	--	--	37	29	19	-	-	-	--	--	--
	6	288	609	1035	10	47	44	37	34	32	27	24	--	--	43	35	24	-	18	-	--	--	--
	8	383	812	1380	18	50	48	40	37	35	30	27	--	22	47	39	28	20	20	-	21	--	--
	10	479	1015	1725	28	52	50	43	40	38	33	29	22	25	51	43	32	23	22	18	24	--	--
	12	575	1218	2070	41	55	53	45	42	40	35	32	25	28	54	46	35	26	25	19	28	21	23
315	2	153	324	550	1	38	37	31	28	24	21	--	--	--	30	24	-	-	-	-	--	--	--
	4	306	648	1101	4	45	44	38	35	31	28	23	--	--	39	32	23	-	18	-	--	--	--
	6	459	971	1651	8	49	48	42	39	35	32	27	--	23	44	38	28	20	21	18	--	--	--
	8	612	1295	2202	15	53	51	45	42	38	35	30	24	26	49	42	33	23	23	19	23	--	--
	10	764	1619	2752	23	55	54	48	45	41	38	33	27	29	52	46	36	26	25	20	27	--	21
	12	917	1942	3301	34	58	56	50	47	43	40	35	29	32	56	49	40	29	27	22	30	23	25
355	2	195	412	701	1	41	40	37	33	28	21	--	--	--	31	24	-	-	-	-	--	--	--
	4	389	824	1401	5	48	47	43	40	35	28	27	--	22	40	32	22	-	-	-	--	--	--
	6	584	1236	2102	12	52	51	48	44	39	32	31	24	26	46	38	28	19	19	-	--	--	--
	8	779	1649	2803	22	55	55	51	47	42	35	34	27	30	50	42	32	23	21	-	24	--	--
	10	973	2061	3503	34	57	57	53	50	45	38	36	30	32	54	46	36	26	24	17	27	21	23
	12	1168	2473	4205	49	60	60	56	52	47	40	39	33	35	57	49	39	28	26	19	31	25	26
400	2	248	524	891	1	42	42	38	34	29	-	21	--	--	33	22	-	-	-	-	--	--	--
	4	495	1049	1783	4	49	48	45	41	36	23	28	20	23	42	31	18	-	-	-	--	--	--
	6	743	1573	2674	8	53	53	49	46	40	27	32	25	28	47	36	24	-	-	-	20	--	--
	8	990	2097	3565	15	56	56	52	49	43	30	35	29	31	52	41	28	19	17	-	25	--	20
	10	1238	2621	4456	23	59	58	55	51	46	33	38	32	34	55	44	32	22	19	-	28	23	25
	12	1485	3145	5346	33	61	61	57	54	48	35	40	35	36	59	48	35	25	22	-	32	27	28

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
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3. The discharge sound power levels Lw are measured in free space and including end reflection.
4. The discharge sound pressure levels are determined with the assumptions as mentioned in table 1 for downstream ductwork including a diffuser with insulated plenum box.
5. The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and suspended ceiling absorption.
6. Lp values are including a room absorption of 10 dB/Oct.
7. dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
8. Δps is static pressure drop across VAV air volume control terminal with damper fully open.
9. For non standard applications and/or selections, please contatct our technical staff.

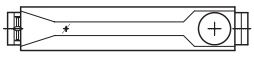
Table 1: Assumptions for additional attenuation

Hz	125	250	500	1K	2K	4K
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	8	11	20	27	28	22	dB
125	7	10	19	26	27	21	dB
160	6	9	18	24	25	19	dB
200	5	10	16	22	23	20	dB
250	6	13	19	26	22	15	dB
315	6	12	19	25	21	17	dB
355	6	12	19	25	21	17	dB
400	5	11	15	19	19	14	dB

Type NSOFOOB



Sound data Δ p = 125 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 125 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	-	-	-	-	-	-	--	--	--	-	19	-	-	-	-	--	--	--
	4	29	62	106	1	23	21	-	-	-	-	--	--	--	22	23	-	-	18	-	--	--	--
	6	44	94	160	2	27	26	-	-	-	-	--	--	--	26	26	17	18	20	-	--	--	--
	8	59	125	213	4	29	30	-	-	-	-	--	--	--	28	28	19	20	21	-	--	--	--
	10	74	156	266	6	31	33	18	-	-	-	--	--	--	30	29	21	22	22	-	--	--	--
	12	89	188	320	9	32	35	20	-	-	-	--	--	--	32	30	22	24	23	-	--	--	--
125	2	23	49	84	1	23	18	-	-	-	-	--	--	--	24	18	-	-	-	-	--	--	--
	4	47	99	168	2	30	28	-	-	-	-	--	--	--	29	23	21	-	-	-	--	--	--
	6	70	149	253	5	34	33	19	-	-	-	--	--	--	31	25	24	-	-	-	--	--	--
	8	94	198	337	8	36	37	23	-	-	-	--	--	--	33	27	26	18	17	-	--	--	--
	10	117	248	421	13	38	40	26	-	-	-	--	--	--	34	28	27	20	18	-	--	--	--
	12	140	296	504	19	39	42	28	-	-	-	--	--	--	36	30	28	22	19	-	--	--	--
160	2	39	82	139	0	29	24	-	-	-	-	--	--	--	30	20	-	-	-	-	--	--	--
	4	78	164	279	2	33	31	-	-	-	-	--	--	--	37	30	19	-	-	-	--	--	--
	6	116	246	418	3	36	34	23	-	-	-	--	--	--	41	35	25	-	-	-	--	--	--
	8	155	328	558	6	37	37	28	-	-	-	--	--	--	44	40	30	21	-	-	--	--	--
	10	194	410	697	10	38	39	31	-	-	-	--	--	--	46	43	34	26	21	-	--	--	--
	12	232	491	835	14	39	40	34	19	-	-	--	--	--	48	45	37	30	25	18	20	--	--
200	2	61	129	219	0	24	-	-	-	-	-	--	--	--	28	-	-	-	-	-	--	--	--
	4	122	258	439	2	28	21	-	-	-	-	--	--	--	36	23	-	-	-	-	--	--	--
	6	183	387	658	4	31	25	-	-	-	-	--	--	--	40	29	-	-	-	-	--	--	--
	8	244	516	878	8	32	27	21	-	-	-	--	--	--	43	33	22	-	-	-	--	--	--
	10	305	645	1097	12	33	29	24	-	-	-	--	--	--	45	36	25	21	18	-	--	--	--
	12	366	775	1318	18	34	30	27	-	-	-	--	--	--	47	39	28	25	22	-	--	--	--
250	2	96	203	345	1	22	-	-	-	-	-	--	--	--	17	-	-	-	-	-	--	--	--
	4	192	406	690	5	30	26	-	-	-	-	--	--	--	25	23	-	-	-	-	--	--	--
	6	288	609	1035	10	34	32	21	-	-	-	--	--	--	29	28	-	-	-	-	--	--	--
	8	383	812	1380	18	37	36	28	22	-	-	--	--	--	33	31	17	-	-	-	--	--	--
	10	479	1015	1725	28	39	40	33	28	22	18	--	--	--	35	33	20	19	20	-	--	--	--
	12	575	1218	2070	41	40	42	37	33	27	21	--	--	--	37	35	23	22	23	18	--	--	--
315	2	153	324	550	1	-	-	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	306	648	1101	4	28	23	-	-	-	-	--	--	--	30	22	-	-	-	-	--	--	--
	6	459	971	1651	8	38	32	17	-	-	-	--	--	--	37	28	-	-	-	-	--	--	--
	8	612	1295	2202	15	45	38	25	22	-	-	--	--	--	42	32	22	-	-	-	--	--	--
	10	764	1619	2752	23	50	43	31	29	19	-	--	--	--	47	35	26	19	17	-	--	--	--
	12	917	1942	3301	34	54	46	36	34	23	-	24	--	--	50	38	29	23	20	-	--	--	--
355	2	195	412	701	1	19	-	-	-	-	-	--	--	--	27	20	-	-	-	-	--	--	--
	4	389	824	1401	5	36	28	-	-	-	-	--	--	--	40	30	19	-	-	-	--	--	--
	6	584	1236	2102	12	46	37	19	-	-	-	--	--	--	47	36	26	-	-	-	--	--	--
	8	779	1649	2803	22	53	44	27	21	-	-	23	--	--	52	40	31	18	-	-	22	--	--
	10	973	2061	3503	34	58	48	33	28	19	-	28	23	25	56	43	35	22	20	-	26	20	22
	12	1168	2473	4205	49	63	52	38	33	24	19	32	28	29	60	46	39	26	22	-	29	25	26
400	2	248	524	891	1	-	-	-	-	-	-	--	--	--	20	23	-	-	-	-	--	--	--
	4	495	1049	1783	4	29	29	-	-	-	-	--	--	--	33	33	21	-	-	-	--	--	--
	6	743	1573	2674	8	39	38	27	20	20	19	--	--	--	40	39	28	-	19	-	--	--	--
	8	990	2097	3565	15	46	44	35	29	27	24	--	--	--	46	43	34	21	22	-	--	--	--
	10	1238	2621	4456	23	51	49	41	36	32	27	23	--	--	50	46	38	26	25	-	21	--	--
	12	1485	3145	5346	33	55	53	45	41	37	30	27	--	22	53	49	41	29	27	-	24	--	--

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
2. Lw in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".
3. The discharge sound power levels Lw are measured in free space and including end reflection.
4. The discharge sound pressure levels are determined with the assumptions as mentioned in table 1 for downstream ductwork including a diffuser with insulated plenum box.
5. The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and suspended ceiling absorption.
6. Lp values are including a room absorption of 10 dB/Oct.
7. dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
8. Δps is static pressure drop across VAV air volume control terminal with damper fully open.
9. For non standard applications and/or selections, please contatct our technical staff.

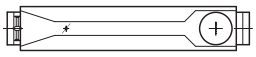
Table 1: Assumptions for additional attenuation

Hz	125	250	500	1K	2K	4K
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	14	18	28	37	38	34	dB
125	13	17	27	36	38	33	dB
160	12	16	26	34	37	31	dB
200	11	17	24	32	35	32	dB
250	12	20	27	36	34	27	dB
315	12	19	27	35	33	29	dB
355	12	19	27	35	33	29	dB
400	11	18	23	29	31	26	dB

Type NSOFOOB



Sound data Δ p = 250 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 250 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	19	17	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	29	62	106	1	26	24	-	-	-	-	--	--	--	25	20	-	-	20	-	--	--	--
	6	44	94	160	2	30	28	-	-	-	-	--	--	--	30	25	-	19	22	-	--	--	--
	8	59	125	213	4	33	31	19	-	-	-	--	--	--	35	29	20	23	25	-	--	--	--
	10	74	156	266	6	36	34	22	-	-	-	--	--	--	38	33	23	26	27	-	--	--	--
	12	89	188	320	9	38	36	24	19	-	-	--	--	--	42	37	27	29	29	-	--	--	--
125	2	23	49	84	1	24	25	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	47	99	168	2	31	32	18	-	-	-	--	--	--	25	20	18	-	-	-	--	--	--
	6	70	149	253	5	36	36	22	-	-	-	--	--	--	31	26	24	-	-	-	--	--	--
	8	94	198	337	8	39	39	26	-	-	-	--	--	--	35	30	28	19	17	-	--	--	--
	10	117	248	421	13	41	42	28	17	-	-	--	--	--	39	34	32	22	19	-	--	--	--
	12	140	296	504	19	44	44	31	20	-	-	--	--	--	42	37	35	25	22	-	--	--	--
160	2	39	82	139	0	27	25	-	-	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	78	164	279	2	34	31	23	-	-	-	--	--	--	35	33	22	-	-	-	--	--	--
	6	116	246	418	3	38	36	27	-	-	-	--	--	--	41	39	27	21	19	-	--	--	--
	8	155	328	558	6	41	39	30	-	-	-	--	--	--	45	43	32	24	21	-	21	--	--
	10	194	410	697	10	44	41	33	20	-	-	--	--	--	49	47	35	28	23	17	25	--	21
	12	232	491	835	14	46	44	35	22	-	-	--	--	--	52	50	39	30	25	19	28	22	25
200	2	61	129	219	0	28	25	-	-	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	122	258	439	2	35	32	23	-	-	-	--	--	--	36	32	18	-	17	-	--	--	--
	6	183	387	658	4	39	36	27	18	-	-	--	--	--	42	38	24	20	20	17	--	--	--
	8	244	516	878	8	42	39	30	21	-	-	--	--	--	46	42	28	24	22	18	21	--	--
	10	305	645	1097	12	45	42	33	23	-	-	--	--	--	50	46	32	27	24	20	25	--	20
	12	366	775	1318	18	47	44	35	26	18	-	--	--	--	53	49	35	30	26	21	28	21	24
250	2	96	203	345	1	30	26	18	-	-	-	--	--	--	28	21	-	-	-	-	--	--	--
	4	192	406	690	5	37	33	25	20	-	-	--	--	--	37	29	19	-	-	-	--	--	--
	6	288	609	1035	10	41	37	29	24	20	-	--	--	--	43	35	24	-	18	-	--	--	--
	8	383	812	1380	18	44	41	32	27	23	18	--	--	--	47	39	28	20	20	-	21	--	--
	10	479	1015	1725	28	46	43	35	30	26	21	--	--	--	51	43	32	23	22	18	24	--	--
	12	575	1218	2070	41	49	46	37	32	28	23	20	--	--	54	46	35	26	25	19	28	21	23
315	2	153	324	550	1	32	30	23	18	-	-	--	--	--	30	24	-	-	-	-	--	--	--
	4	306	648	1101	4	39	37	30	25	19	-	--	--	--	39	32	23	-	18	-	--	--	--
	6	459	971	1651	8	43	41	34	29	23	20	--	--	--	44	38	28	20	21	18	--	--	--
	8	612	1295	2202	15	47	44	37	32	26	23	--	--	--	49	42	33	23	23	19	23	--	--
	10	764	1619	2752	23	49	47	40	35	29	26	21	--	--	52	46	36	26	25	20	27	--	21
	12	917	1942	3301	34	52	49	42	37	31	28	24	--	--	56	49	40	29	27	22	30	23	25
355	2	195	412	701	1	35	33	29	23	-	-	--	--	--	31	24	-	-	-	-	--	--	--
	4	389	824	1401	5	42	40	35	30	23	-	--	--	--	40	32	22	-	-	-	--	--	--
	6	584	1236	2102	12	46	44	40	34	27	20	--	--	--	46	38	28	19	19	-	--	--	--
	8	779	1649	2803	22	49	48	43	37	30	23	22	--	--	50	42	32	23	21	-	24	--	--
	10	973	2061	3503	34	51	50	45	40	33	26	24	--	--	54	46	36	26	24	17	27	21	23
	12	1168	2473	4205	49	54	53	48	42	35	28	27	--	22	57	49	39	28	26	19	31	25	26
400	2	248	524	891	1	36	35	30	24	-	-	--	--	--	33	22	-	-	-	-	--	--	--
	4	495	1049	1783	4	43	41	37	31	24	-	--	--	--	42	31	18	-	-	-	--	--	--
	6	743	1573	2674	8	47	46	41	36	28	-	--	--	--	47	36	24	-	-	-	20	--	--
	8	990	2097	3565	15	50	49	44	39	31	18	23	--	--	52	41	28	19	17	-	25	--	20
	10	1238	2621	4456	23	53	51	47	41	34	21	26	--	21	55	44	32	22	19	-	28	23	25
	12	1485	3145	5346	33	55	54	49	44	36	23	28	21	23	59	48	35	25	22	-	32	27	28

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
2. Lw in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".
3. The discharge sound power levels Lw are measured in free space and including end reflection.
4. The discharge sound pressure levels are determined with the assumptions as mentioned in table 1 for downstream ductwork including a diffuser with insulated plenum box.
5. The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and suspended ceiling absorption.
6. Lp values are including a room absorption of 10 dB/Oct.
7. dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
8. Δps is static pressure drop across VAV air volume control terminal with damper fully open.
9. For non standard applications and/or selections, please contatct our technical staff.

Table 1: Assumptions for additional attenuation

Hz	125	250	500	1K	2K	4K
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

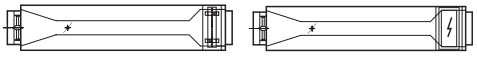
Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	14	18	28	37	38	34	dB
125	13	17	27	36	38	33	dB
160	12	16	26	34	37	31	dB
200	11	17	24	32	35	32	dB
250	12	20	27	36	34	27	dB
315	12	19	27	35	33	29	dB
355	12	19	27	35	33	29	dB
400	11	18	23	29	31	26	dB

Air volume control terminals for low noise requirements

Sound data

Type NSOK . OB *NSOL . OB*
NSOR . OB *NSOS . OB*



Sound data Δ p = 125 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 125 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	24	19	-	-	-	-	--	--	--	-	19	-	-	-	-	--	--	--
	4	29	62	106	2	31	29	-	-	-	-	--	--	--	22	23	-	-	18	-	--	--	--
	6	44	94	160	4	35	35	22	19	-	-	--	--	--	26	26	17	18	20	-	--	--	--
	8	59	125	213	7	38	39	26	22	-	-	--	--	--	28	28	19	20	21	-	--	--	--
	10	74	156	266	10	40	42	29	25	-	-	--	--	--	30	29	21	22	22	-	--	--	--
	12	89	188	320	15	41	45	31	27	-	-	--	--	--	32	30	22	24	23	-	--	--	--
125	2	23	49	84	1	30	26	-	-	-	-	--	--	--	24	18	-	-	-	-	--	--	--
	4	47	99	168	5	37	36	24	-	-	-	--	--	--	29	23	21	-	-	-	--	--	--
	6	70	149	253	11	42	42	29	21	-	-	--	--	--	31	25	24	-	-	-	--	--	--
	8	94	198	337	19	44	46	33	24	17	-	--	--	--	33	27	26	18	17	-	--	--	--
	10	117	248	421	29	46	49	36	27	18	-	22	--	--	34	28	27	20	18	-	--	--	--
	12	140	296	504	42	48	52	38	29	18	-	24	--	21	36	30	28	22	19	-	--	--	--
160	2	39	82	139	1	36	32	-	-	-	-	--	--	--	30	20	-	-	-	-	--	--	--
	4	78	164	279	5	41	39	26	-	-	-	--	--	--	37	30	19	-	-	-	--	--	--
	6	116	246	418	12	44	43	33	20	-	-	--	--	--	41	35	25	-	-	-	--	--	--
	8	155	328	558	22	46	46	38	25	17	-	--	--	--	44	40	30	21	-	-	--	--	--
	10	194	410	697	34	47	48	42	29	19	-	21	--	--	46	43	34	26	21	-	22	--	--
	12	232	491	835	49	48	50	45	32	20	-	23	--	--	48	45	37	30	25	18	24	--	--
200	2	61	129	219	2	31	22	-	-	-	-	--	--	--	28	-	-	-	-	-	--	--	--
	4	122	258	439	6	36	30	19	-	-	19	--	--	--	36	23	-	-	-	-	--	--	--
	6	183	387	658	14	39	34	26	-	-	23	--	--	--	40	29	-	-	-	-	--	--	--
	8	244	516	878	25	40	36	31	22	18	25	--	--	--	43	33	22	-	-	-	--	--	--
	10	305	645	1097	38	42	38	35	26	20	26	--	--	--	45	36	25	21	18	-	--	--	--
	12	366	775	1318	55	43	40	38	29	21	27	--	--	--	47	39	28	25	22	-	21	--	--
250	2	96	203	345	2	30	22	-	-	-	-	--	--	--	17	-	-	-	-	-	--	--	--
	4	192	406	690	9	38	34	21	-	-	-	--	--	--	25	23	-	-	-	-	--	--	--
	6	288	609	1035	21	42	41	31	25	23	22	--	--	--	29	28	-	-	-	-	--	--	--
	8	383	812	1380	37	45	46	38	34	31	28	--	--	--	33	31	17	-	-	-	--	--	--
	10	479	1015	1725	58	47	49	43	41	37	33	22	--	--	35	33	20	19	20	-	--	--	--
	12	575	1218	2070	83	49	52	48	46	42	36	25	--	22	37	35	23	22	23	18	--	--	--
315	2	153	324	550	2	17	-	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	306	648	1101	8	35	32	-	-	-	-	--	--	--	30	22	-	-	-	-	--	--	--
	6	459	971	1651	18	46	41	27	25	20	-	--	--	--	37	28	-	-	-	-	--	--	--
	8	612	1295	2202	32	53	47	36	34	28	-	24	--	--	42	32	22	-	-	-	--	--	--
	10	764	1619	2752	50	58	52	42	41	34	20	29	23	25	47	35	26	19	17	-	--	--	--
	12	917	1942	3301	71	63	56	47	47	38	23	33	28	30	50	38	29	23	20	-	23	--	--
355	2	195	412	701	3	26	21	-	-	-	-	--	--	--	27	20	-	-	-	-	--	--	--
	4	389	824	1401	12	44	37	18	-	-	-	--	--	--	40	30	19	-	-	-	--	--	--
	6	584	1236	2102	28	54	46	29	24	21	22	24	--	20	47	36	26	-	-	-	--	--	--
	8	779	1649	2803	50	62	53	38	33	28	27	31	27	28	52	40	31	18	-	-	25	--	21
	10	973	2061	3503	78	67	58	44	40	34	31	37	34	35	56	43	35	22	20	-	29	24	26
	12	1168	2473	4205	112	71	62	49	46	39	34	41	39	40	60	46	39	26	22	-	32	28	30
400	2	248	524	891	2	18	22	-	-	-	-	--	--	--	20	23	-	-	-	-	--	--	--
	4	495	1049	1783	9	36	38	25	18	23	25	--	--	--	33	33	21	-	-	-	--	--	--
	6	743	1573	2674	20	47	47	37	32	34	33	20	--	--	40	39	28	-	19	-	--	--	--
	8	990	2097	3565	36	54	54	45	41	41	38	27	21	23	46	43	34	21	22	-	22	--	--
	10	1238	2621	4456	57	59	59	51	49	47	42	32	26	29	50	46	38	26	25	-	25	--	21
	12	1485	3145	5346	82	64	63	56	54	52	45	37	31	33	53	49	41	29	27	-	28	21	24

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
2. Lw in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".
3. The discharge sound power levels Lw are measured in free space and including end reflection.
4. The discharge sound pressure levels are determined with the assumptions as mentioned in table 1 for downstream ductwork including a diffuser with insulated plenum box.
5. The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and suspended ceiling absorption.
6. Lp values are including a room absorption of 10 dB/Oct.
7. dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
8. Δps is static pressure drop across VAV air volume control terminal with damper fully open.
9. For non standard applications and/or selections, please contatct our technical staff.

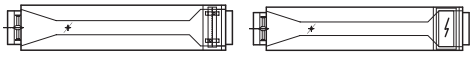
Table 1: Assumptions for additional attenuation

Hz	125	250	500	1K	2K	4K
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	9	12	22	30	31	25	dB
125	8	12	21	29	30	24	dB
160	7	10	20	27	28	22	dB
200	6	11	18	25	26	23	dB
250	7	14	21	29	25	18	dB
315	7	13	21	28	24	20	dB
355	7	13	21	28	24	20	dB
400	6	12	17	22	22	17	dB

Type NSOK . OB *NSOL . OB*
NSOR . OB *NSOS . OB*



Sound data Δ p = 250 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 250 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	26	25	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	29	62	106	2	33	33	21	18	-	-	--	--	--	25	20	-	-	20	-	--	--	--
	6	44	94	160	4	38	37	26	23	-	-	--	--	--	30	25	-	19	22	-	--	--	--
	8	59	125	213	7	41	40	29	26	-	-	--	--	--	35	29	20	23	25	-	--	--	--
	10	74	156	266	10	44	43	32	29	-	-	--	--	--	38	33	23	26	27	-	--	--	--
	12	89	188	320	15	47	46	35	32	-	20	--	--	--	42	37	27	29	29	-	--	--	--
125	2	23	49	84	1	32	33	21	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	47	99	168	5	39	40	28	19	-	-	--	--	--	25	20	18	-	-	-	--	--	--
	6	70	149	253	11	43	45	32	23	-	-	--	--	--	31	26	24	-	-	-	--	--	--
	8	94	198	337	19	47	48	36	27	18	-	21	--	--	35	30	28	19	17	-	--	--	--
	10	117	248	421	29	50	51	39	30	21	-	24	--	20	39	34	32	22	19	-	--	--	--
	12	140	296	504	42	52	54	41	32	24	19	26	20	23	42	37	35	25	22	-	--	--	--
160	2	39	82	139	1	34	33	25	-	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	78	164	279	5	42	40	33	21	-	-	--	--	--	35	33	22	-	-	-	--	--	--
	6	116	246	418	12	46	44	37	26	-	-	--	--	--	41	39	27	21	19	-	--	--	--
	8	155	328	558	22	49	48	40	29	17	-	22	--	--	45	43	32	24	21	-	21	--	--
	10	194	410	697	34	52	51	43	32	20	17	25	--	20	49	47	35	28	23	17	25	--	21
	12	232	491	835	49	55	53	46	34	23	20	27	20	23	52	50	39	30	25	19	28	22	25
200	2	61	129	219	2	35	33	25	18	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	122	258	439	6	42	40	32	25	19	-	--	--	--	36	32	18	-	17	-	--	--	--
	6	183	387	658	14	47	45	37	29	24	21	--	--	--	42	38	24	20	20	17	--	--	--
	8	244	516	878	25	50	48	40	33	27	25	22	--	--	46	42	28	24	22	18	21	--	--
	10	305	645	1097	38	53	51	43	36	30	28	25	--	21	50	46	32	27	24	20	25	--	20
	12	366	775	1318	55	56	54	46	38	33	30	28	21	23	53	49	35	30	26	21	28	21	24
250	2	96	203	345	2	37	35	27	24	22	17	--	--	--	28	21	-	-	-	-	--	--	--
	4	192	406	690	9	44	42	34	32	29	25	--	--	--	37	29	19	-	-	-	--	--	--
	6	288	609	1035	21	48	46	39	36	34	29	21	--	--	43	35	24	-	18	-	--	--	--
	8	383	812	1380	37	52	50	42	39	37	32	24	--	--	47	39	28	20	20	-	21	--	--
	10	479	1015	1725	58	55	53	45	42	40	35	27	--	22	51	43	32	23	22	18	24	--	--
	12	575	1218	2070	83	57	55	48	45	43	38	29	22	25	54	46	35	26	25	19	28	21	23
315	2	153	324	550	2	40	38	32	29	25	22	--	--	--	30	24	-	-	-	-	--	--	--
	4	306	648	1101	8	47	45	40	36	33	29	--	--	--	39	32	23	-	18	-	--	--	--
	6	459	971	1651	18	51	50	44	41	37	34	24	--	--	44	38	28	20	21	18	--	--	--
	8	612	1295	2202	32	55	53	48	44	40	37	27	20	23	49	42	33	23	23	19	23	--	--
	10	764	1619	2752	50	58	56	50	47	43	40	30	24	26	52	46	36	26	25	20	27	--	21
	12	917	1942	3301	71	60	59	53	50	46	43	33	27	29	56	49	40	29	27	22	30	23	25
355	2	195	412	701	3	42	42	38	34	29	22	--	--	--	31	24	-	-	-	-	--	--	--
	4	389	824	1401	12	49	49	45	41	36	29	22	--	--	40	32	22	-	-	-	--	--	--
	6	584	1236	2102	28	53	53	49	46	41	34	27	--	23	46	38	28	19	19	-	--	--	--
	8	779	1649	2803	50	57	57	53	49	44	37	30	24	26	50	42	32	23	21	-	24	--	--
	10	973	2061	3503	78	60	59	56	52	47	40	33	27	30	54	46	36	26	24	17	27	21	23
	12	1168	2473	4205	112	62	62	58	55	50	43	36	30	32	57	49	39	28	26	19	31	25	26
400	2	248	524	891	2	43	43	39	36	30	17	--	--	--	33	22	-	-	-	-	--	--	--
	4	495	1049	1783	9	51	50	46	43	37	25	24	--	--	42	31	18	-	-	-	--	--	--
	6	743	1573	2674	20	55	54	51	47	42	29	28	21	24	47	36	24	-	-	-	20	--	--
	8	990	2097	3565	36	58	58	54	51	45	33	32	25	28	52	41	28	19	17	-	25	--	20
	10	1238	2621	4456	57	61	61	57	54	48	35	35	29	31	55	44	32	22	19	-	28	23	25
	12	1485	3145	5346	82	64	63	60	56	51	38	37	32	34	59	48	35	25	22	-	32	27	28

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
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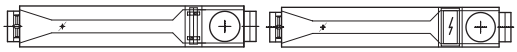
Table 1: Assumptions for additional attenuation

Hz	125	250	500	1K	2K	4K
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	9	12	22	30	31	25	dB
125	8	12	21	29	30	24	dB
160	7	10	20	27	28	22	dB
200	6	11	18	25	26	23	dB
250	7	14	21	29	25	18	dB
315	7	13	21	28	24	20	dB
355	7	13	21	28	24	20	dB
400	6	12	17	22	22	17	dB

Type NSOM . OB
NSOT . OB



Sound data Δ p = 125 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 125 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	18	-	-	-	-	-	--	--	--	-	19	-	-	-	-	--	--	--
	4	29	62	106	2	25	22	-	-	-	-	--	--	--	22	23	-	-	18	-	--	--	--
	6	44	94	160	4	29	28	-	-	-	-	--	--	--	26	26	17	18	20	-	--	--	--
	8	59	125	213	7	32	32	18	-	-	-	--	--	--	28	28	19	20	21	-	--	--	--
	10	74	156	266	10	34	35	21	-	-	-	--	--	--	30	29	21	22	22	-	--	--	--
	12	89	188	320	15	35	38	23	-	-	-	--	--	--	32	30	22	24	23	-	--	--	--
125	2	23	49	84	1	24	19	-	-	-	-	--	--	--	24	18	-	-	-	-	--	--	--
	4	47	99	168	5	31	29	-	-	-	-	--	--	--	29	23	21	-	-	-	--	--	--
	6	70	149	253	11	36	35	21	-	-	-	--	--	--	31	25	24	-	-	-	--	--	--
	8	94	198	337	19	38	39	25	-	-	-	--	--	--	33	27	26	18	17	-	--	--	--
	10	117	248	421	29	40	42	28	-	-	-	--	--	--	34	28	27	20	18	-	--	--	--
	12	140	296	504	42	42	45	30	19	-	-	--	--	--	36	30	28	22	19	-	--	--	--
160	2	39	82	139	1	30	25	-	-	-	-	--	--	--	30	20	-	-	-	-	--	--	--
	4	78	164	279	5	35	32	18	-	-	-	--	--	--	37	30	19	-	-	-	--	--	--
	6	116	246	418	12	38	36	25	-	-	-	--	--	--	41	35	25	-	-	-	--	--	--
	8	155	328	558	22	40	39	30	-	-	-	--	--	--	44	40	30	21	-	-	--	--	--
	10	194	410	697	34	41	41	34	19	-	-	--	--	--	46	43	34	26	21	-	22	--	--
	12	232	491	835	49	42	43	37	22	-	-	--	--	--	48	45	37	30	25	18	24	--	--
200	2	61	129	219	2	25	-	-	-	-	-	--	--	--	28	-	-	-	-	-	--	--	--
	4	122	258	439	6	30	23	-	-	-	-	--	--	--	36	23	-	-	-	-	--	--	--
	6	183	387	658	14	33	27	18	-	-	-	--	--	--	40	29	-	-	-	-	--	--	--
	8	244	516	878	25	34	29	23	-	-	-	--	--	--	43	33	22	-	-	-	--	--	--
	10	305	645	1097	38	36	31	27	-	-	-	--	--	--	45	36	25	21	18	-	--	--	--
	12	366	775	1318	55	37	33	30	19	-	-	--	--	--	47	39	28	25	22	-	21	--	--
250	2	96	203	345	2	24	-	-	-	-	-	--	--	--	17	-	-	-	-	-	--	--	--
	4	192	406	690	9	32	27	-	-	-	-	--	--	--	25	23	-	-	-	-	--	--	--
	6	288	609	1035	21	36	34	23	-	-	-	--	--	--	29	28	-	-	-	-	--	--	--
	8	383	812	1380	37	39	39	30	24	19	-	--	--	--	33	31	17	-	-	-	--	--	--
	10	479	1015	1725	58	41	42	35	31	25	21	--	--	--	35	33	20	19	20	-	--	--	--
	12	575	1218	2070	83	43	45	40	36	30	24	--	--	--	37	35	23	22	23	18	--	--	--
315	2	153	324	550	2	-	-	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	306	648	1101	8	29	25	-	-	-	-	--	--	--	30	22	-	-	-	-	--	--	--
	6	459	971	1651	18	40	34	19	-	-	-	--	--	--	37	28	-	-	-	-	--	--	--
	8	612	1295	2202	32	47	40	28	24	-	-	--	--	--	42	32	22	-	-	-	--	--	--
	10	764	1619	2752	50	52	45	34	31	22	-	23	--	--	47	35	26	19	17	-	--	--	--
	12	917	1942	3301	71	57	49	39	37	26	-	27	21	23	50	38	29	23	20	-	23	--	--
355	2	195	412	701	3	20	-	-	-	-	-	--	--	--	27	20	-	-	-	-	--	--	--
	4	389	824	1401	12	38	30	-	-	-	-	--	--	--	40	30	19	-	-	-	--	--	--
	6	584	1236	2102	28	48	39	21	-	-	-	--	--	--	47	36	26	-	-	-	--	--	--
	8	779	1649	2803	50	56	46	30	23	-	-	25	--	21	52	40	31	18	-	-	25	--	21
	10	973	2061	3503	78	61	51	36	30	22	19	31	26	28	56	43	35	22	20	-	29	24	26
	12	1168	2473	4205	112	65	55	41	36	27	22	35	32	33	60	46	39	26	22	-	32	28	30
400	2	248	524	891	2	-	-	-	-	-	-	--	--	--	20	23	-	-	-	-	--	--	--
	4	495	1049	1783	9	30	31	17	-	-	-	--	--	--	33	33	21	-	-	-	--	--	--
	6	743	1573	2674	20	41	40	29	22	22	21	--	--	--	40	39	28	-	19	-	--	--	--
	8	990	2097	3565	36	48	47	37	31	29	26	21	--	--	46	43	34	21	22	-	22	--	--
	10	1238	2621	4456	57	53	52	43	39	35	30	26	--	21	50	46	38	26	25	-	25	--	21
	12	1485	3145	5346	82	58	56	48	44	40	33	30	23	25	53	49	41	29	27	-	28	21	24

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
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3. The discharge sound power levels Lw are measured in free space and including end reflection.
4. The discharge sound pressure levels are determined with the assumptions as mentioned in table 1 for downstream ductwork including a diffuser with insulated plenum box.
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9. For non standard applications and/or selections, please contatct our technical staff.

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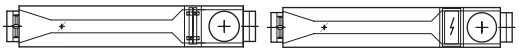
Discharge (dB)	5	10	20	30	30	25
Radiated (dB)	2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	15	19	30	38	38	37	dB
125	14	19	29	38	38	36	dB
160	13	17	28	37	38	34	dB
200	12	18	26	35	38	35	dB
250	13	21	29	38	37	30	dB
315	13	20	29	38	36	32	dB
355	13	20	29	38	36	32	dB
400	12	19	25	32	34	29	dB

Type NSOM . OB
NSOT . OB



Sound data Δ p = 250 Pa

Model	data refering to inlet spigot				min. Δ p_s	Δ p = 250 Pa																	
						discharge sound									radiated sound								
						L_w in dB/Oct. (re 1pW)						Lp values			L_w in dB/Oct. (re 1pW)						Lp values		
	velocity	air volume				125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB(A)	NC	NR
	m/s	l/s	CFM	m^3/h	Pa	dB									dB								
100	2	15	31	53	0	20	18	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	29	62	106	2	27	26	-	-	-	-	--	--	--	25	20	-	-	20	-	--	--	--
	6	44	94	160	4	32	30	18	-	-	-	--	--	--	30	25	-	19	22	-	--	--	--
	8	59	125	213	7	35	33	21	-	-	-	--	--	--	35	29	20	23	25	-	--	--	--
	10	74	156	266	10	38	36	24	19	-	-	--	--	--	38	33	23	26	27	-	--	--	--
	12	89	188	320	15	41	39	27	22	-	-	--	--	--	42	37	27	29	29	-	--	--	--
125	2	23	49	84	1	26	26	-	-	-	-	--	--	--	-	-	-	-	-	-	--	--	--
	4	47	99	168	5	33	33	20	-	-	-	--	--	--	25	20	18	-	-	-	--	--	--
	6	70	149	253	11	37	38	24	-	-	-	--	--	--	31	26	24	-	-	-	--	--	--
	8	94	198	337	19	41	41	28	-	-	-	--	--	--	35	30	28	19	17	-	--	--	--
	10	117	248	421	29	44	44	31	20	-	-	--	--	--	39	34	32	22	19	-	--	--	--
	12	140	296	504	42	46	47	33	22	-	-	--	--	--	42	37	35	25	22	-	--	--	--
160	2	39	82	139	1	28	26	17	-	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	78	164	279	5	36	33	25	-	-	-	--	--	--	35	33	22	-	-	-	--	--	--
	6	116	246	418	12	40	37	29	-	-	-	--	--	--	41	39	27	21	19	-	--	--	--
	8	155	328	558	22	43	41	32	19	-	-	--	--	--	45	43	32	24	21	-	21	--	--
	10	194	410	697	34	46	44	35	22	-	-	--	--	--	49	47	35	28	23	17	25	--	21
	12	232	491	835	49	49	46	38	24	-	-	21	--	--	52	50	39	30	25	19	28	22	25
200	2	61	129	219	2	29	26	17	-	-	-	--	--	--	27	24	-	-	-	-	--	--	--
	4	122	258	439	6	36	33	24	-	-	-	--	--	--	36	32	18	-	17	-	--	--	--
	6	183	387	658	14	41	38	29	19	-	-	--	--	--	42	38	24	20	20	17	--	--	--
	8	244	516	878	25	44	41	32	23	-	-	--	--	--	46	42	28	24	22	18	21	--	--
	10	305	645	1097	38	47	44	35	26	18	-	--	--	--	50	46	32	27	24	20	25	--	20
	12	366	775	1318	55	50	47	38	28	21	18	21	--	--	53	49	35	30	26	21	28	21	24
250	2	96	203	345	2	31	28	19	-	-	-	--	--	--	28	21	-	-	-	-	--	--	--
	4	192	406	690	9	38	35	26	22	17	-	--	--	--	37	29	19	-	-	-	--	--	--
	6	288	609	1035	21	42	39	31	26	22	17	--	--	--	43	35	24	-	18	-	--	--	--
	8	383	812	1380	37	46	43	34	29	25	20	--	--	--	47	39	28	20	20	-	21	--	--
	10	479	1015	1725	58	49	46	37	32	28	23	20	--	--	51	43	32	23	22	18	24	--	--
	12	575	1218	2070	83	51	48	40	35	31	26	23	--	--	54	46	35	26	25	19	28	21	23
315	2	153	324	550	2	34	31	24	19	-	-	--	--	--	30	24	-	-	-	-	--	--	--
	4	306	648	1101	8	41	38	32	26	21	17	--	--	--	39	32	23	-	18	-	--	--	--
	6	459	971	1651	18	45	43	36	31	25	22	--	--	--	44	38	28	20	21	18	--	--	--
	8	612	1295	2202	32	49	46	40	34	28	25	21	--	--	49	42	33	23	23	19	23	--	--
	10	764	1619	2752	50	52	49	42	37	31	28	24	--	--	52	46	36	26	25	20	27	--	21
	12	917	1942	3301	71	54	52	45	40	34	31	26	--	21	56	49	40	29	27	22	30	23	25
355	2	195	412	701	3	36	35	30	24	-	-	--	--	--	31	24	-	-	-	-	--	--	--
	4	389	824	1401	12	43	42	37	31	24	17	--	--	--	40	32	22	-	-	-	--	--	--
	6	584	1236	2102	28	47	46	41	36	29	22	20	--	--	46	38	28	19	19	-	--	--	--
	8	779	1649	2803	50	51	50	45	39	32	25	24	--	--	50	42	32	23	21	-	24	--	--
	10	973	2061	3503	78	54	52	48	42	35	28	26	--	22	54	46	36	26	24	17	27	21	23
	12	1168	2473	4205	112	56	55	50	45	38	31	29	22	25	57	49	39	28	26	19	31	25	26
400	2	248	524	891	2	37	36	31	26	18	-	--	--	--	33	22	-	-	-	-	--	--	--
	4	495	1049	1783	9	45	43	38	33	25	-	--	--	--	42	31	18	-	-	-	--	--	--
	6	743	1573	2674	20	49	47	43	37	30	17	22	--	--	47	36	24	-	-	-	20	--	--
	8	990	2097	3565	36	52	51	46	41	33	21	25	--	20	52	41	28	19	17	-	25	--	20
	10	1238	2621	4456	57	55	54	49	44	36	23	28	21	23	55	44	32	22	19	-	28	23	25
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200	12	18	26	35	38	35	dB
250	13	21	29	38	37	30	dB
315	13	20	29	38	36	32	dB
355	13	20	29	38	36	32	dB
400	12	19	25	32	34	29	dB

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