

NS series

**Rectangular CAV and VAV air volume control terminals
with integral sound attenuator**

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Rectangular CAV and VAV air volume control terminals with integral sound attenuator

Type designation
(NS)

Composition type designation:

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

N Position 1: **Product group**

N = air volume control terminals

B Position 2: **Function**

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

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

O = without controls
For controls, contact our sales staff

Q 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 = circular outlet, integral sound attenuation and provision for integral hot water reheat coil
M = 4 circular 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
1 = non standard, specify separately

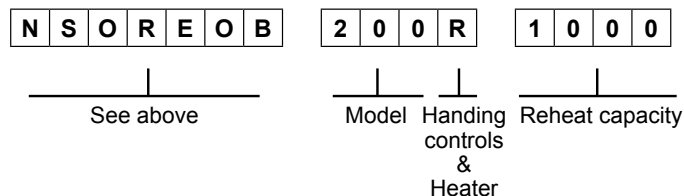
O Position 6: **Controls (type & function)**

O = without controls
R = return/extract application
For controls, contact our sales staff

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 example:



Ordering codes "Specials"

N..1... - 3010 = 4 balancing dampers in 'Octopus' outlet
N..1... - 3006 = 'Octopus' with 6 outlets instead of 4
N..1... - 3016 = 'Octopus' with 6 outlets incl. balancing dampers
N..1... - FL = Flange connection 30 mm for rectangular outlet

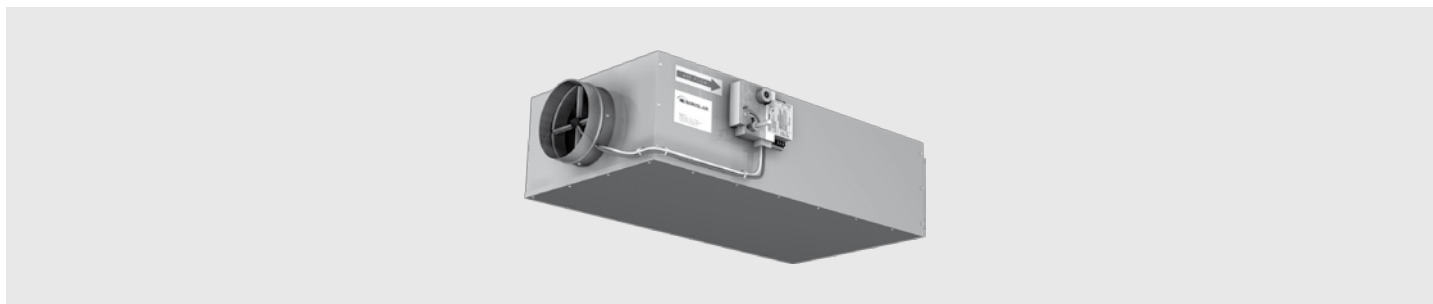
Ordering information:

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



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 CO₂ control. Dependent of the indoor air quality, always the correct amount of fresh air will be supplied to the room. Of 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 V_{nom} 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 flammability. 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 Nylon 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.

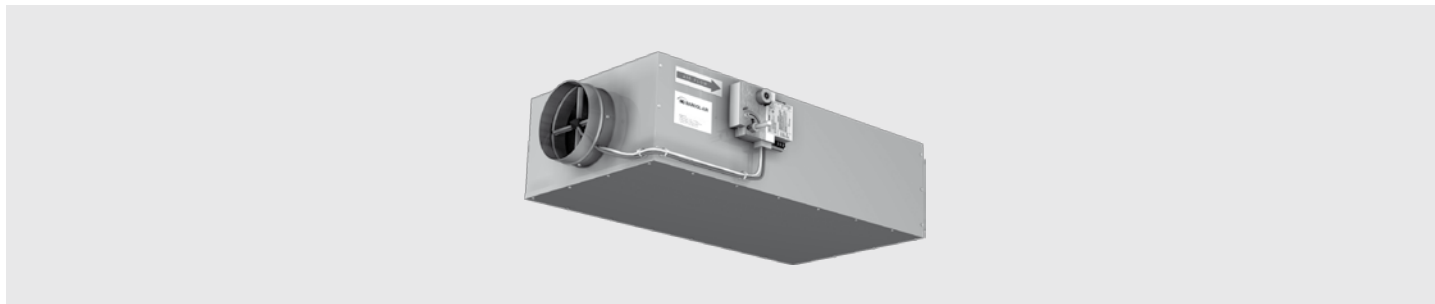
Delivery format

Delivery format:

- The VAV or CAV terminal will be supplied as a single mounting assembly.
Optional ordered distribution plenum, reheat coil and/or controls are factory fitted, wired and calibrated. The on site delivered terminal is ready to be installed and commissioned.
- Controls location and hot water or electric connections are as a standard fitted on the right hand side of the terminal when looking in the direction of the airflow.
- On request, the terminal can be delivered with connections on the left hand side.
- When terminals are ordered with controls, these will be factory fitted, wired and calibrated upon request.
- When terminals are ordered with 'free-issue' controls by others, wiring diagrams and mounting instructions must be provided.

Rectangular CAV and VAV air volume control terminals with integral sound attenuator

Technical data
Type NS



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 Nylon 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
Minimum 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 =
NSOMA0B – 200R

Manufacturer: HC Barcol-Air

Installation Instructions:

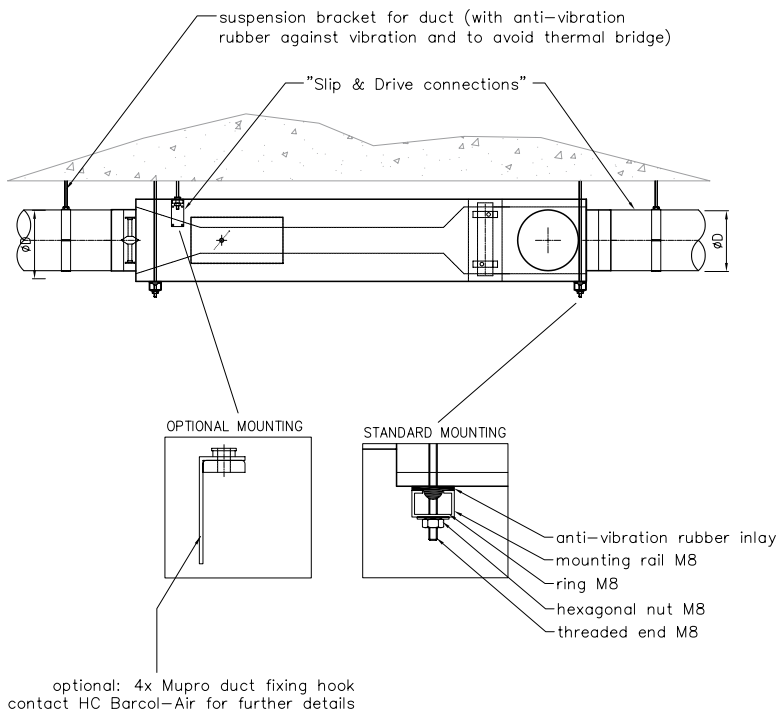
The HC Barcol-Air VAV terminals shall be installed using at least two support brackets (DIN-rail or L-profile), with anti-vibration rubber under the terminal. Each of these brackets shall be fixed with two threaded rods to the ceiling slab above.

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 diagonal straight duct length before the VAV inlet.

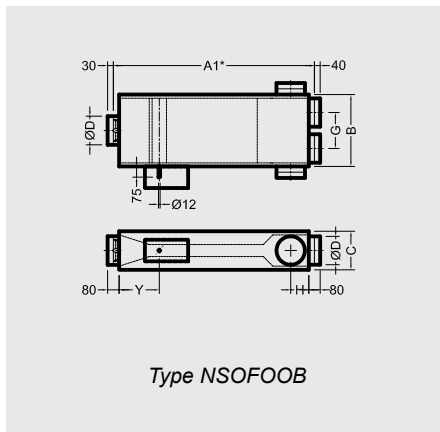
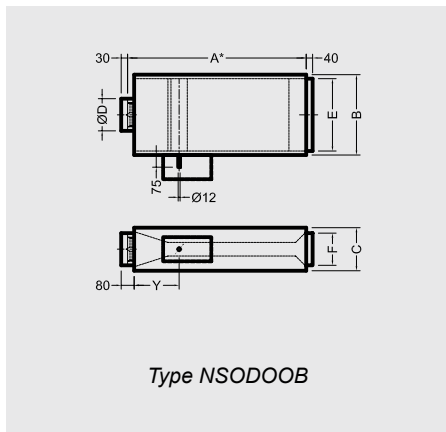
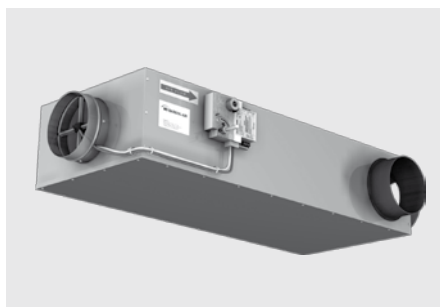
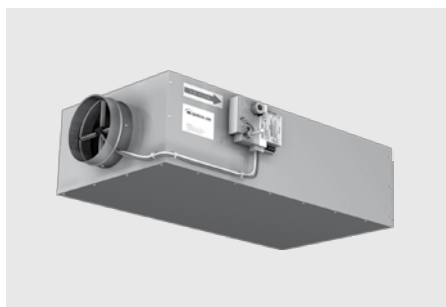
- 5 Additional manual volume control dampers (VCD's) before the inlet are not required / recommended!!
6. All connections shall be thermally isolated.
7. Pressure sensing tubes of Flo-Cross® airflow sensor shall not be "kinked" or otherwise obstructed by the external duct insulation.

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



Rectangular CAV and VAV air volume control terminals with integral sound attenuator

Model overview
(NS.....)



Dimensions NS

Model	100	125	160	200	250	315	355	400
A*	1110	1110	1110	1110	1110	1310	1310	1410
A1*	1360	1360	1360	1360	1460	1710	1710	1910
A2*	1260	1260	1260	1260	1260	1410	1410	1510
A3*	1510	1510	1510	1510	1610	1810	1810	2010
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
Y	268	268	268	268	333	430	430	460

Other dimensions are available upon request.

All dimensions in mm.

* = Installed length.

** = Size varies with a 1-/2-row or 4-row hot water reheat coil.

Kv values

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 $\sqrt{\Delta P_{fc}}$

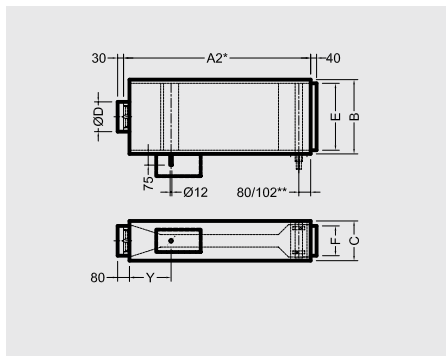
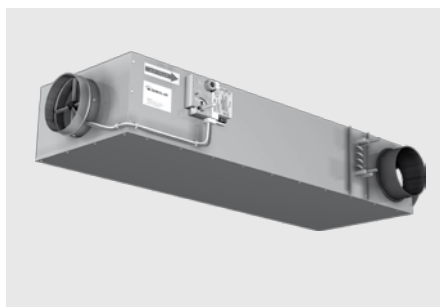
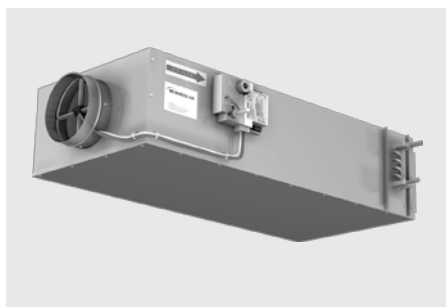
ΔP_{fc} = Flo-Cross® signal

If ΔP_{fc} = 30 Pa and VAV size = 160

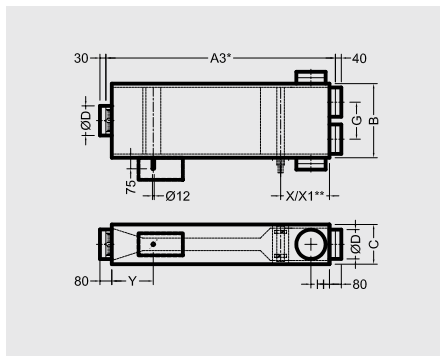
Flow = 15,0 x $\sqrt{30}$ = 82 l/s

Rectangular CAV and VAV air volume control terminals with integral sound attenuator

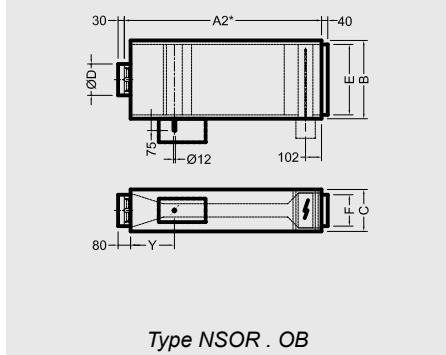
Model overview
(NS.....)



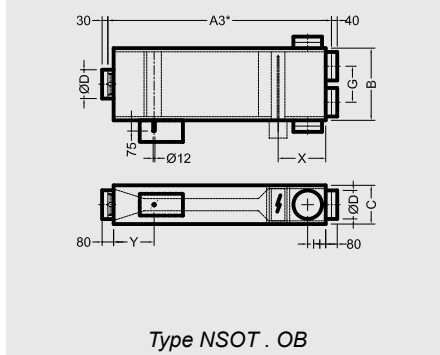
Type NSOK . OB



Type NSOM . OB



Type NSOR . OB



Type NSOT . OB

For dimensions see page 4.

Retangular CAV and VAV air volume control terminals *Type NSOFOOB* with integral sound attenuator



Sound data $\Delta p = 125$ Pa

Model	data referring to inlet spigot				min. Δp_s	$\Delta p = 125$ Pa																		
						discharge sound						radiated sound												
	velocity		air volume			L _w in dB/Oct. (re 1pW)						L _p values			L _w in dB/Oct. (re 1pW)						L _p values			
						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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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	-	-	-	-	-
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	-	-	-	-	-
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	-	-	22	-	-
200	2	61	129	219	0	30	23	-	-	-	-	-	-	-	31	20	-	-	-	-	-	-	-	-
	4	122	258	439	2	35	30	-	-	-	-	-	-	-	38	30	-	-	-	-	-	-	-	-
	6	183	387	658	4	37	34	23	-	-	-	-	-	-	43	36	20	-	-	-	-	-	-	-
	8	244	516	878	8	38	36	27	-	-	-	-	-	-	46	40	25	20	-	-	-	20	-	-
	10	305	645	1097	12	39	38	31	21	-	-	-	-	-	48	44	28	25	21	-	-	23	-	-
250	2	96	203	345	1	25	-	-	-	-	-	-	-	-	26	18	-	-	-	-	-	-	-	-
	4	192	406	690	5	33	26	-	-	-	-	-	-	-	34	26	-	-	-	-	-	-	-	-
	6	288	609	1035	10	37	32	19	-	-	-	-	-	-	38	31	20	-	-	-	-	-	-	-
	8	383	812	1380	18	40	36	26	19	-	-	-	-	-	41	34	25	-	17	-	-	-	-	-
	10	479	1015	1725	28	42	40	31	25	21	18	-	-	-	44	37	28	20	20	-	-	-	-	-
315	2	153	324	550	1	-	-	-	-	-	-	-	-	-	22	19	-	-	-	-	-	-	-	-
	4	306	648	1101	4	26	24	-	-	-	-	-	-	-	34	29	17	-	-	-	-	-	-	-
	6	459	971	1651	8	36	33	22	-	-	-	-	-	-	42	34	25	-	-	-	-	-	-	-
	8	612	1295	2202	15	42	39	29	24	21	18	-	-	-	47	38	30	19	20	-	-	21	-	-
	10	764	1619	2752	23	48	44	35	31	26	21	-	-	-	51	42	34	24	23	-	-	24	-	-
355	2	195	412	701	1	-	-	-	-	-	-	-	-	-	23	19	-	-	-	-	-	-	-	-
	4	389	824	1401	5	27	27	-	-	-	-	-	-	-	36	29	-	-	-	-	-	-	-	-
	6	584	1236	2102	12	37	36	28	17	-	-	-	-	-	43	35	24	-	-	-	-	-	-	-
	8	779	1649	2803	22	44	42	36	27	22	-	-	-	-	48	39	29	19	19	-	-	22	-	-
	10	973	2061	3503	34	49	47	42	33	28	20	21	-	-	52	42	34	23	22	-	-	25	-	21
400	2	248	524	891	1	-	-	-	-	-	-	-	-	-	23	19	-	-	-	-	-	-	-	-
	4	495	1049	1783	4	27	27	18	-	-	-	-	-	-	36	28	-	-	-	-	-	-	-	-
	6	743	1573	2674	8	37	36	29	21	17	-	-	-	-	43	34	20	-	-	-	-	-	-	-
	8	990	2097	3565	15	44	42	37	30	25	-	-	-	-	49	38	26	-	-	-	-	22	-	-
	10	1238	2621	4456	23	49	47	43	37	30	18	22	-	-	53	42	30	20	18	-	-	26	-	22

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
2. L_w 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 pressure levels are determined with the assumptions as mentioned in table 1 for downstream ductwork including a diffuser with insulated plenum box.
4. The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and suspended ceiling absorption.
5. L_p values are including a room absorption of 10 dB/Oct.

6. dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
7. Δp_s is static pressure drop across VAV air volume control terminal with damper fully open.
8. For non standard applications and/or selections, please contact 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



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