

## DUAL DUCT VAV & CAV

### MIXING AIR VOLUME CONTROL TERMINALS

**NZ TYPE**





### Composition type designation

**N - Z - O - A - O - O - B**

#### **N** Position 1: **Product group**

N = air volume control units

#### **Z** Position 2: **Function**

Z = Dual duct mixing unit  
1 = non standard, specify separately

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

O = controls specified separately

#### **A** Position 4: **Outlet and sound attenuator**

A = rectangular outlet  
D = rectangular outlet and sound attenuator (supplied separately)  
1 = non standard, specify separately

#### **O** Position 5: **Reheater**

O = not applicable

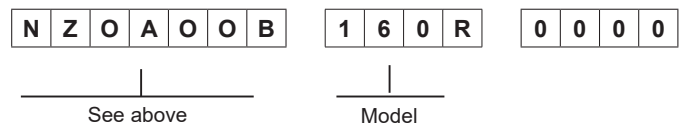
#### **O** Position 6: **Controls (type & function)**

O = without controls  
For controls, contact our sales staff

#### **B** Position 7: **Sensor**

O = without sensor(s)  
B = Flo-Cross® air flow sensor, in cold and warm inlet spigot  
G = Flo-Cross® air flow sensor, in cold or warm inlet spigot and Flo-Cross® air flow sensor in outlet spigot  
1 = non standard, specify separately

#### Ordering example:



#### Ordering information:

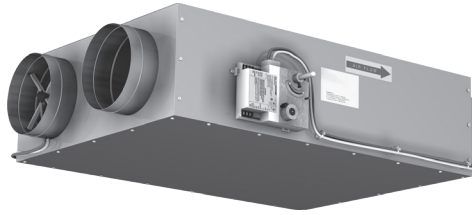
##### Standard units:

- quantity of units
- complete 7 digit code
- unit size or model,
- control setting (Vmax, Vmin, Vtot etc.)
- controls handing (standard on both sides of the unit, cold duct is standard located on the left side of the unit)

##### Non standard units:

- For non standard units a full description and/or drawing are requested.

## Type NZ.....



## Application

- The pressure independent dual duct units with integral mixing section type NZ.A..B provide a constant or variable air volume in dual duct systems. The engineered, reliable long life design offers proportional mixing without the risk of "short-cut" of hot and cold air at the inlet. The airflow sensor type Flo-Cross® in one inlet is standard and provides an accurate measurement and control of the cold or warm air volume. Normally the cold air volume is controlled by a thermostat to match the room load while the hot air volume is controlled to maintain a constant mixed supply volume to the room.

### Features:

- Pressure independent control functions.
- Mixing rate better than 96%, this means that with a primary temperature difference of 20°C, the total air temperature varies a maximum of 0,8°C over the entire outlet spigot.
- Low leakage dampers, less than 2% of Vnom at 750 Pa. Oval shaped damper blades for linear control characteristics.
- Low pressure loss over unit.
- Compact, one-piece construction.
- Suitable for all control functions.
- Accurate control of cold air volume courtesy of the Flo-Cross® 2x12 points averaging and signal amplifying air flow sensor with high accuracy, even with irregular duct approach.
- For the control of cold, warm and total air volume, several standard control solutions are available; for more details, please contact our technical staff.

## Technical information

### Casing:

Rectangular, galvanized sheet steel, casing leakage rate to class II, DI 3803 /DIN 24 194. Mixing section; galvanised perforated sheet steel.

### Insulation:

The terminal is supplied with 25 mm thermal and acoustical insulation (30 kg/m<sup>3</sup>) 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, sandwich construction of twin blade and neoprene gasket with low leakage according to DIN 1946, part 4.
- Damper shafts; aluminium ø12mm, rotating in self lubricating POM (Delrin) bearings.
- Recommended amount of torque for all models is 5Nm.

### Flo-Cross® sensor:

- Extruded aluminium construction with nylon\* core + feet. (\* type Bergamid® B70 G30 H BK713-PA6-F30).

### Sound attenuator:

- Air-tight construction made out of galvanized sheet steel with a 30 mm flange connection on both sides. The attenuating splitter is fitted inside the casing and is made out of a galvanized sheet steel frame, filled with an attenuating mineral wool which is treated with protective tissue layer.
- Special type insulation for hospital application on request.

### Controls:

- Suitable for use with pneumatic, analogue electronic or DDC controllers. Controls can be factory fitted, wired and calibrated. Plug&Play. Controls enclosure NEMA-1 (galvanized sheet steel) can be provided optionally.

### Delivery:

- When units are ordered with controls, these will be factory fitted on both sides of the unit and wired and pre-set upon request.
- When units are ordered with 'free-issue' controls by others, wiring diagrams and mounting instructions must be provided.

## Specify as

### Example:

Supply and install, dual duct variable air volume units constructed from galvanised sheet steel with integral mixing section. Internal insulation, tested to class '0' fire regulations, covered with perforated sheet steel; mixing rate better than 96%; oval shaped, sandwich construction, damper blades. 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 low leakage damper blades 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 controller shall be I/A Series, DDC controller: LonMark® compatible, type MNL-V1RVx, or BACnet® compatible typ MNB-V1.

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

Terminal size 200 mm

Max. pressure loss 35 Pa

Max. discharge sound index < NC35

(@250Pa Δ p)

Max. radiated sound index < NC35

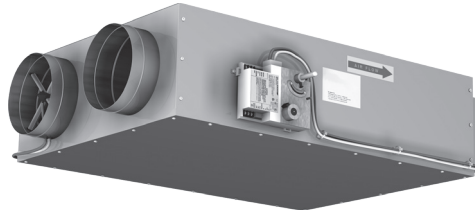
(@250Pa Δ p)

Ordering example: type – model – handing =

NZOAOOG – 200R

Manufacturer: Barcol-Air, the Netherlands

Type NZ.....



## Installation instructions

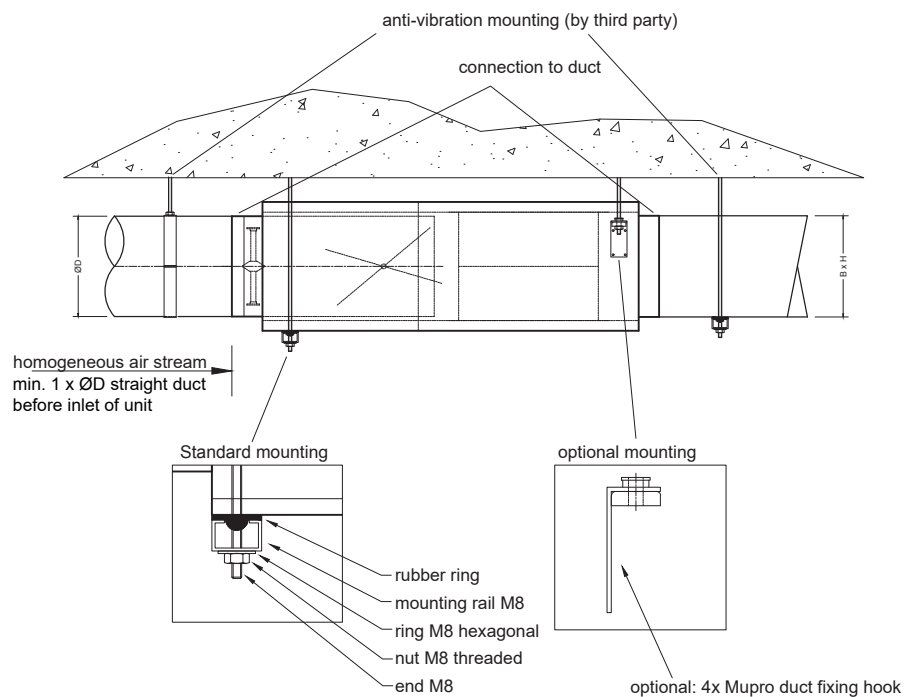
The Barcol-Air dual duct VAV and CAV terminals shall be installed using at least two support brackets (DIN-rail or L-profile), with anti-vibration rubber under the terminal. Each of these brackets shall be fixed with two threaded rods to the ceiling slab above.

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.

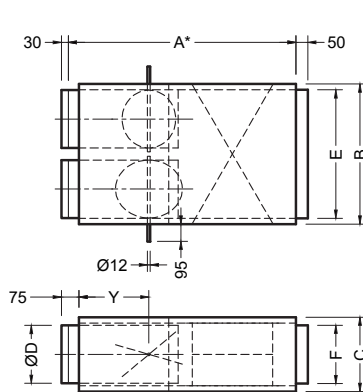
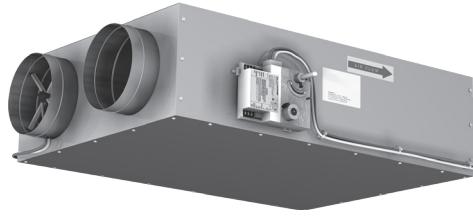
- 4 Use at least 1x diameter straight duct length before the VAV inlet.
- 5 Additional manual volume control dampers (VCD's) before the inlet are not required / recommended!!
6. All connections shall be thermally isolated.
7. Pressure sensing tubes of Flo-Cross® airflow sensor shall not be "kinked" or otherwise obstructed by the external duct insulation.

Optional 4 x Mupro fixing hooks can be used.

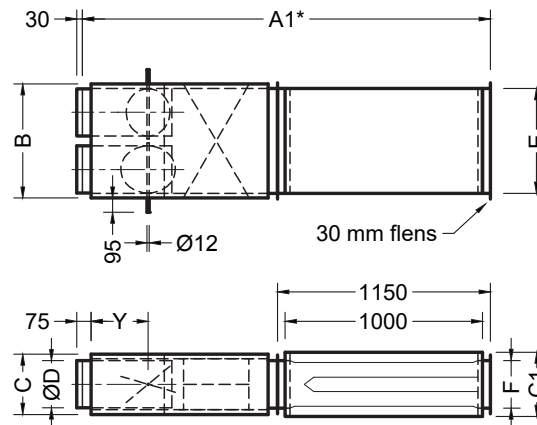


Mounting drawing ype NZ.A...

## Type NZ.D...



Type NZ.A...  
(terminal without sound attenuator)



Type NZ.D...  
(terminal with sound attenuator)

## Dimensions

Model	100	125	160	200	250	315	355	400
A	830	830	880	920	975	1060	1155	1155
A1*	1980	1980	2030	2070	2125	2210	2305	2305
B	330	350	420	500	600	740	820	910
C	228	228	248	268	318	408	408	458
Ø D	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
Y	310	310	310	300	285	260	245	235

## Notes:

1. Dimensions in mm.
2. Other sizes available upon request
3. \* Installed length

## Kv value

Model	100	125	160	200	250	315	355	400
Inlet Kv (l/s / Pa)	5,5	8,5	15,0	24,9	35,4	58,9	74,3	92,6
Outlet Kv (l/s / Pa)	8,5	11,0	17,0	30,0	49,8	70,8	117,8	117,8

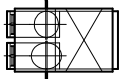
$$\text{Flow} = \text{Kv} \times \sqrt{\Delta p_{fc}}$$

$\Delta p_{fc}$  = Flo-Cross® signal

Example  $\Delta p_{fc} = 30 \text{ Pa}$  and VAV-size = 160

$$\text{Flow} = 15,0 \times \sqrt{30} = 82 \text{ l/s} \times 3,6 = 295 \text{ m}^3/\text{h}$$

Type NZ.A...



Sound data  $\Delta p = 125 \text{ Pa}$

Model	data referring to inlet spigot				min. $\Delta p_s$	$\Delta p_s = 125 \text{ Pa}$																	
						discharge sound						radiated sound											
	air volume					$L_w$ in dB/Oct. (re 1pW)						Lp values			$L_w$ in dB/Oct. (re 1pW)						Lp 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
velocity				Pa	dB									dB									
m/s	l/s	CFM	m <sup>3</sup> /h																				
100	2	15	31	53	2	31	38	32	37	33	18	--	--	--	31	29	20	-	-	-	--	--	--
	4	29	62	106	7	41	48	40	43	36	24	--	--	--	38	38	27	22	19	-	--	--	--
	6	44	94	160	16	46	54	45	47	38	28	25	20	23	43	43	32	26	22	-	21	--	--
	8	59	125	213	28	50	58	48	49	40	31	29	25	28	46	47	35	29	24	-	25	--	22
	10	74	156	266	44	53	61	51	51	41	33	32	29	31	49	50	37	31	25	17	27	22	25
125	2	23	49	84	2	33	39	33	34	30	25	--	--	--	31	28	21	-	-	-	--	--	--
	4	47	99	168	8	43	48	41	40	35	30	20	--	--	38	35	26	22	19	-	--	--	--
	6	70	149	253	17	48	54	46	44	37	34	26	20	23	42	40	30	25	22	-	--	--	--
	8	94	198	337	30	52	57	49	46	39	36	29	25	27	45	43	32	27	23	-	21	--	--
	10	117	248	421	47	55	60	52	49	41	38	32	28	31	47	45	34	29	25	-	24	--	--
160	2	39	82	139	2	35	39	34	30	27	27	--	--	--	31	26	21	18	-	-	--	--	--
	4	78	164	279	8	45	48	42	37	33	32	21	--	--	37	32	26	22	20	-	--	--	--
	6	116	246	418	18	50	53	46	41	36	35	26	20	23	41	35	28	24	22	-	--	--	--
	8	155	328	558	33	55	57	50	44	39	37	30	25	27	43	38	30	25	23	-	--	--	--
	10	194	410	697	51	58	60	52	46	41	39	33	28	30	46	40	31	26	24	-	20	--	--
200	2	61	129	219	2	36	40	35	27	24	28	--	--	--	31	25	21	19	18	-	--	--	--
	4	122	258	439	8	47	48	43	34	31	33	21	--	--	36	29	25	22	20	-	--	--	--
	6	183	387	658	18	52	53	47	38	35	36	26	20	23	40	32	26	23	21	-	--	--	--
	8	244	516	878	32	57	57	51	41	38	38	30	24	27	42	33	28	24	22	-	--	--	--
	10	305	645	1097	49	60	60	53	43	40	39	33	28	30	44	35	29	24	23	-	--	--	--
250	2	96	203	345	2	40	44	43	37	38	36	--	--	--	35	30	26	21	20	-	--	--	--
	4	192	406	690	8	48	52	50	42	43	42	25	--	21	41	34	29	24	23	-	--	--	--
	6	288	609	1035	19	53	56	54	45	46	45	29	24	26	45	37	31	25	24	17	--	--	--
	8	383	812	1380	33	57	60	57	47	48	47	33	28	30	47	38	32	26	25	19	21	--	--
	10	479	1015	1725	52	60	62	59	49	49	49	35	31	33	49	40	33	26	26	20	22	--	--
315	2	153	324	550	2	45	48	47	41	43	40	21	--	--	40	35	30	24	23	17	--	--	--
	4	306	648	1101	9	52	54	52	44	46	45	27	21	24	46	39	33	26	25	20	20	--	--
	6	459	971	1651	19	57	57	55	46	48	48	31	25	27	49	42	35	27	27	22	23	--	--
	8	612	1295	2202	34	60	60	57	47	49	50	34	28	30	52	44	36	28	28	23	26	--	20
	10	764	1619	2752	54	63	62	58	48	50	51	36	30	32	54	45	37	29	28	24	27	21	23
355	2	195	412	701	2	47	50	50	43	45	42	23	--	--	43	38	33	25	25	20	--	--	--
	4	389	824	1401	9	54	55	53	45	48	47	29	22	25	49	42	36	27	27	23	23	--	--
	6	584	1236	2102	20	59	58	55	47	49	49	32	26	28	52	45	37	28	28	24	26	--	21
	8	779	1649	2803	35	62	60	57	48	50	51	35	28	30	54	46	38	29	29	26	28	22	23
	10	973	2061	3503	55	64	62	58	48	51	53	37	30	32	56	48	39	30	30	27	30	24	25
400	2	248	524	891	2	49	52	52	46	48	44	26	--	21	45	40	35	26	26	22	21	--	--
	4	495	1049	1783	9	57	56	55	47	49	48	30	23	26	51	45	38	28	28	25	26	--	--
	6	743	1573	2674	20	61	58	56	47	50	51	33	26	29	54	47	39	29	29	27	29	22	24
	8	990	2097	3565	36	64	60	57	48	51	53	35	29	31	57	49	41	30	30	28	31	25	26
	10	1238	2621	4456	56	66	62	58	48	51	54	37	32	33	59	51	42	31	31	29	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.  $L_w$  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 power levels  $L_w$  are measured in free space and including end reflection.
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. Attenuation through insertion loss mentioned in table 2 is without end reflection. The insertion loss is the difference between the sound power level before and after installing the VAV terminal, at the same position.

8.  $\Delta p_s$  is static pressure drop across VAV air volume control terminal with damper fully open.
9. For non standard applications and/or selections, please contact our technical staff.

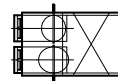
Table 1: Assumptions for additional attenuation

dB \ Hz	125	250	500	1000	2000	4000
Discharge	5	10	20	30	30	25
Radiated	2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1000	2000	4000	Hz
100	5	9	13	22	12	17	dB
125	5	9	13	22	12	17	dB
160	5	9	13	22	12	17	dB
200	8	7	12	15	13	12	dB
250	11	7	8	9	14	10	dB
315	5	5	7	10	14	10	dB
355	9	6	4	9	8	6	dB
400	4	4	5	11	7	6	dB

### Type NZ.A...



Sound data  $\Delta p = 250 \text{ Pa}$

Model	$\Delta p_s = 250 \text{ Pa}$																						
	data referring to inlet spigot				min. $\Delta p_s$	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			Pa	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 <sup>3</sup> /h		dB									dB								
100	2	15	31	53	2	33	41	37	43	35	24	--	--	--	31	29	25	20	17	-	--	--	--
	4	29	62	106	7	43	50	45	49	39	30	22	--	--	39	38	33	27	22	-	--	--	--
	6	44	94	160	16	48	56	50	53	41	34	28	23	26	44	44	37	31	25	19	22	--	--
	8	59	125	213	28	52	60	54	55	42	36	32	28	30	47	48	40	34	27	21	26	--	22
	10	74	156	266	44	55	63	56	57	43	38	35	32	34	49	50	42	36	29	22	28	23	25
125	2	23	49	84	2	35	41	38	39	34	31	--	--	--	33	31	27	22	19	-	--	--	--
	4	47	99	168	8	44	50	46	46	38	37	23	--	--	40	39	33	28	24	18	--	--	--
	6	70	149	253	17	50	56	51	50	41	40	28	23	26	45	43	36	31	26	20	22	--	--
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	10	117	248	421	47	57	63	57	54	44	44	35	31	33	50	48	40	34	29	23	27	20	23
160	2	39	82	139	2	36	42	38	36	32	33	--	--	--	36	33	28	25	22	-	--	--	--
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	8	155	328	558	33	56	60	54	49	44	43	32	27	30	48	44	37	32	28	22	24	--	--
	10	194	410	697	51	59	62	57	51	46	45	35	31	33	50	46	38	33	29	23	26	--	21
200	2	61	129	219	2	38	42	39	32	30	34	--	--	--	38	35	29	27	24	-	--	--	--
	4	122	258	439	8	48	51	47	39	37	39	24	--	20	43	39	33	29	26	20	--	--	--
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	4	192	406	690	8	52	55	53	46	46	46	28	22	25	47	42	36	31	28	22	22	--	--
	6	288	609	1035	19	57	60	57	50	49	49	33	28	30	50	44	37	32	29	24	25	--	--
	8	383	812	1380	33	61	63	60	52	51	51	36	32	34	52	46	39	33	30	25	27	--	21
	10	479	1015	1725	52	64	66	62	53	52	53	39	35	37	54	47	40	33	31	26	28	21	23
315	2	153	324	550	2	48	52	52	46	46	44	25	--	21	44	40	36	30	27	22	20	--	--
	4	306	648	1101	9	56	58	56	50	49	49	31	25	28	50	44	39	32	29	25	25	--	--
	6	459	971	1651	19	61	61	59	51	51	52	35	30	32	53	47	40	33	30	27	28	20	22
	8	612	1295	2202	34	64	64	61	53	52	54	38	33	34	56	49	42	34	31	28	30	23	25
	10	764	1619	2752	54	67	66	62	54	53	56	40	35	37	58	50	43	35	32	29	32	26	27
355	2	195	412	701	2	51	54	54	49	49	46	27	21	23	46	41	37	31	28	23	22	--	--
	4	389	824	1401	9	58	59	58	51	51	51	33	27	29	52	46	40	33	30	26	27	--	20
	6	584	1236	2102	20	62	62	60	52	52	54	36	30	32	55	48	42	34	31	28	29	23	24
	8	779	1649	2803	35	66	64	61	53	53	56	39	33	35	57	50	43	35	32	29	32	25	27
	10	973	2061	3503	55	68	66	62	54	54	57	40	35	37	59	52	44	36	33	30	33	28	29
400	2	248	524	891	2	53	56	57	52	51	48	30	23	26	48	43	39	31	29	25	23	--	--
	4	495	1049	1783	9	60	60	59	53	53	53	34	28	30	54	47	42	34	31	28	28	21	22
	6	743	1573	2674	20	64	63	61	53	54	55	37	31	33	57	50	44	35	32	30	31	25	26
	8	990	2097	3565	36	67	65	62	54	54	57	39	34	35	59	52	45	36	33	31	33	28	29
	10	1238	2621	4456	56	69	66	63	54	55	59	41	37	37	61	53	46	37	34	32	35	30	31

- Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
- $L_w$  in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "--".
- The discharge sound power levels  $L_w$  are measured in free space and including end reflection.
- 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.
- The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and suspended ceiling absorption.

- Lp values are including a room absorption of 10 dB/Oct.
- dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "--".
- Attenuation through insertion loss mentioned in table 2 is without end reflection. The insertion loss is the difference between the sound power level before and after installing the VAV terminal, at the same position.
- $\Delta p_s$  is static pressure drop across VAV air

volume control terminal with damper fully open.  
 9. For non standard applications and/or selections, please contact our technical staff.

Table 1: Assumptions for additional attenuation

dB \ Hz	125	250	500	1000	2000	4000
Discharge	5	10	20	30	30	25
Radiated	2	5	10	15	15	20

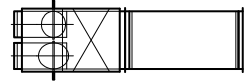
Table 2: Insertion Loss

Model	125	250	500	1000	2000	4000	Hz
100	5	9	13	22	12	17	dB
125	5	9	13	22	12	17	dB
160	5	9	13	22	12	17	dB
200	8	7	12	15	13	12	dB
250	11	7	8	9	14	10	dB
315	5	5	7	10	14	10	dB
355	9	6	4	9	8	6	dB
400	4	4	5	11	7	6	dB



## Sound data

## Type NZ.D...

Sound data  $\Delta p = 125 \text{ Pa}$ 

Model	$\Delta p_s = 125 \text{ Pa}$																							
	data referring to inlet spigot					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				min. $\Delta p_s$	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
dB							dB																	
m/s	l/s	CFM	m <sup>3</sup> /h	Pa																				
100	2	15	31	53	2	28	25	20	17	-	-	-	-	-	31	29	20	-	-	-	-	-	-	-
	4	29	62	106	8	34	29	20	17	-	-	-	-	-	38	38	27	22	19	-	-	-	-	-
	6	44	94	160	19	39	35	20	17	-	-	-	-	-	43	43	32	26	22	-	-	-	-	-
	8	59	125	213	34	43	39	20	17	-	-	-	-	-	46	47	35	29	24	-	-	25	-	22
	10	74	156	266	53	46	42	20	18	-	-	-	-	-	49	50	37	31	25	17	27	22	25	
125	2	23	49	84	2	28	25	20	17	-	-	-	-	-	31	28	21	-	-	-	-	-	-	-
	4	47	99	168	9	35	29	20	17	-	-	-	-	-	38	35	26	22	19	-	-	-	-	-
	6	70	149	253	20	41	35	20	17	-	-	-	-	-	42	40	30	25	22	-	-	-	-	-
	8	94	198	337	36	45	39	20	17	-	-	-	-	-	45	43	32	27	23	-	21	-	-	-
	10	117	248	421	56	48	42	21	17	-	-	-	-	-	47	45	34	29	25	-	24	-	-	-
160	2	39	82	139	2	28	25	20	17	-	-	-	-	-	31	26	21	18	-	-	-	-	-	-
	4	78	164	279	10	38	30	20	17	-	-	-	-	-	37	32	26	22	20	-	-	-	-	-
	6	116	246	418	22	43	35	20	17	-	-	-	-	-	41	35	28	24	22	-	-	-	-	-
	8	155	328	558	39	47	38	24	20	-	-	-	-	-	43	38	30	25	23	-	-	-	-	-
	10	194	410	697	60	51	41	28	25	22	-	20	-	-	46	40	31	26	24	-	20	-	-	-
200	2	61	129	219	2	30	25	20	17	-	-	-	-	-	31	25	21	19	18	-	-	-	-	-
	4	122	258	439	9	39	30	20	17	-	-	-	-	-	36	29	25	22	20	-	-	-	-	-
	6	183	387	658	21	45	35	20	17	-	-	-	-	-	40	32	26	23	21	-	-	-	-	-
	8	244	516	878	37	50	38	26	22	19	-	-	-	-	42	33	28	24	22	-	-	-	-	-
	10	305	645	1097	58	53	41	30	27	24	18	22	-	-	44	35	29	24	23	-	-	-	-	-
250	2	96	203	345	2	34	29	20	17	-	-	-	-	-	35	30	26	21	20	-	-	-	-	-
	4	192	406	690	10	43	37	25	18	19	17	-	-	-	41	34	29	24	23	-	-	-	-	-
	6	288	609	1035	22	48	41	29	21	21	20	-	-	-	45	37	31	25	24	17	-	-	-	-
	8	383	812	1380	39	51	45	32	24	23	22	22	-	-	47	38	32	26	25	19	21	-	-	-
	10	479	1015	1725	61	54	47	34	27	26	24	24	-	-	49	40	33	26	26	20	22	-	-	-
315	2	153	324	550	3	38	28	23	18	19	18	-	-	-	40	35	30	24	23	17	-	-	-	-
	4	306	648	1101	10	46	34	27	20	21	22	-	-	-	46	39	33	26	25	20	20	-	-	-
	6	459	971	1651	23	51	37	31	24	24	25	-	-	-	49	42	35	27	27	22	23	-	-	-
	8	612	1295	2202	40	54	40	34	28	27	27	23	-	-	52	44	36	28	28	23	26	-	-	20
	10	764	1619	2752	63	56	43	37	33	31	29	26	20	22	54	45	37	29	28	24	27	21	23	23
355	2	195	412	701	3	42	35	32	26	28	25	-	-	-	43	38	33	25	25	20	-	-	-	-
	4	389	824	1401	10	50	40	35	28	30	30	-	-	-	49	42	36	27	27	23	23	-	-	-
	6	584	1236	2102	23	54	43	37	29	31	33	24	-	-	52	45	37	28	28	24	26	-	-	21
	8	779	1649	2803	41	57	46	39	30	32	35	27	22	23	54	46	38	29	29	26	28	22	23	23
	10	973	2061	3503	64	60	47	40	31	33	36	29	25	26	56	48	39	30	30	27	30	24	25	25
400	2	248	524	891	3	45	39	37	31	33	30	-	-	-	45	40	35	26	26	22	21	-	-	-
	4	495	1049	1783	10	52	43	39	31	34	34	22	-	-	51	45	38	28	28	25	26	-	-	-
	6	743	1573	2674	24	56	45	40	32	35	37	26	20	22	54	47	39	29	29	27	29	22	24	24
	8	990	2097	3565	42	59	47	41	33	35	38	29	24	25	57	49	41	30	30	28	31	25	26	26
	10	1238	2621	4456	65	61	49	42	34	36	40	31	26	28	59	51	42	31	31	29	32	27	28	28

- Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.
- $L_w$  in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".
- The discharge sound power levels  $L_w$  are measured in free space and including end reflection.
- 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.
- The radiated sound pressure levels are determined with the assumptions as mentioned in table 1 for ceiling plenum and

- suspended ceiling absorption.
- $L_p$  values are including a room absorption of 10 dB/Oct.
- dB(A), NC and NR index figures are sound pressure levels. Figures less than 20 are indicated by "-".
- Attenuation through insertion loss mentioned in table 2 is without end reflection. The insertion loss is the difference between the sound power level before and after installing the VAV terminal, at the same position.

- $\Delta p_s$  is static pressure drop across VAV air volume control terminal with damper fully open.
- For non standard applications and/or selections, please contact our technical staff.

Table 1: Assumptions for additional attenuation

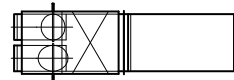
dB	Hz	125	250	500	1000	2000	4000
Discharge		5	10	20	30	30	25
Radiated		2	5	10	15	15	20

Table 2: Insertion Loss

Model	125	250	500	1k	2k	4k	Hz
100	13	28	38	38	38	38	dB
125	13	28	38	38	38	38	dB
160	13	28	38	38	38	38	dB
200	15	26	38	38	38	38	dB
250	17	22	33	35	38	35	dB
315	11	26	32	35	38	33	dB
355	13	21	22	26	26	23	dB
400	9	17	20	27	23	20	dB

## Sound data

## Type NZ.D...

Sound data  $\Delta p = 250 \text{ Pa}$ 

Model	data referring to inlet spigot				min. $\Delta p_s$ Pa	$\Delta p_s = 250 \text{ Pa}$																										
						discharge sound									radiated sound																	
	air volume					L <sub>w</sub> in dB/Oct. (re 1pW)						L <sub>p</sub> values			L <sub>w</sub> in dB/Oct. (re 1pW)						L <sub>p</sub> values											
						velocity	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 <sup>3</sup> /h	dB									dB																			
100	2	15	31	53	2	28	25	20	17	-	-	-	-	-	-	-	31	29	25	20	17	-	-	-	-	-	-	-	-	-	-	-
	4	29	62	106	8	36	32	20	17	-	-	-	-	-	-	-	39	38	33	27	22	-	-	-	-	-	-	-	-	-	-	
	6	44	94	160	19	41	37	20	19	-	-	-	-	-	-	-	44	44	37	31	25	19	22	-	-	-	-	-	-	-	-	
	8	59	125	213	34	45	41	22	21	-	-	-	-	-	-	-	47	48	40	34	27	21	26	-	-	-	-	-	-	-	-	22
	10	74	156	266	53	48	44	24	23	-	-	-	-	-	-	-	49	50	42	36	29	22	28	-	-	-	-	-	-	-	-	25
125	2	23	49	84	2	28	25	20	17	-	-	-	-	-	-	-	33	31	27	22	19	-	-	-	-	-	-	-	-	-	-	
	4	47	99	168	9	37	32	20	17	-	-	-	-	-	-	-	40	39	33	28	24	18	-	-	-	-	-	-	-	-	-	
	6	70	149	253	20	43	37	20	17	-	-	-	-	-	-	-	45	43	36	31	26	20	22	-	-	-	-	-	-	-	-	
	8	94	198	337	36	47	41	22	19	-	-	-	-	-	-	-	48	46	38	33	28	22	25	-	-	-	-	-	-	-	-	21
	10	117	248	421	56	50	44	25	20	-	-	-	-	-	-	-	50	48	40	34	29	23	27	-	-	-	-	-	-	-	-	23
160	2	39	82	139	2	29	25	20	17	-	-	-	-	-	-	-	36	33	28	25	22	-	-	-	-	-	-	-	-	-	-	
	4	78	164	279	10	39	32	20	17	-	-	-	-	-	-	-	42	39	33	28	25	19	-	-	-	-	-	-	-	-	-	
	6	116	246	418	22	45	37	21	17	-	-	-	-	-	-	-	46	42	35	30	27	21	22	-	-	-	-	-	-	-	-	
	8	155	328	558	39	49	41	25	21	17	-	-	-	-	-	-	48	44	37	32	28	22	24	-	-	-	-	-	-	-	-	-
	10	194	410	697	60	52	44	29	25	22	17	22	-	-	-	-	50	46	38	33	29	23	26	-	-	-	-	-	-	-	-	21
200	2	61	129	219	2	31	25	20	17	-	-	-	-	-	-	-	38	35	29	27	24	-	-	-	-	-	-	-	-	-	-	
	4	122	258	439	9	41	32	20	17	-	-	-	-	-	-	-	43	39	33	29	26	20	-	-	-	-	-	-	-	-	-	
	6	183	387	658	21	47	37	22	17	-	-	-	-	-	-	-	47	41	34	30	27	21	22	-	-	-	-	-	-	-	-	-
	8	244	516	878	37	51	41	27	23	20	-	20	-	-	-	-	49	43	36	31	28	23	24	-	-	-	-	-	-	-	-	-
	10	305	645	1097	58	54	44	31	28	25	19	24	-	-	-	-	51	44	37	32	29	24	25	-	-	-	-	-	-	-	-	-
250	2	96	203	345	2	38	32	22	18	-	-	-	-	-	-	-	41	37	32	28	25	19	-	-	-	-	-	-	-	-	-	
	4	192	406	690	10	47	40	28	22	21	21	-	-	-	-	-	47	42	36	31	28	22	22	-	-	-	-	-	-	-	-	
	6	288	609	1035	22	52	45	32	25	24	24	22	-	-	-	-	50	44	37	32	29	24	25	-	-	-	-	-	-	-	-	
	8	383	812	1380	39	55	48	35	27	26	26	25	-	-	-	-	52	46	39	33	30	25	27	-	-	-	-	-	-	-	-	21
	10	479	1015	1725	61	58	51	37	30	28	28	28	22	24	24	24	54	47	40	33	31	26	28	21	-	-	-	-	-	-	-	23
315	2	153	324	550	3	42	31	27	22	21	21	-	-	-	-	-	44	40	36	30	27	22	20	-	-	-	-	-	-	-	-	
	4	306	648	1101	10	50	38	31	25	24	26	-	-	-	-	-	50	44	39	32	29	25	25	-	-	-	-	-	-	-	-	
	6	459	971	1651	23	54	41	34	27	27	29	24	-	-	-	-	53	47	40	33	30	27	28	20	-	-	-	-	-	-	-	22
	8	612	1295	2202	40	58	44	37	30	29	31	27	22	24	24	24	56	49	42	34	31	28	30	23	-	-	-	-	-	-	-	25
	10	764	1619	2752	63	60	46	39	34	32	33	29	25	27	27	27	58	50	43	35	32	29	32	26	-	-	-	-	-	-	-	27
355	2	195	412	701	3	46	39	36	31	31	30	-	-	-	-	-	46	41	37	31	28	23	22	-	-	-	-	-	-	-	-	
	4	389	824	1401	10	53	45	40	33	33	34	23	-	-	-	-	52	46	40	33	30	26	27	-	-	-	-	-	-	-	-	
	6	584	1236	2102	23	58	48	42	35	34	37	28	22	24	24	55	48	42	34	31	28	29	23	-	-	-	-	-	-	-	-	
	8	779	1649	2803	41	61	50	43	35	35	39	31	26	28	28	57	50	43	35	32	29	32	25	-	-	-	-	-	-	-	-	27
	10	973	2061	3503	64	63	51	45	36	36	41	33	29	30	30	59	52	44	36	33	30	33	28	-	-	-	-	-	-	-	-	29
400	2	248	524	891	3	48	43	41	36	36	34	-	-	-	-	-	48	43	39	31	29	25	23	-	-	-	-	-	-	-	-	
	4	495	1049	1783	10	55	47	44	37	37	38	26	-	-	-	-	54	47	42	34	31	28	28	-	-	-	-	-	-	-	-	
	6	743	1573	2674	24	60	50	45	38	38	41	29	24	26	26	57	50	44	35	32	30	31	25	-	-	-	-	-	-	-	-	
	8	990	2097	3565	42	63	52	46	39	39	43	32	28	29	29	59	52	45	36	33	31	33	28	-	-	-	-	-	-	-	-	29
	10	1238	2621	4456	65	65	53	47	39	39	44	34	31	32	32	61	53	46	37	34	32	35	30	-	-	-	-	-	-	-	-	31

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 L<sub>w</sub> are measured in free space and including end reflection.
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<sub>p</sub> 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. Attenuation through insertion loss mentioned in table 2 is without end reflection. The insertion loss is the difference between the sound power level before and after installing the VAV terminal, at the same position.
8.  $\Delta p_s$  is static pressure drop across VAV air

- volume control terminal with damper fully open.
9. For non standard applications and/or selections, please contact our technical staff.

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200	15	26	38	38	38	38	dB
250	17	22	33	35	38	35	dB
315	11	26	32	35	38	33	dB
355	13	21	22	26	26	23	dB
400	9	17	20	27	23	20	dB



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