

NA/NB series

Circular VAV and CAV air volume control terminals



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### Type designation NA / NB.....

### Composition type designation:

## N - B - O - N - E - O - B



B

#### Position 1: Product group

N = air volume control terminals

#### Position 2: Function

A = single wall, circular volume control terminal B = double wall, circular volume control terminal 1 = non standard, specify separately



Ν

## • Position 3: Controls (manufacturer)

O = without controls For controls, contact our sales staff

#### Position 4: Outlet

- A = rectangular outlet
- B = circular outlet
- C = 4 circular outlets ('Octopus')
- G = rectangular outlet and provision for integral hot water reheat coil
- J = 4 circular outlets and provision for integral hot water reheat coil
- N = rectangular outlet and provision for integral electric reheat coil
- Q = 4 circular outlets and provision for integral electric reheat coil
- 1 = non standard, specify separately
- Ξ

Ο

B

#### Position 5: Reheat coil

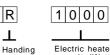
- $\Omega$  = without reheat coil
- A = 1-row hot water reheat
- B = 2-row hot water reheat
- D = 4-row hot water reheat
- E = 1-stage 230VAC/1-phase electric reheat coil
- F = 2-stage 230VAC/1-phase electric reheat coil
- G = 3-stage 230VAC/1-phase electric reheat coil
- H = 1-stage 400VAC/3-phase electric reheat coil
- J = 2-stage 400VAC/3-phase electric reheat coil
- 1 = non standard, specify separately

#### Position 6: Controls (type & function) O = without controls

- For controls, contact our sales staff
- Positon 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





controls & Heater Electric heater capacity (Watt)

#### 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 30mm for rectangular outlet

#### **Ordering information:**

#### Standard terminals:

- quantity of terminals
- complete 7 digit code
- terminal size or model
- air volume setting (V<sub>max</sub>, V<sub>min</sub> etc)
- control handing (standard right side)
- if applicable, electric reheat coil capacity
- supply or return air

#### Non standard terminals:

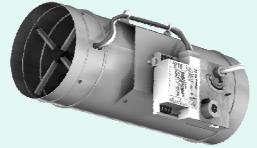
- for non standard terminals a full description and / or drawing are requested.





1

#### Technical data Single wall (NA.....) Double wall (NB.....)



#### Application

Types NA and NB are circular pressure independent VAV and CAV air volume control terminals. The terminals are designed for the accurate measurement and control of air volumes coutresy of the patented airflow sensor type Flo-Cross<sup>®</sup>.

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.

The VAV or CAV terminals can be used either for supply or return air applications in new or refurbishment projects. The terminals have single wall (NA) or double wall (NB) construction and can be delivered with a distribution plenum and a built-in hot water or electric reheat coil.

#### Features:

- Pressure independent control functions.
- Volume control range 100% to 10%.
- Low pressure loss over the terminal.
- Single or double wall construction.
- Factory fitted distribution plenum with built-in hot water or electric reheat coil.
- Oval shaped damper blade for linear control characteristics.
- Low leakage damper, less than 1% of Vnom at 750 Pa.
- Low noise level.
- Suitable for all control functions (VAV, CAV, shut-off, etc.) To maximise system energy savings

- Flo-Cross<sup>®</sup>, 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:

Single or double wall, air-tight construction made of galvanized sheet steel with low casing leakage rate.

Insulation: The rectangular discharge section is internally insulated.

#### Damper:

Damper blade: made of steel, sandwich construction with twin blades and a neoprene gasket with low leakage. Damper shaft: aluminium, $\Phi$ 12mm with self lubricating nylon bearings.

#### Flo-Cross:

Extruded aluminium construction with nylon core and feet.

#### Distribution plenum:

Made of galvanised sheet steel with 13 mm internal isolation. Plenum with standard rectangular or multiple (4 x circular) outlet construction. Optional 1,2,3 or 6 circular outlets are possible. Outlet spigots are made of galvanised steel and optionally can be provided with volume control dampers.

#### Reheat coil:

Choice of 1, 2 or 4-row hot water reheat coil or electric reheat coil (230VAC/1-phase or 400VAC/3phase).

#### Controls:

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

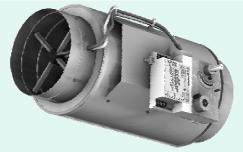
#### **Delivery format:**

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 terminal can be directly installed and commissioned when delivered to site.
- Controls location and hot water or electric connections are as 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.



#### Technical data Single wall (NA.....) Double wall (NB.....)



#### Specify as:

#### Example:

Supply and install, variable air volume terminals with distribution plenum and 4 circular outlets, constructed from galvanized sheet steel. The casing leakage rate shall be classified according to class II, VDI3803/DIN24194. The VAV terminals shall have oval shaped 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, type Flo-Cross shall control the airflow with an accuracy better than 2.5%. The terminals shall be supplied with 1row hot water reheat coil.

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

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

Miximum 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 < NC30 (@250Pa Δp) Max. radiated sound index < NC30 (@250Pa Δp)

Ordering example: type - model - handing= NCOJAOB - 200R

Manufacturer: HC Barcol-Air

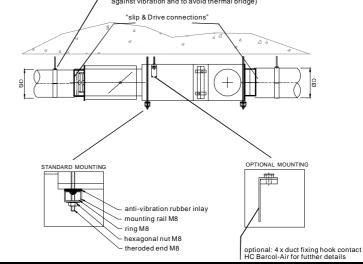
#### Installation Instructions:

The HC Barcol-Air VAV terminals shall be installed using at least two support channels, with antivibration rubber under the terminal (as shown in the drawing below). Each of these channels shall be fixed with two threaded rods to the ceiling slab above. Alternatively 4 duct fixing hooks can be privided for suspending the units.

#### The 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.

3

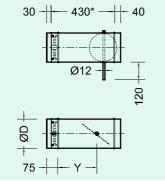


5. Additional manual volume control dampers (VCD's) before the

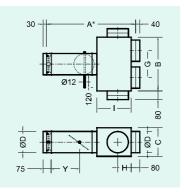
- unit inlet should not be used. 6. All connections shall be
- thermally isolated. 7. Pressure sensing tubes of
- FloCross airflow sensor shall not be "kinked" or otherwise obstructed by the external duct insulation.

See drawing below.

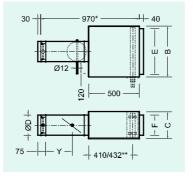




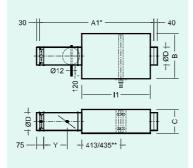
Type NAOAOOB



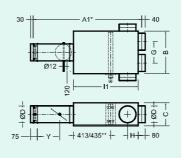
Type NAOCOOB



Type NAOG.OB



Type NAOH.OB



Type NAOJ.OB

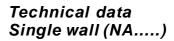
**Dimensions NA terminals** 

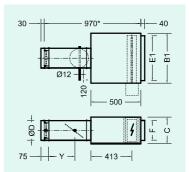
Modle	100	125	160	200	250	315	355	400
A*	780	780	780	830	880	930	990	1030
A1*	1230	1230	1230	1280	1330	1380	1440	1480
В	330	330	400	500	600	740	820	910
B1	330	330	400	400	600	600	600	600
С	228	228	248	268	318	408	408	458
ØD	98	123	158	198	248	313	353	398
E	275	275	350	450	550	690	770	850
E1	275	275	350	350	550	550	550	550
F	170	170	175	200	250	330	330	380
G	180	180	215	255	305	370	410	455
Н	125	125	125	125	170	200	250	250
I	270	270	270	320	370	420	520	520
I1	720	720	720	770	820	870	970	970
Y	304	304	304	294	279	254	239	229
Other dim	nensions	are avalia	ble upon	request.				

Other dimensions are avaliable upon request.

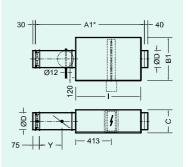
#### Ky values

Kv values	5								Flow = Kv x √ΔPfc
Modle	100	125	160	200	250	315	355	400	$\Delta Pfc = Flo-Cross signal$
Kv (I/s / Pa)	5.5	8.5	15.0	24.9	35.4	58.9	74.3	92.6	If ΔPfc = 30 Pa and VAV size = 160 Flow = 15.0 x √30 = 82 I/s

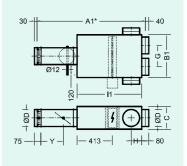




Type NAON.OB



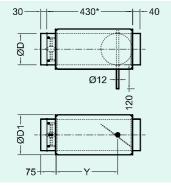
Type NAOP.OB



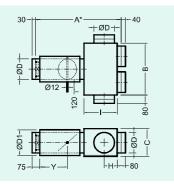
Type NAOQ.OB

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

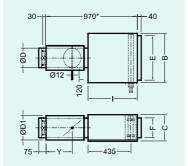




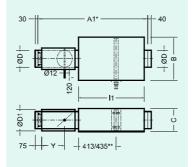
Type NBOBOOB



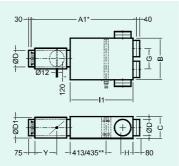
Туре NBOCOOB



Type NBOG.OB



Type NBOH.OB



Type NBOJ.OB

#### **Dimensions NA terminals**

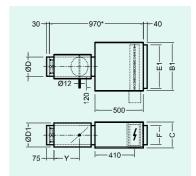
规格	100	125	160	200	250	315	355	400
A*	780	780	780	830	880	930	990	1030
A1**	1230	1230	1230	1280	1330	1380	1440	1480
В	330	330	400	500	600	740	820	910
B1	330	330	400	400	600	600	600	600
С	228	228	248	268	318	408	408	458
ØD	98	123	158	198	248	313	353	398
E	275	275	350	450	550	690	770	850
E1	275	275	350	350	550	550	550	550
F	170	170	175	200	250	330	330	380
G	180	180	215	255	305	370	410	455
Н	125	125	125	125	170	200	250	250
I	270	270	270	320	370	420	520	520
11	720	720	720	770	820	870	970	970
Y	304	304	304	294	279	254	239	229

Other dimensions are avaliable upon request.

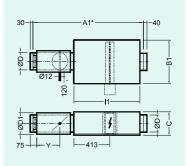
#### Kv values

Kv values	5								Flow = Kv x √∆Pfc
Modle	100	125	160	200	250	315	355	400	∆Pfc = Flo-Cross signal
Kv (I/s / Pa)	5.5	8.5	15.0	24.9	35.4	58.9	74.3	92.6	If ΔPfc = 30 Pa and VAV size = 160 Flow = 15.0 x √30 = 82 I/s

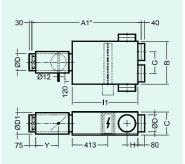
#### Model overview: Double wall type (NB.....)



Type NBON.OB



Type NBOP.OB



Type NBOQ.OB

All dimensions in mm.

\* \*\*

 Installed length.
Size varies with a 1- 2-row or 4-row hot water reheat coil.



Sound data  $\Delta p = 125 Pa$ 

																	Δ	<b>∆p =</b>	125	Ра												
		aref nlets						disc	char	ges	sou	nd				radi	ateo	d so	und	sin	gle v	vall		1	radi	ateo	d so	und	dou	ble	wal	I
_			-p.g-			L,	in d	B/0	Oct.	(re	1p\	M) p	val	ues	L	in c	IB/O	Oct.	(re	1p)	W <b>.)</b> p	val	ues	$L_{\rm w}$	in c	IB/0	Oct.	(re	1p\	<b>M)</b> p	val	ues
Model	Velocity	air	volu	me	min. ∆Ps	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	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB (A)	NC	NR
	m/s	l/s	CFM	m³/h	Ра				в									в								d	в					
	2	15	31	53	2	43	44	40	38	34	22				19	-	19	20	23	21				-	-	-	-	-	-			
	4	29	62	106	8	49	50	46	44	40	29	24		20	26	23	26	27	30	28				22	-	-	-	-	-			
100	6	44	94	160	17	53	54	51	48	44	34	28	22	24	30	27	30	31	34	32				26	20	-	-	-	18			
	8	59	125	213	30	57	58	54	52	49	39	31	26	28	33	30	33	34	37	35				29	23	19	19	19	21			
	10	74	156	266	47	59	61	58	55	52	43	34	29	31	35	32	35	36	39	37				32	26	22	21	21	23			
	2	23	49	84	2	40	43	40	39	34	25				28	24	25	22	23	17				-	-	-	-	-	-			
465	4	47 70	99 149	168 253	7 16	47 52	49 54	46 51	45	40	31 36	23 27	21	24	35 30	31	32 36	29	30 34	24				23	18 22	- 19	- 18	-	- 19			
125	8	70 94	149	337	28	52 56	54 58	51 55	49 53	44 48	36 40	27 31	21	24	39 42	35 38	36 38	33 35	34 37	28 31	21			27 30	22	22	21	20	22			
	10	94 117	248	421	44	50 59	61	55 58	56	40 51	40	34	29	31	42	40	30 41	38	39	33	21			33	23	22	21	20	22			
	2	39	82	139	2	39	41	40	38	37	32				44 28	24	25	22	23	18	23			18	- 20	- 25	- 23	- 22	-			
	4	78	164	279	7	47	48	46	44	41	36	22			35	31	32	22	30	25				25	20	19			_			
160	6	116	246	418	15	52	52	50	49	44	39	26		22	39	35	36	33	34	29				29	24	23	20	18	20			
100	8	155	328	558	26	56	56	54	52	48	42	30	24	26	42	38	38	35	37	31	21			32	27	26	23	21	23			
	10	194	410	697	41	60	60	58	56	51	45	34	28	30	44	40	41	38	39	34	23			34	29	28	25	23	25			
	2	61	129	219	2	39	34	37	34	30	23				29	24	24	23	23	18				19	-	-	-	-	-			
	4	122	258	439	6	48	44	46	42	37	31	20			36	31	31	29	30	25				26	22	21	18	-	-			
200	6	183	387	658	14	54	51	52	47	42	36	26		20	40	35	35	33	34	29				30	26	25	22	20	21			
	8	244	516	878	25	58	55	56	51	46	40	31	23	25	43	38	38	36	37	31	21			33	29	28	25	22	24			
	10	305	645	1097	39	61	59	60	54	50	43	34	27	30	45	40	40	38	39	34	23			35	31	30	27	25	26			
	2	96	203	345	1	41	43	42	39	34	30				29	24	24	23	23	18				19	-	-	-	-	-			
	4	192	406	690	6	50	51	50	45	40	35	25		20	36	31	31	29	30	25				26	21	21	18	-	-			
250	6	288	609	1035	13	56	56	55	50	44	39	30	23	26	40	35	35	33	34	29				30	25	25	22	20	21			
	8	383	812	1380	23	60	60	59	53	47	43	34	28	30	43	38	38	36	37	31	21			33	28	28	25	23	24			
	10	479	1015	1725	36	63	63	62	56	50	45	37	32	34	45	40	40	38	39	34	23			35	31	31	27	25	26			
	2	153	324	550	1	42	45	41	41	38	33				30	24	24	23	23	19				21	18	18	-	-	-			
	4	306	648	1101	5	52	52	48	47	43	38	26		21	37	31	31	30	30	26				28	25	25	22	18	19			
315	6	459	971	1651	12	58	57	54	52	48	42	31	24	27	41	35	35	34	34	30				32	29	29	26	22	23			
	8	612	1295	2202	22	63	61	58	56	52	46	35	29	31	44	38	38	36	37	32	21			35	32	32	29	25	26			
	10	764	1619	2752	34	67	64	62	59	55	50	39	34	35	46	40	40	39	39	35	23			38	34	34	31	27	28			
	2	195	412	701	1	42	52	45	45	40	38	24		21	30	24	24	23	23	19				22	19	19	-	-	-			
355	4	389	824	1401	5	53	56	51	50	43	42	29	24	26	37	31	31	30	30	26				29	26	26	23	18	20			
	6	584	1236	2102	12	59	60	56	54	46	45	33	28	30	41	35	35	34	34	30				33	30	30	27	23	24			
	8	779		2803	21	64	63	60	57	50	48	37	32	33	44	38	38	37	37	33	21			36	33	33	30	25	27			
	10		2061	3503	33	68	66	64	61	53	52	41	36	37	46	40	40	39	39	35	24			38	35	35	32	28	29			
	2	248	524	891	1	43	54	46	46	42	36	26	21	24	30	24	24	23	23	19				22	19	19	-	-	-			
400	4	495	1049	1783	5	54	58	52	51	45	40	31	26	28	37	31	31	30	30	26				29	26	26	24	19	20			
	6	743		2674	11	60 65	62 65	57	55	48	43	35	30	32	41	35	35	34	34	30				33	30	30	28	23	24			
	8	990	2097	3565	20	65 60	65 69	61	58	52	46	39	34	36	44	38	37	37	37	33	21			36	33	33	31	26	27			
1 Sound d	10		2326		32	69	68	65	62	55 55 th	50	42	37	39	46	40	40	39	39	35	23		 	39	36	36	33	28	29		 	enua

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 and ISO 5135 standards.

2. Lw in dB/Oct. (re 1pW) are sound power levels for

 a source of the physical source reversion of discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".
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. Lp 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 "--".
- Δps is static pressure drop across VAV air volume control terminal with damper fully open.
- 8. 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



### **Type NAOBOOB NBOBOOB**

#### Sound data $\Delta p = 250 Pa$

#### ∆p = 250 Pa data refering to discharge sound radiated sound single wall radiated sound double wall inlet spigot L. in dB/Oct. (re 1pWD)p values L in dB/Oct. (re 1pWDp values L, in dB/Oct. (re 1pWDp values min Model ΔPs HZ Ŧ Velocity Ł Hz 보 ΗZ Ϋ́ Ł Ŧ Ϋ́ Ł 꾸 Ŧ 분 님 Ł air volume ₹ ৰ ÿ NЯ R g R ñ ē ġ ĝ l/s CFM m³/h Ра dB m/s dB dB 26 27 - -- -- -- -\_ . \_ . \_ . - -- -\_ - -- -\_ . \_ - -- -- -- -- -- -- -- -- -- -\_ . - -- -- -\_ . - -- -- -- -\_ . - -- -- -\_ . - -\_ . ..... -\_ . - -- -\_ . - -- -- --\_ \_ . - -- -- -- -- -- -- -- -- -- -- -- -- -- -- ---- -\_ - -- -- -- -- -- -\_ - -\_ . \_ . - -- -\_ . 1238 2326 4456 41 42 53 46 46 46 45 42

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 and ISO 5135 standards

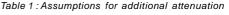
2. Lw in dB/Oct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by '

3. The discharge sound 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. Lp 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 bv
- 7. Δps is static pressure drop across VAV air volume control terminal with damper fully open.
- For non standard applications and/or selections,
  - please contatct our technical staff.



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

#### Type NAOBOOB NBOBOOB

Sound data  $\Delta p = 125 Pa$ 

### Type NAOCOOB NBOCOOB

																	Δ	∆p =	125	Ра												
		taref nlet:						disc	har	ge	sou	nd				radi	ateo	d so	und	sin	glev	wall			radi	atec	lso	und	dou	ıble	wal	1
_			-p.g-			L,	in d	IB/O	Dct.	(re	1p\	W)p	val	ues	L	in c	B/O	Oct.	(re	1p\	<b>ND</b> p	val	ues	$L_{\rm w}$	in c	IB/O	Oct.	(re	1p\	<b>W)</b> p	val	ues
Model	Velocity	air	volu		min. ∆Ps	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	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB (A)	NC	NR
	m/s	l/s	CFM	m³/h	Ра				в									в								d	в					
	2	15	31	53	2	34	32	22	18	-	-				19	-	19	20	23	21				-	-	-	-	-	-			
	4	29	62	106	10	40	38	28	24	18	-				26	23	26	27	30	28				22	-	-	-	-	-			
100	6	44	94	160	22	44	43	33	28	22	-				30	27	30	31	34	32				26	20	-	-	-	18			
	8	59	125	213	38	48	46	36	32	27	-	20			33	30	33	34	37	35				29	23	19	19	19	21			
	10	74 23	156 49	266 84	60 2	50 31	49	40	35	30	19	23			35	32 24	35 25	36 22	39	37				32	26	22	21	21	23			
	2	47	49 99	84 168	2		31	22	19	-	-				28			22	23	17				- 23	-	-	-	-	-			
105	6	47 70	99 149	253	17	38 43	37 42	28 33	25 29	18 22					35 39	31 35	32 36	33	30 34	24 28				23	18 22	- 19	- 18	-	- 19			
125	8	94	149	337	30	43	42	37	29 33	26		20			42	38	38	35	34	31	21			30	22	22	21	- 20	22			
	10	117	248	421	46	50	49	41	36	29	20	23			44	40	41	38	39	33	23			33	28	25	23	22	24			
	2	39	82	139	2	30	29	22	18	-	-				28	24	25	22	23	18				18	-	-	-	-	-			
	4	78	164	279	6	38	36	28	24	19	-				35	31	32	29	30	25				25	20	19	-	-	-			
160	6	116	246	418	14	43	40	32	29	22	-				39	35	36	33	34	29				29	24	23	20	18	20			
100	8	155	328	558	26	47	44	36	32	26	18				42	38	38	35	37	31	21			32	27	26	23	21	23			
	10	194	410	697	40	51	48	40	36	29	21	23			44	40	41	38	39	34	23			34	29	28	25	23	25			
	2	61	129	219	1	30	22	19	-	-	-				29	24	24	23	23	18				19	-	-	-	-	-			
	4	122	258	439	6	39	32	28	22	-	-				36	31	31	29	30	25				26	22	21	18	-	-			
200	6	183	387	658	13	45	39	34	27	20	-				40	35	35	33	34	29				30	26	25	22	20	21			
	8	244	516	878	23	49	43	38	31	24	-	20			43	38	38	36	37	31	21			33	29	28	25	22	24			
	10	305	645	1097	36	52	47	42	34	28	19	23			45	40	40	38	39	34	23			35	31	30	27	25	26			
	2	96	203	345	1	32	31	24	19	-	-				29	24	24	23	23	18				19	-	-	-	-	-			
	4	192	406	690	5	41	39	32	25	18	-				36	31	31	29	30	25				26	21	21	18	-	-			
250	6	288	609	1035	<b>1</b> 1	47	44	37	30	22	-				40	35	35	33	34	29				30	25	25	22	20	21			
	8	383	812	1380	19	51	48	41	33	25	19	23			43	38	38	36	37	31	21			33	28	28	25	23	24			
	10	479	1015	1725	30	54	51	44	36	28	21	26		21	45	40	40	38	39	34	23			35	31	31	27	25	26			
	2	153	324	550	1	36	37	23	21	-	-				30	24	24	23	23	19				21	18	18	-	-	-			
	4	306	648	1101	5	46	44	30	27	21	-				37	31	31	30	30	26				28	25	25	22	18	19			
315	6	459	971	1651	<b>1</b> 1	52	49	36	32	26	18	24			41	35	35	34	34	30				32	29	29	26	22	23			
	8	612	1295	2202	19	57	53	40	36	30	22	28	21	23	44	38	38	36	37	32	21			35	32	32	29	25	26			
	10	764	1619	2752	29	61	56	44	39	33	26	32	26	28	46	40	40	39	39	35	23			38	34	34	31	27	28			
	2	195	412	701	1	36	44	27	25	18	-				30	24	24	23	23	19				22	19	19	-	-	-			
355	4	389	824	1401	4	47	48	33	30	21	18	21			37	31	31	30	30	26				29	26	26	23	18	20			
	6	584	1236	2102	10	53	52	38	34	24	21	26		21	41	35	35	34	34	30				33	30	30	27	23	24			
	8	779		2803	18	58	55	42	37	28	24	24	22	25	44	38	38	37	37	33	21			36	33	33	30	25	27			
	10	973	2061	3503	28	62 27	58	46	41 26	31	28	28	28	29	46	40	40	39	39	35	23			38	35	35	32	28	29		<u> </u>	
	2	248	524	891	1	37	46	28	26 21	20	-			20	30	24	24	23	23	19				22	19	19	-	-	-			
400	4	495	1049	1783 2674	4 9	48	50	34	31 35	23	10	10		20	37	31	31	30	30 34	26				29	26	26 30	24	19 23	20			
		743 990	1573			54 59	54 57	39 43	35 38	26	19	19	21	24	41	35	35	34	34 37	30	21			33	30	30 33	28	23 26	24			
	8	990	2097		17 26	59 63	57 60	43	38 42	30	22	22	24	27	44	38	37	37	37	33	21			36	33	33 36	31	26 28	27			
	10	1238	2326	4456	26	63	60	47	42	33	26	26	29	30	46	40	40	39	39	35	23			39	36	36		28	29		L	

 Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 and ISO 5135 standards.

 Lw in dB/Ŏct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".

 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. 5. 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 "--".

7.  $\Delta ps$  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 : Assumpt	ions	for	addi	tiona	l att	enua	tion							
Hz 125 250 500 1K 2K 4K														
Discharge (dB)	5	10	20	30	30	25								
Radiated (dB)	2	5	10	15	15	20								

Model 125 250 500 1K 2K 4K Ηz 100 15 dB 9 10 11 13 15 125 8 9 10 12 14 14 dB 160 9 14 dB 8 10 12 14 200 9 13 dB 8 8 11 13 250 8 9 11 13 dB 7 13 315 7 8 9 11 13 13 dB

355

400

7 8 9 11 13 13 dB

7 8 9 11 13 13 dB

Table 2: Insertion Loss

#### Sound data $\Delta p = 250 Pa$

## Type NAOCOOB **NBOCOOB**

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			_														Δ	∆p =	250	Ра												
		taref nlet :						disc	har	ge	sou	nd				radi					glev	vall			radi	ated	dso	und	dou	ıble	wal	I
	'	niet	spigo	π		L,				_			val	ues	L.	in c	B/0	Oct.	. (re	1p)	- W.)p	val	ues	L,	in d	IB/(	Oct.	(re	1p\	<b>M)</b> p	val	ues
Model	Velocity	air	volu	ıme	min. ∆Ps		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	125 Hz	250 Hz	500 Hz	Hz	Ηz	4000 Hz	dB (A)	NC	NR
	m/s	l/s	CFM	m³/h	Ра			d	в								d	в								d	в					
	2	15	31	53	2	36	36	27	23	18	-				26	23	26	27	30	28				21	-	-	-	-	-			
	4	29	62	106	10	42	41	33	28	23	-				33	30	33	34	37	35				28	22	18	-	-	18			
100	6	44	94	160	22	46	45	36	32	27	-				37	34	37	38	41	39	21			32	26	22	20	20	22			
	8	59	125	213	38	49	48	39	35	31	20	22			40	37	40	41	44	42	24		22	35	29	25	23	23	25			
	10	74	156	266	60	51	51	42	37	34	23	25		21	42	39	42	43	46	44	26	22	24	38	32	28	25	25	27			
	2	23	49	84	2	34	35	28	23	18	-				35	31	31	28	30	24				22	17	-	-	-	-			
	4	47	99	168	7	41	41	33	29	23	-				41	38	38	35	37	31				29	24	21	18	-	19			
125	6	70	149	253	17	45	45	37	33	26	17				45	42	42	39	41	35	24			33	28	25	22	21	23			
	8	94	198	337	30	49	48	40	36	29	21	22			48	45	45	42	44	38	27		22	36	31	28	25	24	26			
	10	117	248	421	46	52	51	43	38	32	24	25		21	50	47	47	44	46	40	29	22	24	39	34	31	27	26	28			
	2	39	82	139	2	33	35	28	24	21	-				35	31	31	28	30	24				24	19	18	-	-	-			
	4	78	164	279	6	41	41	34	30	25	19				41	38	38	35	37	31				31	26	25	20	18	20			
160	6	116	246	418	14	46	45	37	34	28	22				45	42	42	39	41	35	24			35	30	29	24	22	24			
	8	155	328	558	26	50	48	41	37	31	24	22			48	45	45	42	44	38	27		22	38	33	32	27	25	27			
	10	194	410	697	40	53	51	43	39	33	26	25		21	50	47	47	44	46	40	29	22	24	40	35	34	29	27	29		<u> </u>	
	2	61	129	219	1	34	26	23	19	-	-				36	31	31	29	30	24				25	21	20	-	-	-			
	4	122	258	439	6	43	37	32	27	21	-				43	38	38	36	37	31	21			32	28	27	22	19	21			
200	6	183	387	658	13	48	43	38	31	25	18				47	42	42	40	41	35	25			36	32	31	26	23	25			
	8	244	516	878	23	52	47	42	35	29	21	23			50	45	45	43	44	38	28		22	39	35	34	29	26	28			
	10	305	645	1097	36	55	51	45	38	32	24	27		21	52	47	47	45	46	40	30	22	24	41	37	36	31	29	30			
	2	96	203	345	1	35	35	28	24	19	-				36	31	31	29	30	24				25	20	20	-	-	-			
250	4	192	406	690	5	44	43	36	30	24	18				43	38	38	36	37	31	21			32	27	27	22	20	21			
230	6	288	609	1035	11	50	48	41	34	28	22	22			47	42	42	40	41	35	25			36	31	31	26	24	25			
	8	383 479	812 1015	1380 1725	19 30	54	52	44 47	37 40	31	24 27	26 29	22	22 25	50 52	45	45	43 45	44	38 40	28 30	22	22 24	39	34	34	29	27	28			
	2	153	324	550	1	57 39	55 42	27	40 26	33 23	21	29		25	37	47 31	47 31	43 29	46 30	40 25	30	22	24	41 27	37 24	37 24	31 19	29	30			
	4	306	648	1101	5	48	42	34	20 32	23	20	22			43	37	38	36	36	32	21			34	31	31	26	22	23			
315	6	459	971	1651	11	54	40 52	34 39	32 36	31	20	27		22	43	41	42	40	40	32 36	21			38	35	35	30	26	23			
	8	612	1295	2202	19	59	56	43	39	34	27	31	23	26	50	44	44	43	43	39	27		21	41	38	38	336	29	30			
	10	764	1619	2752	29	63	59	43 46	39 42	37	30	34	23	20 29	50	44	44	43 45	45	39 41	30	21	21	41	40	40	35	31	30	20		
	2	195	412	701	1	39	49	32	31	25	23	21			37	31	31	30	30	26				28	25	25	20	-	-		<u> </u>	
	4	389	824	1401	4	49	53	38	35	28	25	25	20	23	44	38	38	37	37	33	21			35	32	32	27	22	24			
355	6	584	1236	2102	10	55	56	42	38	30	27	29	23	26	48	42	42	41	41	37	25			39	36	36	31	26	28			
	8	779		2803	18	60	58	45	41	33	30	32	26	28	50	45	45	44	44	40	28		22	42	39	39	34	29	31	20		
	10	973	2061	3503	28	64	61	48	44	35	32	35	30	31	53	47	47	46	46	42	30	22	24	44	41	41	36	32	33	23		
	2	248	524	891	1	40	51	33	32	27	21	23		21	37	31	30	30	30	26				28	25	25	21	-	17			
	4	495	1049		4	50	55	39	36	30	23	27	22	25	44	37	37	37	36	33	21			35	32	32	28	23	24			
400	6	743	1573		9	56	58	43	39	32	25	31	25	28	48	41	41	41	40	37	25			39	36	36	32	27	28			
	8	990	2097	3565	17	61	60	46	42	35	28	34	28	31	50	44	44	43	43	39	27		21	42	39	39	35	30	31	21		
	10		2326		26	65	63	49	45	37	30	37	31	33	53	46	46	46	45	42	30	21	23	45	42	42	37	32	33	23		
	1 10	1200	12020	14400	20	00	00	40		01	00			00	00	1 40	40			12		21 Toble	20		12	72	1.07	102	00	20	<u> </u>	

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 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 "-"

 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. Lp 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 "- -"

Zps is static pressure drop across VAV air volume control terminal with damper fully open.
For non standard applications and/or selections,

please contatct our technical staff.

Table 1 : Assumpt	ions	for	addi	tiona	l att	enua	tion						
Hz 125 250 500 1K 2K 4K													
Discharge (dB)	5	10	20	30	30	25							
Radiated (dB)	2	5	10	15	15	20							

9

Model 125 250 500 1K 2K 9 10 11 13

Table 2: Insertion Loss

4K Ηz 100 15 dB 15 125 8 9 10 12 14 14 dB 160 9 14 dB 8 10 12 14 200 9 13 dB 8 8 11 13 250 8 9 11 13 dB 7 13 315 7 8 9 11 13 13 dB 355 7 8 9 11 13 13 dB 400 7 8 9 11 13 13 dB



#### Type NAOG.OB NAON.OB NBOG.OB NBON.OB

Sound				25 6			0.					/	1						ł	4					-	-			/	4		4
					<u>а</u>												L	∆p =	125	Ра												
		taref nlet:						dise	chai	rge	sou	nd				radi	iate	dso	ound	sin	gle	wall			radi	ate	d so	und	dou	ıble	wal	I
		ince .	spige	~		L,	in c	IB/	) Ct.	. (re	1p	W)p	val	ues	L,	in d	dB/	Oct	. (re	1p	W <b>.)</b> p	val	ues	L,	in d	B/	Oct.	(re	1p	<b>W)</b> p	val	ues
Mode	Velocity	air	volu	ıme	min. ∆Ps	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	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB (A)	NC	NR
	m/s	l/s	CFM	m³/h	Ра			d	в								d	в								d	в					
	2	15	31	53	3	38	37	28	26	21	-				19	-	19	20	23	21				-	-	-	-	-	-			
	4	29	62	106	<b>1</b> 1	44	43	34	31	27	-				26	23	26	27	30	28				22	-	-	-	-	-			
100	6	44	94	160	24	48	47	38	35	32	20	21			30	27	30	31	34	32				26	20	-	-	-	18			
	8	59	125	213	43	51	50	41	38	35	24	24			33	30	33	34	37	35				29	23	19	19	19	21			
	10	74	156	266	67	53	53	44	42	39	28	26		22	35	32	35	36	39	37				32	26	22	21	21	23			
	2	23	49	84	3	35	35	28	27	22	-				28	24	25	22	23	17				-	-	-	-	-	-			
	4	47	99	168	10	42	42	34	32	27	-				35	31	32	29	30	24				23	18	-	-	-	-			
125	6	70	149	253	23	46	46	38	36	31	21	20			39	35	36	33	34	28				27	22	19	18	-	19			
	8	94	198	337	40	50	50	42	40	35	25	23			42	38	38	35	37	31	21			30	25	22	21	20	22			
	10	117	248	421	63	53	53	45	43	38	29	26		22	44	40	41	38	39	33	23			33	28	25	23	22	24			
	2	39	82	139	2	34	34	28	26	24	18				28	24	25	22	23	18				18								
	4	78	164	279	9	41	40	33	32	28	21				35	31	32	29	30	25				25	20	19						
	6																											10	20			
160		116	246	418	21	46	45	37	36	32	24				39	35	36	33	34	29				29	24	23	20	18	20			
	8	155	328	558	38	50	48	41	39	35	27	22			42	38	38	35	37	31	21			32	27	26	23	21	23			
	10	194	410	697	59	53	51	44	42	37	30	26		21	44	40	41	38	39	34	23			34	29	28	25	23	25			
	2	61	129	219	2	34	27	25	22	18	-				29	24	24	23	23	18				19	-	-	-	-	-			
	4	122	258	439	9	43	37	34	30	25	-				36	31	31	29	30	25				26	22	21	18	-	-			
200	6	183	387	658	21	48	43	39	34	29	21				40	35	35	33	34	29				30	26	25	22	20	21			
	8	244	516	878	38	52	47	43	38	33	24	23			43	38	38	36	37	31	21			33	29	28	25	22	24			
	10	305	645	1097	59	55	51	46	40	36	27	26		20	45	40	40	38	39	34	23			35	31	30	27	25	26			
	2	96	203	345	2	36	36	29	27	22	-				29	24	24	23	23	18				19	-	-	-	-	-			
	4	192	406	690	9	44	43	37	33	28	21				36	31	31	29	30	25				26	21	21	18	•	-			
250	6	288	609	1035	21	50	48	42	37	31	24	22			40	35	35	33	34	29				30	25	25	22	20	21			
	8	383	812	1380	38	53	52	45	40	34	27	26		21	43	38	38	36	37	31	21			33	28	28	25	23	24			
	10	479	1015	1725	59	57	55	48	42	37	30	29	22	25	45	40	40	38	39	34	23			35	31	31	27	25	26			
	2	153	324	550	2	40	42	29	29	36	18				30	24	24	23	23	19				21	18	18	-	-	-			
	4	306	648	1101	9	49	48	36	34	31	23	22			37	31	31	30	30	26				28	25	25	22	18	19			
315	6	459	971	1651	21	55	53	41	39	35	27	27		22	41	35	35	34	34	30				32	29	29	26	22	23			
	8	612	1295	2202	38	60	57	45	43	39	31	31	25	27	44	38	38	36	37	32	21			35	32	32	29	25	26			
	10	764	1619	2752	59	64	60	48	46	42	34	35	30	31	46	40	40	39	39	35	23			38	34	34	31	27	28			
	2	195	412	701	2	40	49	33	33	27	24	20			30	24	24	23	23	19				22	19	19	-	-	-			
	4	389	824	1401	9	50	53	39	37	31	27	25		22	37	31	31	30	30	26				29	26	26	23	18	20			
355	6	584		2102	21	56	56	43	41	34	30	29	23	26	41	35	35	34	34	30				33	30	30	27	23	24			
	8	779		2803	38	61	59	47	44	37	33	33	27	29	44	38	38	37	37	33	21			36	33	33	30	25	27			
	10	973	2061		59	65	62	50	47	40	36	37	31	32	46	40	40	39	39	35	23			38	35	35	32	28	29			
	2	248	524	891	2	41	51	34	34	29	22	22		20	30	24	24	23	23	19				22	19	19						
	4	495	1049	1783	9	51	55	40	38	33	25	27	22	25	37	31	31	30	30	26				22	26	26	24	19	20			
400	6				21			40																								
		743	1573			57 62	58		42	36	28	31	26	28	41	35	35	34	34	30	24			33	30	30	28	23	24			
	8	990		3565	38	62	61	48	45	39	31	35	29	31	44	38	37	37	37	33	21			36	33	33	31	26	27			
	10		2326		59 reverbe	66		51	48	42	34	38	33	34 100 a	46	40	40	39	39	35	23	L Table		39	36	36	33	28	29			

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 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 "-"

 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. Lp 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.  $\Delta \dot{ps}$  is static pressure drop across VAV air

volume control terminal with damper fully open. 8. For non standard applications and/or selections,

please contatct our technical staff. . ....

Table 1 : Assumpt	ions	for	addi	tiona	l att	enua	tion
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 Ηz 10 100 dB 3 4 6 11 12 125 3 4 6 11 10 12 dB 160 2 6 10 10 10 11 dB 200 2 5 10 10 10 11 dB 250 5 10 10 dB 2 10 11 315 1 4 9 10 10 10 dB 355 1 4 9 10 10 10 dB 400 1 3 9 10 10 10 dB

Rev 100422



#### Type NAOG.OB NAON.OB NBOG.OB NBON.OB

Model	i	a ref	ering																													
	i																L	∆p =	250	Ра												
								diso	char	ge	sou	nd				radi	ate	dso	und	sin	glev	vall		I	radi	atec	d so	und	dou	ıble	wal	L
	ity					L,	in c	IB/(	Oct.	(re	1p)	W))p	val	ues	L,	in c	1B/(	Oct	. (re	1p)	<b>/I)</b> p	val	ues	L	in c	IB/O	Oct.	(re	1p)	<b>м)</b> р	val	ue
	Velocity	air	volu	ıme	min. ∆Ps	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	125 Hz	250 Hz	500 Hz			4000 Hz	dB (A)	NC	NR
	m/s	l/s	CFM	m³/h	Ра			d	в								d	в								d	в					
	2	15	31	53	3	40	41	34	31	28	-				26	23	26	27	30	28				21	-	-	-	-	-			
	4	29	62	106	<b>1</b> 1	46	46	39	36	33	21	20			33	30	33	34	37	35				28	22	18	-	-	18			-
100	6	44	94	160	24	50	50	42	39	37	25	23			37	34	37	38	41	39	21			32	26	22	20	20	22			-
	8	59	125	213	43	52	53	45	42	40	29	26		22	40	37	40	41	44	42	24		22	35	29	25	23	23	25			
	10	74	156	266	67	54	55	47	44	43	32	28	22	25	42	39	42	43	46	44	26	22	24	38	32	28	25	25	27			
	2	23	49	84	3	38	40	34	32	28	19				35	31	31	28	30	24				22	17	-	-	-	-			
	4	47	99	168	10	45	46	39	37	33	24				41	38	38	35	37	31	20			29	24	21	18	-	19			
125	6	70	149	253	23	49	50	43	40	36	27	23			45	42	42	39	41	35	24			33	28	25	22	21	23			
	8	94	198	337	40	52	53	46	43	39	30	26		22	48	45	45	42	44	38	27		22	36	31	28	25	24	26			
	10	117	248	421	63	55	55	48	45	41	33	29	23	25	50	47	47	44	46	40	29	22	24	39	34	31	27	26	28			
	2	39	82	139	2	38	40	34	32	32	26				35	31	31	28	30	24				24	19	18	-		-			
	4	78	164	279	9	45	46	40	38	35	29				41	38	38	35	37	31	20			31	26	25	20	18	20			
160	6	116	246	418	21	50	49	43	41	38	31	23			45	42	42	39	41	35	24			35	30	29	24	22	24			
	8	155	328	558	38	53	52	46	44	40	33	26		22	48	45	45	42	44	38	27		22	38	33	32	27	25	27			
	10	194	410	697	59	56	55	48	46	42	35	29	22	25	50	47	47	44	46	40	29	22	24	40	35	34	29	27	29			
	2	61	129	219	2	39	32	29	27	24	-				36	31	31	29	30	24				25	21	20	-	-	-			
	4	122	258	439	9	47	41	38	35	31	23				43	38	38	36	37	31	21			32	28	27	22	19	21			
200	6	183	387	658	21	52	47	43	39	35	27	23			47	42	42	40	41	35	25			36	32	31	26	23	25			
	8	244	516	878	38	55	51	47	42	38	30	27		21	50	45	45	43	44	38	28		22	39	35	34	29	26	28			
	10	305	645	1097	59	58	54	50	44	41	33	30	22	24	52	47	47	45	46	40	30	22	24	41	37	36	31	29	30			
	2	96	203	345	2	40	41	34	32	29	23				36	31	31	29	30	24				25	20	20	-	-	-			
	4	192	406	690	9	48	48	42	38	34	28	22			43	38	38	36	37	31	21			32	27	27	22	20	21			
250	6	288	609	1035	21	53	53	46	42	37	31	27	20	23	47	42	42	40	41	35	25			36	31	31	26	24	25			
	8	383	812	1380	38	57	56	49	45	40	34	30	23	26	50	45	45	43	44	38	28		22	39	34	34	29	27	28			
	10	479	1015	1725	59	60	59	52	47	42	36	33	27	29	52	47	47	45	46	40	30	22	24	41	37	37	31	29	30			
	2	153	324	550	2	43	47	34	35	33	26	20			37	31	31	29	30	25				27	24	24	19		-			
	4	306	648	1101	9	52	53	40	40	37	30	26	20	23	43	37	38	36	36	32	21			34	31	31	26	22	23			
315	6	459	971	1651	21	58	57	45	43	40	33	31	24	27	47	41	42	40	40	36	25			38	35	35	30	26	27			
	8	612	1295	2202	38	62	60	48	46	43	36	34	28	30	50	44	45	43	43	39	27		21	41	38	38	33	29	30			
	10	764	1619	2752	59	66	63	51	49	46	39	37	32	33	52	46	47	45	45	41	30	21	23	44	40	40	35	31	32	22		
	2	195	412	701	2	43	54	38	39	35	33	26	21	24	37	31	31	30	30	26				28	25	25	20	-	-			
	4	389	824	1401	9	53	58	44	43	38	35	30	25	28	44	38	38	37	37	33	21			35	32	32	27	22	24			
355	6	584	1236	2102	21	59	60	48	46	40	37	33	28	31	48	42	42	41	41	37	25			39	36	36	31	26	28			
	8	779	1649	2803	38	63	63	51	48	42	39	36	31	33	50	45	44	44	44	40	28/		22	42	39	39	34	29	31	20		
	10	973	2061	3503	59	67	65	53	51	44	41	39	34	35	53	47	47	46	46	42	30	22	24	44	41	41	36	32	33	23		
	2	248	524	891	2	44	56	39	40	37	31	28	24	26	37	31	31	30	30	26				28	25	25	21	-	17			-
	4	495	1049	1783	9	54	60	45	44	40	33	32	28	30	44	37	38	37	36	33	21			35	32	32	28	23	24			-
400	6	743	1573	2674	21	60	62	49	47	42	35	35	31	33	48	41	42	41	40	37	25			39	36	36	32	27	28			-
	8	990	2097	3565	38	64	65	52	49	44	37	38	33	35	50	44	45	43	43	39	27		21	42	39	39	35	30	31	21		
	10	1238	2326	4456	59	68	67	54	52	46	39	41	36	37	53	46	47	46	45	42	30	21	23	45	42	42	37	32	33	23		L

 Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 and ISO 5135 standards.

 Lw in dB/Ŏct. (re 1pW) are sound power levels for discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".

 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.

**BARCOL-AIR** 

5. 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 "--".

7.  $\Delta \dot{ps}$  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 : Assumpt	ions	for	addi	tiona	l att	enua	tion
Hz	125	250	500	1K	2K	4K	
Discharge (dB)	5	10	20	30	30	25	
Radiated (dB)	2	5	10	15	15	20	

Changes w/o notice or obligation

100

125

160

200

250

315

355

400

3 4

3 4 6 11 10 12 dB

2 6

2 5

2

1 4

1 4

1 3

Model 125 250 500 1K 2K

5

6 11

10 10 10 11 dB

10 10 10 11 dB

10 11

9 10 10 10 dB

9 10 10 10 dB

9 10

4K Hz

12

dB

10

10 10 dB

10 10 dB

#### Type NAOJ.OB NAOQ.OB NBOJ.OB NBOQ.OB

Sound	data	aΔp	) = 1	25 F	⊃a						/	ŧ		(+)	₽		/		4	(+)	∄					Ð			2		4 (	÷
			-														L	\p =	125	Ра										-		
		ta ref inlet						disc	chai	ge	sou	nd				radi	ate	d so	und	sin	gle	wall			radi	ate	dso	und	dou	uble	wal	
	'	met	spige	~		L,	in c	B/G	Oct.	(re	1p\	M))p	val	ues	L,	in c	3B/	Oct	. (re	1p	W <b>.)</b> p	val	ues	L,	in c	B/	Oct	. (re	1p	w <b>)</b> p	val	ues
Model	Velocity	aiı	r volu	ume	min. ∆Ps	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	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB (A)	NC	NR
	m/s	l/s	CFM	m³/h	Ра			d	в								d	в								c	в					
	2	15	31	53	3	32	30	20	-	-	-				19	-	19	20	23	21				-	-	-	-	-	-			
	4	29	62	106	11	38	36	26	21	-	-				26	23	26	27	30	28				22	-	-	-	-	-			
100	6	44	94	160	24	42	40	30	25	20	-				30	27	30	31	34	32				26	20	-	-	-	18			
	8	59	125	213	43	45	43	33	28	23	-				33	30	33	34	37	35				29	23	19	19	19	21			
	10	74	156	266	67	47	46	36	32	27	-	20			35	32	35	36	39	37				32	26	21	21	21	23			
	2	23	49	84	3	29	28	20	-	-	-				28	24	25	22	23	17				-	-	-	-	-	-			
105	4	47	99	168	10	36	35	26	22	-	-				35	31	32	29	30	24				23	18	-	-	-	-			
125	6	70	149	253	23	40	39	30	26	19	-				39	35	36	33	34	28				27	22	19	18	-	19			
	8 10	94	198 248	337	40	44	43	34	30	23	-				42	38	38	35	37	31	21			30	25	22 25	21	20	22			
	2	117 39	82	421 139	63 2	47 28	46 27	37 20	33	26	-	20			44 28	40 24	41 25	38 22	39 23	33 18	23			33 18	28	- 25	23	22	24			
	4	78	164	279	9	35	33	25	- 22	-	-				35	31	32	22	30	25				25	20	19			-			
400	6	116	246	418	21	40	38	29	26	20	-				39	35	36	33	34	29				29	20	23	20	18	20			
160	8	155	328	558	38	40	41	33	20 29	20	-				42	38	38	35	34	31	21			32	24	23	20	21	20			
	10	194	410	697	59	44	41	36	29 32	25	18				42	40	41	38	39	34	21			34	27	20	25	23	25			
	2	61	129	219	2	28	20		52	2.5					29	24	24	23	23	18	2.5			19	-	20	-	-	-			
	4	122	258	439	9	37	30	26	20						36	31	31	29	30	25				26	22	21	18		_			
200	6	183	387	658	21	42	36	31	24	17					40	35	35	33	34	29				30	26	25	22	20	21			
	8	244	516	878	38	46	40	35	28	21					43	38	38	36	37	31	21			33	29	28	25	22	24			
	10	305	645	1097	59	49	44	38	30	24	_	20			45	40	40	38	39	34	23			35	31	30	27	25	26			
	2	96	203	345	2	30	29	21	-		-				29	24	24	23	23	18				19	-		-	-	-			
	4	192	406	690	9	38	36	29	23	-	-				36	31	31	29	30	25				26	21	21	18		-			
250	6	288	609	1035	21	44	41	34	27	19	-				40	35	35	33	34	29				30	25	25	22	20	21			
	8	383	812	1380	38	47	45	37	30	22	-				43	38	38	36	37	31	21			33	28	28	25	23	24			
	10	479	1015	1725	59	51	48	40	32	25	18	22			45	40	40	38	39	34	23			35	31	31	27	25	26			
	2	153	324	550	2	34	35	21	19	-	-				30	24	24	23	23	19				21	18	18	-	-	-			
	4	306	648	1101	9	43	41	28	24	19	-				37	31	31	30	30	26				28	25	25	22	18	19			
315	6	459	971	1651	21	49	46	33	29	23	-	21			41	35	35	34	34	30				32	29	29	26	22	23			
	8	612	1295	2202	38	54	50	37	33	27	19	25		20	44	38	38	36	37	32	21			35	32	32	29	25	26			
	10	764	1619	2752	59	58	53	40	36	30	22	29	22	24	46	40	40	39	39	35	23			38	34	34	31	27	28			
	2	195	412	701	2	34	42	25	23	-	-				30	24	24	23	23	19				22	19	19	-	-	-			
	4	389	824	1401	9	44	46	31	27	19	-				37	31	31	30	30	26				29	26	26	23	18	20			
355	6	584	1236	2102	21	50	49	35	31	22	18	23			41	35	35	34	34	30				33	30	30	27	23	24			
	8	779	1649	2803	38	55	52	39	34	25	21	27		22	44	38	38	37	37	33	21			36	33	33	30	25	27			
	10	973	2061	3503	59	59	55	42	37	28	24	30	23	25	46	40	40	39	39	35	23			38	35	35	32	28	29			
	2	248	524	891	2	35	44	26	24	17	-				30	24	24	23	23	19				22	19	19	-	-	-			
	4	495	1049	1783	9	45	48	32	28	21	-	20			37	31	31	30	30	26				29	26	26	24	19	20			
400	6	743	1573	2674	21	51	51	36	32	24	-	24		21	41	35	35	34	34	30				33	30	30	28	23	24			
	8	990	2097	3565	38	56	54	40	35	27	19	28	21	24	44	38	37	37	37	33	21			36	33	33	31	26	27			
	10	1238	2326	4456	59	60	57	43	38	30	22	32	25	27	46	40	40	39	39	32	23			39	36	36	33	28	29			
1. Sound a	lata is	deter	mined	in a	reverb	eratio	n		51	n val	ues a	re in	cludi	na a	room	ahsi	orntia	nn of	10		7	able	e 2:	Ins	erti	on L	oss					

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 and ISO 5135 standards.

2. Lw in dB/Oct. (re 1pW) are sound power levels for

 a source of the physical source reversion of discharge sound and case radiated sound. Figures less than 17 dB are indicated by "-".
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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5. Lp 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 "- -"

Apps is static pressure drop across VAV air volume control terminal with damper fully open.
For non standard applications and/or selections,

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Table 1 : Assumpt	tions	for	addi	tiona	l atte	enua	ti
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

4K Ηz 28 30 dB 100 13 17 23 26 125 12 15 22 25 27 29 dB 160 12 15 22 25 27 29 dB 200 28 dB 11 15 21 24 26 250 28 dB 11 15 21 24 26 ion 315 8 11 21 24 26 26 dB 355 8 11 21 24 26 26 dB 400 8 11 21 24 26 26 dB

#### Model 125 250 500 1K 2K

#### Type NAOJ.OB NAOQ.OB NBOJ.OB NBOQ.OB

Sound data  $\Delta p = 250 Pa$ 

																	L	∆p =	250	Ра												
		taref nlet:						diso	char	ge	sou	nd				radi	ate	dso	und	sin	gle	wall			radi	ate	d so	und	dou	ıble	wal	I
_			op.ge	-		L,	in c	IB/O	Oct.	(re	1p)	W))p	val	ues	L	in c	1B/(	Oct	. (re	1p'	W <b>.)</b> p	val	ues	L,	in c	B/	Oct	. (re	1p	<b>W)</b> p	val	ues
Model	Velocity	air	volu	ıme	min. ∆Ps	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	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	dB (A)	NC	NR
	m/s	l/s	CFM	m³/h	Ра			d	в	_	_						d	в								d	в					
	2	15	31	53	3	34	34	26	21	-	-				26	23	26	27	30	28				21	-	-	-	-	-			
	4	29	62	106	11	40	39	31	26	21	-				33	30	33	34	37	35				28	22	18	-	-	18			
100	6	44	94	160	24	44	43	34	29	25	-				37	34	37	38	41	39	21			32	26	22	20	20	22			
	8	59	125	213	43	46	46	37	32	28	-				40	37	40	41	44	42	24		22	35	29	25	23	23	25			
	10	74	156	266	67	48	48	39	34	31	20	22			42	39	42	43	46	44	26	22	24	38	32	28	25	25	27			
	2	23	49	84	3	32	33	26	22	-	-				35	31	31	28	30	24				22	17	-	-	-	-			
	4	47	99	168	10	39	39	31	27	21	-				41	38	38	35	37	31	20			29	24	21	18	-	19			
125	6	70 94	149 198	253 337	23 40	43	43	35	30	24	-				45	42	42	39	41	35	24			33	28	25	22	21	23			
	10		248	337 421	40 63	46	46	38	33 25	27	18				48	45	45	42	44	38	27		22	36	31	28	25	24	26			
	2	117 39	248 82	421	2	49 32	48 33	40 26	35 22	29 20	21	22			50 35	47 31	47 31	44 28	46 30	40 24	29	22	24	39 24	34 19	31 18	27	26	28			
	4	78	164	279	9	39	39	32	28	23	17				41	38	38	35	37	31	20			31	26	25	20	18	20			
160	6	116	246	418	21	44	42	35	31	26	19				45	42	42	39	41	35	24			35	30	29	24	22	24			
160	8	155	328	558	38	47	45	38	34	28	21	20			48	45	45	42	44	38	27		22	38	33	32	27	25	27			
	10	194	410	697	59	50	48	40	36	30	23	22			50	47	47	44	46	40	29	22	24	40	35	34	29	27	29			
	2	61	129	219	2	33	25	21	17	-	-				36	31	31	29	30	24				25	21	20	-	-	-			
	4	122	258	439	9	41	34	30	25	19	-				43	38	38	36	37	31	21			32	28	27	22	19	21			
200	6	183	387	658	21	46	40	35	29	23	-				47	42	42	40	41	35	25			36	32	31	26	23	25			
	8	244	516	878	38	49	44	39	32	26	18	20			50	45	45	43	44	38	28		22	39	35	34	29	26	28			
	10	305	645	1097	59	52	47	42	34	29	21	23			52	47	47	45	46	40	30	22	24	41	37	36	31	29	30			
	2	96	203	345	2	34	34	26	22	-	-				36	31	31	29	30	24				25	20	20	-	-	-			
	4	192	406	690	9	42	41	34	28	22	-				43	38	38	36	37	31	21			32	27	27	22	20	21			
250	6	288	609	1035	21	47	46	38	32	25	19	20			47	42	42	40	41	35	25			36	31	31	26	24	25			
	8	383	812	1380	38	51	49	41	35	28	22	23			50	45	45	43	44	38	28		22	39	34	347	29	27	28			
	10	479	1015	1725	59	54	52	44	37	30	24	26		21	52	47	47	45	46	40	30	22	24	41	37	37	31	29	30			
	2	153	324	550	2	37	40	26	25	21	-				37	31	31	29	30	25				27	24	24	19	-	-			
	4	306	648	1101	9	46	46	32	30	25	18	20			43	37	38	36	36	32	21			34	31	31	26	22	23			
315	6	459	971	1651	21	52	50	37	33	28	21	24			47	41	42	40	40	36	25			38	35	35	30	26	27			
	8	612	1295	2202	38	56	53	40	36	31	24	28	20	23	50	44	44	43	43	39	27		21	41	38	38	33	29	30			
	10	764	1619	2752	59	60	56	43	39	34	27	31	24	26	52	46	47	45	45	41	30	21	23	44	40	40	35	31	32	22		<u> </u> ]
	2	195	412	701	2	37	47	30	29	23	21				37	31	31	30	30	26				28	25	25	20	-	-			
355	4	389	824	1401	9	47	51	36	33	26	23	23		20	44	38	38	37	37	33	21			35	32	32	27	22	24			
	6	584	1236	2102	21	53	53	40	36	28	25	27	20	23	48	42	42	41	41	37	25			39	36	36	31	26	28			
	8		1649		38	57	56	43	38		27		23					44			28			42				29				
	10	973	2061		59	61	58	45	41	32		33	26		53	47				42				44				32		23		
	2	248	524	891	2	38	49		30		19				37	31	30		30					28			21	-	17			
400	4	495	1049		9	48		37	34		21	25		23	44	37	37	37	36		21			35			28		24			
	6	743	1573		21	54	55	41	37	30	23		23		48	41	41	41	40	37	25			39								
	8	990	2097		38	58	58	44	39	32	25	31	25	28	50	44	44	43	43	39	27		21					30		21		
	10	1238	2326	4456	59	62	60	46	42	34	27	34	28	30	53	46	46	46	45	42	30	21	23	45	42	42	33	32	33	23		L

1. Sound data is determined in a reverberation room at an independent sound laboratory, according to ISO3741 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 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. Lp 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.  $\Delta ps$  is static pressure drop across VAV air

volume control terminal with damper fully open. 8. For non standard applications and/or selections,

please contatct our technical staff.

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

13

Model 125 250 500 1K 2K 4K Ηz 100 26 28 30 dB 13 17 23 125 12 15 22 25 27 29 dB 160 12 15 22 25 27 29 dB 200 11 15 21 24 26 28 dB 28 dB 250 11 15 21 24 26 315 8 11 21 24 26 26 dB 355 8 11 21 24 26 26 dB 400 8 11 21 24 26 26 dB

Table 2: Insertion Loss



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