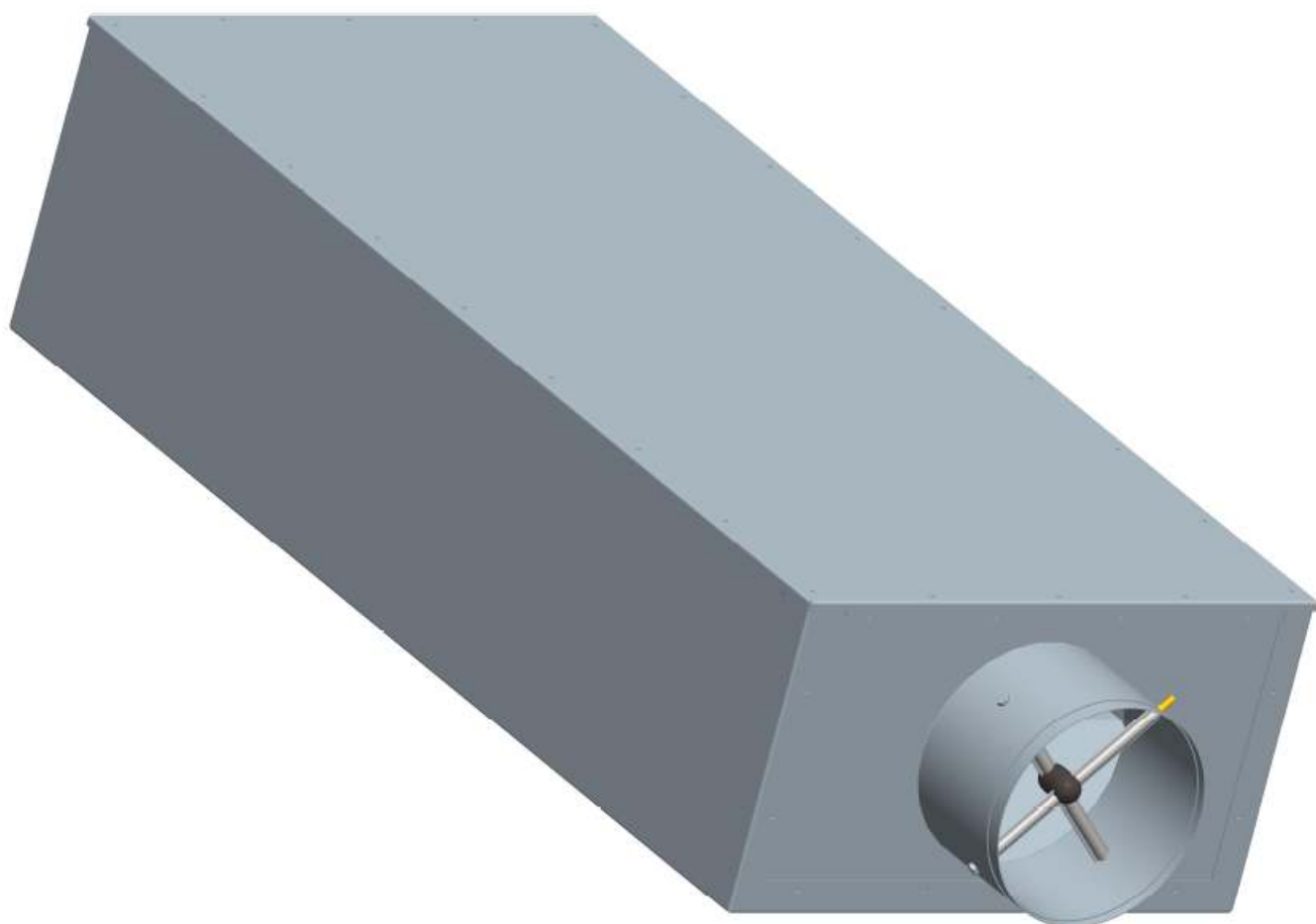


VAV terminals with integral sound attenuator

VSA



AIR-CONCEPTS
air distribution products



Application

Type VSA VAV (Variable-Air-Volume) terminals with integral sound attenuators are commonly used in sound critical areas, to maintain a constant space temperature by varying the conditioned air volume to the space. If the space temperature raises above the set point, the primary air damper modulates open to supply more (cold) primary air into the space so that the required space temperature is maintained. As the space temperature drops below set point, the VAV terminal modulates to a pre-set minimum airflow, which is usually determined by the minimum level of ventilation required in the space. Should the space cooling loads drop even further at the minimum airflow setting, a reheat coil (hot water or electric) can be energized to provide further heating.

Type VSA can also be used to maintain a constant (positive or negative) room pressure and to control the carbon dioxide (CO₂) level in the room.

Design features

Casing

- Ridged galvanised steel construction (1,0mm or 20 gauge).
- Spigots comply with DIN 24145 or DIN 24146.
- Damper blade, galvanised construction with synthetic rubber seals. Leakage rate max 1% of V_{nom} @ 750Pa (3"WG)
- Air leakage flow complies with Class II, VDI 3803 or DIN 24194, Part 2
- Damper shaft aluminium, ø12 mm
- Bearings Polyamide (PA6.6)
- Thermal / acoustical insulation 50kg/m³ (3,0lb/cuFt) non-fibrous or fiberglass, fire resistant to BS-476 Class "O". Exposed edges are sealed from the air-stream with perforated metal lining.
- Operating temperature +5 to 50°C
- Storage temperature 0 to +70°C, max R.H. 95%
- Other construction available upon request.

Air flow sensor

- Multi point averaging sensor type FloXact-X[®]. The unique shape creates an amplified signal (at least 2.5x P_{dyn}) with a very low pressure drop and noise level.

Controls

- All controls fitted are pressure independent and factory calibrated.
- The unit can be supplied with analogue, DDC or pneumatic controls
- When units are ordered with controls "free-issued" by 3rd party, wiring diagrams, calibration instructions, calibration tools and mounting instructions must be provided free of charge.
- All controls will be mounted, as standard, on the right hand side of the unit when looking in the direction of airflow, unless otherwise requested.

Type VSA-O-BE1 (Belimo LMP-D3-MP controller)



Detail FloXact-X[®] multipoint, averaging air flow sensor



HWQ LPHW reheat coil (optional)



Sound data

- The Discharge sound pressure levels **Lp(A)**, are determined with a room absorption of 7dB/oct and the following assumption for downstream ductwork, diffuser(s) and end reflection:

125	250	500	1k	2k	4k	Hz
-3	-5	-10	-15	-15	-12	dB

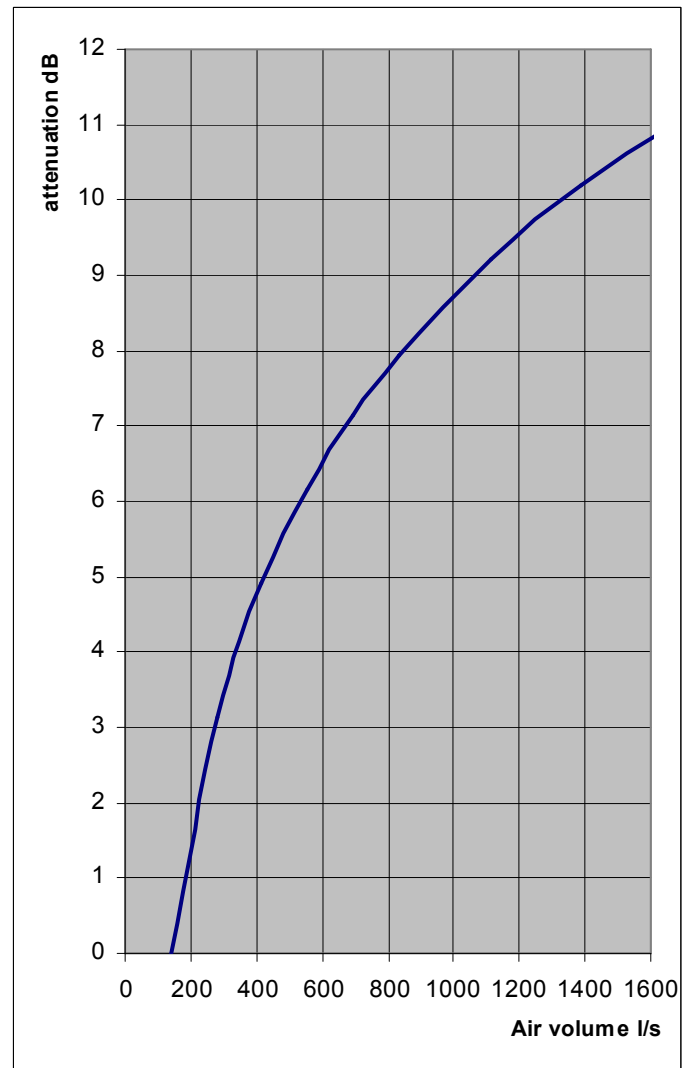
- The Discharge sound pressure levels **Lp(A)**, also include a correction for duct length and duct layout based on air volume as shown in Graph-C1).
- The Radiated sound pressure levels **Lp(A)**, are determined with a room absorption of 7dB/oct and the following assumption ceiling attenuation:
- Sound power data is measured in a reverberation

125	250	500	1k	2k	4k	Hz
-1	-3	-5	-7	-7	-10	dB

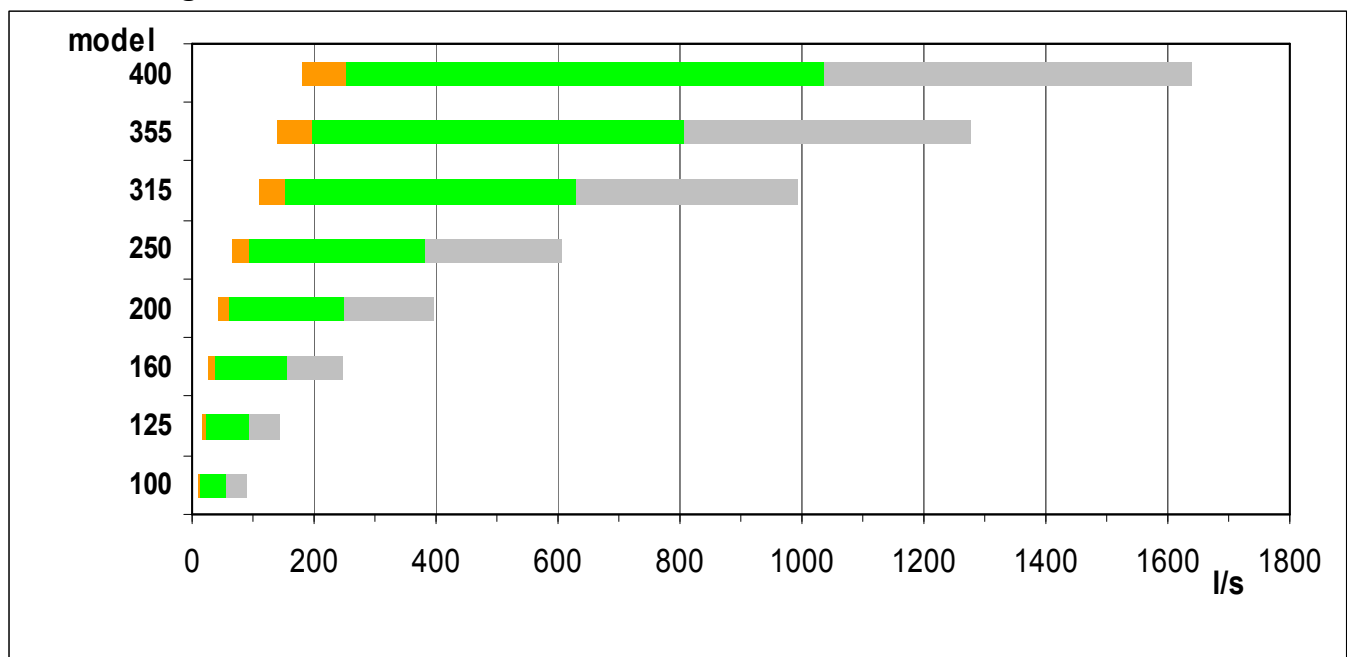
room at an independent sound laboratory, according to ISO 3741 and ISO 5135 standards.

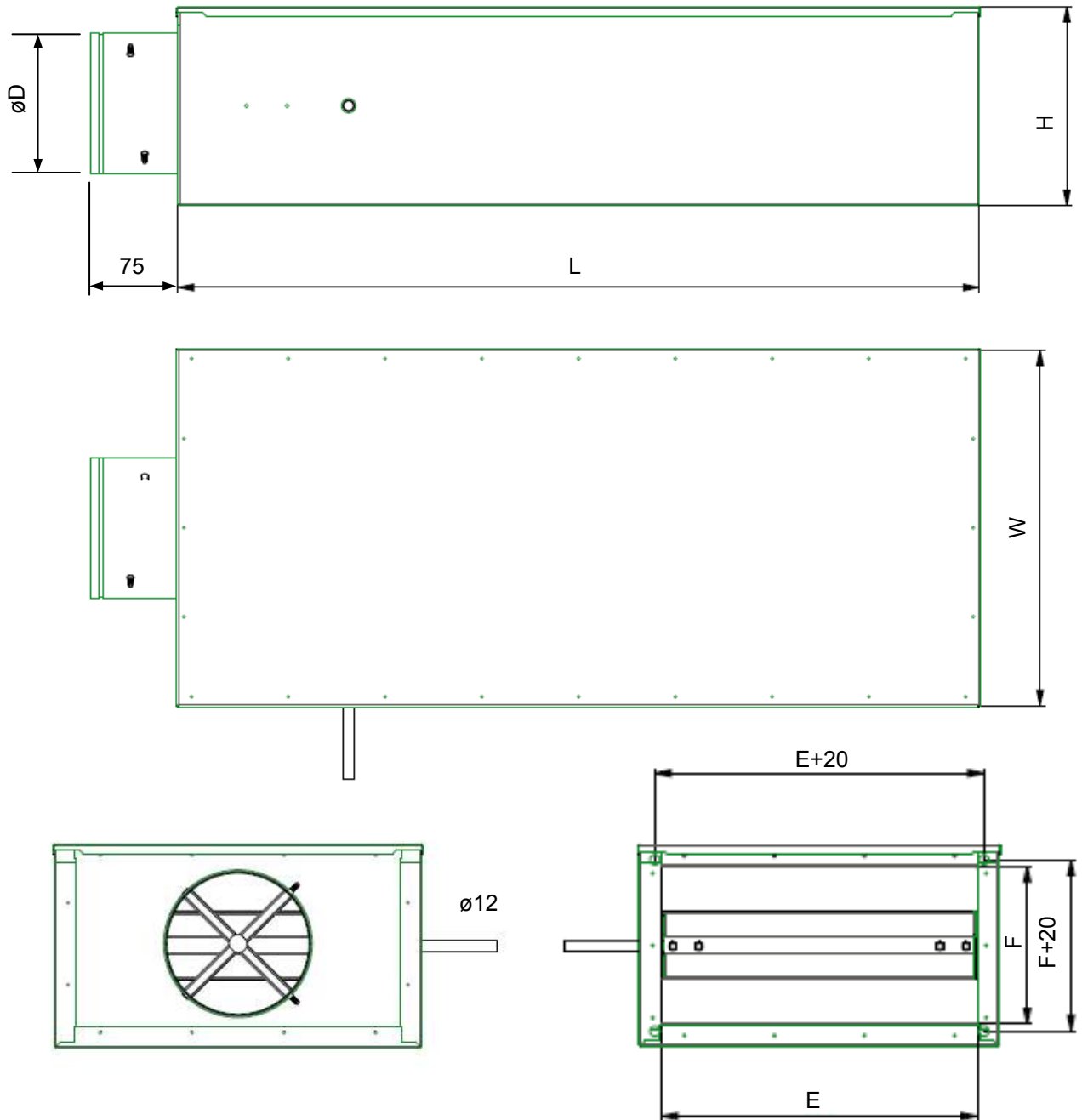
- Lw in dB/Oct are sound power levels (re $10^{-12}W$) per octave band in dB for discharge sound and radiated sound. Values less than 17 dB are indicated by "-".
- Lw(A) in dB/Oct are A-weighted sound power levels (re 20 μPa) for discharge sound and radiated sound. Values less than 20 dB(A) are indicated by "-".
- n/a Not applicable, static pressure < unit resistance
- Ps Static pressure.
- Pt Total Pressure.
- min ΔPs . Unit resistance with fully opened damper blade

Graph-C1: Correction duct system and air volume



Control range





Model	øD	W	H	L	E	F
100	99	200	225	800	150	175
125	124	250	225	800	200	175
160	159	400	225	900	350	175
200	199	500	250	1000	450	200
250	249	650	300	1100	600	250
315	314	800	375	1350	750	325
355	354	900	400	1350	850	350
400	399	1000	450	1400	950	400



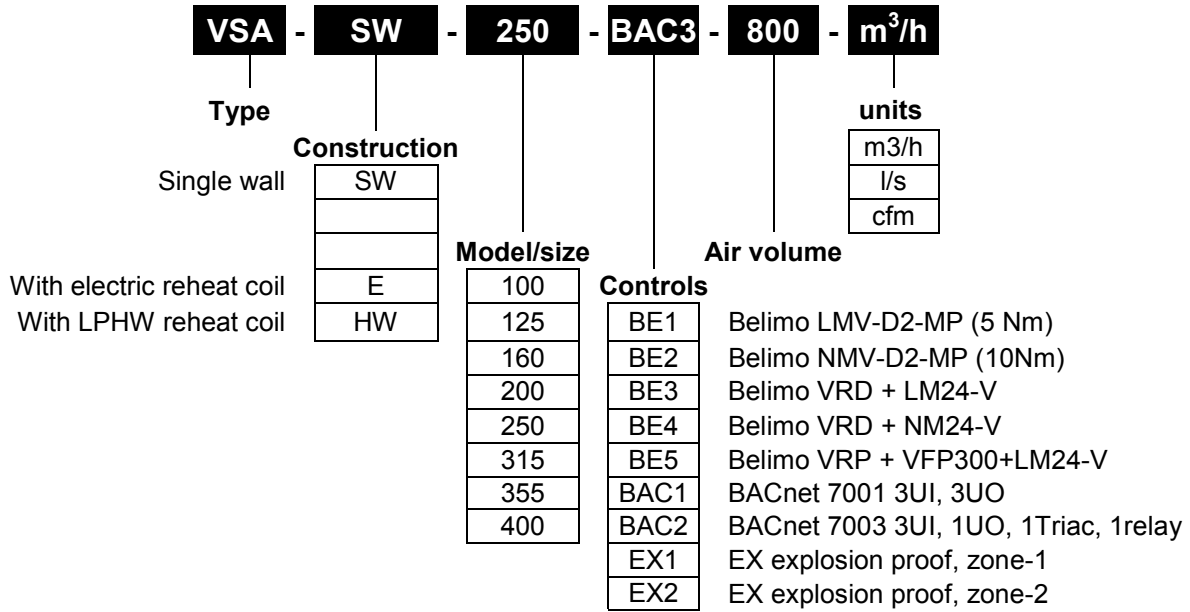
Pressure drop over unit : 200 Pa

Size / model	Air velocity (m/s)		Min. P _{st} (Pa)	Sound pressure level L _p			Discharge sound power						Radiated sound power														
				Discharge sound			Radiated sound			L _w (dB/oct) re 10 ⁻¹² W						L _w (dB/oct) re 10 ⁻¹² W											
				dB(A)	NR	NC	dB(A)	NR	NC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	L _w (dB(A))	L _w NR	L _w NC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	L _w (dB(A))	L _w NR	L _w NC
100	11	1,5	0	--	--	--	--	--	21	21	-	-	-	-	--	--	--	-	-	-	-	-	20	20	--		
	30	4,0	1	--	--	--	--	--	31	31	18	-	-	-	24	20	--	23	19	-	-	17	-	24	23	21	
	44	6,0	2	--	--	--	--	--	35	35	23	19	-	-	28	25	22	29	25	-	17	20	-	27	25	23	
	59	8,0	4	--	--	--	--	--	39	39	26	22	-	-	32	29	26	33	29	19	21	22	-	27	25	23	
	74	10,0	6	22	--	--	--	--	41	41	29	25	-	-	35	32	30	37	33	23	24	25	-	31	28	26	
	89	12,0	9	25	21	--	22	--	--	44	44	31	28	-	-	37	34	33	40	37	27	27	27	-	34	30	28
125	18	1,5	0	--	--	--	--	--	27	28	-	-	-	-	21	--	--	-	-	-	-	-	-	--	--	--	
	47	4,0	2	--	--	--	--	--	37	38	25	-	-	-	31	28	26	24	20	17	-	-	-	--	--	--	
	70	6,0	5	23	20	--	--	--	41	42	29	20	-	-	35	33	31	29	25	23	-	-	-	23	--	--	
	94	8,0	8	26	23	21	--	--	44	46	32	23	-	-	38	36	35	34	30	28	17	-	-	28	23	21	
	117	10,0	13	29	27	24	20	--	--	47	49	35	26	-	-	41	39	38	38	34	31	21	18	-	31	27	25
	140	12,0	19	31	29	27	24	--	--	50	51	38	29	19	-	44	42	41	41	37	35	24	20	-	35	31	29
160	29	1,5	0	--	--	--	--	--	30	28	20	-	-	-	22	--	--	22	20	-	-	-	-	--	--	--	
	77	4,0	2	--	--	--	--	--	40	38	30	18	-	-	32	27	25	34	32	20	-	-	-	26	22	--	
	116	6,0	3	23	--	--	22	--	44	42	34	22	-	-	36	32	30	40	38	26	20	17	-	32	28	26	
	155	8,0	6	26	22	--	26	22	--	47	45	37	25	-	-	39	36	34	45	43	30	23	20	-	36	33	31
	194	10,0	10	28	24	22	28	25	--	50	48	40	28	-	-	42	39	38	49	47	34	26	22	-	40	37	36
	232	12,0	14	30	26	24	31	28	--	53	51	43	31	19	-	45	41	41	52	50	38	29	25	18	43	41	40
200	46	1,5	0	--	--	--	--	--	30	28	19	-	-	-	22	--	--	23	19	-	-	-	-	--	--	--	
	122	4,0	2	--	--	--	--	--	40	38	29	21	-	-	32	27	25	35	31	-	-	-	-	26	21	--	
	183	6,0	4	22	--	--	20	--	45	42	34	26	20	17	36	32	30	41	37	22	19	18	-	31	27	25	
	244	8,0	8	24	20	--	23	--	48	45	37	29	23	21	40	36	34	45	42	26	22	21	-	35	32	30	
	305	10,0	12	26	22	--	26	21	--	51	48	40	32	26	43	39	38	49	46	30	26	23	18	39	36	35	
	366	12,0	18	28	24	21	28	24	--	53	51	42	34	29	45	41	41	53	49	34	29	26	20	42	40	39	
250	72	1,5	1	--	--	--	--	--	32	29	21	18	-	-	25	--	--	24	-	-	-	-	-	--	--	--	
	192	4,0	5	--	--	--	--	--	41	39	30	28	25	20	35	29	26	36	28	-	-	-	-	24	--	--	
	287	6,0	10	22	--	--	--	--	46	43	35	32	30	25	39	33	32	42	34	22	-	-	-	29	24	22	
	383	8,0	18	24	--	--	20	--	49	46	38	36	33	28	42	37	36	46	38	27	18	18	-	34	28	28	
	479	10,0	28	26	21	--	23	--	52	49	41	38	36	31	45	40	39	50	42	31	21	21	-	38	33	33	
	575	12,0	41	27	23	20	25	20	--	54	52	43	41	39	48	43	42	54	46	34	24	23	18	41	36	38	
315	115	1,5	1	--	--	--	--	--	34	32	26	22	18	-	29	22	21	25	19	-	-	-	-	--	--	--	
	306	4,0	4	20	--	--	--	--	44	42	36	32	28	25	39	32	31	38	31	21	-	-	-	27	21	--	
	459	6,0	8	23	--	--	--	--	48	46	40	37	33	29	43	37	35	44	37	27	18	19	-	32	27	25	
	612	8,0	15	25	20	--	20	--	51	49	43	40	36	32	46	40	39	48	41	31	22	21	-	36	32	30	
	765	10,0	23	27	22	--	23	--	54	52	46	43	39	35	49	43	43	52	45	35	25	24	18	40	36	35	
	917	12,0	34	28	24	21	26	20	--	57	55	49	45	41	52	46	46	55	49	39	28	26	20	44	40	40	
355	146	1,5	1	--	--	--	--	--	36	35	31	27	22	-	33	27	25	27	19	-	-	-	-	--	--	--	
	389	4,0	5	22	--	--	--	--	46	45	41	37	32	25	42	37	35	39	31	20	-	-	-	27	21	--	
	584	6,0	12	25	20	--	--	--	50	49	45	41	36	29	47	41	40	45	37	26	17	17	-	32	27	26	
	779	8,0	22	27	22	--	20	--	53	52	48	44	39	32	50	45	44	49	41	31	21	20	-	37	32	32	
	973	10,0	34	29	24	22	23	--	56	55	51	47	42	35	53	48	47	53	45	34	24	22	-	41	36	37	
	1168	12,0	49	31	26	24	25	20	--	59	58	54	50	45	55	50	49	57	49	38	27	25	18	44	40	42	
400	186	1,5	1	--	--	--	--	--	37	36	32	29	23	-	34	29	27	28	17	-	-	-	-	--	--	--	
	495	4,0	4	23	--	--	--	--	47	46	42	39	33	20	44	39	37	41	30	-	-	-	-	27	22	21	
	743	6,0	8	25	20	--	--	--	52	50	46	43	37	25	48	43	42	47	35	22	-	-	-	32	28	29	
	990	8,0	15	27	22	20	--	--	55	54	50	46	40	28	51	46	45	51	40	27	17	-	-	37	33	34	
	1238	10,0	23	29	24	22	22	--	58	56	53	49	43	31	54	49	48	55	44	31	21	18	-	41	38	39	
	1485	12,0	33	31	26	24	25	21	--	60	59	55	52	46	57	52	51	58	47	34	24	21	-	44	42	44	



Pressure drop over unit : 400 Pa

Size / model	Air velocity (m/s)		Min. P _{st} (Pa)	Sound pressure level L _p						Discharge sound power						Radiated sound power											
				Discharge sound			Radiated sound			L _w (dB/oct) re 10 ⁻¹² W						L _w (dB/oct) re 10 ⁻¹² W											
				dB(A)	NR	NC	dB(A)	NR	NC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	L _w (dB(A))	L _w NR	L _w NC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	L _w (dB(A))	L _w NR	L _w NC
100	11	1,5	0	--	--	--	--	--	--	--	--	24	22	-	-	-	-	-	-	20	-	23	24	21			
	30	4,0	1	--	--	--	--	--	--	--	--	34	32	23	21	-	-	-	-	25	-	28	28	26			
	44	6,0	2	--	--	--	--	--	--	--	--	38	36	27	25	-	-	-	-	27	-	31	30	28			
	59	8,0	4	20	--	--	20	--	--	--	--	40	39	30	28	-	17	-	-	29	-	33	32	30			
	74	10,0	6	23	--	--	23	20	--	--	--	43	41	32	30	-	20	-	-	31	-	35	34	32			
	89	12,0	9	24	20	--	26	22	--	--	--	45	43	34	32	18	21	-	-	32	33	-	38	36	34		
125	18	1,5	0	--	--	--	--	--	--	--	--	30	31	20	-	-	-	-	-	-	-	--	--	--			
	47	4,0	2	21	--	--	--	--	--	--	--	39	40	30	22	-	-	-	-	-	-	23	20	--			
	70	6,0	5	25	22	--	--	--	--	--	--	43	44	34	26	19	-	-	-	-	-	27	22	20			
	94	8,0	8	28	25	22	--	--	--	--	--	46	47	37	29	21	17	-	-	-	-	31	26	24			
	117	10,0	13	30	27	25	23	--	--	--	--	48	49	39	31	24	19	-	-	-	-	34	29	27			
	140	12,0	19	32	29	27	25	20	--	--	--	50	51	41	33	26	21	-	-	-	-	37	32	31			
160	29	1,5	0	--	--	--	--	--	--	--	--	32	31	25	-	-	-	-	-	18	22	23	20				
	77	4,0	2	22	--	--	--	--	--	--	--	42	41	34	24	-	-	-	-	20	18	30	24	22			
	116	6,0	3	26	22	--	24	--	--	--	--	45	45	38	28	-	-	-	-	18	35	30	28				
	155	8,0	6	28	25	22	28	23	--	--	--	48	47	41	31	20	-	-	-	19	38	34	33				
	194	10,0	10	30	26	24	30	26	--	--	--	51	50	43	33	22	19	-	-	20	42	38	37				
	232	12,0	14	31	27	25	32	28	--	--	--	53	52	45	35	24	21	-	-	21	45	41	40				
200	46	1,5	0	--	--	--	--	--	--	--	--	33	32	25	18	-	-	-	-	21	24	26	23				
	122	4,0	2	23	--	--	--	--	--	--	--	43	42	35	28	23	21	-	-	21	30	26	24				
	183	6,0	4	26	22	--	23	--	--	--	--	47	46	39	32	27	25	-	-	22	34	30	28				
	244	8,0	8	28	24	21	25	21	--	--	--	50	49	42	35	30	28	-	-	22	38	34	32				
	305	10,0	12	29	25	23	28	23	--	--	--	52	51	44	37	32	30	-	-	23	41	38	36				
	366	12,0	18	30	26	24	30	25	--	--	--	54	53	46	39	34	32	-	-	24	44	41	40				
250	72	1,5	1	--	--	--	--	--	--	--	--	36	35	28	26	24	20	-	-	19	23	25	22				
	192	4,0	5	25	20	--	--	--	--	--	--	45	44	38	35	33	29	-	-	20	29	25	22				
	287	6,0	10	27	23	20	20	--	--	--	--	49	48	41	39	37	33	-	-	20	33	27	26				
	383	8,0	18	28	24	22	22	--	--	--	--	52	51	44	42	40	36	-	-	21	37	31	31				
	479	10,0	28	30	26	23	25	--	--	--	--	54	53	47	44	42	38	-	-	22	40	35	35				
	575	12,0	41	31	27	25	27	21	--	--	--	56	55	49	46	44	40	-	-	23	43	38	39				
315	115	1,5	1	21	--	--	--	--	--	--	--	39	39	34	31	28	25	-	-	18	25	27	24				
	306	4,0	4	28	23	20	--	--	--	--	--	49	49	44	41	37	35	-	-	22	32	27	25				
	459	6,0	8	30	25	23	20	--	--	--	--	53	53	48	45	41	39	-	-	22	36	30	28				
	612	8,0	15	31	27	25	23	--	--	--	--	56	56	51	48	44	41	-	-	23	40	35	33				
	765	10,0	23	33	28	26	25	20	--	--	--	58	58	53	50	46	44	-	-	24	43	38	37				
	917	12,0	34	34	30	28	28	22	--	--	--	60	60	55	52	48	46	-	-	25	46	42	41				
355	146	1,5	1	25	20	--	--	--	--	--	--	42	43	40	37	32	25	-	-	18	23	24	21				
	389	4,0	5	31	26	24	--	--	--	--	--	52	53	50	46	41	35	-	-	19	31	25	23				
	584	6,0	12	33	28	26	20	--	--	--	--	56	57	54	50	45	39	-	-	19	36	30	30				
	779	8,0	22	34	30	28	23	--	--	--	--	59	60	56	53	48	41	-	-	20	40	35	35				
	973	10,0	34	36	31	30	25	--	--	--	--	61	62	59	55	50	44	-	-	21	43	38	39				
	1168	12,0	49	37	33	31	27	21	--	--	--	63	64	61	57	52	46	-	-	22	46	42	43				
400	186	1,5	1	25	21	--	--	--	--	--	--	44	44	42	38	33	20	-	-	-	20	--	--				
	495	4,0	4	31	26	24	--	--	--	--	--	53	54	51	48	42	30	-	-	-	30	25	25				
	743	6,0	8	33	28	26	--	--	--	--	--	57	58	55	51	46	34	-	-	-	35	32	32				
	990	8,0	15	34	30	28	22	--	--	--	--	60	61	58	54	49	36	-	-	-	39	36	37				
	1238	10,0	23	36	32	30	24	20	--	--	--	62	63	60	57	51	39	-	-	-	43	40	42				
	1485	12,0	33	37	33	31	26	22	--	--	--	64	65	62	59	53	41	-	-	-	46	44	46				



Specify as:

Example:

Supply and install, VAV terminal with integral sound attenuator, from galvanized sheet steel, duct sleeve connections suitable for DIN 24 145 or DIN 24 146. Casing leakage rate to class II, VDI 3803/ DIN 24 194. The VAV units should have a low leakage, damper blade with SBR gasket and aluminium damper shaft with self lubricating Nylon bearings and averaging airflow sensor type FloXact®.

For:

- Air volume m³/h
- Unit size mm
- Max. pressure loss Pa
- Max. discharge SPL dB(A)
- Max. radiated SPL dB(A)
- Controller BACnet type 7003 (factory programmed, fitted and calibrated)
- Manufacturer AIR-CONCEPTS BV
- Type VSA-O-xxx-BAC2-xxx-

AIR-CONCEPTS BV

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