

1.1.4 VSR-QA.

VAV terminal with
integral sound attenuator



Application

Type VSR-QAx VAV terminals with integral sound attenuation are designed for projects/ applications with tight acoustical requirements such as educational buildings, apartments, hospitals etc. VAV terminals are commonly used to maintain a constant room temperature by varying the conditioned air volume to the space but can also be used to maintain a constant (positive or negative) room pressure and to control the carbon dioxide (CO₂) level in the room.



Type VSR-QAR with integral sound attenuator

Design features

Casing

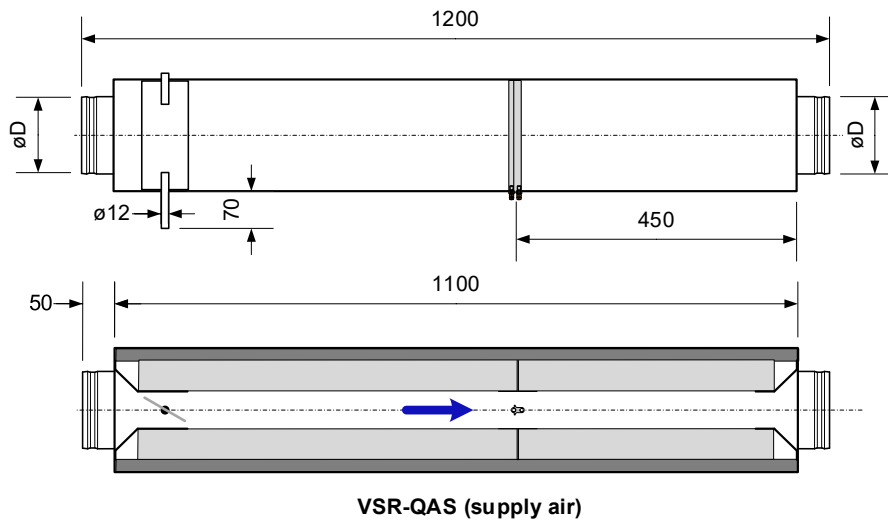
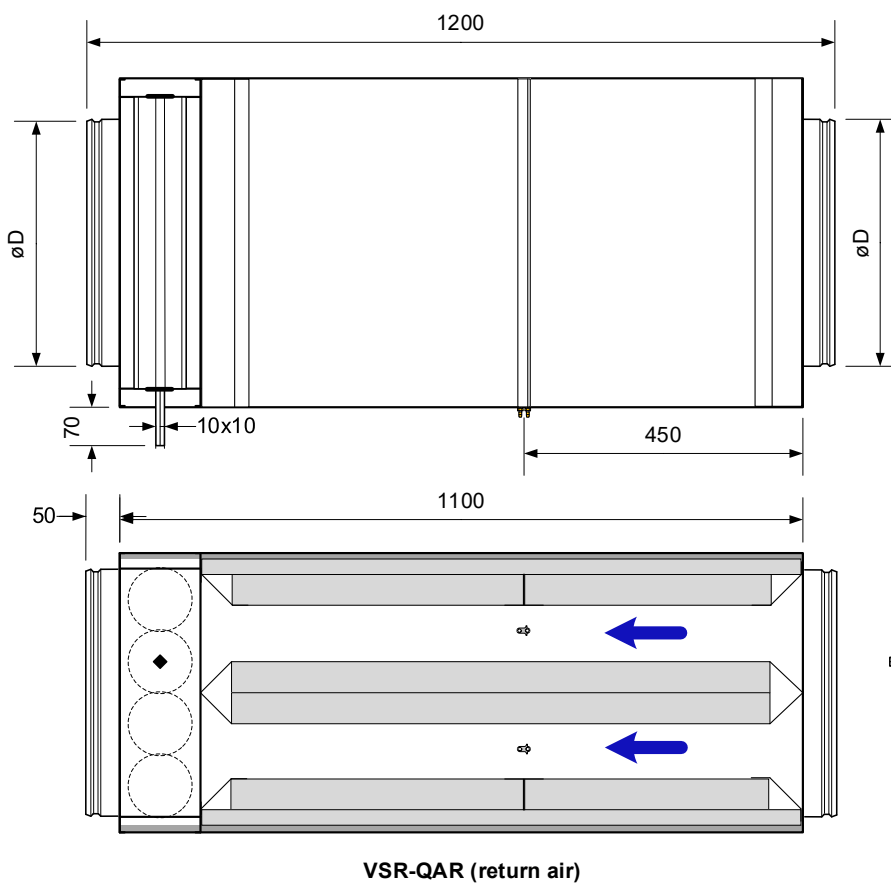
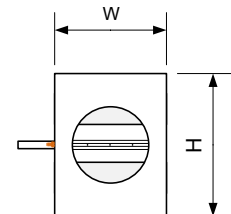
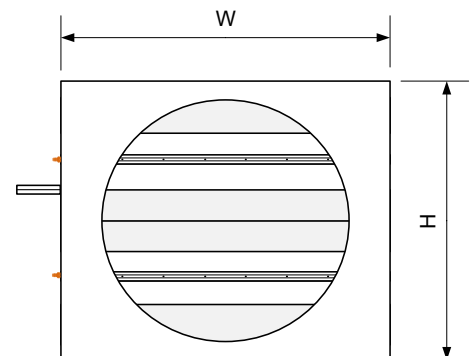
- Galvanised steel construction (275 g/m²), Air –tightness Class C (EN 1751).
- Spigots comply with DIN 24145 or DIN 24146.
- 1-piece construction, saves installation time on site.
- Damper blades: galvanised steel single blade damper for models 100...250. Aluminium opposed blade dampers for models 315...400.
- Dampers: Air-tight damper with seals. Leakage Class-2 (EN 1751).
- Damper shaft aluminium, ø12 mm or 10x10mm.
- Bearings Polyamide (PA6.6)
- Acoustical insulation: sandwich construction consisting of 40kg/m³ mineral wool with glued woven glass fibre top layer erosion proof up to 20 m/s and high density 160kg/m³ open cell rubber to absorb low frequency and reduce radiated noise. fire resistant Class A1 (EN 13501).
- Air flow sensor: Aluminium profile, multi point averaging type FloXact. Fitted inside the unit, thus insensitive to irregular duct approach in supply and return application.
- Stable measuring signal from 0,5 m/s inlet air velocity
- Operating temperature +5 to 50°C
- Storage temperature 0 to +70°C, max R.H. 95%
- Other construction available upon request.



Typical application balanced supply and return air in apartment building

Kv Values FloXact® and air flow range

Model	100	125	160	200	250	315	400	500
Kv Value (l/s.Pa)	5,41	7,36	10,5	16,8	22,3	36.0	49.4	82.7
MIN air volume (l/s)	6	8	11	17	23	36	50	83
Min inlet velocity (m/s)	0,8	0,7	0,6	0,6	0,5	0,5	0,4	0,4
MAX air volume (l/s)	66	90	129	205	273	441	605	1013
MAX inlet velocity (m/s)	9.0	7,7	6,7	6.7	5.7	5.8	4.9	5,2


Model $\varnothing 100 \dots \varnothing 250$

Model $\varnothing 315 \dots \varnothing 500$


Dimensions, weight and Kv values

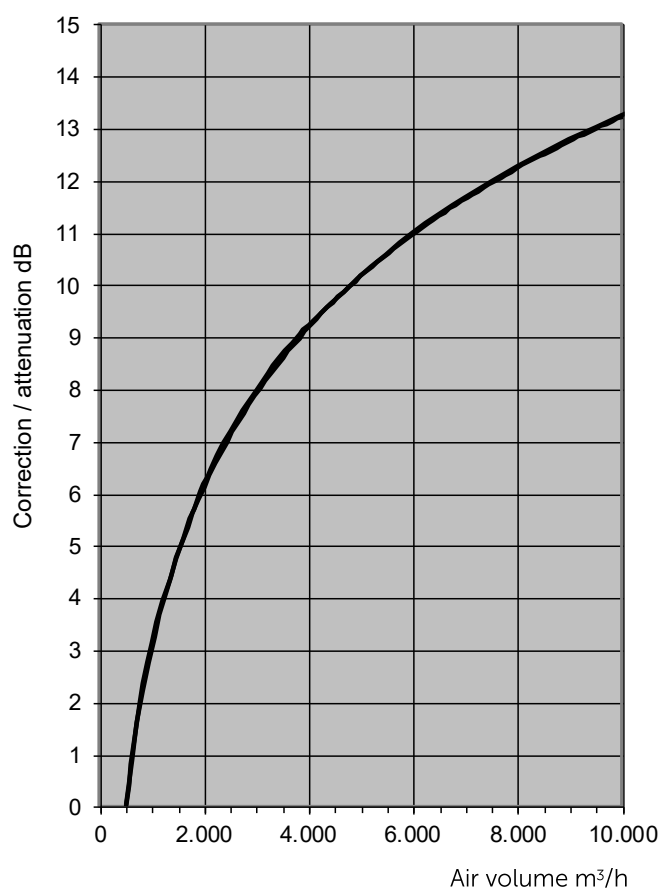
MODEL	100	125	160	200	250	315	400	500	mm
$\varnothing D$	98	123	158	198	248	313	398	498	mm
W	155	185	235	285	335	435	535	685	mm
H	175	200	225	250	300	345	450	550	mm
Weight	9,9	12,5	14,3	17,6	21,4	34,0	45,0	61,1	Kg
Kv value	19,5	26,5	37,9	60,4	71,4	129,5	177,9	297,6	l/s.Pa

Sound Power and Sound Pressure:

1. L_w 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 "-".
2. The discharge sound pressure levels L_p , are determined with a room absorption of 7dB/oct and the following assumption for downstream ductwork, diffusers and end reflection:

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

3. The discharge sound pressure levels $L_p(A)$ also include a correction for air volume :



4. The Radiated sound pressure levels L_p are determined with a room absorption of 7dB/oct and the following assumption ceiling attenuation:

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

5. ΔPa . Unit resistance with fully opened damper blade.
6. Sound data is measured in a reverberation room at an independent sound laboratory, according to ISO -3741 and ISO-5135 standards.



Pressure drop over unit : 100 Pa

Model	Air volume	Inlet air velocity	Press. drop fully open	Discharge sound (Air borne sound)								Radiated sound (Break out sound)							
				Lw (dB/oct) re 10 ⁻¹² W						L _w	L _p	Lw (dB/oct) re 10 ⁻¹² W						L _w	L _p
mm	l/s	m/s	Pa	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	dB	NR	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	dB	NR
100	6	0,8	0	36	31	-	-	-	-	37	--	22	21	-	-	-	-	25	--
	12	1,6	1	36	22	-	-	-	-	36	--	22	-	-	-	-	-	22	--
	24	3,2	6	38	28	-	-	-	-	38	--	24	18	-	-	-	-	25	--
	36	4,9	13	41	30	21	18	-	-	42	--	27	19	-	-	-	-	28	--
	48	6,5	23	41	31	29	26	23	18	42	--	26	-	-	-	-	-	27	--
	60	8,1	36	42	36	35	32	29	24	44	--	26	-	-	-	-	-	27	--
125	9	0,8	0	36	32	-	-	-	-	38	--	22	23	-	-	-	-	26	--
	18	1,5	2	36	23	-	-	-	-	36	--	22	-	-	-	-	-	23	--
	36	3,1	7	41	29	-	-	-	-	41	--	27	20	-	-	-	-	28	--
	54	4,6	16	43	30	24	21	19	-	43	--	29	19	-	-	-	-	29	--
	72	6,2	28	42	34	32	29	26	21	43	--	27	-	-	-	-	-	28	--
	90	7,7	44	45	39	38	35	32	27	47	--	30	-	-	-	-	-	30	--
160	12	0,6	0	35	32	-	-	-	-	37	--	22	24	-	-	-	-	27	--
	24	1,2	2	35	23	-	-	-	-	35	--	22	-	-	-	-	-	23	--
	48	2,5	6	41	29	-	-	-	-	41	--	28	21	-	-	-	-	29	--
	72	3,7	15	43	30	24	21	18	-	43	--	30	20	-	-	-	-	30	--
	96	5,0	26	42	33	31	28	26	20	43	--	29	-	-	-	-	-	29	--
	120	6,2	40	45	39	37	34	32	26	47	--	31	-	-	-	-	-	31	--
200	20	0,7	0	39	36	18	-	-	-	41	--	24	26	19	-	-	-	29	--
	40	1,3	2	37	27	-	-	-	-	37	--	22	-	-	-	-	-	23	--
	80	2,6	7	46	33	-	-	-	-	46	--	31	23	-	-	-	-	32	--
	120	3,9	16	47	32	25	22	20	-	47	--	32	21	-	-	-	-	32	--
	160	5,2	28	46	35	33	30	27	22	47	--	31	17	-	-	-	-	31	--
	200	6,6	43	49	41	39	36	33	28	50	--	34	-	-	-	-	-	34	--
250	30	0,6	1	36	19	-	-	-	-	36	--	22	-	-	-	-	-	22	--
	60	1,3	2	37	27	-	-	-	-	38	--	23	18	-	-	-	-	24	--
	120	2,5	9	49	35	19	-	-	-	49	--	35	26	-	-	-	-	35	--
	180	3,8	20	47	33	29	26	23	18	47	--	32	20	-	-	-	-	33	--
	240	5,0	35	48	38	37	34	31	26	49	--	33	17	-	-	-	-	33	--
	300	6,3	55	52	44	43	40	37	32	53	20	37	-	-	-	-	-	37	--
315	50	0,7	0	42	40	24	-	-	-	44	--	27	29	22	-	-	-	32	--
	100	1,3	2	39	31	-	-	-	-	40	--	24	20	-	-	-	-	25	--
	200	2,6	6	50	37	-	-	-	-	50	--	35	26	-	-	-	-	35	--
	300	3,9	14	51	36	25	22	19	-	51	--	36	24	-	-	-	-	36	--
	400	5,2	24	50	36	33	30	27	22	50	--	35	21	-	-	-	-	35	--
	500	6,5	38	53	40	39	36	33	28	53	--	37	19	-	-	-	-	38	--
400	80	0,6	0	43	41	25	-	-	-	45	--	28	30	23	-	-	-	33	--
	160	1,3	1	40	32	-	-	-	-	41	--	25	21	-	-	-	-	27	--
	320	2,6	5	51	38	-	-	-	-	51	--	36	27	-	-	-	-	36	--
	480	3,9	11	54	38	23	20	17	17	54	--	39	27	-	-	-	-	39	--
	640	5,2	20	53	37	31	28	25	21	53	--	38	24	-	-	-	-	38	--
	800	6,5	32	54	39	37	34	31	26	54	--	39	22	-	-	-	-	39	--
500	120	0,6	0	47	43	24	-	-	-	48	20	32	33	25	-	-	-	36	--
	240	1,2	2	43	33	-	-	-	-	43	--	28	23	-	-	-	-	29	--
	480	2,5	6	54	40	17	-	-	-	54	20	39	30	-	-	-	-	39	--
	720	3,7	14	55	37	26	23	20	17	55	--	40	27	-	-	-	-	40	--
	960	4,9	25	54	37	34	31	28	23	54	--	39	24	-	-	-	-	39	--
	1200	6,2	38	57	41	40	37	34	29	57	--	42	22	-	-	-	-	42	--

Pressure drop over unit : 200 Pa

Model	Air volume	Inlet air velocity	Press. drop fully open	Discharge sound (Air borne sound)								Radiated sound (Break out sound)							
				Lw (dB/oct) re 10 ⁻¹² W						Lw	Lp	Lw (dB/oct) re 10 ⁻¹² W						Lw	Lp
mm	l/s	m/s	Pa	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	dB	NR	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	dB	NR
100	6	0,8	0	40	42	26	-	-	-	44	20	26	32	28	-	-	-	34	--
	12	1,6	1	36	23	-	-	-	-	36	--	22	-	-	-	-	-	23	--
	24	3,2	6	40	30	-	-	-	-	40	--	26	20	-	-	-	-	27	--
	36	4,9	13	46	35	21	18	-	-	47	--	32	24	-	-	-	-	33	--
	48	6,5	23	49	36	29	26	23	18	49	--	35	25	-	-	-	-	35	--
	60	8,1	36	49	38	35	32	29	24	50	20	35	23	-	-	-	-	35	--
125	9	0,8	0	39	39	22	-	-	-	42	--	25	30	24	-	-	-	32	--
	18	1,5	2	36	26	-	-	-	-	36	--	22	-	-	-	-	-	23	--
	36	3,1	7	43	31	-	-	-	-	43	--	29	22	-	-	-	-	30	--
	54	4,6	16	50	36	25	21	19	-	50	20	36	27	-	-	-	-	36	--
	72	6,2	28	51	37	32	29	26	22	51	21	36	25	-	-	-	-	37	--
	90	7,7	44	50	40	38	35	32	27	51	21	36	22	-	-	-	-	36	--
160	12	0,6	0	40	40	23	-	-	-	43	--	27	32	26	-	-	-	34	--
	24	1,2	2	35	25	-	-	-	-	35	--	22	17	-	-	-	-	23	--
	48	2,5	6	43	31	-	-	-	-	43	--	30	23	-	-	-	-	31	--
	72	3,7	15	50	36	24	21	18	-	50	20	37	28	-	-	-	-	37	--
	96	5,0	26	51	37	31	28	26	21	51	22	38	27	-	-	-	-	38	--
	120	6,2	40	50	40	37	34	32	26	51	21	37	24	-	-	-	-	37	--
200	20	0,7	0	44	42	25	-	-	-	46	20	29	32	26	-	-	-	34	--
	40	1,3	2	38	30	-	-	-	-	38	--	23	20	-	-	-	-	25	--
	80	2,6	7	48	35	-	-	-	-	48	--	33	25	-	-	-	-	33	--
	120	3,9	16	55	40	26	22	20	18	55	26	40	30	-	-	-	-	40	--
	160	5,2	28	55	39	33	30	27	23	55	26	40	28	-	-	-	-	40	--
	200	6,6	43	54	41	39	36	33	28	55	24	39	25	-	-	-	-	39	--
250	30	0,6	1	43	40	21	-	-	-	45	--	29	31	24	-	-	-	34	--
	60	1,3	2	40	31	-	-	-	-	41	--	26	22	-	-	-	-	28	--
	120	2,5	9	50	37	19	-	-	-	50	21	36	28	-	-	-	-	37	--
	180	3,8	20	55	39	29	26	23	20	55	25	41	29	-	-	-	-	41	--
	240	5,0	35	55	40	37	34	31	26	55	23	40	27	-	-	-	18	41	--
	300	6,3	55	54	44	43	40	37	32	55	22	40	24	-	-	-	18	40	--
315	50	0,7	0	48	47	32	-	-	-	50	24	33	36	30	-	-	-	38	--
	100	1,3	2	42	34	-	-	-	-	42	--	27	23	-	-	-	-	28	--
	200	2,6	6	51	39	18	-	-	-	52	21	36	28	-	-	-	-	37	--
	300	3,9	14	58	44	26	22	19	22	59	27	43	33	18	-	-	19	44	--
	400	5,2	24	59	43	33	30	27	26	59	26	44	31	-	-	-	21	44	--
	500	6,5	38	58	43	39	36	33	29	58	24	43	28	-	-	-	21	43	--
400	80	0,6	0	51	50	36	-	-	-	53	28	36	39	34	-	-	-	41	--
	160	1,3	1	42	34	-	-	-	-	43	--	27	23	-	-	-	-	29	--
	320	2,6	5	53	41	19	-	-	-	53	20	38	30	-	-	-	-	38	--
	480	3,9	11	59	45	25	20	18	23	60	26	44	34	19	-	-	19	45	--
	640	5,2	20	61	45	31	28	25	27	61	27	46	34	17	-	18	23	47	--
	800	6,5	32	61	44	37	34	31	29	61	25	46	31	-	-	17	23	46	--
500	120	0,6	0	51	48	31	-	-	-	53	26	36	38	32	-	-	-	41	--
	240	1,2	2	46	36	-	-	-	-	46	--	31	26	-	-	-	-	32	--
	480	2,5	6	56	42	19	-	-	-	56	22	41	32	17	-	-	-	41	--
	720	3,7	14	63	46	27	23	20	24	63	28	48	36	21	-	20	23	48	20
	960	4,9	25	63	44	34	31	28	27	63	27	48	34	-	-	19	24	48	20
	1200	6,2	38	62	44	40	37	34	30	62	25	47	31	-	-	18	25	47	--

Pressure drop over unit : 300 Pa

Model	Air volume	Inlet air velocity	Press. drop fully open	Discharge sound (Air borne sound)								Radiated sound (Break out sound)							
				Lw (dB/oct) re 10 ⁻¹² W						Lw	Lp	Lw (dB/oct) re 10 ⁻¹² W						Lw	Lp
mm	l/s	m/s	Pa	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	dB	NR	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	dB	NR
100	6	0,8	0	43	46	30	-	-	-	48	23	29	36	32	-	-	-	38	--
	12	1,6	1	45	42	23	-	-	-	47	--	31	32	25	-	-	-	35	--
	24	3,2	6	42	32	-	-	-	-	42	--	28	22	-	-	-	-	29	--
	36	4,9	13	47	36	21	18	-	-	48	--	33	26	-	-	-	-	34	--
	48	6,5	23	52	40	29	26	23	19	53	23	38	29	-	-	-	-	39	--
	60	8,1	36	54	40	35	32	29	25	54	25	40	28	-	-	-	17	40	--
125	9	0,8	0	47	48	33	-	-	-	50	25	33	39	35	-	-	-	41	--
	18	1,5	2	36	23	-	-	-	-	36	--	22	-	-	-	-	-	23	--
	36	3,1	7	44	33	-	-	-	-	45	--	30	24	-	-	-	-	31	--
	54	4,6	16	51	37	25	21	19	-	51	21	37	28	-	-	-	-	37	--
	72	6,2	28	56	41	32	29	26	23	56	27	42	32	-	-	-	19	42	--
	90	7,7	44	55	42	38	35	32	28	55	27	41	29	-	-	-	19	41	--
160	12	0,6	0	47	47	33	-	-	-	50	25	34	39	36	-	-	-	42	20
	24	1,2	2	35	22	-	-	-	-	35	--	22	-	-	-	-	-	23	--
	48	2,5	6	44	33	-	-	-	-	45	--	31	25	-	-	-	-	32	--
	72	3,7	15	51	37	24	21	18	-	51	21	38	29	-	-	-	-	38	--
	96	5,0	26	56	41	31	28	26	22	56	27	43	32	17	-	-	20	43	--
	120	6,2	40	55	41	37	34	32	27	56	27	42	30	-	-	-	21	43	--
200	20	0,7	0	52	52	38	-	-	-	55	30	37	42	39	-	-	-	44	22
	40	1,3	2	37	28	-	-	-	-	38	--	22	18	-	-	-	-	24	--
	80	2,6	7	49	37	-	-	-	-	50	20	34	27	-	-	-	-	35	--
	120	3,9	16	56	41	26	22	20	18	56	27	41	31	-	-	-	-	41	--
	160	5,2	28	61	45	33	30	27	26	61	33	46	35	20	-	19	24	46	--
	200	6,6	43	59	44	39	36	33	29	59	30	44	31	-	-	-	23	44	--
250	30	0,6	1	49	47	29	-	-	-	51	24	35	38	32	-	-	-	40	--
	60	1,3	2	41	32	-	-	-	-	42	--	27	23	-	-	-	-	29	--
	120	2,5	9	51	38	19	-	-	-	52	22	37	29	-	-	-	-	38	--
	180	3,8	20	58	43	29	26	23	21	58	29	44	34	19	-	17	21	45	--
	240	5,0	35	60	43	37	34	31	27	60	29	46	33	-	-	18	24	46	--
	300	6,3	55	59	45	43	40	37	32	59	28	45	30	-	-	17	24	45	--
315	50	0,7	0	56	56	44	-	-	-	59	34	41	45	42	17	-	-	48	25
	100	1,3	2	40	32	-	-	-	-	40	--	25	21	-	-	-	-	26	--
	200	2,6	6	53	41	20	-	-	-	53	23	38	30	-	-	-	-	39	--
	300	3,9	14	59	45	27	22	19	23	60	28	44	34	19	-	-	20	45	--
	400	5,2	24	65	49	33	30	27	31	65	33	50	38	23	20	23	27	50	23
	500	6,5	38	63	47	39	36	33	32	64	30	48	34	18	-	21	27	49	21
400	80	0,6	0	56	56	44	-	-	-	60	35	41	45	42	18	-	-	48	26
	160	1,3	1	58	53	37	-	-	-	60	30	43	42	35	-	-	-	46	22
	320	2,6	5	55	43	21	-	-	-	55	22	40	32	18	-	-	-	40	--
	480	3,9	11	60	46	26	20	18	24	61	27	45	35	21	-	18	20	46	--
	640	5,2	20	66	50	32	28	25	31	66	32	51	39	24	21	24	28	51	24
	800	6,5	32	66	48	37	34	31	33	66	31	51	37	21	20	24	29	51	24
500	120	0,6	0	59	57	42	-	-	-	61	36	44	47	43	20	18	-	50	27
	240	1,2	2	45	35	-	-	-	-	45	--	30	25	-	-	-	-	31	--
	480	2,5	6	57	43	20	-	-	-	57	23	42	33	20	-	-	-	43	--
	720	3,7	14	64	47	27	23	20	25	64	29	49	37	23	18	21	24	49	21
	960	4,9	25	69	51	34	31	28	32	69	34	54	41	26	24	27	32	54	28
	1200	6,2	38	67	48	40	37	34	33	67	31	52	37	20	20	25	31	52	25

**Type:**

- VSR - VAV terminal round in- and outlet

Construction:

- QAS - Integral sound attenuator, square double wall construction, supply air.
- QAR - Integral sound attenuator, square double wall construction, return air.

Model:

- Dia - 100, 125, 160, 200, 250, 315, 400 or 500

Controls:

- BEX - Belimo LMV-D3-FL, 5Nm without NFC
- BE1 - Belimo LMV-D3-MP, 5Nm with NFC
- BE2 - Belimo LMV-D3-MP, 10Nm with NFC
- BEM - Belimo LMV-D3-MOD, 5Nm MODbus/BACnet

Delivery / Controls

- All controls, supplied and fitted by Air-Concepts, 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.

Specify as:**Example:**

Supply and install, VAV terminal, from Magnelis™ sheet steel, double wall construction with integral sound attenuator (1-piece construction). Inlet and outlet with round male duct sleeve connections minimum 50mm long.
Casing leakage rate to Class-C (EN-1751).
Damper leakage Class-2 (EN-1751).
Acoustical insulation must be combination of high density open cell rubber and mineral wool with woven glass fibre glued top layer, erosion proof up to 20 m/s. Fire rated Class-1
Averaging airflow sensor type FloXact™ fitted inside the unit and insensitive to irregular duct approach.
For:

Air volume	 l/s
Application	Supply air
Unit size	 mm
Max. pressure loss	 Pa
Max. discharge Lp	 NR
Max. radiated Lp	 NR
Controller	Belimo type LMV-D3-MP factory fitted and calibrated with MP bus and NFC chip for easy on site commissioning.
Manufacturer	Air-Concepts BV
Type	VSR-QAS-BE1

Air-Concepts locations

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