VARYCONTROL
VAV Terminal Boxes

for variable volume systems

Type TVB

TROX® TECHNIK

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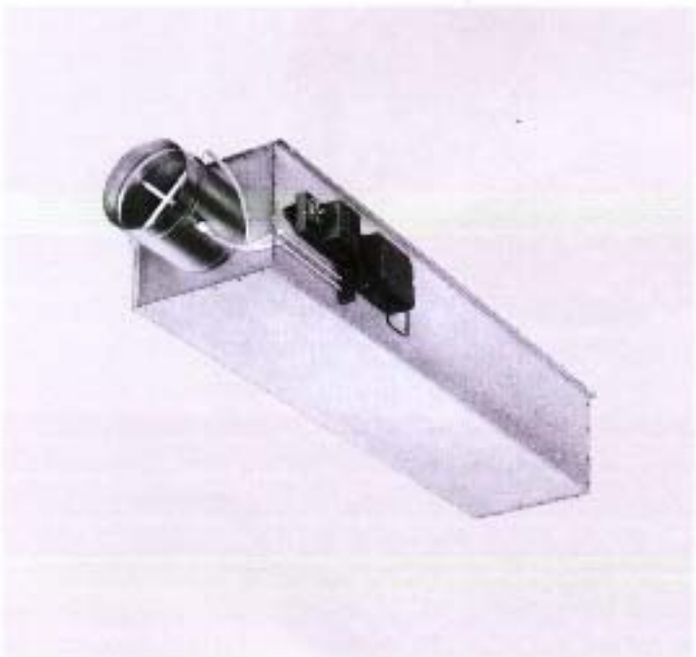
Contents · Description

VAV Terminal boxes TVB-B

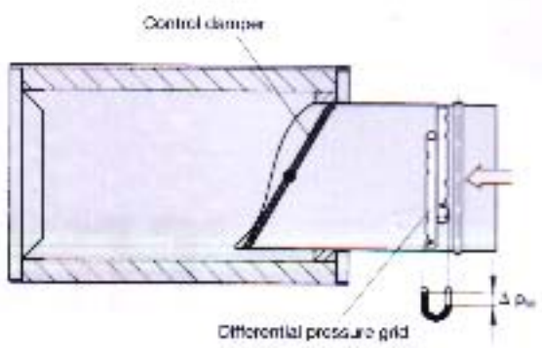


VAV Terminal boxes TVB-C

Trox VARYCONTROL terminal boxes type TVB are suitable for volume flow control of supply air in VAV systems. These are terminal boxes with circular inlet spigot and a larger, rectangular outlet section, i.e. the air velocity is reduced in the terminal.

Terminal boxes are used in VAV systems with a high level of technical and acoustic requirements. Different versions allow appropriate selection of terminals to meet project-specific control requirements. The heating requirements in the outer zones of an air conditioned building can be covered with an electric heater. The air diffusers can be connected directly to a multiple outlet box to save branch ducting and installation costs.

Features:
Variable volume flow control for supply air systems.
Constant volume flow control.
Air heater.
Control components: electronic, pneumatic or DDC.



Construction · Dimensions

Design features

Casing

- Circular spigot connection on high pressure side
- Low pressure side suitable for slide-on flange or angle flange connection
- Holes in the edge of the casing for support rods. Casing air leakage rate complies with Class A, DW 142
- Conforms with clean room Class 100, US standard 209b
- Horizontal or vertical mounting (when using diaphragm pressure sensors, mount according to the labels on the box)
- Volume flow set and airflow tests conducted on each box at the factory
- Volume flow can be measured and adjusted on the box at site
- Operating temperature range 10 to 50 °C
- The control damper mechanism is maintenance free

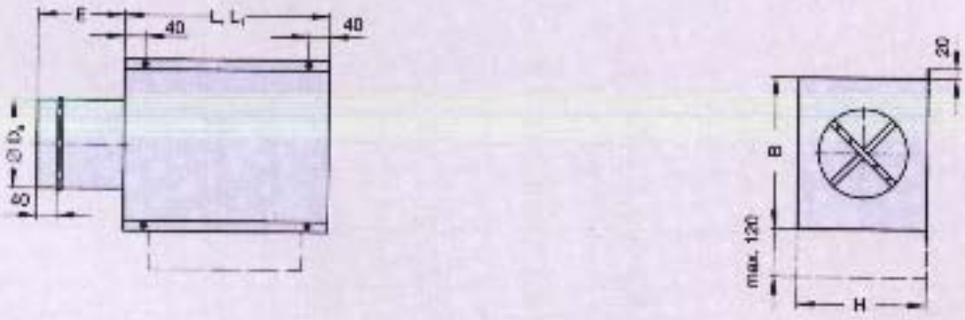
Volume flow control

- Either pneumatic, electronic or DDC
- Suitable for supply air
- Volume control range up to 10 : 1, depending on the type of controller
- Set volume controlled with high level of accuracy, even under adverse upstream conditions, by means of averaging differential pressure sensor (see page 5)
- Differential pressure range 20 to 1500 Pa
- Full shut off using the control damper, wiring by others

Reheat Coils (Hot water)

- For terminal reheat of primary air volume
- Casing from galvanised sheet steel
- Flanged on both ends
- Copper tubes and aluminium fins
- Two or four rows
- Available factory fitted or supplied separately
- For LPHW or MPHW or steam, up to 130 °C
- Maximum operating pressure 16 bar
- Water connection horizontal

TVB-A, TVB-B[1], basic unit



TVB-C, multi outlet unit

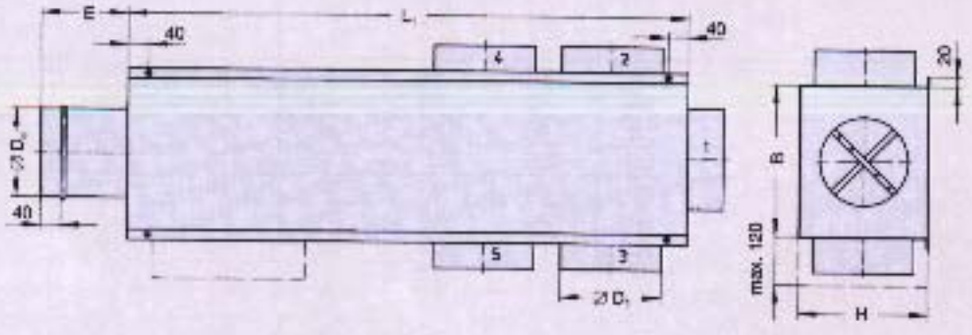


Table 1: Dimensions in mm

Size	⌀D_1	B	H	L	L_1	E	F	G	K	M
4	99	300	203	400	1320	147	268	171	248	151
5	124	300	203	400	1320	154	268	171	248	151
6	149	300	203	400	1320	163	268	171	248	151
7	174	300	254	400	1320	170	268	222	248	202
8	199	300	254	400	1320	176	268	222	248	202
10	249	355	311	400	1320	216	323	279	303	259
12	299	400	381	655	1570	260	368	349	348	329
14	349	500	450	655	1570	315	468	418	448	398
16	399	600	450	765	1680	360	568	418	548	398

1) Construction A: short case type (L)
Construction B: long case type (L1)

Table 2: Spigot

Size	Pos.	⌀D_1
4	1-3	149
5	1-3	149
6	1-3	149
7	2-5	199
8	2-5	199
10	1-5	199
12	1-5	199
14	1-5	199
16	1-5	199

Table 3: Weights in kg approx.

Size	TVB-A	TVB-B	TVB-C	TVB-D
4	6	13	14	17
5	6	13	14	17
6	6	13	14	17
7	7	16	17	22
8	7	16	17	22
10	9	21	22	33
12	15	27	28	40
14	19	37	38	57
16	23	45	46	66

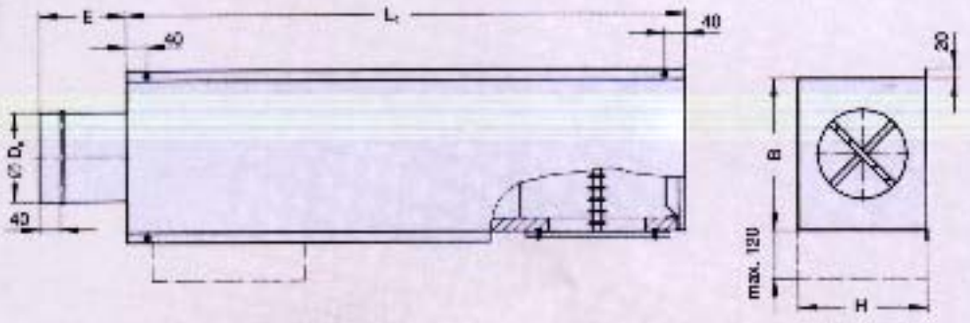
Reheat coils (Electric)
- For terminal reheat of primary air volume
- Mounting plate from galvanised sheet steel
- Sheathed and finned black heat type elements with high temperature aluminium paint
- Auto stem and manual stem cut out
- Airflow switch
- Suitable for three steps balanced circuit wiring
- 230 V, 1 phase stab in electric duct heater

Materials
- Casing from galvanised sheet steel
- Lining in the attenuator section with mineral wool
- Mineral wool with marglass facing in the attenuator section suitable for air velocities up to 20 m/s (Fire rating BS 476 Pt6 I<12, i<6, BS 476 Pt7 Class 1)
- Control damper from galvanised sheet steel with tip seal
- Sensor tubes in aluminium
- Plain bearings in polyurethane

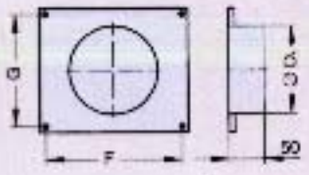
Heat output electric reheat unit

Size	4	5	6	7	8	10	12	14	16
Q in kW	3	3	3	6	6	9	15	21	27

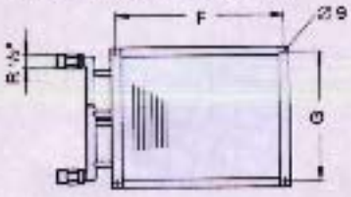
TVB-E, electric reheat unit



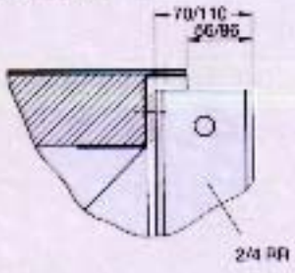
Spigot plate



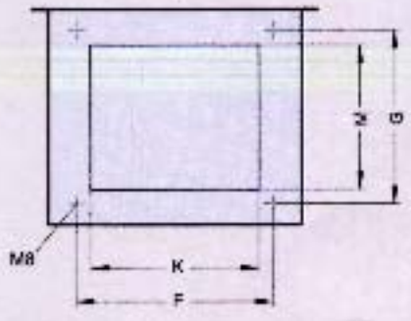
Hot water reheat coil

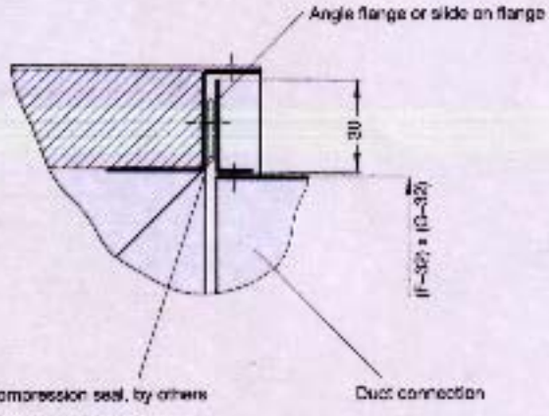


Hot water coil connection



Connection detail





Allow adequate access to control components.

Function Description

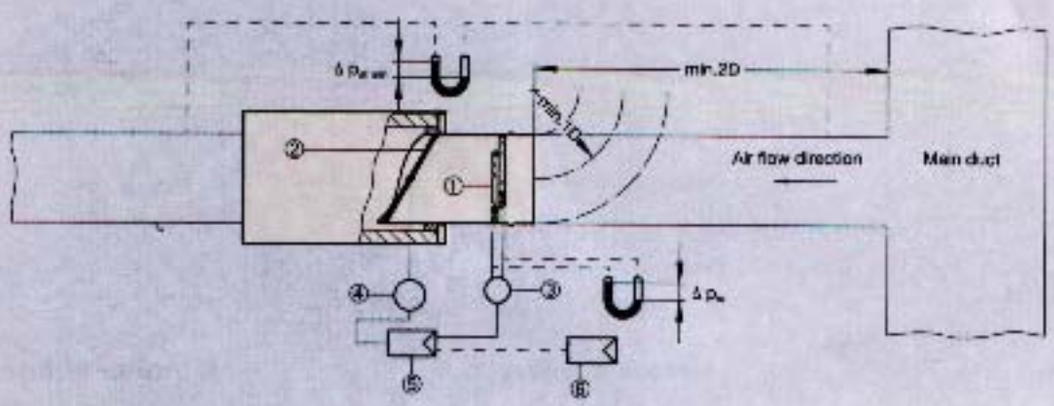
The terminal box consists of a housing with a circular connection on the high pressure side and a rectangular or circular connection on the low pressure side. In the circular inlet spigot is a differential multipoint pressure sensor, and a motorised control damper. To reduce flow noise, the inside of the terminal box is lined with sound-absorbing and heat-insulating material. The controller/transducer and actuator are attached to the outside of the casing and factory wired, calibrated and tested.

The actual volume flow generates an effective pressure at the differential pressure sensor, and this pressure is passed to the transducer high and low pressure connections via control tubing. The transducer converts the effective pressure into an electronic (0/2 to 10 VDC) or pneumatic (0.2 to 1.0 bar) signal. This signal is transmitted to the controller as the actual value which is then compared with the nominal or setpoint value from, for example, a room temperature controller. If there is any variance then a signal from the controller via the actuator adjusts the damper accordingly.

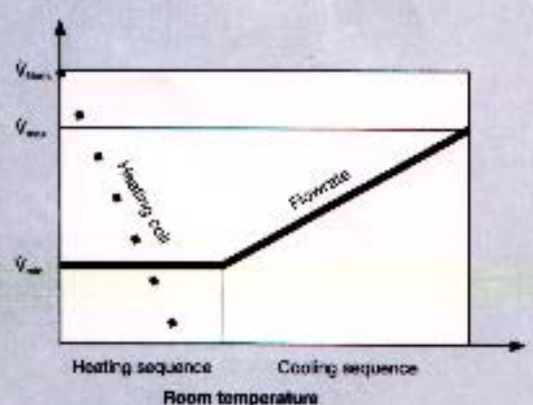
The variable volume flow control between $\dot{V}_{min}$ and $\dot{V}_{max}$ can be overridden by forced controls. In addition to full shut off, constant $\dot{V}_{min}$ or $\dot{V}_{max}$ operation is also possible.

① Differential pressure sensor
② Control damper
③ Transducer
④ Damper actuator
⑤ Volume flow controller
⑥ Room temperature controller
----- Wiring or piping by others

Volume Flow Control



Control Diagram



Nomenclature · Aerodynamic Data

Nomenclature

f_m	in Hz:	Octave band centre frequency
L_W	in dB/Oct.:	Air generated sound power level determined from measurements in a reverberation chamber (re 1 pW)
L_{W1}	in dB/Oct.:	Case radiated sound power level determined from measurements in a reverberation chamber (re 1 pW)
L_p	in dB(A):	Air generated A-weighted sound pressure level including 8 dB room attenuation
L_{p1}	in dB(A):	Case radiated A-weighted sound pressure level including 8 dB room attenuation
NC	:	Noise criteria of air generated noise including 8 dB room attenuation
NC_1	:	Noise criteria of case radiated noise including 8 dB room attenuation
Δp_{st}	in Pa:	Static pressure differential
$\Delta p_{st\ min}$	in Pa:	Minimum static pressure differential
Δp_W	in Pa:	Measured pressure at differential pressure grid
$\dot{V}$	in l/s or CFM:	Volume flow
$\Delta \dot{V}$	in ± %:	Deviation of set volume flows
Q	in kW:	Heat output
RR	:	Number of rows

Table 4: Volume flow range and minimum working pressure

Size	$\dot{V}$		$\Delta p_{st\ min}$ in Pa								
			TVB-A	TVB-B TVB-E	TVB-A with reheat coil		TVB-B with reheat coil		TVB-A with spigot plate	TVB-B with spigot plate	TVB-C
	l/s	CFM			2 RR	4 RR	2 RR	4 RR			
4	10	21	20	20	22	24	22	24	20	20	20
	45	95	20	25	40	60	45	65	20	40	40
	70	148	40	65	105	170	130	195	40	90	90
	100	212	75	130	175	275	230	330	85	185	185
5	20	42	20	20	22	24	22	24	20	20	20
	80	170	20	20	40	60	40	60	20	30	30
	125	265	20	40	85	150	105	170	20	70	70
	165	350	30	70	130	230	170	270	35	115	115
6	25	53	20	20	22	24	22	24	20	20	20
	100	212	20	20	40	60	40	60	20	20	20
	155	328	20	20	85	150	85	150	20	20	20
	215	456	20	20	120	220	120	220	20	40	40
7	30	64	20	20	22	24	22	24	20	20	20
	140	297	20	20	40	60	40	60	20	20	20
	220	466	20	20	85	150	85	150	20	20	20
	300	636	20	20	120	220	120	220	20	35	35
8	40	85	20	20	22	24	22	24	20	20	20
	175	371	20	20	40	60	40	60	20	20	20
	275	583	20	20	85	150	85	150	20	20	20
	380	805	20	20	120	220	120	220	20	20	20
10	65	138	20	20	22	24	22	24	20	20	20
	300	636	20	20	40	60	40	60	20	20	20
	470	996	20	20	85	150	85	150	20	20	20
	640	1356	20	20	120	220	120	220	20	20	20
12	100	212	20	20	22	24	22	24	20	20	20
	450	954	20	20	40	60	40	60	20	20	20
	700	1483	20	20	85	150	85	150	20	20	20
	1000	2119	20	20	120	220	120	220	20	20	20
14	150	318	20	20	22	24	22	24	20	20	20
	700	1483	20	20	40	60	40	60	20	20	20
	1100	2331	20	20	85	150	85	150	20	20	20
	1500	3178	20	20	120	220	120	220	20	20	20
16	190	403	20	20	22	24	22	24	20	20	20
	880	1865	20	20	40	60	40	60	20	20	20
	1380	2924	20	20	85	150	85	150	20	20	20
	1890	4005	20	20	120	220	120	220	20	20	20

Table 5: Volume flow range with static pressure transducer[1)2)]

Size	V̇		ΔV̇
	l/s	CFM	
4	20	42	10
	45	95	7
	70	148	5
	100	212	5
5	35	74	10
	80	170	7
	125	265	5
	165	350	5
6	45	95	10
	100	212	7
	155	328	5
	215	456	5
7	60	127	10
	140	297	7
	220	466	5
	300	636	5
8	75	159	10
	175	371	7
	275	583	5
	380	805	5
10	130	275	10
	300	636	7
	470	996	5
	640	1356	5
12	200	424	10
	450	954	7
	700	1483	5
	1000	2119	5
14	300	636	10
	700	1483	7
	1100	2331	5
	1500	3178	5
16	380	805	10
	880	1865	7
	1380	2924	5
	1890	4005	5

1) Actual range depends on controls manufacturer selected
2) Static pressure transducer: diaphragm type

Table 6: Volume flow range with dynamic pressure transducer[1)3)]

Size	V̇		ΔV̇
	l/s	CFM	
4	10	21	20
	30	64	7
	60	127	5
	100	212	5
5	20	42	20
	60	127	7
	110	233	5
	165	350	5
6	25	53	20
	90	191	7
	150	318	5
	215	456	5
7	30	64	20
	120	254	7
	210	445	5
	300	636	5
8	40	85	20
	150	318	7
	260	551	5
	380	805	5
10	65	138	20
	255	540	7
	445	943	5
	640	1356	5
12	100	212	20
	400	848	7
	700	1483	5
	1000	2119	5
14	150	318	20
	600	1271	7
	1050	2225	5
	1500	3178	5
16	190	403	20
	760	1610	7
	1330	2818	5
	1890	4005	5

3) Dynamic pressure transducer: flow through type

Air Regenerated Noise TVB-A

Example

Data given: TVB-A Size 8
$\dot{V}$ = 40 to 380 l/s or 85 to 805 CFM
Δp_{st} = 200 Pa
Specified sound pressure level in room
55 dB(A) with 8 dB room attenuation

Required: Air regenerated noise in room in dB(A) at 380 l/s or 805 CFM

Result: L_p = 52 dB(A), specification is met.

Table 7: Regenerated noise on discharge side

Size	$\dot{V}$ l/s	$\dot{V}$ CFM	Δp_{st} = 100 Pa: L_W in dB/Oct. f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_p in dB(A)	NC	Δp_{st} = 200 Pa: L_W in dB/Oct. f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_p in dB(A)	NC	Δp_{st} = 500 Pa: L_W in dB/Oct. f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_p in dB(A)	NC	Δp_{st} = 1000 Pa: L_W in dB/Oct. f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_p in dB(A)	NC
4	10	21	28	29	27	22	17	15	<15	<15	16	<15	23	31	29	27	23	21	18	15	21	<15	24	37	33	32	29	31	29	26	29	23	31	40	38	35	30	34	35	34	33	30
	45	95	33	46	43	39	27	25	21	15	32	26	42	49	46	43	34	32	29	26	36	29	47	51	51	47	42	40	38	36	41	34	51	54	55	53	48	47	44	42	47	41
	70	148	43	49	51	45	32	29	26	22	38	31	48	52	55	50	38	35	33	30	42	37	55	56	58	54	46	44	42	39	47	41	57	59	61	59	53	50	48	45	52	47
	100	212	51	53	54	50	38	34	32	28	42	38	55	57	58	54	42	38	36	33	46	42	59	61	63	60	51	47	45	42	52	48	63	63	66	64	57	54	51	48	57	53
5	20	42	36	36	33	28	22	22	20	17	23	<15	37	39	39	34	27	27	27	26	29	22	45	43	43	44	38	36	35	35	37	30	47	46	47	47	46	47	42	42	44	39
	80	170	48	49	46	41	33	31	27	24	35	27	51	54	50	46	40	38	36	34	40	33	54	58	56	54	47	45	43	42	47	41	55	60	60	59	54	51	49	48	53	47
	125	265	50	52	57	49	39	36	33	30	43	38	54	57	59	52	44	42	39	37	46	41	58	63	64	60	53	50	48	46	53	48	62	65	68	65	59	56	53	52	58	53
	165	350	54	56	58	57	43	39	37	35	48	45	57	59	60	60	48	44	42	40	51	48	63	66	67	65	57	53	51	49	57	53	65	69	71	69	63	60	57	54	62	58
6	25	53	32	34	33	30	27	25	22	18	25	17	38	37	37	36	32	31	30	29	31	25	41	42	41	42	43	41	38	38	40	34	42	46	46	44	44	46	45	44	44	40
	100	212	45	49	45	40	36	34	31	27	35	26	46	53	50	47	42	41	39	36	41	33	51	55	55	54	50	48	46	45	48	41	55	59	59	59	56	53	51	50	54	47
	155	328	49	52	54	45	39	36	34	30	41	35	53	57	58	52	46	43	41	39	46	40	58	62	63	60	55	52	51	48	54	49	61	64	66	65	60	57	55	52	59	54
	215	456	51	54	57	51	42	39	36	33	44	39	57	61	62	56	48	45	43	41	50	44	63	67	69	65	58	55	53	50	58	54	66	69	70	70	65	61	58	56	63	58
7	30	64	44	34	37	32	27	26	24	20	27	19	48	37	42	39	33	33	33	34	34	29	47	42	47	47	42	41	39	40	41	36	51	46	50	48	45	48	45	47	46	43
	140	297	55	50	49	43	38	35	32	29	37	30	58	55	55	51	45	43	40	39	45	38	64	59	62	60	55	52	50	49	53	48	66	60	65	66	61	58	56	54	59	54
	220	466	62	54	53	48	40	38	35	33	42	34	64	59	59	54	48	45	43	41	48	41	66	63	67	64	58	55	52	50	57	53	71	66	70	70	66	62	60	58	63	59
	300	636	62	55	60	52	44	41	38	36	46	42	67	60	64	58	51	48	46	44	52	47	75	65	71	67	61	57	54	52	60	56	73	68	76	74	69	65	62	60	67	63
8	40	85	32	38	42	36	35	34	29	25	33	26	40	41	45	42	40	39	36	35	38	31	48	47	50	49	48	46	44	44	45	39	52	51	55	51	51	52	48	50	50	45
	175	371	53	55	51	43	40	38	37	34	40	32	57	59	58	51	47	46	44	43	47	40	60	62	65	61	58	57	54	52	56	49	62	63	67	66	64	62	59	57	61	55
	275	583	55	55	54	47	41	40	39	36	42	35	60	61	62	55	49	48	47	45	50	44	64	66	70	65	60	58	56	55	60	54	68	69	73	71	68	66	63	61	66	60
	380	805	58	60	63	53	46	44	43	41	49	46	62	63	65	57	51	49	49	47	52	48	69	70	74	69	62	59	58	57	62	59	71	73	78	75	70	67	65	63	69	64
10	65	138	42	47	45	40	37	36	34	30	36	29	47	50	50	47	44	43	41	41	43	36	47	54	54	56	53	50	47	49	50	44	50	57	57	56	59	60	51	53	57	53
	300	636	52	54	51	45	42	41	40	37	41	34	57	63	60	54	50	48	48	47	50	42	63	66	69	65	61	58	57	56	59	53	65	69	72	72	69	67	65	63	67	61
	470	996	57	57	58	50	44	42	41	40	46	40	61	62	61	55	51	49	48	48	51	43	68	70	72	67	62	59	58	58	61	56	71	74	78	77	71	68	66	64	70	66
	640	1356	59	60	63	55	47	45	43	41	50	45	64	64	66	59	54	51	50	49	54	49	72	71	72	67	63	60	60	59	62	56	75	77	80	78	73	69	68	66	71	67
12	100	212	33	42	41	36	28	27	28	25	30	22	39	45	48	47	36	35	37	37	39	34	44	46	47	53	50	49	45	47	48	42	48	51	49	51	50	51	50	52	50	47
	450	954	49	54	50	45	40	39	37	35	40	32	55	60	55	52	48	46	45	44	47	39	62	66	63	62	58	55	55	54	56	50	65	69	68	68	65	62	61	60	63	57
	700	1483	53	59	56	51	43	42	40	38	45	38	60	64	60	55	50	48	47	46	50	43	67	71	68	65	61	58	57	56	59	53	70	76	73	71	69	66	64	63	67	60
	1000	2119	58	63	64	57	46	46	44	41	51	46	60	65	66	60	52	50	49	48	54	49	70	73	72	67	62	59	59	58	62	56	74	78	77	74	71	68	67	65	69	63
14	150	318	46	48	44	41	37	35	33	29	36	27	50	51	53	48	43	42	41	40	43	36	53	57	56	59	52	50	48	50	52	47	56	58	55	58	61	59	54	55	57	52
	700	1483	56	55	50	45	42	40	38	36	41	33	62	63	58	53	49	47	46	46	49	41	67	69	66	64	61	58	56	57	59	53	72	73	71	72	69	66	64	63	67	61
	1100	2331	59	58	59	49	46	47	43	40	47	41	67	64	63	56	52	51	50	50	52	46	74	74	71	67	63	60	59	58	62	55	78	78	77	75	72	69	67	66	69	64
	1500	3178	65	63	65	56	49	51	46	44	52	48	69	66	68	60	54	53	51	51	55	51	78	75	73	68	64	62	61	60	63	57	84	82	80	77	73	70	69	67	72	67
16	190	403	44	43	41	36	35	35	33	29	34	28	46	47	50	46	42	42	42	42	42	37	52	51	54	59	52	51	50	52	52	47	58	55	56	58	58	58	56	57	56	52
	880	1865	54	54	51	43	41	40	39	38	41	34	60	59	57	50	47	47	46	47	47	42	65	65	64	61	57	56	54	56	56	51	69	70	69	69	65	63	61	62	63	58
	1380	2924	60	59	59	49	45	45	43	43	46	40	67	64	63	54	50	50	49	49	51	45	72	71	69	64	59	57	56	57	59	53	75	75	74	72	68	65	63	63	66	61
	1890	4005	66	62	63	57	50	49	46	46	51	46	72	67	67	59	54	53	51	52	55	50	78	74	73	67	62	60	58	59	62	57	82	80	78	75	70	67	65	64	69	64

Air Regenerated Noise TVB-A with spigot plate

Table 8: Regenerated noise on discharge side

Size	V̇		Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_W in dB/Oct.										L_W in dB/Oct.										L_W in dB/Oct.									
			f_m in Hz								L_p in dB(A)	NC	f_m in Hz								L_p in dB(A)	NC	f_m in Hz								L_p in dB(A)	NC
	l/s	CFM	63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
4	10	21	40	32	30	26	19	<15	<15	<15	19	<15	40	38	39	33	28	25	23	23	28	19	44	41	43	35	29	26	28	29	30	25
	45	95	53	50	49	43	36	32	26	21	37	29	55	57	56	50	43	39	35	31	44	37	57	61	60	55	49	45	41	38	49	43
	70	148	60	58	60	51	43	39	34	27	46	42	61	61	62	56	48	45	41	36	50	45	62	65	66	60	54	50	46	41	54	49
	100	212	64	63	63	55	47	41	36	31	49	45	67	67	68	62	54	50	46	41	55	52	66	70	71	66	58	55	51	46	59	55
5	20	42	45	39	39	35	27	23	22	26	28	21	49	43	43	40	34	31	28	30	33	26	57	52	49	45	42	47	38	39	43	39
	80	170	62	55	51	47	41	37	32	28	41	34	68	60	58	55	48	44	41	39	48	42	70	64	63	60	54	50	47	45	53	48
	125	265	69	62	60	54	47	43	40	36	48	42	73	68	65	61	54	50	48	43	54	49	76	71	69	66	59	56	53	49	59	55
	165	350	72	66	63	59	51	46	43	38	52	47	77	72	69	66	58	54	52	47	59	55	80	75	73	70	63	59	57	52	63	59
6	25	53	41	44	39	35	29	26	26	27	29	23	44	50	43	39	38	39	35	37	37	32	48	55	49	43	39	41	41	42	41	37
	100	212	56	63	56	51	45	43	38	34	46	38	59	68	62	58	52	49	46	44	52	46	62	71	66	62	56	53	50	49	56	50
	155	328	62	68	61	55	47	48	41	37	50	45	67	75	70	65	58	56	51	48	59	54	69	79	73	70	64	61	57	54	63	59
	215	456	63	69	65	58	50	51	44	41	53	48	70	79	73	68	60	59	54	50	62	59	72	82	78	74	67	65	60	57	67	63
7	30	64	45	44	44	39	33	30	28	28	33	25	47	50	51	47	43	40	37	39	42	35	50	54	55	51	45	44	42	44	45	39
	140	297	57	58	58	51	45	43	39	36	46	40	60	64	66	60	53	51	48	45	54	49	65	68	69	66	60	58	54	51	59	54
	220	466	61	63	62	53	47	44	40	36	49	44	67	69	71	65	59	56	53	49	59	55	71	73	75	71	65	63	60	56	65	60
	300	636	63	62	63	56	49	46	42	38	50	46	71	72	73	68	61	58	55	51	61	58	75	76	78	74	69	66	63	59	68	64
8	40	85	42	47	44	40	37	35	32	32	35	27	50	54	50	47	45	43	42	43	43	38	52	59	54	49	46	48	45	47	47	42
	175	371	60	66	61	57	51	48	44	41	51	44	64	70	67	63	58	56	52	50	57	51	66	73	70	67	63	61	58	55	62	56
	275	583	63	68	64	57	50	47	45	42	52	47	68	75	73	70	64	61	57	53	63	58	72	79	77	74	69	67	63	60	68	64
	380	805	65	70	67	60	52	49	46	44	54	50	72	78	75	71	63	60	58	54	64	60	74	82	81	79	73	71	68	63	72	69
10	65	138	51	54	50	46	42	40	37	39	41	34	56	60	54	53	49	47	45	49	48	44	59	64	59	57	58	58	50	52	55	50
	300	636	63	68	62	55	49	47	45	43	51	45	69	76	73	67	62	61	57	54	62	57	75	79	77	74	69	68	64	61	68	63
	470	996	65	69	63	56	50	48	45	43	52	46	73	78	75	69	63	61	58	55	64	60	79	84	82	79	73	71	68	64	73	69
	640	1356	69	71	67	60	53	50	47	46	55	50	76	79	75	70	63	61	59	56	64	60	80	86	83	79	74	72	70	65	74	69
12	100	212	45	47	47	45	34	33	34	35	37	32	46	51	47	51	46	46	43	45	45	40	49	55	48	49	47	50	48	50	48	45
	450	954	62	65	58	54	49	46	42	40	49	42	66	71	66	63	58	56	52	52	57	52	70	76	71	69	64	62	58	57	63	58
	700	1483	67	69	62	57	51	49	45	42	52	47	72	77	72	69	63	61	56	53	63	58	76	81	77	75	70	68	64	60	69	64
	1000	2119	68	69	65	59	54	52	48	44	54	48	77	80	75	71	65	63	59	56	65	61	79	85	81	79	74	71	67	62	72	68
14	150	318	57	54	51	48	44	43	43	41	44	37	61	56	53	56	54	54	55	58	54	53	58	57	58	61	63	65	65	66	63	61
	700	1483	76	69	61	57	52	50	48	47	52	47	81	76	71	68	63	61	59	60	63	57	83	79	75	74	70	69	68	68	69	63
	1100	2331	77	70	63	59	55	52	50	48	54	48	86	80	75	71	65	63	60	61	66	61	90	86	82	79	74	72	70	69	73	68
	1500	3178	78	72	66	63	59	57	53	53	58	51	87	81	76	72	67	65	62	62	67	64	90	89	85	82	76	75	71	70	76	73
16	190	403	57	58	52	47	42	41	40	39	43	35	58	63	57	54	48	48	47	49	49	44	63	71	62	59	57	56	54	56	56	51
	880	1865	68	70	63	58	52	49	46	44	53	48	77	80	73	70	64	61	56	55	64	60	77	82	77	74	69	67	62	61	68	64
	1380	2924	71	71	64	58	52	50	47	45	53	49	81	83	77	72	66	63	59	58	67	65	84	90	84	81	76	73	68	65	75	73
	1890	4005	74	74	68	62	57	55	51	49	58	53	84	84	77	72	66	64	61	60	67	65	88	91	86	82	77	74	70	67	76	75

Air Regenerated Noise TVB-B

Table 9: Regenerated noise on discharge side

Size	V̇ l/s	V̇ CFM	Δ p_{st} = 100 Pa										Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC
			f_m in Hz										f_m in Hz										f_m in Hz										f_m in Hz									
			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
4	10	21	23	22	20	15	<15	<15	<15	<15	<15	<15	27	22	19	16	<15	<15	<15	<15	<15	<15	<15	26	22	18	<15	15	<15	<15	<15	<15	<15	33	27	21	<15	15	21	22	19	18
	45	95	26	41	35	29	<15	<15	<15	<15	22	14	32	42	37	30	<15	<15	<15	<15	24	16	36	43	40	33	19	17	20	21	27	19	44	46	43	37	26	24	28	29	31	25
	70	148	37	42	43	34	<15	<15	<15	<15	28	22	37	44	46	38	16	<15	<15	<15	32	26	47	48	50	40	22	18	22	23	35	30	47	51	49	43	29	23	28	29	36	30
	100	212	39	46	45	40	20	15	16	<15	32	26	47	51	50	45	23	18	19	19	37	32	50	54	51	48	27	22	25	24	40	35	55	55	55	52	32	26	30	30	43	39
5	20	42	30	29	26	17	<15	<15	<15	<15	<15	<15	41	30	28	22	<15	<15	<15	<15	15	<15	30	33	31	29	20	19	20	23	22	18	30	39	36	33	27	28	28	30	29	25
	80	170	42	44	38	30	<15	<15	<15	<15	25	16	40	47	41	34	<15	<15	16	16	28	19	42	50	46	39	25	22	26	27	33	25	48	51	48	43	32	28	32	35	37	30
	125	265	44	45	49	38	18	<15	<15	<15	34	28	42	49	51	41	23	19	20	22	36	31	50	55	56	45	29	25	28	29	41	37	53	57	57	48	35	29	34	35	43	38
	165	350	42	50	49	46	26	21	21	21	37	33	48	53	51	50	29	24	25	25	41	38	55	59	55	53	33	28	31	31	44	40	57	61	60	57	39	32	36	36	48	44
6	25	53	21	27	24	18	<15	<15	<15	<15	<15	<15	28	29	28	25	<15	<15	<15	<15	16	<15	27	32	31	31	29	24	24	26	26	22	27	37	34	32	30	28	33	33	31	29
	100	212	35	44	37	28	<15	<15	<15	<15	24	14	35	46	40	33	18	15	20	19	28	19	38	49	44	38	26	24	29	29	33	25	45	51	48	43	34	28	35	36	37	32
	155	328	39	47	47	35	20	17	17	15	32	26	41	51	50	40	25	23	24	23	35	30	50	56	54	46	32	29	32	32	40	35	51	58	56	50	36	31	36	36	43	37
	215	456	41	49	50	41	26	23	21	19	36	30	47	54	53	46	29	27	27	25	40	34	53	61	59	52	36	33	35	34	46	41	58	63	61	56	41	36	39	39	48	43
7	30	64	26	27	27	19	<15	<15	<15	<15	<15	<15	26	30	32	28	<15	<15	16	18	21	<15	35	33	36	39	30	21	27	29	30	25	39	37	38	39	39	31	34	37	35	32
	140	297	43	45	40	30	17	<15	15	<15	26	18	47	49	45	36	22	20	23	23	31	24	50	54	50	44	30	26	32	33	38	30	54	54	54	50	39	32	39	41	43	37
	220	466	49	51	47	37	24	21	20	18	33	26	52	54	49	42	28	27	27	26	36	29	59	60	57	49	35	33	35	35	43	38	61	62	61	55	41	37	41	42	48	43
	300	636	55	51	55	44	29	27	25	23	40	36	57	53	56	47	33	31	30	29	42	37	63	61	64	53	40	38	39	39	49	47	66	64	69	59	45	42	44	44	54	52
8	40	85	21	33	35	27	<15	<15	15	<15	21	<15	25	36	37	32	22	18	22	21	25	18	36	43	43	41	35	29	33	33	34	28	43	46	48	43	42	41	39	41	41	36
	175	371	45	50	44	32	22	20	21	19	31	23	48	54	50	38	28	27	29	29	36	30	50	58	56	48	36	36	38	38	43	37	54	58	58	53	44	40	44	43	47	40
	275	583	47	51	48	38	28	27	26	22	34	28	52	56	54	44	33	33	34	32	40	35	58	61	61	52	40	40	41	41	47	43	61	65	66	59	47	45	47	47	53	49
	380	805	52	56	59	46	34	33	33	31	43	40	56	58	58	48	36	36	36	34	44	40	62	66	68	57	45	44	45	45	53	51	66	69	71	63	51	48	50	49	57	55
10	65	138	32	43	38	31	16	<15	20	19	25	16	32	46	42	38	26	22	26	27	31	24	35	50	47	48	40	32	36	38	40	35	41	52	50	49	51	49	42	44	47	42
	300	636	45	50	44	34	25	23	25	23	31	23	49	58	52	41	30	30	32	33	39	33	53	62	60	52	39	37	41	42	47	42	57	64	64	59	49	45	49	49	52	47
	470	996	48	54	52	41	30	29	28	27	38	33	52	57	54	45	35	35	35	35	41	34	62	66	63	53	42	41	43	44	50	46	65	70	70	64	51	47	50	50	57	54
	640	1356	54	56	58	48	36	34	32	30	44	40	58	60	59	50	39	38	38	36	45	41	64	67	66	56	46	45	47	46	52	49	70	73	73	66	54	50	52	51	60	57
12	100	212	30	40	37	30	<15	<15	15	<15	24	15	33	43	42	39	22	20	23	24	30	25	33	46	43	45	37	34	35	36	37	31	43	50	46	45	40	46	43	44	43	39
	450	954	46	51	45	36	26	25	23	21	32	24	50	56	50	41	32	32	32	31	38	30	56	61	57	51	39	39	40	41	45	39	61	66	61	59	47	45	47	46	51	47
	700	1483	48	55	52	43	32	32	29	26	38	32	54	60	55	47	37	37	36	35	42	36	61	66	61	54	44	44	44	44	49	44	66	72	67	62	52	50	50	50	56	50
	1000	2119	55	59	60	51	37	38	36	33	46	42	58	62	61	52	41	41	40	38	47	43	67	69	66	59	49	48	48	47	53	49	72	74	71	65	56	54	53	52	59	55
14	150	318	43	46	41	35	21	21	20	19	29	21	44	49	47	40	28	27	28	28	34	26	42	57	52	51	39	35	38	38	43	38	50	57	52	52	51	54	47	47	50	46
	700	1483	53	52	45	36	28	26	25	22	33	24	56	59	52	42	33	33	33	33	40	34	61	65	60	54	42	41	42	43	48	42	69	69	64	62	51	49	50	49	55	51
	1100	2331	55	54	54	42	35	37	32	28	40	35	62	59	58	48	40	40	39	39	44	39	68	69	65	56	46	46	45	46	52	47	75	74	70	65	55	53	53	53	59	54
	1500	3178	61	59	61	50	40	43	38	36	47	44	67	64	63	52	43	44	42	41	49	45	75	71	67	59	51	51	50	49	55	50	81	78	74	68	59	56	55	54	62	59
16	190	403	42	41	38	30	19	20	21	19	25	16	39	45	45	38	27	27	29	30	32	25	41	51	50	50	39	36	40	41	42	38	52	54	53	51	48	53	49	50	50	45
	880	1865	51	51	46	34	27	26	25	23	33	26	55	55	51	40	31	33	33	34	38	31	59	61	58	50	38	39	40	43	45	39	66	66	62	60	47	45	47	48	52	48
	1380	2924	56	55	54	41	34	35	32	31	40	35	62	60	57	46	38	39	38	39	44	39	67	66	62	53	43	43	43	45	49	45	72	71	67	62	50	48	49	50	56	51
	1890	4005	62	58	59	51	41	42	38	37	46	41	70	65	62	52	43	44	42	42	49	44	75	70	67	58	48	49	47	48	54	50	79	77	72	66	56	53	52	51	60	57

Air Regenerated Noise TVB-B with spigot plate

Table 10: Regenerated noise on discharge side

Size	V̇ l/s	V̇ CFM	Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC
			f_m in Hz										f_m in Hz										f_m in Hz									
			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
4	10	21	24	36	23	21	<15	<15	<15	<15	<15	<15	<15	27	26	22	<15	17	20	17	18	15	<15	39	29	24	<15	17	25	23	22	20
	45	95	27	46	41	34	<15	<15	15	<15	28	20	29	47	45	37	19	17	26	23	32	24	41	51	47	40	28	24	33	34	35	30
	70	148	28	50	52	40	<15	<15	<15	19	37	33	43	52	54	43	17	<15	23	26	39	35	44	56	53	45	27	20	32	34	40	34
	100	212	37	54	54	49	<15	<15	<15	15	41	36	47	60	55	52	18	<15	19	25	44	40	50	61	59	57	28	18	29	34	48	44
5	20	42	26	17	24	17	<15	<15	<15	<15	<15	<15	40	31	27	25	18	18	<15	20	19	15	42	33	33	29	26	26	25	29	26	25
	80	170	44	43	36	30	20	<15	<15	<15	25	16	49	46	41	35	25	22	20	25	29	21	51	46	44	39	30	27	27	30	33	25
	125	265	51	43	45	40	34	30	25	18	33	26	53	50	51	42	35	31	27	25	37	31	56	53	53	46	37	33	30	30	40	34
	165	350	58	50	47	46	42	39	36	29	40	33	58	53	51	49	42	39	37	30	42	36	61	56	55	52	43	40	37	33	44	39
6	25	53	31	24	25	21	<15	<15	<15	<15	<15	<15	34	34	28	28	26	18	20	24	23	20	34	35	32	30	29	24	29	32	28	28
	100	212	34	46	37	30	21	16	<15	<15	26	17	42	47	41	35	25	21	23	26	30	22	45	50	46	40	32	26	30	32	34	28
	155	328	45	49	45	38	33	30	25	18	33	25	49	54	50	43	35	32	30	28	38	31	52	57	53	47	37	32	32	32	40	34
	215	456	50	54	50	44	39	38	34	27	39	30	54	58	55	49	42	40	37	32	43	36	58	61	57	52	44	41	38	35	46	39
7	30	64	45	34	30	25	<15	<15	<15	<15	19	<15	38	38	36	37	27	<15	23	28	29	24	42	38	38	38	38	25	30	35	33	31
	140	297	42	53	42	33	23	17	17	18	31	25	52	55	49	42	28	22	27	29	36	28	50	56	53	48	37	28	34	37	41	35
	220	466	51	56	46	40	33	30	23	20	36	29	55	61	54	47	37	34	31	31	42	37	58	63	59	52	41	36	36	38	46	41
	300	636	54	56	54	46	40	39	34	28	41	35	62	61	59	51	43	42	37	34	46	41	62	66	65	56	47	45	41	41	52	48
8	40	85	41	37	35	30	20	<15	17	17	23	15	43	43	42	38	32	23	29	31	32	26	47	45	46	41	39	34	35	39	37	34
	175	371	47	54	48	36	30	26	25	25	35	27	52	57	54	46	36	32	34	35	41	35	53	58	57	51	42	37	40	41	45	38
	275	583	52	56	52	43	39	37	32	27	40	33	57	62	60	51	44	42	39	38	47	42	61	64	64	57	47	45	44	44	51	46
	380	805	55	59	57	48	44	43	40	33	45	38	62	66	64	56	49	48	44	41	51	47	65	70	69	61	53	51	48	46	56	52
10	65	138	48	46	40	35	24	16	22	23	29	21	42	50	45	45	36	26	32	36	37	32	45	51	49	46	48	42	38	41	43	38
	300	636	47	58	50	40	32	28	28	28	38	32	55	62	59	50	38	34	37	39	45	40	57	64	62	57	47	41	46	46	51	45
	470	996	52	57	51	44	41	39	33	29	40	32	61	67	62	52	45	44	41	41	49	44	64	70	68	62	51	47	47	47	55	52
	640	1356	57	61	58	50	47	45	41	36	46	39	64	67	63	54	50	49	46	42	51	45	68	73	71	64	55	53	51	49	58	55
12	100	212	43	40	40	37	21	16	20	22	28	23	43	42	39	40	33	32	32	33	33	28	47	46	43	41	35	38	40	41	38	36
	450	954	52	54	48	40	34	31	28	28	36	27	59	60	56	49	40	37	37	38	44	37	63	63	59	57	46	42	44	45	49	45
	700	1483	56	58	53	47	44	41	35	31	43	34	64	66	61	54	48	47	43	41	49	43	69	70	66	61	52	50	48	49	54	49
	1000	2119	60	62	60	53	50	48	43	37	49	42	67	68	64	58	54	52	48	44	53	47	72	74	69	64	58	56	53	51	58	53
14	150	318	54	46	45	38	28	23	24	25	32	24	52	53	48	46	35	33	35	36	39	33	55	53	49	48	46	46	44	44	45	40
	700	1483	58	57	50	41	36	33	29	30	38	30	63	63	58	52	43	40	39	41	47	40	71	67	63	61	50	46	47	47	53	49
	1100	2331	63	57	56	48	46	45	38	35	45	37	72	69	64	56	51	49	45	44	52	47	77	72	69	64	55	53	51	51	58	53
	1500	3178	69	64	62	52	52	51	45	40	51	44	76	70	65	59	56	55	50	46	55	48	82	78	72	67	61	59	55	53	62	58
16	190	403	50	42	42	36	26	24	25	27	30	23	51	48	47	46	35	34	37	38	38	33	57	50	50	47	43	45	45	47	45	42
	880	1865	57	53	49	39	34	32	29	30	36	29	61	59	56	49	38	37	37	40	44	38	68	64	61	58	46	43	44	46	50	46
	1380	2924	63	57	56	46	44	44	37	34	44	37	70	66	61	53	47	46	42	43	49	44	74	69	66	61	51	49	47	49	55	49
	1890	4005	72	64	61	52	52	51	45	41	51	44	76	70	65	57	54	53	48	45	54	48	80	76	71	64	57	55	51	50	59	55

Air Regenerated Noise TVB-C

Table 11: Regenerated noise on discharge side

Size	V̇ l/s	V̇ CFM	Δ p_{st} = 100 Pa										Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_W in dB/Oct.										L_W in dB/Oct.										L_W in dB/Oct.										L_W in dB/Oct.									
			f_m in Hz								L_p in dB(A)	NC	f_m in Hz								L_p in dB(A)	NC	f_m in Hz								L_p in dB(A)	NC	f_m in Hz								L_p in dB(A)	NC
			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
4	10	21	<15	22	25	16	<15	<15	<15	<15	<15	<15	41	22	22	19	<15	<15	<15	<15	<15	<15	<15	23	22	19	<15	16	17	<15	15	<15	<15	32	27	22	<15	16	24	22	21	19
	45	95	32	40	35	29	<15	<15	<15	<15	22	15	33	40	37	32	<15	<15	<15	<15	24	17	35	42	40	35	19	18	25	23	28	21	44	45	41	37	26	24	32	32	31	27
	70	148	40	39	44	34	<15	<15	<15	<15	29	23	34	41	48	39	<15	<15	17	18	33	28	47	45	51	42	22	15	26	26	36	31	48	48	49	42	29	21	31	31	36	30
	100	212	36	40	44	36	<15	<15	<15	15	30	24	47	48	49	44	20	<15	19	21	36	31	52	52	49	47	25	<15	26	25	38	34	56	53	54	52	32	19	33	32	43	40
5	20	42	39	30	21	<15	<15	<15	<15	<15	<15	<15	28	31	26	20	<15	<15	<15	<15	<15	<15	34	36	32	28	20	19	18	23	22	18	36	40	36	32	26	27	25	30	28	25
	80	170	36	45	38	29	<15	<15	<15	<15	25	16	39	49	41	32	16	<15	<15	<15	29	21	43	51	46	37	25	21	21	25	33	26	48	52	50	42	32	28	28	32	37	30
	125	265	41	49	47	39	23	24	<15	17	33	27	45	52	49	41	25	26	17	19	36	30	49	58	55	43	29	28	24	26	40	36	52	60	57	49	35	31	31	33	43	38
	165	350	45	56	50	50	32	34	23	19	41	37	48	56	52	51	32	35	25	23	42	39	53	62	57	54	35	38	30	30	46	41	56	64	61	56	38	39	33	35	48	43
6	25	53	30	28	19	<15	<15	<15	<15	<15	<15	<15	<15	30	26	23	16	<15	<15	<15	15	<15	32	36	31	29	29	24	22	26	26	22	34	38	34	31	29	27	30	33	29	29
	100	212	29	46	37	27	18	<15	<15	<15	25	16	34	49	40	31	19	15	16	17	28	20	39	51	45	37	26	23	24	26	32	24	45	53	49	43	33	28	31	34	37	30
	155	328	36	51	46	35	25	28	16	18	32	25	43	54	48	39	27	30	21	20	35	28	49	59	53	44	32	32	28	29	40	33	51	61	56	50	36	33	33	34	44	37
	215	456	44	55	51	44	32	36	24	18	39	31	47	57	54	47	32	38	26	23	41	35	51	64	61	53	38	43	34	34	47	43	57	65	62	55	40	42	36	37	49	44
7	30	64	23	34	32	19	<15	<15	<15	<15	17	<15	25	37	37	26	<15	<15	<15	<15	22	15	39	42	41	36	25	<15	17	20	28	21	43	45	45	36	31	26	26	27	32	24
	140	297	49	52	45	41	35	29	19	<15	35	27	54	57	51	43	37	32	25	20	39	31	59	59	56	48	41	37	31	29	43	37	60	61	59	53	45	39	35	34	46	40
	220	466	53	59	51	47	43	40	33	22	42	34	61	62	55	50	47	44	38	29	45	37	66	67	61	54	50	48	44	37	50	44	69	69	65	58	52	51	46	41	53	48
	300	636	61	61	60	52	50	48	43	34	49	42	65	65	63	55	52	52	47	39	52	45	72	70	69	58	55	56	52	46	56	52	75	74	73	62	57	58	55	49	60	57
8	40	85	18	40	40	27	<15	<15	<15	<15	25	19	25	43	42	30	19	<15	<15	<15	27	20	41	51	48	37	31	20	23	23	34	28	47	54	54	40	34	36	31	31	40	35
	175	371	51	57	50	43	40	36	25	15	39	31	55	62	56	46	43	40	31	26	44	37	58	63	62	52	48	46	37	33	48	44	61	65	63	56	50	47	40	37	51	45
	275	583	51	59	53	49	47	45	39	27	45	38	60	64	60	52	52	51	45	35	50	43	65	69	66	57	55	55	50	43	55	49	70	71	70	62	58	59	52	45	58	53
	380	805	59	66	64	54	55	55	51	42	54	47	64	70	65	55	55	56	53	44	55	49	70	75	72	63	60	62	59	51	61	57	76	79	75	66	63	65	60	53	64	60
10	65	138	36	42	38	31	17	<15	16	<15	25	16	33	44	43	38	26	21	22	21	31	24	42	48	44	47	37	32	33	33	38	34	43	48	45	43	41	38	35	36	39	32
	300	636	54	56	47	41	44	41	37	27	41	35	61	64	56	47	48	46	43	35	47	40	64	69	63	55	52	50	49	44	52	46	66	69	66	60	56	54	53	50	56	49
	470	996	61	62	56	49	53	50	46	38	49	44	65	66	59	53	55	55	52	45	53	47	75	75	70	62	58	60	58	53	60	54	76	78	75	69	61	62	62	58	64	60
	640	1356	66	66	61	54	56	56	53	46	54	48	71	70	64	58	57	59	57	51	57	52	76	78	72	64	60	64	64	60	63	58	82	83	80	73	64	67	68	65	69	65
12	100	212	34	39	37	31	<15	<15	<15	<15	24	16	33	41	42	39	22	20	20	19	30	25	39	44	41	43	34	35	32	31	35	30	45	46	41	39	31	34	37	37	35	33
	450	954	55	57	48	43	46	43	35	25	42	36	62	62	54	48	50	48	42	34	47	41	67	68	60	54	52	53	48	43	52	45	70	70	63	59	54	54	51	47	55	48
	700	1483	62	64	56	51	54	53	47	38	51	45	67	68	60	55	57	57	53	45	55	50	75	75	68	62	60	62	59	54	60	55	78	79	72	67	62	65	63	58	64	60
	1000	2119	67	69	63	57	57	60	57	49	57	52	71	73	66	60	59	62	60	53	60	55	78	79	72	67	63	67	65	61	65	60	84	85	78	72	67	71	70	66	70	67
14	150	318	47	46	40	35	22	20	16	<15	29	21	44	48	47	40	29	27	24	22	34	27	48	54	50	49	36	35	35	33	41	36	53	53	47	46	42	42	41	40	42	36
	700	1483	62	58	48	43	47	45	37	26	43	38	68	65	56	49	51	50	43	36	49	42	72	71	63	57	55	55	50	45	55	49	78	74	66	63	58	58	54	50	58	53
	1100	2331	68	62	58	49	58	58	51	40	55	51	74	68	63	56	60	60	56	49	57	53	82	78	71	64	62	64	61	56	63	59	86	82	76	70	65	68	65	60	67	63
	1500	3178	74	69	64	56	59	64	59	52	60	57	80	74	68	60	61	65	62	56	62	58	86	82	73	68	65	69	67	63	67	63	94	89	80	75	70	73	72	67	73	73
16	190	403	46	40	37	31	19	19	16	<15	25	16	39	43	45	39	27	27	25	24	32	25	47	49	48	49	36	36	37	36	40	36	55	50	48	46	39	41	42	42	42	38
	880	1865	61	57	49	41	46	45	37	28	43	37	67	62	55	46	49	49	43	37	47	42	70	67	61	54	51	53	48	45	51	45	75	71	64	60	54	55	51	49	55	49
	1380	2924	69	63	58	49	56	56	50	42	53	49	74	68	62	54	57	59	55	49	56	52	81	75	69	61	59	62	58	55	60	54	83	79	73	67	61	64	61	58	64	59
	1890	4005	75	68	62	57	61	63	59	53	60	56	83	75	66	60	61	65	62	57	62	58	86	81	73	66	63	67	65	62	66	62	92	87	79	73	66	70	68	65	70	70

Air Regenerated Noise TVB-E

Table 12: Regenerated noise on discharge side

Size	V̇ l/s	V̇ CFM	Δ p_{st} = 100 Pa										Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC	L_W in dB/Oct.								L_p in dB(A)	NC
			f_m in Hz										f_m in Hz										f_m in Hz										f_m in Hz									
			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
	l/s	CFM																																									
4	10	21	19	24	19	<15	<15	<15	<15	<15	<15	<15	24	23	20	16	<15	<15	<15	<15	<15	<15	<15	27	22	18	<15	15	16	<15	<15	<15	<15	35	27	21	<15	15	21	22	19	18
	45	95	26	40	36	28	<15	<15	<15	<15	22	<15	31	42	38	30	<15	<15	<15	<15	24	16	32	43	41	33	17	16	22	22	27	19	41	46	43	36	25	24	29	31	31	26
	70	148	38	40	42	33	<15	<15	<15	<15	27	20	35	44	46	38	<15	<15	<15	17	32	25	41	47	50	40	19	<15	23	25	35	30	47	51	49	42	26	19	29	30	36	29
	100	212	36	45	45	38	<15	<15	<15	<15	31	24	46	51	50	44	16	<15	17	21	37	31	51	55	50	47	23	<15	25	26	39	47	55	56	55	51	29	19	30	31	43	38
5	20	42	34	27	27	17	<15	<15	<15	<15	<15	<15	45	30	27	22	<15	<15	<15	<15	16	<15	44	32	31	29	21	19	19	22	22	18	39	37	35	33	28	28	28	30	29	26
	80	170	42	45	37	30	<15	<15	<15	<15	25	16	40	48	40	33	18	<15	<15	<15	28	19	46	50	46	39	27	23	25	26	33	26	51	51	48	43	33	28	31	33	37	30
	125	265	43	47	50	40	28	24	16	18	35	30	44	49	52	41	27	24	20	20	37	32	55	55	56	45	33	30	27	27	41	37	53	57	57	49	38	34	33	34	43	39
	165	350	45	51	49	48	36	33	25	20	39	35	49	53	51	51	35	33	26	23	42	38	54	59	56	54	37	35	31	29	45	42	57	60	59	57	42	39	36	36	48	45
6	25	53	26	28	26	19	<15	<15	<15	<15	<15	<15	38	31	29	25	<15	<15	<15	<15	17	<15	38	33	32	31	29	24	24	26	26	22	31	37	34	32	31	28	33	33	31	29
	100	212	35	45	36	28	17	<15	<15	<15	25	16	35	47	39	32	22	18	19	17	27	18	42	50	45	39	28	26	28	28	33	25	47	51	48	44	34	29	34	35	37	31
	155	328	39	48	47	36	29	27	20	16	33	27	42	51	50	40	31	29	25	22	36	30	51	56	54	45	35	34	32	31	40	35	51	59	56	50	39	36	36	35	43	37
	215	456	43	50	51	42	35	34	27	20	37	31	49	54	54	47	36	36	30	25	41	35	51	60	59	52	41	40	36	33	46	40	57	62	61	56	44	42	40	38	49	44
7	30	64	32	29	28	20	<15	<15	<15	<15	<15	<15	40	34	34	28	<15	<15	16	19	22	15	43	35	38	40	29	20	27	29	31	26	39	38	38	39	39	31	34	37	35	32
	140	297	43	46	40	30	22	20	16	<15	27	18	47	49	44	35	25	23	22	22	31	23	53	55	51	45	32	30	32	33	39	31	55	54	54	51	39	34	39	40	43	38
	220	466	49	50	47	38	31	30	23	17	34	26	52	54	50	41	34	34	29	25	37	30	57	61	57	49	39	38	36	34	44	38	61	63	61	55	44	42	42	42	49	43
	300	636	56	52	55	45	39	38	31	25	41	36	59	53	57	48	41	41	36	30	44	39	62	60	63	53	45	45	42	38	49	45	65	64	69	59	49	48	46	44	54	52
8	40	85	24	34	35	27	15	17	<15	<15	22	<15	31	36	38	32	23	18	21	21	26	18	41	43	43	41	34	29	32	32	34	27	42	45	47	42	42	39	39	40	40	35
	175	371	44	51	44	34	31	29	25	20	32	23	49	53	50	39	34	34	31	28	37	30	51	58	57	49	40	41	39	38	44	38	54	58	59	54	45	43	45	43	47	41
	275	583	48	51	49	40	39	38	33	25	38	31	51	56	55	45	42	43	39	33	43	36	57	62	62	53	47	48	45	42	49	44	61	65	66	60	51	51	50	47	54	49
	380	805	54	58	59	48	46	46	43	36	47	41	58	59	60	50	47	48	45	39	48	42	60	66	67	58	52	53	51	47	54	51	64	69	71	63	56	56	54	51	58	55
10	65	138	34	43	38	31	17	18	19	17	26	16	39	45	43	38	26	22	26	27	31	24	40	50	47	48	39	32	35	37	40	35	40	51	49	48	50	47	42	43	46	41
	300	636	44	50	44	36	33	32	28	23	33	24	49	57	52	42	37	36	34	32	40	33	54	62	61	53	43	42	42	42	48	43	58	64	64	60	51	48	50	49	53	48
	470	996	49	54	53	43	41	41	35	29	41	34	52	57	54	46	44	44	40	36	43	37	61	67	64	55	49	49	47	45	51	47	64	70	70	65	55	53	53	51	58	54
	640	1356	55	59	59	50	48	47	42	36	47	41	59	61	61	52	49	50	46	41	50	43	63	67	66	57	53	54	52	49	54	49	68	73	73	66	59	58	56	53	61	57
12	100	212	29	38	36	29	<15	<15	<15	<15	23	15	31	39	41	39	23	21	23	23	30	25	33	44	41	44	36	35	34	34	36	30	41	48	44	43	39	42	42	43	41	38
	450	954	45	51	45	39	38	37	29	23	36	29	50	56	51	43	41	41	35	31	40	33	56	61	58	52	45	45	43	41	47	40	61	64	61	59	50	49	48	47	52	47
	700	1483	51	57	53	47	46	46	40	32	44	38	54	60	56	49	48	49	44	38	47	41	61	66	63	56	54	54	51	47	53	47	66	71	67	63	57	57	54	51	57	51
	1000	2119	56	63	61	54	52	53	49	42	51	45	58	64	63	56	54	55	51	46	53	47	65	69	67	61	59	59	56	52	58	52	69	73	71	66	63	63	60	57	62	56
14	150	318	42	45	40	34	22	20	19	16	28	20	42	46	46	40	29	27	27	27	33	26	42	55	50	50	38	36	36	36	41	37	48	55	50	50	50	50	46	46	48	43
	700	1483	52	52	46	38	39	38	31	24	37	30	56	59	53	44	42	42	37	33	42	35	61	64	60	55	48	48	44	44	50	43	68	68	65	63	54	53	51	50	55	51
	1100	2331	58	56	56	45	50	51	43	34	48	43	62	59	59	50	51	52	47	42	50	44	68	70	66	58	56	56	53	49	56	49	74	74	70	66	60	60	57	54	60	54
	1500	3178	63	63	62	53	55	57	51	45	54	50	67	65	65	56	57	58	53	48	56	50	73	71	68	62	61	62	58	54	60	54	79	77	74	69	66	66	62	59	65	58
16	190	403	40	39	37	30	20	20	19	<15	24	15	37	41	44	38	28	28	28	28	32	24	42	49	49	49	38	37	38	39	41	36	50	52	51	49	46	49	48	48	47	43
	880	1865	50	51	47	37	38	38	31	25	37	30	55	55	52	42	40	42	37	34	41	34	59	61	58	52	44	45	42	43	47	40	65	65	63	60	50	50	49	48	53	48
	1380	2924	59	57	55	45	48	49	43	37	46	41	62	60	58	48	49	51	46	42	49	43	67	66	64	56	52	54	50	48	53	46	71	71	67	63	56	56	53	52	57	51
	1890	4005	63	62	60	53	56	56	51	46	54	48	70	66	64	55	56	58	53	50	55	50	73	70	67	60	59	60	56	53	58	52	77	76	72	67	62	62	59	56	62	57

Case Radiated Noise TVB-A

Example

Data given: TVB-A Size 6
$\dot{V}$ = 25 to 100 l/s or 53 to 212 CFM
Δp_{st} = 500 Pa
Specified sound pressure in room 42 dB(A)
10 dB/Oct. room attenuation and 4 dB/Oct. ceiling sound reduction.

Required: Case radiated noise in room based on sound spectrum data at $\dot{V}$ = 100 l/s or 212 CFM

Calculation (figures in dB/Oct.):

f_m in Hz	63	125	250	500	1000	2000	4000	8000
L_{w1}	53	51	55	49	47	48	44	37
Ceiling sound reduction	4	4	4	4	4	4	4	4
Room attenuation	10	10	10	10	10	10	10	10
	39	37	41	35	33	34	30	23
A-weighting	−26	−16	− 9	− 3	0	+ 1	+ 1	− 1
Corrected level	13	21	32	32	33	35	31	22

Result: L_p = approx. 40 dB(A) by logarithmic addition.

Table 13: Case radiated noise

Size	$\dot{V}$ l/s	$\dot{V}$ CFM	Δp_{st} = 100 Pa: L_{w1} in dB/Oct. at f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_{p1} in dB(A)	NC	Δp_{st} = 200 Pa: L_{w1} in dB/Oct. at f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_{p1} in dB(A)	NC	Δp_{st} = 500 Pa: L_{w1} in dB/Oct. at f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_{p1} in dB(A)	NC	Δp_{st} = 1000 Pa: L_{w1} in dB/Oct. at f_m in Hz 63	125	250	500	1000	2000	4000	8000	L_{p1} in dB(A)	NC
4	10	21	29	16	28	<15	<15	<15	<15	<15	<15	<15	34	<15	28	18	<15	<15	<15	<15	<15	<15	40	33	36	27	22	18	24	32	26	27	44	37	42	32	27	24	29	40	33	36
	45	95	45	34	42	27	<15	<15	<15	<15	26	21	49	45	47	31	21	15	<15	<15	31	27	51	47	52	38	31	27	27	34	37	32	54	50	55	45	39	34	33	41	41	36
	70	148	46	39	50	32	18	16	<15	<15	34	30	54	48	52	37	25	20	<15	<15	36	33	56	54	60	43	34	30	29	36	44	42	60	55	61	49	42	37	36	41	46	44
	100	212	45	36	46	27	18	23	<15	<15	30	26	55	42	54	40	27	27	20	<15	38	35	61	55	60	48	37	33	30	35	45	42	61	60	65	54	44	41	38	42	50	48
5	20	42	41	36	35	17	<15	<15	<15	<15	20	<15	40	38	41	31	17	<15	<15	<15	27	19	46	40	44	41	31	21	<15	17	33	27	49	45	50	43	36	31	29	36	38	31
	80	170	48	44	43	26	20	17	<15	<15	28	22	52	49	49	36	28	22	18	16	34	29	55	53	55	49	40	31	26	23	42	36	59	56	58	51	46	39	32	34	45	40
	125	265	49	45	47	33	21	17	<15	<15	31	26	56	52	43	38	31	26	24	<15	33	24	61	59	59	50	42	36	34	29	45	41	64	62	63	56	50	43	39	36	50	46
	165	350	47	45	45	32	25	22	15	<15	30	24	57	54	54	37	32	27	24	27	39	35	64	62	62	50	44	38	37	30	47	44	68	66	66	58	51	46	44	40	53	49
6	25	53	<15	19	31	29	26	21	<15	<15	22	16	39	33	37	33	29	26	17	<15	27	18	27	33	38	38	34	32	21	18	31	24	47	43	43	39	37	34	28	26	34	27
	100	212	47	43	40	36	34	33	26	<15	32	25	54	50	48	42	42	42	37	28	40	34	53	51	55	49	47	48	44	37	46	41	57	52	58	54	52	51	48	42	50	44
	155	328	51	44	40	38	36	35	30	18	34	28	61	51	51	44	44	44	40	31	42	36	63	57	60	52	52	52	49	42	51	45	66	60	63	58	56	57	54	49	55	49
	215	456	44	46	46	33	33	32	25	15	33	26	60	46	48	45	45	45	41	33	43	37	67	58	64	53	54	54	51	45	53	47	70	66	67	59	58	59	57	52	58	52
7	30	64	41	40	24	28	24	19	<15	<15	22	<15	43	43	41	36	30	27	21	18	30	22	44	47	44	41	34	30	27	27	34	27	47	53	49	47	41	37	34	36	40	34
	140	297	52	47	36	31	26	26	20	<15	28	19	53	55	46	39	34	35	30	26	36	28	58	61	57	50	46	46	40	37	46	39	59	64	59	56	52	51	46	44	51	44
	220	466	53	60	45	32	25	25	18	<15	37	35	59	64	45	39	34	36	31	27	41	40	65	68	60	52	47	47	42	39	49	45	67	70	66	59	53	54	49	45	55	49
	300	636	59	59	58	30	21	22	<15	<15	43	40	64	63	57	41	33	36	30	25	44	39	66	69	62	53	47	48	44	41	50	47	68	71	70	59	54	55	51	47	57	54
8	40	85	27	41	31	31	28	26	22	<15	26	18	25	40	35	35	31	32	29	22	30	24	24	47	38	42	38	38	36	30	37	30	44	56	50	47	45	42	39	34	42	35
	175	371	41	43	33	29	23	26	18	<15	25	18	43	58	48	41	36	39	35	27	39	32	54	61	55	52	47	48	47	42	48	41	57	66	62	59	55	54	53	50	54	47
	275	583	40	58	35	33	27	28	20	<15	35	32	54	61	44	40	35	37	32	24	39	37	51	70	58	55	48	50	48	43	51	48	60	73	65	62	56	57	55	51	57	52
	380	805	39	58	46	36	24	28	20	<15	36	32	47	61	46	42	34	37	32	23	39	36	46	70	58	55	47	49	46	42	51	48	65	76	64	65	58	57	55	51	59	56
10	65	138	30	39	38	35	28	27	19	<15	28	21	32	42	38	35	31	33	26	18	30	25	41	41	47	44	41	38	32	28	38	31	36	54	55	48	48	43	37	33	45	39
	300	636	48	43	32	25	24	26	17	<15	25	19	54	49	45	37	34	36	28	21	34	28	58	62	60	45	44	47	40	34	47	42	64	68	68	59	56	56	50	44	56	51
	470	996	54	55	43	34	30	29	20	<15	34	28	62	59	52	41	37	38	31	24	40	34	68	71	64	50	47	48	42	39	52	50	63	74	74	64	57	56	50	45	60	59
	640	1356	53	50	43	31	33	32	24	17	32	25	64	64	54	44	40	39	32	25	43	40	74	76	68	54	49	49	44	40	56	56	67	78	76	64	57	57	51	46	62	61
12	100	212	44	43	35	24	18	<15	<15	<15	23	13	47	46	41	36	27	21	17	17	29	22	53	51	46	44	40	37	31	35	38	31	57	56	50	49	43	41	40	44	43	39
	450	954	56	52	45	36	28	27	21	<15	33	24	61	59	52	44	37	36	32	26	40	34	68	67	61	55	49	48	44	42	50	44	71	72	66	62	56	54	51	50	56	51
	700	1483	59	56	51	41	33	30	24	17	38	31	63	61	54	45	38	36	31	25	42	36	71	71	63	57	50	49	45	43	52	49	77	77	70	65	58	57	54	53	60	57
	1000	2119	63	59	53	45	36	35	29	22	41	34	67	62	57	48	40	38	33	26	44	38	73	74	65	58	50	49	45	43	54	53	82	81	72	66	59	58	55	54	62	62
14	150	318	49	33	30	27	20	21	<15	<15	22	13	52	48	41	37	29	31	26	22	32	23	55	49	49	47	40	35	32	30	39	34	58	52	48	49	49	45	42	48	46	43
	700	1483	57	43	41	35	29	30	24	19	31	22	63	54	41	43	35	37	31	27	37	29	72	66	59	57	48	45	41	39	50	44	77	71	64	63	55	50	45	40	56	51
	1100	2331	62	52	43	41	35	35	30	23	36	28	66	57	51	46	39	38	33	29	41	32	79	71	63	57	48	47	42	39	53	51	82	78	71	68	57	55	50	41	61	58
	1500	3178	64	52	52	46	39	40	36	30	41	33	70	62	58	51	44	43	39	33	46	40	81	73	62	56	49	48	45	40	53	53	85	81	75	70	58	57	54	51	64	62
16	190	403	48	32	27	26	19	20	<15	<15	20	12	50	47	38	36	29	30	25	21	30	22	58	50	50	48	41	36	32	29	40	35	66	55	51	51	48	46	43	47	47	43
	880	1865	61	42	39	33	28	28	23	18	31	23	69	54	39	41	34	36	31	26	38	36	77	67	57	54	46	45	41	39	49	47	85	75	64	62	55	50	45	40	57	61
	1380	2924	71	55	41	41	36	35	30	24	40	39	80	64	50	46	41	39	33	29	47	52	87	78	64	58	52	49	43	40	58	64	89	84	73	66	60	56	51	43	64	67
	1890	4005	75	57	53	47	41	42	36	31	44	44	83	72	59	55	51	46	41	36	53	57	91	86	71	63	60	56	50	46	64	70	94	90	81	71	65	61	57	54	70	74

Case Radiated Noise TVB-A with spigot plate

Table 14: Case radiated noise

Size	V̇ l/s	V̇ CFM	Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_{W1} in dB/Oct. f_m in Hz								L_{p1} in dB(A)	NC	L_{W1} in dB/Oct. f_m in Hz								L_{p1} in dB(A)	NC	L_{W1} in dB/Oct. f_m in Hz								L_{p1} in dB(A)	NC
			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
4	10	21	34	18	17	19	<15	<15	<15	<15	<15	<15	44	33	28	28	21	20	27	33	27	29	45	35	32	31	25	22	29	42	34	37
	45	95	50	46	38	32	20	19	16	17	27	18	54	51	44	37	28	27	28	33	33	29	54	53	47	44	38	33	33	42	39	37
	70	148	56	48	44	36	21	19	18	17	31	23	57	54	48	43	32	31	31	34	37	30	60	59	53	49	41	37	37	42	43	37
	100	212	60	56	42	37	<15	20	21	22	34	29	64	59	53	48	35	31	32	35	42	35	63	63	56	53	43	40	40	43	46	40
5	20	42	38	37	38	30	16	<15	<15	<15	24	16	45	44	41	40	30	22	16	16	32	27	48	50	45	46	36	34	28	22	37	32
	80	170	55	51	42	34	23	18	<15	<15	31	23	57	56	52	48	37	29	21	20	40	35	59	60	56	54	45	38	30	29	46	42
	125	265	54	54	47	37	29	26	18	18	35	27	63	62	55	49	38	32	23	26	43	38	63	67	61	59	47	41	34	33	51	47
	165	350	57	60	50	41	31	27	18	18	39	35	63	66	57	52	40	36	29	32	46	43	67	71	64	61	48	43	38	38	53	49
6	25	53	38	38	34	34	33	33	26	18	30	25	46	44	38	40	38	38	32	25	35	30	47	46	42	42	42	41	36	32	39	34
	100	212	53	54	43	40	42	44	40	35	41	36	57	58	51	48	48	50	46	42	47	42	59	62	56	54	53	54	50	47	51	46
	155	328	58	55	46	42	44	47	43	39	43	39	63	63	57	50	50	53	50	47	50	45	68	67	61	58	56	58	55	53	56	50
	215	456	58	54	46	42	44	46	42	37	43	38	67	67	57	51	52	55	53	50	52	47	71	71	65	60	57	59	57	55	58	52
7	30	64	45	43	35	33	22	<15	<15	17	25	18	40	46	43	41	34	26	18	28	33	27	44	50	46	45	40	34	26	32	38	32
	140	297	50	56	46	36	26	21	20	20	35	29	55	61	55	49	42	34	31	34	43	37	56	64	58	56	51	44	37	40	49	44
	220	466	56	58	47	37	29	26	26	25	37	32	61	66	59	50	42	36	35	36	46	42	64	69	64	60	53	47	42	43	53	48
	300	636	58	58	49	39	28	26	25	24	37	33	65	69	60	49	41	38	38	39	48	47	71	72	67	61	55	50	48	48	56	50
8	40	85	35	39	31	28	21	<15	<15	<15	21	<15	42	45	39	39	36	25	21	22	32	26	47	51	44	46	46	36	31	33	41	37
	175	371	54	55	45	37	31	29	26	25	34	28	56	60	54	48	43	38	36	35	43	35	58	63	59	57	54	43	40	40	50	45
	275	583	53	56	46	37	32	33	29	26	36	30	63	66	59	52	46	41	39	37	47	43	66	70	65	61	57	46	43	43	55	49
	380	805	55	57	50	41	33	34	31	27	38	30	65	68	60	52	46	45	42	39	49	45	68	73	69	64	59	50	48	45	58	52
10	65	138	31	41	35	32	26	26	20	17	26	18	36	38	46	44	40	35	27	29	37	31	31	50	53	48	48	43	33	31	44	39
	300	636	52	48	43	35	31	27	24	18	31	22	56	60	57	43	41	38	33	30	43	38	64	67	65	57	54	49	42	39	53	48
	470	996	59	54	52	39	36	34	31	26	38	32	66	69	62	48	46	42	39	38	49	47	60	73	72	64	56	50	45	42	58	56
	640	1356	59	60	48	42	40	36	33	28	40	35	73	74	65	52	49	45	43	40	53	53	67	77	73	65	58	54	50	46	60	58
12	100	212	42	43	40	34	25	21	19	16	28	20	47	47	44	44	39	35	30	35	37	30	49	51	48	48	44	43	40	44	43	39
	450	954	61	56	49	42	38	34	32	27	38	30	67	64	57	52	45	40	38	37	46	40	73	69	62	59	52	46	44	45	52	47
	700	1483	61	57	51	44	43	39	37	32	41	33	72	69	61	55	52	48	47	43	51	46	76	75	67	63	57	53	52	49	57	54
	1000	2119	63	59	54	47	45	41	39	34	43	35	73	69	62	56	55	50	50	46	53	47	79	78	70	65	62	58	57	53	61	58
14	150	318	47	46	40	35	26	31	27	21	30	24	49	45	47	47	39	33	31	29	38	33	50	47	47	48	50	47	42	48	46	43
	700	1483	62	51	37	41	36	34	32	28	36	27	71	63	54	53	44	38	35	34	46	41	79	69	60	60	51	43	39	34	53	52
	1100	2331	64	53	48	45	44	41	39	35	42	35	79	69	60	56	50	46	44	39	52	51	81	75	68	66	55	50	47	36	58	55
	1500	3178	66	59	55	50	49	46	45	41	47	39	80	69	59	54	54	49	49	43	53	52	82	78	72	70	61	56	56	50	62	59
16	190	403	45	44	37	34	26	30	27	21	29	23	53	46	48	47	40	34	31	28	39	34	58	50	49	51	49	48	42	47	47	42
	880	1865	69	51	36	39	35	33	31	27	37	35	76	64	53	50	42	37	35	34	46	46	87	72	60	59	51	43	39	35	56	64
	1380	2924	78	60	48	46	46	41	40	36	46	49	88	76	61	57	54	48	45	40	57	64	88	82	70	64	58	52	49	38	62	64
	1890	4005	79	68	56	54	56	50	47	44	52	51	91	81	68	61	65	58	55	49	63	69	91	87	79	71	67	60	58	52	68	70

Case Radiated Noise TVB-B · TVB-E

Case radiated noise of type TVB-C is dependant on the number and configuration of discharge connections used. For assessment purposes the average of data for TVB-A and TVB-B can be taken.

Table 15: Case radiated noise

Size	V̇		Δ p_{st} = 100 Pa										Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_{W1} in dB/Oct.								L_{p1} in dB(A)	NC	L_{W1} in dB/Oct.								L_{p1} in dB(A)	NC	L_{W1} in dB/Oct.								L_{p1} in dB(A)	NC	L_{W1} in dB/Oct.								L_{p1} in dB(A)	NC
			f_m in Hz										f_m in Hz										f_m in Hz										f_m in Hz									
	l/s	CFM	63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
4	10	21	28	<15	<15	<15	<15	<15	<15	<15	<15	<15	24	<15	<15	<15	<15	<15	<15	<15	<15	<15	33	28	28	19	<15	18	22	19	19	16	36	33	32	27	22	32	26	23	27	24
	45	95	40	34	40	27	<15	<15	<15	<15	25	19	46	44	43	27	<15	<15	<15	<15	28	22	50	46	46	31	23	18	17	27	31	26	51	49	49	41	32	27	26	30	36	29
	70	148	45	41	44	35	20	<15	<15	<15	29	23	52	47	54	38	20	<15	<15	<15	38	35	52	51	54	39	27	20	16	22	38	35	60	54	54	44	35	28	24	33	40	35
	100	212	50	41	48	37	23	24	17	26	33	28	53	42	50	49	28	26	17	<15	39	36	61	54	54	47	31	25	19	27	41	35	60	58	59	49	38	30	25	31	44	40
5	20	42	40	29	<15	<15	<15	<15	<15	<15	<15	<15	29	30	26	20	<15	<15	<15	<15	<15	<15	40	35	36	33	24	20	<15	<15	25	18	41	41	41	38	31	38	25	18	34	31
	80	170	43	44	41	26	<15	<15	<15	<15	26	19	48	49	44	32	20	<15	<15	<15	30	24	54	52	50	42	31	22	16	17	36	30	56	55	52	47	40	31	25	23	41	34
	125	265	48	47	40	36	23	15	<15	<15	29	22	55	51	45	38	26	20	<15	<15	33	24	57	57	53	45	35	26	21	15	40	34	64	61	56	51	43	34	27	28	44	38
	165	350	52	50	47	43	29	23	17	17	35	29	55	54	50	46	32	26	20	<15	38	33	63	61	56	50	38	30	26	21	44	38	66	65	60	54	45	36	30	29	48	42
6	25	53	<15	<15	21	23	18	<15	<15	<15	<15	<15	30	26	23	21	17	<15	<15	<15	<15	<15	21	25	28	30	27	28	<15	<15	25	20	38	32	31	30	32	37	26	16	32	30
	100	212	43	44	39	33	26	20	<15	<15	27	19	52	48	42	35	30	27	21	<15	31	21	50	48	47	41	36	33	30	26	36	28	54	48	51	49	43	40	39	32	42	36
	155	328	49	42	37	39	36	30	25	<15	32	26	58	48	51	42	37	33	28	27	38	31	57	53	54	47	43	41	37	31	42	35	63	57	55	53	48	46	44	41	47	41
	215	456	47	47	44	42	40	36	31	29	37	31	57	43	45	49	46	43	38	25	43	36	66	55	59	51	48	46	42	37	47	41	68	64	61	56	52	50	47	45	51	44
7	30	64	33	33	23	17	<15	<15	<15	<15	<15	<15	36	38	30	24	<15	<15	<15	<15	19	<15	38	36	31	33	27	23	16	17	25	19	39	36	35	35	34	35	34	34	34	29
	140	297	49	49	37	25	16	<15	<15	<15	27	21	52	52	38	30	20	<15	<15	<15	30	24	53	56	47	42	31	25	21	21	36	29	55	57	51	51	41	36	36	36	42	38
	220	466	51	56	43	31	22	16	<15	<15	33	29	56	58	44	35	26	21	17	18	36	33	58	63	53	46	37	35	31	29	42	38	61	65	58	55	45	43	40	38	48	42
	300	636	60	56	53	37	31	30	24	17	38	33	61	57	54	41	34	33	28	22	40	35	64	65	59	49	41	41	37	34	46	41	67	68	64	57	48	47	45	43	52	47
8	40	85	22	35	30	26	19	20	<15	<15	20	<15	21	33	26	27	22	26	24	19	23	19	19	39	29	35	34	34	33	26	32	28	37	44	40	38	39	40	40	34	38	34
	175	371	38	43	32	24	16	15	<15	<15	22	13	41	55	42	34	25	24	21	17	32	28	50	56	47	46	36	33	34	31	39	32	55	60	55	54	47	42	44	43	47	41
	275	583	39	55	34	31	24	22	16	<15	31	28	52	58	42	37	29	27	24	19	36	32	47	66	53	50	41	40	39	36	45	42	55	68	59	58	49	46	46	44	51	46
	380	805	40	55	44	40	29	32	26	16	35	29	46	57	45	41	34	36	31	23	37	31	45	66	55	52	42	42	41	36	46	43	63	72	58	62	51	49	48	45	54	51
10	65	138	25	34	37	30	19	21	<15	<15	24	15	28	35	29	27	22	27	21	<15	24	20	35	32	37	37	37	34	30	24	33	27	30	42	46	39	43	42	38	33	40	35
	300	636	45	44	31	20	17	16	<15	<15	22	<15	52	46	38	30	23	21	<15	<15	27	17	54	57	53	39	34	31	28	23	39	33	62	62	61	53	49	44	41	37	49	44
	470	996	52	52	42	32	27	23	16	<15	31	24	60	56	50	37	31	28	22	19	37	31	64	67	59	45	39	37	33	32	46	43	58	69	68	59	49	46	41	37	54	52
	640	1356	54	47	40	35	39	37	30	24	35	29	63	61	52	43	40	37	31	25	41	36	73	72	65	51	44	43	38	34	52	50	65	74	71	60	51	48	44	40	57	55
12	100	212	42	40	35	25	16	22	<15	<15	22	<15	46	37	35	33	25	27	27	27	27	22	48	44	39	39	39	37	37	37	37	32	52	48	45	42	39	40	42	45	41	41
	450	954	54	51	42	31	24	22	<15	<15	30	23	58	56	48	38	30	28	26	23	36	30	65	63	56	50	42	37	38	37	45	38	70	67	61	57	51	45	43	45	51	45
	700	1483	58	53	49	38	31	28	22	20	36	29	63	59	53	42	34	32	28	25	40	34	70	67	60	52	44	40	38	37	48	43	74	71	65	59	52	47	45	45	54	49
	1000	2119	64	58	55	45	37	36	31	24	41	36	67	62	57	47	39	37	33	30	44	39	74	70	63	54	47	43	40	38	51	47	79	76	68	60	53	49	46	46	56	55
14	150	318	47	30	30	28	18	30	18	<15	25	22	51	40	34	34	26	37	36	32	34	30	50	42	43	42	38	35	38	31	37	33	53	44	43	42	45	44	44	49	44	44
	700	1483	55	42	39	31	25	25	18	16	28	18	60	51	36	37	27	28	25	24	32	23	69	62	54	51	41	34	35	34	45	39	77	66	59	58	50	41	37	34	51	47
	1100	2331	62	50	41	38	32	32	28	26	34	25	67	56	49	43	36	34	30	28	39	32	78	67	59	52	42	38	35	33	49	49	79	72	66	62	50	44	40	33	55	51
	1500	3178	65	51	53	46	40	41	38	33	42	34	70	62	59	50	43	42	39	37	46	41	81	69	59	52	45	42	40	35	51	54	83	75	70	65	52	47	45	43	59	57
16	190	403	46	29	27	26	17	29	18	<15	24	21	49	38	32	33	27	36	35	39	33	30	53	43	43	43	40	36	39	31	38	33	61	47	46	44	44	45	44	49	45	44
	880	1865	59	41	36	29	23	23	17	<15	28	20	66	51	35	36	26	27	25	24	34	32	74	63	52	49	39	34	35	34	45	43	85	69	60	57	50	41	38	35	54	59
	1380	2924	71	53	39	38	34	33	28	26	38	38	80	63	49	44	38	35	31	28	47	53	86	74	60	54	46	40	37	34	55	62	86	79	68	61	54	46	42	35	59	62
	1890	4005	76	56	54	47	43	43	38	34	45	46	83	71	59	54	51	46	41	40	53	56	92	81	69	59	56	50	46	42	61	70	92	85	77	66	58	51	48	46	65	70

Case Radiated Noise TVB-B with spigot plate

Table 16: Case radiated noise

Size	V̇		Δ p_{st} = 200 Pa										Δ p_{st} = 500 Pa										Δ p_{st} = 1000 Pa									
			L_{W1} in dB/Oct.										L_{W1} in dB/Oct.										L_{W1} in dB/Oct.									
			f_m in Hz								L_{p1} in dB(A)	NC	f_m in Hz								L_{p1} in dB(A)	NC	f_m in Hz								L_{p1} in dB(A)	NC
	l/s	CFM	63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
4	10	21	18	<15	<15	<15	<15	<15	<15	<15	<15	<15	29	31	29	20	16	16	21	19	19	16	35	34	32	28	24	27	22	23	25	19
	45	95	40	44	36	25	<15	<15	<15	<15	24	14	42	46	43	30	23	18	16	28	29	24	43	50	47	42	33	27	24	28	35	28
	70	148	44	46	54	35	19	16	<15	<15	38	25	48	51	53	38	26	20	15	25	37	34	49	54	54	44	36	28	23	34	40	35
	100	212	46	37	44	42	24	28	18	<15	33	28	54	53	49	44	28	26	19	27	37	30	52	56	57	49	38	31	24	31	43	38
5	20	42	24	32	27	21	<15	<15	<15	<15	<15	<15	35	38	36	34	25	18	<15	<15	26	20	39	42	40	38	33	33	22	19	32	26
	80	170	43	48	38	30	19	<15	<15	<15	27	20	46	52	47	41	31	21	15	18	35	27	48	56	51	48	41	32	23	21	40	35
	125	265	46	49	45	35	25	22	<15	<15	31	24	53	57	52	44	34	26	20	18	39	33	54	60	56	51	44	34	26	29	44	38
	165	350	48	49	44	39	29	28	22	25	33	25	57	60	51	46	36	32	26	21	40	35	58	63	58	53	45	36	29	29	46	41
6	25	53	28	25	23	21	17	<15	<15	<15	<15	<15	19	27	29	30	28	26	16	<15	25	19	38	34	32	31	33	34	24	17	30	27
	100	212	51	47	38	34	30	26	21	<15	29	21	48	47	45	40	35	33	30	27	35	26	51	49	50	49	43	39	37	31	42	36
	155	328	55	44	50	40	37	36	29	19	37	31	58	52	52	45	41	38	33	30	40	33	61	55	54	52	47	42	40	40	46	40
	215	456	53	38	40	44	44	43	40	30	41	36	64	53	55	47	45	44	40	35	44	37	66	62	59	54	50	46	43	41	49	42
7	30	64	37	34	29	25	<15	<15	<15	16	18	<15	38	38	34	34	27	22	19	20	26	20	39	39	37	36	36	34	33	34	34	29
	140	297	54	51	38	30	20	<15	<15	<15	29	23	57	55	46	41	30	26	22	22	36	28	58	57	51	49	39	33	35	34	41	36
	220	466	57	53	42	35	27	25	20	<15	32	26	63	61	51	43	33	28	24	24	40	35	66	63	57	53	42	35	35	35	46	40
	300	636	59	53	51	38	34	32	30	22	37	31	67	62	55	46	37	35	33	29	43	37	70	67	62	54	43	38	37	36	49	44
8	40	85	18	31	27	28	22	26	27	26	25	22	18	39	32	37	34	33	35	28	33	29	38	46	42	40	42	42	40	34	40	35
	175	371	42	51	40	33	24	24	21	17	30	23	51	53	46	44	33	32	34	32	37	30	56	58	55	53	44	40	44	43	46	40
	275	583	52	52	39	35	29	29	24	16	32	24	50	62	51	48	37	35	35	33	42	37	58	66	57	56	45	41	43	42	48	43
	380	805	43	52	41	39	32	33	30	21	34	26	46	61	51	49	38	38	38	34	42	36	63	69	56	59	47	43	44	42	51	47
10	65	138	26	33	30	27	22	27	24	22	24	19	34	32	41	39	36	34	31	26	34	27	30	43	48	41	45	44	37	33	42	37
	300	636	53	43	37	29	22	21	<15	<15	26	14	55	54	51	37	31	31	28	24	37	31	62	60	61	52	46	42	40	36	47	43
	470	996	60	50	47	35	31	30	23	16	34	27	66	63	57	42	35	33	29	29	43	39	61	66	67	57	46	40	38	36	52	50
	640	1356	60	55	49	41	37	35	30	23	38	29	75	67	61	47	40	38	35	32	48	44	65	71	68	58	46	42	40	36	54	52
12	100	212	39	37	37	33	24	27	28	27	28	23	46	43	43	41	38	35	37	37	37	33	52	48	47	45	42	45	43	45	43	40
	450	954	58	50	45	36	28	28	25	23	33	24	63	57	54	47	38	35	37	37	42	35	69	63	60	55	47	43	43	46	49	43
	700	1483	61	53	48	39	33	32	27	23	36	28	69	62	57	49	41	38	38	37	45	39	75	68	63	57	48	44	44	45	52	46
	1000	2119	63	55	52	46	34	33	29	26	40	33	73	63	59	51	41	40	39	38	47	41	77	71	65	58	49	47	46	46	53	49
14	150	318	45	40	36	34	26	37	36	32	34	31	48	41	46	44	38	34	38	32	38	32	53	44	45	45	48	49	45	49	47	44
	700	1483	59	45	33	35	26	28	24	24	30	21	67	57	51	49	37	33	34	34	42	36	75	63	58	57	47	39	38	35	49	45
	1100	2331	65	49	45	40	34	34	29	26	36	29	77	62	57	50	39	37	35	33	47	48	80	69	64	60	46	42	40	33	53	52
	1500	3178	66	55	54	49	38	38	35	32	42	36	80	62	56	49	40	39	38	35	48	52	80	70	68	63	48	45	45	43	56	53
16	190	403	43	38	34	33	26	36	36	32	33	30	51	42	47	45	39	35	38	31	38	33	61	47	48	48	47	50	45	49	47	44
	880	1865	66	46	32	34	24	27	24	24	33	31	72	57	50	46	35	33	34	34	42	40	83	66	58	56	47	39	38	36	52	57
	1380	2924	78	56	45	41	36	34	39	26	45	50	85	69	58	51	43	39	36	34	53	61	87	75	66	58	49	43	41	34	57	63
	1890	4005	79	65	55	52	45	41	37	35	48	51	91	75	65	56	51	47	44	41	58	69	89	80	74	64	54	49	48	45	62	66

Order Details

Specification Text

VAV terminal box for variable volume supply air systems, flow rate range 10 to 1890 l/s or 21 to 4005 CFM, suitable for connecting to pneumatic, electronic or DDC control circuits. Each VAV box is tested and the desired volume flow rates set in the factory.

Sensing of the volume flow rate is by an averaging differential pressure grid. The minimum and maximum volume flow rates set at the factory are capable of being site monitored and adjusted. Casing is lined with acoustic and thermal insulation, erosion-resistant up to 20 m/s. Circular high pressure duct spigot connection, low pressure duct connection angle flange or slide-on flange. Casing air leakage rate complies to Class A, DW 142. The equipment conforms with clean room Class 100 US-standard 209b.

Static differential pressure range 20 to 1500 Pa, volume flow turndown to 10 : 1, depending on the type of controller.

Materials:
Casing from galvanised sheet steel, mineral wool lining in the attenuator and damper section to have density of 30 to 40 kg/m³, with marglass facing suitable for velocities of up to 20 m/s, (Fire rating BS 476 Pt6 I<12, i<6, BS 476 Pt7 Class 1). Control damper from sheet steel with tip seal, aluminium sensor tubes, polyurethane plain bearings.

Available with:

Reheat coil (Hot water)
For supply volume reheat, casing from galvanised sheet steel, copper tubes and aluminium fins, connected to the box on the discharge side, flanged both ends.

Reheat coil (Electric), Type TVB-E
For supply volume reheat (stab in electric duct heater), mounting plate from galvanised sheet steel, finned elements, auto stem and manual stem cut out, airflow switch, suitable for three steps balanced circuit wiring.

Order Code

TVB-A-2 / 8 / 0 / BA 3 / 40 - 380 l/s

Type
VAV controller — TVB

Construction
Short case — A
Long case — B
With spigots — C
With electric reheat — E

Reheat coil (Hot water)
With 2 rows — 2
With 4 rows — 4

(Leave blank if no reheat coil; only for type TVB-A and TVB-B)

Size
4
5
6
7
8
10
12
14
16

Matching flange
0 Without (standard construction)
1 Slide on flange
2 Spigot plate

Control attachments
Actuator
Controller/Sensor
Manufacturer
— see Price List

Volume flow values

Order Example

Make: TROX
Type: TVB-A-2 / 8 / 0 / BA 3 / 40 - 380 l/s