CVQ CONSTANT AIR VOLUME DAMPER

- Precision constant air volume control
- Shock absorber built in to stabilise flow
- Fine tuning via indicator volume adjuster
- Heavy duty volume control blade
- High quality springs for linear control
- Instant response from 50 to 1000 Pa
- Response time milliseconds
- Body construction air tight
- 30mm standard Flange for fast installation
- Supplied factory calibrated and adjusted
- Individually Tag numbering on request
- 24 month warranty
- 30 Years field application experience

CVQ Mechanical Constant Volume Damper

Damper Body Construction
The CMR CVQ Constant Volume Damper is manufactured to the highest engineering precision with CNC machines.The Damper is formed galvanised senzimir sheet metal with all cut outs for the damper adjustment and the blade axle.

The damper consists of a specially shaped control blade which is secured into PTFE bearings on the side. A spring mechanism hold the blade in position. Aerodynamic forces push the blade to a defined position which finally controls the volume flow.
A shock absorber is fitted within the Damper which is secured to the body and the blade to eliminate any bouncing caused by turbulent air.

The spring tension can be adjusted by an external screw type indicator which is also air tight. The air volume can be adjusted at the factory or on site. The Damper is factory assembled and tested.

Pressure accuracy
The CVQ Damper works reliably from a minimum static pressure, of 50Pa which depends on the air velocity and a maximum of 1000Pa .
The flow rate variation is usually within a tolerance of +/- 10% (up to 100m3/h +/- 10m3/h), if the air velocity is less then 4m/s and the controller is installed horizontally The variation can be higher if the CVQ is installed Vertically at elbows and unusual duct locations. But by re-adjusting the set point on the spring dial, this can be easily fine tuned on site to bring it to its final control point. Furthermore, it is recommended to design the air velocity to be around 4.5 to 5 m/s but it should not be below 2.7 m/s.

Temperature
The CVQ operates within a temperature range of -30°C to 70°C. Higher temperatures can be achieved with a special heat resistant version.

Insulation
A 25 or 50mm thick insulation for noise or heat transfer protection can be supplied on request.

CVQ Mechanical Constant Air Volume Control Dampers single and dual height

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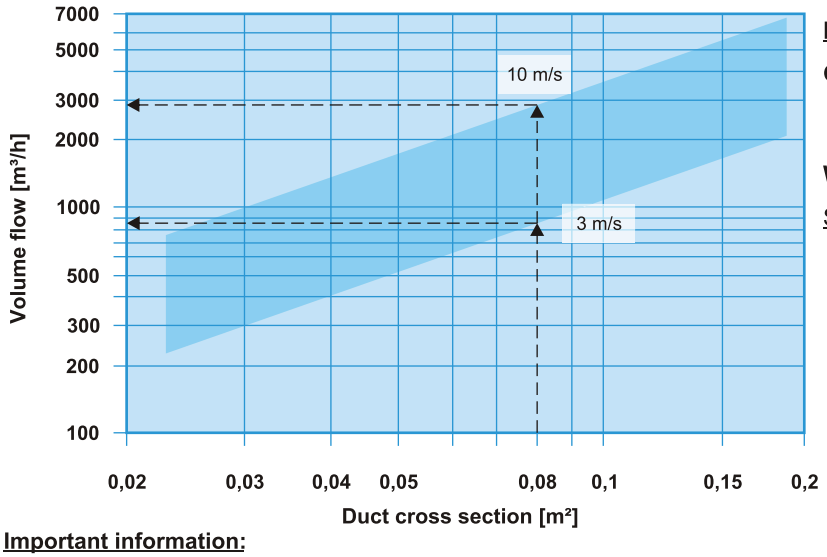
CVQ VALVE VOLUMES AND DIMENSIONS

Volume flow against duct cross section



Example:

Given: Volume flow controller
Width 400 mm, height 200 mm
[duct cross section 0,08 m²]

Which volume flow is possible?

Solution according to the chart on the left:

V at 3 m/s = 865 m³/h
V at 10 m/s = 2880 m³/h

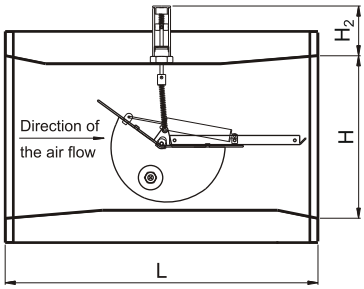
Air velocity
between 3 m/s und 10 m/s

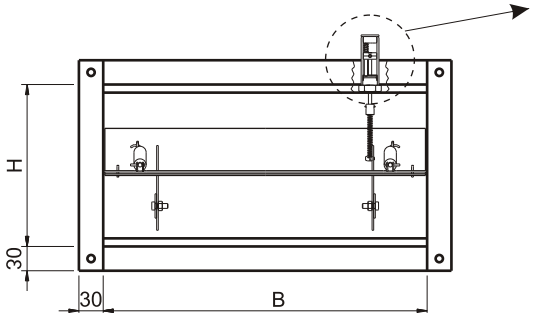
Important information:
Generally the regulators do not cover the airflow shown but only a partition.
In case of orders and demands, please do indicate the airflow desired or the airflow range.

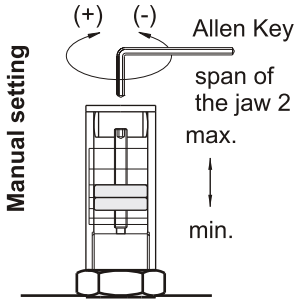
- Constant volume flow controller, self regulating
- Factory-preset reference flow rate according to customer specification
- Manual setting of the flow rate by adjusting device
- Variable height and width, constant length (385 mm)
- Height100 mm, between 150 mm to 300 mm (to 600 mm, see page 7)
- Width between 150 mm to 600 mm

} H ≤ B ≤ 2H

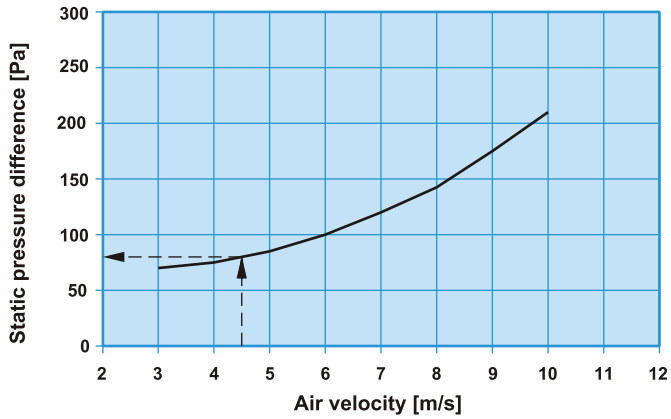
- Connection: 4 holes flange 30 mm







Minimum static pressure difference at the controller



Example:

Given: Volume flow controller
Width 250 mm, height 200 mm
[duct cross section 0,05 m²]
Volume flow 810 m³/h
(= Air velocity 4,5 m/s)

Minimum static pressure difference Δp in Pa?

Solution according to the chart on the left:

Δp = 80 Pa

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CVQ VALVE SOUND DATA NOISE LEVELS

Table 1: Air flow noise generated by the CVQ

Width [mm]	Height [mm]	Velocity [m/s]	Volume flow [m3/ h]	Static pressure difference at the controller [Pa]																										
				100 Pa									250 Pa								500 Pa									
				Octave power level* L_W [dB/octave]								Summation L_{wtotal} A-eval. [dB(A)]	Octave power level* L_W [dB/octave]							Summation L_{wtotal} A-eval. [dB(A)]	Octave power level* L_W [dB/octave]							Summation L_{wtotal} A-eval. [dB(A)]				
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		
		2,8	202	48	47	46	44	42	40	37	35	48	56	55	54	52	50	48	45	43	59	62	61	60	58	56	54	51	49	62
200	100	6,3	435	53	53	52	50	49	47	45	42	54	61	61	60	58	57	55	53	50	62	67	67	66	64	63	61	59	56	68
		9,7	698	-	-	-	-	-	-	-	-	-	64	64	63	62	61	59	57	59	66	70	70	69	68	67	65	63	61	72
		2,0	216	46	45	44	42	40	37	35	32	45	54	53	52	50	48	45	43	40	53	60	59	58	56	54	51	49	46	59
300	100	4,7	508	53	52	51	49	47	45	43	40	53	61	60	59	57	55	53	51	48	61	67	66	65	63	61	59	57	54	67
		7,4	799	-	-	-	-	-	-	-	-	-	64	63	62	61	59	57	55	53	65	70	69	68	67	65	63	61	59	71
		2,1	302	47	46	45	43	41	38	35	32	46	55	54	53	51	49	46	43	40	54	61	60	59	57	55	52	49	46	60
400	100	4,9	705	53	53	51	50	48	46	44	41	54	61	60	59	58	56	54	52	49	62	67	66	65	64	62	60	58	55	68
		7,6	1094	-	-	-	-	-	-	-	-	-	64	64	63	61	60	58	56	53	65	70	70	69	67	66	64	62	59	71
		3	243	49	48	47	45	43	41	39	36	49	57	56	55	53	51	49	47	44	57	63	62	61	59	57	55	53	50	63
150	150	6	486	54	54	52	51	49	48	45	43	55	62	61	60	59	57	55	53	51	63	68	67	66	65	63	62	59	57	69
		9	729	57	56	56	54	53	51	49	47	58	65	64	63	62	61	59	57	55	66	71	70	69	68	67	65	63	61	72
		3	486	52	50	49	47	45	43	40	37	50	60	58	57	55	53	51	48	45	58	66	64	63	61	59	57	54	51	64
300	150	6	972	56	56	54	53	51	49	47	44	57	64	64	62	61	59	57	55	52	65	70	70	68	67	65	63	61	58	71
		9	1458	59	59	58	56	55	53	51	48	60	67	66	66	64	63	61	59	56	68	73	73	72	70	69	67	65	62	74
		3	432	52	50	49	47	45	43	40	37	50	60	58	57	55	53	51	48	45	58	66	64	63	61	59	57	54	51	64
200	200	6	864	56	56	54	53	51	49	47	44	57	64	64	62	61	59	57	55	52	65	70	70	68	67	65	63	61	58	71
		9	1296	59	59	58	56	55	53	51	48	60	67	66	66	64	63	61	59	56	68	73	73	72	70	69	67	65	62	74
		3	648	53	52	50	48	46	44	41	38	51	61	60	58	56	54	52	49	46	59	67	66	64	62	60	58	55	52	65
300	200	6	1296	58	57	56	54	52	50	48	45	58	66	65	64	62	60	58	56	53	66	72	71	70	68	66	64	62	59	72
		9	1944	61	60	59	57	56	54	52	49	61	69	68	67	65	64	62	59	57	69	75	74	73	71	70	68	65	63	75
		3	864	54	52	51	49	47	44	41	38	52	62	60	59	57	55	52	49	46	60	68	66	65	63	61	58	55	52	66
400	200	6	1728	59	58	56	55	53	51	48	45	58	67	66	64	63	61	59	56	53	66	73	72	70	69	67	65	62	59	72
		9	2592	61	61	60	58	56	54	52	49	62	69	69	68	66	64	62	60	57	70	75	75	74	72	70	68	66	63	76
		3	972	54	53	51	49	47	45	42	39	53	62	61	59	57	55	53	50	47	61	68	67	65	63	61	59	56	53	67
300	300	6	1944	60	58	57	56	54	51	49	46	59	67	66	65	63	62	59	57	54	67	74	72	71	69	68	65	63	60	73
		9	2916	62	62	60	59	57	55	53	50	63	70	69	68	67	65	63	61	58	71	76	75	74	73	71	69	67	64	77
		3	1458	56	54	53	50	48	46	43	39	54	64	62	60	58	56	53	51	47	62	70	68	67	64	62	59	57	53	68
450	300	6	2916	61	60	58	57	55	52	50	47	60	69	68	66	65	63	60	58	55	68	75	74	72	71	69	66	64	61	74
		9	4374	64	63	62	60	58	56	54	51	64	72	71	70	68	66	64	62	59	72	78	77	76	74	72	70	68	65	78
		3	1944	56	55	53	51	49	46	43	40	54	64	63	61	59	57	54	51	48	62	70	69	67	65	63	60	57	54	68
600	300	6	3888	62	60	59	57	55	53	50	47	61	70	68	67	65	63	61	58	55	69	76	74	73	71	69	67	64	61	75
		9	5832	65	64	62	61	59	57	54	51	64	73	72	70	69	67	65	62	59	72	79	78	76	75	73	71	68	65	78

* Sound level in dB/octave in relation to 10^{-12} W

If air is discharged into a room, additional attenuation will take place as a result of duct outlet attenuation which results in a reduction in the sound level.The room and duct outlet attenuation can be calculated according to VDI 2081. As a rough estimate, about 8 dB can be deducted.

The flow noise is heavily dependent on the local conditions, the radiating duct length upstream, or downstream of the sound attenuator and the acoustic insulation. Therefore the data provide dis calculated in the laboratory and can only be used as a guide.

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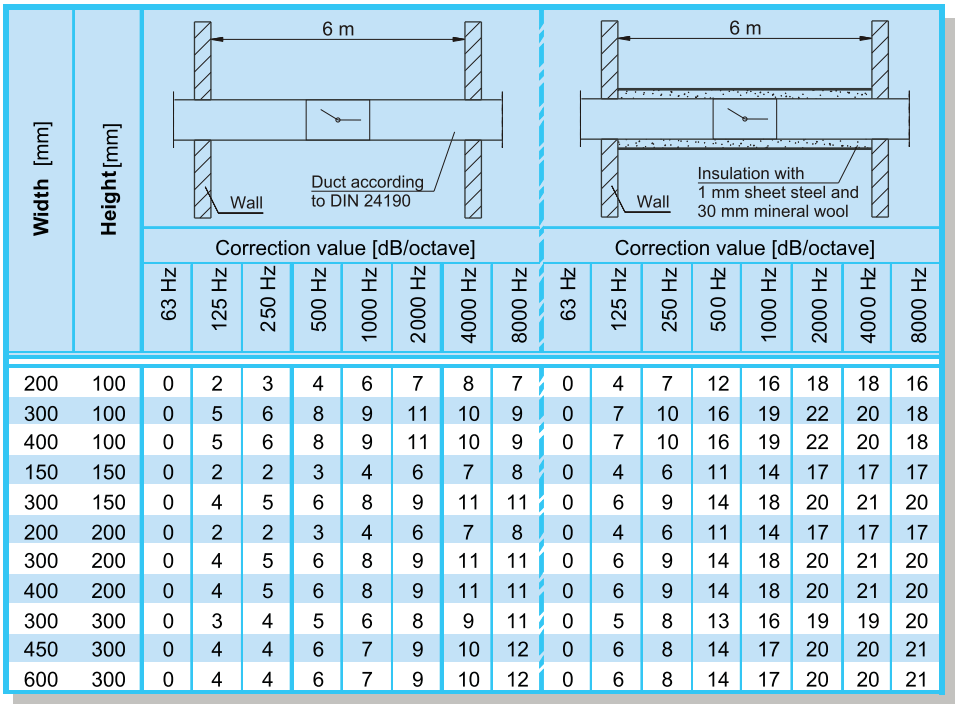
CVQ AIR FLOW NOISE LEVEL EXAMPLES

Table 2: Correction values for calculation of the radiant noise of a duct with a length of 5m with a built in CVQ



Width [mm]	Height [mm]	Correction value [dB/octave]								Correction value [dB/octave]							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
200	100	0	2	3	4	6	7	8	7	0	4	7	12	16	18	18	16
300	100	0	5	6	8	9	11	10	9	0	7	10	16	19	22	20	18
400	100	0	5	6	8	9	11	10	9	0	7	10	16	19	22	20	18
150	150	0	2	2	3	4	6	7	8	0	4	6	11	14	17	17	17
300	150	0	4	5	6	8	9	11	11	0	6	9	14	18	20	21	20
200	200	0	2	2	3	4	6	7	8	0	4	6	11	14	17	17	17
300	200	0	4	5	6	8	9	11	11	0	6	9	14	18	20	21	20
400	200	0	4	5	6	8	9	11	11	0	6	9	14	18	20	21	20
300	300	0	3	4	5	6	8	9	11	0	5	8	13	16	19	19	20
450	300	0	4	4	6	7	9	10	12	0	6	8	14	17	20	20	21
600	300	0	4	4	6	7	9	10	12	0	6	8	14	17	20	20	21

Example: Calculation of the noise pressure level

Frequency →	Noise pressure level [dB/octave]								Summation L_{WTotal} A-eval. [dB(A)]
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
Flow noise L_W according to table 1	53	52	50	48	46	44	41	38	51
Correction Value according to table 2	0	-6	-9	-14	-18	-20	-21	-20	-
Room attenuation	-4	-4	-4	-4	-4	-4	-4	-4	-
A-evaluation	-26	-16	-9	-3	0	1	1	-1	-
Noise pressure level L_A A-evaluated dB (A)	23	26	28	27	24	21	17	13	33

Example:

Given: Volume flow controller
with 30 mm insulating shell
Width 300 mm, height 200 mm
Volume flow 648 m³/h
(= velocity 3 m/s)
Static pressure difference Δp 100 Pa

Noise pressure level of a duct (length 6 m) with integrated volume flow controller?

Calculated noise pressure level: 33 dB (A)

Example: Calculation of the flow noise

Frequency →	Noise pressure level [dB/octave]								Summation L_{WTotal} A-eval. in dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
Flow noise L_W according to table 1	53	52	50	48	46	44	41	38	51
Reflection attenuation	-18	-10	-5	-1	0	0	0	0	-
Room attenuation	-4	-4	-4	-4	-4	-4	-4	-4	-
A-evaluation	-26	-16	-9	-3	0	1	1	-1	-
Noise pressure level L_A A-evaluated [dB (A)]	5	22	32	40	42	41	38	33	46

Example:

Given: Volume flow controller
with 30 mm insulating shell
Width 300 mm, height 200 mm
Volume flow 648 m³/h
(= velocity 3 m/s)
Static pressure difference Δp 100 Pa

Noise pressure level of a duct (length 6 m) with integrated volume flow controller?

Calculated noise pressure level: 46 dB (A)

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CVQ TWIN CONSTANT VOLUME CONTROL

Twin Constant Volume Controller

All twin controllers are equipped with two control damper blades each with their own adjustment set point flow rate scale. The summation of both of the scale values results in the total flow rate.

Twin controllers cannot be delivered with electric or pneumatic actuators

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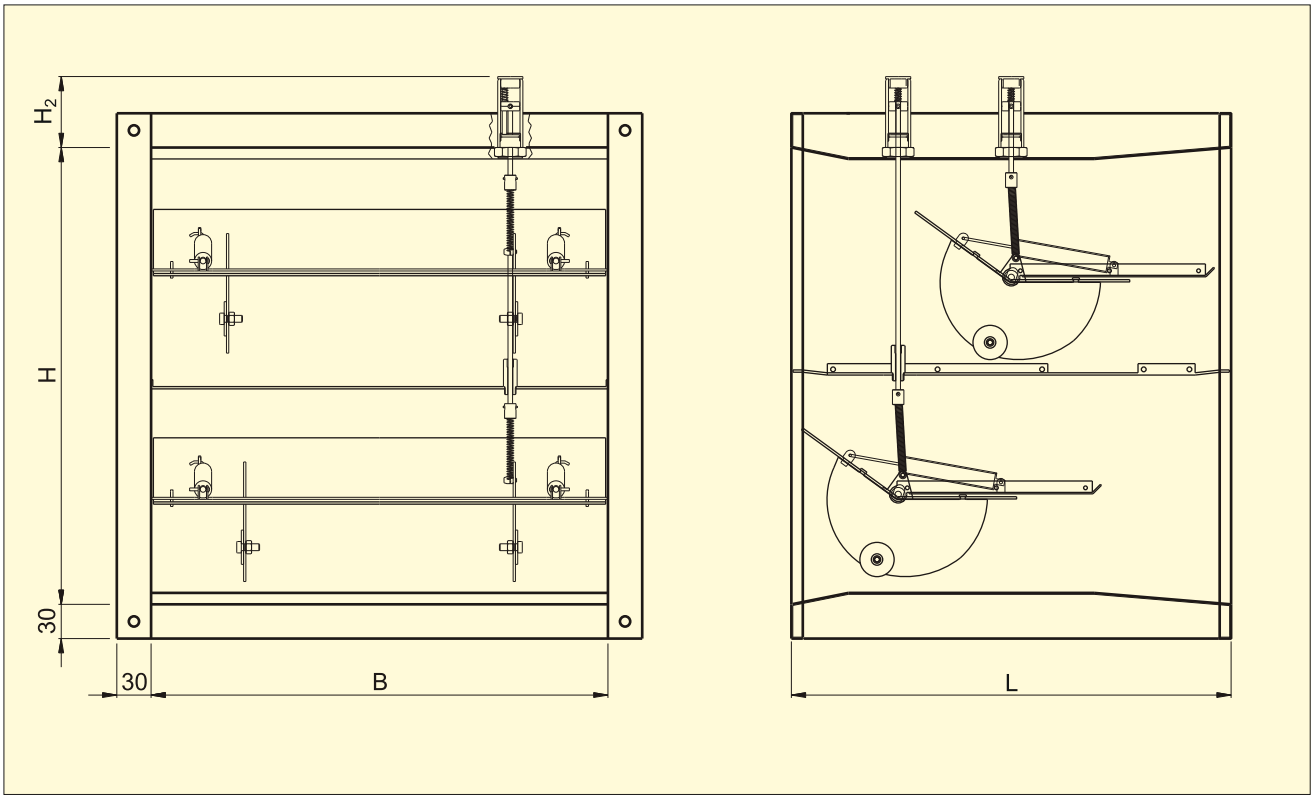
CVQ Twin Mechanical Constant Volume Damper

CVQ Twin Mechanical Constant Volume Damper dimensions



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CVQ TWIN CONTROLLER NOISE LEVELS

Table 1: Flow noise

Width [mm]	Height [mm]	Velocity [m/s]	Volume flow [m³/h]	Static pressure difference at the controller [Pa]																					
				100 Pa									250 Pa								500 Pa								
				Octave power level* L_W [dB/octave]								Summation L_{wtotal} A-eval. in dB(A)	Octave power level* L_W [dB/octave]							Summation L_{wtotal} A-eval. in dB(A)	Octave power level* L_W [dB/octave]							Summation L_{wtotal} A-eval. in dB(A)
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
400	400	3	1728	56	55	53	51	49	46	43	40	54	64	63	61	59	57	54	51	48	62	70	69	67	65	63	60	57	54	68
		6	3456	62	60	59	57	55	53	50	47	61	70	68	67	65	63	61	58	55	69	76	74	73	71	69	67	64	61	75
		9	5184	-	-	-	-	-	-	-	-	-	73	72	70	69	67	65	62	59	72	79	78	76	75	73	71	68	65	78
500	400	3	2160	57	56	54	52	49	46	43	40	55	65	64	62	60	57	54	51	48	63	71	70	68	66	63	60	57	54	69
		6	4320	62	61	60	58	56	53	51	48	61	70	69	68	66	64	61	59	56	69	76	75	74	72	70	67	65	62	75
		9	6480	-	-	-	-	-	-	-	-	-	73	72	71	69	67	65	63	60	73	79	78	77	75	73	71	69	66	79
600	400	3	2592	58	56	54	52	50	47	44	41	55	66	64	62	60	58	55	52	48	63	72	70	68	66	64	61	58	54	69
		6	5184	63	62	60	58	56	54	51	48	62	71	70	68	66	64	62	59	56	69	77	76	74	72	70	68	65	62	76
		9	7776	-	-	-	-	-	-	-	-	-	74	73	71	70	68	65	63	60	73	80	79	77	76	74	71	69	66	79
500	500	3	2700	58	56	54	52	50	47	44	41	55	66	64	62	60	58	55	52	49	63	72	70	68	66	64	61	58	55	69
		6	5400	63	62	60	59	56	54	51	48	62	71	70	68	66	64	62	59	56	70	77	76	74	73	70	68	65	62	76
		9	8100	-	-	-	-	-	-	-	-	-	74	73	72	70	68	66	63	60	73	80	79	78	76	74	72	69	66	79
600	500	3	3240	58	56	55	53	50	47	44	41	56	66	65	63	61	58	55	52	49	64	72	71	69	67	64	61	58	55	70
		6	6480	64	62	61	59	57	54	51	48	62	72	70	69	67	64	62	59	56	70	78	77	75	73	71	68	65	62	76
		9	9720	-	-	-	-	-	-	-	-	-	75	74	72	71	68	66	63	61	74	81	80	78	77	74	72	70	67	80
600	600	3	3888	59	57	55	53	51	48	45	41	56	67	65	63	61	59	56	53	49	64	73	71	69	67	65	62	59	55	70
		6	7776	65	63	62	60	57	55	52	49	63	72	71	69	68	65	62	60	57	71	78	77	76	74	71	69	66	63	77
		9	11664	-	-	-	-	-	-	-	-	-	75	74	73	71	69	67	64	61	74	82	80	79	77	75	73	70	67	80

* Sound level in dB/octave in relation to 10^{-12} W

Table 2: Correction values for calculation of the radiant noise of a duct with a length of 5m with a built in CVQ

Width [mm]	Height [mm]	Duct without insulation								Duct with 30 mm insulating shell							
		Correction value [dB/octave]								Correction value [dB/octave]							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
400	400	0	3	4	5	6	8	9	11	0	5	8	13	16	19	19	20
500	400	0	4	4	6	7	9	10	10	0	6	8	14	17	20	20	19
600	400	0	4	4	6	7	9	10	10	0	6	8	14	17	20	20	19
500	500	0	4	4	6	7	9	10	10	0	6	8	14	17	20	20	19
600	500	0	4	4	6	7	9	10	10	0	6	8	14	17	20	20	19
600	600	0	4	4	6	7	9	10	10	0	6	8	14	17	20	20	19

Because of aerodynamic conditions and because of stability reasons, the width should be maximum twice the height; the width must not be smaller than the height [H ≤ B ≤ 2H].

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