



Swirl Diffuser

Type DCS



Type DCS

Description

DCS-R Construction



DCS-Q Construction



The diffuser face of the type DCS consists of fixed, radially arranged air control blades. The supply air design has specially arranged internal air guidance elements which are not required on the extract version.

Due to the rotary swirling motion of the air discharge, induction of room air occurs very quickly, resulting in rapid decay of supply air velocity and temperature differential. Air change rates of 30 per hour can be achieved with supply air temperature differentials of +10K to -10K.

To stabilise horizontal discharge, all sizes must be mounted flush with a ceiling.

The minimum mounting height between floor and diffuser face is 2.60 m.





Construction

Type DCS swirl diffusers are available in 5 sizes.

Depending on the architectural requirements, the face plate can be circular or square. The fixed air control blades on the diffuser face are arranged radially.

The diffuser face can be attached or removed via a center fix screw into the plenum box. The screw head is covered with a decorative cap. The plenum box can be supplied with either top or side entry spigots and on request, with spigot lip seals and volume control damper.

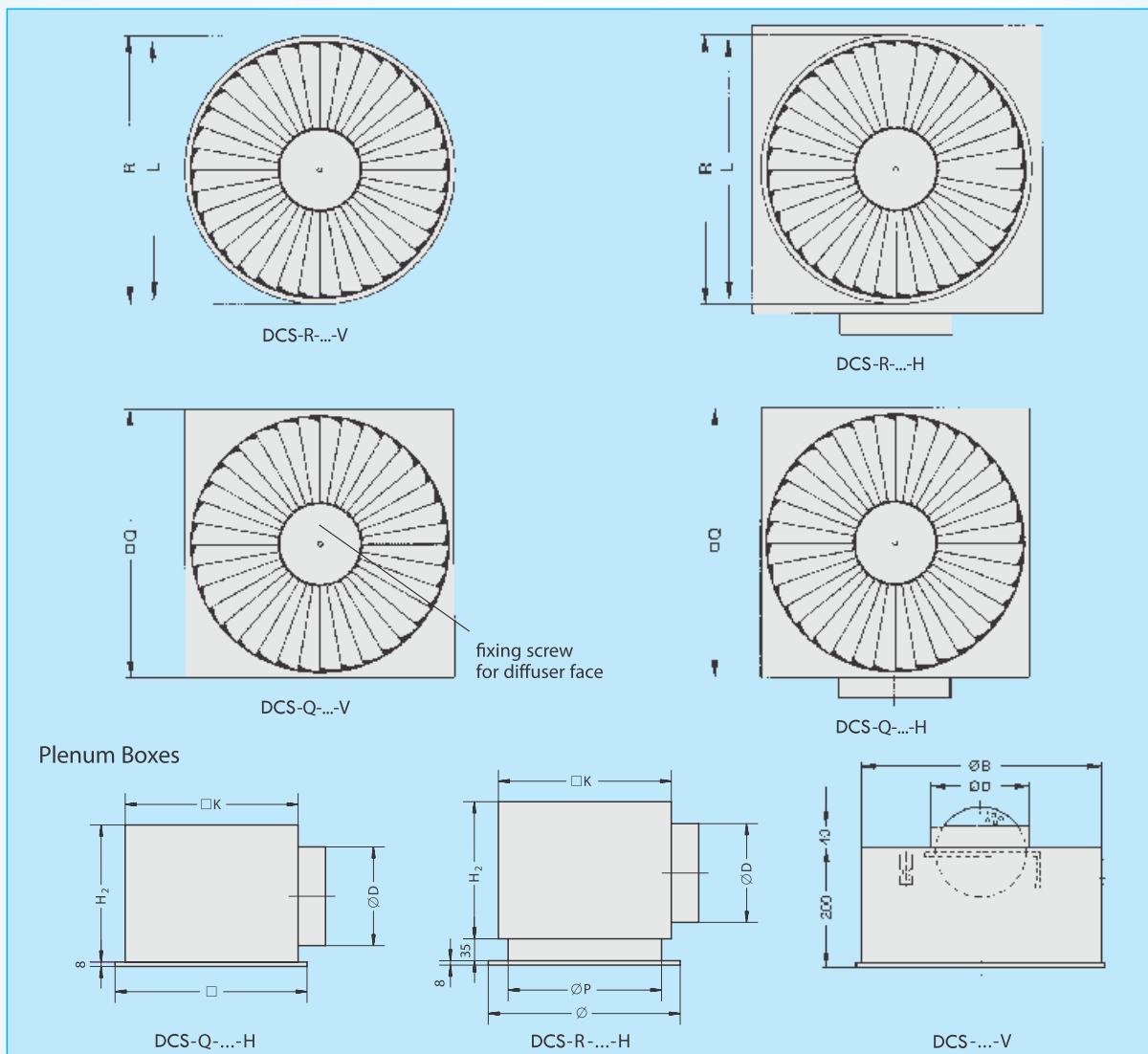
If a circular diffuser face is ordered, the plenum box with side entry spigot has a 35 mm extension piece fitted to the plenum.

For simple adjustment of the volume flow, on request the plenum box can be provided with a test connection for measurement of a reference pressure and a volume control damper operated by sheathed cables. The characteristic curve of pressure reading versus volume flow rate for each size of plenum box is supplied.

Note: If a larger size side entry plenum is fitted to a diffuser face, this should be considered in relation to performance (lower noise levels and pressure drop).

Dimensions

Size	B	D	L	Q	R	H ₂	□K	∅P	AK code, diffuser face ¹⁾	
									Square	Circular
300	280	158	250	298	300	250	290	278	AK001	AK013
400	364	198	350	398	400	295	372	362	AK002	AK014
500	462	198	450	498	500	295	476	460	AK003	AK015
600	559	248	538	598	600	345	567	557	AK004	AK016
625	559	248	538	623	623	345	567	557	AK004	AK016





Materials

The diffuser face is made of galvanised sheet steel. The surface is pre-treated and powder coated white (RAL 9010). The plenum boxes are galvanised sheet steel, the lip seal of rubber.

Installation

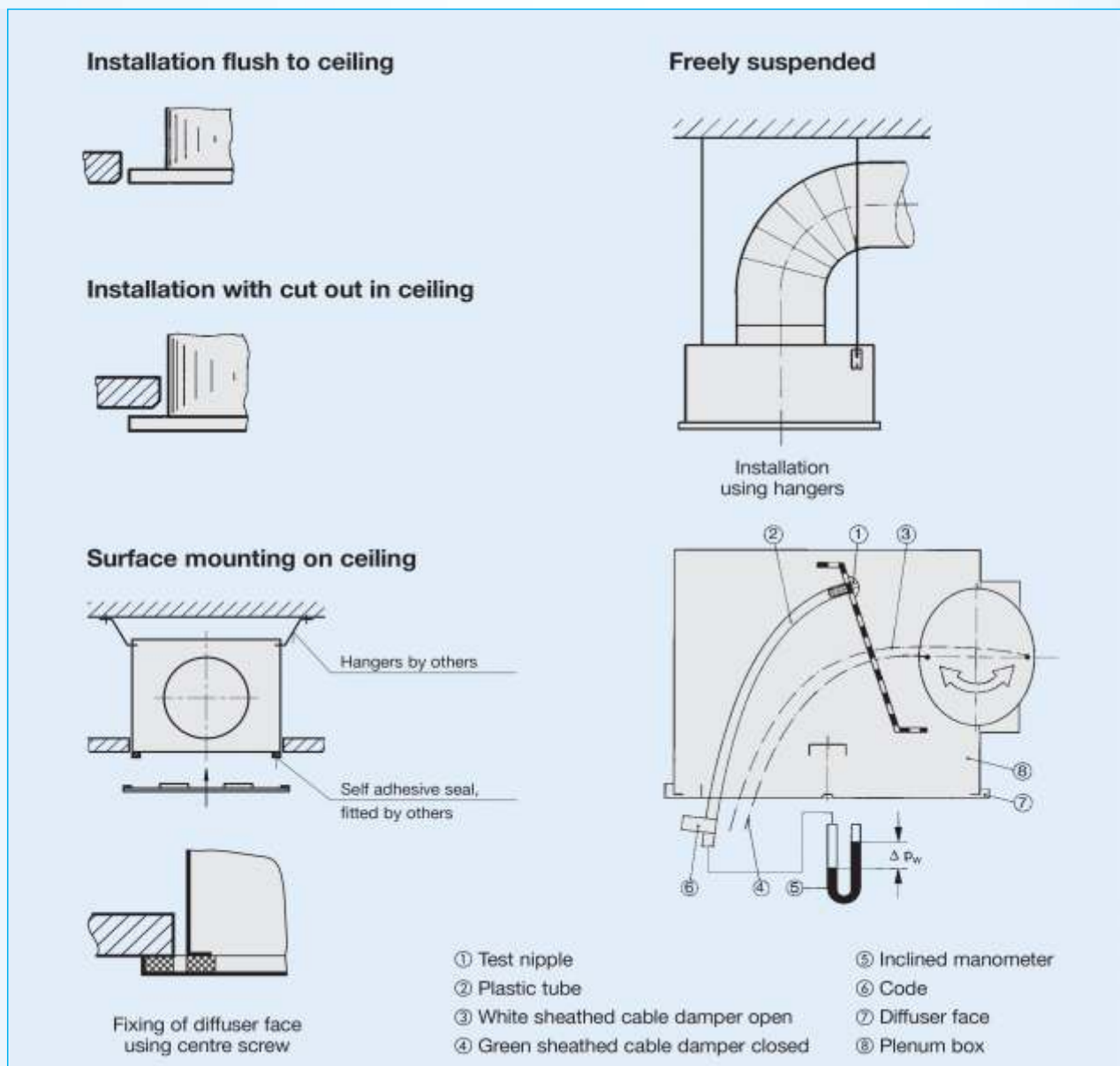
All sizes are suitable for flush mounting into a ceiling. If the diffuser is installed below a closed ceiling (i. e. freely suspended) a stable discharge can be achieved if a peripheral collar 50 mm is provided – available on request.

Assembly

The plenum box is suspended by wires or slotted strips using the drilled holes in the plenum return edge or hanging brackets, when provided. For the side entry plenum box, a self adhesive seal, supplied loose, must be fitted by the client. The diffuser face is fitted to the plenum box by means of centre fix screw locating in cross channel in the plenum box.

Measurement of Reference Pressures

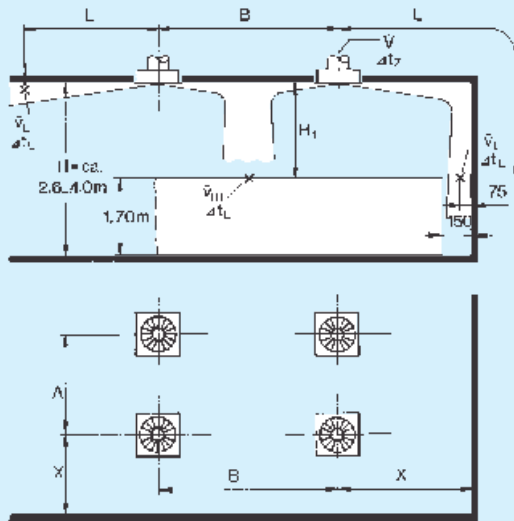
For simple adjustment of the volume flow, on request the plenum box can be provided with a test connection for measurement of a reference pressure and a volume control damper operated by sheathed cables. The characteristic curve of pressure reading versus volume flow rate for each size of plenum box is supplied.





Nomenclature

Nomenclature



- \dot{V} in l/s: Volume flow per diffuser
- \dot{V} in m³/h: Volume flow per diffuser
- A, B in m: Spacing between two diffusers
- X in m: Distance between diffuser centre and wall
- H₁ in m: Distance between ceiling and occupied zone
- \bar{v}^{H_1} in m/s: Time average air velocity between two diffusers at distance from ceiling H₁
- $\bar{v}^{H_1} L$ in m: (Horizontal + vertical) distance (X + H₁) discharge to the wall
- \bar{v}^L in m/s: Time average air velocity at the wall
- Δt_z in K: Temperature difference between supply air and room air
- Δt_L in K: Difference between core and room air temperature at distance $L = A/2 + H_1$
or $L = B/2 + H_1$
or $L = X + H_1$
- A_{eff} in m²: Effective outlet area
- Δp_t in Pa: Total pressure drop (supply air)
- L_{WA} in dB(A): A-weighted sound power level
- L_{WNC}: NC rating of sound power level
- L_{WNR}: L_{WNR} = L_{WNC} + 2
- L_{pA}, L_{pNC}: A-weighting and NC rating respectively of room sound pressure level
 $L_{pA} \approx L_{WA} - 8 \text{ dB}$
 $L_{pNC} \approx L_{WNC} - 8 \text{ dB}$
- α in °: Damper angle

Quick Selection (Supply air)

Size	\dot{V}_{max}		\dot{V}_{min}		L _{WA max} dB(A)	L _{WNC max} NC	L _{WA min} dB(A)	L _{WNC min} NC	A _{eff} m ²
	l/s	m ³ /h	l/s	m ³ /h					
300	055	200	40	145	40	34	< 31	< 25	0.00884
400	110	400	50	180	40	34	25	< 20	0.0180
500	145	520	60	215	40	34	< 20	< 20	0.0251
600 625	165	600	80	290	40	34	< 20	< 20	0.0295

Octave band spectrum on request!



Acoustic Data DCS -...-V

Supply Air

Correction to diagram 1: Volume control damper setting

	Damper angle α	°90	°45	°0
	\square pt	x 1.0	x 1.2	x 2.5
	L_{WA}	-	-	+ 2
	L_{WNC}	-	-	+ 2

Correction to diagram 3: Volume control damper setting

	Damper angle α	°90	°45	°0
	\square pt	x 1.0	x 1.5	x 4.0
	L_{WA}	-	+ 7 + 3	
	L_{WNC}	-	+ 7 + 3	

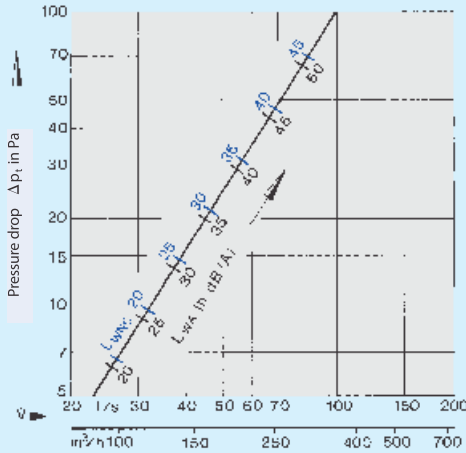
Correction to diagram 2: Volume control damper setting

	Damper angle α	°90	°45	°0
	\square pt	x 1.0	x 1.1	x 2.1
	L_{WA}	-	+ 2 + 1	
	L_{WNC}	-	+ 2 + 1	

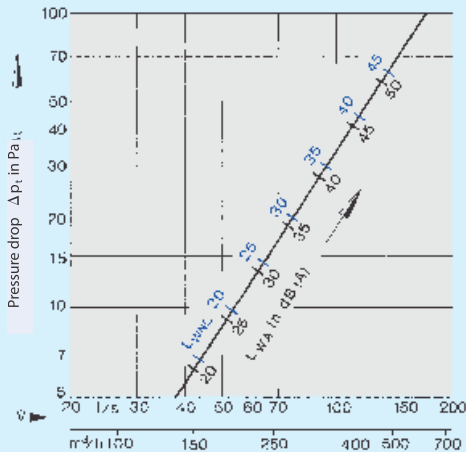
Correction to diagram 4: Volume control damper setting

	Damper angle α	°90	°45	°0
	\square pt	x 1.0	x 1.1	x 2.2
	L_{WA}	-	+ 4 + 1	
	L_{WNC}	-	+ 4 + 1	

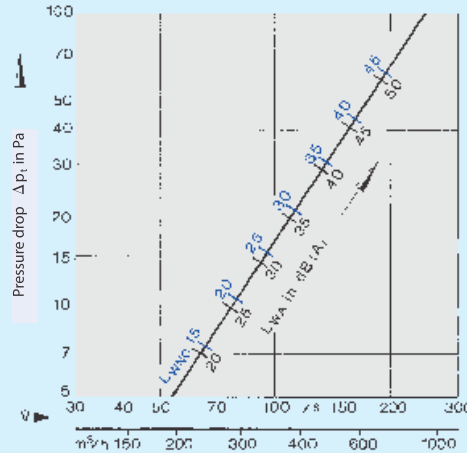
1 Sound power level and pressure drop
Size 300



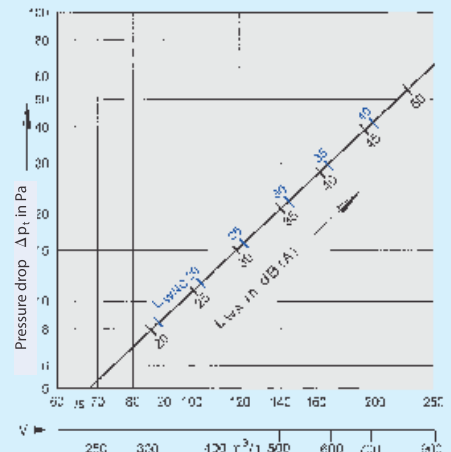
Sound power level and pressure drop
Size 400



3 Sound power level and pressure drop
Size 500



4 Sound power level and pressure drop
Size 600 and 625





Acoustic Data DCS -...-H

Supply Air

Correction to diagram 5 Volume control damper setting

	Damper angle α	$^{\circ}90$	$^{\circ}45$	$^{\circ}0$
	$\square p_t$	x 1.0	x 1.1	x 2.3
	L_{WA}	-	+ 2 + 0	
	L_{WNC}	-	+ 2 + 0	

Correction to diagram 7: Volume control damper setting

	Damper angle α	$^{\circ}90$	$^{\circ}45$	$^{\circ}0$
	$\square p_t$	x 1.0	x 1.4	x 4.3
	L_{WA}	-	+ 8 + 1	
	L_{WNC}	-	+ 8 + 1	

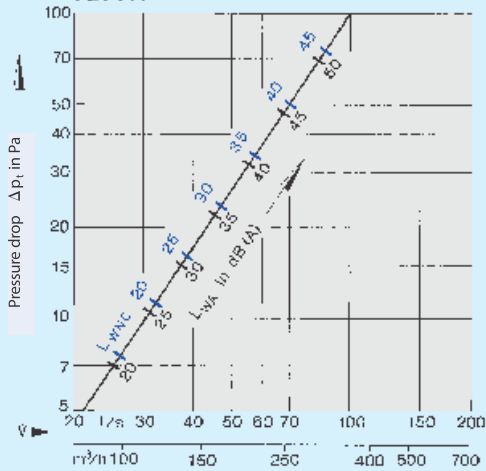
Correction to diagram 6: Volume control damper setting

	Damper angle α	$^{\circ}90$	$^{\circ}45$	$^{\circ}0$
	$\square p_t$	x 1.0	x 1.3	x 2.7
	L_{WA}	-	+ 3 + 1	
	L_{WNC}	-	+ 3 + 1	

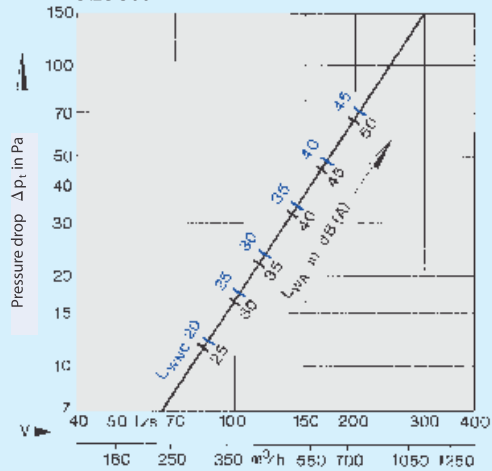
Correction to diagram 8: Volume control damper setting

	Damper angle α	$^{\circ}90$	$^{\circ}45$	$^{\circ}0$
	$\square p_t$	x 1.0	x 1.4	x 3.5
	L_{WA}	-	+ 4 + 1	
	L_{WNC}	-	+ 4 + 1	

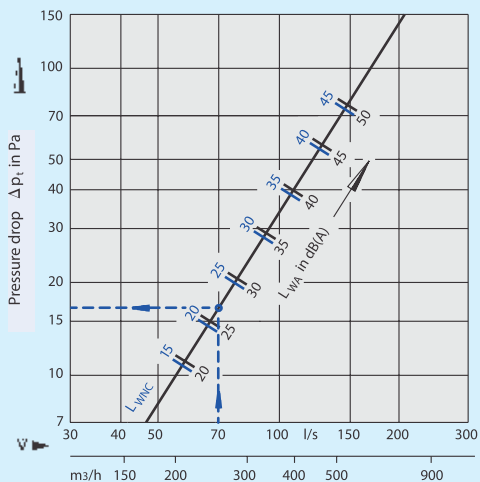
Sound power level and pressure drop
Size 300



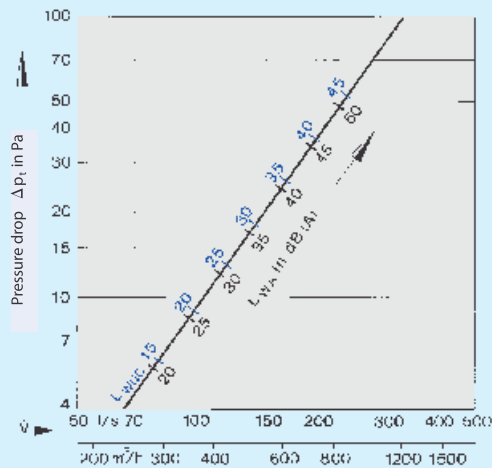
7 Sound power level and pressure drop
Size 500



Sound power level and pressure drop
Size 400



8 Sound power level and pressure drop
Size 600 and 625





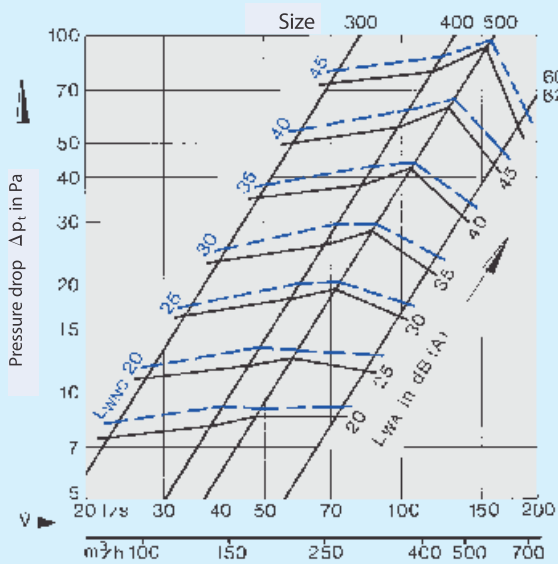
Acoustic Data

Extract Air

Correction to diagram 9 and 10: Volume control damper setting

Size	Damper angle	°90	°45	°0
300	Δp_t	x 1.0	x 1.1	x 2.0
	L_{WA}	-	-	+ 3.0
	L_{WNC}	-	-	+ 3.0
400	Δp_t	x 1.0	x 1.0	x 1.9
	L_{WA}	-	-	+ 4.0
	L_{WNC}	-	-	+ 4.0
500	Δp_t	x 1.0	x 1.1	x 2.5
	L_{WA}	-	-	+ 7.0
	L_{WNC}	-	-	+ 7.0
625/600	Δp_t	x 1.0	x 1.1	x 2.2
	L_{WA}	-	+ 4.0 + 1.0	
	L_{WNC}	-	+ 4.0 + 1.0	

9 Sound power level and pressure drop FD -...-V



10 Sound power level and pressure drop FD -...-H

