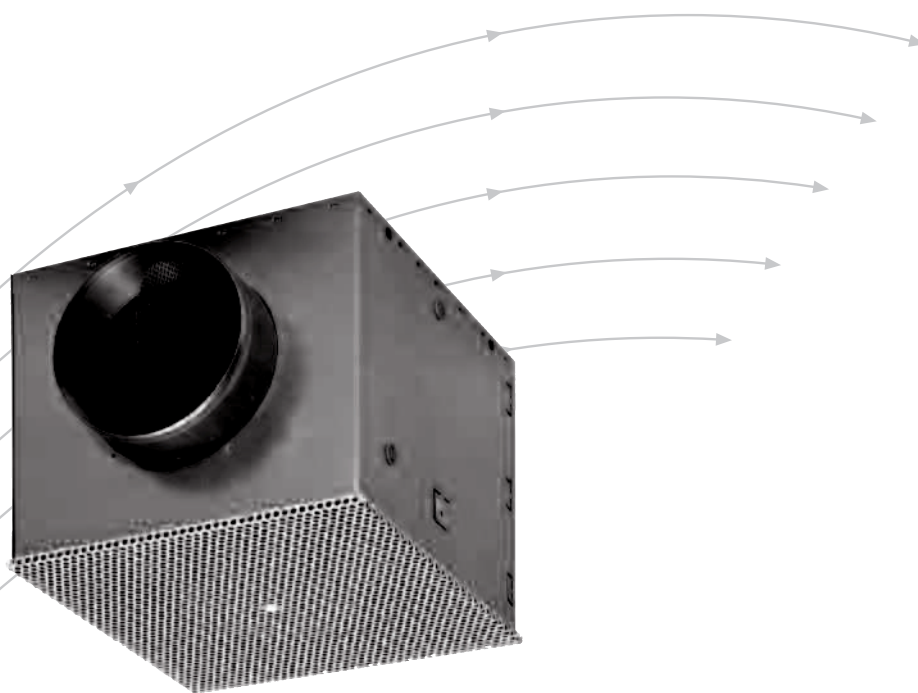


Ceiling diffusers

Type DLQL

For clear room heights to approximately 4.0 m



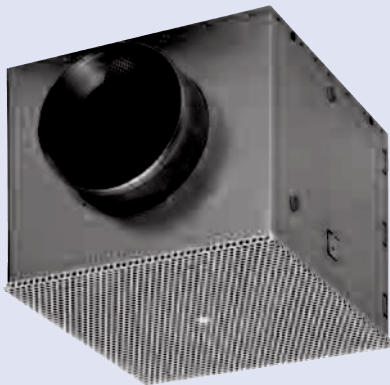
TROX[®] TECHNİK

The art of handling air

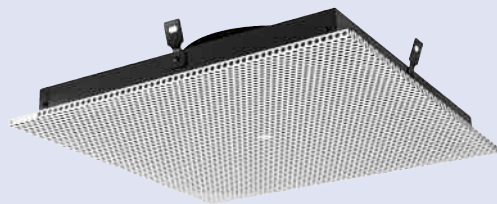
Contents · Description

Description	2	Acoustic data	
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DLQL...-H for side entry



DLQL...-V for top entry



Ceiling diffusers Type DLQL provide a comfortable air conditioning of rooms. The horizontal discharge takes place with high induction, which results in a rapid decay of supply air velocity and temperature differential over a short distance from the diffuser. Diffusers with one to four way discharge allow the best discharge configuration to be selected to match the room geometry and provide acceptable velocities in the occupied zone.

The ceiling diffusers are suitable for all types of suspended ceiling systems. The frameless construction ideally blends with the design of the ceiling.

For comfort conditioning of the occupied zone the diffusers can be used for room heights up to 4 m.

Special characteristics

- Face plate made of powder-coated perforated sheet metal
- Face plate in various dimensions can be integrated into conventional ceiling systems
- Additional blanking plates to provide various air discharge directions

The ceiling diffusers consist of a sheet metal casing and a face plate made of perforated sheet metal. The construction with the side entry spigot is achieved using an additional universal plenum box. Supply air diffusers have a baffle plate on the rear of the perforated face plate.

Construction · Dimensions

Characteristics

- For supply or extract air
- Side or top entry spigot
- Recommended supply air temperature difference up to ± 10 K

Construction features

- Face plate made of perforated sheet metal for fitting into T-bar ceilings (T) or central fixing screw fastening for installation into grid or plasterboard ceilings (P)
- Supply air construction with baffle plate
- Spigot connection suitable for circular ducts according to EN 1506 or EN 13180
- Option with groove for lip seal
- Additional blanking plates to provide various air discharge directions

Materials

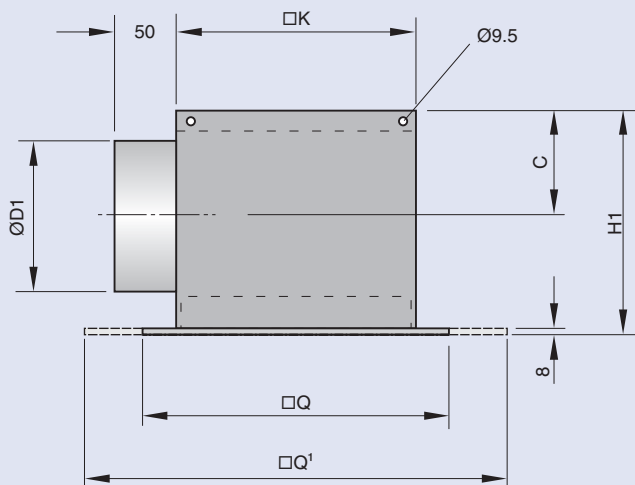
- Face plate made of galvanised perforated sheet steel, casing made of galvanised sheet steel
- Baffle plate made of acoustic non woven composite material
- Casing painted black (RAL 9005)
- Face plate powder-coated white (RAL9010)

Plenum box

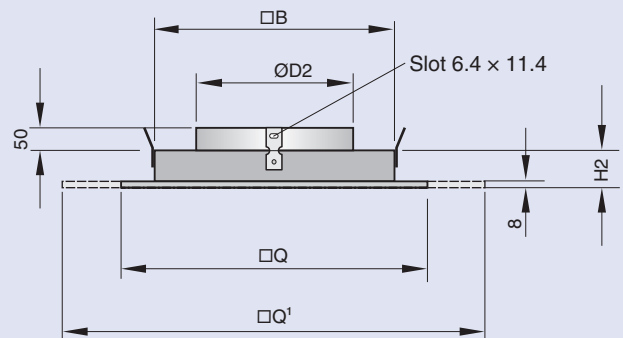
The DLQL...-H construction has an additional universal plenum box with side entry spigot.

- Plenum box suitable for DLQL
- Plenum box and flow rate control damper made of galvanised sheet steel
- Control damper for flow rate balancing (optional)
- See leaflet 2/16.4/EN/... for dimensions and technical data

DLQL...-H



DLQL...-V



Nominal size	Dimensions in mm								Weight in kg		Plenum box	
	□Q		□K	□B	C	ØD1	ØD2	H1	H2	DLQL...-H	DLQL...-V	AK
250	248	593	216	198	111	158	123	258	28	2.8	0.9	008
300	298	593	290	272	111	158	158	258	34	4.0	1.2	001
400	398	593	372	354	131	198	198	303	44	6.5	2.0	002
500	498	593	476	458	156	248	248	353	55	9.6	3.1	010
600	598	593	590	572	189	313	313	418	64	13.8	4.4	012

¹ For P and T constructions the face plate size can be up to a max. of 623 mm

² Other dimensions for □Q insert into item8 of order code

Installation

The customer must install the ceiling diffusers, make all connections, and provide the hanging system, connection and sealing materials.

Only trained expert personnel should install and make the appropriate connections.

All legal regulations for site work must be complied with.

The plenum box (side entry) has four suspension holes and the casing (top entry) has four hanging brackets for suspending the diffuser from the ceiling slab.

Use only certified hanging systems.

Installation into grid and plasterboard ceilings

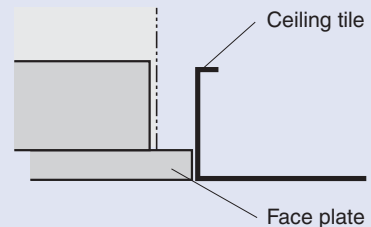
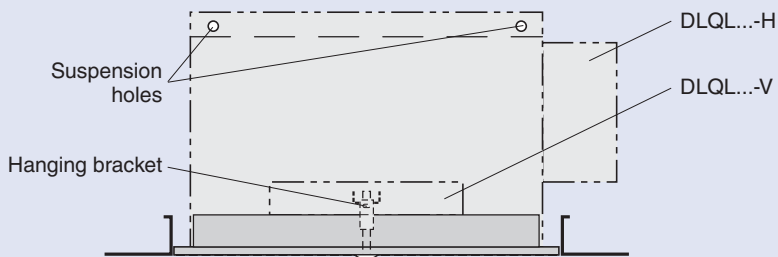
The face plate of the ceiling diffuser (DLQL-P) is attached to the casing with a central fixing screw. In the case of large dimensions (above $\square Q = 500$ mm), the face plate is equipped with chamfered corners.

Installation into T-bar ceilings

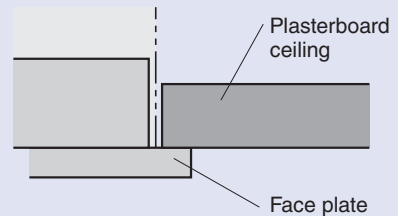
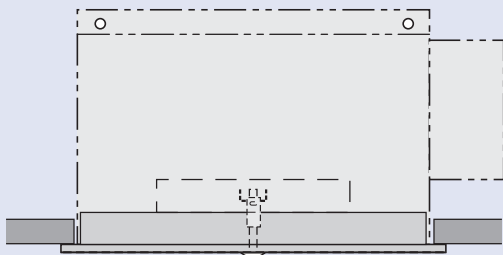
The face plate of the ceiling diffuser (DLQL-T) rests on the T-bar or on a similar profile. The casing rests on the back of the face plate but it must be supported separately from the ceiling slab.

Installation into suspended ceiling systems

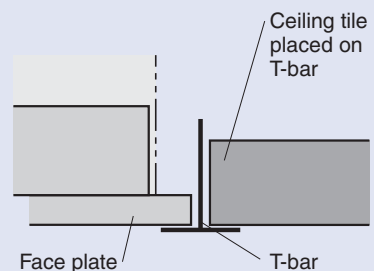
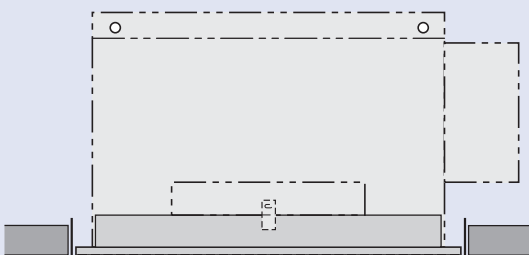
Grid ceiling DLQL...-P



Plasterboard ceiling DLQL...-P



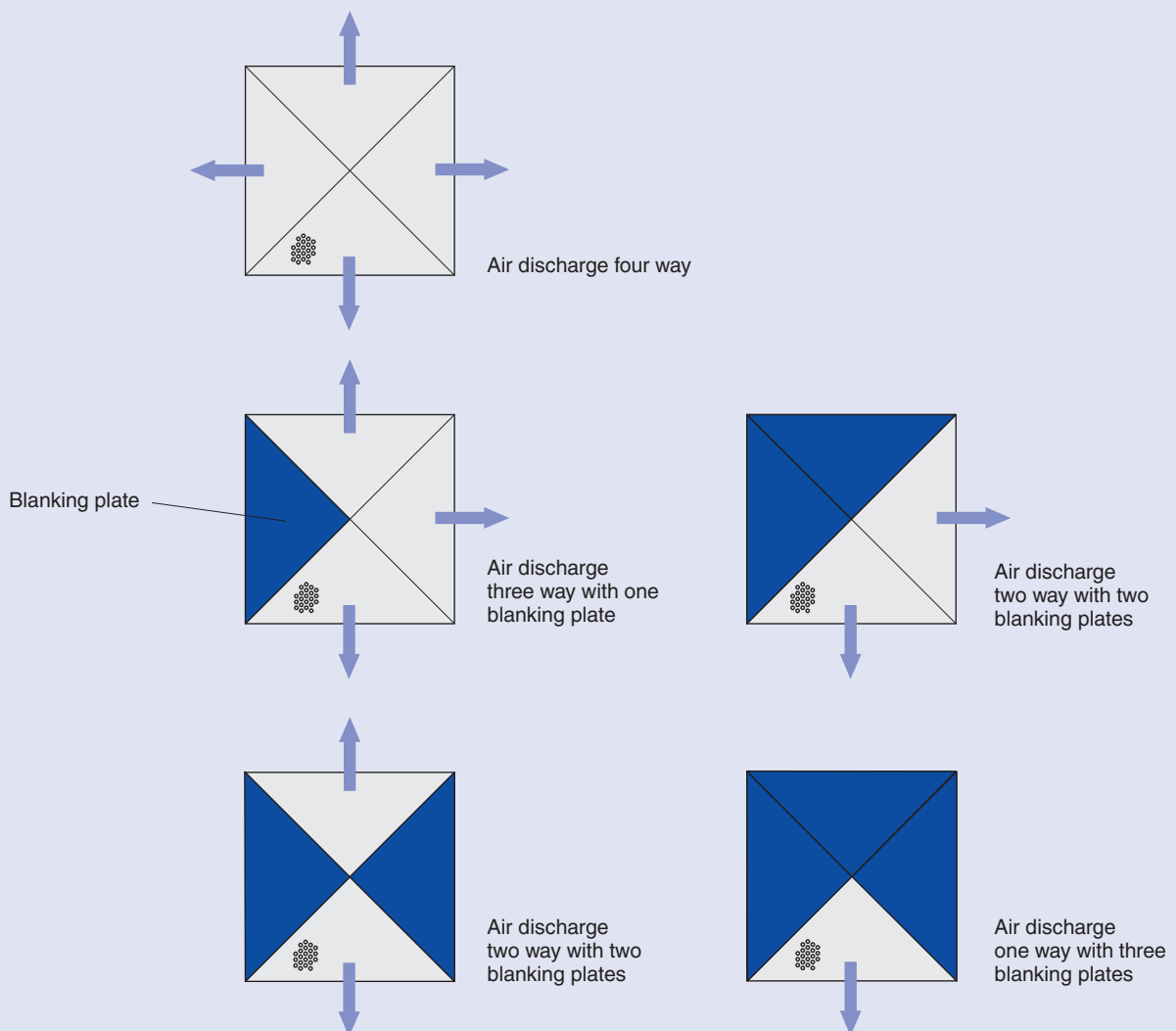
T-bar ceiling DLQL...-T



Directions of discharge

- Without blanking plates, the air is discharged horizontally and evenly on all sides (four-way). Alternative air discharge directions can be achieved with blanking plate accessories.
 - A maximum of three blanking plates are placed in the ceiling diffuser. They can be arranged in any manner.
- Extract air ceiling diffusers have no blanking plates.

Directions of discharge



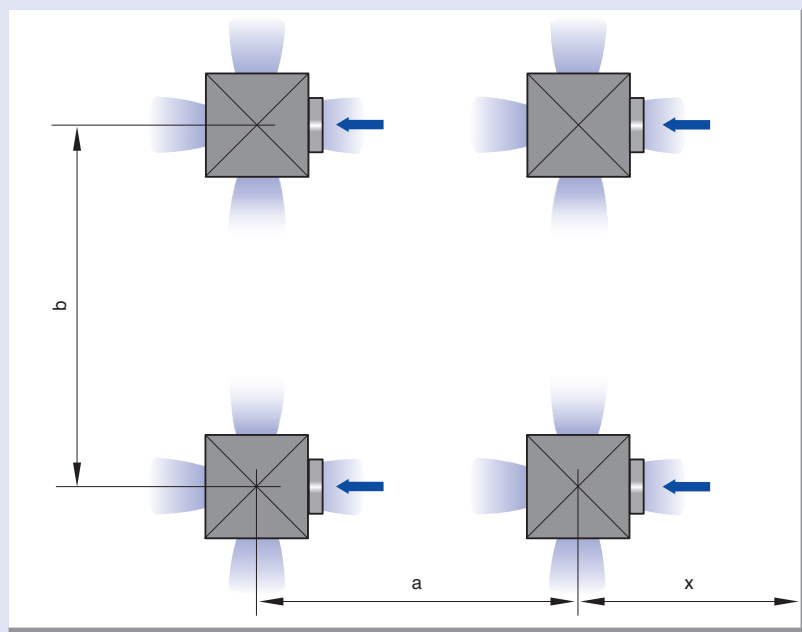
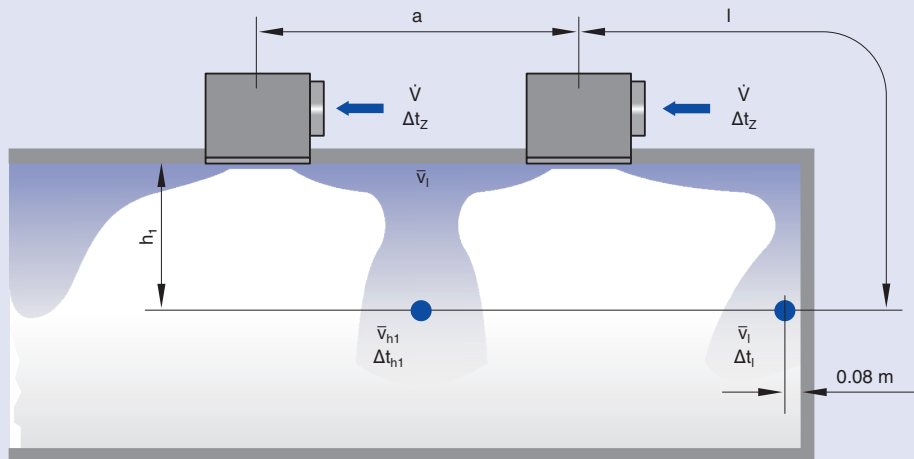
Nomenclature

Nomenclature

A_{eff}	in m^2	: Effective outlet area
\dot{V}	in l/s and m^3/h	: Flow rate per diffuser
\dot{V}_4	in l/s and m^3/h	: Flow rate for four way discharge diffuser
For three, two and one way discharge enter diagram 11 using the following:		
		three way: $\dot{V}_4 = 1,33 \times \dot{V}$
		two way: $\dot{V}_4 = 2,0 \times \dot{V}$
		one way: $\dot{V}_4 = 4,0 \times \dot{V}$
a, b	in m	: Spacing between two diffusers
h_1	in m	: Distance between the ceiling and the occupied zone
l	in m	: Distance from the diffuser $l = x + h_1$, $l = a/2$ or $l = a/2 + h_1$
\bar{v}_l	in m/s	: Maximum time average air velocity at the wall at distance $l = x + h_1$ or at the ceiling at distance $a/2$
\bar{v}_{h1}	in m/s	: Maximum time average air velocity between two diffusers at distance $l = a/2 + h_1$

Δt_z	in K	: Temperature difference between supply and room air
Δt_{h1}	in K	: Temperature difference between room air and core at distance $l = a/2 + h_1$
Δt_l	in K	: Temperature difference between room air and core at distance $l = x + h_1$
Δp_t	in Pa	: Total differential pressure
L_{WA}	in dB(A)	: A-weighted sound power level
L_{WNC}		: NC rating of sound power level ($L_{\text{WNC}} = L_{\text{WA}} - 4 \text{ dB}$)

Note the noise levels quoted are the dBA rating of sound power level L_{WA} . To obtain typical room levels $L_{\text{PA}} \approx L_{\text{WA}} - 5 \text{ dB}$.



Supply air, top entry

Nominal size	Discharge one way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	6	23	15	55	35	21	77	69	
300	9	33	21	76	26	29	105	50	
400	16	58	33	120	25	45	162	45	
500	25	91	47	168	20	63	228	37	
600	36	131	67	239	19	89	320	33	

Nominal size	Discharge two way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	13	45	25	90	28	35	124	55	
300	18	65	34	121	23	45	162	41	
400	32	116	55	196	21	71	256	36	
500	50	181	74	266	17	97	349	29	
600	73	261	111	401	17	144	518	29	

Nominal size	Discharge three way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	19	68	34	123	26	47	168	48	
300	27	98	44	159	23	58	209	39	
400	48	174	74	265	19	96	345	32	
500	76	272	99	357	16	128	460	26	
600	109	392	159	572	17	202	726	27	

Nominal size	Discharge four way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	25	90	41	149	24	56	200	43	
300	36	131	56	202	22	73	261	37	
400	65	232	91	328	18	116	427	31	
500	101	363	120	430	16	151	545	25	
600	145	522	198	713	16	252	908	25	

Extract air, top connection

Nominal size	Intake four way					
	\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)		
	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t
250	72	260	24	99	355	45
300	116	416	28	164	591	56
400	209	753	27	288	1036	50
500	245	882	21	324	1167	37
600	431	1550	23	593	2136	43

Supply air, side entry

Nominal size	Discharge one way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	6	23	22	80	43	28	100	68	
300	9	33	24	85	30	32	117	57	
400	16	58	37	133	29	49	177	51	
500	25	91	47	167	24	61	218	40	
600	36	131	71	255	22	94	339	39	

Nominal size	Discharge two way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	13	45	30	109	32	42	150	62	
300	18	65	36	130	29	48	173	52	
400	32	116	58	210	28	76	274	47	
500	50	181	77	277	24	100	362	40	
600	73	261	117	420	23	152	546	39	

Nominal size	Discharge three way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	19	68	36	131	29	50	179	55	
300	27	98	44	158	28	58	209	49	
400	48	174	76	272	27	98	352	46	
500	76	272	101	362	23	131	471	39	
600	109	392	158	568	24	204	734	40	

Nominal size	Discharge four way								
	\dot{V}_{min}		\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)			
	l/s	m ³ /h	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t	
250	25	90	42	150	27	58	208	52	
300	36	131	51	182	29	67	239	50	
400	65	232	90	324	29	117	422	48	
500	101	363	121	435	26	157	565	44	
600	145	522	190	683	26	244	878	43	

Extract air, side connection

Nominal size	Intake four way					
	\dot{V} at 35 dB(A)			\dot{V} at 45 dB(A)		
	l/s	m ³ /h	Δp_t	l/s	m ³ /h	Δp_t
250	91	327	28	122	438	49
300	104	375	18	145	523	35
400	168	605	15	228	820	28
500	229	824	14	304	1095	25
600	385	1387	12	519	1867	22

Note the noise levels quoted are the dBA rating of sound power level L_{WA} .
To obtain typical room levels $L_{PA} \approx L_{WA} - 5$ dB.

Acoustic data

Supply air, top entry

Example 1

Given:

Office Room

width: 5.60 m

Room depth: 2.80 m

Room height: 3.00 m

Total supply air

flow rate to room: 200 l/s (720 m³/h)

Two ceiling diffusers, discharge four way, top entry

Flow rate per diffuser: 100 l/s (360 m³/h)

Required sound

power level per diffuser: 40 dB(A)

Quick Selection:

See page 7.

DLQL...-V.../400

91 l/s at 35 dB(A)

Result of selection:

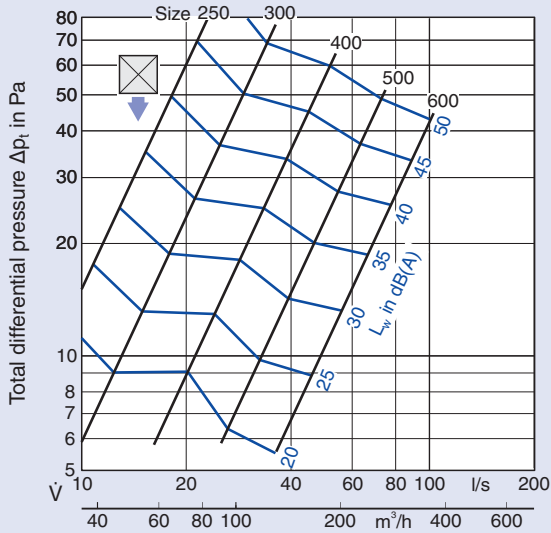
$\Delta p_t = 22 \text{ Pa}$ (from Diagram 4)

$L_{WA} = 38 \text{ dB(A)}$ (from Diagram 4)

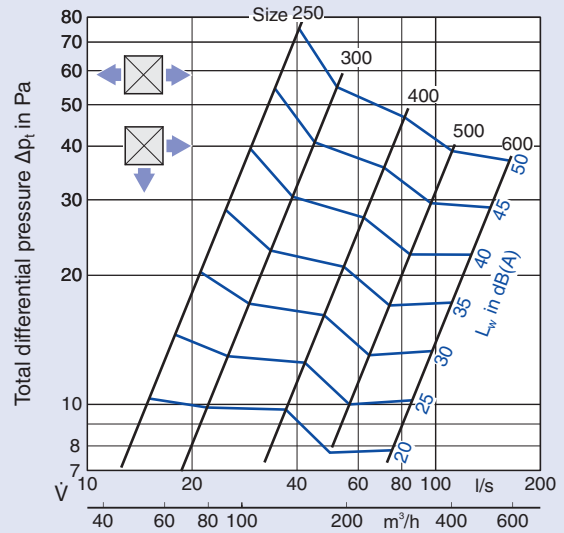
For the aerodynamic data, see the continuation on page 11

Sound power level and total differential pressure

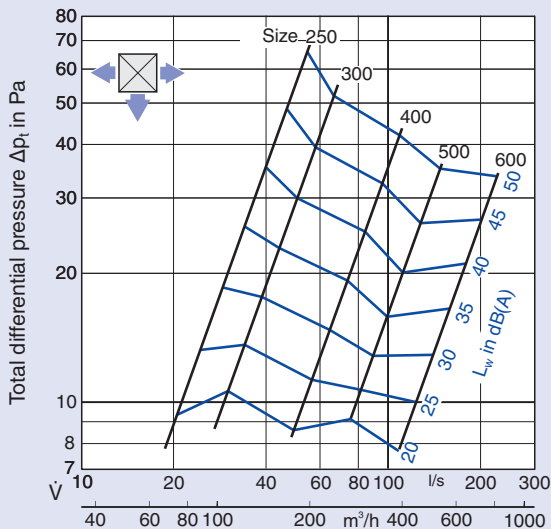
1 DLQL...-Z-V, discharge one way



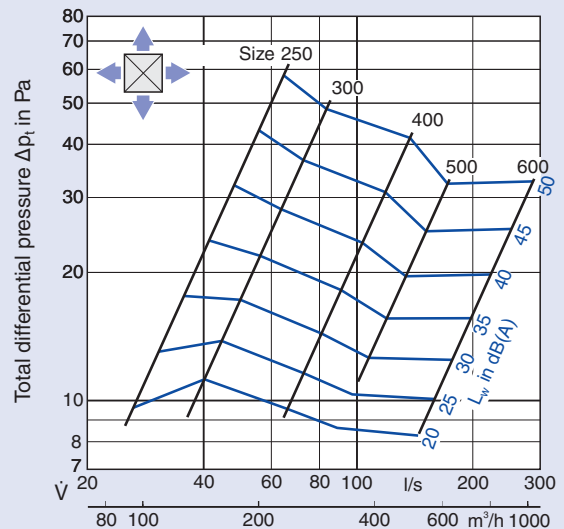
2 DLQL...-Z-V, discharge two way



3 DLQL...-Z-V, discharge three way



4 DLQL...-Z-V, discharge four way



Example 2

Given:

Office
 Width: 5.60 m, depth: 2.80 m, height: 3.00 m
 Total supply air flow rate to room: 200 l/s (720 m³/h)
 Two ceiling diffusers, discharge four way, side entry
 Take a flow rate control damper setting up to 45° into consideration.
 Flow rate per diffuser: 100 l/s (360 m³/h)
 Required sound power level per diffuser: 40 dB(A)

Quick Selection:

See page 7.

DLQL...-H.../400

90 l/s at 35 dB(A)

Result of selection:

$\Delta p_t = 36$ Pa (from Diagram 8)

Correction according to table:

$36 \times 1.1 = 40$ Pa

$L_{WA} = 39$ dB(A) (from Diagram 8)

Correction according to table

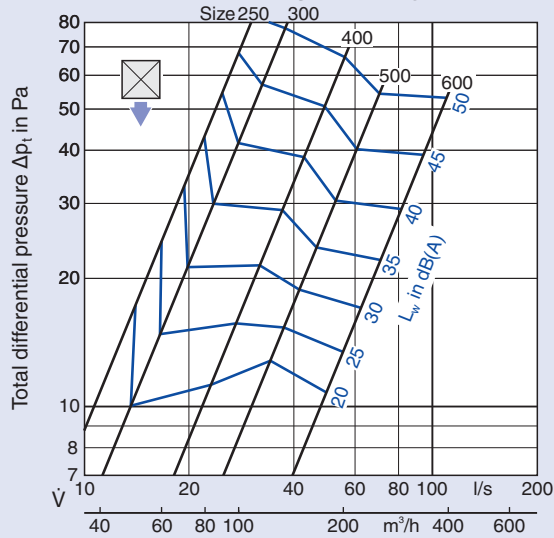
39 dB(A) + 1dB = 40 dB(A)

Influence of flow rate control damper

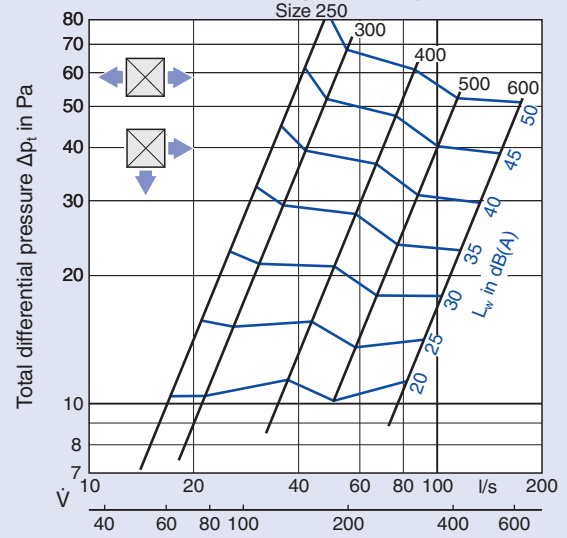
Correction values for diagrams 5 to 8				
Nominal size	Δp_t		L_{WA}	
	45°	90°	45°	90°
250	× 1.1	× 2	0	0
300	× 1.1	× 2	0	+ 1
400	× 1.1	× 2	+ 1	+ 2
500	× 1.1	× 2	+ 1	+ 1
600	× 1.1	× 2	0	0

Sound power level and total differential pressure

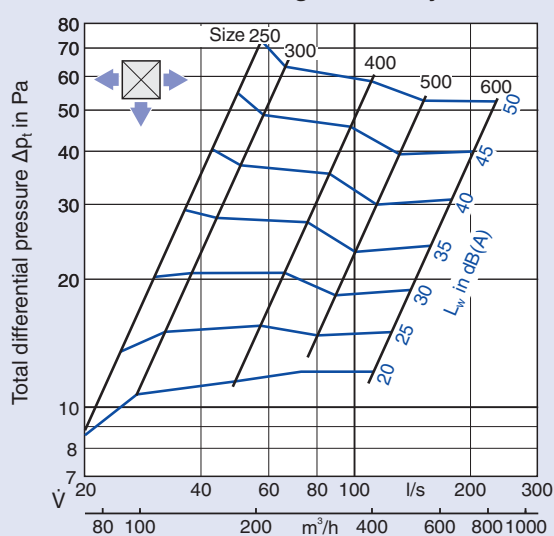
5 DLQL...-Z-H, discharge one way



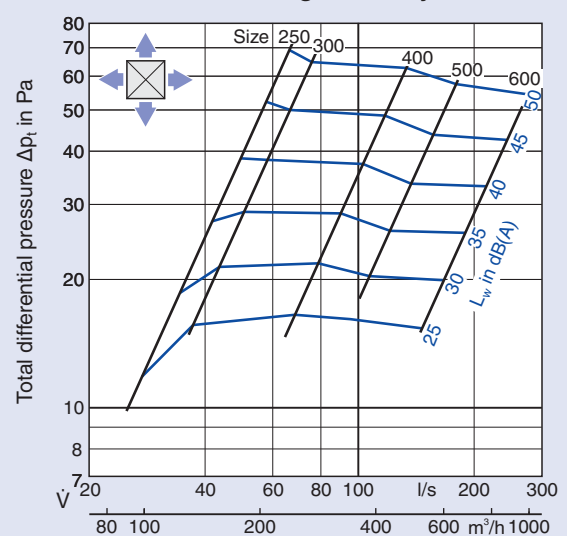
6 DLQL...-Z-H, discharge two way



7 DLQL...-Z-H, discharge three way



8 DLQL...-Z-H, discharge four way



Acoustic data

Extract air

Example 3

Given:

Office
 Extract air flow rate: 200 l/s (720 m³/h)
 Required sound power level: 40 dB(A)
 One ceiling diffuser, top connection

Quick Selection:

DLQL...-V.../400
 209 l/s at 35 dB(A)

Result of selection:

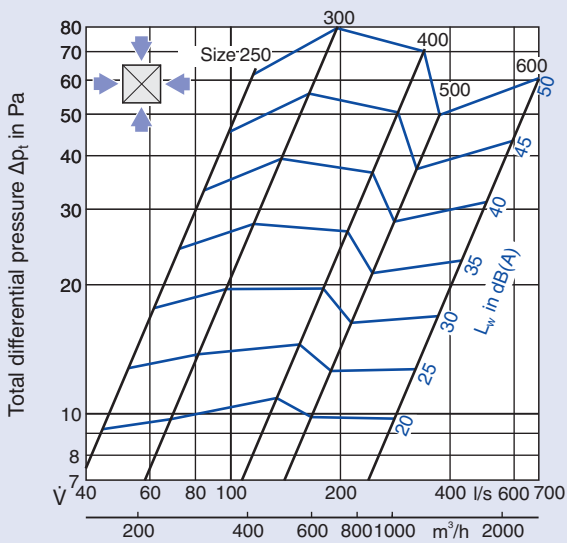
$\Delta p_t = 26$ Pa (from Diagram 9)
 $L_{WA} = 34$ dB(A) (from Diagram 9)

Influence of flow rate control damper

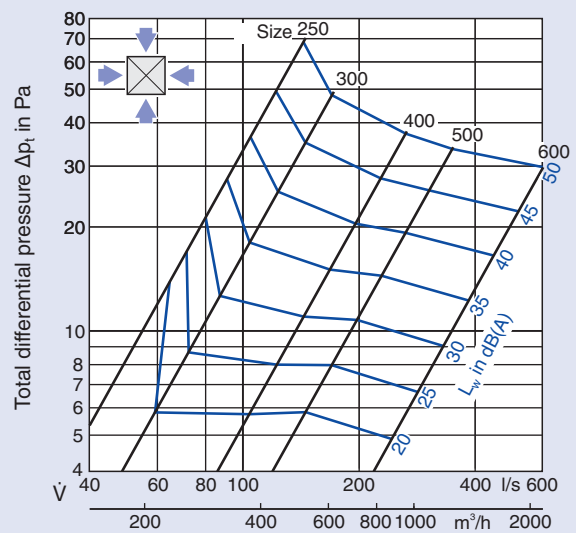
Correction values for diagram 10				
Nominal size	Δp_t		L_{WA}	
	45°	90°	45°	90°
250	× 1.4	× 4.0	+ 11	+ 15
300	× 2.3	× 7.5	+ 8	+ 12
400	× 2.1	× 8.6	+ 9	+ 14
500	× 2.2	× 7.8	+ 8	+ 12
600	× 2.6	× 10.7	+ 4	+ 11

Sound power level and total differential pressure

9 DLQL...-A - V



10 DLQL...-A - H



Continuation of Examples 1 and 2

Given:

Spacing between two diffusers: $a = 2.8 \text{ m}$
 Distance between the ceiling and the occupied zone: $h_1 = 1.2 \text{ m}$
 Distance to wall: $x = 1.40 \text{ m}$

Between two diffusers:

$a/2 = 2.8/2 = 1.4 \text{ m}$
 $\bar{v}_l = 0.45 \text{ m/s}$ from Diagram 11
 $\bar{v}_{h1} = 0.15 \text{ m/s}$ from diagram 13
 $a/2 + h_1 = 1.4 + 1.2 = 2.6 \text{ m}$
 $\Delta t_l / \Delta t_z = 0.11$ from Diagram 12

Result of selection:

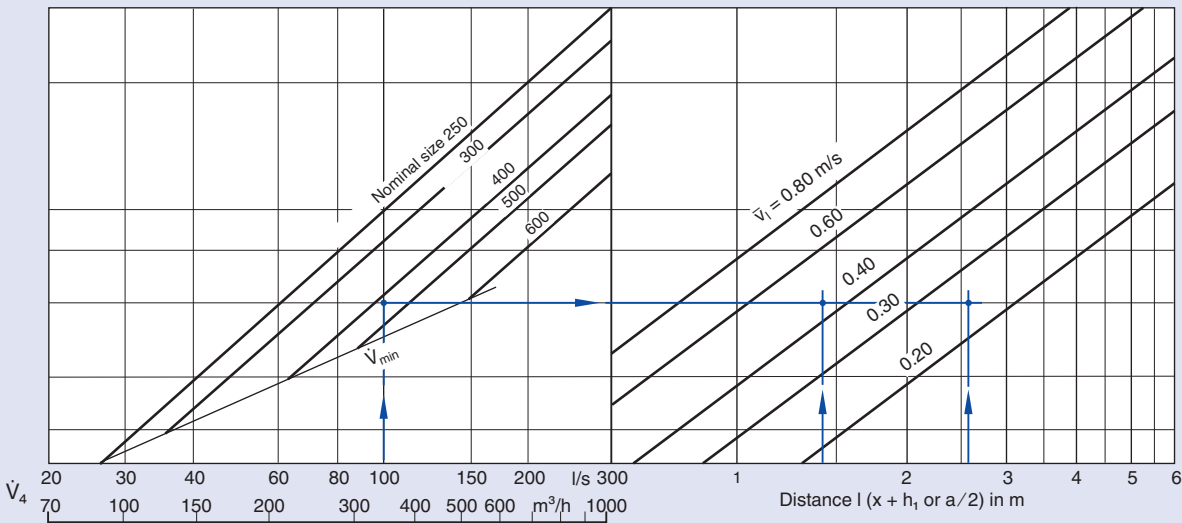
Flow rate for discharge four way
 $\dot{V}_4 = \dot{V} = 100 \text{ l/s}$

At the wall:

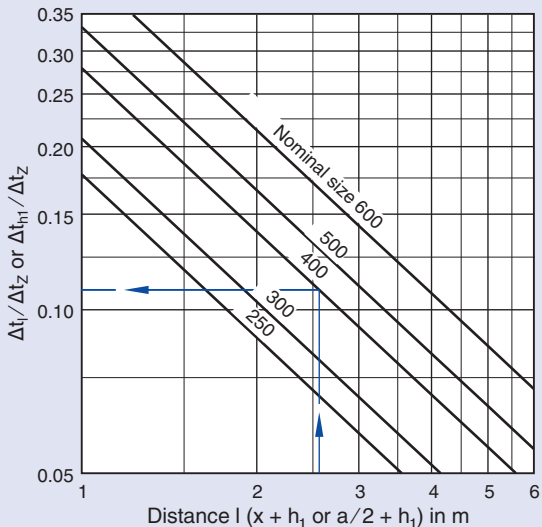
$l = x + h_1 = 1.4 + 1.2 = 2.6 \text{ m}$
 $\bar{v}_l = 0.27 \text{ m/s}$ from Diagram 11
 $\Delta t_l / \Delta t_z = 0.11$ from Diagram 12

Effective outlet area					
Nominal size	250	300	400	500	600
A_{eff}	0.0103	0.0140	0.0254	0.0360	0.0600

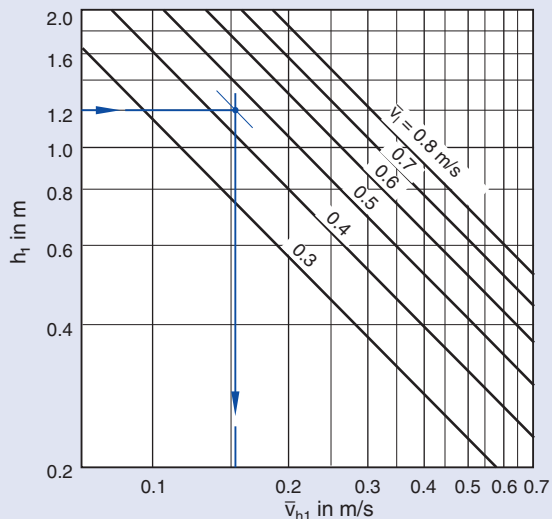
11 Air velocity \bar{v}_l at distance l



12 Temperature quotient



13 Air velocity \bar{v}_{h1} between two diffusers



Order Details

Specification text*

Supply air ceiling diffusers with a square perforated sheet metal face plate. Horizontal air discharge with high induction, which results in a rapid decay of supply air velocity and temperature differential over a short distance from the diffuser. Diffusers with one to four way discharge allow the best discharge configuration to be selected to match the room geometry.

Special characteristics:

- Face plate made of powder-coated perforated sheet metal
- Face plate in various dimensions can be integrated into conventional ceiling systems
- Additional blanking plates to provide various air discharge directions

Frameless construction, suitable for conventional grid and plasterboard ceilings. Consist of a sheet metal casing and face plate made of perforated sheet metal. Construction with side entry also has an additional universal plenum box. Supply air construction with baffle plate. Spigot connection with lip seal for circular connecting ducts according to EN 1506 or EN 13180.

Sound power level of the air-regenerated noise measured in accordance with EN ISO 5135.

Materials

Face plate made of galvanised perforated sheet steel; casing, sheet metal covers, plenum box, and flow rate control damper made of galvanised sheet steel. Baffle plate made of acoustic non woven composite material.

Face plate powder-coated white (RAL9010) or another colour. Casing painted black (RAL 9005). Black baffle plate.

Ceiling diffuser options:

- Frameless construction, suited for conventional T-bar ceilings.
- Plenum box with flow rate control damper for flow rate balancing
- Blanking plates for the configuration of the air discharge directions.

* Text for a DLQL for supply air and for grid or plasterboard ceilings, with plenum box for side entry and lip seal.

Text for construction variants see our homepage.

Order code

DLQL - T - Z - H - M - L	/	500	/	618	/	P1	/	RAL 9006
1 2 3 4 5 6		7		8		9		10

1 Type

2 Ceiling system

- P Grid or plasterboard ceiling
- T T-bar ceiling

3 Ventilation system

- Z Supply air
- A Extract air

4 Connection

- V Top entry
- H Side entry

5 Control damper for flow rate balancing

- None, no entry required
- M With control damper¹

6 Lip seal

- None, no entry required
- L With lip seal

7 Nominal size

- 250
- 300
- 400
- 500
- 600

8 Size of face plate

- Dimensions P or T, no entry required
- ... Other dimensions

9 Surface²

- 0 Powder-coated, white (RAL 9010, gloss level 50 %)³
- P1 Powder-coated RAL ...

10 Colour

- For P1 only
- RAL 9006 white aluminium, gloss level 30 %
- RAL ... other colours, gloss level 70 %

¹ Side entry plenum only

² Colours in RAL CLASSIC collection

³ Combination of white face plate with white baffle plate on request

Order example

Make: TROX
Type: DLQL -P -Z -H -M / 400 / P1 / RAL 9006

Order example: blanking plate

Make: TROX
Type: DLQL-AB / 400