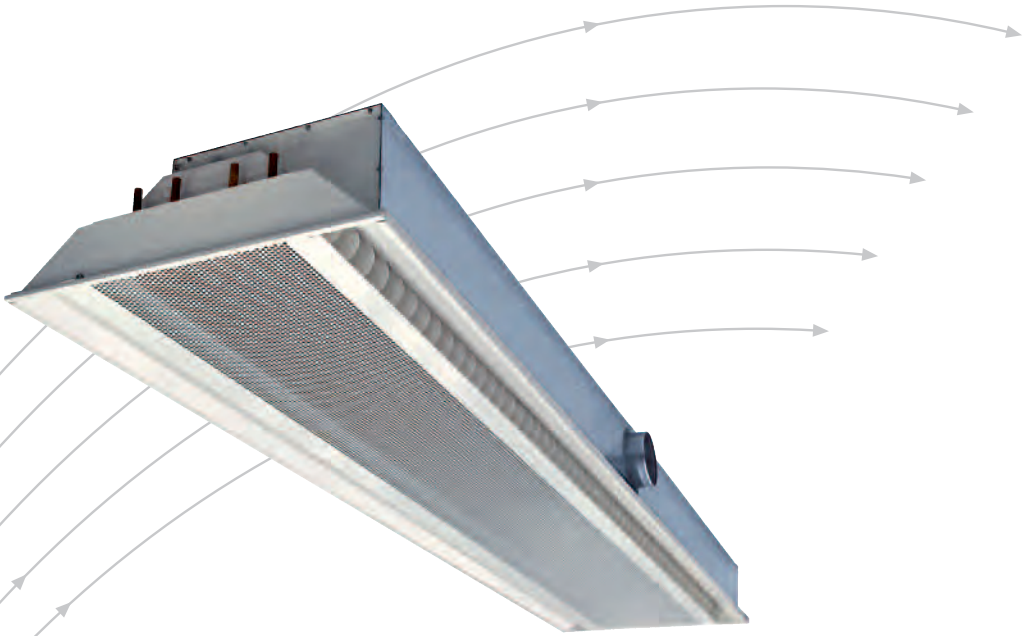
Active Chilled Beams

Type DID632

Air discharge two way

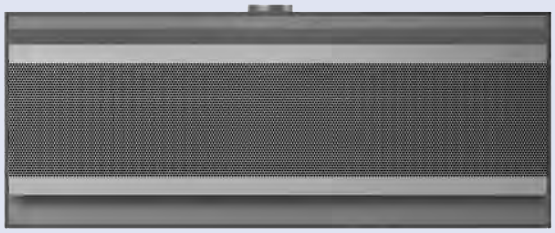


TROX® TECHNIK

The art of handling air

EUROVENT CERTIFIED PERFORMANCE

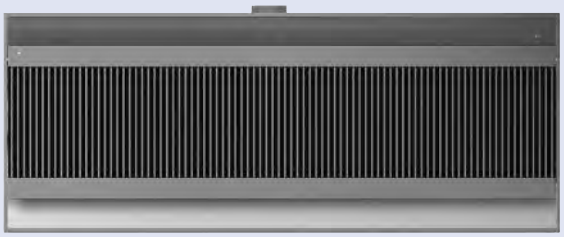
Contents · Description



DID632-LR

DID632-GL

DID632-LQ



DID632-GQ

Active chilled beams Type DID632 using air-water systems provide a comfortable air conditioning of rooms with a high cooling load. They combine the aerodynamic properties of ceiling diffusers with the energy benefits of load dissipation using water.

Due to its low height construction, Type DID632 is particularly suited for low false ceiling voids in new buildings and for the refurbishment of existing buildings with clear room heights of approximately 2.6 m to 4.0 m.

Special characteristics

- High cooling capacity with low conditioned fresh air flow rates, low air velocities in the occupied zone and low sound power levels
- Adjustable control blades to control the air discharge direction
- Four options of induced air grille design
- Heat exchangers for two or four pipe systems
- Heating and/or cooling is possible
- Supply-extract-air combination available

The active chilled beams contain an internal plate with punched nozzles, a horizontal heat exchanger, and a spigot for the connection of the conditioned fresh air.

Further, current information on design can be found on our Website and in our “Air-water systems” design manual.

Our “Easy Product Finder” online design programme is also available on the Internet for the design and selection of our products.

Certification of EUROVENT

TROX is participating in the Eurovent Certification Progamme for Chilled Beams. Products are certified under the number 09.12.432 and presented on the Eurovent Website.

Functional description

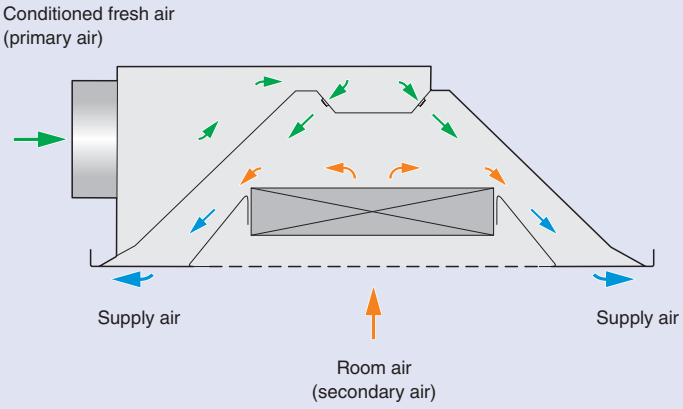
Active chilled beams supply conditioned fresh air (primary air) to the space from a central plant room to maintain indoor air quality whilst providing additional cooling and/or heating using heat exchangers.

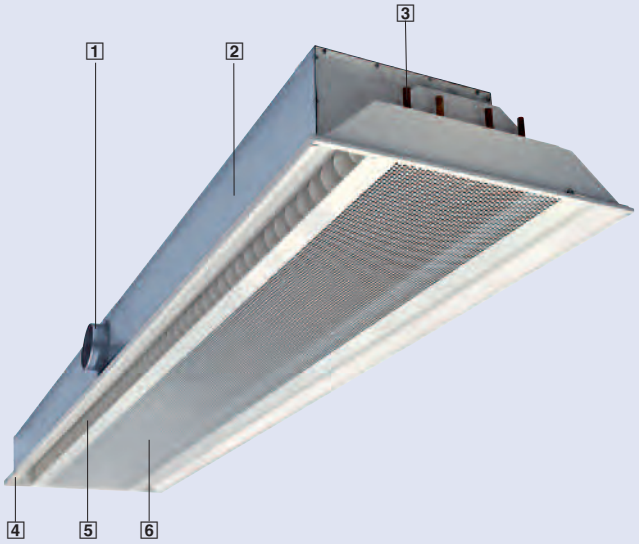
The primary air is discharged into the beam mixing chamber via nozzles. As a result of this secondary air is induced via an inlet grille and then passes through a horizontally mounted heat exchanger into the mixing chamber. Both air flows mix and the total supply air is discharged horizontally into the space through integral slot diffusers.

There are eight nominal lengths each having four nozzle options. This allows the optimum selection to meet fresh air flow rate and thermal capacity requirements whilst exhibiting low differential pressures and sound power level characteristics.

There are two types of heat exchanger, one is a two pipe system for cooling, heating can be provided using a changeover mode. The other is a four pipe system which enables any room to be cooled or heated independently of other rooms. Operation below the dew point (wet operation) must be avoided.

Principle of operation





1 Side entry spigot
2 Casing
3 Water connections
4 Face frame
5 Adjustable control blades to control the air discharge direction
6 Hinged induced air grille

Construction · Dimensions

Characteristics

- Fresh air range 6 to 85 l/s, 22 to 306 m^3/h
- For clear room heights from approximately 2.6 to 4.0 m
- Flush ceiling installation
- Lengths from 893 to 3000 mm and widths 593, 598, 618 and 623 mm, thus suitable for all ceiling systems
- Four options of induced air grille design
- Nozzles in four sizes to optimise induction
- Nozzles punched in sheet metal plate, non-combustible
- Optional adjustable control blades to control the air discharge direction
- Heat exchangers for two or four pipe systems
- Supply-extract-air combination available
- Maximum operating pressure: 6 bar
- Maximum operating temperature: 75 °C

  Other operating pressures and temperatures upon request.

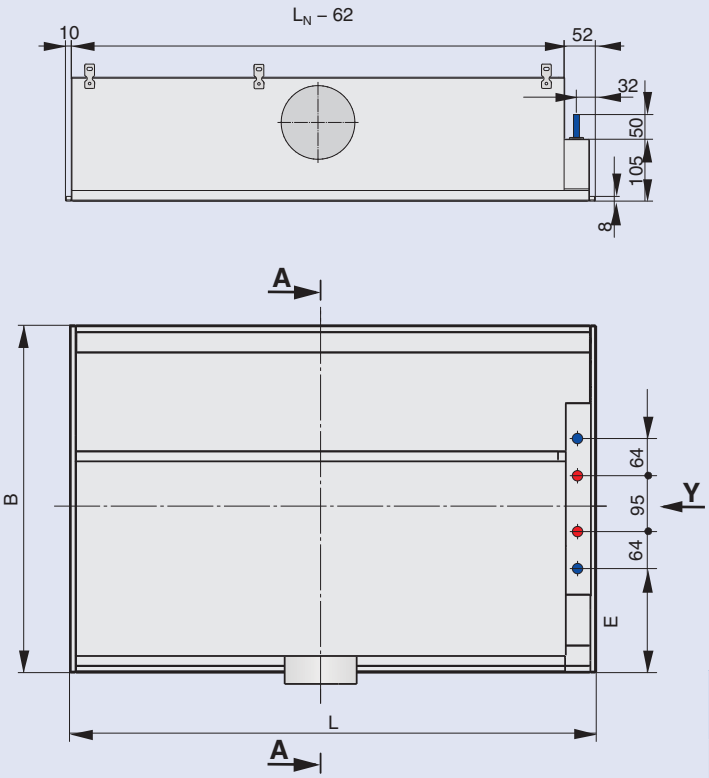
Construction features

- Spigot connections suitable for circular connecting ducts according to EN 1506 or EN 13180
- Vertical water connections, Ø12mm plain end or with external thread G½", flat end seal

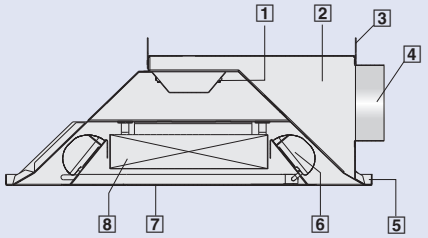
Materials

- Casing, frame of the induced air grille (GL/GQ) and perforated induced air grille (LR/LQ) made of galvanised sheet steel
- Blades of the induced air grille (GL/GQ) made of aluminium profiles
- Face frame with integral nozzle duct made of sheet steel
- Heat exchanger made of copper tubes and formed aluminium fins
- Control blades made of polypropylene, flame retardant (V0) to UL 94
- Visible surfaces powder-coated white (RAL 9010) or another RAL colour
- Heat exchanger alternatively black (RAL 9005)

Type DID632...-LR

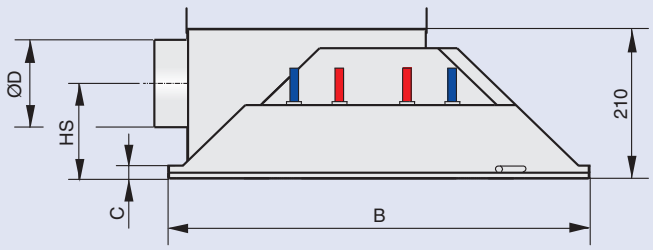


View A – A



1 Nozzles
2 Casing
3 Hanging brackets
4 Side entry spigot (primary air)
5 Face frame
6 Adjustable control blades to control the air discharge direction (option)
7 Hinged induced air grille
8 Heat exchanger

View Y



Dimensions in mm		
B	C	E
593	18	193
598	8	195
618	18	205
623	8	208

Dimensions in mm			
L_N	Available sizes L	ØD	HS
900	893 – 1500	123	134
1200	1193 – 1800		
1500	1493 – 2100		
1800	1793 – 2400		
2100	2093 – 2700	158	116
2400	2393 – 3000		
2700	2693 – 3000		
3000	2993 – 3000		

L = Total length (diffuser face)
L_N = Nominal length
B = Face frame width

Characteristics

- Integral extract air casing for removal of extract air through the ceiling
- Flow rate range 6 to 85 l/s, 22 to 306 m^3/h
- Extract air spigot on the same side as or opposite the primary air spigot

Materials

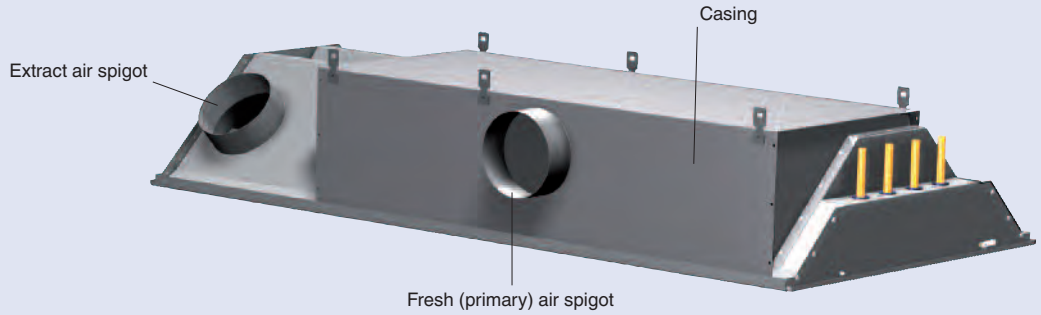
- Casing with extract air spigot made of galvanised sheet steel

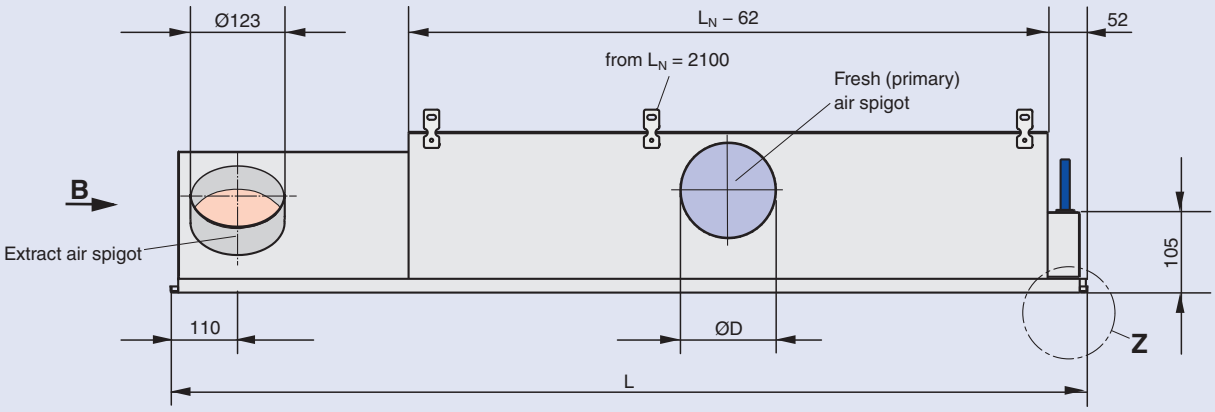
Dimensions in mm	
B	C
593	18
598	8
618	18
623	8

L = Overall length (diffuser face)
L_N = Nominal length
B = Face frame width

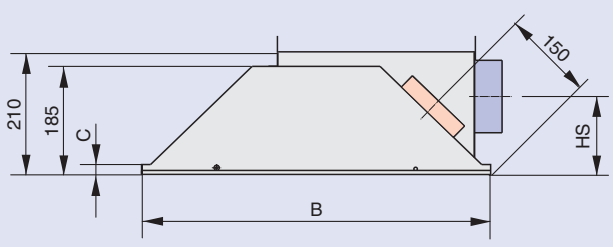
Dimensions in mm			
L_N	Available sizes L	ØD	HS
900	1150 – 1500	123	134
1200	1450 – 1800		
1500	1750 – 2100		
1800	2050 – 2400		
2100	2350 – 2700	158	116
2400	2650 – 3000		
2700	2950 – 3000		

Type DID632...-RR-AV

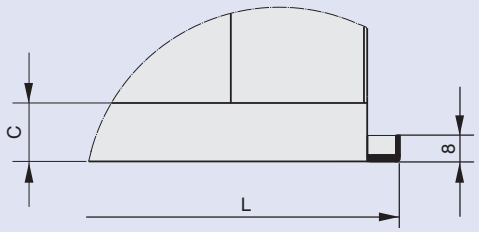




View B



Detail Z



Casing configurations

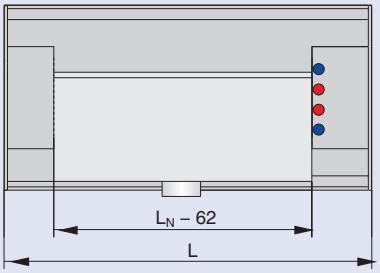
Supply air

Construction variant		
Casing	**Water connections**	**Order code**
Centred	Right	MR*
Centred	Left	ML*
Right	Right	RR*
Right	Left	RL
Left	Right	LR
Left	Left	LL*

* The construction variants MR, ML, RR and LL are available only from L = L_N + 200 mm.

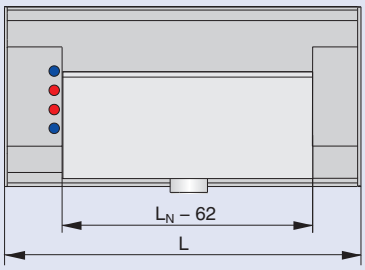
Type DID632...-MR*

Casing: centred
Water connections: right



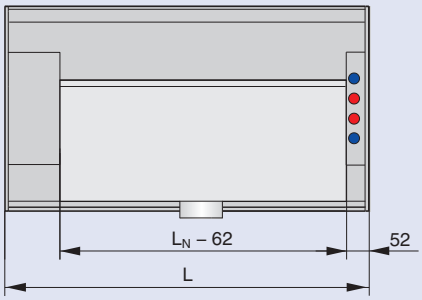
Type DID632...-ML*

Casing: centred
Water connections: left



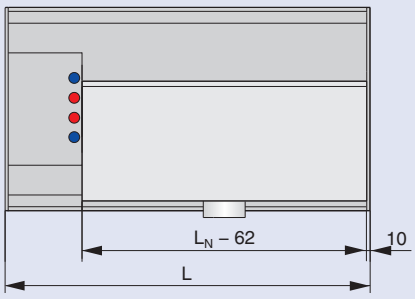
Type DID632...-RR*

Casing: right
Water connections: right



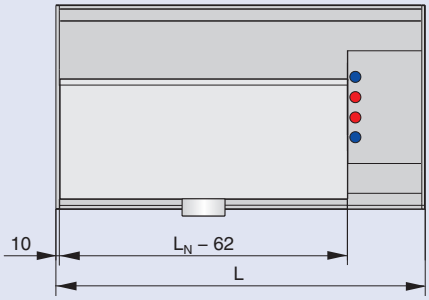
Type DID632...-RL

Casing: right
Water connections: left



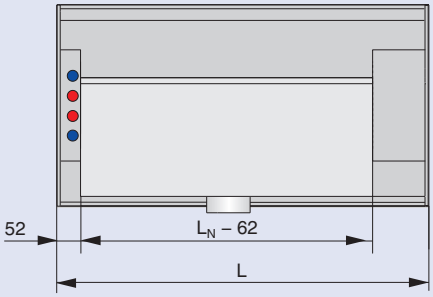
Type DID632...-LR

Casing: left
Water connections: right



Type DID632...-LL*

Casing: left
Water connections: left



Casing configurations

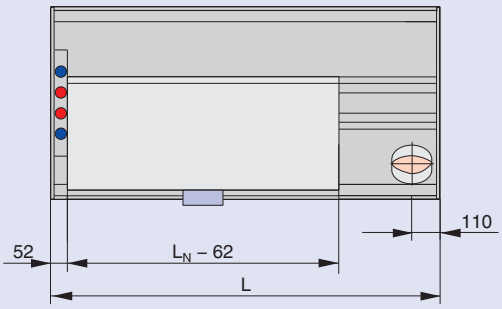
Supply-extract-air combination

Construction variant			
Casing	**Water connec-tions**	**Extract air spigot**	**Order code**
Left	Left	Front	LL-AV
Right	Right	Front	RR-AV
Left	Left	Rear	LL-AH
Right	Right	Rear	RR-AH

Supply-extract-air combination only for arrangements LL and RR, available from L = L_N + 250 mm

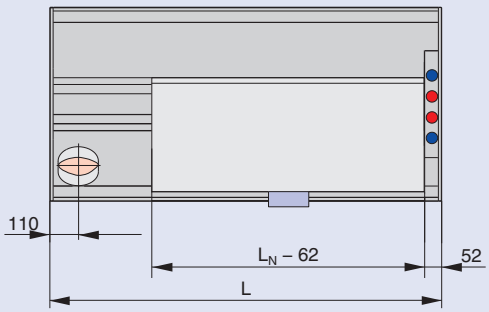
Type DID632...-LL-AV

Casing: left
Water connections: left
Extract air spigot: front



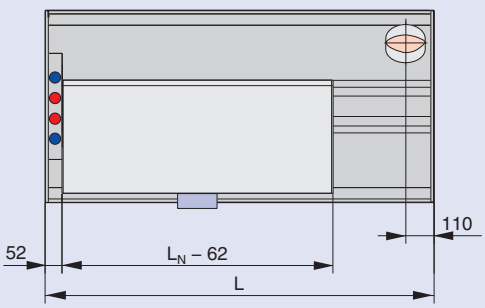
Type DID632...-RR-AV

Casing: right
Water connections: right
Extract air spigot: front



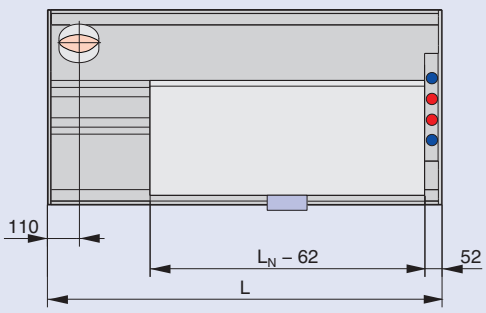
Type DID632...-LL-AH

Casing: left
Water connections: left
Extract air spigot: rear



Type DID632...-RR-AH

Casing: right
Water connections: right
Extract air spigot: rear



Installation

The customer must install the active chilled beams, make all connections, and provide the hanging system, connection and sealing materials.

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

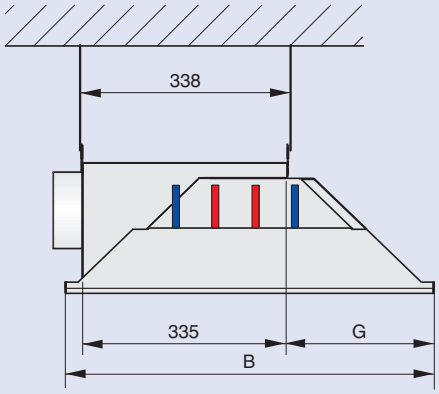
All legal regulations for site work must be complied with.

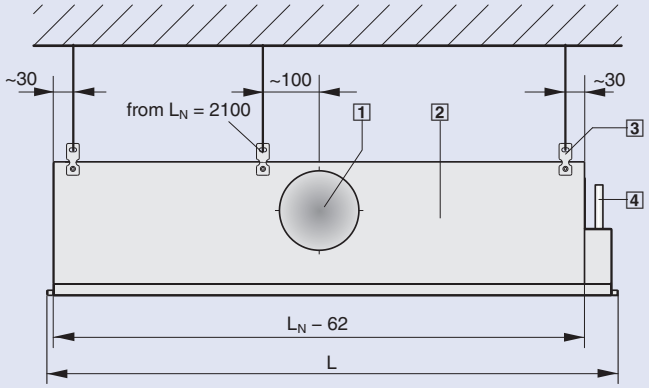
The active chilled beam has four hanging brackets (six on nominal length 2100 and above) for suspending the unit from the ceiling slab using threaded rods, wires or metal hangers. Use only certified hanging systems.

The primary air is connected to the inlet spigot. The heat exchanger has common flow and return connections on the side of the unit (four connections in the case of a four pipe system). The actual connections can either be rigid – soldered or screw, or flexible – using push fit hoses. It is important to ensure adequate venting and draining facilities are provided.

Flexible hoses can be supplied as accessories see separate technical leaflet.

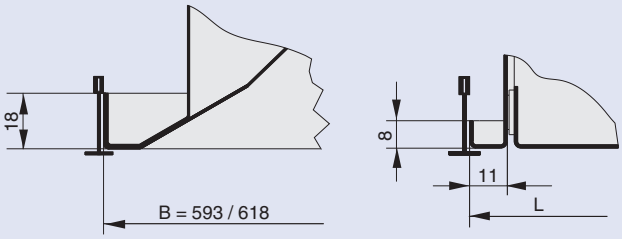
Dimensions in mm	
B	**G**
593	230
598	233
618	243
623	245



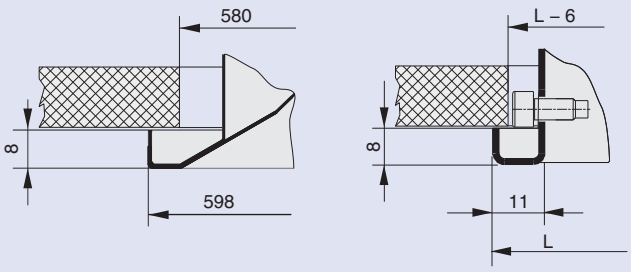


1 Side entry spigot
2 Casing
3 Hanging brackets
4 Water connections

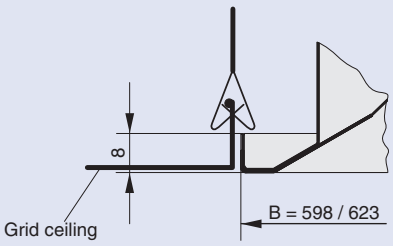
Installation into T-bar ceilings



Installation into plasterboard ceilings



Installation into grid ceilings



Maintenance

As is the case with all diffusers that induce room air, depending on the cleanliness of the room air, deposits may accumulate on the surfaces of the diffuser. If required, clean the diffuser with commercial, non-aggressive cleaning agents.

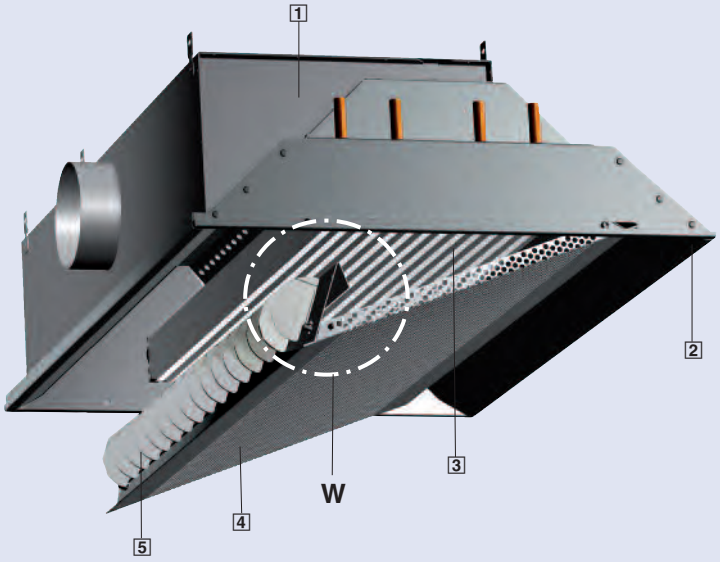
Clean the heat exchanger with an industrial vacuum cleaner. For maintenance, also see VDI 6022, Sheet 1 – “Hygiene Requirements on Ventilation Systems”.

Removal of the induced air grille

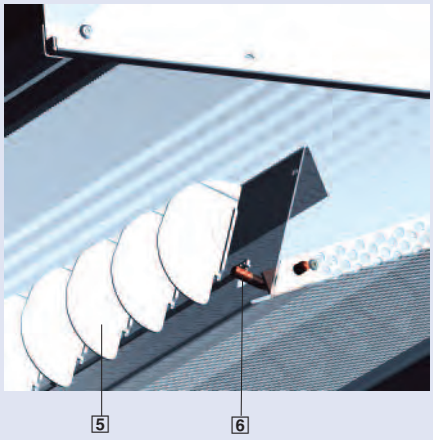
The heat exchanger is accessible when the induced air grille has been hinged down or removed.

To hinge down the induced air grille on its long side release two fixing bolts. If the screws on the opposite side are also unscrewed, the induced air grille can be completely removed. Care must be taken to support the grille when removing the screws as there are no safety wires.

After repositioning the induced air grille, engage the fixing bolts and make sure they are in the locked position.



Detail W



1 Casing
2 Face frame
3 Heat exchanger
4 Induced air grille (hinged down)
5 Adjustable control blades
6 Fixing bolts

All units have two fixing bolts on the long side

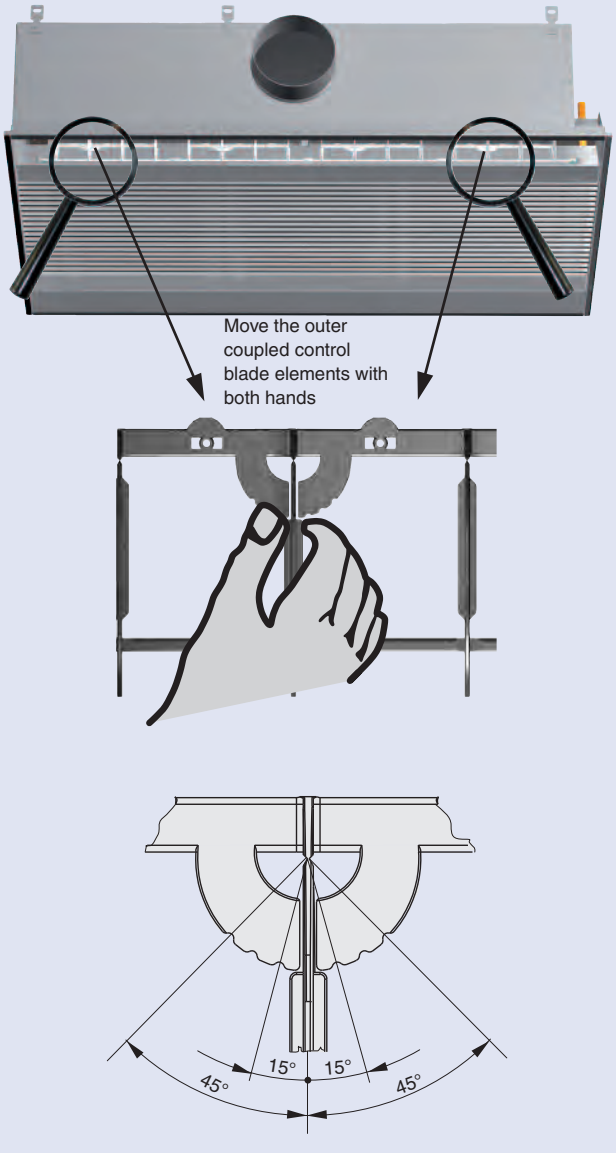
Adjustable air discharge direction

If a large cooling capacity is required in a very small space with active chilled beams, the use of an adjustable horizontal air discharge can still result in acceptable air velocities in the occupied zone. The spread of the air discharge can be increased dependent on room geometry. In case of change of use the air discharge can be optimised by subsequent adjustment.

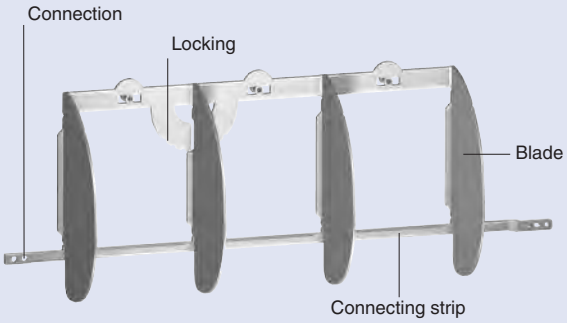
- Several control blade elements are linked together to provide a uniform adjustment
- For finer adjustment of individual elements cut the connection strip (plastic) between control blade elements
- To adjust the coupled control blade elements at the outer parts of the slot diffuser two hands should be used
- Maximum possible adjustment is 45° to the right or left in steps of 15°
- The units are delivered with an air discharge direction set to horizontal and at right angles to the slot

Different air discharge directions reduces the water-side capacity. At 45° a loss of 5 % can occur.

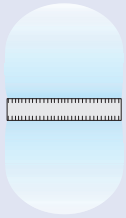
Adjustment of the control blades



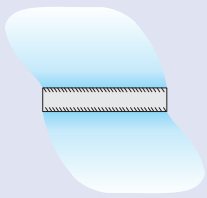
Single control blade element



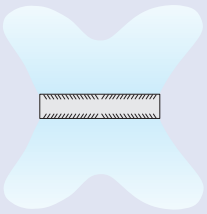
Horizontal air discharge at right angles to the slot



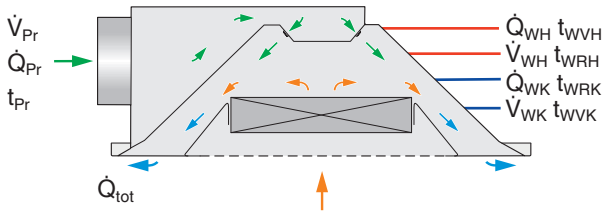
Angled horizontal air discharge

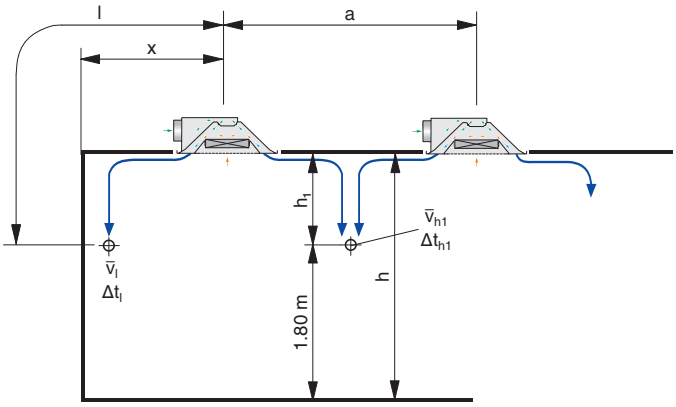


Divergent horizontal air discharge



Nomenclature





Δt_l	in K :	Temperature difference between room air and core at distance $l = x + h_1$
Δt_{h1}	in K :	Temperature difference between room air and core at distance $l = a/2 + h_1$
Δt_{Pr}	in K :	Temperature difference between room air and conditioned fresh air
Δt_W	in K :	Temperature difference between water flow and return
Δt_{RWV}	in K :	Temperature difference between room air and water flow
Δp_t	in Pa :	Total differential pressure
Δp_W	in kPa :	Water-side pressure differential
t_R	in °C :	Room temperature
t_{WVK}	in °C :	Water flow temperature – cooling
t_{WRK}	in °C :	Water return temperature – cooling
t_{WVH}	in °C :	Water flow temperature – heating
t_{WRH}	in °C :	Water return temperature – heating
t_{Pr}	in °C :	Temperature of the conditioned fresh air
$\dot{Q}_{WK}$	in W :	Water cooling capacity
$\dot{Q}_{WH}$	in W :	Water heating capacity
$\dot{Q}_{tot}$	in W :	Total cooling capacity $\dot{Q}_{Pr} + \dot{Q}_{WK}$
$\dot{Q}_{Pr}$	in W :	Conditioned fresh air cooling capacity
$\dot{V}_{WK}$	in l/h :	Water flow rate – cooling
$\dot{V}_{WH}$	in l/h :	Water flow rate – heating
$\dot{V}_{Pr}$	in l/s :	Conditioned fresh air flow rate
$\dot{V}_{PrN}$	in (l/s)/m :	Conditioned fresh air flow rate per meter based on nominal length
$\dot{V}_{Ext}$	in l/s :	Extract air flow rate
$\bar{v}_l$	in m/s :	Maximum time average air velocity at wall at distance $l = x + h_1$
$\bar{v}_{h1}$	in m/s :	Maximum time average air velocity between two diffusers at distance $l = a/2 + h_1$
L_{WA}	in dB(A) :	A-weighted sound power level
a	in m :	Spacing between two diffusers
l	in m :	Horizontal plus vertical distance from diffuser, discharge down the wall (1.8 m above the floor), $l = x + h_1$
h_1	in m :	Distance from the ceiling to the occupied zone (1.8 m above the floor)
h	in m :	Room height
x	in m :	Distance from the diffuser centre line to the wall

All sound power levels are based on 1 pW.
All noise levels determined in a reverberation chamber.
Technical data based on an air density of 1.2 kg/m^3.

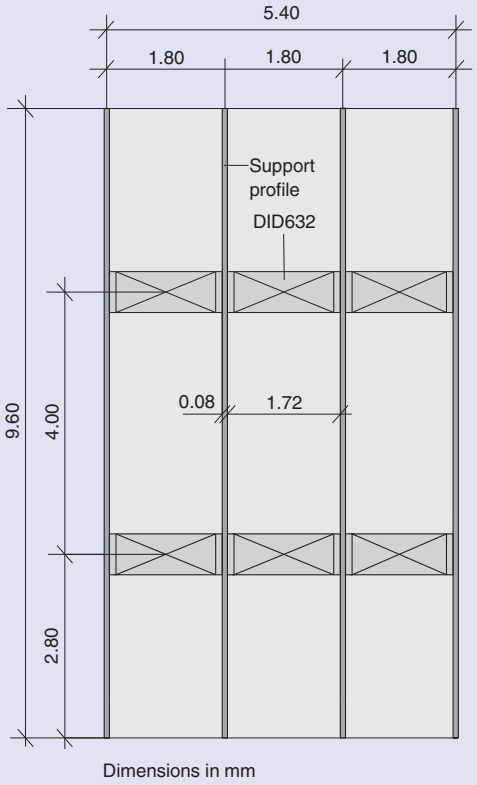
Selection example

First step in selecting active chilled beams is based on the quick selection table (Page 14).
Listed capacities are valid only for the reference values.

Second step, if the operating values differ from the reference ones, corrections must be made using diagrams and tables pages 16 to 18.

Our “Easy Product Finder” online design programme is also available on the Internet for easy and detailed design of our products.

Following example shows the unit selection using this leaflet.



Dimensions in mm

Given

Flexible office, width 3 modules

Room width:	5.4 m
Room depth:	9.6 m
Room height:	2.8 m
Occupancy:	5 persons
Cooling load:	95 W/m²
Room temperature (Summer):	26 °C
Conditioned fresh air temperature:	16 °C
Chilled water flow temperature:	16 °C

Fresh air flow rates

According to EN 15251, low-pollution building, Category I,

Building:	1.0 (l/s)/m²
People:	10.0 (l/s)/Person

Calculation procedure

Fresh air flow rate:

52 m² × 1.0 (l/s)/m²	= 52 l/s
5 persons × 10 (l/s)/person	= 50 l/s
Total	= 102 l/s
Cooling load: 52 m² × 95 W/m²	= 4940 W

Data for quick selection, page 14

DID632 6 units
Each unit:

Fresh air flow rate	102/6	= 17 l/s
Cooling capacity	4940/6	= 823 W
Maximum possible nominal length		= 1500 mm

Data for aerodynamic, page 17

Fresh air flow rate per meter based on nominal length	17/1.2	≅ 14 (l/s)/m

Selected type:

Nominal length: 1200 mm
Type of nozzle: M
each with a fresh air flow rate of 17 l/s

DID632-DE-LR-2-M-MR-0/1720×1200×593

Selection example

Result of design				
Capacities and comfort parameters	**Source**	**Formula**	**Calculation**	**Value**
Selected nominal length	Quick selection			1200
Selected nozzle	Quick selection			M
Total cooling capacity each unit	Quick selection			790 W
Water cooling capacity at 110 l/h	Quick selection			585 W
Cooling capacity too low, thus increase of water flow rate, try 140 l/h				
Air cooling capacity		$\dot{Q}_{Pr} = \dot{Q}_{tot} - \dot{Q}_{WK}$	790 – 585	205 W
Correction factor for 140 l/h	Page 16			1.07
Water cooling capacity at 140 l/h			585 × 1.07	626 W
Total cooling capacity each unit		$\dot{Q}_{Pr} + \dot{Q}_{WK}$	205 + 626	831 W
Water-side temperature difference	Diagram 1			approx. 3.9 K
Pressure differential water	Diagram 2			approx. 4.7 kPa
Flow rate per meter nom. length			17/1.2	14 (l/s)/m
Spacing between two diffusers		a		4 m
Distance from ceiling to occupied zone		$h_1 = h - 1.8$	2.8 – 1.8	1 m
Air velocity between two diffusers	Diagram 8	$\bar{v}_{h1}$	0.17 × 0.95[1]	approx. 0.16 m/s
Distance between two diffusers and the occupied zone		$a/2 + h_1$	4/2 + 1	3 m
Temperature reduction	Diagram 8	$\Delta t_{h1}/\Delta t_{Pr}$ $\Delta t_{Pr} \times \Delta t_{h1}/\Delta t_{Pr}$	 10 × 0.09 × 0.97[1]	0.09 0.9 K
Supply air temperature in the occupied zone		$t_R - \Delta t_{h1}$	26 – 0.9	approx. 25°C
Distance from diffuser to the occupied zone at the wall		$l = x + h_1$	2.8 + 1.0	3.8 m
Air velocity at the wall	Diagram 6	$\bar{v}_l$	0.25 × 0.95[1]	approx. 0.24 m/s
Air velocity in the occupied zone (0.5 m from the wall)		approx. 50% of $\bar{v}_l$	approx. 0.5 × 0.24	approx. 0.12 m/s
Temperature reduction	Diagram 6	$\Delta t_l/\Delta t_{Pr}$ $\Delta t_{Pr} \times \Delta t_l/\Delta t_{Pr}$	 10 × 0.2 × 0.97[1]	0.2 1.94 K
Supply air temperature in the occupied zone		$t_R - \Delta t_l$	26 – 1.94	approx. 24 °C
Sound power level	Quick selection			23 dB(A)
Fresh air pressure differential	Quick selection			126 Pa
Selected unit: DID632-DE-LR-2-M-MR0/1720×1200×593/P1/RAL 9006/G3/LE				

[1] Refer to correction factors page 17.

Quick selection

Nominal length 900 to 1800

Reference values – Cooling

t_R = 26 °C
t_{Pr} = 16 °C
t_{WVK} = 16 °C
$\dot{V}_{WK}$ = 110 l/h (L_N 900 to 1800)

Reference values – Heating

t_R = 22 °C
t_{Pr} = 22 °C (isothermal)
t_{WVH} = 50 °C
$\dot{V}_{WH}$ = 50 l/h (L_N 900 to 1800)

L_N	Type of nozzle	Fresh air			Cooling (Two and four pipe system)				Heating (Four pipe system)			Air-regenerated noise
		$\dot{V}_{Pr}$		Δp_t	$\dot{Q}_{tot}$	$\dot{Q}_{WK}$[1] (water)	Δt_W	Δp_W (water)	$\dot{Q}_{WH}$[1]=$\dot{Q}_{tot}$ (water)	Δt_W	Δp_W (water)	L_{WA}
		l/s	m³/h	Pa	W	W	K	kPa	W	K	kPa	dB(A)
900	Z	6	22	67	411	339	2.6	2.4	495	8.5	0.2	<20
		9	32	151	573	464	3.6		673	11.6		<20
		12	43	268	690	545	4.3		786	13.5		22
	M	9	32	65	459	350	2.7		512	8.8		<20
		13	47	136	628	472	3.7		683	11.7		<20
		18	65	260	785	568	4.4		818	14.1		28
	G	16	58	58	590	397	3.1		577	9.9		<20
		24	86	129	815	526	4.1		759	13.1		29
		34	122	259	1035	625	4.9		897	15.4		38
	U	30	108	65	847	485	3.8		702	12.1		30
		36	130	94	964	530	4.1		764	13.1		35
		44	158	140	1107	577	4.5		829	14.3		40
1200	Z	8	29	64	529	433	3.4	3.1	628	10.8	0.3	<20
		12	43	145	728	584	4.6		839	14.4		<20
		16	58	257	871	679	5.3		970	16.7		26
	M	12	43	63	592	447	3.5		648	11.2		<20
		17	61	126	790	585	4.6		841	14.5		23
		24	86	250	995	705	5.5		1006	17.3		32
	G	21	76	59	750	496	3.9		718	12.3		22
		32	115	126	1042	656	5.1		939	16.2		34
		44	158	238	1292	762	6.0		1083	18.6		42
	U	36	130	54	1011	577	4.5		830	14.3		33
		42	151	73	1129	623	4.9		893	15.4		37
		48	173	95	1240	661	5.2		945	16.3		41
1500	Z	10	36	63	639	519	4.1	3.7	749	12.9	0.3	<20
		15	54	141	871	690	5.4		986	17.0		21
		20	72	251	1037	795	6.2		1128	19.4		29
	M	15	54	62	716	535	4.2		772	13.3		<20
		20	72	109	908	666	5.2		953	16.4		25
		30	108	243	1187	825	6.4		1168	20.1		36
	G	30	108	71	1014	652	5.1		934	16.1		30
		38	137	114	1209	751	5.9		1068	18.4		36
		44	158	153	1338	807	6.3		1144	19.7		40
	U	42	151	49	1166	659	5.2		943	16.2		37
		46	166	59	1245	691	5.4		986	17.0		40
		50	180	70	1321	718	5.6		1024	17.6		42
1800	Z	12	43	62	743	598	4.7	4.3	859	14.8	0.3	<20
		18	65	139	1003	786	6.1		1115	19.2		24
		24	86	247	1188	899	7.0		1266	21.8		32
	M	18	65	61	834	617	4.8		884	15.2		<20
		24	86	108	1050	760	5.9		1080	18.6		28
		36	130	243	1364	930	7.3		1307	22.5		39
	G	30	108	50	1015	653	5.1		935	16.1		29
		40	144	89	1276	794	6.2		1126	19.4		37
		44	158	107	1367	836	6.5		1182	20.3		39
	U	40	144	33	1143	661	5.2		945	16.3		37
		44	158	40	1230	700	5.5		998	17.2		40
		50	180	52	1352	749	5.9		1066	18.3		43

[1] Different air discharge directions reduces water side capacity. At 45° a loss of 5 % can occur.

Reference values – Cooling

t_R = 26 °C
t_{Pr} = 16 °C
t_{WVK} = 16 °C
$\dot{V}_{WK}$ = 200 l/h (L_N 2100 to 3000)

Reference values – Heating

t_R = 22 °C
t_{Pr} = 22 °C (isothermal)
t_{WVH} = 50 °C
$\dot{V}_{WH}$ = 110 l/h (L_N 2100 to 3000)

L_N	Type of nozzle	Fresh air			Cooling (Two and four pipe system)				Heating (Four pipe system)			Air-regenerated noise
		$\dot{V}_{Pr}$		Δp_t	$\dot{Q}_{tot}$	$\dot{Q}_{WK}$[1] (water)	Δt_W	Δp_W (water)	$\dot{Q}_{WH}$[1]=$\dot{Q}_{tot}$	Δt_W	Δp_W (water)	L_{WA}
		l/s	m³/h	Pa	W	W	K	kPa	W	K	kPa	dB(A)
2100	Z	14	50	61	994	825	3.5	14.2	1506	11.8	1.6	<20
		21	76	137	1363	1110	4.8		1997	15.6		22
		28	101	243	1625	1287	5.5		2297	18.0		30
	M	21	76	59	1106	852	3.7		1553	12.1		<20
		28	101	105	1408	1070	4.6		1929	15.1		25
		42	151	237	1844	1337	5.8		2381	18.6		36
	G	36	130	50	1364	930	4.0		1688	13.2		26
		56	202	120	1921	1246	5.4		2228	17.4		38
		70	252	188	2230	1386	6.0		2462	19.2		44
	U	60	216	47	1793	1070	4.6		1929	15.1		37
		70	252	64	2001	1157	5.0		2077	16.2		41
		80	288	84	2193	1229	5.3		2199	17.2		45
2400	Z	16	58	61	1113	920	4.0	15.9	1671	13.1	1.8	<20
		24	86	136	1516	1226	5.3		2195	17.2		24
		32	115	241	1801	1415	6.1		2510	19.6		32
	M	24	86	59	1239	949	4.1		1722	13.5		<20
		32	115	105	1570	1184	5.1		2123	16.6		27
		48	173	236	2047	1468	6.3		2598	20.3		38
	G	40	144	48	1491	1009	4.3		1825	14.3		28
		60	216	107	2049	1326	5.7		2362	18.5		39
		70	252	145	2276	1432	6.2		2539	19.9		43
	U	60	216	38	1823	1099	4.7		1979	15.5		37
		70	252	51	2040	1196	5.1		2144	16.8		41
		80	288	67	2241	1277	5.5		2279	17.8		45
2700	Z	18	65	60	1227	1010	4.3	17.7	1826	14.3	2.0	<20
		27	97	135	1661	1336	5.7		2378	18.6		26
		36	130	240	1968	1534	6.6		2706	21.2		34
	M	27	97	59	1367	1041	4.5		1880	14.7		22
		36	130	105	1725	1291	5.6		2303	18.0		30
		54	194	235	2240	1589	6.8		2796	21.9		40
	G	45	162	48	1648	1105	4.8		1989	15.6		29
		60	216	85	2073	1350	5.8		2402	18.8		38
		70	252	116	2311	1467	6.3		2597	20.3		42
	U	62	223	33	1889	1141	4.9		2051	16.0		38
		73	263	46	2134	1254	5.4		2242	17.5		43
		84	302	61	2358	1345	5.8		2395	18.7		46
3000	Z	20	72	60	1337	1096	4.7	19.4	1973	15.4	2.1	<20
		30	108	135	1800	1438	6.2		2549	19.9		28
		40	144	239	2126	1644	7.1		2885	22.6		36
	M	30	108	59	1491	1129	4.9		2030	15.9		23
		40	144	105	1874	1391	6.0		2471	19.3		31
		60	216	235	2424	1701	7.3		2977	23.3		42
	G	50	180	49	1799	1196	5.1		2144	16.8		32
		65	234	82	2216	1432	6.2		2538	19.8		39
		75	270	109	2451	1547	6.7		2728	21.3		43
	U	65	234	31	1974	1190	5.1		2134	16.7		40
		75	270	41	2202	1297	5.6		2314	18.1		44
		85	306	53	2410	1385	6.0		2461	19.2		47

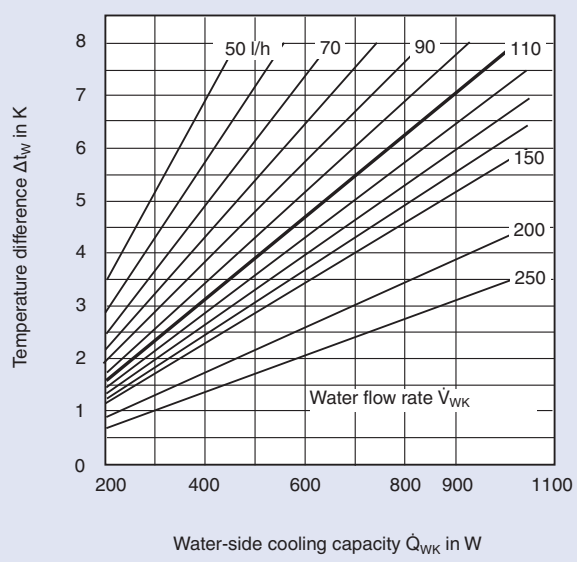
[1] Different air discharge directions reduces water side capacity. At 45° a loss of 5 % can occur.

Water-side capacity

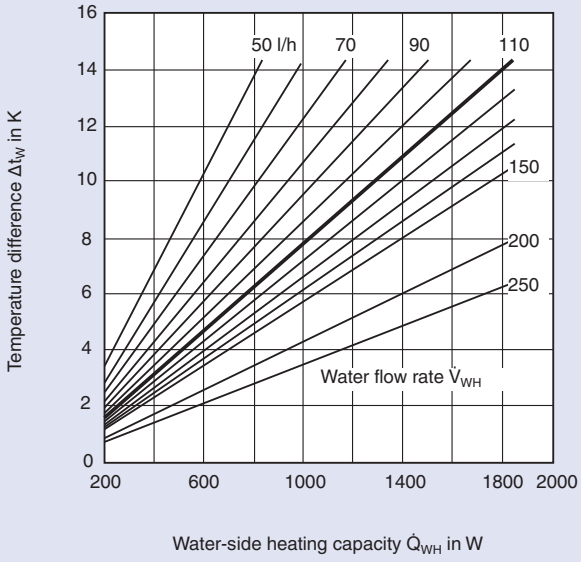
Correction factors – Cooling								
$\dot{V}_{WK}$ in l/h		50	70	90	110	140	200	250
L_N	900	0.71	0.85	0.94	1.00	1.07	1.14	1.18
	1200	0.69	0.83	0.93	1.00	1.07	1.16	1.20
	1500	0.68	0.82	0.93	1.00	1.08	1.18	1.23
	1800	0.67	0.81	0.92	1.00	1.09	1.19	1.25
	2100	0.55	0.67	0.76	0.83	0.90	1.00	1.05
	2400	0.53	0.66	0.75	0.82	0.90	1.00	1.05
	2700	0.52	0.64	0.74	0.81	0.89	1.00	1.06
	3000	0.51	0.63	0.73	0.80	0.89	1.00	1.06

Correction factors – Heating									
$\dot{V}_{WH}$ in l/h		30	50	60	90	100	110	130	160
L_N	900	0.70	1.00	1.10	1.30	1.35	1.51	1.45	1.52
	1200	0.69	1.00	1.11	1.33	1.38	1.54	1.48	1.56
	1500	0.69	1.00	1.11	1.35	1.40	1.57	1.52	1.60
	1800	0.68	1.00	1.12	1.36	1.42	1.60	1.54	1.63
	2100	0.46	0.68	0.76	0.93	0.97	1.00	1.06	1.12
	2400	0.45	0.66	0.75	0.92	0.96	1.00	1.06	1.13
	2700	0.44	0.66	0.74	0.92	0.96	1.00	1.06	1.13
	3000	0.44	0.65	0.73	0.92	0.96	1.00	1.06	1.14

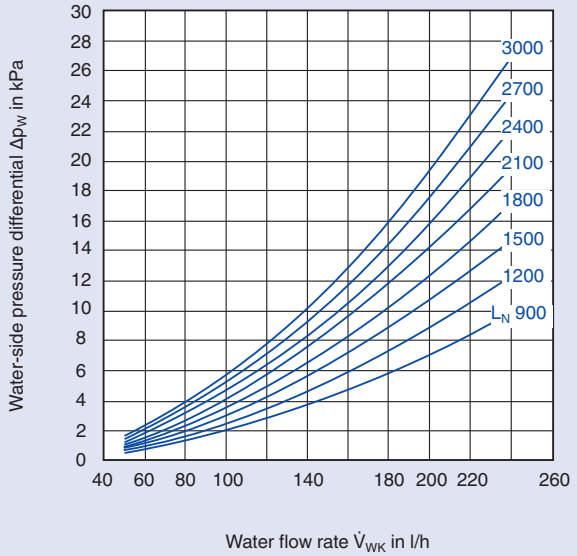
1 Cooling



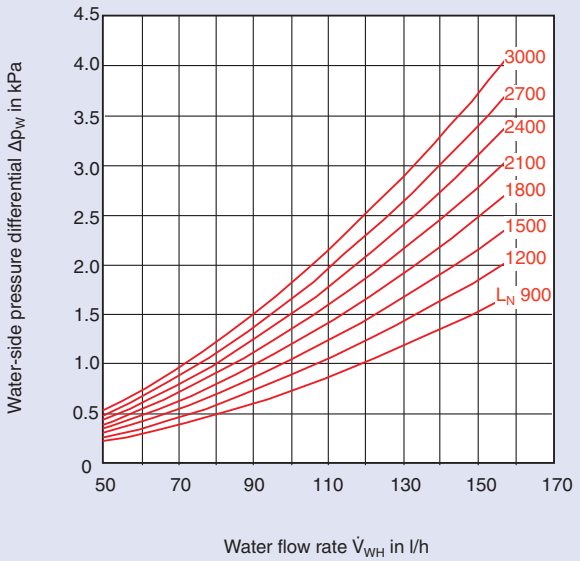
3 Heating



2 Cooling



4 Heating



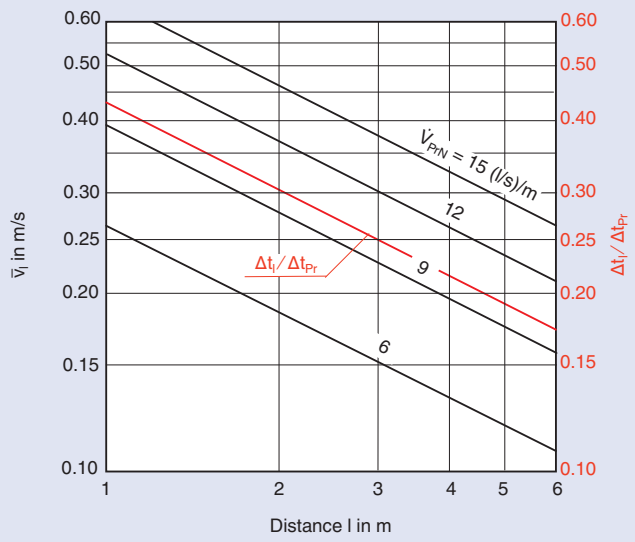
The tabulated air velocities $\bar{v}_l$ and $\bar{v}_{h1}$ are based on a regular distribution of heat loads in the space.
Strong asymmetric distribution will result in variations to the tabulated values.

The air velocities are based on horizontal discharge at right angles to the beam. Local air velocities can be significantly reduced by adjusting the control blades.

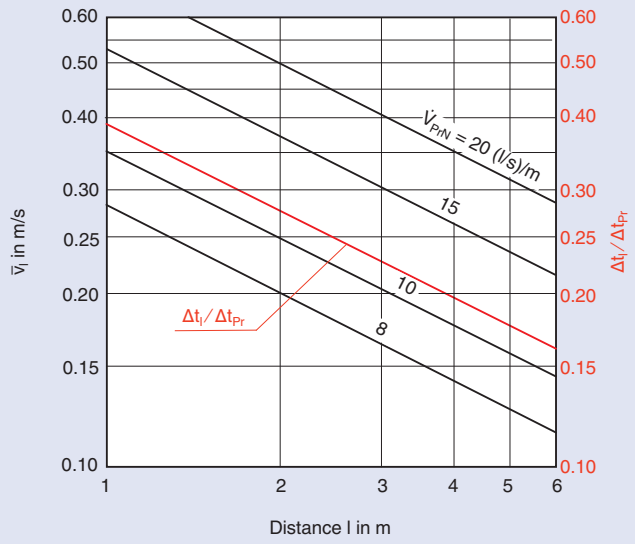
Use fresh air flow rate per meter based on nominal length $\dot{V}_{PrN}$ for diagrams 5 to 12.

Correction factors for the diagram values as a function of nominal length								
L_N in mm	900	1200	1500	1800	2100	2400	2700	3000
$\bar{v}_l$, $\bar{v}_{h1}$ from diagram	0.90	0.95	1.00	1.04	1.08	1.12	1.15	1.18
$\Delta t_l / \Delta t_{Pr}$, $\Delta t_{h1} / \Delta t_{Pr}$ from diagram	0.93	0.97	1.00	1.02	1.03	1.04	1.04	1.04

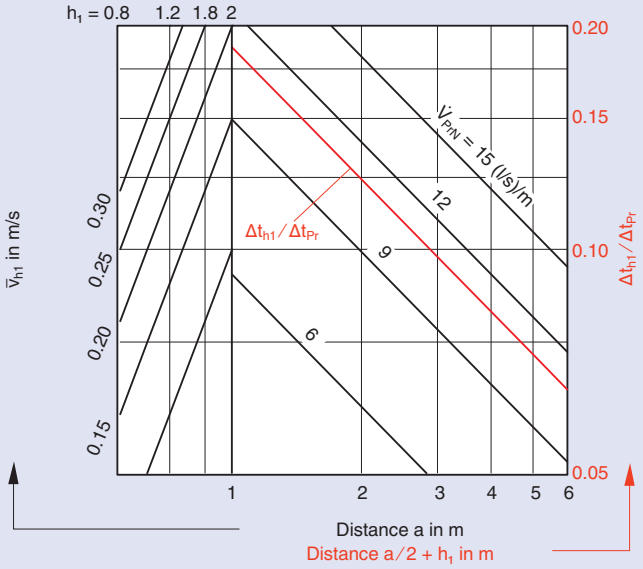
5 Nozzle type Z



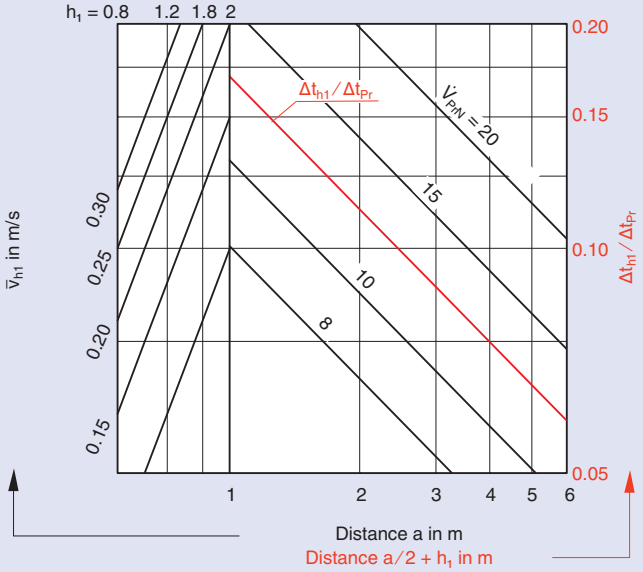
6 Nozzle type M



7 Nozzle type Z



8 Nozzle type M



Aerodynamic data

Supply air

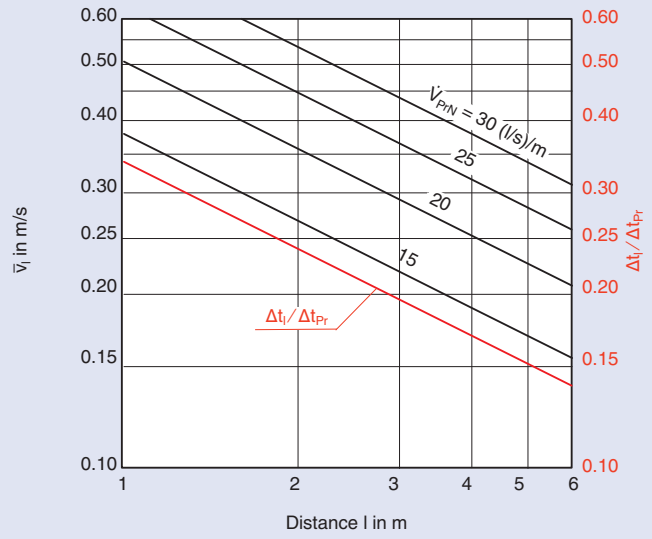
The tabulated air velocities $\bar{v}_l$ and $\bar{v}_{h1}$ are based on a regular distribution of heat loads in the space.
Strong asymmetric distribution will result in variations to the tabulated values.

The air velocities are based on horizontal discharge at right angles to the beam. Local air velocities can be significantly reduced by adjusting the control blades.

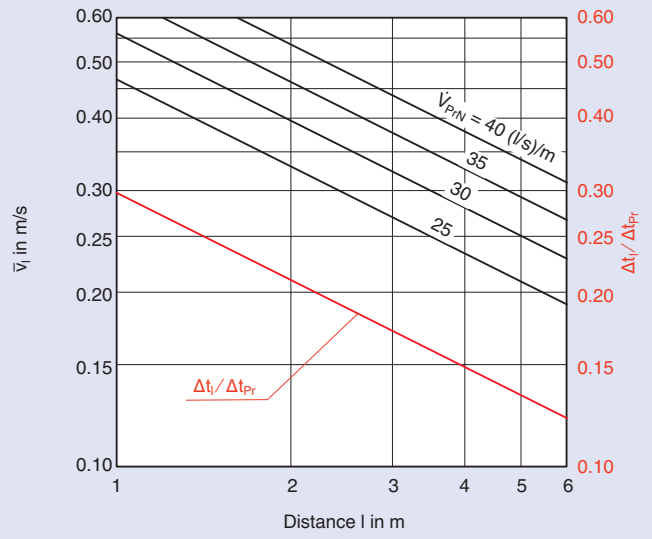
Use fresh air flow rate per meter based on nominal length $\dot{V}_{PrN}$ for diagrams 5 to 12.

Correction factors for the diagram values as a function of nominal length								
L_N in mm	**900**	**1200**	**1500**	**1800**	**2100**	**2400**	**2700**	**3000**
$\bar{v}_l$, $\bar{v}_{h1}$ from diagram	0.90	0.95	1.00	1.04	1.08	1.12	1.15	1.18
$\Delta t_l / \Delta t_{Pr}$, $\Delta t_{h1} / \Delta t_{Pr}$ from diagram	0.93	0.97	1.00	1.02	1.03	1.04	1.04	1.04

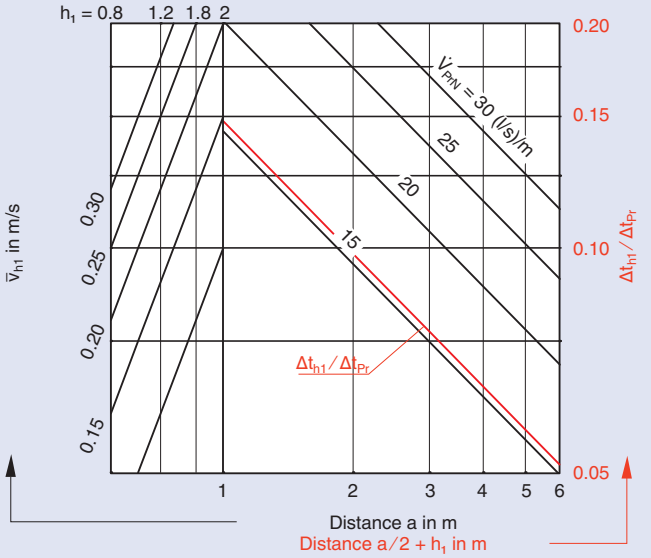
9 Nozzle type G



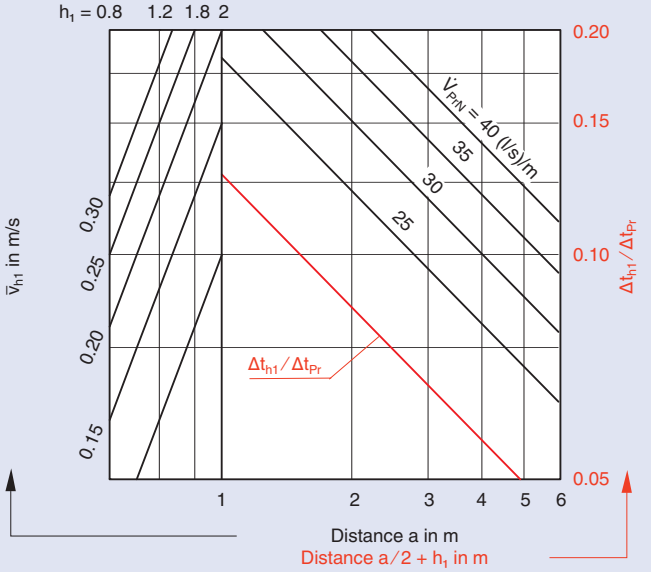
10 Nozzle type U



11 Nozzle type G



12 Nozzle type U



DID632 - Extract air			
$\dot{V}_{Ext}$		Δp_t	L_{WA}
in l/s	in m^3/h	in Pa	in dB(A)
12	43	0.5	<15
18	65	1.0	<15
24	86	1.9	<15
30	108	2.9	<15
35	126	3.9	<15
40	144	5.1	<15
50	180	8.0	20
60	216	11.6	26
70	252	15.7	30
80	288	20.6	34

Order Details

Specification text

Active chilled beams with high thermal capacities using air-water systems. Suited for flush ceiling installation in rooms with heights from approximately 2.6 to 4.0 m. Consisting of a casing with hanging brackets, connecting spigot, non-combustible nozzles and heat exchanger.

Special characteristics:

– Four options of induced air grille design
– Horizontally mounted heat exchanger without condensate drip tray suitable for dry (sensible) cooling only
– Heat exchangers for two or four pipe systems
– Supply-extract-air combination available

Nozzles in four sizes to optimise induction. Water-side connecting tails with 12 mm outer diameter plain end.

Beam options:

– Water-side connecting tails with G½" external thread, flat end seal
– Supply-extract-air combination with additional connecting spigot for extract air
– With adjustable control blades to control the air discharge direction

Materials

Casing, frame of the induced air grille (GL/GQ) and perforated induced air grille (LR/LQ) made of galvanised sheet steel, face frame and nozzle duct made of sheet steel, induced air grille (GL/GQ) made of aluminium profiles, heat exchanger made of copper tubes and formed aluminium fins, control blades to control the air discharge direction made of white plastic, flame retardant (VO) to UL 94.

Visible surfaces of the face of the beam powder-coated white (RAL 9010) or other RAL colour. Heat exchanger optionally black (RAL 9005).

Order code

DID632 - DE - LR - 2 - M - LL - AV - A1	/	1800 × 1200 × 593	/	P1	/	RAL 9016	/	G3	/	LE
1 2 3 4 5 6 7		8 9		10		11		12		13

1 Type

2 Induced air grille
- -GL Longitudinal blades
- -GQ Transverse blades
- -LR Perforated metal (circular holes)
- -LQ Perforated metal (square holes)

3 Heat exchanger
- -2 Two pipe system
- -4 Four pipe system

4 Nozzle variant
- -Z
- -M
- -G
- -U

5 Arrangement of the casings and connections
- -LL[1]
- -LR
- -ML[1]
- -MR[1]
- -RL
- -RR[1]

6 Extract air spigot
- None, no entry required
- -AV Front[2]
- -AH Rear[2]

7 Water connections
- Pipe end Ø12 mm, smooth, no entry required
- -A1 External thread G½", flat end seal

8 Total length (diffuser face) × nominal length

893 – 1500 × 900
1193 – 1800 × 1200
1493 – 2100 × 1500
1793 – 2400 × 1800
2093 – 2700 × 2100
2393 – 3000 × 2400
2693 – 3000 × 2700
2993 – 3000 × 3000

Supply-extract-air combination

1150 – 1500 × 900
1450 – 1800 × 1200
1750 – 2100 × 1500
2050 – 2400 × 1800
2350 – 2700 × 2100
2650 – 3000 × 2400
2950 – 3000 × 2700

9 Face frame width

593
598
618
623

10 Exposed surface[3]
- Powder-coated, white (RAL 9010, gloss level 50 %), no entry required
- P1 Powder-coated RAL ...

11 Colour

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

12 Surface of heat exchanger
- Untreated, no entry required
- G3 Black (RAL 9005)

13 Control blades
- Without control blades, no entry required
- LE With control blades

[1] Available from L = L_N + 200 mm

[2] Supply-extract-air combination only for arrangements LL and RR, available from L = L_N + 250 mm

[3] Colours in RAL CLASSIC collection

Order example

Make: TROX

Type: DID632 -DE -LR -2 -M -LL -AV -A1 / 1800×1200×593 / P1 / RAL 9016 / G3 / LE