

Passive chilled beams

Type TCB-RB



TCB-RB with skirt option



Passive chilled beam in nominal lengths of up to 4500 mm and with a horizontal heat exchanger

Passive chilled beam with 2-pipe heat exchanger for ceiling installation either within a ceiling void or can be freely suspended.

- Beams can be supplied in various lengths from 1200 mm up to 4500 mm in 100 mm increments
- For room heights from 2.60 m.
- Suitable for mounting within a ceiling void above a perforated ceiling tile or can be freely suspended
- Comfortable room cooling, offering low investment costs ideal for refurbishment or new build projects
- Absence of moving parts offers a silent, low maintenance cooling solution

Optional equipment and accessories:

- Flexible skirt to provide directional control of discharge air
- Standard casing surface finish of TCB unit is black (RAL 9005) powder coat. Other RAL CLASSIC colours are available on request

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Variants

Product examples

TCB-RB



TCB-RB with skirt fitted



Description



TCB-RB

Application

- Passive chilled beam Type TCB-RB for ceiling installation, either freely suspended or above an open cell ceiling, suitable for room heights from 2.60 m
- Dissipation of high heat loads using a 2-pipe heat exchanger
- Energy-efficient solution since water is used as the medium for cooling
- Passive chilled beam (no supply air) for new buildings and refurbishment projects

Variants

- TCB-RB-UK-0: No skirt
- TCB-RB-UK-S: with skirt fitted

Attachment

- PVC skirt

Useful accessories

- Connecting hoses

Nominal sizes and sizes

- Nominal length: 1200 to 4500 mm in 100 mm increments
- Nominal width: 250, 300, 350, 400, 450, 500, 550, 600 mm
- Height: 200, 250, 300 mm

Special features

- Air-water component for the dissipation of heat loads
- Horizontal heat exchanger as 2-pipe system
- Water connections at the narrow side, Ø15 mm copper pipe, with plain tails, either horizontal or 90° vertical.

Construction features

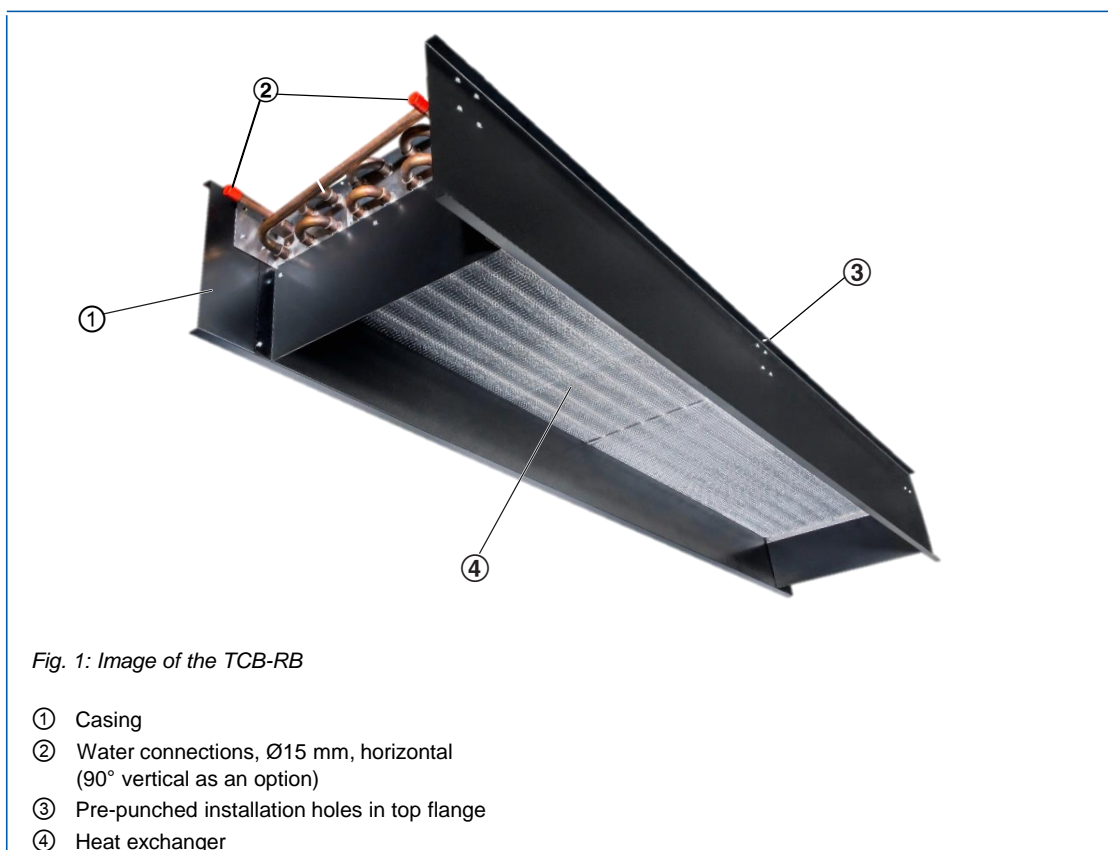
TCB-RB

- TCB-RB passive chilled beam comprises a cooling coil and casing, with return edges, which provide mounting points suitable for Ø 8mm drop rods or suitable wire support
- Casing is galvanised steel sheet, cooling coil manufactured from high grade copper pipework with self-finish aluminium fins
- Standard casing surface finish of TCB-RB units is black (RAL 9005) powder coat with coil natural fin (black coil optional). Other RAL CLASSIC colours are available on request for unit casing

TCB-RB Skirt

- The black flexible skirt is made from high quality plasticised PVC polymer directly coated onto both sides of a polyester substrate
- The PVC skirt is mechanically fixed to the bottom of the casing providing directional control of discharge air through the ceiling into the occupied zone
- The TCB-RB skirt is only available in black

Overview of the TCB-RB



Function

Functional description

Passive chilled beams are used to dissipate high heat loads. Warm room air rises due to thermal buoyancy, is cooled by the heat exchanger, then slowly flows downwards again to the occupied zone

Principal dimensions

L_N [mm]
Nominal length

Nomenclature

L_N [mm]
Nominal length

L_{WA} [dB(A)]
Sound power level

t_{Pr} [°C]
Primary air temperature

t_{wV} [C°]
Water flow temperature – cooling/heating

t_R [C°]
Room temperature

t_R [C°]
Room temperature

t_{AN} [C°]
Secondary air intake temperature

Q_{Pr} [W]
Thermal output – primary air

Q_{tot} [W]
Thermal output – total

Q_W [W]
Thermal output – water side, cooling/heating

V_{Pr} [l/s]
Primary air volume flow rate

V_{Pr} [m³/h]
Primary air volume flow rate

V_W [l/h]
Water flow rate – cooling/heating

V [l/h]
Volume flow rate

U_{tW} [K]
Temperature difference – water

U_{pW} [kPa]
Pressure drop, water side

U_{pt} [Pa]
Total pressure drop, air side

$U_{t_{Pr}} = t_{Pr} - t_R$ [K]
Difference between primary air temperature and room temperature

$U_{t_{RWV}} = t_{wV} - t_R$ [K]
Difference between water flow temperature and room temperature

$U_{t_{Wm-Ref}}$ [K]
Difference between mean water temperature and reference temperature

Quick sizing -
Single row coil

Quick sizing – nominal cooling capacity [W] to EN 14518

Length (L ₁)	Coil Width (B)	Height	Ut _{Wm-Ref} = 8 K; Ut _W = 2 K		
			Distance to ceiling		
			100 mm	200 mm	300 mm
mm		W			
1200	250	200	87	94	94
		250	104	111	111
		300	120	127	127
1500		200	145	153	153
		250	166	175	177
		300	186	196	196
2000		200	240	251	252
		250	269	281	282
		300	295	308	309
2500		200	333	347	348
		250	369	385	386
		300	402	418	419
3000		200	433	442	443
		250	469	487	488
		300	508	528	529
1200	400	200	185	209	214
		250	208	233	238
		300	227	255	260
1500		200	269	299	305
		250	297	330	336
		300	323	357	364
2000		200	406	447	455
		250	444	488	497
		300	479	525	534
2500		200	542	593	603
		250	590	645	656
		300	633	692	703
3000		200	677	739	751
		250	735	802	814
		300	787	858	871
1200	550	200	239	279	291
		250	266	309	322
		300	290	336	350
1500		200	337	388	404
		250	371	426	442
		300	401	460	477
2000		200	498	567	588
		250	544	618	641
		300	585	644	688
2500		200	657	745	771
		250	715	810	838
		300	767	868	897
3000		200	816	924	953
		250	886	1000	1034
		300	949	1070	1106

Note:

- Free area of perforation underneath the beam: 50%

Quick sizing -
Two row coil

Quick sizing – nominal cooling capacity [W] to EN 14518

Length (L ₁)	Coil Width (B)	Height	Ut _{Wm-Ref} = 8 K; Ut _W = 2 K			
			Distance to ceiling			
			100 mm	200 mm	300 mm	
mm		W				
1200	250	200	141	148	148	
		250	158	166	166	
		300	173	179	182	
1500		200	207	218	218	
		250	235	242	243	
		300	253	264	265	
2000		200	324	337	338	
		250	356	371	371	
		300	385	400	401	
2500		200	438	455	456	
		250	478	497	498	
		300	515	535	536	
3000		200	519	537	538	
		250	598	579	581	
		300	508	617	619	
1200		400	200	266	294	300
			250	289	319	325
			300	310	341	347
1500	200		363	392	402	
	250		391	426	433	
	300		415	453	459	
2000	200		513	556	565	
	250		549	595	604	
	300		581	630	639	
2500	200		607	663	673*	
	250		653	712	724*	
	300		694	757	769*	
3000	200		753	821	834*	
	250		809	882	896*	
	300		860	938	952*	
1200	550		200	327	372	385
			250	353	401	415
			300	377	427	442
1500		200	440	490	507	
		250	468	526	544	
		300	497	558	576	
2000		200	557	631	653*	
		250	600	680	703*	
		300	639	724	749*	
2500		200	728	823	852*	
		250	784	886	917*	
		300	834	946	976*	
3000		200	901	1018	1053*	
		250	970	1095	1133*	
		300	1032	1165	1205*	

Note:

* 2 circuit

- Free area of perforation underneath the beam: 50%

Order code

TCB-RB

TCB-RB – UK – 00 – S / 3000 × 450 × 200 / 2H-1-N / P4 / RAL 9005 / 20%												
1	2	3	4	5	6	7	8	9	10	11	12	13

[1] Type

TCB-RB Passive chilled beam

[2] Market

UK

[3] Not used

[4] Skirt

0 No skirt
S Skirt

[5] Beam length (L₁)

1200 – 4500 (in 100mm increments)
(Note: Overall beam length L₁ +100 mm)

[6] Coil width (B)

250
300
350
400
450
500
550
600

[7] Stack height (H)

200
250
300

[8] Coil rows

1V 1 row vertical connections
1H 1 row horizontal connections
2V 2 rows vertical connections
2H 2 rows horizontal connections

[9] Coil circuits

1 Single hydraulic circuit
2 Twin hydraulic circuit

[10] Coil finish

N Natural finish coil
B Black finish coil

[11] Case finish

P4 Standard finish (RAL 9005-20%)
P6 Powder coat finish (RALXXXX-XX%)

[12] Colour

For P6 only
RAL...(specify RAL colour)

[13] Gloss level

For P6 only
...% (specify gloss level)

Order example

TCB-RB-UK-00-S/3000x450x200/2H-1-N/P4/RAL 9005/20%

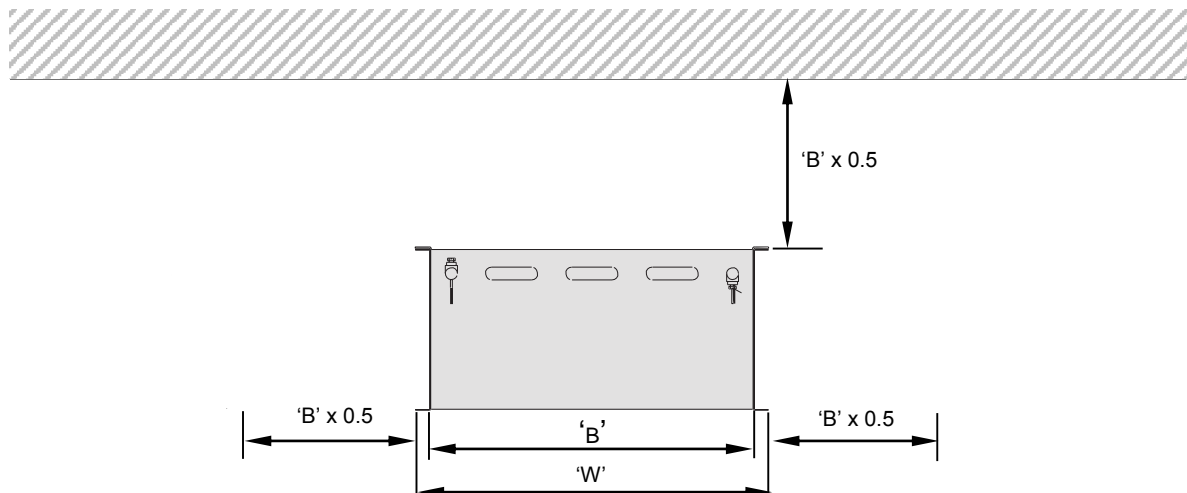
Type	TCB-RB Passive chilled beam
Market	Manufactured by TROX UK
Not used	Not used
Skirt	With skirt
Beam length (L₁)	3000 mm
Coil width (B)	450 mm
Stack height	200 mm
Coil rows	2 rows with horizontal connectors
Coil circuit	Single hydraulic circuit
Coil finish	Natural
Case finish	Standard finish
Colour	RAL 9005
Gloss level	20%

Design considerations

Design considerations

- Passive chilled beams require a minimum gap between the underside of the soffit and the top of the cooling coil. The performance of the convection process can be restricted if the free area above the coil is reduced
- To achieve optimum performance a return air path should be provided to allow room air back into the ceiling void to feed the heat exchanger. The optimum arrangement for this return air path is to provide 50% of the coil width each side of the chilled beam unit
- The performance data within this leaflet is based on:
 - A return air passage through the perforated ceiling being equal to the width of the coil (i.e. return area is each to the discharge area below the coil)
 - The free area of the return air path is the same as the discharge path (50%)
 - The air fed from the top of the coil feeds the coil from both sides
- Refer to performance tables
- For alternative arrangements or project specific selections refer to the TROX Technical Department
- TROX can also offer a range of customised exposed beams, including multi service options. Refer to TROX Technical Department for more details

TCB-RB design considerations



Dimensions

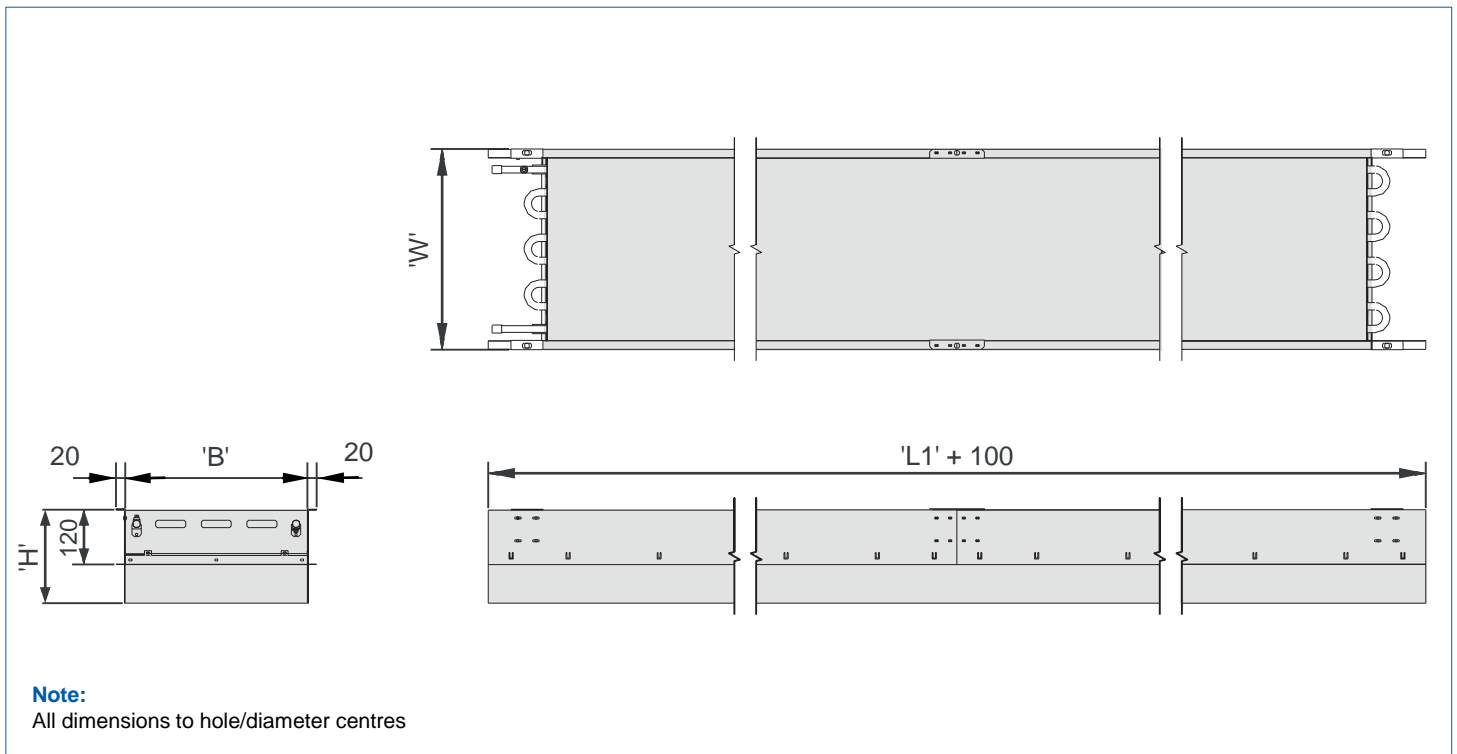
Length	1200 to 4500 mm in 100 mm increments
Nominal width	250, 300, 350, 400, 450, 500, 550, 600 mm
Height	200, 250, 300 mm
Cooling capacity	Refer to tables
Max. operating pressure, water side	15 bar

Dimensions in mm			
L ₁	B	W	H
1200	250	290	200
↓	300	340	250
	350	390	300
	400	440	
	450	490	
	500	540	
	550	590	
4500	600	640	

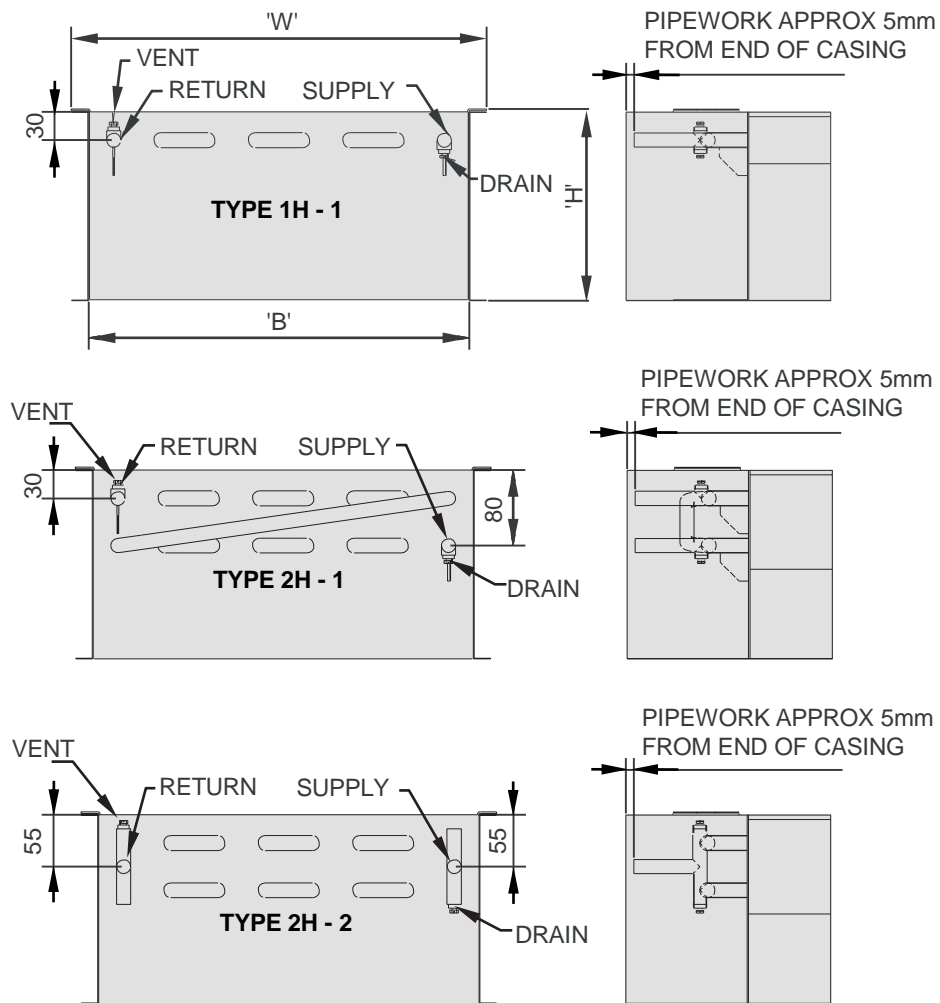
Beam Weight	
Beam Type	Weight (kg/m)
TCB-RB/RB-S	15

Note:
(coil width 500 mm)

TCB-RB dimensions

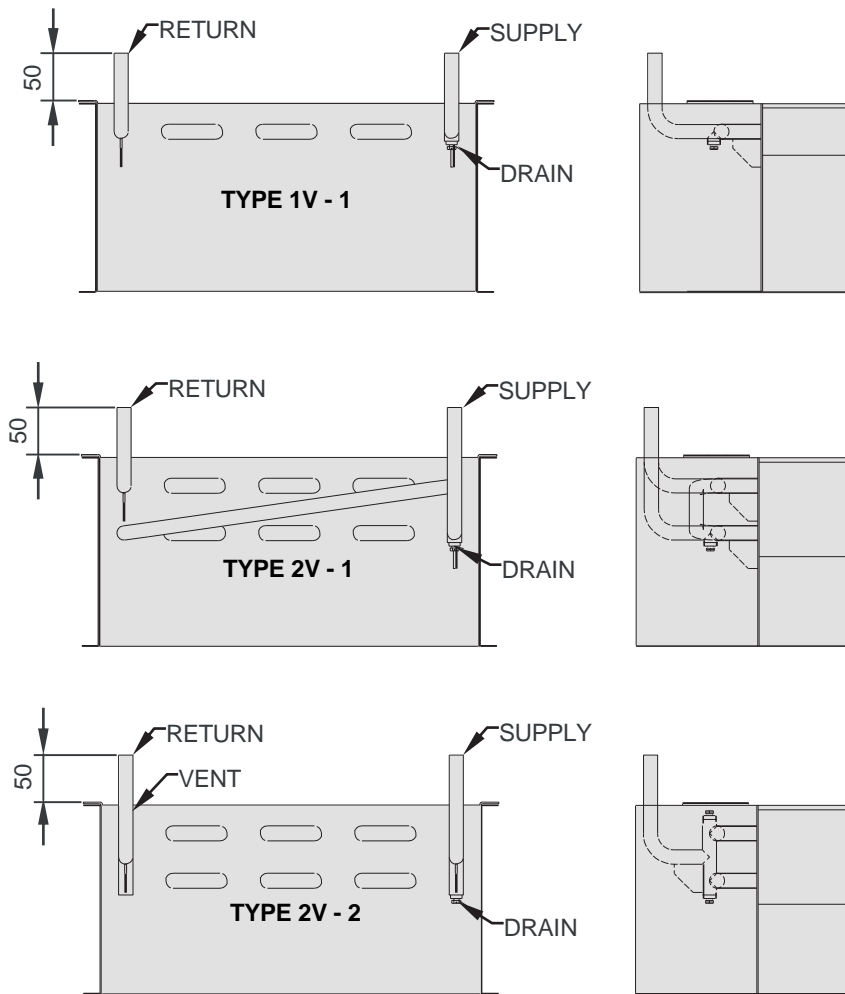


TCB-RB dimensions and connection options (horizontal)



Note:
 All dimensions to hole/diameter centres

TCB-RB dimensions and connection options (vertical)



Note:
All dimensions to hole/diameter centres

Installation and maintenance

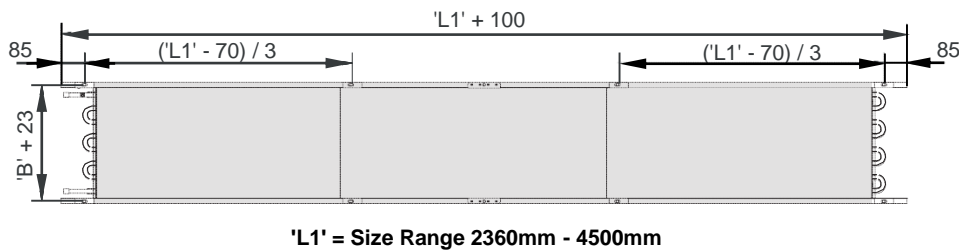
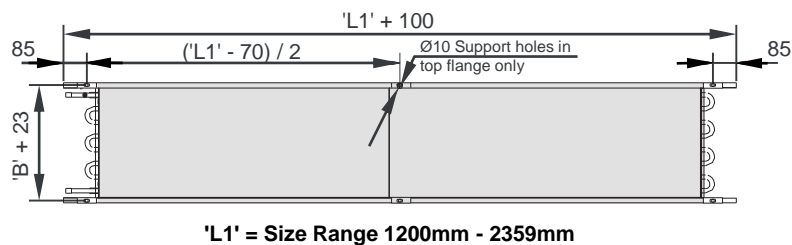
Installation

- Installation either freely suspended or above an open cell ceiling
- Installation and connections to be performed by others; fixing, connection and sealing material to be provided by others
- TROX TCB-RB chilled beams are provided with $\text{Ø}10$ mm holes, pre-punched within the top flange to fix it to the soffit using threaded rods, metal hangers, or wires (not supplied)
- Heat exchangers are fitted with water flow and water return connections at the narrow side
- Ensure all connection pipework is independently supported

Maintenance

- No moving parts, hence low maintenance
- The heat exchanger can be vacuumed with a vacuum cleaner if necessary

TCB-RB installation details



Note:
All dimensions to hole/diameter centres