ENGINEERING
TOMORROW

Data sheet

Brazed heat exchanger XB

Description



The XB is a range of copper brazed plate heat exchangers for use in District Heating (DH) and District Cooling (DC) applications, e.g. domestic hot water production, district heating substation to separate the network from house installation or as pressure breakers. The range consist of numerous individual plate sizes of which several can be delivered with different corrugation depth or pattern, thus ensuring that the optimal heat exchanger can be selected for all applications.

Main data:

- Min. temperature –10 °C
  Max. temperature +180 °C
- Max. working pressure 25 bar
- Flow media
  DH: Circulation water / glycolic water up to 50 %
  DC: ethylene-, propylene-glycolic water, ethanol-water solutions and other suitable heat transfer media. (Please contact your Danfoss representative).
- Connection size DN (threaded or flanged) 20-100

Approvals:

- CE certificate according (PED) 97/23/EC
- GOST/Russia
- SVGW/Switzerland
- VA/Denmark

Ordering

Explanation, XB type

XB 51L – 1 – 10 — Number of plates

- Pass of the heat exchanger
  1 = 1-pass
  2 = 2-pass
- Plate type
- Plate size
- B = Brazed heat exchanger

Plate types
Several of the heat exchangers can be delivered in three different basic corrugations: H M L making them optimal for different applications. Please see the characteristics below.

	H- types	M- type	L-type
Channel	Small	Medium Mix of H/L	Large
Angle if chevron pattern	Obtuse		Acute
Heat transfer	Relatively high	Medium	Relatively low
Pressure drop	Relatively high	Medium	Relatively low

Micro Plate Heat Exchanger (MPHE) principle:
Traditionally the different versions have been created by using different angles in the chevron pattern of the heat exchanger plates.

However new and more efficient heat transfer patterns have been developed. Characteristic for the pattern is that the corrugation consists of dimples in different size and shape, creating Micro Plate heat exchangers. Micro Plate heat exchangers offers same heat transfer with lower weight, size and pressure drop. Besides better heat transfer Micro Plate heat exchangers offers higher mechanical strength.

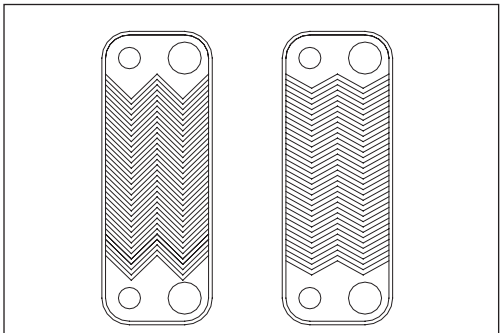
1-pass brazed heat exchangers type XB

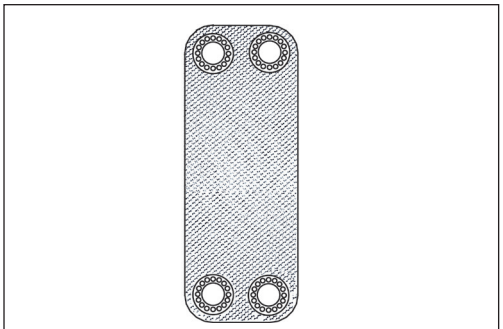
Type	XB04-1	XB24-1
Connection	Thread G ¾	Thread G ¾
No of plates, n	Code No.	
8	**004B1011**	-
10	**004B1012**	**004B1027**
16	**004B1014**	**004B1028**
20	**004B1016**	**004B1029**
26	**004B1017**	**004B1031**
30	**004B1019**	**004B1032**
36	**004B1021**	**004B1033**
40	**004B1023**	**004B1034**
50	**004B1024**	**004B1067**
60	**004B1026**	**004B1068**
70	-	**004B1069**

The heat exchanger can consist of plates type L or plates type H.

The H- type plate has larger herring bone angle than the L- type plate. H- type plate fits better for certain temperatures than L- type. H- type heat exchangers have better heating capacity, but they also have higher pressure loss.

The plate set can also be a combination of these two types. If every other plate is H-type plate and every other plate is L-type plate, the combination is called type M.



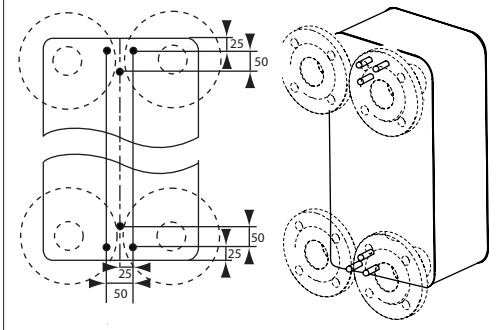


Ordering *(continued)*

1-pass brazed heat exchangers type XB

Type	XB51L-1	* XB51L-1 SB	* XB51L-1 SB	XB70L-1 [2]	XB70M-1 [2]	XB70H-1 [2]
Connection	Thread G 2	Thread G 2	Flange DN 50	Flange DN 65/100 [1]	Flange DN 65/100 [1]	Flange DN 65/100 [1]
No of plates, n	Code No.					
10	**004B1141**	-	-	-	-	-
16	**004B1142**	-	-	-	-	-
20	**004B1532**	-	-	-	-	-
26	**004B1533**	-	-	-	-	-
30	**004B1194**	**004B1345**	-	-	-	-
36	**004B1195**	**004B1346**	-	-	-	-
40	**004B1196**	**004B1347**	-	-	-	-
50	**004B1197**	**004B1348**	-	**004B2425**	**004B2000**	**004B2012**
60	**004B1198**	-	**004B1350**	**004B2430**	**004B2001**	**004B2013**
70	**004B1199**	-	**004B1351**	**004B2435**	**004B2002**	**004B2014**
80	**004B1200**	-	**004B1352**	**004B2440**	**004B2003**	**004B2015**
90	**004B1201**	-	**004B1353**	**004B2445**	**004B2004**	**004B2016**
100	**004B1202**	-	**004B1355**	**004B2450**	**004B2005**	**004B2017**
110	**004B1203**	-	**004B1356**	**004B2455**	**004B2006**	**004B2018**
120	**004B1204**	-	**004B1357**	**004B2460**	**004B2007**	**004B2019**
130	**004B1534**	-	-	-	-	-
140	**004B1536**	-	-	**004B2470**	**004B2008**	**004B2020**
160	-	-	-	**004B2480**	**004B2009**	**004B2021**
180	-	-	-	**004B2490**	**004B2010**	**004B2022**
200	-	-	-	**004B2499**	**004B2011**	**004B2023**

[1] *primary side (PN 25) / secondary side (PN 16)*
[2] *delivered with mounting brackets ex factory*
* **Special versions; SB:** *This version includes 6 supporting bolts M12×20*



SB version: Supporting bolts in the front.

Special versions
Special versions for different mediums, connections/couplings, max. operating pressures, materials and capacities are available on request. Please contact the local sales representative for details

Ordering *(continued)*

2-pass brazed heat exchangers type XB

Type	XB04-2	XB51L-2
Connection	Thread G ¾	Thread G 2
No of plates [1], n	Code No.	
10/10	-	**004B1147**
16/16	-	**004B1148**
20/20	**004B1036**	**004B1149**
26/26	**004B1037**	**004B1150**
30/30	**004B1038**	**004B1292**
36/36	**004B1039**	**004B1293**
40/40	**004B1040**	**004B1294**
46/46	**004B1041**	**004B1295**
50/50	**004B1042**	**004B1296**
56/56	**004B1043**	**004B1297**
60/60	**004B1044**	**004B1298**
66/66	-	**004B1299**
70/70	-	**004B1300**

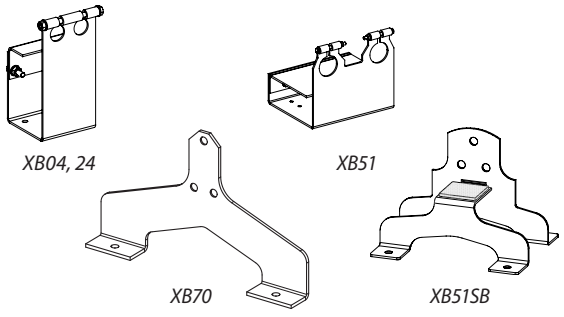
[1] *afterheating/preheating*

Accessories: Tailpieces

	Description	Suitable for	Connection	Code No. [1]
	Solder tailpieces	XB04, XB24	G ¾ / 15 mm	**004B2945**
			G ¾ / 18 mm	**004B2946**
		XB51L	G 2 / 28 mm	**004B2910**
			G 2 / 35 mm	**004B2911**
			G 2 / 42 mm	**004B2912**
	Weld-on tailpieces	XB04, XB24	G ¾ / DN 20	**004B2944**
		XB51L	G 2 / DN 32	**004B2907**
			G 2 / DN 40	**004B2908**
			G 2 / DN 50	**004B2909**
	Threaded tailpieces	XB04, XB24	G ¾ / G ¾	**004B2947**
			G ¾ / G 1	**004B2953**

[1] *One set contains 2 tailpieces with union nuts and gaskets*

Accessories: Mounting brackets for brazed heat exchanger type XB



Suitable for	Code No.
XB04, XB24	**004B2948**
XB51	**004B2923**
XB70	**004B2925** [1]
XB51SB, 30-60 plates	**004B1788**
XB51SB, 70-100 plates	**004B1789**
XB51SB, 110-160 plates	**004B1790**

[1] *The brackets are delivered with XB70, they will thus be needed only for service or special purposes.*

Ordering *(continued)*

Accessories: Insulation for 1-pass brazed heat exchangers type XB

Type	XB51-1	XB70-1
No of plates	Code No.	
10	004B1924	-
16		-
20		-
26		-
30		-
36		-
40		-
50	004B1935	004B2535
60		
70		
80	004B1950	004B2550
90		
100		
110	004B1960	004B2570
120		
140	004B3735	
160	-	004B2599
180	-	
200	-	

Accessories: Insulation for 2-pass brazed heat exchangers type XB anger

Type	XB51-2
No of plates [1]	Code No.
30/30	004B1935
36/36	
40/40	004B1950
46/46	
50/50	
56/56	004B3730
60/60	
66/66	004B3735
70/70	

[1] *afterheating/preheating*

Accessories: Insulation properties

Type			PU (Polyurethane) see page 12 for XB51	Coated steel sheet and polyester insulation, see page 12 for XB70
Heat conductivity, λ		W/mK	0,035	0,042
Max temperature	Permanent	°C	130	150
	Short term peak		160	180
Wall thickness		mm	20	30

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Technical data

1-pass brazed heat exchangers type XB

Type	XB04-1	XB24-1	XB51L-1	XB70L-1 XB70M-1 XB70H-1
Max. working pressure (bar)	25 (16) [1]			25(16) [1]/16 [3]
Min. / Max. temperature [2] (°C)	-10/180			
Flow medium	DH: Circulation water / glycolic water up to 50 % DC: ethylene-, propylene-glycolic water, ethanol-water solutions and other suitable heat transfer media. (Please contact your Danfoss representative).			
Volume/channel (litres)	0,060	0,100	0,210	0,55/0,70 [3]
Connection type	Cylindrical external thread acc. to DIN ISO 228/1			Flange, DN
Connection size	G ¾	G ¾	G 2	65 [4]/100 [5] [3]
Plate material	Stainless steel, EN 1.4404 (AISI 316L)			
Brazing material	Copper			

[1] *16 bar versions are available on enquiry (all types except XB 04-1, 24-1). XB 70-1 secondary side: max. working pressure 16 bar*
[2] *At flow temperatures below 2 °C glycolic water must be used*
[3] *Primary side / secondary side*
[4] *Flanges PN 25 acc. to EN 1092, facing type B (B1)*
[5] *Flanges PN 16 acc. to EN 1092, facing type B (B1)*

2-pass brazed heat exchangers type XB

Type	XB04-2	XB51L-2
Max. working pressure (bar)	25 (16)[1]	
Max. operating temp. (°C)	180	
Min. operating temp.[2] (°C)	–10	
Flow medium	Circulation water / glycolic water up to 50 %	
Volume/channel (litres)	0,060	0,210
Connection type	Cylindrical external thread acc. to DIN ISO 228/1	
Connection size	G ¾	G 2
Plate material	Stainless steel, mat. no. 1.4404	
Brazing material	Copper	

[1] *16 bar versions are available on enquiry (all types except XB 04-2).*
[2] *At flow temperatures below 2 °C glycolic water must be used*

To avoid corrosion and leakage in the copper brazed plate heat exchangers please observe Danfoss recommendations for the water quality in the guideline on www.heating.danfoss.com (Documentation).

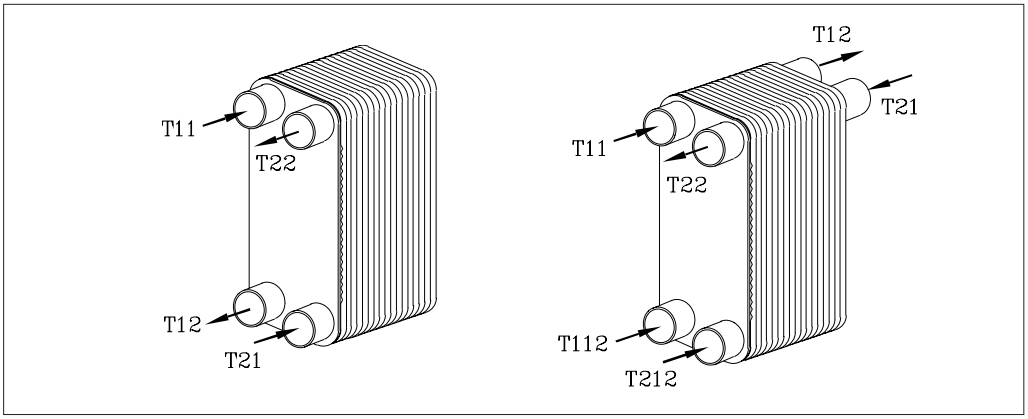
For the standard range of heat exchangers material 1.4404 (316L) has been selected to achieve:

- good delivery service
- good balance between low price and avoiding corrosion in the most common applications
- 1.4404 offers better corrosion properties than e.g. 1.4301 but is more expensive.

Attention must always be paid to the water condition when selecting material for a heat exchanger. The heat exchangers can be delivered in other materials on request.

Design and function

T11 - Primary side in
T12 - Primary side out
T112 - Primary side second inlet (2-pass)
T21 - Secondary side in
T22 - Secondary side out
T212 - Secondary side second inlet (2- pass)



The heat exchangers are made of shape-pressed and brazed heat exchange plates, between which the flow channels are created. The heavy turbulence and counterflow principle enable efficient heat transfer. The task of the heat exchanger is to transfer heat from the primary to secondary flow through a heat transfer plate thus preventing the flows from mixing with each other.

The choice of heat exchanger is determined by the desired heat output, required temperatures and the permitted pressure losses.

The 2-pass heat exchanger should be chosen for domestic hot water. The 2-pass heat exchanger will often cool the district heating water to below 25 °C. This capacity can be achieved by using a larger temperature difference, a smaller water flow and a heat exchanger with an optimum heat transfer area. This will affect the choice of motorized control valve, for instance.

Sizing and selection

Dimensioning and selection of heat exchangers should be carried out with the support of the Danfoss dimensioning program for heat exchangers.

Mounting

It is recommended to mount heat exchangers on their base in vertical position. This will assure the best venting and the least fouling. It is recommended that all pipes connected to the heat exchanger are equipped with shut-off valves for maintenance purposes.

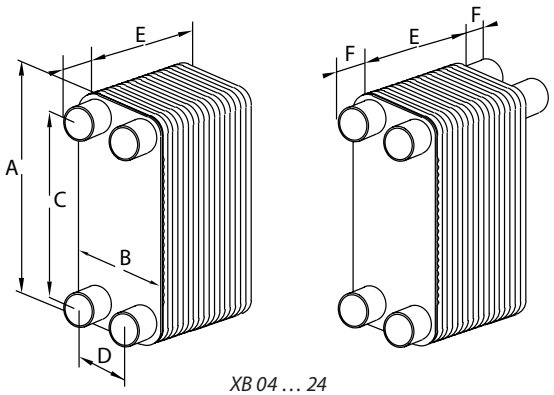
The pipes to be connected must be mounted so that the strain caused by the thermal expansion, for instance, does not harm the heat exchanger.

The pipes must be equipped with brackets to prevent any torsional stress concentration at the heat exchanger's pipe connections.

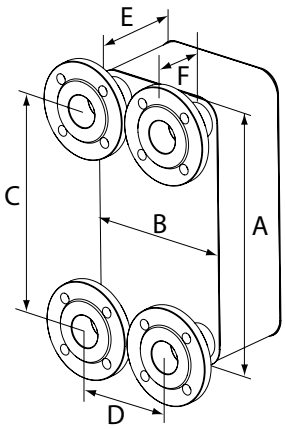
It is recommended that the heat exchanger is equipped with insulation.

Use a safety valve between a heat exchanger and a shut off valve on the secondary side to avoid breaking of the heat exchanger due to thermal expansion of liquid.

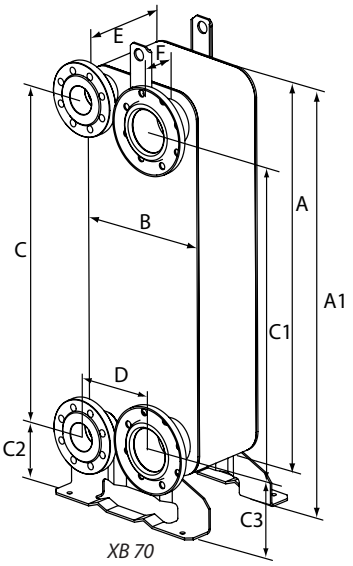
Dimensions



XB 04 … 24



XB 51 … SB



XB 70

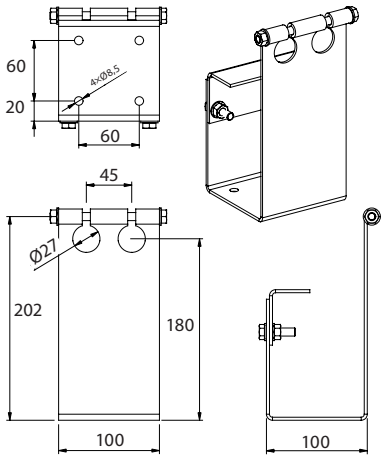
Type	Connection	External dimensions [mm]						Weight empty [kg]
		A/A1	B	C/C1 C2/C3	D	E	F	
XB04-1-…	G ¾ [1]	296	93	248	45	11 + 2,25 × n	20	0,9 + n × 0,085
XB04-2-…	G ¾ [1]	296	93	248	45	11 + 2,25 × n	20	1,13 + n × 0,085
XB24-…	G ¾ [1]	490	93	442	45	11 + 2,25 × n	20	1,4 + n × 0,15
XB51L-… XB51… SB [5]	G 2 [1]	466	256	380	170	12 + 2,6 × n	50	8 + n × 0,38
XB51… SB [6]	DN 50 [2]	466	256	380	170	12 + 2,6 × n	90	18,8 + n × 0,38
XB70L-… XB70M-… XB70H-…	DN 65 [2] / 100 [3] [4]	990/1110	365	861/816 180/203	214	10 + 2,7 × n	90	40 + n × 1,50

n = number of plates (for 2-pass heat exchangers the sum of fterheating and preheating plates)

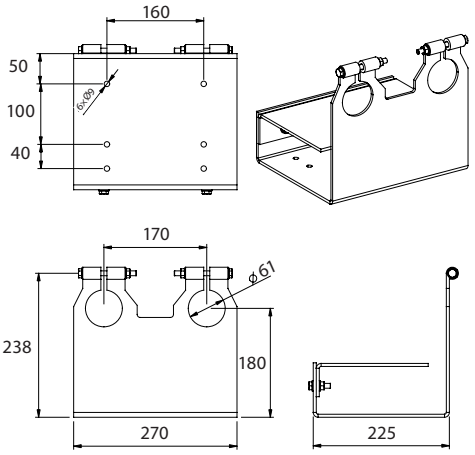
1) *Cylindrical external thread acc, to DIN ISO 228/1*
2) *Flanges PN 25 acc, to EN 1092, facing type B (B1)*
3) *Primary side / secondary side*
4) *Flanges PN 16 acc, to EN 1092, facing type B (B1)*
5) *For number of plates n < 60*
6) *For number of plates n ≥ 60*

Dimensions *(continued)*

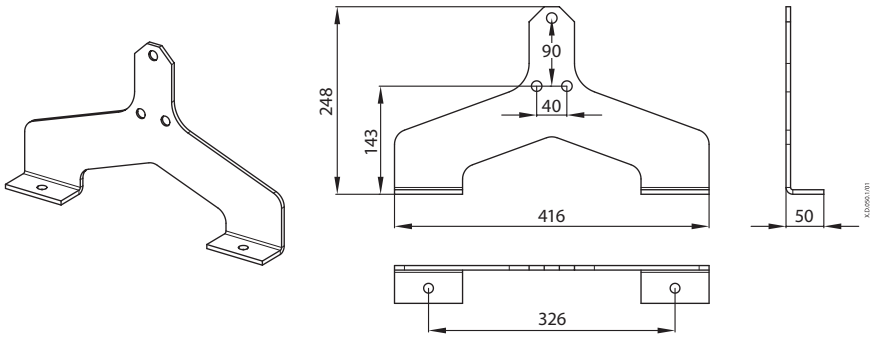
Mounting brackets



XB04, 24 bracket



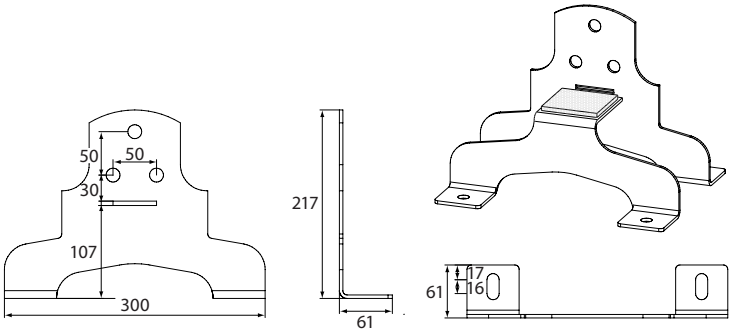
XB51 bracket

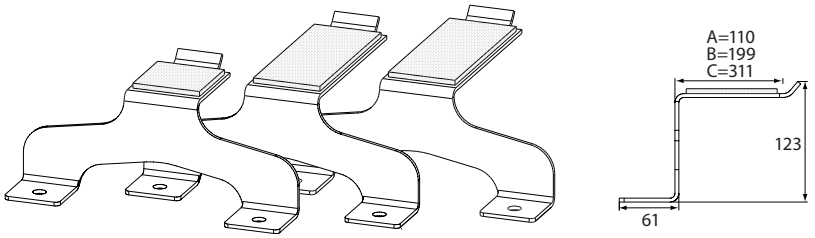


XB70 bracket

Dimensions *(continued)*

Mounting brackets

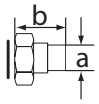
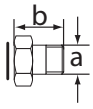




A= 30-60 plates B= 70-100 plates C= 110-160 plates

XB51SB

Tailpieces

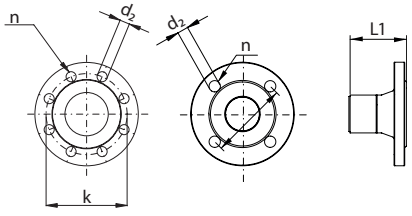
	Description	Connection	Code No.	a	b	SW [1]
				mm		
	Solder tailpieces	G ¾ / 15 mm	**004B2945**	15	35	32
		G ¾ / 18 mm	**004B2946**	18	35	32
		G 2 / 28 mm	**004B2910**	32	45	65
		G 2 / 35 mm	**004B2911**	39	45	65
		G 2 / 42 mm	**004B2912**	51	45	65
	Weld-on tailpieces	G ¾ / DN 20	**004B2944**	21,2	35	32
		G 2 / DN 32	**004B2907**	42,4	45	65
		G 2 / DN 40	**004B2908**	48,5	45	65
		G 2 / DN 50	**004B2909**	58	43	65
	Threaded tailpieces	G ¾ / G ¾	**004B2947**	¾"	40	32
		G ¾ / G 1	**004B2953**	1"	22	32

[1] *Union nut, width across flats*

Flanges

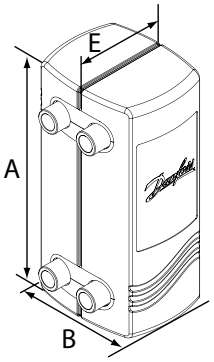
Type	DN	L1	k	d_2	n	PN
	mm					(bar)
XB51... SB	50	90	125	18	4	25
XB70	65/100 [1]	90	145/180 [1]	18	8	25/16 [1]
XB70	65/100 [1]	90	145/180 [1]	18	4/8 [1]	16

[1] *Primary side/secondary side*

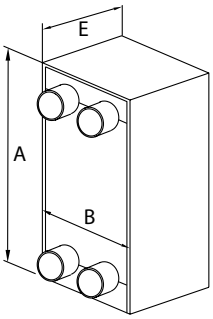


Dimensions *(continued)*

Insulation program (polyurethane) for brazed heat exchangers type XB



XB51L



XB70

Insulations set of PU type for XB70 can be delivered on request. Please contact the local sales representative for details.

Insulation dimensions for 1-pass brazed heat exchangers type XB

Type	XB51-1	XB70-1
No of plates	mm	
10	**004B1924** A=512 B=320 E=197	-
16		-
20		-
26		-
30		-
36		-
40		-
50	**004B1935** A=512 B=320 E=257	**004B2535** A=1202 B=445 E=259
60		
70		
80	**004B1950** A=512 B=330 E=337	**004B2550** A=1202 B=445 E=340
90		
100		
110	**004B1960** A=512 B=340 E=392	**004B2570** A=1202 B=445 E=448
120		
140	**004B3735** A=512 B=346 E=445	
160	-	**004B2599** A=1202 B=445 E=610
180	-	
200	-	

Insulation dimensions for 2-pass brazed heat exchangers type XB

Type	51-2
No of plates[1)]	mm
30/30	**004B1935** A=512 B=320 E=257
36/36	
40/40	**004B1950** A=512 B=330 E=337
46/46	
50/50	
56/56	**004B3730** A=512 B=340 E=392
60/60	
66/66	**004B3735** A=512 B=346 E=445
70/70	

[1)] *afterheating/preheating*

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