

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 $+180^{\circ}\text{C}$
- 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

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

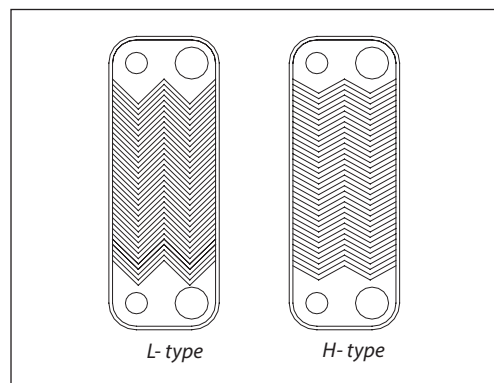
The H- type plate has larger herring bone angle than the L- type plate. H- type plate fits better for certain temperatures than L- type. H- type heat exchangers have better heating capacity, but they also have higher pressure loss.

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.

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.

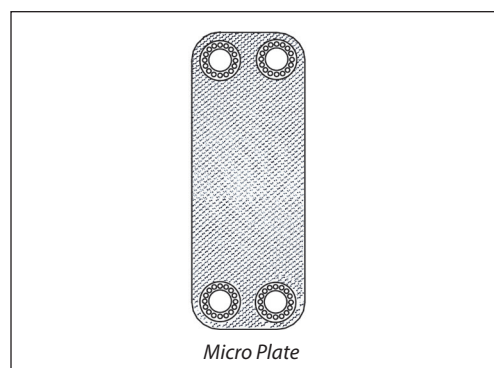
	H- types	M- type	L- type
Channel	Small	Medium Mix of H/L	Large
Angle if chevron pattern	Obtuse		Acute
Heat transfer	Relatively high	Medium	Relatively low
Pressure drop	Relatively high	Medium	Relatively low



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 3/4	Thread G 3/4
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

Ordering (continued)

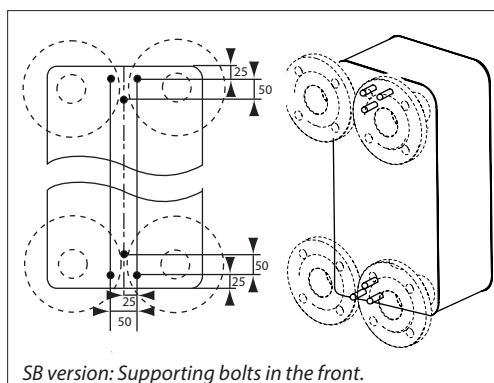
1-pass brazed heat exchangers type XB

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



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

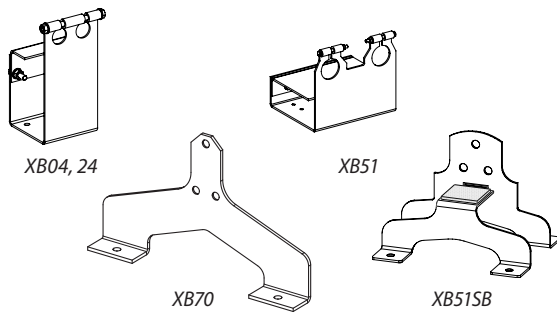
¹⁾ afterheating/preheating

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		-
60	004B1935	004B2535
70	004B1950	004B2550
80		
90		
100	004B1960	004B2570
110		
120	004B3735	004B2599
140		
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	
46/46	004B1950
50/50	
56/56	
60/60	004B3730
66/66	
70/70	004B3735

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	130	150
	Short term peak	160	180
Wall thickness	mm	20	30

Technical data

1-pass braze 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⁾
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 braze 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 braze plate heat exchangers please observe Danfoss recommendations for the water quality in the guideline on www.heating.danfoss.com

(Documentation).

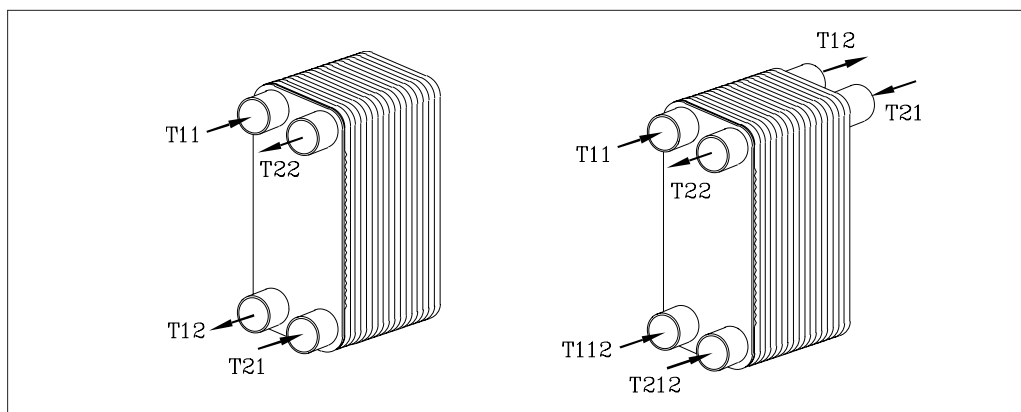
For the standard range of heat exchangers material 1.4404 (316L) has been selected to achieve:

- 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.

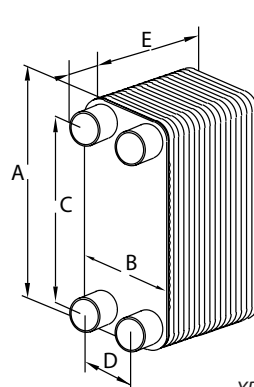
The pipes to be connected must be mounted so that the strain caused by the thermal expansion, for instance, does not harm the heat exchanger.

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

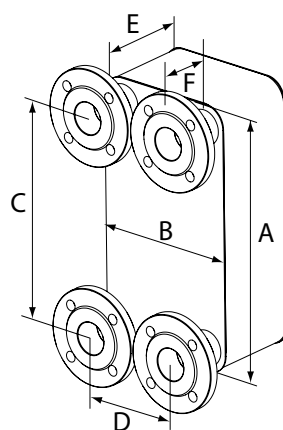
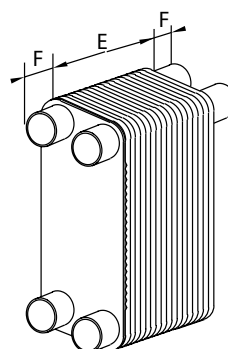
It is recommended that the heat exchanger is equipped with insulation.

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.

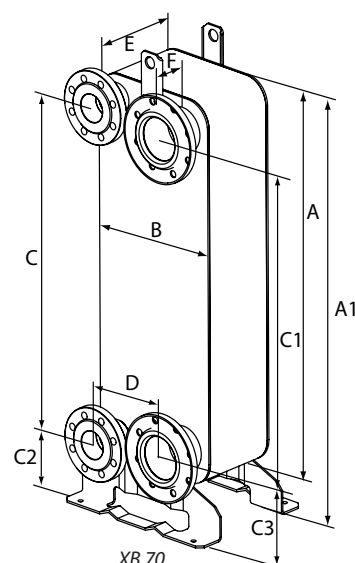
Dimensions



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 3/4 ¹⁾	296	93	248	45	11 + 2,25 × n	20	0,9 + n × 0,085
XB04-2-...	G 3/4 ¹⁾	296	93	248	45	11 + 2,25 × n	20	1,13 + n × 0,085
XB24-...	G 3/4 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

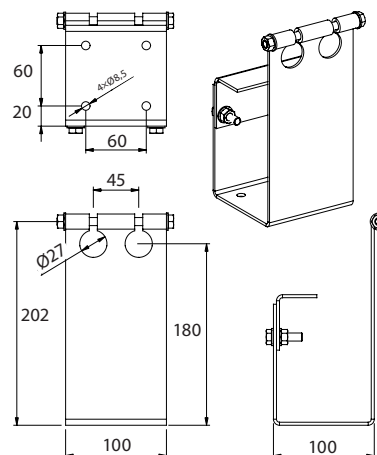
⁴⁾ Flanges PN 16 acc. to EN 1092, facing type B (B1)

⁵⁾ For number of plates *n* < 60

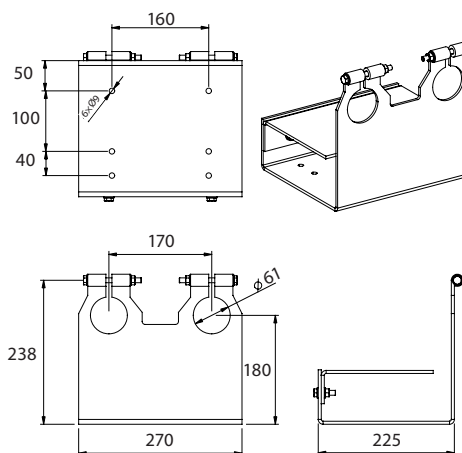
⁶⁾ For number of plates *n* ≥ 60

Dimensions (continued)

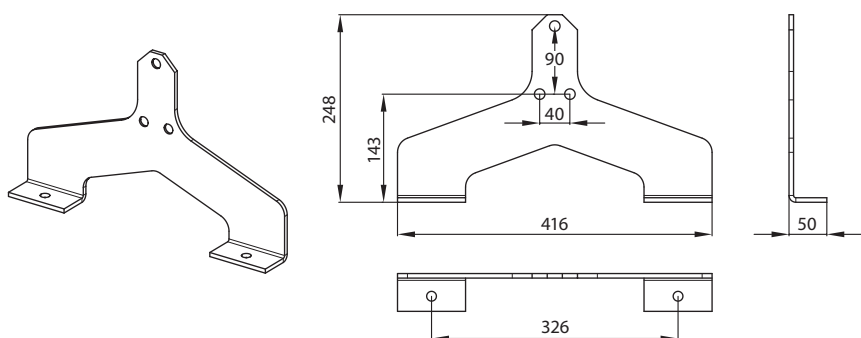
Mounting brackets



XB04, 24 bracket



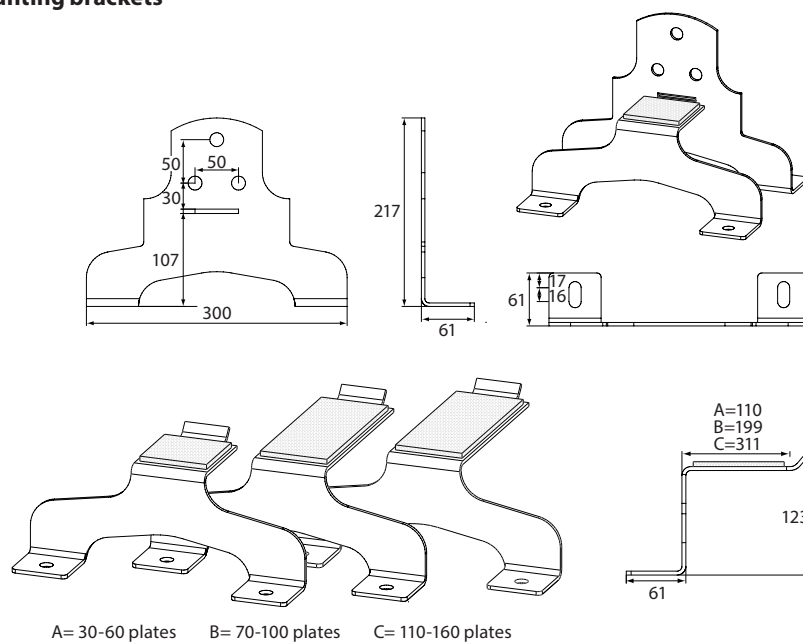
XB51 bracket



XB70 bracket

Dimensions (continued)

Mounting brackets



XB51SB

Tailpieces

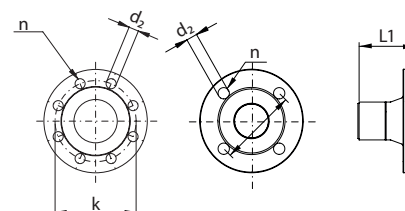
	Description	Connection	Code No.	a	b	SW ¹⁾
				mm		
	Solder tailpieces	G ¾ / 15 mm	004B2945	15	35	32
		G ¾ / 18 mm	004B2946	18	35	32
		G 2 / 28 mm	004B2910	32	45	65
		G 2 / 35 mm	004B2911	39	45	65
		G 2 / 42 mm	004B2912	51	45	65
	Weld-on tailpieces	G ¾ / DN 20	004B2944	21,2	35	32
		G 2 / DN 32	004B2907	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

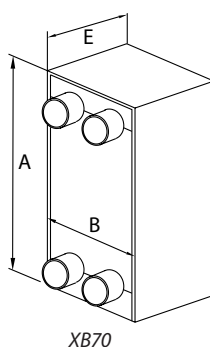
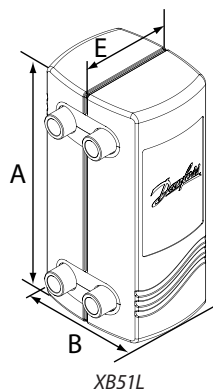
Type	DN	L1	k	d ₂	n	PN (bar)
XB51... SB	50	90	125	18	4	25
XB70	65/100 ¹⁾	90	145/180 ¹⁾	18	8	25/16 ¹⁾
XB70	65/100 ¹⁾	90	145/180 ¹⁾	18	4/8 ¹⁾	16

¹⁾ Primary side/secondary side



Dimensions (continued)

Insulation program (polyurethane) for brazed heat exchangers type XB



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	004B2599 A=1202 B=445 E=610
160		
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	
46/46	004B1950 A=512 B=330 E=337
50/50	
56/56	
60/60	004B3730 A=512 B=340 E=392
66/66	
70/70	

¹⁾ afterheating/preheating

