Danfoss Brazed Plate Heat Exchanger type PHE

Introduction

Providing the ability to remove and transfer heat from one medium to another, Danfoss brazed plate heat exchangers are a cost-saving alternative to conventional evaporators and condensers used for all types of commercial and industrial refrigeration, cooling and air conditioning applications.

Less space and weight, wide range of sizes and cooling capacities, high heat transfer surface, great versatility, available for high-.viscosity fluids and low energy consumption are just a few of the many items on its benefits list.

Features

- *Compact design*
- *Low fouling*
- *High corrosion resistance*
- *Easy to service*
- *NPT or BSP connection type of water/brine side*

Approvals

CE certificate according to (PED) 97/23/EC
UL
RoHS

Technical data

Rated capacity	3.5 ~ 210 kW for R22 as evaporator
Design temperature	–196/+200°C
Standard design pressure	30 bar
Test pressure	45 bar
Standard plate material	AISI 316L
Brazing material	Copper

Nomenclature

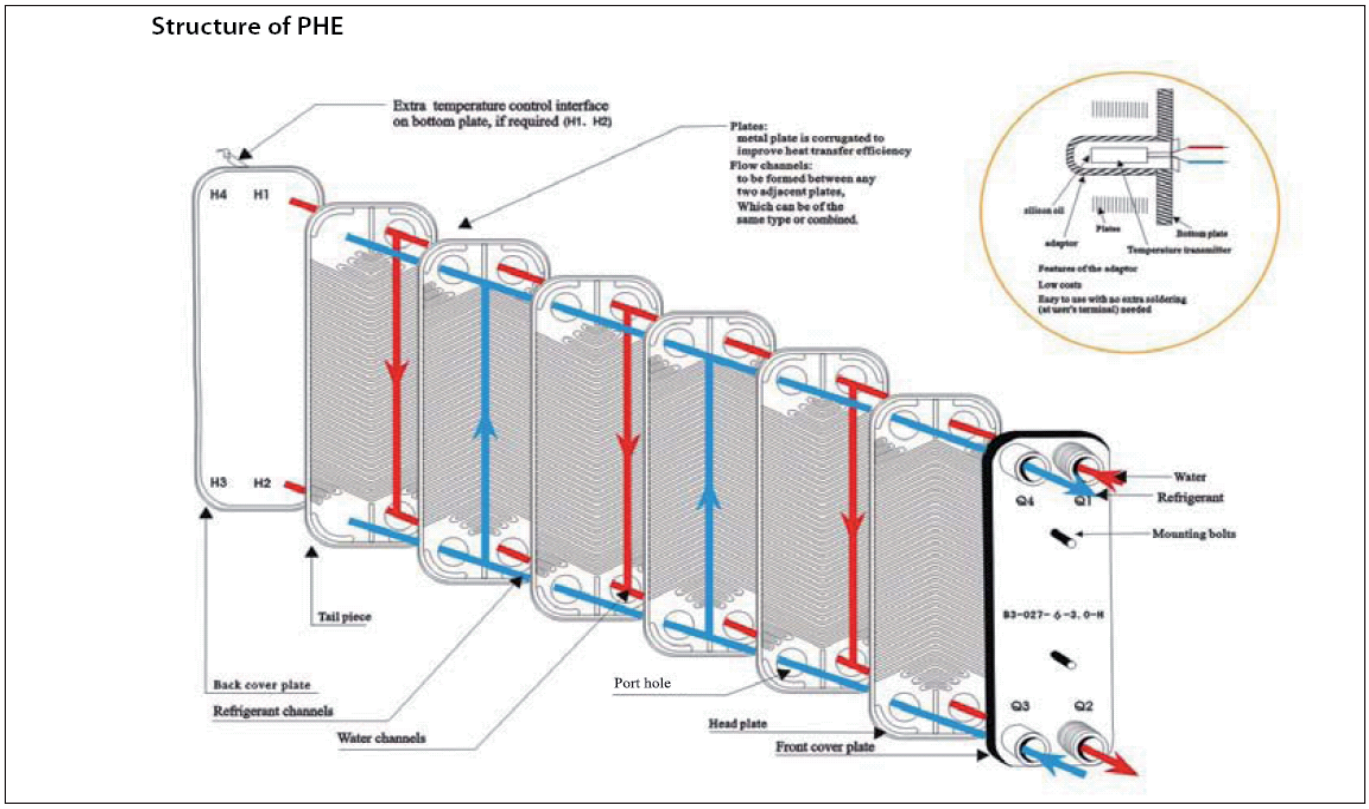
B 3 - 052 - 54 - 3.0 - H Q

- B — Brazed plate heat exchanger
- 3 — Copper braze
- 052 — Single plate heat transfer area, m^2
- 54 — Number of plate
- 3.0 — Design pressure, MPa
- H — Plate type H
- Q — Distributor

Plate type

Having high coefficient and high resistance, suitable for situations where flow rate is small and heat transfer is intensified (specific heat is high, phase is changing or temperature difference is big), such as transferring agent via phase changing

Structure of PHE



- The principal PHE design is constructed using a series of thin corrugated stainless steel plates that are brazed together with copper or nickel in a vacuum furnace.
- Every second plate is turned 180° to create separate flow paths for liquid or vapor.

Rated capacity

Evaporator

Type	Model	Rated capacity / Water side pressure drop					
		R22		R134a		R407C	
		kW	kPa	kW	kPa	kW	kPa
PHE B3-030	B3-030-10-3.0-HQ	3.5	47	2.5	25	3.5	47
PHE B-3030	B3-030-20-3.0-HQ	7.0	47	5.5	31	7.0	47
PHE B3-030	B3-030-30-3.0-HQ	10.5	47	8.5	33	10.5	47
PHE B3-030	B3-030-50-3.0-HQ	17.5	49	15.0	37	17.5	49
PHE B3-030	B3-030-70-3.0-HQ	26.3	57	21.5	40	25.0	52
PHE B3-052	B3-052-54-3.0-HQ	35.0	46	31.0	36	33.5	42
PHE B3-052	B3-052-70-3.0-HQ	43.8	44	38.0	34	42.0	41
PHE B3-052	B3-052-88-3.0-HQ	52.5	42	45.5	32	50.0	39
PHE B3-095	B3-095-44-3.0-HQ	52.5	31	44.0	22	52.5	31
PHE B3-095	B3-095-60-3.0-HQ	70.0	30	60.0	23	70.0	30
PHE B3-095	B3-095-74-3.0-HQ	87.5	31	73.0	24	87.5	31
PHE B3-095	B3-095-92-3.0-HQ	105.0	31	94.0	25	105.0	31
PHE B3-095	B3-095-122-3.0-HQ	140.0	33	125.0	27	140.0	33
PHE B3-210	B3-210-74-3.0-HQ	175.0	35	165.0	32	168.0	33
PHE B3-210	B3-210-90-3.0-HQ	210.0	36	200.0	32	205.0	34

Rated conditions

Refrigerant	Evaporating temperature (°C)	Super heat (K)	Condensing temperature (°C)	Sub cool (K)	Water-in temperature (°C)	Water-out temperature (°C)
R22	+2	5	+40	5	12	7
R134a	+2	5	+40	5	12	7
R407C	+4.5 (dew point)	5	+40	5	12	7

Rated capacity (continued)

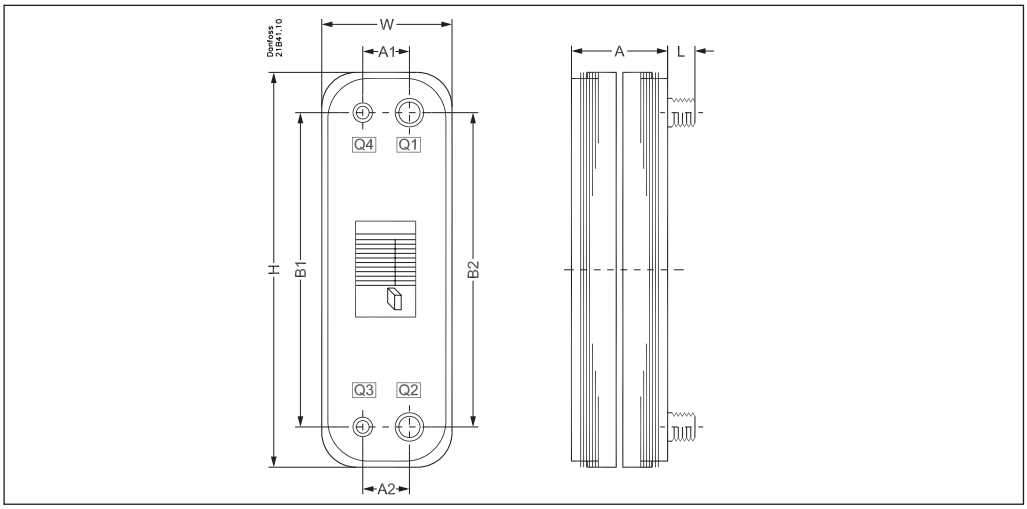
Condenser

Type	Model	Rated capacity / Water side pressure drop					
		R22		R134a		R407C	
		kW	kPa	kW	kPa	kW	kPa
PHE B3-030	B3-030-10-3.0-HQ	5.0	82	4.4	65	2.6	25
PHE B-3030	B3-030-20-3.0-HQ	11.0	98	9.0	68	5.4	27
PHE B3-030	B3-030-30-3.0-HQ	16.5	99	13.2	66	8.0	26
PHE B3-030	B3-030-50-3.0-HQ	27.0	98	18.5	49	13.0	26
PHE B3-030	B3-030-70-3.0-HQ	37.0	98	30.0	66	18.2	27
PHE B3-052	B3-052-54-3.0-HQ	38.0	55	29.0	32	18.5	14
PHE B3-052	B3-052-70-3.0-HQ	48.0	54	37.0	32	24.0	14
PHE B3-052	B3-052-88-3.0-HQ	61.0	58	47.0	35	30.0	15
PHE B3-095	B3-095-44-3.0-HQ	56.0	33	44.0	21	29.0	10
PHE B3-095	B3-095-60-3.0-HQ	75.0	33	59.0	21	39.0	10
PHE B3-095	B3-095-74-3.0-HQ	92.0	33	72.0	21	48.0	10
PHE B3-095	B3-095-92-3.0-HQ	114.0	34	89.0	22	59.0	10
PHE B3-095	B3-095-122-3.0-HQ	148.0	36	116.0	23	78.0	11
PHE B3-210	B3-210-74-3.0-HQ	190.0	42	152.0	27	100.0	12
PHE B3-210	B3-210-90-3.0-HQ	235.0	44	188.0	28	122.0	12

Rated conditions

Refrigerant	Hot gas temperature (°C)	Condensing temperature (°C)	Water-in temperature (°C)	Water-out temperature (°C)
R22	+85	+50	+40	+45
R134a	+85	+50	+40	+45
R407C	+85	+50 (dew point)	+40	+45

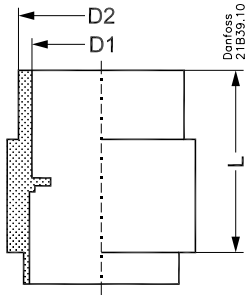
Dimensions and weight



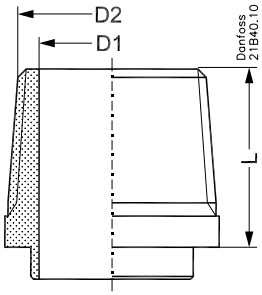
Type	Model	H (mm)	W (mm)	A (mm)	A1/A2 (mm)	B1/B2 (mm)	Weight (kg)
PHE B3-030	B3-030-10-3.0-HQ	325	95	24	39	269	1.9
PHE B3-030	B3-030-20-3.0-HQ	325	95	39	39	269	2.8
PHE B3-030	B3-030-30-3.0-HQ	325	95	54	39	269	3.7
PHE B3-030	B3-030-50-3.0-HQ	325	95	84	39	269	5.5
PHE B3-030	B3-030-70-3.0-HQ	325	95	114	39	269	7.3
PHE B3-052	B3-052-54-3.0-HQ	527	111	138.6	50	466	14.22
PHE B3-052	B3-052-70-3.0-HQ	527	111	177	50	466	17.90
PHE B3-052	B3-052-88-3.0-HQ	527	111	220.2	50	466	22.04
PHE B3-095	B3-095-44-3.0-HQ	617	192	115.6	92/98	515/519	22.64
PHE B3-095	B3-095-60-3.0-HQ	617	192	154	92/98	515/519	29.2
PHE B3-095	B3-095-74-3.0-HQ	617	192	187.6	92/98	515/519	34.94
PHE B3-095	B3-095-92-3.0-HQ	617	192	230.8	92/98	515/519	42.32
PHE B3-095	B3-095-122-3.0-HQ	617	192	302.8	92/98	515/519	54.62
PHE B3-210	B3-210-74-3.0-HQ	739	322	220.2	211/232	599	72.20
PHE B3-210	B3-210-90-3.0-HQ	739	322	265	211/232	599	85.0

Connections

Welded connection



Threaded connection



Danfoss connection type	Connection description	Internal diameter - D1		External diameter - D2	Lenght - L	Connection	Thread
		in.	mm	mm	mm		
H½	½ " weld	½	12.8	17	29	welded	x
H $^5/_8$	$^5/_8$" weld	$^5/_8$	16.2	20	29	welded	x
H $^7/_8$	$^7/_8$" weld	$^7/_8$	22.3	28	29	welded	x
H1"$^1/_8$	1$^1/_8$" weld	1 $^1/_8$	28.7	33	29	welded	x
H1"$^3/_8$ A	1$^3/_8$" weld	1 $^3/_8$	35.3	40	29	welded	x
H2"$^1/_8$	2$^1/_8$" weld	2 $^1/_8$	54.1	60	40	welded	x
H2"$^1/_8$ D	2$^1/_8$" weld	2 $^1/_8$	54.1	60	40	welded	x
L$^3/_4$	$^3/_4$" BSP external	x	16	G $^3/_4$	29	BSP	external
L1"$^1/_4$ A	1$^1/_4$" BSP external	x	30	G 1 $^1/_4$	29	BSP	external
L2A	2" BSP external	x	49	G 2	48	BSP	external
L$^3/_4$C	$^3/_4$" NPT external	x	16	NPT $^3/_4$	29	NPT	external
L1B	1" NPT external	x	23	NPT 1	29	NPT	external
L2B	2" NPT external	x	49	NPT 2	48	NPT	external

Ordering

Type	Model	Connection type 1			Code no.	Connection type 2			Code no.
		Ref. in	Ref. out	Water/ brine		Ref. in	Ref. out	Water/ brine	
PHE B3-030	B3-030-10-3.0-HQ	H½	H$^7/_8$	L¾	**021B2060**	H½	H$^7/_8$	L¾C	**021B2055**
PHE B-3030	B3-030-20-3.0-HQ	H½	H$^7/_8$	L¾	**021B2061**	H½	H$^7/_8$	L¾C	**021B2056**
PHE B3-030	B3-030-30-3.0-HQ	H½	H$^7/_8$	L¾	**021B2062**	H½	H$^7/_8$	L¾C	**021B2057**
PHE B3-030	B3-030-50-3.0-HQ	H$^5/_8$	H1"$^1/_8$	L¾	**021B2063**	H$^5/_8$	H1"$^1/_8$	L¾C	**021B2058**
PHE B3-030	B3-030-70-3.0-HQ	H$^5/_8$	H1"$^1/_8$	L¾	**021B2064**	H$^5/_8$	H1"$^1/_8$	L¾C	**021B2059**
PHE B3-052	B3-052-54-3.0-HQ	H$^5/_8$	H1"$^1/_8$	L1"¼A	**021B3706**	H$^5/_8$	H1"$^1/_8$	L1B	**021B3709**
PHE B3-052	B3-052-70-3.0-HQ	H$^5/_8$	H1"$^1/_8$	L1"¼A	**021B3707**	H$^5/_8$	H1"$^1/_8$	L1B	**021B3710**
PHE B3-052	B3-052-88-3.0-HQ	H$^5/_8$	H1"$^1/_8$	L1"¼A	**021B3708**	-	-	-	**-**
PHE B3-095	B3-095-44-3.0-HQ	-	-	-	**-**	H$^7/_8$	H1"$^3/_8$ A	L2B	**021B6352**
PHE B3-095	B3-095-60-3.0-HQ	H$^7/_8$	H1"$^3/_8$ A	L2A	**021B6321**	H$^7/_8$	H1"$^3/_8$ A	L2B	**021B6324**
PHE B3-095	B3-095-74-3.0-HQ	H$^7/_8$	H1"$^3/_8$ A	L2A	**021B6322**	H$^7/_8$	H1"$^3/_8$ A	L2B	**021B6325**
PHE B3-095	B3-095-92-3.0-HQ	H$^7/_8$	H1"$^3/_8$ A	L2A	**021B6323**	H$^7/_8$	H1"$^3/_8$ A	L2B	**021B6326**
PHE B3-095	B3-095-122-3.0-HQ	-	-	-	**-**	H1"$^1/_8$	H2"$^1/_8$	L2B	**021B6358**
PHE B3-210	B3-210-74-3.0-HQ	-	-	-	**-**	H1"$^1/_8$	H2"$^1/_8$ D	L2B	**021B7595**
PHE B3-210	B3-210-90-3.0-HQ	-	-	-	**-**	H1"$^1/_8$	H2"$^1/_8$ D	L2B	**021B7596**

Danfoss offers customized products to meet your requirements. Please contact Danfoss for more information.