PLATE HEAT EXCHANGERS

Edition 2009 - Rev. 00

INSPECTABLE PLATE HEAT EXCHANGERS		
Series	**Product description**	**Page**
-	Specifications	SC - 5-18
K042	Plate surface area 0.042 m^2 - fittings 1”1/4	SC - 19
K080	Plate surface area 0.085 m^2 - fittings 1”1/2	SC - 20
F16	Plate surface area 0.14 m^2 - fittings 2”	SC - 21
F22	Plate surface area 0.22 m^2 - fittings 2”	SC - 22
F31	Plate surface area 0.30 m^2 - fittings DN100	SC - 23
F40	Plate surface area 0.40 m^2 - fittings DN100	SC - 24
F50	Plate surface area 0.50 m^2 - fittings DN100	SC - 25

BRAZE-WELDED PLATE HEAT EXCHANGERS		
Series	**Product description**	**Page**
-	Specifications	SC - 27-30
WP4	Plate surface area 0.03 m^2 - fittings 1”	SC - 31
WP5	Plate surface area 0.053 m^2 - fittings 1”1/4	SC - 32
WP7	Plate surface area 0.132 m^2 - fittings 2”	SC - 33
WP8	Plate surface area 0.124 m^2 - fittings 2”1/2	SC - 34

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Application

The *fiorini* inspectable plate heat exchangers are generally used in HVAC applications, and for heat recovery. The contact faces of the adjacent corrugated plates touch, forming fragmentary inter-channels so the internal motion inside the heat exchangers is extremely turbulent; this makes it possible to obtain very high heat exchange coefficients.
The results are:

- a high heat exchange potential with minimum overall dimensions and reduced weight
- the possibility of modifying the heat exchange potential by simply adding plates.

Description

The plate heat exchangers are made up of a number of corrugated metal plates in a containment frame. Plates are so arranged to create a primary and a cooling circuit through which the media flow and spread out over the two opposite faces of each plate while counterflowing. The corrugations of the adjacent plates touch, forming very close and fragmentary inter-channels, and making the motion of the fluids extremely turbulent. Thanks to the perfect alignment of the packaged plates, the four holes in each plate form four inlet and collection headers for the fluids which are taken out through four passages (threaded stainless steel nozzles or flanged fittings) on the surface of the front frame plate.
The materials used for the construction of the heat exchangers are:

Component part	Standard execution	Custom execution
Plates	AISI 316 stainless steel	Titanium, AISI 304 stainless steel
Sealing gaskets	NBR (max 130°C) EPDM (max 150°C)	Viton (max 180°C)
Frame end plates	Carbon steel	Stainless steel
Frame treatment	Painting	Enamel painting in different colours
Tie-rods	Galvanised steel	Stainless steel
Connections up to 2”	Threaded, AISI 304 stainless steel	Threaded, AISI 316L stainless steel with UNI, ANSI flanges
Connections larger than 2”	UNI flanges on frame and painted	with ANSI flanges Coated (METAL-LINED)
Executions	1x1	2x2

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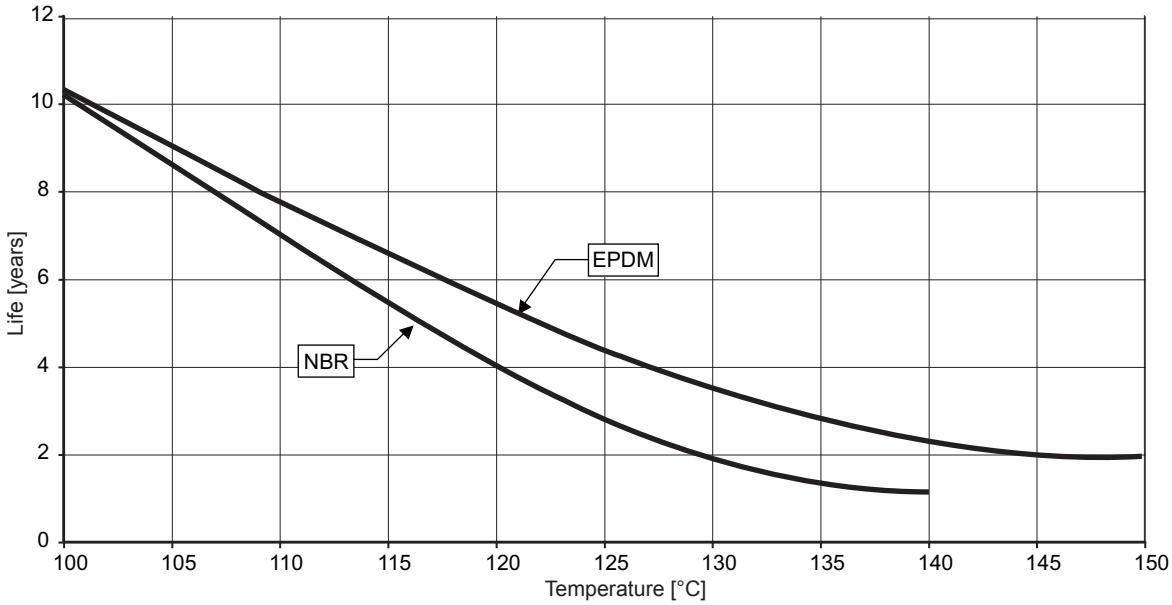
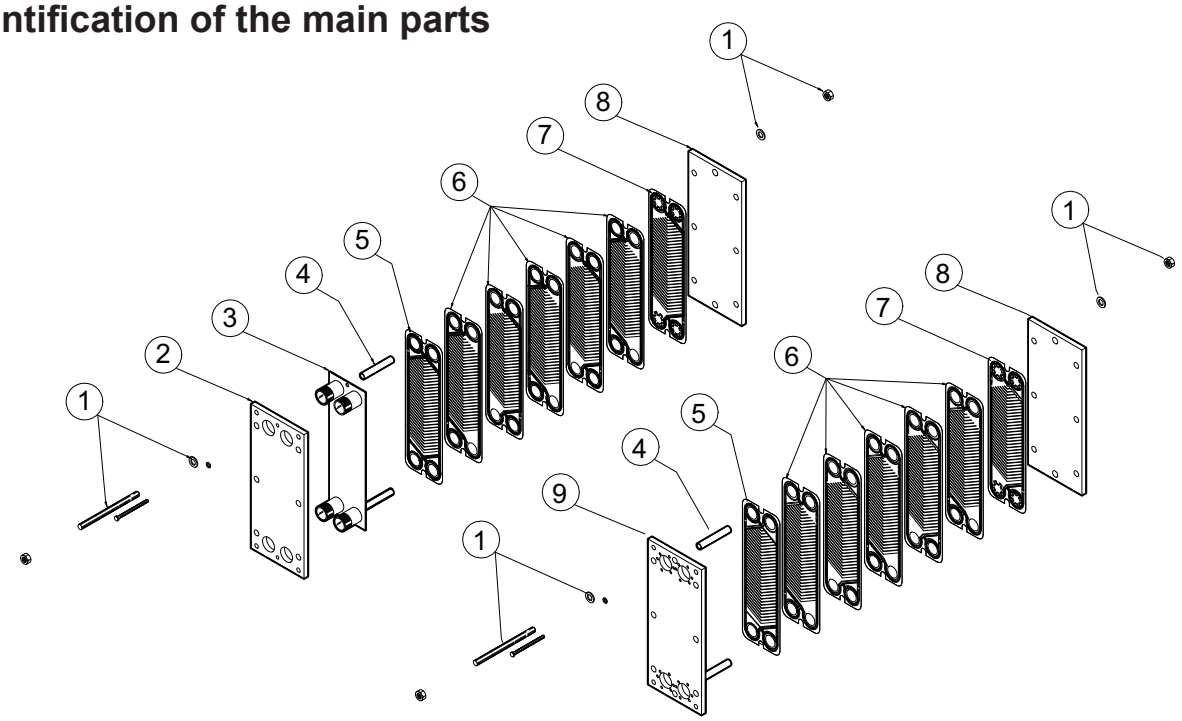
Gaskets' average lifetime



The diagram shows the indicative average lifetime, expressed in years, of the sealing gaskets based on the average temperature of the heating medium.
Data refer to a use at a constant temperature with water. The use fluids other than water or at a variable temperature may affect the lifetime of the sealing gaskets.
When the heat exchanger is inspected, also check the sealing gaskets and replace them, if needed, regardless of the average lifetime indicated above.

Identification of the main parts



Pos.	Item
1	Tie-rods
2	Front end plate
3	Initial counter-plate for models K042-K080-F16-F22
4	Guide
5	Initial plate (except models K042 and K080)

Pos.	Item
6	Intermediate plate
7	Final plate
8	Rear end plate
9	Front end plate with holes for flange (models F31-F40-F50)

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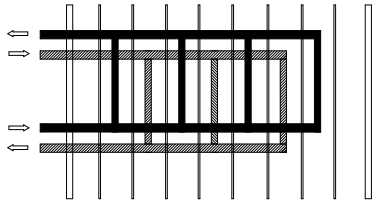
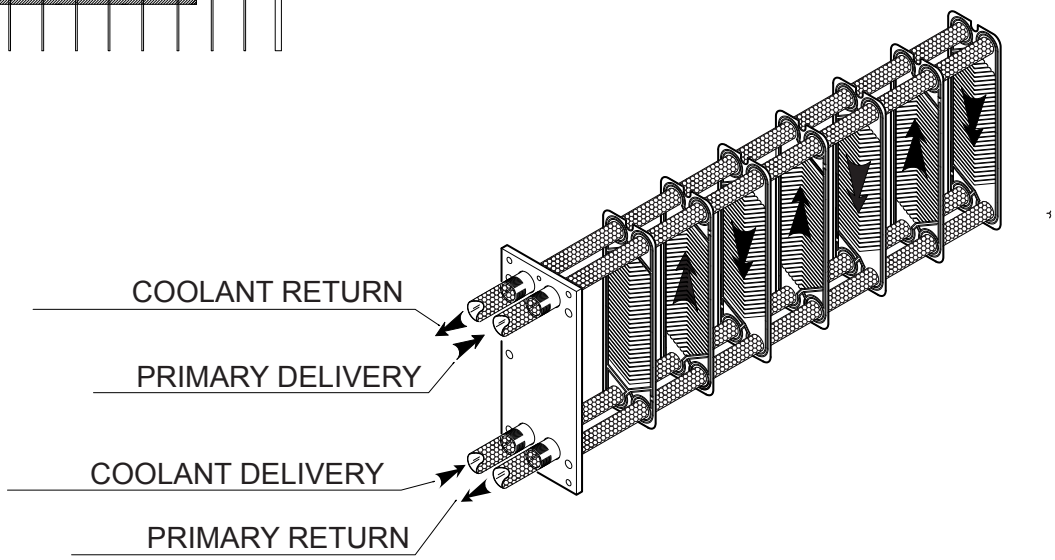
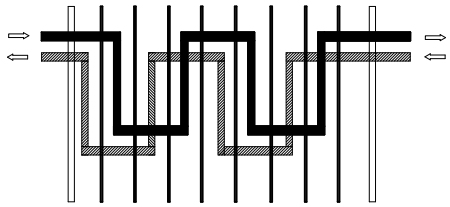
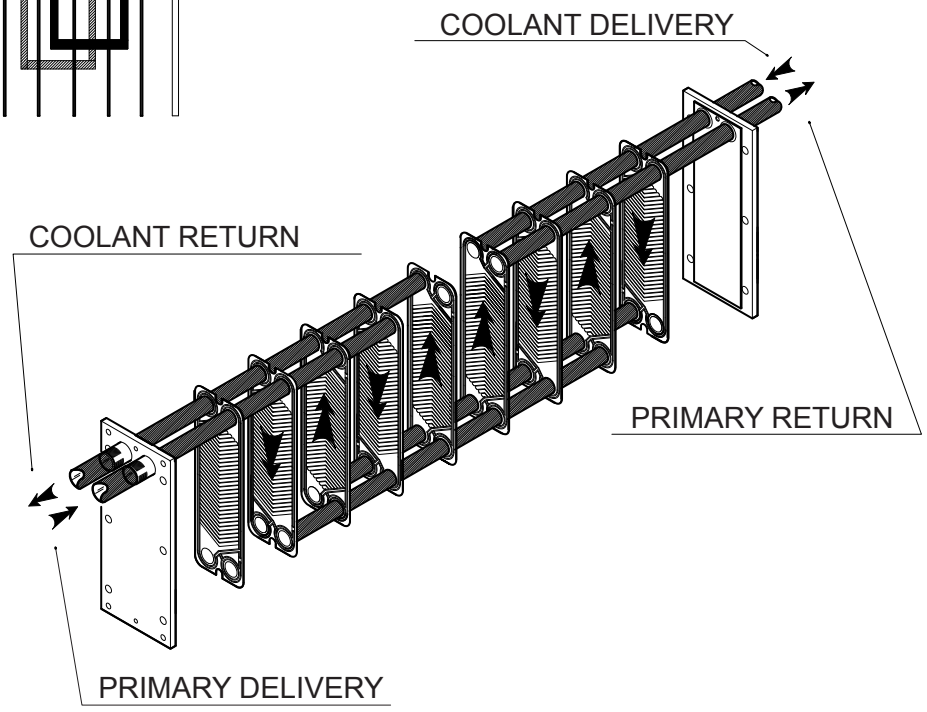
Single passage configuration





Multiple passage configuration





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Compatibility table

The table lists ome of the most used fluids and their compatibility with the sealing gaskets, plates and fittings of ***fiorini*** plate heat exchangers.

	AISI 316L plates	Titanium plates	NBR nitrile gaskets	EPDM gaskets	AISI 304 stainl. steel fittings	Nylon fittings (Tmax 50°C)
Water (T < 110°C)	■	■	■	■	■	■
Water (T > 110°C)	■	■		■	■	
Glycol water (glycol < 30%)	■	■	■	■	■	■
Glycol water (glycol > 30%)	■	■		■	■	
Demineralized water	■	■	■	■	■	
Thermal water		■		■		■
Seawater		■	■	■		■
Swimming pool water	■	■	■		■	■
Mineral water	■		■	■	■	
Steam < 4 bar	■			■	■	
Hydraulic oil (mineral base)	■		■		■	
Diathermic oil	■		■		■	
Quenching oil	■		■		■	
Mineral oil	■		■		■	
Synthetic oil	■		■		■	
Olive oil	■		■		■	
Seed oil	■		■		■	
Diesel oil	■	■	■		■	
Kerosene	■	■	■		■	
Oil	■	■	■		■	
Pure gasoline	■	■	■		■	
Naphta	■	■	■		■	
Sulphuric acid 20% (in water sol.), 70°C		■		■		■
Hydrochloric acid 10% (in water sol.), 30°C		■		■		■
Acetic acid 70°C	■	■		■		■
Chromic acid 40%, 50°C		■				■
Acetone	■	■		■	■	
Ethyl alcohol	■	■		■	■	
Ethanol	■	■		■	■	
Methanol	■	■		■	■	
Ethylene	■	■	■		■	
Glycol	■	■	■	■	■	
Diethylene glycol	■	■	■	■	■	
Ethylene glycol	■	■	■	■	■	
Milk	■		■	■	■	
Wine	■		■	■	■	
Fruit juice	■		■	■	■	
Beer	■		■	■	■	
Wisky	■		■	■	■	
Wine vinegar	■			■	■	
Spirit	■		■	■	■	

Key

■ Compatible □ Not compatible

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Installation

For a correct installation of the heat exchanger, obey the following instructions:
- Leave enough space around the exchanger for inspection and routine maintenance.
- Position the exchanger in the vertical position.
- Fit on-off valves to the connection pipes.
- To avoid putting stress on the nozzles, install, if necessary, suitable compensators to neutralise any pipe thermal expansion.
- Install a safety valve calibrated to a lower pressure than the maximum working pressure envisaged for the exchanger to both circuits.

CAUTION

Disconnect the heat exchanger from the plant before carrying out any electric welding.

Starting

For the exchanger to start properly:
- slowly open both circuits at the same time to avoid overpressure in one circuit with respect to the other, as well as water hammering;
- bleed the two circuits of the exchanger. The presence of air in one of the two circuits causes a premature wear of the whole exchanger.

Dismanlting and cleaning

If, after checking the temperature, you find that there has been a drop in performance, or if the load loss is high, dismantle and clean the exchanger as follows:
- Slowly reduce the pressure in both circuits at the same time.
- Disconnect all the pipes.
- If you shall move the exchanger, never attach any hoisting accessories to its connections or tie rods.
- Wait for the exchanger to cool then loosen the tie rods and open the pack of plates being careful to keep the two frame end plates parallel while loosening the tie rods.
- If the plates stick due to scale build-up, force them apart gently with a screwdriver, taking care not to damage the gaskets and making sure they remain in their seats.
- Mark the plates while removing them to make it easier to reassemble them in the same order and position.
- Clean the heat exchanger surfaces with a jet of water and a soft brush, being careful not to damage the gasket faces. In the presence of scale and calcium deposits, prepare a solution of water and nitric acid (HNO_3) with a concentration of 7% at a temperature of 70°C, and clean the plates using the soft brush making sure you remove any crystals or other deposits also from the gaskets.
- Neutralize the acid of the solution using caustic soda (NaOH) with a concentration of 1-2% (100 litres of water to 1-2 kg of caustic soda) at a temperature of 40°C.
  As an alternative to the soda you can also use alkaline detergents containing phosphates.
- Rinse with abundant clean water.

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CAUTION

Handle the chemical cleaning solutions with care as, in the case of contact, they may be harmful. Always use gloves and protective goggles.

- Reassemble the exchanger, assembling the heat transfer plates following the same procedure explained in chapter 'Assembly'. Note that the tightening distance indicated in the specifications is the minimum distance to avoid deforming the gaskets and the plates.

Replacing the sealing gaskets

To replace a damaged gasket, obey the following instructions:
- Remove the old gasket, taking care not to scratch or bend the plate it is mounted on (if bonding is highly resistant, heat the back of the plate).
- Carefully clean the seat of the gasket of any residues.
- Clean the new gasket.
- Fit the new gasket being careful to properly attach its clips to the plate.

Assembly

The plates must be assembled in the correct sequence. The plates have the gaskets on the inlet and outlet holes on alternate sides, with the exception of the first plate which has the gasket around the 4 holes (except K042 and K080). The plates have "fishbone" corrugations facing alternatively downwards and upwards. With the pack of plates mounted, you can see a honeycomb design, looking at the plate pack from the side. The last plate of the sequence is the one without holes.
Tighten down, proceeding in a symmetric and parallel way, by screwing the nuts down alternatively on diagonal lines, and leaving the four nuts at the corners for last.
It is important to remember that the tightening distance between the front and rear end plates, is the value given by the number of plates multiplied by the tightening torque (see specifications for each model).
The distance check shall be done on both sides of the exchanger, in various points, to make sure the parts are perfectly parallel. When you reach the pre-established distance, proceed with the hydraulic tightness test at the test pressure.

Remark: Check for leaks at the working temperature.

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Inspection and maintenance

Check that:
- the circuits have pressures and temperatures below the working conditions of the exchanger;
- the safety valves installed in the circuits are in efficient working order;
- there are no leaks caused by a wrong tightening of the plates.

It is always advisable to protect the threads of the tie-rods from dust and rust with silicone grease or, even better, using “Molikote” (molybdenum sulphate). The painted parts should be lightly greased.

If the exchanger leaks during use, make sure the tightening distance is correct, remembering that the distance indicated in our specifications is the minimum distance. If the leak continues, locate the faulty plate, dismantle the pack of plates and replace the damaged one. If no spare plate is available, eliminate the faulty plate and the one next to it, to avoid stoppages, but note that the heat exchange potential will be reduced in proportion to the total number of plates in the exchanger.

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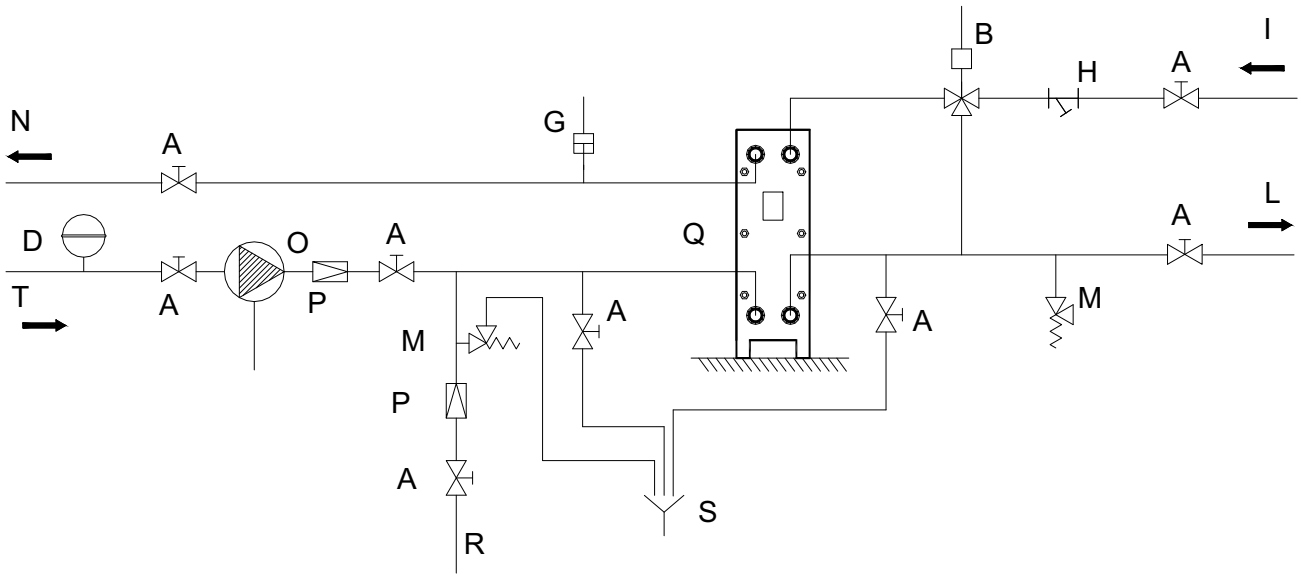
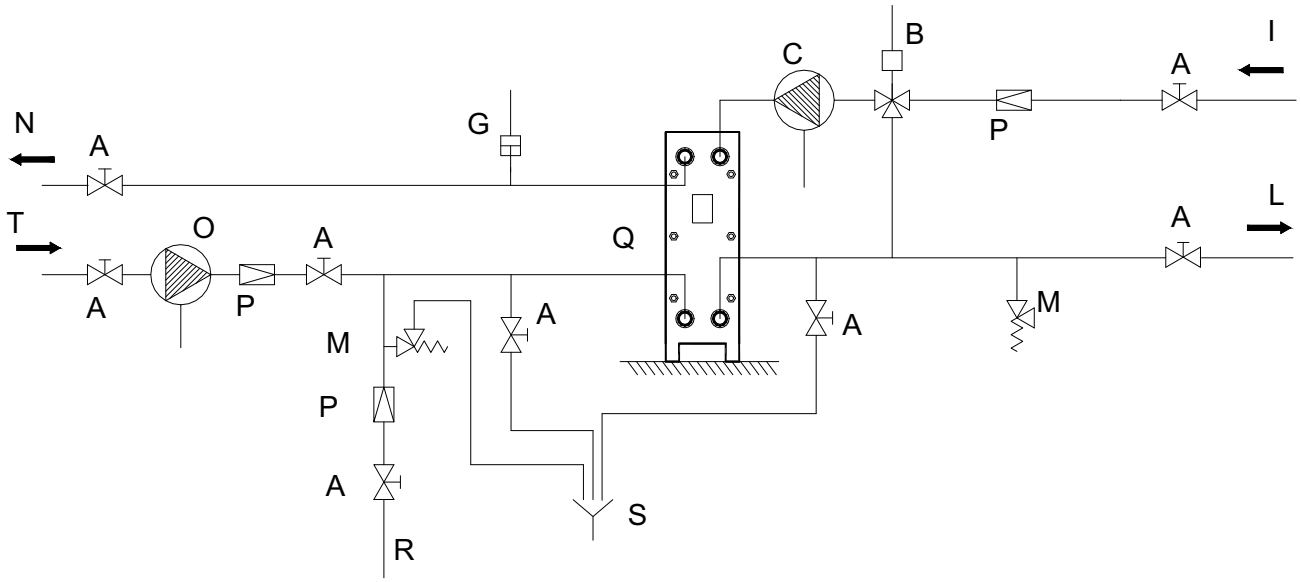
Plant diagrams

High temperature hot water - domestic hot water plant



Hot water - domestic hot water plant



Pos.	Description
A	Valve
B	3-way valve
C	Primary pump
D	Expansion tank
G	Temperature probe
H	Filter
I	Primary inlet
L	Primary outlet

Pos.	Description
M	Safety valve
N	Utility
O	Domestic water circulation pump
P	Check valve
Q	Exchanger
R	Water mains
S	Drain
T	Domestic water recirculation

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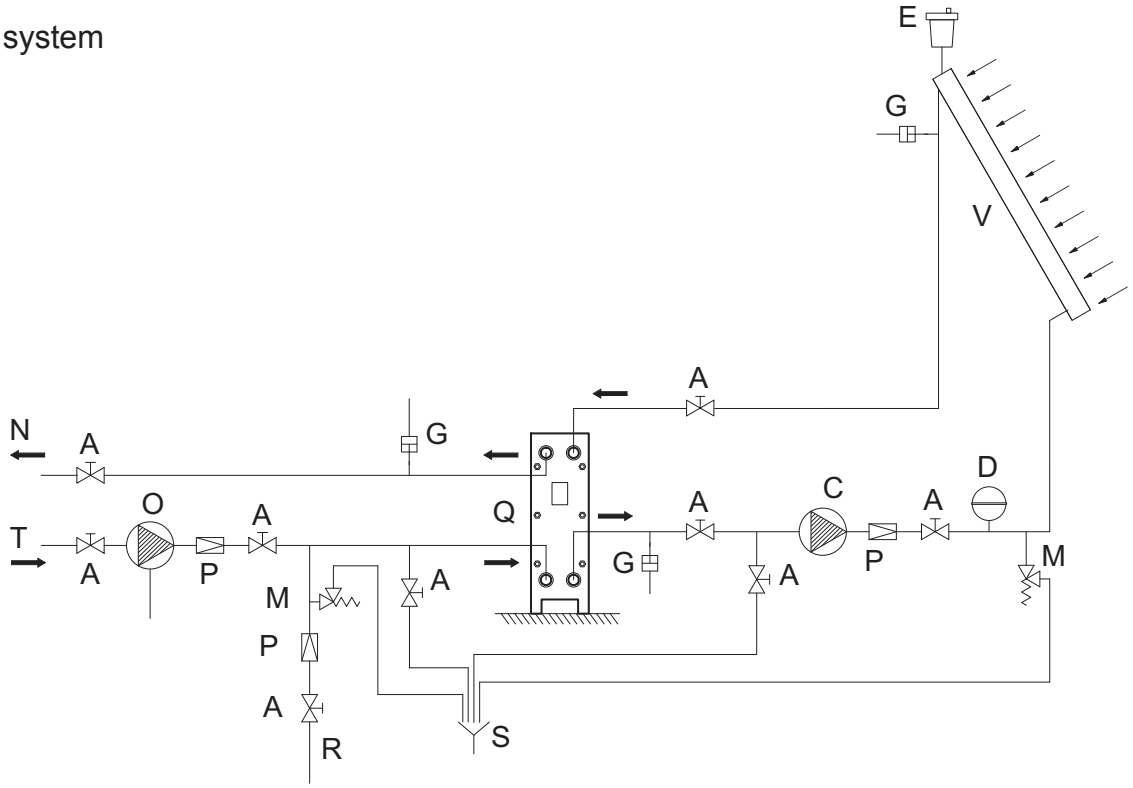
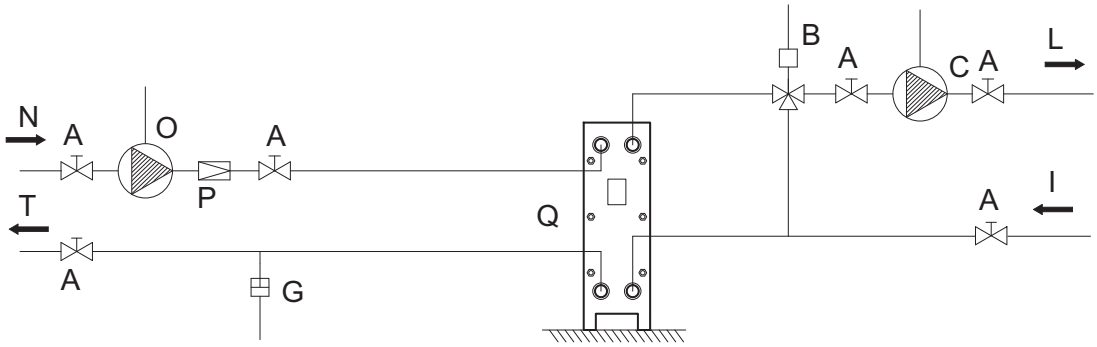
Plant diagrams

Solar system



Chilled water - cold water plant

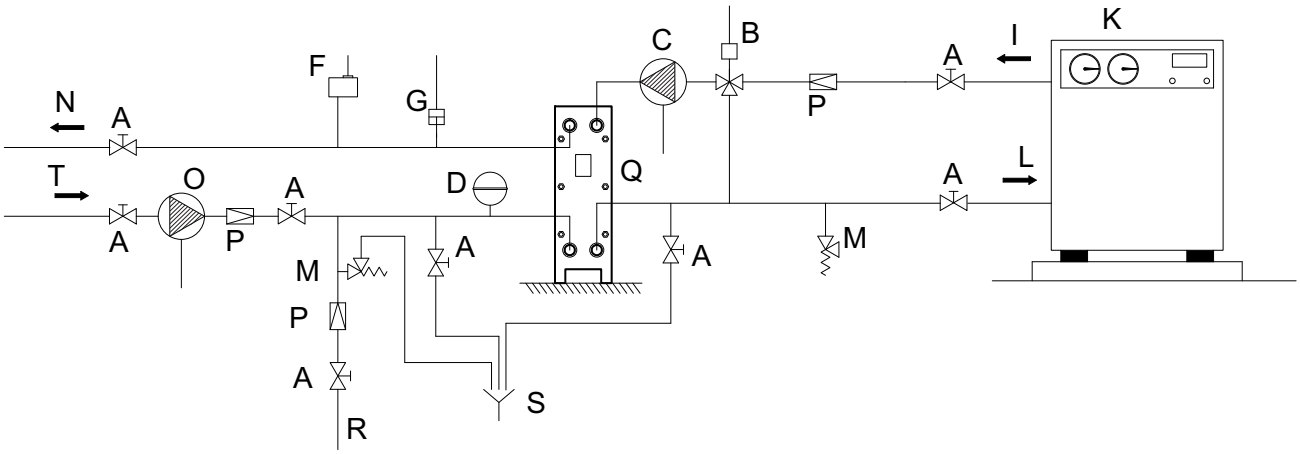


Pos.	Description
A	Valve
B	3-way valve
C	Primary pump
D	Expansion tank
E	Bleed valve
G	Temperature probe
I	Primary delivery
L	Primary return
M	Safety valve

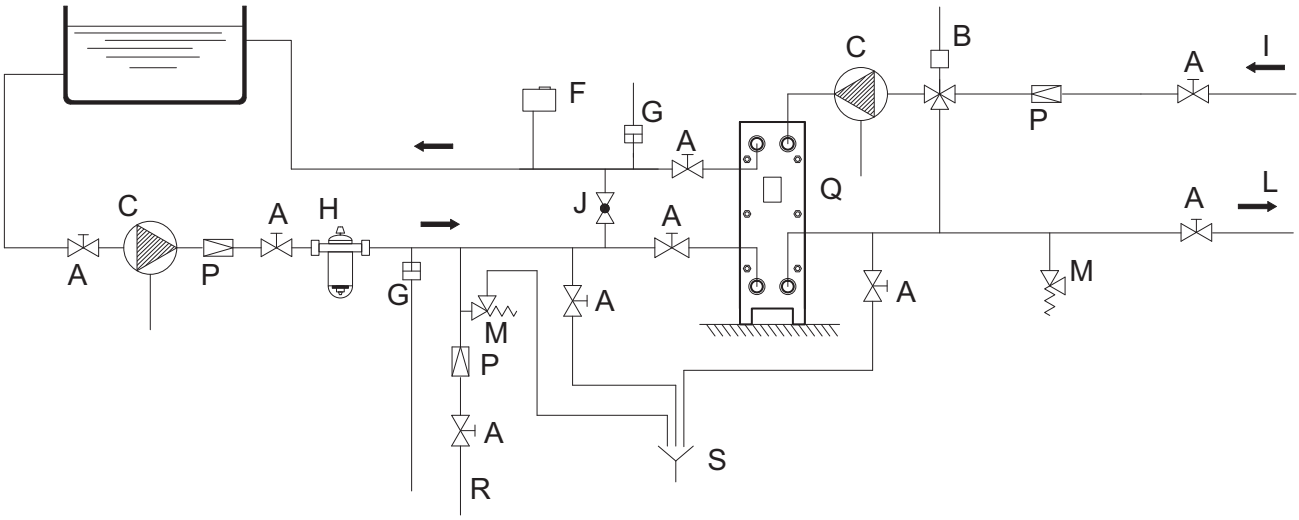
Pos.	Description
N	Utility
O	Domestic water circulation pump
P	Check valve
Q	Exchanger
R	Water mains
S	Drain
T	Domestic water recirculation
V	Solar collectors

Plant diagrams

Boiler - domestic hot water plant



Heating circuit for swimming pool



Pos.	Description
A	Valve
B	3-way valve
C	Pump
G	Temperature probe
I	Primary delivery
L	Primary return
M	Safety valve
K	Boiler
N	Utility

Pos.	Description
S	Drain
P	Check valve
Q	Exchanger
F	Safety thermostat
J	Adjustable bypass
H	Filter
D	Expansion tank
R	Water mains
T	DHW recirculation

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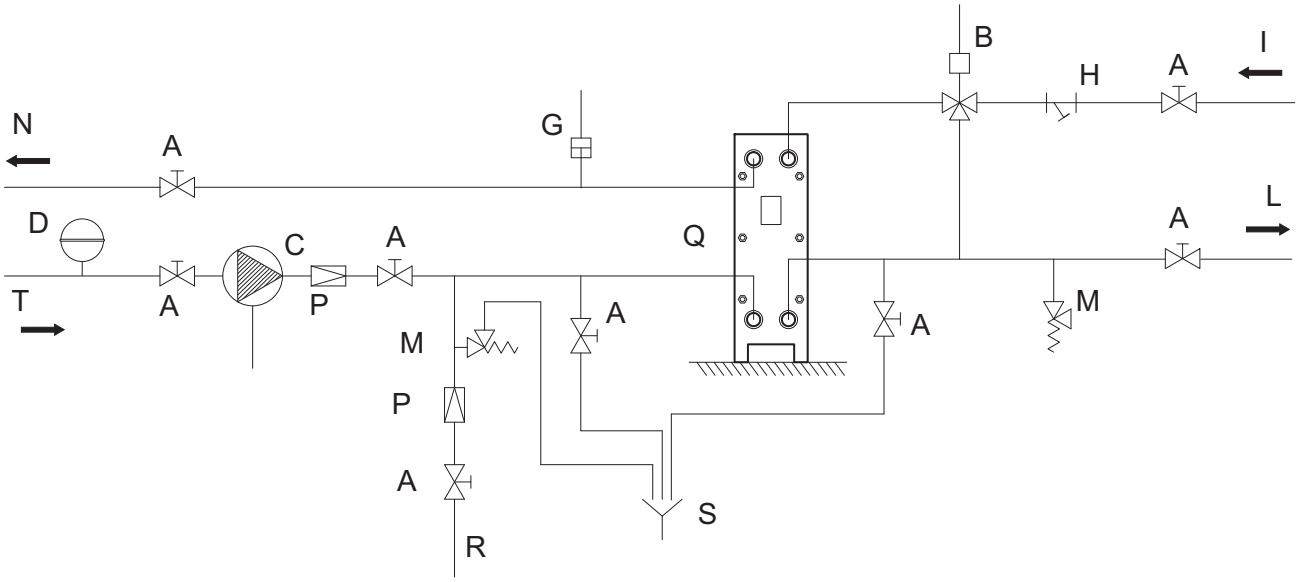
Plant diagrams

High temperature hot water - hot water for heating



Pos.	Description
A	Valve
B	3-way valve
C	Pump
G	Temperature probe
M	Safety valve
D	Expansion tank
I	Primary inlet
L	Primary outlet

Pos.	Description
P	Check valve
Q	Exchanger
N	Heating delivery
T	Heating return
H	Filter
S	Drain
R	Water mains

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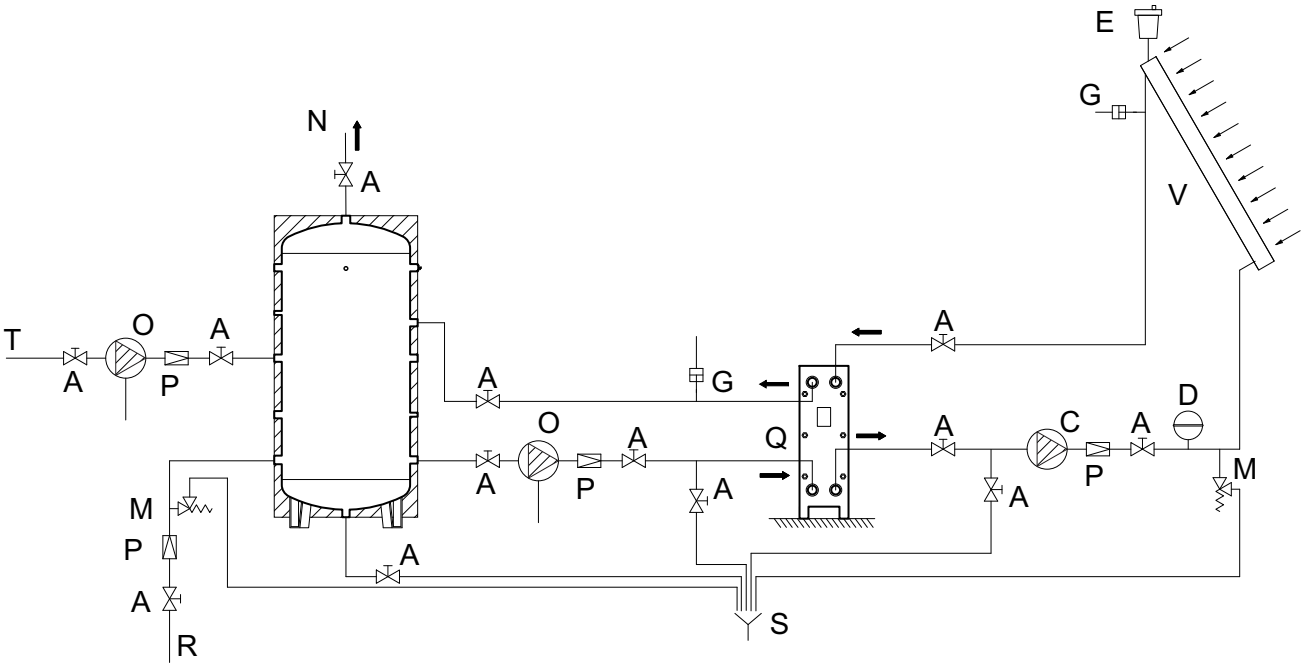
Plant diagrams

Solar system - Hot water



Pos.	Description
A	Valve
O	Circulation pump
C	Primary pump
G	Temperature probe
M	Safety valve
D	Expansion tank
V	Solar collectors
Y	Water storage unit

Pos.	Description
P	Check valve
Q	Exchanger
N	Utility
T	Domestic water recirculation
E	Bleed valve
S	Drain
R	Water mains

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Plate exchanger dimensioning for DHW production

Power (kW)	Model	Plate number	Load loss (kPa)		Flow rate (l/h)	
			Primary	Coolant	Primary	Coolant
25	K042	9	10	3	1090	570
30	K042	9	14	4	1291	680
35	K042	9	18	5	1506	794
40	K042	10	24	4	1721	907
45	K042	10	30	6	1936	1020
50	K042	10	36	7	2151	1134
60	K042	12	34	7	2581	1360
70	K042	14	32	7	3011	1587
80	K042	16	31	7	3441	1814
90	K042	16	39	9	3872	2041
100	K042	18	37	9	4302	2267
110	K042	20	36	9	4732	2494
120	K042	22	35	9	5162	2721
130	K042	24	35	9	5592	2947
140	K042	26	34	9	6023	3174
150	K042	26	39	10	6453	3401
160	K042	28	38	10	6883	3628
170	K042	30	38	10	7313	3854
180	K042	32	37	10	7743	4081
190	K042	34	37	10	8173	4308
200	K042	36	37	10	8604	4534
220	K042	40	37	10	9464	4988
240	K042	44	37	10	10324	5441
260	K042	48	37	11	11185	5895
280	K042	52	37	11	12045	6348
300	K042	56	38	11	12905	6802
325	K042	62	38	11	13981	7369
350	K080	38	22	6	15056	7935
375	K080	40	23	6	16132	8502
400	K080	42	24	7	17207	9069

Primary Δt: 70-50°C; Coolant Δt: 10-48°C

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DATA FORM FOR INQUIRY

Applicant:_____ ***Date:*** _____

Company:_____ ***Tel.:***_____

e-mail:_____ ***Fax:***_____

Exchanger type	☐	Inspectable	
	☐	Braze welded	
Thermal power*		☐	KW
		☐	Kcal/h
Overdimensioning			%
Hot side			
Medium:			
Inlet T* [°c]	Outlet T* [°c]		
Flow rate* :		Units of measure	
Max admissible load loss			Kpa
Cold side			
Medium:			
Inlet T* [°c]	Outlet T* [°c]		
Flow rate* :		Units of measure	
Max admissible load loss			Kpa

*5 **COMPULSORY** data out of 7 matching the following conditions:

1. Hot Tin>Cold Tout
2. Cold Tin>Hot Tout
3. Temperatures and flow rates consistent with thermal power

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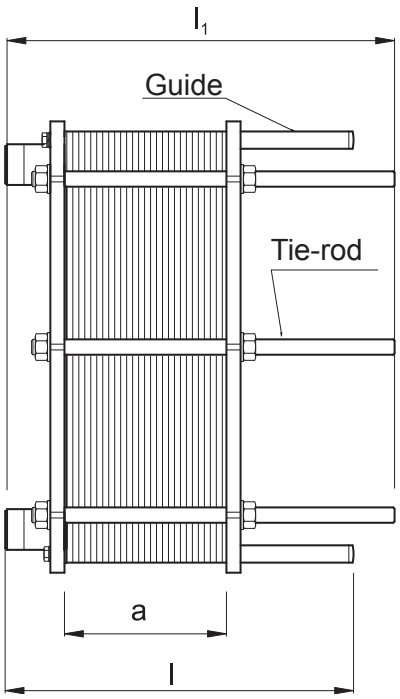

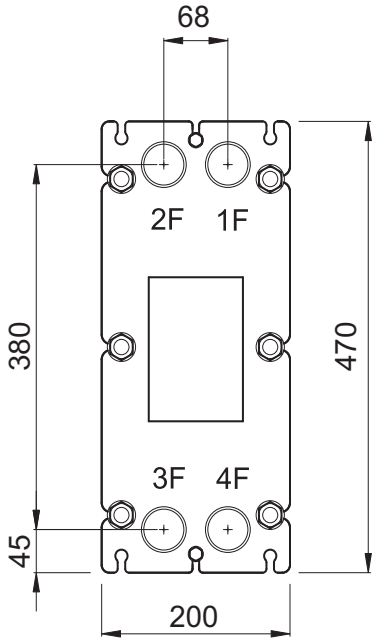

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
1F	4F	3F	2F

Dimensional data	**Plate number**		
	NP<=14	**14<NP<=38**	**38<NP<=64**
l_1 (mm)	153.5	278.5	378.5
l (mm)	180	250	370
Tie-rod length (mm)	125	250	350
Guide length (mm)	110	180	300
Fitting diameter	G 1”1/4 M		
Tightening distance “a” (mm)	3.2 x no. of plates + 2.5		

Plate and frame characteristics:

Surface area	**Water content in lt per channel**	**Plate weight**	**Frame weight PN16**	**Nominal pressure**
(m^2)	***(litres per channel)***	***(kg)***	***(kg)***	***(bar)***
0.042	0.143	0.3	27	16

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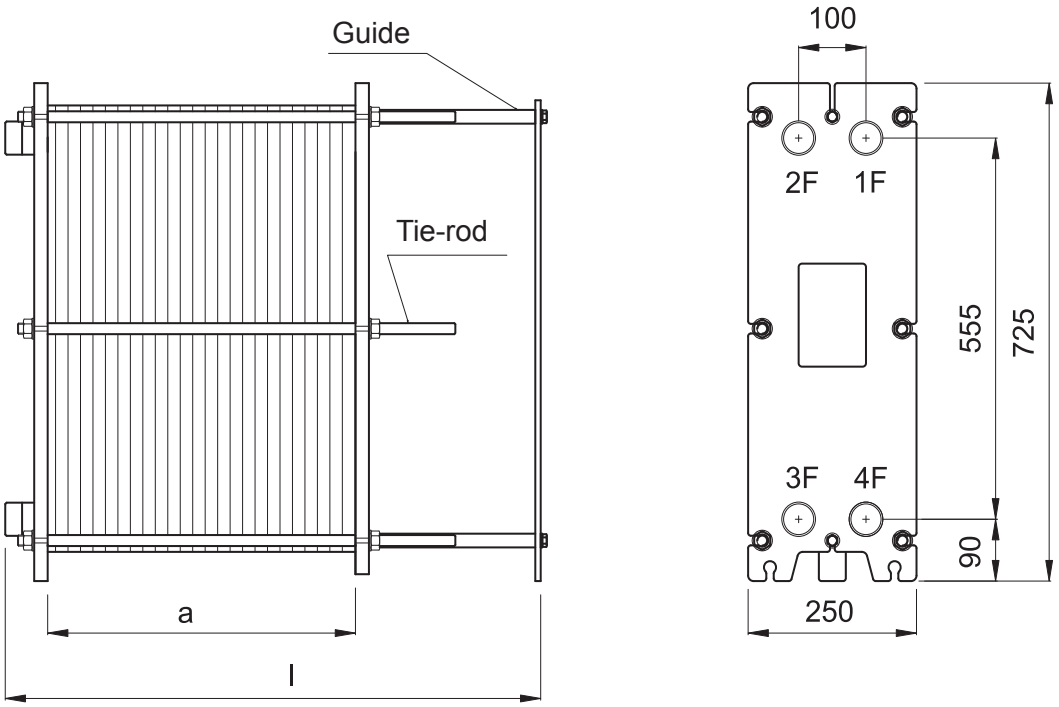

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
1F	4F	3F	2F

Dimensional data	**Plate number**			
	NP<=14	**14<NP<=38**	**38<NP<=64**	**64<NP<=90**
l (mm)	275	395	495	795
Tie-rod length (mm)	125	250	350	650
Guide length (mm)	202	322	422	722
Fitting diameter	G 1”1/2 M			
Tightening distance “a” (mm)	3.05 x no. of plates + 2.5			

Plate and frame characteristics:

Surface area	**Water content in lt per channel**	**Plate weight**	**Frame weight PN16**	**Nominal pressure**
(m^2)	***(litres per channel)***	***(kg)***	***(kg)***	***(bar)***
0.085	0.22	0.56	69	16

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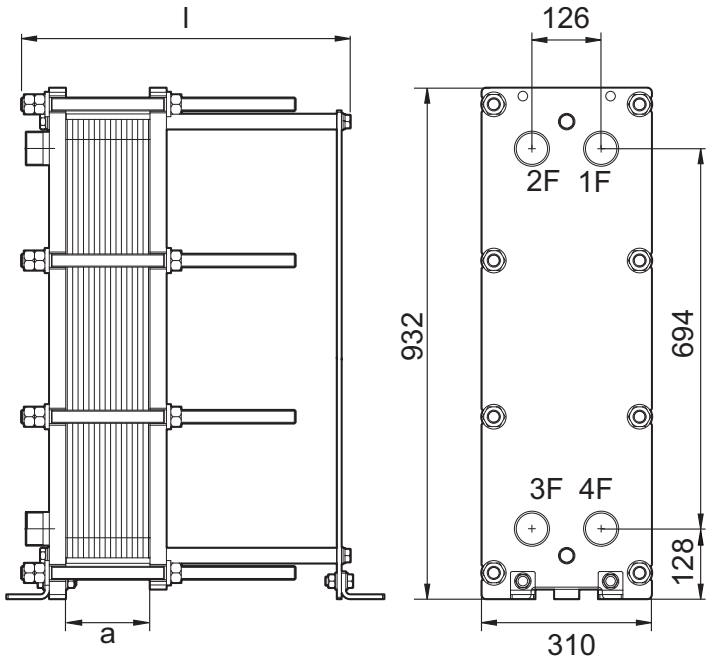

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
1F	4F	3F	2F

Dimensional data	**Plate number**	
	NP<=60	**60<NP<=150**
l (mm)	590	1090
Tie-rod length (mm)	500	1000
Guide length (mm)	495	995
Fitting diameter	G 2” M	
Tightening distance “a” (mm)	2.9 x no. of plates + 2	

Plate and frame characteristics:

Surface area	Water content in lt per channel	Plate weight	Frame weight PN16	Nominal pressure
(m^2)	***(litres per channel)***	***(kg)***	***(kg)***	***(bar)***
0.14	0.35	0.70	150	16

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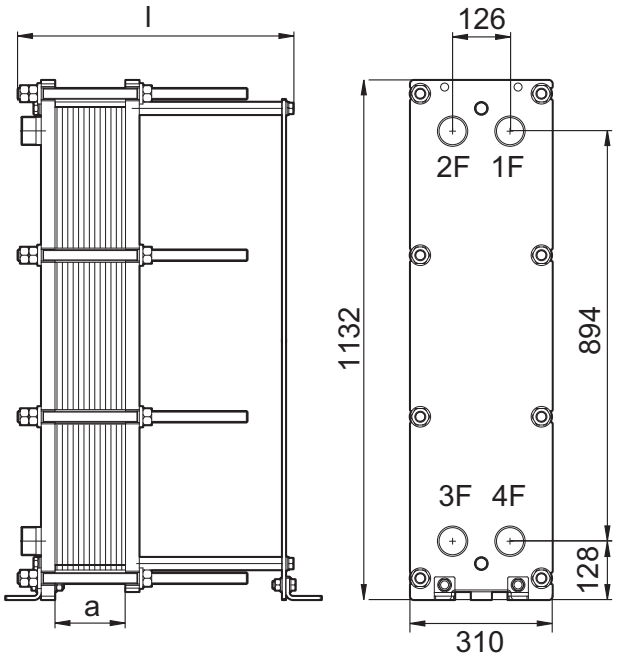

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
1F	4F	3F	2F

Dimensional data	**Plate number**	
	NP<=60	**60<NP<=150**
l (mm)	590	1090
Tie-rod length (mm)	500	1000
Guide length (mm)	495	995
Fitting diameter	G 2” M	
Tightening distance “a” (mm)	2.9 x no. of plates + 2	

Plate and frame characteristics:

Surface area	Water content in lt per channel	Plate weight	Frame weight PN16	Nominal pressure
(m^2)	***(litres per channel)***	***(kg)***	***(kg)***	***(bar)***
0.22	0.44	1	183	16

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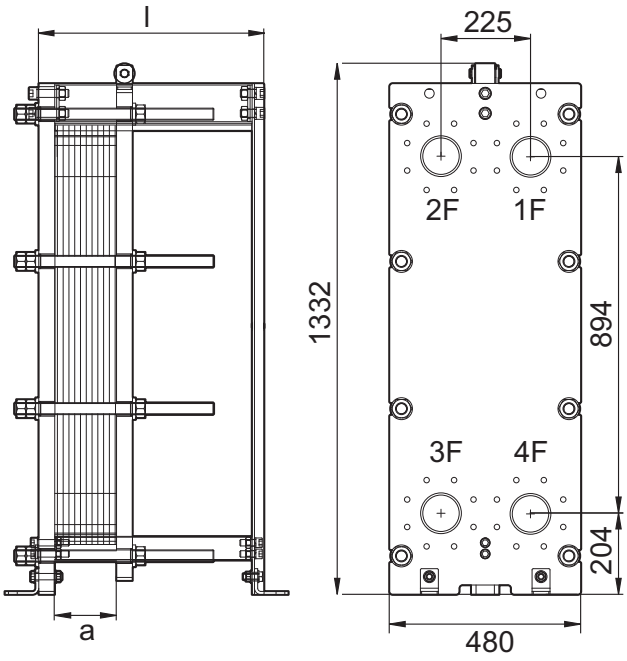

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
1F	4F	3F	2F

Dimensional data	Plate number	
	NP<=60	**60<NP<=150**
l (mm)	620	1120
Tie-rod length (mm)	500	1000
Guide length (mm)	495	995
Fitting diameter	DN100 UNI PN16	
Tightening distance "a" (mm)	3.10 x no. of plates	

Plate and frame characteristics:

Surface area	Water content in lt per channel	Plate weight	Frame weight PN16	Nominal pressure
(m^2)	***(litres per channel)***	***(kg)***	***(kg)***	***(bar)***
0.30	0.78	1.7	420	16

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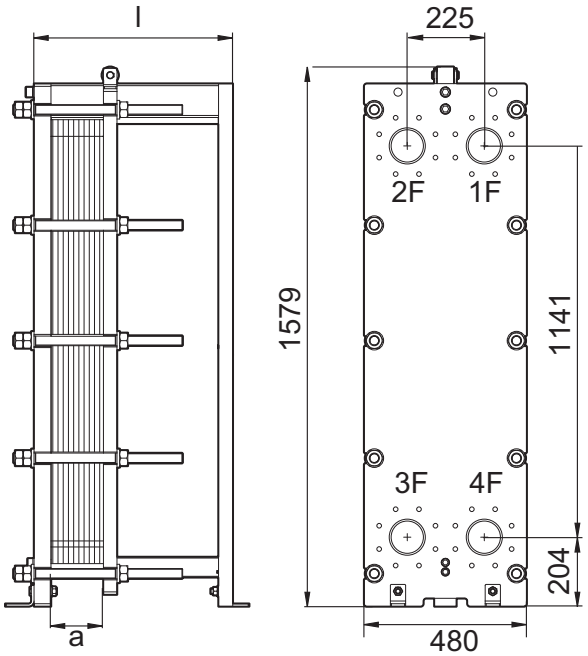

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
1F	4F	3F	2F

Dimensional data	**Plate number**	
	NP<=60	**60<NP<=150**
I (mm)	620	1120
Tie-rod length (mm)	500	1000
Guide length (mm)	495	995
Fitting diameter	DN100 UNI PN16	
Tightening distance "a" (mm)	3.10 x no. of plates	

Plate and frame characteristics:

Surface area	Water content in lt per channel	Plate weight	Frame weight PN16	Nominal pressure
(m^2)	***(litres per channel)***	***(kg)***	***(kg)***	***(bar)***
0.40	1.04	2.1	475	16

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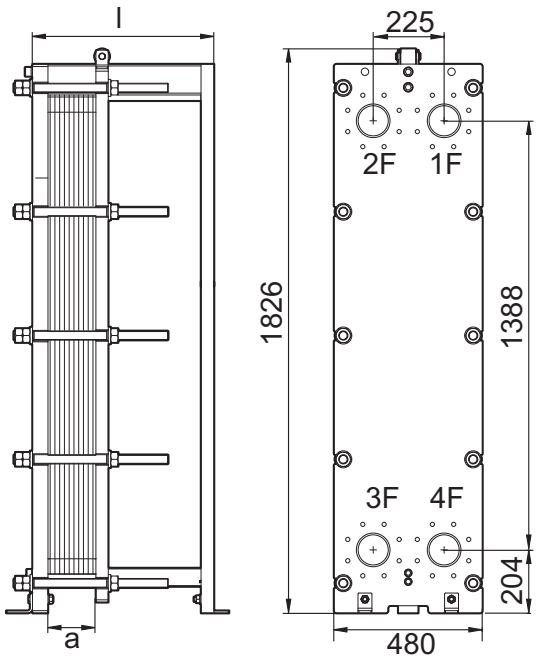

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
1F	4F	3F	2F

Dimensional data	**Plate number**	
	NP<=60	**60<NP<=150**
l (mm)	620	1120
Tie-rod length (mm)	500	1000
Guide length (mm)	495	995
Fitting diameter	DN100 UNI PN16	
Tightening distance "a" (mm)	3.10 x no. of plates	

Plate and frame characteristics:

Surface area	Water content in lt per channel	Plate weight	Frame weight PN16	Nominal pressure
(m^2)	***(litres per channel)***	***(kg)***	***(kg)***	***(bar)***
0.50	1.30	2.5	550	16

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NOTES

Application

The *fiorini* braze-welded plate exchangers are used in HVAC applications, for heat recovery and, generally speaking, where particularly high working pressures and temperatures are required (up to 30 bar and 195°C). The brazing process that fixes the pack of plates without the use of gaskets makes it possible to obtain a product with a high heat exchange and quite reduced overall dimensions.

Description

The heat transfer surface of this parallel-flow exchanger is obtained by brazing corrugated AISI 316 stainless steel plates. Channels are formed in the pack of plates creating the primary and coolant circuits through which the fluids flow and spread out over the two opposite faces of each plate while counterflowing. The corrugations of the adjacent plates touch, forming very close and fragmentary inter-channels, making the motion of the flowing media extremely turbulent. Thanks to the perfect alignment of the plates, the four holes in each plate form four inlet and collection headers for the fluids, which are taken out through four passages on the surface of the front end plate. Braze welding is done around the edge of the plates and in the contact points between the V-shaped corrugations of the plates overlapping in an alternate way.
The fluids that can be used are: liquid, steam, gas.

Examples: water/water, water/oil etc.
steam/water, steam/oil etc.
freon/water, air/water etc.

Standard execution

The pack of intermediate plates is closed between two end plates. The four connections are on one or both of these end plates.

End plates: AISI 316 stainless steel
Connections: AISI 316 stainless steel
Plates: AISI 316 stainless steel
Brazing material: Copper

On request and for applications with fluids that aren't compatible with copper brazing, exchangers with nickel brazing can be supplied.

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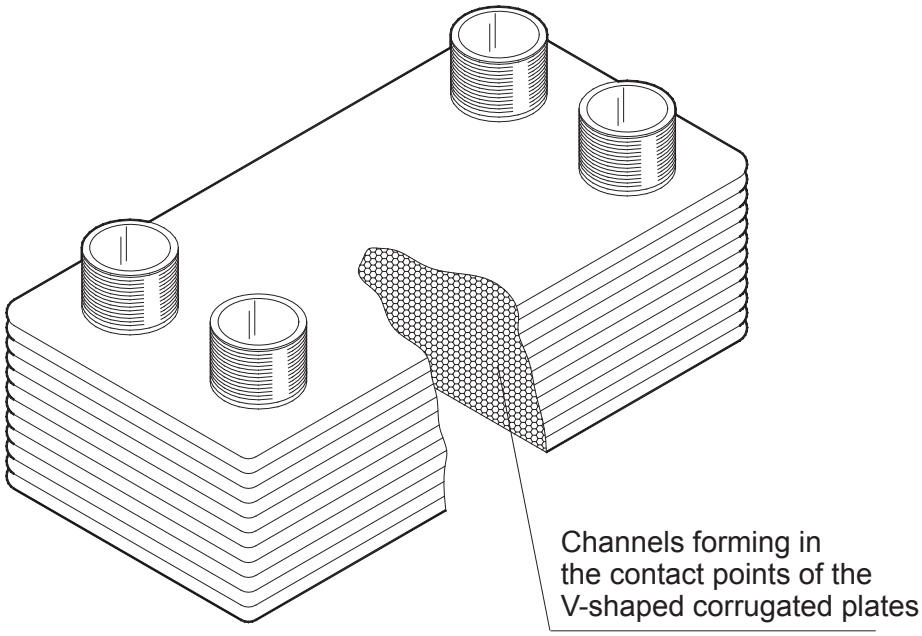

Installation

For a correct installation of the ***fiorini*** braze-welded plate exchanger, follow the instructions below:

- Leave enough space around the exchanger for inspection and routine maintenance.
- Fit on-off valves to the connection pipes.
- To avoid putting stress on the nozzles, install, if necessary, suitable compensators to neutralise the thermal expansion of the pipes.
- Install a safety valve calibrated to a lower pressure than the maximum working pressure envisaged for the exchanger.
- Install an earth to avoid stray currents.
- Water hammering and pressure vairtions can cause internal ad external leaks. Make sure the plant doesn't intake air during operation and avoid prssure vairtions.

Starting

For the exchanger to start properly you should:

- slowly open both circuits at the same time to avoid overpressure in one circuit with respect to the other;
- bleed the two circuits of the exchanger.

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Cleaning

If, after checking the temperature, you find that there has been a drop in performance, or if the load loss is high, or, if the exchanger becomes blocked due to the poor quality of the water (hard water or with many particles in suspension), clean the exchanger as follows:
- reduce the pressure in both circuits at the same time slowly;
- let the exchanger cool down;
- force a detergent liquid to circulate inside.

To do this, you can use a high head pump and a tank containing a low acid percentage (5% of phosphoric acid or 5% of oxalic acid dissolved in water). For a good result, the flow at which the detergent circulates should be at least 1.5-fold higher than the working flow rate of the exchanger; furthermore, circulation should last at least 8-10 consecutive hours.
To avoid residues of acid at the end of the operation, rinse with abundant water.

WARNING! : always use low-concentration acids compatible with the materials (stainless steel and copper or nickel) the exchanger is made of.

Inspection and Maintenance

Check that:
- the circuits have pressure and temperature below the working conditions of the exchanger.
- the safety valves built in the circuits are in efficient working order.

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DATA FORM FOR INQUIRY

Applicant:_____ ***Date:*** _____

Company:_____ ***Tel.:***_____

e-mail:_____ ***Fax:***_____

Exchanger type	☐	Inspectable	
	☐	Braze welded	
Thermal power*		☐	KW
		☐	Kcal/h
Overdimensioning			%
Hot side			
Fluid:			
Inlet T* [°c]	Outlet T* [°c]		
Flow rate* :		Units of measure	
Max admissible load loss			Kpa
Cold side			
Fluid:			
Inlet T* [°c]	Outlet T* [°c]		
Flow rate* :		Units of measure	
Max admissible load loss			Kpa

*5 **COMPULSORY** data out of 7 matching the following conditions:
1. Hot Tin>Cold Tout
2. Cold Tin>Hot Tout
3. Temperatures and flow rates consistent with thermal power

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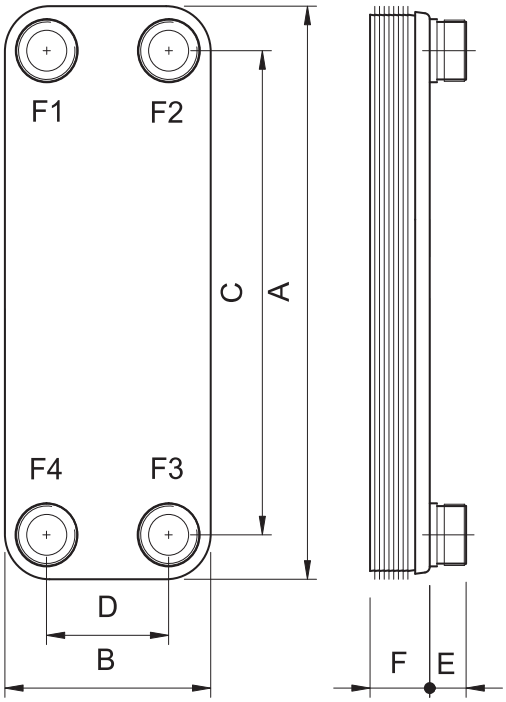

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
F1	F4	F3	F2

Nominal pressure	A	B	C	D	E	F	Standard fittings
			(mm)				***(inches)***
30 bar	335	124	281	73	20	13+2.3 x no. of plates	G 1”

Plate and frame characteristics:

Surface area	Water content in lt per channel	Exchanger weight
(m^2)	***(litres per channel)***	***(kg)***
0.03	0.065	1.6+0.13 x no. of plates

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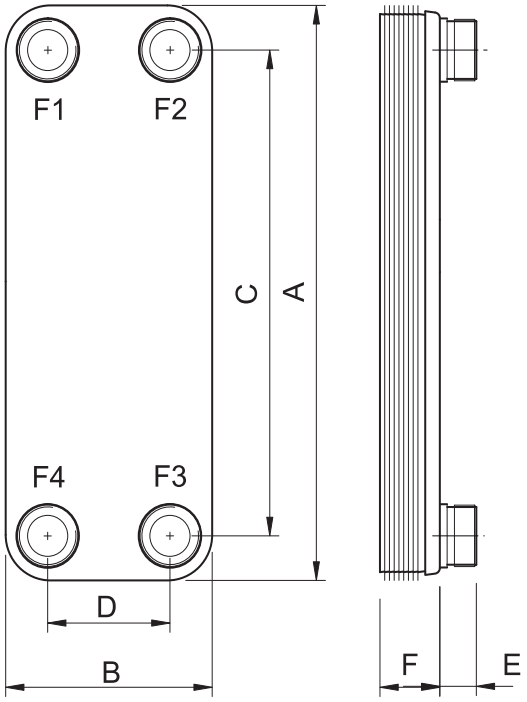

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
F1	F4	F3	F2

Nominal pressure	A	B	C	D	E	F	Standard fittings
(mm)							***(inches)***
30 bar	532	124	478	73	20	13+2.30 x no. of plates	G 1”1/4

Plate and frame characteristics:

Surface area	Water content in lt per channel	Exchanger weight
(m^2)	***(litres per channel)***	***(kg)***
0.053	0,1	2+0.24 x no. of plates

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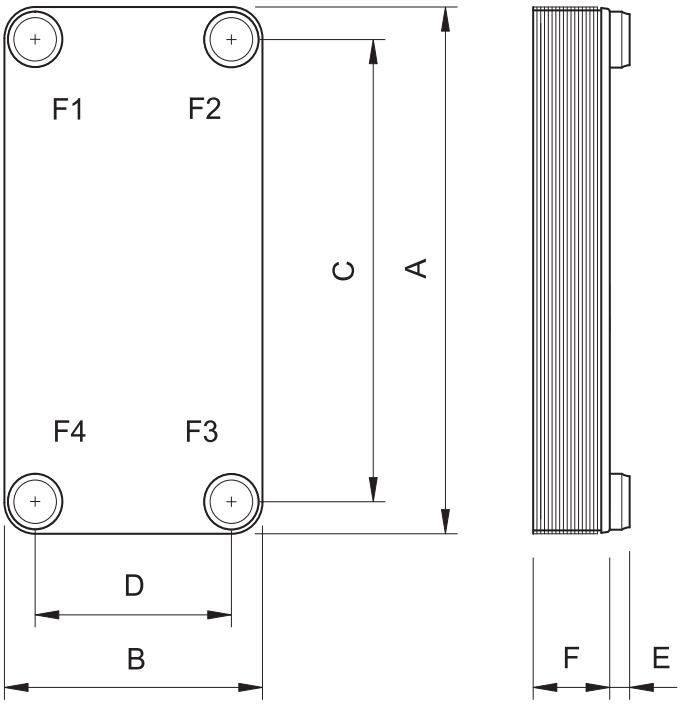

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
F1	F4	F3	F2

Nominal pressure	A	B	C	D	E	F	Standard fittings
			(mm)				***(inches)***
30 bar	532	271	460	200	20/65	13.5+2.4 x no. of plates	G 2”

Plate and frame characteristics:

Surface area	Water content in lt per channel	Exchanger weight
(m^2)	***(litres per channel)***	***(kg)***
0.132	0.23	9.6+0.54 x no. of plates

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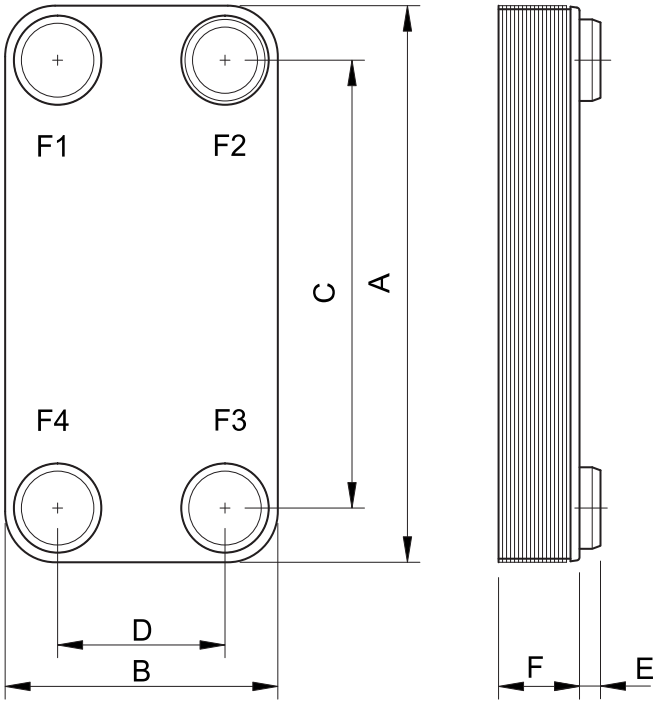

Dimensional characteristics:

Primary		Coolant	
Inlet	***Outlet***	***Inlet***	***Outlet***
F1	F4	F3	F2

Nominal pressure	A	B	C	D	E	F	Standard fittings
			(mm)				***(inches)***
30 bar	532	271	421	161	65	13.5+2.35 x no. of plates	G 2”1/2

Plate and frame characteristics:

Surface area	Water content in lt per channel	Exchanger weight
(m^2)	***(litres per channel)***	***(kg)***
0.124	0.221	10+0.54 x no. of plates

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Braze welded heat exchanger dimensioning for heating circuit

Temperature (°C)		Power (kW)	Model	Load loss (kPa)		Flow rate (l/h)	
Hot	Cold			Primary	Coolant	Primary	Coolant
80 - 70	60 - 70	20	WP4 - 14	31.7	23.9	1720.8	1724.4
		25	WP4 - 20	22.6	18.7	2152.8	2156.4
		30	WP4 - 20	31.9	26.4	2584.8	2584.8
		35	WP4 - 20	39.9	35.4	3013.2	3016.8
		40	WP4 - 30	24.3	21.5	3445.2	3448.8
		45	WP4 - 30	30.4	27	3873.6	3880.8
		50	WP4 - 30	37.1	33	4305.6	4309.2
		55	WP4 - 40	25.6	23.5	4737.6	4741.2
		60	WP4 - 40	30.2	27.7	5166	5173.2
80 - 70	65 - 75	20	WP4 - 20	14.8	12.2	1720.8	1724.4
		25	WP4 - 30	9.9	8.8	2152.8	2152.8
		30	WP4 - 30	14	12.4	2584.8	2584.8
		35	WP4 - 40	10.8	9.9	3013.2	3016.8
		40	WP4 - 40	13.9	12.7	3445.2	3445.2
		45	WP4 - 40	17.4	16	3873.6	3877.2
		50	WP4 - 50	14.1	13.2	4305.6	4309.2
		55	WP4 - 50	16.9	15.8	4737.6	4741.2
		60	WP4 - 50	20	18.7	5166	5169.6
70 - 60	50 - 60	20	WP4 - 14	32	24.1	1724.4	1724.4
		25	WP4 - 20	22.8	18.9	2156.4	2156.4
		30	WP4 - 20	32.3	26.7	2584.8	2588.4
		35	WP4 - 20	40	35.8	3016.8	3020.4
		40	WP4 - 30	24.5	21.8	3448.8	3448.8
		45	WP4 - 30	30.7	27.2	3880.8	3880.8
		50	WP4 - 30	37.5	33.3	4309.2	4312.8
		55	WP4 - 40	25.8	23.7	4741.2	4744.8
		60	WP4 - 40	30.5	28	5173.2	5176.8
70 - 60	55 - 65	20	WP4 - 30	6.6	5.8	1724.4	1724.4
		25	WP4 - 30	10	8.9	2156.4	2156.4
		30	WP4 - 30	14.2	12.5	2584.8	2588.4
		35	WP4 - 40	10.9	10	3016.8	3020.4
		40	WP4 - 40	14.1	12.9	3448.8	3448.8
		45	WP4 - 50	11.7	10.9	3880.8	3880.8
		50	WP4 - 50	14.3	13.3	4309.2	4312.8
		55	WP4 - 50	17.1	16	4741.2	4744.8
		60	-	-	-	-	-

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DATA FORM FOR INQUIRY

Applicant:_____ ***Date:*** _____

Company:_____ ***Tel.:***_____

e-mail:_____ ***Fax:***_____

Exchanger type	☐	Inspectable	
	☐	Braze welded	
Thermal power*		☐	KW
		☐	Kcal/h
Overdimensioning			%
Hot side			
Fluid:			
Inlet T* [°c]		Outlet T* [°c]	
Flow rate* :		Units of measure	
Max admissible load loss			Kpa
Cold side			
Fluid:			
Inlet T* [°c]		Outlet T* [°c]	
Flow rate* :		Units of measure	
Max admissible load loss			Kpa

*5 **COMPULSORY** data out of 7 matching the following conditions:
1. Hot Tin>Cold Tout
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CERTIFICATO N. 11436/04/SU

CERTIFICATE No.

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FIORINI S.P.A.

VIA COPERNICO 81/85 47100 FORLI' (FC) ITALIA

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IS IN COMPLIANCE WITH THE STANDARD

ISO 9001:2000

PER I SEGUENTI CAMPI DI ATTIVITÀ / *FOR THE FOLLOWING FIELD(S) OF ACTIVITIES*

EA:18
EA:29A

PROGETTAZIONE E PRODUZIONE DI PRODOTTI PER LA TERMOTECNICA: SCAMBIATORI DI CALORE A PIASTRE SERBATOI, COLLETTORI SOLARI TERMICI, BOLLITORI, MODULI IDRICI E GRUPPI DI SCAMBIO TERMICO, POMPE DI CALORE E REFRIGERATORI.
COMMERCIALIZZAZIONE DI AUTOCLAVI E SCAMBIATORI DI CALORE.

Riferirsi al Manuale della Qualità per i dettagli delle esclusioni ai requisiti della norma

DESIGN AND MANUFACTURE OF PRODUCTS FOR HEATING, REFRIGERATION AND CONDITIONING: PLATE HEAT EXCHANGERS, FLAT-PLATE SOLAR THERMAL COLLECTORS, TANKS, WATER HEATER TANKS, HYDRAULIC KITS, HEAT EXCHANGER SETS, HEAT PUMPS AND WATER CHILLERS. TRADE OF AIR-WATER STORAGE TANKS AND HEAT EXCHANGERS.

Reference is to be made to the Quality Manual for details regarding the exemptions from the requirements of the standard

La validità del presente certificato è subordinata a sorveglianza periodica annuale / semestrale ed al riesame completo del sistema di gestione con periodicità triennale
The validity of this certificate is dependent on an annual / six monthly audit and on a complete review, every three years, of the management system
L'uso e la validità del presente certificato sono soggetti al rispetto del documento RINA: Regolamento per la Certificazione di Sistemi di Gestione per la Qualità
The use and validity of this certificate are subject to compliance with the RINA document : Rules for the certification of Quality Management Systems

Prima emissione *First Issue*	30.07.2004
Emissione corrente *Current Issue*	23.07.2008
Data scadenza *Expiry Date*	30.07.2010

Dott. Roberto Cavanna
(Direttore della Divisione Certificazione e Servizi)

RINA SpA
Via Corsica 12 - 16128 Genova Italy

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