

Industrial Group

AKROPOL

گروه صنعتی آکروپل





**INSTRUCTIONS FOR
PLATE HEAT EXCHANGERS**

Type 1000 D-GB

AKROPOL

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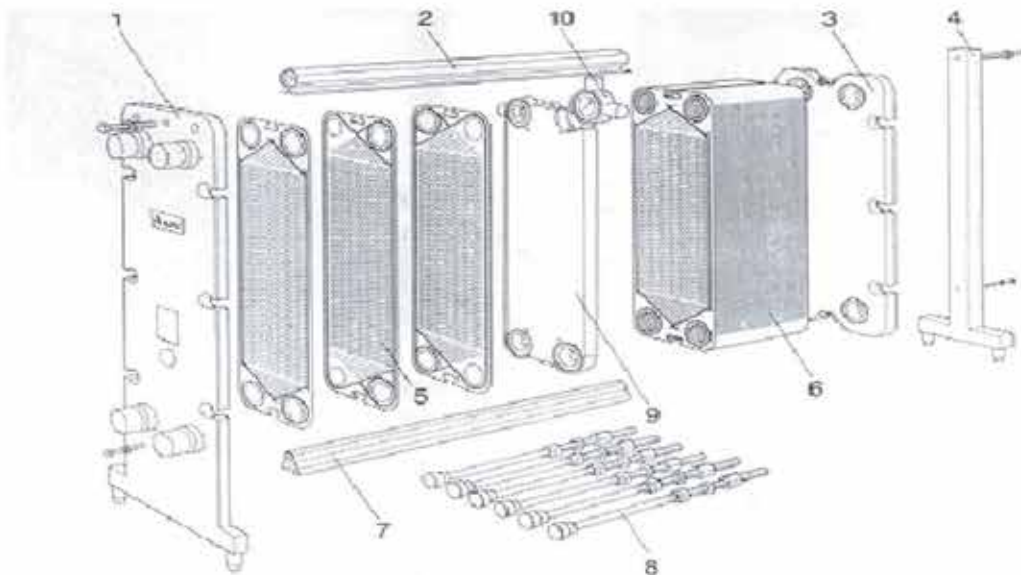
1) PRINCIPLE AND CONSTRUCTION

1.1) PRINCIPLE OF THE PLATE HEAT EXCHANGER

A plate heat exchanger consists of an edge clamped frame within which a number of cold pressed plates are compressed. These are

made with special corrugations which ensures turbulent flow and high heat transfer coefficients.

1.2) CONSTRUCTION OF THE PLATE HEAT EXCHANGER



1. Head
2. Top bar
3. Follower
4. End support
5. Flow plate
6. Plate pack
7. Bottom bar
8. Tie bolts
9. Connector grid
10. Connector boss

Example of plate heat exchanger coated with stainless steel. Connector grid (9) and connector bosses (10) are only used in plate heat exchangers with two or more sections.

2) FUNCTION

2.1) FUNCTION OF THE PLATE HEAT EXCHANGER



Fig 2

2.1.1) PLATES

After clamping of the plate pack, the plates - which are fitted with gaskets - ensure, an effective seal between fluids and atmosphere (fig. 2).

In addition, intermixing of the fluids is eliminated by a double gasket seal around the inlet ports (fig. 3). Every second plate is turned through 180 degrees. This means that the double gasket seal occurs around every second inlet to the channels between the plates. The plate pack now forms a series of parallel flow channels in which the fluids flow in a counter current regime (fig. 4).

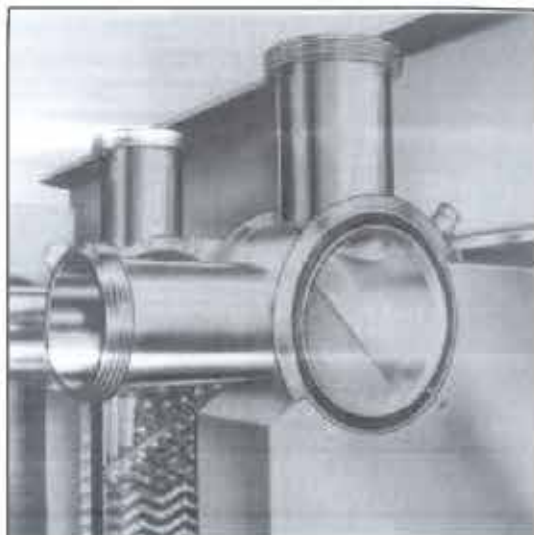


Fig 5

2.1.2) CONNECTOR GRIDS

Connector grids must be inserted in a plate heat exchanger operating

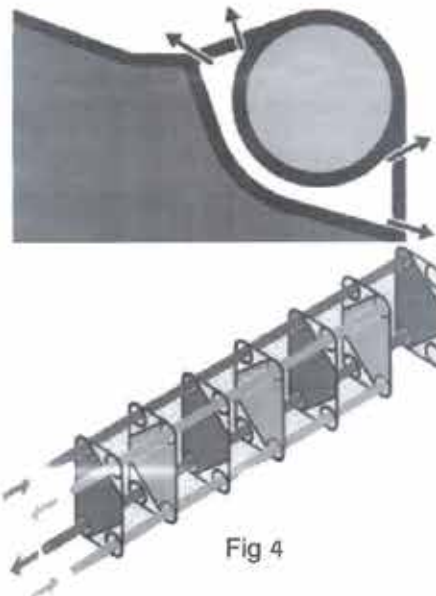


Fig 4

simultaneously with several media. These connector grids divide the plate heat exchanger in separated sections.

The connector grids are equipped with exchangeable connector bosses (fig. 5).

The connector bosses form the connecting link between the respective sections of the plate heat exchanger and/or connections for pipes. Two connecting branches can be provided in the same connection boss with connection to their respective section.

2.1.3) SEPARATING PLATES

Plate heat exchangers with more than one section requiring no inlet/outlet branches in the separation can be equipped with separating plates (strong sheet, 2-10 mm) or flow plates equipped with reinforced blankings.

2.2) ASSEMBLY DRAWING

Normally, an assembly drawing will be attached to the plate heat exchanger. This shows all principal dimensions as well as connection specifications and identification. Figures 6 a-b-c show examples of the construction of a plate heat exchanger:

HEAD = Head
 G = Connector grid
 FOLL. = Follower
 H = Horizontal connection
 V = Vertical connection

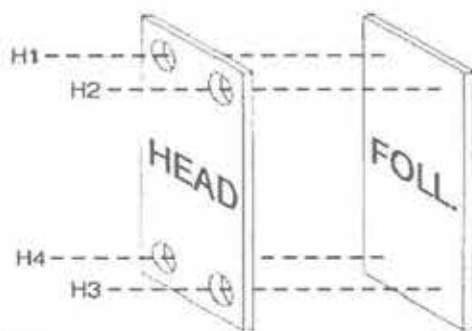


Fig. 6 a
 1 section
 1 pass

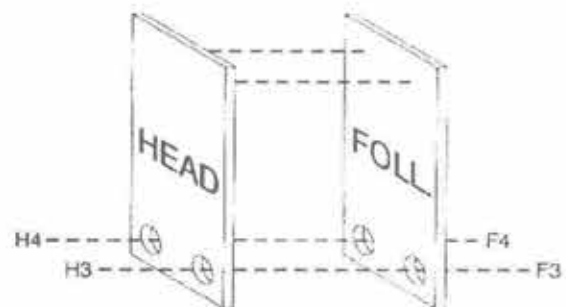


Fig. 6 b
 1 section
 2 passes

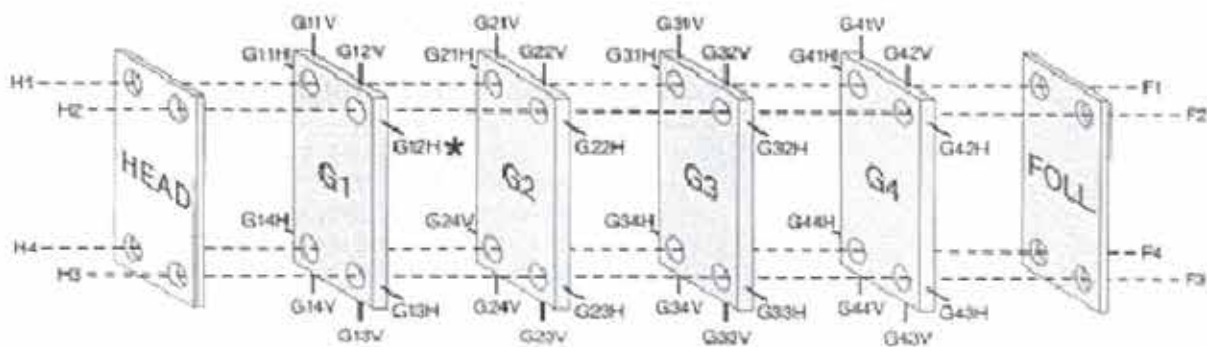
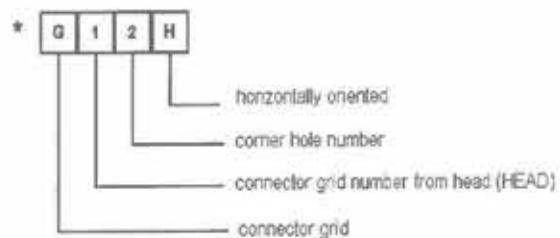


Fig. 6 c
 5 sections



2.3) DIAGRAM (FIG. 8)

2.3.1) CONFIGURATION OF THE DIAGRAM

The plate pack is suspended between the head and the follower. The gasket side of the plates must always face towards the head. On the right-hand side of fig. 8 can be seen a single plate viewed from the gasket side. The corner holes of the plate are designated 1-4. Inter-connecting lines have been drawn from the plate pack to the four corner holes of the plate. The flow channels for each fluid are marked with a thick or a thin line to ease identification.

2.3.2) EXAMPLE

Figs. 7, 8 and 9 show the same plate heat exchanger with a heating and cooling section separated by a connector grid G1.

The cold fluid enters the heating section via H1 in the head and flows through two parallel channels in one pass before entering the cooling section via hole 4 in the connector grid. From here the fluid is cooled in two passes, each with two parallel channels, before leaving the plate heat exchanger through F4 in the follower.

The heating medium enters through head (H3 in HEAD) and leaves again through head (H2 in HEAD).

The cooling medium enters through follower (F3 in FOLL.) and leaves through the connector boss of the connector grid (G13H).

2.3.3) REFERENCE NUMBER AND PUNCH CODE

The material quality and the four first digits of the reference number

of the plate are stated in the top left-hand corner of the diagram fig. 8 (No. 1075). The four last digits of the eight-digit reference number are placed on the plate together with a punch code. The code indicates which corner holes are open to allow fluid flow. For example: 1204* means that this plate is open in corners 1, 2, and 4, whereas corner 3 (marked with 0) is closed.

The letter H at the top is explained in section 5.4.1.

2.3.4) SERIAL NUMBERS

The numbers of the diagram - under the plates - are serial numbers, i.e. indication of the placing of the plates in the plate heat exchanger.

Serial numbers start with number 1 for the head and after that continuous numbers for each plate, connector grid, or separating plate. When extending the plate pack, the existing numbers are used, but the new plates are marked with an extra figure, e.g. 16, 17, 18, 18-1, 18-2, 18-3, 18-4, 19, 20 etc.

2.3.5) REFERENCE NUMBERS AND GASKETS

The diagram gives the reference number of gaskets for each section in the plate heat exchanger as well as quantity and reference numbers for glue and cleaning fluid for a complete replacement of all gaskets.

2.3.6) CAPACITY

The data list on the diagram gives the capacities and other criteria used for the design of the plate heat exchanger.

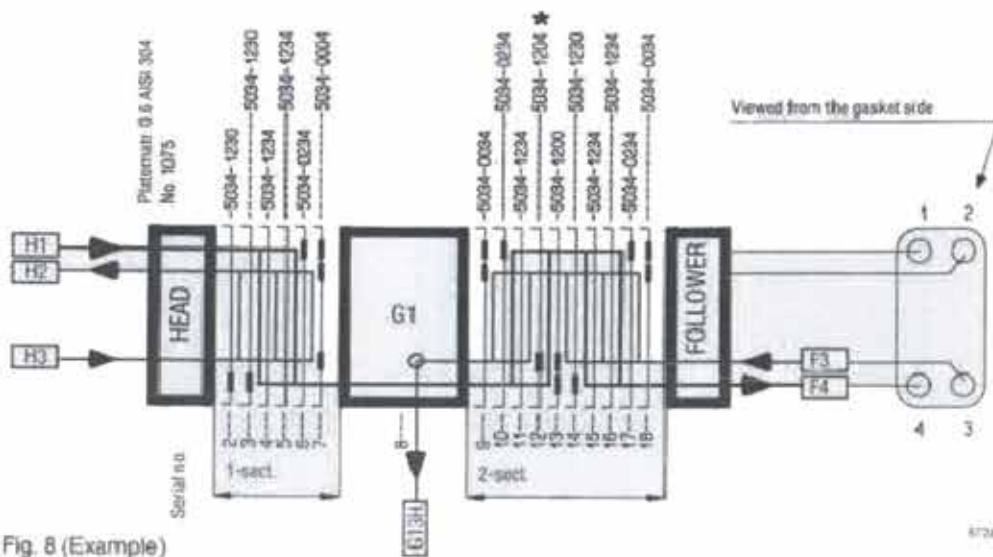
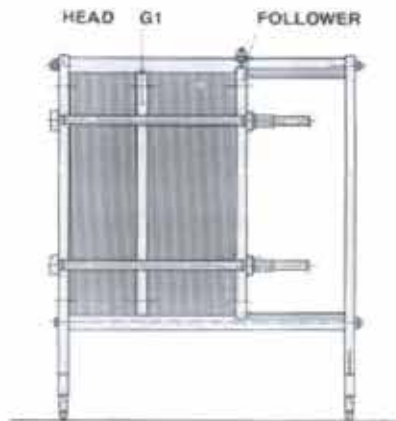


Fig. 8 (Example)

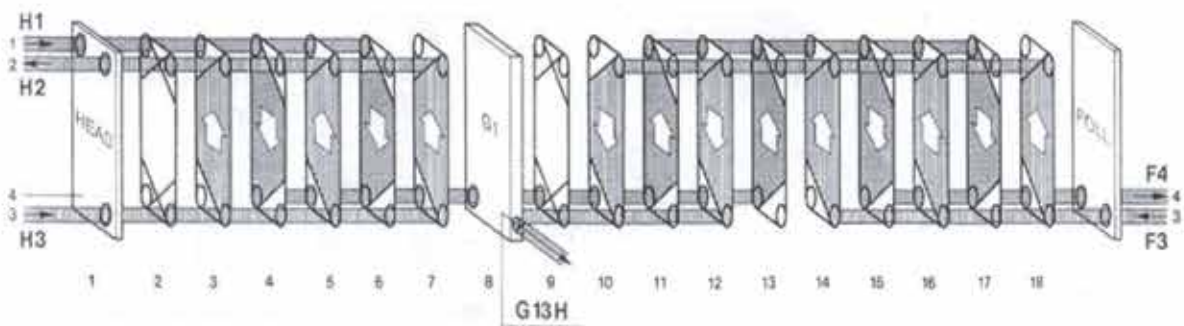


Fig. 9 (Example)

The plate heat exchanger is heated to 90-100°C (194-212°F) by means of water or steam -the temperature must be kept for 1½ - 2 hours! The liquid pressure must be kept as low as possible. On plate heat exchangers for food, pipe branches which are not connected to water / steam must be kept free, in order to permit glue vapours to escape! If there is no possibility of heating the plate heat exchanger, it must stand at a place as warm as possible with dismantled connections.

The drying time will at 20°C (68°F) be approx. 48 hours. At e.g. 40°C (104°F), the drying time is reduced to approx. 24 hours.

When the glue vapours have vaporized, the plate heat exchanger can be clamped again as stated in section 5.3.

5.4.7) NON-GLUE PARACLIP GASKETS

PARACLIP is a non-glue gasket designed as a conventional gasket. It is designed with a special clip-on feature which locks it into recesses in the gasket groove on the plate.

When replacing PARACLIP gaskets, the old gasket is removed completely. Before fitting the new PARACLIP gasket, check that the plate gasket groove is clean and free from residual rubber, particularly in the clip-on pockets. New gaskets can be fitted without using tools.

The first plate after the head and the connector grids, which have no physical contact with the product, are equipped with a glued gasket as described, see section 5.4.6.

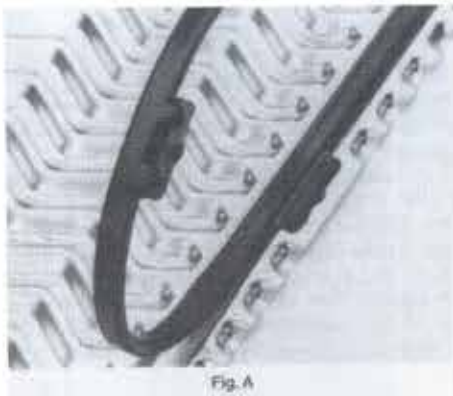


Fig. A

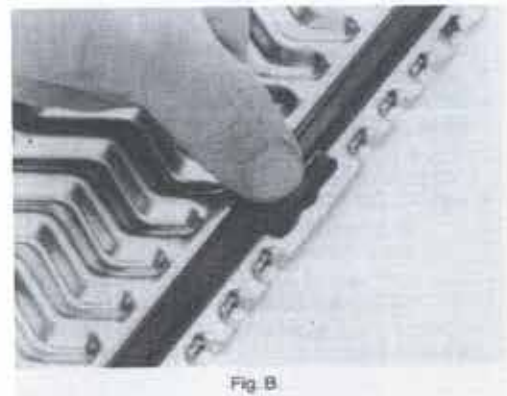
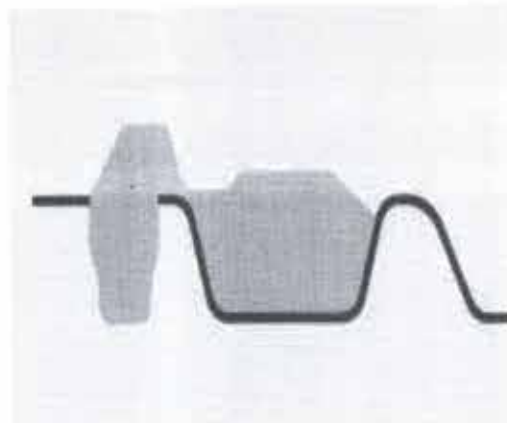
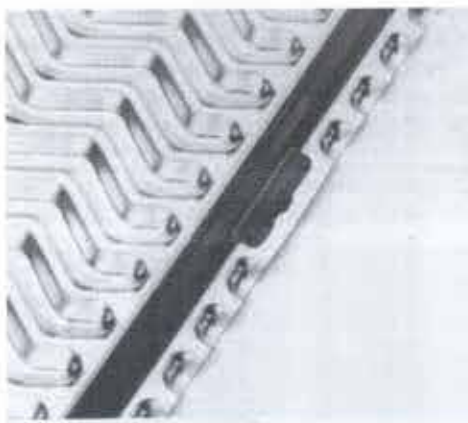
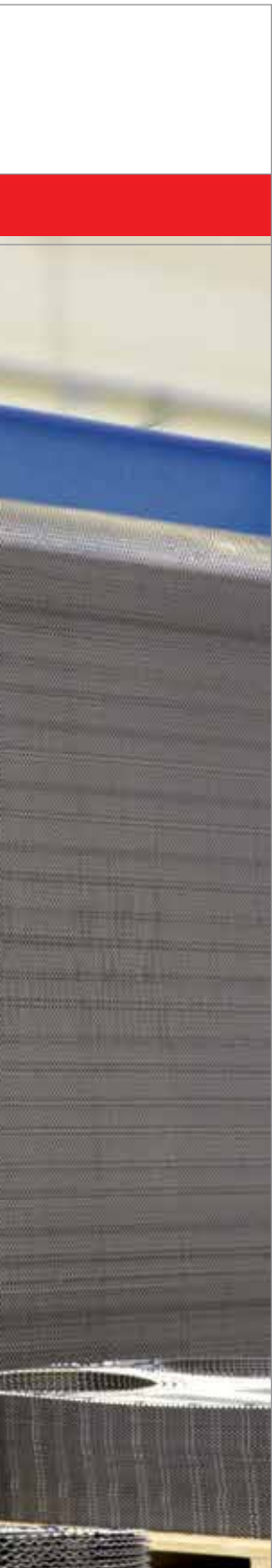


Fig. B



Design: Pazineh.com (041) 35571037



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