



## Double-wall, double safety at Shanghai MDI plant

Shanghai BASF Polyurethane Co., Ltd. (SBPC)

Case story

A large chemical plant in China, Shanghai BASF Polyurethane Co., Ltd. (SBPC), has installed a double-wall plate heat exchanger from Alfa Laval for cooling MDI from the process plant before it is put into storage tanks. The double-wall design of the plate heat exchanger provides double safety in case of damage to the heat transfer plates. According to Mr. Walter van Gysel, MDI Technology Manager, at SBPC, the double wall plate heat exchanger has performed beyond expectations

Located in the Shanghai Chemical Industry Park, SBPC is an MDI finishing plant and a 160,000 metric tonnes per year TDI plant, with precursors Nitric Acid and Di-Nitrotoluene. The plant is a joint venture between BASF, Shanghai Hua Yi (Group) Company and Sinopec Shanghai Gao Qiao Petrochemical Corporation.

MDI (Methylene di-para-phenylene isocyanate) is mainly used in the production of rigid polyurethane foam.



Installed at Shanghai BASF Polyurethane Co., Ltd., a double-wall plate heat exchanger from Alfa Laval cools MDI from the process plant before it is put into storage tanks.

### Fast Facts:

#### The customer:

Shanghai BASF Polyurethane Co., Ltd. (SBPC), an MDI plant in China.

#### The challenge:

To find a heat exchanger for MDI cooling where there is no risk of intermixing between the cooling water and the product.

#### The solution:

An Alfa Laval double-wall plate heat exchanger.

#### The benefits:

Double safety. Damage to one plate would only result in external leakage which can be detected visually. The hot and cold fluids cannot intermix unless both plates are damaged at the same time.

Other uses include binders, flexible foam, adhesives and sealants.

### The challenge

At SBPC, MDI from the process plant must be cooled using a heat exchanger before it is put into storage tanks. This prevents dimerisation, a reaction which degrades the quality of the product.

In many MDI plants, MCB (monochlorobenzene) is used instead of water as a coolant, since any mixing of the process media with water would result in the formation of solids. These solids

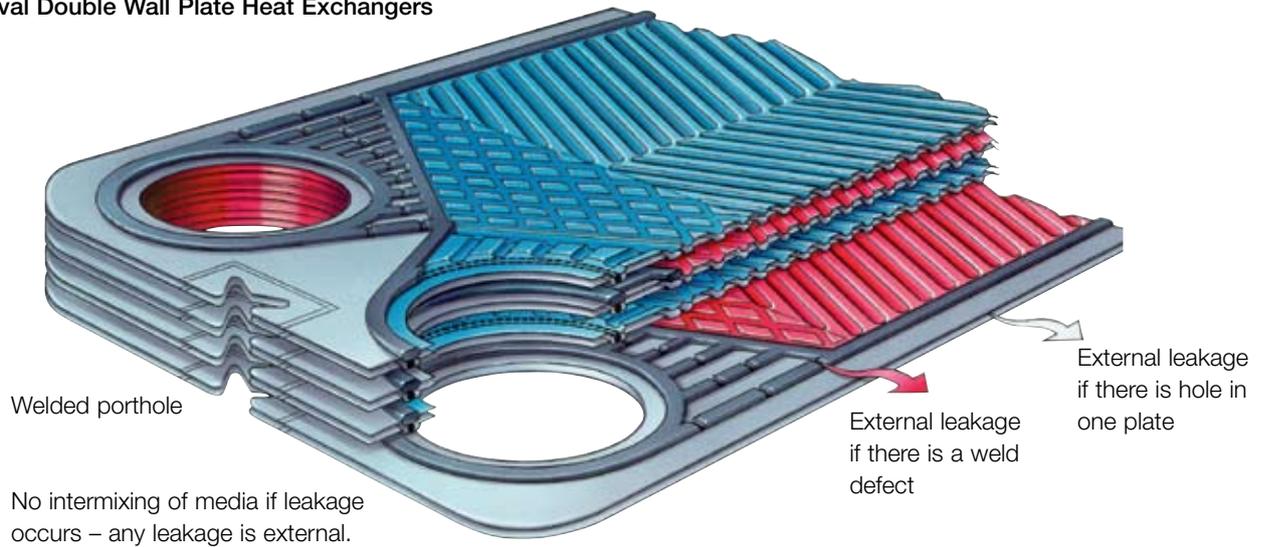
would then cause blockages in other process equipment further downstream.

However, since the final product is viscous and the capacity is relatively high, to use MCB as the coolant would demand a costly increase in the MCB cooling loop. Accordingly, SBPC chose to use cooling tower water as the cooling medium in order to reduce costs.

### Double wall – double safety

Seeking a solution for this duty that would eliminate the risk of intermixing between the coolant and the product,

## Alfa Laval Double Wall Plate Heat Exchangers



SBPC process engineers consulted Alfa Laval. Alfa Laval proposed a double-wall type plate heat exchanger and worked with SBPC to optimise the design.

The Alfa Laval double-wall type plate heat exchanger provides double safety in case of damage to the heat transfer plates, resulting for instance, from corrosion caused by poor cooling water quality. The double plate system means that damage to one plate would only result in an external leakage which can



In the Alfa Laval double-wall plate heat exchanger there is no risk of intermixing between the cooling water and the product (MDI).

### Alfa Laval Double Wall Plate Heat Exchangers

#### Benefits

- Risk of the fluids intermixing is eliminated
- Any leakage is external
- Two to three times higher heat transfer coefficients than in shell-and-tube heat exchangers
- Low weight and compact design gives lower installation costs
- Full access to the heat transfer area makes maintenance easy and reduces the number of man-hours required.

#### Double-wall performance limits

- Temp: Up to 180°C (depending on model)
- Pressure: Up to 24 barg (depending on model)
- Heat transfer area: Up to 1,100m<sup>2</sup> (depending on model)
- Plates: Alloy 316 std, Ti std except for M6-MD (other material depending on model)
- Gaskets: NBR and EPDM standard (H-NBR, EPDM-AL, FKM-G except M3-D)

be detected visually. The hot and cold fluids cannot intermix unless both plates are damaged at the same time.

The double wall plate heat exchanger channels are sealed with Alfa Laval FKM-G gaskets for resistance to MDI. The gaskets are also equipped with double seals to prevent intermixing in case of gasket failure.

#### Alfa Laval presence in China, a factor

According to SBPC, Alfa Laval was the chosen partner for this project due to SBPC's favourable experiences with Alfa Laval at other sites in Europe. Also, Alfa Laval's presence in China ensured that there were no communication problems.

#### How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at [www.alfalaval.com](http://www.alfalaval.com).