



# The optimal solution for Merck

## Hygienic Compabloc Condenser

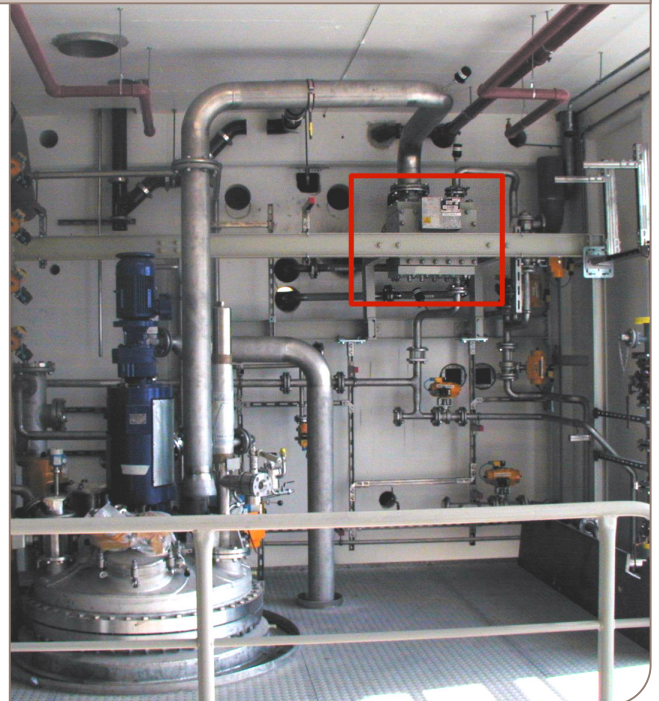
## Case story

Merck has installed more than hundred Compabloc condensers at its pharmaceutical production plant in Darmstadt, Germany. Merck selected these particular condensers for their compact size, and to satisfy the strict demands for the requirements set under the cGMP (current Good Manufacturing Practices) guidelines. Merck wanted to optimize the cost, space and process efficiency and the Compabloc was the perfect solution to meet each challenge.

When Merck decided to modernize its production, the company was on the lookout for a new concept to make this possible. Merck had used graphite heat exchangers, but graphite is a brittle material that is sensitive to temperature changes, and thus increases the risk of failure. Merck had also used shell-and-tube condensers made of glass and silicon carbide with marginal results. In 1996 Merck installed its first Compabloc, a compact welded plate type condenser.

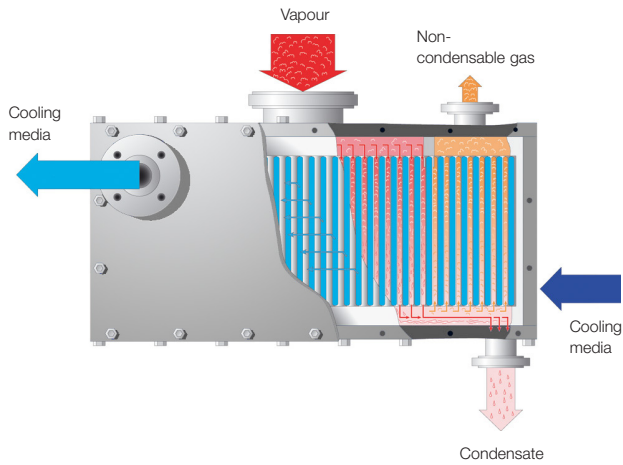
The company's experience with the Compabloc condensers was so good that Merck decided to install the same type of condensers as part of its modernization project. Compact plate condensers are easy to clean, with only very limited dismantling required. However, increasing hygienic demands within the industry forced Merck to find an alternative solution to the Compabloc acquired in 1996. The solution was a new version with special sanitary features, designed for use where hygienic standards are crucial.

Rigorous tests were carried out with the new hygienic version of the Compabloc in a pilot plant. Merck was extremely satisfied with the results, and the new version met the company's cGMP requirements. Merck selected this condenser for the modernization project not only due to the successful tests, but also because of Alfa Laval's considerable experience in this field, the large number of installed units globally and because of its willingness to collaborate closely with Merck on this project. The hygienic

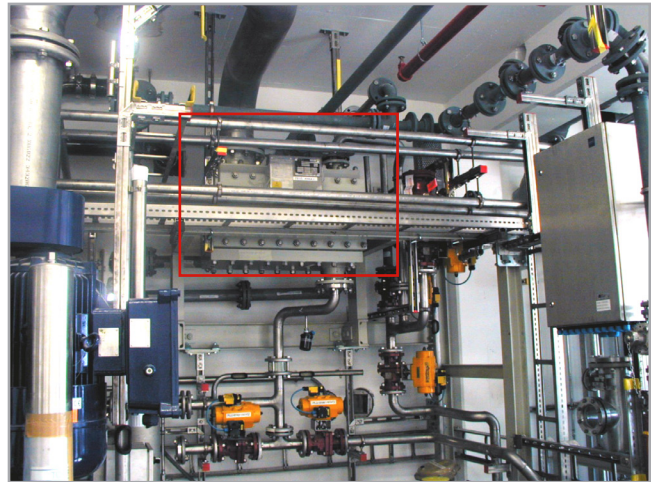


Compablocs now installed at Merck are used in a multi-purpose plant as condensers for solvents in conjunction with reactors and dryers. The different solvents in the production process are condensed using heat transfer oil as the cooling medium. Design pressures are between full vacuum and 16 barg, and temperatures range from  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) to  $200^{\circ}\text{C}$  ( $392^{\circ}\text{F}$ ).

The Compablocs installed at the Merck plant feature a two-pass arrangement. This enables sub-cooling of non-condensable gases, ensuring maximum condensing. The two-pass arrangement also permits gas/liquid separation inside the unit, eliminating any need for a mist separator for this purpose. The main condensation takes place in the first pass, and sub-cooling of the non-condensable gases takes place in the second pass. The second pass also serves as a mist eliminator. The two-pass condenser thus works like two heat exchangers in series.



Two-pass condenser with inert gas sub-cooling.



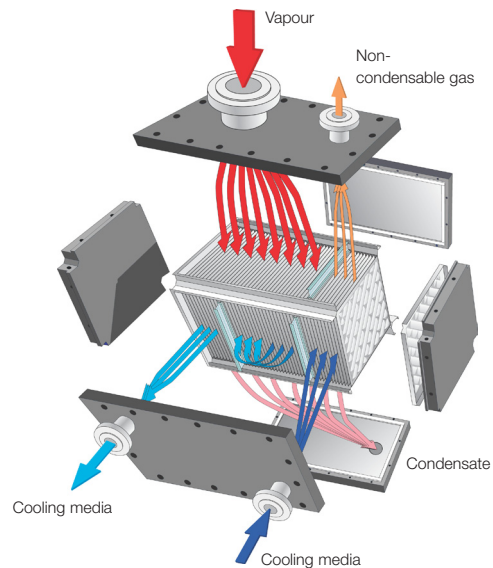
One of the more than 100 hygienic Compabloc condensers installed at Merck.

CIP (Cleaning-In-Place) is carried out to clean both the reactor and the peripheral equipment – including the piping and the condensers.

### The hygienic Compabloc condenser

In the pharmaceutical industry there is a requirement for high quality, hygienic condensers – used as overhead condensers on reactors as well as vent condensers.

This requirement can be met with the welded and fully drainable hygienic Compabloc condenser. The design, compared to the conventional Compabloc, involves a new concept of baffles and lateral end plates without any retention of condensate. Electropolishing can also be offered on request in order to improve surface finish of process contact surfaces.



Exploded view of 2-pass Compabloc condenser.

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### How to contact Alfa Laval

Contact details for all countries are continually updated on our website. Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information direct.