Compabloc condensers solves problem

Belgian dichloroethane plant **Case story**

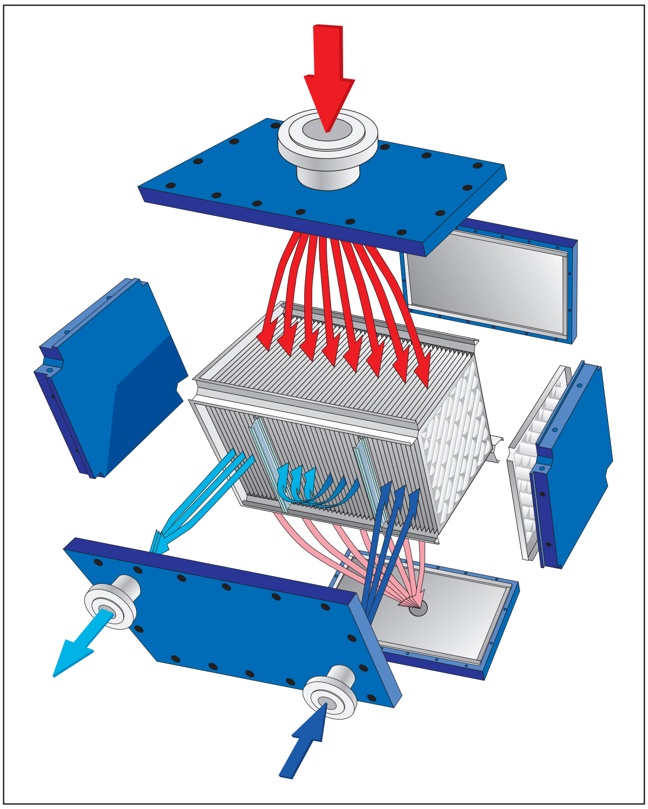
When their graphite shell-and-tube heat exchanger cracked and began to leak, engineers at the SolVin NV plant in Zandvliet Belgium took the opportunity not just to replace the old unit but to improve the overall design and safety of the plant by replacing it with a Compabloc welded heat exchanger from Alfa Laval.

This exchanger is used as a condenser to treat waste gas in a line producing dichloroethane. This part of the process is cyclic in nature. The temperature cycling resulted in the cracking of the graphite in the original shell-and-tube exchanger, which was an environmental risk.

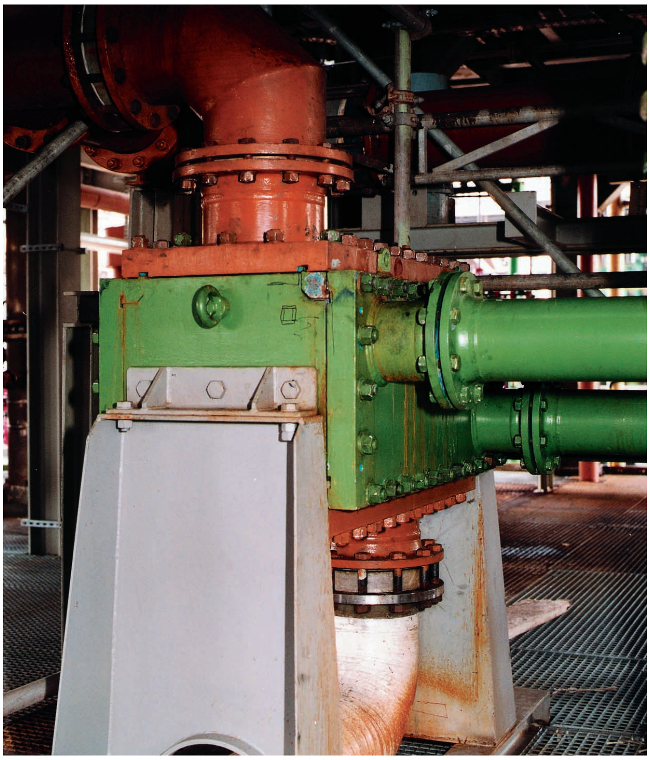
Although SolVin's engineers did consider direct replacement with similar shell-and-tube, Compabloc heat exchangers from Alfa Laval offered a compact, cheaper alternative that also promised to be less expensive and easier to maintain. Compabloc units are compact in size and, generally speaking, take up only a fraction of the space required by shell-and-tube exchangers of equivalent thermal capacity. This was obviously an attractive point for SolVin's engineers, especially when this advantage is supplemented by high levels of thermal efficiency, low hold-up volumes and the ability to handle both high temperatures (up to 300°C) and relatively high pressures (up to 32 Bar).

The SolVin plant produces about 250.000 ton of dichloroethane every year. One part of the waste gas treatment operates in 8 to 10 hour cycles, during which the Compabloc condenser is in use for up to 3.5 hours.

As a first stage in this part of the plant, waste gases are treated by adsorption in one of the two active carbon filters present. As this adsorption process continues, gases and entrained product build up until the carbon becomes saturated. Once this occurs, filters are switched and steam is passed through the filter to regenerate it and the steam/gas mixture is led through the Compabloc to be condensed, a process



Compabloc condenser. Vapour enters from the top and condenses on the cold plates. The condensate is extracted from the bottom. The cooling media is forced through several passes in order to maximize turbulence, thus boosting the heat transfer coefficient and minimize fouling.



Compabloc condensers provide a compact solution for this dichloroethane plant

that takes around 70 minutes. The treated waste gas of the other filter in adsorption mode is heated up and used to dry the regenerated filter to prepare it for the next adsorption cycle while any remaining water and entrained gases are condensed in the Compabloc for a further 150 minutes. After this drying step the temperature in this filter is reduced and the pressure is increased in readiness for its next adsorption step, while product flow is switched to the other carbon filter. The cycle is then repeated.

Cooling water at 24°C is used to condens a mixture of steam, dichloroethane and ethylene chloride. Condensation takes place from 130°C down to 30°C. No temperature controls are required as the cooling water runs continuously in order to achieve as high a degree of condensation as possible.

According to Frank Van Rompuy, SolVin's production manager, some problems with fouling were anticipated, but none have actually been encountered, even though the Compabloc has been in almost continuous operation every day for 18 months. Most importantly, the risk of cracking and the potential for environmental problems have been eliminated.

Alfa Laval reserves the right to change specifications without prior notification.

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