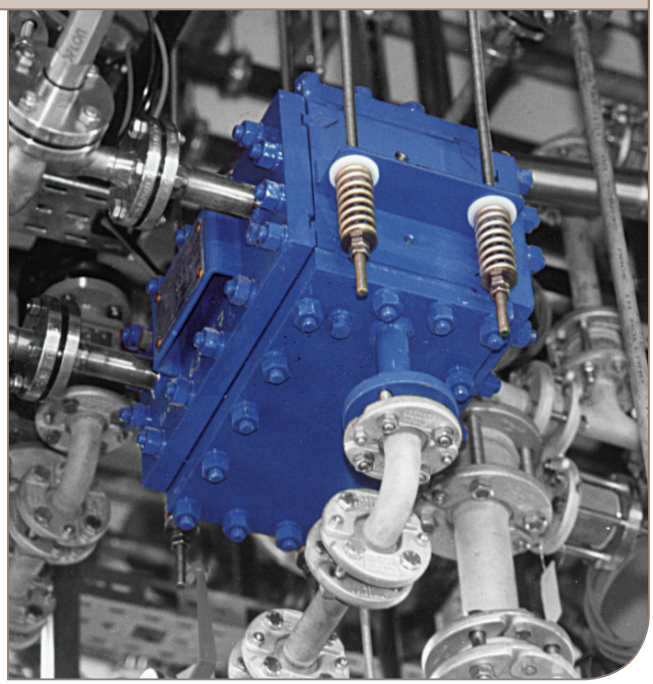
# The hygienic condenser

## Compabloc



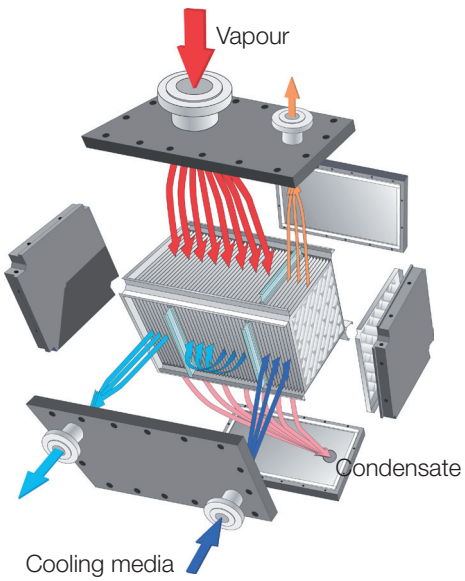
In the pharmaceutical industry there is a requirement for high quality condensers - used as overhead condensers on reactors as well as vent condensers.

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 surfce finish of process contact surfaces.

### Applications
Pharmaceuticals, fine chemicals and speciality chemicals.

### Duty
Condensing duties with or without non-condensable gases. Low vacuum, atmospheric or higher pressures.

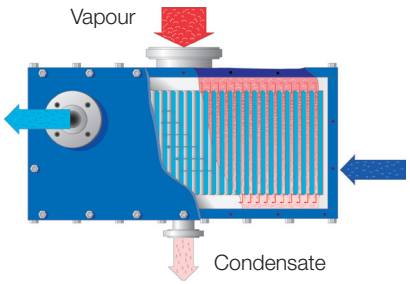
### Unique design
The Compabloc condenser has an innovative design, completely different from traditional shell-and-tube condensers. It represents a quantum leap in process capability and cost savings.



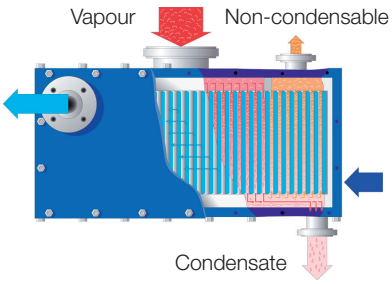

The Compabloc is built around a core of corrugated heat transfer plates. These plates are welded alternately to form channels. The complete plate pack slides inside a four-column carbon steel frame bolted to pressure-retaining heads. Four removable panels contain the fluid inlet and outlet connections.

The condensing side consists of straight-through channels with very short vapour paths, allowing for very low pressure drops. On the coolant side, baffles direct the cooling media back and forth through the channels in order to increase turbulence.

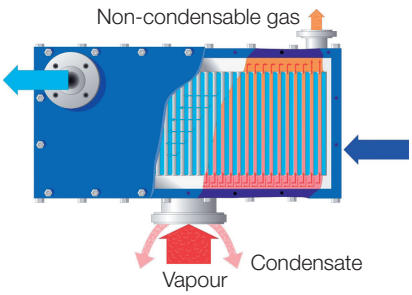
The corrugated pattern in the condenser creates maximum turbulence, which in turn results in outstanding heat transfer efficiency. The overall heat transfer coefficient is two to four times greater than in a corresponding shell-and-tube unit. In other words, the condenser requires only 25-50% of the heat transfer area of an equivalent tubular unit. That, in essence, is the advantage of the Compabloc.




Single-pass condenser




Two-pass condenser with inert gas sub-cooling




Reflux condenser

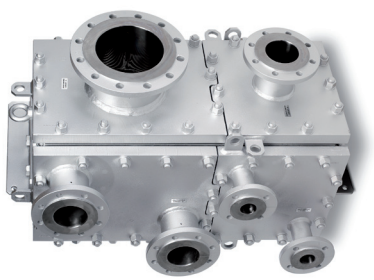
## Working principles

In operation, the vapour enters the unit and condenses on the cold plate while passing through the plate pack. The condensate is extracted from the bottom of the unit. The cooling media is forced through several passes with a series of baffles. This, together with the plate corrugations, maximises heat transfer efficiency and minimizes fouling.

The hygienic Compabloc can be fitted to any condensing duty. If the vapour contains non-condensable gases, a two-pass arrangement on the condensing side can be used. The second pass enables sub-cooling of the non-condensable gases, thus condensing as much as possible. The two-pass arrangement permits gas/liquid separation inside the unit, eliminating any need for an additional vapour separator. The main condensation takes place in the first pass. The sub-cooling of the non-condensable gases is achieved in the second pass, while also serving as a mist eliminator. The two-pass arrangement works like two condensers in series. The Compabloc can be mounted directly on top of a reactor, for example, as a reflux condenser. In the reflux design, the vapour enters from the bottom and condenses on the cold plates, with non-condensable gases being removed at the top, and the condensate flowing back to the reactor.

## Two-in-one solution

Also available is a special design of the hygienic Compabloc condenser; a condenser working with two different cooling medias.



Two cooling media condenser

The first section works as a main condenser, followed by a gas/liquid separation in the bottom of the unit. The vapours not condensed go on to the second section, working as a vent condenser, where the cooling media is much colder. This extremely compact construction allows for main and vent condensation in a single unit, providing savings in piping, space and a lower VOC content.

## Hygienic standard design on process circuit

- Full drainability.
- Plate pack acid pickled and passivated.
- Complete process circuit acid pickled and passivated by recirculation.
- Helium leak test.
- Surface roughness, Ra < 0.8 µm, on process circuit.
- Electropolished plates (SS 316L, Alloy C22).

## Options

- Electropolished plate pack after welding (SS 316L).

## Materials

Standard: SS 316L and Alloy C22.
On request: Alloy C276, C2000 and Tantalum.
Cover gaskets in Gylon blue (PTFE).

## Design codes

AD-2000 AD merkblatt design for CE-marking (PED).
ASME VIII Div. 1 design (with U-stamp option).

## Technical specifications

Design pressure: FV to 16 barg (232 psig).
Design temperature: -40°C (-40°F) / 200°C (392°F) for PED.
-45°C (-49°F) / 200°C (392°F) for ASME.

## Models

CP2M15, CP2M20, CP2M30, HCP15, HCP20, HCP30 and HCP40.

PLS00103 EN 1104