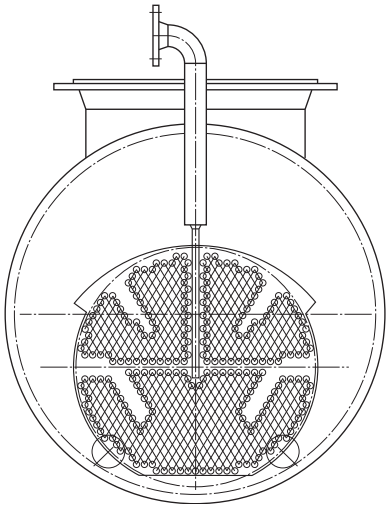
Water Cooled Vacuum Condensers

The Hamworthy Serck Como condenser series **AA43 CD** and **AA43 VD** have been specifically developed for the following operating conditions:

AA43 CD: Vacuum Condensers
AA43 VD: Atmospheric or Pressure Condensers

Some constructive details are essential in the Vacuum Condensers **AA43 CD** series:

With increased vacuum pressure (i.e. with decreasing absolute pressure), the volume of the vapour heavily increases. Therefore, a sufficiently sized steam space is necessary for distribution of the vapour in the condenser. This is granted by a bundle of pipes which are essentially arranged in the casing.



Sectional drawing of AA43 CD series vacuum condenser

In order to minimise the inlet velocity into the bundle, and thus the surface strain of the individual pipes, vapour channels are provided in the bundle increasing the inlet surface.

To allow for efficient absorption of the non-condensed gases from the condenser it is required to provide a sufficiently sized air cooling zone.

With our vacuum condensers the installations are designed in such a way that the vapour entering the apparatus will not directly escape again from the atmosphere connection.

Apart from the supply of apparatus Hamworthy Serck Como also offer supplies of complete condenser installations including all necessary equipment such as evacuating systems, condensate pumps, condensate level control and safety valves.

Based on many years experience in the design and manufacture of such installations Hamworthy Serck Como will provide you with a sufficient completion of your order. A reference list, which we would be pleased to submit upon request, will confirm our knowledge and experience of our products and the satisfaction of our customers.

Hamworthy

Description of process

The flow diagram shows in a simplified way the functioning of a water-cooled vacuum condensation plant.

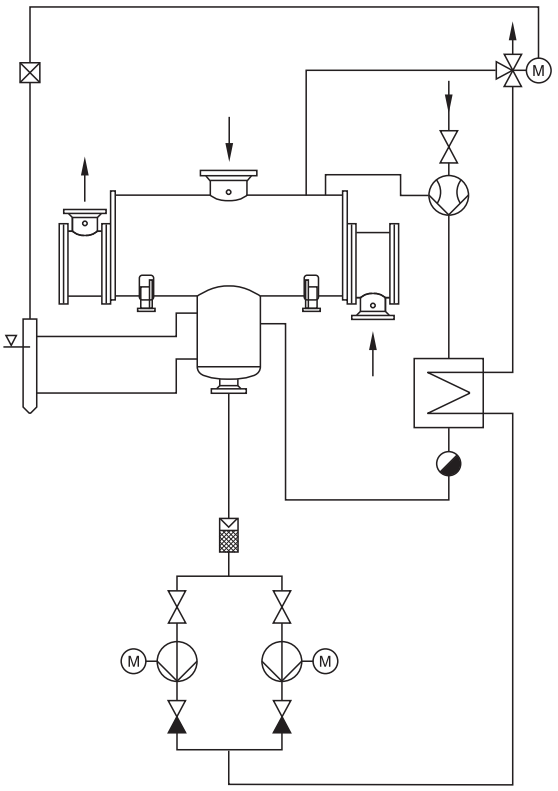
The condensation plant serves for condensing the vapour and inducing the condensation heat into the cooling water. In the case of heating condensers the condensation heat is used for heating up the water. Furthermore, the arising condensate is lead back into the boiler water circuit.

This condenser is a shell and tube type heat exchanger. The vapour is conducted around the heat bundle and it condenses (liquifies) at the heat exchange space of the pipes. Below the steam inlet there is an impact plate in order to protect the pipes against erosion due to beating of drops, a hotwell is provided for collecting the condensate.

In the condenser, low volumes of air and non-condensable gases are accumulated. In order to avoid an increase of the operating pressure due to a deterioration of the heat exchange, these air and gas portions are vacuumed out. In the apparatus there is a sufficiently sized partial space for cooling of these air and gas portions in order to minimise the strain of the evacuation plant due to the carried vapour.

To enable absorption of the non-condensable gases an evacuation plant, including a steam ejector(s), is used. By the means of high acceleration of the motive steam a pressure is created in the suction chamber of the steam ejector. This is lower than the pressure in the turbine condenser so that the mixture of air, gas and carried vapour is suctioned and conducted into the ejector condenser topped behind the radiator pump together with the motive steam. Here, the mixture is brought to atmospheric pressure and the vapour portion is mostly condensed. The arising condensate is equally conducted into the hotwell and the non-condensable gases escape through the atmospheric connection. The condensate from the main condenser serves as a cooling medium for the radiator condenser.

Flow diagram of a water cooled vacuum condensation plant



The pressure (the vacuum) that is created in the condenser depends on the temperature conditions of the cooling water and the installed heat exchange space of the condenser.

A condensate pump provides for the condensate to be conducted back into the boiler water circuit. In order not to jeopardise the operation of the overall turbine plant, in case of pump failure, it is useful to provide a stand-by pump and pump control. In order to grant a constant supply level and in order to avoid that the condensate pumps run dry, a level control installation is provided for the hotwell. Depending on the condensate level in the hotwell, the condensate is distributed via a 3-way-valve. One way leads back into the condenser, the other into the boiler water circuit.

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The manufacturers reserve the right to alter the specification and data to incorporate improvements in design. Certified drawings will be issued on request.

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