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IMPROVING THE EFFECTIVENESS OF THERMAL DEAERATOR

Аннотация: в статье рассмотрен вариант модернизации деаэрационной колонны деаэратора путем внедрения насадочного элемента, приведены некоторые типы насадочных элементов. Сделаны выводы для подобных вариантов модернизации деаэраторов

Ключевые слова: модернизация, насадка, термический деаэратор, насадочная колонна.

Abstract: the article describes the type of modernization of the deaerator unit of the deaerator, by introducing the placement unit, also some types of packing elements are produced. Conclusions are drawn and recommendations were developed on these types of deaerator modernization.

Keywords: modernization, nozzle, thermal deaerator, packed column.

A deaerator is a device that is widely used to remove oxygen and other dissolved gases from the feed water to steam-generating boilers, particularly of dissolved in boiler's feed water oxygen, from which steam systems are corrode. This corrosion forms inside the metal pipes and other metal equipment. Dissolved carbon dioxide reacts with water by forming the carbonic acid, which causes corrosion. Deaerators mostly designed for deleting oxygen to the level of 0,005 cm³/l by the weight, as for deleting carbon dioxide.

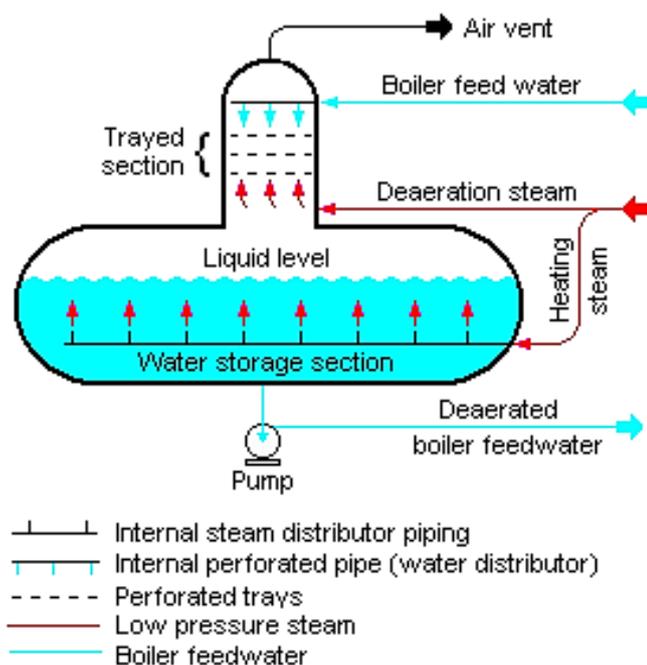


Fig. 1 Plate deaerator scheme

The horizontal plate deaerator on picture 1 usually has the vertical deaeration tank, situated on the horizontal tank with the boiler's feed water inside. The feed water gives to the vertical deaeration tank from the top and then flows down through the perforated plates row to the horizontal tank. Low pressure deaeration steam gives from the bottom of the perforated plates row and passes through them up. Deaerated water from the horizontal tank then gives to the steam generating facility [1].

Sometimes deaerators designed in the other way by using special nozzles and diaphragms instead of plates to increase the phase boundary.

There are some problems associated with the operation of thermal deaerators.

They consist in the following:

- the quality deaeration decreases in case workload exceeds 50%;
- the quality of deaerated water reduces under variable loads.

To solve these problems suggested the following option:

- modernization of deaerators with using contact devices with more efficient heat-mass-transfer properties.

Modernization of the deaerator means to set new types of nozzles instead bubbling plates. The nozzles have a wider interval of stable work and bigger efficiency.

In the deaerators can be used various kinds of contact nozzles, such as Raschig rings, pall rings, nozzle «Inzhekhim» (fig. 2).



a)



b)



c)

Fig. 2 Packed columns: a) Raschig rings; b) pall rings; c) nozzle «Inzhekhim»

Packed columns are widely used in industry for carrying out various chemical and physical processes. The advantages of packed columns are high efficiency, low cost and simplicity of design, and small hydraulic resistance, which is especially important

for vacuum columns. In practice, already has experience with the replacement of the bubbling plates on the nozzles, which showed high efficiency [2].

Therefore, it can be argued that the using of packed columns leads to higher efficiency of thermal deaeration in case right approach of calculating aeration, as well as streamlined operational process.

References

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