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IMPROVEMENT OF THE DESIGN OF THE SPECIAL TECHNOLOGICAL CONTAINERS FOR CHEMICAL HEAT TREATMENT

The special technological containers for chemical heat treatment of workpieces belong to specialized equipment. That's why their design is not covered by standards [1], [2]. The particular character of this containers caused by complex thermomechanical influences during operation, including heating, chemical surface saturation, holding, and quenching processes. Stresses from temperature gradients under the quenching are the most significant factor that influence on an operation life of the special technological containers for chemical heat treatment. These stresses are significantly increased at stress concentration spots, such as sharp edges, small radius transitions, structural bends, thickness variations, and welds. Such stress concentrators are mostly located at gripping nodes of the special technological container for chemical heat treatment.

A good way to decrease stress concentration is to produce the special technological containers for chemical heat treatment by casting. But sometimes this is not possible due to technological limitations.

A comprehensive set of measures to reduce thermomechanical stresses in a typical special technological container for chemical heat treatment have been proposed. It includes creation of special cavities to improve the circulation of quenching liquid, ensuring more uniform cooling of the gripping node during quenching and, as a result, significant stress reduction. More extensive redesign of the gripping node of the special technological containers for chemical heat treatment is required for further reduction of the thermal stresses. This implies simultaneous modification of a design of the lifting device.

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