

1.12.21. THERMAL NON-DESTRUCTIVE TESTING OF THE STATE OF PRESSURE VESSELS

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For diagnosis of high-pressure vessels, there are various methods of non-destructive testing to detect different types of defects available. Most of them are suitable only for detection of the so-called macrodefects (larger than 100 microns), but the tightness of a vessel is no less influenced by micro-defects (microtubuleness, micropores, etc).

Microdefects usually appear in the process of loading an object under testing by internal pressure, when most of flaw detection methods are inapplicable, since their implementation requires the presence of an NDT operator in close proximity to a controlled product, which can be dangerous.

In order to solve this problem thermal method of diagnostics of internal excess internal pressure vessels technical state has been studied.

A substance, before being inflowed into the vessel, is heated up to a temperature exceeding the temperature of the surface of a vessel. Then, the vessel is loaded with internal pressure and during the loading process permanent records of the temperature field on its surface are made.

Obtained thermograms are processed with a special method to detect and identify internal discontinuity defects.

A mathematical model of microdefects formation during pressure loading of a product and a mathematical device for microdefects calculation have been developed. Experimental research (diagram of testing in the general form is shown in fig. 1) confirmed the efficiency and effectiveness of the method.

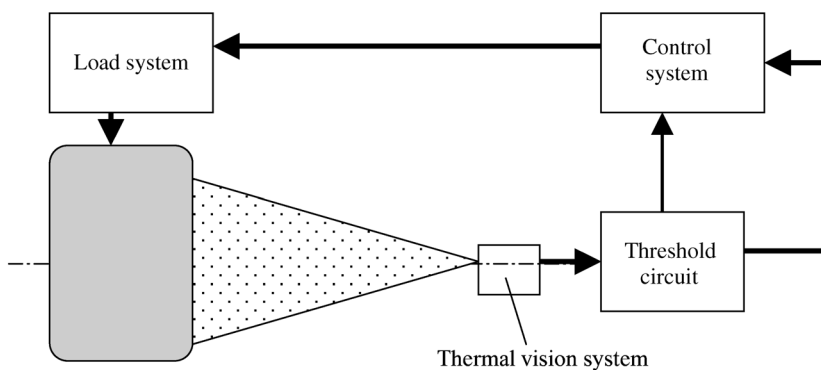


Fig. 1. Testing diagram