

1.12.24. MAGNETIC TESTING OF STRUCTURAL STATE OF VESSELS OPERATING UNDER PRESSURE

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Currently, under accounting data, more than 60% of pressure vessels in Russia have completed formally their term of service. Nevertheless, as practice shows, overwhelming majority of such assemblies are able to operate for a long time yet without the risk of creation of emergency situation. Taking into account significant production costs of high-strength articles, the degree of topicality of the task of testing of their structural state and remaining service life becomes clear.

Based on practical and theoretical researches, link between the material wear extent or, in other words, its structural state and the amount of coercive force was established. It was demonstrated that amount of coercive force increases in the process of article operation and achieves critical value at the end of practically admissible term of operation. For measurement of coercive force, structuroscope KRM-C-K2M, co-design of the association CJSC "NIIIN MNPO "SPEKTR" and "SNR" Company (Kharkov, Ukraine), was used. Instrument has wide enough measurement range: from 1 to 40 A/cm, and accuracy characteristics of about 5%.

By the example of testing of oxygen bottles, it was established that the whole operation period can be divided into 3 groups:

1. Period of reliable operation.
2. Period of controlled operation.
3. Pre-accident situation, when article requires overhaul or replacement.

Practical data on the coercive force value by all periods for bottles made of St20 steel are presented.

Detailed diagrams are plotted by means of computer processing. These diagrams make it possible to demonstrate obviously the extent of wear of different sections of an article.

Together with measurements of the coercive force value, it is recommended to carry out testing of the vessel wall thickness, because it affects measurement results especially with regard to articles of small thickness in the process of their wear. For wall thickness testing, it is convenient to use contactless electromagnetic-acoustic instruments.