

### **1.11.15. COMPLETE CONTACTLESS TESTING OF BOTTOM SHEETS IN VERTICAL STEEL TANKS**

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Paper discusses technical and methodological matters of testing steel tank bottoms during technical diagnostics.

Ultrasonic testing of residual thickness of tank bottom sheets in individual points does not guarantee bottom leak tightness for the period until the next term of technical diagnostics (2 – 4 years). Firstly, deep corrosion pits, cracks and through holes of smallest size can be out of points of thickness measurement. Secondly, ultrasonic thickness meter does not detect pits with non-flat bottom even when it is located directly under transducer of thickness meter.

In order to detect any deviations (defects) from initially flat sheet of known thickness, magnetic instrument RPM-20 was developed and manufactured in LLC “Magnetic Flaw Detection” under the order of LLC “Askotekhenergo – diagnostika”. This instrument ensures complete contactless testing of any deviations from initial sheet thickness. Instrument is controlled by single operator, moves on wheels secured to bottom and has the following specifications: weight – 10 kg; testing zone width with 32 sensors – 150 mm; movement speed – up to 0.5 m/s; range of initial sheet thicknesses – 4 to 14 mm; sensitivity to uniform thinning – 5% of initial thickness; sensitivity to individual corrosion pit – 15% of initial thickness.

Methodology of complete testing of tank bottoms with sheet thickness of 4, 6 and 8 mm was developed, as well as calibration blocks for its implementation were developed and manufactured in LLC “Askotekhenergo – diagnostika”. There are artificial defects like uniform thinning, single corrosion pit, single crack and small through hole provided in calibration blocks. Dimensions of artificial defects correspond with acceptance and recording levels for the central part and edges of bottom.

Calibration blocks with weight within the limits from 3 to 8 kg are used to adjust instrument for testing in laboratory or operational conditions. Settings can be recorded into the instrument’s memory and retrieved from it directly prior performance of testing. In order to verify the sensitivity consistency, methodology provides special specimens with weight up to 100 g. Their application makes it possible to avoid transportation to the place of testing of calibration blocks used for instrument adjustment in laboratory.

Paper discusses in more details technical and methodological matters of complete technical diagnostics of the tank bottoms.