

MULTI BARRIER THICKNESS TOOL



Multi Barrier Thickness Tool (MBTT) is designed to evaluate the metal loss of the tubing and/or casing(s) and well completion elements up to 3rd barrier based on emission and measurement of an electromagnetic field with the following data processing. Memory and SRO MBTT requires no preparation of the well completion, such as a scraper run. It is a stand-alone survey aimed to save time and cost for the mature well's integrity evaluation.

Applications:

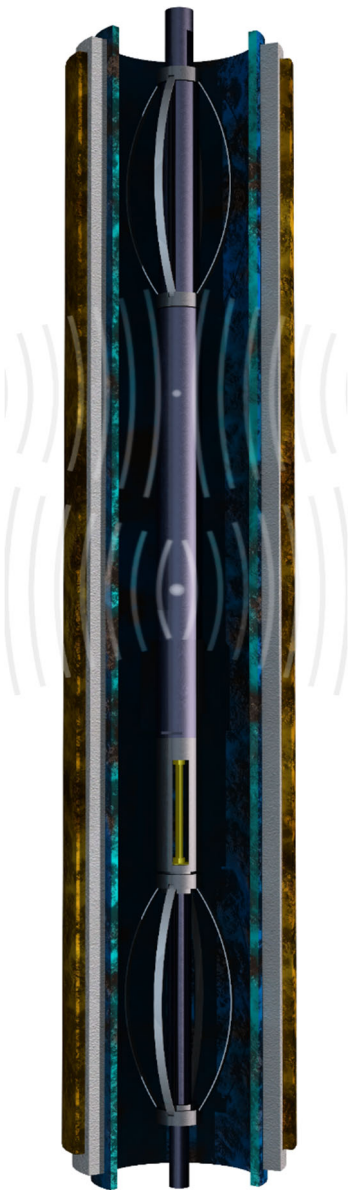
- Quantitative 3 pipes corrosion evaluation
- Localization of holes, cracks, parted casings
- Allocation of completion elements
- Perforation check

Advantages:

- Not affected by scale deposition
- Through-tubing technology
- Multiple barriers evaluation in one run
- Compatible with an entire range of North Side Tools
- Fully autonomous (memory mode) and Surface Readout

Tool Specifications	
Number of measurable pipes	3 pipes
Measurement range (OD)	2 7/8-13 3/8"
Maximum temperature	150°C (304°F)
Maximum pressure	11,600 PSI (80 MPa)
Maximum cumulative casing thickness	1.65"
Minimum detectable hole size (1 st barrier)	0.6"
Minimum detectable hole size (3 rd barrier)	1.2"
Chrome pipes evaluation	Yes
Tool length	10.8 ft (3.3 m)
Tool weight	33 lbs (15.0 kg)
Tool diameter	1.65 in (42 mm)
Connections	15/16 SR
Housing material	SS
H ₂ S resistance	25%
Memory mode and Surface Readout	Yes
Operational time	50 hours
Internal memory	1 Gb

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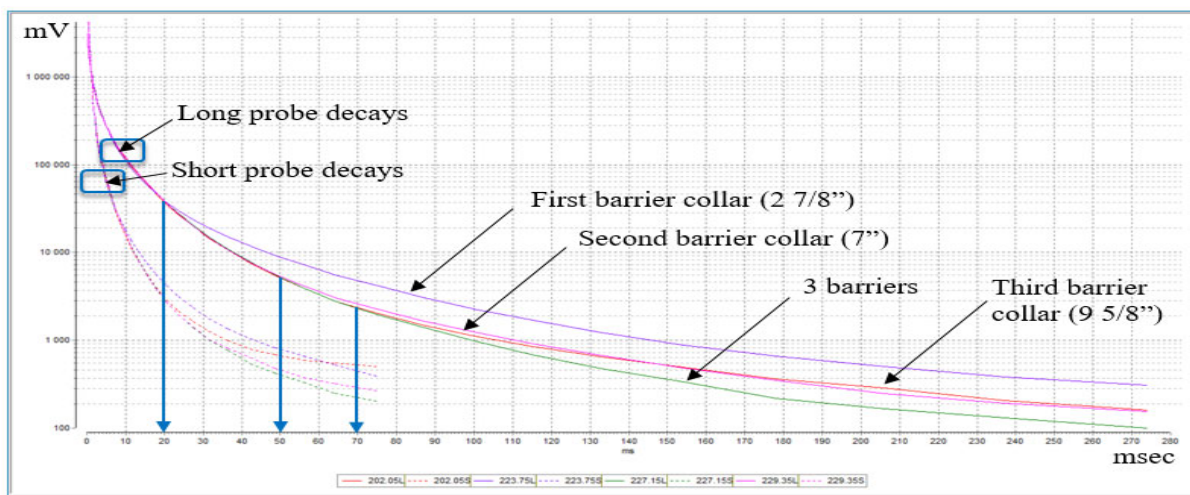
MBTT is the most promising technology for well integrity evaluation. The technology is based on the induction of a current in a string by a pulsed magnetic field and the subsequent recording of electromagnetic field (EMF) decay in pipes. This parameter is used to determine casing wall thickness and to identify and characterize defects. Analysis of EMF decay at various time domains enables the evaluation of multi-string structures. The main advantage of this method is the opportunity to conduct studies in single, double, and multi-string completions.

The MBTT assembly consists of two main modules: MBTT 2 (including short and long probes) and MBTT 3 (including extra-powered long probe). It works in a pulse-pause mode:

- During pulse mode, the current supplied to generating coil of each probe creates a primary magnetic field in the wellbore.
- In pause mode, the generating coils are switched off, and the eddy currents create a secondary magnetic field in the wellbore, decaying in time. These EMF decays are measured by the receiving coil of each probe.

The MBTT 2 short probe records the EMF decay in the time range from 1 to 75 ms and the long probe records in the time range from 1 to 274 ms. The module focuses on the first and second barrier evaluation.

The MBTT 3 extra-powered long probe records the EMF decay in the time range from 1 to 562 ms for the third barrier response assessment.



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The calculation of the metal loss percentage of each particular pipe is based on the behavior of the most relevant EMF decay curves in comparison with a baseline corresponding to a nominal pipe thickness. The North Side in-house software allows for determining the best match between the recorded data and the calibration database coming from the real field tests.

The “MBTT Image” column is the easiest way to visualize the corrosion log data for the general corrosion overview and instant quality control.

The header of the “MBTT Image” shows two scales. The upper one shows the color scale with the range of metal loss. The level of metal loss relates to changes in the color palette from black color for metal loss to dark brown color for the metal increase. The header scale displays EMF decay values and allows the differentiation of time domains that correspond to a particular barrier (1st, 2nd, or 3rd).

