Magnetic Thickness Detector-E (MTD-E)

The Magnetic Thickness Detector (MTD) is a 1-11/16 in O.D corrosion measuring instrument primarily run through tubing with the unique ability to simultaneously inspect tubing and the casings behind it. The integrity of the casing string can be evaluated with neither the requirement for costly workover rig, nor the time consuming removal of the tubing completion.

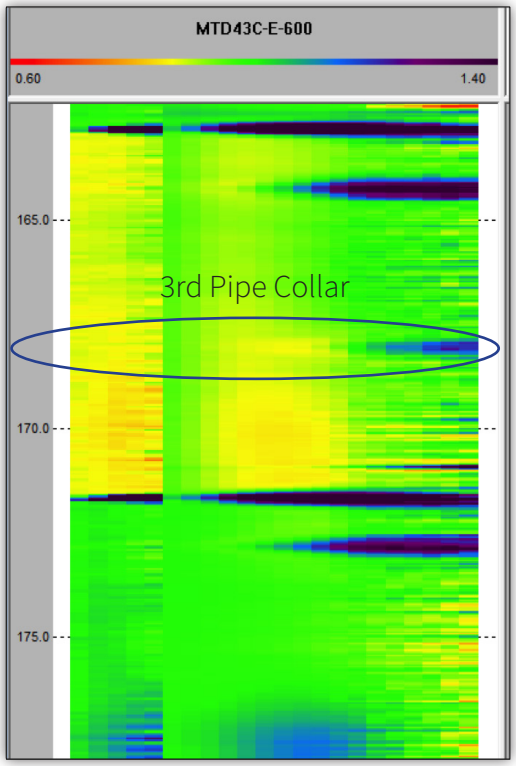
MTD-E

INTRODUCTION

GOWell's latest generation MTD tool is capable of evaluating quantitative thickness measurements of three concentric pipes. The state-of-the-art instrument combines a high power transmitter, improved signal-to-noise (SNR) electronics and fully configurable acquisition. This flexible approach allows a wide range of evaluations under different conditions and conveyance systems.

A simple engineer selection of the functional mode allows features such as:

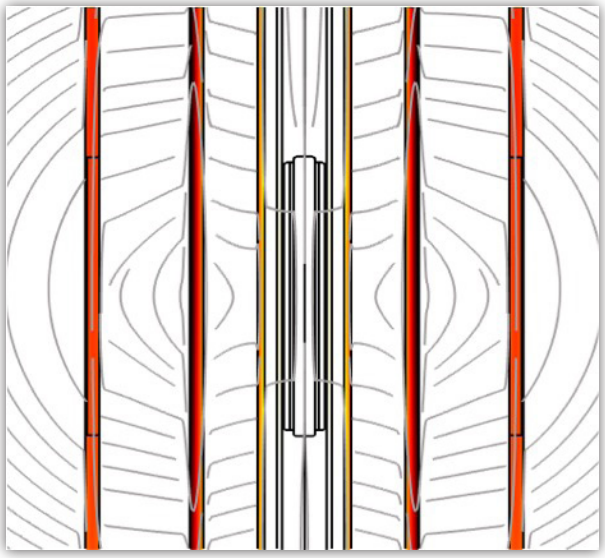
- Logging in large pipes (up to 18-5/8 inches)
- Fast logging of single pipes
- Chrome/alloy pipe evaluation
- Thick casings
- Memory-optimized logging



2-7/8" Tubing - 5-1/2" Casing1 - 13-3/8" Casing2

Internally the tool acquires up to 300 channels of pulsed eddy current transient decay, that can be transmitted real-time to surface or stored downhole. Real-time logging is possible either in combination below any of GOWell's existing Multi-Finger caliper (MFC) tools or when combined with PegasusStar– GOWell's state-of-the-art high-speed telemetry system. Memory acquisition is supported via GOWell's memory logging system.

When run with our PegasusStar platform, the MTD is fully combinable with Multi-Finger calipers (MFC), Gamma-Ray/Temperature/CCL (GTC) and our Digital Radial Bond Tool (RBL). The combination provides a comprehensive evaluation of the well integrity, providing accurate thickness information for multiple pipe strings as well as the cement bond quality.



Three Pipe Evaluation

DESCRIPTION

The MTD tool has two sets of sensors, one short ("C") and one long ("A"), which use high-efficiency and fast response transmitter coils that deliver high-energy electromagnetic pulses. Based on the Pulsed Eddy Current (PEC) physics principles, the tool records the composite decay of the eddy current signals that are used to evaluate the properties of the tubing and casings surrounding the tool.

The long sensor records up to 300 channels that scan a wide range of signals from the quick decay of alloy pipes to far-field signals from large casings. The short sensor has a smaller measurement aperture that scans up to 50 channels for better resolution of the inner pipe and near-field signals.

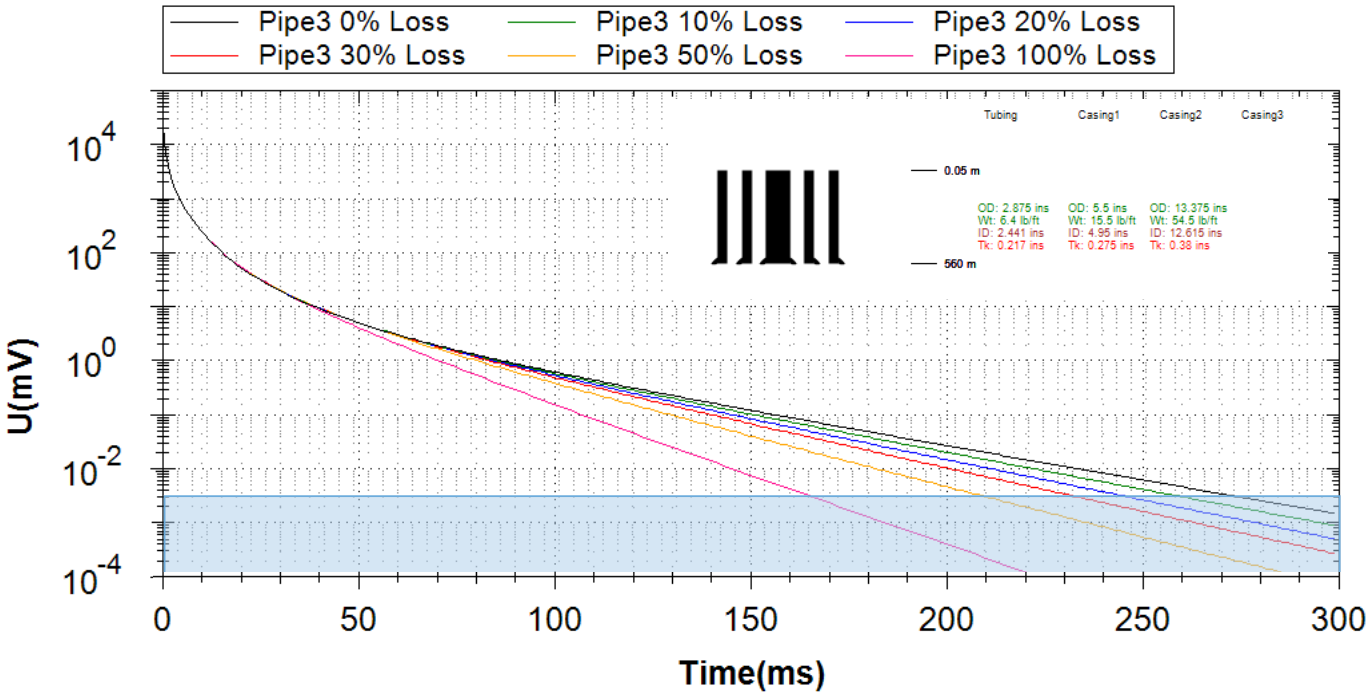
Log processing is performed with GOWell's proprietary inversion module built within the industry leading Well Integrity platform – MIPSPro. All MFC and MTD data can be processed, viewed and interpreted side-by-side within a single software platform.

APPLICATIONS & FEATURES

- Slim tool with 1-11/16 in O.D
- Pegasus modular, combinable tool for both SRO and memory
- Quantitative 3 pipe thickness evaluation
- Pre-job planner software that combines a powerful forward modeling module and simulation tool that is used to predict job specific tool responses to allow effective job planning
- Fully configurable tool caters to a wide range of down hole conditions. Customizable operating modes allow for maximum job flexibility in both SRO and memory modes
- Full physics inversion processing in an easy to use, user friendly module of MIPSPro Well Integrity Platform
- 3-axis accelerometer allows monitoring of tool motion, relative bearing and well inclination
- Warrior Compatible

MTD-E JOB PLANNER APPLICATION

Modeled Response for Nominal Pipe



SPECIFICATIONS

	MTD43C-E P/N 100507229
General Specs	
Maximum Pressure	14,503 PSI (100 Mpa)
Temperature Range	–4°F ~ 350°F (-20°C ~ 177°C)
Diameter	1.69 in. (43 mm)
Length	44.3 in. (1125 mm)
Weight	12 lbs (5 kg)
Recommended Logging Speed	20 ft/min (7 m/min)
Max. Logging Speed	32 ft/min (10 m/min)
Thru-wired or bottom only	Thru Wired
Measuring Range	2.362 in. ~ 18.625 in. (60 mm ~ 473.1 mm)
Metallurgy	17-4 SST, Titanium & Al-Bronze
Total Pipe Wall Thickness	1.5 in. (38.1 mm)
Combinability	Pegasus Series and PegasusStar
Wall Thickness Measurement	
First Pipe Measurement	
Maximum Pipe Wall Thickness	0.9 in. (22.86 mm)
Thickness Accuracy	0.0075 in. (0.190 mm)
First Pipe (2-7/8") minimum aperture**	0.5 in. (12.7 mm)
Second Pipe Measurement	
Maximum Pipe Wall Thickness	1.2 in. (30.48 mm)
Thickness Accuracy	0.01 in. (0.254 mm)
Second Pipe (2-7/8" + 7") minimum aperture**	1.5 in. (38.1 mm)
Third Pipe Measurement	
Maximum Pipe Wall Thickness	1.5 in. @ 0.06 in. accuracy (38.1 mm @ 1.52 mm accuracy)
Thickness Accuracy	0.06 in. (1.52 mm)
Third Pipe (2-7/8" + 13-3/8") minimum aperture**	3 in. (76.05 mm)
Relative Bearing Measurement	
Measuring Range	0°~ 360°
Accuracy	±5° (deviation ≥5°)
Sensitivity	±0.1° (deviation ≥5°)
Deviation Measurement	
Measuring Range	0°~ 180°
Accuracy	±5°
Sensitivity	±0.1°
Power Requirements	
Voltage	18-38 Volts (Pegasus), 90 Volts (Conventional MFC)
Current	350 mA @ 18 Volts (Pegasus), 100 mA @ 90 Volts (Conventional MFC)

*Specifications are subject to change as tools are constantly being improved

** Minimum aperture is the minimum detectable height of a circumferential slot (100% loss)