

Tube & Tank Inspection

MRUT (Medium Range UT)



Equipment Highlights

- Permits inspection from 25 mm to 3,000 mm ahead of sensor using guided waves and bulk waves.
- Uses Electro Magnetic Acoustic Transducer technology for non-contact ultrasonic inspection on metallic components.
- Easy and fast to deploy, permits covering the near-field of Long Range UT inspections.
- Applicable to a full range of applications including pipes, tank walls, rail heads, thin laminated composites, and surface inspections.
- Requires VOLTA instrument plus the appropriate sensors and accessories for each application from Innerspec's catalog.

MRUT (Medium Range UT) describes a suite of techniques that permit covering an area between approximately 25 mm to 3,000 mm from the location where the inspection is performed. MRUT uses guided wave and/or bulk wave techniques and complements LRUT (Long Range UT) by covering the near field area where LRUT cannot be used.

All MRUT techniques use Electro Magnetic Acoustic Transducer (EMAT) technology and different types of sensors and wave-modes (Lamb, SH, Shear Vertical) to adapt to the requirements of the application.

The most common applications include:

- Inspection of light-coated free-standing pipes. The system provides fast scanning on pipes with none or light coatings (3-4 mm) for fast and accurate defect detection around the circumference of the pipe.
- Inspection of pipe supports from top. Uses axial scanning to find corrosion under supports.
 - Inspection of inaccessible areas from side. Side (circumferential) scanning is used for detection of defects on inaccessible areas up to 3 m (10') from the inspection point.
- Plate and tank volumetric inspection. Provides fast inspection of walls or bottom covering up to 1 m (3') per pass.
- Rail head inspection. Guided wave technique to inspect the top (head) of a common rail.
- Inspection of thin materials. Guided wave technique used to inspect thin materials such as aircraft skin and thin laminated metallic composites from 0.5 mm to 6 mm.
- Surface inspection. Fast inspection of detection of surface defects.



All these applications can be performed using Innerspec's VOLTA instrument and the appropriate accessories, sensors, and software.

MRUT - Specifications

Hand-Held Scanning		Automated Scanning	
Components	<ul style="list-style-type: none"> VOLTA Permanent Magnet Sensors MRUT-Lamb Hand-Held Scanner MRUT-SH (MS) Hand-Held Scanner Magnetostrictive Strip (for operation with MS Scanner) Cables (up to 2 m) 	<ul style="list-style-type: none"> VOLTA Innerspec PowerBox MP (PBMP) Pulsed or Permanent Magnet Sensors Navigator Scanner Cable bundle (up to 100 m) 	
Inspection Speed	<ul style="list-style-type: none"> Approx. 25 mm/s (manual scanning). 	<ul style="list-style-type: none"> Approx. 150 mm/s (manual or automated scanning) 	
Power Requirements	<ul style="list-style-type: none"> Battery Operated (3-8 hours) 	<ul style="list-style-type: none"> 100-240 VAC, 47-63 Hz 	
Dimensions & Weight Instrumentation	VOLTA <ul style="list-style-type: none"> 16" x 12" x 6" (406 x 305 x 152 mm) 20 lbs (9.1 kg) 		
Other Equipment	PMX Scanner <ul style="list-style-type: none"> 7.25" x 8" x 2.70" (184 x 203 x 67 mm) MS Scanner <ul style="list-style-type: none"> 8.25" x 3.5" x 3.25" (210 x 89 x 83 mm) 	PBMP <ul style="list-style-type: none"> 12.75" x 13.25" x 9.25" (324 x 336 x 235 mm) Navigator <ul style="list-style-type: none"> 31.5" x 22.9" x 19" (800 x 581 x 483 mm) 	
Materials Inspected	<ul style="list-style-type: none"> Metallic (magnetic and non-magnetic) materials, including carbon steel, stainless steel and inconel. Minimum OD: 1" (25 mm) Minimum ID for inspection: 48" (1219 mm) Maximum Thickness: 1" (25 mm) 		
Inspection Technique	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Figure 1: Axial scan method</p> </div> <div style="text-align: center;">  <p>Figure 2: Circumferential scan method</p> </div> </div>		
Defect Detection	<p>Axial Scanning (Through Transmission)</p> <ul style="list-style-type: none"> 25 mm x 20% wall smooth corrosion, 10% for perpendicular cracks. Cross sectional area - 1.4% of 14" pipe / 3.3% of 4" 0.005" (0.125 mm) surface defect detection. <p>Circumferential Scanning (Reflection)</p> <ul style="list-style-type: none"> 25 mm x 30% wall smooth corrosion, 0.1 m to 3 m coverage. MRUT-SH (MS) Scanner permits inspection of pipes with heavy coatings (Tapecoat, tar coating). 		
Custom Software	<ul style="list-style-type: none"> MRUT Suite for inspection of pipelines and tanks using MS scanner and PMX (Lamb) Scanner. MRUT for Rail Heads. 		