

RUSSELL

Technologies-India

DETECTION OF CORROSION UNDER INSULATION (CUI)



Detection, Sizing & Service Support

DETECTING THOSE UNSEEN HAZARDS THAT CAN CAUSE LIFE-THREATENING LEAKS, FIRES AND EXPLOSIONS

Our Associate company Russell NDE Systems Inc. has developed a flexible “Bracelet Probe” (BP) that can adapt quickly and easily to any size of insulated pipe, starting at 3”. The BP contains sensitive sensors that cover a 10” wide scan path as it is wheeled along the outside of the insulated or fire-proofed pipe or pressure vessel.



The sensors detect changes in the electromagnetic (EM) field from an exciter coil that has energized the pipe. The pipe acts like a conduit for the AC magnetic fields; however, variations in its thickness affect the efficiency of how the pipe conducts the fields. At places where the pipe wall is thinner, it cannot contain as much magnetic energy and therefore the magnetic field around the BP becomes stronger, allowing the corrosion-under-insulation (CUI) to be detected and roughly sized.

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**Our Associate company
Russell NDE Systems Inc.
snapshot**

- MANUFACTURE OF NDE EQUIPMENT
- SERVICE AND CALIBRATION
- PIPELINE INSPECTIONS WITH ILI TOOLS
- BOILER INSPECTIONS USING ROBOTICS
- CCTV INSPECTIONS, UP TO 1.25 MILES
- LEAK DETECTION
- WATER AND WASTE WATER MAINS
- OIL AND GAS PIPELINES
- SLURRY PIPELINES
- LINED AND OTHER CHALLENGING PIPE-
LINES
- CUSTOMERS WORLD-WIDE

Flexible solutions for your inspection needs

THE BRACELET PROBE PROVIDES A TOTAL END TO END SOLUTION FOR ALL OF YOUR INSULATED AND FIREPROOFED PIPES.

Rapid results: near real-time

Data from the BP is fed to a lap-top computer which both displays and instantly records the condition of the pipe under the insulation

Screen snap-shots can be saved of the 3D color-maps, strip charts and voltage planes which are used to size the CUI.

- Scan at up to 12 feet/minute
- Horizontal and vertical pipes.
- Fireproofed sphere legs
- Fireproofed or insulated vessels and skirts
- 10" wide scans cover the whole pipe in a few quadrants

STANDARD BRACELET



The standard Bracelet is used with a pole and rope system to inspect sphere legs.



The Large Diameter Bracelet Probe is used with an Inuktun robotic crawler to inspect the leg in 3-4 passes

CUSTOM SOLUTIONS

Our Associate company Russell NDE Systems can design and manufacture custom NDT solutions for your refinery or pipeline operations.

TRAINING SOLUTIONS

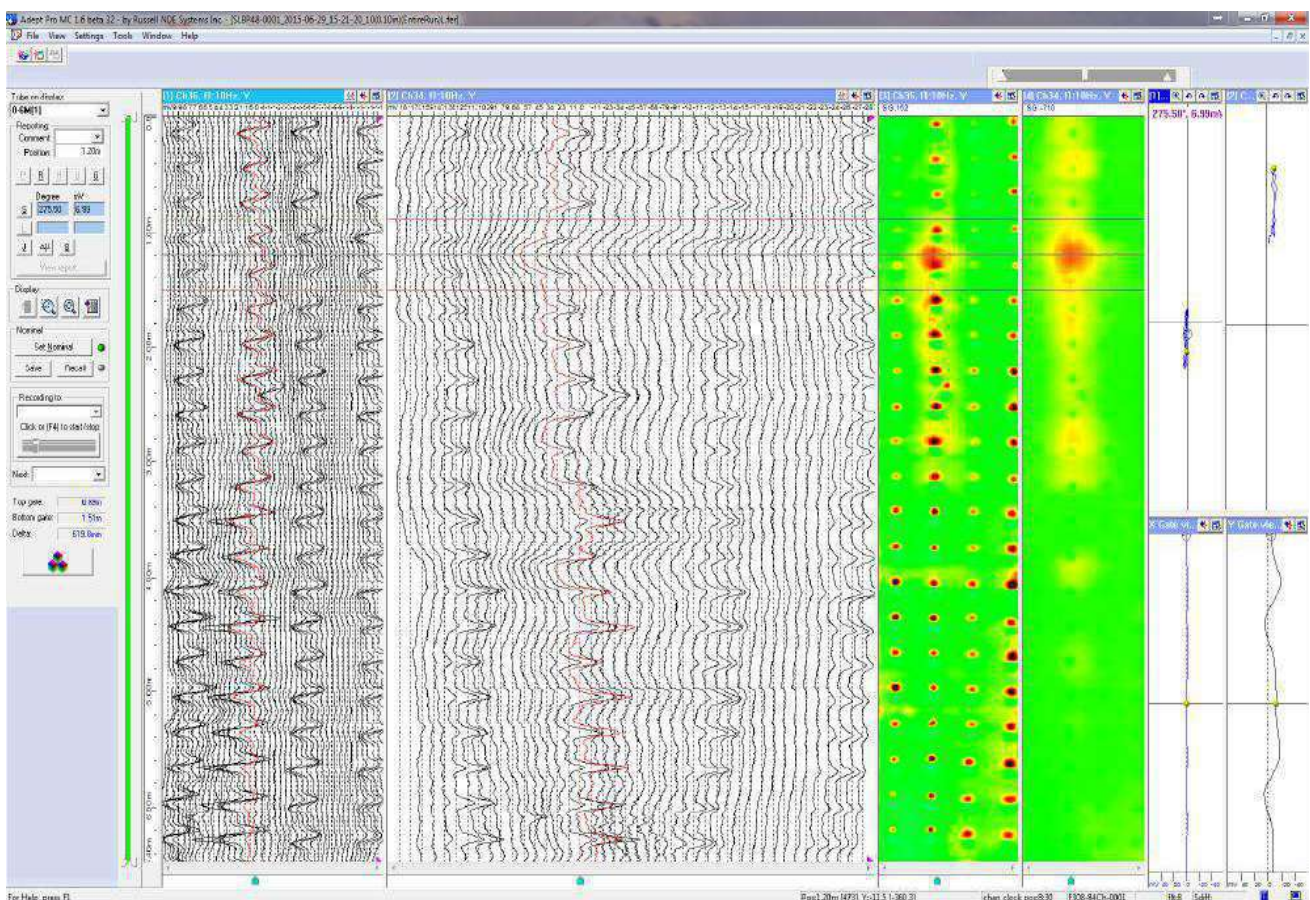
Our Associate company Russell NDE Systems Inc. is an equipment manufacturer and as such, regularly provides training courses for our customers.

SOFTWARE SOLUTIONS

Our talented software engineers can customize our software to meet your needs. The family of software products that we offer starts with Adept-Pro and Easy-Log and continues with IRIS and Links software for pipeline applications



Don't let corrosion under freproofng (CUF) weaken the legs holding up your gas storage spheres: Inspect for CUF using either the standard Bracelet Probe, pictured below, of the large Bracelet Probe used with our patented robotic crawler.





CUI/CUF Bracelet™ probe Gen 1&3 spec sheet

Specifications	Gen 1	Gen 3
Applicable material types	Ferromagnetic materials, such as mild steel	Ferromagnetic materials, such as mild steel
Maximum wall thickness	No limit for CUI/CUF detection	No limit for CUI/CUF detection
Pipe/vessel size	≥6", including insulation or fireproofing	≥6", including insulation or fireproofing
ToD (threshold of detection)	A function of insulation thickness only. For 6" sch 40 pipe: <i>Local wall loss (LWL)</i> Ø1.0" dia. 20% deep FBH** at 1" insulation Ø2.0" dia. 25% deep FBH at 2" insulation Ø3.5" dia. 50% deep FBH at 3" insulation Ø5.0" dia. 80% deep FBH at 4" insulation <i>General wall loss (GWL):</i> As low as 10% deep wall loss	A function of insulation thickness only. For 6" sch 40 pipe: <i>Local wall loss (LWL)</i> Ø0.5" dia. 20% deep FBH** at 1" insulation Ø1.0" dia. 20% deep FBH at 2" insulation Ø2.0" dia. 25% deep FBH at 3" insulation Ø2.0" dia. 30% deep FBH at 4" insulation <i>General wall loss (GWL):</i> As low as 10% deep wall loss
PoD (Probability of Detection)	PoD of 1.0 for >25% local wall loss for 10" sch 20 pipe with 2" insulation	- PoD of 0.70 for 25% wall loss for 10" sch 80 pipe with 4" insulation - PoD of 0.95 for 35% wall loss for 10" sch 80 pipe with 4" insulation
Defect types	Local and general wall loss	Local and general wall loss
Probe footprint	Constant and non-uniform excitation in test material; small footprint	Constant and uniform excitation in test material; small footprint
Sensitivity to NS & FS [†] defects	Primarily NS defects	Primarily NS defects
Defect quantification	Quantitative	Quantitative
NS and FS defect discrimination	NS defects only i.e. O.D. wall loss on insulated/fireproofed pipe/vessel	NS defects only i.e. O.D. wall loss on insulated/fireproofed pipe/vessel
Scan speed	~2 meters per minute	~2 meters per minute
Inspection coverage	8-10" wide scan path, depending on surface curvature	8-10" wide scan path, depending on surface curvature
Maximum clearance	Up to 2" insulation or fireproofing	Up to 4" insulation or fireproofing
Cladding material types	Stainless steel or aluminum	Stainless steel or aluminum
Surface cleanness	Minimum cleaning	Minimum cleaning
Surface temperature	Up to 65°C	Up to 65°C
Test object temperature	Can be much higher than 65°C	Can be much higher than 65°C

*Internal and external Bracelet Probes available for scanning large diameter PCCP and C-301 pipe; **FBH = Flat Bottom Hole; [†]NS=Near-side; FS=Far-side