

# Long Range UT



## Guided Wave Ultrasonic Testing

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### How it works

The Long-Range Guided Wave Ultrasonic Technique (LRUT) was designed to inspect 100 percent of a pipe segment from one single location.

torsional or longitudinal guided waves are induced into the pipe body and propagated along the pipe segment. When these guided waves identify an anomaly or pipe feature, they mode convert into laminar waves and reflect back to the tool's original location. Using a laptop these signals are digitally captured. The time-of-flight for each signature is calculated to determine its distance from the tool. The amplitude of the signature determines the significance of the defect. The quadrants determine the feature's o'clock position to help in the analysis.





## Application

Its primary application is within the Oil and Gas Refining, Petrochemical, Storage, Offshore and Pipeline Transportation industries used to inspect difficult to access piping systems such as:

- Insulated Pipe in Refineries
- Offshore Pipeline Risers
- Cased Road or Railway Crossings
- Loading Lines
- Tank Dyke Pipeline Crossings
- River or Bridge Pipeline Crossings
- Above Ground or Buried Flow Lines

## Technique Methodology

LRUT is a fast screening technique and is most sensitive to an overall reduction in the pipe cross-sectional area. Guided waves are particularly applicable to the detection of corrosion on internal or external pipe surfaces in situations where access is restricted, for example, due to the presence of thermal insulation, being buried, or submerged, elevated or sleeved or when conventional inspection will take very long time such as inspection of long pipelines. The maximum operating range varies and depends on pipe geometry, contents, coatings/insulation and general condition.



# Technique Accessibility

Degree of difficulty	Surface conditions	Geometry	Content
Long range / easy	Bare metal		
	Smooth well bonded paint	Straight lengths	Gas
	Mineral wool insulation		
	Fusion bonded epoxy	Infrequent swept/bends	Low viscosity Liquid
	Light pitting	Attachments/brackets	
	Heavy pitting		High viscosity Liquid
	Plastic coating (i.e. PVC)		
	Buried (clay, earth, sand)		
	Bitumen Coated	Multiple bends	High viscosity
	Denso tape		
Short range / difficult	Concrete Coated	Branches	Waxy or sludgy deposits
		Many bends	

See above table of inspection that are successful and able to inspect long lengths (green marked), successful but smaller lengths only (orange marked), and difficult scopes with short lengths (red marked).

