



Application Note

Corrosion Detection in Ferrous Pipes

The RFT Array Technology

For decades now, the remote field technology (RFT) has been used to detect and size corrosion damage in ferrous heat exchangers and boilers tubing among other things. With typical tubing diameters under 50mm, the RFT technology can even detect small pinhole defects. However, in larger diameter pipes, such as those used for urban water systems, urban steam heating systems or in the oil and gas business, the RFT encircling coils loses sensitivity to small defect as

the defect size to tube size ratio decreases. For this reason, SGNDT has developed a series of RFT Array probes that greatly increases the probe sensitivity to small defects in larger pipes. The array probe also provides a CScan display (imaging of the tube as if it was open flat) which is more user friendly than traditional RFT strip chart data representation. Two types of probes exist for two different types of inspection: classical probes and intelligent probes.

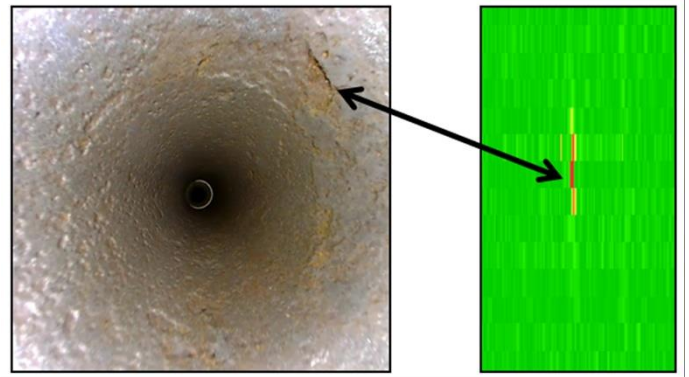


The Technology capabilities

The RFT Array technology works on various ferrous pipes (Steel, Ductile Iron, Cast Iron). Typically, defects as shallow as 20% with a minimum area of 6cm² can be detected. This however highly depends on three factors : the pipe material, the probe fill factor (ratio between probe OD and pipe ID) and the mechanical stability of the probe in the pipe. Probes are equally sensitive to ID and OD defect. Other tools can be used to discriminate ID defects from OD defects such as remote visual inspection.

Typical pull speed of 5 meters per minute are used. Faster pull speed can be achieved at the

cost of lower detection capabilities. For accurate defect sizing and positioning, probes can be encoded.



Correlating video results and RFT signal results

Classical Probes

Classical probes are used when the data must be streamed live. A tether cable is usually passed in the pipe section using a vacuum or a pigging like system. The probe is then hooked up to the tether and to an umbilical cable consisting of electrical conductors for data transmission. As the probe is pulled through the pipe using the tether, data is sent back live to the S2G2-800 eddy current unit and to a computer station (laptop). In some cases, the umbilical cable can be used as the tether cable.

This technique has the advantage that a certain diameter probe can easily be disconnected and replaced by a different diameter probe without having to modify the rest of the system (eddy current unit, cable, etc.). It is therefore more economical to switch between different probe diameters.



Classical RFT Array Probe (120mm OD)

Intelligent Probes

Intelligent probes are used when an umbilical cable cannot be used typically when inspection length are over 150m or when the section has too many bends. The probe has a series of housing unit in which all the required electronics (PCB , batteries, ...) to perform data acquisition is housed. Initially the probe is connected to a computer for setup configuration. The probe is then disconnected and hooked to a tether cable. As the probe is pulled in the pipe section, all data

is recorded in SSD storage onboard. When the inspection is complete, the probe is connected back to the computer for data transfer. Analysis can then be performed on the computer.

This technique makes it however more expensive to switch from one probe diameter to another as each probe as its own embedded "intelligent" electronic.



85mm OD Intelligent RFT Array Probe



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