

ATTRIBUTES	APR	ECT	IRIS
Type	Non Invasive	Invasive	Invasive
Technology	Uses sound waves	Eddy Current	Ultrasonic
Principle of operation	Acoustic Pulse Reflectometry	Pulse Echo method	Pulse Echo method
Cleaning Requirement	<p>Proper cleaning to ensure that there are no scales/ deposits.</p> <p>In case of hydro jetting, blow dry by air is recommended to avoid water stagnation.</p> <p>Scales/deposits shall be reflected as blockage. Defects under the blockages shall be not be detected unless cleaned.</p>	<p>Proper cleaning to ensure that there are no scales/ deposits.</p> <p>In case of hard deposits, probe will be damaged.</p>	<p>Metal level cleaning is highly required.</p> <p>In case of deposits/scales, fill factor cant be maintained and hence be declared as blind spot.</p>
Tube Configuration	<ul style="list-style-type: none"> • Straight, • Tubes with bends (U-type, multiple bends), • Spiral, twisted, helical 	<ul style="list-style-type: none"> • Straight tubes in most of the cases. • Flexible probe for U-bend but accuracy is low. 	<ul style="list-style-type: none"> • Only Straight portions.
Tube Material	Applicable for all materials but not limited to ferrous, non ferrous, graphite, composites, plastics.	Applicable only for non ferrous materials.	Applicable for tube material with minimum thickness of 2mm.
Defect Detection	<ul style="list-style-type: none"> • Hole (leaks), Blockages (deposits/scales) • Wall loss (pitting & erosion). • Limited only to ID (inner diameter) defects 	<ul style="list-style-type: none"> • Hole (Leaks), Wall loss 	<ul style="list-style-type: none"> • Wall Loss
Accuracy (Detection & Sizing)	<p>Precise location of defect is feasible.</p> <ul style="list-style-type: none"> • Minimum Hole diameter - 0.5mm • Minimum Blockage - 5% cross section reduction • Minimum Pitting/Erosion - 10% wall thickness reduction 	<p>Location is not feasible.</p> <ul style="list-style-type: none"> • Minimum Hole Diameter - 1.5mm • Wall loss: <ul style="list-style-type: none"> • 0-20% • 21-40% • 41-60% • 61-80% • >80% 	<p>Location is not feasible.</p> <ul style="list-style-type: none"> • Remaining wall loss in terms of mm shall be indicated.

<p>Inspection time per tube</p>	<p>10 seconds/tube irrespective of tube configuration and length. 2000 tube shall be inspected in 12hr shift.</p>	<p>Dependent on tube length. At a sampling rate of 2000 samples/sec, the inspection of a tube can be done at a speed of 72 inches/sec (6ft/sec). 750-800 tubes for 12 hour shift.</p>	<p>2 inches per second. 100-200 tubes in one shift.</p>
<p>Interpretation of signals</p>	<p>Advanced analysis supported by sophisticated machine learning algorithm developed based upon 1,500,000 tube signatures.</p>	<p>Manual analysis by expertise in Eddy Current Testing.</p>	<p>Manual analysis supported by C scan & expertise.</p>
<p>Reporting time</p>	<p>Report for 2000 tube inspection shall be issued within 24 hour stint.</p>	<p>Totally dependent on number of tubes and proficiency on analysis. In most of the case, prelim report shall be issued in couple of days and final report after a week.</p>	<p>Totally dependent on number of tubes and expertise proficiency on analysis. In most of the case, prelim report shall be issued in couple of days and final report after a week.</p>
<p>Calibration</p>	<p>No calibration required as acoustic components are self calibrated prior to each inspection.</p>	<p>Calibration should be performed on the specific tube as per ASNT standards.</p>	<p>Calibration should be performed prior to the inspection on specific tube.</p>