

TALCYON

 APRIS

Acoustic Pulse Reflectometry
Inspection System

Fast ||| Reliable ||| Intuitive

Key Industry: Oil & Gas



Acoustic Pulse Reflectometry Inspection System



Heat-exchanger tube failures accounted for 31% of the unplanned downtime in oil & gas industries. This resulted in over \$1.2 billion of unplanned production interruptions globally.

— Oil & Gas Journal

Up to
50%

of industrial energy output is wasted. Preventive maintenance helps to reduce that wastage in a safe and efficient way.

— Inside Oil & Gas

Heat Exchanger Failure Mechanism

What are some possible factors that affect the performance and productivity of the oil & gas sector?



Under deposit cooling water corrosion of tubes



Process corrosion



Stress-corrosion cracking (SCC) of tubes in cooling water service



Steam/condensate corrosion



Process fouling

How to minimise in-service tube failures using APRIS?

①

MINIMIZE DOWNTIME

- Inspect 2,000 tubes per equipment during a 10-hour shift
- Use less resources and consumables for inspection

②

EFFECTIVE DECISION-MAKING

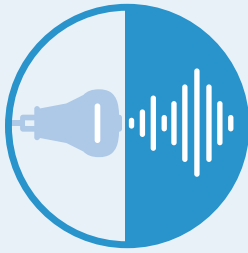
- Precise and reliable results based on 100% inspection
- Corrective actions in terms of plugging, re-tubing and design process change

③

PREVENTIVE MAINTENANCE

- Mitigate risks associated with production output
- Conserve the lifespan of equipment

How APRIS Works



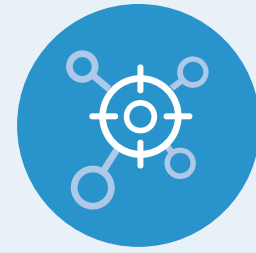
STEP 1

Probe injects an acoustic pulse down the tube.



STEP 2

Returned echoes generated by defects are recorded and analysed.



STEP 3

A set of proprietary, patented algorithms identifies and reports the exact location, type and size of inner diameter tube defects.

APRIS Unique Key Features

Key attributes that set Talcyon's APRIS apart from conventional tube inspection tools and methods in the current market today.



ANY TUBE SIZE UP TO 4" IN DIAMETER, REGARDLESS OF SHAPE OR MATERIAL

- U-bends, twisted and spiral wound tubes
- Ferrous & Non Ferrous, graphite and plastics



ULTRA-FAST, NON-INVASIVE INSPECTION

- Less than 10 seconds per tube
- No need for inventory of consumable probes or standards



LESS EXPERTISE REQUIRED

- Testing is easily performed by any operator with minimal training
- Artificial Intelligence based data interpretation & report generation

Tube Testing

The impact of human factors is more prominent with the increased complexity and sophistication of today's NDT techniques. Root cause analysis of some of the tube failures identified the need for reliable technicians and technologies.

Technologies for inspecting heat exchanger tubes are rapidly changing and continually evolving. Variance in test results depends on both the instrument and operator expertise. APRIS delivers notable advantages in tube inspection for the oil & gas sector by minimizing downtime and enhancing operator-level productivity.

OUR OIL & GAS INDUSTRY APPLICATIONS

- Surface & stabilizer condenser
- Oil Coolers
- Kerosene Product Water Cooler
- Blow Down Air Coolers
- Flushing Oil Heater
- Water Tube (D-Shaped) Boiler
- Steam Condenser
- Fire Tube Boiler
- Crude Oil Heater

INSPECTION RANGE	Tube Size Length	7mm-100mm (0.27" – 4") inner diameter Up to 25m (82') length, if inspected from one end; Up to 50m (164') length, if inspected from both ends	
DETECTABLE DEFECTS		5/16" – 2 1/2" (8mm – 63.5mm) Tubes	2 1/2" – 4" (63.5mm – 100mm) Tubes
	Holes	Minimum diameter 0.039" (1mm)	Minimum diameter 0.118" (3mm)
	Blockages	Minimum 5% of cross section reduction	Minimum 10% of cross section reduction
	Wall Loss	Minimum 10% of wall thickness	Minimum 20% of wall thickness
TUBE CONFIGURATION	Any configuration including U-bends, finned tubes, twisted tubes, multiple bends and spiral wound tubes.		
TUBE MATERIAL	Any material including metals (ferrous & non-ferrous) and non-metals (graphite, composites)		
INSPECTION SPEED	10 seconds per tube depending on tube size, length and configuration.		
HARDWARE	Compact Handheld Device — Non-invasive probe assembly including a transducer, controls, LCD screen and adaptors.		
SOFTWARE	Data Acquisition Software — APRIS software installed on computer used for inspection setup, probe status and test data recording.		
PORTAL	Exclusively for interactive analysis using sophisticated algorithms based on artificial intelligence & deep learning which assist to generate quality and intuitive reports based on user needs. Seamless interaction to enhance user experience in tracking inspection activities, reports and other support pertaining to inspection.		
ALGORITHM	Patented Acoustic Pulse Reflectometry (APR) technology featuring specialized, proprietary algorithms for tube inspection.		
REPORTING	Customizable, graphical on-line reports. Available output in PDF and HTML format.		
PHYSICAL CHARACTERISTICS	Compact, rugged and lightweight design. Total box weight: 14.88 lbs (6.75kg) Box dimensions: 46 L x 33 W x 21 H cm (18.1" x 12.9" x 8.2")		
POWER INPUT	Dual voltage system (110V/220V)		
TEMPERATURE RANGE	-10° to +50° C (14° to 122° F)		
CERTIFICATIONS	CE Declaration of Conformity; Safety Certificate IEC 61010; EMC Test Certificate; Company Quality System certified to ISO 9001:2008		
STANDARDS	ASTM E2906/E2906M-13 ASME BPVC.V-2017-Article 18		
PREREQUISITES	Tube should be cleaned prior to the inspection. Blow drying is recommended to avoid water stagnation, if water jetting to be performed.		

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