ITS100

Induction Thermography System

Aircraft Inspection

- Composite delaminations
- Honeycomb/skin disbonds
- Water ingress

Industrial NDI

- Coatings integrity
- Laminated structures
- Composite layups

Qi2

Rapid Disbond Visualization

What is ITS™

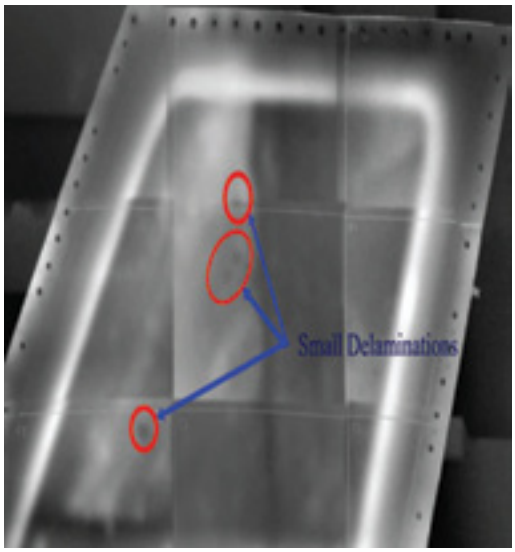
ITS™ (Induction Thermography System) is a new type of transient thermography that uses inductive heating of electrically conducting materials to detect flaws. The standard unit delivers up to 2 kW of RF energy in the 160-400 kHz range in a pulsed mode. The resulting heat deposited in the material can highlight flaws as it diffuses through the material. Disbonds, delaminations and cracks are all easily seen. Compared to conventional flash thermography the equipment is much more compact, and because the energy delivery efficiency is higher, smaller flaws can be detected.

How the ITS™ works

The ITS™ uses electrical currents induced by eddy currents to provide a controlled and powerful way to stimulate a material for observation by sensitive infrared cameras. Resistive heating from conducting members results in temperature rises of a few degrees F. Using sensitive infrared cameras that can detect as little as 0.08 degrees F, subsurface flaws show up as variations in the surface temperature pattern. This technique has the ability to inject thermal energy precisely at the bondline between aluminum honeycomb and composite skinned structures. The US Air Force uses this technique to inspect components of F-15 aircraft.

Why use the ITS™

The ITS™ system is effective in detecting disbonds in coatings or electrically insulating layers applied over metals. Disbonds appear as "cold" spots on the infrared image. The system is available either in a PC based data acquisition (Model PCDAS) configuration or in a heads-up data acquisition (Model HUDAS) configuration. The latter configuration allows the rapid inspection of large surface areas while the PC based system allows imaging processing to enhance feature detection.



Composite images can be assembled to show flaw details over large areas. Dime-sized disbond flaws are clearly visible.

ITS™ Models

ITS 100/PCDAS

ITS100/PCDAS (Personal Computer Data Acquisition System) is designed for stationary applications in which image processing may be necessary to enhance feature recognition. The PCDAS includes a high performance LWIR camera linked to a laptop computer. Data processing includes controlled image capture and image normalization.

This model includes:

- RF power unit
- RF heating wand
- Thermal imaging camera*
- Analysis computer
- ITS camera software
- Camera interface cable
- Custom shipping case
- Operator's manual

The PCDAS system uses a powerful LabVIEW™ based image processing program to acquire, analyze and archive data.

ITS100 power supply and wand are common to all systems. The lightweight power supply and wand are easily transported to remote areas. The wand is designed to provide up to 1.5 kW of RF energy. Protection circuits limit the total energy input for safety.

ITS100/HUDAS

ITS100/HUDAS (Heads-Up Data Acquisition System) is designed for rapid scanning of large areas. The heads up data system includes a high performance infrared and visible camera with display, control and storage capability. The user can move freely around the structure to examine areas of interest quickly.

This model includes:

- RF power unit
- RF heating wand
- Heads-up display system
- Dual imaging (IR/visible light) system*
- Data acquisition/storage system
- Operator's manual

* *Not available for export.*

ITS™ Specifications

	ITS 100/PCDAS	ITS 100/HUDAS
Frequency range:	150 kHz – 400 kHz*	150 kHz – 400 kHz*
Camera wavelength:	8 - 12 microns	8 - 12 microns
Camera resolution:	320 x 240 pixels	160 x 120 pixels
Image acquisition:	LabVIEW™** GUI	Digital video recorder
Image storage:	Disk files, CD ROM	Hard Drive
Frame rate:	0.01 to 5 frames/sec.	30 frames per second
RF power supply input:	115 volt / 15 amps	115 volt / 15 amps
RF current in:	100 to 200 amps	100 to 200 amps
RF wand weight:	8.6 pounds	8.6 pounds

* Frequency not user selectable—automatically optimized by system.
** LabVIEW is a registered trademark of National Instruments.

Comparison of ITS™ to Flashlamp Thermography

Flashlamp Heating	ITS™	Advantages
Heat added to surface by absorption	Heat added internally by resistive heating	Higher resolution
Variations in surface absorption causes non-uniform heating	Inductive heating of subsurface conductors is uniform	Easier to interpret images
Low energy coupling efficiency	High energy coupling efficiency	Rapid inspection of large surfaces

ITS in use

Qi2 quality/support:

- We design and build all our systems
- Total product life cycle support
- Systems serviced by skilled in-house technicians
- Receive a superior customer experience

ACQUIRE
ANALYZE
ARCHIVE

Analysis Computer

RF Power Unit

RF Heating Wand

Thermal Imaging Camera

Qi2 experience makes a difference

A recognized technology leader in measurement and sensors since 1985, government and industry have looked to Qi2 to solve the unsolved and deliver new technologies that change what is possible.

Qi2's non-contact measurement systems are delivering improved operating safety, extending useful equipment life, improving parts reliability and delivering improved process control within an array of industries.

- Aerospace
- Automotive
- Civil Aviation
- Civil Government
- Defense & Military
- Electronics
- Energy
- Highway and Transportation
- Instrumentation
- Industrial
- Marine / Shipbuilding
- Munitions
- Nuclear
- Oil and Gas
- Pipeline
- Paper and Plastics
- Power Generation
- Refining and Chemical
- Space Systems
- Utilities

QUALITY IN ENGINEERING, SCIENCE & TECHNOLOGY

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