



U31D™

Subsea ACFM® Inspection Technology



Leaders in Advanced Non-Destructive Testing



Subsea ACFM[®] Inspection Technology

TSC has pioneered the deployment of both diver and diverless underwater ACFM[®], so whether you need to deliver inspections using ROVs, mini ROV, crawlers or divers, we have the solution.

TSC's U31[™] range of underwater instruments has been developed to provide reliable ACFM[®] inspection in harsh subsea environments. With a range of standard products covering depths to 3,000m, we have the technology and equipment needed to conduct NDT surface crack detection underwater.

The U31D[™] instrument offers all the advantages of ACFM[®] inspection in a small, light package designed specifically for ease of diver deployment.

Capable of inspecting up to 300m depth, the U31D is ideal for inspection of jackets, pipelines and subsea structures.

Features

- Rapid scanning using a hand-held probe.
- Reliable crack detection with accurate sizing (length and depth).
- Capable of operating up to depths of 300m.
- Reduced cleaning requirements, no need to clean to bare metal.
- Capable of inspecting corroded surfaces, or through non-conducting coatings several millimetres thick.
- Full data storage for back-up, off-line view and audit purposes.
- Access to a wide range of geometries using TSC's range of active subsea probes.
- Probes with embedded serial numbers to simplify operation and the reduce the likelihood of operator error.
- ASSISTu[™] software (Microsoft Windows[®]) for ease of operation and compatibility with other Windows[®] applications.

Probes

- ACFM[®] is routinely used for underwater inspection and there are a variety of probes for shallow and deep water applications.
- Subsea probes are available in several common body styles to allow access to a variety of standard geometries and components.
- Underwater Weld Probes are designed primarily for scanning along weld toes but can also be used to inspect for defects in general components.
- Pencil Probes are used in places that the weld probes cannot gain access and are particularly useful at plate edges where their smaller induction fields produce less of a geometry effect.
- Micro and Mini Pencil Probes are also available where greater sensitivity is needed.
- Umbilical cables are supplied at 150m, as standard, different lengths are available upon request.

ASSISTu™ Software

The U31D™ is supplied with ASSISTu™ software, TSC's comprehensive instrument control, data collection and analysis package features include:

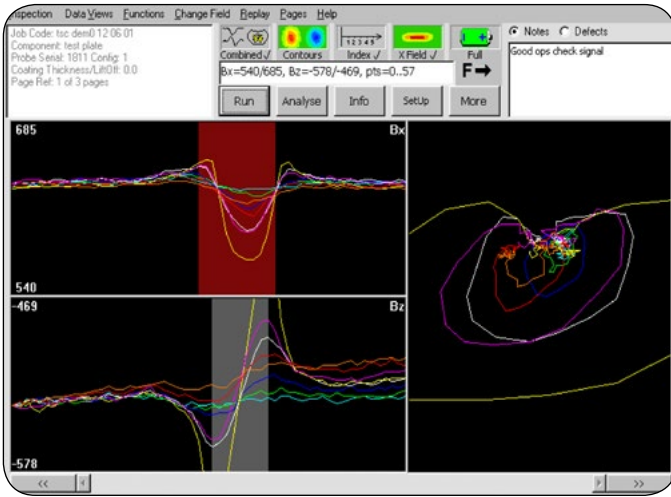
- Enables the creation of professional client reports of inspection data and results.
- Real-time output of graphic based results enables instant defect recognition.
- Immediate defect identification and sizing.
- Reliability, time-saving and auditing capability enhanced by automated data-saving.
- Powerful graphical views including butterfly, surface contours, zooming, panning etc.
- Recording of inspection notes and identified regions of other areas of interest.
- Data analysis possible on or off-site.
- Full range of ACFM[®] probes supported.
- Simple clock-marking capability during scan.
- Mouse/Pen controlled defect marking and sizing.

Common Applications

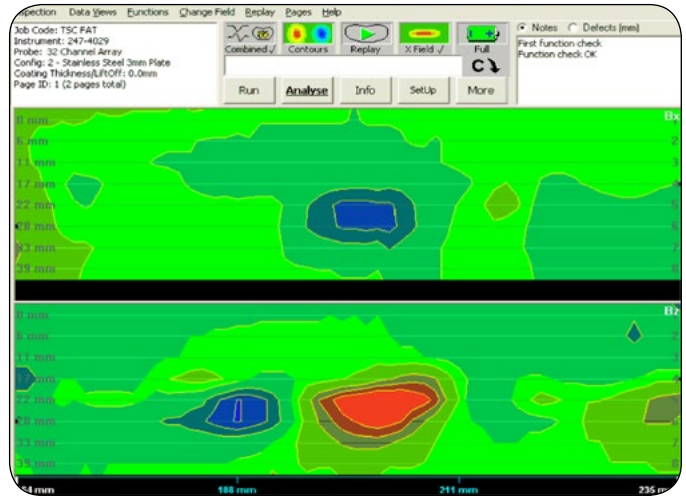
- ✓ Subsea Weld Inspection
- ✓ Splash Zone Inspections
- ✓ Jackets & Subsea Structures
- ✓ Damage Assessment
- ✓ Pipelines
- ✓ Through Coating NDT

Advantages of ACFM[®]

Feature	ACFM [®]	MPI	Eddy Current
Reduced dependence on operator competence <ul style="list-style-type: none"> • Detection reliability and repeatability • Confidence in integrity data 	✓	✗	✗
Detection through coatings. <ul style="list-style-type: none"> • Avoids cost and disruption of coating removal 	✓	✗	✓
Detection in normal ambient light. No pollutants used	✓	✗	✓
Detection in Duplex and non-magnetic materials	✓	✗	✓
Can be remotely deployed. <ul style="list-style-type: none"> • Enables deep water or hazardous zone deployment • Reduced cost of dive support vessels and systems 	✓	✗	✗
Provides accurate and auditable inspection records. <ul style="list-style-type: none"> • Enables effective integrity and risk management • Supports regulator verification and audits 	✓	✗	✗
Determines crack length and depth without calibration. <ul style="list-style-type: none"> • Allows crack criticality assessment 	✓	✗	✗
High POD and low false call rate. <ul style="list-style-type: none"> • Avoids cost of unnecessary repairs and rework 	✓	✗	✗



Typical signal of a longitudinal defect detected with an array probe, showing Bx and Bz traces on the left and the Butterfly plot on the right.



Typical signal of a transverse defect detected with an array probe, shown as a contour plot. Bx and Bz signals are depicted above and below.

U31D™ System Specifications

Unit Weight	7.6kg in air / 4.3kg in water
Unit Size	142mm diameter x 260mm
Probe Cable Length (topside)	5 metres (standard).
Umbilical Cable	150 metres (as standard)
Serial Communications Cable	5 metres as standard up to 30 metres if required.
Operating Temperature	-20°C to 40°C
Environment Protection (topside)	IP54 rated
Maximum Operating Depth	300m as standard. >10 hours with a single probe
Power Requirements	110v AC. 200mA
ROV use	The U31D™ can be upgraded for ROV deployment, where the ROV provides power and communications. Systems are available for operation in water depths up to 3000m.

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