



EVO 1.0 UCx and ATLAS UG

Cracks in Dents Diagnosis








Managing Pipeline Safety through Combined ILI

To better understand the true condition of their pipelines, operators have been asking ILI companies for a probability of detection of cracks interacting with dents (PODd) to make informed decisions and manage their assets.

NDT Global has successfully developed a diagnosis methodology based on combining high-resolution crack detection and ultrasonic geometry data to detect interacting features associated with a deformation.

Federal regulation in the United States (PHMSA title 49 CFR 192) considers dents with any stress riser i.e. crack, crack colony, and gouge as an immediate threat to the pipeline. Once one of these threats are identified, the operator must take immediate action to verify the defect.

A dent on its own creates a stress concentrator for the pipeline, adding the internal pressure cycling from the pipeline the material starts to fatigue, and cracks are formed within or in the surroundings of the dent. The crack propagation, location in the pipe wall, and relative location in the dent all depend on the dent type (restrained or unrestrained) and the depth of the dent.

-  Axial Cracks
-  Circumferential Cracks
-  Metal Loss
-  Geometry Ovalities
-  Mapping

Accurately Detecting Cracks in Dents

NDT Global's inline inspection tools eliminate pipeline condition uncertainty with a systematic methodology that provides quantitative probabilities for interacting threats (crack, grooves, gouges, and linear indications in dents).

Based on data integration from ultrasonic deformation and high-resolution inspection tools, NDT Global's Cracks in Dents Diagnosis considers multiple attributes from a deformation's geometry. Expert data analysts consider relevant information such as circumferential location of the dent, dent depth and length ratio, while applying special analysis procedures for the dent area. As a result, each dent has an individual probability of detection and any feature interacting with it receives an individual confidence that it is a true feature, enabling informed decision making.

Benefits

- Prioritize remediation efforts avoiding unnecessary digs
- Probability of detection for individual interacting feature(s) per dent (PODd) using ultrasonic geometry data
- Diagnostic Confidence when detecting individual interacting features per dent using ultrasonic geometry and high-resolution crack data

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Specifications

Key Performance Specifications: EVO 1.0 UCx within and Surrounding a Dent (referring to A1163)

POD for axial cracks, crack-like and linear indications \geq PODd (individual POD per dent)

Min. depth of crack with $L \geq 20$ mm (0.79 in)

• Base material and at weld	1 mm	0.04 in
• In weld	2 mm	0.08 in

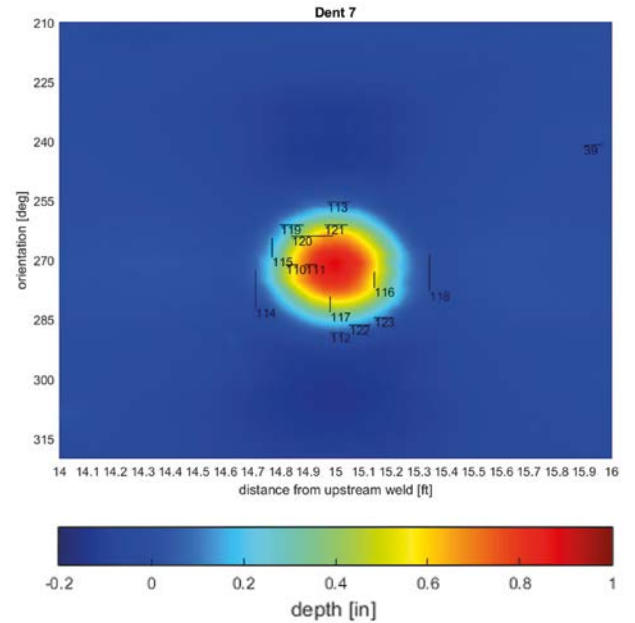
Probability of detection from the UCx tool within and surrounding a dent

Key performance specifications: Atlas UG (referring to API 1163)

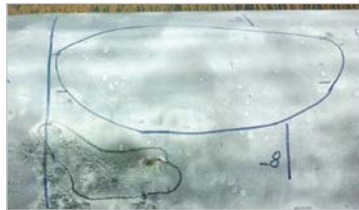
POD for dents and ovalities $\geq 90\%$

• Min. dent depth	2 mm	0.08 in
• Min. ovality	2 mm	0.08 in
Dent depth sizing accuracy	± 1 mm	± 0.04 in
Dent length sizing accuracy	± 10 mm	± 0.39 in

Depth percentage can be calculated dividing the depth (mm/in) by OD (mm/in), absolute value is provided as direct measurement of the UT method



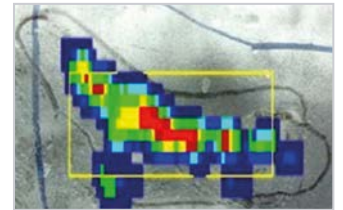
Heat map of a dent highlighting axial and circumferential linear anomalies within its area



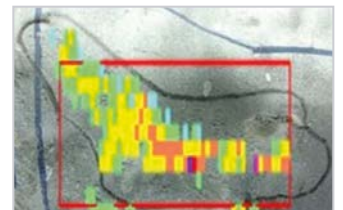
Highlighting the circumference and depth of the dent



Axial crack colony surrounding the dent



Crack colony showing UCx recorded data of cracks in a dent



Please note: Tool and performance specifications depend on inspection and pipeline conditions. Please contact your local NDT Global representative for further information. NDT Global reserves the right to introduce modifications and changes without prior notice.