



# **H**YDROGEN **I**NDUCED **C**RACKING **D**ETECTION

# SAFETY EVALUATION AND HIC MONITORING ON PIPING AND VESSEL

Hydrogen Induced Cracking (HIC) is a failure mechanism resulting in sudden exposures and cracks due to growing laminations inside the base material and welds. Hydrogen Induced Cracking is a mechanical fracture caused by penetration and diffusion of atomic hydrogen into the internal structure of steel, which changes into molecular hydrogen at internal interfaces between non-metallic inclusions and the base material.

Due to its failure mechanism, it is extremely important to follow this process closely whenever first signs have been detected.

Applicable Codes, e.g. API RP579 and NACE RP0296-96 give good direction for the assessment of high temperature/ high pressure equipment but expertise and experience in HIC inspections is critical to assess correctly the damaged condition of materials and determine when replacement has become absolutely critical.

## HIC INSPECTION TECHNIQUE

Our system scans steel plates and pipes. The system transfers acquired ultrasonic data to digital images with a resolution of 0.5x0.5 mm pixels. After printing sections, scan plans, and side views, calculations can be made. Connectivity and distribution of defects and maximum damaged zones are reported. By using materials and fracture mechanical strength calculations, client assets are evaluated for safe use and monitoring.



## APPLICATIONS

- Pipelines, towers, vessels, heat exchangers in aqueous sulphide environment of oil industry facilities, petrochemical plants and oil transportation
- Parts where HIC has occurred and accurate testing is needed
- Possible testing geometries: pipe, curved pipe, spherical surface and flat plate (diameter > 150 mm)

## ADVANTAGES

- Very high resolution equipment giving clear data presentation
- Test speed: 150 mm/sec
- Scanner accuracy: Maximum  $\pm 0.5$  mm
- Possibility to print an image of real defect size
- Quantitative analysis, permanent integrity of data, periodic monitoring and side by side analysis
- Identifies the need to apply further NDT to confirm or increase integrity

## THE SGS EXPERTS

SGS Industrial Services has the knowledge, expertise and experience to perform conventional and advanced NDT inspections around the world using our unique network. Our services offer variations from Guided Wave and the conventional NDT techniques to Risk Based Inspection (RBI/AIM), Time of Flight Diffraction (TOFD), Corroscan, Positive Material Identification (PMI), Magnetic Flux Leakage (MFL), ACFM, Leak Testing, Thermography, Electromagnetic Testing (ET), RFEC, IRIS, Digital Radiography, Radiation Detection, RVI and Endoscopy Inspections.



We are pleased to provide services to any location around the world, pertaining as to how SGS can help you in improving the reliability of your processes and assets.

## CONTACT US

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