



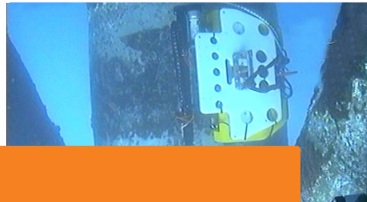
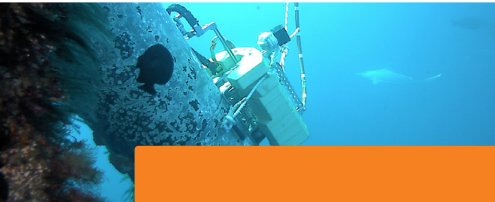
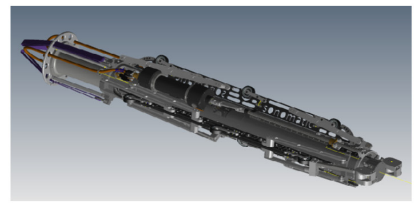
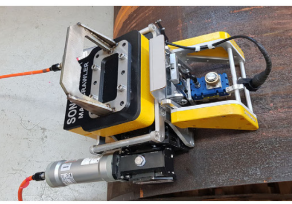
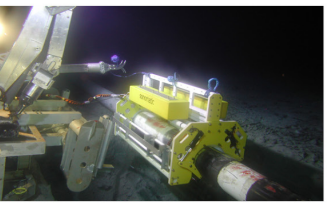
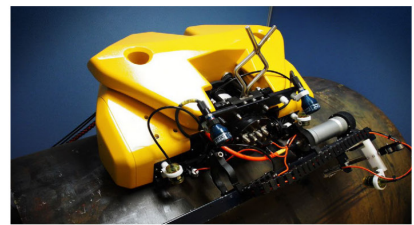
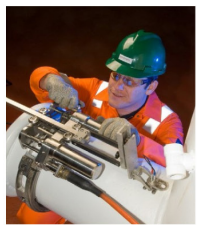
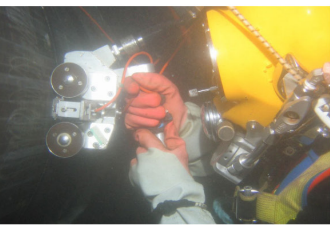
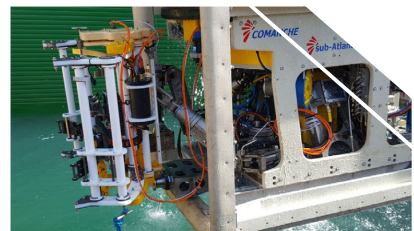
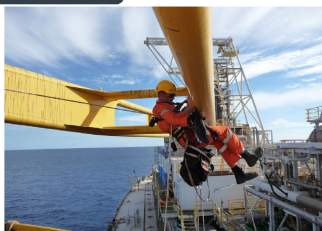
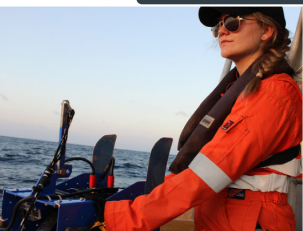
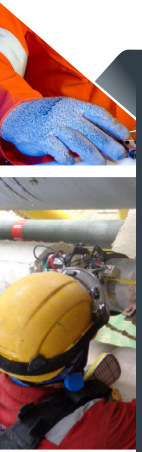
# SONOMATIC

## DATA SHEET

### NON-INTRUSIVE INSPECTION OF STORAGE TANKS

### THE PURPOSE

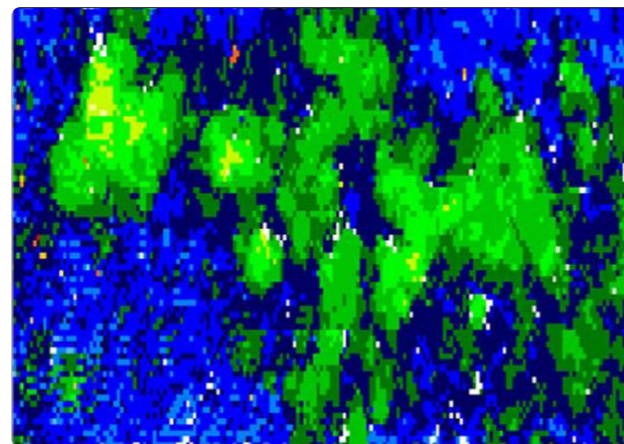
This document is composed to assist our clients and the supply chain with a high-level understanding of the benefits and services associated with Non-Intrusive Inspection of Storage Tanks.



# NII OF STORAGE TANKS

Inspection is a key element of integrity management of storage tanks, as they typically contain large volumes of valuable but potentially hazardous liquids. The objective of inspection is to provide information on the tank condition, however opening storage tanks for internal inspection is a lengthy and difficult process. Not only will the vessel be unavailable during internal inspection, but the vessel must be drained and cleaned before entry is possible and there are also safety hazards associated with vessel entry for inspection. As such, non-intrusive inspection (NII) methods offer an attractive alternative as they can be conducted whilst the vessel is in-service and do not require vessel entry.

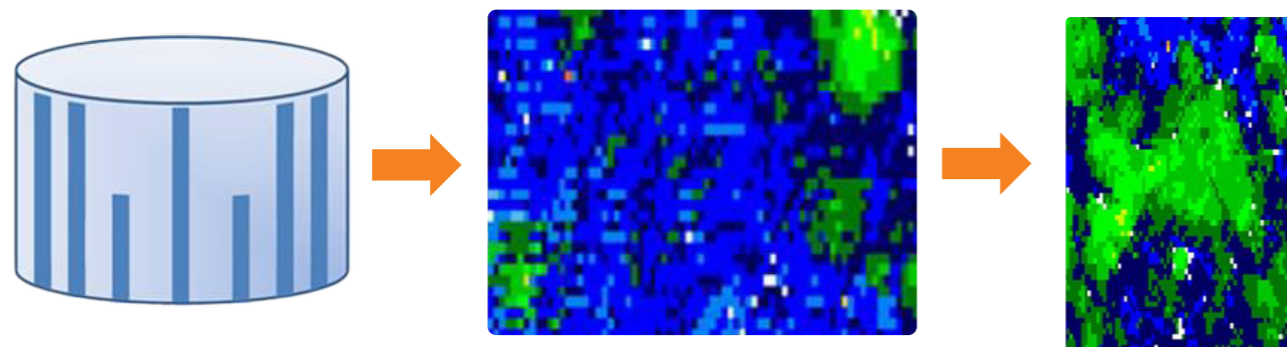
Sonomatic Ltd have considerable experience in the field of NII. The engineering services team have completed assessments and evaluations on over 400 pressure vessels of various designs and functions. Sonomatic's technicians are experienced in using a wide variety of inspection techniques on various assets, in a multitude of environments. The mechanical engineering department of Sonomatic Ltd are capable of adapting existing scanners to various configurations or designing bespoke solutions when required. Sonomatic Ltd is also capable of providing fitness for service guidelines for vessels based on the design parameters.



## KEY FEATURES

NII of vessels has been regulated through the recommended practice (RP) HOIS-RP-G 103 since 2007. The RP was originally developed and issued through the HOIS R&D joint industry project (JIP) in 2002. The JIP includes major oil companies, service organisations and the UK H&SE.

- ✔ NII seeks to either maintain or improve on the risk profile generated through internal inspection.
- ✔ NII typically involves input from previous inspection history, a corrosion risk assessment, comparison with similar assets, expert judgement and externally applied inspection.
- ✔ Inspection techniques depend heavily on the use of ultrasonic imaging technology with advanced forms of statistical analysis.



## STATISTICAL ANALYSIS

The statistical distribution of thickness values for an undamaged vessel should behave in a predictable manner. Any areas of degradation can often be highlighted by deviations of a thickness distribution. As well as being able to identify areas of degradation, the information provided by statistical analysis of the collected data can be used to predict the minimum thickness of the asset, including any un-inspected regions.

## NII TOOLS

There are a variety of non-intrusive techniques that Sonomatic Ltd employ in order to determine the condition of storage tanks. Some of these methods are briefly described in the coming text:

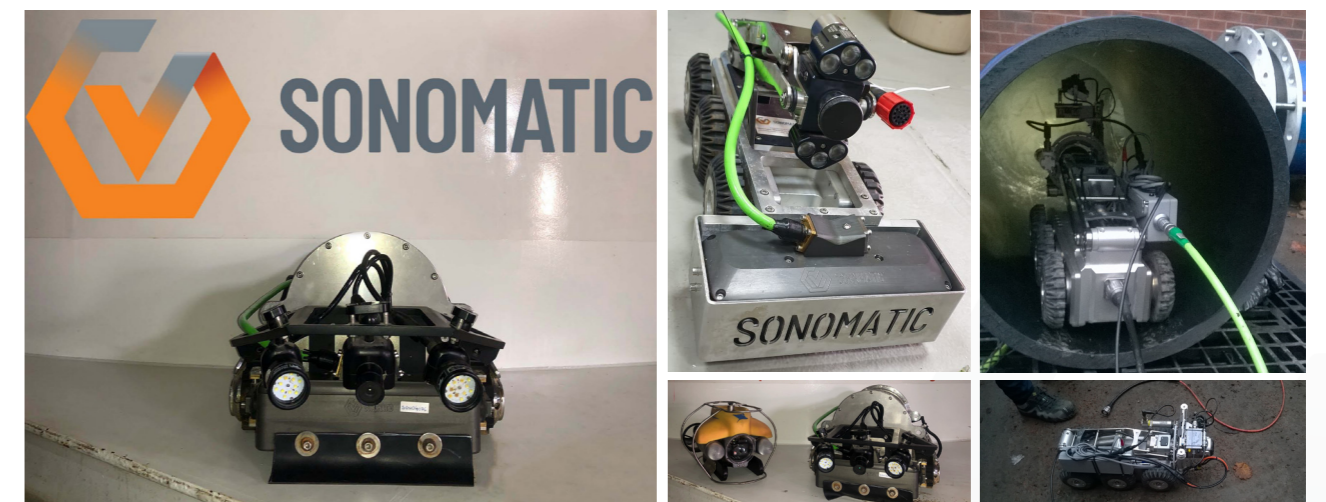
### ANGLED INSPECTION OF THE ANNULAR PLATE

The areas under and close to the inner diameter of tank walls represent a challenge for inspection (including intrusive methods). Sonomatic Ltd has developed advanced ultrasonic inspection methods to identify degradation in this region. Initially inspection can be completed from the walls of the vessel, the purpose of this approach is to identify degradation under the annular plate below the critical internal wall to floor joint fillet weld and also on the upper surface of the annular plate adjacent to the internal fillet weld.

Confirmation of any indications can be achieved using angled inspection from the accessible regions of the annular plate. This approach can be used to evaluate the plate condition up to x200 mm from the plate edge.

### CORROSION MAPPING OF TANK WALLS

The Sonomatic Rapter is a high-speed magnetic wheeled scanner. The Rapter can be attached to the external surface at the bottom of a storage tank and is then driven up the sides of the vessel whilst collecting high resolution corrosion mapping data. Typically each corrosion map will be 500mm wide, with thickness measurements recorded at 4 mm x 1 mm increments. The system allows several channels of data employing different settings to be collected simultaneously; these results can be combined off-line allowing sophisticated analysis processes to be employed.



## QA AND HS&E

Sonomatic operate under an integrated QHSE management system and are committed to the highest quality and safety of service provision | ISO9001: 2015: 00007140 | ISO17020: 2012: 4276 | Achilles FPAL Verified: 076712 | British Safety Council Member: S0388440



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