

1.13.12. APPLICATION OF ULTRASONIC GUIDED WAVES IN THE FIELD OF CRYOGENIC FLUIDS

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The prevention of malfunction due to corrosion and defects in pipelines is one of the most important problems in industrial plants, particularly oil companies, chemical, and distribution of gas and water.

This paper presents a study of applicability of the guided-wave non-destructive inspection technique in industrial plants where the piping system for the transportation of cryogenic liquids is a critical component. In particular, the subject of this study is the control of the integrity of pipelines for the transport of fluids at temperatures between -33°C and -196°C .

Amongst the various industries that use this type of pipes are the various petrochemical plants and for production of plastic materials, the refrigeration systems, piping systems for the transport of liquefied gases in general and in particular the transportation of LNG – Liquefied Natural Gas – inside of LNG terminals. For example, the boiling temperatures for several gases used in industry for processes of refrigeration, or fuels are for the ammonia -33°C , -43°C for propane (LPG), $-78,5^{\circ}\text{C}$ for CO_2 , -162°C for LNG, -183°C for the oxygen or -196°C with regard to liquid nitrogen.

The paper will present some experiments (fig.1) carried out with a magnetostrictive sensor for guided wave NDT in the range of temperature between -33°C and -196°C . Analysis of the results will determine the possible application of the magnetostrictive type sensors for the inspection / long-term monitoring of pipelines for the transportation of cryogenic liquids.



Fig. 1. Low temp. tests on sample pipe