



Verification of Indications in Austenitic Tubes by Means of a Magnet Probe

In non-destructive testing of tubing systems, particularly those manufactured from austenitic stainless steels, indications are frequently detected whose origin cannot be unambiguously attributed to material defects. In order to improve the reliability of inspection results and to avoid misinterpretation, it is advisable to verify such indications by means of a magnet probe.

Austenitic stainless steels are paramagnetic in their ideal metallurgical condition and therefore exhibit no significant magnetic attraction. However, in practical applications, manufacturing processes such as cold working, forming operations, welding, or localized thermal exposure may induce microstructural transformations. These processes can result in the formation of ferromagnetic phases, such as delta ferrite or strain-induced martensite. The presence of such phases can produce responses in electromagnetic or eddy-current-based testing methods that are not associated with geometrical discontinuities or service-relevant defects.

The application of a magnet probe allows a targeted assessment of these indications. If magnetic attraction is observed at the location of an indication, this behavior suggests the presence of locally magnetizable microstructural constituents rather than a critical flaw. In many cases, such indications can therefore be classified as non-relevant or so-called false indications.

By correlating the original inspection signal with the magnetic response of the material, a more robust evaluation of the indication can be achieved. Indications that do not exhibit magnetic interaction are more likely to be associated with geometric irregularities or surface-breaking defects, whereas magnetically responsive areas are often attributable to metallurgical effects. This approach significantly enhances the discrimination between relevant and non-relevant indications.

In summary, the verification of indications in austenitic tubes using a magnet probe represents an effective supplementary technique in non-destructive testing. It enables the elimination of false indications, reduces unnecessary follow-up inspections, and improves the overall reliability and efficiency of the inspection process. This is of particular importance with regard to quality assurance and cost-effective testing strategies.

30-January-2026

DELTA TEST ME LLC
Stefan Köllner

