



Thickness Measurement on Oxide Layers in Boiler Tubes

Ultrasonic Application Solutions

Application

This application report deals with tubes in the energy sector.

To estimate the life of tubes used on boilers heated with fossil fuels, it is necessary to determine the thickness of the oxide layer on the tube's inside surface.

This measurement can be made with the high resolution "pencil" probe G 25 MPN which was developed by the European Solutions Center.

Solution

This measurement can be made with the high resolution "pencil" probe G 25 MPN which was developed by the European Solutions Center. The probe has a high frequency of 25MHz. Its contact face produces a reliable acoustic transition in the inspected area, even with small radii of curvature. The probe housing resembles a pencil and enables very easy handling for optimizing echo indications.



Figure 1: G 25 MPN testing situation

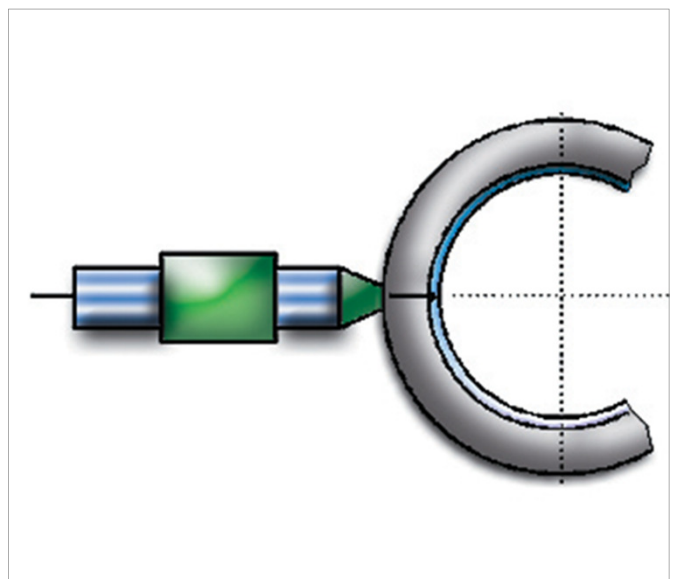


Figure 2: G 25 MPN testing setup



The pencil probe G 25 MPN

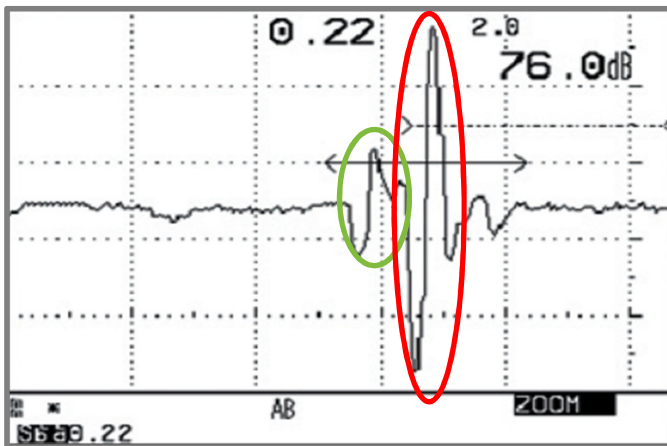


Figure 3: A-scan, interface echo and backwall echo



Figure 4: Pencil probe G 25 MN

General solution information

- Ultrasonic Flaw Detector: USM 36, USM Go+
- Probe: G 25 MPN

The illustrated A-Scan shows the small interface echo (tube material / oxide layer) in front of the high backwall echo from the inside of the tube.

The difference in time of flight of these echoes is proportional to the thickness of the layer. In order to couple the probe, the outside surface of the boiler tube must be free of any scores and scale as well as being smooth at the coupling point.

The minimum layer thickness which can be measured is in the magnitude of 0.15mm, depending on the sound velocity in the oxide layer. Sound velocity has varying characteristics and needs to be determined for each application.

Your benefit

- Ensure high quality
- Reduce field failures and potential liability
- Save money by eliminating destructive testing and by improving your process

Part numbers

USM 36	0037400	USM Go+	0113214
G 25 MPN	0067305		

Contact the GE European Solutions Center for your individual inspection problems:

GE Measurement & Control
European Solutions Center
www.utprobes.com
Portable.utsolutions@ge.com



GE imagination at work