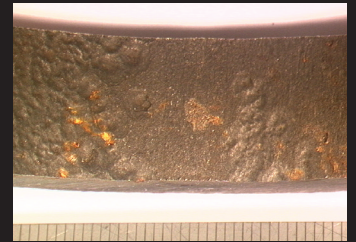


## Inspection Solutions Carburization in Heater Tubes



Sonomatic offers the use of exclusive inspection methods for the non intrusive inspection of 2% - 9% chrome heater tubes to locate and quantify carburization damage.

The standard approach to the identification and definition of carburization damage in heater tubes has always been to make use of destructive test methods. The technique utilized by Sonomatic is a non-destructive method for rapid, accurate examination of the tubes in situ.

This inspection application has been designed specifically to our customer's requirements and feeds directly into life assessment calculations.

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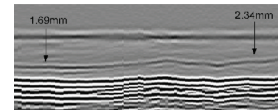
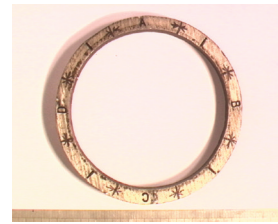
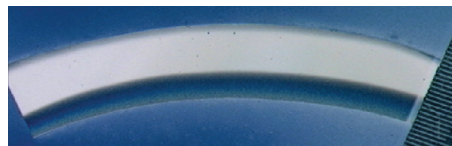
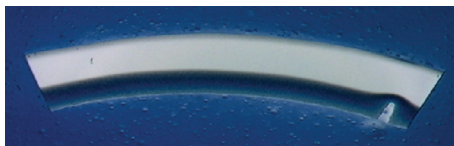
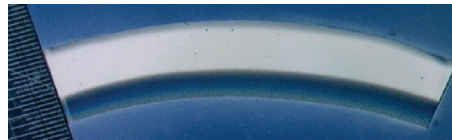
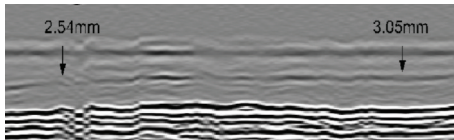
Sonomatic has offices in strategic global locations so we can respond quickly to customers' requirements wherever they may be situated. Our high quality products are matched only by our customer service. In addition to our field services, we offer training and consultancy at our sites in the UK or at clients' premises anywhere in the world. Sonomatic is committed to improving asset performance through applied and innovative technology; to delivering these benefits to our customers in the products and services that we provide; and to working with our customers, as value-added partners, to realise the maximum benefits of inspection technology.

## The system combines:

- Bespoke scanner systems.
- Data acquisition with  $\mu+$  (microplus) technologies.
- PC-based modelling and inspection design and data analysis.

## Key advantages

- Real time results.
- Rapid scanning rates.
- Permanent records with graphic images.
- No removal of pipe for destructive examination.
- Provides data for a repair strategy to be developed.
- The data feeds into life assessment protocol.



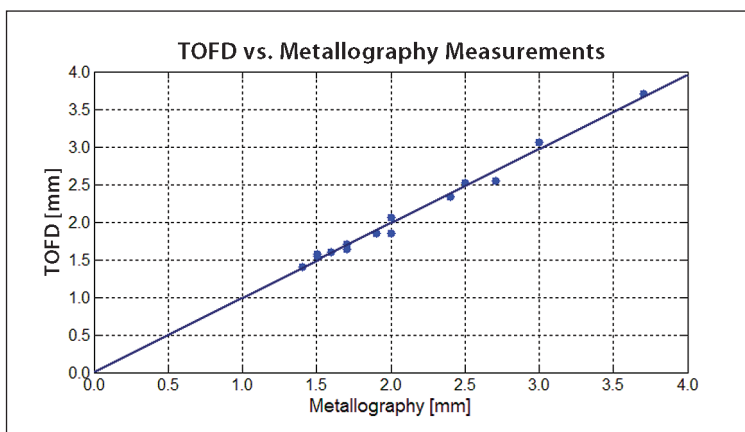
Heater tubes convey heavy carbon residues from the distillation process through the heater. The heater coils are typically 100mm – 140mm diameter tubes which are manufactured from creep resistant high Cr material such as P9. The process temperatures, lends itself to diffusion of the carbon into the parent material and corresponding degradation of material properties.

The technique proven to work to identify this degradation mechanism is a non-standard Time of Flight Diffraction application with a specific process protocol.

Note: It is possible to carry out a standard TOFD inspection and not be able to identify the specific damage mechanism. The inspection protocol and set-up parameters are critical to the ability of the technique to locate and identify the Carburization damage. This has been developed and proven through extensive qualification work independently validated.

Sonomatic's unique software provides powerful tools for optimizing the inspection and analyzing the captured data.

The data is collected using a bespoke scanner system fitted with encoders for positional information. The data is enhanced using specialized software routines on the  $\mu+$  (microplus).



Carburization measured with TOFD at the same position as the visual measurement from the metallographic samples.

## QA and HS&E

It is Sonomatic's ongoing commitment to supply services and products, through the application of technical and engineering excellence, which complement both the customer's and our own QA and HS&E requirements.

Sonomatic's commitment to quality is maintained through continuous assessment and review of our Quality Management Systems to BS EN ISO 9001:2008. Sonomatic actively promotes the development, implementation and improvement of our QMS as a part of our ongoing drive to enhance customer satisfaction by meeting or exceeding customer requirements. In 2009 Sonomatic achieved UKAS accreditation as an Inspection Body to BS EN ISO/IEC 17020 (UKAS IB4276).