framatome

# Mobile Material Analysis

## On-site and in-situ analysis for accurate condition assessment of structural materials

### Take advantage of economic, non-destructive methods and the quick availability of on-site results covering the entire life cycle of components and assets.

## Challenge

In a situation of global competition, availability and cost effectiveness of assets and equipment have a very high priority. Therefore, it is vital to accurately assess the current condition of structural materials allowing an early detection of degradation mechanisms, to finally avoid unexpected failures.

## Solution

Target-oriented inspection and maintenance activities can be derived and implemented through the determination of remaining service life of important equipment. Framatome provides support with mature and proven on-site and in-situ analysis methods. Our economic and non-destructive methods have a broad range of application.

- Mobile hardness testing
- Chemical analysis – Positive Material Identification (PMI)
- Foil replicas
- Digital microscope
- Contour and topographic replicas by silicone rubber compounds
- 3D-macroscopy
- Corrosion investigations

The accredited (DIN EN ISO/IEC 17025:2018*) material testing laboratory of Framatome's Technical Center offers a wide variety of solutions and has profound experience to perform testing specifically in the following fields of activities:

- Metallography
- Electron microscopy of steel and ironworks materials as well as non-iron metal materials
- X-ray fluorescence analysis
- Corrosion tests
- Mechanical-technological material tests


Mobile TIV-hardness tester

Mobile x-ray
fluorescence spectroscopy
for Positive Material Identification (PMI)

## Customer benefits

- Economic methods for detailed condition assessment of structural materials: non-destructive, quick and individual
- Experienced teams with mobile equipment enable concrete, tangible statements right on-site
- Quick worldwide deployment of teams

**Your performance**
is **our** everyday **commitment**

# Technical information

**Mobile hardness testing**

The hardness level of structural materials allows a first orienting statement regarding the condition of a component. After appropriate surface preparation the hardness can be determined relatively quickly. Framatome utilizes various hardness testing methods for all relevant materials.

**Chemical analysis – Positive Material Identification**

Depending on the level of accuracy that is required, both x-ray fluorescence and spark emission spectroscopy are available as mobile analysis methods.

**Foil replicas**

After appropriate surface preparation that entails local step-wise grinding, polishing and etching, foil replicas can reproduce an accurate microstructural image of a given material. The typical appearances of microstructural phenomena allow determining the reason of failure. Also, the degree of thermal degradation mechanisms caused by creep (acc. to VGB-S-517) can be determined accurately.

**Digital microscopy**

After an appropriate surface preparation that entails local step-wise grinding, polishing and etching the digital microscope allows directly visualizing and documenting the materials microstructure up to magnifications of X1000. The loss of information that can occur with foil replicas utilized on very fine-grained materials will be avoided.

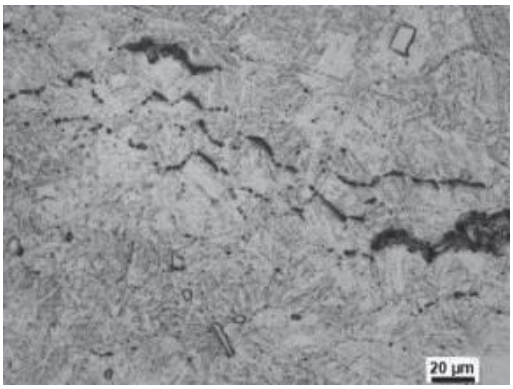
**Contour and topographic replicas by silicone rubber compounds**

Compounds originating from the dental technology are utilized. They enable a very accurate replication of surface contours such as fracture surfaces or surface roughness up to a resolution of 1µm. Hence, fracture surfaces can be evaluated indirectly for determining the reason of failure. Measurements of already installed geometries can be realized any time.

**3D-macroscopy**

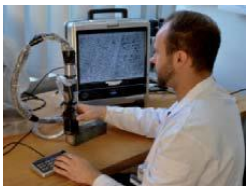
The contact-free acquisition of surface contours allows a quick visualization of geometries and topographies. At the same time exact measurements are possible. This method is often used in combination with the silicon rubber compounds but can also be utilized directly on the work piece of interest.

Process and methods are accredited according to DIN EN ISO/IEC 17025:2018 *)

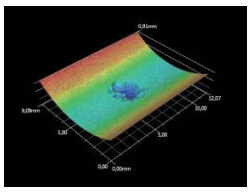



Replica disclosing creep pores as a result of long term operation at high temperatures


Replica of a large bore thread out of a ductile cast iron housing for further thread profile measurements



Direct grain structure evaluation up to X1000 with digital microscope



Exact characterization of pitting attack in heat exchanger tubing

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-21039-03-00

*) the accreditation is valid only for the scope as listed in appendix of certificate D-PL-21039-03-00 and in list of test methods: https://www.dakks.de/de/akkreditierte-stellen-suche.html; https://www.framatome.com/EN/customer-1668/certificates-and-accreditations.html

**Contact** : materials@framatome.com
**www.framatome.com**



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