



## Cross Manufacturing Metallurgical Laboratory Capabilities

The metallurgical laboratory at Cross Manufacturing Bath is a fully NADCAP approved/accredited highly capable modern facility containing a comprehensive array of state of the art test and analytical equipment. Routinely carrying out extensive material testing, analysis and research, the department is dedicated to supporting production and customer needs.

The capabilities of the Metallurgical Laboratory include:

**Metallography** – Evaluation of microstructures for grain size, carburisation, weld analysis, corrosion, inclusions, defects, recast layers, fracturing/micro fracturing, coating evaluation, heat treatment, rolling effects and more. Digital Optical Microscopes providing up to 1000X magnification, Scanning Electron Microscope (60,000X magnification), a dedicated etching facility and modern semi-automated polishing/grinding capabilities allow for precise and accurate analysis at very high magnification enabling comprehensive microstructural examination.

**Mechanical testing** – Vickers and Knoop microhardness testers, hardometers, and an Instron 100kN tensile tester enable full mechanical testing of material at all stages of production in accordance to ASTM, NADCAP, customer specs etc...

**Chemical analysis** – our Scanning Electron Microscopy Electron Dispersive Spectroscopy (SEM-EDS) suite enables extensive chemical and elemental analysis of raw material and products allowing for material grade identification, contamination analysis, material heterogeneity analysis and more.

**Material testing** – Through the use of test furnaces and analytical equipment/software materials and products can be tested at very high temperatures for extreme lengths of time in order to simulate working conditions Corrosion, creep rate, thermal dispersion and relaxation and more can be investigated.



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Capabilities include:

- Microstructure
- Chemical analysis
- Grain size
- Weld analysis
- Corrosion analysis
- Heat treatment effectiveness
- Thermal relaxation, creep rate, heat dispersion
- EDM analysis
- Coating thickness
- Oxide evaluation
- Fracture analysis
- Defect characterisation
- Failure analysis
- Coating effectiveness
- Carburisation
- Hardness substantiation
- Precise sample preparation (?)
- & more

Equipment:

- Hardness & microhardness testers – Knoop, Rockwell, Vickers
- 100kN tensile tester
- Digital optical microscopes and capture software. 10 – 1000X magnification
- Scanning Electron Microscope (SEM). 20-60000X magnification.
- SEM with Electron Dispersive Spectroscopy (EDS) capability.
- Modern ventilated etching facility with ASTM E407 etchants and electrolysis capabilities.
- Precision sectioning saw.
- Semi-automatic polisher grinder.
- Compression mounting equipment.
- Test furnaces.