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CSIR MECHANICAL TESTING FACILITY

The CSIR Mechanical Test facility (MTF) is ISO 17025:2017 accredited and consists of facilities such as specimen preparation areas, load frames, test jigs for composite materials, impact drop testing, creep testing of metals and rotating beam testing facilities, as well as data collection and analysis software.

The MTF is extensively used by the local industry, state-owned enterprises, science councils and universities, including international clients for testing and qualification of materials and components.

Key testing services offered are:

- Tensile and compression testing (to 1 000 kN);
- Fatigue testing up to 800 kN;
- Low and high cycle fatigue testing;
- High-temperature fatigue and tensile (0 °C to 800 °C);
- Fracture toughness testing;
- Crack growth rates, threshold stress intensity;
- S-N curves; and
- Creep testing (up to 1 000 °C).

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Typical testing standards followed include:

- ASTM E466: Constant amplitude axial fatigue;
- ASTM E606: Strain-controlled fatigue testing;
- ASTM E647: Fatigue crack growth rates;
- ASTM E399: K1c plane strain fracture toughness;
- ASTM E813: JIc testing;
- ASTM E1820: Fracture toughness (metallics);
- ASTM E561: R-curve determination; and
- ASTM E1290: Crack tip opening displacement.

Testing includes manufactured rebar, multi-strand wire cabling and composites for local aerospace manufacturing companies. Notable projects include materials testing for the construction of the SKA Antenna Reflector, wire rope for the Nelson Mandela Bridge, 2010 Soccer World Cup stadiums and Eskom power stations. Collaboration with other test facilities is ongoing, including private companies and the South African Bureau of Standards.