

SM1090

Rotating Fatigue Machine

Demonstrates the failure of materials when subjected to an alternating stress

Works with
VDAS®



Screenshot of the optional VDAS® software

- Compact bench-mounting unit – ideal for student use and classroom demonstrations
- Demonstrates clearly both high and low cycle fatigue
- Adjustable 'dead weight' and load cell system – to apply and measure a consistent and accurate load on the test specimens
- Electronic display of cycle rate, cycle count and load
- Clear guard with interlock – allows you to see the experiment in safety
- Automatic switch stops the experiment when the specimen breaks – lets the equipment run unattended
- Includes tools and two sets of specimens of different metals
- Works with TecEquipment's Versatile Data Acquisition System (VDAS®) – perfect to monitor the experiment while unattended

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
- **T** +44 115 972 2611 • **F** +44 115 973 1520 • **E** info@tecquipment.com • **W** www.tecquipment.com
- An ISO 9001 certified company
- VDAS is a registered trademark of TecEquipment Ltd

SM1090

Rotating Fatigue Machine

Description

This machine demonstrates the fatigue failure of materials when subject to alternating stresses. Based on Wohler's design, it uses a motor to rotate a circular cantilever specimen with a load at its free end. It is in two parts: a robust main unit, and a separate control and instrumentation unit.

A variable speed drive controls the motor to allow safe and gradual increase of the cycle rate. The motor turns a compliant coupling and a precision shaft held in sturdy bearings. A collet type chuck on the end of the shaft grips the specimen with reliable and accurate concentricity. This reduces set up time and unwanted vibration.

The specimens have a special design that creates a point of maximum stress at their midpoint rather than at their end. This gives a definite point of failure and avoids unwanted stress concentrations.

A gimbal mounted self-aligning bearing holds the 'free end' of the specimen. The gimbal assembly links to a short load arm. This applies a purely vertical load even when the specimen deflects under load. A load cell links the short load arm to a longer load arm. The longer load arm has an integral moveable dead weight that sets the load.

The load cell measures the load and an electronic sensor measures shaft rotation. The separate control and instrumentation unit shows the load, speed (cycle rate) and the number of cycles.

A switch cuts power to the drive motor when the specimen fails, stopping the test. This freezes the cycle display at failure to record the result, even without the operator being present. Unlike some designs, the mechanism shuts off the motor only when the specimen actually breaks (not when the specimen is near to failure).

A removable clear guard covers the rotating parts. It has an interlock switch to stop the motor if you remove the guard.

The machine includes aluminium and steel specimens and tools to fit and remove them. TecEquipment can also supply extra specimens to work with this machine. The base of the main unit includes a handy storage area to store the tools and specimens when not in use.

The control and instrumentation unit connects to TecEquipment's Versatile Data Acquisition System (VDAS®). This gives accurate real-time data capture, monitoring and display, calculation and charting of all important readings on a computer (computer not included). This may allow you to use a networked computer and remotely monitor your tests. This could be especially useful during tests of long duration.

Note: You must contact your local computer engineer to setup suitable software (not supplied) for remote monitoring.

Experiments

The user guide includes suggested experiments that show:

- Low and high cycle fatigue
- How to create and use Wohler (S-N) curves for various materials
- Comparison of fatigue properties of various materials

Recommended Ancillaries

- Bench-mounted version of the Versatile Data Acquisition System (VDAS-B)
- Additional Specimens: RF1010 (steel), RF1020 (aluminium) and RF1030 (brass)

Standard Features

- Supplied with comprehensive user guide
- Two-year warranty
- Manufactured in accordance with the latest European Union directives

Essential Services

Electrical supply:

220 VAC to 240 VAC phase to neutral or phase to phase
50 Hz to 60 Hz at 5 A

Note: Please state your electrical supply type on order.

Approximate bench space needed: 1200 mm x 600 mm

Operating Conditions

Operating environment: Laboratory or classroom

Storage temperature range:

-25°C to +55°C (when packed for transport)

Operating temperature range: +5°C to +40°C

Operating relative humidity range:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Sound Levels

Less than 70 dB(A).

Specifications

Dimensions and nett weight:

- Main unit: 600 mm x 350 mm x 400 mm high and 30 kg
- Control and instrumentation unit: 400 mm x 350 mm x 180 mm and 7.5 kg

Total packed dimensions: 60 kg and 0.25 m³

Maximum stress: Approximately 350 MPa

Maximum cycle count:

9.99 x 10⁸ with a one cycle resolution

Specimens included:

10 RF1010 (steel) and 10 RF1020 (aluminium)

Tools included: Spanner, tommy bar, hexagon tool

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
- **T** +44 115 972 2611 • **F** +44 115 973 1520 • **E** info@tecequipment.com • **W** www.tecequipment.com
- An ISO 9001 certified company
- VDAS is a registered trademark of TecEquipment Ltd

