

Welcome to the Instron® Materials Testing Accessories Newsletter

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Application Features: The Testing of Metals – Part 1

Metals Testing

Metals and alloys are routinely tested for tensile, shear, bend, impact, torsion, fatigue and fracture properties. Metals testing is one of the most common applications for both electromechanical and servohydraulic systems, with materials as diverse as fine gold wire for microelectronics and steel reinforcing bar for the construction industry.

Typical tensile properties include E-modulus (Young's modulus), yield/offset strength, elastic and plastic deformation, tensile strength, and break elongation. The strain-hardening behavior of metal sheet is of major concern to manufacturers of deep drawn pressed components such as car bodies, where parameters such as anisotropy ratio (R) and strain-hardening component (N) are frequently required. Tensile tests are performed on a variety of metallic materials including wire, foil, sheet, plate, bar, tube and fasteners.

The volume of testing performed on metals and alloys is such that productivity is of great importance. The widespread use of computerized testing systems and automated extensometry improves not only productivity, but also the reliability of test results.

The crucial importance of fatigue and fracture behavior in applications, such as rotating shafts, axles and aircraft components, has resulted in the widespread use of dynamic tests in which forces are cycled many times to evaluate the performance of materials and components over long periods. High-cycle fatigue, fracture toughness, low-cycle fatigue (LCF) and specialty tests, such as thermo-mechanical fatigue (TMF), are frequently performed. In many cases, these tests are carried out under non-ambient temperatures with furnaces, environmental chambers and cryostats integrated into the testing system.

Grips and Fixtures

Static testing of metals can be carried out with a variety of Instron grips, depending on the load and material requirement.

Pneumatic wedge grips are widely used for the tensile testing of metals. The 2716 Series grips are available with capacities ranging from 5 kN to 300 kN.

Pneumatic Wedge Action Grips

2718 Series side-action hydraulic grips, suitable for tensile testing of metals, are available in capacities up to 1200 kN.

Thin wires and foils can often be successfully tested using 2712 Series pneumatic and 2710 screw-action tensile grips with smooth faces.

Special grips are available for braided wires, including 2714-010 wire tire cord grips, and 2715 Series webbing capstan grips.



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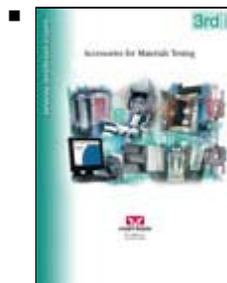
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Future Events

- **ANTEX Plastics Encounter:** (Milwaukee, WI, US) May 4th-8th
- **ChemExpo 2008:** (Hungary) May 27th-30th
- **Plastpol Exhibition:** (Poland) May 27th-30th
- **Quality Expo:** (Detroit, MI, US) June 11th-12th
- **Metals Congress:** (Spain) June 18th-20th

Pneumatic Wire Tire Cord Grips



Fatigue tests on metals can be performed using a variety of pre-load mechanical and hydraulic grips.

2742-301 30 kN hydraulic wedge grips are ideal for R&N testing on sheet metals and fatigue tests on smaller specimens.

2742 and 2743 Series mechanical and hydraulic wedge grips provide full reverse-loading capability with a wide range of jaw face types and sizes, including carbide-coated.

2741 Series mechanical Buttonhead grips are designed for fatigue tests on circular section specimens without the need for

hydraulic clamping.

2718 Series hydraulic wedge grips are fully enclosed, top loaded grips for fatigue tests up to ± 500 kN.

Fracture mechanics tests on CT specimens are readily performed with 2750 Series clevis grips. 2810 Series bend fixtures are ideal for fracture mechanics testing on bend specimens.

For more information on Accessories, visit us [on the web](#), submit an [online request](#), or call us at +1 800 473 7838 (US only) or +44 1494 456815 (Europe only)

Are you testing something a little different? Do you think more people should know about it? Would you like to submit an article for possible publication in the Instron accessories newsletter? If so, please [submit your story](#).

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