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Mechanical Testing Laboratory

Universal Testing Machine (UTM)

Specifications:

- * Make : Instron
- * Dynamic axial load capacity : ± 100 kN
- * Dynamic torsion load capacity : ± 1000 Nm
- * Actuator Axial Stroke : 150 mm
- * Rotary stroke : 90°
- * Bi-axial Fatigue Load cell : 100 kN Linear & 1000 N-m Torsional
- * Additional load cell for testing of plastics and FRP composites : 10 kN
- * Dynamic Strain Gauge Extensometer : Gauge Length 12.5, 25 and 50 mm
Frequency range: 0-50 Hz
- * Controller : designed for both cyclic and static testing applications
- * Hydraulic Power pack : Maximum system Pressure 207 bar
 - Tank capacity : 225 Litres
 - Oil flow capacity : 48 Litres/minute
- * Cooling Tower & Pump : Hydraulic Power pack oil cooling

Major Accessories & Fixtures

- * 100 kN/1kNm Fatigue rated Tension/Torsion Hydraulic Wedge Grips
 - Biaxial hydraulic wedge action grips suitable for gripping round and flat specimens
- * Compression Platen of 150 mm diameter
- * Dynamic Bend Fixture for Single-Edge- Notch-Bend (SENB) specimen
- * Three Point Flexure Fixture 100 kN Dynamic
 - The flexure fixture allows a variety of flexural and fracture toughness bond tests to be performed, including determination of flexural modulus, flexural strength and flexural yield strength
- * Three Point Bend Fixture 10 kN for both Static and Fatigue Testing: for plastics and Composites
- * Clevis Grips CT 12.5 and CT 25: Rated Capacity: ± 50 kN Dynamic, 100 kN Static :
 - Application Range: Fracture Toughness, J-Integral, Crack Growth & R-Curve
- * Crack Opening Displacement (COD) Gauge Extensometer
 - 5 mm gauge length, 2 mm travel
 - 10 mm gauge length, 4 mm travel
 - To perform fracture mechanics tests (both cyclic and static).

Schematics of UTM



List of Major Mechanical Tests

- * Tension Test
- * Compression Test
- * Flexural Test
- * High Cycle Fatigue
- * Low Cycle Fatigue
- * Crack Growth Rate (da/dn)
- * Fracture Toughness Parameters (J_{IC} & K_{IC})

Standards used for Testing

Name of Test	Standard Name
Tensile Test	ASTM E-8
Compressive Test	ASTM E-9
Fatigue crack growth rates	ASTM E399/E647
High Cycle Fatigue Test	ASTM E466
Strain controlled Fatigue Testing	ASTM E606
Flexural Bend Testing	ASTM D790
Fracture Toughness Measurement	ASTM E1820