

MEMS Material Testing Equipment (Revised Jan 2016)

MEMS has shared materials testing equipment available for use in Jolley Hall, Room 103. If you are interested in using this equipment, please contact Ruth Okamoto (rjo@wustl.edu) or Gene Bulfin (gene@wustl.edu).

Instron 5583 electro-mechanical Universal Testing Machine. The 5583 has a load frame capacity of 150 kN (33.7 kip). It can be used for tension, compression and bending tests. Load cells with ranges of 500 N (112 lb), 5000 N (1124 lb), or 150 kN (33.7 kip) are available. The cross head speed range is 0.002 to 500 mm/min. Accessories include wedge grips, compression platens, a dynamic extensometer (Instron 2620-602), and a 3-point bending setup, which accommodates specimens up to 6 in. long. Instron Bluehill software is used to control the test parameters, record and store data.

MTS 858 Mini Bionix servo-hydraulic test system. The recently upgraded MTS system uses a FlexTest 40 controller. It has a load frame capacity of 25 kN (5.5 kip), torsional actuator capacity of 150 N-m (1325 in-lb) and displacement range of 100 mm. It is equipped with a 550 lb/150 inlb combined axial/torsional load cell and an additional 8 channel A/D board for external inputs. The system uses MTS TestSuiteTM software to control the test parameters, record and store data.

TA Instruments AR-G2 rheometer for characterizing viscous fluids and viscoelastic solids. The G2 has a torque range (0.003 uN-m to 200 N-m), axial force range (0.005 – 50 N), angular velocity 0-300 rad/sec, oscillatory frequency up to 100 Hz. A Peltier plate is used to control sample temperature (2 to 100 oC). Accessories include flat plate (8, 20, 40, 60 mm dia), cone (20 mm, 40 mm) and crosshatched (8, 20, 40, 60 mm dia) geometries and TA Rheology AdvantageTM software for test control and data acquisition and analysis.

Objet 24 High-Resolution 3D printer. The Objet 24 employs patented PolyJet technology. PolyJet 3D Printing is similar to inkjet document printing. Instead of jetting drops of ink onto paper, PolyJet 3D Printers jet layers of liquid photopolymer onto a build tray and cure them with UV light. The layers build up one at a time to create a 3D model or prototype. Fully-cured models can be handled and used immediately, without additional post-curing. The build material is a rigid white opaque photopolymer.

Build Size:

234 x 192 x 148.6 mm (9.21 x 7.55 x 5.85 in)

Build Resolution:

X-axis: 600 dpi; Y-axis: 600 dpi;

Z-axis: 900 dp

Accuracy:

0.1 mm (0.0039 in) - varies according
to geometry, part orientation and print size

Costs:

Build material is \$0.38/gm, support material is \$0.19/gm, machine time is \$10/hr

Confocal Microscope. Contact Jessica Wagenseil for more information (jessica.wagenseil@wustl.edu).