

## **Fastenal (Winona) Lab Equipment**

**30,000 lb. & 200,000 lb. Tensile Testers**---Testing externally threaded fasteners for tensile, proof load, and yield strengths; Testing internally threaded fasteners for proof loads. Software: MTESTQuattro Version 5.07.07

**Rockwell Hardness Tester**--- Testing Rockwell hardness in the B and C scales, and surface hardness on the 30N.

**Micro-hardness Tester**---Hardness testing using the Vickers scale. Software: Confident Version 2.6.0

**Skidmore-Wilhelm**---Measurement of clamp load between internal and external thread assembly.

**Spectrometer**---Chemical analysis for Iron, Nickel, Aluminum, Copper, and Titanium base materials. Software Version: 1.2.2c

**Portable XRF**---Rapid Alloy Identification, PMI (Positive Material Identification). Software Version: 8.2.1

**Metallographic Microscope**---Analysis of grain structures and boundaries on raw material and finished product. Software: Paxit! 2 Version 1.5.2

**Phenom XL Scanning Electron Microscope (SEM)**---Material imaging and fractographic analysis with nanoscale magnification up to 100,000x

**Mag-Particle (AC/DC)** ---Nondestructive inspection for cracks above and below the surface.

**Variable Thread Gauging**---Inspection of internal and external threads for pitch and functional diameters

**Ring and Plug Gauges**---Go and No-Go thread inspection for inch and metric sizes.

**Optical Comparator**---Dimensional inspection of linear measurements, angles, thread profiles, and radiuses.

**Drive Test Plates, Torsional Collets, and Ductility Blocks**---Performance testing for tapping, thread cutting, and thread rolling screws.

**Length Gauges**---6 and 12 inch gages for measuring lengths.

**Recess Checker**---Recess depth and penetration depth on cross-recessed, hex, six lobe, square, and slotted drives.

**Protrusion Gauge**---Measurement of head protrusion on countersunk fasteners.

**Drill Drive Tester**---Drill-Drive performance test for self-drilling tapping screws.

**CMM**---Coordinate Measuring Machine for precise measurements of angles, concentricity, roundness, diameter of holes, distance of points, etc.

**Corrosion Test Chamber**---Salt Spray (Fog) Testing per ASTM B117

**Charpy Impact Machine**---Impact testing up to 264 ft/lbs with a temperature range of +410 F to -202°F. Software Version: 6.2.7

**Liquid Penetrant**---NDT (non-destructive testing) of non-magnetic materials

**Fatigue Testing**---Cyclic loading of fasteners

**UT Testing**---NDT (non-destructive testing) with high frequency sound waves

### **Additional Equipment:**

**Profilometer, Elongation Gauge, Torque Wrenches, Digital Calipers, Micrometers, Pitch Micrometers, 1-2-3 Block, Wobble Gauge, Straightness Gauge.**