

## Mechanical Test Laboratory Price List

Effective July 5, 2011

Note: Minimum charge of \$100 per invoice.

Tests requiring machining, sample preparation, fixturing, or significant setup time will be charged by the hour at applicable rates plus materials costs. An estimate will be given upon receipt of samples.

Quantities of 10 or more of a specific test may be eligible for a volume discount. This will be determined based upon the nature of the samples and test.

Our regular turn-around time is 5 business days.

For rush orders, add a minimum of 50% dependant on timing and nature of work.

Our laboratory is accredited by the Standards Council of Canada (SCC) to ISO/IEC 17025 for specific tests as indicated by ✓. Our Scope of Accreditation is listed on the Standards Council of Canada website at [http://palcan.scc.ca/specs/pdf/22\\_e.pdf](http://palcan.scc.ca/specs/pdf/22_e.pdf)



| Metallic Materials               |          |                                    |  |         |
|----------------------------------|----------|------------------------------------|--|---------|
| <b>Tension &amp; Compression</b> |          |                                    |  |         |
| Tensile                          | ✓        | ASTM E8                            | Metallic Materials   | \$70 ea |
|                                  | ✓        | ASTM A370                          | Steel Products   |         |
|                                  |          | CSA G40.20/- .21                   | Rolled or welded structural quality steel/<br>Structural quality steel |         |
|                                  | ✓        | ASTM B557                          | Wrought and Cast Aluminum- and Magnesium-<br>Alloy Products            |         |
| Rebar Tensile                    |          | CSA 30.18                          | Billet-Steel Bars for Concrete Reinforcement                           | \$80 ea |
|                                  |          | CSA W186                           | Welding of Reinforcing Bars in Reinforced<br>Concrete Construction     |         |
| Wire Tensile                     | ✓        | ASTM A370                          | Steel Products   | \$80 ea |
|                                  | ✓        | ASTM B557                          | Wrought and Cast Aluminum- and Magnesium-<br>Alloy Products            |         |
| Weld Tensile                     | ✓        | CSA W47.1                          | Fusion Welding of Steel  | \$70 ea |
|                                  | ✓        | CSA W47.2                          | Fusion Welding of Aluminum   |         |
|                                  | ✓        | ASME IX QW-150                     | Welding General Requirements - Tension Tests                           |         |
|                                  | ✓        | ASME IX QB-150                     | Brazing General Requirements - Tension Tests                           |         |
|                                  |          | AWS D1.1                           | Structural Welding Code - Steel  |         |
|                                  | AWS D1.2 | Structural Welding Code - Aluminum |  |         |

|                               |           |  |                  |
|-------------------------------|-----------|--|------------------|
| Steel Chain Tensile           | ASTM A413 | Carbon Steel Chain   | \$100 ea         |
|                               | ASTM A466 | Weldless Chain   |                  |
|                               | ASTM A467 | Machine and Coil Chain   |                  |
| Roller Chain Tensile          | Custom    | Ultimate load of Chain   | \$100 ea         |
| Fastener Proof Load & Tensile | ASTM F606 | Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets | \$100 ea         |
|                               | SAE J429  | Externally Threaded Fasteners  |                  |
|                               | SAE J1199 | Metric Externally Threaded Steel Fasteners   |                  |
|                               | SAE J1216 | Metric Threaded Fasteners (Cancelled Jul 1999)   |                  |
|                               | SAE J995  | Steel Nuts   |                  |
|                               | Custom    | Standard or customs test available   | \$100 - \$150 ea |

### Bending & Ductility

|                             |                  |  |                              |
|-----------------------------|------------------|--|------------------------------|
| Weld Bend                   | ✓ CSA W47.1      | Fusion Welding of Steel                          | \$50 ea                      |
|                             | ✓ CSA W47.2      | Fusion Welding of Aluminum                       |                              |
|                             | ✓ ASME IX QW-160 | Welding General Requirements - Guided Bend Tests |                              |
|                             | ✓ ASME IX QB-160 | Brazing General Requirements - Guided Bend Tests |                              |
| Fillet-Weld Bend            | ✓ CSA W47.1      | Fusion Welding of Steel                          | \$60 ea                      |
|                             | ✓ CSA W47.2      | Fusion Welding of Aluminum                       |                              |
|                             | ✓ ASME IX QW-180 | Welding General Requirements - Fillet-Weld Tests |                              |
| Torsional Ductility of Wire | ASTM A938        | Torsion Testing of Wire                          | \$70 ea<br>\$500 / set of 10 |

### Impact

|                 |                    |   |   |
|-----------------|--------------------|---|---|
| Charpy          | ✓ ASTM E23         | Notched Bar Impact Testing of Metallic Materials<br>- Typically 3 specimens   | For prenotched specimens:<br><br>\$30 each<br>\$75 / set of 3<br>\$110 / set of 5 |
|                 | ✓ ASME VIII UCS-67 | Rules for Construction of Pressure Vessels Division 1 - Impact Testing of Welding Procedures<br>- Typically 3 specimens |   |
|                 | ✓ CSA W47.1        | Fusion Welding of Steel<br>- Typically 5 specimens  |   |
|                 | ✓ ASTM A370        | Steel Products<br>- Number of specimens TBD   |   |
|                 | CSA G40.20/-21     | Rolled or Welded Structural Quality Steel/<br>Structural Quality Steel<br>- Number of specimens TBD                     |   |
|                 | AWS D1.1           | Structural Welding Code – Steel<br>- Typically 3 or 5 specimens   |   |
|                 | ✓ Option           | Specimen Type A Vee notch (with broach)   |   |
| Vertical Impact | Custom             | Standard or customs test available  | \$100 ea  |

### Hardness

|                          |   |            |  |          |
|--------------------------|---|------------|--|----------|
| Rockwell Hardness        | ✓ | ASTM E18   | Rockwell Hardness of Metallic Materials  | \$55 ea  |
|                          |   | ASTM F606  | Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets |          |
|                          |   | SAE J429   | Externally Threaded Fasteners  |          |
|                          |   | SAE J1199  | Metric Externally Threaded Steel Fasteners   |          |
|                          |   | SAE J1216  | Metric Threaded Fasteners (Cancelled Jul 1999)   |          |
| Brinell Hardness         | ✓ | ASTM E10   | Brinell Hardness of Metallic Materials   | \$55 ea  |
|                          |   | ASTM E110  | Indentation Hardness of Metallic Materials by Portable Hardness Testers                      |          |
| Barcol Hardness          |   | ASTM D2583 | Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor                        | \$55 ea  |
| Vickers - Micro Hardness | ✓ | ASTM E384  | Microindentation Hardness of Materials   | \$100 ea |
| Profile Hardness         | ✓ | ASTM E384  | Microindentation Hardness of Materials   | \$125 ea |
| Case Depth               | ✓ | ASTM E384  | Microindentation Hardness of Materials   | \$125 ea |

### Plastics, Resins, Rubbers, & Composite Materials

#### Tension & Compression

|  |   |            |  |               |
|--|---|------------|--|---------------|
| Plastics, Resins, & Composites Tensile | ✓ | ASTM D638  | Tensile Properties of Plastics   | \$75 ea       |
|  | ✓ | ASTM D3039 | Tensile Properties of Polymer Matrix Composite Materials   | \$75 ea       |
|  |   | Option     | Strain Gauging (1 - 3 Quarter-Bridge gauges)   | \$80 / gauge  |
| Rubber Tensile                         |   | ASTM D412  | Vulcanized Rubber and Thermoplastic Elastomers—Tension   | \$75 ea       |
| Flatwise Tensile                       |   | ASTM C297  | Flatwise Tensile Strength of Sandwich Constructions  | \$75 ea       |
| Plastics, Resins, & Composites Shear   | ✓ | ASTM D7078 | Shear Properties of Composite Materials by V-Notched Rail Shear Method   | \$100 ea      |
|  |   | Option     | Strain Gauging (1 - 2 Shear Half-Bridge gauges)  | \$100 / gauge |
| Rubber Peel Adhesion                   |   | ASTM D413  | Rubber Property—Adhesion to Flexible Substrate   | \$80 ea       |
|  |   | ASTM D429  | Rubber Property—Adhesion to Rigid Substrates   | \$80 ea       |
| Compression                            | ✓ | ASTM D6641 | Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture | \$100 ea      |
|  |   | Option     | Strain Gauging (1 - 3 Quarter-Bridge gauges)   | \$80 / gauge  |

#### Flexural

|                    |   |           |   |         |
|--------------------|---|-----------|---|---------|
| Flexural - 3 Point | ✓ | ASTM D790 | Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials | \$80 ea |
|                    |   | ASTM C393 | Core Shear Properties of Sandwich Constructions by Beam Flexure                                 | \$80 ea |

|                                     |              |   |         |
|-------------------------------------|--------------|---|---------|
| Flexural - 3 Point Short Beam Shear | ✓ ASTM D2344 | Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates             | \$80 ea |
| Flexural - 4 Point                  | ASTM D6272   | Flexural Properties of Plastics and Electrical Insulating Materials by Four-Point Bending | \$80 ea |

### Hardness

|                    |            |   |         |
|--------------------|------------|---|---------|
| Durometer Hardness | ASTM D2240 | Rubber Property—Durometer Hardness                                    | \$55 ea |
| Barcol Hardness    | ASTM D2583 | Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor | \$55 ea |

## Adhesives, Coatings & Environmental

### Physical Tests

|                              |                 |   |         |
|------------------------------|-----------------|---|---------|
| Peel Adhesion - 180deg       | ASTM D903       | Peel or Stripping Strength of Adhesive Bonds  | \$80 ea |
| Peel Adhesion -Tee           | ASTM D1876      | Peel Resistance of Adhesives (T-Peel Test)  | \$80 ea |
| Lap Shear                    | ASTM D3163      | Strength of Adhesively Bonded Rigid Plastic Lap-Shear Joints in Shear by Tension Loading                          | \$70 ea |
|                              | ✓ ASTM D3164(M) | Strength Properties of Adhesively Bonded Plastic Lap-Shear Sandwich Joints in Shear by Tension Loading            |         |
|                              | ASTM D1002      | Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal) |         |
|                              | ASTM D5868      | Lap Shear Adhesion for Fiber Reinforced Plastic (FRP) Bonding   |         |
| Galvanized Coating - on Wire | ASTM B498       | Zinc-Coated (Galvanized) Steel Core Wire for Use in Overhead Electrical Conductors                                | \$70 ea |

### Temperature and Humidity Exposure

|                            |                              |                               |                 |
|----------------------------|------------------------------|-------------------------------|-----------------|
| Programmable Environmental | Small                        | 190°C to -73°C 10%RH to 95%RH | \$100 / 8 hr †  |
|                            |                              | 24" x 24" x 24" Chamber       | \$175 / 24 hr † |
|                            | Medium                       | 190°C to -73°C 10%RH to 95%RH | \$1000 / week † |
|                            |                              | 30" x 30" x 30" Chamber       |                 |
| Large                      | 60°C to -40°C 10%RH to 80%RH |                               |                 |
|                            | 60" x 83" x 86" Chamber      |                               |                 |

### Corrosion Chamber

|                  |           |   |   |
|------------------|-----------|---|---|
| Salt Fog / Spray | ASTM B117 | Standard Practice for Operating Salt Spray (Fog) Apparatus          | \$3.00 / hr for 500 hours or less †<br>\$2.50 / additional hour |
|                  | ASTM B368 | Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test) | \$4.00 / hr †   |
| Cyclic Corrosion | SAE J2334 | Laboratory Cyclic Corrosion Test                                    | \$125 / 24 hr †   |
|                  | Custom    | Tested as requested   |   |

### Coating Testing Options

|                             |            |  |         |
|-----------------------------|------------|--|---------|
| Scribe Evaluation           | ASTM D1654 | Evaluation of Painted or Coated specimens Subjected to Corrosive Environments  | \$25 ea |
| Coating Thickness           | ASTM D7091 | Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals | \$15 ea |
| Pencil Hardness             | ASTM D3363 | Film Hardness by Pencil Test   | \$20 ea |
| Tape Adhesion               | ASTM D3359 | Measuring Adhesion by Tape Test  | \$20 ea |
| Paint Blistering Evaluation | ASTM D714  | Evaluating Degree of Blistering of Paints  | \$15 ea |
| Rust Evaluation             | ASTM D610  | Evaluating Degree of Rusting on Painted Steel Surfaces   | \$15 ea |
| Gravelometer                | SAE J400   | Test for Chip Resistance of Surface Coatings   | \$15 ea |

### Product Testing & Verification

|  |                    |  |                        |
|--|--------------------|--|------------------------|
| Fatigue / Cycle Testing<br>Load or Displacement<br>Control | Small              | 1,000 lbf tension or compression   | \$20 / hr †            |
|  | Mechanical         | 10 inch travel   | \$100 / 8 hr †         |
|  | Disp. Control Only | Cycle rates up to 6 Hz   | \$150 / 24 hr †        |
|  | Medium             | 22 klbf tension or compression   | \$50 / hr †            |
|  | Servo-Hydraulic    | 10 inch travel   | \$350 / 8 hr †         |
|  |                    |  | Cycle rates up to 6 Hz |
| Flammability - Vehicle<br>Interior Materials               | Large              | 55 klbf tension or compression   |                        |
|  | Servo-Hydraulic    | 5 inch travel  |                        |
|  |                    | Cycle rates up to 4 Hz   |                        |
| Flammability - Vehicle<br>Interior Materials               | FMVSS 302          | Flammability of Interior Materials                                       | \$250 ea               |
|  | SAE J369           | Flammability of Polymeric Interior Materials--<br>Horizontal Test Method |                        |
| Bus Window Push Out  | FMVSS 217          | Bus Emergency Exits and Window Retention and Release                     | \$300 ea               |
|  | 571.217            | Bus Emergency Exits and Window Retention and Release                     |                        |
| Spring Constant  | Custom             | Tension or Compression Springs   | \$100 ea               |
| Load vs. Deflection<br>Curve                               | Custom             |  | \$100 ea               |
| Webbing Load   | Custom             | Tension Test to Failure  | \$100 ea               |
| Jackstand Proof Load                                       | Custom             | Validate Load Bearing Capabilities                                       | \$250 ea               |
| Loading Ramp Proof<br>Load                                 | Custom             | Validate Load Bearing Capabilities                                       | \$250 ea               |
| Hoist Proof Load   | Custom             | Validate Load Bearing Capabilities                                       | \$250 ea               |
| Anchor Proof Load  | Custom             | Validate Load Bearing Capabilities                                       | \$250 - \$1000 ea      |
| Jack Proof Load  | Custom             | Validate Load Bearing Capabilities                                       | \$250 ea               |
| Hitch Proof Load   | SAE J684           | Trailer Couplings, Hitches, and Safety Chains--<br>Automotive Type       | \$100 - \$1000 ea      |

|                               |               |   |                           |
|-------------------------------|---------------|---|---------------------------|
| Winch Pulling Load            | SAE J706      | Validate Load Rating Capabilities                                     | \$1500 ea                 |
| Gas Strut Load vs. Deflection | Custom        | Validate damping, load holding and cyclic life testing                | \$100 ea                  |
| Shock Load vs. Deflection     | Custom        | Validate damping, load holding and cyclic life testing                | \$100 ea                  |
| Load Simulation               | Custom        | Apply to test object  | \$100 - \$500 ea          |
| Cabinetry Stain               | KCMA - 9.0    | Finish Test   | \$150 - \$450 ea          |
| Rubber Tarp Strap Load        | Custom        | Ultimate Load Testing   | \$100 ea                  |
| Headlight Illumination        | FMVSS 108     | Lamps, Reflective Devices, and Associated Equipment                   | \$1500 - \$3000 / vehicle |
|                               | CMVSS 108     | Lamps, Reflective Devices, and Associated Equipment                   |                           |
|                               | FMVSS 571.108 | Lamps, Reflective Devices, and Associated Equipment                   |                           |
|                               | SAE J1383     | Performance Requirements for Replaceable Bulb Motor Vehicle Headlamps |                           |
|                               | SAE J1735     | Harmonized Vehicle Headlamp Performance Requirements                  |                           |
| Strain Gauging                | Custom        | Strain Gauging and Measurement  | \$200 +                   |

† The rates quoted are run-time rates. Initial setup and project management costs will depend upon the nature of the test.

Subject to ITC's General Terms and Conditions.  
All terms and prices shown are subject to change without notice.