



# Primary Standards Laboratory Acceleration and Shock Project

## Fact Sheet

The Primary Standards Laboratory (PSL) maintains a wide variety of primary acceleration and shock standards to assure accurate and traceable measurements for customers. Capabilities include acceleration measurements for a wide variety of accelerometers and shock pulses to 100,000 g.

While the automated vibration calibration system is designed to operate over a range of 0.5 Hz to 10 kHz, traceable calibrations are performed from 2 Hz to 10 kHz. Test parameters and data presentation instructions can be programmed for each calibration.



**Unholtz Dickie Automated Vibration Calibration System**

The system will measure capacitance for piezoelectric accelerometers, output bias voltage for internal electronic accelerometers and resistance, zero measurand output, excitation voltage, damping, natural or resonant frequency, shunt, and simulated electrical calibration for piezoresistive accelerometers.

Traceability is established through direct comparison with a NIST-calibrated accelerometer.

### Capabilities

Below is a representative sample of PSL's uncertainties. The Acceleration and Shock project is NVLAP accredited under Lab Code 105002-0 by the National Institute of Standards and Technology/National Voluntary Laboratory Accreditation Program (NIST/NVLAP) in most of its capabilities. For full details, see <http://ts.nist.gov/standards/scopes/1050020.pdf>

### Acceleration

#### Vibration

| Level       | Frequency Range   | Best Uncertainty for UUT (k=2)         |
|-------------|-------------------|--|
| 10g to 30g  | 0.5Hz to 10,000Hz | Primary 2.5%<br>Secondary 4%<br>Note 1 |
| 0.01g to 1g | 1Hz to 200Hz      | 2.5% (Long Stroke)                     |

Note 1: Temperature characterizations can be performed at temperature excursions from ambient conditions over the temperature range of -54°C to 80°C, noting that these are not traceable calibrations and are to be used for informational purposes only.



## Shock

| Level              | Pulse Width               | Best Uncertainty for UUT (k=2) |
|--------------------|---------------------------|--------------------------------|
| 500g to 10,000g    | 40 $\mu$ S to 100 $\mu$ S | 8% (Drop Ball)                 |
| 1,500g to 100,000g | 15 $\mu$ S to 30 $\mu$ S  | 6% (Hopkinson Bar)             |
| 500g to 75,000g    | 15 $\mu$ S to 30 $\mu$ S  | 3.5% (Primary High g System)   |

## Static

| Level         | Best Uncertainty for UUT (k=2) |
|---------------|--------------------------------|
| 10g to 1,000g | 1% (Centrifuge)                |

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