

# Formotion

## WHITEPAPER

**Our OEM partners have some very strict and rigid performance requirements before they allow us to put their name on our products. Our customers benefit from the exhaustive testing and evaluations our partners require of us, because every Formotion timepiece and thermometer we sell must meet these requirements.**

**Formotion timepieces and thermometers are the most tested gauges available on the market. Our OEM's require that our gauges meet certain benchmarks of durability and quality and are tested by independent testing laboratories using the methods listed in this whitepaper.**

**Independent testing results help prove Formotion durability and ruggedness. Built for motorsports and designed for motorsports.**

**Listed below are the testing and evaluation descriptions that Formotion and its partners use to determine quality acceptance:**

### **DUST INGESTION**

SAE J 726B coarse or equivalent	70%
120 grit aluminum oxide	30%

The quantity of dust ingested by the gauge must not compromise the operation of the gauge. The unit shall meet the requirements of the product specification.

### **GRAVEL BOMBARDMENT (NON-OPERATIONAL)**

With the gauge mounted as on a representative production motorcycle or mechanical assembly (buck) similar to a production motorcycle and, using the Q-Panel Gravelometer specified in SAE J400 JAN85 or equivalent, subject the gauge to direct bombardment under room ambient conditions. With the air pressure adjusted to  $70 \pm 5$  psi open the air valve and feed 1 pint of water-worn road gravel (.375 to .625 dia.) slowly, over a period of 5 to 10 seconds, into the funnel. Upon completion of the test cover the gauge with masking tape to remove any loose chips not completely separated from the gauge. The unit shall meet the requirements of the product specification. Reference to the requirements of GES 22601.

## **STORAGE**

Stabilize the non operating equipment at -40° in an altitude (decompression) chamber for 30 minutes. Reduce the atmospheric pressure from sea level to 40,000 feet (2.72 psi). The pressure should not be changed at a rate exceeding the equivalent of 2000 feet per minute.

Soak the gauge for one hour in this environment then returned the gauge to room ambient (75° F, 14.5 psi). Again, do not exceed the pressure change rate. Temperature change should be limited to 5° F per minute. The unit shall meet the requirements of the applicable product specification. Reference to the requirements of GES 22601.

## **OPERATING**

Stabilize the operating equipment at 0° F in an altitude (decompression) chamber for 30 minutes. Reduce the atmospheric pressure from sea level to 12,000 feet (9.37 psi). The pressure should not be changed at a rate exceeding the equivalent of 2000 feet per minute. Run the equipment at maximum stress levels for two hours in this environment. Ramp the temperature at 5° F per minute to 140° F and exercise the equipment at maximum stress levels, at this temperature, for two hours.

Return the gauge to room ambient levels (75° F, 14.5 psi), not exceeding the temperature change rate of 5° F per minute and altitude change rate of 2000 feet per minute. The unit shall meet the requirements of the applicable product specification. See a cross reference to the requirements of GES 22601.

## **MECHANICAL STRESS**

Mechanical stress tests are those road induced, engine induced, and gauge handling tests that are encountered during the normal usage of the motorcycle.

The gauge shall not malfunction, when reconnected, under any combination of disconnected leads. See a cross reference to the requirements of GES 22601 in paragraph 4.2 of this document.

## **INSULATION RESISTANCE (MEGGER)**

Insulation resistance tests are applicable to all assemblies with an exposed conductive surface or chassis. This test is not applicable to assemblies that are potted or assembled in plastic, non conductive, enclosures.

Using a megger meter with a source voltage of 500 volts minimum, measure the resistance between each or all of the connector pins and the conductive surface. The

meter shall read a minimum of 10 meg Ohms. See a cross reference to the requirements of GES 22601.

### **DIELECTRIC STRENGTH (HI POT)**

Hi pot tests are applicable to all assemblies with an exposed conductive surface or chassis. This test is not applicable to assemblies that are potted or assembled in plastic, non conductive, enclosures.

Using a hi pot test set with a minimum 115 VRMS, 60 Hz source; hi pot each or all of the pins to the conductive chassis. The leakage current shall read less than 450 microamperes. See a cross reference to the requirements of GES 22601.

### **WEATHERING**

These tests are intended to test the mechanical and cosmetic ability of the gauge to long and short term endurance to sun, dry heat, wet heat, and cold climates conditions. The degree of color change or cosmetic difference allowed is defined by the Harley-Davidson styling department. Colors are defined by the "Pantone Color Formula Guide".