



QA Technology Company, Inc.

# A p p l i c a t i o n s N o t e

## Working Temperature Ranges

### For QA Test Probes

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QA Technology test probes can be used over a wide range of temperatures without affecting their performance. The following discusses some items to consider when using QA test probes at the limits of operating temperature.

#### **Upper Temperature Limit:**

The internal lubricant and the spring material govern the upper temperature limit of a test probe. At elevated temperatures the lubricant properties are altered and the strength of the spring material is reduced, therefore yielding may occur when the probe is deflected. Although the springs are not likely to fracture in this situation, they may take a permanent set and the spring force at a given deflection will be reduced.

#### **Lower Temperature Limit:**

The lubricant used within the probe governs the lower temperature limit of a spring probe. Lubricants are commonly used to prevent wear of the precious metal internal surfaces of the probe, thus extending probe life and maintaining low electrical resistance.

The viscosity of lubricants used for probes will increase as temperature decreases. If probes are exercised below their rated low temperature, the lubrication may not be adequate, and galling of the plunger and inside surface of the probe tube may occur. This wear could allow the base metal to form oxides, which would greatly reduce electrical performance.

If, however, it is necessary to perform tests below the rated low temperature limit, the probes can be actuated at room temperature, and then refrigerated or moved to the cold environment without harm to the plating or materials. The probes should not be exercised when the temperature of the lubricant is below the lower temperature limit.

In some applications, movement of the plunger (by deliberate actuation, thermal contraction or vibration), at low temperatures is unavoidable. The increased viscosity of the lubricant at these temperatures causes sluggish movement of the plungers, which could result in intermittent contact. In spite of their reduced life, unlubricated probes should be used in these cases, so that plungers will move freely. There is no known lower temperature limit for unlubricated probes.

Please refer to QA's catalog or website ([www.gatech.com](http://www.gatech.com)) for the upper and lower temperature specifications for all probe series.