Traceable calibration based on ISO 17025 at Tektronix

I. Introduction

Tektronix is adopting ISO/IEC 17025:2005[1] as the preferred calibration standard for non-accredited traceable calibration (and for accredited calibration, although that is not the subject of this paper). For an increasing selection of Tektronix products, calibration services at Tektronix manufacturing and service facilities are based on ISO 17025. This paper describes the reasons for adopting ISO 17025, how the standard is being implemented at Tektronix, and the features of ISO 17025 based certificates of traceable calibration and calibration data reports.

See the white paper "Metrology, Calibration, and Your Tektronix Instrument" for an introduction to metrology and calibration and to related Tektronix policies and practices.

II. What is ISO 17025, and why is Tektronix adopting ISO 17025?

ISO 17025 is a complete and well-conceived requirements document that covers all aspects of calibration and test programs, including but not limited to quality system management, measurement method validation and control, measurement traceability, equipment selection and maintenance, and reporting of calibration and test results.

Tektronix is adopting ISO 17025 as the preferred standard for traceable calibration primarily because it is the international standard for test and calibration that is recognized worldwide. ISO 17025 is intended to apply to a wide range of test and calibration activities in diverse fields. Many Tektronix customers and suppliers use and accept the ISO 17025 standard.

III. How is Tektronix implementing ISO 17025?

Tektronix is phasing in ISO 17025 as a calibration standard for selected products, starting with oscilloscope products currently in production in early 2008.

For products not converted to ISO 17025, calibration at Tektronix continues to be based on ANSI/NCSL Z540.1-1994(R2002)[2], a United States standard. Tektronix manufacturing and US service facilities issue traceable certificates that reference Z540.1. Outside of the United States, Tektronix service facilities follow the same metrology policies and practices as US facilities, although certificates issued by service facilities outside of the United States do not reference Z540.1.

The calibration procedures used when calibrating a particular Tektronix instrument are the same throughout worldwide manufacturing and service. Certificates of traceable calibration and calibration data reports for a Tektronix model have basically the same features regardless of which Tektronix site generates the documents, although there may be some differences due to regional requirements.

IV. How do Tektronix ISO 17025 based certificates of traceable calibration differ from other Tektronix traceable certificates?

When calibration is based on ISO 17025, certificates of traceable calibration generated by Tektronix manufacturing facilities and by some service facilities include a reference to ISO 17025. In some regions, however, it is acceptable to refer to ISO 17025 only on accredited certificates. In those regions, non-accredited traceable calibration certificates do not include a reference to ISO 17025.

ISO 17025 forbids the inclusion of recommended calibration intervals and calibration due dates on certificates, except as requested by clients. Tektronix ISO 17025 based certificates in general include neither a calibration due date nor a recommended calibration interval. However Tektronix service customers with Tektronix calibration service agreements may receive a calibration due date notification based on the Tektronix recommended calibration interval. Tektronix new product certificates provide guidance for finding the Tektronix recommended calibration interval at the Tektronix web site, and for calculating a due date.

ISO 17025 mandates that statements of compliance of measurements with specifications must take into account measurement uncertainty. Tektronix service certificates that are based on ISO 17025 include the category "indeterminate" as one of the possible received and returned conditions. This category applies when no measurements fail and at least one measurement is indeterminate as defined in the next section. Tektronix new product certificates do not include the "indeterminate" category. Manufacturing test limits in most cases are set to preclude the possibility of shipping products with indeterminate measurements. In the remaining cases manufacturing test limits are set to provide a high probability that measurements are within published specifications based on known manufacturing measurement distributions and uncertainties[3,4].

V. What are the key features of ISO 17025 calibration data reports?

Calibration data reports are included with all Tektronix service ISO 17025 calibrations, and the reports are available at a nominal cost with new product ISO 17025 calibrations.

The key added features of Tektronix calibration data reports based on ISO 17025 are found in the Uncertainty and Result columns of the reports.

ISO 17025 mandates that measurement data and associated uncertainties must be recorded and available to clients. Entries in the Uncertainty column show the expanded measurement uncertainties evaluated and reported in accordance with ISO/IEC Guide 98: Guide to the Expression of Uncertainty in Measurement (GUM)[5]. The coverage factor (k) is 2, with coverage probability of approximately 95 %. Uncertainty values are reported with the same units as the measured values.

Determinations of compliance with specifications must account for uncertainty, according to ISO 17025. Entries in the Result column account for uncertainty. Results may be Pass, Fail, Pass*, or Fail*. When a step has Pass or Fail status, the difference between the measured value and the nearest test limit is greater than the uncertainty, and the coverage probability of the pass or fail decision is at least 95 %. When a step has Pass* or Fail* status, the difference between the measured value and the nearest test limit is less than the uncertainty, and the decision may have reduced probability. Steps with Pass* or Fail* results are considered to have "indeterminate" status.

VI. Summary

Tektronix ISO 17025 based calibration services and documents provide enhanced quality and features to better meet your needs and expectations. For more information on Tektronix calibration services, including on-site and accredited services, visit www.tektronix.com/service

VII. References

[1] ISO/IEC 17025:2005, General Requirements for the Competence of Testing and Calibration Laboratories, International Organization for Standardization, Geneva, Switzerland (2005).

[2] ANSI/NCSL Z540.1-1994(R2002), Calibration Laboratories and Measuring and Test Equipment – General Requirements, American National Standards Institute, Boulder, CO, USA (2002).

[3] D. Deaver, How to Maintain Your Confidence (in a World of Declining Test Uncertainty Ratios), John Fluke Mfg. Co., Inc., Everett, Washington.

[4] UKAS M3003, The Expression of Uncertainty and Confidence in Measurement, Appendix M, section M3, United Kingdom Accreditation Service, Middlesex, UK (2007).

[5] ISO/IEC Guide 98: Guide to the Expression of Uncertainty in Measurement (GUM), International Organization for Standardization, Geneva, Switzerland (1995).

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