Manual of Petroleum Measurement Standards Chapter 22.4

Testing Protocol for Pressure, Differential Pressure, and Temperature Measuring Devices

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Testing Protocol for Pressure, Differential Pressure, and Temperature Measuring Devices

1 Scope

This testing protocol documents the method for testing the performance characteristics specific to pressure, differential pressure, and temperature sensors and transmitters used in petroleum measurement. The testing protocol includes a listing of parameters affecting the performance of the devices, a description of the tests required, requirements for the test facility, a data reporting format, and an uncertainty determination methodology.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62828-5: 2020 [1], *Reference conditions and procedures for testing industrial and process measurement transmitters—Part 5: Specific procedures for flow transmitters*

ISO [2]/IEC Guide 98-3:2008 (GUM:1995), *Uncertainty of measurement—Part 3: Guide to the expression of uncertainty in measurement*

ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1
analog signal
A signal that varies continuously in amplitude rather than in discrete steps.

3.2
API 22.4 baseline accuracy
A measure of the accuracy at a near ambient temperature determined by the testing procedure defined in this document. The API *MPMS* Ch. 22.4 (API 22.4) baseline accuracy is calculated from the combination of the linearity and combined repeatability and hysteresis (CRH) data calculations. API 22.4 baseline accuracy is used to compare the result to other transmitters tested at the same time and is also used in the calculation of influence factor effects.

3.3
combined repeatability and hysteresis
CRH
The combined effect of repeatability and hysteresis. Due to the manner in which the API 22.4 baseline accuracy is determined, it may be impossible to differentiate between repeatability and hysteresis; therefore, the two effects are combined into one test.

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[1] International Electrotechnical Commission, 3 rue de Varembé, 1st Floor, PO Box 131, CH-1211 Geneva 20, Switzerland, www.iec.ch.

[2] International Organization for Standardization, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, www.iso.org.