Recommended Practice for Testing Well Cements

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Introduction

Users of this standard should be aware that further or differing requirements may be needed for individual applications. This standard is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this standard and provide details.

In this standard, where practical, U.S. customary units (USC) are included in brackets for information. The units do not necessarily represent a direct conversion of metric units (SI) to USC units, or USC to SI. Consideration has been given to the precision of the instrument making the measurement. For example, thermometers are typically marked in one degree increments, thus temperature values have been rounded to the nearest degree.

In this standard, calibrating an instrument refers to assuring the accuracy of the measurement. Accuracy is the degree of conformity of a measurement of a quantity to its actual or true value. Accuracy is related to precision, or reproducibility of a measurement. Precision is the degree to which further measurements or calculations will show the same or similar results. Precision is characterized in terms of the standard deviation of the measurement. The results of calculations or a measurement can be accurate, but not precise, precise but not accurate, neither and both. A result is valid if it is both accurate and precise.

Well cement classes and grades are defined in API Specification 10A.

Warning—The tests specified in this standard require the handling of hot, pressurized equipment and materials that may be hazardous and can cause injury. Do not exceed manufacturer's safety limits. Only trained personnel should perform these tests.

Recommended Practice for Testing Well Cements

1 Scope

This standard specifies methods and gives recommendations for the testing of cement slurries and related materials under simulated well conditions.

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.

API Specification 10A, *Specification for Cements and Materials for Well Cementing*

API Recommended Practice 13B-1, *Recommended Practice for Field Testing Water-based Drilling Fluids*

API Recommended Practice 13B-2, *Recommended Practice for Field Testing Oil-based Drilling Fluids*

API Recommended Practice 13J, *Testing of Heavy Brines*

ASTM C109/C109M-07 [1], *Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or [50 mm] Cube Specimens)*

ASTM C188-95, *Standard Test Method for Density of Hydraulic Cement*

ASTM C618-08, *Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete*

3 Terms, Definitions, and Symbols

3.1 Terms and Definitions

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

3.1.1
absolute density
Density of a material without the fluid around the particles, similar to the relative density and can be obtained by multiplying the relative density of a material by the density of water at 4 °C, 1000 kg/m^3 (8.345 lbm/gal).

3.1.2
absolute volume
The volume occupied by a material, not including the intergranular space in the case of a solid.

3.1.3
additive
Material incorporated in a cement slurry to modify or enhance some desired property.

[1] ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org.