Drilling Fluids Materials

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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, Suite 1100, Washington, DC 20001, standards@api.org.

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Introduction

This Standard covers materials that are in common usage in petroleum and natural-gas drilling fluids. These materials are used in bulk quantities, can be purchased from multiple sources and are available as commodity products. No single-source or limited-source products are included, nor are specialty products.

Standards are published to facilitate communication between purchasers and manufacturers, to provide interchangeability between similar equipment and materials purchased from different manufacturers and/or at different times and to provide an adequate level of safety when the equipment or materials are utilized in the manner and for the purposes intended. This Standard provides minimum requirements and is not intended to inhibit anyone from purchasing or producing materials to other standards.

The purpose of this Standard is to provide product specifications for materials manufactured for use in oil and gas-well drilling fluids. The materials covered are barite, hematite, bentonite, non-treated bentonite, Oil Companies Material Association (OCMA)-grade bentonite, attapulgite, sepiolite, technical grade low-viscosity carboxymethyl cellulose (CMC-LVT), technical grade high-viscosity carboxymethyl cellulose (CMC-HVT), starch, low-viscosity polyanionic cellulose (PAC-LV), high-viscosity polyanionic cellulose (PAC-HV), and drilling-grade xanthan gum.

A survey of the industry found that only the American Petroleum Institute (API) issued testing procedures and specification standards for these materials.

Annex A (informative) concerning use of the API Monogram by Licensees is now purposely blank; refer to Annex A of API Specification Q1. Annex B provides the test precision, Annex C (informative) details examples of calculations, and Annex D discusses the API Reference Material Program.

As with any laboratory procedure requiring the use of potentially hazardous chemicals and equipment, the user is expected to have received proper training and knowledge in the use and disposal of these potentially hazardous materials. The user is responsible for compliance with all applicable local, regional, and national requirements for worker and local health, safety, and environmental liability.

In this standard, quantities expressed in the International System of Units (SI) are also, where practical, expressed in U.S. customary units (USC) in parentheses for information. The units do not necessarily represent a direct conversion of SI units to USC units, or USC units to SI units. 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.

Calibrating an instrument refers to ensuring 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 accurate nor precise, or both accurate and precise. A result is valid if it is both accurate and precise.

This document uses a format for numbers which follows the examples given in *API Document Format and Style Manual*, First Edition, June 2017 (Editorial Revision, November 2017). This numbering format is different than that used in API 13A 19th Edition. In this document the decimal mark is a period and separates the whole part from the fractional part of a number. No spaces are used in the numbering format. The thousands separator is a comma and is only used for numbers greater than 10,000 (i.e. 5000 items, 12,500 bags).

Drilling Fluids Materials

1 Scope

This specification covers physical properties and test procedures for materials manufactured for use in oil- and gas-well drilling fluids. The materials covered are barite; hematite; bentonite; non-treated bentonite; OCMA-grade bentonite; attapulgite; sepiolite; technical grade, low-viscosity carboxymethyl cellulose (CMC-LVT); technical grade, high-viscosity carboxymethyl cellulose (CMC-HVT); starch; low-viscosity polyanionic cellulose (PAC-LV); high-viscosity polyanionic cellulose (PAC-HV); and drilling-grade xanthan gum. This specification is intended for the use of manufacturers, distributors, and end users of named products. Annex A (informative) on the API Monogram Program is now purposely blank; refer to Annex A of API Specification Q1.

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

ASTM D422-63 [1], *Standard Test Method for Particle-size Analysis of Soils*

ASTM E11, *Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves*

ASTM E77, *Standard Test Method for Inspection and Verification of Thermometers*

ASTM E161, *Standard Specification for Electroformed Material and Test Sieves*

ASTM E617, *Standard Specification for Laboratory Weights and Precision Mass Standards*

ISO 386 [2], *Liquid-in glass laboratory thermometers–Principles of design, construction and use*

NIST National Bureau of Standards Monograph 150 [3], *Liquid-In-Glass Thermometry*

3 Terms, Definitions, Symbols, and Abbreviations

3.1 Terms and Definitions

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

3.1.1
ACS reagent grade
Chemicals that meet purity standards as specified by the ACS [4].

3.1.2
flash side
Side containing residue (“flash”) from stamping, or the side with concave indentation.

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1 ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, www.astm.org.
2 International Organization for Standardization, Chemin de Blandonnet, 8, CP401, 1214 Vernier Geneve, Switzerland, www.iso.org.
3 National Institute of Standards and Technology, 100 Bureau Drive, Stop 3460, Gaithersburg, MD 20899, www.nist.gov.
4 American Chemical Society, 1155 Sixteenth Street NW, Washington, DC 20036, www.acs.org.