Cements and Materials for Well Cementing

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Contents

Page

1 Scope . . . 1
1.1 General . . . 1
1.2 Application of the API Monogram . . . 1
1.3 Use of Metric SI and US Customary Units . . . 1

2 Normative References . . . 1

3 Terms, Definitions, Acronyms, and Abbreviations . . . 2
3.1 Terms and Definitions . . . 2
3.2 Acronyms and Abbreviations . . . 3

4 Requirements . . . 4
4.1 Specification, Chemical, and Physical Requirements . . . 4
4.2 Sampling Frequency, Timing of Tests, and Equipment . . . 9

5 Sampling Procedure . . . 10

6 Fineness Tests . . . 10
6.1 Procedure . . . 10
6.2 Requirements . . . 10

7 Preparation of Slurry for Free-fluid, Compressive Strength and Thickening-time Tests . . . 11
7.1 Apparatus . . . 11
7.2 Procedure . . . 12

8 Free-fluid Test (free-water) . . . 13
8.1 Apparatus . . . 13
8.2 Calibration . . . 18
8.3 Procedure . . . 19
8.4 Calculation of Percent Free-Fluid . . . 19
8.5 Acceptance Requirements . . . 20

9 Compressive Strength Tests . . . 20
9.1 Apparatus . . . 20
9.2 Procedure . . . 22
9.3 Test Procedure . . . 24
9.4 Compressive Strength Acceptance Criteria . . . 24

10 Thickening-time Tests . . . 25
10.1 Apparatus . . . 25
10.2 Calibration . . . 31
10.3 Procedure . . . 34
10.4 Thickening-time and Consistency . . . 37
10.5 Specification Acceptance Requirements . . . 37

11 Marking . . . 38

12 Packing . . . 38

13 Bentonite . . . 39

Contents

Page

Annex A (informative) API Monogram Program—Use of the API Monogram by Licensees 40

Annex B (normative) Composite Well Cements 44

Annex C (normative) Calibration and Verification of Well Cement Testing Equipment 49

Annex D (informative) Calibration Procedures for Thermocouples, Temperature-measuring Systems, and Controllers 64

Bibliography 66

Figures

1 Example of a Typical Cement-Mixing Device 12
2 Common Blade Assembly 12
3 Container Assembly for an Atmospheric Pressure Consistometer 14
4 Typical Lid and Mechanism for an Atmospheric Pressure Consistometer 15
5 Slurry Container for an Atmospheric Pressure Consistometer 16
6 Paddle for an Atmospheric Pressure Consistometer 17
7 Typical Conical 500-mL Flask for Free-fluid Measurement 18
8 Typical Gear Drive Consistometer for Pressurized Specification Thickening-time Test 26
9 Typical Magnetic Drive Consistometer for Pressurized Specification Thickening-time Test 27
10 Slurry Container Assembly for a Pressurized Consistometer 28
11 Slurry Container Assembly for a High-temperature Pressurized Consistometer 29
12 Paddle for a Pressurized Slurry Container 30
13 Paddle Shaft for a Pressurized Slurry Container 31
14 Typical Potentiometer Mechanism for a Pressurized Consistometer 33
C.1 Worn Blade Compared to a New One 56
C.2 Common Calibrating Device for Pressurized Consistometer Potentiometer 60

Tables

1 Chemical Requirements 6
2 Summary of Physical and Performance Requirements 8
3 Specification Test Equipment for Well-Cement Manufacturers 10
4 Slurry Requirement 13
5 Dimensions for a 500-mL Conical Flask without Caps or Stoppers 18
6 Dimensions for 50-mm and 2-in. Cube-molds in Use 20
7 Specification Schedules for Pressurized Curing of Class D Cement Specimens 23
8 Compressive Strength Specification Requirements 25
9 Schedule 4: Specification Thickening-time Test for Classes A, B, C, and D Cement 36
10 Schedule 5: Specification Thickening-time Test for Classes G and H Cement 36
11 Schedule 6: Specification Thickening-time Test for Class D Cement 37
12 Thickening-time Acceptance Requirement 38
B.1 Physical and Performance Requirements for Composite Well Cements 48
C.1 Equipment Calibration Requirements 50
C.2 Verification and Calibration of Well Cement Testing Equipment 51
C.3 Permissible Variation in Mass of Reference Weights 55
C.4 Slurry Consistency vs Equivalent Torque (for Potentiometer with Radius of 52 mm ±1 mm) 61
C.5 Density of Distilled Water as a Function of Temperature 62

Introduction

It is necessary that users of this specification be aware that further or differing requirements can be required for individual applications. This specification is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This can be particularly applicable where there is innovative or developing technology. Where an alternative is offered, it is the responsibility of the vendor to identify any variations from this specification and provide details.

In this specification, where practical, US Customary (USC) units are included in brackets for information. The units do not necessarily represent a direct conversion of SI to USC units, or USC to SI units. Consideration has been given to the precision of the instrument making the measurement. For example, thermometers are typically marked in 1° increments, thus temperature values have been rounded to the nearest degree.

In this specification, 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 or both. A result is valid if it is both accurate and precise.

Cements and Materials for Well Cementing

1 Scope

1.1 General

This document specifies requirements and gives recommendations for six classes of well cements, and two classes of composite well cements including their chemical and physical requirements, and procedures for physical testing.

This specification is applicable to well cement classes A, B, C, and D, which are the products obtained by grinding Portland cement clinker and, if needed, calcium sulfate ($CaSO_4$) as an interground additive. Processing additives can be used in the manufacture of cement of these classes. Suitable set-modifying agents can be interground or blended during the manufacture of Class D cement. Annex B describes composite well cement classes K and L, which are the products obtained by intergrinding Portland cement clinker and one or more forms of $CaSO_4$ with composite constituents, or by subsequent blending of separately produced Portland cement with separately processed composite constituents. Composite constituents are also specified in Annex B.

This specification is also applicable to well cement classes G and H, which are the products obtained by grinding clinker with no additives other than one or more forms of $CaSO_4$, water, or chemical additives as required for chromium (VI) reduction.

1.2 Application of the API Monogram

When product is manufactured at a facility licensed by API and is intended to be supplied bearing the API Monogram, the requirements of Annex A shall apply.

1.3 Use of Metric SI and US Customary Units

This document contains metric SI and US customary oilfield units. For the purposes of this document, the conversion between the systems is not exact and has been intentionally rounded to allow for ease of use in calibration and measurement.

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 applies (including any addenda/errata). However, not all documents listed may apply to your specific needs. The body of the standard should be referred to for how these documents are specifically applied.

API Specification 13A, *Specification for Drilling Fluid Materials*

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

ASTM C114, *Standard Test Methods for Chemical Analysis of Hydraulic Cement*

ASTM C115, *Standard Test Method for Fineness of Portland Cement by the Turbidimeter*

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[1] ASTM International, 100 Barr Harbor Drive, West Conshohoken, PA 19428-2959, www.astm.org.