Testing Water-based Drilling Fluids

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Contents

Page

1 Scope ... 1

2 Normative References ... 2

3 Terms, Definitions, Abbreviations, and Symbols ... 2
3.1 Terms and Definitions ... 2
3.2 Abbreviations ... 3
3.3 Symbols ... 4

4 Determination of Drilling Fluid Density (Mud Weight) ... 8
4.1 Principle ... 8
4.2 Apparatus ... 8
4.3 Drilling Fluid Density (Mud Weight)—Ambient-pressure Mud Balance Method ... 9
4.4 Calculation ... 9

5 Determination of Drilling Fluid Density—Pressurized Balance Method ... 11
5.1 Principle ... 11
5.2 Apparatus ... 12
5.3 Pressurized Mud Balance Procedure ... 12
5.4 Calculation ... 13

6 Drilling Fluid Viscosity and Gel Strength ... 13
6.1 Principle ... 13
6.2 Determination of Funnel Viscosity Using the Marsh Funnel ... 14
6.3 Determination of Viscosity and Gel Strengths using a Direct-indicating Viscometer ... 14

7 Static Filtration ... 18
7.1 Principle ... 18
7.2 Low-temperature, Low-pressure Filtrate Test ... 18
7.3 High-temperature, High-pressure Filtration Test Up to 175 °C (350 °F) ... 20
7.4 HTHP Static Filtration Test above 175 °C (350 °F) Up to and Including 230 °C (450 °F) ... 23

8 Retort Test for Water, Oil (NAF), and Solids Concentrations ... 27
8.1 Principle ... 27
8.2 Apparatus ... 27
8.3 Procedure—Volumetric Method ... 29
8.4 Calculation—Volumetric Method ... 30
8.5 Procedure—Gravimetric Method ... 34
8.6 Gravimetric Method Calculation-mass Balance ... 35
8.7 Gravimetric Method Calculation—Volume Fractions of Water, Oil (NAF), and Solids ... 36

9 Sand Content ... 38
9.1 Principle ... 38
9.2 Apparatus ... 38
9.3 Procedure ... 38
9.4 Reporting ... 39

10 Methylene Blue Capacity of Drilling Fluid ... 39
10.1 Principle ... 39
10.2 Reagents and Apparatus ... 39
10.3 Procedure ... 40

Contents

Page

10.4 Calculation 42

11 pH 42
11.1 Principle 42
11.2 Reagents and Apparatus 43
11.3 Procedure for pH Measurement 44
11.4 Care of Electrode 45

12 Alkalinity and Lime Content 46
12.1 Principle 46
12.2 Reagents and Apparatus 46
12.3 Procedure—Phenolphthalein and Methyl Orange Filtrate Alkalinities 47
12.4 Procedure—Phenolphthalein Drilling Fluid (Whole Mud) Alkalinity 47
12.5 Calculation of Ion Concentrations from P_f and M_f 47
12.6 Estimation of Lime Content 48

13 Chloride Ion Content 48
13.1 Principle 48
13.2 Reagents and Apparatus 48
13.3 Procedure 49
13.4 Calculation 49

14 Total Hardness as Calcium 50
14.1 Principle 50
14.2 Reagents and Apparatus 50
14.3 Reagent Quality Control (QC) 51
14.4 Procedure 51
14.5 Calculation 52

15 HTHP Static Filtration Using the Permeability Plugging Apparatus (PPA) 52
15.1 Principle 52
15.2 Safety Considerations 53
15.3 Apparatus—Permeability Plugging Apparatus 55
15.4 Procedure for HTHP Filtration Test using the PPA 58
15.5 PPA Test Report 64

Annex A (normative) Additional Chemical Analysis of Water-based Drilling Fluids 66

Annex B (informative) Potassium Testing 80

Annex C (normative) Measurement of Shear Strength Using Shearometer Tube 88

Annex D (informative) Resistivity 90

Annex E (informative) Removal of Air or Gas Prior to Testing 93

Annex F (normative) Drill Pipe Corrosion Ring Coupon 94

Annex G (informative) Sampling, Inspection, and Rejection of Drilling Materials 98

Annex H (informative) Rig-site Sampling 100

Contents

Page

Annex I (normative) Calibration and Verification of Glassware, Thermometers, Timers, Viscometers, Retort Cup, and Drilling Fluid Balances 103

Annex J (normative) Testing of Weight-material Sag 110

Annex K (informative) Solids Calculations 121

Annex L (informative) Abbreviated Chemical Titrations for Water-based Drilling Fluids 125

Annex M (informative) Example Water-based Drilling Fluid Daily Report 130

Bibliography 132

Figures

1 Spot Tests Example for Endpoint of Methylene Blue Test (MBT) 41
2 Typical Permeability Plugging Apparatus 57
A.1 Garrett Gas Train and Apparatus for Sulfide Testing 72
A.2 Garrett Gas Train and Apparatus for Carbonate Testing 76
B.1 Example of Calibration Curve for Potassium Chloride 82
H.1 Side-stream Sampling Device 101
H.2 Sample Scoop 102
J.1 Key Equipment for VSST Method 111
J.2 Published “Sag Window” for Drilling Fluids Versus Shear Rate 117
J.3 Example Profiled Rotor and Bob 117
J.4 Wall Slip Example from Smooth and Profiled Rotor and Bob 118
L.1a Abbreviated Chemical Titrations for Water-based Drilling Fluids: Alkalinity and Chloride Tests 126
L.1b Abbreviated Chemical Titrations for Water-based Drilling Fluids: Total Hardness and MBT Tests 127
L.2a Abbreviated Chemical Titrations for Calcium and Magnesium in Water-based Drilling Fluids 128
L.2b Abbreviated Chemical Titrations for Calcium Sulfate in Water-based Drilling Fluids 129

Tables

1 Conversion of Density Units 10
2 Density Equivalents 11
3 Recommended Minimum Backpressure 21
4 Specifications of Retort Liquid Receivers 28
5 Concentrations of Hydroxyl, Carbonate and Bicarbonate Ions 48
6 Ceramic Discs, API Designation and Mean Pore Throat Diameter 58
7 Recommended Minimum Cell Heat-up Pressure and Backpressure 62
A.1 Dräger Tube (or Equivalent) Identification, Sample Volume, and Tube Factors for Various Sulfide Ranges 75
A.2 Dräger Tube (or Equivalent) Identification, Sample Volumes, and Tube Factors for Various Carbonate Ranges 78
B.1 Filtrate Volumes to be Used at Various KCl Concentrations 83
B.2 Filtrate Volumes to Be Used at Various KCl Concentrations 86

Contents

Page

I.1 Density of Water as a Function of Temperature 105
J.1 Dynamic Sag Window Data Table 116
J.2 Air Bearing Rheometer Dynamic Sag Window Data Table 120
K.1 Physical and Chemical Properties of Examples of Water-based Drilling Fluids 121

Introduction

This standard is based on API Recommended Practice 13B-1, *Field Testing Water-based Drilling Fluids*, Fifth Edition, May 2019.

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. The result is valid if it is both accurate and precise.

This document uses a format for numbers which follows the examples given in the API Document Format and Style Manual. 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).

Testing Water-based Drilling Fluids

1 Scope

This recommended practice provides standard procedures for determining the following characteristics of water-based drilling fluids:

a) drilling fluid density (mud weight);

b) viscosity and gel strength;

c) static filtration;

d) water, oil, and solids contents;

e) sand content;

f) methylene blue capacity;

g) pH;

h) alkalinity and lime content;

i) chloride content;

j) total hardness as calcium;

k) low-gravity solids and weighting material concentrations;

l) static filtration at high-temperature and high-pressure through permeability plugging testing.

Annexes provide additional test methods and information for water-based drilling fluids:

— chemical analysis for calcium, magnesium, calcium sulfate, sulfide, and carbonate (Annex A)

— chemical analysis of potassium (Annex B);

— determination of shear strength (Annex C);

— determination of resistivity (Annex D);

— removal of air or gas before testing (Annex E);

— drill-pipe corrosion monitoring (Annex F);

— sampling, inspection, and rejection (Annex G);

— rig-site sampling (Annex H);

— calibration and verification of glassware, thermometers, timers, viscometers, retort cup, and drilling fluid balances (Annex I);

— weight-material dynamic sag testing (Annex J);

— examples of solids calculations (Annex K);