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Petroleum and natural industries — Drilling fluids — Laboratory testing



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AS ISO 10416:2022

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Petroleum and natural industries — Drilling fluids — Laboratory testing

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Preface

This Standard was prepared by the Standards Australia Committee ME-092, Materials, equipment, structures and related services for petroleum, petrochemical and natural gas industries.

The objective of this document is to provide procedures for the laboratory testing of both drilling-fluid materials and drilling-fluid physical, chemical and performance properties. It is applicable to both water-based and oil-based drilling fluids, as well as the base or “make-up” fluid.

This document is not applicable as a detailed manual on drilling fluid control procedures. Recommendations regarding agitation and testing temperature are presented because the agitation history and temperature have a profound effect on drilling fluid properties.

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Contents

Preface	ii
Foreword	ix
Introduction	x
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviations	2
5 Barite	5
5.1 Principle	5
5.2 Reagents and apparatus	6
5.3 Sampling	7
5.4 Calculation of moisture content	7
5.5 Sieve analysis	7
5.6 Sedimentation analysis	8
6 Barite performance	12
6.1 Principle	12
6.2 Reagents and apparatus	13
6.2.1 Reagents	13
6.2.2 Apparatus	13
6.3 Base drilling fluid preparation	14
6.4 Rheology test	15
6.5 Calculation	15
7 Abrasiveness of weighting materials	16
7.1 Principle	16
7.2 Reagents and apparatus	16
7.3 Determination of abrasion	17
8 Mercury in drilling fluid barite	18
8.1 Principle	18
8.2 Reagents and apparatus	19
8.3 Preparation of standards	21
8.4 Sample digestion	21
8.5 Check for recovery of Hg during digestion	21
8.6 Analysis of standards and samples	22
8.7 Calculation	22
9 Cadmium and lead in drilling fluid barite	23
9.1 Principle	23
9.2 Reagents and apparatus	23
9.3 Preparation of combined cadmium and lead standards	24
9.4 Sample digestion	24
9.5 Analysis of standards and samples	25
9.6 Calculation	25
10 Arsenic in drilling fluid barite	26
10.1 Principle	26
10.2 Reagents and apparatus	26
10.3 Preparation of standards	28
10.4 Sample digestion	28
10.5 Analysis of standards and samples	28
10.6 Calculation	29
11 Bridging materials for regaining circulation	29

11.1	Principle	29
11.2	Apparatus	29
11.3	Preparation of test drilling fluid	30
11.4	Static slot test	30
11.5	Dynamic slot test	31
11.6	Static marble bed test	31
11.7	Dynamic marble bed test	31
11.8	Static ball bearings (BB shot) bed test	32
11.9	Dynamic ball bearings (BB shot) bed test	32
12	Filtration-control agents	32
12.1	Principle	32
12.2	Reagents and apparatus	32
12.2.1	Reagents	32
12.2.2	Apparatus	33
12.3	General instructions for preparation of base drilling fluids	34
12.4	Salt-saturated drilling fluid	35
12.5	High-hardness, salt-saturated drilling fluid	35
12.6	10 % potassium chloride (KCl) drilling fluid	36
12.7	Pre-hydrated bentonite slurry	36
12.8	Modified seawater drilling fluid	37
12.9	Low-salinity drilling fluid	37
12.10	Lime-treated drilling fluid	38
12.11	Low solids, non-dispersed drilling fluid	38
12.12	Freshwater lignosulfonate drilling fluid	39
12.13	Initial performance test	39
12.14	Performance after heat ageing	40
13	Methylene blue test for drilled solids and commercial bentonite	40
13.1	Methylene blue capacity of drill solids	40
13.1.1	Principle	40
13.1.2	Reagents and apparatus	41
13.1.3	Procedure	41
13.2	Methylene blue capacity of commercial bentonite	44
13.2.1	Principle	44
13.2.2	Reagents and apparatus	44
13.2.3	Procedure	44
13.3	Solids content	45
13.3.1	Principle	45
13.3.2	Calculation	45
14	Deflocculation test for thinner evaluation	46
14.1	Principle	46
14.2	Reagents and apparatus	47
14.3	Procedure for moisture content	48
14.4	Calculation of moisture content	48
14.5	Preparation of drilling fluid base	49
14.6	Calculation	49
14.7	Determination of rheological properties	50
14.8	Calculation of thinner efficiency	51
15	Testing base oils used in drilling fluids	51
15.1	General	51
15.2	Reagents and apparatus	52
15.3	Density, relative density (specific gravity), or API gravity-hydrometer method (see ISO 3675)	52
15.3.1	Principle	52
15.3.2	Summary of the method	52
15.4	Density and relative density of liquids using a digital density meter (see ASTM D 4052)	52

15.4.1	Principle	52
15.4.2	Summary of method	52
15.5	Kinematic viscosity of transparent and opaque oils — Calibrated capillary tube method (see ISO 3104)	52
15.5.1	Principle	52
15.5.2	Summary of method	53
15.6	Distillation (see ISO 3405)	53
15.6.1	Principle	53
15.6.2	Summary of method	53
15.7	Aniline point and mixed aniline point (see ISO 2977:1997)	54
15.7.1	Principle	53
15.7.2	Summary of methods	54
15.8	Pour point (see ISO 3016)	54
15.8.1	Principle	54
15.8.2	Summary of method	54
15.9	Flash point by Pensky-Martens closed tester (see ISO 2719)	54
15.9.1	Principle	54
15.9.2	Summary of method	54
15.10	Aromatics content (see IP 391 or ASTM D 5186)	54
15.10.1	Principle	54
15.10.2	Summary of the IP 391 method	55
15.10.3	Summary of the ASTM D 5186 method	55
16	Potassium ion content — Ion-selective electrode method	55
16.1	Principle	55
16.2	Reagents and apparatus	56
16.3	Preparation of electrodes	57
16.4	Operational check of electrode system	57
16.5	Measurements using a meter with direct concentration readout capability	58
16.6	Measurements with instruments that provide either a digital or an analogue readout in millivolts	58
17	Calcium ion content — Ion-selective electrode method	59
17.1	Principle	59
17.2	Reagents and apparatus	59
17.3	Preparation of electrodes	60
17.4	Operational check of electrode system	61
17.5	Measurements using a meter with direct concentration readout capability	61
17.6	Measurements with instruments that provide either a digital or an analogue readout in millivolts	62
18	Sodium ion content — Ion-selective electrode method	63
18.1	Principle	63
18.2	Reagents and apparatus	63
18.3	Preparation and operational check of the electrode system	64
18.4	Measurements using a meter with a direct concentration-readout capability	65
18.5	Measurements using a meter with readout in millivolts	65
19	Density of solids — Stereopycnometer method	66
19.1	Principle	66
19.2	Apparatus	66
19.3	Procedure — Stereopycnometer method	66
19.4	Calculation — Stereopycnometer method	67
20	Density of solids — Air comparison pycnometer method	68
20.1	Principle	68
20.2	Apparatus	68
20.3	Procedure — Air comparison pycnometer method	68
20.4	Calculation — Air comparison pycnometer method	69
21	Ageing of water-based drilling fluids	69

21.1	Principle.....	69
21.2	Practices common to preparation, handling and testing over all temperature ranges.....	69
21.2.1	Water-based drilling fluids and components.....	69
21.2.2	Mixing, blending and/or shearing devices.....	69
21.2.3	Property ranges of drilling fluids or base fluids, emphasizing pH values.....	70
21.2.4	Drilling fluid sample storage, disposal and test methods.....	70
21.3	Drilling fluid sample preparation and ageing at ambient temperature.....	71
21.3.1	Sample preparation.....	71
21.3.2	Apparatus.....	71
21.3.3	Procedure for ageing at ambient temperatures.....	71
21.4	Drilling fluid ageing at moderate temperatures [ambient to 65 °C (150 °F)].....	72
21.4.1	Sample preparation.....	72
21.4.2	Apparatus.....	72
21.4.3	Procedure for ageing at moderate temperatures.....	72
21.4.4	Maintaining fluid properties at moderate temperatures.....	72
21.4.5	Storage and testing of samples aged at moderate temperature.....	73
21.5	Drilling fluid ageing at substantially elevated temperatures [over 65 °C (150 °F)].....	73
21.5.1	Sample preparation.....	73
21.5.2	Apparatus.....	73
21.5.3	Characteristics of metal ageing cells.....	73
21.5.4	Additional safety considerations for metal ageing cells.....	74
21.5.5	Maintenance of metal ageing cells.....	74
21.5.6	Procedure for ageing at elevated temperatures.....	75
21.6	Inertness and chemical compatibility in high-temperature ageing cells.....	75
21.6.1	Chemical compatibility of materials with metal ageing cells.....	75
21.6.2	Inertness of metal ageing cells to chemicals.....	76
21.6.3	Use of lining materials in metal ageing cells.....	76
21.6.4	Considerations regarding metal plating to enhance contamination resistance of ageing cells.....	76
21.6.5	Contrast between drilling fluid material performance in inert and real work environments.....	76
21.7	Obtaining supplies and services for the ageing of drilling fluid samples.....	77
21.7.1	Apparatus suppliers.....	77
21.7.2	Metallurgical consultants.....	77
21.7.3	Pressure-vessel consultants.....	77
22	Ageing of oil-based drilling fluids.....	77
22.1	Principle.....	77
22.2	Apparatus.....	78
22.3	Practices common to preparation, handling and testing over all temperature ranges.....	79
22.3.1	Oil-based drilling fluids and their components.....	79
22.3.2	Mixing/blending/shearing devices.....	80
22.3.3	Property ranges of oil-based drilling fluids or their base fluids.....	80
22.3.4	Sample storage and disposal.....	80
22.4	Drilling fluid ageing at ambient temperatures.....	80
22.4.1	Containers for preparation and storage.....	80
22.4.2	Procedure for ageing at ambient temperatures.....	80
22.4.3	Storage.....	81
22.5	Drilling fluid ageing at moderate temperatures [ambient to 65 °C (150 °F)].....	81
22.5.1	Sample preparation.....	81
22.5.2	Procedure for ageing at moderate temperatures.....	81
22.5.3	Maintaining fluid properties at moderate temperatures.....	81
22.5.4	Storage and testing of samples aged at moderate temperatures.....	82
22.6	Drilling fluid ageing at substantially elevated temperatures [over 65 °C (150 °F)].....	82
22.6.1	Sample preparation.....	82
22.6.2	Choice of ageing cell and temperature.....	82
22.6.3	Procedure for ageing at elevated temperatures.....	83
22.6.4	Safety considerations for metal ageing cells.....	83
22.7	Inertness and chemical compatibility in high-temperature ageing cells.....	84

22.7.1	Chemical compatibility of materials with metal ageing cells	84
22.7.2	Inertness of metal ageing cells to chemicals	84
22.7.3	Considerations regarding metal plating to enhance contamination resistance of ageing cells	84
22.7.4	Contrast between drilling fluid material performance in inert and real work environments	84
22.8	Obtaining supplies and services for the ageing of drilling fluid samples	84
22.8.1	Apparatus suppliers	84
22.8.2	Metallurgical consultants	84
22.8.3	Pressure-vessel consultants	84
23	Shale-particle disintegration test by hot rolling	85
23.1	Principle	85
23.2	Reagents and apparatus	86
23.3	Procedure	86
23.4	Calculation	87
24	Drilling fluid materials — High-viscosity polyanionic cellulose (PAC-HV) (regular)	88
24.1	Principle	88
24.2	Determination of moisture content	88
24.2.1	Apparatus	88
24.2.2	Procedure	88
24.2.3	Calculation of PAC-HV moisture content	89
24.3	Procedures with test fluid containing PAC-HV	89
24.3.1	Reagents and apparatus	89
24.3.2	Measurement of test fluid filtrate volume	90
24.3.3	Calculation of corrected test fluid filtrate volume	91
24.3.4	Measurement of test fluid viscosity	91
24.3.5	Calculation of test-fluid apparent viscosity	92
25	Drilling fluid materials — Low-viscosity polyanionic cellulose (PAC-LV)	92
25.1	Principle	92
25.2	Determination of moisture content	92
25.2.1	Apparatus	92
25.2.2	Procedure	92
25.2.3	Calculation of moisture content	93
25.3	Procedures with test fluid containing PAC-LV	93
25.3.1	Reagent and apparatus	93
25.3.2	Measurement of test-fluid filtrate volume	94
25.3.3	Calculation of corrected test-fluid filtrate volume	95
25.3.4	Measurement of test-fluid viscosity	95
25.3.5	Calculation of test-fluid apparent viscosity	96
26	Preparation and evaluation of invert-emulsion drilling fluids	96
26.1	Principle	96
26.2	Reagents and apparatus	96
26.3	Mixing of the initial drilling fluid	98
26.4	Testing the properties of the initial drilling fluid	99
26.5	Preparation of the sample contaminated by seawater	99
26.6	Preparation of the sample contaminated by base evaluation clay	99
26.7	Preparation of the sample contaminated by mixed-salt brine	99
26.8	Procedure for hot-rolling	100
26.9	Procedure for static ageing	100
26.10	Procedure for testing after heat ageing	100
27	High-temperature/high-pressure filtration testing of drilling fluids using the permeability plugging apparatus and cells with set-screw-secured end caps	101
27.1	Principle	101
27.2	Safety considerations	101
27.3	Apparatus — Permeability-plugging apparatus (PPA) with set-screw-secured end caps	103

27.4	Procedure for high-temperature/high-pressure (HTHP) filtration.....	105
27.4.1	Preheating the heating jacket.....	105
27.4.2	Loading the filtration cell.....	105
27.4.3	Pressurizing the cell.....	107
27.4.4	Conducting the filtration test.....	108
27.5	Test conclusion and disassembly.....	109
27.6	Data reporting.....	110
27.6.1	Filtrate reporting.....	110
27.6.2	Spurt loss.....	110
27.6.3	Calculation.....	110
27.6.4	Filter cake reporting.....	111
28	High-temperature/high-pressure filtration testing of drilling fluids using the permeability-plugging apparatus and cells with threaded end caps.....	111
28.1	Principle.....	111
28.2	Safety considerations.....	111
28.3	Apparatus — Permeability-plugging apparatus (PPA) with threaded end caps.....	113
28.4	Procedure for high-temperature/high-pressure (HTHP) filtration.....	116
28.4.1	Preheating the heating jacket.....	116
28.4.2	Loading the filtration cell.....	116
28.4.3	Pressurizing the cell.....	117
28.4.4	Conducting the filtration test.....	118
28.5	Test conclusion and disassembly.....	119
28.6	Data reporting.....	120
28.6.1	Filtrate reporting.....	120
28.6.2	Spurt loss.....	120
28.6.3	Calculation.....	120
28.6.4	Filter cake reporting.....	121
	Bibliography.....	122

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10416 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 3, *Drilling and completion fluids, and well cements*.

This second edition cancels and replaces the first edition (ISO 10416:2002), which has been technically revised.

Introduction

This International Standard, which establishes testing methodologies for drilling fluid materials, is based on API RP 13I, seventh edition/ISO 10416:2002 [\[2\]](#). This International Standard was developed in response to a demand for more exacting testing methodologies. The tests contained herein were developed over several years by a group of industry experts and were identified as being those which can yield reproducible and accurate results. The tests are anticipated to be performed in a laboratory setting, but can be applicable in a field situation with more rigorous apparatus and conditions than normally found in a drilling fluid field-test kit.

These tests are designed to assist in the evaluation of certain parameters for drilling fluids, with these properties not necessarily used for the maintenance of a drilling fluid in field use. The tests provide either more precision or different properties than those given in the field-testing standards ISO 10414-1 and ISO 10414-2.

It is necessary that users of this International Standard be aware that further or differing requirements can be needed for individual applications. This International 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 appropriate where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this International Standard and provide details.

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

This International Standard contains footnotes giving examples of apparatus, reagents and sometimes the supplier(s) of those materials that are available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of the products named. Equivalent products may be used if they can be shown to lead to the same results.

Australian Standard®

Petroleum and natural industries — Drilling fluids — Laboratory testing

1 Scope

This International Standard provides procedures for the laboratory testing of both drilling fluid materials and drilling fluid physical, chemical and performance properties. It is applicable to both water-based and oil-based drilling fluids, as well as the base or “make-up” fluid.

It is not applicable as a detailed manual on drilling fluid control procedures. Recommendations regarding agitation and testing temperature are presented because the agitation history and temperature have a profound effect on drilling fluid properties.

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.

ISO 91-1:1992, *Petroleum measurement tables — Part 1: Tables based on reference temperatures of 15 °C and 60 °F*

ISO 2719, *Determination of flash point — Pensky-Martens closed cup method*

ISO 2977:1997, *Petroleum products and hydrocarbon solvents — Determination of aniline point and mixed aniline point*

ISO 3007, *Petroleum products and crude petroleum — Determination of vapour pressure — Reid method*

ISO 3016, *Petroleum products — Determination of pour point*

ISO 3104, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 3405:2000, *Petroleum products — Determination of distillation characteristics at atmospheric pressure*

ISO 3675, *Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 3839, *Petroleum products — Determination of bromine number of distillates and aliphatic olefins — Electrometric method*

ISO 10414-1:2008, *Petroleum and natural gas industries — Field testing of drilling fluids — Part 1: Water-based fluids*

ISO 10414-2:—¹⁾, *Petroleum and natural gas industries — Field testing of drilling fluids — Part 2: Oil-based fluids*

ISO 13500:—²⁾, *Petroleum and natural gas industries — Drilling fluid materials — Specifications and tests*

ASTM D 1141, *Standard Practice for the Preparation of Substitute Ocean Water*

ASTM D 4052, *Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter*

ASTM D 5186, *Standard Test Method for Determination of Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels by Supercritical Fluid Chromatography*

1) To be published. (Revision of ISO 10414-2:2002)

2) To be published. (Revision of ISO 13500:2006)