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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 39533-2020

Preparation and testing of foamed cement slurries at atmospheric pressure

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the redrafting method to amend and adopt ISO 10426-4.2004 "Cement and Material for Cementing in Oil and Gas Industry No. 4

Part. Preparation and test method of foam cement slurry under normal pressure.

Compared with ISO 10426-4.2004, this standard has technical differences, and the clauses related to these differences have been passed on the outer margins.

The vertical single line ( ) of the position is marked.

The technical differences between this standard and ISO 10426-4.2004 and the reasons are as follows.

---Chapter 1 "Scope" has been revised, and the scope of application has been increased. The original international standards are general and not specific enough;

--- Regarding normative reference documents, this standard has made adjustments with technical differences to adapt to my country's technical conditions and adjustments.

The situation is collectively reflected in Chapter 2 "Normative Reference Documents", and the specific adjustments are as follows.

* Replace ISO 10426-2.2003 with GB/T 19139 which is modified to adopt international standards;

---In order to facilitate the calculation of standard users, it is added in "4.1 Calculation of Base Pulp Formulation with and without Surfactant"

The "calculation formula (3) of the density of base pulp containing surfactants";

--- Change the "slurry cup assembly" in "6.2.2 temperature" to check the speed every year, 4000r/min error +/-200r/min, 12000r/min

The error is +/-500r/min. "Moved to 5.2 to make the standard more organized;

--- Amend "Stir the cement slurry for 15s at a speed of 12000r/min" in "7.2 Preparation Method of Foamed Cement Slurry" to "In

Stir the cement slurry at 12000r/min for 15s or 4000r/min for 60s", which can guide the

tester

Flexible preparation of foam cement slurry according to equipment conditions;

--- Modify "1749kg/m3" in "8.4 known gas volume fraction calculation foam cement slurry density" to "1737kg/m3", the original

If the international standard is quoted incorrectly, the "density of base pulp containing surfactant is 1737kg/m3" in "8.1 General" should be adopted;

--- Repair the "Cure in a cylinder with a cover with a diameter of 50.8mm and a height of 101.6mm" in "9.3.2 Stability of Foamed Cement Stone"

Changed to "Cure in a cylinder with a cover with a diameter of 25.4mm and a height of 101.6mm", which is more in line with my country's cement slurry stability test

The habit of

---Modified the formula (11) in "9.3.2 Stability of Foamed Cement Stone", the unit of the original international standard formula was wrong, and "the cement sample

Density rhos" is changed to "relative density drel of cement sample".

This standard has made the following editorial changes.

--- Modify the standard name to "Preparation and Test Method of Foamed Cement Slurry under Normal Pressure";

---Deleted the value of the relevant parameter USC unit in ISO 10426-4.2004, and all adopt the SI unit;

---Delete the USC unit system formula in ISO 10426-4.2004, and all adopt the SI unit system formula;

---Because of the addition of "calculation formula (3) for the density of base pulp containing surfactants", the subsequent formula number has been adjusted;

---References are deleted.

Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying these patents.

This standard was proposed and managed by the National Petroleum and Natural Gas Standardization Technical Committee (SAC/TC355).

This standard was drafted. China Oilfield Services Co., Ltd., China Petroleum & Chemical Corporation Petroleum Engineering Technology Research Institute.

1 Scope

This standard specifies the preparation and test methods of foamed cement slurry and

unfoamed base slurry under normal pressure.

This standard is applicable to the preparation and testing of foamed cement slurry and unfoamed base slurry under normal pressure.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 19139 Oil Well Cement Test Method (GB/T 19139-2012, ISO 10426-2..2003, MOD)

3.1 General

The sampling method of cement or cement mixture, solid admixture, liquid admixture and mixing water should meet the requirements of GB/T 19139.most

The best sampling method should ensure that the sample materials are as consistent as possible on site.

3.2 Method

See GB/T 19139 for sampling methods of liquid and solid materials used in foam cementing operations. When the temperature needs to be measured, the accuracy is +/-2 degrees C

The thermocouple or thermometer measures the temperature of the mixing water, cement or cement mixture, and liquid additives, and records the measured temperature. Temperature measuring device

The setting should be calibrated once a year (for thermocouples), or check accuracy (for thermometers) once a year.

4.1 The formula calculation of the base slurry with and without surfactant

The base slurry containing surfactant is prepared, and other additives are mixed first, and then the surfactant is added. Therefore, it is necessary to calculate the surface activity

The mass fraction of property agent in foamed cement slurry. The mass fraction of surfactant is equal to the mass of surfactant divided by the base slurry and surface activity

The total mass of the agent. (This calculation method assumes that the admixture material does not make the cement slurry system foam)

The mass fraction of surfactant is calculated in formula (1).