

First edition
2006-11-01

Petroleum and natural gas industries — Completion fluids and materials —

Part 2: Measurement of properties of proppants used in hydraulic fracturing and gravel-packing operations

Industries du pétrole et du gaz naturel — Fluides de complétion et matériaux —

Partie 2: Mesurage des propriétés des matériaux de soutènement utilisés dans les opérations de fracturation hydraulique et de remplissage de gravier



Reference number
ISO 13503-2:2006(E)

© ISO 2006

This is a preview of "ISO 13503-2:2006". [Click here to purchase the full version from the ANSI store.](#)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO 13503-2:2006". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword.....	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Abbreviations	1
4 Standard proppant sampling procedure	2
4.1 General	2
4.2 Particle segregation.....	2
4.3 Equipment	2
4.4 Number of required samples — Bulk.....	4
4.5 Sampling —Bulk material	5
4.6 Sampling — Bagged material	5
5 Sample handling and storage.....	5
5.1 Sample reduction.....	5
5.2 Sample splitting	5
5.3 Sample and record retention and storage	5
6 Sieve analysis	6
6.1 Purpose.....	6
6.2 Description	6
6.3 Equipment and materials	6
6.4 Procedure	6
6.5 Calculation of the mean diameter, median diameter and standard deviation.....	7
6.6 Sieve calibration	9
7 Proppant sphericity and roundness	11
7.1 Purpose.....	11
7.2 Description	12
7.3 Apparatus capability.....	12
7.4 Procedure	12
7.5 Alternate method for determining average sphericity and roundness	13
8 Acid solubility	13
8.1 Purpose.....	13
8.2 Description	13
8.3 Equipment and materials	14
8.4 Procedure	14
9 Turbidity test	15
9.1 Purpose.....	15
9.2 Description	16
9.3 Equipment and materials	16
9.4 Equipment calibration	16
9.5 Procedure	16
10 Procedures for determining proppant bulk density, apparent density and absolute density....	17
10.1 Purpose.....	17
10.2 Description	17
10.3 Bulk density.....	17
10.4 Apparent density.....	19
10.5 Absolute density.....	21

This is a preview of "ISO 13503-2:2006". [Click here to purchase the full version from the ANSI store.](#)

11	Proppant crush-resistance test	21
11.1	Purpose	21
11.2	Description.....	21
11.3	Equipment and materials	22
11.4	Sample preparation.....	22
11.5	Crush-resistance procedure	23
12	Loss on ignition of resin-coated proppant.....	25
12.1	Objective	25
12.2	Apparatus and materials	25
12.3	Loss-on-ignition procedure for whole-grain proppant	25
Annex A (informative) Formazin solution preparation.....		27
Bibliography		28

This is a preview of "ISO 13503-2:2006". [Click here to purchase the full version from the ANSI store.](#)

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 13503-2 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*.

ISO 13503 consists of the following parts, under the general title *Petroleum and natural gas industries — Completion fluids and materials*:

- *Part 1: Measurement of viscous properties of completion fluids*
- *Part 2: Measurement of properties of proppants used in hydraulic fracturing and gravel-packing operations*
- *Part 3: Testing of heavy brines*
- *Part 4: Procedure for measuring stimulation and gravel-pack fluid leakoff under static conditions*
- *Part 5: Procedures for measuring the long-term conductivity of proppants*

This is a preview of "ISO 13503-2:2006". [Click here to purchase the full version from the ANSI store.](#)

Introduction

This part of ISO 13503 is a compilation and modification of API RP 56 ^[1], API RP 58 ^[2] and API RP 60 ^[3].

The procedures have been developed to improve the quality of proppants delivered to the well site. They are for use in evaluating certain physical properties used in hydraulic fracturing and gravel-packing operations. These tests should enable users to compare the physical characteristics of various proppants tested under the described conditions and to select materials useful for hydraulic fracturing and gravel-packing operations.

The procedures presented in this part of ISO 13503 are not intended to inhibit the development of new technology, material improvements or improved operational procedures. Qualified engineering analysis and judgment are required for their application to a specific situation.

In this part of ISO 13503, where practical, US Customary (USC) units are included in brackets for information.

Annex A of this part of ISO 13503 is for information only.