SLOVENSKI STANDARD
oSIST prEN ISO 13503-3:2021

01-junij-2021

Industrija za predelavo nafte in zemeljskega plina - Tekočine in materiali za zaključna dela - 3. del: Preskušanje težkih slanic (ISO/DIS 13503-3:2021)

Petroleum and natural gas industries - Completion fluids and materials - Part 3: Testing of heavy brines (ISO/DIS 13503-3:2021)

Erdöl- und Erdgasindustrie - Komplettierungsflüssigkeiten und –materialien - Teil 3: Prüfung von schweren Solen (ISO/DIS 13503-3:2021)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Industries du pétrole et du gaz naturel - Fluides de complétion et matériaux - Partie 3: Essais de saumures denses (ISO/DIS 13503-3:2021)

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42c2b7c623/osist-pren-iso-13503-3-2021

Ta slovenski standard je istoveten z: **prEN ISO 13503-3**

ICS:

75.100	Maziva	Lubricants, industrial oils and related products
75.180.30	Oprema za merjenje prostornine in merjenje	Volumetric equipment and measurements

oSIST prEN ISO 13503-3:2021 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

oSIST prEN ISO 13503-3:2021

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

oSIST prEN ISO 13503-3:2021

DRAFT INTERNATIONAL STANDARD

ISO/DIS 13503-3

ISO/TC **67**/SC **3** Secretariat: **SN**

Voting begins on: **2021-04-14**

Voting terminates on: **2021-07-07**

Petroleum and natural gas industries — Completion fluids and materials —

Part 3: Testing of heavy brines

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

Partie 3: Essais de saumures denses

ICS: 75.100

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 13503-3:2021(E)

© ISO 2021

oSIST prEN ISO 13503-3:2021

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2021 – All rights reserved

oSIST prEN ISO 13503-3:2021

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

© ISO 2021 – All rights reserved

oSIST prEN ISO 13503-3:2021

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This document 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*.

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

This second edition cancels and replaces the first edition (ISO13503-3:2005), which has been technically revised.

This document supplements API RP 13J, 5th edition (2014).

The technical requirements of this part of ISO 13503 and API RP 13J used to be identical. In the meantime, API RP 13J has been technically revised as API RP 13J, 5th edition (2014). The purpose of this revision is to bring this part of ISO 13503 up-to-date, by referencing the current edition of API RP 13J, and including supplementary content.

The main changes compared to the previous edition are as follows:

— The main content of the document is removed to avoid duplication of content in API RP 13J, 5th edition (2014). Only content supplemental to API RP 13J, 5th edition (2014) is now present in this document.

— The method for measuring crystallization temperature in formate brines is described in this document and differs from the method described in API RP 13J, 5th edition (2014) due to the specific nature of formate brines.

— The method for measuring pH in formate brines is described in this document and differs from the method described in API RP 13J, 5th edition (2014), since the API recommended method is unsuitable for formate brines.

A list of all parts in the ISO 13503 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

 © ISO 2021 – All rights reserved

oSIST prEN ISO 13503-3:2021

Introduction

Crystallization temperature is an important property of well construction and intervention fluids used in cold weather conditions and/or under high pressure. API RP 13J, 5th edition (2014) defines the crystallization temperature of a brine as the temperature at which crystals will appear in a brine solution of a given density as it cools. The definition of the crystallization temperature of a brine provided by API RP 13J, 5th edition (2014) is not suitable for formate brines because of prominent supercooling and metastable phase potassium formate crystals that can form at temperatures much lower than crystallization temperature for stable potassium formate crystals. A more suitable definition of crystallization temperature is therefore “the highest temperature at which crystals and liquid can exist in stable equilibrium”.

Formate brines, especially potassium and cesium formate brines and their blends, behave very differently from most other brines due to strong kinetic effects that complicate crystallization temperature measurements. The following factors complicate crystallization temperature measurements in formate brines:

— crystallization temperatures can be very low and can be lower than the cooling capability of the measuring equipment;

— a significant amount of supercooling;

— existence of metastable potassium formate crystals that form in potassium-rich formate brines.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

© ISO 2021 – All rights reserved

oSIST prEN ISO 13503-3:2021

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

oSIST prEN ISO 13503-3:2021

Petroleum and natural gas industries — Completion fluids and materials —

Part 3: Testing of heavy brines

1 Scope

This document covers the physical properties, potential contaminants and test procedures for heavy brine fluids manufactured for use in oil and gas well drilling, completion, and workover fluids.

This document generally refers to API RP 13J, 5th edition (2014) for description of methods for assessing the performance and physical characteristics of heavy brines for use in field operations.

This document supplements API RP 13J, 5th edition (2014), the requirements of which are applicable with the exceptions specified in this document. This document provides more suitable method descriptions for determining the formate brines pH and crystallization temperature at ambient pressure compared to the methods provided by API RP 13J, 5th edition (2014).

This document is intended for the use of manufacturers, service companies and end-users of heavy brines.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

2 Normative references

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7cc25/osist-pren-iso-13503-3-2021

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

API RP 13J, *5th edition (2014), Testing of heavy brines*

3 Terms, definitions, and abbreviations

For the purposes of this document, the terms and definitions given in API RP 13J, 5th edition (2014) and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
crystallization temperature
CT
temperature at which crystals and liquid exists in stable equilibrium

Note 1 to entry: The definition provided by API RP 13 J, 5th edition (2014) is not valid for formate brines

© ISO 2021 – All rights reserved

oSIST prEN ISO 13503-3:2021

4 Supplements to API RP 13J, 5th edition (2014)

4.1 General

The requirements, recommendations and permissions specified in API RP 13J, 5th edition (2014) shall apply, with the exceptions specified in 4.2 to 4.5.

4.2 Method for determining iron content

The requirements specified in API RP 13J, 5th edition (2014), Clause 11 apply with the following exception.

The method for determining iron content shall not be used on formate brines.

4.3 Method for determining buffering capacity

The requirements specified in API RP 13J, 5th edition (2014), Clause 13 apply with the following exception.

The method for determining buffer capacity shall not be used on formate brines.

4.4 Method for determining CT

4.4.1 General

iTeh STANDARD PREVIEW
(standards.iteh.ai)

The requirements specified in API RP 13J, 5th edition (2014), Clause 7 apply with the following exception.

The method for determining CT of formate brines shall be in accordance with 4.4.2 to 4.4.6.

oSIST prEN ISO 13503-3:2021
https://standards.iteh.ai/catalog/standards/sist/3eac771e-dda5-48cd-9dc7-1b42a3b7c623/osist-pren-iso-13503-3-2021

4.4.2 Application and procedure

The CT can be measured in all formate single-salt and blended brines:

— sodium formate brine;

— potassium formate brine;

— cesium formate brine;

— sodium/potassium formate brine blends;

— potassium/cesium formate brine blends.

The overall procedural steps for measurement of CT of formate brines are:

a) prepare seeding material (see 4.4.3);

b) select seeding material (see 4.4.4);

c) determine approximate CT (see 4.4.5);

d) determine accurate CT (see 4.4.6).

 © ISO 2021 – All rights reserved