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**Petroleum and natural gas industries —  
Completion fluids and materials —**

**Part 4:  
Procedure for measuring stimulation and  
gravel-pack fluid leakoff under static  
conditions**

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

*Partie 4: Mode opératoire pour mesurer la stimulation et la fuite du  
fluide filtrant dans des conditions statiques*



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## 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.

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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 13503-4 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 leak-off under static conditions*
- *Part 5: Procedures for measuring the long-term conductivity of proppants*

## Introduction

The objective of this part of ISO 13503 is to provide a standard procedure for measuring fluid loss under static conditions. This standard procedure was compiled on the basis of several years of comparative testing, debate, discussion and continued research by the industry<sup>1)</sup>.

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

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1) PENNY, G.S. and CONWAY, M.W. Fluid Leakoff, *Recent Advances in Hydraulic Fracturing*, J.L. Gidley, S.A. Holditch, D.E. Nierode and R.W. Veatch Jr. (eds), SPE Monograph 1989.

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# Petroleum and natural gas industries — Completion fluids and materials —

## Part 4:

## Procedure for measuring stimulation and gravel-pack fluid leakoff under static conditions

### 1 Scope

This part of ISO 13503 provides for consistent methodology to measure fluid loss of stimulation and gravel-pack fluid under static conditions. However, the procedure in this part of ISO 13503 excludes fluids that react with porous media.

### 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 2.1

##### **base fluid**

solution media used to prepare completion fluid

#### 2.2

##### **filtrate**

fluid that permeates into the porous medium

#### 2.3

##### **filter cake**

build-up of materials on the face or within the matrix of porous medium due to fluid leakoff

#### 2.4

##### **fluid loss**

fluid loss is a measure of fluid volume that leaks into a porous medium over time

#### 2.5

##### **gravel-pack fluids**

fluids used to place filtration media to control formation sand production from oil and gas wells

#### 2.6

##### **leakoff**

entry of fluid into a porous media

#### 2.7

##### **pH**

negative of the logarithm (base 10) of the hydrogen ion concentration

#### 2.8

##### **spurt time**

time between the initial entry of fluid into porous medium and the onset of square-root-of-time leakoff behaviour