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

**Part 6:
Procedure for measuring leakoff of
completion fluids under dynamic
conditions**

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

*Partie 6: Mode opératoire pour le mesurage de la perte de fluide par
filtration en conditions dynamiques des fluides de complétion*





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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.

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 13503-6 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*
- *Part 6: Procedure for measuring leakoff of completion fluids under dynamic conditions*

Introduction

The objective of this part of ISO 13503 is to provide a procedure for measuring fluid loss (leakoff) under dynamic conditions. This procedure was compiled on the basis of several years of comparative testing, debate, discussion and continued research by the industry.

Dynamic fluid loss testing consists of a simulation of the circulation process where completion fluid loss occurs at a core face with appropriate shear conditions. Under dynamic conditions, the filter cake deposition and fluid loss behaviour are different to those of fluid loss under static conditions.

Laboratory leakoff tests have shown that there is a dynamic effect for low-permeability formations, i.e. $< 1,0$ mD. This is due to the fact that the filter cake develops at the core surface and the shear effect controls the thickness. However, for high-permeability formations, i.e. > 50 mD, the dynamic effect is relatively small because the fluid system that penetrates the fracture face forms minimum filter cake.

The determination of the fluid loss coefficients is simply a quadratic regression of the data, with time and square root of time as variables.

In this part of ISO 13503, where practical, US Customary (USC) units are included in parentheses for information. The units do not necessarily represent a direct conversion of SI to USC units, or vice versa. Consideration has been given to the precision of the instrument making the measurement.

Petroleum and natural gas industries — Completion fluids and materials —

Part 6: Procedure for measuring leakoff of completion fluids under dynamic conditions

1 Scope

This part of ISO 13503 provides consistent methodology for measuring the fluid loss of completion fluids under dynamic conditions. This part of ISO 13503 is applicable to all completion fluids except those that react with porous media.

2 Terms and definitions

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

2.1

backpressure

constant pressure maintained at the leakoff port

2.2

cell

tool that contains the core and maintains test conditions such as test temperature and confining pressure

NOTE Cell orientation is defined according to whether the long axes of the core are horizontal or vertical.

2.3

filter cake

build-up of materials on core face or within the porous medium

2.4

filtrate

fluid exiting the core

2.5

fluid inlet

point at which fluid enters the gap

2.6

fluid loss

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

2.7

gap

linear distance from the core face to the wall opposite the core face

2.8

shear-history simulator

apparatus used to simulate shear history in a fluid

[SOURCE: ISO 13503-1:2011, definition 2.10]