International

ISO 13357-1

Petroleum products — Determination of the filterability of lubricating oils —

Part 1: Procedure for oils in the presence of water

Produits pétroliers — Détermination de la filtrabilité des huiles lubrifiantes —

Partie 1: Méthode pour les huiles en présence d'eau

Third edition
2025-03

Reference number
ISO 13357-1:2025(en)

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

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principle **2**
5 Reagents and materials **2**
6 Apparatus **2**
7 Samples and sampling **5**
8 Preparation of apparatus **5**
9 Procedure **5**
10 Calculations **7**
10.1 Stage I filterability 7
10.2 Stage II filterability 7
11 Acceptance and expression of results **8**
11.1 General 8
11.2 Assessment of validity 8
12 Precision **8**
13 Test report **8**
Annex A (informative) **Suitable procedure for the addition of graduations to a measuring cylinder** **9**
Annex B (normative) **Procedure for carrying out the tests using gravimetric techniques** **11**
Bibliography **15**

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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.

This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*.

This third edition cancels and replaces the second edition (ISO 13357-1:2017), which has been technically revised.

The main changes are as follows:

— included the use of gravimetric measurement techniques;

— included the use of alternative membranes when testing higher viscosity oils.

A list of all parts in the ISO 13357 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.

To minimize wear on the components of an oil-lubricated system, it is important to reduce the concentrations of circulating hard contaminant particles. This is particularly important for hydraulic power systems, for systems whose performance and reliability rely on the maintenance of small clearances and orifices, or for systems that include rolling element bearings as components. These contaminants are removed by the use of filters. The ability of an oil to pass through fine filters, without plugging them, is called its filterability. This document describes a laboratory test procedure for assessing the filterability of mineral oils which have been subjected to prolonged hot contact with water. Filterability so determined is not a physical characteristic of the oil, but represents an estimation of its behaviour in service.

This document describes two measurements, referred to as “stages”. The stage I determination is based on a comparison of the mean flow rate of a fluid through a test membrane with its initial flow rate. Oils having good stage I filterability, but a poor stage II performance (see below), are not likely to have performance problems in use, unless extremely fine system filters are utilized.

The stage II determination is based upon the ratio between the initial flow rate of the fluid through the test membrane and the rate at the end of the test. This part of the procedure is a more severe test and is more sensitive to the presence of gels and fine silts in the oil. Silts and gels can be present in an oil when it is produced or can be formed as an oil ages, especially when hot. An oil with good stage II filterability is unlikely to have filtration problems even in extreme conditions and with fine (less than 5 µm) filtration present. It is thus suitable for use in more critical hydraulic and lubrication systems.

This procedure was developed primarily for hydraulic oils having ISO viscosity grades up to 100, and, apart from the filtration apparatus, was designed to be implemented using mainly standard laboratory apparatus. A modified procedure that includes gravimetric measurements rather than volumetric ones is provided in Annex B. Further, the method has been adapted to test oils of higher viscosity grade than 100 using a coarser membrane filter.

This document defines a method for assessing the filterability of oils in the presence of contaminating water. Some oils will exhibit poorer filterability characteristics in these conditions. ISO 13357-2 is used to investigate the filterability of an oil which is used in applications where the presence of water in the oil is unlikely. An oil which has good filterability in the presence of contaminating water does not necessarily have equally good filterability in dry conditions. An oil having good filterability only when wet is not likely to be generally acceptable.