International Standard 4263

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Petroleum products — Inhibited mineral oils — Determination of oxidation characteristics

Produits pétroliers — Huiles minérales inhibées — Détermination des caractéristiques d'oxydation

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Petroleum products — Inhibited mineral oils — Determination of oxidation characteristics

1 Scope and field of application

1.1 This International Standard specifies a method for evaluating the oxidation stability of inhibited steam-turbine oils in the presence of oxygen, water, and metallic copper and iron at an elevated temperature. The method is also used for testing other oils such as hydraulic oils and circulating oils having a relative density less than that of water and containing rust and oxidation inhibitors.

1.2 This method is widely used for specification purposes and is considered of value in evaluating the oxidation stability of lubricants, especially those that are prone to water contamination. It should be recognized, however, that correlation between results of this method and the oxidation stability of a lubricant in field service may vary markedly with field service conditions and with various lubricants.

1.3 In the course of testing a lubricant by this method, other signs of deterioration, such as sludge formation or catalyst coil corrosion, may appear which are not reflected in the calculated oxidation lifetime. The application of alternative criteria for evaluation of lubricants using this test method is under investigation.

2 References

ISO 1553, *Unalloyed copper containing not less than* 99,90 % *of copper — Determination of copper content — Electrolytic method.*

ISO 3170, *Petroleum products — Liquid hydrocarbons — Manual sampling.*

ISO 3405, *Petroleum products — Determination of distillation characteristics.*

3 Principle

A test portion is reacted with oxygen in the presence of water and iron—copper catalyst at 95 °C. The test continues until the measured total acid number of the oil is 2,0 mgKOH/g or above. The number of test hours required for the oil to reach 2,0 mgKOH/g is the "oxidation lifetime."

4 Reagents and materials

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade, and only distilled water or water of equivalent purity.

4.1 Acetone, 99,5 % grade and conforming to the essential requirements given in annex A.

4.2 Catalyst wires.

4.2.1 Low-metalloid iron wire, 1,59 mm in diameter, soft bright annealed and free from rust, of the composition given in annex B. Other equivalent wire may be used, provided that it is found satisfactory in comparative tests using this method.

4.2.2 Electrolytic copper wire, 1,63 mm in diameter, 99,90 % purity (when tested in accordance with ISO 1553). Soft copper wire of an equivalent grade may also be used.

4.3 Detergent, water soluble.

4.4 ***n*-Heptane,** knock test grade, conforming to the essential requirements given in annex C.

4.5 Hydrochloric acid, diluted 1 + 3.

Carefully add 1 volume of concentrated hydrochloric acid (ϱ_{20} = 1,19 g/ml) to 3 volumes of water.

4.6 2-Propanol (Isopropyl alcohol), conforming to the essential requirements given in annex D.

4.7 Oxygen, 99,5 % minimum purity, with pressure regulation adequate to maintain a constant flow of gas through the apparatus. The use of a two-stage pressure regulator on tank oxygen is recommended.

4.8 1,1,1-Trichloroethane.

4.9 Chromic acid, or other suitable cleaning solution.