SLOVENSKI STANDARD
SIST EN ISO 12156-1:2000

01-julij-2000

Nadomeģļ a:
SIST CR 12787:1998

Dieselsko gorivo - Ocenjevanje mazalne sposobnosti z uporabo visokofrekvenļ nega merilnika - 1. del: Preskusna metoda (ISO 12156-1:1997, vkljuļ uje tehniļ ni popravek 1:1998)

Diesel fuel - Assessment of lubricity using the high-frequency reciprocating rig (HFRR) - Part 1: Test method (ISO 12156-1:1997, including Technical Corrigendum 1:1998)

Diesel-Kraftstoff - Methode zur Bestimmung der Schmierfähgigkeit unter Verwendung eines
Schwingungsverschleiß-Prüfgerätes - Teil 1: Pr fmethode (ISO 12156-1:1997, einschließlich technisches Corrigendum 1:1998)

Carburant diesel - Evaluation du pouvoir lubrifiant au banc alternatif a haute fréquence - Partie 1: Méthode d'essai (ISO 12156-1:1997, Rectificatif Technique 1:1998 inclus)

Ta slovenski standard je istoveten z: **EN ISO 12156-1:2000**

ICS:

75.160.20	Tekoļ a goriva	Liquid fuels

SIST EN ISO 12156-1:2000 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 12156-1

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ICS 75.160.20

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English version

Diesel fuel - Assessment of lubricity using the high-frequency reciprocating rig (HFRR) - Part 1: Test method (ISO 12156-1:1997, including Technical Corrigendum 1:1998)

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This European Standard was approved by CEN on 20 January 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of the International Standard from Technical Committee ISO/TC 22 "Road vehicles" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 19 "Petroleum products, lubricants and related products", the secretariat of which is held by NNI.

This European Standard supersedes CR 12787:1997.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 12156-1:1997, including Technical Corrigendum 1:1998 has been approved by CEN as a European Standard without any modification

INTERNATIONAL STANDARD

ISO 12156-1

First edition
1997-12-15

Diesel fuel — Assessment of lubricity using the high-frequency reciprocating rig (HFRR) —

Part 1:
Test method

Carburant diesel — Évaluation du pouvoir lubrifiant au banc alternatif à haute fréquence —
Partie 1: Méthode d'essai

Reference number
ISO 12156-1:1997(E)

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.

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.

International Standard ISO 12156-1 was prepared jointly by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 7, *Injection equipment and filters for use on road vehicles* and ISO/TC 28, *Petroleum products and lubricants*.

ISO 12156 consists of the following parts, under the general title *Diesel fuel — Assessment of lubricity using the high-frequency reciprocating rig (HFRR)*:

— *Part 1: Test method*

— *Part 2: Limits*

Annex A of this part of ISO 12156 is for information only.

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Introduction

All diesel fuel injection equipment has some reliance on diesel fuel as a lubricant. Wear due to excessive friction resulting in shortened life of engine components, such as diesel fuel injection pumps and injectors, has sometimes been ascribed to lack of lubricity in the fuel.

The relationship of test results to diesel injection equipment component distress due to wear has been demonstrated for some fuel/hardware combinations where boundary lubrication is a factor in the operation of the component.

Test results from fuels tested to this procedure have been found to correlate to many fuel/hardware combinations and provide an adequate prediction of the lubricating quality of the fuel.

Diesel fuel — Assessment of lubricity using the high-frequency reciprocating rig (HFRR) —

Part 1:
Test Method

WARNING — Application of this part of ISO 12156 may involve the use of hazardous materials, operations, and equipment. This part of ISO 12156 does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this part of ISO 12156 to establish appropriate safety and health practices and determine the applicable regulatory limitations prior to use.

1 Scope

This part of ISO 12156 specifies a test method using the high-frequency reciprocating rig (HFRR), for assessing the lubricating property of diesel fuels including those fuels which may contain a lubricity-enhancing additive.

It applies to fuels used in diesel engines.

NOTE — It is not known if this test method will predict the performance of all additive/fuel combinations. Additional work is underway to further establish this correlation and future revisions of this part of ISO 12156 may be necessary once this work is complete.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 12156. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4259:1992, *Petroleum products — Determination and application of precision data in relation to methods of test.*

ISO 5272:1979, *Toluene for industrial use — Specifications.*

ISO 6507-1:—[1)], *Metallic materials — Vickers hardness test — Part 1: Test method.*

ISO 6508:1986, *Metallic materials — Hardness test — Rockwell test (scales A - B - C - D - E - F - G - H - K).*

ISO/IEC Guide 25:1990, *General requirements for the competence of calibration and testing laboratories.*

ISO Guide 35:1989, *Certification of reference materials — General and statistical principles.*

ASTM D-329:1995, *Specification for acetone.*

AISI E-52100, *Chromium alloy steel.*

ANSI B3.12, *Metal balls.*

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1) To be published. (Revision of ISO 6507-1:1982, ISO 6507-2:1983, ISO 6507-3:1989, ISO 409-1:1982, ISO 409-2:1983 and ISO/DIS 409-3)

3 Definitions

For purposes of this part of ISO 12156, the following definitions apply.

3.1 lubricity: A property of the fluid, measured by the wear scar produced on an oscillating ball from contact with a stationary plate immersed in the fluid and operating under closely controlled conditions.

3.2 MWSD: Measured mean diameter of the wear scar produced on the test ball.

3.3 WS1,4: Calculated value of wear scar diameter corrected to the standardized water vapour pressure of 1,4 kPa.

4 Principle

A sample of the fluid under test is placed in a test reservoir which is maintained at the specified test temperature. A fixed steel ball is held in a vertically mounted chuck and forced against a horizontally mounted stationary steel plate with an applied load. The test ball is oscillated at a fixed frequency and stroke length while the interface with the plate is fully immersed in the fluid reservoir. The metallurgies of the ball and plate, temperature, load, frequency, and stroke length are specified. The ambient conditions during the test are used to correct the size of the wear scar generated on the test ball to a standard set of ambient conditions. The corrected wear scar diameter is a measure of the fluid lubricity.

5 Reagents and materials

5.1 Compressed air, used for drying the equipment, supplied at a pressure of 140 kPa to 210 kPa and containing less than 0,1 ml/m^3 hydrocarbons and less than 50 ml/m^3 water.

Warning — Use with extreme caution in the presence of combustible material.

5.2 Toluene, in accordance with ISO 5272.

Warning — Flammable. Harmful if inhaled.

5.3 Acetone, in accordance with ASTM D-329.

Warning — Extremely flammable. Vapours may cause flash fire.

5.4 Reference fluids

Warning — Flammable.

Two reference fluids shall be used for verifying the performance of the test apparatus. The fluids shall have significantly different lubricity performance, as measured by this International Standard. The fluids shall have certified HFRR values and humidity correction factors (HCF) from a supplier accredited to ISO/IEC Guide 25 and prepared in accordance with ISO Guide 35. They shall be clearly marked with the HFRR value (WS1,4) and its expanded uncertainty, expressed in micrometres, and with the HCF expressed in micrometres per kilopascal. The two reference fluids shall have a minimum difference in HFRR value of 200 µm, as measured by this part of ISO 12156.

NOTE — ISOPAR M, which is manufactured by the Exxon Chemical Company and used as CEC Reference Fuel RF-74-T-95, has been found to be satisfactory for the basis of a low-lubricity reference fluid.

The fuel qualified for use in the Caterpillar 1H or 1G single-cylinder tests, fuel conforming to ISO 4113:1988, *Road vehicles — Calibration fluid for diesel injection equipment*, or CEC Reference Fuel RF-90-A-92 have all been found to be satisfactory for the basis of a high-lubricity reference fluid.

This information is given for the convenience of users of this part of ISO 12156 and does not constitute an endorsement by ISO of the products named. Equivalent products may be used if they can be shown to lead to the same results.

6 Apparatus

6.1 Test apparatus

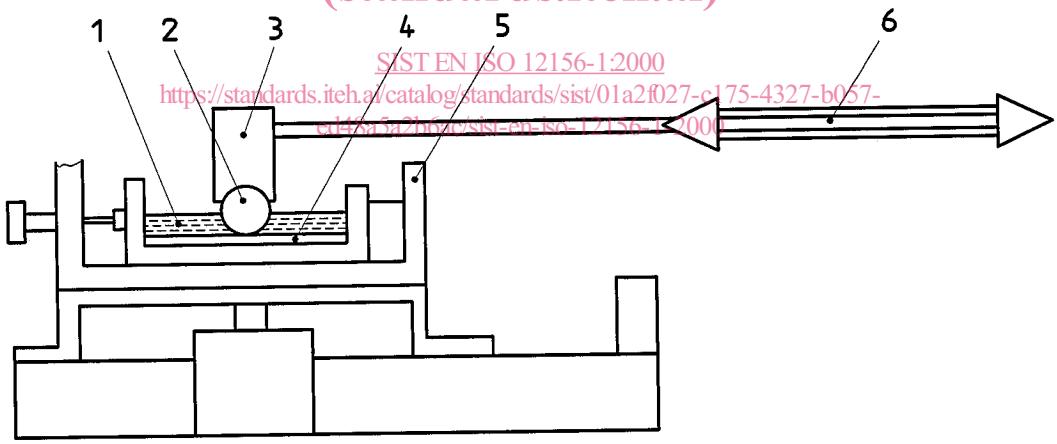
The test apparatus[2)] (see figure 1) shall be capable of engaging a steel ball loaded against a stationary steel plate with an applied load and oscillating at a fixed frequency and stroke length while the contact interface is fully immersed in a fluid reservoir according to the test conditions given in table 1.

Table 1 — Test conditions

Parameter	Value
Fluid volume, ml	2 ± 0,2
Stroke length, mm	1 ± 0,02
Frequency, Hz	50 ± 1
Laboratory air[1)]	see figure 2
Fluid temperature, °C	60 ± 2
Applied load[2)], g	200 ± 1
Test duration, min	75 ± 0,1
Bath surface area, mm^2	600 ± 100

1) Laboratory air conditions as measured within 0,1 m to 0,5 m of test specimen are to be controlled to acceptable range of conditions as shown in figure 2.

2) Total applied load including fixing elements.



Key

1 Fuel bath (reservoir)
2 Test ball
3 Applied load
4 Test plate
5 Heating bath
6 Oscillating motion

Figure 1 — Example of the high-frequency reciprocating rig

2) HFRR units, HFR2, supplied by PCS Instruments, 5 Warple Mews, Warple Way, London W3 0RF, England, have been found satisfactory. This information is given for the convenience of users of this part of ISO 12156 and does not constitute an endorsement by ISO. Equivalent products may be used if they can be shown to lead to the same results.