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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Road vehicles — Calibration fluid for diesel injection equipment

Véhicules routiers — Fluide d'essai pour équipements d'injection à gazole

Reference number
ISO 4113 : 1988 (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 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.

International Standard ISO 4113 was prepared by Technical Committee ISO/TC 22, *Road vehicles.*

This second edition cancels and replaces the first edition (ISO 4113 : 1978), of which it constitutes a technical revision.

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Road vehicles — Calibration fluid for diesel injection equipment

1 Scope

This International Standard specifies the requirements for a calibration fluid with which diesel injection equipment may be calibrated and tested in production, in service and in laboratories.

2 Normative references

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

ISO 2049 : 1972, *Petroleum products — Determination of colour.*

ISO 2160 : 1985, *Petroleum products — Corrosiveness to copper — Copper strip test.*

ISO 2719 : 1988, *Petroleum products and lubricants — Determination of flash point — Pensky-Martens closed cup method.*

ISO 3015 : 1974, *Petroleum oils — Determination of cloud point.*

ISO 3104 : 1976, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity.*

ISO 3405 : 1988, *Petroleum products — Determination of distillation characteristics.*

ISO 3675 : 1976, *Crude petroleum and liquid petroleum products — Laboratory determination of density or relative density — Hydrometer method.*

ISO 4008-3 : 1987, *Road vehicles — Fuel injection pump testing — Part 3: Application and test procedures.*

ISO 6073 : 1980, *Hydraulic fluid power — Petroleum fluids — Prediction of bulk moduli.*

ASTM D 665, *Test for rust-preventing characteristics of steam-turbine oil in the presence of water.*

ASTM D 892, *Test for foaming characteristics of lubricating oils.*

ASTM D 1748, *Test for rust protection by metal preservatives in the humidity cabinet.*

ASTM D 2140, *Test for carbon-type composition of insulating oils of petroleum origin.*

IP 306/82, *Oxidation stability of straight mineral oil.*

3 Technical requirements for calibrating fluid as supplied

The calibration fluid shall be refined, deodorized mineral oil and may contain additives to inhibit undesirable characteristics such as foaming, ageing, corrosion and wear.

The calibration fluid shall not contain components in such a concentration that irritation of normal skin could be caused.

The calibration fluid shall be such that, without cleaning of the equipment after calibration, proper functioning of the equipment after test is ensured after storage of the equipment for a period of 1 year minimum, in normal conditions.

The calibration fluid shall have the properties specified in table 1.

Table 1

Characteristic	Unit	Value	Method of determination
Density [1] at 15 °C	g/ml	0,82 to 0,83	ISO 3675
Flash point	°C	+ 75 min.	ISO 2719
Kinematic viscosity at 40 °C [2]	mm^2/s	2,45 to 2,75	ISO 3104
Volume distilled at 210 °C	%	5 max.	ISO 3405
at 360 °C	%	95 min.	
Ageing test (catalysed) — Sludge	%	0,05 max. by mass	IP 306/82 (time : 48 h)
— Total acidity after oxidation [3]	mgKOH/g	0,7 max.	
Cloud point	°C	− 10 max.	ISO 3015
Rust protection	—	Five out of six faces on three panels shall pass the test	ASTM D 1748 (test time : 50 h with polished panels)
Corrosion test — Ferrous metals	—	Pass the test	ASTM D 665 (procedure A)
— Copper	—	Class 1	ISO 2160 (3 h at 100 °C)
Water content	—	Free from undissolved water	
Aromatic components, C_A	%	12 max.	ASTM D 2140
Foaming — Tendency	ml	50 max.	ASTM D 892 (sequence I only)
— Stability	ml	0	
Colour	—	2,0 max.	ISO 2049

1) The bulk modulus may be determined according to ISO 6073.

2) According to ISO 4008-3, the viscosity discard limit is 3 mm^2/s (1 mm^2/s = 1 cSt) at 40 °C.

3) Sum of volatile and soluble acidity.