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**Lubricants, industrial oils and related products (class L) — Family E (internal combustion engine oils) — Specifications for oils for use in four-stroke cycle motorcycle gasoline engines and associated drivetrains (categories EMA and EMB)**

*Lubrifiants, huiles industrielles et produits connexes (classe L) — Famille E (huiles pour moteurs à combustion interne) — Spécifications pour les huiles pour moteurs quatre-temps à essence et transmissions associées, pour motocyclettes (catégories EMA et EMB)*



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## Foreword

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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 24254 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 4, *Classifications and specifications*.

## Introduction

This International Standard aims to specify the minimum performance requirements for four-stroke engine oils and to classify their performance according to their frictional properties. Unique lubricant performance standards have not been in existence for four-stroke engine oils used in motorcycles, motor scooters, all-terrain vehicles (ATVs) and related equipment. As a consequence, manufacturers of these kind of equipment have experienced field-related problems where four-stroke engine oils not meeting the unique frictional requirements of some of these engines have been used. The intent of this International Standard is to enable engine manufacturers to better communicate the lubricant needs of their engines to consumers and, thus, assist the consumer in selecting the proper lubricant from the many available in the marketplace.

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# Lubricants, industrial oils and related products (class L) — Family E (internal combustion engine oils) — Specifications for oils for use in four-stroke cycle motorcycle gasoline engines and associated drivetrains (categories EMA and EMB)

**WARNING** — Handling and use of products as specified in this International Standard may be hazardous if suitable precautions are not observed. This International Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

## 1 Scope

This International Standard specifies the requirements of lubricating engine oils (hereinafter referred to as “four-stroke engine oils”) to be used in four-stroke cycle spark ignition gasoline engines employing a common sump containing the lubricating oil for both the engine and associated drivetrain (transmission, clutch, starter) of motorcycles, motor scooters, all-terrain vehicles (ATVs) and related equipment. Classification of four-stroke engine oils is defined in ISO 6743-15<sup>[1]</sup>. Among all of the categories covered by ISO 6743-15, this International Standard includes categories EMA and EMB.

This International Standard specifies the performance classification of four-stroke cycle gasoline engine oils based on physical and chemical properties, and three friction performance indices, which are derived from the frictional properties of the lubricant, according to the JASO T904 test procedure<sup>1)</sup>.

**NOTE** For the purposes of this International Standard, the term “% (m/m)” is used to represent the mass fraction.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3987, *Petroleum products — Lubricating oils and additives — Determination of sulfated ash*

ISO 6247, *Petroleum products — Determination of foaming characteristics of lubricating oils*

ISO 20844, *Petroleum and related products — Determination of the shear stability of polymer-containing oils using a diesel injector nozzle*

ASTM D4683, *Standard Test Method for Measuring Viscosity at High Shear Rate and High Temperature by Tapered Bearing Simulator*

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1) JASO T904:2006 is based upon the test procedures and specifications developed by the Japanese Automobile Standards Organization (JASO) of the Society of Automotive Engineers of Japan, Inc. (JSAE). JASO was joined in this effort by the American Society for Testing and Materials (ASTM) and the Coordinating European Council for the development of performance tests for lubricants and engine fuels (CEC). Lubricants meeting this International Standard can be applied to four-stroke-cycle spark-ignition gasoline engines used in transportation, leisure and utility applications, such as motorcycles, motor scooters, ATVs and related equipment.

ASTM D4741, *Standard Test Method for Measuring Viscosity at High Temperature and High Shear rate by Tapered-Plug Viscosimeter*

ASTM D4951, *Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectroscopy*

CEC L40-A93, *Standard test method for evaporation loss of lubricating oils by the Noack method*

JASO T904, *Motorcycles — Four Stroke Cycle Gasoline Engine Oils — Friction Properties Test for the Clutch Systems*

JPI-5S-38, *Lubricating Oils — Determination of Additive Elements — Inductively Coupled Plasma Atomic Emission Spectrometry*

### 3 Terms and definitions

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

#### 3.1

##### **candidate oil**

four-stroke cycle engine oil whose performance is subject to evaluation in this test method

#### 3.2

##### **reference oil**

four-stroke cycle engine oil of known performance that is used for comparison to categorize the performance of a candidate oil

NOTE Two standard reference oils are used for comparison purposes in evaluating the performance of a candidate oil: JAFRE-A (Japanese Four-Stroke Cycle Engine Reference Oil-A) with high frictional properties and JAFRE-B (Japanese Four-Stroke Cycle Engine Reference Oil-B) with low frictional properties <sup>2)</sup>.

#### 3.3

##### **friction index**

relative performance index, which is determined by comparing the test results of the candidate oil with the results of the reference oils

#### 3.4

##### **dynamic friction index**

##### **DFI**

resultant index determined from the dynamic friction coefficients,  $\mu_d$ , obtained from the dynamic friction test

#### 3.5

##### **static friction index**

##### **SFI**

resultant index determined from the static friction coefficients,  $\mu_s$ , obtained from the static friction test

#### 3.6

##### **stop time index**

##### **STI**

resultant index determined from the stop time, ST, obtained from the dynamic friction test

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2) Reference oils can be ordered from Technical Center, Japan Lubricating Oil Society, 2-16-1, Hinode, Funabashi-shi, Chiba 273-0015, Japan, Tel.: +81 47 433 5181, Fax: +81 47 431 9579. This information is given for the convenience of the users of this International Standard and does not constitute an endorsement of these products by ISO.