INTERNATIONAL STANDARD

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Petroleum products — Fuels (class F) — Specifications of marine fuels

Produits pétroliers — Combustibles (classe F) — Spécifications des combustibles pour la marine

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Contents

Page

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.

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 8217 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 4, *Classifications and specifications*.

This fourth edition cancels and replaces the third edition (ISO 8217:2005), which has been technically revised.

Introduction

0.1 General

The specifications in this International Standard were prepared in co-operation with ship owners, ship operators, shipping associations, national standards bodies, classification societies, fuel testing services, engine designers, fuel suppliers and the petroleum industry to meet the requirements for fuels supplied on a world-wide basis for consumption on board ships. Crude oil supplies, refining methods, ships' machinery, environmental legislation and local conditions vary considerably. These factors have led historically to a large number of categories of residual fuels being available internationally, even though locally or nationally there can be relatively few categories available.

0.2 Classification

The categories of fuel in this International Standard have been classified in accordance with ISO 8216-1.

0.3 International statutory requirements

This International Standard takes into account the SOLAS Convention[1] in respect of the allowable minimum flash point of fuels.

The Revised MARPOL Annex VI[2], which controls air pollution from ships, includes a requirement either that the fuel not exceed specified maximum sulfur content or that an approved equivalent alternative be used. During the lifetime of this International Standard, regional and/or national bodies can introduce their own local emission requirements, which can impact the allowable sulfur content, for example EU Sulfur Directive[3]. It is the users' responsibility to establish the requirement to comply with such statutory requirements and to specify the maximum sulfur content of the fuel to the supplier.

0.4 Changes from ISO 8217:2005

This fourth edition of this International Standard reflects several important and significant changes. These include category rationalizations of both distillate and residual fuels and substantial amendments to Clause 5. These changes reflect market demand, recognize regulatory developments and current industry experiences with the use of fuels.

The limits contained in Tables 1 and 2 now reflect the test method reporting requirements. For example, viscosity limits are given to four significant figures.

a) Changes to the distillate fuels (4 categories) include the following.

- An additional grade, DMZ, has been added with a minimum viscosity of 3,000 mm^2/s at 40 °C, but is otherwise identical in its characteristics to the DMA.
- The previous DMC category has been modified and moved to Table 2 as RMA10.
- Specifications for the following characteristics have been added to Table 1: hydrogen sulfide, acid number, oxidation stability and lubricity.
- The minimum viscosity requirement for DMA has been raised to 2,000 mm^2/s.
- A minimum viscosity requirement of 2,000 mm^2/s has been added for DMB.
- The specifications for the "appearance" characteristic in Table 1 have been amended.

b) Changes to the residual fuels (6 categories) include the following.

- RMA 10 has been added.
- RMG and RMK have been expanded to include additional viscosity grades.
- RMF and RMH categories have been removed.
- To Table 2 have been added the Calculated Carbon Aromaticity Index (CCAI) and specifications for the following characteristics: hydrogen sulfide, acid number and sodium content.
- Sulfur limits have not been tabulated, as these are controlled by statutory requirements. See 0.3 and Annex C.
- Potential Total Sediment (TSP) has been assigned as the reference test method. Accelerated Total Sediment (TSA) has been added as an alternative test method.
- Ash limit values have been reduced for many of the categories.
- Vanadium limit values have been reduced, with the exceptions of those for RMB 30 where the limit value is unchanged and for RMG 380 where the limit value has been slightly increased.
- Aluminium-plus-silicon limit values have been reduced.
- The criteria for assessing whether a fuel contains used lubricating oil have been amended.

c) Changes to the informative annexes include the following.

- Amendments have been made to a number of the annexes.
- Annex C of the previous edition, dealing with viscosity conversions, has been deleted.
- The equations dealing with specific energy in Annex E of this new edition have been revised and a gross specific energy equation for distillate fuel has been added.
- Four new annexes have been added:
  - Annex A, dealing with bio-derived products;
  - Annex B, dealing with deleterious materials;
  - Annex C, dealing with sulfur content;
  - Annex D, dealing with hydrogen sulfide.

Petroleum products — Fuels (class F) — Specifications of marine fuels

WARNING — The handling and use of products as specified in this International Standard can be hazardous, if suitable precautions are not observed. This International Standard does not purport to address all of the safety and health considerations that can be associated with its use. It is the responsibility of the users of this International 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 for petroleum fuels for use in marine diesel engines and boilers, prior to appropriate treatment before use. The specifications for fuels in this International Standard can also be applicable to fuels for stationary diesel engines of the same or similar make and type as those used for marine purposes.

This International Standard specifies four categories of distillate fuel, one of which is for diesel engines for emergency purposes. It also specifies six categories of residual fuel.

NOTE 1 For the purpose of this International Standard, the term “petroleum” is used to include oil from tar sands and from shale.

NOTE 2 Appropriate guidance about fuel treatment systems for diesel engines is published by the International Council on Combustion Engines (CIMAC)[4].

NOTE 3 Requirements for gas turbine fuels used in marine applications are specified in ISO 4261[5].

NOTE 4 For the purposes of this International Standard, the terms “mass %” and “volume %” are used to represent the mass and volume fractions respectively.

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 91-1:1992, *Petroleum measurement tables — Part 1: Tables based on reference temperatures of 15 °C and 60 °F*

ISO 2719:2002, *Determination of flash point — Pensky-Martens closed cup method*

ISO 3015:1992, *Petroleum products — Determination of cloud point*

ISO 3016:1994, *Petroleum products — Determination of pour point*

ISO 3104:1994, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 3675:1998, *Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method*