Two-stroke cycle gasoline engine - Engine oils - Classifications

1. Scope

This standard specifies the lubricating oil used in two-stroke-cycle gasoline engines such as motor-cycle engines, utility engines, and outboard engines, etc. (hereinafter referred to as “two-stroke oil”).

Remark: A corresponding international standard is shown below.

ISO 6743-15: Lubricants, industrial oils and related products (class L) - Classification - Part 15: Family E (Internal combustion engine oils) (MOD)

2. Normative reference

The following standards, when referred to in this standard, constitutes a part of the specifications of this standard. As required, the most recently updated version of the applicable standard (including addenda) shall be applied.

JIS K 2265 Crude oil and petroleum products -- Determination of flash point

JIS K 2272 Crude oil and petroleum products -- Determination of ash and sulfated ash

JIS K 2283 Crude petroleum and petroleum products -- Determination of kinematic viscosity and calculation of viscosity index from kinematic viscosity

JASO M 340 Two-stroke- cycle gasoline engine - Engine oils - Lubricity test procedure

JASO M 341 Two-stroke-cycle gasoline engine - Engine oils - Detergency test procedure

JASO M 342 Two-stroke-cycle gasoline engine - Engine oils - Smoke test procedure

JASO M 343 Two-stroke-cycle gasoline engine - Engine oils - Exhaust system blocking test procedure

3. Definitions

Definitions of main terms used in this standard shall be as follows.

a) Lubricity

Lubricating performance of sliding parts (between pistons and cylinders) in the engine with two-stroke oil.

b) Initial torque

Average output torque of each of the standard reference oil and the candidate oil at a spark plug seat temperature of 200 ^{o}C in the lubricity test.

c) Detergency

Degree of dirtiness inside the engine due to deposits such as varnish and carbon originating from two-stroke oil.

d) ESmoke property

Concentration of visible smoke that is emitted from an exhaust pipe, originating from two-stroke oil.

e) Exhaust system blocking property

Degree of blocking caused by two-stroke oil, due to deposits inside the exhaust gas passage from the cylinder exhaust port to the exhaust pipe and muffler.

f) Standard reference oil

Two stoke oil that is used for comparison to evaluate the performance of a candidate oil. It refers to JATRE-1.

g) Candidate oil

Lubricating oil, the performance of which is evaluated in the test.

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h) Performance indices

Comparative reference values that indicate the performance of a candidate oil, expressed as a percentage assuming each value for the standard reference oil obtained in the lubricity test, detergency test, exhaust smoke test, and exhaust system blocking test as 100. There are five types of indices: lubricity index, initial torque index, detergency index (including piston skirt detergency index), exhaust smoke index, and exhaust system blocking index.

i) Standard index

Performance index specified to classify the candidate oil according to performance.

4. Properties

4.1 Physical and chemical properties

The two-stroke oil shall satisfy the physical and chemical properties specified in **Table 1**.

Table 1 Physical and chemical properties

Measuring item		Applicable performance classification	Measurement value	Test method
Kinematic viscocity (100 °C)	(mm^2/s)	FB, FC, FD	6.5 min.	**JIS K 2283**
Flash point	(°C)	FB, FC, FD	70 min.	**JIS K 2265**
Sulfated ash	(mass%)	FB, FC	0.25 max.	**JIS K 2272**
		FD	0.18 max.	

Remark: The applicable performance classification shall be as specified in **Table 2**.

4.2 Classification

The performance of two-stroke oils is classified into three grades, FB, FC and FD in ascending order. The classification is based on the performance indices derived from four engine tests. Each performance index of two-stroke oil shall satisfy the standard index specified in **Table 2** Further, a candidate oil shall be classified according to the lowest grade to which one of its performance indices corresponds. When even one of the evaluation items does not satisfy the target standard index that corresponds to the performance classification, the two-stroke oil shall be regarded as not meeting this standard.

Table 2 Standard index according to performance classification

Evaluation item			Performance classification			Test method
			FB	FC	FD	
Lubricity			95 min.	95 min.	95 min.	**JASO M 340**
Initial torque			98 min.	98 min.	98 min.	
Detergency	60-minute evaluation	Basic portion	85 min.	95 min.	-	**JASO M 341** 60-minute evaluation
		Piston skirt portion	-	-	-	
	180-minute evaluation	Basic portion	-	-	125 min.	**JASO M 341** 180-minute evaluation
		Piston skirt portion	-	-	95 min.	
Smoke property			45 min.	85 min.	85 min.	**JASO M 342**
Exhaust system blocking property			45 min.	90 min.	90 min.	**JASO M 343**

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