

TWO CYCLE GASOLINE ENGINE OIL
PERFORMANCE CLASSIFICATION (JASO M345:2018)
IMPLEMENTATION MANUAL

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JASO Engine Oil standards
Implementation Panel

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TWO CYCLE GASOLINE ENGINE OIL
PERFORMANCE CLASSIFICATION (JASO M345:2018)
IMPLEMENTATION MANUAL

NOTICE

The quality, performance and labeling of the 2-Cycle Oil notified and field under this JASO Two Cycle Gasoline Engine Oil Performance Classification Implementation System, is classified and guaranteed based upon the judgment and responsibility of the company itself (the lube oil supplier) who submitted the specified notification documents for filing. The company shall assume all liabilities resulting therefrom.

Accordingly, under this system, the JASO Two Cycle Oil Standards Implementation Panel (the "Panel") does not guarantee the quality or performance of the oil, and takes no responsibility with regard to such matters.

In the case where any problems associated with the quality, performance, or labeling of the 2-Cycle Oil arise, the company that has utilized the JASO 2-Cycle Oil Standards shall itself resolve the problems.

In order to facilitate the proper use of the JASO 2-Cycle Oil Standards, the Panel requests that the users of the standards fully understand both this Manual and the Guidelines for utilizing the standards. Information regarding any change in the contents of this manual will be provided through the Internet Web site of the JASO Engine Oil Standard Implementation Panel (<http://www.jalos.or.jp/onfile/>) or by any other means. Before attempting on-file, please check the latest information.

1. Foreword

This manual has been prepared as a part of the activities of the JASO Engine Oil standards Implementation Panel (the "Panel"), which has been voluntarily organized by various industry associations and academic societies in Japan concerned with two-cycle engine oils to promote in Japan and other countries the proper Two Cycle Gasoline Engine Oil Performance Classification Standards (JASO M345) (the "JASO 2-Cycle Oil Standards" or "JASO M345 Standards"), which were established by the Society of Automotive Engineers of Japan (the "JSAE"). The purpose of this Manual is to explain the procedures to enable those who distribute, supply or otherwise offer for sale, 2-cycle oils in the course of trade or business (collectively "Suppliers"), to take the steps necessary to submit to, and have filed with, the Panel notification documents in accordance with the JASO 2-Cycle Oil Standards.

In this manual, the term "2-Cycle Engines" means two stroke cycle engines using gasoline as fuel, and the term "2-Cycle

Oil" means lubricating oil for 2-cycle engines. In reply to an inquiry from the Automotive/Lubricant Joint Committee ("ALJC"), a committee of the Petroleum Association of Japan ("PAJ") and the Japan Automobile Manufacturers Association, Inc. ("JAMA"), this submission and filing system was drafted by the 2-Cycle Engine Oil Working Group, which itself was set up by the Engine/Oil Subcommittee, a subsidiary organization of the ALJC, and established with the approval of each of the above mentioned committees.

2. Purpose of Implementation System

Although Japan is a major country producing 2-cycle engines used in motorcycles, utility equipment, and outboard motors, etc., there have been no formal standards for 2-cycle Oils. As a result, in the case where 2-cycle oils of low quality are used in recently developed, high power 2-cycle engines, the engines sometimes have experienced performance problems. Therefore, a performance classification of 2-cycle oils meeting the current technical requirements for 2-cycle engines was established by the JSAE.

The implementation system, described in this document, was established with the aim of improving the quality of 2-cycle oils in the market by enabling suppliers of 2-cycle oils to put the performance classification into practical use. By this system, the standards necessary for consumers to correctly select 2-cycle oils, when purchasing, will become clear, and an improvement will be expected in the durability of 2-cycle engines.

3. Outline of JASO M345 Standard(JASO M 345:2018)

3.1 JASO Engine Test Procedures

To evaluate the four important performance parameters of 2-cycle oils, i.e., lubricity, detergency exhaust smoke formation and exhaust system blocking performance, the four test procedures indicated in Table 1 were developed by the 2-Cycle Oil Subcommittee, which was organized within the Motorcycle Committee of the JSAE.

Table 1 JASO 2-Cycle Oil Test Procedures

Test Procedure	JASO Standard No.
Lubricity Test Procedure for Evaluating Two Stroke Gasoline Engine Oils	JASO M340
Detergency Test Procedure for Evaluating Two Stroke Gasoline Engine Oils	JASO M341
Smoke Test Procedure for Evaluating Two Stroke Gasoline Engine Oils	JASO M342
Exhaust System Blocking Test Procedure for Evaluating Two Stroke Gasoline Engine Oils	JASO M343

3.2 Basic Concept of the Performance Classification

The performance level of 2-cycle oils is classified into three grades, FB, FC and FD, according to the test results based on the above-mentioned four JASO 2-cycle oil test methods. These are defined as FB, FC, FD from lowest to highest performance. The FC grade is defined for low smoke 2-cycle oils superior to FB with regard to exhaust smoke and exhaust system blocking. FD grade is defined as improved version of FC in terms of detergency performance at high temperatures.

3.3 Evaluation Items and Standard Indices for Each Performance Classification

The evaluation items for the JASO test procedures and the standard indices for each performance classification are shown in Table 2.

Table 2 JASO Test Procedures and Standard Indices

Evaluation Item			Standard Index (min.)			Test Procedure
			FB	FC	FD	
Lubricity			103	103	103	JASO M 340-2018
Initial Torque			98	98	98	JASO M 340-2018
Detergency	Evaluation after 180 min.	Fundamental Part	65	95	110	JASO M 341-2018 180 min.test
		Piston Skirt Part	65	90	100	
Exhaust Smoke			45	85	85	JASO M 342-2018
Exhaust System Blocking			45	90	90	JASO M 343-2018

In addition to the above engine tests, three standard physico-chemical properties indicated in Table 3 are specified.

Table 3 Physico-chemical Properties Required for JASO 2-Cycle Oil Standards

Item	The performance classification applied	Limit	Test Method	
			JIS	ASTM
Kinematic Viscosity at 100°C mm ² /s	FB, FC, FD	6.5 min.	JIS K 2283	D445
Flash Point °C	FB, FC, FD	70 min.	JIS K 2265	D83
Sulfated Ash mass%	FB, FC	0.25 max.	JIS K 2272	D874
	FD	0.18 max.		

3.4 Background of Development and Revision of JASO Test Procedures and Performance Classification

In spite of the fact that Japan is one of the leading countries producing 2-cycle engines in the world, domestic quality standards of 2-cycle oils have previously been unavailable. Because of this, there are 2-cycle oils which are not necessarily satisfactory for the oil performance required by recent, high power 2-cycle engines. Consequently, there was a strong demand by Japanese motorcycle manufactures to develop JASO 2-cycle oil standards. The standards were finally established through the following process. In order to keep consistency with ISO 6743-15, which was established in March 2000, it was revised in the 2002 fiscal year in parallel with its periodic review.

* In April 1987, a "Research Group on 2-cycle Engine Lubrication" was formed in the Japanese Society of Tribologists, and study meetings were held on 2-cycle engine oil standards for the next two years, until March 1989.

* In April 1989, a preparative subcommittee on the development of 2-cycle oil standards was formed in the JSAE Motorcycle Committee, and the concepts and methods for standardization of 2-cycle oils were discussed over a period of one year, until March 1990.

* In April 1990, the JSAE Motorcycle Committee formed the 2-cycle Engine Oil Subcommittee. This Subcommittee worked for three years, until March 1993, to develop test procedures and establish standards. In September 1992, the four JASO engine test procedures (lubricity, detergency, exhaust smoke and exhaust system blocking), and the standards for physico-chemical properties of 2-cycle oils were completed. In March 1993, the JASO Performance Classification Standard was finalized.

* During the above period, international meetings were held eight times. With the participation of the ASTM, CEC and TISI (Thailand Industrial Standards Institute), who introduced opinions from overseas, the 2-Cycle Engine Oil Subcommittee gained common consent on how to proceed with the global standardization of 2-cycle oils.

* ISO standardization of a JASO standard was proposed from Japan for the purpose of global deployment of this standard.

By the cooperation of standard establishment organizations in Japan (JSAE/PAJ), the U.S.A (ASTM) and Europe (CEC), ISO 6743-15 was established in March 2000 adding the detergency test with longer duration. In order to correspond this, JASO standard was revised in fiscal 2002.

* After the issuance of the standard in 1993, productions

of two-stroke engines were rapidly reduced due to environmental issues and emission regulation, and the engine which was used for testing in recent years encountered production cancellation, which made the continuation of test difficult.

However, there are still high demands in small and light weight two-stroke engines primarily for utility engines, and the quality of two-stroke engine oil needs to be continuously and appropriately classified as before.

Thus, this standard has been revised to accommodate the new test engine so that the standard can be utilized at length in March 2018.

3.5 Background of Study on Implementation of the JASO 2-cycle Oil Standards

For the implementation of the JASO 2-Cycle Oil Standards mentioned above, with the aim of promoting the use of the standards a temporary organization was formed through the following process:

* At JSAE's request, in August 1992, the 2-Cycle Engine Oil Working Group was formed in the ISO Petroleum Product Domestic Committee of the PAJ, and a study on the implementation of the JASO 2-Cycle Oil Standards and the transformation of the JASO Standards to an ISO Standard was initiated by the Working Group.

* Further, in May 1993, the 2-Cycle Engine Oil Working Group was formed as a subsidiary organization of the Engine Oil Subcommittee, which is a joint committee of PAJ and JAMA. It was decided that the Working Group should take charge of the study on the implementation of the JASO Engine Oil standards. As a result of the study, it was decided to form the Panel mentioned earlier in order to smoothly put the JASO 2-Cycle Oil Standards Implementation System into practice.

* Based on the request from "Automotive/Lubricant Joint Committee ("ALJC")" which is a joint committee between "The Petroleum Association of Japan" (PAJ) and "The Japan Automobile Manufacturers Association"(JAMA), the "JASO Motorcycle Four-Cycle Engine Oil Standards Implementation Working Group" was formed in September 1998 as a lower branch of the "JASO Two-Cycle Oil Implementation Panel". At that time, the "JASO Two-Cycle Oil Implementation Panel" was the only organization that was operating JASO Engine Oil Standards.

Based upon the WG proposal, the former JASO Two-Cycle Engine Oil Implementation Panel was restructured into the "JASO Engine Oil Standards Implementation Panel" in April 1999 to manage the smooth operation of the implementation system.

4. Procedures for Utilization of the JASO 2-Cycle Oil Standards

4.1 Outline

* The Panel advises that a lube oil supplier (user of the JASO 2-Cycle Oil Standards) who desires to file a 2-cycle oil against the Performance Classification based on the JASO M345 Standard, (the "Submitter") should go through certain formalities for the utilization of the standards for each brand of product and for each formulation according to the undermentioned procedure.

4.2 Procedure Flow Chart

The outline of the submission and filing procedure is shown in Figure 1.

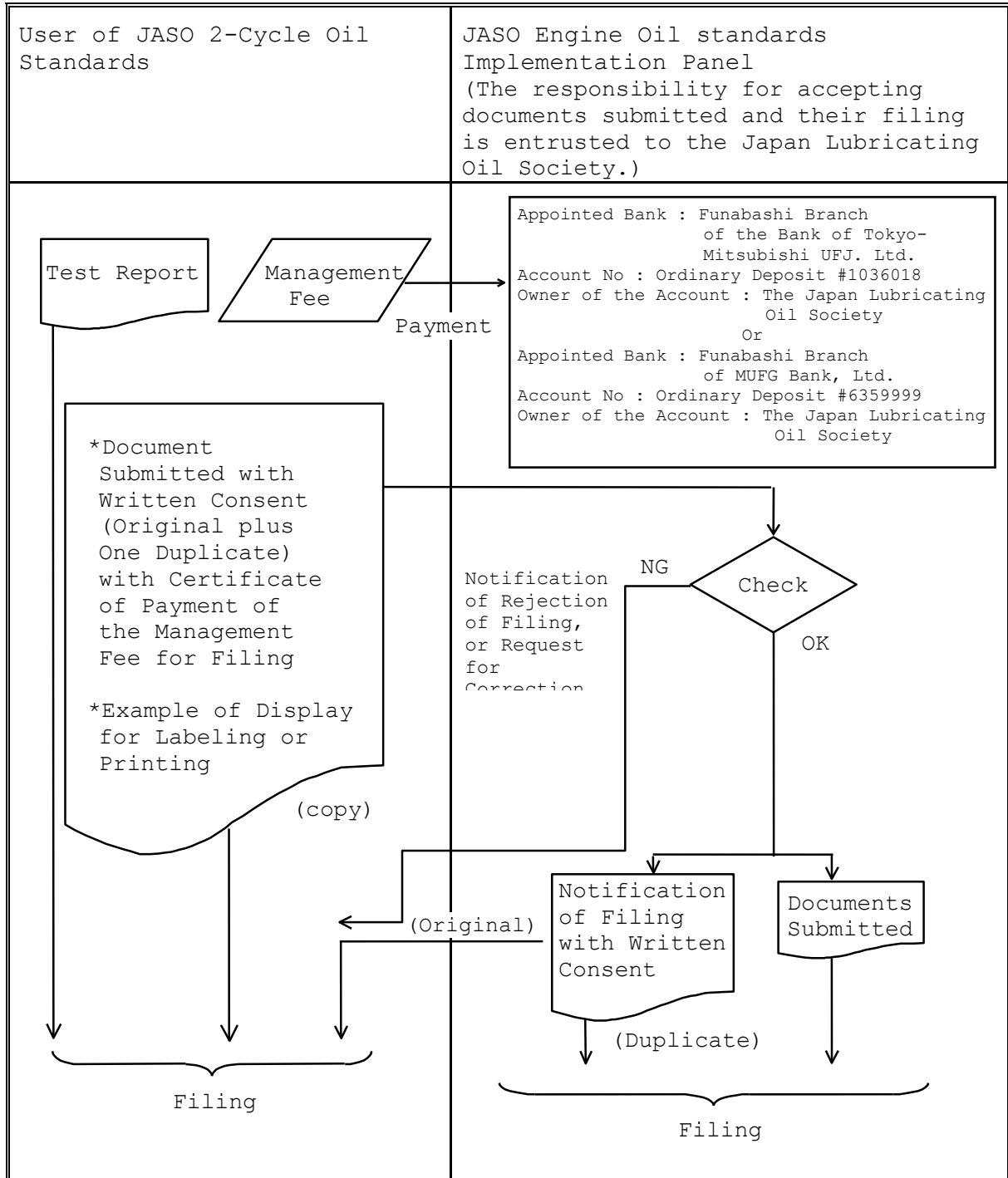


Figure 1 Procedure Flow Chart for Submission and Filing

4.3 Submission and Filing of Notification Documents

A user of the JASO 2-Cycle Oil Standards should fill in the notification documents (see Appendix 1) and Column B of the notice with written consent (see Appendix 2), in duplicate, and mail them to the following address of the Panel c/o the Japan Lubricating Oil Society, which is entrusted with handling the management of acceptance of documents submitted and their filing.

The JASO Engine Oil Standards
Implementation Panel
c/o Business Dept.
The Japan Lubricating Oil Society
2-16-1, Hinode, Funabashi-shi
Chiba 273-0015, Japan

A Submitter shall pay ¥40,000 (which includes consumption tax) as a management fee for filing each submission by payment into the bank account indicated in Appendix 1, and shall submit the certificate of payment along with the specified documents to the Panel. At the time of reporting, the submitter shall submit to the JASO Engine Oil Standards Implementation Panel a representative example of performance classification marking on the 2 Cycle Gasoline engine oil product container and an entire product label (design allowable). The Panel requests the user to submit to the Panel a typical example (or design) of the labeling, etc. of the performance classification on the containers of the 2-cycle oils concerned when submitting documents to the Panel. In principle, the documents submitted and the management fee shall not be returned to the Submitter. Should the management fee rate be revised, the Panel will publicize it through allied organizations.

4.4 Custody and Submission of Test Data

The original engine test reports, which must be prepared in the form prescribed in the JASO Standards, from which the notification documents for filing were completed, should be retained by the Submitter on their responsibility until the Submitter withdraws the filed documents concerned (i.e., the documents are no longer kept on file).

On receipt of a request from the Panel, the Submitter should submit the original engine test reports.

4.5 Document Check

The Panel will check the documents received from a Submitter as follows:

- i) Are all required items completed?
- ii) Is an infrared absorption spectrum analysis chart, prepared in the specified form, attached to the documents?

- iii) Do the physico-chemical properties satisfy the three required parameters?
- iv) Do the engine test results meet the standard indices of the Performance Classification?

Also the Panel will check whether there is any incorrect statement in the description of the performance classification or improper expression which might lead to misunderstanding in the product label.

In the case where even one of the above items is not satisfactory, the Panel will mail to the Submitter a notice of the rejection of the filing along with the reason for the rejection, or a notice requesting the Submitter to make the necessary corrections.

In the case where all the items are satisfactory, the Panel will mail a notice of the filing to the Submitter and file a copy with the notification documents submitted.

4.6 Oil Code Reference Numbers

A Submitter should choose an Oil code reference number, which the Panel will record. An oil code reference number is to be established on the following basis:

○○○ △△△ □□□
① ② ③

- ① Country Number (a three digit number)
The international telephone country number of the Submitter or the company who manufactures the 2-cycle oil concerned (e.g. Japan: 081; the United States: 001; the United Kingdom: 044)
- ② Supplier's Code (three English capital letters)
This code consists of three English capital letters which a Submitter wishes, e.g., HMC for Honda Motor Company or JXE for JXTG Nippon Oil & Energy Corporation. Note that a Submitter should use only one supplier's code for each different 2-cycle oil.

However, one submitter is allowed to use multiple suppliers' code with JASO Panel's approval. Such cases are when the supplier is inheriting the different supplier's code due to company merger or brand inheritance.

In the case where a Submitter's desired code duplicates a code which has already been used by another submitter, the Panel may request a change to the desired code to avoid duplication.

- ③ Control Number (a three digit number)
This is the Submitter's own number, which is freely chosen by a Submitter. However, it is not allowable

for a Submitter to apply the same control number followed by same seller code to more than one product or trial product.

For reference, examples for choosing oil codes are indicated in Appendix 3.

4.7 Disclosure of On-File Information

For promotion and public recognition of the JASO Two Stroke Gasoline Engine Oils(JASO M 345: 2018), and two stroke gasoline engine oil products, the JASO Engine Oil Standards Implementation Panel will publicize, based on the JASO Two Stroke Gasoline Engine Oils, Oil Codes, brand names, submitters' names and performance classifications of on-file products through such communication media as the Internet, newspapers, magazines and other printed matters according to the JASO Two Stroke Gasoline Engine Oils.

If the informations are incorrect in those the submitter has submitted, the submitter shall notice the correction in written materials as soon as possible.

JASO Engine Oil Standards Implementation Panel does not have any responsibilities on the loss and the damage of submitters caused by the informations which has been agreed between JASO Engine Oil Standards Implementation Panel and submitters by the "NOTIFICATION AND WRITTEN CONSENT OF FILING".

4.8 Responsibility for Quality

The quality and performance of a 2-cycle oil filed in accordance with this system are classified and guaranteed on the responsibility of the Submitter, and all responsibility rests with the Submitter (the Supplier).

Under this system, the Panel will not assume any responsibility for quality or performance. The Panel will not take any responsibility for loss or damage resulting from the use of this system.

In the case where a problem associated with the quality or the performance of the 2-cycle oil occurs, it must be resolved by the Submitter.

Further, in the case where this system conflicts with any legislation of the country concerned (including a country's local government(s) thereof), the legislation shall be over-riding. Accordingly, the Panel will not assume any responsibility for loss or damage which may be caused by using this system, should it be incompatible with any legislation.

4.9 Maintenance of Secrecy

Except for the conditions mentioned in Item 4.7 - Disclosure of On-File Information, the Panel will not disclose documents submitted and filed to a third party

(other than an organization entrusted by the Panel) without the written consent of the Submitter. This rule, however, does not apply to the case where the Panel is required by a public body to disclose information based on a legal requirement. Should the notification documents submitted or contents of the filing become disclosed or leaked to a third party, the Panel shall in no event be held responsible for compensation for any loss or damage resulting from such disclosure or leakage.

In the case where a market problem takes place and the Panel receives an inquiry in writing based on such a market problem from the party involved, the Panel shall be allowed to reply to the party as to whether or not the 2-cycle oil having the designated Oil Code Reference Number is on file, and to advise the party of submitter name concerned. Further, in the case where the party desires to contact the Submitter, the Panel will inform the Submitter, and will leave the problem to the Submitter. The Panel will take no further action.

4.10 Alteration of Filing

If the same product name is used, but the 2-cycle oil formulation on file is modified, new notification documents shall be submitted. In this case, the control number of the Oil Code Reference Number must be revised. However, it is not necessary to revise the Oil Code Reference Number of the reformulation if it is within the allowable range of read-across indicated in Appendix 4 (except in the case where coloring agent or odorant is changed).

In any of the following cases, the submitter shall report to the JASO Engine Oil Standards Implementation Panel in advance. In any of these cases, the submitter shall make necessary payment as specified in Item 4.3 and update the oil code concerned.

- (1) Change of the submitter's code
- (2) Change of the name of submitter (company) or the code
of submitter
- (3) Change of the name of product
- (4) Change of the performance classification marking form

In any of the following cases, the submitter shall promptly report to the JASO Engine Oil Standards Implementation Panel. Note that it is not required to pay a on-file fee specified in Item 4.3 or update the oil code concerned. However, handling fee is required for (2) listed below, but the update of the oil code reference number is not needed.

- (1) Change of the information on communication with the submitter (address, telephone number, etc.)
- (2) Change of submitter's company's name.
(Only when supplier code is same due to company merger or brand inheritance. In this case, submit a form in Appendix 7, original on-file submitting form, and performance classification marking form with a new company name.)

Regarding the alteration of 2-cycle oil formulations and the necessity for alteration of filing, see Appendix 3.

4.11 Items to be Taken into Consideration by the Submitter

In the case where a Submitter indicates an Oil Code Reference Number and performance classification on product containers, the Submitter has to take the following into consideration.

- 1) The quality and performance of the marketed product and its labeling shall be the same as those described in the notification documents.
- 2) In the case where problems associated with the quality, performance or labeling of the product occurs, the Submitter shall, on his/her own responsibility, solve such problems and, if necessary, make compensation.
- 3) It is requested that Submitters widely publicize and educate general consumers through their sales Channels that the quality and performance of the filed 2-cycle oils and their labeling is classified and guaranteed on their own responsibility.
- 4) When ceasing sales of the 2-cycle engine oil on file, the submitter shall promptly apply for cancellation to the JASO Engine Oil Standards Implementation Panel.

5. Labeling

In the case where a Submitter, who has received a notice of a filling from the Panel, labels the performance classification and Oil Code Reference Number on the containers, the Submitter shall expressly state that the Submitter makes such performance classification and labeling on his/her own responsibility, using the form indicated in Appendix 5.

A user of the standards, who labels his/her products accordingly, shall not use in advertising a description which might lead to the misunderstanding that the Panel approved or certified the quality and performance of the 2-cycle oil concerned. Further, as stated in Item 4.3, a user of the standards shall submit a typical example and an entire product label(or design) to the Panel by mail.

6. Market Survey

For ensuring proper interests of consumers and on-file submitters, the JASO Engine Oil Standards Implementation Panel will conduct market survey regarding JASO two stroke gasoline engine oil products and check that the JASO two stroke gasoline engine oils(JASO M 345: 2018), are used correctly on the market. Therefore, the JASO Engine Oil Standards Implementation Panel may take arbitrary samples of JASO engine oil category FB, FC or FD from the market, examine the performance marking form and quality/performance items specified in the JASO Two Stroke Gasoline Engine Oils(JASO M 345: 2018), and check them against the on-file documents concerned. If any clear discrepancy from the on-file document concerned is found in this market survey, the JASO Engine Oil Standards Implementation Panel may ask the on-file for its reason in writing or make a request

for improvement.

The JASO Engine Oil Standards Implementation Panel may disclose the results of market survey in a form that particular names of submitters and their oil products are not identifiable.

7. Utilization of the Standards by Dealers of Motorcycles
A person who distributes, deals, supplies or otherwise offers motorcycles, etc. for supply in the course of trade or business (the "Dealers") can utilize the JASO M345 Standards by way of recommending in the owner's manual, etc. 2-cycle oils to be used by consumers according to the performance classification set forth in the JASO M345 Standards based on the Dealer's own judgment and responsibility.

When recommending a 2-cycle oil, a user of the standards shall not utilize any expression which may lead to the misunderstanding that the Panel approved or certified the quality and performance of the 2-cycle oil (e.g., an expression such as "2-cycle oil approved by the Panel")

Further, the Panel would like a user of the standards, recommending a 2-cycle oil, to submit a typical example of the owner's manual concerned to the Panel.

8. References

The availability of reference documents, parts and the other items relating to this system are given below :

- 8.1 Addressee for Specified Notification Documents for Filing, and Supply of Forms

The JASO Engine Oil Standards Implementation Panel
c/o Business Dept.
The Japan Lubricating Oil Society
2-16-1, Hinode, Funabashi-shi
Chiba 273-0015, Japan
Tel:81-47-433-5181 / Fax:81-47-431-9579
URL : <http://www.jalos.or.jp/onfile>

- 8.2 Supply of Test Procedures and Performance Classification (JASO Standards)

Society of Automotive Engineers of Japan, Inc.
Gobancho Center Bldg. 5F
10-2 Gobancho, Chiyoda-ku
Tokyo 102, Japan

Tel : 81-3-3262-8211/Fax : 81-3-3261-2204
URL : <http://www.jsae.or.jp/>
e-mail : book@jsae.or.jp

- 8.3 Supply of JATRE-1 and JATRE-3 Reference Oils 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

8.4 Supply of Test Engines and Parts

(a) Yamaha ET-1 engine

Engine and Parts

(Exhaust Smoke and Exhaust System Blocking Tests)

Yamaha generator ET-1 order reception desk

YAMAHA MOTOR POWERED PRODUCTS CO., LTD

e-mail : order_yamaha_et1@ympc.co.jp

In addition, because it becomes the order production,
they need a time of three to six months before delivery.

(b) RedMax Engine blower (EBZ6500) engine

Engine and Parts

(Lubricity and Detergency Tests)

Special Customer Sales Group

Husqvarna Zenoah Co., Ltd

1-9 Minamidai, Kawagoe City

Saitama 350-1165,

Japan

Tel:+81-49-243-6567 Fax:+81-49-243-6947

Dealer of RedMax(for American Market)

Appendix 1

DOCUMENT FOR FILING BASED ON TWO CYCLE GASOLINE ENGINE OIL
PERFORMANCE CLASSIFICATION (JASO M345)

Date of submission of Documents		/Day	/Month	/Year
Submitter		Contact Person		
Person Responsible for Documentation Name		Name		
		Position		
Signature		Address		
Title		Tel		
		Fax		

2-Cycle Oil To Be Filed			
Internal Product Name or No.			
Trade Name			
Performance Classification	FB	FC	FD
Oil Code			

1. Physical and Chemical Properties

Item		Test method		Measured value	Specification
		JIS or JPI	ASTM		
Density (15°C)	g/cm ³	K 2249-1 or K 2249-2	D1298 or D4052		Report
Flash point	°C	K 2265-3 or K 2265-4	D92 or D93		70 min.
Kinematic viscosity (40°C)	mm ² /s	K 2283	D445		Report
Kinematic viscosity(100°C)	mm ² /s	K 2283	D445		6.5 min.
Viscosity index		K 2283	D2270		Report
Carbon residue	mass%	K 2270-1or K 2270-2	D189 or D4530		Report
Sulfated ash (FB,FC),	mass%	K 2272	D874		0.25 max.
↑ (FD),	mass%	K 2272	D874		0.18 max.
Acid number	mg KOH/g	K 2501	D664		Report
Base number (HClO ₄ method)	mg KOH/g	K 2501	D2896		Report
Pour point	°C	K 2269	D97		Report
Color (Visual inspection)					Report
Elemental analysis	mass%				
Calcium		JPI-5S-38	D4951 or D5185		Report
Barium		JPI-5S-38	D4951 or D5185		Report
Magnesium		JPI-5S-38	D4951 or D5185		Report
Zinc		JPI-5S-38	D4951 or D5185		Report
Boron		JPI-5S-38	D4951 or D5185		Report
Phosphorus		JPI-5S-38	D4951 or D5185		Report
Nitrogen		K 2609	D4629		Report
Sulfur		K 2541-7 or JPI-5S-38	D2622 or D4951 or D5185		Report
Other elements > 100ppm (except carbon, hydrogen, and oxygen)					Report
Infrared absorption spectrum analysis (0.1 mm sealed absorption cell)					A4 size IR chart to be attached

Note : JIS test methods are preferred, but ASTM methods are also acceptable.

2. JASO Engine Test Results

Item			Test method	Test result (Performance index)	Standard index		
					FB	FC	FD
Lubricity			JASO M 340-2018		103 min.	103 min.	103 min.
Initial torque			JASO M 340-2018		98 min.	98 min.	98 min.
Detergency	180 min	Funda- mental Part	JASO M 341-2018 180min test		65 min.	95 min.	110 min.
		Piston Skirt Part			65 min.	90 min.	100 min.
Smoke			JASO M 342-2018		45 min.	85 min.	85 min.
Blocking			JASO M 343-2018		45 min.	90 min.	90 min.

We hereby warrant that the test results described in this document indicate typical figures of the 2-cycle oil concerned, and represent performance of the product that will be marketed.

The test reports were prepared according to the format specified in the JASO Standards and the retained tests reports are kept under our own responsibility. We herewith submit a typical example and an entire product label of the quality and performance of the 2-cycle oil concerned that will be used on containers and literature.

Note:

- 1) Refer to the "TWO CYCLE GASOLINE ENGINE OIL PERFORMANCE CLASSIFICATION (JASO M 345) IMPLEMENTATION MANUAL" in filling in this form.
- 2) The current version (if no date is cited) of the JASO, JIS and ASTM test procedure at the time of documents submission must be used to generate test data which are reported in the documents submitted.
- 3) The handling fee is Yen 40,000 per submission. It should be paid into the following bank account, and a certificate of the payment should be attached to documents being submitted to the JASO Engine Oil standards Implementation Panel.

Appointed Bank: Funabashi Branch
of the MUFG Bank, Ltd.

Account No: Ordinary Deposit #1036018

Owner of the Account: The Japan Lubricating Oil Society

Or

Appointed Bank: Funabashi Branch
of the Sumitomo Mitsui Banking Corporation

Account No: Ordinary Deposit #6359999

Owner of the Account: The Japan Lubricating Oil Society
- 4) In the case where a false report is made, and labeling of the performance of a product and sales were made based on such a report, the company concerned may be penalized under the Act against Unjustifiable Premiums and Misleading Representations of Japan, Article 4, Item 1-1 or the Unfair Competition Prevention Laws of Japan, Article 2, Item 1-13, or any other equivalent laws in the country in which the product is marketed.

Only for the Use of the JASO Engine Oil standards Implementation Panel	
Person responsible for receipt - Name: _____ Seal: _____	
Date of receipt: _____	
Receipt number: _____	
Remarks:	

Appendix 2

ORIGINAL

TABLE A

NOTIFICATION AND WRITTEN CONSENT OF FILING BASED ON
THE TWO CYCLE GASOLINE ENGINE OIL PERFORMANCE
CLASSIFICATION (JASO M 345)
[NOTIFICATION OF FILING]

TO : _____ DATE : _____ /Day /Month /Year

From : The JASO Engine Oil
standards Implementation
Panel

As shown below, we have filed the 2-cycle oil with the oil code number and performance classification indicated below, and hereby inform you as follows:

Receipt no. : _____
Product name or no. : _____
Trade name : _____
Oil code no. : _____
Performance classification : _____

ORIGINAL

TABLE B

NOTIFICATION AND WRITTEN CONSENT OF FILING BASED ON
THE TWO CYCLE GASOLINE ENGINE OIL PERFORMANCE
CLASSIFICATION (JASO M 345)
[WRITTEN CONSENT OF FILING]

TO : The JASO Engine Oil standards Implementation Panel

Regarding the marketing of a 2-cycle oil filed by the JASO Engine Oil standards Implementation Panel (the "Panel"), we hereby agree to the following items:

1. We shall classify and guarantee the quality and performance of the 2-cycle oil concerned as well as labeling thereof on our own responsibility.
2. We shall resolve, by ourselves, any problems associated with the use of the 2-cycle oil concerned in the market, and we agree that the JASO Engine Oil standards Implementation Panel will not be held responsible in any way.

3. We hereby guarantee that the quality and performance described in the notification documents submitted for filing are data representing the physico-chemical properties and performance of the 2-cycle oil that will be actually marketed. Also the description of quality and performance that has been submitted is representative of that which will be used.
4. We will widely publicize and educate consumers through our sales channels that the quality and performance of the 2-cycle oils and its description that are submitted for filing are classified and guaranteed on our own responsibility.
5. We shall not use in our advertisement any expression which may lead to the misunderstanding that the Panel approved or certified the performance of the 2-cycle oil concerned.
6. Upon receipt of a request from the Panel, we shall submit the original engine test reports without delay.
7. The submitter shall approve that the JASO Engine Oil Standards Implementation Panel may disclose the oil code, submitter name, product name and performance classification, through communication media including the Internet, newspapers, magazines, and other publications. Further, where market survey is conducted by the JASO Engine Oil Standards Implementation Panel, the submitter shall approve that the JASO Engine Oil Standards Implementation Panel may disclose the results of the market survey in a form of that the name of the submitter and the oils are not identifiable.
8. When the marketing of the 2-cycle oil concerned is discontinued, we will immediately notify the Panel that the filing be canceled.
9. In addition to the above, we hereby acknowledge that we have understood all contents of the Two Cycle Engine Oil Performance Classification (JASO M345) Implementation Manual and the Guidelines for Utilizing Two Cycle Gasoline Engine Oil Performance Classification Standards, and we hereby agree to abide by them in all respects.

Date : _____ /Day _____ /Month _____ /Year

Company : _____

Responsible Person : _____

Title : _____

Signature : _____

Appendix 2

DUPLICATE

TABLE A

NOTIFICATION AND WRITTEN CONSENT OF FILING BASED ON
THE TWO CYCLE GASOLINE ENGINE OIL PERFORMANCE
CLASSIFICATION (JASO M 345)
[NOTIFICATION OF FILING]

TO : _____ DATE : _____ /Day /Month /Year

From : The JASO Engine Oil
standards Implementation
Panel

As shown below, we have filed the 2-cycle oil with the oil code number and performance classification indicated below, and hereby inform you as follows:

Receipt no. : _____
Product name or no. : _____
Trade name : _____
Oil code no. : _____
Performance classification : _____

DUPLICATE

TABLE B

NOTIFICATION AND WRITTEN CONSENT OF FILING BASED ON
THE TWO CYCLE GASOLINE ENGINE OIL PERFORMANCE
CLASSIFICATION (JASO M 345)
[WRITTEN CONSENT OF FILING]

TO : The JASO Engine Oil standards Implementation Panel

Regarding the marketing of a 2-cycle oil filed by the JASO Engine Oil standards Implementation Panel (the "Panel"), we hereby agree to the following items:

1. We shall classify and guarantee the quality and performance of the 2-cycle oil concerned as well as labeling thereof on our own responsibility.
2. We shall resolve, by ourselves, any problems associated with the use of the 2-cycle oil concerned in the market, and we agree that the JASO Engine Oil standards Implementation Panel will not be held responsible in any way.

3. We hereby guarantee that the quality and performance described in the notification documents submitted for filing are data representing the physico-chemical properties and performance of the 2-cycle oil that will be actually marketed. Also the description of quality and performance that has been submitted is representative of that which will be used.
4. We will widely publicize and educate consumers through our sales channels that the quality and performance of the 2-cycle oils and its description that are submitted for filing are classified and guaranteed on our own responsibility.
5. We shall not use in our advertisement any expression which may lead to the misunderstanding that the Panel approved or certified the performance of the 2-cycle oil concerned.
6. Upon receipt of a request from the Panel, we shall submit the original engine test reports without delay.
7. The submitter shall approve that the JASO Engine Oil Standards Implementation Panel may disclose the oil code, submitter name, product name and performance classification, through communication media including the Internet, newspapers, magazines, and other publications. Further, where market survey is conducted by the JASO Engine Oil Standards Implementation Panel, the submitter shall approve that the JASO Engine Oil Standards Implementation Panel may disclose the results of the market survey in a form of that the name of the submitter and the oils are not identifiable.
8. When the marketing of the 2-cycle oil concerned is discontinued, we will immediately notify the Panel that the filing be canceled.
9. In addition to the above, we hereby acknowledge that we have understood all contents of the Two Cycle Engine Oil Performance Classification (JASO M345) Implementation Manual and the Guidelines for Utilizing Two Cycle Gasoline Engine Oil Performance Classification Standards, and we hereby agree to abide by them in all respects.

Date : _____ /Day _____ /Month _____ /Year

Company : _____

Responsible Person : _____

Title : _____

Signature : _____

Appendix 3

EXAMPLES OF SETTING UP OIL CODE NUMBERS AND THE NECESSITY
FOR RETESTING AND SUBMISSION OF DOCUMENTS FOR ALTERATION OF FORMULATIONS

Although the procedure of setting up oil code number is indicated in Item 4.6 of the Standards Implementation Manual, the following examples are shown for reference (Case 1 is the baseline).

Cs.	Country of Marketing	Product Name	Marketer			Manufacturer		Formulation			Example of Oil Code Number	Necessity for Renewal of Filing	Necessity for JASO Engine Testing
			Company	Code	Country	Company	Country	Name	No.	Alteration			
1	Japan	α	A	ABC	Japan	A	Japan	a	001	Note(1)	081ABC001	Yes	Yes
2	Japan	α	A	ABC	Japan	B	Japan	a	001	None	081ABC001	None	None
3	Japan	α	A	ABC	Japan	A	Japan	a'	002	Note(2)	081ABC001	None	Recommended
4	Japan	α	A	ABC	Japan	A	Japan	a''	003	Note(3)	081ABC002	Yes	Yes
5	Japan	α	A	ABC	Japan	A	Japan	a'''	004	Note(4)	081ABC003	Yes	None
6	Japan	β	A	ABC	Japan	A	Japan	a'''	004	Note(4)	081ABC004	Yes	None
7	Japan	β	A	ABC	Japan	A	Japan	a	001	None	081ABC005	Yes	None
8	Japan	τ	A	ABC	Japan	A	Japan	b	005	Note(5)	081ABC006	Yes	Yes
9	USA	α	A	ABC	Japan	A	Japan	a	001	None	081ABC001	None	None
10	USA	α	A	ABC	Japan	C	USA	a	001	None	081ABC001	None	None
11	USA	α	A	ABC	Japan	C	USA	a'	002	Note(2)	081ABC001	None	Recommended
12	USA	α	A	ABC	Japan	C	USA	a''	003	Note(3)	081ABC002	Yes	Yes
13	USA	α	A	ABC	Japan	E	UK	a	001	None	081ABC001	None	None
14	USA	δ	A	ABC	Japan	A	Japan	a	001	None	081ABC007	Yes	None
15	USA	α	D	DEF	USA	A	Japan	a	001	None	001DEF001	Yes	None
16	USA	ε	D	DEF	USA	A	Japan	a	001	None	001DEF002	Yes	None
17	USA	α	D	DEF	USA	E	UK	a	001	None	001DEF001	Yes	None
18	Japan	α	A	ABC	Japan	E	USA	a	001	None	081ABC001	None	None
19	Japan	ζ	D	DEF	USA	A	Japan	a	001	None	001DEF001	Yes	None
20	Japan	α	D	DEF	USA	E	UK	a	001	None	001DEF001	Yes	None
21	USA	α	E	EFG	UK	G	Germany	a	001	None	044EFG001	Yes	None
22	Japan	α	F	FGH	Japan	A	Japan	a	001	None	081FGH001	Yes	None
23	Japan	α	F	FGH	Japan	F	Japan	a	001	None	081FGH001	Yes	None
24	Japan	α	F	ABC	Japan	F	Japan	a	001	None	081ABC001	None	None

- Note (1) : Base for formulations subsequently filed
 (2) : Within the read-across range
 (3) : Outside the read-across range
 (4) : Alteration of coloring agent and odorant only
 (5) : Different formulation

Appendix 4

GUIDELINES FOR READ-ACROSS WHEN MODIFYING TWO CYCLE OIL FORMULATIONS

The primary raw materials usually used for 2-cycle oil formulations may be classified into the following four categories :

- i) Base Oil - Main base component. Mineral oil or synthetic oil but not including polybutenes or their mixtures.
- ii) Additives - To improve Lubricity and detergency of 2-cycle oils, additives such as detergents, dispersants, antiwear agents, and EP agents, etc. are used.
- iii) Polybutenes (Polyisobutylenes) - To improve exhaust smoke and exhaust system blocking, polybutenes are used.
- iv) Diluent - To improve the handling and fuel (Solvent) miscibility of 2-cycle oils, distillates of petroleum such as kerosene, gas oils or other solvents are used as diluents.

Since any of these primary raw materials affects the performance of 2-cycle oils, in the case where alteration of any of these primary raw materials or their blend ratio is made, the oil is regarded as a different formulation, and it is required to rerun the JASO engine tests and to submit specified documents for filing using another oil code number.

If a reformulation is made within the following ranges, the oil is regarded as equivalent to its original formulation and renewal of the documents submission is exempted. However, confirmative testing for detergency and exhaust smoke is recommended.

- i) Base Oil - The case where a base oil of the same type and physical properties is used at the same blend ratio.
- ii) Additives - In principle, any alteration of additives is not approved. However, in the case of alteration of a coloring agent or odorant, read-across of the engine test data is allowed. In this case, however, renewal of the filing is required.
- iii) Polybutenes - The case where a polybutene of the same (Polyisobutylenes) type and molecular weight distribution is used at the same treat rate.
- iv) Diluent - The case where a diluent of the same (Solvent) type and physical properties is used at the same blend ratio.

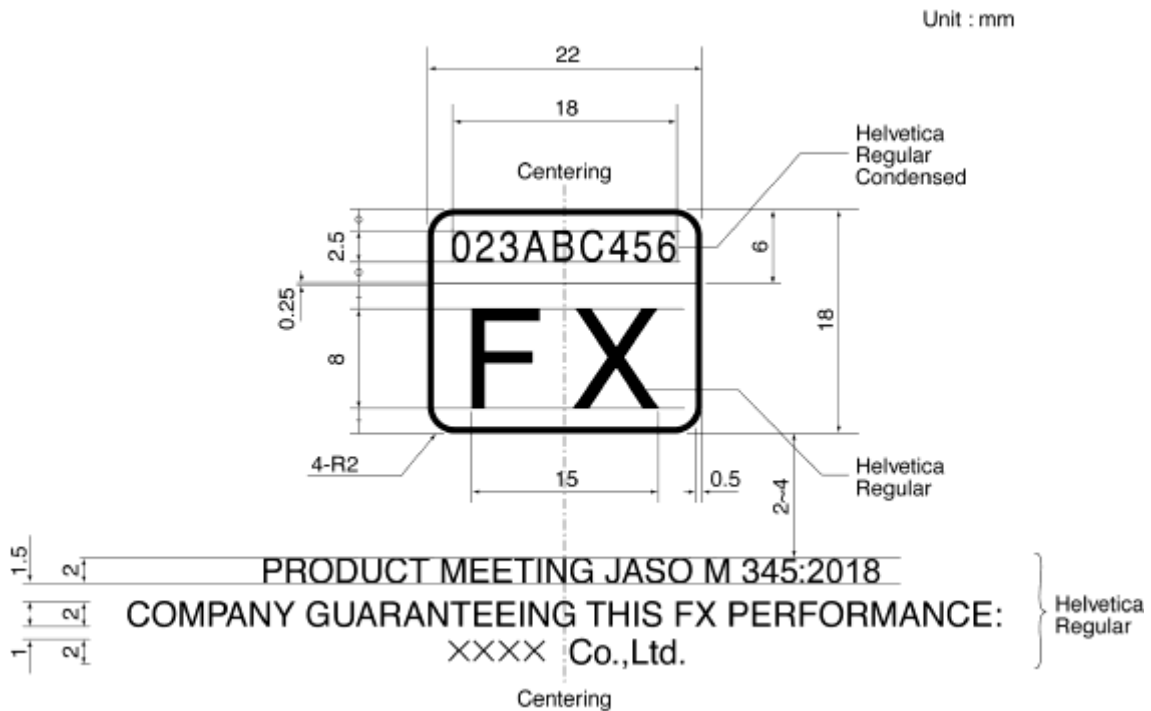
Appendix 5

INSTRUCTIONS FOR LABELING OR PRINTING THE
OIL CODE NUMBER AND PERFORMANCE CLASSIFICATION

If the performance classification and oil code number are indicated on product containers, they shall be depicted as follows:

1. Required display format

1.1 Dimensions and form of characters



1.2 Notes

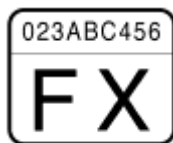
- 1) The designation of "023ABC456" indicates the oil code. Use Helvetica Regular Condensed font or Arial Narrow font with the size equivalent to the border with the specified dimensions.
- 2) Use one of the letters FB, FC or FD in place of "FX" above in accordance with the performance classification of the lubricating oil concerned. Use the Helvetica Regular font or Arial font for which the size should be equivalent to the border with the specified dimension.
- 3) Use the Helvetica Regular font or Helvetica Regular Condensed or Arial Narrow font for "PRODUCT MEETING JASO M345", with the size equivalent to the specified dimensions. In the same way, use the Helvetica Regular font or Helvetica Regular Condensed or Arial Narrow font for "COMPANY GUARANTEEING THIS FX PERFORMANCE : XXXX CO., LTD.", and limit it to 2 or 3 lines.

- 4) Colors which contrast the letters and the rectangular lines with the background should be used.
- 5) For the sentence under the above mark, the marketer may use their own language indicating the same expression as that written in English. In this case, it is to be desired that the form of characters used and their size are as similar as possible to the exemplification in English.

2. Guidelines for indication of the designation mark

- 1) The dimension of the above mark indicates the reference size. Depending upon the size of the product containers, the size above minimum dimensions can be used, but it is desirable not to exceed quadruple the size. The minimum size is limited 0.8 x reference dimensions.
- 2) The marketer without constraint can be decided the location of the mark on containers.

3. Examples of the Designation Mark



PRODUCT MEETING JASO M 345:2018
 COMPANY GUARANTEEING THIS FX PERFORMANCE:
 XXXX Co.,Ltd.

Mark with Dimensions
 Specified in Item 1.1
 of Appendix 5



PRODUCT MEETING JASO M 345:2018
 COMPANY GUARANTEEING THIS FX PERFORMANCE:
 XXXX Co.,Ltd.

1.5 x Dimensions



PRODUCT MEETING JASO M 345:2018
 COMPANY GUARANTEEING THIS FX PERFORMANCE:
 XXXX Co.,Ltd.

2 x Dimensions

Appendix 6

Procedure to change the submitter's company name

When requesting the change in the name of the company, the handling fee of JPY 40,000 per submission must be made to following bank account. When applying for change of the submitter's company name, a certificate of the payment must be attached with necessary documents listed below to the JASO Engine Oil standards Implementation Panel.

Appointed Bank: Funabashi Branch
of the Sumitomo Mitsui Banking
Corporation
Account No: Ordinary Deposit #6359999
Owner of the Account: The Japan Lubricating Oil Society

Or

Appointed Bank: Funabashi Branch
of MUFG Bank, Ltd.
Account No: Ordinary Deposit #1036018
Owner of the Account: The Japan Lubricating Oil Society

Necessary forms

- 1) Certificate of the payment
- 2) Appendix 7, Notification of the change in the name of the company
- 3) Original on-file submission form
- 4) Representative example of performance classification marking form and overall product design label (Design is also allowed)

THE TWO CYCLE GASOLINE ENGINE OIL PERFORMANCE
 CLASSIFICATION (JASO M 345)
 Notification of the change in the name of the company

To : JASO Engine Oil standards
 Implementation Panel

We hereby notify the change in the name of the submitter's company based on performance classification implementation manual 4.10 regarding the following two cycle gasoline engine oil listed on-file as below registration number.

The two cycle gasoline engine oil to be filed

Registration Number	
Company's name , No.	
Product Name (English)	
Oil Code	
Performance Classification	FB FC FD

(Circle the corresponding performance classification to be filed)

Date of submission of documents	/Day	/Month	/Year
Submitter (Company)			
Person Responsible for Documentation Name			
Title			
Signature			

JASO Engine Oil standards Implementation Panel			
Registrar	:		
Registered Date	:	/Day	/Month
Registration Number	:	/Year	