

AUTOMOTIVE DIESEL ENGINE OIL STANDARD
(JASO M 355: 2008)
APPLICATION MANUAL

May, 2009

JASO Engine Oil Standards Implementation Panel

NOTICE: The quality, performance and classification marking of a diesel engine oil product which has been filed on file using the Automotive Diesel Engine Oil Standard (JASO M 355: 2008) Implementation System shall be assured by the submitter. The submitter shall assume responsibility for the quality, performance and classification marking of the filed engine oil product concerned.

The JASO Diesel Engine Oil Performance Classification Implementation System is not intended for the JASO Engine Oil Standards Implementation Panel to provide assurance concerning the quality and performance of any filed diesel engine oil product. Note that no responsibility for any filed diesel engine oil product shall be assumed by the JASO Engine Oil Standards Implementation Panel.

Should any problems occur concerning the quality, performance and marking of a filed diesel engine oil product, the submitter or the user of the JASO DH-1 Diesel Engine Oil Standard shall be responsible for any response. The submitter and/or the user of Automotive Diesel Engine Oil Standard (JASO M 355: 2008), shall attain a full understanding of the contents of the Standards in application. 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.

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1. Introduction

This document has been prepared by the JASO Engine Oil Standards Implementation Panel, which was established voluntarily by industrial and academic associations related with engine oil products in Japan, for the purpose of establishing JASO Engine Oil Standards in domestic and overseas markets. Explained in this document are the reporting and on-file procedures to be taken by lubricant sellers or oil suppliers when registering an oil product with the JASO Engine Oil Standards Implementation Panel according to the Automotive Diesel Engine Oil Standard (JASO M 355: 2008) specified by the Society of Automotive Engineers of Japan, Inc. (JSAE).

In this document, the term “diesel engine” means a four-stroke-cycle engine driven with diesel fuel, and the term “diesel engine oil” signifies lubricant for the four-stroke-cycle diesel engine.

According to recommendations made in 2000 by the Automotive/Lubricant Joint Committee (ALJC) which is a joint committee of the Petroleum Association of Japan (PAJ) and the Japan Automobile Manufacturers Association, Inc. (JAMA), this reporting/on-file system has been proposed by the JASO “DX-1” Working Group which is subordinate to the Engine Oil Sub Committee, and it has been established by the JASO Engine Oil Standards Implementation Panel with support by relevant industrial and academic associations. In 2005, on the occasion of revision of the Automotive Diesel Engine Oil Standard (JASO M 355: 2005) to which new classifications are added, the amendment to this reporting/on-file system has been proposed by the Diesel Oil Working Group which is subordinate to the Engine Oil Sub Committee and it has been approved by the JASO Engine Oil Standards Implementation Panel.

2. Purpose of Automotive Diesel Engine Oil Standard JASO DH-1 (JASO M 355: 2008) Performance Classification Implementation System and Working Organizations Thereof

2.1 Purpose

This system has been established for the purpose of ensuring the conformity of Automotive Diesel Engine Oil Standard (JASO M 355: 2008) to a diesel engine vehicle. Through the use of this system, diesel engine oil sellers or suppliers can communicate the quality of the oil to consumers of diesel engine oil. It is therefore expected to provide enhancement in reliability of diesel engines.

2.2 Working Organizations

To increase application of the Automotive Diesel Engine Oil Standard (JASO M 355: 2008), the Diesel Engine Oils Steering Committee (“DEO Steering Committee”) has been set up in parallel to the existing Motorcycle-Two Stroke Cycle Engine Oils Steering Committee and the Motorcycle-Four Stroke Cycle Engine Oils Steering Committee under the JASO Engine Oil Standards Implementation Panel as shown in Figure 1. Under the DEO Steering Committee, the Technical Committee has been set up which presides over the Valve Train Wear Test Surveillance Panel, the Detergency Test Surveillance Panel, the Hot Tube Test Surveillance Panel, and the Market Survey Panel. The chairman and vice-chairman of the Engine Oil Sub Committee shall take chairmanship and vice-chairmanship in the Technical Committee. The leaders of the panels mentioned above take part in the Technical Committee as commissioners, and the Society of Automotive Engineers of Japan, Inc. (JSAE) and the Japan Petroleum Institute participate as liaison members.

The Valve Train Wear Test Surveillance Panel, the Detergency Test Surveillance Panel, and the Hot Tube Test Surveillance Panel conduct examinations for solving problems encountered with the tests. The Market Survey Panel forms market survey plans and analyzes the results of market survey when required. Each panel shall be mainly composed of members from automobile manufacturers, petroleum manufacturers, and additive manufacturers. As required, participation from other industries shall be requested.

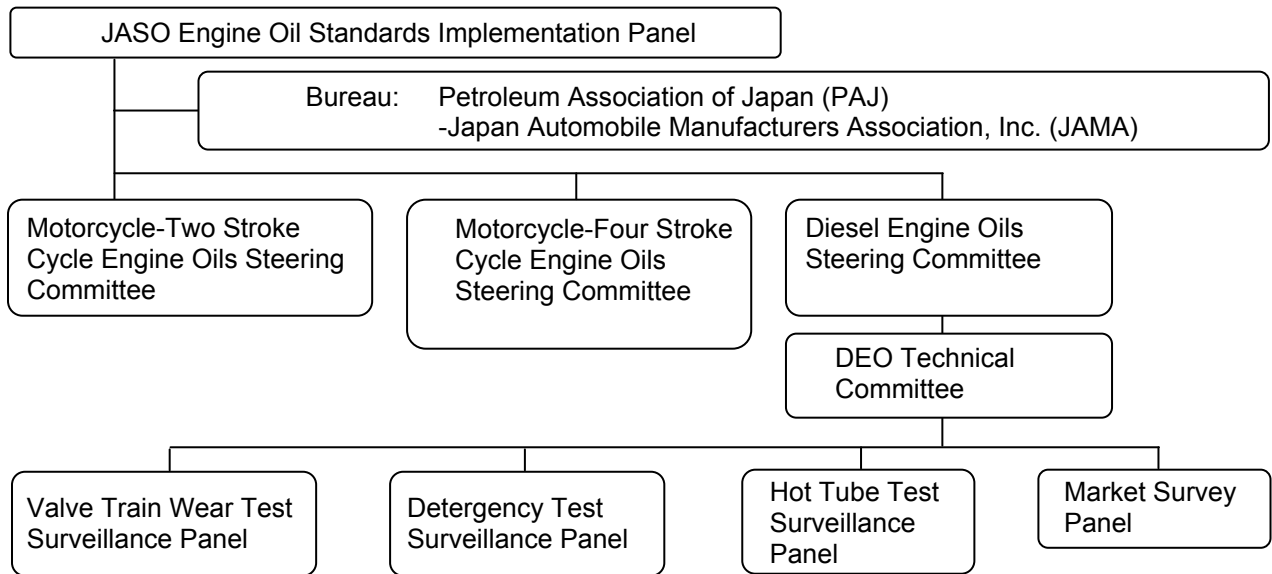


Fig. 1 Working Organizations for Automotive Diesel Engine Oil Standard (JASO M 355: 2008) Chart

3. Automotive Diesel Engine Oil Standard (JASO M 355: 2008)

3.1 Outline of JASO Standard

Engine oils subject to the Automotive Diesel Engine Oil Standard JASO M 355: 2008 shall be classified into DH-1, DH-2 and DL-1, all of which apply to four-cycle diesel engines.

DH-1 classification has been developed for the diesel engines which are subjected to long-term exhaust emission regulations, and stipulate requirements for performance in such conditions as wear prevention, corrosion prevention, high-temperature oxidation stability, and soot control. Further, oils conforming to DH-1 standard (hereinafter "DH-1 Oils") are intended for suppressing deterioration of piston detergency, formation of deposits at high temperature, foaming, oil consumption due to evaporative loss, viscosity decrease by shear, deterioration of oil seals, etc.

The DH-1 Oils are also applicable to engines which were predating the long-term exhaust emission regulations. Based on the premise that the drain intervals recommendation specified by engine manufacturers are observed, application of a DH-1 Oil is also allowed to cases where diesel fuel having more than 0.05% sulfur content is used.

DH-2 and DL-1 classifications have been developed for the engines which are equipped with after-treatment devices such as Diesel Particulate Filter (DPF) and catalyst in compliance with exhaust emission regulations subsequent to the new short-term regulations. Oils conforming to these standards (hereinafter "DH-2 Oils," "DL-1 Oils") have an excellent applicability to DPF and catalyst while keeping the same performance level as required for DH-1 classification. Note that because required levels of engine oil are different between for truck/bus and for passenger car class in engine durability, oil change distance, fuel economy, etc., DH-2 classification is adopted for heavy-duty use by trucks/buses and DL-1 classification is adopted for light-duty use by passenger car classes.

DH-2 Oils and DL-1 Oils can be used only in the environment where low-sulfur diesel fuel having not more than 0.005% sulfur content is used.

Based on the premises that low-sulfur diesel fuel having not more than 0.005% sulfur content is used and that the user complies with oil change distance recommended by the engine manufacturer, application of a DH-2 Oil is also allowed to engines predating the new short-term exhaust emission regulations.

3.2 Details of Establishment of the Standard

In Japan, it is common practice to use the API Service Classification Standard for quality assurance of automotive diesel engine oil products. However, it has been found that the API Service Classification Standards are not always applicable to diesel engines manufactured in Japan, due to differences in design between Japan and the U.S.A. engine manufacturers. More specifically, in a majority of diesel engine oil products in widespread use in Japan, special performance characteristics such as wear prevention improvement characteristics for sliding rocker-arm valve train are added so that the requirements for made-in-Japan engines are satisfied. Further, the automotive manufacturers in Japan have made a request for establishing new oil quality Standard that will meet the recent requirements concerning exhaust emission regulations.

In the Asian market where the market share of Japanese-made automobiles is rather high, diesel engine oil products having lower quality than those used in Japan are used in most cases. It is therefore necessary to promote diesel engine oil products having higher quality in the Asian countries as well. With this background, the SAE Fuel and Lubricant Division Steering Committee for Asia, in which Japanese Automobile manufacturers participate, has also made a request for establishing new quality Standard for diesel engine oil products.

In view of the foregoing, it was determined to establish quality Standard for engine oil products conforming to Japanese made diesel engines. Through the steps mentioned below, the Diesel Engine Oil Standard has been established:

- In April, 1994, the Engine Oil Subcommittee of the Society of Automotive Engineers of Japan, Inc. (JSAE), in collaboration with the Japan Lubricating Oil Society, developed a method of diesel oil engine test using low-sulfur diesel fuel (with a sulfur content of 0.05%). In March, 1998, the detergency test method (JASO M 336:1998) using a Nissan Diesel Motor's engine (TD25) was established. And, in March, 1999, the valve train wear test method (JASO M 354:1999) using a Mitsubishi Motors Corporation's (present Mitsubishi Fuso Truck and Bus Corporation) engine (4D34T4) was established.
- Thereafter, in April, 1994, the Japan Automobile Manufacturers Association, Inc. (JAMA) and the Petroleum Association of Japan (PAJ) proposed diesel oil quality Standard including a detergency test method, valve train wear test method, hot tube test method and eight other test methods. Through examination of the proposed quality Standard as to oil products on the market, the Quality Standard (JASO M 355:2000) was established in October, 2000.
- In diesel fuels for automobiles conforming to exhaust emission regulations subsequent to the new short-term regulations which are equipped with after-treatment devices such as DPF and NOx deoxidization catalyst, in addition to the existing standards, quality standards that provide for chemical compositions such as ash, phosphorus, and sulfur content are necessary. In April, 2004, JAMA and PAJ adopted, as guidelines, DH-2 for trucks/buses and DL-1 for passenger car classes. After the validity of these guidelines is examined, the Automotive Diesel Engine Oil Standard (JASO M 355: 2005) was amended in April, 2005 by adding DH-2 and DL-1 classifications to the existing DH-1 classification.
- On the occasion of the revision of the valve train wear test method (JASO M 354:2005), in the Automotive Diesel Engine Oil Standard (JASO M 355: 2005), quality standards for DH-1 classification was also reconsidered.
- The Automotive Diesel Engine Oil Standard (JASO M355:2005) was amended in April 2008 by revising the limit of Chlorine content in DH-2 and DL-1, and new Standard was issued as JASO M355:2008.

3.3 Test Items and Acceptance Criteria

Table 1 presents the required performance and acceptance criteria specified in the Automotive Diesel Engine Oil Standard (JASO M 355: 2008).

Some characteristic values to be reported at the time of on-file are not stipulated in the Automotive Diesel Engine Oil Standard (JASO M 355: 2008). For these items, refer to Appendix 3.

In implementation of the engine and bench tests in Table 1, alternative test methods may be used as indicated in Appendix 2, Comparison Table. If an alternative method is available, it is required to specify on the reporting documents which method was used for acquiring the submitted test data.

When the Automotive Diesel Engine Oil Standard (JASO M 355) is revised, it is required to apply the latest version. As to test methods stipulated in the Automotive Diesel Engine Oil Standard (JASO M 355), be sure to use the latest version of related test method, unless the use of method of a specific year is required. But as to the quoted standard stipulated in the JASO M 336 and JASO M354, it may use the latest version at the time conducting the engine test.

The supply of the TD25 engine, used for piston detergency test (JASO M 336), halted March 2009. To allow continued evaluation of this parameter, alternative engine tests can be used. Details are given in Appendix 8.

Table 1 Required Performance and Acceptance Criterion (Quality Standards) stipulated in Automotive Diesel Engine Oil Standard (JASO M 355: 2008)

Items		Unit	Performance Criteria			Test Method	
			DH-1-05	DH-2-08	DL-1-08		
Viscosity Grade			-	-	XW-30,XW-20	SAE J300	
Piston Detergency (NOTE1)	TGF(Top Groove Fill)	vol%	60.0 Max.	60.0 Max	60.0 Max	JASO M 336	
	Piston Ring Stickings		All free	All free	All free		
	Deposits on Ring Lands	Merit Rating	Report	Report	Report		
Valve Train Wear Protection (NOTE 2)	Average Cam Diameter Loss (Normalized at 4.5 mass % Carbon Residue Increase)	μ m	95.0 Max.	95.0 Max	95.0 Max	JASO M 354	
	Maximum Cam Diameter Loss (Normalized at 4.5 mass % Carbon Residue Increase)	μ m	210 Max.	210 Max	210 Max		
	Cam Surface Wear		No pitting	No pitting	No pitting		
Soot Dispersancy	Viscosity Increase (100 ~ 150H) @100	mm ² /s/h	0.2 Max.	0.2 Max.	0.2 Max.	ASTM D 5967	
High Temperature Oxidation Stability	Viscosity Increase@40	%	200 Max.	200 Max.	-	ASTM D 5533	
	Viscosity Increase@40 (60H)	%	295 Max.	295 Max.	-	ASTM D 6984	
	Viscosity Increase@40 (80H)	%	-	-	275 Max.	ASTM D 6984	
Fuel Economy (NOTE 3)	Fuel Economy Improvement	%	-	-	2.5 Min.	CEC-L-54-T-96	
Hot Surface Deposit Control	@280	Merit Rating	7.0 Min.	7.0 Min.	7.0 Min.	JPI-5S-55-99	
Anti-foaming	Sequence	Foaming/ Stability	mL/mL	10/0 Max.	10/0 Max.	10/0 Max.	JIS-K-2518:2003
	Sequence		mL/mL	50/0 Max.	50/0 Max.	50/0 Max.	
	Sequence		mL/mL	10/0 Max.	10/0 Max.	10/0 Max.	
High Temperature Anti-foaming	Sequence		mL/mL	-	-	100/0 Max.	ASTM D 6082
Volatility	Evaporation Loss@250	mass %	18.0 Max.	18.0 Max.	15 Max	JPI-5S-41-2004	
Anti-corrosion	Copper	mass ppm	20 Max.	20 Max.	20 Max.	ASTM D 6594	
	Lead	mass ppm	120 Max.	100 Max.	120 Max.		
	Tin	mass ppm	50 Max.	50 Max.	50 Max.		
	Discoloration of Copper Coupon after Test @135		3Max	3Max	3Max	ASTM D 130	
Shear Stability (NOTE 4)	Kinetic Viscosity of Oil after Test@100	mm ² /s	Stay-in-grade of virgin oil viscosity classification in SAE J300	Stay-in-grade of virgin oil viscosity classification in SAE J300	XW-30:8.6 Min. XW-20: Stay-in-grade of virgin oil viscosity classification in J300	ASTM D 6278	
Sulfated Ash		mass %	-	1.0±0.1	0.6 Max.	JIS K 2272 1998 5.	
Base Number		mgKOH/g	10.0 Min.	5.5 Min.	-	JIS K 2501 2003 8. ASTM D 4739	
Phosphorus		mass %	-	0.12 Max.	0.10 Max	JPI-5S-38-2003	
Sulfur		mass %	-	0.5 Max	0.5 Max	JIS K 2541 2003 5.	
Chlorine		mass ppm	-	150 Max	150 Max	JPI-5S-64-2002	
Seal Compatibility	RE1 (Fluoro)	Hardness Change	Point	-1 ~ +5	-1 ~ +5	-1 ~ +5	CEC-L-39-T-96
		Tensile Strength Rate of Change	%	-40 ~ +10	-50 ~ +10	-40 ~ +10	
		Elongation Rate of Change	%	-50 ~ +10	-60 ~ +10	-50 ~ +10	
		Volume Rate of Change	%	-1 ~ +5	-1 ~ +5	-1 ~ +5	
	RE2-99 (Acrylic)	Hardness Change	Point	-5 ~ +8	-5 ~ +8	-5 ~ +8	
		Tensile Strength Rate of Change	%	-15 ~ +18	-15 ~ +18	-15 ~ +18	
		Elongation Rate of Change	%	-35 ~ +10	-35 ~ +10	-35 ~ +10	
		Volume Rate of Change	%	-7 ~ +5	-7 ~ +5	-7 ~ +5	
	RE3 (Silicon)	Hardness Change	Point	-25 ~ +1	-25 ~ +1	-25 ~ +1	
		Tensile Strength Rate of Change	%	-45 ~ +10	-45 ~ +10	-45 ~ +10	
		Elongation Rate of Change	%	-20 ~ +10	-20 ~ +10	-20 ~ +10	
		Volume Rate of Change	%	-1 ~ +30	-1 ~ +30	-1 ~ +30	
	RE4 (Nitrile)	Hardness Change	Point	-5 ~ +5	-5 ~ +5	-5 ~ +5	
		Tensile Strength Rate of Change	%	-20 ~ +10	-20 ~ +10	-20 ~ +10	
		Elongation Rate of Change	%	-50 ~ +10	-50 ~ +10	-50 ~ +10	
		Volume Rate of Change	%	-5 ~ +5	-5 ~ +5	-5 ~ +5	
AEM (Ethylene Acrylic)	Hardness Change	Point	Per agreement between concerned parties	Per agreement between concerned parties	Per agreement between concerned parties		
	Tensile Strength Rate of Change	%					
	Elongation Rate of Change	%					
	Volume Rate of Change	%					

Note: 1. Carbon residue shall be analyzed in accordance with JIS K2270. As the primary control item, the carbon residue increase shall be calculated in accordance with the following equation. To ensure operation accuracy, the carbon residue increase shall be 2.8 mass % minimum.

$$CRI = \frac{(b-a) + (d-c)}{2}$$

Where,

CRI: carbon residue increase (mass %)

a: carbon residue of virgin oil (mass %)

b: carbon residue after running test for 100 hours (mass %)

c: carbon residue after complete oil replacement followed by running test for 100 hours (mass %)

d: carbon residue after running test for 200 hours (mass %)

Note: 2. Cam diameter loss shall be normalized to 4.5 mass % of the carbon residue increase and calculated in accordance with the following equation:

$$Y_c = e^R \qquad R = \ln(Y_o) \times \frac{4.5}{X}$$

Where,

Yo: actual loss in cam diameter (μm)

Yc: normalized loss in cam diameter (μm)

e: base of infinitive logarithm

X: post-test carbon residue increase (mass %)

For operation accuracy, X shall be within a range of 4.5±1.0 mass %.

Note: 3. Not required for 10W-30

Note: 4. Shear stability shall be specified only for multi-grade oils.

3.4 New Filing of a Oil conforming to Standard, Effective Period of On-Filing and Indication of Classification

The first date when classification indication is allowed, the last date when a new filing is accepted, and the last date when on-filing is maintained for engine oils conforming to the Automotive Diesel Engine Oil Standard JASO DH-1 (JASO M 355:2000), the Automotive Diesel Engine Oil Standard (JASO M 355:2005), or the Automotive Diesel Engine Oil Standard (JASO M 355:2008) are as follows:

Further, the last date when on-filing is maintained for engine oils conforming to JASO DH-1 (JASO M 355:2000) for which a reporting is filed by September 30, 2006 will be September 30, 2010.

The last date when a new filing is accepted for engine oils conforming to JASO M 355:2005 will be July 31, 2008.

The first date when a filing is accepted for engine oils conforming to JASO M355:2008 will be August 1st, 2008. Current on-filed engine oils conforming to JASO M 355:2005 still meet JASO M 355:2008, therefore the engine oils need not to re-register.

Year of Issuance of the Standard	First date when Classification Indication is allowed	Last date when new filing is accepted	Last data when on-filing is maintained
2000	April 1, 2001	September 30, 2006	September 30, 2010
2005	October 1, 2005	July 31, 2008	
2008	August 1, 2008		

For the indication of classification in the standards, the year of issuance will not be indicated. Instead, DH-1-05 will be indicated as "DH-1," DH-2-08 will be indicated as "DH-2," and DL-1-08 will be indicated as "DL-1."

4. Selection of Test Organization

4.1 General

In the Automotive Diesel Engine Oil Standard (JASO M 355: 2008), the requirements are specified concerning various engine tests, bench tests and physical/chemical properties. For on-file (to be described later), it is required to report the results of tests conducted by a test organization. That is, the test results are valid only under if the following requirements are satisfied.

4.2 JASO Engine Test (M 336 and M 354)

As to the JASO M 336:1998 (High Temperature and High Load Detergency Test Procedure for Evaluating Automotive Diesel Engine Oils) and the JASO M 354:1999 (Valve Train Wear Test Procedure for Evaluating Automotive Diesel Engine Oils), it is required to submit results of tests that have been carried out by a test organization providing test accuracy specified in each test method.

In submission of the test results, it is also required to include results of a standard oil test (latest test result attained within a period of one year from the date of test of oil to be conducted) which has been carried out by a test organization (for engine test concerned), which must meet acceptance criteria as indicated in Form 4a-b and Form 4b-b of Appendix 3.

4.3 ASTM Engine Test (ASTM D 5967 and D7156, and ASTM D 5533 and D 6984 and D7320)

As to Soot dispersancy test (Mack T-8A and 8E:ASTM D 5967, T-11:ASTM D7156) and high-temperature oxidation stability test (Sequence IIIE:ASTM D5533, Sequence IIIF and IIIF HD:ASTM D6984, Sequence IIIG:ASTM D7320) for engine oils, it is required to conform to the ACC Product Approval Code of Practice specified by ACC (the American Chemistry Council). For the purpose of submitting test results, the tests must be conducted in one of test organizations certified by the ASTM Test Monitoring Center in accordance with the ACC Product Approval Code of Practice.

4.4 CEC Engine Test (CEC-L-54-T-96)

As to fuel economy test for diesel engine oils (CEC-L-54-T-96), it is required to conform to the ATIEL Code of Practice specified by ATIEL (the Association Technique de L'Industrie Europeenne des Lubrifiants, EEIG). For the purpose of submitting test results, the test must be conducted in one of test organizations certified by CEC in accordance with the ATIEL Code of Practice.

4.5 Bench Test

As to the JPI-5S-55-99 (Hot Tube Test, HTT), ASTM D 6594 (Standard Test Method for Evaluation of Corrosiveness of Diesel Engine Oils), ASTM D 6278 (Shear Stability Test), CEC-L-39-T-96 (Evaluation of Oil-Elastomer Compatibility), defoaming characteristic, volatility, Base Number and other physical/chemical properties to be reported for on-file, any test organization may be selected under condition that accuracy specified for each test method is satisfied.

4.6 Public Information on Test Organization

Test organizations that can carry out JASO engine tests in request from an outside party (if disclosure is allowed) are publicized at the Web site of the JASO Engine Oil Standards Implementation Panel (<http://www.jalos.or.jp/onfiles/>) or through any other means. When the disclosure is desired, enter necessary data in the Application Form of Notification of Desired Consignee Test Laboratory (Appendix 1) and submit it to the JASO Engine Oil Standards Implementation Panel. Inquiries or test requests to the publicized test organizations shall be made directly by each Standard user, i.e., the JASO Engine Oil Standards Implementation Panel will not provide mediation between each Standard user and the publicized test organizations.

5. Standard Application Procedures (Reporting, On-Filing)

5.1 General

Each oil seller or supplier using the Automotive Diesel Engine Oil Standard (JASO M 355:2008) through this system shall ensure that each product subject to reporting has such required performance, etc. as stipulated in the Automotive Diesel Engine Oil Standard (JASO M 355:2008) by confirmation, in accordance with the guidance of this Manual, of a test organization designated by this Manual and shall use the Standard application procedures for each product brand and for each prescription as described in subsequent sections of “Reporting and On-Filing” and “Custody and Submission of Test Data.”

This system is for each user of the Standard to give a public notice of the conformity of the user’s product with the Standard, on its own responsibility, by way of on-filing of a product together with its test data, and is not for this system or the Panel to certify or acknowledge the conformity of any product with the Standard. Each user of this system shall fully understand such nature of the system. Each user shall be careful so as not to cause misunderstanding by end users including consumers, and is required to make a sincere effort to maintain the conformity with the Standard of the said product on the market.

5.2 Procedure Flow Chart

The outline of the reporting and on-filing procedure is shown in Figure 2.

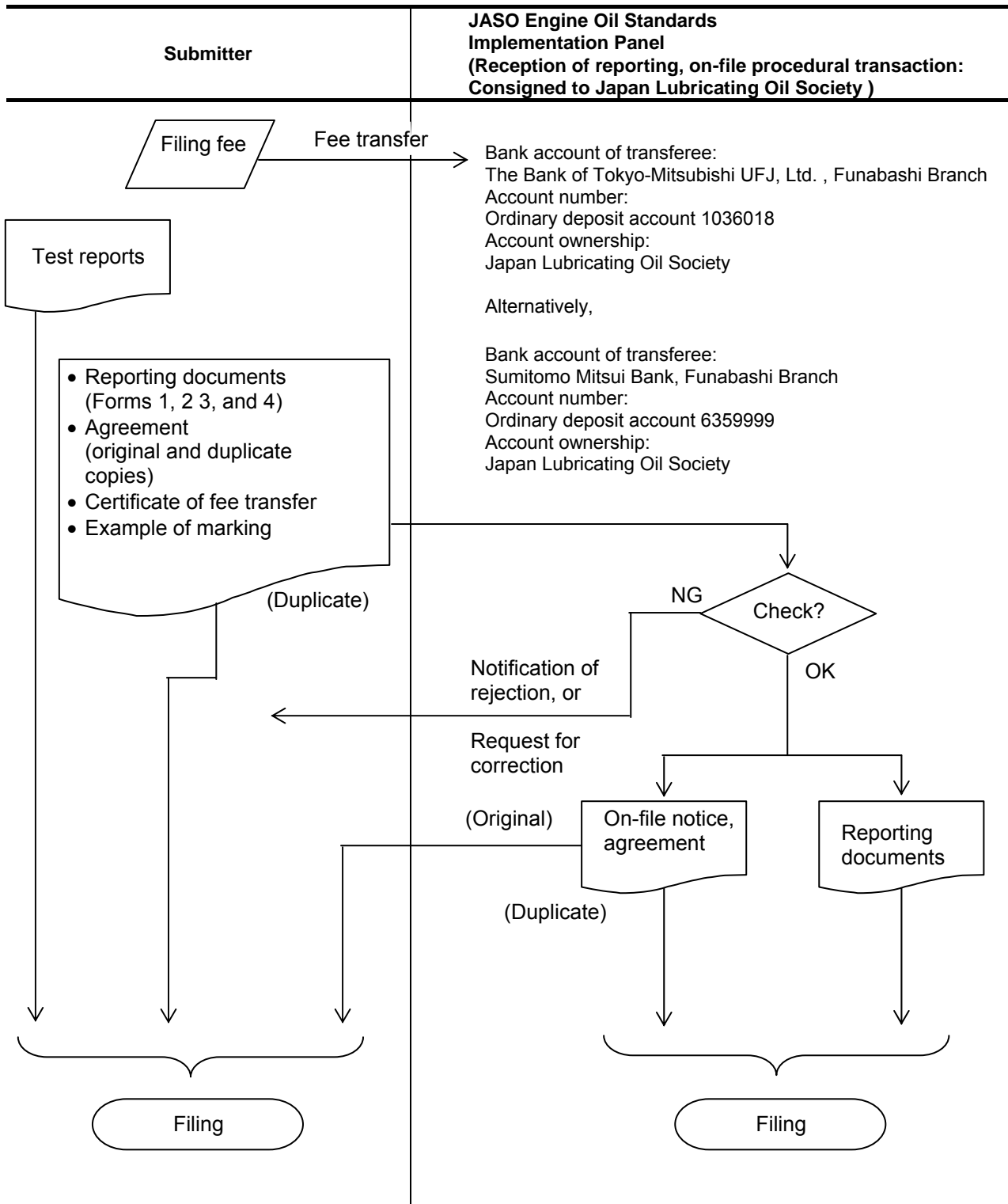


Fig. 2 Procedure Flow Chart for Reporting and Filing

5.3 Reporting and On-Filing

Prior to on-filing, the submitter shall transfer a filing fee indicated in Appendix 1 to the specified bank account of the JASO Engine Oil Standards Implementation Panel. Thereafter, the submitter shall prepare the reporting documents (forms 1, 2, 3 and 4 in Appendix 3) and enter necessary data in form B of the original and duplicate copies of the notice and agreement documents (Appendix 4). Together with a certificate of a filing fee, the submitter shall send the reporting documents to the JASO Engine Oil Standards Implementation Panel. Note that transactions for receipt of reporting and on-filing are to be consigned to the Japan Lubricating Oil Society. Therefore, the reporting documents and the filing fee certificate shall be sent to the address shown below:

Address: 2-16-1 Hinode, Funabashi, Chiba
273-0015 Japan
Japan Lubricating Oil Society
c/o Business Department

Any cost required for transferring a filing fee to the specified bank account shall be borne by the submitter. Note that the reporting documents and the filing fee will not be returned after reception. If a change in the amount of filing fee is made, it will be communicated by the JASO Engine Oil Standards Implementation Panel through related associations.

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 diesel engine oil product container and an entire product label (design allowable). (Refer to 6 - Marking.)

5.4 Custody and Submission of Test Data

JASO engine test reports (basic data for reporting) shall be prepared in a format specified in the JASO Standard, and the submitter shall maintain responsibility for the JASO engine test reports. Further, data of ASTM engine and bench test results shall also be maintained by the submitter. The period of maintenance of test results and reports shall be until the submitter cancels on-file of the product concerned.

The submitter shall submit the test reports as promptly as possible upon receipt of a request for them from the JASO Engine Oil Standards Implementation Panel.

5.5 Documents Check

Upon receipt of reporting documents, the JASO Engine Oil Standards Implementation Panel shall check:

- (1) whether all the necessary items have been entered.
- (2) whether infrared absorption spectral data has been attached in the specified format.
- (3) whether engine oil performance data has been entered as specified.
Further, the JASO Engine Oil Standards Implementation Panel shall check:
- (4) against the specified values as to the bench test characteristic items for which the specified values have been determined.
- (5) against the criteria of acceptance as to the JASO and ASTM engine test results.

Further, the JASO Engine Oil Standards Implementation Panel shall check the performance classification documents and product labels for any improper points or unclear expressions.

If any improper or inadequate item is found, the JASO Engine Oil Standards Implementation Panel shall return a notice of on-file rejection (with information on reasoning) to the submitter or it shall request the submitter to make a correction.

If all the documents are satisfied, the JASO Engine Oil Standards Implementation Panel shall send an on-file notice to the submitter and put its copy into a file of the reporting documents.

5.6 Oil Code

An oil code shall be determined by the submitter and recorded by the JASO Diesel Engine Oil Standards Implementation Panel.

Each oil code shall be set up in the format shown below:

D { { {
(1) (2) (3) (4)

- (1) Category code (one alphabetic capital letter):
“D” shall be assigned to a diesel engine oil product.
- (2) Country number (three digits):
An international telephone country number of a nation where the submitter resides or the diesel engine oil is manufactured.
(Example: Japan: 081, USA: 001, England: 044, ...)
- (3) Seller code (three alphabetic capital letters):
Any three alphabetic capital letters desired by the submitter (e.g., Hino: HNM, Nippon Oil Corporation: ENE, ...)
Note that plural seller codes shall not be used by the same submitter. If a seller code has already been filed for another JASO engine oil product (such as an engine oil product for motorcycles), the same seller code shall be used unless there is any exceptional reason.
If a seller code desired by the submitter has already been used by any other submitter, the JASO Engine Oil Standards Implementation Panel may request a change of the seller code to prevent duplication.
- (4) Control number (three digits):
A voluntary control number to be assigned by the submitter arbitrarily. It is not allowed for the same submitter to assign the same control number to different products or different trial products.

For the purpose of reference, an example of oil code assignment is shown in Appendix 6.

5.7 Disclosure of On-File Information

For promotion and public recognition of the Automotive Diesel Engine Oil Standard (JASO M 355: 2008), and diesel engine oil products, the JASO Engine Oil Standards Implementation Panel will publicize product names, submitter names, viscosity grades, oil codes and classifications of on-file products through such communication media as the Internet according to the Standard.

JASO Engine Oil Standards Implementation Panel will announce the information disclosed to the submitter before disclosure. If the information is 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 information which has been agreed between JASO Engine Oil Standards Implementation Panel and submitters.

5.8 On-File Maintenance

If continuation of on-file of the product concerned is desired on and after January 1 of the year subsequent to the year of on-file, the submitter (requesting continuation of on-file) shall notify the JASO Engine Oil Standards Implementation Panel by the end of February of the subsequent year as to the amount of on-file maintenance fee, which is to be calculated according to the sales quantity (from January to December of the preceding year) in the method specified in Appendix 3. Upon notification from the submitter requesting continuation of on-file, the JASO Engine Oil Standards Implementation Panel will check it and send an invoice to the submitter requesting continuation of on-file. After receiving the invoice, the submitter requesting continuation of on-file shall promptly transfer an on-file maintenance fee to the specified bank account of the JASO Engine Oil Standards Implementation Panel. Any cost required for transfer of the on-file maintenance fee to the specified bank account shall be borne by the submitter. Note that the on-file maintenance fee will not be returned once received by the JASO Engine Oil Standards Implementation Panel.

In case that the on-file maintenance fee and calculation method are to be revised, the JASO Engine Oil Standards Implementation Panel will issue notification through the related organizations.

If the submitter requesting continuation of on-file does not transfer the on-file maintenance fee to the specified bank account, the JASO Engine Oil Standards Implementation Panel will judge that the sale of the product concerned has been discontinued. In this case, the on-file of the product concerned may be canceled.

Figure 3 shows a general flow of on-file maintenance procedure.

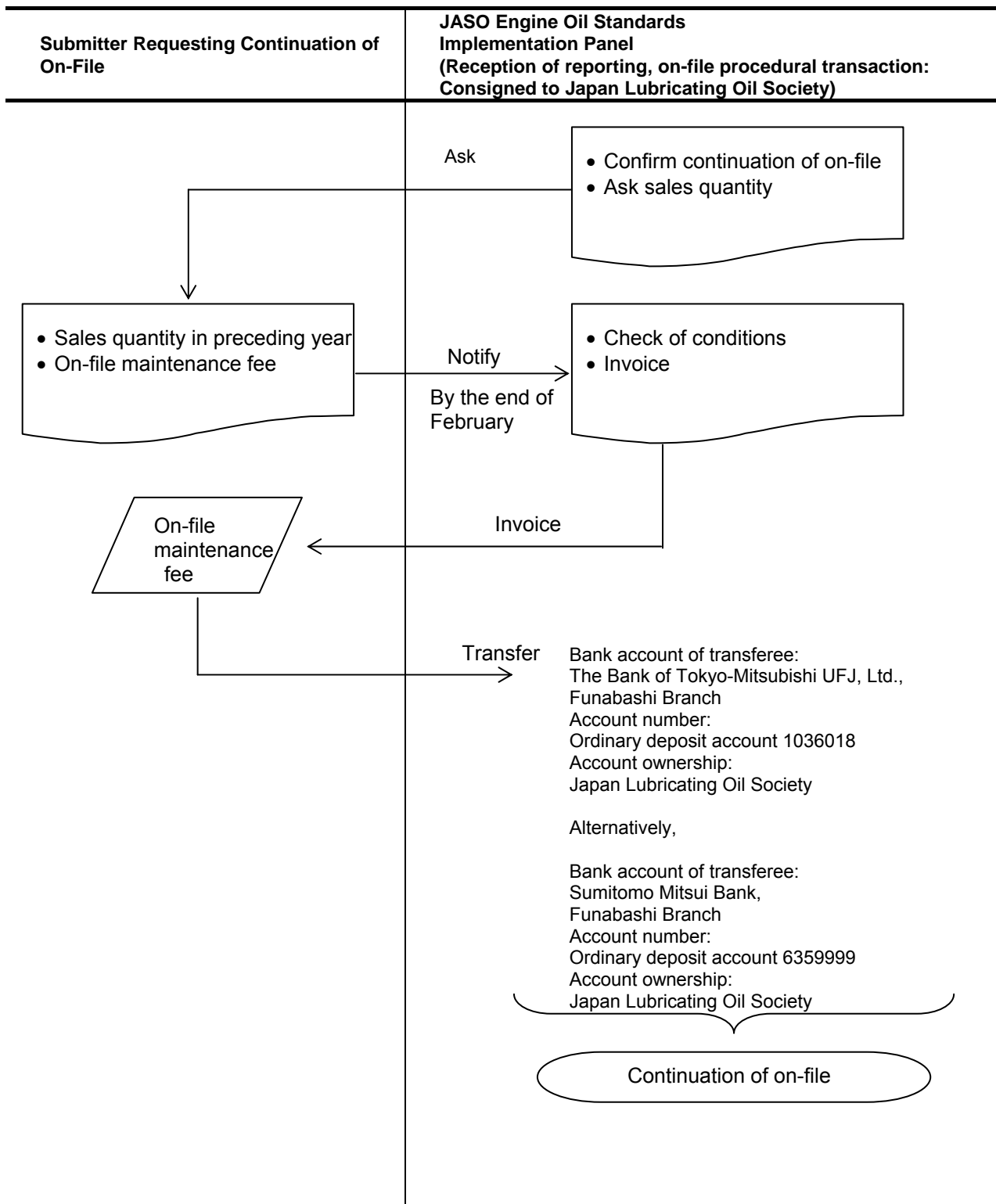


Fig. 3 On-File Continuation Procedure Flow

5.9 Liability for Product Quality

As to the quality and performance of each diesel engine oil product filed (on file) through this system, classification and guarantee shall be the submitter's responsibility, and the submitter (seller) shall assume liability for the quality of the product concerned.

This system is not intended for the JASO Engine Oil Standards Implementation Panel to provide warranty on quality and performance of engine oil products on file. The JASO Engine Oil Standards Implementation Panel shall not be responsible for any loss or damage which may occur as a result of the use of an engine oil product on file.

If any trouble takes place concerning the quality and performance of an on-file engine oil product, the submitter shall take respond to solve the problem as his own responsibility.

If this system is contradictory to any legal regulations of the country concerned (including local administration regulations), the legal regulations take precedence over this system. Therefore, as to loss or damage arising from the use of this system without regard to inconsistency with legal regulations, the JASO Engine Oil Standards Implementation Panel will not assume any responsibility.

5.10 Information Security

Except for the conditions mentioned in Item 5.7 - Disclosure of On-File Information, the JASO Engine Oil Standards Implementation Panel will not disclose on-file information to a third party without the written permission of the submitter, except if disclosure of on-file information is required as a legislative action by public organizations. Even if submitted or filed information is inadvertently disclosed to a third party, the JASO Engine Oil Standards Implementation Panel will not be responsible for compensation as to any loss or damage due to information disclosure.

If any questions arise regarding a filed product and a party concerned makes reference in writing to the JASO Engine Oil Standards Implementation Panel, it is allowed for the JASO Engine Oil Standards Implementation Panel to inform the questioner as to the on-file status of the diesel engine oil product corresponding to the oil code concerned and the name of the seller concerned. Further, if the questioner desires communication with the submitter, the JASO Engine Oil Standards Implementation Panel will notify the submitter and leave any responses to the submitter. In this event, the JASO Engine Oil Standards Implementation Panel will not take any further action by itself.

5.11 Change in File

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 5.3 and update the oil code concerned.

- (1) Change of the name of submitter (company) or the code of submitter
- (2) Change of the name of product
- (3) Addition/change of the viscosity grade (Reporting is required even if the read-across allowable range shown in Appendix 5 is satisfied.)
- (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 5.3 or update the oil code concerned.

- (1) Change of the information on communication with the submitter (address, telephone number, etc.)
(In this case, it is required to submit documents in forms 5 and 6 shown in Appendix 3.)
- (2) Change of any condition other than the viscosity grade within the read-across allowable range shown in Appendix 5
(In this case, it is required to submit reporting documents in forms 5, 6, 7 and 8 shown in Appendix 3.)

If another submitter makes a change in an already filed product within the read-across allowable range shown in Appendix 5, it is required to provide new on-file according to Item 5.3.

Also, if said submitter makes changes in the newly filed product concerned as to any condition other than the viscosity grade within the read-across allowable range shown in Appendix 5, the contents of the change shall be promptly reported to the JASO Engine Oil Standards Implementation Panel.

Appendix 6 presents examples of reporting and notification.

5.12 Precautions for Submitter

When indicating an oil code and performance classification mark on a product container according to this system, the submitter shall pay particular attention to the following conditions:

- (1) The quality, performance and marking of the product to be sold shall meet those entered in the on-file documents.
- (2) If any questions occur as to the quality, performance and/or marking of the product, the submitter is responsible for any responses.
- (3) As to the quality, performance and marking of the diesel engine oil product filed, the submitter shall provide classification and guarantee on his own responsibility, and information on this responsibility shall be publicized to general consumers through sales channels of the submitter.

If the submitter discontinues sales of the on-file diesel engine oil product, the submitter shall promptly notify the JASO Engine Oil Standards Implementation Panel as to cancellation of on-file.

6. Indication

After receipt of the on-file notice, the submitter may indicate the oil code concerned on a product container. In this case, the submitter shall clarify that the oil code is provided on his own responsibility, using the form shown in Appendix 7. Note that any additional oil code indication on the container (by using a sticker or the like) is not permitted.

In advertisements or the like, the user of this system shall not use such an expression as will lead to a misunderstanding that the quality/performance of the diesel engine oil concerned has been certified by the JASO Engine Oil Standards Implementation Panel.

As specified in Item 5.3, the user of this system shall send a representative example of performance classification marking and a representative example of an entire product label (design acceptable) to the JASO Engine Oil Standards Implementation Panel.

7. Market Survey

For ensuring proper interests of consumers and on-file submitters, the JASO Engine Oil Standards Implementation Panel will conduct market survey regarding diesel engine oil products for which on-filing is maintained and check that the Automotive Diesel Engine Oil Standard (JASO M 355: 2008) are used correctly on the market. Therefore, the JASO Engine Oil Standards Implementation Panel may take arbitrary samples of JASO engine oil category DH-1 from the market, examine the performance

marking form and quality/performance items specified in the Automotive Diesel Engine Oil Standard (JASO M 355: 2008), 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 manner that particular submitter names and oil product names are not identifiable.

8. Use of Standard by Vehicle Manufacturers or Sellers

Any vehicle manufacturer or seller may utilize the Automotive Diesel Engine Oil Standard (JASO M 355:2008), under his own judgment and on his own responsibility. For instance, in owner's manual or any other document, the vehicle manufacturer or seller may indicate a recommended diesel engine oil product to be used by consumers according to the Automotive Diesel Engine Oil Standard (JASO M 355:2008).

In recommending any diesel engine oil product, the user of this system shall not provide such an expression as will lead to a misunderstanding that the quality/performance of the diesel engine oil concerned has been certified by the JASO Engine Oil Standards Implementation Panel (e.g., diesel engine oil certified or assured by the JASO Engine Oil Standards Implementation Panel).

As to the above recommendation, the user of this system shall send a representative example in the owner's manual concerned to the JASO Engine Oil Standards Implementation Panel.

9. Information Available

For details of conditions regarding this system, contact the following organizations.

9.1 Information on Destination Addresses of On-file Documents and On-file Forms

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

9.2 Information on Test Methods (JASO Standards)

Society of Automotive Engineers of Japan, Inc. (JSAE)
Publishing Team
Publishing, E-NET & Professional Development Group
5 Bancho Center Building 5F
10-2, 5 Bancho, Chiyoda-ku, Tokyo
102-0076 Japan
Tel : 81-3-3262-8215(Direct)
Fax : 81-3-3261-2204

9.3 Information on Standard Reference Oil

Japan Lubricating Oil Society
Technical Center
2-16-1 Hinode, Funabashi, Chiba
273-0015 Japan
Tel : 81-47-433-5181
Fax : 81-47-431-9579

9.4 Information on Test Engines and Parts

9.4.1 JASO M 336 (TD25 engine/parts)

Capital Trading Co., Ltd.
Sales Department
Nikko SS Bldg. 2F
1-1 Ageo-shi, Saitama-ken
362-0046 Japan
Tel: 81-48-780-6754
Fax: 81-48-780-6755

9.4.2 JASO M 354 (4D34T4 engine/parts)

Mitsubishi Fuso Truck and Bus Corporation
Sales Parts International Department
890-12, Kashimada, Saiwai-ku, Kawasaki-shi, Kanagawa
212-0058 Japan
Tel: 81-44-330-7596
Fax: 81-44-330-5830

9.4.3 JPI-5S-55-99 (Hot tube test, HTT)

Komatsu Engineering Corporation
400 Yokokura, Shinden, Oyama Tochigi
323-8558 Japan
Tel: 81-285-27-3856
Fax: 81-285-27-3642

9.5 Information on Overseas Related Test Methods

9.5.1 Information on ASTM Test Methods and Test Implementation Organization

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959, U.S.A.
Tel: (+1)610-832-9585 FAX: (+1)610-832-9555
Website: <http://www.astm.org>
e:mail: service@astm.org

9.5.2 Information on CEC Test Methods and Test Implementation Organization

Interlynk Administrative Services Ltd
P.O. Box 6475, Earl Shilton
Leicester LE 9 9ZB, United Kingdom
Tel: (+44)1455-821993 Fax: (+44)1455-821994
Website: <http://www.cectests.org>
e:mail: cecinfo@interlynk.co.uk

APPENDIX 1

Application Form of Notification of Desired Consignee Test Laboratory

Date on-file (year, month, day) : year, month, day		
Submitter (Company)	Company seal	Contact address
Person in charge of on-file		Name
Name		_____
_____ Seal		Department/Section
Department/Section, Title		_____
_____		Address
_____		_____
_____		Tel
_____		_____
_____		Fax
_____		_____

Desired engine test to be consigned (Enter “ ” for desired test.)		
JASO High Temperature and high Load Detergency Test (JASO M336)		Result data of the latest standard oil test carried out within one year shall be included using forms 4a-b and 4b-b.
JASO Value Train Wear Test (JASO M354)		

- NOTE:**
1. For continuation of the consignment-desired test, the relevant test shall be carried out using standard oil per year and the test result data shall be submitted.
 2. The names and addresses of the authorized test laboratories to be selected are publicized at the Panel Web site. A1 -
 3. For cancellation of on-file of the consignee test laboratory, notification shall be made to the Panel.

To be entered by the JASO Engine Oil Standards Implementation Panel	
Person in charge of receipt:	Seal
Date received (year, month, day): year, month, day	
Receipt number:	
Remarks:	

APPENDIX 2

COMPARISON TABLE FOR TEST METHODS JIS/JPI Test and ASTM Test

Test Item	Test method	ASTM test No.	JIS/JPI test No.
Density	Type I Hydrometers Density Test	ASTM D 1298	JIS K 2249-1995 4.
	Vibration Method Density Test	ASTM D 4052	JIS K 2249-1995 5.
Flash Point(COC)	Cleveland Open Cup Method Flash Point Test	ASTM D 92	JIS K 2265-4-2007
Kinematic viscosity		ASTM D 445	JIS K 2283-2000 5.
Viscosity Index		ASTM D 2270	JIS K 2283-2000 6.
CCS viscosity		ASTM D 5293	JIS K 2010-1993 Attachment A
MRV viscosity		ASTM D 4684	JPI-5S-42-2004
High temperature high shear viscosity		ASTM D 4683	JPI-5S-36-2003
Sulfated Ash		ASTM D 874	JIS K 2272-1998 5.
Carbon residue	Conradson Method	ASTM D 189	JIS K 2270-2000 5.
	Micro Method	ASTM D 4530	JIS K 2270-2000 6.
Acid number	Potentiometric Titration	ASTM D 664	JIS K 2501-2003 7.
Volatility	Noack Method	ASTM D 5800	JPI-5S-41-2004
Color	ASTM Color Test Method	ASTM D 1500	JIS K 2580-2003 6.
Ca	ICP Method	ASTM D 5185	JPI-5S-38-2003
Mg			
Zn			
P			
B			
N	Macro Kjeldahl Method	ASTM D 3228	JIS K 2609-1998 3.
	Chemiluminescence Detection	ASTM D 4629	JIS K 2609-1998 4.
	Micro Electricity Titration	-	JIS K 2609-1998 5.
S	Wavelength Dispersive X-ray Fluorescence Spectrometry	ASTM D 2622	JIS K 2541-7-2003
	ICP Method	ASTM D 5185	JPI-5S-38-2003
Anti-foaming	Sequence , ,	ASTM D 892	JIS K 2518-2003
High temperature Anti-foaming	Sequence (DL-1)	ASTM D 6082	JIS K 2518-2003 Attachment 1

APPENDIX 3

Diesel Engine Oil Reporting and On-File Maintenance

Contents

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1. Notes on Entries in Report Forms

- (1) When entering data in the report forms, refer to the text in the standard application manual.
- (2) As to an item concerning any test method without indication of a year (in the report forms), adopt a test method which is the latest version at the time of reporting.
- (3) If a marking/sale corresponding to false reporting is made, the authorities concerned may impose a punishment according to the Act Against Unjustifiable Premium and Misleading Representation (Article 4 - Clause 1) or the Act of Prevention of Unfair Competition (Article 2-item 1 - Clause 12).

2. On-File Reporting Procedure

- (1) Filing Fee

Filing fee required for
new oil item : ¥40,000 per oil item to be filed

- (2) Submission and Transfer of Filing Fee

Prior to reporting of a new oil item to be filed, a filing fee indicated in 2.(1) shall be transferred to the following bank account (per oil item to be filed). At the time of reporting, a certificate of the fee transfer into the bank account and necessary documents shown below shall be prepared and submitted to the panel.

Bank account of transferee:
The Bank of Tokyo-Mitsubishi UFJ, Ltd. , Funabashi Branch
Account number:
Ordinary deposit account 1036018
Account ownership:
Japan Lubricating Oil Society

Alternatively,

Bank account of transferee:
Sumitomo Mitsui Bank, Funabashi Branch
Account number:
Ordinary deposit account 6359999
Account ownership:
Japan Lubricating Oil Society

- Document required for filing

Certificate of filing fee transfer

Form 1 : Front sheet of reporting

Form 2 : Bench test results

Form 3 : Blending change rule application data

Form 4 : Engine test results

Representative example of performance classification marking, and representative example of entire product label (Design figure acceptable)

3. On-File Maintenance Fee

As to on-file registration maintenance, a term of one year starts from January 1 and ends with December 31 of the current year.

To maintain on-file registration on and after January 1 of the year subsequent to the year of registration, it is required to pay an on-file maintenance fee. For each registrant, an on-file maintenance fee is calculated as shown below according to the total sales quantity of each registered oil in the previous year.

Total Sales Quantity of Each Registered Oil in the Previous Year	On-File Maintenance Fee
Less than 1,000 kl	¥30,000
1,000 kl or more	To be calculated in increments of ¥30 per kl

- Calculation Example – 1

In case that on-file registration has been completed June 15, 2006, and 1,250 kl of oil has been sold by December 31, 2006:

The term of the first year means a period between June 15, 2006 and December 31, 2006, and the term of the second year means a period between January 1, 2007 and December 31, 2007.

An on-file maintenance fee to be paid in the second year is calculated on the basis of the previous year. In this case, it is determined according to declaration of sales quantity during a period of June 15, 2006 to December 31, 2006.

Hence,

$$1,250 \text{ kl} \times ¥30/\text{kl} = ¥37,500$$

- Calculation Example – 2

In case that on-file registration of oil A has been completed on July 15, 2006, 500 kl of oil A has been sold by December 31, 2006, 2,000 kl of oil A has been sold in the year 2007, on-file registration of oil B has been completed on May 1, 2007, and 1,000 kl of oil B has been sold by December 31, 2007: (See Fig. 3.1.)

Since the total sales quantity of oil A in the year 2006 is 500 kl, an on-file maintenance fee to be paid in the year 2007 is ¥30,000. The total sales quantity of oil in the year 2007 is 3,000 kl, i.e., 2,000 kl of oil A plus 1,000 kl of oil B. Hence, an on-file maintenance fee to be paid in the year 2008 is calculated as indicated below.

$$3,000 \text{ kl} \times \text{¥}30/\text{kl} = \text{¥}90,000$$

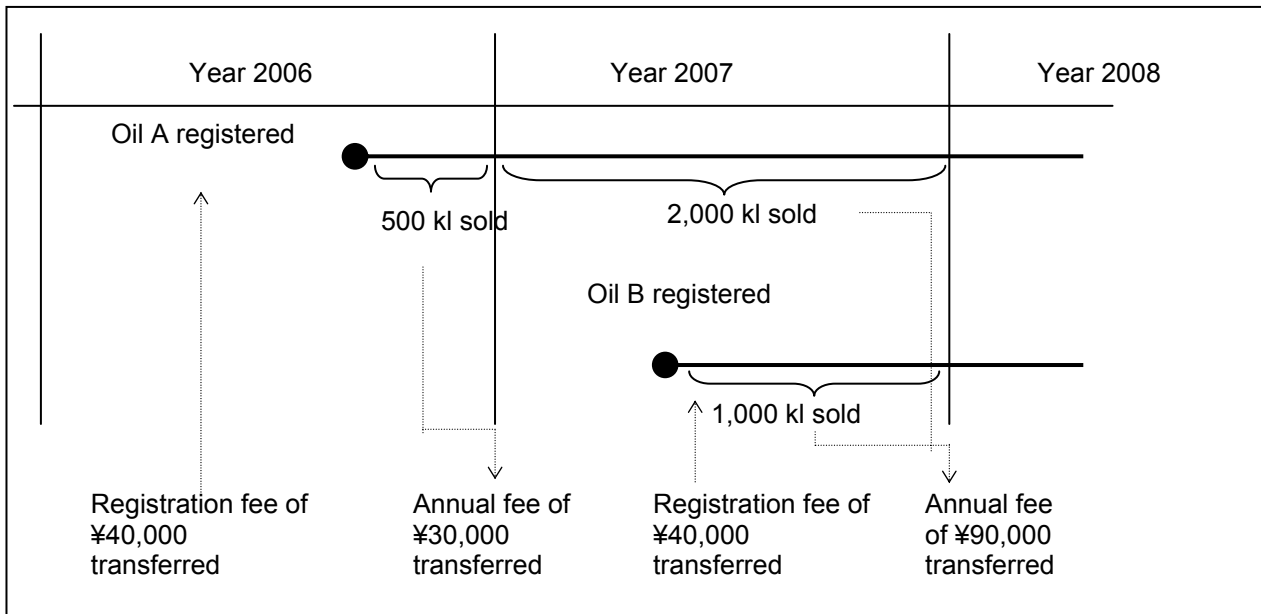


Fig. 3.1 Calculation Example of On-File Maintenance Fee

4. On-File Change Notification Procedure

Where the registrant wants to change the contents described in the on-file report, the following documents shall be prepared even if renewal of the oil code is not required. These documents shall then be submitted to the JASO Engine Oil Standards Implementation Panel. Refer to Item 5.11 in the Standards Application Manual.

- (1) To change the contact address of the registrant:

Documents required for notification

Form 5: Notice of change

Form 6: Front sheet for change notification reporting

- (2) To change any condition other than viscosity grade within the read-across allowable range indicated in Appendix 3:

Documents required for notification

Form 5: Notice of change

Form 6: Front sheet for change notification reporting

Form 7: For change notification; bench test result data

Form 8: Blending change rule application data

Form 1: Front sheet of reporting

Diesel Engine Oil Reporting

Date registration (year, month, day):			year,	month,	day
Registrant (Company)	Company seal	Contact address			
Person in charge of registration		Name			
Name		_____			
Seal		Department/Section			
Department/Section, Title		_____			
Signature		Address			
_____		_____			
		Tel			

		Fax			

Registered Oil	
Intra-company designation or code number	
Product name	
Classification	DH-1 DH-2 DL-1
Viscosity grade	
Oil code	

Form 2: Bench test results
Form 2a: Bench test results (DH-1)

Items		Test Method	Measured Value	Performance Criteria
Density (15 °C)	g/cm ³	ASTM D 1298 ASTM D 4052		Reported
Flash point COC	°C	ASTM D 92		Reported
Kinematic viscosity (40 °C)	mm ² /s	ASTM D 445		Reported
Kinematic viscosity (100 °C)	mm ² /s	ASTM D 445		SAE J300
Viscosity index		ASTM D 2270		Reported
CCS viscosity (- °C)	mPa·s	ASTM D 5293		SAE J300
MRV viscosity (- °C)	mPa·s	ASTM D 4684		SAE J300
High-temperature high-shear-stability viscosity (150 °C)	mPa·s	ASTM D 4683		SAE J300
Ash sulfate	mass%	ASTM D 874		Reported
Residual carbon	mass%	JIS K 2270-2000 5 ASTM D 189 JIS K 2270-2000 6 ASTM D 4530		Reported
Acid number	mgKOH/g	ASTM D 664		Reported
Base number(HClO ₄ method)	mgKOH/g	ASTM D 2896		Reported
Base Number (HCl method or Tri Solvent method)	mgKOH/g	JIS K2501-2003 8. ASTM D 4739		10.0 Min
Volatility(NOACK method)	mass %	JPI-5S-41-2004 ASTM D 5800		18.0 Max.
Color		ASTM D 1500		Reported
Element analysis value mass%	Ca	ASTM D 5185		Reported
	Mg	ASTM D 5185		Reported
	Zn	ASTM D 5185		Reported
	P	ASTM D 5185		Reported
	B	ASTM D 5185		Reported
	N	ASTM D 3228 ASTM D 4629 JIS K 2609-1998 3.		Reported
	S	ASTM D 2622 ASTM D 5185		Reported
	Other element (NOTE3) []			Reported
Infrared absorption spectrum (in use of 0.1 mm fixed cell)			IR chart attached,A4	
Anti-foaming (Foaming/Stability)	ml	Sequence	JISK 2518:1991-2003 ASTM D 892	10/0 Max.
		Sequence		50/0 Max.
		Sequence		10/0 Max.
Shear Stability Kinetic Viscosity of Oil after Test@100°C	mm ² /s	ASTM D6278		SAE J300 (NOTE4)

- NOTE:**
- The specified value of viscosity shall conform to the latest version of New SAE viscosity classification .
 - If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).
 - Any other element having a concentration of 100 ppm, except for C, H and O.
 - The kinematic viscosity at 100 °C after shear stability test shall conform to SAE viscosity classification (SAE J300). Note that this requirement is not imposed on mono-grade oil.

Form 2a: Bench test results (DH-1) (Continued)

Items		Test Method	Measured Value	Performance Criteria
Hot Surface Deposit Control@ 280 °C Merit Rating		JPI-5S-55 99		7.0 Min.
Anti-corrosion				
Concentration of Element in Oil after Test		ASTM D 6594		20 Max. 120 Max. 50 Max.
Copper	ppm			
Lead	ppm			
Tin				
Discoloration of Copper Coupon after test@135°C		ASTM D130		3 Max.
Oil Elastomer Compatibility (NOTE5)				
RE1	Hardness Change	Point		-1 ~ +5
	Tensile Strength Rate of Change	%		-40 ~ +10
	Elongation Rate of Change	%		-50 ~ +10
	Volume Rate of Change	%		-1 ~ +5
RE2 New Old (NOTE6)	Hardness Change	Point		-5 ~ +8 (-5 ~ +5)
	Tensile Strength Rate of Change	%		-15 ~ +18(-15 ~ +10)
	Elongation Rate of Change	%		-35 ~ +10(-35 ~ +10)
	Volume Rate of Change	%		-7 ~ +5(-5 ~ +5)
RE3 New Old (NOTE6)	Hardness Change	Point		-22 ~ +1 (-25 ~ +1)
	Tensile Strength Rate of Change	%		-30 ~ +10 (-45 ~ +10)
	Elongation Rate of Change	%		-20 ~ +10 (-20 ~ +10)
	Volume Rate of Change	%		-1 ~ +22(-1 ~ +30)
RE4	Hardness Change	Point		-5 ~ +5
	Tensile Strength Rate of Change	%		-20 ~ +10
	Elongation Rate of Change	%		-50 ~ +10
	Volume Rate of Change	%		-5 ~ +5
AEM	Hardness Change	Point		Apply the latest version of Daimler Chrysler Standard. Attach Test report.
	Tensile Strength Rate of Change	%		
	Elongation Rate of Change	%		
	Volume Rate of Change	%		
NBR	Hardness Change	Point		Apply the latest version of Daimler Chrysler Standard. Attach Test report.
	Tensile Strength Rate of Change	%		
	Elongation Rate of Change	%		
	Volume Rate of Change	%		
FPM	Hardness Change	Point		Apply the latest version of Daimler Chrysler Standard. Attach Test report.
	Tensile Strength Rate of Change	%		
	Elongation Rate of Change	%		
	Volume Rate of Change	%		
ACM	Hardness Change	Point		Apply the latest version of Daimler Chrysler Standard. Attach Test report.
	Tensile Strength Rate of Change	%		
	Elongation Rate of Change	%		
	Volume Rate of Change	%		

- Note:**
- Oil elastomer compatibility test shall conform to one of the following methods:
 - RE1, RE2, RE3, RE4 in the Table and Daimler Chrysler AEM D 8948/200.1 (150°C).
 - Daimler Chrysler standard (VDA 675301, seven days, four elastomer materials (NBR: NBR34 DIN 53538 T3 (100 °C); FPM: AK6 (150 °C); ACM: E7503 (150 °C); AEM: D8948/200.1 (150 °C);) and RE3 in the Table. Note that the standard values in the latest Daimler Chrysler standard shall be used.
 - As to the samples RE2 and RE3 in the oil elastomer compatibility test, the material and specified values have been changed. In the above table, the newly specified values of the newly specified materials (RE2-99 and RE3-04) and the previously specified values (parenthesized) of the previously specified material are shown. In registration, indicate whether the newly specified material or the previously specified material has been used. For the newly specified materials (RE2-99 and RE3-04), apply the newly specified values. For the previously specified material, apply the previously specified values.

Form 2b: Bench test results (DH-2)

Items		Test Method	Measured Value	Performance Criteria
Density (15 °C)	g/cm ³	ASTM D 1298 ASTM D 4052		Reported
Flash point COC	°C	ASTM D 92		Reported
Kinematic viscosity (40 °C)	mm ² /s	ASTM D 445		Reported
Kinematic viscosity (100 °C)	mm ² /s	ASTM D 445		SAE J300
Viscosity index		ASTM D 2270		Reported
CCS viscosity (- °C)	mPa·s	ASTM D 5293		SAE J300
MRV viscosity (- °C)	mPa·s	ASTM D 4684		SAE J300
High-temperature high-shear-stability viscosity (150 °C)	mPa·s	ASTM D 4683		SAE J300
Ash sulfate	mass%	ASTM D 874		0.9-1.1
Residual carbon	mass%	JIS K 2270-2000 5 ASTM D 189 JIS K 2270-2000 6 ASTM D 4530		Reported
Acid number	mgKOH/g	ASTM D 664		Reported
Base number(HClO ₄ method)	mgKOH/g	ASTM D 2896		Reported
Base Number (HCl method or Tri Solvent method)	mgKOH/g	JIS K2501-2003 8.		5.5 Min
Volatility(NOACK method)	mass %	JPI-5S-41-2004 ASTM D 5800		18.0 Max.
Color		ASTM D 1500		Reported
Element analysis value mass%	Ca	ASTM D 5185		Reported
	Mg	ASTM D 5185		Reported
	Zn	ASTM D 5185		Reported
	P	ASTM D 5185		0.12 Max
	B	ASTM D 5185		Reported
	N	ASTM D 3228 ASTM D 4629 JIS K 2609-1998 3.		Reported
	S	ASTM D 2622 ASTM D 5185		0.5 MAX
	Cl (Mass ppm)	JPI-5S-64-2002 ASTM D 6443		150 MAX
	Other element (NOTE9) []			Reported
Infrared absorption spectrum (in use of 0.1 mm fixed cell)			IR chart attached,A4	
Anti-foaming (Foaming/Stability)	ml	Sequence Sequence Sequence	JISK 2518:1991-2003 ASTM D 892	10/0 Max.
				50/0 Max.
				10/0 Max.
Shear Stability Kinetic Viscosity of Oil after Test@100°C	mm ² /s	ASTM D 6278		SAE J300 (NOTE10)

- NOTE:**
- The specified value of viscosity shall conform to the latest version of New SAE viscosity classification .
 - If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).
 - Any other element having a concentration of 100 ppm, except for C, H and O.
 - The kinematic viscosity at 100 °C after shear stability test shall conform to SAE viscosity classification (SAE J300). Note that this requirement is not imposed on mono-grade oil.

Form 2b: Bench test results (DH-2) (Continued)

Items		Test Method	Measured Value	Performance Criteria			
Hot Surface Deposit Control@ 280 °C Merit Rating		JPI-5S-55 99		7.0 Min.			
Anti-corrosion							
Concentration of Element in Oil after Test		ASTM D 6594		20 Max. 100 Max. 50 Max.			
Copper	ppm						
Lead	ppm						
Tin							
Discoloration of Copper Coupon after test@135°C		ASTM D130		3 Max.			
Oil Elastomer Compatibility (NOTE11)							
RE1	Hardness Change	CEC-L-39-T-96		-1 ~ +5			
	Tensile Strength Rate of Change			%	-50 ~ +10		
	Elongation Rate of Change			%	-60 ~ +10		
	Volume Rate of Change			%	-1 ~ +5		
RE2 New Old (NOTE12)	Hardness Change			CEC-L-39-T-96		-5 ~ +8 (-5 ~ +5)	
	Tensile Strength Rate of Change					%	-15 ~ +18(-15 ~ +10)
	Elongation Rate of Change					%	-35 ~ +10(-35 ~ +10)
	Volume Rate of Change					%	-7 ~ +5(-5 ~ +5)
RE3 New Old (NOTE12)	Hardness Change	CEC-L-39-T-96				-25 ~ +1.(-25 ~ +1)	
	Tensile Strength Rate of Change					%	-45 ~ +10(-45 ~ +10)
	Elongation Rate of Change					%	-20 ~ +10(-20 ~ +10)
	Volume Rate of Change					%	-1 ~ +30.(-1 ~ +30)
RE4	Hardness Change			CEC-L-39-T-96		-5 ~ +5	
	Tensile Strength Rate of Change					%	-20 ~ +10
	Elongation Rate of Change					%	-50 ~ +10
	Volume Rate of Change					%	-5 ~ +5
AEM	Hardness Change	CEC-L-39-T-96				Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change					%	
	Elongation Rate of Change					%	
	Volume Rate of Change					%	
NBR	Hardness Change			CEC-L-39-T-96		Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change					%	
	Elongation Rate of Change					%	
	Volume Rate of Change					%	
FPM	Hardness Change	CEC-L-39-T-96				Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change					%	
	Elongation Rate of Change					%	
	Volume Rate of Change					%	
ACM	Hardness Change			CEC-L-39-T-96		Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change					%	
	Elongation Rate of Change					%	
	Volume Rate of Change					%	

- Note:**
11. Oil elastomer compatibility test shall conform to one of the following methods:
 - (1) RE1, RE2, RE3, RE4 in the Table and Daimler Chrysler AEM D 8948/200.1 (150°C).
 - (2) Daimler Chrysler standard (VDA 675301, seven days, four elastomer materials (NBR: NBR34 DIN 53538 T3 (100 °C); FPM: AK6 (150 °C); ACM: E7503 (150 °C); AEM: D8948/200.1 (150 °C);) and RE3 in the Table. Note that the standard values in the latest Daimler Chrysler standard shall be used.
 12. As to the samples RE2 and RE3 in the oil elastomer compatibility test, the material and specified values have been changed. In the above table, the newly specified values of the newly specified materials (RE2-99 and RE3-04) and the previously specified values (parenthesized) of the previously specified material are shown. In registration, indicate whether the newly specified material or the previously specified material has been used. For the newly specified materials (RE2-99 and RE3-04), apply the newly specified values. For the previously specified material, apply the previously specified values.

Form 2c: Bench test results (DL-1)

Items		Test Method	Measured Value	Performance Criteria
Density (15 °C)	g/cm ³	ASTM D 1298 ASTM D 4052		Reported
Flash point COC	°C	ASTM D 92		Reported
Kinematic viscosity (40 °C)	mm ² /s	ASTM D 445		Reported
Kinematic viscosity (100 °C)	mm ² /s	ASTM D 445		SAE J300
Viscosity index		ASTM D 2270		Reported
CCS viscosity (- °C)	mPa·s	ASTM D 5293		SAE J300
MRV viscosity (- °C)	mPa·s	ASTM D 4684		SAE J300
High-temperature high-shear-stability viscosity (150°C)	mPa·s	ASTM D 4683		SAE J300
Ash sulfate	mass%	ASTM D 874		0.6Max
Residual carbon	mass%	JIS K 2270-2000 5 ASTM D 189 JIS K 2270-2000 6 ASTM D 4530		Reported
Acid number	mgKOH/g	ASTM D 664		Reported
Base number(HClO ₄ method)	mgKOH/g	ASTM D 2896		Reported
Base Number (HCl method or Tri Solvent method)	mgKOH/g	JIS K2501-2003 8.		Reported
Volatility(NOACK method)	mass %	JPI-5S-41-2004 ASTM D 5800		15.0 Max.
Color		ASTM D 1500		Reported
Element analysis value mass%	Ca	ASTM D 5185		Reported
	Mg	ASTM D 5185		Reported
	Zn	ASTM D 5185		Reported
	P	ASTM D 5185		0.10 MAX
	B	ASTM D 5185		Reported
	N	ASTM D 3228 ASTM D 4629 JIS K 2609-1998 3.		Reported
	S	ASTM D 2622 ASTM D 5185		0.5 MAX
	Cl (Mass ppm)	JPI-5S-64-2002 ASTM D 6443		150 MAX
	Other element (NOTE15) []			Reported
Infrared absorption spectrum (in use of 0.1 mm fixed cell)			IR chart attached,A4	
Anti-foaming (Foaming/Stability)	ml	Sequence	JISK 2518:1991-2003 ASTM D 892	10/0 Max.
		Sequence		50/0 Max.
		Sequence		10/0 Max.
High-temperature anti-foaming (Foaming/Stability)	ml	Sequence	ASTM D 6082	100/0 Max.
Shear Stability Kinetic Viscosity of Oil after Test@100°C	XW-30 XW-20	ASTM D 6278		8.6Min SAE J300 (NOTE16)

- NOTE:** 13. The specified value of viscosity shall conform to the latest version of New SAE viscosity classification .
14. If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).
15. Any other element having a concentration of 100 ppm, except for C, H and O.
16. The kinematic viscosity at 100 °C after shear stability test shall conform to SAE viscosity classification (SAE J300). Note that this requirement is not imposed on mono-grade oil.

Form 2c: Bench test results (DL-1) (Continued)

Items		Test Method	Measured Value	Performance Criteria	
Hot Surface Deposit Control@ 280 °C Merit Rating		JPI-5S-55 99		7.0 Min.	
Anti-corrosion					
Concentration of Element in Oil after Test		ASTM D 6594		20 Max. 120 Max. 50 Max.	
Copper	ppm				
Lead	ppm				
Discoloration of Copper Coupon after test@135°C		ASTM D130		3 Max.	
Oil Elastomer Compatibility (NOTE17)					
RE1	Hardness Change	CEC-L-39-T-96		-1 ~ +5	
	Tensile Strength Rate of Change			%	-40 ~ +10
	Elongation Rate of Change			%	-50 ~ +10
	Volume Rate of Change			%	-1 ~ +5
RE2 New Old (NOTE18)	Hardness Change			Point	-5 ~ +8 (-5 ~ +5)
	Tensile Strength Rate of Change			%	-15 ~ +18(-15 ~ +10)
	Elongation Rate of Change			%	-35 ~ +10(-35 ~ +10)
	Volume Rate of Change			%	-7 ~ +5(-5 ~ +5)
RE3 New Old (NOTE18)	Hardness Change	Point	-22 ~ +1 (-25 ~ +1)		
	Tensile Strength Rate of Change	%	-30 ~ +10 (-45 ~ +10)		
	Elongation Rate of Change	%	-20 ~ +10 (-20 ~ +10)		
	Volume Rate of Change	%	-1 ~ +22(-1 ~ +30)		
RE4	Hardness Change	Point	-5 ~ +5		
	Tensile Strength Rate of Change	%	-20 ~ +10		
	Elongation Rate of Change	%	-50 ~ +10		
	Volume Rate of Change	%	-5 ~ +5		
AEM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
NBR	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
FPM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
ACM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			

- Note:** 17. Oil elastomer compatibility test shall conform to one of the following methods:
- (1) RE1, RE2, RE3, RE4 in the Table and Daimler Chrysler AEM D 8948/200.1 (150°C).
 - (2) Daimler Chrysler standard (VDA 675301, seven days, four elastomer materials (NBR: NBR34 DIN 53538 T3 (100 °C); FPM: AK6 (150 °C); ACM: E7503 (150 °C); AEM: D8948/200.1 (150 °C);) and RE3 in the Table. Note that the standard values in the latest Daimler Chrysler standard shall be used.
18. As to the samples RE2 and RE3 in the oil elastomer compatibility test, the material and specified values have been changed. In the above table, the newly specified values of the newly specified materials (RE2-99 and RE3-04) and the previously specified values (parenthesized) of the previously specified material are shown. In registration, indicate whether the newly specified material or the previously specified material has been used. For the newly specified materials (RE2-99 and RE3-04), apply the newly specified values. For the previously specified material, apply the previously specified values.

Form 3: Blending change rule application data

Where registered oil is different from oil which has been used to generate engine test result data (where a change is made in oil blending), enter “X” in the following table in the reporting form.

This indication shall be given for a test in which each rule has been applied. For use of each rule, follow the guidelines specified in Appendix 5.

Test Method	JASO M 356:1998 (TD25) or for DH-1 and DH-2 Any of one test from Cat.1K, 1N, 1P, 1R or C13 or for DL-1 VW TDI See Appendix 8	JASO M 354:2005 (4D34T4)	ASTM D5533 (Sequence E) or ASTM D6984 (Sequence F) or ASTM D7320 (Sequence IIIG)	ASTM D 5967 (T-8A or 8E) or ASTM D7156 (Mack T-11)	CEC L-54-T-96 (M111)
Minor change in additive formulation					
Change in base oil					
Read-across for grade of viscosity					

Form 4: Engine test result data

Form 4a: Detergency test (JASO M 336 1998, TD25)

Form 4a-a: Test result data of registered oil (DH-1, DH-2, DL-1)

Date of Start of Test						
Date of End of Test						
No.	Item	Evaluation Method	Unit of Measure	Test Result	Specified Value	
1	Piston ring sticking	JPI-5S-15			Arbitrary	
• Deposit in piston						
2	TGF	JPI-5S-15	%		≤ 60.0	
3	Ring groove		First	Merit evaluation point		Reported
			Second	Merit evaluation point		
			Third	Merit evaluation point		
4	Ring land		First	Merit evaluation point		Reported
			Second	Merit evaluation point		
			Third	Merit evaluation point		
5	Underside			Merit evaluation point		Reported
• Evaluation of combustion deposit						
6	Exhaust valve		CRC No. 15	Merit evaluation point		Reported
7	Intake valve	Merit evaluation point			Reported	
• Evaluation of sludge						
8	Gear case cover	JPI-5S-19-94	Merit evaluation point		Reported	
• Wear loss						
9	Loss of piston ring mass		mg		Reported	
10	Loss of spindle bearing mass		mg		Reported	
11	Loss of crank pin bearing mass		mg		Reported	
• Analysis of oil						
12	Residual carbon New oil	JIS K 2270-2000.5.	mass%		Reported	
	100 Hr Oil after operation for 100 Hr 200 Hr	JIS K 2270-2000.6.				
13	Carbon residue increase	JIS K 2270-2000.5. JIS K 2270-2000.6.	mass%		2.8 (NOTE19)	
14	Base number New Oil 100 Hr Oil after operation for 100 Hr 200 Hr	JIS K 2501-2003.8. ASTM D 4739 (DH-1 only).	mgKOH/g		Reported	

- Note:** 19 Note that this number given here is a criterion to check the validity of the test, not a specified standard value.
 20 If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).

Form 4a-b: Test results of standard oil (DH-1, DH-2, DL-1)

Name of Standard Oil Used					
Date of Start of Test					
Date of End of Test					
No.	Item	Evaluation Method	Unit of Measure	Test Result	Criterion for test validity
1	Piston ring sticking	JPI-5S-15			Free
• Deposit in piston					
2	TGF	JPI-5S-15	%		40-75 (NOTE21)
3	Ring groove		First	Merit evaluation point	Reported
			Second	Merit evaluation point	
			Third	Merit evaluation point	
4	Ring land		First	Merit evaluation point	Reported
			Second	Merit evaluation point	
			Third	Merit evaluation point	
5	Underside		Merit evaluation point		Reported
• Evaluation of combustion deposit					
6	Exhaust valve	CRC No. 15	Merit evaluation point		Reported
7	Intake valve		Merit evaluation point		Reported
• Evaluation of sludge					
8	Gear case cover	JPI-5S-19-94	Merit evaluation point		Reported
• Wear loss					
9	Loss of piston ring mass		mg		Reported
10	Loss of spindle bearing mass		mg		Reported
11	Loss of crank pin bearing mass		mg		Reported
• Analysis of oil					
12	Residual carbon New oil 100 Hr	JIS K 2270-2000 5.	mass%		Reported
	Oil after operation for 100 Hr 200 Hr	JIS K 2270-2000 6.			
13	Carbon residue increase	JIS K 2270-2000 5. JIS K 2270-2000 6.	mass%		2.8
14	Base number New Oil 100 Hr Oil after operation for 100 Hr 200 Hr	JIS K 2501-2003 8. ASTM D 4739	mgKOH/g		Reported

- Note:**
21. Accepted range will be confirmed periodically and any change thereof will be notified through Website, etc. Make your own confirmation before submitting a report.
 22. If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).

Form 4b: Valve train wear test (JASO M 354:2005, 4D34T4)

Form 4b-a: Test result data of registered oil (DH-1, DH-2, DL-1)

Date of Start of Test				
Date of End of Test				
No.	Item	Unit of Measure	Test Result	Specified Value
• Degree of wear				
1	Average change in cam axis diameter	μm		Reported
2	Average change in cam axis diameter (Normalized at 4.5 mass % Carbon residue increase)	μm		≤ 95.0
3	Maximum change in cam axis diameter (Normalized at 4.5 mass % Carbon Residue Increase)	μm		≤ 210
4	Wear on cam surface			No pitting
5	Change in tappet mass	mg		Reported
• Analysis of oil used				
6	Carbon residue increase JIS K 2270-2000 5.) JIS K 2270-2000 6.	mass%		3.5 ~ 5.5 (NOTE23)
7	Base Number JIS K 2501-2003 8. ASTM D 4739 (DH-1 only)	mgKOH/g		Reported

Form 4b-b: Test results of standard oil (DH-1, DH-2, DL-1)

Name of Standard Oil Used				
Date of Start of Test				
Date of End of Test				
No.	Item	Unit of Measure	Test Result	Acceptance criterion
• Degree of wear				
1	Average change in cam axis diameter	μm		Reported
2	Average change in cam axis diameter (Normalized at 4.5 mass % Carbon residue increase)	μm		55 ~ 125 (NOTE25)
3	Change in tappet mass	mg		Reported
• Analysis of oil used				
4	Carbon residue increase JIS K 2270-2000 5. JIS K 2270-2000 6.	mass%		3.5 ~ 5.5
5	Base Number JIS K 2501-2003 8. ASTM D 4739	mgKOH/g		Reported

Note: 23. Note that this number given here is a criterion to check the validity of the test, not a specified standard value.

24. If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).

25. Accepted range will be confirmed periodically and any change thereof will be notified through Website, etc. Make your own confirmation before submitting a report.

Form 4c-a: High-temperature oxidation stability Test (ASTM D5533, Sequence IIIE or ASTM D6984, Sequence IIIF or ASTM D7320, Sequence IIIG), Test results of registered oil (DH-1, DH-2)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Sequence IIIE Kinematic viscosity at 40 °C, rate of increase after 64 Hr(NOTE26)	%		200 max. (NOTE26)
	Sequence IIIF Kinematic viscosity at 40 °C, rate of increase after 60 Hr(NOTE26)			295 max (NOTE26)
	Sequence IIIG Kinematic viscosity at 40 °C, rate of increase after 100 Hr(NOTE26)			150 max (NOTE26)

Note: 26 Conduct one of Sequence IIIE, Sequence IIIF or Sequence IIIG and indicate which test was run (Check a check box).

Form 4c-b: High-temperature oxidation stability Test (ASTM D 6984, Sequence IIIF or ASTM D7320, Sequence IIIG), Test results of registered oil (DL-1)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Sequence IIIF Kinematic viscosity at 40 °C, rate of increase after 80 Hr(NOTE27)	%		275 max. (NOTE27)
	Sequence IIIG Kinematic viscosity at 40 °C, rate of increase after 100 Hr(NOTE27)			150 max. (NOTE27)

Note: 27. Conduct either of Sequence IIIF or Sequence IIIG and indicate which test was run (Check a check box).

Form 4d: Soot Dispersancy Test for Diesel Engine Oils (ASTM D 5967, T-8A and T-8E, and ASTM D7156, T-11), Test result data of registered oil (DH-1, DH-2, DL-1)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Mack T-8A Viscosity Increase (100 to 150 Hr) at 100°C	mm ² /s/hr		0.2 max.
	Mack T-8E Maximum Relative Viscosity at 4.8% Soot	-		1st test, 2.1max. 2nd test, 2.2max. 3rd test, 2.3max. (Note 28)
	Mack T-11 Minimum TGA Soot @4.0mm ² /s increase @100°C	%		1st test, 3.5min. 2nd test, 3.4min. 3rd test, 3.3min. (Note 28)
	Minimum TGA Soot @12.0mm ² /s increase @100°C	%		1st test, 6.0min. 2nd test, 5.9min. 3rd test, 5.9min. (Note 28)
	Minimum TGA Soot @15.0mm ² /s increase @100°C	%		1st test, 6.7min. 2nd test, 6.6min. 3rd test, 6.5min. (Note 28)

(Note 28) Conduct T-8A, T-8E or T-11, and indicate which test was run (Check a check box). Please Indicate test run number (Check a check box), when T-8E or T-11 was conducted, ex 2nd test or 3rd test.

Form 4e: Fuel Economy Test (CEC L-54-T-96, M111), Test result data of registered oil (DL-1)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Fuel economy improvement	%		2.5

To be Entered by the JASO Engine Oil Standards Implementation Panel			
Person in charge of receipt:	Seal		
Date received (year, month, day):	year,	month,	day
Receipt number:			
Remarks:			

Form 5: Notice of change

Diesel Engine Oil/Lubricant Notice of Change in On-File Data

To: JASO Engine Oil Standards Implementation Panel

With the receipt number indicated below, we hereby notify changes in the on-file data of diesel engine oil according to Item 5.11 in the Standards Application Manual.

- Diesel engine oil concerning changes in on-file data

Receipt number : _____
 Intra-company designation, number : _____
 Product name : _____
 Classification : DH-1 DH-2 DL-1
 Grade of viscosity : _____
 Oil code : _____

- Changes in on-file data, and documents submitted

*	Changes in Data	Documents Submitted
	Change of the address of the registrant	Form 5
	Change of the data within the read-across allowable range indicated in Appendix 5, other than grade of viscosity	Form 5 Form 6

* Enter "X" for changes concerned.

Date reported
 (year, month, day) : _____ year, _____ month, _____ day
 Registrant (Company) : _____ Company seal
 Person in charge of reporting : _____ Seal
 Department/Section, Title : _____
 Sign : _____

To be entered by the JASO Engine Oil Standards Implementation Panel	
Person in charge of receipt:	Seal
Date received (year, month, day):	year, month, day
Receipt number:	
Remarks:	

Form 6: Front sheet for change notification reporting

Diesel Engine Oil Reporting (For notification of change)

Date registration (year, month, day):			year,	month,	day
Registrant (Company)	Company seal	Contact address			
Person in charge of registration		Name			
Name		_____			
Seal		Department/Section			
Department/Section, Title		_____			
Signature		Address			
_____		_____			
		Tel			

		Fax			

Registered Oil	
Intra-company designation or code number	
Product name	
Classification	DH-1 DH-2 DL-1
Grade of viscosity	
Oil code	

Form 7: For change notification; bench test result data

Form 7a: For change notification; bench test result data (DH-1)

Items		Test Method	Measured Value	Performance Criteria
Density (15 °C)	g/cm ³	ASTM D 1298 ASTM D 4052		Reported
Flash point COC	°C	ASTM D 92		Reported
Kinematic viscosity (40 °C)	mm ² /s	ASTM D 445		Reported
Kinematic viscosity (100 °C)	mm ² /s	ASTM D 445		SAE J300
Viscosity index		ASTM D 2270		Reported
CCS viscosity (- °C)	mPa·s	ASTM D 5293		SAE J300
MRV viscosity (- °C)	mPa·s	ASTM D 4684		SAE J300
High-temperature high-shear-stability viscosity (150 °C)	mPa·s	ASTM D 4683		SAE J300
Ash sulfate	mass%	ASTM D 874		Reported
Residual carbon	mass%	JIS K 2270-2000 5 ASTM D 189 JIS K 2270-2000 6 ASTM D 4530		Reported
Acid number	mgKOH/g	ASTM D 664		Reported
Base number(HClO ₄ method)	mgKOH/g	ASTM D 2896		Reported
Base Number (HCl method or Tri Solvent method)	mgKOH/g	JIS K2501-2003 8. ASTM D 4739		10.0 Min
Volatility(NOACK method)	mass %	JPI-5S-41-2004 ASTM D 5800		18.0 Max.
Color		ASTM D 1500		Reported
Element analysis value mass%	Ca	ASTM D 5185		Reported
	Mg	ASTM D 5185		Reported
	Zn	ASTM D 5185		Reported
	P	ASTM D 5185		Reported
	B	ASTM D 5185		Reported
	N	ASTM D 3228 ASTM D 4629 JIS K 2609-1998 3.		Reported
	S	ASTM D 2622 ASTM D 5185		Reported
	Other element (NOTE31) []			Reported
Infrared absorption spectrum (in use of 0.1 mm fixed cell)			IR chart attached,A4	
Anti-foaming (Foaming/Stability)	ml	Sequence	JISK 2518:1991-2003 ASTM D 892	10/0 Max.
		Sequence		50/0 Max.
		Sequence		10/0 Max.
Shear Stability Kinetic Viscosity of Oil after Test@100°C	mm ² /s	ASTM D6278		SAE J300 (NOTE32)

- Note:**
29. The specified value of viscosity shall conform to the latest version of New SAE viscosity classification .
 30. If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).
 31. Any other element having a concentration of 100 ppm, except for C, H and O.
 32. The kinematic viscosity at 100 °C after shear stability test shall conform to SAE viscosity classification (SAE J300). Note that this requirement is not imposed on mono-grade oil.

Form 7a: For change notification; bench test result data (Continued) (DH-1)

Items		Test Method	Measured Value	Performance Criteria	
Hot Surface Deposit Control@ 280 °C Merit Rating		JPI-5S-55 99		7.0 Min.	
Anti-corrosion					
Concentration of Element in Oil after Test		ASTM D 6594		20 Max. 120 Max. 50 Max.	
Copper	ppm				
Lead	ppm				
Discoloration of Copper Coupon after test@135°C		ASTM D130		3 Max.	
Oil Elastomer Compatibility (NOTE33)					
RE1	Hardness Change	CEC-L-39-T-96		-1 ~ +5	
	Tensile Strength Rate of Change			%	-40 ~ +10
	Elongation Rate of Change			%	-50 ~ +10
	Volume Rate of Change			%	-1 ~ +5
RE2 New Old (NOTE34)	Hardness Change			Point	-5 ~ +8 (-5 ~ +5)
	Tensile Strength Rate of Change			%	-15 ~ +18(-15 ~ +10)
	Elongation Rate of Change			%	-35 ~ +10(-35 ~ +10)
	Volume Rate of Change			%	-7 ~ +5(-5 ~ +5)
RE3 New Old (NOTE34)	Hardness Change	Point	-22 ~ +1 (-25 ~ +1)		
	Tensile Strength Rate of Change	%	-30 ~ +10 (-45 ~ +10)		
	Elongation Rate of Change	%	-20 ~ +10 (-20 ~ +10)		
	Volume Rate of Change	%	-1 ~ +22(-1 ~ +30)		
RE4	Hardness Change	Point	-5 ~ +5		
	Tensile Strength Rate of Change	%	-20 ~ +10		
	Elongation Rate of Change	%	-50 ~ +10		
	Volume Rate of Change	%	-5 ~ +5		
AEM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
NBR	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
FPM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
ACM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			

- Note:** 33. Oil elastomer compatibility test shall conform to one of the following methods:
- (1) RE1, RE2, RE3, RE4 in the Table and Daimler Chrysler AEM D 8948/200.1 (150°C).
 - (2) Daimler Chrysler standard (VDA 675301, seven days, four elastomer materials (NBR: NBR34 DIN 53538 T3 (100 °C); FPM: AK6 (150 °C); ACM: E7503 (150 °C); AEM: D8948/200.1 (150 °C);) and RE3 in the Table. Note that the standard values in the latest Daimler Chrysler standard shall be used.
34. As to the samples RE2 and RE3 in the oil elastomer compatibility test, the material and specified values have been changed. In the above table, the newly specified values of the newly specified materials (RE2-99 and RE3-04) and the previously specified values (parenthesized) of the previously specified material are shown. In registration, indicate whether the newly specified material or the previously specified material has been used. For the newly specified materials (RE2-99 and RE3-04), apply the newly specified values. For the previously specified material, apply the previously specified values.

Form 7b: Bench test results (DH-2)

Items		Test Method	Measured Value	Performance Criteria
Density (15 °C)	g/cm ³	ASTM D 1298 ASTM D 4052		Reported
Flash point COC	°C	ASTM D 92		Reported
Kinematic viscosity (40 °C)	mm ² /s	ASTM D 445		Reported
Kinematic viscosity (100 °C)	mm ² /s	ASTM D 445		SAE J300
Viscosity index		ASTM D 2270		Reported
CCS viscosity (- °C)	mPa·s	ASTM D 5293		SAE J300
MRV viscosity (- °C)	mPa·s	ASTM D 4684		SAE J300
High-temperature high-shear-stability viscosity (150 °C)	mPa·s	ASTM D 4683		SAE J300
Ash sulfate	mass%	ASTM D 874		0.9-1.1
Residual carbon	mass%	JIS K 2270-2000 5 ASTM D 189 JIS K 2270-2000 6 ASTM D 4530		Reported
Acid number	mgKOH/g	ASTM D 664		Reported
Base number(HClO ₄ method)	mgKOH/g	ASTM D 2896		Reported
Base Number (HCl method or Tri Solvent method)	mgKOH/g	JIS K2501-2003 8.		5.5 Min
Volatility(NOACK method)	mass %	JPI-5S-41-2004 ASTM D 5800		18.0 Max.
Color		ASTM D 1500		Reported
Element analysis value mass%	Ca	ASTM D 5185		Reported
	Mg	ASTM D 5185		Reported
	Zn	ASTM D 5185		Reported
	P	ASTM D 5185		0.12Max
	B	ASTM D 5185		Reported
	N	ASTM D 3228 ASTM D 4629 JIS K 2609-1998 3.		Reported
	S	ASTM D 2622 ASTM D 5185		0.5 MAX
	Cl (Mass ppm)	JPI-5S-64-2002 ASTM D 6443		150 MAX
	Other element (NOTE37) []			Reported
Infrared absorption spectrum (in use of 0.1 mm fixed cell)			IR chart attached,A4	
Anti-foaming (Foaming/Stability)	ml	Sequence	JISK 2518:1991-2003 ASTM D 892	10/0 Max.
		Sequence		50/0 Max.
		Sequence		10/0 Max.
Shear Stability Kinetic Viscosity of Oil after Test@100°C	mm ² /s	ASTM D 6278		SAE J300 (NOTE38)

- NOTE:**
35. The specified value of viscosity shall conform to the latest version of New SAE viscosity classification .
 36. If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).
 37. Any other element having a concentration of 100 ppm, except for C, H and O.
 38. The kinematic viscosity at 100 °C after shear stability test shall conform to SAE viscosity classification (SAE J300). Note that this requirement is not imposed on mono-grade oil.

Form 7b: Bench test results (DH-2) (Continued)

Items		Test Method	Measured Value	Performance Criteria	
Hot Surface Deposit Control@ 280 °C Merit Rating		JPI-5S-55 99		7.0 Min.	
Anti-corrosion					
Concentration of Element in Oil after Test		ASTM D 6594		20 Max. 100 Max. 50 Max.	
Copper	ppm				
Lead	ppm				
Tin					
Discoloration of Copper Coupon after test@135°C		ASTM D130		3 Max.	
Oil Elastomer Compatibility (NOTE39)					
RE1	Hardness Change	CEC-L-39-T-96		-1 ~ +5	
	Tensile Strength Rate of Change			%	-50 ~ +10
	Elongation Rate of Change			%	-60 ~ +10
	Volume Rate of Change			%	-1 ~ +5
RE2 New Old (NOTE40)	Hardness Change	CEC-L-39-T-96		-5 ~ +8 (-5 ~ +5)	
	Tensile Strength Rate of Change			%	-15 ~ +18(-15 ~ +10)
	Elongation Rate of Change			%	-35 ~ +10(-35 ~ +10)
	Volume Rate of Change			%	-7 ~ +5(-5 ~ +5)
RE3 New Old (NOTE40)	Hardness Change	CEC-L-39-T-96		-25 ~ +1.(-25 ~ +1)	
	Tensile Strength Rate of Change			%	-45 ~ +10(-45 ~ +10)
	Elongation Rate of Change			%	-20 ~ +10(-20 ~ +10)
	Volume Rate of Change			%	-1 ~ +30.(-1 ~ +30)
RE4	Hardness Change	CEC-L-39-T-96		-5 ~ +5	
	Tensile Strength Rate of Change			%	-20 ~ +10
	Elongation Rate of Change			%	-50 ~ +10
	Volume Rate of Change			%	-5 ~ +5
AEM	Hardness Change	CEC-L-39-T-96		Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change			%	
	Elongation Rate of Change			%	
	Volume Rate of Change			%	
NBR	Hardness Change	CEC-L-39-T-96		Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change			%	
	Elongation Rate of Change			%	
	Volume Rate of Change			%	
FPM	Hardness Change	CEC-L-39-T-96		Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change			%	
	Elongation Rate of Change			%	
	Volume Rate of Change			%	
ACM	Hardness Change	CEC-L-39-T-96		Apply the latest version of Daimler Chrysler Standard. Attach Test report.	
	Tensile Strength Rate of Change			%	
	Elongation Rate of Change			%	
	Volume Rate of Change			%	

- Note:** 39. Oil elastomer compatibility test shall conform to one of the following methods:
- (1) RE1, RE2, RE3, RE4 in the Table and Daimler Chrysler AEM D 8948/200.1 (150°C).
 - (2) Daimler Chrysler standard (VDA 675301, seven days, four elastomer materials (NBR: NBR34 DIN 53538 T3 (100 °C); FPM: AK6 (150 °C); ACM: E7503 (150 °C); AEM: D8948/200.1 (150 °C);) and RE3 in the Table. Note that the standard values in the latest Daimler Chrysler standard shall be used.
40. As to the samples RE2 and RE3 in the oil elastomer compatibility test, the material and specified values have been changed. In the above table, the newly specified values of the newly specified materials (RE2-99 and RE3-04) and the previously specified values (parenthesized) of the previously specified material are shown. In registration, indicate whether the newly specified material or the previously specified material has been used. For the newly specified materials (RE2-99 and RE3-04), apply the newly specified values. For the previously specified material, apply the previously specified values.

Form 7c: Bench test results (DL-1)

Items		Test Method	Measured Value	Performance Criteria
Density (15 °C)	g/cm ³	ASTM D 1298 ASTM D 4052		Reported
Flash point COC	°C	ASTM D 92		Reported
Kinematic viscosity (40 °C)	mm ² /s	ASTM D 445		Reported
Kinematic viscosity (100 °C)	mm ² /s	ASTM D 445		SAE J300
Viscosity index		ASTM D 2270		Reported
CCS viscosity (- °C)	mPa·s	ASTM D 5293		SAE J300
MRV viscosity (- °C)	mPa·s	ASTM D 4684		SAE J300
High-temperature high-shear-stability viscosity (150 °C)	mPa·s	ASTM D 4683		SAE J300
Ash sulfate	mass%	ASTM D 874		0.6Max
Residual carbon	mass%	JIS K 2270-2000 5 ASTM D 189 JIS K 2270-2000 6 ASTM D 4530		Reported
Acid number	mgKOH/g	ASTM D 664		Reported
Base number(HClO ₄ method)	mgKOH/g	ASTM D 2896		Reported
Base Number (HCl method or Tri Solvent method)	mgKOH/g	JIS K2501-2003 8.		Reported
Volatility(NOACK method)	mass %	JPI-5S-41-2004 ASTM D 5800		15.0 Max.
Color		ASTM D 1500		Reported
Element analysis value mass%	Ca	ASTM D 5185		Reported
	Mg	ASTM D 5185		Reported
	Zn	ASTM D 5185		Reported
	P	ASTM D 5185		0.10 MAX
	B	ASTM D 5185		Reported
	N	ASTM D 3228 ASTM D 4629 JIS K 2609-1998 3.		Reported
	S	ASTM D 2622 ASTM D 5185		0.5 MAX
	Cl (Mass ppm)	JPI-5S-64-2002 ASTM D 6443		150 MAX
	Other element (NOTE43) []			Reported
Infrared absorption spectrum (in use of 0.1 mm fixed cell)			IR chart attached,A4	
Anti-foaming (Foaming/Stability)	ml	Sequence	JISK 2518:1991-2003 ASTM D 892	10/0 Max.
		Sequence		50/0 Max.
		Sequence		10/0 Max.
High-temperature anti-foaming (Foaming/Stability)	ml	Sequence	ASTM D 6082	100/0 Max.
Shear Stability Kinetic Viscosity of Oil after Test@100°C	XW-30 XW-20	ASTM D 6278		8.6Min SAE J300 (NOTE44)

- Note:**
41. The specified value of viscosity shall conform to the latest version of New SAE viscosity classification .
 42. If a single item indicates two or more test methods, it is sufficient to enter test data under one of such methods, provided that it is required to identify the adopted method (Check a check box).
 43. Any other element having a concentration of 100 ppm, except for C, H and O.
 44. The kinematic viscosity at 100 °C after shear stability test shall conform to SAE viscosity classification (SAE J300). Note that this requirement is not imposed on mono-grade oil.

Form 7c: Bench test results (DL-1) (Continued)

Items		Test Method	Measured Value	Performance Criteria	
Hot Surface Deposit Control@ 280 °C Merit Rating		JPI-5S-55 99		7.0 Min.	
Anti-corrosion					
Concentration of Element in Oil after Test		ASTM D 6594		20 Max. 120 Max. 50 Max.	
Copper	ppm				
Lead	ppm				
Discoloration of Copper Coupon after test@135°C		ASTM D130		3 Max.	
Oil Elastomer Compatibility (NOTE45)					
RE1	Hardness Change	CEC-L-39-T-96		-1 ~ +5	
	Tensile Strength Rate of Change			%	-40 ~ +10
	Elongation Rate of Change			%	-50 ~ +10
	Volume Rate of Change			%	-1 ~ +5
RE2 New Old (NOTE46)	Hardness Change			Point	-5 ~ +8 (-5 ~ +5)
	Tensile Strength Rate of Change			%	-15 ~ +18(-15 ~ +10)
	Elongation Rate of Change			%	-35 ~ +10(-35 ~ +10)
	Volume Rate of Change			%	-7 ~ +5(-5 ~ +5)
RE3 New Old (NOTE46)	Hardness Change	Point	-22 ~ +1.(-25 ~ +1)		
	Tensile Strength Rate of Change	%	-30 ~ +10(-45 ~ +10)		
	Elongation Rate of Change	%	-20 ~ +10(-20 ~ +10)		
	Volume Rate of Change	%	-1 ~ +22.(-1 ~ +30)		
RE4	Hardness Change	Point	-5 ~ +5		
	Tensile Strength Rate of Change	%	-20 ~ +10		
	Elongation Rate of Change	%	-50 ~ +10		
	Volume Rate of Change	%	-5 ~ +5		
AEM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
NBR	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
FPM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			
ACM	Hardness Change	Point	Apply the latest version of Daimler Chrysler Standard. Attach Test report.		
	Tensile Strength Rate of Change	%			
	Elongation Rate of Change	%			
	Volume Rate of Change	%			

- Note:** 45. Oil elastomer compatibility test shall conform to one of the following methods:
- (1) RE1, RE2, RE3, RE4 in the Table and Daimler Chrysler AEM D 8948/200.1 (150°C).
 - (2) Daimler Chrysler standard (VDA 675301, seven days, four elastomer materials (NBR: NBR34 DIN 53538 T3 (100 °C); FPM: AK6 (150 °C); ACM: E7503 (150 °C); AEM: D8948/200.1 (150 °C);) and RE3 in the Table. Note that the standard values in the latest Daimler Chrysler standard shall be used.
46. As to the samples RE2 and RE3 in the oil elastomer compatibility test, the material and specified values have been changed. In the above table, the newly specified values of the newly specified materials (RE2-99 and RE3-04) and the previously specified values (parenthesized) of the previously specified material are shown. In registration, indicate whether the newly specified material or the previously specified material has been used. For the newly specified materials (RE2-99 and RE3-04), apply the newly specified values. For the previously specified material, apply the previously specified values.

Form 8: For change notification; blending change rule application data

Where registered oil is different from oil which has been used to generate engine test result data (where a change is made in oil blending), enter "X" in the following table in the reporting form.

This indication shall be given for a test in which each rule has been applied. For use of each rule, follow the guidelines specified in Appendix 5.

Test Method	JASO M 356:1998 (TD25) or for DH-1 and DH-2 Any of one test from Cat.1K, 1N, 1P, 1R or C13 or VW TDI for DL-1	JASO M 354:2005 (4D34T4)	ASTM D5533 (Sequence E) or ASTM D6984 (Sequence F) or ASTM D7320 (Sequence IIIG)	ASTM D 5967 (T-8A or 8E) or ASTM D7156 (Mack T-11)	CEC L-54-T-96 (M111)
Minor change in additive formulation					
Change in base oil					
Read-across for grade of viscosity					

APPENDIX 4

(Original)

Form A

Diesel Engine Oil/Lubricant On-File Notice

To: _____ Date (____year, ____month, ____day)
JASO Engine Oil Standards
Implementation Panel
_____Seal

We hereby notifies that for a diesel engine oil product having the following receipt number which was reported by you, an oil code and performance class thereof have been filed as indicated below.

Description

Receipt number : _____
Intra-company designation, number : _____
Product name : _____
Classification : _____ DH-1 DH-2 DL-1
Grade of viscosity : _____
Oil code : _____

(Original)

Form B

On-File Agreement Concerning Diesel Engine Oil/Lubricant On-File Agreement

To JASO Engine Oil Standards Implementation Panel

We hereby agree the following conditions in sales of the on-file diesel engine oil indicated above.

1. As to the quality, performance and marking of the diesel engine oil concerned, classification and guarantee shall be made on submitter's own responsibility, and the relevant information shall be publicized to general consumers through the sales channels of the submitter.
2. If any troubles takes place on the market due to use of the diesel engine oil concerned, the submitter shall solve it on his own responsibility. In such an event, no responsibility shall be assumed by the JASO Engine Oil Standards Implementation Panel.
3. The submitter declares that the quality/performance data and marking example indicated in the report document represent the diesel engine oil concerned to be sold actually.
4. In advertisements or the like, the submitter shall not use such an expression as will lead to a misunderstanding that the quality/performance of the diesel engine oil concerned has been certified by the JASO Engine Oil Standards Implementation Panel.
5. Upon request for submitting JASO engine test result record to the JASO Engine Oil Standards Implementation Panel, the submitter shall promptly submit relevant documents to the JASO Engine Oil Standards Implementation Panel.
6. The submitter shall approve that the JASO Engine Oil Standards Implementation Panel may disclose product names, submitter names, viscosity grades, oil codes and classifications through communication media including the Internet 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 submitter and oil name are not identifiable.
7. The submitter shall pay an on-file maintenance fee specified in the Standards Application Manual by due date each year.
8. When the sale of the diesel engine oil concerned is discontinued, the submitter shall promptly inform the JASO Engine Oil Standards Implementation Panel as to cancellation of the on-file data.
9. As to other items than those mentioned above, the submitter shall agree each condition/requirement contained in the Standards Application Manual with clear understanding thereof.

Date reported
(year, month, day) : _____year, _____month, _____day
Submitter (Company) : _____ Company seal
Person in charge of reporting : _____ Seal
Department/Section, Title : _____
Signature : _____

(Duplicate)

Form A

Diesel Engine Oil/Lubricant On-File Notice

To: _____ Date (____year, ____month, ____day)
JASO Engine Oil Standards
Implementation Panel
_____Seal

We hereby notifies that for a diesel engine oil product having the following receipt number which was reported by you, an oil code and performance class thereof have been filed as indicated below.

Description

Receipt number : _____
Intra-company designation, number : _____
Product name : _____
Classification : _____ DH-1 DH-2 DL-1
Grade of viscosity : _____
Oil code : _____

(Duplicate)

Form B

On-File Agreement Concerning Diesel Engine Oil/Lubricant On-File Agreement

To JASO Engine Oil Standards Implementation Panel

We hereby agree the following conditions in sales of the on-file diesel engine oil indicated above.

1. As to the quality, performance and marking of the diesel engine oil concerned, classification and guarantee shall be made on submitter's own responsibility, and the relevant information shall be publicized to general consumers through the sales channels of the submitter.
2. If any troubles takes place on the market due to use of the diesel engine oil concerned, the submitter shall solve it on his own responsibility. In such an event, no responsibility shall be assumed by the JASO Engine Oil Standards Implementation Panel.
3. The submitter declares that the quality/performance data and marking example indicated in the report document represent the diesel engine oil concerned to be sold actually.
4. In advertisements or the like, the submitter shall not use such an expression as will lead to a misunderstanding that the quality/performance of the diesel engine oil concerned has been certified by the JASO Engine Oil Standards Implementation Panel.
5. Upon request for submitting JASO engine test result record to the JASO Engine Oil Standards Implementation Panel, the submitter shall promptly submit relevant documents to the JASO Engine Oil Standards Implementation Panel.
6. The submitter shall approve that the JASO Engine Oil Standards Implementation Panel may disclose product names, submitter names, viscosity grades, oil codes and classifications through communication media including the Internet 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 submitter and oil name are not identifiable.
7. The submitter shall pay an on-file maintenance fee specified in the Standards Application Manual by due date each year.
8. When the sale of the diesel engine oil concerned is discontinued, the submitter shall promptly inform the JASO Engine Oil Standards Implementation Panel as to cancellation of the on-file data.
9. As to other items than those mentioned above, the submitter shall agree each condition/requirement contained in the Standards Application Manual with clear understanding thereof.

Date reported
(year, month, day) : _____year, _____month, _____day
Submitter (Company) : _____ Company seal
Person in charge of reporting : _____ Seal
Department/Section, Title : _____
Signature : _____

APPENDIX 5

Read-Across Allowable Range for Change in Diesel Engine Oil Formulation

A change of base oil or any additive in diesel engine oil may give significant effects to performance characteristics of the diesel engine oil. Therefore, if a change has been made regarding the viscosity grade, components or compounding ratio of a filed diesel engine oil product, each of the tests specified by the standard shall be carried out for the product changed.

Note, however, that as to JASO engine tests, equivalent performance could be recognized if a change is within the standard allowable range indicated below in this document.

The product concerned will be exempted from the JASO engine test if the standard allowable range is satisfied. As to ASTM engine tests and bench tests, changes can be allowed in conformance with the ACC Code of Practice and API EOLCS guidelines. As to CEC engine tests and bench tests, changes can be allowed in conformance with the ATC Code of Practice and ATIEL Code of Practice. (Referred to as read-across)

Tables A to E indicate the read-across standard allowable ranges for respective engine tests.

Table A List of Read-Across Standard Allowable Ranges

Item	Change in Developmental FORMULATION			On-file registration	Change in filed FORMULATION			Remarks
	JASO Engine Test	ASTM Engine Test and Bench Test	CEC Engine Test and Bench Test		JASO Engine Test	ASTM Engine Test and Bench Test	CEC Engine Test and Bench Test	
Change in base oil	Read-across allowed within the range specified in Table B	Conforming to API EOLCS guidelines (Note 1)	Conforming to ATIEL Code of Practice		Read-across allowed within the range specified in Table B	Conforming to API EOLCS guidelines (Note 1)	Conforming to ATIEL Code of Practice	For any item, a degree of cumulative changes with respect to the standard FORMULATION shall be within each applicable standard range.
Minor change in major additives	No read-across allowed	Conforming to ACC Code of Practice	Conforming to ATC Code of Practice		Read-across allowed within the range specified in Table C	Conforming to ACC Code of Practice	Conforming to ATC Code of Practice	
Change in viscosity index improver	No read-across allowed	Conforming to ACC Code of Practice	Conforming to ATC Code of Practice		Read-across allowed within the range specified in Table D	Conforming to ACC Code of Practice	Conforming to ATC Code of Practice	
Change in pour point depressant/defoamer	Read-across allowed	Conforming to ACC Code of Practice	Conforming to ATC Code of Practice		Read-across allowed	Conforming to ACC Code of Practice	Conforming to ATC Code of Practice	
Read-across for grade of viscosity	<ul style="list-style-type: none"> JASO detergency test(M-336:1998): Read-across allowed within the range specified in Table E JASO valve train wear test (M-354:1999): Read-across is allowed where the HTHS viscosity is equivalent to or higher than that indicated in the original prescription and also the kinematic viscosity at 100 °C after shear stability test is equivalent or higher than that indicated therein. 	Conforming to API EOLCS guidelines (Note 1)	Conforming to ATIEL Code of Practice		<ul style="list-style-type: none"> JASO detergency test(M-336:1998): Read-across allowed within the range specified in Table E JASO valve train wear test (M-354:1999): Read-across is allowed where the HTHS viscosity is equivalent to or higher than that indicated in the original prescription and also the kinematic viscosity at 100 °C after shear stability test is equivalent or higher than that indicated therein. 	Conforming to API EOLCS guidelines (Note 1)	Conforming to ATIEL Code of Practice	

Note: 1. Read-across in soot dispersancy test for diesel engine oil (ASTM D 5967, Mack T-8A and T-8E) are in conformance to Table-F and G. Also about ASTM D 7156, Mack T-11 is in conformance with that in API CJ-4 standard.

<Terminology>

- (1) Base oil A main component base material of diesel engine oil. Mineral oil, synthetic lubricant, or a mixture thereof not including the following components (2), (3) and (4).
- (2) Major additives To be added to the base oil for the purpose of enhancing diesel engine oil performance, e.g., detergents, dispersants, anti-wear additives, friction modifiers, anti-oxidants, etc.
- (3) Viscosity index improver To be added to the base oil for the purpose of improving viscosity characteristic of diesel engine oil.
- (4) Pour point depressant/defoamer To be added to the base oil for the purpose of improving fluidity characteristic and foaming characteristic of diesel engine oil.

Table B Guidelines for Change in Base Oil in JASO Engine Tests

Base Oil in Original Prescription	Base Oil After Replacement				
	Group I	Group II	Group III	Group IV	Group V
Group I					TD25, 4D34
Group II	≤ 10%				TD25, 4D34
	> 10%	TD25			
Group III	≤ 10%		≤ 10%		TD25, 4D34
	> 10%	TD25, 4D34T4	> 10%	TD25	
Group IV	≤ 10%		≤ 10%		TD25, 4D34
	> 10%	TD25, 4D34T4	> 10%	TD25	
Group V	TD25, 4D34	TD25, 4D34	TD25, 4D34	TD25, 4D34	TD25, 4D34

- Note: 2. The engine test to be carried out after replacement of base oil is indicated.
 TD25: Detergency Test (JASO M 336:1998, TD25)
 4D34: Valve Train Wear Test (JASO M 354:2005, 4D34T4)
3. Groups I to V of base oil conform to the base oil categories specified by API and ATIEL.

Table C Guidelines for Change in Formulation of Major Additives in JASO Engine Tests (MFM)

Change in prescription of major additives	Level-1	Level-2
Decrease in concentration of each additive component	Not allowed	Not allowed except for the purpose of rebalancing of detergents
Increase in additive package	≤ 15%	> 15% to ≤ 30%
Increase in concentration of component - 1.0% or more in product - Less than 1.0% in product > 0.5% to ≤ 1.0% > 0.2% to ≤ 0.5% ≤ 0.2%	≤ 15% ≤ 30% ≤ 50% ≤ 100%	> 15% to ≤ 30% > 30% to ≤ 100% (Note: 1.3% at maximum in product) > 50% to ≤ 100% > 100% to ≤ 200% (Note: 0.5% at maximum in product)
Addition of new component	Not allowed	Within the range not exceeding 10% of additive package
ZnDTP rebalancing	Not allowed	Not allowed
Rebalancing of metal detergents	Not allowed	Allowed under condition that the sulfated ash content remains unchanged and the soap content is not decreased (only once). The allowable range of an increase of the soap content in each detergent is up to 30%.
Other rules	For MFM, a change in each element is counted as one time. Up to three times are allowed in total. In the result by MFM, an increase shall not exceed 30% as to any component having a concentration of 1.0% or more in product.	

- LEVEL:** 1. To be regarded as equivalent in performance so that each engine test is exempted for the MFM.

2. To be regarded as equivalent in performance so that each engine test is exempted for the MFM if backup data is available. Note, however, that when submission of the backup data concerned is requested by the JASO Engine Oil Standards Implementation Panel, the backup data must be submitted to them without delay.

Table D Guidelines for Change in Viscosity Index Improver (VII) in JASO Engine Tests

Change in treat rate of VII	10% at maximum
Change in VII type	Allowed for dispersant type polymer, if the dispersibility is equivalent or higher and if the chemical types and SSI levels are the same ($\pm 5\%$).
	Allowed for non-dispersant type polymer, if the chemical types and SSI levels are the same ($\pm 5\%$).

<Terminology>

- Dispersant type polymer : Polymer molecule contains polar group having dispersibility.
- Non-dispersant type polymer : Polymer molecule dose not contain polar group having dispersibility.
- Chemical type polymer : OCP, PMA, SDC, Mix
- SSI (shear stability index) : To be calculated using the following equation with kinematic viscosity at 100 °C before and after shear stability test (ASTM D 6278-98) and 100 °C kinematic viscosity of base oil:

$$SSI (\%) = \left(1 - \frac{\text{Viscosity after shear stability test} - \text{Viscosity of base oil}}{\text{Viscosity before shear stability test} - \text{Viscosity of base oil}} \right) \times 100$$

Table E Guidelines for Change in Grade of Viscosity Regarding JASO M 336

Oil Tested	Grade Allowable for Read-across												
	5W30	5W40	10W	10W30	10W40	15W40	15W50	20W	20W40	20W50	30	40	50
5W30			x	x	x	x	x	x	x	x	x	x	x
5W40	x		x	x	x	x	x	x	x	x	x	x	x
10W								x			x	x	x
10W30			x			x	x	x	x	x	x	x	x
10W40			x	x		x	x	x	x	x	x	x	x
15W40			x					x	x	x	x	x	x
15W50			x			x		x	x	x	x	x	x
20W											x	x	x
20W40								x		x	x	x	x
20W50								x	x		x	x	x
30								x				x	x
40								x			x		x
50								x			x	x	

x: Read-across allowed

Table F Base oil inter change guideline for ASTM D 5967, Mack T-8A and T-8E

Base Oil in Original Prescription	Base Oil After Replacement								
	Group I		Group II		Group III		Group IV		Group V
Group I	-		-		-		-		T-8A or T-8E
Group II	-		-		-		-		T-8A or T-8E
Group III	≤ 10%	-	≤ 10%	-	≤ 10%	-	≤ 10%	-	T-8A or T-8E
	> 10%	T-8A or T-8E	> 10%	T-8A or T-8E	> 10%	T-8A or T-8E	> 10%	T-8A or T-8E	
Group IV	≤ 10%	-	≤ 10%	-	≤ 10%	-	- (*1)		T-8A or T-8E
	> 10%	T-8A or T-8E	> 10%	T-8A or T-8E	> 10%	T-8A or T-8E			
Group V	T-8A or T-8E		T-8A or T-8E		T-8A or T-8E		T-8A or T-8E		T-8A or T-8E

*1) Not Required provided the interchange Group IV meets the original manufacturer's specifications in all physical and chemical properties.

Table G Viscosity-Grade read across guideline for ASTM D5967, Mack T-8A and T-8E

Oil Tested	Grade Allowable for Read-across						
	10W	10W30	15W40	20W	20W50	30	40
10W							
10W30			×		×		
15W40		×			×		
20W							
20W50		×	×				
30	×	×	×	×	×		×
40							

×: Read-across allowed

APPENDIX 6

Examples of Assigned Oil Codes, On-file Items, and Reporting/Notification Requirements for Change in Prescription

Details of oil code assignments, on-file items and reporting requirements for change in prescription are indicated in Items 5.6 and 5.11 of the Standard Application Manual. For the purpose of reference, concrete examples are shown in the following table. (Case 1: Reference)

A6-1

	Description	Reporter notification	Date of report or notification	Date of issuance of on-file notice (Reference on-file)	Product		Submitter (Seller, etc.)			Manufacturer		Viscosity		Prescription							Example of oil code	Test required/not required		
					Product name	Marketplace	Company name	Code	Country	Company name	Country	Grade of viscosity	VGRA	Base oil group	BOI	Main additive name	Minor change in main additive prescription	VII name	Change in VII prescription	PPD defoamer name		Change in PPD defoamer prescription	ASTM/CEC	JASO
1	Reference on-file product	New reporting	2001/6/1	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC001	Required	Required
2	Change of product name	To be reported	2002/6/1	2001/6/8	BBB	U	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC002	Not required	Not required
3	Change of submitter (seller, etc.), company name, code	To be reported	2003/6/2	2001/6/8	AAA	Japan	A	XYZ	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081XYZ001	Not required	Not required
4	Change of address of submitter (seller, etc.)	To be notified	2002/2/5	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC001	Not required	Not required
5	Change of marketplace	No action required		2001/6/8	AAA	V	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC001	Not required	Not required
6	Change in viscosity in case 1, within VGRA range	To be reported	2001/7/5	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W40	Allowed	III	None	ad	None	pm	None	pp	None	D081ABC010	Not required	Not required
7	Change in viscosity in case 1, out of VGRA range	New reporting	2002/1/25	2002/2/5	AAA	Japan	A	ABC	Japan	A	Japan	5W30	Not allowed	III	None	ad	None	pm	None	pp	None	D081ABC101	Required	Required

<Terminology> VGRA : Viscosity Grade Read-across , BOI : Base oil interchange , VII : Viscosity Index Improver , PPD : Pour point depressant

(cont'd)

	Description	Reporter notification	Date of report or notification	Date of issuance of on-file notice (Reference on-file)	Product		Submitter (Seller, etc.)			Manufacturer		Viscosity		Prescription							Example of oil code	Test required/not required		
					Product name	Marketplace	Company name	Code	Country	Company name	Country	Grade of viscosity	VGRA	Base oil group	BOI	Main additive name	Minor change in main additive prescription	VII name	Change in VII prescription	PPD defoamer name		Change in PPD defoamer prescription	ASTM/CEC	JASO
1	Reference on-file product	New reporting	2001/6/1	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC001	Required	Required
8	Change in base oil in case 1, BOI test not required	To be notified	2001/9/3	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	I	Provided	ad	None	pm	None	pp	None	D081ABC001	Not required	Not required
9	Change in base oil in case 1, BOI test required	To be notified	2001/9/3	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	VI	Provided	ad	None	pm	None	pp	None	D081ABC001	Relevant test required	Relevant test required
10	Minor change in main additive prescription in case 1, level 1	To be notified	2001/9/3	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	Provided	pm	None	pp	None	D081ABC001	Not required	Not required
11	Minor change in main additive prescription in case 1, level 2	To be notified	2001/9/3	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	Provided	pm	None	pp	None	D081ABC001	Relevant test required	Relevant test required
12	Change in main additive prescription in case 1	New reporting	2002/1/25	2002/2/5	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	D	Not allowed	pm	None	pp	None	D081ABC003	Required	Required
13	Minor change in VII in case 1 (within range specified in guidelines)	To be notified	2001/9/3	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	Provided	pp	None	D081ABC001	Not required	Not required
14	Change in VII in case 1 (out of range specified in guidelines)	New reporting	2002/1/25	2002/2/5	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	OC	Not allowed	pp	None	D081ABC004	Required	Required
15	Change in PPD/defoamer prescription in case 1	To be notified	2001/9/3	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	FI	Provided	D081ABC001	Not required	Not required

<Terminology> VGRA : Viscosity Grade Read-across , BOI : Base oil interchange , VII : Viscosity Index Improver , PPD : Pour point depressant

(cont'd)

A6-3

	Description	Reporter notification	Date of report or notification	Date of issuance of on-file notice (Reference on-file)	Product		Submitter (Seller, etc.)			Manufacturer		Viscosity		Prescription							Example of oil code	Test required/not required		
					Product name	Marketplace	Company name	Code	Country	Company name	Country	Grade of viscosity	VGRA	Base oil group	BOI	Main additive name	Minor change in main additive prescription	VII name	Change in VII prescription	PPD defoamer name		Change in PPD defoamer prescription	ASTM/CEC	JASO
1	Reference on-file product	New reporting	2001/6/1	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC001	Required	Required
16	Change in base oil by another submitter based on the on-file of case 1 (JASO BOI test notification)	New reporting	2002/3/1	2001/6/8	CCC	U	B	DEF	U	BB	U	10W30	None	I	Provided	ad	None	pm	None	pp	None	D001DEF001	Relevant test required	Not required
17	Change in base oil by another submitter based on the on-file of case 1 (BOI test required)	New reporting	2002/4/1	2001/6/8	DDD	A	C	GHI	A	CC	U	10W30	None	I	Provided	ad	None	pm	None	pp	None	D111GHI001	Relevant test required	Relevant test required
18	Minor change in main additive prescription, level 1, or change in base oil, by another submitter based on the on-file of case 1 (JASO BOI test notification)	New reporting	2002/4/3	2001/6/8	EEE	Japan	D	JKL	Japan	DD	Japan	10W30	None	III	Provided	ad	Provided	pm	None	pp	None	D081JKL001	Relevant test required	Not required
19	Minor change in main additive prescription, level 2, or change in base oil, by another submitter based on the on-file of case 1 (JASO BOI test notification)	New reporting	2002/4/4	2001/6/8	FFF	Japan	E	MNP	Japan	EE	Japan	10W30	None	III	Provided	ad	Provided	pm	None	pp	None	D081MNP001	Relevant test required	Relevant test required
20	Minor change in VII (within the range specified in the guidelines), or change in base oil, by another submitter based on the on-file of case 1 (JASO BOI test notification)	New reporting	2002/5/7	2001/6/8	GGG	Japan	F	QRS	Japan	FF	Japan	10W30	None	III	Provided	ad	None	pm	Provided	pp	None	D081QRS201	Relevant test required	Not required

<Terminology> VGRA : Viscosity Grade Read-across , BOI : Base oil interchange , VII : Viscosity Index Improver , PPD : Pour point depressant

(cont'd)

	Description	Reporter notification	Date of report or notification	Date of issuance of on-file notice (Reference on-file)	Product		Submitter (Seller, etc.)			Manufacturer		Viscosity		Prescription							Example of oil code	Test required/not required		
					Product name	Marketplace	Company name	Code	Country	Company name	Country	Grade of viscosity	VGRA	Base oil group	BOI	Main additive name	Minor change in main additive prescription	VII name	Change in VII prescription	PPD defoamer name		Change in PPD defoamer prescription	ASTM/CEC	JASO
1	Reference on-file product	New reporting	2001/6/1	2001/6/8	AAA	Japan	A	ABC	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC001	Required	Required
17	Change in base oil by another submitter based on the on-file of case 1 (BOI test required)	New reporting	2002/4/1	2001/6/8	DDD	A	C	GHI	A	CC	U	10W30	None	I	Provided	ad	None	pm	None	pp	None	D111GHI001	Relevant test required	Relevant test required
21	VGRA by the submitter of case 17 based on case 17	To be reported	2002/4/3	2001/6/8	DDD	A	C	GHI	A	CC	U	15W40	None	I	None	ad	None	pm	None	pp	None	D111GHI002	Not required	Not required
22	BOI by the submitter of case 17 based on case 21	To be notified	2001/11/1	2001/6/8	DDD	A	C	GHI	A	CC	U	15W40	None	II	Provided	ad	None	pm	None	pp	None	D111GHI002	Relevant test required	Not required
23	Minor change in main additive prescription, level 1, by the submitter of case 17 based on case 21	To be notified	2001/11/1	2001/6/8	DDD	A	C	GHI	A	CC	U	15W40	None	I	None	ad	None	pm	None	pp	None	D111GHI002	Not required	Not required
24	Minor change in main additive prescription, level 2, by the submitter of case 17 based on case 21	To be notified	2001/11/1	2001/6/8	DDD	A	C	GHI	A	CC	U	15W40	None	I	None	ad	Provided	pm	None	pp	None	D111GHI002	Relevant test required	Relevant test required
25	Minor change in VII (within the range specified in the guidelines) by the submitter of case 17 based on case 21	To be notified	2001/11/1	2001/6/8	DDD	A	C	GHI	A	CC	U	15W40	None	I	None	ad	None	pm	Provided	pp	None	D111GHI002	Not required	Not required
26	Change in ppd/defoamer prescription by the submitter of case 17 based on case 21	To be notified	2001/11/1	2001/6/8	DDD	A	C	GHI	A	CC	U	15W40	None	I	None	ad	None	pm	None	pp	Provided	D111GHI002	Not required	Not required
27	Notification of compliance with DH-1-05 based on the existing on-file of case 1 DH-1 oil report	To be notified	2005/9/3	2005/10/8	AAA	Japan	A	ABC JKL	Japan	A	Japan	10W30	None	III	None	ad	None	pm	None	pp	None	D081ABC001 D081JKL001	Not required	Relevant test required

<Terminology> VGRA : Viscosity Grade Read-across , BOI : Base oil interchange , VII : Viscosity Index Improver , PPD : Pour point depressant

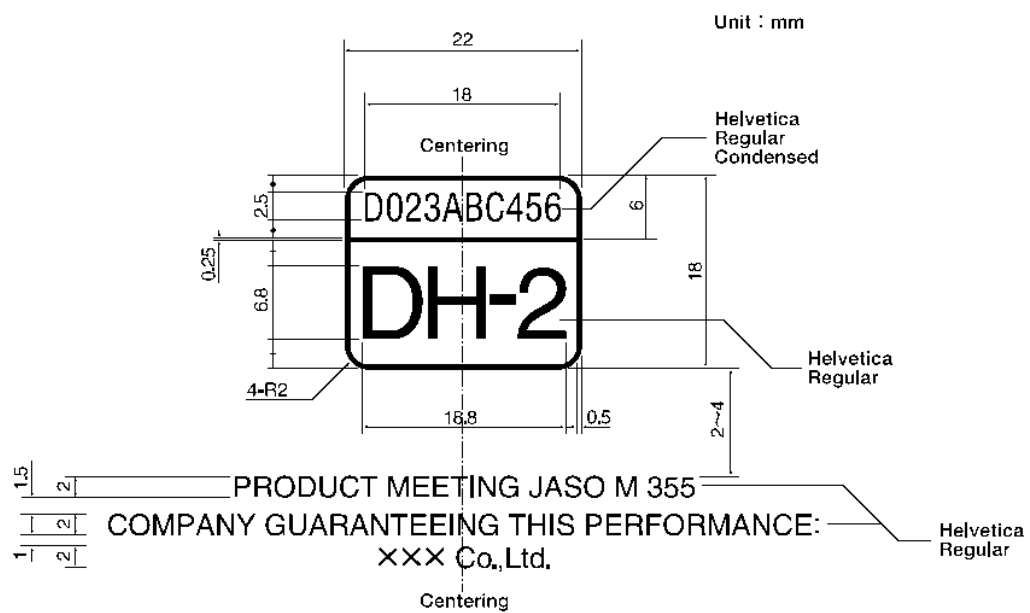
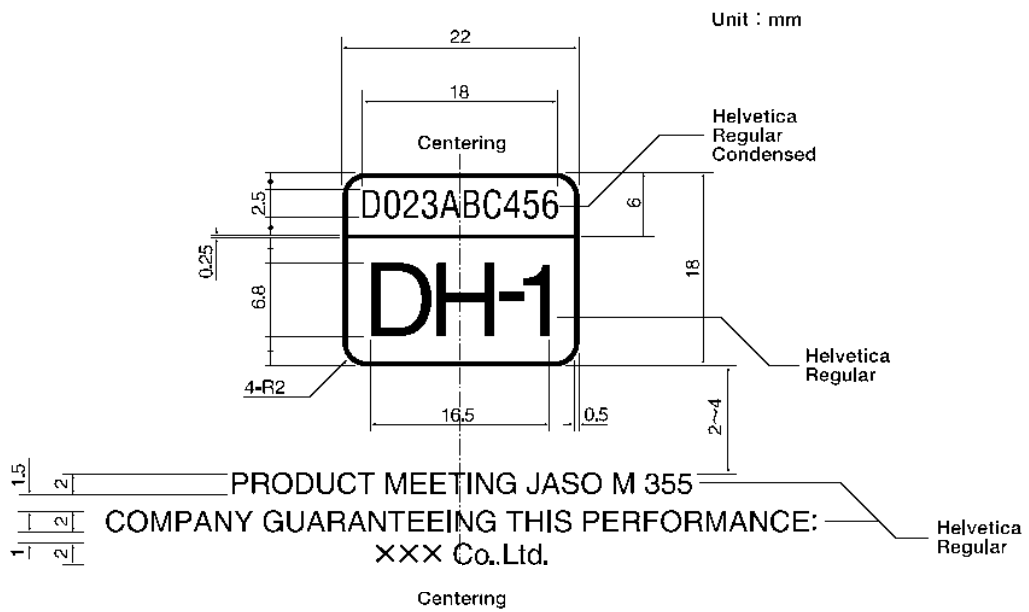
APPENDIX 7

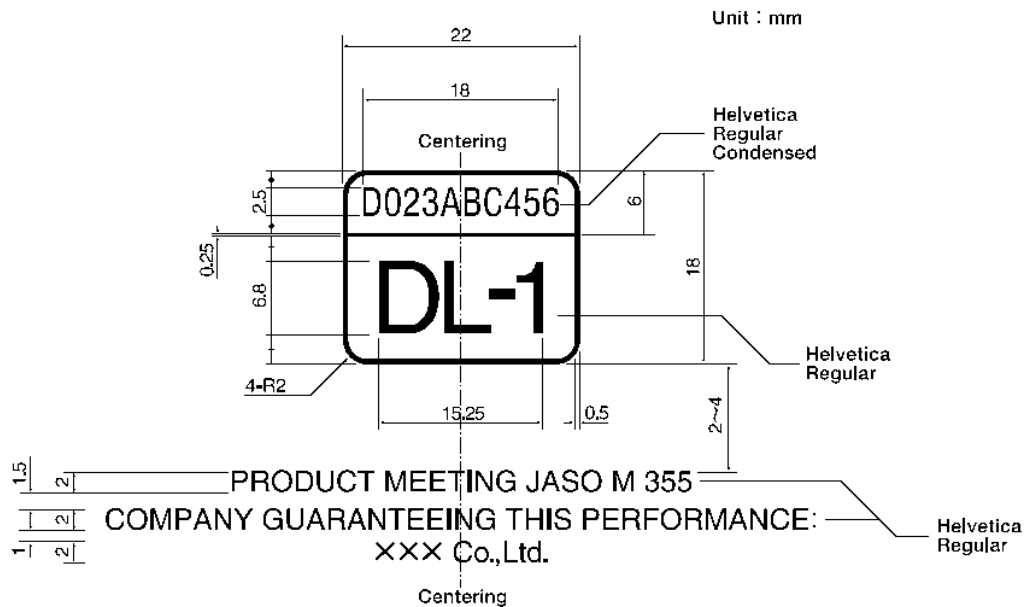
Oil Code and Performance Classification Marking Label

For providing an oil code and a performance classification indication on a container of an on-file product, it is required to follow the marking example indicated below.

1. Example of Marking Label

1.1 Dimensions and Fonts





1.2 Notes

- (1) In the above figure, "D023ABC456" indicates an oil code. The Helvetica regular condensed font or the Arial narrow font shall be used. The characters shall be entered so that their size can be fit in the specified dimensional frame.
- (2) "DL-1" in the above figure shall be indicated using the Helvetica regular font or the Arial font. The characters shall be entered so that their size can be fit in the specified dimensional frame.
- (3) For the alphanumeric characters of "PRODUCT MEETING JASO M 355" under the figure, the Helvetica regular font or the Arial font shall be used. In the character size corresponding to the specified dimensions, "PRODUCT MEETING JASO M 355" shall be entered on one line. In the same manner, for the alphanumeric characters of "COMPANY GUARANTEEING THIS DH-1 PERFORMANCE: Company name" the Helvetica regular font or the Arial font shall be used. In the character size corresponding to the specified dimensions, "COMPANY GUARANTEEING THIS PERFORMANCE: Company name" shall be entered on two or three lines.
- (4) The color of the characters and frame lines shall be contrastive to the background color.

2. Marking Method

- (1) The minimum dimensions are indicated in the above example of marking label. An analogous form may be enlarged according to the size of the container used.
- (2) The marking label may be attached at an arbitrary position on the container used.

3 Marking Label Samples



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged 1.5times



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged 2times



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged 1.5times



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged 2times



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged 1.5times



PRODUCT MEETING JASO M 355
COMPANY GUARANTEEING THIS PERFORMANCE:
XXX Co.,Ltd.

Figure dimension not enlarged 2times

APPENDIX 8

Alternative detergency tests for halt of TD 25 engine/parts supply on JASO M 336

The supply of the TD25 engine for the JASO M 336 Detergency test halted March 2009 (announced by the JASO Engine Oil Standards Implementation Panel on November 9th, 2007). For this reason, this on-filing system allows other international piston detergency tests as alternatives to JASO M 336:1998 which remains valid. If it is not possible to run JASO M 336, alternative piston detergency tests listed below are allowed for on-filing application for DH-1, DH-2 and DL-1.

1. Alternative piston detergency tests for DH-1-05 and DH-2-08

Any one of the piston detergency tests listed below which are used for API CH-4, CI-4 and CJ-4 can be used. The test must be conducted at one of test organizations certified by the ASTM Test Monitoring Center. The acceptance criteria shall be in conformance with those limits specified for the appropriate category of API CH-4, CI-4 or CJ-4. For submitting on-filing application, a copy of test data obtained from the test organization and JASO engine test reports filled with the test data shall be attached to the reporting documents.

ASTM D6750 Caterpillar 1K
ASTM D6750 Caterpillar 1N
ASTM D6681 Caterpillar 1P
ASTM D6923 Caterpillar 1R
Caterpillar C13

2. Alternative piston detergency test for DL-1-08

Conduct the piston detergency test given below, which is used for ACEA EUROPEAN OIL SEQUENCES FOR SURVICE-FILL OILS according to the CEC procedure. The acceptance criteria shall be in conformance with those limits on piston detergency specified for ACEA C2-08 category. For submitting on-filing application, a copy of test data obtained from the test organization and JASO engine test reports filled with the test data shall be attached to the reporting documents.

CEC-L-78-T-99 Volkswagen TDI

Base oil interchange (BOI) and SAE viscosity-grade read-across (VGRA) for API Service Categories CH-4, CI-4 and CJ-4 shall be in conformance with the API EOLCS guidelines specified for each engine test. For Volkswagen TDI test, the BOI and VGRA shall be in conformance with guidelines specified by the ATIEL Code of Practice.

Allowable ranges for minor change in major additives, change in viscosity index improver and change in pour point depressant/defoamer for API Service Categories CH-4, CI-4 and CJ-4 shall conform to the ACC Code of Practice, and those for Volkswagen TDI shall conform to the ATC Code of Practice.

Form A8-1. Detergency test (ASTM D6750, 1K), Test result data of registered oil (DH-1, DH-2)

No.	Item	Unit of Measure	Test Result	Specified Value	
1	Caterpillar 1K Weighted Demerits	WDK		1 Test ≤332	
				2 Tests ≤347	
				3 Tests ≤353	
	Top Groove Fill	%Vol			1 Test ≤24
					2 Tests ≤27
					3 Tests ≤29
	Top Land Heavy Carbon	%			1 Test ≤4
					2 Tests ≤5
					3 Tests ≤5
	Oil Consumption (0-250 h)	g/kW-h			1 Test ≤0.5
					2 Tests ≤0.5
					3 Tests ≤0.5
	Piston, Ring and Liner Scuffing				1 Test None
					2 Tests None
					3 Tests None

Note: 28 Indicate how many tests conducted (Check a check box).

Form A8-2. Detergency test (ASTM D6750, 1N), Test result data of registered oil (DH-1, DH-2)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Caterpillar 1N			
	Weighted Demerits	WDN		1 Test ≤286.2 2 Tests ≤311.7 3 Tests ≤323.0
	Top Groove Fill	%Vol		1 Test ≤20 2 Tests ≤23 3 Tests ≤25
	Top Land Heavy Carbon	%		1 Test ≤3 2 Tests ≤4 3 Tests ≤5
	Oil Consumption (0-252 h)	g/kW-h		1 Test ≤0.5 2 Tests ≤0.5 3 Tests ≤0.5
	Piston, Ring and Liner Scuffing			1 Test None 2 Tests None 3 Tests None
	Piston Ring Sticking			1 Test None 2 Tests None 3 Tests None

Note: 29 Indicate how many tests conducted (Check a check box).

Form A8-3. Detergency test (ASTM D6681, 1P), Test result data of registered oil (DH-1, DH-2)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Caterpillar 1P			
	Weighted Demerits	WDP		1 Test ≤350 2 Tests ≤378 3 Tests ≤390
	Top Groove Carbon	%Vol		1 Test ≤36 2 Tests ≤39 3 Tests ≤41
	Top Land Carbon	%		1 Test ≤40 2 Tests ≤46 3 Tests ≤49
	Oil Consumption (0-360 h)	g/h		1 Test ≤12.4 2 Tests ≤12.4 3 Tests ≤12.4
	Oil Consumption (312-360 h)	g/h		1 Test ≤14.6 2 Tests ≤14.6 3 Tests ≤14.6
	Piston, Ring and Liner Scuffing			1 Test None 2 Tests None 3 Tests None

Note: 30 Indicate how many tests conducted (Check a check box).

Form A8-4. Detergency test (ASTM D6923, 1R), Test result data of registered oil (DH-1, DH-2)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Caterpillar 1R			
	Weighted Demerits	WDR		1 Test ≤382 2 Tests ≤396 3 Tests ≤402
	Top Groove Carbon	%Vol		1 Test ≤52 2 Tests ≤57 3 Tests ≤59
	Top Land Carbon	%		1 Test ≤31 2 Tests ≤35 3 Tests ≤36
	Initial Oil Consumption (0-252 h)	g/hr		1 Test ≤13.1 2 Tests ≤13.1 3 Tests ≤13.1
	Final Oil Consumption (432 - 504 h)	g/hr		1 Test ≤IOC+1.8 2 Tests ≤IOC+1.8 3 Tests ≤IOC+1.8
	Piston, Ring and Liner Distress			1 Test None 2 Tests None 3 Tests None
	Ring Sticking			1 Test None 2 Tests None 3 Tests None

Note: 31 Indicate how many tests conducted (Check a check box).

Form A8-5. Detergency test (C13), Test result data of registered oil (DH-1, DH-2)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Caterpillar C13			
	Merit Rating			1 Test ≥1000
				2 Tests ≥1000
				3 Tests ≥1000
	Hot-Stuck Piston Ring			1 Test None
				2 Tests None
	3 Tests None			

Note: 32 Indicate how many tests conducted (Check a check box).

Form A8-6. Detergency test (CEC-L-78-T-99, VW TDI), Test result data of registered oil (DL-1)

No.	Item	Unit of Measure	Test Result	Specified Value
1	Volkswagen TDI			
	Piston Cleanliness			≥ RL 206
	Ring Sticking (Rings 1 & 2)			
	Average of All 8 Rings	ASF		≤1.2
	Max. for Any 1 st Ring	ASF		≤2.5
	Max for Any 2 nd Ring	ASF		≤0.0
	EOT TBN (ISO 3771) and EOT TAN (ASTM D 664)	mgKOH/g		report