



SURFACE VEHICLE RECOMMENDED PRACTICE

J1536™

MAY2025

Issued 1988-10
Reaffirmed 2006-12
Revised 2025-05

Superseding J1536 JUN2017

Two-Stroke-Cycle Engine Oil Fluidity/Miscibility Classification

RATIONALE

J1536 has been revised to remove the reference to a 1987 version of ASTM D4682, update formatting, and clarify the supplier of the reference oils. Also, terminology for the Miscibility and Low Temperature Rotational Viscosity tests (formally called the Brookfield viscometer test) has been updated, the reference to the ASTM test method has been added, and the sentences about the test methods have been clarified.

1. SCOPE

This SAE Recommended Practice is intended for use by engine manufacturers in determining the Fluidity/Miscibility Grades to be recommended for use in their engines and by oil marketers in formulating and labeling their products.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

- ASTM D2983 Low-Temperature Viscosity of Automatic Transmission Fluids, Hydraulic Fluids, and Lubricants using a Rotational Viscometer
- ASTM D4682 Specification for Miscibility With Gasoline and Fluidity of Two-Stroke-Cycle Gasoline Engine Lubricants
- ASTM D4857 Test Method for Determination of the Ability of Lubricants to Minimize Ring Sticking and Piston Deposits in Two-Stroke-Cycle Gasoline Engines Other Than Outboards
- ASTM D4858 Test Method for Determination of the Tendency of Lubricants to Promote Preignition in Two-Stroke-Cycle Gasoline Engines
- ASTM D4859 Specification for Lubricants for Two-Stroke-Cycle Spark-Ignition Gasoline Engines - TC
- ASTM D4863 Test Method for Determination of the Lubricity of Two-Stroke Gasoline Engine Lubricants

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2025 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER:
Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
<http://www.sae.org>

SAE WEB ADDRESS:

Full document details: [SAE J1536_202505](https://www.sae.org/standards/content/J1536_202505)

For more information on this standard, visit https://www.sae.org/standards/content/J1536_202505/

Documents



Standard, visit Sharing Hub

3. The SAE Fluidity/Miscibility Grades defined in Tables 1 and 2 constitute a classification for two-stroke-cycle engine lubricating oils in rheological terms only. Other oil characteristics are not considered or included.

Fluidity and Miscibility are measured according to test procedures ASTM D2983 and ASTM D4682. These test procedures relate to the two common methods for introducing lubricating oils into two-stroke-cycle engines as defined in Table 3.

Most oils will meet the requirements of one of the grades. In labeling an oil with its Fluidity/Miscibility Grade, only the highest grade may be referred to on the label.

Listed are all documents that have been published in support of the Two-Stroke Engine Oil Fluidity/Miscibility Classification and the Two-Stroke Engine Oil Performance and Service Classification. In brief, they are:

- a. Fluidity/Miscibility - SAE J1536 and ASTM D4682
- b. Performance/Service TC (Formerly TSC-3) - ASTM D4859, ASTM D4857, ASTM D4858, and ASTM D4863

Table 1 - SAE miscibility grades for two-stroke-cycle engine oils

Grade	Test Temperature °C ⁽¹⁾	Reference ⁽²⁾ Oil
1	0	VI-GG
2	-10	VI-FF
3	-25	VI-D
4	-40	VI-II

⁽¹⁾ Both Miscibility and Low Temperature Rotational Viscosity tests must be run on a candidate oil at the temperature intended for qualification.

⁽²⁾ Miscibility revolutions on the candidate oil must not exceed those on the reference oil by more than 10% to qualify under a grade.

Table 2 - SAE fluidity grades for two-stroke-cycle engine oils

Grade	Test Temperature °C ⁽²⁾	Maximum Viscosity cP ⁽³⁾	Reference Oil ⁽⁴⁾	Reference Oil Limits cP ⁽¹⁾
1	0	3500	N74B	3250- 3600
2	-10	3500	N38B	2900- 3300
3	-25	7500	N25B	7600- 8700
4	-40	17000	N14B	16000-18000

⁽¹⁾ Miscibility revolutions on the candidate oil must not exceed those on the reference oil by more than 10% to qualify under a grade.

⁽²⁾ Both Miscibility and Low Temperature Rotational Viscosity tests must be run on a candidate oil at the temperature intended for qualification.

⁽³⁾ Low Temperature Rotational Viscosity in centipoise on the candidate oil must not exceed the maximum limit as shown for each temperature. The test must be monitored by running a reference oil with each set of tests (same freezer, same time), and the reference oil result must be within the set limits.

⁽⁴⁾ Reference oils available from Cannon Instrument Company.