

CAN/CGSB-3.0 No. 28.8-2020
Reaffirmed October 2025
Corrigendum No.1, December 2025

Supersedes CAN/CGSB-3.0 No. 28.8-2015



Methods of testing petroleum and associated products

Visual haze rating of liquid fuels

Developed by the Canadian General Standards Board

Canadian General Standards Board statement

The CANADIAN GENERAL STANDARDS BOARD (CGSB), under whose auspices this standard has been developed, is a government directorate within Public Services and Procurement Canada. CGSB is engaged in the production of voluntary standards in a wide range of subject areas through the media of standards committees and the consensus process. The standards committees are composed of representatives of relevant interests including producers, consumers and other users, retailers, governments, educational institutions, technical, professional and trade societies, and research and testing organizations. Any given standard is developed on the consensus of views expressed by such representatives.

CGSB has been accredited by the Standards Council of Canada as a national Standards Development Organization. The standards that CGSB develops and offers as National Standards of Canada conform to the requirements and guidance established for this purpose by the Standards Council of Canada. In addition to standards it publishes as National Standards of Canada, CGSB may produce other deliverables that meet particular needs, in response to requests from a variety of sources in both the public and private sectors. CGSB standards and CGSB's National standards are developed in conformance with the policies described in the CGSB Policy and Procedures Manual for the Development and Maintenance of standards.

CGSB's standards are subject to review and revision to ensure that they keep abreast of technological progress. CGSB will review and publish this standard on a schedule not to exceed five years from the date of publication. Suggestions for their improvement, which are always welcome, should be brought to the notice of the standards committees concerned. Changes to standards may be issued as amendments or as new editions of standards.

An up-to-date listing of CGSB's standards, including details on latest issues and amendments, is found in the CGSB Catalogue at the following website, <https://www.canada.ca/en/public-services-procurement/services/standards-oversight/canadian-general-standards-board/development-services/catalogue.html>, along with more information about CGSB products and services.

Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

The testing and evaluations of a product or service against this standard may require the use of materials and/or equipment that could be hazardous. This standard does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any applicable regulatory requirements prior to its use. CGSB neither assumes nor accepts any responsibility for any injury or damage that may occur during or as the result of tests, wherever performed.

Attention is drawn to the possibility that some of the elements of this standard may be subject of patents right. CGSB shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

For enforcement purposes, standards shall be considered published the final day of the month of their publication date.

Contact the Canadian General Standards Board

To obtain information on CGSB, its services and standards or to obtain CGSB publications, please contact us:

Web <https://www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html>

Email ncr.cgsb-ongc@tpsgc-pwgsc.gc.ca

Telephone 1-800-665-2472

Mail Canadian General Standards Board
140 O'Connor Street, Tower East
Ottawa, Ontario Canada K1A 0S5

Standards Council of Canada statement

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at <https://scc-ccn.ca/>.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organisations. A list of SCC programs and accredited bodies is publicly available at <https://www.scc-ccn.ca/>.

CAN/CGSB-3.0 No. 28.8-2020
Reaffirmed October 2025
Corrigendum No.1, December 2025

Supersedes CAN/CGSB-3.0 No. 28.8-2015

Methods of testing petroleum and associated products

Visual haze rating of liquid fuels

This standard was developed by the Canadian General Standards Board and published in October 2025.

ICS 75.160.20

ISBN 978-0-660-78780-0

Catalogue number : P29-3-0-28-8-2025E-PDF

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE.
La version française de la présente norme est intitulée *Méthodes d'essai des produits pétroliers et produits connexes - Évaluation visuelle de la turbidité des combustibles liquides*

© HIS MAJESTY THE KING IN RIGHT OF CANADA, as represented by the Minister of Public Services and Procurement Canada, the Minister responsible for the Canadian General Standards Board (2025).

No part of this publication may be reproduced in any form without the prior permission of the publisher.

CAN/CGSB-3.0 No. 28.8-2020
Reaffirmed October 2025
Corrigendum No.1, December 2025

Canadian General Standards Board
Committee on Fuel Test Methods
(Voting membership at date of ballot)

Chair

Scott Harvie Co-op Refinery Complex (Producer)

General interest category

Alberto Villegas	Anton Paar Canada Inc.
Andrew Pickard	Consultant (Independent)
Aurelian Hanganu	Bureau Veritas
Dan Wispinski	VUV Analytics
Glen MacLean	Intertek Caleb Brett
Gordon Chiu	Petroleum Analyzer Company (PAC)
Lee Marotta	PerkinElmer
Luc Menard	CFR Engines Canada ULC
Pierre Lévesque	SGS Canada Inc.
Pierre Poitras	Fuel Plus Consulting

Producer category

Andrew Brown	Irving Oil Ltd.
Bonnie Sparling	Parkland Refining (BC) Ltd.
Gandalf O'Breham	Shell Canada Ltd.
Greg Rockwell	Imperial Oil Limited
Ken Mitchell	Consultant for Canadian Fuels Association
Kevin Adlaf	Archer Daniels Midland Company
Kyle Hanson	Suncor Energy Products Partnership
Matthew Barnes	Baker Hughes
Rajesh Gupta	Cenovus Energy
Randy Jennings	Darling Ingredients
Rhonda Hiscock	NARL Logistics LP
Stu Porter	Consultant for Renewable Industries Canada

Regulator category

Ide Pamir Environment and Climate Change Canada

User category

Ajae Hall	Natural Resources Canada
Amanda Prefontaine	InnoTech Alberta
Michael Kopac	National Defence

Committee Manager (non-voting)

Robert Long Canadian General Standards Board

Translation of this National Standard of Canada was conducted by the Government of Canada.

Preface

This National Standard of Canada has been reaffirmed by the CGSB Committee on Fuel Test Methods.

Changes since the previous edition

- Updated clause 6.5 for clarity.

The following definitions apply in understanding how to implement this National Standard of Canada:

- “shall” indicates a **requirement**;
- “should” indicates a **recommendation**;
- “may” is used to indicate that something is **permitted**;
- “can” is used to indicate that something is **possible**, for example, that an organization is able to do something.

Notes accompanying clauses do not include requirements or alternative requirements. The purpose of a note accompanying a clause is to separate explanatory or informative material from the text. Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

Corrigendum

- Editorial correction to the nomenclature and indication of which edition of this Standard is being superseded.
- Correction to the voting membership stage (from Public Review to ballot) on the committee list page.

Contents		Page
1	Scope	1
2	Normative references	1
3	Summary of test method.....	1
4	Terms and definitions.....	2
5	Interferences	2
6	Apparatus	2
7	Precautions	3
8	Procedure	3
9	Report	4
10	Precision and bias	4
Annex A (normative) Referenced ASTM International publications (see 2.1)		8
<u>Figures</u>		
Figure 1 – Visual Haze Rating – Standard Bar Chart		6
Figure 2 – Visual Haze Rating – Standard Rating Chart		7
<u>Table</u>		
Table 1 — Comparative haze ratings of light-coloured diesel fuel (5 °C)		5
Table 2 — Comparative haze ratings of light-coloured diesel fuel (20 °C)		5
Table 3 — Comparative haze ratings of dark-coloured diesel fuel (5 °C)		5
Table 4 — Comparative haze ratings of dark-coloured diesel fuel (20 °C)		6

Methods of testing petroleum and associated products

Visual haze rating of liquid fuels

1 Scope

This test method describes two procedures for the visual haze rating or appearance of contamination of liquid fuels with an ASTM colour rating of 5 or less, and a cloud point below the reported temperature of the test.

The testing and evaluation of a product against this method requires the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this method has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any applicable regulatory requirements prior to its use.

Units of measurement – Quantities and dimensions in this standard are given in SI units.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this method. The referenced documents may be obtained from the sources noted below.

Note: The contact information provided below was valid at the date of publication of this method.

An undated reference is to the latest edition or revision of the reference or document in question, unless otherwise specified by the authority applying this method. A dated reference is to the specified revision or edition of the reference or document in question.

2.1 ASTM International

Annual Book of ASTM Standards (see Annex A)

2.1.1 Contact information

The above may be obtained from ASTM International, Telephone: 1-877-909-2786. Web site: <https://www.astm.org>. They can also be obtained from Standards Store by Accuris. Telephone: 1-800-447-2273. Web site: <https://store.accuristech.com/>.

3 Summary of test method

3.1 Procedure A: Numerical haze rating

A nominal 1 L volume of liquid fuel sample is collected in a colourless and clear sample container. This sample is visually examined for suspended matter (visual haze) with the use of a reference chart then immediately swirled to create a vortex to visually detect the presence of settled matter. The report includes a numerical rating of 1 through 6 and statements indicating the presence or absence of settled water and particulates. The temperature of the test is also reported in °C.

3.2 Procedure B: Visual haze (Pass/Fail)

A nominal 1 L volume of liquid fuel sample is collected in a colourless and clear sample container. This sample is visually examined for suspended matter (visual haze) then immediately swirled to create a vortex to visually detect the presence of settled matter. The report includes a pass-fail rating and statements indicating the presence of any suspended matter, settled water or particulates. The temperature of the test is also reported in °C.

4 Terms and definitions

For the purposes of this method, the following terms and definitions apply.

appearance

visual rating of a liquid fuel under specified conditions.

clear and bright (clean and bright)

absence of visually discernible haze and settled (precipitated) matter, including free water.

cloud point

temperature at which the smallest observable cluster of wax crystals first appears in a fuel upon cooling under prescribed test conditions (ASTM D2500 or ASTM D5773).

standard bar chart (Figure 1)

consists of five horizontal black bars of varying thickness positioned parallel to each other on a white background.

standard rating chart (Figure 2)

consists of six numbered photographic images each depicting a sample with a different degree of visual haze. The amount of suspended water increases at higher haze ratings and depicts the following six degrees of visual haze:

No. 1 — A clear fuel, all bars clearly and completely visible

No. 2 — A slightly hazy fuel, all bars visible, but with slightly reduced sharpness and optical density

No. 3 — A progressive visual haze, all bars visible, but with significantly reduced sharpness and optical density

No. 4 — A progressive visual haze, lowest bar not discernable, second lowest bar barely visible

No. 5 — A progressive visual haze, lowest bar invisible, second and third lowest bars barely visible

No. 6 — A heavy haze, no bars visible

visual haze

scatter of light from an accumulation of suspended matter (particulates or water droplets) in the liquid fuel detectable by eye.

5 Interferences

5.1 The sample containers shall be colourless, clean, clear and free of dust or other particulates.

5.2 A sample tested at or below its expected cloud point temperature may appear hazy as a result of wax crystals.

5.3 Samples with an ASTM colour rating greater than 5 by ASTM D1500 or ASTM D6045 are too dark to allow visual haze rating by this method.

5.4 The solubility of water in liquid fuel generally varies with temperature, therefore the temperature of the sample can affect the observed visual haze. Warming a sample can cause suspended water droplets producing haze to dissolve, giving a clear fuel sample at the warmer temperature.

5.5 Visual determination of fine particulate matter may become evident after allowing the sample to sit undisturbed. In some cases it may be beneficial to allow the sample to sit for 24 hours prior to analyzing.

6 Apparatus

6.1 Insertion mixer: non-aerating, stand-alone device as described in ASTM D5854.

6.2 Sample container: pre-cleaned, colourless, clear, cylindrical, 1 L capacity sample bottle, or equivalent, with an outer diameter of approximately 8 to 10 cm.

6.3 Standard bar chart (Figure 1)¹.

Print this electronic chart on a high quality colour printer and laminate.

6.4 Standard rating chart (Figure 2)¹.

Print this electronic chart on a high quality colour printer and laminate.

6.5 Thermometer: Glass or digital with a minimum accuracy of 0.2 °C at the temperature of the test. Refer to ASTM 12C thermometer or equivalent (see ASTM E1).

6.6 Temperature-controlled bath: suitable dimensions to accommodate the sample container, and capable of controlling the sample temperature within ± 0.5 °C of the test temperature.

7 Precautions

7.1 This test method involves the handling of potentially volatile or flammable liquid fuels. Appropriate measures shall be taken to minimize associated hazards including the use of personal protective equipment.

8 Procedure

8.1 Sampling

8.1.1 Obtain a representative sample taken in accordance with ASTM D4057, D4177 or D5842.

8.1.2 For field measurements, it is recommended to take a sample in a clean, colourless and clear 1 L sample bottle filled to approximately 80%. Cleaning can be accomplished by rinsing the container twice with the sample to be tested.

8.1.3 Samples received in opaque containers or in volumes greater than 1 L may be transferred to the recommended sample container provided they are first homogenized² to ensure they remain representative when transferred, and that they are transferred into a clean, dry, colourless and clear 1 L container.

Note: When wide mouth containers are used, it is good practice to cover the mouth of the container with a watch glass, clear plastic-wrap or an equivalent closure modified to permit the insertion of a temperature measuring device.

8.2 Procedure A

8.2.1 Insert the thermometer into the sample and record the temperature to the nearest 0.5 °C. The use of a bath is acceptable to obtain visual ratings at temperatures.

8.2.2 Immediately remove the thermometer and place the standard bar chart (Figure 1, see 6.3) directly behind the sample container in a well-lit area (ensure the outside of the container is wiped clean of any water droplets or frost prior to rating).

8.2.3 Compare the observed visual haze of the sample with the standard rating chart (Figure 2, see 6.4) and record the haze rating that provides the best match. Disregard the colour of the sample.

8.2.4 Remove the bar chart and swirl the sample container to produce a vortex. Examine the bottom of the vortex at arm's length for particulates and water droplets. Record the presence of any settled particulates or water.

¹When the figures are not in use, store them in an opaque envelope at room temperature to minimize image deterioration that could be caused by exposure to light or heat.

²Refer to ASTM D5854 for a suggested best practice.

8.3 Procedure B

8.3.1 Insert the thermometer into the sample and record the temperature to the nearest 0.5 °C. The use of a bath is acceptable to obtain visual ratings at temperatures.

8.3.2 Immediately remove the thermometer and hold the sample up to the light and visually examine for the presence of visual haze (ensure the outside of the container is wiped clean of any water droplets or frost prior to rating).

8.3.3 Swirl the sample container to produce a vortex. Examine the bottom of the vortex at arm's length for particulates and water droplets. Record the presence of any settled particulates or water.

9 Report

9.1 Report the results as follows:

9.1.1 Procedure A

Visual haze rating at test temperature = numerical rating of 1 through 6.

Free Water (see 8.2.4) — Pass (absent) or fail (present).

Particulates (see 8.2.4) — Pass (absent) or fail (present).

9.1.2 Procedure B

Visual haze rating at test temperature = pass or “clear and bright” if there is no visually discernible haze and there is no settled water or particulates.

Visual haze rating at test temperature = fail or “not clear and bright” if there is visually discernible haze, settled water or particulates, or both.

The reason for any failure shall also be recorded and reported.

10 Precision and bias

10.1 The precision and bias of the method has not been developed because circulating samples of uniform haze is difficult. The haze rating results recorded in Tables 1 to 4 were obtained for samples at 5 °C and 20 °C.

10.2 A significant departure in sample colour from that shown in the standard rating chart (ASTM colour of L1.0) will have a marked effect on precision. Ratings may be very imprecise or impossible to take with very dark samples (ASTM colour greater than 5).

Table 1 — Comparative haze ratings of light-coloured diesel fuel (5 °C)

Operators	Samples ^a								
	A	B	C	D	E	F	G	H	I
1	2	3	2	6	4	4	1	3	2
2	2	4	1	6	4	5	1	5	2
3	2	4	2	6	5	5	1	5	2
4	2	5	2	6	5	5	1	5	3
5	2	5	2	6	5	4	1	5	3
6	2	5	1	6	3	4	1	5	2
7	2	3	1	6	3	2	1	5	2
8	2	3	2	6	3	6	1	6	3
9	2	5	2	6	5	5	1	5	3

^a A diesel fuel (ASTM D1500 colour L1.5) blended with up to 200 mL/m³ of water for different periods in a blender.

Table 2 — Comparative haze ratings of light-coloured diesel fuel (20 °C)

Operators	Samples ^a								
	A	B	C	D	E	F	G	H	I
1	1	6	5	4	1	1	2	6	3
2	1	6	5	5	1	1	2	5	4
3	1	6	4	3	1	1	2	6	3
4	1	6	4	3	1	1	2	6	4
5	1	6	5	4	1	1	2	5	4
6	1	6	5	4	1	1	2	5	3
7	1	6	5	5	1	1	2	5	4
8	1	6	5	4	1	1	2	6	4
9	1	6	4	3	1	1	2	5	5
10	1	6	4	1	2	2	6	5	5

^a A diesel fuel (ASTM D1500 colour L1.5) blended with up to 200 mL/m³ of water for different periods in a blender.

Table 3 — Comparative haze ratings of dark-coloured diesel fuel (5 °C)

Operators	Samples ^a								
	A	B	C	D	E	F	G	H	I
1	2	5	2	3	5	6	5	5	2
2	3	6	4	5	5	6	6	5	3
3	5	6	2	4	5	6	6	5	3
4	2	5	4	4	5	6	6	5	3
5	3	5	3	5	5	6	6	4	3
6	4	5	4	5	6	6	6	5	5
7	2	5	2	3	5	6	6	5	2

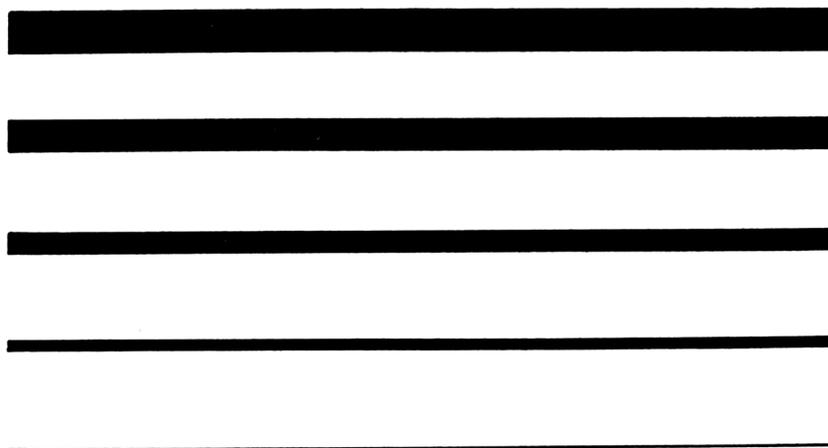
^a A diesel fuel (ASTM D1500 colour L3.5) blended with up to 200 mL/m³ of water for different periods in a blender.

Table 4 — Comparative haze ratings of dark-coloured diesel fuel (20 °C)

Operators	Samples ^a								
	A	B	C	D	E	F	G	H	I
1	2	2	1	6	2	2	2	3	3
2	2	2	1	6	2	1	2	4	3
3	4	3	2	6	4	2	4	5	5
4	2	1	2	6	2	1	2	3	3
5	1	2	6	2	1	1	2	3	3
6	2	1	2	6	2	1	2	3	2
7	2	2	2	6	2	2	3	2	3
8	2	1	1	5	2	2	1	2	2
9	3	3	1	6	4	2	4	5	5

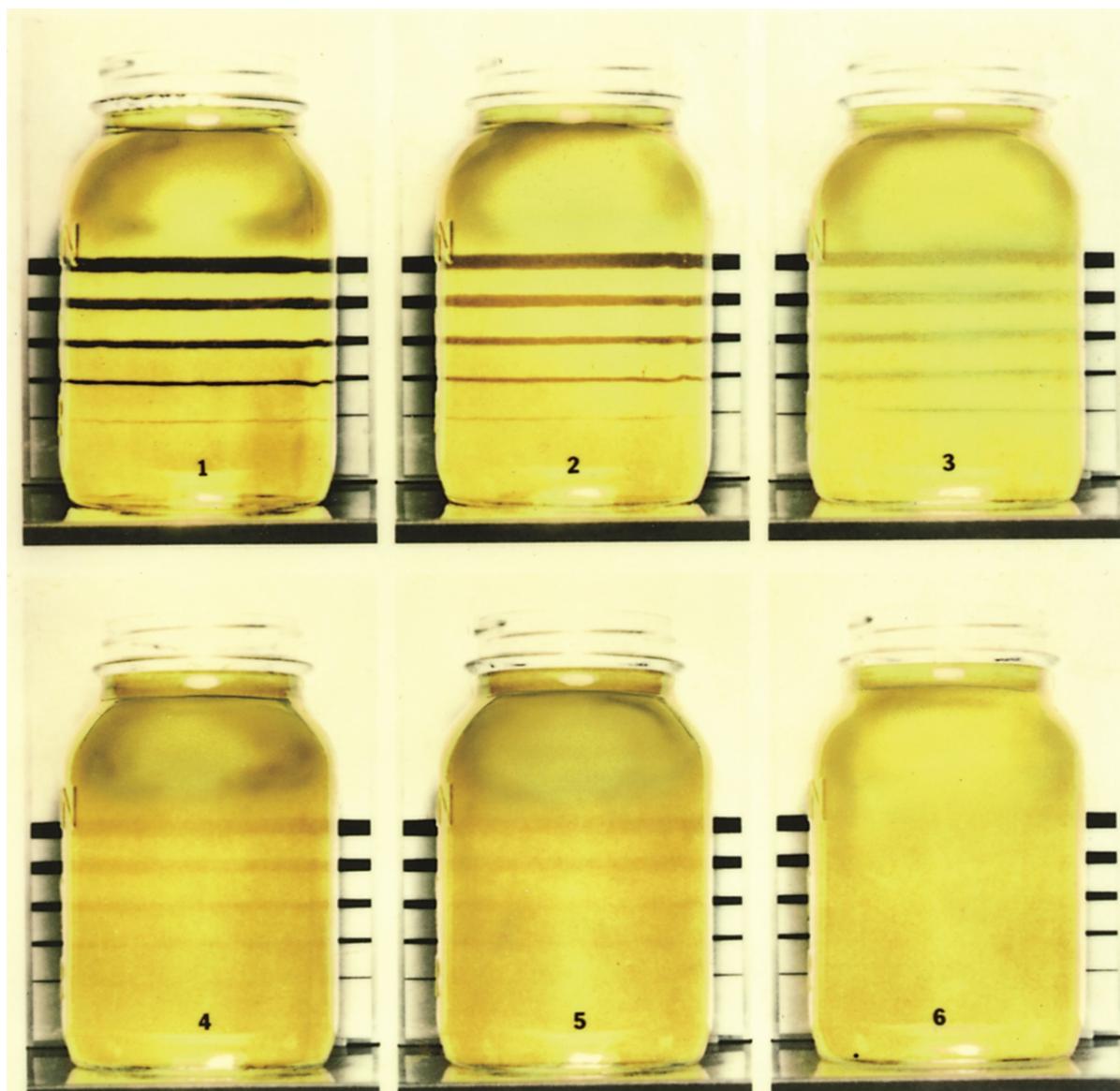
^a A diesel fuel (ASTM D1500, colour L3.5) blended with up to 200 mL/m3 of water for different periods in a blender.

Figure 1 – Visual Haze Rating – Standard Bar Chart



Note: This chart should be printed on high-quality glossy photo paper for accuracy.

Figure 2 – Visual Haze Rating – Standard Rating Chart



Note: This chart should be printed on high-quality glossy photo paper for accuracy.

Annex A
(normative)
Referenced ASTM International publications (see 2.1)

Annual Book of ASTM Standards

ASTM D1500 — *Standard test method for ASTM color of petroleum products (ASTM Color Scale)*

ASTM D2500 — *Standard test method for cloud point of petroleum products and liquid fuels*

ASTM D4057 — *Standard practice for manual sampling of petroleum and petroleum products*

ASTM D4177 — *Standard practice for automatic sampling of petroleum and petroleum products*

ASTM D5773 — *Standard test method for cloud point of petroleum products and liquid fuels (constant cooling rate method)*

ASTM D5842 — *Standard practice for sampling and handling of fuels for volatility measurement*

ASTM D5854 — *Standard practice for mixing and handling of liquid samples of petroleum and petroleum products*

ASTM D6045 — *Standard test method for color of petroleum products by the automatic tristimulus method*

ASTM E1 — *Standard Specification for ASTM Liquid-in-Glass Thermometers*