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AUTOMOTIVE DIESEL FUEL

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This Australian Standard was prepared by Committee CS/48, Automotive Diesel Fuel. It was approved on behalf of the Council of the Standards Association of Australia on 28 August 1988 and published on 3 October 1988.

The following interests are represented on Committee CS/48:

Australian Federation of Consumer Organizations Inc.
Australian Institute of Petroleum
Automotive and Petroleum Technical Council of Australia
Department of Agriculture and Rural Affairs, Vic.
Department of Defence
Department of Energy, N.S.W
Department of Industrial Relations and Employment, N.S.W.
Department of Primary Industries and Energy
Department of Transport and Communications
Environment Protection Authority, Vic.
Federal Chamber of Automotive Industries
National Farmers Federation
Railways of Australia Committee
Society of Automotive Engineers—Australasia
Tractor and Machinery Association of Australia

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This Standard was issued in draft form for comment as DR 86101.

STANDARDS AUSTRALIA

Amendment No 1
to
AS 3570—1988
Automotive diesel fuel

REVISED TEXT

The 1988 edition of AS 3570 is amended as follows; the amendment(s) should be inserted in the appropriate place.

SUMMARY: This Amendment applies to Clause 2 and Paragraph A4 of Appendix A.

Published on 6 November 1989.

AUSTRALIAN STANDARD

AUTOMOTIVE DIESEL FUEL

AS 3570—1988

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PREFACE

This Standard was prepared by the Association's Committee on Automotive Diesel Fuel under the direction of the Consumer Standards Advisory Board. The request for the preparation of the Standard was made by the National Farmer's Federation and the Shires Association of New South Wales. Both organizations expressed concern about the declining quality of automotive diesel fuel.

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FOREWORD

The purpose of this Standard is to specify requirements which will ensure that difficulties associated with the use of diesel fuel will be eliminated or at least minimized.

One area of concern for diesel fuel users has been the cetane number (see Paragraph A4, Appendix A). It was argued by some members of the committee that some passenger cars, light commercial vehicles, and light tractors will have engine problems if the cetane number is below 48. In particular, white smoke emission during cold start-up was cited as a typical problem. However, other members argued that because the demand for diesel fuel is increasing while at the same time the availability of local crude (having high cetane number) is dwindling, more and more imported crude (having low cetane number) is needed for blending. Accordingly, in order to ensure sufficient supply of diesel fuel, a minimum limit for cetane number of 45 is essential. As to the concern about engine performance, it was generally agreed that only a very small percentage of vehicles would be adversely affected by fuel having a cetane number of 45. As such, it was considered most unfair to penalize the majority of diesel fuel users with increased costs and the possibility of fuel shortages in order to produce a higher cetane fuel necessary to satisfy the small minority. Further, it was argued that low cetane fuels affect cold weather starting only and that this problem could be improved by a number of other means (e.g., injection of additive into the intake manifold) rather than by increasing the cetane number. Moreover, it was stated that as there are no locally produced diesel engines and the world trend for diesel fuel is to reduce the cetane number, it would be unrealistic to encourage the development of engines capable of only using high cetane number fuels.

Although a consensus was reached to accept a cetane number of 45, the vehicle manufacturer's representatives indicated that they would strongly oppose any attempts to reduce the cetane number at a later date without substantial justification.

Another area of concern has centred around the filterability of diesel fuel. The filterability of diesel fuel is substantially affected by firstly, sediment caused by oxidation, and secondly, by microbiological growth. That is, during storage, diesel fuel may oxidize to form gums and sediments and in the presence of water, may be contaminated by the growth of fungus and bacteria with resultant sludge formation (see Paragraphs A11 and A13, Appendix A). Accordingly, when such fuel is transferred to the vehicle, these sediments and sludges can cause fuel filter blockages which cannot be removed readily. It was argued that probably the greatest number of complaints about the quality of diesel fuel were related to its filterability. However, even though there was some doubt as to the appropriateness of the oxidation stability test as a predictor of storage stability and subsequent filterability, it was argued that this test is the best that is currently available. Further, it was argued that diesel fuel from the refineries should not present any filterability problems as these problems generally occur as a result of the fuel being improperly stored.

In response to the problems associated with storage, a Standard which is to recommend procedures for storage of automotive diesel fuel is in the course of preparation.

Cold weather presents another form of filterability problem. At very low temperatures, small wax crystals start to form in the fuel. These crystals grow and eventually block fuel filters. In order to minimize this type of problem, limits for cloud points (CP) and cold filter plugging point (CFPP) have been specified. (See Table 2, and Paragraphs A5 and A6, Appendix A). In this regard, the CFPP is specified as an alternative to CP in order to encourage the development of effective wax-modifying additives, but the differential between CFPP and CP limits was contentious. Some members argued that the differential should be 2°C while others argued for a substantially higher value. A differential of 3°C (as specified in Table 2) was agreed to as a compromise. However, this is to be reviewed when sufficient feedback becomes available.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
AUTOMOTIVE DIESEL FUEL

1 SCOPE. This Standard specifies requirements for automotive diesel fuel intended for use in high speed diesel engines.

NOTES:

1. Automotive diesel fuel is also commonly known as 'diesel', 'distillate', 'automotive distillate', and 'automotive diesel oil'.
2. See Clause 3.2 for the definition of a high speed diesel engines.
3. This Standard does *not* apply to diesel fuel intended for use in medium or low speed engines.

2 REFERENCED DOCUMENTS. The documents below are referred to in this Standard.

ASTM

D 86-IP 123	Method for distillation of petroleum products
D 93-IP 34	Test methods for flash point by Pensky-Martens closed tester
D 95-IP 74	Test method for water in petroleum products and bituminous materials by distillation
D 129-IP 61	Test method for sulfur in petroleum products (general bomb method)
D 130-IP 154	Method for detection of copper corrosion from petroleum products by the copper strip tarnish test
D 189-IP 13	Test method for Conradson carbon residue of petroleum products
D 445-IP 71	Test method for kinematic viscosity of transparent and opaque liquids (and calculation of dynamic viscosity)
D 473-IP 53	Test method for sediment in crude oils and fuel oils by the extraction method
D 482-IP 4	Test method for ash from petroleum products
D 524-IP 14	Test method for Ramsbottom carbon residue of petroleum products
D 613	Test method for ignition quality of diesel fuels by the cetane method
SEE AMENDMENT 1 D-976-IP-364	~~Methods for calculated cetane index of distillate fuels~~
D 1298-IP 160	Test method for density, relative density (specific gravity), or API gravity of crude petroleum and liquid petroleum products by hydrometer method
D 1796-IP 75	Test method for water and sediment in crude oils and fuel oils by centrifuge
D 2274	Test method for oxidation stability of distillate fuel oil (accelerated method)
D 2500-IP 219	Test method for cloud point of petroleum oils
D 2622	Test method for sulfur in petroleum products (X-ray spectrographic method)
D 2709	Test method for water and sediment in distillate fuels by centrifuge
D 2785	Test method for trace quantities of total sulfur (Wickbold and Beckman combustion apparatus)
D 4052-IP 365	Test method for density and relative density of liquids by digital density meter
D 4057	Practice for manual sampling of petroleum and petroleum products
D4737-IP 380 SEE AMENDMENT 1	

BS

2000	Petroleum and its products Part 54: Detection of copper corrosion from petroleum products by the copper strip tarnish test
3195	Methods for sampling petroleum products Part 1: Liquid hydrocarbons, manual sampling

IP

170	Flash point by the Abel apparatus
309	Cold filter plugging point of distillate fuels
336	Sulphur in petroleum products by energy-dispersive X-ray fluorescence (non-dispersive X-ray fluorescence)

3 DEFINITIONS. For the purpose of this Standard, the definitions below apply.

3.1 Additives—chemical substances added to automotive diesel fuel, usually in small quantities to impart desirable properties to, or prevent deterioration of the automotive diesel fuel.

3.2 High speed diesel engine—a compression-ignition engine which operates faster than 800 r/min and typically powers medium and heavy duty trucks, buses, passenger cars, farm machinery, industrial and construction machinery, stationary generating sets, pump sets, and work and pleasure boats.

NOTE: Besides the above definitions, because it was not practicable to use full expressions, this specification (e.g., Figures 1, B1 and B2) also includes the following abbreviations:

(a) *ADF*—automotive diesel fuel.

(b) *CP*—cloud point.

(c) *CFPP*—cold filter plugging point.

4 COMPOSITION. Automotive diesel fuel—

(a) shall consist of hydrocarbons derived from petroleum;

(b) shall not include any inorganic acid;