

CONFIRMED
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Guide to

**Low temperature properties
and cold weather use of diesel
fuels and gas oils conforming
to BS EN 590 and classes A2
and D of BS 2869**

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The preparation of this British Standard was entrusted to Technical Committee PTI/2, Liquid fuels, upon which the following bodies were represented:

- Association of United Kingdom Oil Independents
- Autobobile Association
- British Railways Board
- Chemical Industries Association
- Confederation of Passenger Transport
- Consumer Policy Committee of BSI
- Department of Transport
- Federation of British Historic Vehicle Clubs
- Federation of Petroleum Suppliers
- Freight Transport Association
- Institute of Petroleum
- Institute of Road Transport Engineers
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- Road Haulage Association Ltd.
- Royal Automobile Club
- Society of Motor Manufacturers and Traders Limited
- United Kingdom Petroleum Industry Association Ltd.
- World Wide Fund for Nature

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Foreword

This British Standard has been prepared by Technical Committee PTI/2 in response to requests from producers and users of fuel oils.

BS 6380 was first published in 1983 in response to requests from users of fuel oils who experienced fuel flow problems during the extremely cold winter of 1981/82. This British Standard supersedes BS 6380 : 1983 which is withdrawn.

This British Standard has been prepared as a guide because it does not set out to cover the subject completely, but it is intended to help individual users of the fuels covered who will probably require other expert guidance in applying some of the recommendations. This British Standard has been prepared in support of the automotive diesel specification BS EN 590 and the fuel oil specification BS 2869 but also refers to British Standards that cover in detail the storage of fuel oils.

The principal changes between BS 6380 : 1983 and this edition include:

- a) the recognition that automotive diesel fuels are now specified in BS EN 590;
- b) changes in the cold filter plugging points of the fuels.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

Guide

Introduction

These guidelines are intended to help users of fuels conforming to BS EN 590 and classes A2 and D of BS 2869 to understand the problems that may be encountered in very severe winters and to help overcome them. Users have found that it is not always possible to avoid fuel flow problems during extreme weather conditions. Such problems can arise because of:

- a) inappropriate fuel quality for certain weather conditions encountered, for example summer grade in use out of season;
- b) fuel systems on vehicles or burner plant that through their design give rise to sensitivity to blockage by precipitated wax;
- c) fuel storage systems that are badly sited and poorly maintained;
- d) fuel storage systems that are inadequately heated or protected against loss of heat, bearing in mind their conditions of service;
- e) freezing of free water accumulated from the condensation of damp air entering the storage tank as fuel is withdrawn.

1 Scope

This British Standard give guidance on the low temperature properties and cold weather use of diesel fuels conforming to BS EN 590 and gas oils conforming to classes A2 and D of BS 2869.

Clauses 3 and 4 give details of the fuel classes and low temperature properties. Clauses 5 to 9 give recommendations for fuel quality and treatment, the cold weather use of bulk handling and storage systems and diesel-engined vehicles and tractors, and remedial measures for fuel starvation in oil-fired burner systems.

2 References

2.1 Normative references

This standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the cited publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this standard only when incorporated in it by updating or revision.

2.2 Informative references

This standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Classes of fuels

Three classes of middle distillate fuel are specified in British Standards. Automotive diesel fuel is specified in BS EN 590 and a diesel fuel and a gas oil are specified in BS 2869, and their primary uses are as follows.

a) *BS EN 590*. BS EN 590 fuel is for use in diesel-engined vehicles operating on the public highway. It is manufactured and handled as a separate grade and is dispensed either from service station tanks directly into the vehicle tank, or alternatively handled by fleet users who have their own bulk storage. BS EN 590 fuel is undyed and unmarked.

b) *BS 2869 class A2*. BS 2869 class A2 fuel is for use in stationary diesel engines, farm tractors and in vehicles which operate entirely off the public highway, e.g. airport refuellers. Users normally carry their own bulk stocks in tanks or barrels. Class A2 fuel is dyed red and contains a chemical marker, in accordance with HM Customs and Excise requirements.

c) *BS 2869 class D*. BS 2869 class D fuel is used for oil burners in domestic, commercial and lower thermally-rated industrial heating plants and in industrial gas turbines. Users have their own bulk storage. It is dyed and marked.

These three classes of fuel may be stored, handled and used in conditions sufficiently different to affect markedly their low temperature performance.

Automotive diesel fuel is usually stored underground at service stations and therefore protected from the worst of the weather, but most user storage for all three classes is in above-ground storage, usually unprotected from the elements. Where the fuel offtake is small, the pipework is narrow bore and will be more subject to blockage in very cold weather. The position of filter boxes and the length and diameter of pipework exposed need to be carefully considered to minimize the potential for problems in extreme weather conditions.

4 Low temperature properties of BS EN 590 and BS 2869 classes A2 and D fuels

These fuels consist of a wide range of hydrocarbons with boiling points predominantly between about 180 °C and 380 °C. As the fuel is cooled progressively, there comes a point at which the heavier paraffinic hydrocarbons, i.e. the waxes, begin to separate and appear as a cloud in the fuel. Further cooling brings more of the hydrocarbons out of solution and the waxes will begin to agglomerate, although the fuel is still fluid and can be used in practice.