BRITISH STANDARD

BS 6413-6: 1991
ISO 6743-6: 1990

Lubricants, industrial oils and related products (class L) —

Part 6: Classification for family C (Gears)

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Petroleum Standards Policy Committee (PTC/-) to Technical Committee PTC/7, upon which the following bodies were represented:

Advanced Manufacturing Technology Research Institute
Ball and Roller Bearing Manufacturers' Association
British Coal Corporation
British Fluid Power Association
British Gear Association
British Lubricants Federation Limited
British Railways Board
British Steel plc
Department of Transport
Electricity Supply Industry in the United Kingdom
Engineering Equipment and Materials Users' Association
Institute of Petroleum
London Regional Transport
Ministry of Defence

This British Standard, having been prepared under the direction of the Petroleum Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 29 March 1991

The following BSI references relate to the work on this standard:
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Contents

National foreword

This Part of BS 6413 has been prepared under the direction of the Petroleum Standards Policy Committee in order to provide a classification scheme for lubricants, industrial oils and related products. It is identical with ISO 6743-6:1990 "*Lubricants, industrial oils and related products (Class L) — Classification — Part 6: Family C (Gears)*", published by the International Organization for Standardization (ISO). ISO 6743-6 was prepared as a result of discussions in Sub-committee 4 "Classifications and specifications" of Technical Committee 28 "Petroleum products and lubricants", in which the United Kingdom has participated.

A general classification of petroleum products prepared in ISO/TC 28 has allocated class L to lubricants. BS 6413-0 details the subdivision of class L into families of products, to each of which a code letter is allocated. This Part provides a detailed classification within family C of class L. Further Parts of the International Standard will provide a detailed classification within other families of class L and will be published as further Parts of BS 6413.

A classification of machine tool lubricants has been separately published as BS 5063:1982 "*Classification for a rationalized range of lubricants for machine tool applications*", and covers grades drawn from ISO 3498:1979 "*Lubricants for machine tools — Classification*", but does not include all the grades in ISO 3498.

Cross-references

International Standard	Corresponding British Standard
ISO 3448:1975	BS 4231:1982 *Classification for viscosity grades of industrial liquid lubricants* (Identical) BS 6413 *Lubricants, industrial oils and related products (class L)*
ISO 6743-0:1981	Part 0:1983 *Classification (general)* (Identical)
ISO 6743-1:1981	Part 1:1983 *Classification for family A (total loss systems)* (Identical)
ISO 6743-9:1987	Part 9:1988 *Classification for family X (greases)* (Identical)

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 4, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This part of ISO 6743 establishes the detailed classification of family C (gears) which belongs to class L (Lubricants, industrial oils and related products).

It should be read in conjunction with ISO 6743-0.

This part of ISO 6743 is concerned only with lubricants for industrial gears. Lubricants for motor vehicle gears may be included in a future edition.

To establish this classification, two essential series of parameters have been taken into account, one including the environment and the other considering the tooth operating conditions. These parameters are explained in Annex A.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 6743. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 6743 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3448:1975, *Industrial liquid lubricants — ISO viscosity classification.*

ISO 6743-0:1981, *Lubricants, industrial oils and related products (class L) — Classification — Part 0: General.*

ISO 6743-1:1981, *Lubricants, industrial oils and related products (class L) — Classification — Part 1: Family A (Total loss systems).*

ISO 6743-9:1987, *Lubricants, industrial oils and related products (class L) — Classification — Part 9: Family X (Greases).*

3 Explanation of symbols used

3.1 The detailed classification of family C has been established by defining the categories of products required for the primary applications of gears.

3.2 Each category is designated by a symbol consisting of a group of three letters, which together constitute a code.

NOTE 1 The first letter of the code (C) identifies the family of the product considered, but the second and third letters, taken separately, have no significance of their own. In order to prevent confusion with the API diesel engine oil code, the letter K is included as the second of the ISO category symbols.

The designation of each category shall be supplemented by the addition of viscosity grades according to ISO 3448.

3.3 In the present classification system, products are designated in a uniform manner. For example, a particular product may be designated in the complete form, i.e. ISO-L-CKS, or in an abbreviated form, i.e. L-CKS.

4 Detailed classification

The detailed classification is shown in Table 1.

Table 1 — Classification of lubricants for gears

Code letter	General application	Particular application	More specific application	Composition and properties	Symbol ISO-L	Typical applications	Remarks
C	Gears	Enclosed gears	Continuous lubrication by splash circulation or spray	Refined mineral oils with oxidation stability, anti-corrosion (ferrous and non-ferrous metal) and anti-foam properties	CKB	Gears operating under light load	
				Oils of CKB type with enhanced extreme-pressure and anti-wear properties	CKC	Gears operating at a stabilized temperature of oil that remains normal or medium and under high load	See Annex A
				Oils of CKC type with enhanced thermal/oxidative stability that permits use at a higher temperature	CKD	Gears operating at a high stabilized temperature of the oil and under high load	
				Oils of CKB type ensuring low coefficient of friction	CKE	Gears operating under high friction (e.g. worm gears)	
				Lubricants with oxidation stability, anti-friction and anti-corrosion (ferrous and non-ferrous) properties usable under extreme temperature conditions (low and high)	CKS	Gears operating at a very low, low or very high stabilized temperature of the fluid and under light load	1) See Annex A 2) Categories of products that require high performance may be synthetic or contain synthetic bases that risk to pose the problem of compatibility with some equipment regularly used with mineral oils
				Lubricants of type CKS usable under extreme temperature conditions (low and high) and under high load	CKT	Gears operating at a very low, low or very high stabilized temperature of the fluid and under high load	
			Continuous splash lubrication	Greases with extreme pressure and anti-wear properties	CKG[a]	Gears operation under light load	See Annex A

Table 1 — Classification of lubricants for gears

Code letter	General application	Particular application	More specific application	Composition and properties	Symbol ISO-L	Typical applications	Remarks
		Open gears may be fitted with safety guards	Intermittent or dip or mechanical application	Products usually of bituminous type with anti-corrosion properties	CKH	Cylindrical or bevel gears operating at medium ambient temperatures and generally under light load	1) See Annex A 2) AB oils as defined in ISO 6743-1 may be used for the same applications as CKJ lubricants 3) These products can be used with a volatile diluent for ease of application (in this case, they shall be designated as follows: CKH-DIL or CKJ-DIL
				Products of CKH type with enhanced extreme-pressure and anti-wear properties	CKJ		
				Greases with improved extreme-pressure, anti-wear and anti-corrosion properties and improved thermal stability	CKL[a]	Cylindrical or bevel gears operating at high or very high ambient temperatures and under high load	See Annex A
			Intermittent application	Products with improved anti-seizing properties that permit use under extreme load conditions, and products with anti-corrosion properties	CKM	Gears operating occasionally under exceptionally high loads	Products that cannot be sprayed

[a] These applications may concern several greases. The grease designation according to ISO 6743-9 shall be indicated by the supplier.

Annex A (informative)
Main parameters governing lubricant selection

To establish this classification, two essential series of parameters have been taken into account:

— the environment;

— the tooth operating conditions (load level and sliding velocity).

These parameters are not the only ones to be considered when a lubricant has to be selected. Nevertheless, due to their importance and for clarification purposes, these parameters have been quantified. The values given in Table A.1 and Table A.2 below have been shown to assist in making a choice. They should be considered only as guides, however.

Table A.1 — Stabilized temperature of the oil or ambient temperature

Very low	< – 34 °C
Low	< – 34 °C to – 16 °C
Normal	– 16 °C to + 70 °C
Medium	+ 70 °C to + 100 °C
High	+ 100 °C to + 120 °C
Very high	> + 120 °C

Table A.2 — Examples of tooth operating conditions

	Definition
Light load	Load level usually encountered in so-called "lightly loaded" gears with a contact stress generally below 500 MPa (500 N/mm^2) and with a maximum sliding velocity (v_g) on the tooth surface generally lower than one-third of the pitch line velocity on the working pitch cylinder (v)
High load	Load level usually encountered in so-called "heavily loaded" gears with a contact stress generally above 500 MPa (500 N/mm^2) and with a maximum sliding velocity (v_g) possibly higher than one-third of the pitch line velocity on the working pitch cylinder (v)

Publication(s) referred to

See national foreword.

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