
International Standard



6743/7

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**Lubricants, industrial oils and related products (class L) —
Classification —
Part 7 : Family M (Metalworking)**

Lubrifiants, huiles industrielles et produits connexes (classe L) — Classification — Partie 7 : Famille M (Travail des métaux)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 6743/7 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Lubricants, industrial oils and related products (class L) — Classification — Part 7 : Family M (Metalworking)

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1 Scope and field of application (standardsiteh.ai) 3 Explanation of symbols used

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

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

To avoid any misunderstanding and to clarify the text, the following annexes are included :

- annex A : definitions of certain words or terms used in this classification;
- annex B : distribution of categories of products by field of application in tabular form;
- annex C : distribution of categories of products, in relation to their constitution and properties, in tabular form.

2 References

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

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

3.1 This detailed classification of family M has been established by defining the categories of products required for the main applications of this family.

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

NOTE — The first letter of the category (M) identifies the family of the product considered but any following letters taken separately have no significance on their own.

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

3.3 In this 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-MHA 32, or in an abbreviated form, i.e. : L-MHA 32, the number indicating the class of viscosity according to ISO 3448.

4 Classification of lubricants for metalworking (family M)

See table 1.

Table 1 — Classification of lubricants for metalworking (Family M)

Code letter	General application	Particular application	More specific application	Product type and/or end use requirements	Symbol ISO-L	Typical application	Remarks	
M	Metal-working	Metal removal by cutting, abrasion or electrical discharge and metal forming by punching, deep drawing, ironing, power spinning, wire drawing, forging — hot and cold, extrusion, stamping, cold rolling	Operations primarily needing lubrication	Fluid which may have anti-corrosion properties	MHA	See table in annex B	These fluids which are used undiluted may be inhibited against oxidation or may contain fillers for particular forming operations.	
				Fluid of MHA type with friction-reducing properties	MHB			
				Fluid of MHA type with extreme pressure (E.P.) properties, chemically non-active	MHC			
				Fluid of MHA type with extreme pressure (E.P.) properties, chemically active	MHD			
				Fluid of MHB type with extreme pressure (E.P.) properties, chemically non-active	MHE			
				Fluid of MHB type with extreme pressure (E.P.) properties, chemically active	MHF			
				Greases, pastes, waxes, applied pure or diluted with a fluid of MHA type	MHG			May contain a filler for particular applications
				Soaps, powders, solid lubricants, etc. and blends thereof	MHH			These products are applied without dilution
				Metal removal by cutting or abrasion and metal forming by punching, deep drawing, ironing, power spinning, wire drawing, forging — hot and cold, extrusion, stamping, rolling — hot and cold	Operations primarily needing cooling			Concentrates giving, when blended with water, milky emulsions having anti-corrosion properties
		Concentrates of MAA type having friction-reducing properties	MAB					
		Concentrates of MAA type having extreme pressure (E.P.) properties	MAC					
		Concentrates of MAB type having extreme pressure (E.P.) properties	MAD					
		Concentrates giving, when blended with water, translucent emulsions (micro-emulsion) having anti-corrosion properties	MAE					
		Concentrates of MAE type having friction-reducing and/or extreme pressure (E.P.) properties	MAF					
		Concentrates giving, when blended with water, transparent solutions having anti-corrosion properties	MAG			May contain a filler for particular applications		
		Concentrates of MAG type having friction-reducing and/or extreme pressure (E.P.) properties	MAH					
		Greases and pastes applied blended with water	MAI					

Annex A

Definitions

(This annex forms an integral part of the Standard.)

A.1 fluid : A liquid substance of mineral, animal, vegetable or synthetic origin in any proportion. Metalworking fluid may contain biocides.

A.2 concentrate : A blend of suitable emulsifying agents and additives such as antirust, antimicrobial and others with refined mineral oils in the case of aqueous emulsions, or suitable chemical products in the case of aqueous solutions, which are later diluted for use.

For particular applications, these concentrates may be applied undiluted.

A.3 chemically active lubricant : A fluid which is corrosive to copper and its alloys, as opposed to "chemically non-active lubricants", which are not. Methods for the evaluation of this characteristic will be defined later.

A.4 containing a filler : Containing additives in a solid form, such as solid lubricants (graphite, molybdenum disulfide), metallic salts, metallic soaps, metallic oxides, etc., to enhance lubricating properties when contact pressures are high (forming, and hot operations in particular).

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Annex B

Distribution of categories of family M products according to field of application

(This annex does not form an integral part of the Standard.)

Table 2 constitutes a general and non-exhaustive example of an application guide for the main classes of metalworking fluids.

Professional users will be able to refer to it to obtain an overall view of the principal families of products which are in common use.

This table may equally serve as a basis for establishing specifications according to areas of applications.

Table 2 – Distribution of categories of family M products according to field of application

Operations ISO categories	Cutting operations	Abrasion	Electrodischarge machining	Sheet metal forming	Ironing, power spinning	Wire drawing	Forming, stamping	Rolling
L-MHA	●		●					●
L-MHB	●			●	●	●	●	●
L-MHC	●	●				○	○	
L-MHD	●			●				
L-MHE	●	●		●	●			
L-MHF	●	●		●				
L-MHG				●		●		
L-MHH						●		
L-MAA	●			●				○
L-MAB	●			●		●	○	●
L-MAC	●			○		○		
L-MAD	●			●	●			
L-MAE	●	○						
L-MAF	●	○						
L-MAG	○	●		○			●	●
L-MAH	●	●					●	
L-MAI				●		●		

- Main application
- Possible application

Annex C

Distribution of categories of family M products according to their nature and properties

(This annex does not form an integral part of the Standard.)

To aid in the practical use of metalworking fluids, tables 3 and 4 show a schematic view of the

- classification of neat oils,
- classification of aqueous fluids,

in which the nature and properties of each of these two kinds of product are compared.

Table 3 – Distribution of categories of family M products according to their nature and properties – Part 1 : Neat oils

	Code ISO-L	Type of product and main properties					Remarks
		Refined mineral oils ¹⁾	Others	Friction-reducing properties	E.P. ²⁾ properties (cna) ³⁾	E.P. ²⁾ properties (ca) ⁴⁾	
Neat oils	MHA	●					
	MHB	●		●			
	MHC	●			●		
	MHD	●				●	
	MHE	●		●	●		
	MHF	●		●		●	
	MHG						Greases
	MHH						Soaps

- 1) Or synthetic fluids
- 2) E.P. : extreme pressure
- 3) cna : chemically non-active
- 4) ca : chemically-active

Table 4 – Distribution of categories of family M products according to their nature and properties – Part 2 : Aqueous fluids

	Code ISO-L	Type of product and main properties						Remarks
		Emulsions	Micro-emulsions	Solutions	Others	Friction-reducing properties	E.P. properties ¹⁾	
Aqueous fluids	MAA	●						
	MAB	●				●		
	MAC	●					●	
	MAD	●				●	●	
	MAE		●					
	MAF		●			●	and/or ●	
	MAG			●				
	MAH			●		●	and/or ●	
	MAI					●		Greases Pastes

- 1) E.P. : extreme pressure

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