INTERNATIONAL STANDARD

ISO 6743-3A

First edition
1987-04-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

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

Part 3A: Family D (Compressors)

Lubrifiants, huiles industrielles et produits connexes (classe L) — Classification —

Partie 3A: Famille D (compresseurs)

Reference number
ISO 6743-3A : 1987 (E)

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 6743-3A 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.

Printed in Switzerland

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

Part 3A:
Family D (Compressors)

1 Scope and field of application

This part of ISO 6743 establishes the detailed classification of lubricants in use for air compressors. It forms the preliminary part of the classification of lubricants in use for all compressors types, family D, including gas compressors and refrigeration compressors[1].

The intention of this part of ISO 6743 is to provide a rationalized range of the most commonly used, internationally available lubricants for air compressors, without resorting to unnecessary restriction by specifications or product description.

The primary intention of this classification in particular has been to describe and to promote the use of the type of lubricant which is best suited for the particular application, with the aim of reducing as far as possible the risks of fire and explosion in stationary air compressors (see ISO 5388).

This document should be read in conjunction with ISO 6743-0.

2 References

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

ISO 5388, *Stationary air compressors — Safety rules and code of practice.*

ISO 6521, *Lubricants, industrial oils and related products (class L) — Specifications of categories L-DAA and L-DAB (Lubricants for reciprocating and drip-feed rotary air compressors).*[2]

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

ISO 8681, *Petroleum products and lubricants — Method of classification — Definition of classes.*

3 Explanation of systems used

3.1 The detailed classification of family D 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 letters, which together constitute a code.

NOTE — The first letter of the code "D" identifies the family of the product considered but the second and third letters taken separately have no significance of their own.

The designation of each category will 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 in accordance with ISO 8681. For example, a particular product may be designated in complete form, i.e. ISO-L-DAB 68, or in an abbreviated form, i.e. L-DAB 68, the number indicating the viscosity grade according to ISO 3448.

1) At present at the stage of draft (ISO/DIS 6743-3B). For the time being, classification of lubricants in use for air compressors and classification of lubricants in use for gas and refrigeration compressors are being studied separately; the two classifications may be published separately but will be combined in a single document when the two final documents are available.

2) At present at the stage of draft.

Classification of lubricants, industrial oils and related products (class L) — Part 3A: Family D (compressors)

Letter Symbol	General application	Particular application	More specific application	Product type and/or performance requirements	Symbol ISO-L	Typical applications	Remarks
D	Air compressors	Positive displacement air compressors with oil-lubricated compression chambers	Reciprocating (crosshead and trunk pistons or Rotary drip feed (vane)		DAA	Light duty	See the annex
					DAB	Medium duty	
					DAC	Heavy duty	
			Rotary oil-flooded (vane and screw compressors)		DAG	Light duty	
					DAH	Medium duty	
					DAJ	Heavy duty	
		Positive displacement air compressors with oil-free compression chambers	Liquid ring compressors and water-flooded vane and screw compressors Reciprocating oil-free compressors Rotary oil-free compressors		—	—	Lubricants suitable for gears, bearings and transmissions
		Dynamic compressors	Radial and axial turbocompressors		—	—	Lubricants suitable for bearings and gears
	Vacuum pumps	Positive displacement vacuum pumps with lubricated compression chambers	Reciprocating Rotary drip feed Rotary oil-flooded (vane and screw)		DVA	Low vacuum for non-aggressive gas	Low vacuum is 10^2 to 10^{-1} kPa (10^3 to 1 mbar)
					DVB	Low vacuum for aggressive gas	
			Oil-sealed vacuum pumps (sliding vane rotary and rotary plunger)		DVC	Medium vacuum for non-aggressive gas	Medium vacuum is 10^{-1} to 10^{-4} kPa (1 to 10^{-3} mbar)
					DVD	Medium vacuum for aggressive gas	
					DVE	High vacuum for non-aggressive gas	High vacuum is 10^{-4} to 10^{-8} kPa (10^{-3} to 10^{-7} mbar)
					DVF	High vacuum for aggressive gas	

NOTE — Specification standards will define the required characteristics for each category of oil. At the present time, three documents are being prepared for categories DAA - DAB (DIS 6521), for categories DAG - DAH, and for categories DAC - DAJ.

Annex

Information concerning duties of compressors

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

A.0 Introduction

The following guidelines are given to help interested parties in differentiating between

— light duty

— medium duty

— heavy duty

(See also ISO 5388.)

A.1 Reciprocating oil-lubricated and rotary drip-feed air compressors

Whether the duty of reciprocating and rotary drip feed compressors is to be classified as light, medium or heavy depends on many parameters, for example

a) the compressor design, i.e. type of cooling, number of stages, valve velocities, oil retention time, etc.;

b) ambient conditions, i.e. intake air temperature, coolant temperature, presence of catalytic dust or gases, etc.;

c) operating conditions, i.e. continuous or intermittent service, layout of the pressure system, maintenance, oil change intervals, etc.

The ultimate criterion is satisfactory, reliable air compressor operation with the prevention of excessive oil retention or the formation of coke deposits in the hot discharge air system.

A.2 Rotary oil-flooded air compressors

Whether the duty of rotary oil-flooded air compressors is to be classified as light, medium or heavy depends on many parameters, for example

a) the compressor design, i.e. air discharge pressure and pressure ratio, number of stages, oil recirculation rate, oil separating system, etc.;

b) ambient conditions, i.e. intake air temperature and humidity, presence of contaminants (dust or gases), etc.;

c) operating conditions, i.e. continuous or intermittent service maintenance, oil change intervals, discharge temperature, etc.

NOTE — It is to be noted that conditions may be such as to recommended an oil for heavier duty such as

a) high air humidity;

b) low circulating oil volume.

Table 1 — Reciprocating oil-lubricated air compressors

Duty	Symbol		Operating conditions
Light	DAA	Intermittent operation	Sufficient time to allow cooling between periods of operation — compressor stop and start — variable discharge capacity
		Continuous operation	a) discharge pressure ⩽ 1 000 kPa (10 bar) discharge temperature ⩽ 160 °C stage pressure ratio < 3: 1 or b) discharge pressure > 1 000 kPa (10 bar) discharge temperature ⩽ 140 °C stage pressure ratio ⩽ 3: 1
Medium	DAB	Intermittent operation Continuous operation	Sufficient time to allow cooling between periods of operation a) discharge pressure ⩽ 1 000 kPa (10 bar) discharge temperature > 160 °C or b) discharge pressure > 1 000 kPa (10 bar) discharge temperature > 140 °C but ⩽ 160 °C or c) stage pressure ratio > 3: 1
Heavy	DAC	Intermittent or continuous operation	As for "medium" when conditions a), b) or c) above are fulfilled and where severe coke formation in a discharge system might be anticipated as a result of previous experience with a medium-duty oil.

Table 2 — Rotary oil-flooded air compressors

Duty	Symbol	Operating conditions
Light	DAG	Air and air/oil discharge temperature < 90 °C Discharge pressure < 800 kPa[1] (< 8 bar)
Medium	DAH	Air and air/oil discharge temperature < 100 °C Discharge pressure 800 to 1 500 kPa (8 to 15 bar) or Air and air/oil discharge temperature between 100 and 110 °C Discharge pressure < 800 kPa (< 8 bar)
Heavy	DAJ	Air and air/oil discharge temperature > 100 °C Discharge pressure < 800 kPa (< 8 bar) or Air and air/oil discharge temperature ⩾ 100 °C Discharge pressure 800 to 1 500 kPa (8 to 15 bar) or Discharge pressure > 1 500 kPa (> 15 bar)

1) Under favourable conditions, light-duty oil may be used at discharge pressures higher than 800 kPa (8 bar).

NOTE — In some countries, temperatures higher than 90 °C are not allowed because of legal restrictions.

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UDC 665.765

Descriptors : petroleum products, lubricants, lubricating oils, classification, compressors.

Price based on 4 pages