Doc No.: PCD 25(25117)WC
March 2024

BUREAU OF INDIAN STANDARDS
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भारतीय मानक मसौदा

सेना के उपयोग के लिए सामान्य प्रयोजन ग्रीस - विशिष्ट

(IS 507 का *चौथा पुनरीक्षण*)

Draft Indian Standard

GENERAL PURPOSE GREASE FOR DEFENCE APPLICATIONS — SPECIFICATION

(*Fourth Revision of* IS 507)

(ICS 75.100)

Lubricants and related Products Sectional Committee, PCD 25

Last date for receipt of comment is **30 May 2024**

FOREWORD

(*Formal Clauses will be added later*).

This Standard was first published in 1953 and subsequently revised in 1970, 1980, and 1993.

In the third revision (1993), considerable assistance was derived from the standard "DEF STAN 91-17/l Grease, Calcium base. Joint Service Designation: LG 280 and CS 2985 Grease, LG 190, LG 280, and LG 320", published by the Ministry of Defence, U.K. Also, two grades for defence requirements covered in IS 506 were incorporated in this standard such that only general purpose greases were covered in IS 506.

This fourth revision has been brought out to keep pace with the latest technological developments and to meet the current requirements for defence usage. In this revision, the following changes have been made:

a) Base oil viscosity changed to 'ISO VG grades';
b) Grease fortified with Extreme Pressure (EP) additives have been incorporated, therefore, the acidity and alkalinity values are changed to 'To Report';
c) The following five additional tests are incorporated, as per defence requirements:
    i. Wear Preventing Properties;
    ii. Extreme Pressure Properties;
    iii. Evaporation Loss;
    iv. Roll Stability; and
    v. Oxidation Stability.
d) Clauses for reference and marking are updated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance

with IS 2 : 2022 ‘Rules for rounding off numerical values (second revision)’. The number of significant places retained in the rounded off value should be the same as that of specified value in this standard.

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for general purpose greases intended for defence applications. The standard includes applications in the temperature range of – 18 °C to + 60 °C.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
IS 1447 (Part 3) : 2021	Petroleum and its Products — Methods of Sampling — Part 3 Method of sampling of semi solid and solid petroleum products (*second revision*)
IS 1448	Methods of tests for petroleum and its products
(Part 4/Sec2): 2021	Ash from Grease, Sulphated Ash and Water Soluble Ash (*fourth revision*)
(Part 25/Sec1): 2018/ISO 3104:1994	Transparent and Opaque Liquids Section 1 Determination of Kinematic Viscosity and Calculation of Dynamic Viscosity (*second revision*)
(Part 40): 2015/ ISO 3733:1999	Petroleum products and Bituminous materials – Determination of water — Distillation Method (*fourth revision*)
(Part 51): 2023	Copper strip corrosion test for lubricating greases (*first revision*)
(Part 52): 2017/ ISO 2176:1995	Drop Point (*second revision*)
(Part 53): 1979	Determination of acidity and alkalinity of greases (*first revision*)
(Part 60): 2023	Consistency of Lubricating Greases by Cone Penetrometer (*third revision*)
(Part 62): 2023	Heat Stability of Greases (*second revision*)
(Part 68) : 2023	Determination of Evaporation Loss of Lubricating Greases (22 hour drying) (*first revision*)
(Part 69): 2019/ ISO 2592: 2000	Determination Flash and Fire Points — Cleveland Open Cup Method (*second revision*)
(Part 94): 2019	Test for Oxidation Stability of Lubricating Grease by Oxygen Pressure Vessel Method (*first revision*)
(Part 165): 2018	Test Method for Roll Stability of Lubricating Grease
(Part 170) : 2021 / ISO 20623 : 2017	Determination of the extreme pressure and anti-wear properties of lubricants Four-ball method European conditions
IS 7794:1984	Specification for manual portable grease guns (*first revision*)
ASTM D128-98	Standard Test Methods for Analysis of Lubricating Grease (*first revision*)
ASTM D1743-22	Standard Test Method for Determining Corrosion Preventive Properties of Lubricating Greases

3 GRADES

The material shall be of the following three grades:

a) Grade 1,
b) Grade 2, and
c) Grade 3.

4 REQUIREMENTS

4.1 General

The material shall be smooth, of homogeneous preparation, uniform in consistency, and free from objectionable odour, deleterious materials and other impurities, such as rosin, rosinates, tar oil, grit and fillers of any description. It shall not show any sign of breakdown, hardening, or tendency of the constituents to separate.

4.2 Composition

The material shall be prepared from the following ingredients in such proportions so as to comply with the requirements prescribed in Table 2.

4.2.1 *Mineral Lubricating Oil* — The oil used in the manufacture of grease shall be a refined mineral oil complying with the requirements in Table 1:

Table 1 Requirements for Refined Mineral Oil
(*Clause* 4.2.1)

Sl No.	Characteristics	Requirement			Method of Test
		Grade 1	Grade 2	Grade 3	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Kinematic viscosity in mm^2/s at 40 ºC	ISO VG 150	ISO VG 100	ISO VG 22	IS 1448 (Part 25/Sec 1)
ii)	Flash point, ºC, (Cleveland open cup), *Min*	230	220	160	IS 1448 (Part 69)

4.2.2 Calcium based soap (with additives, if required) to meet extreme pressure, antiwear, oxidation stability, rust prevention, and corrosion protection requirements.

4.3 Keeping Quality (Shelf Life)

The material when stored in original sealed containers under ambient temperature conditions, protected from sunlight, shall retain the requirements given in the specification for a period not less than one year from the date of manufacture/packing.

4.4 The material shall also comply with the requirements given in Table 2 when tested according to the methods given in col 6 of Table 2.

Table 2 Requirements for General Purpose Grease for Defence Applications
(*Clause* 4.2, 4.3 *and* 4.4)

Sl No.	Characteristic	Requirements			Method of Test
		Grade 1	Grade 2	Grade 3	
(1)	(2)	(3)	(4)	(5)	(6)
i)	Consistency of worked grease at 25 °C ± 0.5 °C (60 double strokes)	310 to 340	265 to 295	175 to 205	IS 1448 (Part 60)
ii)	Drop point, °C, *Min*	95	100	100	IS 1448 (Part 52)
iii)	Free acidity (as oleic acid), percent by mass, *Max*	To Report	To Report	To Report	IS 1448 (Part 53)
iv)	Free alkalinity [as Ca $(OH)_2$], percent by mass, *Max*	To Report	To Report	To Report	IS 1448 (Part 53)
v)	Glycerin content, percent by mass, *Max*	—	0.25	—	ASTM D128
vi)	Copper strip corrosion test, at 75 °C, for 24 h, *Max*	1b	1b	1b	IS 1448 (Part 51)
vii)	Heat stability at 120 °C ± 1 °C	No sign of breakdown, marked change in consistency or separation of oil			IS 1448 (Part 62)
viii)	Low temperature pumping properties	Shall be easily pumpable at 0 °C	Shall be easily pumpable at -18 °C	Shall be easily pumpable at 0 °C	Annex A
ix)	Water content, percent by mass, *Max*	1.5	1.0	2.0	IS 1448 (Part 40)
x)	Sulphated ash, percent by mass, *Max*	4.0	5.0	8.0	IS 1448 (Part 4/Sec 2)
xi)	Corrosion preventive test, *Max*	← Rating 1 →			ASTM D1743
xii)	Wear preventing properties, mean wear scar diameter, mm, *Max* (Ball pot temperature 75 °C ± 1 °C; Load 40 kg; Running period 60 minutes)	0.70	0.70	0.70	IS 1448 (Part 170)
xiii)	Extreme pressure properties, mean hertz load, kg, *Min* (Running period 10 seconds)	40	40	40	IS 1448 (Part 170)
xiv)	Evaporation loss, percent by mass, at	10	10	15	IS 1448 (Part 68)

	100 ºC ± 2 ºC for 1 h, *Max*				
xv)	Roll stability				IS 1448 (Part 165)
	a. Condition of grease	No liquification or separation	No liquification or separation	No liquification or separation	
	b. Work penetration, change from original, mm	-25 to +45	-25 to +45	-25 to +45	
xvi)	Oxidation stability, pressure drop after 100 h, kPa, *Max*	35	35	35	IS 1448 (Part 94)

5 PACKING AND MARKING

5.1 Packing — The material shall be packed in clean, dry, leak-proof tinplate containers free from rust.

5.2 Marking

The containers shall be marked with the following information:

a) Name and grade of material;
b) Manufacturer's name, initials or trade-mark, if any;
c) Net mass of material;
d) Identification in code or otherwise to enable the lot of consignment or manufacture to be traced back from records;
e) Date or month and year of manufacture/packing; and
f) Any other statutory requirements.

5.2.1 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

6 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 1447 (Part 3).

6.1 Number of tests — Tests for the determination of all requirements shall be conducted on each of the individual samples separately.

6.2 Criteria for Conformity — The lot shall be declared as conforming to the specification, if the individual samples conform to all the requirements prescribed in the standard.

ANNEX A

[*Table* 1, *Sl. No* (viii)]

DETERMINATION OF LOW TEMPERATURE PUMPING PROPERTIES

A-1. APPARATUS

A-1.1 Grease Gun — Push Type (*see* IS 7794).

A-1.2 Refrigerator — Capable of being maintained at -18 ºC ± 1 ºC.

A-2 PROCEDURE

A-2.1 Fill the gun with grease and place in a refrigerator at -18 ºC ± 1 ºC.

A-2.2 Maintain the test temperature for 24 h.

A-2.3 Remove the gun from the refrigerator and operate it immediately (*see* Note).

NOTE — Protective gloves should be worn during the test.