INTER PLANT STANDARDIZATION – STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR HIGH TEMPERATURE GREASE**	**IPSS: 1-09-008-20** **(FOURTH REVISION)**
	CORRESPONDING IS 12790:1999 (Reaffirmed 2014)	*FORMERLY* IPSS:1-09-008-10 (*Third Revision*)

0. FOREWORD

0.1 This Inter Plant Standard has been prepared by the Standards Committee on Oils & Lubricants, IPSS 1:9 with the active participation of the representatives of the steel plants, reputed consulting organizations and established manufacturers of greases and was adopted with fourth revision in **January, 2020**.

0.2 This Inter Plant Standard was originally published in 1978 and it was revised in 1986, 1995 & 2010. In this fourth revision some modifications have been made in the light of experience gained during the usage of the standard since its second revision. These modifications pertain to grading and the requirements of characteristics like kinematic viscosity of oil used, resistance to water wash-out, oxidation stability and four ball EP test etc.

0.3 In the fourth revision, some more clauses have been introduced like Supply requirement, Marking and the clause of Keeping quality has been modified.

0.4 This Inter Plant Standard includes requirements which would enable these greases acquire high temperature and shear stability, resistance to water wash out, oxidation and rusting, long serviceability and good pumpability.

0.5 Efforts are underway to render this standard should also be compatible and lubricant manufacturing ingredient should also be the same for products manufactured by different oil companies so that substitutes for costly molybdenum disulphide (like graphite) could be introduced.

1. SCOPE

1.1 This Inter Plant standard covers requirements of high temperature grease of the grades used in steel industry at high pressure centralized systems with bearings operating at temperature between 120-160^{o}C.

2. GRADES

2.1 The material shall be of three grades, namely:

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

Grade 1 and Grade 2 shall contain molybdenum disulfide or graphite or a combination thereof.

3. COMPOSITION

3.1 The material shall consist of the following ingredients:

a) Refined mineral oil;
b) Non-soap thickening agent;
c) Molybdenum disulphide or graphite or a combination thereof (in case of Grade I and Grade 2 only) conforming to IS 13796:1993 specification for moly sulphide and graphite conforming to IS 495.

3.2 Non-soap grease with or without solid lubricants. In case of cetralise grease system no solid lubricants to be used in grease solid lubricants, non-centralized greasing system shall be used.

4. TECHNICAL REQUIREMENTS

4.1 The technical requirements for high temperature grease shall be as given in **Table-1.**

4.2 **Keeping Quality** – The keeping quality of the material shall be such that when stored in original sealed containers under normal conditions, it shall retain the properties detailed in the specification for nor less than one year from the date of manufacture.

4.3 The grease should be easily pumpable at ambient temperature to a centralized grease system.

4.4 The material shall also comply with the requirements given in Table1, when tested according to the methods in col 6 of the table1.

5. PACKING

5.1 The packing shall be done in new sound steel drums/barrels of 182 kg nominal capacity conforming to IS 13997:1994 (Grade A drum) `Specification for drums large open top'. The drums/barrels shall be properly sealed against water and other contaminants.

6. SAMPLING

6.1 Representative samples of the material shall be drawn as prescribed in IS 1447 (Part 3):1992 `Method of sampling of petroleum and its products'.

7. SUPPLY REQUIREMENTS

7.1 The lubricants may be supplied in bulk or drum as per agreement between the purchaser and supplier.

7.2 The supplier is required to furnish the test certificate for each batch indicating typical values of the properties stipulated in the standard.

8. MARKING

8.1 The drum/barrels shall be securely closed and marked with the following:

a) Indication of the source of manufacture;

b) Name, type and grade of the material;

c) Net mass of the material;

d) Date of manufacture;

e) Recognized trade mark, if any; and

f) Identification in code or otherwise to enable the lot of consignment or manufacture to be traced back.

8.2 The drum/barrels may also be marked with the standard mark.

TABLE 1

REQUIREMENTS OF HIGH TEMPERATURE GREASE

(Clause 4.1)

Sl. No.	Characteristic	Requirement			Method of test, Ref to (P:) IS 1448*
		Grade 1	Grade 2	Grade 3	
1.	Consistency of worked grease at 25 °C				P:60 1994
2.	a) at 60 strokes	310-340	280-300	280-300	
3.	b) at 10000 strokes	Shall not be more than 30 units from the consistency at 60 strokes			
4.	Drop point, °C, M in	280			[P:][1]
5.	Viscosity Index, Min	90	90	90	P:56 2013
6.	Kinematic viscosity of mineral oil used in cSt at 40°C	VG 460	VG 460	VG 460	P:25 (1976)
7.	Corrosion preventive properties of lubricating greases	Pass			[P:][2]
8.	Freedom from Deleterious particles	Not more than 10 scratches			P:125 (1987)
9.	Resistance to water washout at 80°C, percent loss by mass, Max	10	10	10	P:90 2008
10.	Leakage and deposit forming tendencies (wheel bearing test) at 165°C				[P:][3]
	a) Leakage by mass, g, Max	10	10	10	
	b) Deposit in the wheel bearing races or the rollers	Free from deposits			
	c) Evidence of abnormal changes in the consistency or structure of the material	Not limited, but observations are to be reported			
	d) Indication of dry running of races	No dry running of races			

11.	Roll stability, change in consistency in two hours, percent, Max	10	10	10	[P:][4]
12.	Oxidation stability at 99°C(100 h), drop in pressure, kgf/cm^2, Max	0.5	0.5	0.5	P:94 2019
13.	Solid lubricant concentration, percent by mass may be molybdenum disulphide, graphite or mixture of these (choice will be as agreed to between supplier and users). Min	3.0	3.0	-	[P:58] (1991)
14.	Four ball wear test, scar dia, mm, Max at 7.5 kg load, 1800 r.p.m., 55°C, 1h	0.60	0.60	0.60	[P:][5]
15.	Four ball EP test, weld load, kg Min	250	250	250	[P:][6]
16.	Copper strip corrosion, 24 h, 100°C	negative	negative	negative	P:51 (1963)
17.	Elastomer Compatability				ASTM D 4289 - 2014
	Vol Change, percent	← -5 to + 30 →			
	Hardness change, durometer-A points	← -15 to + 2 →			
18.	Oil separation in storage condition, max	5%			ASTM D 1742 - 2018

NOTE: S. No. 10 and 12 are type tests for which manufacturers/suppliers shall give the guarantee for their compliance.
S.No. 13 choice will be as agreed to between supplier and users).

A few more Indian Standards on methods of test are under preparation. Till such time these are published, the methods given in the following standards shall be applicable for the requirements mentioned against each.

	Requirement	Standard
[P:][1]	Sl No. (4)	ASTM D 2265-2015
[P:][2]	Sl No. (7)	ASTM D 1743- 2015 Rust preventive properties of lubricating greases
[P:][3]	Sl No. (10)	ASTM D 1263- 1999 Leakage tendencies of

		automotive wheel bearing greases
[P:][4]	Sl No. (11)	ASTM D 1831- 2019 Roll stability of lubricating grease
[P:][5] & [P:][6]	Sl No. (14) & (15)	ASTM D 2266- 2015 Wear preventive characteristic of lubricating grease (four ball method), IP 239/ 2014

*Methods of test for petroleum and its products.