INTER PLANT STANDARD - STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR INDUSTRIAL EP GEAR OIL** (*SECOND REVISION*)	**IPSS:1-09-003-97**
	Corresponding to IS 8406:1993	Formerly: IPSS:1-09-003-82

0. FOREWORD

0.1 This Inter Plant Standard, prepared by the Standards Committee on Oils and Lubricants, IPSS 1:9, with the active participation of the representatives of all steel plants and established manufacturers, was adopted in March 1997.

0.2 Inter Plant Standards in steel industry primarily aim at achieving rationalization and unification of technical requirements of consumable stores, parts and sub-assemblies used in steel plant equipment and machinery and provide guidance for indenting them.

0.3 This Inter Plant Standard was originally published in 1978 and it was revised in 1982. In this second revision some modifications have been made in the light of the experience gained in the usage of this standard since its first revision. These modifications pertain to the requirements of characteristics like flash point, pour point, foam stability, demulsibility, ash and timken EP test.

0.4 In this standard two more gradings have been introduced i.e. ISO VG 100 and ISO VG 1000.

0.5 This standard includes all those requirements which would render gear oil to possess anti-oxidation, anti-rust, anti-foam and good demulsibility properties.

1. SCOPE

1.1 This Inter Plant Standard covers the requirements of gear oil used in the steel industry for lubricating heavily loaded bearings, heavy duty mill reducers, pinions and screw downs by both and or pressure circulation systems; all these applications are subjected to large quantities of water, dust, scale, heat and boundary lubrication.

2. GENERAL REQUIREMENTS

2.1 The industrial EP gear oil shall consist of a refined petroleum product with suitable additives and shall be homogeneous and free from water, suspended materials, dust, sediment and any other impurities.

3. GRADING

3.1 Industrial EP gear oil shall be of the following seven ISO grades in conformity with IS 9466:1980 `Viscosity classification for industrial liquid lubricants', based on their kinematic viscosity at 40°C, when tested according to P:25 of IS 1448:1976 `Methods of test for petroleum and its products. However, range of kinematic viscosity will be restricted to ± 10% as per the requirement of the steel plant:

ISO VG No.	*Kinematic Viscosity (in centistokes)*
100	90-110
150	135-165
220	198-242
320	288-352
460	414-506
680	612-748
1000	900-1100

4. TECHNICAL REQUIREMENTS

4.1 The technical requirements for all the grades of the material shall be as given in **Table-1**.

5. PACKING

5.1 The packing shall be done in new and sound steel drums/barrels of 200 litres nominal capacity conforming to IS 1783 (Part 2):1988 `Specification for drums, large, fixed ends: Part 2 Grade B drums (*third revision*)'. The drums/barrels shall be properly sealed against water and contaminants and shall also comply with the provisions of Red Tariff Rules and Rates for the Conveyance by Rail of Explosives and other dangerous goods issued by the Indian Railway Conference Association with any alterations or additions made thereto.

6. SAMPLING

6.1 Representative samples of the material shall be drawn as prescribed in IS 1447:1966 `Methods 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 user 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 drums/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.

9. KEEPING QUALITY

9.1 The keeping quality of the lubricant shall be such that when stored in original sealed container under normal condition, it shall retain the properties given in the specification for not less than one year from the date of manufacture.

TABLE 1

TECHNICAL REQUIREMENTS OF INDUSTRIAL EP GEAR OIL

(Clause 4.1)

Sl No.	Characteristic	Requirement	Method of Test. Ref to [P:] of IS 1448*
1.	Viscosity index, Min	90 for VG 100 to VG 680 85 for VG 1000	P:56 (1980)
2.	Flash point, clevealand (open) cup, °C, Min	200 for VG 100 & 150 220 for VG 220 & 320 230 for VG 460, 680 & 1000	P:69 (1969)
3.	Pour point, °C, Max	-6 for VG 100 & VG 150 -3 for VG 220 & VG 320 0 for VG 460-680 & VG 1000	P:10 (1970)
4.	Foam stability, volume of foam in ml after 10 minutes setting time, Max:		
	a) Sequence I at 24°C	10 |	
	b) Sequence II at 93°C	10 |	P:67 (1982)
	c) Sequence III at 24°C after test at 93°C	10 |	
5.	Demulsibility:		See Note
	a) Percent water in oil after 5 h test, Max	1.0	
	b) Cuff after centrifuging, ml, Max	1.0 for VG 100 to VG 320 2.0 for VG 460 to VG 1000	
	c) Total free water collected during test, ml (starting with 90 ml water), Min	80 for VG 1000 to VG 320 70 for VG 460 to VG 1000	
6.	Acidity, inorganic	Nil	P:2 (1967)
7.	Copper strip corrosion for 100°C for 3 h	Not worse than No.1	P:15 (1976)
8.	Oxidation stability @ 121°C, 312 h, 10 ltrs air/h	Increase in kinematic viscosity at 100°C upto VG 320-6% and above VG 320 not to exceed 10%	See note
9.	Rust Protection	No rust after 24 h with synthetic sea water	P:96 (1990)
10.	Ash, percent by mass, Max	0.1%	P:4 (1984)

11.	a) Timken EP test, OK load, Min	25.0 Kg for VG 100 27.0 kg for VG 150-VG 1000	See note
	b) FZG - Niemann EP test, Pass load Stage, Min	12th load stage	See note

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

Requirement	Standard
Sl No. (5)	ASTM D 2711-1986"`Test for demulsibility characteristics of lubricating oil'.
Sl No. (8)	ASTM D 2893-1988 `Test for oxidation characteristics of extreme pressure oils'.
Sl No. (11)(a)	ASTM D 2782-1977 `Measurement of extreme pressure properties of lubricating fluids (Timke method)'.
Sl No. (11)(b)	IP - 334 : 1993