INTER PLANT STANDARD – STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR SINGLE STAGE HORIZONTAL HELICAL GEARBOXES**	**IPSS: 1-01-012-18 (First Revision)**
	Corresponding IS does not exist	Formerly-: **IPSS: 1-01-012-82**

0. FOREWORD

0.1 Interplant standardization in steel industry has been initiated under the aegis of the Indian Standards Institution (ISI) and the Steel Authority of India Limited (SAIL). The Interplant Standards prepared by the Standard Committee on Mechanical Drives, IPSS 1:1, with the active participation of the representatives of all the steel plants and established manufacturers of Single Stage Helical Gearboxes was adopted by the Approval Committee on Consumable Stores and General Equipment, IPSS 1, on 21st May, 1982. Thereafter, this standard revised by IPSS 1:1, Standard Committee on Mechanical Drives in **November, 2018.**

0.2 Interplant Standards for steel industry primarily aim at achieving rationalization and unification of parts and sub-assemblies used in steel plant equipment and accessories and provide guidance in indenting stores or equipment for existing or new installations by individual steel plants. For exercising effective control or inventories, it is advisable to select a fewer number of sizes (or /types) from among those mentioned in this standard for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

1. Scope

This Interplant Standard covers the requirements of single stage horizontal helical gear boxes, such as centre distance, reduction ratio, power transmitting capacity, principal external dimensions, method of selection and supply conditions.

1.1 The gear boxes covered in this standard shall be of two types:

Type A	-	General
Type B	-	Special

1.2 The internal design features of the gear boxes have not been covered in this standard.

2. Dimensions

2.1 The dimensions of each unit shall be as given in Table 1 for Type A and Table 2 for Type B.

3. Rating

3.1 The unit size, centre distance between input and output shafts, reduction ratio, and power transmitting capacity of gear boxes shall be as given in Table 3 for both Types A and B.

4. Construction

4.1 Gear Box Casing :- The gear box casing shall be made of closed grained cast iron conforming to Grade 260 or above specified in IS :210-1978 "Specification for grey iron castings (third revision)' or of fabricated construction, stress relieved, as agreed to between the suppliers and the users or cast steel 280-520 W as specified in IS :1030-1998 'Specification for carbon steel castings for general engineering purposes (second revision)'. It shall be free from harmful defects. Casing may also be fabricated out of steel conforming to IS 2062-11 'Specification for structural steel (standard quality) (fifth revision)'.

4.1.1 Cast iron gear box casing shall be artificially aged.

4.1.2 The casing shall have at least two lifting lugs suitably located for handling.

4.1.2 Breathers, inspection covers, drain out plugs and dowel holes shall be provided at conveniently accessible locations. There shall be a provision for indicating the level of oil. Dower pins shall be supplied along with the gear box.

4.1.3 The joints of the casing shall be oil tight, dust proof and water proof.

4.1.4 The interior of the casing shall be painted with suitable anticorrosive paint.

4.2 Bearings – The bearings shall be of antifriction type.

4.3 Oil Seals – The oil seals provided shall be such that there is no seepage of oil at the sealing edges and oil seal shall conform to IS-5129. Also see IPSS 1-02-013-18 for reference of Rotary shaft oil seal units.

5. Design

5.1 Gear and Shafts – The manufacturer shall make suitable designs for the gears and shafts of suitable material and heat treatment to suit the load and working conditions.

5.2 Direction of Rotation – All the gear boxes shall be capable of working in any direction of rotation of the input shaft.

5.3 Hold Back Device – There shall be a provision for fixing up a hold back device. If specified by the user.

6. **Lubrication**

6.1 All the gear and bearing shall have adequate lubrication. The temperature of the lubricating oil shall not exceed 20^{o} above ambient temperature. There shall be a provision to avoid mixing of grease with oil in case bearings are grease lubricated.

7. **Selection of Gear Boxes**

7.1 The following methods are suggested :

a) Replacement of an Existing Gear box by a Gear box conforming to this Standard – A power transmitting capacity value is to be selected from Table 3 which is at least equal to the power transmitting capacity of the existing gearbox for the corresponding rev/min of the prime mover shaft, and\

b) Replacement of an Existing Gearbox along with the Prime Mover of Selection of a Gear box for a new Installation – Depending upon the location, intended prime mover and rigour of duty, the service factor of the gear box is to be selected from Table 1 of IS: 7403-1974 (R2001) “Code of practice for selection of standard worm and helical gear boxes. The minimum power is to be calculated by multiplying the selected service factor with the actual power requirement of the driven machine, the nearest higher value of power transmitting capacity would give the other parameters of the gearbox needed.

8. **Designation**

8.1 The single stage horizontal helical gear boxes shall be designated by the following:

a) Type,
b) Unit Size,
c) Reduction ratio, and
d) Input speed

Example – A Single stage horizontal helical gearbox of Type A, unit size S-200, reduction ratio 5:1, input speed 1500 rev/min shall be designated as :

Gear box S-200 x 5:1 x 1500 Type A

9. **Marking**

9.1 Every gear box shall have a name –plate bearing the following particulars:

a) Manufacturer's name, trade-mark and year of manufacture;

b) Designation of the gear box indicating its size, reduction ratio, corresponding input speed power transmitting capacity ; and

c) Manufacturer's serial number.

d) Power rating of gear box in KW

10. **Technical Information**

10.1 Every gearbox shall be accompanied with the following information:

a) Specification and quantity of lubricant,

b) Bearings and oil seals used,

c) List and specifications of other wearing parts, and

d) Maximum permissible overhung load

e) Inspection & Test certificate

10.2 Supplier shall mention moments of inertia (GD^2) value of the gear box in their quotation.

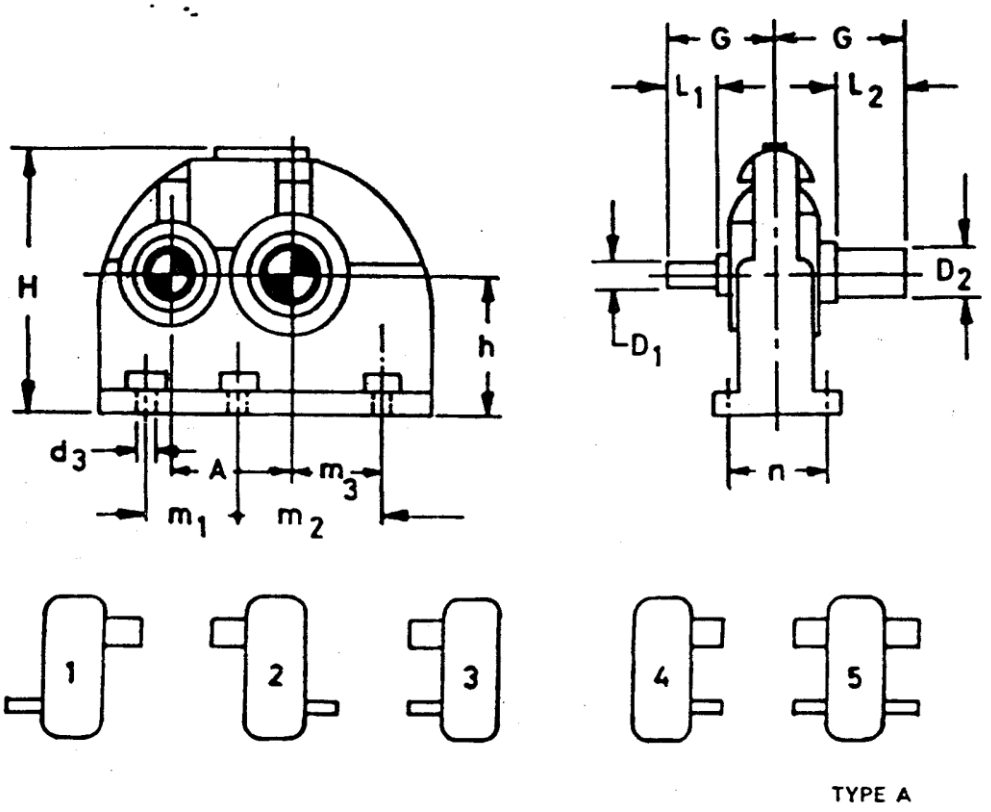
11. **Guarantee**

11.1 The gear box shall be guaranteed by the manufacturer for satisfactory service for a minimum period of 18 months from the date of dispatch of the gearbox and 12 months from the commissioning. The manufacturer shall replace the unit / components free of cost to the satisfaction of purchaser, if any material flaw, poor workmanship or design defect is found during the guarantee period.

TABLE 1 DIMENSIONS OF SINGLE STAGE GEARBOX (TYPE A)

(Clause 2.1)

All dimensions in millimetres.



TYPE A

Size	A	h Max	H Max	Input Shaft				Output Shaft				G	m_1	m_2	m_3	n	ϕd_3	Approx Wt kg
				ϕD_1	W_1	V_1	L_1 Min	ϕD_2	W_2	V_2	L_2 Min							
S-100	100	126	255	24	8	20	60	38	10	33	80	180	200	—	80	110	14	30
S-125	125	160	333	32	10	27	55	45	14	39·5	60	195	290	—	100	130	14	45
S-140	140	180	375	38	10	33	55	50	14	44·5	75	220	290	—	110	145	16	65
S-160	160	200	415	45	14	39·5	60	55	16	49	80	210	340	—	130	180	18	100
S-180	180	225	460	50	14	44·5	75	65	18	58	80	225	370	—	140	200	22	140
S-200	200	250	510	55	16	49	80	80	22	71·5	115	275	410	—	160	210	22	180
S-250	250	315	630	65	18	58	80	90	24	81	160	255	200	200	280	195	26	285
S-280	280	355	705	70	20	62·5	100	100	28	90	180	400	230	315	215	240	30	400
S-320	320	400	790	90	28	81	115	100	28	90	150	505	260	370	240	260	33	550
S-360	360	450	895	100	28	90	130	120	32	109	175	675	300	410	270	300	33	780
S-400	400	500	1 000	100	28	90	130	140	36	128	195	500	320	450	310	340	33	1 040
S-450	450	560	1 105	120	32	109	145	140	36	128	225	560	360	500	335	360	33	1 300
S-500	500	630	1 235	120	32	109	175	170	40	157	250	625	420	560	380	430	46	1 850
S-630	630	710	1 360	140	36	128	210	210	50	203	300	780	560	700	500	510	46	3 600

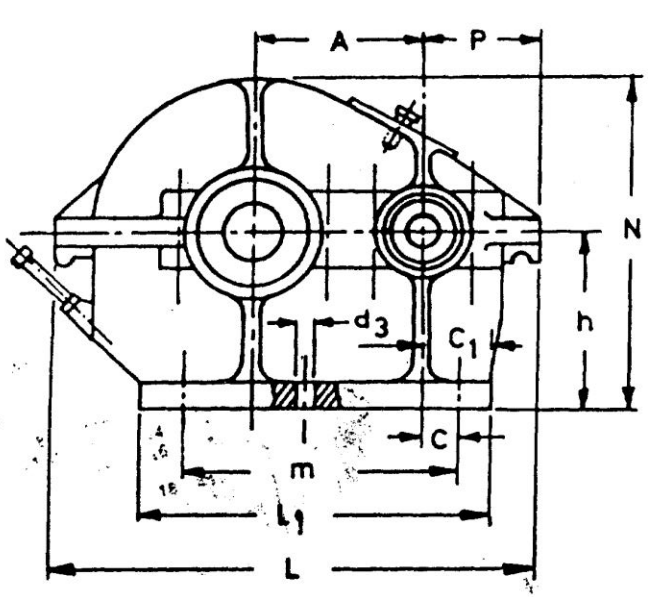
Tolerance on shaft : Up to ϕ 50 mm — kg

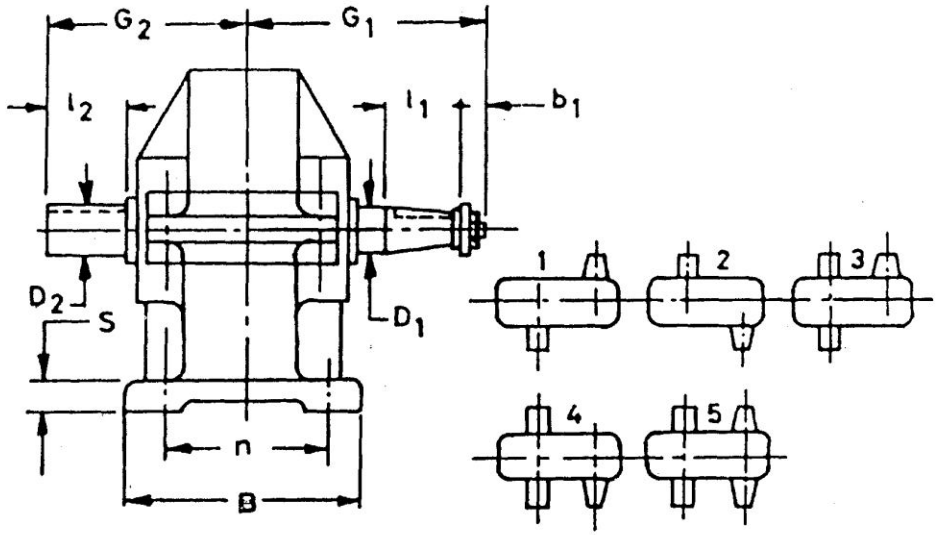
Over ϕ 50 mm — mg

TABLE 2 DIMENSIONS OF SINGLE STAGE GEARBOX (TYPE B)

(*Clause* 2.1)

All dimensions in millimetres.





SCHEME OF ASSEMBLIES

Size	A	h	H	B	L	P	Foundation Base								Input Shaft						Output Shaft					wt in kg
							L_1	C	C_1	Q	m	n	S	d_3	G_1	D_1	l_1	b_1	W_1 H_7	V_1	G_2	D_2	l_2	W_2 H_7	V_2	
S-100	100	125	233	154	340	95	260	30	52	1	170	115	18	15	157	30	60	15	8	105	147	35	55	12	295	39
S-150	150	170	323	190	460	115	330	35	60	1	230	150	22	17	210	40	85	25	12	135	200	55	85	18	47	80
S-200	200	225	423	225	519	142	410	45	70	1	300	180	25	17	260	50	85	25	16	18	245	80	120	28	67	136
S-250	250	265	515	300	715	165	505	45	75	2	190	230	25	25	345	60	108	32	18	215	280	80	120	28	67	250
S-300	300	315	610	330	840	190	580	45	75	2	230	260	30	25	360	60	108	32	18	215	295	80	120	28	67	327
S-350	350	355	697	385	975	290	695	55	95	2	280	315	35	32	412	90	135	35	24	35	393	110	165	36	93	610
S-400	400	400	792	400	1 118	253	870	110	150	2	350	320	35	32	420	90	135	35	24	35	400	110	165	36	93	820

Tolerance on shaft: Up to ϕ 50 mm — kg
Over ϕ 50 mm — kg

TABLE 3 RATINGS OF SINGLE STAGE HORIZONTAL HELICAL GEARBOX

(*Clause* 3.1)

Unit Size	Reduction Ratio	Minimum Power Transmitting Capacity in kW at Input rev/min			
		500	750	1 000	1 500
S-100	1·8 : 1	5·9	8·4	11·5	16·0
	2·8 : 1	4·0	5·3	6·2	9·5
	4 : 1	2·5	3·2	4·0	5·2
	4·5 : 1	2·1	2·7	3·4	4·4
	5·6 : 1	1·5	1·9	2·4	3·2
	6·3 : 1	1·3	1·6	2·0	2·6
	8 : 1	0·9	1·1	1·3	1·7
S-125	3·55 : 1	5·9	7·7	9·3	12·3
	5 : 1	3·5	4·6	5·6	7·4
S-140	4 : 1	6·2	7·5	9·8	14·2
	5 : 1	4·4	5·5	7·3	10·5
S-160	1·8 : 1	26·1	34·3	41·0	52·3
	5 : 1	7·4	9·6	11·9	14·9
S-180	5 : 1	9·3	12·0	15·2	21·9
S-200	1·8 : 1	52·2	68·6	81·3	107·4
	2·3 : 1	41·4	55·2	67·1	85·0
	2·8 : 1	32·8	42·5	51·4	67·8
	3·5 : 1	23·8	31·1	37·3	49·9
	5 : 1	14·9	19·2	22·3	29·8
S-250	1·8 : 1	102·2	179·0	161·8	212·6
	2·3 : 1	79·0	104·4	130·5	167·8
	2·8 : 1	59·6	80·5	100·7	130·5
	3·5 : 1	47·7	61·1	74·6	95·4
	4 : 1	40·2	52·2	62·6	80·5
	4·5 : 1	34·1	44·7	52·9	70·8
	5 : 1	27·9	37·6	44·0	59·6
	5·6 : 1	23·8	31·3	38·0	49·2
	6·3 : 1	20·1	26·4	32·8	41·0
	7·1 : 1	16·7	22·3	26·4	24·3
	8 : 1	13·7	17·9	20·8	27·6
S-280	3·55 : 1	65·5	83·5	101·4	133·5
S-320	3·5 : 1	96·2	119·3	149·2	197·6
	5 : 1	57·4	78·3	93·2	122·3
S-360	5 : 1	84·3	108·1	130·5	171·5
S-400	1·8 : 1	410·3	523·6	671·4	969·8
	2 : 1	369·2	473·7	596·8	895·2
	2·8 : 1	255·1	328·2	410·3	529·6
	3·5 : 1	190·2	246·1	303·6	391·6
	4 : 1	160·3	208·8	257·3	335·7
	4·5 : 1	138·0	180·5	221·5	287·2
	5·6 : 1	96·9	130·5	156·6	205·1
	6·3 : 1	82·0	108·1	128·3	167·8
	8 : 1	55·2	70·8	89·5	111·9
S-450	4·5 : 1	193·9	246·1	335·7	367·0
S-500	5 : 1	164·1	212·6	261·1	339·4
S-360	5 : 1	458·7	604·2	731·0	—
	5·5 : 1	389·4	449·8	619·1	—
	6·1 : 1	272·2	354·3	428·9	555·7
	8 : 1	223·8	283·4	350·6	447·6