INTER PLANT STANDARD – STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR CHAIN WHEELS**	**IPSS: 1-01-017-18 (First Revision)**
	Based on IS : 2403	IPSS: 1-01-017-94

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 Sub-Committee on Hydraulic, Pneumatic and Lubricating Equipment, IPSS 1 : 1, with the active participation of representatives of all the steel plants and established manufacturers of remote control hydraulic jacks was adopted by the Approval Committee on Consumable Stores and General Equipment, IPSS 1, on 30 March, 1984. Thereafter, this standard revised with first revision 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 dimensional requirements of chain wheels suitable to the chains covered by IPSS: 1-01-016-18 “Specification for Drive Roller Chains”.

Note : - This Interplant Standard is generally based on IS: 2403-1991 “Short Pitch Transmission Precision Roller Chains and Chain Wheels (Second revision)” and for convenience of reference, the clause numbers of the Indian Standard for each requirement are given in Appendix A along with the numbers of the matching clauses of this standard.

2. **Nomenclature** – The nomenclature for basic chain dimensions on which all wheels data are based shall be given in Table 1 of IPSS: 1-01-016-18. Chain wheel nomenclature is covered under the respective headings.

3. **Diametral Dimensions of Wheel Rim** – **See Fig.1**

3.1 Measurement Over Pins

3.1.1 The measurement over pins of wheels with even number of teeth should be carried out over pins inserted in opposite booth gaps and shall be equal to d + dR Min.

3.1.2 The measurement over pins of wheels with odd number of teeth should be carried out over pins with tooth gaps most nearly opposite and shall be equal to

$$d \cos\left\{\frac{(90^{O})}{(z)}\right\} + dR\ Min.$$

3.1.3 The limits of tolerance for the measurement over pins are identical to those for corresponding root diameters.

3.1.4 The measuring pin diameter shall be equal to roller diameter (Max) subject to tolerance limit of $+\frac{0.01}{0}$ mm.

3.2 Tolerance for Root Diameter

S No.	Root dia (mm)	Total (MM)
1.	df≤ 127	0 - 0.25
2.	127 < df ≤ 250	0 – 0.30
3.	df >250	h 11

3.3 Axial Runout – The axial run-out measured with reference to the bore and the flat part of the side face of the teeth shall not exceed a value for total indicator reading derived from 0.0009 df + 0.08 mm subject to a maximum of 1.14 mm. For fabricated (welded) wheels 0.25 mm may be accepted when the above formula gives smaller values.

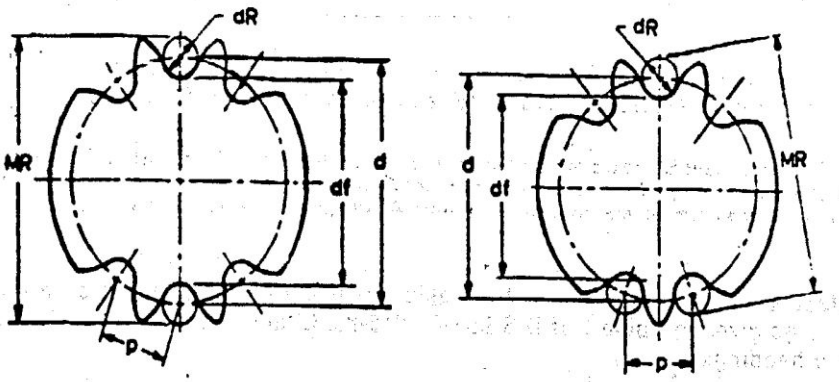
3.4 Concentricity – The total indicator reading between the bore of the chain wheel and the root diameter shall not exceed the value 0.0008 dg + 0.08 mm or 0.15 mm whichever is greater up to a maximum of 0.76 mm.

4. **Wheel Tooth Gap Forms** – See Fig. 2, 3 and 4

5. **Wheel Rim Profile** – **See Fig. 5**

5.1 The value of tooth width of simple chain wheels and multiplex chain wheels shall be as given below:

Dimensions	p 12·7 mm	Tolerance	p 12·7 mm	Tolerance
bf_1 for simple chain wheels	0·93 b_1	h 14	0·95 b_1	h 14
bf_1 for Duplex and Triplex chain wheels	0·91 b_1		0·93 b_1	



EVEN NUMBERS OF TEETH

p = chordal pitch = chain pitch

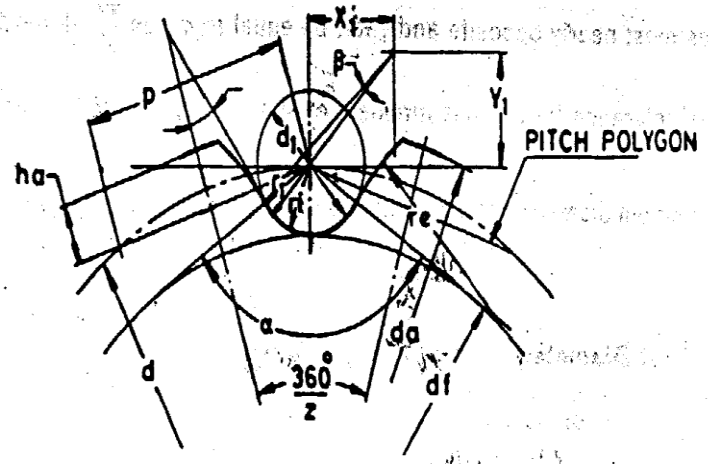
dR = measuring pin diameter
Z = number of teeth

ODD NUMBERS OF TEETH

d = pitch circle diameter $\sin \frac{p}{180}$

df = root diameter
MR = measurement over pins

Fig. 1. DIAMETRAL DIMENSIONS OF WHEEL RIM

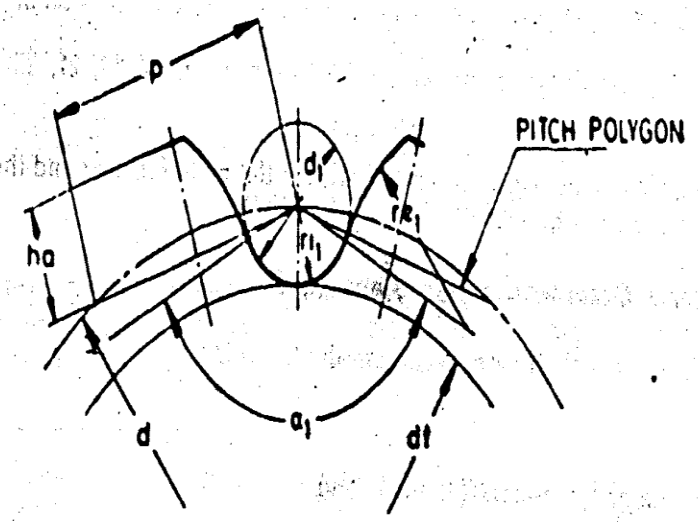


$\beta = 18° - \frac{56°}{Z}$; X_1 $0{\cdot}8d_1 \cos\left[35° + \frac{60°}{Z}\right]$; $r_i = 1{\cdot}302\,5d_1 + 0{\cdot}05$

$\alpha = 17° - \frac{64°}{Z}$; Y_1 $0{\cdot}8d_1 \sin\left[35° + \frac{60°}{Z}\right]$

p = chordal pitch = chain pitch
d = pitch circle diameter
d_1 = roller diameter, Max
ri = roller seating radius
α = roller seating angle
re = tooth flank radius
ha = height of tooth above pitch polygon
da = top diameter
df = root diameter
z = number of teeth

FIG. 2 WHEEL TOOTH GAP FORMS



$ri_1 = 0{\cdot}505\, d_1$

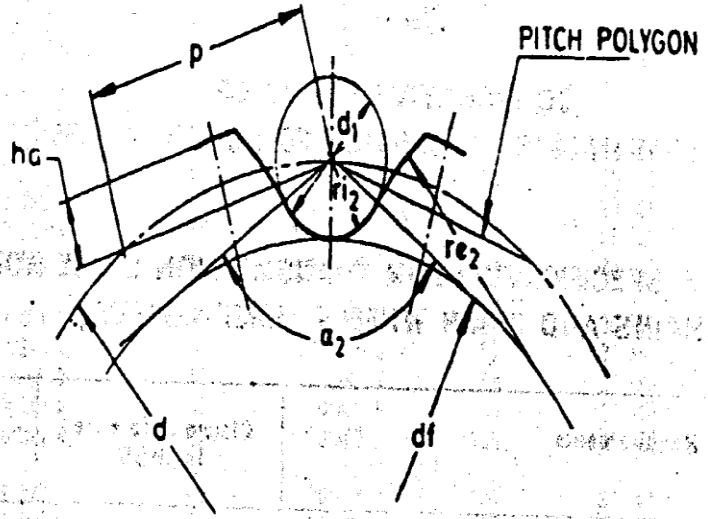
$\alpha_1 = 140° - \frac{90°}{z}$

$re_1 = 0{\cdot}12\, d_1\ (z - 2)$

$ha_{min} = 0{\cdot}5\ (p - d_1)$

$da_{min} = d + p\left(1 - \frac{1{\cdot}6}{z}\right) - d_1$

Fig. 3 MINIMUM TOOTH GAP FORMS



$ri_2 = (0{\cdot}505\, d_1 + 0{\cdot}069^{3}\, d_1)$ mm

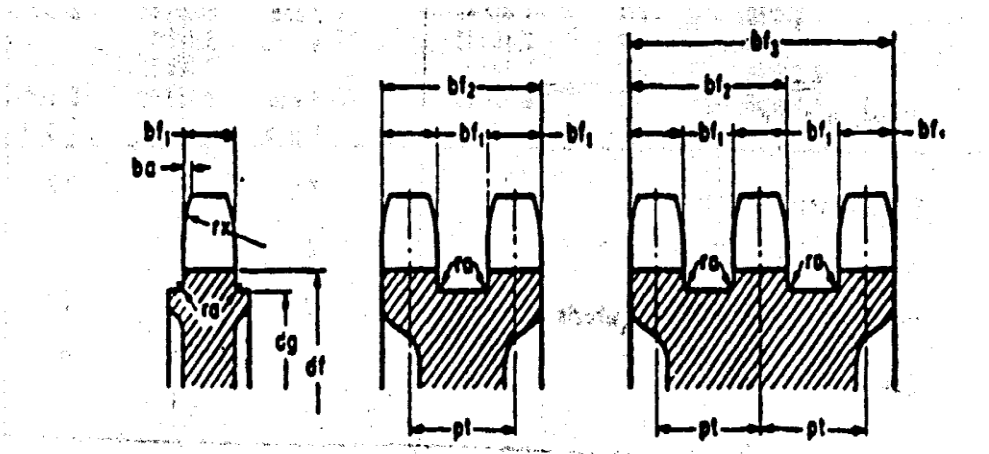
$\alpha_2 = 120° - \frac{90°}{z}$

$re_2 = 0{\cdot}008\, d_1\ (z^2 + 180)$

$ha_{max} = 0{\cdot}625\, p - 0{\cdot}5\, d_1 + \frac{0{\cdot}8\, p}{z}$

$da_{max} = d + 1{\cdot}25\, p - d_1$

Fig. 4 MAXIMUM TOOTH GAP FORMS



bf_1 = tooth width
bf_2 and bf_3 = widths over teeth
rx = minimum tooth side radius = p
ba = tooth side relief
= 0·1 p to 0·15 p *Max*
ra = shroud radius = 1·5 p *Max* for $p \leqslant 35$ mm
= 2·5 p *Max* for $p > 35$ mm
dg = absolute maximum shroud diameter
$= p \cot \frac{180°}{z} - 1{\cdot}05\, h_2 - 1{\cdot}00 - 2\, ra$

df = root diameter of wheels
p = chain pitch
pt = transverse pitch of strands
b_1 = width between inner plates, minimum
h_2 = inner plate depth, maximum

Fig. 5 WHEEL RIM PROFILE

5.2 bf1 and bf2 =(Number of strands of chain–1) x pt + bf1(tolerance h 14 on bf1)

5.3 Range of Teeth – The preferred range of number of teeth shall be 17, 19, 21, 23, 25, 38, 57, 76, 95 and 114.

6. **Bore Tolerances** – Unless otherwise agreed to between the manufacturer and the purchaser the bores shall have a tolerance value of H8.

6.1 Pitch Circle Diameter of Chain Wheels – See Appendix B

7. **Marking** – The chain wheels shall be marked with the following:

a) Number of teeth
b) Manufacturer's name or trade-mark (if any), and
c) Chain designation for which it is suitable.

8. **Packing** – All chains shall be suitably pack3ed and lubricated to ensure protection during transit and store life.

APPENDIX A

(Clause 1)

COMPARATIVE STUDY OF

IPSS: 1-01-017-18 'SPECIFICATION FOR CHAIN WHEELS'

AND IS; 2403-1991 ' SPECIFICATION FOR TRANSMISSION STEEL ROLLER CHAINS AND CHAIN WHEELS (Second Revision)

	Requirements	Clause Reference in IPSS	Clause Reference in ISS
Identical	Nomenclature	2	2
	Diametral dimensions of wheel size	3 and Fig. 1	4 and Fig. 4
	Wheel tooth gap forms	4 and Fig. 2, 3 and 4	5 and Fig. 5, 6 and 7
	Wheel rim puple	5 and Fig. 5	6 and Fig. 8
	Range of teeth	5.3	7.2
	Bore tolerances	6	7.3
	Pitch circle diameter of chain wheels	7	7.4
	Packing	9	9
Selection	–	–	–
Supplementary	Marking	8	10
Deviation	–	–	–

APPENDIX B

(*Clause* 6.1)

PITCH CIRCLE DIAMETER

The following table gives correct pitch circle diameters for wheels to suit a chain of unit pitch (for example 1 mm). The pitch circle diameters for wheels to suit a chain of any other pitch are directly proportional to the pitch of the chain:

Number of Teeth	Pitch Circle Diameter	Number of Teeth	Pitch Circle Diameter	Number of Teeth	Pitch Circle Diameter	Number of Teeth	Pitch Circle Diameter
9	2·923 8	45	14·335 6	81	25·789 6	117	37·246 7
10	3·236 1	46	14·653 7	82	26·107 8	118	37·565 0
11	3·549 4	47	14·971 7	83	26·426 0	119	37·883 3
12	3·863 7	48	15·289 8	84	26·744 3	120	38·201 6
13	4·178 6	49	15·607 9	85	27·062 5	121	38·519 8
14	4·494 0	50	15·926 0	86	27·380 7	122	38·838 1
15	4·808 7	51	16·244 1	87	27·699 0	123	39·154 4
16	5·125 8	52	16·562 2	88	28·017 2	124	39·474 6
17	5·442 2	53	16·880 3	89	28·335 5	125	39·792 9
18	5·758 8	54	17·198 4	90	28·653 7	126	40·111 2
19	6·075 5	55	17·516 6	91	28·971 9	127	40·429 5
20	6·392 5	56	17·834 7	92	29·290 2	128	40·747 8
21	6·709 5	57	18·152 9	93	29·608 4	129	41·066 0
22	7·026 6	58	18·471 0	94	29·926 7	130	41·384 3
23	7·343 9	59	18·789 2	95	30·244 9	131	41·702 6
24	7·661 3	60	19·107 3	96	30·563 2	132	42·020 9
25	7·978 7	61	19·425 5	97	30·881 5	133	42·339 1
26	8·296 2	62	19·743 7	98	31·199 7	134	42·657 4
27	8·613 8	63	20·061·9	99	31·518 0	135	42·975 7
28	8·931 4	64	20·380 0	100	31·836 2	136	43·294 0
29	9·249 1	65	20·698 2	101	32·154 5	137	43·612 3
30	9·566 8	66	21·016 4	102	32·472 7	138	43·930 6
31	9·884 5	67	21·334 6	103	32,791 0	139	44·248 8
32	10·202 3	68	21·652 8	104	33·109 3	140	44·567 1
33	10·520 1	69	21·971 0	105	33·427 5	141	44·885 4
34	10·838 0	70	22·289 2	106	33·745 8	142	45·203 7
35	11.155 8	71	22·607 4	107	34·064 0	143	45·522 0
36	11·475 7	72	22·925 6	108	34·382 3	144	45·840 3
37	11·791 6	73	23·243 8	109	34·700 6	145	46·158 5
38	12·109 6	74	23·562 0	110	35·018 8	146	46·476 8
39	12·427 5	75	23·880 2	111	35·337 1	147	46·795 1
40	12·745 5	76	24·198 5	112	35·655 4	148	47·113 4
41	13·063 5	77	24·516 7	113	35·973 7	149	47·431 7
42	13·381 5	78	24·934 9	114	36·291 9	150	47·750 0
43	13·699 5	79	25·153 1	115	36·610 2	151	
44	14·017 5	80	25·471 3	116	36·928 5		