भारतीय मानक **IS 6834 (Part 2) : 2024**

Indian Standard

कन्वेयर चेन, चेन-पहिये और अटैचमेंट — विशिष्टि

भाग 2 चेन-पहिये

(पहला पुनरीक्षण)

Conveyor Chains, Chain-Wheels and Attachments — Specification

Part 2 Chains-Wheels

(First Revision)

ICS 53.020.30

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Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment Sectional Committee, MED 06

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard (Part 2) was first published in 1976. This revision has been brought out to keep pace with the latest technological developments and the practices followed in conveyor industry and the standard has been brought into the latest style and format of Indian Standards.

This following major modifications have been incorporated in this revision of the standard:

a) A reference clause has been added mentioning the latest version of all the referred standards;

b) Editorial changes have been made;

c) Marking clause has been added.

The specification for conveyor chains, chain-wheels and attachments is in three parts. This standard (Part 2) covers the chain-wheels. Other parts in this series under the general title are as follows:

Part 1 Chain

Part 3 Attachments

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

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 the specified value in this standard.

Indian Standard

CONVEYOR CHAINS, CHAIN-WHEELS ANDATTACHMENTS — SPECIFICATION

PART 2 CHAIN-WHEELS

(First Revision)

1 SCOPE

This standard (Part 2) lays down the requirements for chain-wheels associated with chains used for conveyors.

2 REFERENCES

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

IS No.	*IS Title*
IS 210 : 2009	Grey iron castings — Specification (*fifth revision*)
IS 2048 : 1983	Specification for parallel keys and keyways (*second revision*)
IS 919	Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes:
(Part 1) : 2014/ ISO 286-1 : 2010	Basis of tolerance, deviation and fits (*third revision*)
(Part 2) : 2014/ ISO 286-2 : 2010	Tables of standard tolerance classes and limit deviation for holes and shafts (*second revision*)
IS 6834 (Part 3) : 1976	Technical supply condition for pipe cutters (*first revision*)

3 NOMENCLATURE

It's shall be as given in Fig. 1.

4 MATERIAL

The manufacturing material of the chain-wheels shall be selected to suit design. The suitable materials are grey cast iron conforming to Grade 25 (or superior grade) of IS 210, cast steel or alloy steel with necessary heat treatment as required for the duty conditions.

5 TEETH

5.1 Chain-wheels shall be provided with teeth in accordance with **6** which specifies control criteria to ensure correct meshing, operating and transmission of load given under normal operating conditions. The controls do not necessarily determine the design parameters of conveyor chain-wheels.

5.2 Preferred Tooth Range

The requirements laid down in the standard apply to chain-wheels having teeth from 6 to 40. The following shall be the preferred number of teeth:

8, 10, 12, 16 and 24.

6 DIMENSIONS

6.1 Diametral Dimensions

6.1.1 *Tip Diameter*

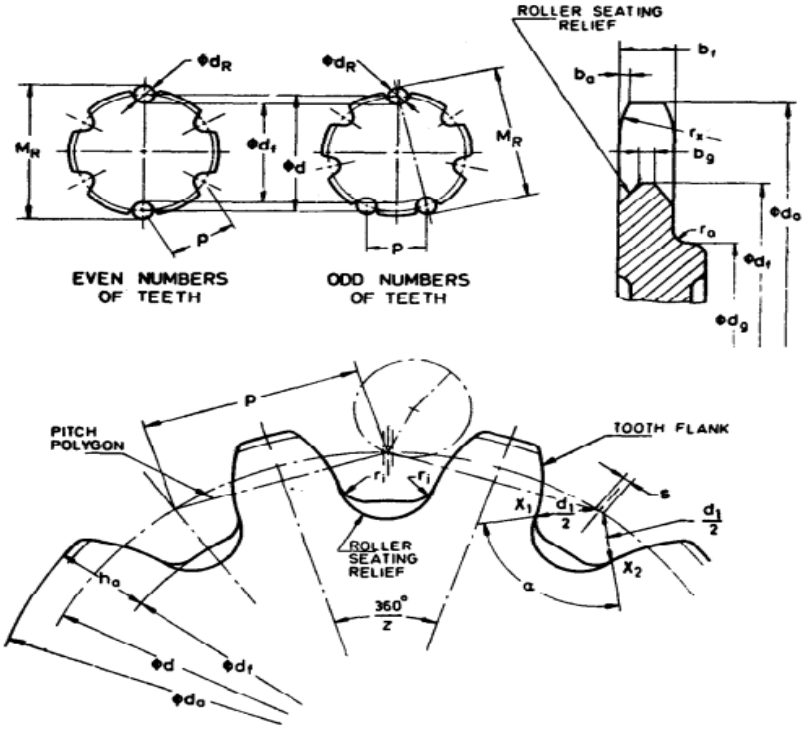
The maximum recommended tip diameter is 3 000 mm.

6.1.2 *Measuring Pin Diameter*

Measuring pin diameter $d_R = d_1$(or $d_4$or d_7 as appropriate) subject to tolerance *h*11of IS 919 (Part 1) and IS 919 (Part 2).

6.1.3 *Pitch Circle Diameter*

Pitch circle diameter $d = p \operatorname{cosec} \frac{180^\circ}{Z}$ (*see* Annex A for nominal dimensions of the normal range of teeth).



Key

b_2 = tooth side relief
b_t = tooth width
b_g = relieved tooth width, minimum
d = pitch circle diameter
d_a = tip diameter
d_t = root diameter
d_g = absolute maximum shroud diameter
d_R = measuring pin diameter
d_1 = plain roller diameter, maximum
d_2 = bearing pin diameter
h_2 = tooth height above bottom diameter
M_R = measurement over measuring pins
P = chordal pitch and is equal to chain pitch
r_a = shroud radius
r_1 = roller seating radius
r_x = minimum tooth side radius
S = pitch line clearance
Z = number of teeth
α = roller seating angle

FIG. 1 NOMENCLATURE FOR CHAIN-WHEELS

6.1.4 *Root Diameter*

Root diameter $d_{tMax} = d - d_1$ (or $d - d_4$, or $d - d_7$as appropriate) subject to limits of tolerance as follows:

Sl No. (1)	*Tooth Form* (2)	*Upper Deviation* (3)	*Lower Deviation* (4)
i)	As cast	0	0.004 3 d_r + 2.6 up to a maximum deviation of 11 mm
ii)	Machine-cut	0	0.000 21 d_t + 0.5 up to a maximum deviation of 0.8 mm

6.1.5 *Measurement Over Measuring Pins*

For even number of teeth $M_R = d + d_R$

For odd number of teeth $M_R = d \cos\frac{90^\circ}{Z} + d_R$

NOTES

1 For a wheel having an even number of teeth, measurement is made over pins inserted in diametrally opposed tooth spaces. For a wheel having an odd number of teeth, measurement is made over pins inserted in tooth spaces most nearly diametrally opposite. During measurement, the pins should always be in contact with corresponding working faces of the respective teeth.

2 The limits of tolerance for the measurement over pins are identical for those according to the corresponding root diameter.

6.2 Tooth Form and Dimensions (Cast Teeth)

The wheel tooth gap is defined taking the following criteria into consideration.

6.2.1 *Working Face*

The working face is the functional part of the tooth form. It is the area which lies between the-lines of contact of-two rollers, the centre line of one lying on the pitch circle and the centre line of the other lying on a circle of diameter:

$$= (p + 0.25\, d_2)\, cosec\, \frac{180^\circ}{Z}$$

unless reduced due to limitations imposed by having all lines inside the adjacent pitch point on the pitch circle.

The working face may be straight or convex.

6.2.2 *Pressure Angle*

The angle between the pitch line of the chain link and the line perpendicular to the working face at the point of roller contact. The pressure angle at any point of the working face shall be as follows:

Sl No.	*Number of Teeth* Z	*Pressure Angle Degrees* *Min*	*Max*
(1)	(2)	(3)	(4)
i)	6 to 7	7	10
ii)	8 to 9	9	12
iii)	10 to 11	12	15
iv)	12 to 13	14	17
v)	14 to 15	16	20
vi)	16 to 19	18	22
vii)	20 to 27	20	25
viii)	28 and above	23	28

6.2.3 *Tooth Height*

When attachments bridge the chain link, the tip of the tooth shall not, project above the chord of pitch circle by an amount greater than 0.8 h_4.

NOTE — h_4 = platform height of *k* attachments [*see* IS 6834 (Part 3)].

6.2.4 *Minimum pitch line clearance*

Minimum clearance, s = 0.04*p* (for as cast teeth) or 0.08 d_1 (for machine-cut teeth).

Maximum roller seating radius

$$r_1\, Max = \frac{d_1}{2} (\text{or } \frac{d_4}{2} \text{ or } \frac{d_7}{2} \text{ as appropriate})$$

6.2.5 *Maximum Roller Seating Radius*

6.2.6 *Tooth Flank*

6.2.6.1 Regardless of the size of the seating radius or whether a straight or curved tooth form is employed, it is essential to achieve clearance at points $X_1$and X_2 of $\frac{d_1}{2}$ (or $\frac{d_4}{2}$ or $\frac{d_7}{2}$ as appropriate) between the pitch line clearance dimension lines and the tooth flank measured along the seating angle dimension lines.

6.2.6.2 Minimum clearance between tooth tip and roller track shall be 0.06 d_1 in all cases including wheels for bush and for small roller chains.

6.3 Tooth Dimensions and Proportions (Machine-Cut Teeth)

The basic dimensions and proportions as specified in **6.1** are applicable. It may be noted that the finer tolerances than for 'as cast' teeth are specified against certain dimensions and these tolerances are given in the appropriate clauses of this standard.

6.4 Dimensions of Wheel Rim Profile

6.4.1 *Tooth Width*

For bush, small and plain roller chains:

$$b_{tMax} = 0.9\, b_1 — 1 \text{ mm}$$

$$b_{tMin} = 0.87\, b_1 — 1.7 \text{ mm}$$

For flanged roller chains:

$$b_{tMax} = 0.9\ (b_1 - b_{11}) - 1 \text{ mm}$$

$$bt_{Min} = 0.87\ (b_1 - b_{11}) - 1.7 \text{ mm}$$

6.4.2 *Minimum tooth side radius*– $r_x = 1.6\, b_1$

6.4.3 *Tooth side relief*– $b_a = 0.16\ b_1$

6.4.4 *Minimum relived tooth width*– $b_g = 0.25\ b_t$

NOTE — Under some conditions of use the material being conveyed may build up in the space between the roller and the tooth and to prevent malfunctioning it is permissible to relieve the roller seating as shown in Fig. 1.

6.4.5 *Shroud radius* — r_a at the discretion of manufacturer.

6.4.6 *Maximum shroud diameter* — $d_g = P\ cot\ \frac{180^\circ}{z} - h_2 - 2r_a$

6.5 General Limits of Tolerance

6.5.1 *Bore Diameter*

Unless otherwise agreed upon between purchaser and manufacturer, bores shall conform to H9 of IS 919 (Part 1) and IS 919 (Part 2).

6.5.2 *Radial Run-Out*

The radial run-out between the bore and the root diameter shall not exceed a value for total indicator reading derived from:

a) for 'as cast' teeth 0.005 d_t or 1.5 mm, whichever is the greater;

b) for 'machine-cut' teeth 0.001 d_r + 0.1 mm or 0.2 mm whichever is the greater; and

c) Radial run-out for machine-cut teeth shall in no case exceed 2 mm.

6.5.3 *Axial Run-Out*

The axial run-out measured with reference to the bore and the flat part of the side face of the teeth shall not exceed the same values for total indicator readings as given in **6.5.2**.

6.5.3.1 Axial run-out for machine-cut teeth shall in no case exceed 2 mm.

7 KEYWAYS

The provision of keyways shall be the subject of agreement between the purchaser and the manufacturer. In case keyways are provided they shall conform to IS 2048.

8 MARKING

8.1 Chain-wheels shall be marked with manufacturer's name and/or trade-mark; the number of teeth and the appropriate chain number for which the chain-wheel is suitable.

8.2 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.

ANNEX A

(*Clause* 6.1.3)

PITCH CIRCLE DIAMETERS

The following table gives correct pitch circle diameters for chain-wheels to suit a chain of unit pitch. The pitch circle diameters for wheels to suit a chain of any other pitch are directly proportioned to the pitch of the chain:

Sl No.	*Number of Teeth*	*Pitch Circle Diameter*	*Number of Teeth*	*Pitch Circle Diameter*	*Number of Teeth*	*Pitch Circle Diameter*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	5	1.701 3	17	5.442 2	29	9.249 1
ii)	$5\frac{1}{2}$	1.849 6	$17\frac{1}{2}$	5.600 5	$29\frac{1}{2}$	9.408 0
iii)	6	2.000 0	18	5.758 8	30	9.566 8
iv)	$6\frac{1}{2}$	2.151 9	$18\frac{1}{2}$	5.917 1	$30\frac{1}{2}$	9.725 6
v)	7	2.304 8	19	6.075 5	31	9.884 5
vi)	$7\frac{1}{2}$	2.458 6	$19\frac{1}{2}$	6.234 0	$31\frac{1}{2}$	10.043 4
vii)	8	2.613 1	20	6.392 5	32	10.202 3
viii)	$8\frac{1}{2}$	2.768 2	$20\frac{1}{2}$	6.550 9	$32\frac{1}{2}$	10.361 2
ix)	9	2.923 8	21	6.709 5	33	10.520 1
x)	$9\frac{1}{2}$	3.079 8	$21\frac{1}{2}$	6.868 1	$33\frac{1}{2}$	10.679 0
xi)	10	3.236 1	22	7.026 6	34	10.838 0
xii)	$10\frac{1}{2}$	3.392 7	$22\frac{1}{2}$	7.185 3	$34\frac{1}{2}$	10.996 9
xiii)	11	3.549 4	23	7.343 9	35	11.155 8
xiv)	$11\frac{1}{2}$	3.706 5	$23\frac{1}{2}$	7.502 6	$35\frac{1}{2}$	11.314 8
xv)	12	3.863 7	24	7.661 3	36	11.473 7
xvi)	$12\frac{1}{2}$	4.021 1	$24\frac{1}{2}$	7.820 0	$36\frac{1}{2}$	11.632 7
xvii)	13	4.178 6	25	7.978 7	37	11.791 6
xviii)	$13\frac{1}{2}$	4.336 2	$25\frac{1}{2}$	8.137 5	$37\frac{1}{2}$	11.950 6
xix)	14	4.494 0	26	8.296 2	38	12.109 5
xx)	$14\frac{1}{2}$	4.651 8	$26\frac{1}{2}$	8.455 0	$38\frac{1}{2}$	12.268 5
xxi)	15	4.809 7	27	8.613 8	39	12.427 5
xxii)	$15\frac{1}{2}$	4.967 7	$27\frac{1}{2}$	8.772 6	$39\frac{1}{2}$	12.586 5
xxiii)	16	5.125 8	28	8.931 4	40	12.745 5
xxiv)	$16\frac{1}{2}$	5.284 0	$28\frac{1}{2}$	9.090 2	—	—

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment Sectional Committee, MED 06

Organization	*Representative* (*s*)
Rites Limited, Gurugram	SHRI R. K. SHARMA **(*Chairperson*)**
Adventure Tour Operator Association, New Delhi	SHRI AJEET BAJAJ SHRI PRADEEP MURTHY (*Alternate* I) SHRI NIRAT BHATT (*Alternate* II)
Bharat Heavy Electricals Limited, Project Engineering Management, Noida	SHRI PANKAJ KAPSIMAY SHRI VIVEK HEMROM (*Alternate*)
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Damodar Ropeways & Infra Limited, Kolkata	SHRI D. L. DAS
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Directorate General of Mines Safety, Dhanbad	SHRI D. B. NAYAK SHRI VIJAY YADAV RAO BARAPATRE (*Alternate*)
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Indian Association of Amusement Parks and Industries, Mumbai	SHRI PRADEEP SHARMA SHRI ANIL PADWAL (*Alternate*)
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Lepton Projects Private Limited, Ghaziabad	SHRI SANJAY KUMAR SHRI PIYUSH RATHI (*Alternate*)
Mecon Limited, Ranchi	SHRI SHRI SATYA PRAKSH SHRI MANOJ KUMAR MAHTO (*Alternate*)
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National Highways Logistics Management Limited, New Delhi	SHRI SUNIL YADAV
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Ropeway and Resorts Pvt Ltd, Kolkata	SHRI BIPLAB DAS SHRI SUDIPTA KRISHANA MANDAL (*Alternate*)

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Usha Breco Limited Ghaziabad	SHRI MANOJ PANWAR SHRI SANJEEV DHARIWAL (*Alternate*)
Usha Martin Limited, Ranchi, Jharkhand	SHRI TUSHAR MUKHERJEE SHRI SANDEEP JAISWAL (*Alternate*)
In Personal Capacity (*BH/V1/SF, VIP Floors Sector 81, DPS Faridabad - 121007*)	SHRI ASHUTOSH BHADRA
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In Personal Capacity (*20 D, Dhakuria Station Road, Kolkata - 700031*)	SHRI RANJAN MUKHERJEE
BIS Directorate General	SHRI K. VENKATESWARA RAO, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (MECHANICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI AMAN DHANAWAT
SCIENTIST 'C'/DEPUTY DIRECTOR
(MECHANICAL ENGINEERING), BIS

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