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IS 8531 (1986): Pulleys for Belt Conveyors [MED 6: Continuous Bulk Conveying, Elevating, Hoisting Aerial Ropeways and Related Equipment]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR
PULLEYS FOR BELT CONVEYORS

(First Revision)

1. Scope — Covers the requirements for pulleys for belt conveyors.

1.1 It does not cover the requirements for pulleys for portable and mobile belt conveyors.

2. Terminology

2.1 The terminology as given in IS : 4240-1984 'Glossary of conveyor terms and definitions' shall apply.

2.2 Edge Clearance of Belt — The edge clearance of a belt is the gap between each edge of the return and carrying belt in their correct position and the nearest obstacle liable to be approached by the edge of the belt.

3. Dimensions

3.1 Nomenclature of dimensions shall be as given in Fig. 1 and in 3.2 to 3.4.

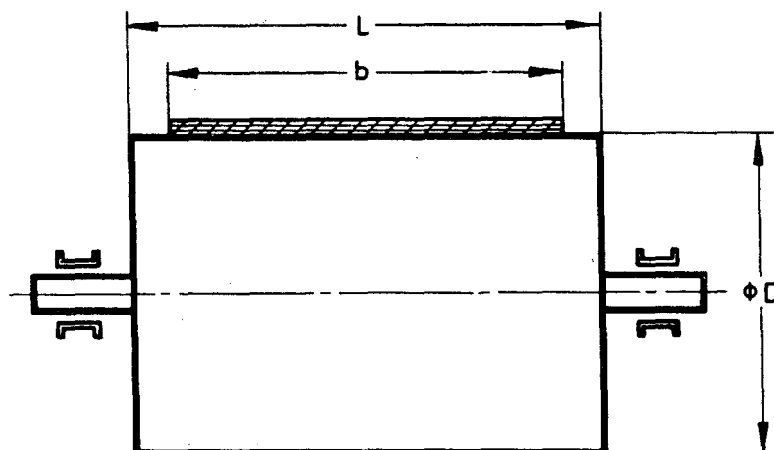


FIG. 1 PULLEY

3.2 Pulley Diameters D — The basic diameter of the pulley shall be one of the followings:

200, 250, 315, 400, 500, 630, 800, 1 000, 1 250, 1 400 and 1 600 mm.

3.2.1 Selection of pulley diameter shall be done as recommended in Appendix K of IS : 1891 (Part 1)-1978 'Specification for rubber conveyor and elevator belting: Part 1 General purpose belting (second revision)'.

3.3 Edge Clearance — Pulleys shall be manufactured such that belts shall have minimum edge clearance of 50 mm up to belt widths (b) of 650 mm : 75 mm for belt widths of 800 and 1 000 mm; and 100 mm for belt widths exceeding 1 000 mm. These edge clearances shall be applicable to conveyor belt speeds not greater than 3 m/s. For conveyor belt speeds greater than 3 m/s, the edge clearances shall be as agreed to between the purchaser and the manufacturer.

3.3.1 For special purpose conveyors and very short installations, it may be necessary to reduce the edge clearance given in 3.2.

3.4 Pulley Face Width (L) — Shall be calculated by the following formula:

$$\text{Pulley face width } (L) = \text{Belt width } (b) + 2 \times \text{Edge clearance}$$

IS : 8531 - 1986

3.4.1 Based on the formula in 3.4 and edge clearance values in 3.3, the values of pulley face widths (L) in relation to belt widths (b) for conveyor belt speeds up to 3 m/s are given below, for easy reference:

Belt Width (b)	Pulley Face Width (L)
mm	mm
300	400
400	500
500	600
650	750
800	950
1 000	1 150
1 200	1 400
1 400	1 600
1 600	1 800
1 800	2 000
2 000	2 200

4. Material — The pulley may be made from the standard tube sizes [see IS : 1161-1979 Specification for steel tubes for structural purposes (*third revision*), IS : 1239 (Part 1)-1979 Specification for mild steel tubes, tubulars, and other wrought steel fittings: Part 1 Mild steel tubes (*fourth revision*) and IS : 3601-1966 Specification for steel tubes for mechanical and general engineering purposes] which are nearest to the basic diameter mentioned in this standard, wherever the requirement of thickness permits. Alternatively pulleys may be manufactured from Grade FG 200 of IS : 210-1978 'Specification for grey iron castings (*third revision*)' or from mild steel conforming to IS : 226-1975 'Specification for structural steel (standard quality) (*fifth revision*)' or conforming to IS : 2062-1980 'Specification for structural steel (fusion welding quality) (*second revision*)'.

4.1 In case the pulleys are fabricated, the welding procedure shall conform to IS : 823-1964 'Code of procedure for manual meta arc welding of mild steel' or IS : 1323-1982 'Code of practice for oxy-acetylene welding for structural work in mild steel (*second revision*)'.

5. Requirements

5.1 Pulley Profile — The pulley surface in contact with the belt may have a flat or crowned profile depending upon the application as agreed to between the purchaser and the manufacturer. Normally crowning is not effective for use with lagged pulley.

5.1.1 When pulleys are crowned the preferred profile of the pulley surface in contact with the belt is an arc of a circle or flat taper surface.

5.1.2 The crowning of 1 to 2 mm per 300 mm of the pulley face width which is crowned, shall be symmetrical about the middle of pulley face width. Crowning shall be calculated by following formulae:

- a) In case the pulley face width is up to and including 1 150 mm, the crowning shall be symmetrical about the middle of the pulley face width and shall start from the centre.

$$C = S \times L/2$$

- b) In case the pulley face is wider than 1 150 mm, pulley face shall be divided into three equal portions, keeping centre portion as straight and providing crowning on both the side portions.

$$C = S \times L/3$$

where

C is crowning reduction in

$$\text{radius} = \frac{D_{\max} - D^{m,n}}{2}$$

S is 1 to 2 mm per 300 mm pulley face width which is crowned.

L is pulley face width.

5.1.3 The pulleys shall be statically balanced

5.2 Pulley Diameter — When determining the basic diameter of a pulley it shall be measured at the centre and shall not include the thickness of any pulley lagging.

5.2.1 The diameter of pulley shall be maintained within the tolerance given below :

All dimensions in millimetres.

Pulley Diameter (D)	Pulley Face Width (L)	
	UP to and Including 650	Above 650
Up to and including 630	+6 -3	+12 -3
Above 630	+12 -3	+15 -3

Note — The out of roundness shall be ± 0.5 percent prior to lagging, if any.

5.2.2 The basic diameter of a crowned pulley shall be taken as maximum diameter excluding lagging, if provided.

5.2.3 The lagging, where provided, shall be as follows:

- For plain rubber lagged pulley, the lagging thickness shall be 6 mm minimum up to 500 mm diameter pulleys and 10 mm minimum for over 500 mm diameter pulleys.
- For grooved rubber lagged pulleys, the depth of the groove shall be 6 mm minimum with 3 mm minimum thickness of material under the bottom of the groove.
- It may not be possible to achieve the exact requirements of crowning on the rubber lagging.

5.2.3.1 The hardness of rubber lagging of the pulley shall be less than that of the cover rubber of the running belt. The value of hardness in shore number shall be as agreed to between the purchaser and the manufacturer. The hardness of rubber lagging may be graded as required for different applications, such as drive, bend and tail point in a conveyor system.

5.3 *Pulley Thickness* — The pulley shell thickness shall be as agreed to between the purchaser and the manufacturer. The actual thickness shall not be less than 90 percent of the agreed thickness as measured at the end.

5.4 *Pulley Face Width* — The tolerance on finished pulley face width prior to rubber lagging, if any, shall be ± 6 mm (see 3.2).

6. *Designation* — A pulley of basic diameter of 400 mm and of face width 600 mm with crowning (C) shall be designated as, 'Belt Pulley 400 × 600 C IS : 8531' and a pulley of basic diameter of 400 mm and face width of 600 mm with rubber lagging (R), shall be designated as, 'Belt Pulley 400 × 600 R IS : 8531'.

7. *Marking* — The pulley shall be marked with the manufacturer's name, and/or recognized trademark, if any.

7.1 *Certification Marking* — Details available with the Bureau of Indian Standards.

EXPLANATORY NOTE

This standard was first published in 1977. The present revision takes care of the changes in the crowning requirements and other industrial practices.

In the preparation of this standard considerable assistance has been derived from the following:

- ISO 1536-1975 Continuous mechanical handling equipment for loose bulk material—Troughed belt conveyors (other than portable conveyors)—Belt pulleys issued by the International Organization for Standardization (ISO).
- BS 2890 : 1973 Specification for troughed belt conveyors issued by the British Standards Institution (BSI).