ANSI/CEMA STANDARD B105.1-2015
(A revision of ANSI/CEMA STANDARD B105.1-2009)
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CEMA Standard B105.1

Specifications for

Welded Steel Conveyor Pulleys

With Compression Type Hubs

Conveyor Equipment Manufacturers Association

The Conveyor Pulley Subsection of the Conveyor Equipment Manufacturers Association has the responsibility for maintenance of this standard.

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FOREWORD

Welded steel conveyor pulleys have been in common use since the 1930's. MPTA formed a Steel Pulley Engineering Committee in 1958 to develop recommended pulley load ratings. This Committee consisted of pulley and conveyor engineers who studied available information on pulley design, theoretical stress analysis, and data from actual tests. All parts of the pulley and shaft assembly were included in the study. In May, 1960, recommended load ratings for standard conveyor pulleys were published.

In June, 1966 - The combined revised standard was approved as B105.1 U. S. STANDARD SPECIFICATION FOR WELDED STEEL CONVEYOR PULLEYS.

In November, 1987 - The standard was transferred to the Conveyor Equipment Manufacturers Association (CEMA). The CEMA Engineering Committee reviewed the standard and decided to revise the method used for determining Drive Shaft diameters so that the method would conform to the ANSI B106.1M-1985 "Design of Transmission Shafting" standard. Also, a run-out tolerance on pulley diameters was added. This industry standard is not intended in any way to limit the design of any manufacturer.

ANSI B106.1M was withdrawn in 1994. 1995, the CEMA Eng. Conference determined that the methods used by this former standard were technically sound and consistent with modern fatigue analysis methods. Therefore, the relevant data from ANSI B106.1M remains incorporated in this standard, and in Chapter 8 of CEMA's Publication "Belt Conveyors for Bulk Materials."

In the 2003 edition, the Conveyor Pulley Subsection:

1) Revised the Scope to clarify that the standard is not applicable to cone clamping keyless locking devices
2) Added Section 2.6 Shaft Run-out
3) Added information to Section 3.2 and a footnote to Table 2 describing the origin of the Load Ratings

In the 2009 edition, the Conveyor Pulley Subsection reviewed the standard and:

1) Added capability to use keyless locking devices in Scope and 3.6 Hub and bushing types
2) Added data and trapezoidal crown to 2.5 Crown
3) Clarified applications where better than standard tolerance is recommended in 2.6 Shaft Run-out
4) Added Section 2.7 limiting belt speed to 800 fpm.
5) Added overload information for 6th belt book into 3.4 Overloads
6) Standard has had selection method and examples intermingled. Created a generic selection method (4.1 – 4.7) and put examples into Appendix IV.
7) Inserted figures and tables in area of use rather than grouped at the end.
8) Reduced maximum PIW to 800 in Table 1 of Section 4.1 Pulley Diameter selection.
9) Added resultant load updates from 6th Belt Book into Section 4.2 and added discussion of use without weight.
10) Created section 4.3 overhung loads, added Appendix III for more background and historical reference.
11) Added overhung load multiplier to section 4.4 Shaft Fatigue.
12) Added Section 4.5 Pulley Fatigue Life.
13) Added overhung load and fatigue factors into Section 4.6 Pulley Selection. Clarified deflection versus stress control in Table 2. Added shaded area to clarify loads potentially exceeding 800 PIW.

In the 2015 edition, the Conveyor Pulley Subsection reviewed the standard and:

1) Metric equivalents and examples added.
2) Added figure 4 and figure 5 in appendix III.
3) Added appendix V describing Mine Duty and Engineered Pulleys.
4) Edited text, references, and tables numbers, for internal consistency and ease of reading
5) Added an index of tables and figures

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1. SCOPE

1.1 This standard applies to a series of straight face and crowned face welded steel conveyor pulleys that have a continuous rim and two end discs each with a compression type hub to provide a clamp fit on the shaft. It is not applicable to single disc pulleys, wing or slat type pulleys, or cast pulleys. This standard applies to pulleys using compression type hubs and high pressure keyless locking assemblies. It does not cover pulleys welded to the shaft.

The standard establishes load ratings, allowable variation from nominal dimensions, permissible crown dimensions and such overall dimensions as are normally necessary to establish clearances for location of adjacent parts. It is not intended to specify construction details, other than as outlined above, nor to establish the actual dimensions of any component parts.

The series of pulley sizes and shaft combinations shown in Tables 5-A and 5-B, and the load ratings shown in Tables 4-A and 4-B, cover the majority of combinations of welded steel pulleys with compression type hubs normally used in belt conveyor and elevator practice. Only the series shown are covered by this standard.

This standard is not intended to provide thorough guidance on shaft design at all potential failure points. The standard is intended to provide a shaft diameter at the pulley connection consistent with other external components such as bearings and drive components. It is assumed that the shaft is a consistent diameter throughout and layout clearances between components are minimized.

1.2 Welded steel conveyor pulleys covered by this standard should not be used with steel cable and other high modulus belts because such belts create stress concentrations and demand manufacturing tolerances beyond the capacities of these pulleys. High modulus belts are defined as those having operating tension ratings greater than 800 PIW (140 kN/m) or a modulus greater than 80,000 PIW (14000 kN/m). Consult your CEMA pulley manufacturer for assistance.

2. DIMENSIONS AND TOLERANCES

2.1 Diameters

Standard welded steel pulley diameters are as shown in Tables 5-A and 5-B. All other sizes are considered special. These nominal diameters apply to straight and crown face pulleys and are for bare pulleys only; they do not include any increase brought about by lagging.

2.2 Diameter Variations

Permissible diameter variations from nominal diameter are based on face width as follows:

FACE WIDTH in (mm)	OVER NOMINAL DIAMETER in (mm)	UNDER NOMINAL DIAMETER in (mm)
12 (305) thru 26 (660)	0.250 (6.35)	0.125 (3.18)
over 26 (660) thru 66 (1676)	0.625 (15.88)	0.125 (3.18)

These limitations apply equally to straight face and crown face pulleys with nominal diameter measured at the midpoint of the face width. The diameter is defined as the bare diameter exclusive of lagging.

Permissible diameter variations listed are not to be considered as diameter run-out tolerances. Listed nominal diameter variation may occur from one pulley to another. Diameter run-out tolerance at midpoint of the bare pulley face is as follows: