ANSI/CEMA B105.1-2003
(Approved November 14, 2003)

CEMA Standard B105.1

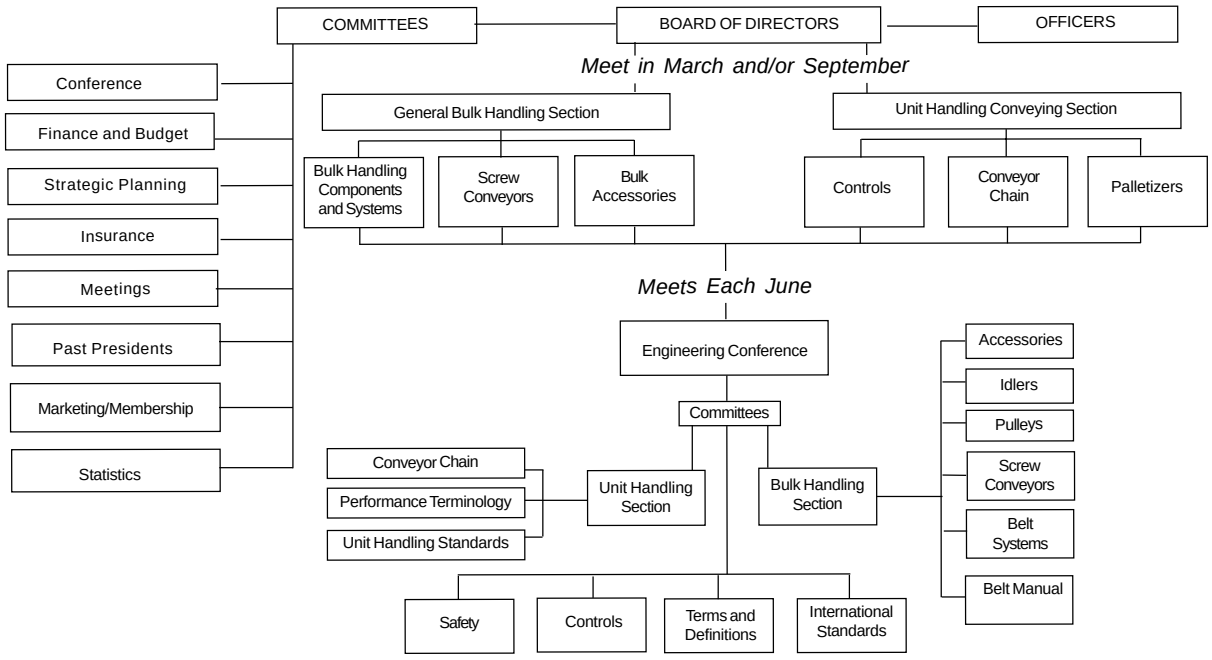
Specifications for

Welded Steel Conveyor Pulleys

With Compression Type Hubs

Conveyor Equipment Manufacturers Association

CEMA ORGANIZATIONAL CHART



For Information on Company Membership
visit the CEMA Web Site at
http://www.cemanet.org

SAFETY NOTICE

The Conveyor Equipment Manufacturers Association has developed Industry Standard Safety Labels for use on the conveying equipment of its member companies.

The purpose of the labels is to identify common and uncommon hazards, conditions, and unsafe practices which can injure, or cause the death of, the unwary or inattentive person who is working at or around conveying equipment.

The labels are available for sale to member companies and non-member companies.

A full description of the labels, their purpose, and guidelines on where to place the labels on typical equipment, has been published in CEMA's *Safety Label Brochure* No. 201. The Brochure is available for purchase by members and non-members of the Association. Safety Labels and Safety Label Placement Guidelines, originally published in the Brochure, are also available free on the CEMA Web Site at http://www.cemanet.org/CEMA_Safety_Pg.htm

PLEASE NOTE: Should any of the safety labels supplied by the equipment manufacturer become unreadable for any reason, the equipment USER is then responsible for replacement and location of these safety labels.

Replacement labels and placement guidelines can be obtained by contacting your equipment supplier or CEMA.

DISCLAIMER

The information provided in this document is advisory only. These recommendations are provided by CEMA in the interest of promoting safety in the work place. These recommendations are general in nature and are not intended as a substitute for a thorough safety program. Users should seek the advise, supervision or consultation of qualified engineers or other safety professionals. Any use of this document, the information contained herein, or any other CEMA publication may only be made with the agreement and understanding that the user and the user's company assume full responsibility for the design, safety, specifications, suitability and adequacy of the system component, or mechanical or electrical device designed or manufactured using this information. The user and the user's company understand and agree that CEMA, its member companies, its officers, agents and employees shall not be liable in any manner under any theory of liability for the user or user's reliance on these recommendations. The users and the user's company agree to release, hold harmless and indemnify CEMA, its member companies, successors, assigns, officers, agents and employees from any and all claims of liability, costs, fees (including attorney's fees), or damages arising in any way out of the use of this information. CEMA and its member companies, successors, assigns, officers, agents and employees make no representations or warranties whatsoever, either express or implied, about the information contained in this document, including, but not limited to, representations or warranties that the information and recommendations contained herein conform to any federal, state or local laws, regulations, guidelines or ordinances.

FOREWORD
and
SUMMARY OF CHANGES

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. The committee has continued its work since then.

October, 1961 - WELDED STEEL CONVEYOR PULLEY STANDARD, which covered the overall dimensions representing standard practice in welded steel conveyor pulley design at that time.

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

November, 1987 - The standard was transferred to the Conveyor Equipment Manufacturers Association (CEMA).

In 1987, 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 runout tolerance on pulley diameters was added. This industry standard is not intended in any way to limit the design of any manufacturer.

> Note: ANSI B106.1M was withdrawn in 1994. In 1995, the CEMA Engineering 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 1992 The Standard was published as ANSI/CEMA B105.1-1992 (Revision and Redesignation of ANSI B105.1-1983) Approved August 24, 1992.

In 2002, the Conveyor Pulley Subsection reviewed the standard and:

1) Revised the Scope to clarify that the standard is not applicable to cone clamping keyless locking devices
2) Added Section 2.6 Shaft Runout
3) Added information to Section 3.2 and a footnote to Table 2 describing the origin of the Load Ratings
4.) Corrected typo in Table 2 Diameter 10 last item 26 to read 36.

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

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WELDED STEEL CONVEYOR PULLEY STANDARD

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. It does not cover pulleys welded to the shaft or high pressure keyless locking assemblies.

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 Table 3 and the load ratings shown in Table 2 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.

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.***

2. DIMENSIONS AND TOLERANCES

2.1 Diameters: Standard welded steel pulley diameters are as shown in Table 3. *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 (inches)	OVER NOMINAL DIAMETER (inches)	UNDER NOMINAL DIAMETER (inches)
12 thru 26	1/4	1/8
over 26 thru 66	5/8	1/8

These limitations apply equally to straight face and crown face pulleys.

The nominal diameter is measured at the midpoint of the face width.

The diameter is defined as the bare diameter exclusive of lagging.

The permissible diameter variations listed are not to be considered as runout tolerance on diameter. The listed variation in nominal diameter may occur from one pulley to another. Runout tolerance on diameter is measured at the midpoint of the bare pulley face and is as follows:

Diameters	Maximum total indicator reading
8" thru 24"	0.125
30" thru 48"	0.188
54" thru 60"	0.250

2.3 Face Width Variations: Permissible face width variation from nominal face width is plus or minus 1/8 inch for all sizes. Face width is defined as the length of the rim along the shaft axis.

The permissible face width variation is not to be construed as an edge runout tolerance. The listed variation in face width may occur from one pulley to another. Edge runout tolerance is specified by the individual pulley manufacturers.

2.4 Clearance Along the Shaft: The distance between the outer faces of the hubs shall never exceed the overall pulley face width.

2.5 Crown: Crown is defined as the amount (expressed in inches) per foot of total face width by which the diameter at the center of the face exceeds the diameter at the edge. The amount of crown may be from 1/16 to 1/8 inch per foot of total face width.

2.6 Shaft Runout: The shaft extension runout is measured from the bearing journals after the shaft is installed in the pulley. Radial shaft extension Total Indicator Reading (TIR) shall not exceed 0.002 inch per inch of shaft extension beyond the bearing center. Typically bearings will introduce an additional runout, which is not included in this limit.

3. PULLEY SELECTION - GENERAL INFORMATION

3.1 Pulley Diameter and Face Width: The following selection procedures assume the pulley diameter and face width have been established consistent with belting and conveyor design requirements.

3.2 Ratings: The tabulated ratings for pulley and shaft combinations are based on the use of non-journalled shafting with pulleys centrally located between two bearings. Ratings are based on SAE 1018 shaft material using either a maximum shaft bending stress of 8000 psi or a maximum free shaft deflection slope at the hub of 0.0023 inches per inch (tan of 8 min.), whichever governs. (See Appendix II for shaft deflection formula.)