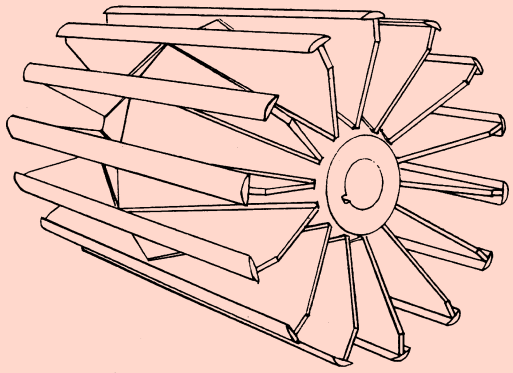
BSR/CEMA 501.1-2003 (R2009)
(Reaffirmation of ANSI/CEMA 501.1-2003)
Approved: March 26, 2009)



CEMA Standard 501.1

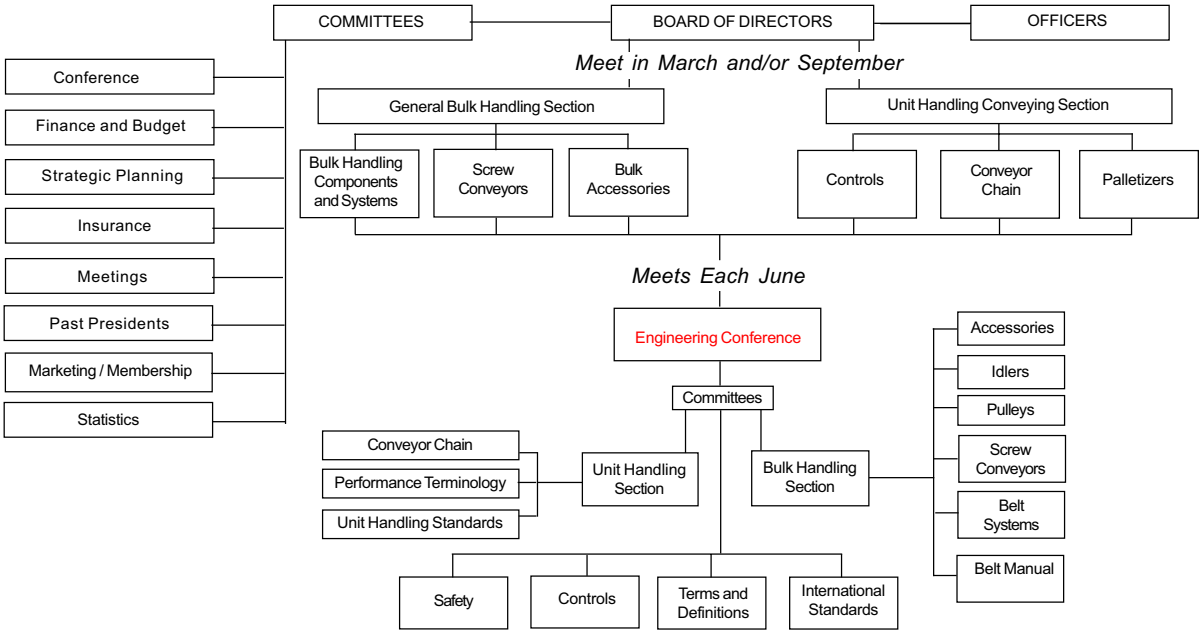
Specifications for

Welded Steel Wing Pulleys

Conveyor Equipment Manufacturers Association

ISBN 978-1-891171-37-6

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.

Note - CEMA Has Reaffirmed the 2003 Edition.
This 2009 Edition is Identical to the 2003 Edition

SUMMARY OF CHANGES IN 2003 EDITION

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 3, describing the origin of the Load Ratings

4) Made Section 3 consistent with CEMA Standard B105.1 - Specifications for Welded Steel Conveyor Pulleys with Compression Type Hubs.

CEMA Standard No. 403-2003 (R2009)
Reviewed by the
Unit Handling Section
of the
CEMA Engineering Conference

Specifications for Welded Steel Wing Pulleys

1. SCOPE

1.1 This Standard applies to a series of straight face and crown face welded steel wing pulleys which have a number of steel wing plates that extend radially from the longitudinal axis of two compression type hub assemblies and are equally spaced about the pulley circumference. The purpose of the compression type hubs is to provide a clamp fit on the shaft. The wings are supported or joined by welded steel plates so arranged as to form the shape of two frustums of cones or regular pyramids being joined at their bases. A bar of sufficient radius is attached to the outer longitudinal edge of each wing to provide more contact area with the belt.

This standard is restricted to pulleys which do not transmit torque. This standard is not applicable to pulleys with continuous (uninterrupted) rims, 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.

This 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.

The pulley diameters, face widths and shaft sizes shown are those that are nominally used in current belt conveyor and elevator practice. These only are covered by this standard; all other sizes and capacities are not covered by this standard.

1.2 Welded steel wing 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 wing pulley diameters are 8, 10, 12, 14, 16, 18, 20, 24, 30 and 36 inches. 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 variations from nominal diameter are based on face width as follows:

FACE WIDTH (inches)	OVER NOMINAL DIAMETER (inches)	UNDER NOMINAL DIAMETER (inches)
8 thru 26	1/8	3/8
over 26 thru 66	1/8	3/4

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 any lagging.

The permissible diameter variations listed are not to be construed as runout tolerance on diameter. The listed variation in nominal diameter may occur from one pulley to another. Runout tolerance on diameter shall not exceed 3/16" total indicator reading for all pulley diameters.

2.3 FACE WIDTHS: Standard welded steel wing pulley face widths are 12, 14, 16, 18, 20, 22, 26, 32, 38, 44, 51, 57, 63, and 66 inches. All other sizes are considered special.

2.4 FACE WIDTH VARIATIONS: Permissible face width variation from nominal face width is ± 1/4" for all sizes. Face width is defined as the length of the wing or contact bar 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 shall not exceed 1/4" total indicator reading for all pulley face widths.

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 inches 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 INSTRUCTIONS

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 using non-journalled shafting thru the pulley hubs, with pulleys centrally located between two bearings. Ratings are based on SAE 1018 shaft material using either a maximum shaft bending stress of 6000 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.)

Pulleys used on shafting selected with a bending stress greater that 6000 psi, or a slope exceeding 0.0023 inches per inch, are special and are not covered by this standard. High strength shafting is of value in some cases where it may permit turning down the shaft ends to allow the use of smaller-diameter, high-capacity anti-friction bearings.
The allowable shaft load in the rating tables must not be exceeded.

3.3 OVERLOADS: Normal running loads should not exceed ratings in the load tables. Starting and occasional peak loads should not exceed ratings by more than 50 percent. Overloads may result from such causes as starting, jam-ups, screw take-ups, backstops, misalignment and excess amounts of material on the belt.

3.4 BELT SPEED: The maximum belt speed for welded steel pulleys shall not exceed 450 feet per minute. (For conveyor speeds in excess of the maximum, the manufacturer should be consulted.)

4. SELECTION OF PULLEY SIZE

4.1 DETERMINATION OF ACTUAL RESULTANT RADIAL LOAD: The resultant radial load is the vector sum of the belt tensions, pulley weight and the weight of the shaft. The forces from the weights always act downward and the forces from the belt act in the path of the belt and away from the pulley. In most cases, a graphical solution, as illustrated in Fig. 1 is a simple means of obtaining the resultant load.

WHERE:

T_3 = Tension (non-driving pulleys), pounds.

W = Weight, pounds.

R = Resultant radial load, pounds.

Fig 1. GRAPHICAL SOLUTION OBTAINING RESULTANT RADIAL LOAD