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BSR/CEMA 501.1-2003 (R2009)
Reaffirmation of ANSI/CEMA 501.1-2003
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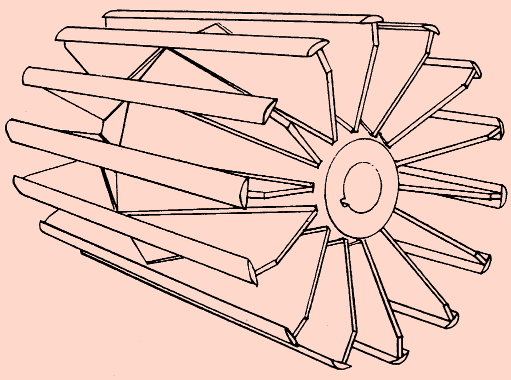

CEMA Standard 501.1

Specifications for

Welded Steel Wing Pulleys

Conveyor Equipment Manufacturers Association

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CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION
(CEMA)

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END

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

FOREWORD
and
SUMMARY OF CHANGES

These recommended load ratings should be of benefit to the entire industry and, in particular, establish a basis for economical pulley selection. This standard is not intended in any way to limit the design of any manufacturer.

In 1966, the Wing Pulley Subcommittee of the Mechanical Power Transmission Association (MPTA) was formed to study a recommended standard for pulley load ratings and dimensions. This committee, composed of pulley and conveyor engineers, studied the available information on pulley design and theoretical stress analysis and data from actual tests. All parts of the pulley and shaft assembly were included in this study. This standard was later approved as ANSI/MPTA 501-1977 and was subsequently revised MPTA 501.1-1984.

In November, 1985 the standard was transferred to the Conveyor Equipment Manufacturers Association (CEMA). The Conveyor Pulley Subsection of the Conveyor Equipment Manufacturers Association was assigned the responsibility for maintenance of the standard.

On January 27, 1988 the standard was approved as ANSI/CEMA 501.1-1988.

In 1995 CEMA reviewed the document and determined that no changes were required. It was reaffirmed as an ANSI/CEMA Standard in 1996.

In 2003, the Conveyor Pulley Subsection reviewed the standard and and made four changes. The document was subsequently approved as ANSI/CEMA 501.1-2003. See next page for a summary of the changes.

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

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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.)