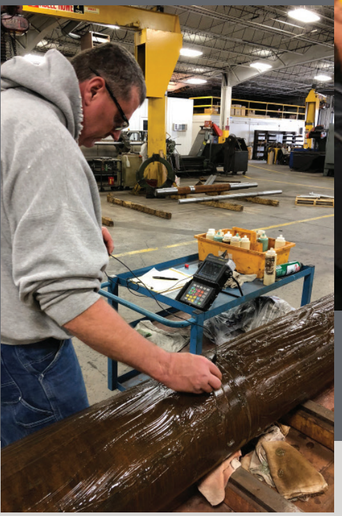
INSPECTION AND TESTING FOR TURBINE PULLEYS

- All welds are ultrasonically inspected to AWS D1.1. Ultrasonic testing of materials and weldments are performed prior to thermal stress relief to ensure internal soundness of the materials.
- All welds are magnetic particle inspected over their entire length in accordance with ASTM E-709. Magnetic particle testing of materials and weldments are performed after thermal stress relief. Magnetic particle testing ensures the pulley materials are free of cracks or defects on the machined weld surfaces.



Note: If rim shell materials are stainless-steel the ultrasonic inspection may be replaced with radiography and magnetic particle inspection replaced with liquid dye penetrant inspection.

PPI has the expertise to design and build some of the largest pulleys in the world. With an in-house engineering group comprised of more than ten experts focused exclusively on pulley design, PPI has the capacity to handle any project.

ENGINEERING REVIEWS INCLUDE:

- Shaft design and material selection
- Drum design
- Ceramic lagging selection and torque capacity analysis
- Overhung load analysis
- Bearing selection, housing selection and standardization
- In-depth conveyor design and spares reduction

PPI has developed a unique Finite Element Analysis program, PFEA. PFEA is an axisymmetric model with non-axisymmetric loading using Fourier series. This model can perform complete analysis for loading in any and all of the three directions in a cylindrical model. PFEA has brought new understanding to the dynamics of a conveyor pulley system. Understanding how stresses will affect the life of a pulley is where our IP-Life analysis comes into play. The unique combination of PFEA and IP-LIfe Analysis gives our engineers state of the art tools to design World Class High Tension Pulleys.

PPI uses the proprietary PFEA design tool for all custom designed, engineered class pulleys.

www.ppi-global.com | sales@ppi-global.com

PUL 010-02

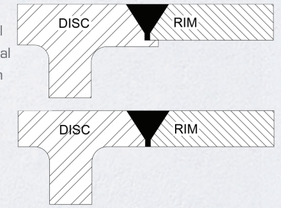
05/21

ENGINEERED PULLEYS

WHEN CUSTOMERS NEED THE ULTIMATE IN RELIABILITY AND STRENGTH, THEY RELY ON PPI ENGINEERED PULLEYS FOR THEIR CONVEYOR SYSTEMS. PPI ENGINEERED PULLEYS ARE DESIGNED, DEVELOPED AND TESTED BASED ON CUSTOMER SPECIFICATIONS. PPI MAKES SOME OF THE LARGEST PULLEYS IN THE WORLD.

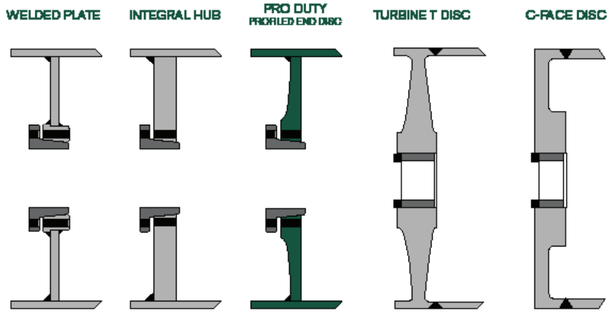
WELD JOINTS

When fabricating turbine pulleys, one of two weld joint styles will be used. PPI Engineers analyze each pulley to determine the ideal weld based on the pulley size, materials of construction, position in the conveyor and application. The custom design process ensures a competitively priced, extremely reliable pulley.



END DISCS

In a high-tension application, the pulley experiences a very high load transmitted from the belt down through the shaft. By controlling the shaft deflection, loading on the end disc and rim is minimized. PPI manufactures the following types of end discs, for high-tension applications we recommend the Turbine "T" or "C" face disc. The choice will be determined by the load, economic factors and customer preference.



PROFILED END DISC

Profiled end disc pulleys can be used in light aggregate applications to the toughest quarry and mining operations. Profiled end discs are machined from solid steel with an integral hub rather than using a welded hub. Removing the welded hub eliminates the most common cause of pulley failure.

TURBINE PULLEYS

The ultimate in reliability, ideal for tensions over 100,000 pounds or shafts greater than 12 inches. Smooth machined end disc with solid steel construction. Rim weld located in lower stress area. Designed with dynamic stress/life modeling for optimized welds. Joint preparation, pre-heat, and welding to AWS specifications.

Two of the most common types of Turbine pulleys are "T" end and "C" end, referring to the shape of the disc. Customers with high tonnage steel cable belt systems have tensions that can exceed 200,000 pounds. These systems require a special pulley designed to minimize stresses.

FITTINGS

- Locking elements are self-locking, self-centering and sized to transmit the required torque and bending moment per manufacturer's recommendations. Keyless locking assemblies hold the shaft securely, are easier to install and remove and are designed to transmit torque without using a keyway
- Line boring improves hub alignment and shaft run-out
- Protective cover plates are standard for pulleys utilizing B115, B112, B113 and B117 (or approved equals from other manufacturers) locking devices. Pulleys with B106 type devices will only have them when requested by the customer

RIM

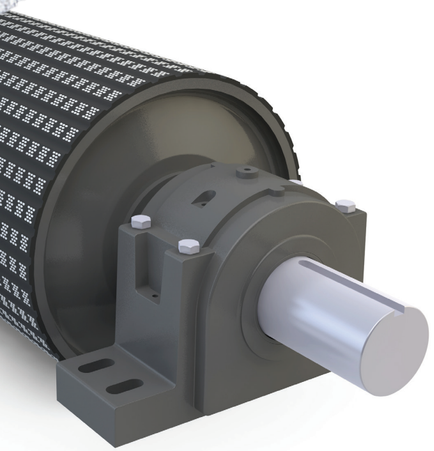
Because the rim experiences the full belt tension, every turbine pulley rim is individually analyzed for stresses generated by the tension as well as the wrap of the belt. Since the rim is also the connector to the end discs, those joints are also closely examined, and welds are ultrasonically inspected. Typically, the rim will be machined to ensure concentricity between the rim and the shaft.

BENEFITS OF "T" END AND "C" END TURBINE PULLEYS

- Ultimate reliability
- Smooth machined end disc from a solid piece of steel
- Rim weld moved away from the stress concentration into a lower stress area
- Machined to 0.030" TIR
- Full penetration weld
- Thermal stress relieved
- Static balanced

ADDITIONAL BENEFITS OF A "C" END TURBINE PULLEY

- Lower stress at weld allowing integral back up
- No internal welding or grinding
- More efficient use of hub width
- Less rim thickness needed
- More efficient end disc machining



FEATURES AND BENEFITS

- Machined end disc made from solid single piece of steel
- Rim machined to within 0.030" Total Indicator Run-out (TIR)
- Full penetration welds
- Thermal stress relieved
- Static balancing included on all turbine pulleys and is in accordance with ISO Standard 1940-1973 E Grade G40
- All welds inspected using magnetic particle and ultrasonic methods