Manage Your Marine and Industrial Lifting Needs with Confidence

Versatile Blocks and Sheaves Designed for Today's Demanding Applications

Blocks and sheaves play a crucial role in a variety of applications throughout the manufacturing, marine, construction, agriculture, commercial, industrial, food processing, theatrical, and transportation industries. They are typically used in applications that require a change in the direction of a pulling force or to lift loads. As applications and uses continue to evolve, the need for a versatile, robust, and long lasting product line of block assemblies has emerged.

PULLPRO® premium blocks and sheaves are available for fibrous or wire rope and are comprised of only the highest quality raw materials. The blocks feature grade 316 stainless steel forged attachments for strength and fatigue resistance and can be configured in a variety of ways within the 316 stainless steel universal heads. Polished 316 stainless steel cheeks add durability to the blocks and ensure that they will hold up under harsh conditions in challenging environments. The polished cheeks feature the wire or fibrous rope size, working load limit and Suncor logo permanently stamped into the side. A stainless steel locknut allows for sheave removal for premade wire or fibrous rope installation as well as sheave serviceability and maintenance. The sheaves are constructed from 316 stainless steel for maximum corrosion resistance and durability and incorporate precision machined grooves to increase wire longevity. They feature either lead free bronze bushing or 440C hardened stainless steel ball bearing type hub styles. CNC precision machined stainless steel spacers are included with most of the bronze bushing style sheaves allowing the sheave to suit multiple shaft sizes.

Features and Benefits

Five Different Attachment Types

PULLPRO® blocks are available with five different attachment types, allowing the user to choose an assembly that meets the needs of their application. Attachment types include a forged swivel eye, forged D shackle, forged bow shackle, machined bolt head, and a forged swivel hook (*Figure 1*).

The forged swivel eye attachment is ideal for applications where there will be rotation when moving or picking up a load. The ability to rotate allows the assembly to self-align ensuring proper cable leads to avoid chafe. The forged eye can be hung from a variety of attachments including hooks, screws, rods, shackles, or bolts.

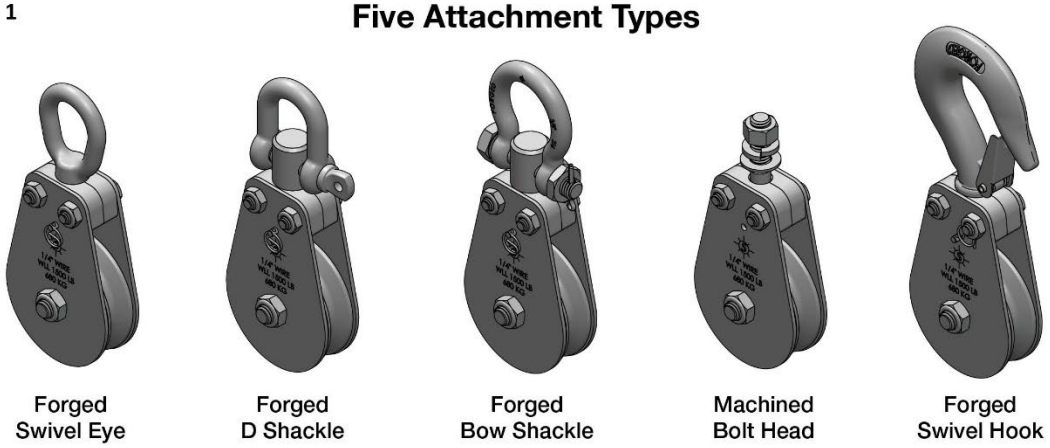
The forged D shackle attachment is a non-permanent, temporary attachment used for lifting or transferring objects. The D Shackles screw pin allows for easy temporary installation. The attachment can be made permanent by securing the screw pin with lashing wire. The shackle bail and pin are the same diameter.

The forged bow shackle is a permanent attachment. It is typically used in applications where the block assembly is mounted up high and/or out-of-reach. The bow shackle features a bolt and nut which is permanently secured into place with a cotter pin. The shackle bail and pin are the same diameter.

The machined bolt head is a permanent, fixed attachment that is supplied with a flat washer, split washer, and hex nut. This type of attachment is ideal in applications where the load pull direction is in line with block assembly and swiveling is not required. It is attached by through-bolting onto support structures. The machine bolt head fits into a hex recess built into the block head design to lock the bolt into place while fastening the hex nut.

The forged swivel hook is ideal for applications requiring a quick, removable attachment with rotation. Hook is heavy duty to meet the WLL of the block assembly and features a spring-loaded latch for added safety.

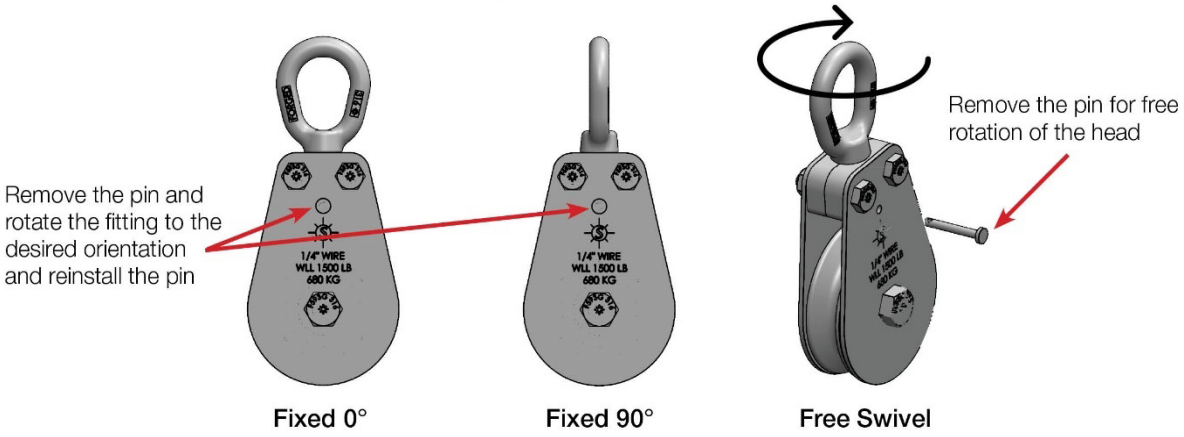
Figure 1



Three-Way Head Configuration

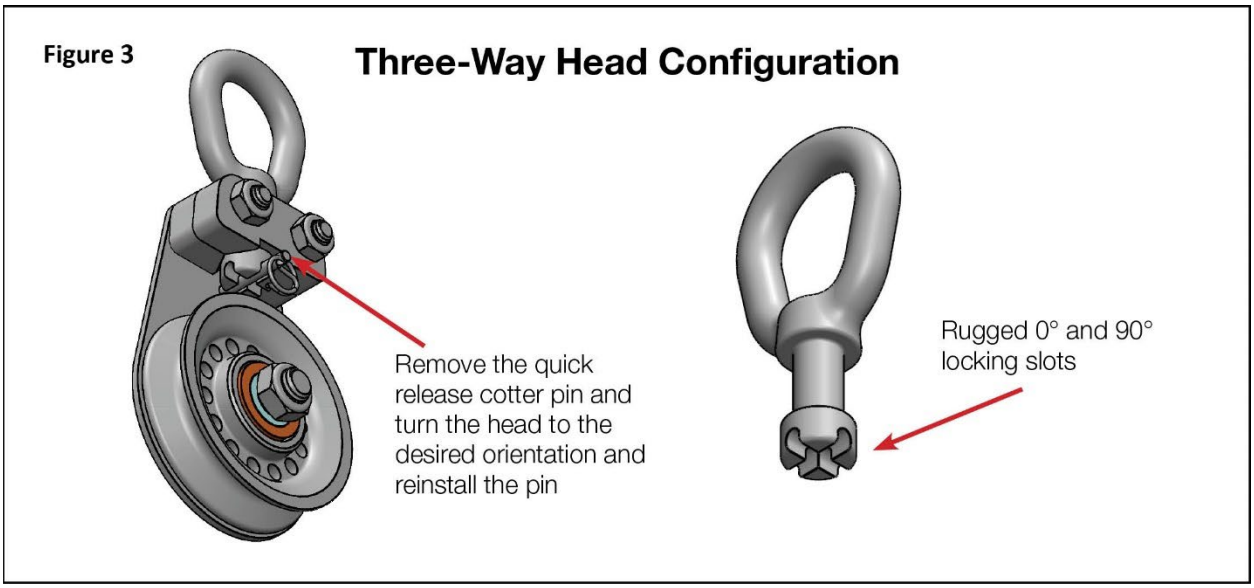
PULLPRO® blocks feature a unique three-way head configuration that allows a single block to offer versatility and multiple usages (*Figure 2*). While competitor's products would require three independent blocks to achieve multiple head configurations, PULLPRO® blocks offer the versatility of utilizing one block. As a result, users can stock a reduced inventory and provide greater options for changes in the field without having to swap out the block for another configuration. The ability to make on site changes immediately saves time and permits the project to be completed without having to order replacement blocks.

Figure 2



For quick configuration adjustments on site without tools, simply remove the quick release cotter pin and reposition the attachment to a fixed 0° or fixed 90° position and reinstall the pin. A free swivel mode can be accomplished by removing the cotter pin completely. Rugged and durable 0° and 90° locking slots have been built into the forged swivel eye, forged D shackle, forged bow shackle, and

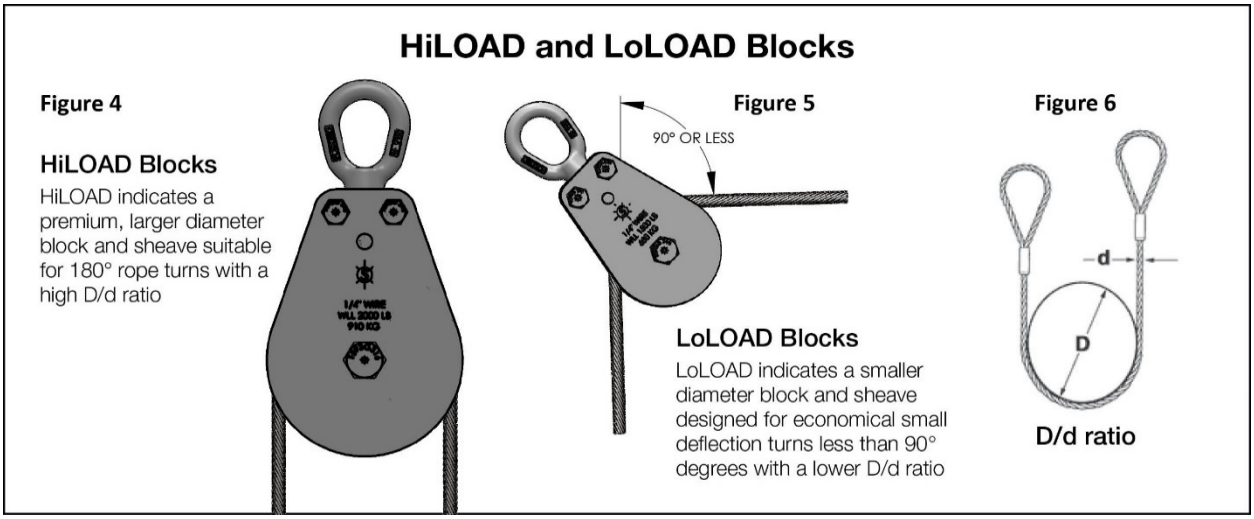
forged swivel hook attachments to ensure safe and reliable operation from either configuration setup (*Figure 3*).



Block Design: HiLOAD and LoLOAD Options

When selecting a block, it is critical to understand the design and components. The design, quality of components used, sheave, working load limits, annual usage, and application will play a major factor in the quality, safety, and lifespan.

PULLPRO® premium stainless steel blocks were designed with versatility as a key feature with blocks available in a variety of sizes for today's demanding applications. Historically, end users have been limited by block and sheave offerings and large diameter block assemblies are often used in situations where a smaller, less expensive block assembly would meet the demands of the application. As a result, the PULLPRO® block offering includes HiLOAD (*Figure 4*) and LoLOAD (*Figure 5*) blocks for wire rope applications. HiLOAD indicates a premium, larger diameter block assembly suitable for 180° rope turns with a high D/d ratio, which is the ratio of the diameter around which the rope is bent, divided by the body diameter of the rope (*Figure 6*). LoLOAD indicates a smaller diameter block assembly designed for economical small deflection turns less than 90° with a lower D/d ratio.



The LoLOAD block assemblies are available for 3/16”, 1/4”, 5/16”, and 3/8” wire rope sizes and the HiLOAD block assemblies are available for 1/8”, 3/16”, 1/4”, 5/16”, and 3/8” wire rope sizes. Fibrous rope block assemblies are also available with either bronze bushing or stainless steel ball bearings and are available for 3/8”-7/16”, 1/2”, 5/8”, 3/4”, and 1” fibrous rope sizes. Block assemblies with a ball bearing hub style are generally easier to turn and have less friction. Whereas a bronze bushing hub style is ideal for heavy slow rotation applications.

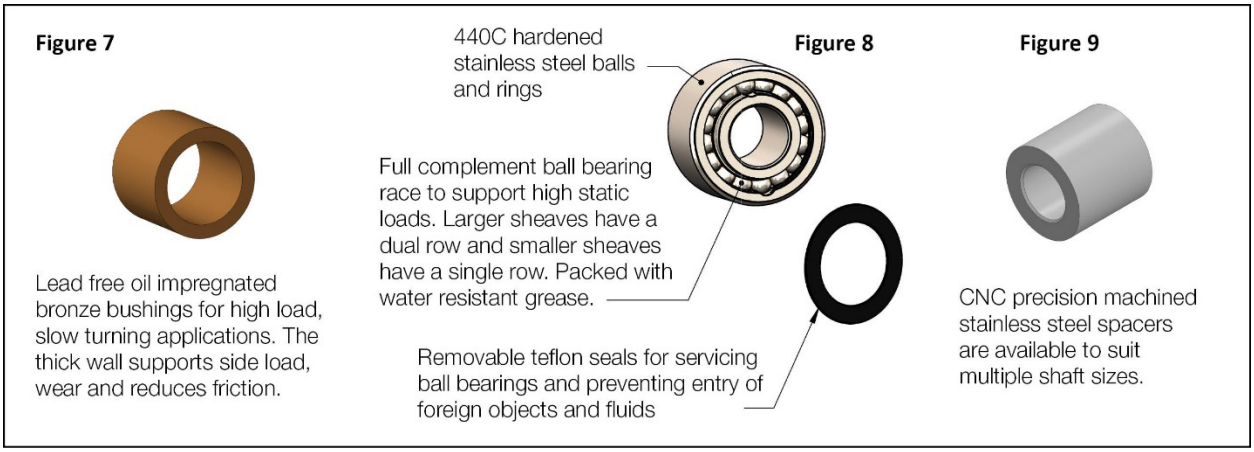
In-Field Reeving of Established Rope Assemblies

PULLPRO® blocks allow for easy reeving of the block without removing any fittings from your fibrous or wire rope configuration. Simply remove the stainless steel locknuts and block cheek to access the sheave. Rope can be reeved onto the sheave and the cheek reinstalled to complete the assembly.

Versatile, Robust, and Long Lasting Premium Sheaves

PULLPRO® blocks and sheaves work together to help you manage your lifting applications with confidence and the sheave is a critical component of the assembly. PULLPRO® premium sheaves are comprised of high quality grade 316 stainless steel. The sheaves are available for fibrous rope or wire rope and feature either bronze bushing or stainless steel ball bearing type hub styles.

The bushings are made from lead free, oil impregnated bronze which wears extremely well, is tarnish-resistant, shows low oxidation rates, and is resistant to corrosion in seawater making it particularly useful in marine applications (*Figure 7*). Being completely lead free, they are Prop 65 Compliant. They have been designed with thick walls to support side load and wear while also reducing friction. They are generally used for high load, slow turning applications.

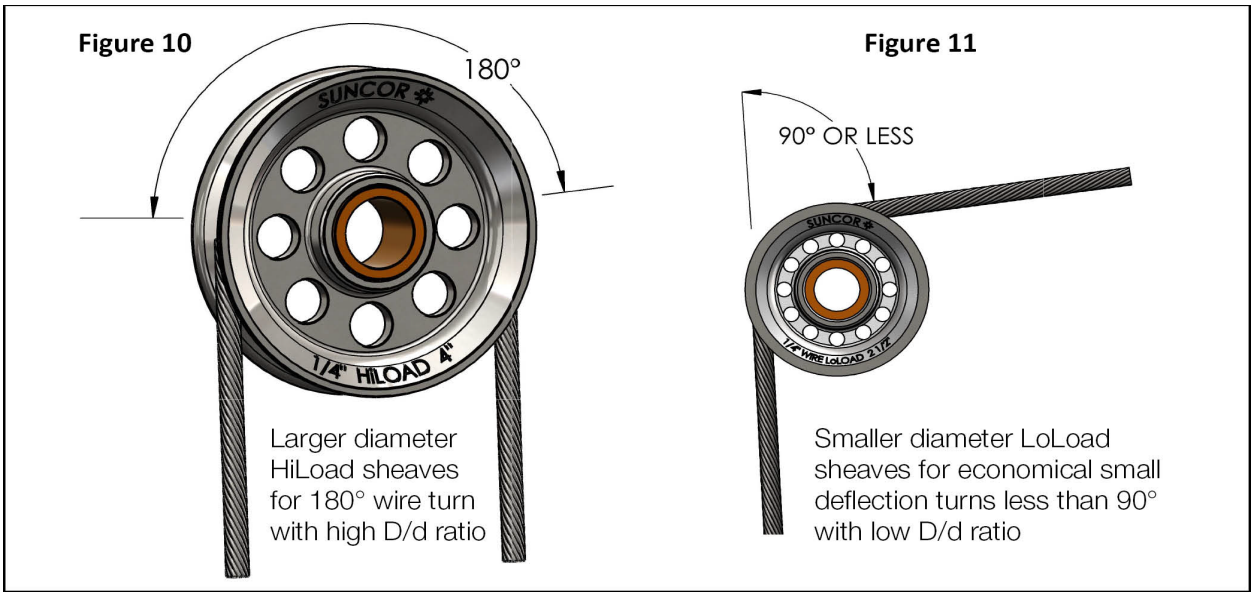


The ball bearings are made from 440C hardened stainless steel balls and rings with a full complement ball bearing race to support high static loads (*Figure 8*). Smaller sheaves utilize a single row of ball bearings while larger higher load sheaves have a double row. The bearings are packed with water resistant grease to ensure consistent and smooth operation. A removable Teflon ring acts as a seal on the ball bearings and prevents dust and debris from entering the cavity while allowing for easy and convenient servicing of the ball bearings.

The spacers are CNC precision machined stainless steel and suit multiple shaft sizes. The outside of the spacer is polished for smooth contact on the bronze bushing (*Figure 9*). They are included with most of the bushing style sheaves as part of a kit. The inclusion of spacers adds to the versatility by allowing a standard sheave to adapt to various shaft sizes.

Sheave Design

An emphasis was placed on versatility when designing the PULLPRO® components, and just like the blocks, the sheaves are available as HiLOAD (*Figure 10*) or LoLOAD (*Figure 11*) for wire rope applications. HiLOAD indicates a premium, larger diameter sheave suitable for 180° rope turns with a high D/d ratio and LoLOAD indicates a smaller diameter sheave designed for economical small deflection turns less than 90° with a lower D/d ratio.



Sheave Durability and Wear

A critical, and often overlooked area, is the wear exerted on the sheave during use. Throat angle, groove diameter, and sheave size are three areas that significantly factor into the wear sheaves can experience (*Figure 12*). Sheaves are often designed with thin straight sided grooves which can cause scrubbing on the side walls and unnecessary wear on the rope and the sheave (*Figures 13-15*). PULLPRO® sheaves were designed with wide sheave grooves that provide a proper throat angle to permit slight rope lead misalignment without damaging the rope or wearing the sheave groove.

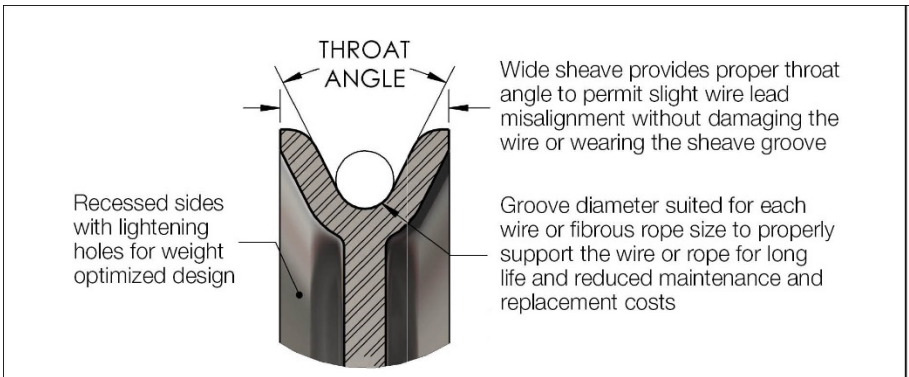
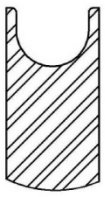


Figure 12: Example of proper throat angle



Thin straight sided grooves cause scrubbing on the side walls causing wear on the wire and sheave and reducing the life of both components

Figure 13: Example of poor throat angle

Figure 14

Wide groove permits lead misalignment without scrubbing the sheave or the block.

Figure 15

Narrow straight sided sheaves can cause wear on the wire and sheave and reduce their longevity.

The groove diameter is also critical for proper rope support under load and has a significant effect on the overall safety and lifespan of the sheave and rope. If the sheave groove diameter has too much clearance, it will not support the rope properly (*Figure 16*). When tension is applied by the rope, the high radial pressures will flatten and distort the rope and that distortion leads to increased fatigue damage, early failure, costly repairs, and unplanned downtime. Conversely, if the sheave groove diameter has too little clearance, it will not fit properly in the groove and the rope will experience wear along two lines of contact. This results in distortion of the rope, and severe notching within the individual rope strands. Abrasive wear is accelerated, and additional force is required to move the rope over the sheave.

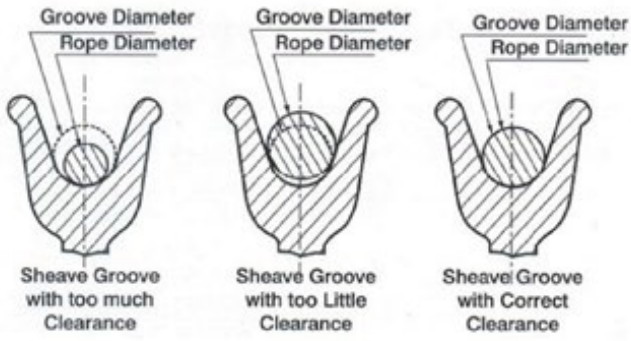


Figure 16

PULLPRO® sheaves have been designed with the optimal sheave groove clearance suited for each rope size and a maximized lifespan for the rope and sheaves.

Working Load Limits

The working load limits (WLL) for PULLPRO® premium blocks and sheaves were certified through extensive in-house laboratory testing. The WLL represents a 5:1 design factor (DF), and when used appropriately, the blocks and sheaves meet ASME B30.26 and exceed the minimum 4:1 design factor. In most instances, the WLL for PULLPRO® products is higher than comparable products. Proof loads are twice the WLL. All wire loads are based on grade 304, 7x19 stainless steel which are slightly higher than grade 316. Twice the WLL of the wire represents the wire maximum load with a 180° wire wrap around the sheave.

Conclusion

PULLPRO® premium blocks and sheaves are versatile, robust, long lasting, and manufactured from the highest quality raw materials. They are designed for today's demanding lifting applications and allow you to manage your marine and industrial lifting projects with confidence. The introduction of large diameter, HiLOAD assemblies and smaller diameter LoLOAD assemblies provides a new level of versatility. The variety of sizes and hub styles allow the user to select an assembly tailored to fit their specific product application and the design provides optimal weight, wear resistance, a variety of attachments, and configurations. The unique three-way head configuration allows users to adapt a single block to various applications without the use of tools. The result is one of the most versatile and highest quality offerings of block assemblies on the market.