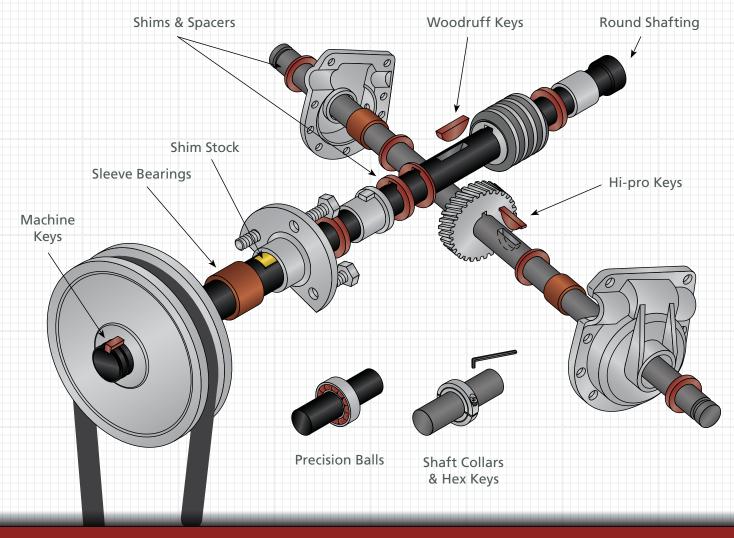


## INDUSTRIAL FASTENERS & POWER TRANSMISSION COMPONENTS



huyett.com | 785-392-3017 | sales@huyett.com



## **Company History**

Huyett was founded in Minneapolis, Kansas in 1899 by Guy L. Huyett, a German immigrant. The business was incorporated in 1906, and is now one of the oldest continuously operating businesses in the state. In 1930, Guy Huyett turned the operation of the business over to Henry Hahn. At the time, the Company had six accounts. Louis Hahn, Henry's son, bought the business in 1948. During this period, the business generated \$18,000 in annual sales. Huyett began a major transformation in the 1970's when Louis' son, Bob, joined the business. He had an entrepreneurial urge and felt that Huyett had a great deal of unrealized potential. In November of 1992, Bob sold the business to Tim and Carol O'Keeffe. In recent years,



Huyett has made substantial investments in facilities and technology, working to establish itself as a World Class leader in the specialty fastener industry. Huyett counts itself as a successful example of the American Dream and looks forward to another century of triumph.

## About Us

#### WHAT WE SELL

#### **MASTER DISTRIBUTOR**



Over 100,000 inventory items and more than 1,200 product lines.

State-of-the-art manufacturing.

"If it's hard to find... You'll find it here."

## NZ

Key Stock • Non-Threaded Fasteners Washers • Grease Fittings • Premium Lifting Hardware

Parts that are *Hard to Manufacture*. Short Runs • Odd Configurations • No Tooling

Parts that are Hard to Find. Metric • Stainless Steel • Big or Little Sizes

Parts made by Manufacturers that are Hard to Do Business with.

"What you need when you need it."

#### **HOW WE SELL IT**



Ship Within 24 Hours Multiple Commodities

"Packaged in the Quantity You Want by *Friendly People*."

## Purveyors of a Way of Life"

#### It's not what you buy, It's why you buy...

- Over 100,000 Parts
- Over 1,200 Product Lines
- Stock Quotes and Orders Acknowledged and Returned within 4 Hours
- Phones Answered by Real People in Kansas

#### Informative, Fact-filled Catalogs

- Innovative Manufacturing and Sourcing
- Complete In-house Manufacturing Facility
- Knowledgeable Staff

- In Stock Orders Ship Within 24 Hours
- One Purchase Order
- One Bill of Lading
- One Dock Receipt
- The Pack List that Will Change Your Life<sup>™</sup>

#### The right part, at the right time, at a fair price. Every time.

#### LOW MINIMUMS • GREAT PRICES • EASY ORDERING

## Where are the Parts?



#### **BEARINGS**

- Retaining Rings
- Grease Fittings
- Shims & Shim Rings
- Steel Balls

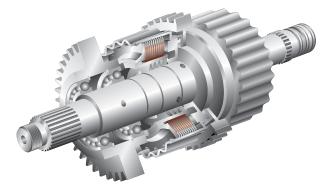


#### DRIVES

• Shims

• Washers

- Machine Keys
- Retaining Rings
- Keyed Shafts



#### **CLUTCHES**

- Wave Springs
- Spiral Rings
- Belleville Washers
- Shim Rings



#### **COUPLINGS**

- Shaft Collars
- Shafting
- Tool Steel
- Shaft Locknuts
- Retaining Rings
- Bushings



## **MOTORS AND TRANSMISSIONS**

- Pins
- Shaft Keys
- Shafts
- O-Rings
- Grease Fittings
  - Seals
  - Hose Clamps



## **GEARS & SPROCKETS**

- Machine Keys
- Gib Keys
- Woodruff Keys
  - Retaining Rings



## **History of Key Stock**

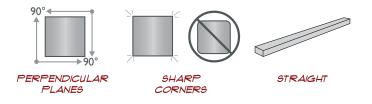
The specifications of "key stock" are complicated, which makes it important for users and engineers to understand what they are specifying and the economics of industry specifications as they consider design standards since this can have an impact on the costs of producing to the specifications.

In general, cold drawing of squares and flats (or rectangles as they are also called) is more costly and less desirable to steel producers. For example:

- Forming right angles is complicated and difficult to control. If not closely monitored, the formation can take the shape of a parallelogram or trapezoid.
- For key stock, sharp corners are generally desired so that the interference fit of the key into the corners of the keyway is optimized. Sharp corners are not easy to draw.
- As the material passes through the die, stresses from cold working are introduced. For a round, the stresses can move and not affect the shape. For a square or flat, the stresses can cause twisting, which is a problem.

- Key stock is a near-finished good when drawn; nearly all other steel is processed into some other form. However, the surface finish of key stock must be more uniform and precise, a condition generally not needed for rounds or other forms. Additionally, grinding squares and flats is a far more complex process than the centerless grinding process used for rounds.
- Tolerances for key stock tend to be more precise than for rounds because of the desired interference fit into the keyway.

The reality is that key stock is far more costly and difficult to produce than conventional steel bars. Therefore, the market for key stock is less fluid than for other material. These conditions make the buying of key stock more difficult.



#### Tolerances

In general, material grades are widely available depending on the user requirements and availability of hot melt. It is in the tolerances that specification of key stock is made more complicated. The user must first determine if an undersized or oversized tolerance is required.

Steel mills cannot make "perfect" material so tolerancing aligns to the permitted variances allowed in manufacturing.

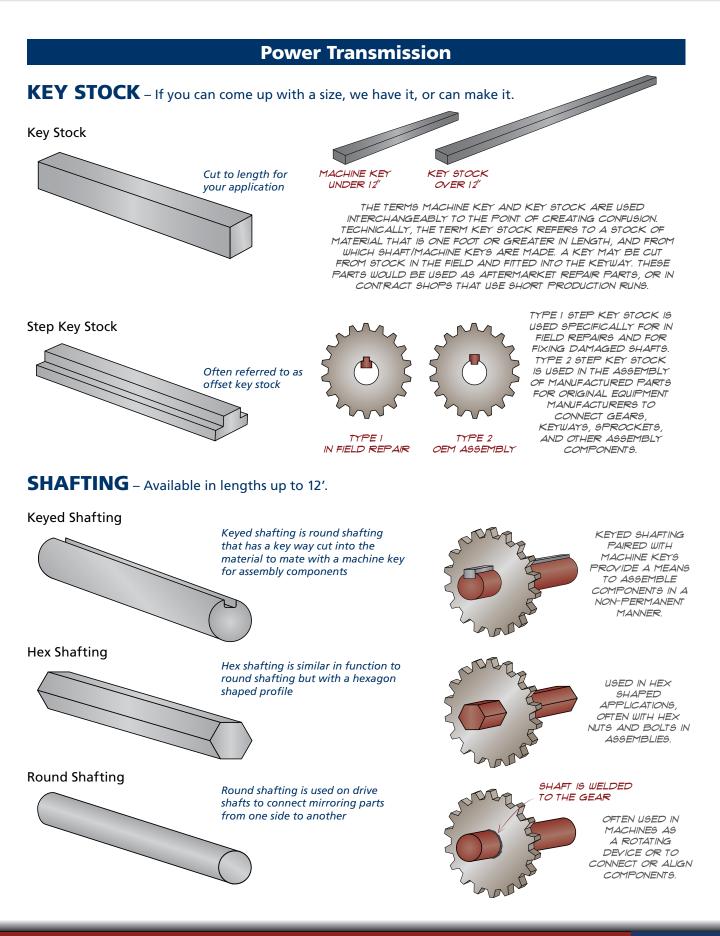
Among squares and flats, tolerances are called out either over the nominal ("oversized") or under the nominal ("undersized"). In rounds it is common to specify a plus or minus tolerance from the nominal thus the terms "over" and "under" sized are not used as often. Therefore, the first task in specification after knowing material grade is to understand the permitted tolerances.

High Nickel Alloy	02		
Aluminum	04		
Brass	06		
Inconel®	08		
Monel®	10		
Nylon	12		
Special Grade 1215	15		
Standard Undersized Plain	30		
Standard Undersized Zinc Plated	31		
Standard Oversized Plain	35		
Standard Oversized Zinc Plated	36		
Special Tolerance (002) 1045 Undersized Plain	40		
Special 1045 Undersized Plain			
Special 1045 Undersized Zinc Plated	46		

#### **Standard Huyett Material Grades and Codes**

Special 1045 Oversized Plain Special 1045 Oversized Zinc Plated Special Tolerance (+.001) 1045 Plain Special Grade 1095 Plain	50 51 54 55		
Special Tolerance (+.001) 1045 Plain Special Grade 1095 Plain	54		
Special Grade 1095 Plain			
	55		
Special Crede 1005 Zine Distant	55		
Special Grade 1095 Zinc Plated	56		
Moltrup Plain	60		
Moltrup Zinc Plated	61		
Special Grade 4140 Alloy			
Special Grade 4140 Alloy Zinc Plated			
Standard Undersized Stainless Steel			
Standard Oversized Stainless Steel			
Special 316 Stainless Steel	80		
Special 416 Stainless Steel	85		

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## **Complexity of Specifications**

#### ANSI B17.1-1967

ANSI B17.1-1967 (R1989) is the prevailing standard for key stock, but even this standard causes confusion. Within the standard are call outs for "Class 1, a clearance or metal-to-metal side fit using barstock and keyseat tolerances... This is known as a relatively free fit and applies only to parallel keys." and "Class 2, a side fit, with possible interference or clearance, obtained by using key stock and keyseat tolerances... This is a relatively tight fit." While the terms "barstock," "key stock," and "parallel keys" are used in the standard, the definitions are somewhat ambiguous. The standard defines that there are two classes of stock for parallel keys: Class 1; broad, negative tolerance barstock, and Class 2; close, plus tolerance key stock. There is a Class 3 noted, but no standards are given and it is suggested to use Class 2 for Class 3 applications.

#### **ANSI Key Stock Tolerance Specifications**

	Key Width			
ANSI B17.1-1967 (R1989)	Over	To (incl.)	Tolerance	
Class 1: "A clearance or metal-to- metal side fit obtained by using barstock keys and keyseat tolerances."		1/2	+0.000/-0.002	
	1/2	3/4	+0.000 / -0.002	
	3/4	1	+0.000/-0.003	
	1	1-1/2	+0.000 / -0.003	
	1-1/2	2-1/2	+0.000/-0.004	
	2-1/2	3-1/2	+0.000 / -0.006	
Class 2: "A side fit, with possible interference or clearance, obtained by using key stock and keyseat tolerances."		1-1/4	+0.001 / -0.000	
	1-1/4	3	+0.002 / -0.000	
	3	3-1/2	+0.003 / -0.000	

The variance in standards is to account for the availability of material at economic costs in the marketplace. Some refer to the Class 1 standard as "barstock" and the Class 2 as "key stock" or "true key stock."

Class 2 aligns to the conventional and historical definition of key stock. This specification denotes oversized, close tolerance standards of +.001''/-.000'' from nominal on sizes up to  $1-\frac{1}{4}''$ . The idea is that such tolerance will insure a tight fit with minimum rocking of the key in the key way.

Class 1 widens the permitted standards to more or less the standards of ASTM A108 used by the commercial steel industry. It is thought that this second standard was created to insure a commercially viable alternative to so-called "true key stock."

#### **DIN and ISO**



Historically, key stock was specified under DIN 6880 and parallel and tapered keys in DIN 6885, ISO R773 and ISO 2491. These standards have been withdrawn without replacement standards. Because there was no replacement standard issued, these standards are still in use today with DIN 6885 as the predominant standard. Contrarily, ANSI standards contemplate close tolerance oversized material for Class 2, and wider tolerance undersized for Class 1; ISO contemplates ONLY UNDERSIZED and only one tolerance specification that is roughly equal to Class 2 ANSI, except the tolerances are under the nominal.

#### Now that is confusing!

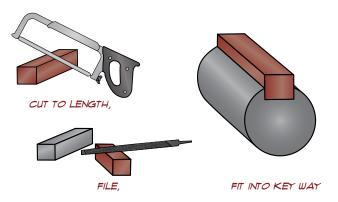
#### **Branding and Trade Names**

The traditional branding and trade names for key stock add additional complexity and confusion. Class 2 and ISO key stock is difficult to make, and only specialized mills using specialized equipment can maintain such close tolerances.

Moltrup Steel of Beaver Falls, Pennsylvania, was one such company, and is one of the more famous brand names for key stock. Moltrup was bought out as the steel industry consolidated in the 1980's. The plant closed and is no longer in operation. Moltrup is still listed on many prints and when listed, the general inference is that the user wants ANSI B17.1 Class 2 fit.

Mak-A-Key, originally a trademark of Illinois Tool Works, Inc. (ITW), was the first brand of key stock produced as an aftermarket product. Mak-A-Key is typically "cut, filed, and fit" in the field by maintenance, repair, and operations (MRO) service providers.

Mak-A-Key has added confusion in that while it has historically been advertised as "key stock," the material was actually oversized-drawn barstock. In this regard Mak-A-Key is unique. Oversized barstock is quite rare, and nearly never specified in an application. Yet the Mak-A-Key brand is often referenced in the vernacular as key stock, along with Moltrup and other brand names.



## **Complexity of Specifications**

## The Implications of Steelmaking, Standards, and Brands on Material Specification

In short, the world of key stock is confusing and nonstandardized. For the user, it is important to note:

- Producing key stock is more difficult than it looks.
- Inch (inch) product tends to be close tolerance oversized if called "key stock" and wider tolerance undersized if called "bar stock."
- Metric (mm) parts are nearly always close tolerance undersized.
- The tighter the tolerance the more the product costs to manufacture.

The addition of other features and attributes such as heat treatment can further complicate production of shaft keys. Heat treatment can relieve material stresses, and parts can swell and shrink. In close tolerance key stock applications, the addition of heat treatment can result in additional processing costs for stress relieving, grinding, or milling.

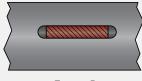
The engineer and designer should carefully work with Huyett engineers to find the right balance of specification and costs, so that the part yields desirable mechanical benefits at the desired cost.

CONTACT OUR ENGINEERING TEAM AT ENGINEERING@HUYETT.COM FOR IMMEDIATE ASSISTANCE.

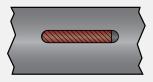
The ends of the key can impact performance. Round or radiused ends refer to an end design where the end is milled or broached into a full radius. Keys may have one end or both ends round. In the DIN 6885 standard, which is a leading international standard for parallel and tapered keys, the ends are called out as forms. The letter "A" refers to a round end and "B" refers to a square end. A key with one end round is referred to as Form AB, while a key with both ends rounded is Form A, and both ends square is Form B.



Form A

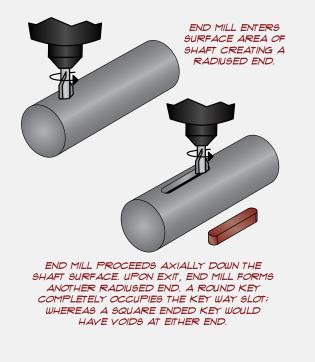


Form B



Form AB

Because key ways are milled into the side of shafts using a rotating cutter, the entry and exit points of the cutter into the shaft form a radius or slot. Form A keys match the pattern of the keyway and it is for this reason that round end keys are specified. Some believe that the round design eases installation into the keyway. Round end keys are more common in Europe than the United States.

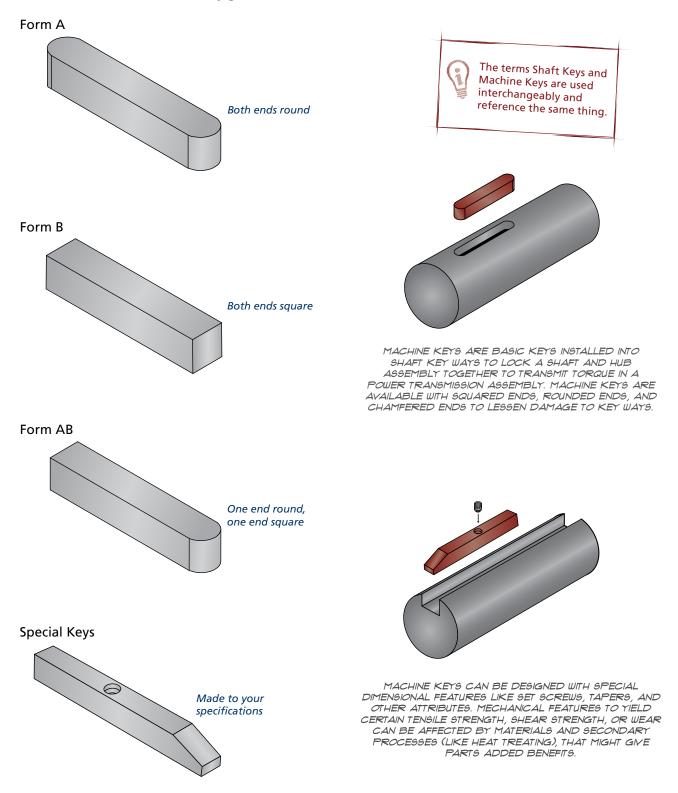






## **Power Transmission**

## **MACHINE KEYS** – Every grade and tolerance the world has ever known.

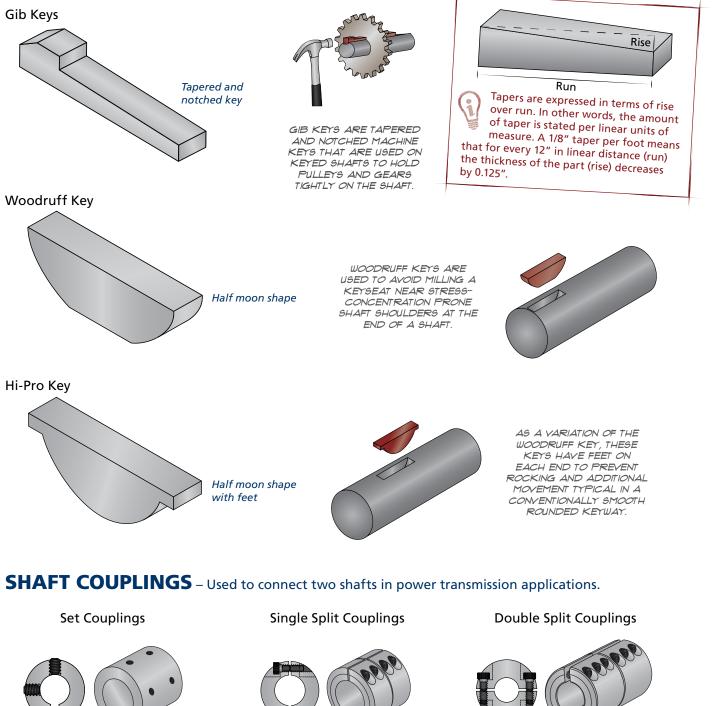


## **Power Transmission**

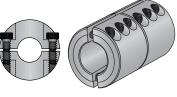
## **MACHINE KEYS** – Customized to fit your needs.

Solid piece made to

slide over a shaft



General purpose to align two shafts axially



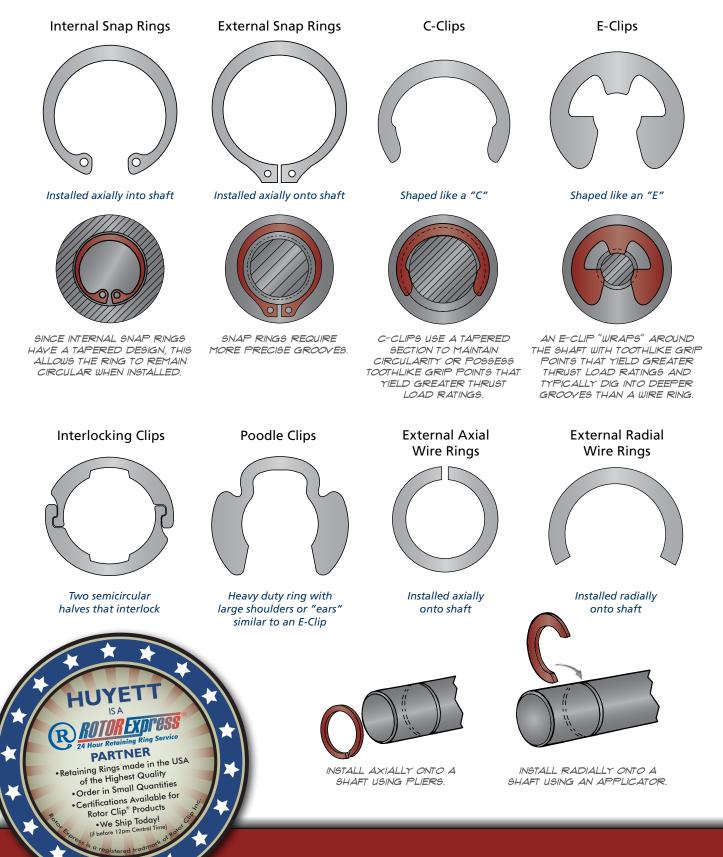
Same benefits as the single split with the benefit of axial or radial application





## Fasteners

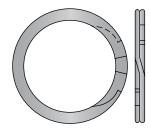
## **RETAINING RINGS** – The world's most complete inventory in inch and metric sizes.



## Fasteners

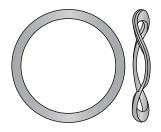
## **RETAINING RINGS** – Tools and customized packaging available.

**External Spiral Rings** 



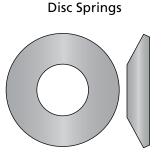
Installed axially onto a shaft by winding the part into a groove

#### Wave Washer



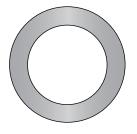
Provides great load-bearing capabilities because of its multi-point contact and sharper curves or waves

APPROACH.

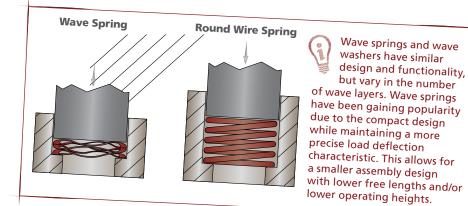


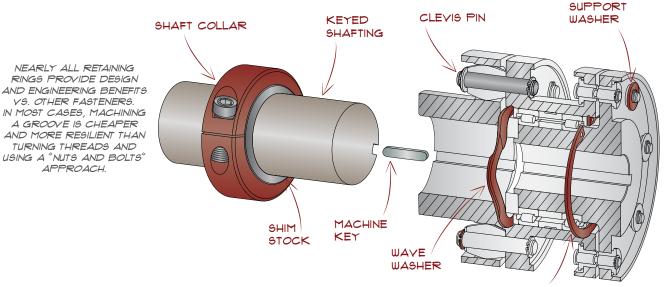
Common spring with high load capacity but limited deflection; also known as a conical washer or spring washer

#### Support Washers



Support washers conform to the DIN 988 standard





RETAINING RING





## **Power Transmission**

## SHAFT COLLARS – Install axially or radially as a mechanical stop for positioning.





Solid shaft collar to be installed axially

#### Hex Bore



Bore allows for a hex shaft application; installed axially

Single Split



Single split allows for clamping power; installed axially

#### **Double Split**

Double split allows for complete disassembly; installed axially or radially

#### **Threaded Single Split**

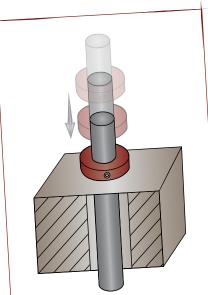


Same benefits as the smooth bore, while adding the feature of a threaded shaft

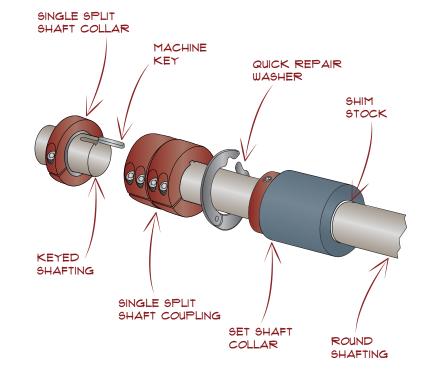
#### **Threaded Double Split**



Same benefits as the smooth bore, while adding the feature of a threaded shaft



Shaft collars have many uses in machine applications from holding components on a shaft to being used as mechanical stops and stroke limiters to reduce mechanical failure.



#### LOW MINIMUMS • GREAT PRICES • EASY ORDERING

## **Standard Materials**

Undersized Cold Finished Oversized Cold Finished High Nickel Alloy 1215 Low Carbon Alternate Materials Available Brass 303/304 Stainless Steel 1045 Medium Carbon



1095 High Carbon 4140 Alloy Steel 8630 Alloy Steel Monel® Nylon Moltrup 316 Stainless Steel 416 Stainless Steel

## How would you like it?



Standards Inch • Metric DIN • ANSI • ASME • ASTM • ISO

Finishes Zinc Plating • Passivation • Trivalent Multiple Plating & Finishing Options Available

Heat Treatments Cold Hardening • Annealing Hot Quenching • Spray Quenching Tempering • Carburizing



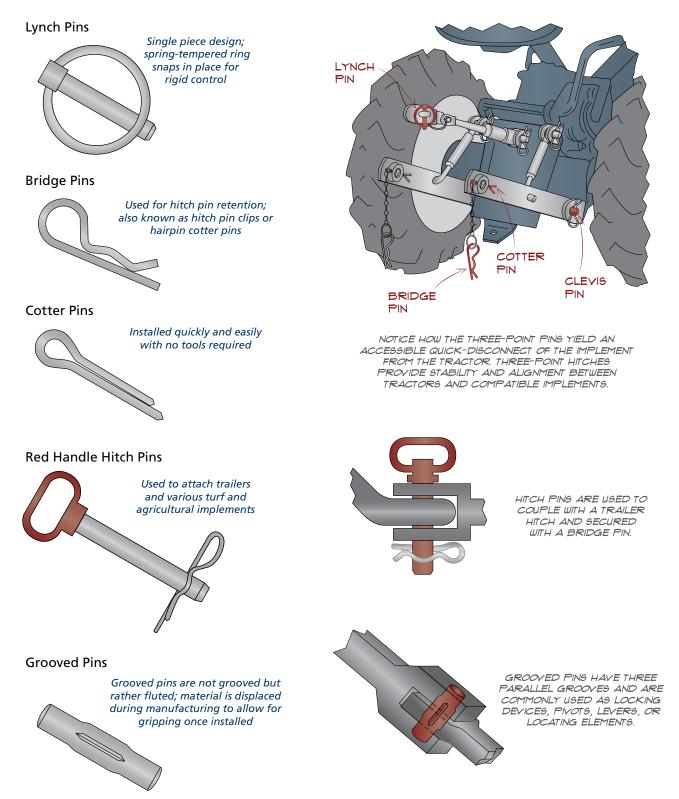




#### **MANUFACTURER & MASTER DISTRIBUTOR**

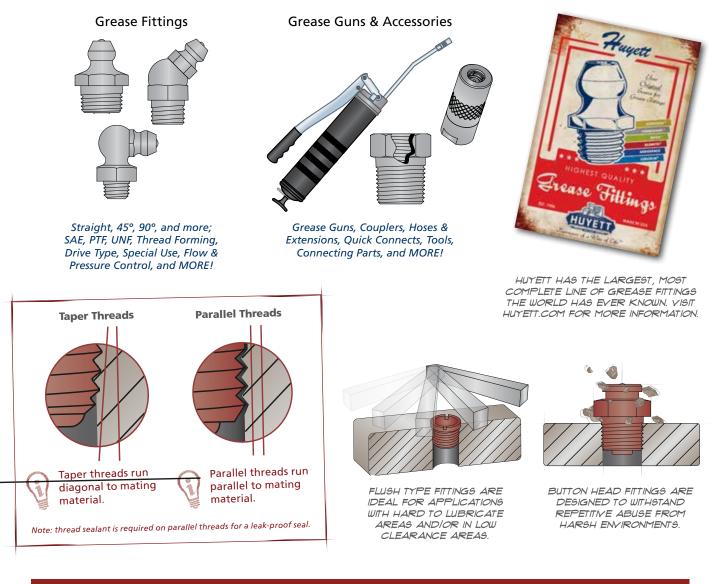
### Fasteners





### **Grease Fittings**

## **GREASE FITTINGS & ACCESSORIES** – Everything needed for your fluid power application.



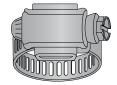
## Miscellaneous

**MISCELLANEOUS** – Thousands of items in stock, ready for delivery.

# O-Rings

Used to make a seal in fluid power applications

Hose Clamps



Used to secure a hose connection and prevent leaking

Steel Balls



Used in ball bearing and other industrial applications





# HUYETT.COM

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