

The Essential Guide To

# BLIND RIVETS

***Bay Supply***

*Fastener Source & Supply Network*



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# Overview: What are Blind Rivets?

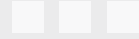
A blind rivet is a fastener that can be set from the outside, without the need to access the back of the workpiece. This becomes important in many applications, such as aircraft manufacturing, where only one side of the work is accessible.

The name “POP® rivet” is often used as a generic name for blind fasteners. However, even though all POP® rivets are blind, not all blind rivets are POP® brand rivets (see sidebar).

Rivets are constructed with two parts: a tubular rivet and a mandrel. The mandrel consists of a thin tail and a ball-shaped head, which fits through the rivet body. Once the rivet has been set (see the section, How to Install a Blind Rivet), the mandrel tail breaks off, leaving the mandrel ball head inside the rivet.

Today, rivets are used to replace traditional nut and bolt or welding applications because rivets improve speed and efficiency for nearly all assembly processes.

**>> Shop All Blind Rivets**



## How to Install a Blind Rivet

- 1 Insert the mandrel of the rivet into the installation tool.
- 2 Place the rivet through pre-drilled holes in the two pieces of material to be joined.
- 3 Squeeze or activate the trigger of the tool. This pulls the mandrel head into the rivet body, deforming the blind end of the rivet into a secondary head, and causing it to clamp the two pieces together.
- 4 The mandrel breaks off away from the rivet at a predetermined force or breakpoint, leaving the head of the rivet at the surface of the workpiece with the tail end of the rivet radially expanded and clamped into the backside of the workpiece.



# Blind Rivet Applications and Industries

Blind rivets are extremely popular because they are fast and easy to use, and work well for joining many different types of materials. In addition to general industry and electronics, blind rivets are used extensively in the following industries:



**Agriculture**—operating, manufacturing, repairing, or maintenance of agricultural equipment



**Solar/Green Energy**—the manufacturing, installation, service, or repair of alternate energy equipment including solar, wind, and water



**Truck & Transport**—trucks, buses, and fleet service and maintenance, aftermarket service, or custom modifications



**Rail/Railcar or Mining**—rail or mining equipment manufacturing, service, and repair or maintenance of tracks and cars



**Lighting-Residential** and commercial light fixtures, assemblies, and controls





# Blind Rivet Specifications

When selecting a blind rivet for a particular application, the following physical characteristics must be determined: style, nature of materials, holes, thickness, joints, corrosion resistance, tensile strength, and shear strength.

## Style of the Primary Head

The rivet head style determines the look of the installed rivet as it faces the viewer. In applications where the head of the rivet will be visible (such as in aircraft), consistency in appearance is important.

Use a dome rivet for general applications.  
Use a flush rivet (same as a countersunk rivet) for low clearance applications.  
Use a large bearing head (large flange) rivet for covering larger holes or slots—this

can be used to provide additional bearing support for joints made either of thin sheet metal or soft, brittle material, such as composites or plastic.

## Nature of the Materials to Be Fastened

The rivet body material should be the same or similar to the material(s) of the two components to be joined, in order to prevent failure or corrosion. Blind rivets are made from a variety of materials including an assortment of alloys, nylon, and thermoplastic. The rivet body material and mandrel material may be the same or different. Various versions of rivets include those with painted, metal-plated, and protective surface finishes.



# Blind Rivet Specifications

## Hole Size

The size of the hole determines rivet diameter, which must be neither too small, making it harder to place the rivet, or too large, leaving a gap that could increase shear stress on the rivet or cause installation problems. A hole that is too large might also allow the blind head to expand in the space between the two workpieces. Another consideration is whether the holes will be pre-drilled separately, making it more difficult to match up the hole size and spacing in the two parts of the joint.

## Material Thickness

The grip range of a joint is the thickness of the two parts combined. Rivets are available in varying grip ranges, with longer range required for joining thicker materials.

## Liquid and/or Gas Joint

Some applications require a joint to be watertight or non-permeable for gases up to a certain pressure. Examples include pipes, appliances, and refrigerated trailers.

## Corrosion Resistance

Applications subject to water, salt spray, or corrosive cleaning chemicals may require a rivet material that won't corrode in the presence of the joint material(s). To prevent galvanic corrosion between two dissimilar metals, choose less corrosive combinations or add a protective barrier or finish.

## Strength—Shear/Tensile

Tensile strength applies to the maximum tension that the rivet can withstand along its length. Shear strength is the maximum force the rivet can withstand as the two parts of the joint tend to slide apart. Heavy-duty applications, such as agricultural equipment, require much greater shear and tensile strength.

Blind rivets are so popular because they are fast and easy to use, and work well for joining many different types of materials.

# Types of Blind Rivets

Multiple styles of blind rivets have been developed to meet a wide variety of applications, such as the following general types.

## Non-Structural/Open End

Open end rivets are the standard, general purpose rivets that retain the mandrel head loose inside the rivet body after it is set. The tail of the mandrel, or “stem,” is broken off and discarded, leaving some airspace through the fastener. This type of rivet does not have the high strength needed for structural applications.

### >> Open End Rivets

## Multi-Grip

Multi-grip rivets are designed for use in applications with varying grip ranges (e.g., different material thicknesses), or where surfaces are curved or holes are pre-drilled, making it difficult to align the two components to be joined.

This grip range versatility also saves money in applications such as auto manufacturing, where the same rivet can be used for different joints, reducing the number of styles that must be stocked in inventory.

### >> Multi-Grip Rivets

## Closed End (Sealed)

In closed end rivets, the mandrel head that has broken off during the setting process remains sealed inside the rivet shaft, so that it can't fall out later, causing mechanical or electrical problems. This type is specifically designed for applications requiring an air or water-tight joint, such as in a pipe; closed-end rivets prevent leakage of liquid or vapor.

### >> Closed End Rivets

## Pull-thru

Pull-Thru (PT) rivets are used in applications where no head projection is allowed on either side of the joint. These rivets are widely used in the electronics industry, where space is at a premium and where there can be no chance a mandrel ball will drop into the assembly components. Additionally, there is no sharp protrusion on both sides of the workpiece which could damage wiring and other sensitive components.

### >> Pull-thru Rivets



# Types of Blind Rivets

## Bulbing/Tri-Fold Rivets

Tri-fold, or bulbing, rivets are made with a slotted rivet body that is designed to split into three folded sections as the mandrel head is pulled through and clamped. The result is a blind rivet with a large, “three-winged” bearing head that provides more support to the back of the joint. Tri-fold rivets are especially useful in fastening soft or brittle materials, such as plastic or composites. They are available in both structural and non-structural versions to accommodate a variety of application strength requirements.

### >> Bulbing Rivets

## T Peel Rivets

Similar to the bulbing rivet, peel rivets have aluminum split shafts that allow the body to separate into three or four “peeled

back” sections, or legs, on the blind side as the rivet is set. The legs provide a much larger surface area to spread the load, so this type of rivet is especially good for joining soft material such as plastic, wood, or insulation. They are also popular for automotive component assembly applications.

### >> T Peel Rivets

## Structural “High Strength” (HS) Rivets

For structural applications where load-bearing joints are required, HS rivets offer high shear and tensile strength. These are designed with a mandrel lock that ensures the mandrel is retained inside the rivet body, where it enhances the shear strength of the fastener.

### >> Structural High Strength Rivets





# Types of Blind Rivets

## Mate Rivets

Some applications for assembling thick or soft materials, such as playground equipment, street signs, and furniture, require extra-long grip ranges. A mate rivet is a two-piece fastener that requires access to the back of the workpiece. A male rivet is inserted through the front face of the two materials, while a female, tubular rivet with a pre-formed head is inserted from the back side and over the male rivet. The male rivet is then set, so that the mandrel head expands to grip the workpiece, while remaining inside the female component. The result is a fastener that does not crush or damage the workpiece, yet provides a secure clamp force—even with non-uniform drill holes. Both sides of the assembly are left with a clean attractive head.

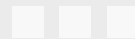
### >> Mate Rivets

## Auto-Feed “Speed Fastening” Rivets

For faster assembly times, automated rapid blind riveting (speed-fastening) systems allow dozens of rivets to be loaded into the rivet tool at once, delivering feed rates of up to 60 rivets per minute. These rivets are hollow, with no internal mandrel. Instead, they rely on a “reusable” mandrel built into

the tool, which saves on the expense and hassle of dealing with the broken mandrel stems.

### >> Avdel Speed Fasteners



## Quick Facts About Blind Rivets

- ✓ Rivets are used to replace traditional nut-and-bolt or welding applications because they improve speed and efficiency for nearly all assembly processes.
- ✓ Blind rivets can be fastened from the front of a workpiece, and require no access to the back.
- ✓ The name “POP” is often used as a generic name for blind fasteners. However, even though all POP® rivets are blind, not all blind rivets are POP® brand rivets made by Stanley Engineered Fasteners.
- ✓ Blind rivets work well for joining thin sheet metal, softer materials (such as plastic, wood, and composites), and thicker materials in structural applications.
- ✓ Automated “speed fastening” systems allow installation speeds of up to 60 rivets per second.

# Working Efficiently with a Fastener Distributor

Bay Supply has been supporting global manufacturers with best-in-show technical know-how, deep inventory of the top U.S. brands, and all of the installation systems expertise to get the job done right at the right price.

Our specialists can help you solve any blind rivet application or supply problem, helping you select the optimal style, brand, size, and number of rivets required to meet virtually any fastening challenge.

Typically, product designers who specify brand-name blind rivets are looking for a unique, engineered type, and require the

highest quality and integrity of the fastener. For example, in applications where the head of the rivet will be visible (such as in aircraft), consistency in appearance is important.

**Bay Supply** is a top-tier, factory-authorized master stocking distributor for all of the top brands. Bay Supply also supplies our own brand of BayFast™ blind rivets in order to serve the economic demands of our distributors. We have invested many resources in cross-analysis of fastener specifications to establish substitute or alternative brands at various price points.



# Working Efficiently with a Fastener Distributor

## Substitute/Alternative Fasteners

When a distributor identifies a desired fastener on our website and visits the item detail page, under the item specifics you will find a list of Substitute/Alternative brands offered that meet the exact or similar specifications of the item sourced.

This display of Substitute/Alternative items is a valuable resource for our distributors because it compares the pricing and available quantities of each brand offered. There are a number of benefits that our distributors utilize with these offerings:

- >> Pricing for each Substitute/Alternative Item is displayed to evaluate possible savings for the distributor or his/her customer.
- >> Quantities available are displayed for assessment of alternative procurement opportunities to serve immediate sourcing needs.
- >> 'Compare' feature allows distributors to display a side-by-side comparison of all substitute items including price, available quantities, and engineering specifications to establish a true substitute.

When it comes to fastener selection, distributors evaluate their customer's application and preferences. While top brands have the most reliable consistency related to setting and overall appearance, certain applications may not have an aesthetic requirement for visible consistency; a more cost-effective alternative may be a prudent choice.

Many distributors are not familiar with appropriate cross-referencing of various brands to efficiently evaluate options for procurement. Structural fasteners of very high quality offered by a number of top-brand manufacturers are frequently overlooked by distributors because of the analytical time required to identify a possible alternative offering.

## Membership Discounts

We offer one of the largest warehouse and inventory management systems in the industry to serve our customers with instant order processing and tracking.

**Discount Membership** is free to qualifying members in the following industries:

**TRUCK/BUS OR TRANSIT**—Qualifying businesses must operate a truck or bus service (and/or repair service), fleet maintenance, provide aftermarket service, or make custom modifications.



# Working Efficiently with a Fastener Distributor

**RAIL/RAILCAR OR MINING**—Qualifying businesses must engage in rail or mining equipment manufacturing, service, repair, or track/car maintenance.

**AGRICULTURE**—Qualifying businesses must engage in the operating, manufacturing, repair, or maintenance of agricultural equipment.

**GREEN ENERGY**—Qualifying businesses must engage in the manufacturing, installation, service, or repair of alternate energy equipment including solar, wind, and water.

Online pricing is accurate to our internal systems for ease of use. Quantity Break Pricing is displayed to help our customers carefully budget and plan for cost efficiencies.

Accounts and pricing are specific to each customer and can be managed by your staff. You may rename part numbers specific to your operating system, save product groupings, and establish rapid reorder lists to streamline your order processes.

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systems since 1962. If the item you require is not found through our online search, please submit requests for quotes and our rapid response team will source products that meet your specifications.

Engineering Specifications, Data Sheets, Product Attributes, Tool Manuals, Instructional Videos, and Manufacturer Catalogues are available on item detail pages and supplemental information may be available in our [Resource Library](#).

Bay Supply offers many styles, materials, and sizes of blind rivets for a wide variety of industrial and aerospace applications.

Our specialists can help solve any application or supply problem, helping you select the optimal fasteners required to meet virtually any fastening challenge.

Shop [Blind Rivets](#) at BaySupply.com.

 We have electronically catalogued every product specification compiled in our systems since 1962.

# A Short History of POP Rivets

The name POP®, widely used as a generic term for blind rivets, is actually a brand name for a specific style of rivet patented by the George Tucker Eyelet Company, which was acquired by the United Shoe Machinery Co. (USM). USM later became part of Stanley Engineered Fastener, which now owns the trademark.

In the early 20th century, the **history of POP® rivets** began in the U.K. British inventor Hamilton N. Wylie patented a method for installing tubular rivets from one side, rather than the typical method of pounding the metal shaft down while holding a buckboard against the back of the assembly. Wylie's rivet design used a pull-through mandrel, the end of which then had to be secured by a nut or some other way.

As aircraft designs changed from wood and metal to all-metal fabrication, there was a need for a fastener which could be set from just one side of the workpiece. In the 1920s, Wylie went to work for the Armstrong-Whitworth aircraft company, which later called in the Tucker Eyelet Company to help further develop the blind rivet.

Together, the two companies created a rivet design with a mandrel head that would pop off after the rivet was set. The new fastener was called a POP® rivet, after the popping sound heard when the rivet tool broke off the mandrel head inside the shank.

The original rivet tool, as designed by Wylie, was also adapted to set POP® rivets. The tool had internal teeth which grabbed the long mandrel, pulling it out and away from the rivet, while the head of the tool held the hollow rivet shaft in place against the workpiece. The two actions worked against each other to provide the tension which deforms and settles in place the blind side of the rivet. Once it was settled, the mandrel tail popped off and was discarded.

Assembling a POP® rivet required an operator to place the rivet into the tool by hand, then position the rivet into a pre-drilled hole before squeezing the handle to activate the tool.



POP® fasteners proved extremely popular, because they are fast and easy to use, and work well for joining thin sheet metal and composites.

Production of POP® rivets for use in aircrafts increased to three billion during WWII, and after the war, applications for POP® rivets expanded to automotive, appliance, and metal furniture markets. Significant growth for the company allowed

it to build new, dedicated POP® rivet factories in the U.S., as well as in Australia and Japan, as post-war economies expanded.

POP® rivets made by Stanley Engineered Fasteners are now the only U.S.-manufactured blind rivets, providing the highest quality in manufacturing.



For further information, we encourage you to check out our complete list of blind rivet offerings:

- >> [Non-Structural Open End Rivets](#)
- >> [Multi-Grip Rivets](#)
- >> [Closed-End Rivets](#)
- >> [Pull-Thru Rivets](#)
- >> [Bulbing/Tri-Fold Rivets](#)
- >> [Peel Style Rivets](#)
- >> [T-Lok Rivets](#)
- >> [Monobolt Style Rivets](#)
- >> [Magnalok/Interlock Style Rivets](#)
- >> [Large Blind Side Structural Rivets](#)
- >> [Q-Locking Style Rivets](#)
- >> [Metric Extra Length Rivets](#)
- >> [Soft Set Rivets](#)
- >> [Easy Entry Rivets](#)
- >> [Micro-Rivets](#)
- >> [Plastic Rivets](#)
- >> [Huck-Lok Rivets](#)
- >> [Huck Floortight Rivets](#)
- >> [Avdel Speed Fastening](#)
- >> [Mate Rivets](#)





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