

RIVETKING[®] SMALL DIAMETER SOLID RIVETS

SOLID RIVETS

**WHEN IT DOESN'T HAVE TO COME APART
A RIVET IS YOUR MOST LOGICAL FASTENER, HERE'S WHY...**

ONE OF THE LOWEST COST FASTENERS

Rivets are used in many major consumer and industrial products made today. Designers and production people have long recognized that riveting is one of the least expensive and most versatile assembly methods available to them.

CAN BE USED WITH MOST ANY MATERIAL

Rivets have been successfully set in wood, metals, plastics, fiberboard, cloth and ceramics. It's a strong fastener. All other things being equal, no other fastener - for it's size and simplicity - can equal the shear strength of a rivet.

CAN BE USED FOR MANY PURPOSES

Rivets are not only used to fasten two or more parts but often provide a dual function. They have been used as pivots, hinges, levers, terminals, electrical contacts, cam followers, for decoration and in hundreds of other ways. The only limiting factor to the use of rivets is the designer's imagination.

AVAILABLE IN A GREAT VARIETY OF FINISHES

They can be made from copper, brass, steel, aluminum, stainless steel and any material that can be cold-heated. If color is desired, they are plated, Japanned or painted.

IS A LOW COST PRODUCTION METHOD

Compared to other assembly machines, rivet setting equipment is lowest in cost. Since the riveting operation is automatic, non-skilled operators can quickly perform the work and lengthy training is not necessary.

IT'S GEARED TO MOST PRODUCTION REQUIREMENTS

Depending on the assembly, rivets can be set at extremely high speeds or to meet the optimum production capabilities of the operator. Machines have been built to feed several parts of the assembly simultaneously and to achieve most any degree of mechanization necessary.

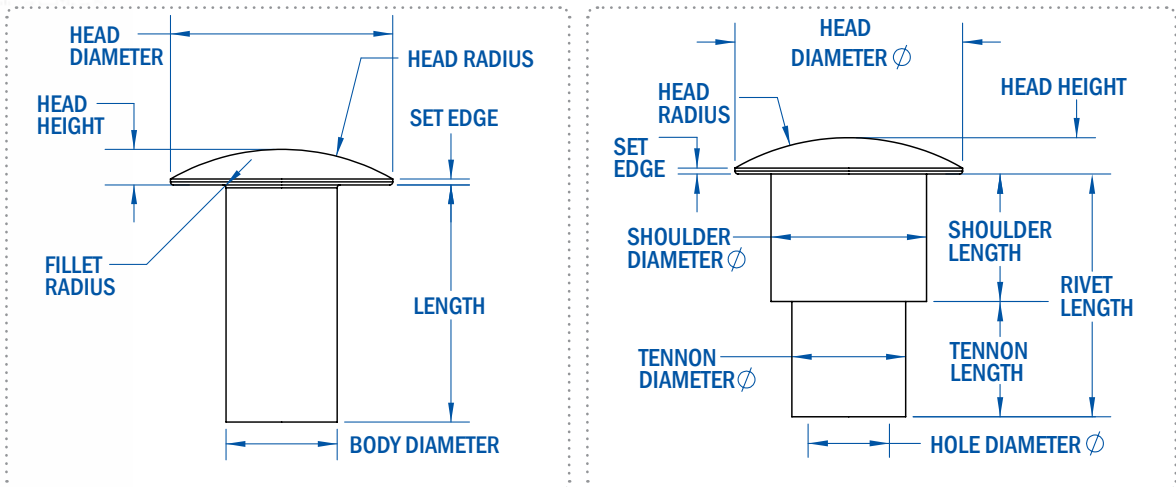
SOME LIMITATIONS

Tensile and fatigue strengths are lower than bolts. High tensile loads and extreme vibrations can pull out the set.

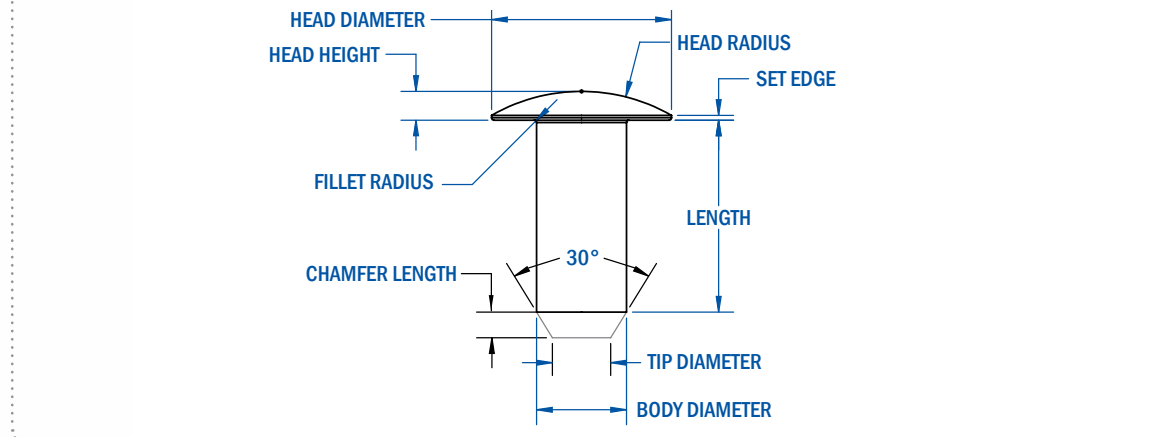
Once set with rivets, an assembly cannot be easily disassembled for maintenance purposes.

While rivets can be made to close tolerances, they are not usually as highly a precision fastener as a screw machined part might be. Where rivets are required for highly critical assemblies, consult our sales department.

ANATOMY OF THE SOLID RIVET

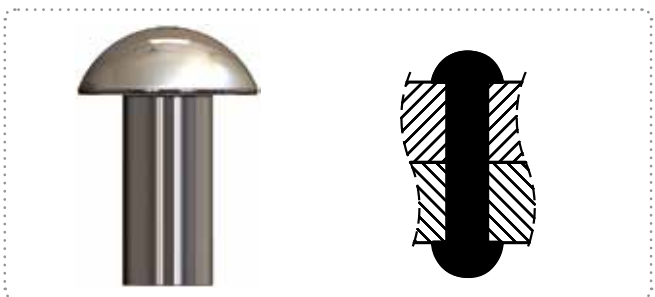


OPTIONAL CHAMFER POINTS



RIVETKING® COLD HEADED SOLID RIVETS

SOLID RIVETS



The popular use of mechanical fasteners in the fabrication of all types of metal structures continues because of the rivet's relative design simplicity, low cost, and ease of assembly. The cold headed solid rivet is a unique one-piece fastener that offers advantages and properties found in no other connection system:

- A connection stronger than the material being riveted and stronger than the rivet itself
- Remarkable uniform results from fastener to fastener
- Energy savings
- Lower house cleaning cost – no stubs, washers or discards
- Noise pollution reduced – no loud pneumatic bucking tools

The rivet is cold-worked from low carbon steel, then cold-driven in the piece with one quick, quiet squeeze of a hydraulic piston. The rivet actually over-fills the rivet hole, rounding out the sharp edges and results in a superior connection. Sharp hole edges are the main cause of connection failure when fatigue loading is applied. This should be of particular interest to the design engineer.

Shear movement is eliminated. The rivet system overfills and actually expands the rivet hole. In short, the properly driven rivet is so tight that it acts almost as a dowel. It can only be removed by drilling and collapsing.

Cold driving a conventional un-heated rivet pushes the rivet shank through the head. Consequently, to relieve stress it must be annealed.

THE POWER REQUIREMENTS

The power requirements to produce cold-made rivets increase in direct proportion to the shank area. This factor escalates by squaring the cross-section diameter. These power requirements increase markedly with rivet size. The possibility of grain growth in annealing the metal becomes proportionately greater due to these higher stresses. Cold-driving conventional rivets over 1/2" in diameter is not recommended.

PURPOSE AND QUALITY OF THE RIVET

The rivet has been an important part of construction and metal fabrication for many years. The use of rivet technology has many advantages and remains a popular mechanical fastener because:

- It offers multi-faceted applications
- It allows high production rates
- It is a permanent fastener
- Can be used on assemblies of varying complexities
- It is easy to inspect
- It requires no maintenance
- It is a low cost fastener
- Its simple, one piece design

JOINT STRENGTH, SHEAR STRENGTH

Shearing is one of the recognized causes of failure in a connected metal joint. If the area is not quite filled by the fastener in its hole, movement (moment) is possible – particularly in non-static connections. This is the beginning point of shear failure. Factors to consider when calculating shear are: Strength of the metal shank of the fastener, the number of planes upon which shear occurs, and the diameter of the "in place" fastener. In rivets this latter dimension can vary with the conditions prevailing in the joint construction such as driving pressure and temperature, tooling, alignment and other closure elements.

BEARING STRENGTH

The more the fastened joint is subject to bearing forces, the more hole-filling becomes desirable since bearing failure calculations consider the size of the fastener hole. By filling (or over-filling) the hole, compressive distortion force is transmitted into the connected material. As a result, either tear-out of the plate edge or progressive elongation of the grip dimension may occur.

TENSILE STRENGTH

Rivets are not recommended for transmitting loads in tension. Permanent failure may result when loads exert movements that cause a prying action on the head of a rivet. Tensile load stress should be kept at a minimum when using rivets.

RIVET INSPECTION

When inspecting a driven rivet, take the following factors into consideration: the dimensions and perfection of shape; whether the driven head is coaxial with the shank; and if there is excessive cracking of the head. Note: Even if the head is severely cracked, the rivet still is satisfactory in terms of static strength, fatigue strength, and corrosion resistance.

RIVET HISTORY

The rivet is a reliable and effective mechanical fastener. Rivets are a suitable fastener when used for construction and assembly.

STANDARD RIVET-HOLE DRILL SIZES & NOMINAL HOLE DIAMETERS

RIVET SIZE, INCHES	1/16"	3/32"	1/8"	5/32"	3/16"	1/4"	5/16"	3/8"
DRILL NUMBER	51	41	30	21	11	F	P	W
NOMINAL HOLE DIA., INCHES	0.067	0.096	0.1285	0.159	0.191	0.257	0.323	0.386

Engineering practices for installation of rivets (reference only)

NOTES: Hole tolerance to be established by user company

PRESSURES TO DRIVE RIVETS

Recommendation of Safe Practice to Form Steel Rivet Heads

DIAMETER	TONS PRESSURE COLD	TONS PRESSURE HOT
3/16"	4.5	-
1/4"	7	-
5/16"	12	-
3/8"	16	-
7/16"	22	-
1/2"	29	13
5/8"	44	19
3/4"	64	28
7/8"	87	38
1"	112	50
1-1/8"	-	63
1-1/4"	-	77

MANUFACTURED HEADS

The driven heads represent what is considered good practice for riveting. Rivets used for cold riveting should be cold formed and must be annealed after forming before driving.

The pressure required to cold form the heads will, of course, depend on the material in the rivet. For the commonly used carbon steel rivet, the above listed pressures are needed.

FORMULA:

$$DIA^2 \times 88.36 = \text{TONS OF PRESSURE TO DRIVE RIVETS}$$

DRIVEN HEADS

