

TAB 6 - FAQs

GROOVED PIN FAQs

What is a Grooved Pin?

A Grooved Pin is a solid cylindrical pin with three longitudinal grooves, manufactured from bar or coil stock. The three grooves are pressed into the cylindrical body to expand its diameter to a size greater than its nominal diameter in a precisely controlled way. Material is displaced, but not removed, from the pin in the process.

How does a Grooved Pin work?

When a Grooved Pin is pressed into a hole the size of the pin nominal diameter, the constraining action of the hole will compress the expanded material in a spring-like manner and produce a holding force. This unique locking action is accomplished without permanent deformation of either the base material or the pin.

Where would I use a Grooved Pin?

You can use Grooved Pins in thousands of places. Here are a few examples:

- Hinges for rotation
- Valves for a T-turn
- Sprinklers as a fulcrum pin
- Latches for rotation
- Heat Sinks for locating pins
- Conveyor Chain for linking tracks together
- Hand Tools as swivel pins in universal joints
- Pumps for spring anchors and locating pins
- Shafts for locating pins for gears or other attachments
- Locks for tamper-proof assembly

What are the benefits of Grooved Pins?

There are many reasons to choose Grooved Pins. Here are a few benefits:

- Grooved Pins require only a straight hole, without the need for close tolerances.
- There are no reaming, milling, or tapping operations involved, which keeps production costs low.
- Grooved Pins withstand severe shock and vibration.
- They are solid, which makes them stronger than spring pins.
- Different groove types are available to suit a variety of applications.
- Grooved Pins can provide a smooth bearing surface for rotation.
- They are quick and easy to install.

What materials are standard Grooved Pins made of? Are surface treatments available?

Material	Plating
1215 Low-Carbon Steel	Cadmium, Zinc, Nickel, Oil, Black Oxide, None
303 Stainless Steel	Passivation, None
6150 Alloy Steel	Cadmium, Zinc, Nickel, Oil, Black Oxide, None

What is the shear strength of Grooved Pins compared to Spring Pins?

The Grooved Pin shear strength is up to twice the shear strength of a spring pin of the same diameter. The shear resistance of alloy steel Grooved Pins can be 40% higher than that of a heavy-duty spring pin.

What hole size should a Grooved Pin be installed in?

You can find the recommended hole size in the Standard Pin Dimensions table. (link to tab or link to Kbase resource)

What is the tolerance for overall length and straightness of a Grooved Pin?

The tolerance for overall length is +/- .010 inch and for straightness, +/- .010 per inch.

What kind of equipment do I need to install a Grooved Pin? How much force is required?

Grooved Pins can be pressed in by hammer, air cylinder, or hydraulic press. For the required insertion force, see the charts below:

Insertion Forces for Tapered Grooves

Groove Length In.	Insertion Force, lbs. (approx.) According to Pin Diameter				<i>These forces are average obtained from test data and may be used as a guide for engineering and in the selection of installation equipment.</i>									
	3/64	1/16	5/64	3/32	7/64	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2
1/4	40	50	65	80	110	140	210	290	390	490				
1/2	85	110	140	180	230	280	410	560	730	920	1340	1800		
3/4		160	200	270	340	410	600	810	1050	1320	1900	2560	3260	4000
1		205	280	360	450	560	800	1060	1370	1700	2460	3300	4200	5100
1-1/2							1150	1510	1900	2340	3340	4460	5600	6700
2							1500	1960	2440	2960	4220	5560	6900	8300
2-1/2											5270	6960	8600	10300
3											6300	8340	10300	12400

Insertion Forces for Parallel Grooves

Pin Diameter	Insertion Force per Inch of Groove Length													
	1/16	5/64	3/32	7/64	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	
Lbs.	500	600	710	820	930	1200	1500	1800	2150	2950	3840	4750	5700	

What is the difference between a Tapered Groove and a Parallel Groove?

A parallel groove has more engagement between the pin and the hole walls. A parallel groove has higher pull-out strength, but requires a higher insertion force.

How are Grooved Pin dimensions and characteristics measured?

Overall Length	Caliper
Pin Diameter	Micrometer
Expansion Diameter	Ring Gage
Groove Length	Caliper