

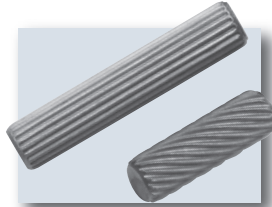
SPIROL® DESIGN CONSIDERATIONS

RETENTION MECHANICS

“Press fit fasteners” is a term used to describe fasteners that retain themselves in the assembly by the friction between the pin and host. The majority of our solid pin products fit into this category. Retention mechanics is one of the most important aspects of recommending the correct pin for an application.

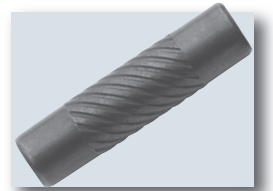
Knurled Pins

- ⊙ **Knurled Pins** are retained in the hole by cutting into the softer host material.
- ⊙ The pin should always be harder than the host.
- ⊙ A knurled pin offers numerous points of contact in the host which distributes the radial stress in a uniform fashion.
- ⊙ A 30° helical knurl causes the pin to rotate as it enters the hole and has more surface contact with the host. This results in higher friction forces, greater engagement and resistance to back out.



Helical Grooved Pins

- ⊙ **Helical Grooved Pins** provide reliable press-fit retention in hardened host materials and are excellent for use in applications requiring high shear strength.
- ⊙ The raised portions of the pin have a low, flat, uniform profile that extends around the majority of the pin resulting in a cylindrical expanded outside diameter.
- ⊙ The more uniform and larger surface features of a helical grooved pin are far less likely to damage the host hole or to be sheared off during assembly. These pins offer lower insertion forces and more consistent retention performance over alternative hardened pins.



MATERIALS & FINISHES

AISI 1022 low carbon steel is work hardened to 70 kpsi (480 MPa) tensile strength. **This is the preferred standard for all pins except helical grooved pins.** 1022 may be case hardened with a .005” - .010” (0.1mm - 0.25mm) effective case depth to produce a high wear surface on straight pins or high strength knurls on knurled pins.

AISI 305 corrosion resistant stainless steel is work hardened to 120 kpsi (825 MPa) tensile strength. **This is the preferred material when stainless steel is required.** 305 has the best corrosion resistance of the materials/finishes offered.

AISI 4037 is a heat treatable alloy steel that provides very good performance when moderate strength is required. It has good toughness and fatigue strength, and can be used in both the work hardened and heat treated states (Rc 36-42). Tensile strength is 110 kpsi (755 MPa) work hardened and 150 kpsi (1035 MPa) heat treated.

AISI 6150 is the highest strength material available. Solid Pins are heat treated to a hardness of Rc 43-49 with a corresponding tensile strength of 235 kpsi (1620 MPa). Helical Groove Pins are heat treated to a hardness of Rc 36-42 with a resulting tensile strength of 200 kpsi (1375 MPa). 6150 is considered a “tough” material even at the higher hardness levels.

MATERIAL CODE	FINISHES
F - Low Carbon Steel AISI 1022 / C20C	K - Plain oiled
V - Low Carbon Steel Case Hardened	T - Electroplated zinc
B - Alloy Steel AISI 4037 / 37Mo2	R - Zinc phosphate with oil
J - Alloy Steel Through Hardened	P - Passivated
W - High Strength Alloy Steel Through Hardened AISI 6150 / 51CrV4	
D - Austenitic Stainless Steel AISI 305 / X4CrNi18-12	
<p>Not all materials are available in each series. For standard series, standard material is provided in the specification tables. For pre-designed specials, recommended material is provided in the notes.</p>	

SPIROL®

Innovative fastening solutions.
Lower assembly costs.



Challenge Us!

SPIROL Application Engineers will review your application needs and work with your design team to recommend the best solution. One way to start the process is to visit our **Optimal Application Engineering** portal at www.SPIROL.com.

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