SPIROL® DESIGN GUIDELINES

HOW TO SELECT THE PROPER RETENTION FEATURE

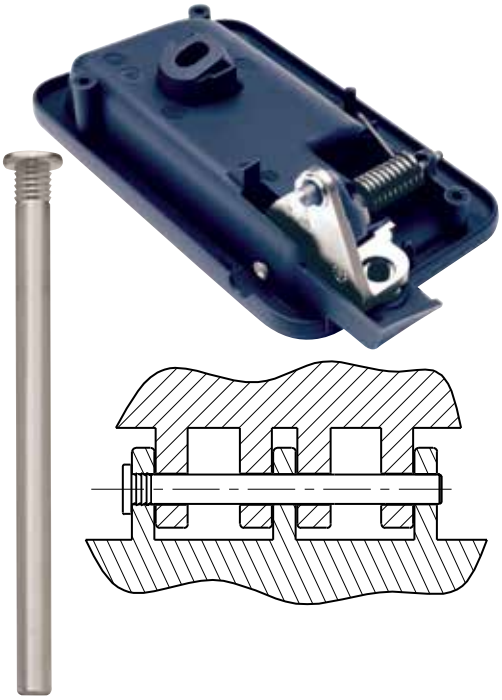
SPIROL manufactures Solid Pins with straight knurls, helical knurls and barbs. There are many overlaps as to the applications in which these retention features can be used successfully. Straight knurls have lower insertion forces than helical knurls, offer resistance to turning within the assembly, but provide limited retention when axially loaded. Therefore, straight knurls are often recommended when the pin is used to transmit torque such as when used as an axle to rotate a wheel. Helical knurls provide both resistance to torque and push out when axially loaded.

Barbs are recommended for use in flexible plastics where optimum resistance to axial force is desired. After installation, the plastic will backfill into the area around the barbs resulting in maximum retention. Barbs are not appropriate for brittle plastics or those containing high percentages of fillers. As barbs are a radial feature, they do not resist rotation of two components relative to one another. For this requirement, a straight or helical knurl should be used.

KNURL/BARB LOCATION

It is sometimes necessary for the purpose of assembly, retention or function to modify the knurl length or location on the pin. The location of the retention feature can be customized to suit design requirements. More specifically, rather than having the knurls or barbs spanning the full length of the pin, a partial-length knurl or barb, or set of partial-length knurls (or barbs) can be located anywhere along the tenon of the Solid Pin to coincide with the component in which it will be retained.

An example of this is given on the right. The designer of a plastic handle wanted to have the pin securely held in one component and have the other component rotate freely around the pin when the plastic handle was actuated. SPIROL designed a Solid Pin with a barb located under the head with a barb length equal to the width of the outermost section of the assembly. The remaining length of the pin was smooth and had no retention feature. This allowed the pin to easily align and freely install through all of the holes of the assembly until the barb made contact with the final hole to securely lock the pin in place. Once fully installed, the handle would pivot freely around the non-barbed end of the stationary pin. The head prevented the pin from being over-installed, and enabled the pin to be mechanically oriented for automatic installation.



HOLE DESIGN

When the Solid Pin is retained by being press-fit into the assembly, it is important for the pin to be harder than the host material. Otherwise, the pin will be deformed during installation. If a higher hardness is required, Solid Pins can be produced from alloy steel and through-hardened.

It is important to note that the recommended hole sizes (on pages 4-7) are guidelines based on typical applications and may require modification depending on the hardness of the materials or required engagement. Additionally, there are many applications that require a different hole size to ensure the proper function of the assembly. For this reason, it is recommended that SPIROL be consulted on new designs.

***SPIROL**'s Application Engineers will review your requirements and work with your design team to recommend the best solution at the lowest total assembly cost.*

SPIROL® Innovative fastening solutions. Lower assembly costs.

*Please refer to **www.SPIROL.com** for current specifications and standard product offerings.*

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

Technical Centers

Americas

SPIROL International Corporation
30 Rock Avenue
Danielson, Connecticut 06239 U.S.A.
Tel. +1 860 774 8571
Fax. +1 860 774 2048

SPIROL Shim Division
321 Remington Road
Stow, Ohio 44224 U.S.A.
Tel. +1 330 920 3655
Fax. +1 330 920 3659

SPIROL Canada
3103 St. Etienne Boulevard
Windsor, Ontario N8W 5B1 Canada
Tel. +1 519 974 3334
Fax. +1 519 974 6550

SPIROL Mexico
Avenida Avante #250
Parque Industrial Avante Apodaca
Apodaca, N.L. 66607 Mexico
Tel. +52 81 8385 4390
Fax. +52 81 8385 4391

SPIROL Brazil
Rua Mafalda Barnabé Soliane, 134
Comercial Vitória Martini, Distrito Industrial
CEP 13347-610, Indaiatuba, SP, Brazil
Tel. +55 19 3936 2701
Fax. +55 19 3936 7121

Europe

SPIROL France
Cité de l'Automobile ZAC Croix Blandin
18 Rue Léna Bernstein
51100 Reims, France
Tel. +33 3 26 36 31 42
Fax. +33 3 26 09 19 76

SPIROL United Kingdom
17 Princewood Road
Corby, Northants
NN17 4ET United Kingdom
Tel. +44 1536 444800
Fax. +44 1536 203415

SPIROL Germany
Ottostr. 4
80333 Munich, Germany
Tel. +49 89 4 111 905 71
Fax. +49 89 4 111 905 72

SPIROL Spain
08940 Cornellà de Llobregat
Barcelona, Spain
Tel. +34 93 669 31 78
Fax. +34 93 193 25 43

SPIROL Czech Republic
Sokola Tůmy 743/16
Ostrava-Mariánské Hory 70900
Czech Republic
Tel/Fax. +420 417 537 979

SPIROL Poland
ul. Solec 38 lok. 10
00-394, Warszawa, Poland
Tel. +48 510 039 345

Asia Pacific

SPIROL Asia Headquarters
1st Floor, Building 22, Plot D9, District D
No. 122 HeDan Road
Wai Gao Qiao Free Trade Zone
Shanghai, China 200131
Tel. +86 21 5046 1451
Fax. +86 21 5046 1540

SPIROL Korea
160-5 Seokchon-Dong
Songpa-gu, Seoul, 138-844, Korea
Tel. +86 (0) 21 5046-1451
Fax. +86 (0) 21 5046-1540

e-mail: **info@spirol.com**

SPIROL.com