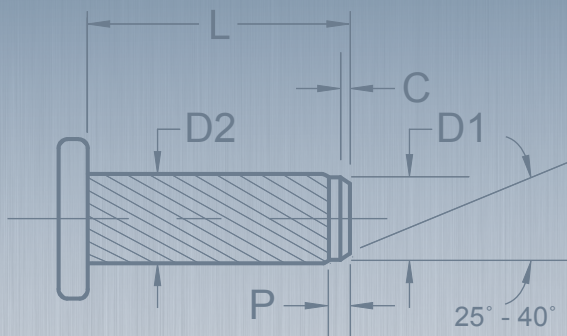
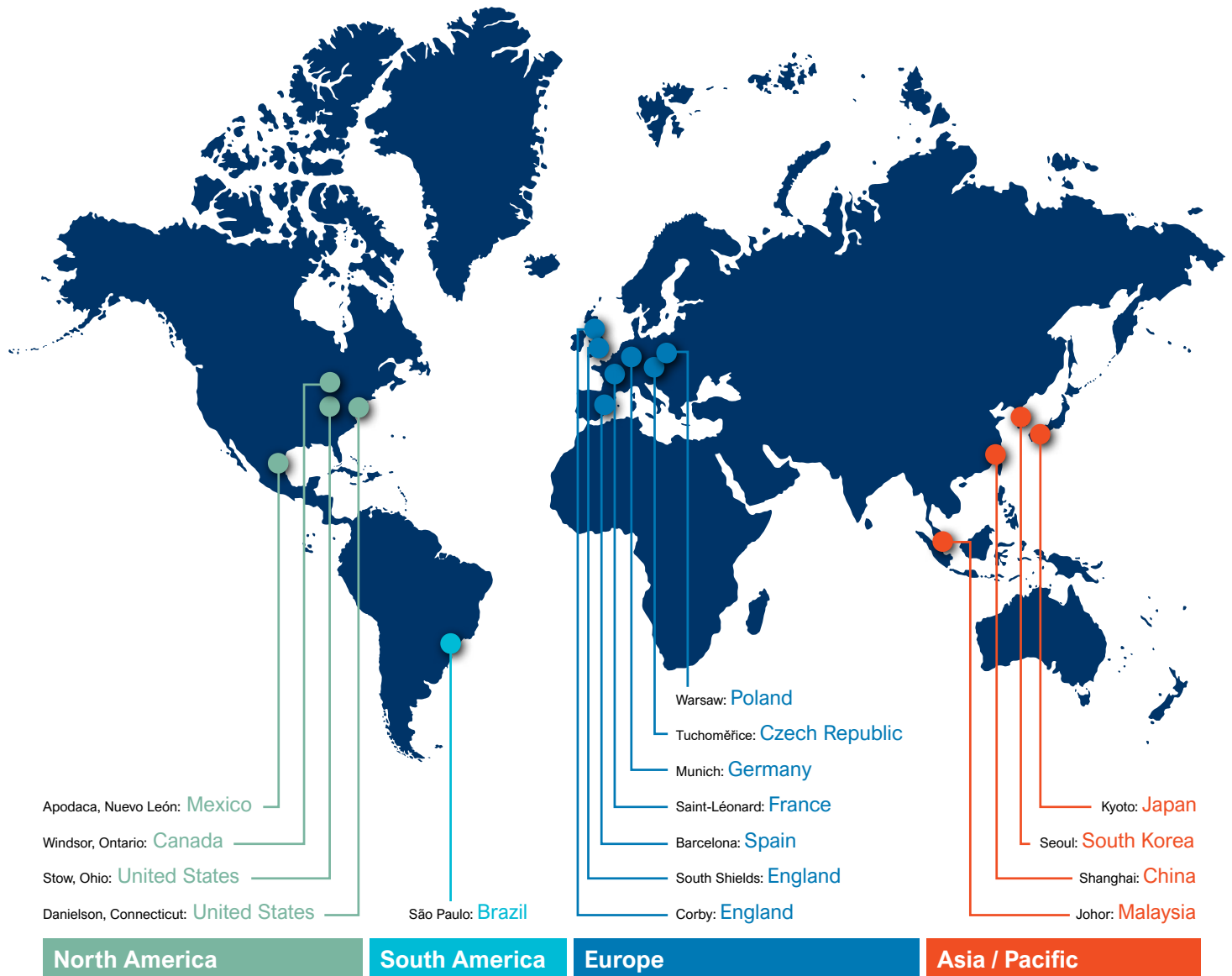


SPIROL[®]

SOLID PINS



SPIROL stands apart from all other companies in our industry. We are a technical resource that provides high quality components that improve the quality of your assembly, extend the life of your products and reduce your manufacturing costs.



Local Design, Global Supply

SPIROL has Application Engineers throughout the world to assist you in your designs, supported by state-of-the-art manufacturing centres and worldwide stocking facilities to simplify the logistics of delivering your product.

Contact SPIROL for design assistance:
www.SPIROL.co.uk

With so many types of industrial standard pins to choose from, the challenge for the designer is to select the most cost-effective pin that meets the specific application requirements. While more than one type of pin may meet certain requirements, here are some general guidelines when a Solid Pin may be most suitable:

- When a head is required for a positive stop or to retain a thin member to a thicker member of the assembly
- When a smooth, uninterrupted surface is required such as when used in conjunction with a pawl or other angular component
- When a hollow pin is not suitable such as when the designer is looking to plug a hole (i.e. Restrict passage of liquids)
- When there is a need to manually align several clearance holes
- When increased bending or shear strength is required
- When precise hole locations need to be maintained



SPIROL SOLID PINS

SPIROL has a standard offering of Straight Pins, Knurled Pins and Barbed Pins. The specifications for these pins can be found on pages 5-9.



Straight Pins – Offered with or without a head, Straight Pins are distinguished by their uniformity. The chamfered ends are more consistent than tumbled edges—making installation with automatic assembly equipment more reliable. Straight Pins are retained by compressing the host, not the pin. They are suitable for use in plastics for press-fit applications limited to those cases where the host material can withstand compression in the order of 0.05mm – 0.08mm (.002” – .003”). These pins are often used to replace ground dowels in applications that do not require the tight tolerances of a ground dowel.

Knurled Pins – Offered with or without a head, Knurled Pins are available with either straight or helical knurls. Unlike a Straight Pin where retention is provided by the uniform interference between the pin and hole, Knurled Pins are designed to cut into the host. The displacement of the host material into the valleys of the knurls yields more frictional contact area between the pin and hole thus resulting in higher retention. With Helical Knurled Pins, a 30° knurl causes the pin to rotate as it enters the hole creating even more surface contact with the host. This results in higher frictional forces, greater engagement and improved resistance to back out.

Barbed Pins – Offered with a head, Barbed Pins were created specifically for use in plastic assemblies. The raised barbs are angled backwards, opposite the direction of insertion for maximum retention. All Barbed Pins are provided with a generous pilot to facilitate alignment with the hole and ease installation.

Press-N-Lok – Offered without a head, Press-N-Lok™ Pins were designed to permanently retain two plastic components to each other. The raised barbs are angled backwards on the pin, opposite the direction of insertion. During installation, plastic backfills into the area around the barbs resulting in maximum resistance to axial force.

Latch Pins – Offered with or without a head, Latch Pins were designed specifically for use in plastic hinges. These pins are retained within the hinge by the raised barb section of the pin anchoring itself within the outer component of the latch. The straight tenon portion of the pin functions as the axis of rotation for the latch. Advantages include corrosion resistance, ease of alignment and installation, and low in-place cost.

CUSTOMISED PRODUCTS TO MEET YOUR APPLICATION REQUIREMENTS

One of the advantages of partnering with SPIROL early in the design stage is that if one of our 30,000 standard items doesn't meet your specific application requirements, the solution is often a simple derivation of our standard design. Regardless of the complexity, SPIROL's Engineers will work with you to develop a pin to meet the exact requirements of your application at the lowest total manufacturing cost.



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.

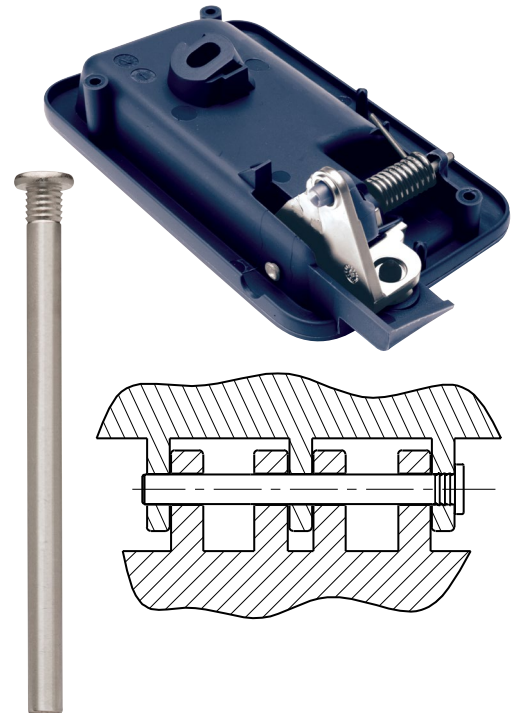


Barbs are recommended for use in flexible plastics where optimum resistance to axial force is desired. After installation, the plastic will backfill into the area around the barbs resulting in maximum retention. Barbs are not appropriate for brittle plastics or those containing high percentages of fillers. 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 customised 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 5-9) 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.

STANDARD MATERIALS

Austenitic (Nickel) Stainless Steel (D)

Austenitic stainless steel provides excellent corrosion protection against normal environmental conditions. It withstands fresh water and atmospheric marine conditions very well, and is suitable for many other industrial conditions including acidic environments. All austenitic stainless Solid Pins are passivated.

Aluminium (A)

Aluminium is lightweight, lead free, and has sufficient strength for most plastic applications. Aluminium is less than half the weight of steel, and does not require any supplemental coatings or platings to provide the necessary corrosion protection in most environments.

Low Carbon Steel (F)

Low carbon steel is one of the most versatile materials. This material is readily available, and is the most economical of the standard Solid Pin materials in the absence of any plating or coating. Low carbon Solid Pins have a dry to the touch rust preventative. Additional coatings and finishes can be applied to low carbon steel to improve corrosion resistance, however for some applications, it may be more appropriate and cost beneficial to specify stainless steel when a high level of corrosion resistance is required.

STANDARD FINISHES

Plain/Oiled (K)

This finish is a thin coating of dry-to-the touch oil that provides corrosion resistance during storage and shipping. Since this lubricating oil is suspended in a carrier which evaporates over time, the pins are dry-to-the-touch and conducive for automatic feeding and assembly.

Passivated (P)

Passivation of stainless steel Solid Pins is a process whereby surface contaminants such as embedded tool steel and other free iron particles are removed. The sole purpose of passivation is to remove embedded iron; not to clean the part. While all stainless steel Solid Pins are passivated as a standard, there are some critical applications that absolutely require passivation such as medical devices, components used in the food or drug industry, fuel system applications, and any application requiring a clean environment.

Available only for stainless steel.

MATERIALS		FINISHES
TYPE	GRADE	
D - Stainless Steel, Austenitic (Nickel)	UNS S30500 / X4CrNi18-12	P - Passivated K - Plain, oiled
A - Aluminium	UNS A95056 / AlMg5 (3.3355)	
F - Low Carbon Steel	UNS G10220 / C20C (1.0411)	

SPECIAL MATERIALS

SPIROL has extensive experience with special materials required for unique circumstances such as:

Alloy Steel (W)

Alloy steel is used in applications that require higher shear strength than our standard materials offer, or when increased hardness is needed to ensure the pin is harder than the host material into which it is installed.

Nickel Silver (N)

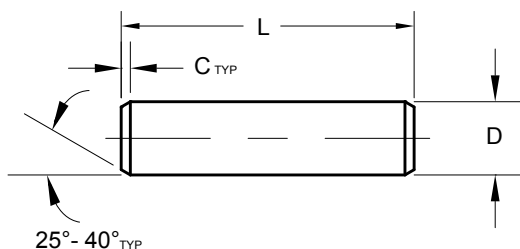
Nickel Silver is a copper alloy that is used for lightly loaded applications where cosmetic finish and corrosion resistance are important. This material is easy to work with and is a cost-effective alternative to austenitic stainless steel or plating.

High Carbon Steel (B)

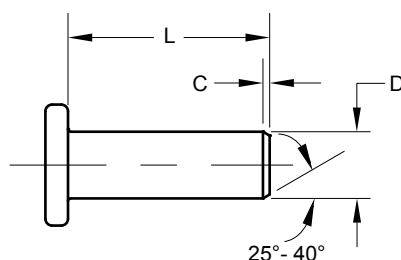
High carbon steel is available for applications that require increased shear strength and fatigue life. Additional coatings and finishes can be applied to carbon steel to improve corrosion resistance, however for some applications, it may be more appropriate and cost beneficial to specify stainless steel when a high level of corrosion resistance is required.

Other materials and finishes are available to order depending on the application requirements.

Straight Pin Series DP100



Headed Pin Series FH100



MATERIAL

F Low Carbon Steel

D Stainless Steel, Austenitic (Nickel)

FINISH

K Plain

P Passivated

DIMENSIONAL DATA

	METRIC SPECIFICATIONS							INCH SPECIFICATIONS						
Nominal Diameter ▶		2	2.5	3	4	5	6		5/64 .078	3/32 .094	1/8 .125	5/32 .156	3/16 .187	1/4 .250
Diameter "D"	Min.	1.95	2.45	2.95	3.95	4.95	5.95	Min.	.0761	.0917	.1230	.1542	.1855	.2480
	Max.	2.00	2.50	3.00	4.00	5.00	6.00	Max.	.0781	.0937	.1250	.1562	.1875	.2500
Head Diameter	Min.	3.30	4.20	4.95	6.75	8.50	10.20	Min.	.132	.156	.209	.263	.312	.425
	Max.	3.70	4.60	5.45	7.25	9.10	10.80	Max.	.142	.172	.229	.283	.338	.451
Head Thickness	Min.	0.55	0.70	0.90	1.20	1.50	1.90	Min.	.022	.028	.036	.048	.060	.077
	Max.	0.75	0.90	1.20	1.50	1.80	2.20	Max.	.030	.036	.048	.060	.073	.090
Chamfer "C"	Min.	0.15	0.2	0.2	0.3	0.4	0.4	Min.	.005	.008	.008	.010	.015	.015
Length "L"	6							.250						
	8							.312						
	10							.375						
	12							.437						
	14							.500						
	16			Length Tolerance				.562		Length Tolerance				
	20			± 0.25				.625		± .010				
	24							.750						
	26							.875						
	30							1.000						
	35							1.250						
	40							1.500						
	45							1.750						
	50							2.000						

Notes:

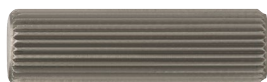
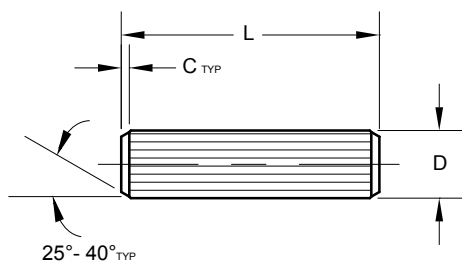
- Please consult SPIROL Engineering for recommended hole sizes when used as a press-fit.
- Other diameters and lengths available on request.
- Series FH100 is available to order with a round head.

Part Number Code

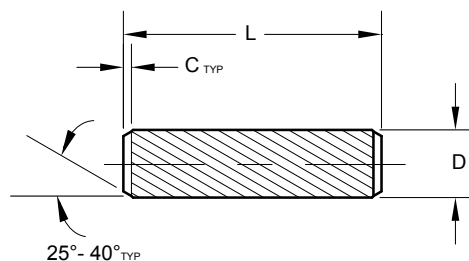
TO ORDER: SLDP (Nominal Diameter)x(Length)(Material)(Finish)(Pin Series Number)

EXAMPLE: SLDP .156 x 1.250 FK DP100

Straight Knurl Series KP200



Helical Knurl Series KP300



MATERIAL

F Low Carbon Steel

D Stainless Steel, Austenitic (Nickel)

FINISH

K Plain

P Passivated

DIMENSIONAL DATA

Nominal Diameter ▶	METRIC SPECIFICATIONS							INCH SPECIFICATIONS						
		2	2.5	3	4	5	6		5/64 .078	3/32 .094	1/8 .125	5/32 .156	3/16 .187	1/4 .250
Diameter "D"	Min.	2.20	2.70	3.25	4.25	5.25	6.25	Min.	.084	.099	.131	.163	.195	.256
	Max.	2.30	2.80	3.35	4.35	5.35	6.35	Max.	.088	.103	.136	.168	.200	.262
Chamfer "C"	Ref.	0.15	0.2	0.2	0.3	0.4	0.4	Ref.	.005	.008	.008	.010	.015	.015
Recommended Hole	Min.	2.00	2.50	3.00	4.00	5.00	6.00	Min.	.078	.094	.125	.156	.188	.250
	Max.	2.06	2.56	3.06	4.08	5.08	6.08	Max.	.080	.096	.127	.159	.191	.253
Length "L"	6	*						.250	*					
	8	*						.312	*					
	10	*						.375	*					
	12	*						.437	*					
	14	*						.500	*					
	16	*	Length Tolerance					.562	*	Length Tolerance				
	20				± 0.25			.625	*			± .010		
	24							.750						
	26							.875						
	30							1.000						
	35							1.250						
	40							1.500						

* Denotes sizes only available in KP300.

Notes:

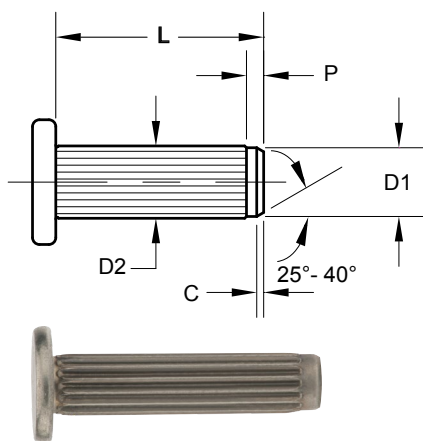
- Recommended hole sizes are given for average conditions. Actual required hole size is dependent on length of knurl engagement and hardness of host material.
- Other diameters, lengths and alternative knurl locations available on request.

Part Number Code

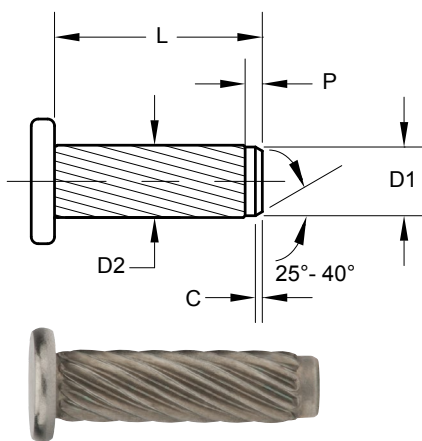
TO ORDER: SLDP (Nominal Diameter)x(Length)(Material)(Finish)(Pin Series Number)

EXAMPLE: SLDP 3 x 20 FK KP300

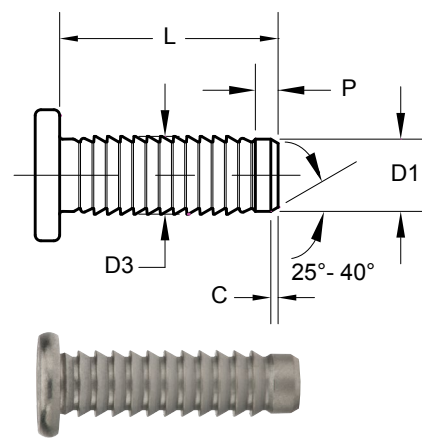
Straight Knurl Series FH200



Helical Knurl Series FH300



Barbed Series FH400



MATERIAL

F Low Carbon Steel

D Stainless Steel, Austenitic (Nickel)

FINISH

K Plain

P Passivated

DIMENSIONAL DATA

		METRIC SPECIFICATIONS							INCH SPECIFICATIONS					
Nominal Diameter ▶		2	2.5	3	4	5	6		5/64 .078	3/32 .094	1/8 .125	5/32 .156	3/16 .187	1/4 .250
Pilot Diameter "D1"	Min.	1.95	2.45	2.95	3.95	4.95	5.95	Min.	.0761	.0917	.1230	.1542	.1855	.2480
	Max.	2.00	2.50	3.00	4.00	5.00	6.00	Max.	.0781	.0937	.1250	.1562	.1875	.2500
Diameter "D2"	Min.	2.20	2.70	3.25	4.25	5.25	6.25	Min.	.084	.099	.131	.163	.195	.256
	Max.	2.30	2.80	3.35	4.35	5.35	6.35	Max.	.088	.103	.136	.168	.200	.262
Diameter "D3"	Min.	2.36	2.86	3.36	4.36	5.36	6.36	Min.	.092	.107	.139	.170	.201	.264
	Max.	2.46	2.96	3.46	4.46	5.46	6.46	Max.	.097	.112	.144	.175	.206	.269
Head Diameter	Min.	3.30	4.20	4.95	6.75	8.50	10.20	Min.	.132	.156	.209	.263	.312	.425
	Max.	3.70	4.60	5.45	7.25	9.10	10.80	Max.	.142	.172	.229	.283	.338	.451
Head Thickness	Min.	0.55	0.70	0.90	1.20	1.50	1.90	Min.	.022	.028	.036	.048	.060	.077
	Max.	0.75	0.90	1.20	1.50	1.80	2.20	Max.	.030	.036	.048	.060	.073	.090
Chamfer "C"	Ref.	0.15	0.2	0.2	0.3	0.4	0.4	Ref.	.005	.008	.008	.010	.015	.015
Pilot Length "P"	Ref.	0.6	0.8	1	1.2	1.5	2	Ref.	.026	.031	.039	.046	.062	.078
Recommended Hole	Min.	2.00	2.50	3.00	4.00	5.00	6.00	Min.	.078	.094	.125	.156	.188	.250
	Max.	2.06	2.56	3.06	4.08	5.08	6.08	Max.	.080	.096	.127	.159	.191	.253
Length "L"	6	*						.250	*					
	8	*						.312	*					
	10	*		Length Tolerance				.375	*		Length Tolerance			
	12			± 0.25				.500			± .010			
	16							.625						
	20							.750						
	24							1.000						

* Denotes sizes only available in FH300 and FH400.

Notes:

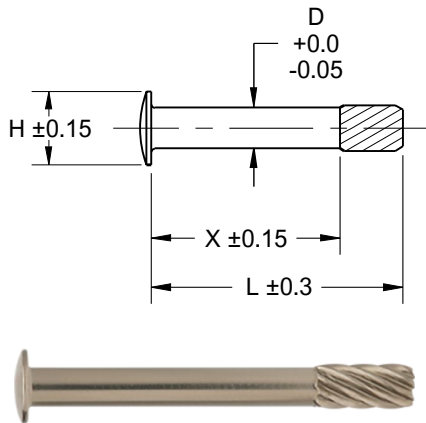
- Recommended hole sizes are given for average conditions. Actual required hole size is dependent on length engagement and hardness of host material.
- Other diameters, lengths and alternative knurl locations available on request.
- Series FH200, FH300 and FH400 are available to order with round heads.

Part Number Code

TO ORDER: SLDP (Nominal Diameter)x(Length)(Material)(Finish)(Pin Series Number)

EXAMPLE: SLDP 4 x 16 FK FH100

Twist-Lok™ Pin Series RH600



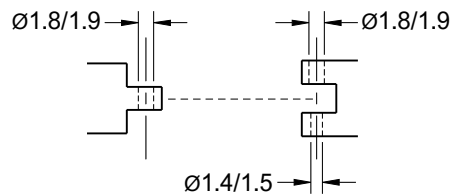
MATERIAL
N Nickel Silver

FINISH
K Plain

DIMENSIONAL DATA

	METRIC SPECIFICATIONS
Nominal Diameter ▶	1.60
Head Diameter "H"	2.85
Length "L"	6
	8
	10
Length "X"	4.5
	6
	7.5

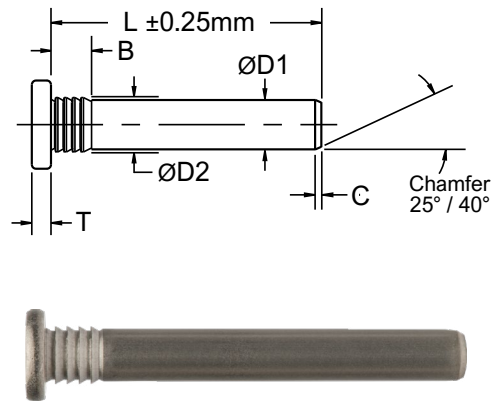
RECOMMENDED HOLE SIZE



Notes:

- Series RH600 Twist-Lok™ Pins are made to order.
- Series LP500 Latch Pins are available to order with or without a head.
- Other diameters, lengths and alternative knurl locations available on request.

Latch Pin Series LP500



MATERIAL
A Aluminium

FINISH
K Plain

DIMENSIONAL DATA

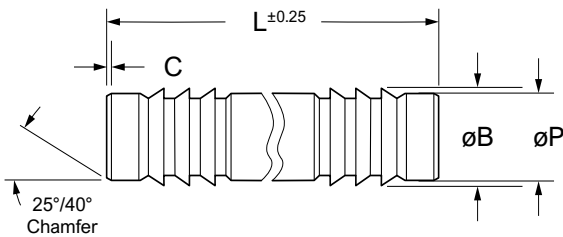
		METRIC SPECIFICATIONS		
Nominal Diameter ▶		3	4	5
Head Diameter "S"	Min.	4.95	6.75	8.50
	Max.	5.45	7.25	9.10
Head Thickness "T"	Min.	0.90	1.20	1.50
	Max.	1.20	1.50	1.80
Diameter "D1"	Min.	2.95	3.95	4.95
	Max.	3.00	4.00	5.00
Barb Diameter "D2"	Min.	3.25	4.25	5.25
	Max.	3.40	4.40	5.40
Chamfer Length "C"	Min.	0.15	0.40	0.40
Barb Count "B"	Max.	3	4	5
Recommended Hole	Min.	3.00	4.00	5.00
	Max.	3.06	4.08	5.08
Length "L"	16			
	18			
	20			
	24			
	26			
	30			
	35			
	40			
	45			
	50			
	55			
	60			
	65			
	70			
	75			

Part Number Code

TO ORDER: SLDP (Nominal Diameter)x(Length)(Material)(Finish)(Pin Series Number)

EXAMPLE: SLDP .250 x .625 FK FH300

Press-N-Lok™ Pin Series BP100



MATERIAL

A Aluminium

FINISH

K Plain

DIMENSIONAL DATA

	METRIC SPECIFICATIONS			
Nominal Diameter ▶		2	3	4
Pilot Diameter "P"	Min.	1.90	2.90	3.90
	Max.	2.00	3.00	4.00
Barb Diameter "B"	Min.	2.25	3.25	4.25
	Max.	2.40	3.40	4.40
Barb Count (Per Side)	#	2	3	4
Chamfer Length "C"	Min.	0.15	0.20	0.30
Recommended Hole	Min.	2.00	3.00	4
	Max.	2.10	3.10	4.10
Length "L"	8			
	12			
	16			
	18			
	24			
	32			

Notes:

- Available to order in stainless steel
- Other diameters and lengths available on request

Part Number Code

TO ORDER: SLDP (Nominal Diameter)x(Length)(Material)(Finish)(Pin Series Number)
 EXAMPLE: SLDP 4 x 16 FK FH100

We recognise that an essential factor in reducing the overall cost is trouble-free assembly. While Solid Pins can be installed with a hammer or with an arbor press, SPIROL's Pin Installation equipment increases production efficiency, particularly with awkward or small components.

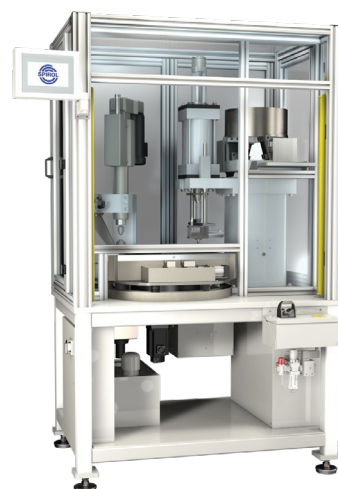
SPIROL is the *only* manufacturer of Solid Pins that designs, builds and supports a comprehensive standard line of Pin Installation Equipment ranging from manual to fully automatic modules. We are experts in adapting our standard modules to customer specific applications, including fixturing and holding components for both a quality installation and ease-of-assembly. Our time-tested, proven and reliable equipment can be equipped with options such as rotary index tables, pin sensing, force monitoring, and drilling and pinning combinations for enhanced productivity, heightened process control and error proofing.



Model PMH
Manual Pin
Inserter



Model CR
Semi-Automatic
Pin Inserter



Model DP
Drilling and
Pinning Machine

SPIROL *guarantees* that our equipment will enhance your productivity and reduce your total manufacturing costs by offering the *only* performance warranty in the industry.

COMPLIMENTARY APPLICATION ENGINEERING

SPIROL offers complimentary Application Engineering support. Through partnering with each other early in the design stage, we will not only help specify the most appropriate Solid Pin for your application, but we will make the critical recommendations for the interface between our product and your assembly. If Installation Equipment is required, SPIROL's Engineers will help you select the appropriate level of automation to meet your specific needs. Essentially, when you engage SPIROL as a design partner, you will shorten the cycle time and get to market as quickly as possible with a high quality, profitable product.



**Innovative Fastening Solutions.
Lower Assembly Costs.**



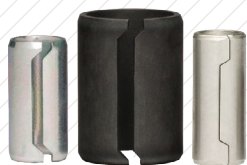
Coiled Spring Pins



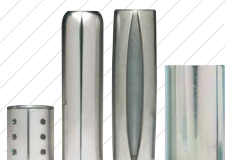
Slotted Spring Pins



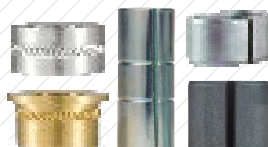
Solid Pins



**Alignment Dowels /
Bushings**



**Spacers & Rolled
Tubular Components**



**Compression
Limiters**



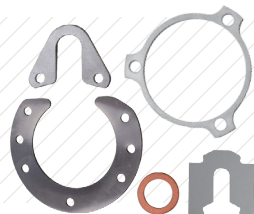
**Threaded Inserts
for Plastics**



Disc Springs



**Machined Aerospace
Components**



**Precision Shims,
Washers & Metal Gaskets**



Laminated Shims



**Parts Feeding
Technology**



**Pin Installation
Technology**



**Insert Installation
Technology**



**Compression Limiter
Installation Technology**

Please refer to www.SPIROL.co.uk for current specifications and standard product offerings.

SPIROL offers complimentary Application Engineering support! We will assist on new designs as well as help resolve issues, and recommend cost savings on existing designs. Let us help by visiting **Application Engineering Services** on SPIROL.co.uk.

Technical Centres

Europe **SPIROL United Kingdom**
Corby, Northants, England
+44 (0) 1536 444800
info-uk@spirol.com

SPIROL Ford
South Shields, Tyne & Wear, England
+44 (0) 1914 540141
contactus@ford-engineering.com

SPIROL France
Saint-Léonard
+33 (0) 3 26 36 31 42
info-fr@spirol.com

SPIROL Germany
Münich
+49 (0) 89 4 111 905 71
info-de@spirol.com

SPIROL Spain
Barcelona
+34 932 71 64 28
info-es@spirol.com

SPIROL Czech Republic
Tuchoměřice
+420 226 218 935
info-cz@spirol.com

SPIROL Poland
Warsaw
+48 510 039 345
info-pl@spirol.com

Americas **SPIROL International Corporation**
Connecticut, USA
+1 860 774 8571
info@spirol.com

SPIROL Shim Division
Ohio, USA
+1 330 920 3655
info@spirol.com

SPIROL Canada
Windsor, Ontario
+1 519 974 3334
info-ca@spirol.com

SPIROL Mexico
Apodaca, Nuevo León
+52 81 8385 4390
info-mx@spirol.com

SPIROL Brazil
Indaiatuba, São Paulo
+55 19 3936 2701
info-br@spirol.com

Asia Pacific **SPIROL China**
Shanghai
+86 (0) 21 5046-1451
info-cn@spirol.com

SPIROL Malaysia
Iskandar Puteri, Johor
+60 77 063 960
info-my@spirol.com

SPIROL Korea
Seoul, South Korea
+82 (0) 10 9429 1451
info-kr@spirol.com