

# SPIROL<sup>®</sup>

COILED SPRING PINS





# The Spirol Concept

Our objective is to provide our customers with the best value; the lowest installed pin cost. To achieve this objective, our sales strategy focuses on the application engineering approach.

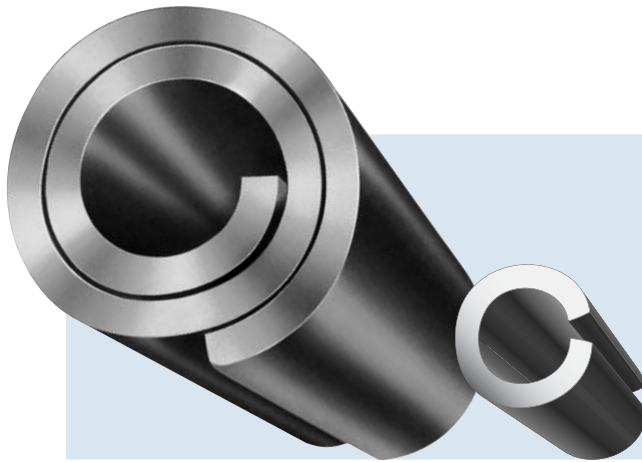
Starting with an analysis of your needs and objectives, our application engineers determine the best Spirol® coiled pin for the application. Consideration is not only given to the pin but also to the specifications of the components to be assembled and potential assembly problems. Recommendations and samples are provided for your evaluation.

The versatility of the Spirol® coiled pin makes it the ideal fastener to meet the specific engineering and economic objectives of pinning applications. Our broad range of standard pins is designed to meet most requirements. If a special diameter, length, duty, material, tolerance or pin configuration is needed, we are ready to assist you.

*Challenge us!*



# What Differentiates A Coiled Pin?



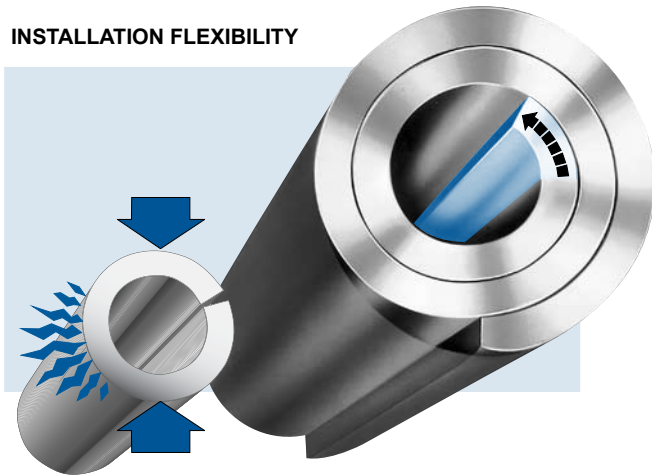
SPIROL COILED PIN  
PRIOR TO INSTALLATION

SLOTTED PIN

## PRIOR TO INSTALLATION

All spring pins have the common characteristic of a pin diameter larger than the hole diameter into which the pin is installed. Coiled pins can be easily identified by the  $2\frac{1}{4}$  coil cross-section. The absence of a gap eliminates pin nesting and interlocking.

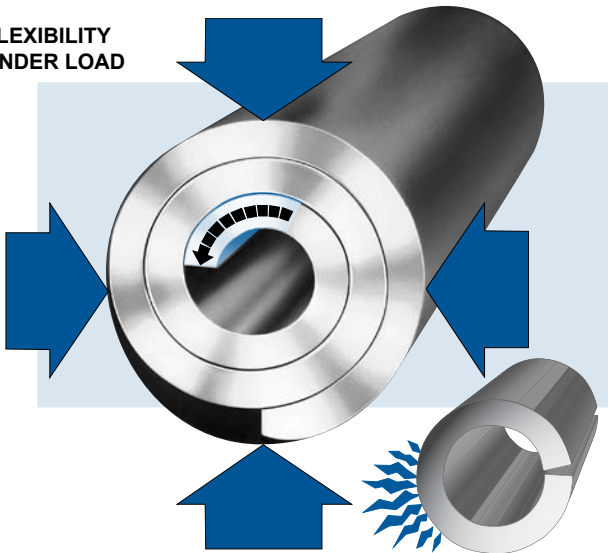
## INSTALLATION FLEXIBILITY



## DURING INSTALLATION

When Spirol® coiled pins are installed, the compression starts at the outer edge and moves through the coils toward the center. Compression is uniform and stresses are distributed equally throughout the cross-section. Slotted pins compress by closing the gap—stresses concentrate opposite the gap and compression is not uniform around the circumference of the pin.

## FLEXIBILITY UNDER LOAD



## UNDER APPLIED LOADS

Spirol® coiled pins continue to flex after insertion when a load is applied to the pin. The stresses are distributed equally throughout the pin cross-section. The strength of the pin is not affected by the direction of the applied load. Shock and vibration are absorbed. Slotted pins cannot flex after the gap is closed to absorb shock or vibration. Stresses resulting from applied loads are concentrated opposite the gap. Consequently the strength of the pin is affected by the direction of the load.

Only coiled pins utilize the spiral spring concept...a recognized superior spring design. It imparts to Spirol® coiled pins unique features not found in other spring pins. More than fasteners, Spirol® coiled pins are also shock absorbing elements which are integral, active components of a total assembly.

### ABSORBS SHOCK AND VIBRATIONS

The spiral spring concept represents broad design latitude in the control and development of pin flexibility. The engineered flexibility of Spirol® coiled pins provides for compression of the pin into the hole and for continued flexibility after insertion. Without this flexibility, the total load applied to the pin would be transmitted to the hole wall without dampening the impact. Since the hole material is normally softer than the pin, elongation or enlargement of the hole would result. The fit between the hole and the pin would become loose, increasing the impact force and accelerating the rate of hole damage. The inevitable result would be premature failure of the assembly. In properly engineered applications, the flexibility of Spirol® coiled pins dampens shock and vibration, thus eliminating hole damage on all the components of the assembly resulting in maximum product life.

### UNIFORM STRENGTH AND FLEXIBILITY

Force direction does not affect the flexibility and shear strength of the Spirol® coiled pin. Compression causes the pin to coil from the outer edge inwardly towards the center. When loads are applied and relieved, as happens in shock and vibration, the pin contracts

and expands in unison. Application of an excessive load compresses the pin into a solid tube. Further loading causes shear failure. In properly engineered applications, this condition should not occur.

### EQUAL STRESS DISTRIBUTION

Stresses imparted to the pin during installation compression, as well as stresses resulting from applied loads, shock and vibration, are distributed equally throughout the Spirol® coiled pin cross section. This concept and uniform flexing and strength are related and inherent features of the spiral design. Stress concentration results in a weak point where progressive shear failure starts and premature fatigue occurs. Spirol® coiled pins have no weak points of stress concentration.

### DUTIES

Flexibility, strength, and diameter must be in the proper relationship to each other and to the mating host materials to maximize the unique features of the Spirol® coiled pin. Strength and flexibility must be balanced. A pin too strong for the applied load would not flex, causing damage to the hole. A pin not strong enough would flex too much and fatigue. Balanced strength and flexibility must be combined with a large enough pin diameter to transmit applied loads without damaging the hole wall. That is why Spirol® coiled pins are offered in different duties...to provide a variety of combinations of strength, flexibility and diameter to suit different mating host materials.



## ...and Other Advantages

### CLOSER DIAMETER TOLERANCES

Spirol® coiled pins have a closer diameter tolerance than any other type of spring pins. At least 270° of the outer circumference is within the specified tolerance range. The minimum diameter is not averaged, as is the case with other spring pins. The outer lip of the spiral is beveled to eliminate a sharp edge. These factors combine to make the Spirol® coiled pin ideal for hinge, axle, and dowel applications.

### CONFORMS TO HOLE

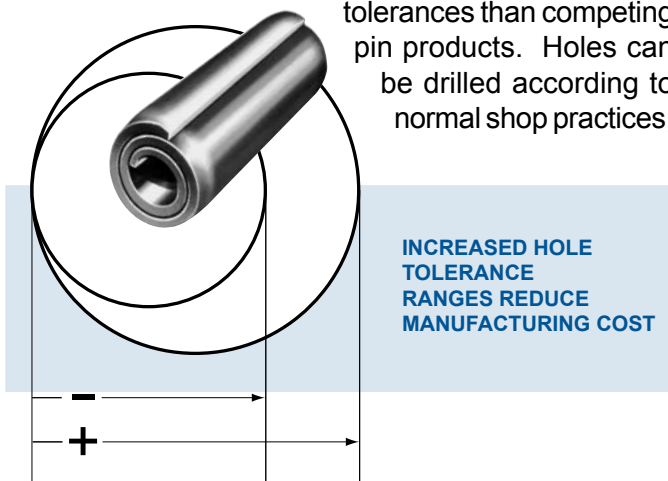
The thin gauge material in the 2¼ coiled construction gives the pin a greater inherent ability to conform itself radially and longitudinally to the hole wall. It can be used in out-of-round and tapered holes without negatively affecting its performance. Greater contact area between the pin and hole results in better load distribution and reduces the possibility of hole damage.

### SWAGED CHAMFERS

Spirol® coiled pins have a smooth, concentric lead-in chamfer with a radius which blends into the diameter of the pin. There are no sharp angles or edges to bite into the hole wall. The swaged chamfer provides maximum compression leverage with minimum thrust resistance to ease insertion. The chamfer concentricity assists in alignment of holes.

### LARGE HOLE TOLERANCE RANGE

Spirol® coiled pins accommodate larger hole tolerances than competing pin products. Holes can be drilled according to normal shop practices,



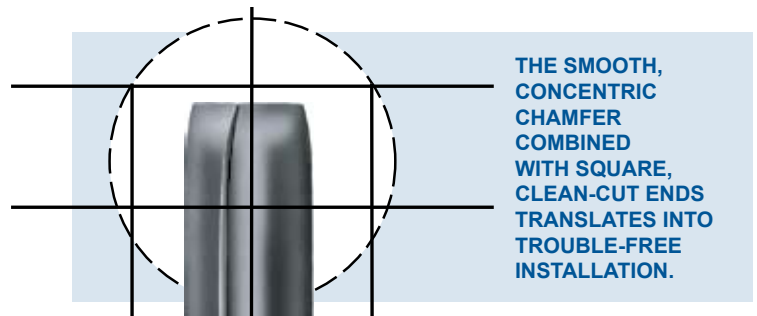
drills can be used longer, and the feed rate of the drills can be optimized. Drilling can be eliminated completely by utilizing molded, cast, and stamped holes.

### LOW INSERTION PRESSURE-RADIAL TENSION

Standard and light duty coiled pins require less pressure to insert than other spring pins. In addition, these pins exert less radial tension; an important factor where holes are in thin sections, close to an edge, or in fragile materials. The benefit is reduced component damage, fewer rejects and increased productivity.

### SQUARE ENDS-LENGTH TOLERANCE

Spirol® coiled pins combine a close length tolerance with square, clean-cut ends. The clean-cut ends are a distinct advantage in appearance. The close length tolerance insures maximum contact area in those applications where protrusion by the pin from the hole is not acceptable.

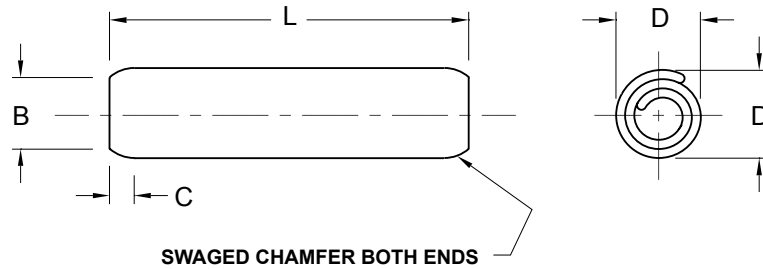


### AUTOMATIC FEEDING

The square ends and closer length tolerance have a substantial impact on trouble-free automatic feeding. Most important of all is the absence of a gap which eliminates pin nesting and interlocking—a major problem in automation.

### REUSABLE

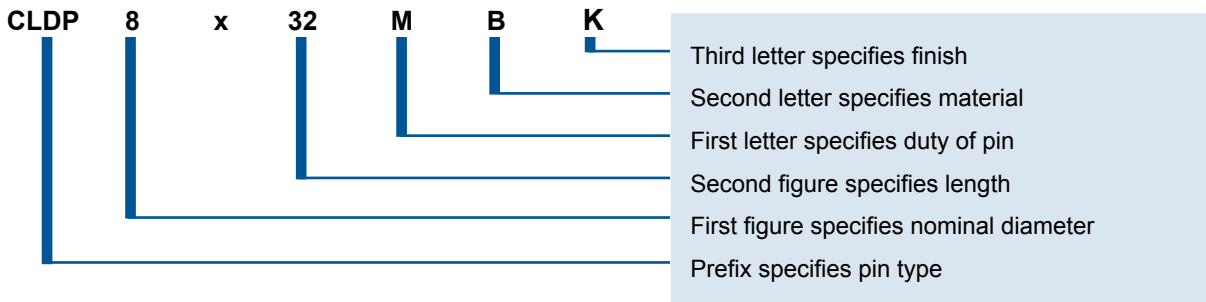
When driven from a hole, the Spirol® coiled pin expands to its original diameter. The same pin may be reused indefinitely in the same hole or other holes meeting specifications.



PIN DUTIES	PIN MATERIAL AND HARDNESS		FINISHES
<b>M</b> Standard	<b>B</b> High Carbon Steel SAE 1070-1095/CS 70	HV 420 TO 545	<b>K</b> Plain, oiled
<b>H</b> Heavy	<b>C</b> Chrome Stainless Steel SAE 51420	HV 460 TO 560	<b>P</b> Passivated, oiled
<b>L</b> Light	<b>D</b> Nickel Stainless Steel SAE 30302/30304	Work hardened	<b>R</b> Phosphate coated
	<b>W</b> Alloy Steel SAE 6150H	HV 423 to 544	<b>T</b> Zinc plated

### IDENTIFICATION CODE

Coiled pin 8 mm dia. x 32 mm Length Standard Duty/Carbon Steel/Plain Finish



### SPECIFICATIONS AND STANDARDS

- Standard Duty Pins — ISO 8750, NASM10971, NASM51923, NAS1407, ASME B18.8.2, ASME B18.8.3M
- Heavy Duty Pins — ISO 8748, NASM10971, NASM39086, NAS561, ASME B18.8.2, ASME B18.8.3M
- Light Duty Pins — ISO 8751, NASM10971, NASM51987, NAS1407, ASME B18.8.2, ASME B18.8.3M

### NOTES

- Standard specifications apply except where otherwise specified.
- Light duty carbon steel pins are not produced in diameters smaller than .094 and 2.5 mm.
- .031, .047, 1 mm diameter pins are only available in SAE 30302/30304 and 51420 materials.
- Where appropriate, zinc plating conforms to ASTM B633 SC1, Type 1 and BS 1706.1990 Fe/Zn/5c.
- Where appropriate, phosphate coating conforms to MIL-DTL-16232 Type Z, Class 1 and BS 3189 Fe/Zn/10ph.
- The standard material for .625 in. and .750 in. and 16 mm and 20 mm diameter pins is SAE 6150H.
- The standard finish for stainless steel pins is plain, oiled. Passivated pins are available at an additional cost.
- Special materials and finishes, including oil-free pins, are available upon request.

# STANDARD COILED PINS

## Inch Sizes

NOMINAL DIAMETER			.031	.039	.047	.052	.062	.078	.094	.109	.125	.156	.187	.219	.250	.312	.375	.500	.625	.750
			1/32		3/64		1/16	5/64	3/32	7/64	1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	5/8	3/4
STANDARD DUTY DIAMETER	D	MAX.	.035	.044	.052	.057	.072	.088	.105	.120	.138	.171	.205	.238	.271	.337	.403	.535	.661	.787
		MIN.	.033	.041	.049	.054	.067	.083	.099	.114	.131	.163	.196	.228	.260	.324	.388	.516	.642	.768
HEAVY DUTY DIAMETER	D	MAX.	—	—	—	—	.070	.086	.103	.118	.136	.168	.202	.235	.268	.334	.400	.532	.658	.784
		MIN.	—	—	—	—	.066	.082	.098	.113	.130	.161	.194	.226	.258	.322	.386	.514	.640	.766
LIGHT DUTY DIAMETER	D	MAX.	—	—	—	—	.073	.089	.106	.121	.139	.172	.207	.240	.273	.339	.405	.537	—	—
		MIN.	—	—	—	—	.067	.083	.099	.114	.131	.163	.196	.228	.260	.324	.388	.516	—	—
CHAMFER	B DIA.	MAX.	.029	.037	.045	.050	.059	.075	.091	.106	.121	.152	.182	.214	.243	.304	.366	.488	.613	.738
	C LENGTH	REF.	.024	.024	.024	.024	.028	.032	.038	.038	.044	.048	.055	.065	.080	.095	.110	.125	.150	
RECOMMENDED HOLE SIZE		MAX.	.032	.040	.048	.053	.065	.081	.097	.112	.129	.160	.192	.224	.256	.319	.383	.510	.635	.760
		MIN.	.031	.039	.047	.051	.061	.077	.093	.108	.124	.155	.185	.217	.247	.308	.370	.493	.618	.743

Special diameters, lengths, duties and controlled chamfers made to order.

### MINIMUM DOUBLE SHEAR STRENGTH LBS.

NOMINAL DIAMETER			.031	.039	.047	.052	.062	.078	.094	.109	.125	.156	.187	.219	.250	.312	.375	.500	.625	.750
			1/32		3/64		1/16	5/64	3/32	7/64	1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	5/8	3/4
CARBON/ALLOY STEEL CHROME STAINLESS STEEL																				
	STANDARD DUTY		90	135	190	250	330	550	775	1,050	1,400	2,200	3,150	4,200	5,500	8,700	12,600	22,500	35,000	50,000
	HEAVY DUTY		—	—	—	—	475	800	1,150	1,500	2,000	3,100	4,500	5,900	7,800	12,000	18,000	32,000	48,000	70,000
	LIGHT DUTY		—	—	—	—	205	325	475	650	825	1,300	1,900	2,600	3,300	5,200	—	—	—	—
NICKEL STAINLESS STEEL																				
	STANDARD DUTY		65	100	145	190	265	425	600	825	1,100	1,700	2,400	3,300	4,300	6,700	9,600	17,500	—	—
	HEAVY DUTY		—	—	—	—	360	575	825	1,150	1,700	2,400	3,500	4,600	6,200	9,300	14,000	25,000	—	—
	LIGHT DUTY		—	—	—	—	160	250	360	500	650	1,000	1,450	2,000	2,600	4,000	—	—	—	—

Shear tests performed in accordance with ASME B18.8.2.

### STANDARD LENGTHS

NOMINAL DIAMETER ▶		.031	.039	.047	.052	.062	.078	.094	.109	.125	.156	.187	.219	.250	.312	.375	.500	.625	.750		
		1/32		3/64		1/16	5/64	3/32	7/64	1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	5/8	3/4		
LENGTHS	.125 1/8																				
	.188 3/16																				
	.250 1/4																				
	.312 5/16																				
	.375 3/8																				
	.438 7/16																				
	.500 1/2																				
	.563 9/16																				
	.625 5/8																				
	.688 11/16																				
	.750 3/4																				
	.813 13/16																				
	.875 7/8																				
	.938 15/16																				
	1.000 1																				
	1.125 1-1/8																				
	1.250 1-1/4																				
	1.375 1-3/8																				
	1.500 1-1/2																				
	1.625 1-5/8																				
	1.750 1-3/4																				
	1.875 1-7/8																				
	2.000 2																				
	2.250 2-1/4																				
	2.500 2-1/2																				
	2.750 2-3/4																				
	3.000 3																				
	3.250 3-1/4																				
3.500 3-1/2																					
3.750 3-3/4																					
4.000 4																					
4.500 4-1/2																					
5.000 5																					

Special lengths made to order

**Interchangeable Inch and mm Pins**

Inch Diameter	mm Diameter
.031 1/32	0.8
.039	1.0
.047 3/64	1.2
.078 5/64	2.0
.156 5/32	4.0
.312 5/16	8.0
.625 5/8	16.0

Pin Length		Length Tolerance	
Nominal Pin Size		ø1/32 to 3/8	ø1/2 to 3/4
Up to 2.000	2"	±0.010	±0.025
Over 2.000 to 3.000	2" to 3"	±0.015	±0.025
Over 3.000	3"	±0.025	±0.025

Pin Length		† Straightness Tolerance	
Up to 1.000	1"		.007
Over 1.000 to 2.000	1" to 2"		.010
Over 2.000	2"		.013

Available in Standard Duty and Stainless Steel materials only    Available in all duties    Available in Standard Duty and Heavy Duty only

† Pin must fall through a hole gauge in length equal to the next one-inch increment over the pin length with a hole equal to the maximum specified pin diameter plus the straightness tolerance by its own weight.

# STANDARD COILED PINS

## Metric Sizes

NOMINAL DIAMETER			0.8	1	1.2	1.5	2	2.5	3	3.5	4	5	6	8	10	12	16	20
STANDARD DUTY DIAMETER	D	MAX.	0.91	1.15	1.35	1.73	2.25	2.78	3.3	3.84	4.4	5.5	6.5	8.63	10.8	12.85	17.0	21.1
		MIN.	0.85	1.05	1.25	1.62	2.13	2.65	3.15	3.67	4.2	5.25	6.25	8.3	10.35	12.4	16.45	20.4
HEAVY DUTY DIAMETER	D	MAX.	—	—	—	1.71	2.21	2.73	3.25	3.79	4.3	5.35	6.4	8.55	10.65	12.75	16.9	21.0
		MIN.	—	—	—	1.61	2.11	2.62	3.12	3.64	4.15	5.15	6.18	8.25	10.3	12.35	16.4	20.4
LIGHT DUTY DIAMETER	D	MAX.	—	—	—	1.75	2.28	2.82	3.35	3.87	4.45	5.5	6.55	8.65	—	—	—	—
		MIN.	—	—	—	1.62	2.13	2.65	3.15	3.67	4.2	5.2	6.25	8.3	—	—	—	—
CHAMFER	B DIA. C LENGTH	MAX.	0.75	0.95	1.15	1.4	1.9	2.4	2.9	3.4	3.9	4.85	5.85	7.8	9.75	11.7	15.6	19.6
		REF.	0.3	0.3	0.4	0.5	0.7	0.7	0.9	1.0	1.1	1.3	1.5	2.0	2.5	3.0	4.0	4.5
RECOMMENDED HOLE SIZE	MAX. MIN.	MAX.	0.84	1.04	1.24	1.6	2.1	2.6	3.1	3.62	4.12	5.12	6.15	8.15	10.15	12.18	16.18	20.21
		MIN.	0.8	1.0	1.2	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0

Special materials, diameters, duties and controlled chamfer lengths made to order.

### MINIMUM DOUBLE SHEAR STRENGTH KN

NOMINAL DIAMETER			0.8	1	1.2	1.5	2	2.5	3	3.5	4	5	6	8	10	12	16	20
CARBON/ALLOY STEEL CHROME STAINLESS STEEL																		
STANDARD DUTY			0.4	0.6	0.9	1.45	2.5	3.9	5.5	7.5	9.6	15	22	39	62	89	155	250
HEAVY DUTY			—	—	—	1.9	3.5	5.5	7.6	10	13.5	20	30	53	84	120	210	340
LIGHT DUTY			—	—	—	0.8	1.5	2.3	3.3	4.5	5.7	9	13	23	—	—	—	—
NICKEL STAINLESS STEEL																		
STANDARD DUTY			0.3	0.45	0.65	1.05	1.9	2.9	4.2	5.7	7.6	11.5	16.8	30	48	67	—	—
HEAVY DUTY			—	—	—	1.45	2.5	3.8	5.7	7.6	10	15.5	23	41	64	91	—	—
LIGHT DUTY			—	—	—	0.65	1.1	1.8	2.5	3.4	4.4	7	10	18	—	—	—	—

Shear tests performed in accordance with ASME B18.8.3M, BS 7054 and ISO 8749.

### STANDARD LENGTHS

NOMINAL DIAMETER ►		0.8	1	1.2	1.5	2	2.5	3	3.5	4	5	6	8	10	12	16	20							
LENGTHS	4																							
	5																							
	6																							
	8																							
	10																							
	12																							
	14																							
	16																							
	18																							
	20																							
	22																							
	24																							
	26																							
	28																							
	30																							
	32																							
	35																							
	40																							
	45																							
	50																							
55																								
60																								
65																								
70																								
75																								
80																								
85																								
90																								
95																								
100																								
120																								

Interchangeable mm and Inch Pins	
mm	Inch
0.8	.031 1/32
1.0	.039
1.2	.047 3/64
2.0	.078 5/64
4.0	.156 5/32
8.0	.312 5/16
16.0	.625 5/8

**Special lengths made to order**

Pin Length	Length Tolerance	
Nominal Pin Size	∅0.8 - 10	∅12 - 20
Up to 50, inclusive	±0.25	±0.5
Over 50	±0.5	±0.5

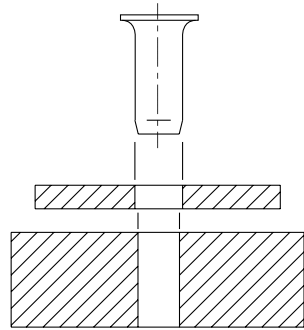
  

Pin Length	† Straightness Tolerance
Up to 24, inclusive	0.2
Over 24 to 50 inclusive	0.34
Over 50	0.48

Available in Standard Duty and Stainless Steel materials only Available in all duties Available in Standard Duty and Heavy Duty only

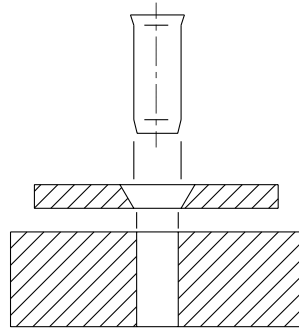
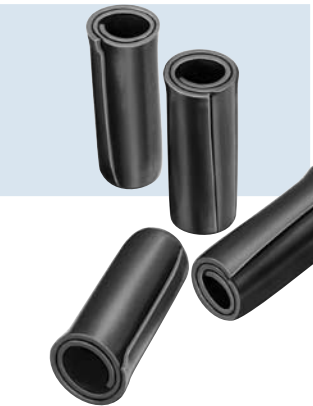
6

† Pin must fall through a hole gauge in length equal to the next 25 mm increment over the pin length with a hole equal to the maximum specified pin diameter plus the straightness tolerance by its own weight.



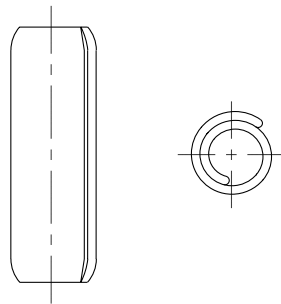
### SERIES 400 HEADED PINS

The applications for headed pins are those normally associated with studs. Headed pins are also used as spring retainers, both as anchors for tension springs and as cores for compression springs.



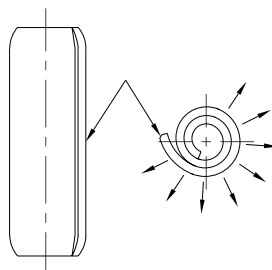
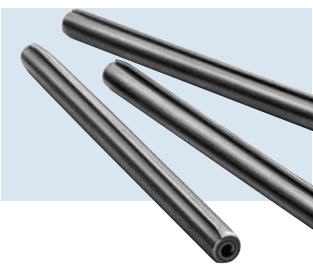
### SERIES 410 FLARED PINS

Flared pins guarantee retention to the outer limit at one end of the pin and absolute limitation of movement in one direction. Flared pins also offer benefits when removal from a blind hole is required.



### SERIES 500 EXTRA LIGHT DUTY PINS

The 1½ coil construction makes extra light duty pins the ideal solution for fragile hole materials and the most economical solution where pin strength is not a major design consideration.



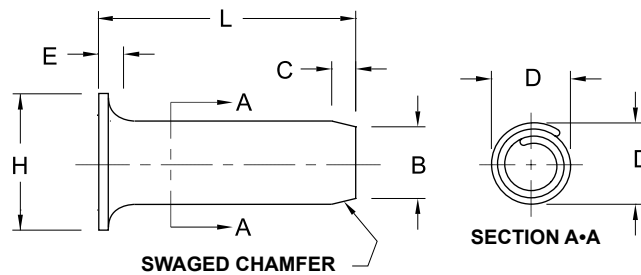
### SERIES 600 SUPERFLEX PINS

Extra flexibility is designed into the outer coil of superflex pins and the expanded diameter is reduced. The benefits are low insertion force and enhanced flexibility in the installed condition.



# SERIES 400 HEADED PINS

## Specifications and Technical Data



When a design calls for the head of the pin to be driven down flush, the radius under the head must be given clearance. To provide this clearance, either countersink the hole or enlarge the hole in the component adjacent to the head as shown above by 0.15 mm or .006" over the maximum hole sizes in the specifications.

PIN DUTIES	PIN MATERIAL AND HARDNESS	FINISHES
<b>M</b> Standard	<b>B</b> High Carbon Steel SAE 1070-1095/CS 70 HV 420 TO 545	<b>K</b> Plain, oiled <b>R</b> Phosphate coated <b>T</b> Zinc Plated

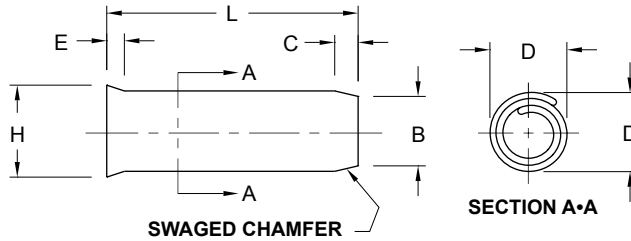
### DIMENSIONAL DATA — INCH

NOMINAL PIN SIZE	PIN DIAMETER		HEAD DIMENSIONS			CHAMFER		RECOMMENDED HOLE SIZE		LENGTHS
	D		H		E	B	C			L
	STANDARD DUTY		DIAMETER		THICK- NESS	DIA.	LENGTH			TOLERANCE ± .020
	MAX.	MIN.	MAX.	MIN.	REF.	MAX.	REF.	MAX.	MIN.	
<b>.062</b> 1/16	.072	.067	.099	.084	.016	.059	.028	.065	.062	.187 to .750
<b>.078</b> 5/64	.088	.083	.122	.105	.016	.075	.032	.081	.078	.250 to .875
<b>.094</b> 3/32	.105	.099	.144	.125	.031	.091	.038	.097	.094	.312 to 1.000
<b>.125</b> 1/8	.138	.131	.189	.166	.031	.121	.044	.129	.125	.375 to 1.500
<b>.156</b> 5/32	.171	.163	.234	.207	.047	.152	.048	.160	.156	.437 to 1.750
<b>.187</b> 3/16	.205	.196	.279	.248	.062	.182	.055	.192	.187	.500 to 2.000

### DIMENSIONAL DATA — METRIC

NOMINAL PIN SIZE	PIN DIAMETER		HEAD DIMENSIONS			CHAMFER		RECOMMENDED HOLE SIZE		LENGTHS
	D		H		E	B	C			L
	STANDARD DUTY		DIAMETER		THICK- NESS	DIA.	LENGTH			TOLERANCE ± 0.50
	MAX.	MIN.	MAX.	MIN.	REF.	MAX.	REF.	MAX.	MIN.	
<b>1.5</b>	1.73	1.62	2.4	2	0.4	1.4	0.5	1.6	1.5	5 to 18
<b>2</b>	2.25	2.13	3.1	2.6	0.5	1.9	0.7	2.1	2	6 to 22
<b>2.5</b>	2.78	2.65	3.8	3.2	0.7	2.4	0.7	2.6	2.5	8 to 28
<b>3</b>	3.3	3.15	4.6	3.9	0.8	2.9	0.9	3.1	3	10 to 25
<b>3.5</b>	3.84	3.67	5.2	4.6	0.9	3.4	1	3.62	3.5	10 to 45
<b>4</b>	4.4	4.2	6	5.2	1.2	3.9	1.1	4.12	4	12 to 40
<b>5</b>	5.5	5.25	7.4	6.5	1.5	4.85	1.3	5.12	5	14 to 50

- ⊙ Specifications on other metric and inch diameters and lengths are available on request.
- ⊙ Shear strength is the same as the equivalent size, material and duty coiled pin.



When a design calls for the flare of the pin to be driven down flush, the radius under the flare must be given clearance. To provide this clearance, countersink the hole in the component adjacent to the flare.

PIN DUTIES	PIN MATERIAL AND HARDNESS		FINISHES
<b>M</b> Standard	<b>B</b> High Carbon Steel SAE 1070-1095/CS 70	HV 420 TO 545	<b>K</b> Plain, oiled
<b>H</b> Heavy	<b>C</b> Chrome Stainless Steel SAE 51420	HV 460 TO 560	<b>P</b> Passivated, oiled
	<b>D</b> Nickel Stainless Steel SAE 30302/30304	Work hardened	<b>R</b> Phosphate coated
			<b>T</b> Zinc Plated

## DIMENSIONAL DATA — INCH

NOMINAL PIN SIZE	PIN DIAMETER				FLARE DIMENSIONS			CHAMFER		RECOMMENDED HOLE SIZE		LENGTHS	
	D				H		E	B	C			L	
	STANDARD DUTY		HEAVY DUTY		DIAMETER		THICK- NESS	DIAM.	LENGTH	TOLERANCE ± .020			
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	REF.	MAX.	REF.	MAX.	MIN.		
<b>.062</b> 1/16	.072	.067	.070	.066	.087	.078	.031	.059	.028	.065	.062	.187 to .750	
<b>.078</b> 5/64	.088	.083	.086	.082	.106	.095	.031	.075	.032	.081	.078	.250 to .875	
<b>.094</b> 3/32	.105	.099	.103	.098	.124	.112	.047	.091	.038	.097	.094	.312 to 1.000	
<b>.125</b> 1/8	.138	.131	.136	.130	.160	.145	.047	.121	.044	.129	.125	.375 to 1.500	
<b>.156</b> 5/32	.171	.163	.168	.161	.196	.178	.062	.152	.048	.160	.156	.437 to 1.750	
<b>.187</b> 3/16	.205	.196	.202	.194	.232	.211	.062	.182	.055	.192	.187	.500 to 2.000	
<b>.250</b> 1/4	.271	.260	.268	.258	.305	.278	.062	.243	.065	.256	.250	.500 to 2.000	

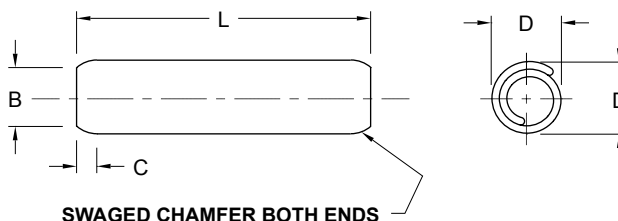
## DIMENSIONAL DATA — METRIC

NOMINAL PIN SIZE	PIN DIAMETER				FLARE DIMENSIONS			CHAMFER		RECOMMENDED HOLE SIZE		LENGTHS	
	D				H		E	B	C			L	
	STANDARD DUTY		HEAVY DUTY		DIAMETER		THICK- NESS	DIAM.	LENGTH	TOLERANCE ± 0.50			
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	REF.	MAX.	REF.	MAX.	MIN.		
<b>1.5</b>	1.73	1.62	1.71	1.61	2.2	1.9	0.7	1.4	0.5	1.6	1.5	5 to 18	
<b>2</b>	2.25	2.13	2.21	2.11	2.7	2.4	0.8	1.9	0.7	2.1	2	6 to 20	
<b>2.5</b>	2.78	2.65	2.73	2.62	3.3	2.9	0.9	2.4	0.7	2.6	2.5	8 to 25	
<b>3</b>	3.3	3.15	3.25	3.12	3.9	3.4	1	2.9	0.9	3.1	3	8 to 30	
<b>3.5</b>	3.84	3.67	3.79	3.64	4.5	4	1.1	3.4	1	3.62	3.5	10 to 35	
<b>4</b>	4.4	4.2	4.3	4.15	5	4.5	1.2	3.9	1.1	4.12	4	12 to 40	
<b>5</b>	5.5	5.25	5.35	5.15	6.2	5.5	1.4	4.85	1.3	5.12	5	14 to 50	
<b>6</b>	6.5	6.25	6.4	6.18	7.3	6.6	1.6	5.85	1.5	6.13	6	18 to 50	

- ⊙ Specifications on other metric and inch diameters and lengths are available on request.
- ⊙ Shear strength is the same as the equivalent size, material and duty coiled pin.

# SPIROL® SERIES 500 EXTRA LIGHT PINS

## Specifications and Technical Data



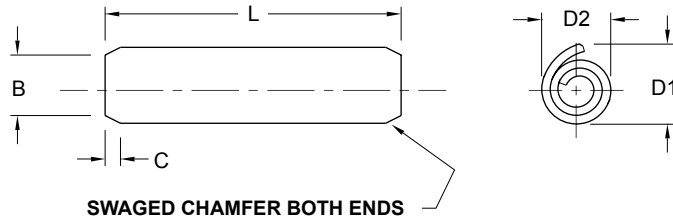
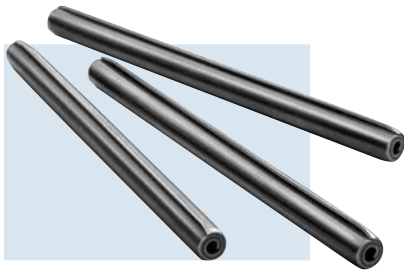
PIN DUTIES	PIN MATERIAL AND HARDNESS	FINISHES
<b>XL</b> Extra Light	<b>B</b> High Carbon Steel SAE 1070-1095/CS 70 HV 420 TO 545 <b>C</b> Chrome Stainless Steel SAE 51420 HV 460 TO 560 <b>D</b> Nickel Stainless Steel SAE 30302/30304 Work hardened	<b>K</b> Plain, oiled <b>P</b> Passivated, oiled <b>R</b> Phosphate coated <b>T</b> Zinc plated

### DIMENSIONAL DATA — INCH

NOMINAL PIN SIZE	PIN DIAMETER D		CHAMFER		RECOMMENDED HOLE SIZE		DOUBLE SHEAR STRENGTH LBS. MIN.		LENGTHS
			B	C			HIGH CARBON SAE 51420	SAE 302/304	L
			DIA.	LENGTH					TOLERANCE ± .010
MAX.	MIN.	MAX.	REF.	MAX.	MIN.				
<b>.094</b> 3/32	.108	.099	.091	.038	.097	.093	225	175	.375 to 1.000
<b>.125</b> 1/8	.141	.131	.121	.044	.129	.124	400	300	.500 to 1.250
<b>.156</b> 5/32	.174	.163	.152	.048	.160	.155	620	480	.625 to 1.750
<b>.187</b> 3/16	.210	.196	.182	.055	.192	.186	900	700	.750 to 1.750
<b>.250</b> 1/4	.276	.260	.243	.065	.256	.247	1600	1200	1.000 to 2.000

### DIMENSIONAL DATA — METRIC

NOMINAL PIN SIZE	PIN DIAMETER D		CHAMFER		RECOMMENDED HOLE SIZE		DOUBLE SHEAR STRENGTH kN MIN.		LENGTHS
			B	C			HIGH CARBON SAE 51420	SAE 302/304	L
			DIA.	LENGTH					TOLERANCE ± 0.50
MAX.	MIN.	MAX.	REF.	MAX.	MIN.				
<b>2.5</b>	2.87	2.65	2.4	0.7	2.6	2.49	1	0.75	10 to 24
<b>3</b>	3.4	3.15	2.9	0.9	3.1	2.99	1.5	1.15	12 to 30
<b>4</b>	4.5	4.2	3.9	1.1	4.12	3.98	2.8	2.1	16 to 40
<b>5</b>	5.57	5.25	4.85	1.3	5.12	4.95	4	3	20 to 45
<b>6</b>	6.72	6.25	5.85	1.5	6.13	5.95	6	4.6	24 to 50



PIN DUTIES	PIN MATERIAL AND HARDNESS	FINISHES
<b>M</b> Standard	<b>B</b> High Carbon Steel SAE 1070-1095/CS 70 HV 420 TO 545	<b>K</b> Plain, oiled
<b>H</b> Heavy	<b>C</b> Chrome Stainless Steel SAE 51420 HV 460 TO 560	<b>P</b> Passivated, oiled
		<b>R</b> Phosphate coated
		<b>T</b> Zinc plated

### DIMENSIONAL DATA — INCH

NOMINAL PIN SIZE	PIN DIAMETER								CHAMFER		RECOMMENDED HOLE SIZE		LENGTHS	
	D1				D2				B	C			L	
	STANDARD DUTY		HEAVY DUTY		STANDARD DUTY		HEAVY DUTY		DIA.	LENGTH			TOLERANCES Up to 2.000 2" ± .010 2.000 to 3.000 2" to 3" ± .015 Over 3.000 3" ± .025	
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	REF.	MAX.	MIN.		
<b>.062</b> 1/16	.072	.067	.070	.066	.065	.062	.065	.062	.059	.028	.065	.061	.250 to .625	
<b>.078</b> 5/64	.088	.083	.086	.082	.081	.078	.081	.078	.075	.032	.081	.077	.312 to .750	
<b>.094</b> 3/32	.105	.099	.103	.098	.097	.094	.097	.094	.091	.038	.097	.093	.375 to 1.000	
<b>.125</b> 1/8	.138	.131	.136	.130	.129	.125	.129	.125	.121	.044	.129	.124	.500 to 1.250	
<b>.156</b> 5/32	.171	.163	.168	.161	.160	.156	.160	.156	.152	.048	.160	.155	.625 to 1.750	
<b>.187</b> 3/16	.205	.196	.202	.194	.192	.187	.192	.187	.182	.055	.192	.185	.750 to 1.750	
<b>.250</b> 1/4	.271	.260	.268	.258	.256	.249	.256	.249	.243	.065	.256	.247	1.000 to 2.250	
<b>.312</b> 5/16	.337	.324	.334	.322	.319	.311	.319	.311	.304	.080	.319	.308	1.250 to 3.000	
<b>.375</b> 3/8	.403	.388	.400	.386	.383	.373	.383	.373	.366	.095	.383	.370	1.500 to 3.500	

### DIMENSIONAL DATA — METRIC

NOMINAL PIN SIZE	PIN DIAMETER								CHAMFER		RECOMMENDED HOLE SIZE		LENGTHS	
	D1				D2				B	C			L	
	STANDARD DUTY		HEAVY DUTY		STANDARD DUTY		HEAVY DUTY		DIA.	LENGTH			TOLERANCES Up to 10 ± 0.25 10 to 50 ± 0.50 Over 50 ± 0.75	
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	REF.	MAX.	MIN.		
<b>1.5</b>	1.73	1.62	1.71	1.61	1.63	1.5	1.63	1.5	1.4	0.5	1.6	1.5	6 to 16	
<b>2</b>	2.25	2.13	2.21	2.11	2.13	2	2.13	2	1.9	0.7	2.1	1.99	8 to 20	
<b>2.5</b>	2.78	2.65	2.73	2.62	2.64	2.5	2.64	2.5	2.4	0.7	2.6	2.49	10 to 24	
<b>3</b>	3.3	3.15	3.25	3.12	3.14	3	3.14	3	2.9	0.9	3.1	2.99	12 to 30	
<b>3.5</b>	3.84	3.67	3.79	3.64	3.66	3.5	3.66	3.5	3.4	1	3.62	3.48	14 to 35	
<b>4</b>	4.4	4.2	4.3	4.15	4.17	4	4.17	4	3.9	1.1	4.12	3.98	16 to 40	
<b>5</b>	5.5	5.25	5.35	5.15	5.18	5	5.18	5	4.85	1.3	5.12	4.95	20 to 45	
<b>6</b>	6.5	6.25	6.4	6.18	6.21	6	6.21	6	5.85	1.5	6.13	5.95	24 to 55	
<b>8</b>	8.63	8.3	8.55	8.25	8.29	8	8.29	8	7.8	2	8.17	7.93	30 to 75	
<b>10</b>	10.75	10.35	10.65	10.3	10.34	10	10.34	10	9.75	2.5	10.2	9.93	40 to 85	

- ⊙ Specifications on other metric and inch diameters and lengths are available on request.
- ⊙ Shear strength is the same as the equivalent size, material and duty coiled pin.

### HOLE CONSIDERATIONS

The edges of hardened holes should be deburred. SAE 30302/30304 pins are not recommended for hardened holes. Cast or sintered metal holes should be provided with a slight lead-in radius. Excessive burrs from drilling or stamping holes should be avoided.

### SHAFT DESIGN CONSIDERATIONS

The hole in a shaft should not exceed  $\frac{1}{3}$  of the shaft diameter. For mild steel and nonferrous shafts, we recommend standard duty pins. The extra strength of a heavy duty pin is only beneficial if the hole is  $\frac{1}{4}$  the diameter of the shaft or less or if the shaft is hardened.

### TEMPERATURE CONSIDERATIONS

- ⊗ Application temperatures for carbon and alloy steel pins should be -50° F (-45° C) to 300° F (150° C).
- ⊗ Stainless steel SAE 30302/30304 performs satisfactorily in temperatures up to 500° F (260° C) and as low as -300° F (-185° C).
- ⊗ Stainless steel SAE 51420 pins are excellent for applications up to 700° F (370° C) and as low as -50° F (-45° C).

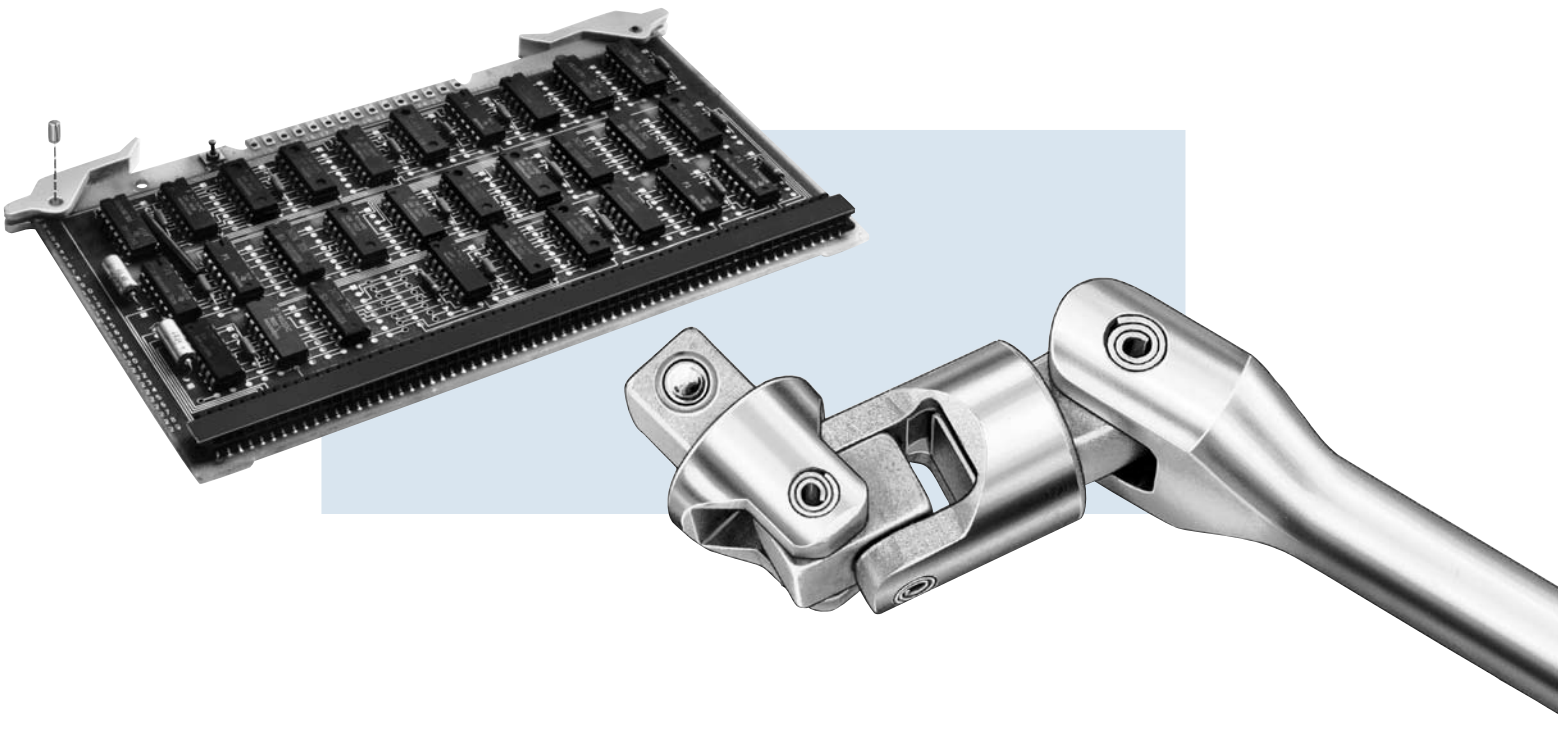
### PLATING CORROSION CONSIDERATIONS

- ⊗ Zinc plating reduces atmospheric and galvanic corrosion.
- ⊗ Phosphate coating, in addition to offering good atmospheric corrosion resistance, is an excellent base for paint.
- ⊗ SAE 30302/30304 has an excellent range of corrosion resistance in both oxygenating and nonoxygenating agents.
- ⊗ SAE 51420 has a good range of corrosion resistance in oxygenating agents.

### HINGES, PIVOTS AND AXLE DESIGN

Coiled pins have found wide application as hinges, pivots and axles. Since the part of the pin not held in the tight hole tends to recover its expanded diameter, new design concepts need to be considered.

If a free hinge, pivot or axle is the objective, determine the maximum tight hole, insert a pin and measure the exposed diameter of the pin. Add a clearance factor, usually .001" or 0.025 mm. This establishes the minimum free hole. The free fit is preferred in the center component. If a friction fit is the objective, all the holes have to be the same and the hole tolerance has to be reduced to avoid excessive friction or a loose fit. Empirically developed data is available on request.



# Installation and Automatic Assembly

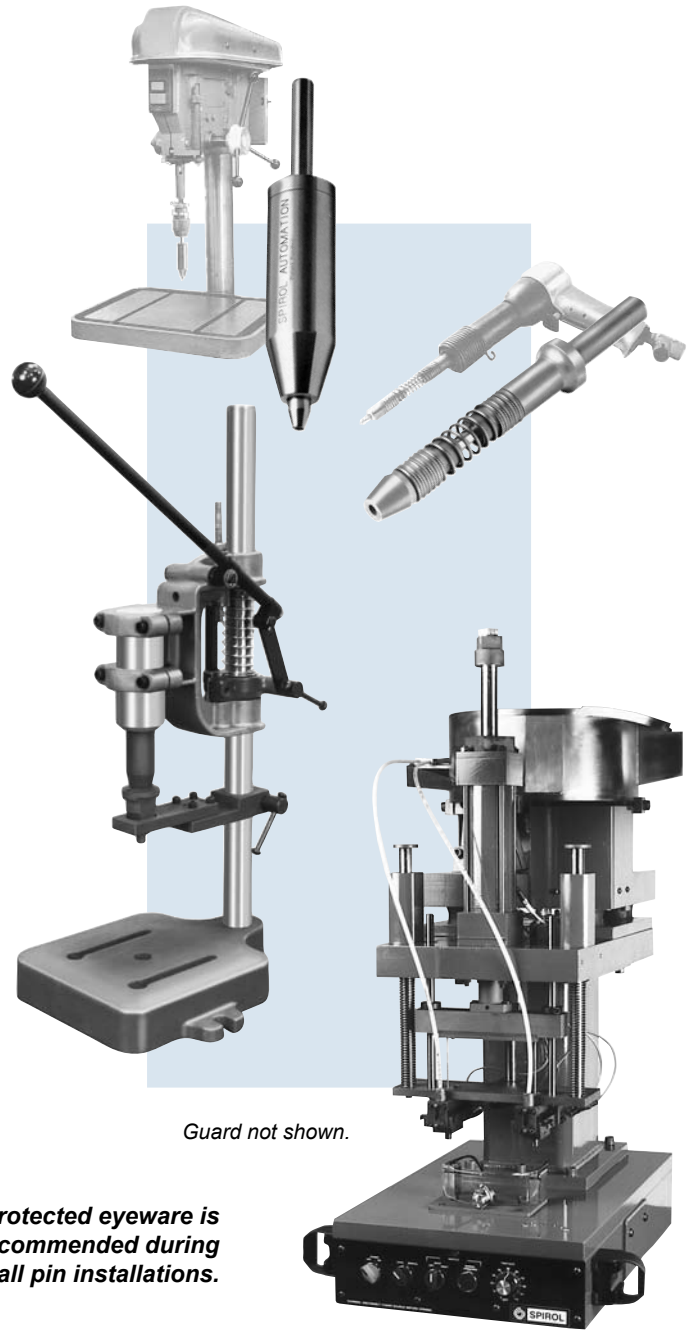
**Spirol is the only pin manufacturer that designs, builds and supports a complete line of custom-engineered pin insertion equipment.**

Spring pins can be easily installed with a hammer or a simple arbor press, but Spirol® coiled pins have several features which make them the ideal pin for automatic assembly.

- ◎ **Square ends** to line the pin up straight with the punch and hole.
- ◎ **Smooth chamfers** around the entire periphery of the pin to line up holes.
- ◎ **No gaps** to cause pin interlocking and nesting.
- ◎ **Square ends with smaller length tolerance ranges** than competing products eliminate jamming during pin installation.

To further enhance these features, Spirol® coiled pins are produced subject to demanding quality standards controlled through **STATISTICAL PROCESS CONTROL**. The objective is to provide not only a quality part but also a part suited for trouble-free automatic assembly.

We endeavor to provide our customers with the lowest installed pin cost. Our commitment to this concept is so complete that we are the only pin manufacturer who designs, builds and supports a complete line of custom engineered pin insertion equipment, fixtures and tools. Our engineers are uniquely qualified to recommend component design features and assembly methods to optimize your automation objectives.



*Guard not shown.*

***Protected eyeware is recommended during all pin installations.***

**CHALLENGE US!**

# SPIROL®

## INTERNATIONAL

**FREE APPLICATION AND  
INSTALLATION INFORMATION**

**Make Spirol your single source.**



**Coiled Spring Pins**

**Slotted Spring Pins**

**Solid Pins**

**Drive Studs**



**Inserts**

**Tubular Products**

**Alignment Dowels**

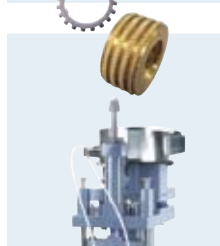
**Compression Limiters**



**Machined Nuts**

**Shims**

**Washers**



**CNC Products**

**Pin Installation Equipment**

**Insert Installation Equipment**

**Vibratory Feed Systems**



ISO/TS 16949:2002  
ISO 9001:2000 Certified

**U.S.A. Spirol International Corporation**  
30 Rock Avenue  
Danielson, Connecticut 06239  
Tel. 860.774.8571 Fax 860.774.2048

**Spirol West Inc.**  
1950 Compton Avenue, Unit 111  
Corona, California 92881-6471  
Tel. 951.273.5900 Fax 951.273.5907

**Spirol International Corporation  
Shim Division**  
321 Remington Road  
Stow, Ohio 44224  
Tel. 330.920.3655 Fax 330.920.3659

**Spirol Ascunty Inc.**  
2637 US Route 5 North  
Windsor, Vermont 05089  
Tel. 802.674.6721 Fax 802.674.6121

**Spirol Distribution**  
30 Rock Avenue  
Danielson, Connecticut 06239  
Tel. 800.321.4679 Fax 860.774.0487  
(For Distributor Customers)

**Canada Spirol Industries, Ltd.**  
3103 St. Etienne Boulevard  
Windsor, Ontario  
Canada N8W 5B1  
Tel. 519.974.3334 Fax 519.974.6550

**Mexico Spirol México, S.A. de C.V.**  
Carretera a Laredo KM 16.5 Interior E  
Col. Moises Saenz  
Apodaca, N.L. 66613 México  
ó Apdo. Postal 151 de Apodaca, N.L.  
Tel. (81) 8385 4390 Fax (81) 8385 4391

**Europe Spirol Industries, Ltd.**  
Prinewood Road  
Corby, Northants  
England NN17 4ET  
Tel. 44 (0) 1536 444800  
Fax 44 (0) 1536 203415  
(For Distributor Customers)  
Tel. 44 (0) 8003 890034

**Spirol SAS**  
Rue Henri Rol Tanguy  
Z.A. Les Naux  
51450 Bétheny  
France  
Tel. 33 (0)3 26 36 31 42  
Fax 33 (0)3 26 09 19 76

**Asia Pacific Spirol International Engineered  
Fastener Trading Co. Ltd.**  
No. 11 Xi Ya Rd. North  
Section A, 1F, Building 14  
Wai Gao Qiao Free Trade Zone  
Shanghai, China 200131  
Tel. (8621) 5046 1451/1452  
Fax (8621) 5046 1540

**e-mail: [information@spirol.com](mailto:information@spirol.com)**

**SPIROL.com**