

SPIROL[®]

SPACERS AND TUBULAR PRODUCTS



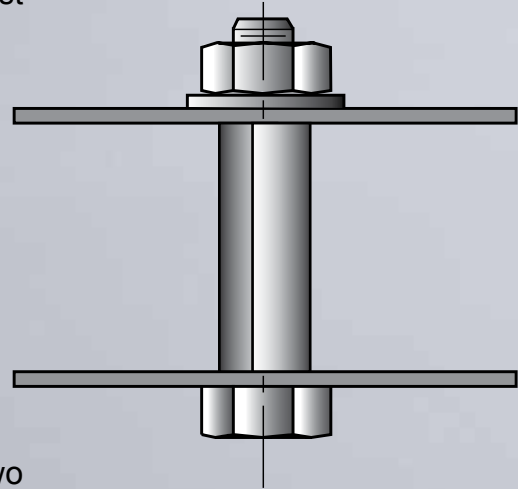


SPACERS AND TUBULAR PRODUCTS

PROPRIETARY PRODUCTION TECHNOLOGY AND VALUE-ENGINEERED DESIGN REDUCES THE COST OF TUBULAR PRODUCTS

SPIROL® Spacers and Tubular Products are formed into butted tubes from cold rolled strip. The component cost savings are achieved through:

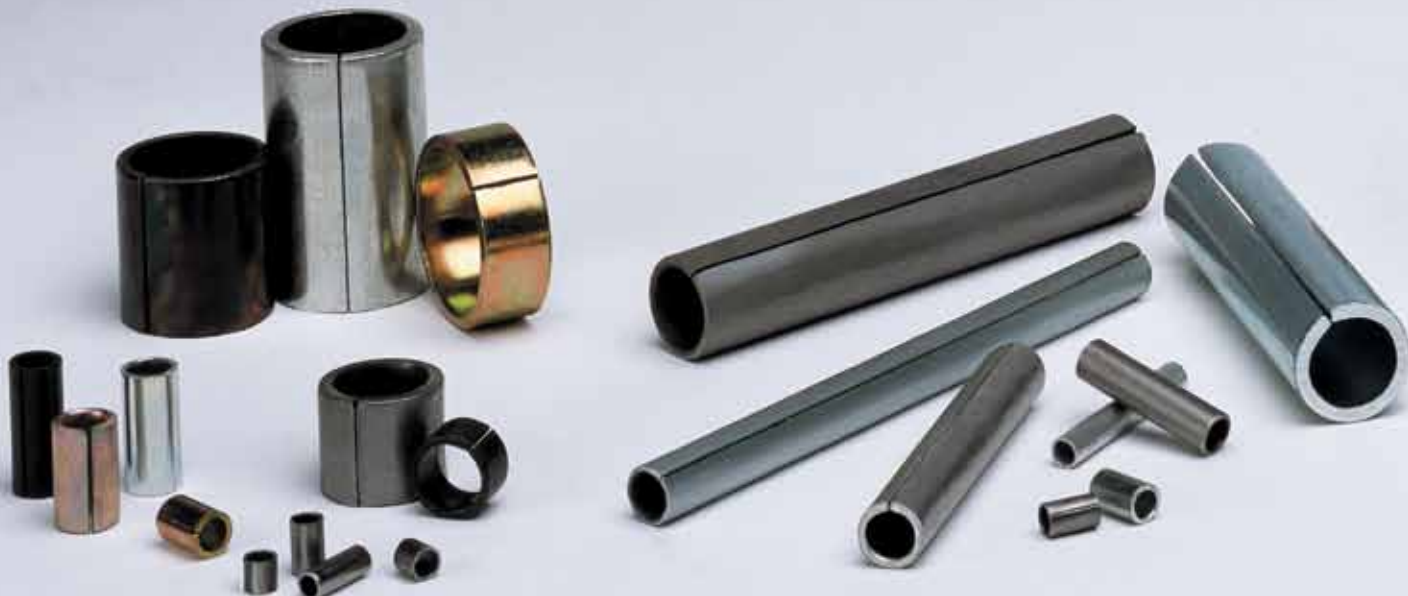
- ⊙ **SPIROL**'s proprietary, highly flexible and efficient production technology.
- ⊙ **SPIROL** designs components with the tolerancing required by the application, eliminating unnecessary tight tolerancing which is generally based on the production technology used in producing the components and not the application requirements.



Typical applications use the Spacers to separate two components in an assembly joined by a screw, rivet or rod passed through the inside diameter of the Spacers. The inside diameters of Spacers are designed for a clearance fit.

OTHER USES

Tubular parts and Spacers are also used as stand-offs, bushings, tension sleeves, compression limiters, axles and pins. **They often replace cut-off tubing, ferrules, grommets, rivets and machined parts.**



The standard range of **SPIROL®** Spacers includes both inch and metric specifications in two wall thicknesses and several materials. This provides a very extensive range of sizes particularly if the inch sizes are converted to metric or vice versa. The benefits of using standard Spacers are as follows:

- ⦿ Reduced cost particularly in low or medium volume applications and no tooling charges
- ⦿ **SPIROL** stock allows for just-in-time delivery and reduced inventories for you
- ⦿ No excess components at the end of a production run
- ⦿ No need for in-house standards and specifications and the elimination of design time



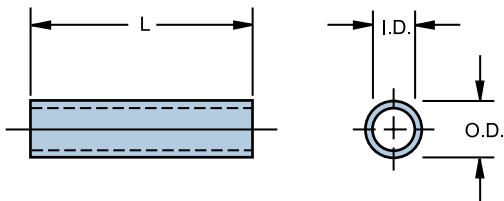
SPECIALS

If your application needs cannot be met by a standard **SPIROL®** Spacer, our Application Engineering department will assist you in designing tubular parts that meet your requirements and will provide you with samples for prototype and testing purposes.



SPACERS – SERIES SP100 AND SP150

Heavy wall Spacers have greater compression strength and additional bearing surface. Contact **SPIROL** for compression specifications and bearing surface requirements based on your application.



METRIC SPECIFICATIONS

Nominal Spacer Size		3 mm	3.5 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	20 mm	24 mm	
SP100 Std. Wall	I.D.	Min.	3.15	3.65	4.15	5.2	6.2	8.2	10.2	12.25	14.25	16.25	20.4	24.4
		Max.	3.3	3.8	4.3	5.4	6.4	8.5	10.5	12.7	14.8	16.8	21	25.2
	Wall Thickness	0.5	0.5	0.7	0.7	0.9	1.1	1.2	1.6	1.8	1.8	2	2.4	
	O.D. Ref. Only	4.25	4.75	5.65	6.7	8.1	10.55	12.75	15.7	17.75	20.15	24.7	29.6	
SP150 Heavy Wall	I.D.	Min.	3.1	3.6	4.1	5.1	6.1	8.1	10.1	12.15	-	16.15	20.2	-
		Max.	3.3	3.85	4.35	5.4	6.4	8.6	10.6	13	-	17.1	21.2	-
	Wall Thickness	0.7	0.9	1	1.2	1.5	1.7	2	2.2	-	2.6	2.8	-	
	O.D. Ref. Only	4.6	5.55	6.45	7.65	9.25	11.75	14.35	17.0	-	21.85	26.3	-	

STANDARD SIZES

Nominal Spacer Size	3 mm	3.5 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	20 mm	24 mm
4												
5												
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95												
100												
110												
120												
130												
140												
150												

Length

LENGTH TOLERANCE
SP100 ± 0.15 mm
SP150 ± 0.2 mm

LENGTH TOLERANCE
SP100 ± 0.25 mm
SP150 ± 0.4 mm

LENGTH TOLERANCE
SP100 ± 0.4 mm
SP150 ± 0.5 mm


LENGTH TOLERANCE
SP100 ± 0.25 mm
SP150 ± 0.3 mm

LENGTH TOLERANCE
SP100 ± 0.4 mm
SP150 ± 0.5 mm

LENGTH TOLERANCE
SP100 ± 0.5 mm
SP150 ± 0.6 mm

MATERIALS	FINISHES
F Low Carbon Steel	K Plain ²
D Austenitic Stainless Steel ¹	T Zinc Plated
A Aluminum ¹	R Phosphate Coated

INSPECTION METHODS
I.D. - Go and No Go Plug Gauges
Length - Calipers

PART NUMBER
Product Type, Size x Length, Material Finish, Series
Example SPCR 6 x 40 FK SP 100 SPCR .250 x 1.125 FK SP 100
 Standard Lengths shorter, longer and intermediate lengths are available on request.

¹ Only standard up to 1/4" and 6 mm diameters
² Plain finish Carbon Steel parts have a protective oil finish

INCH SPECIFICATIONS

Nominal Spacer Size		#4	#6	#8	#10	.250 1/4	.312 5/16	.375 3/8	.437 7/16	.500 1/2	.625 5/8	.750 3/4	.875 7/8	1.000 1	
SP100 Standard Wall	I.D.	Min.	.118	.144	.172	.198	.260	.322	.385	.449	.512	.637	.767	.892	1.017
		Max.	.124	.150	.180	.206	.268	.332	.395	.464	.532	.657	.792	.922	1.047
	Wall Thickness	.021	.021	.027	.027	.036	.042	.048	.048	.062	.072	.078	.083	.094	
	O.D. Ref. Only	.160	.190	.230	.255	.335	.410	.485	.550	.645	.790	.935	1.075	1.250	
SP150 Heavy Wall	I.D.	Min.	.116	.142	.168	.194	.254	.318	.381	-	.508	.632	.758	-	-
		Max.	.124	.152	.180	.206	.268	.338	.401	-	.538	.672	.798	-	-
	Wall Thickness	.027	.036	.042	.048	.058	.067	.078	-	.094	.102	.110	-	-	
	O.D. Ref. Only	.175	.220	.260	.295	.375	.460	.545	-	.710	.855	1.000	-	-	

STANDARD SIZES

Nominal Spacer Size		#4	#6	#8	#10	.250 1/4	.312 5/16	.375 3/8	.437 7/16	.500 1/2	.625 5/8	.750 3/4	.875 7/8	1.000 1	
Length	.187 3/16														
	.250 1/4														
	.312 5/16														
	.375 3/8														
	.437 7/16														
	.500 1/2														
	.562 9/16														
	.625 5/8														
	.687 11/16														
	.750 3/4														
	.812 13/16														
	.875 7/8														
	.937 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														
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4.750 4-3/4															
5.000 5															
5.250 5-1/4															
5.500 5-1/2															
5.750 5-3/4															
6.000 6															

CUSTOMIZED TO MEET YOUR SPECIFIC REQUIREMENTS

SPECIAL LENGTHS

Any length from 3/32" to 6" or 2.5 mm to 150 mm, subject to some limitations relative to diameter and wall thickness.

SPECIAL INSIDE DIAMETERS

Any diameter between 5/64" to 1" or 2 mm to 25.5 mm. Reduced tolerances are also available.

SPECIFIED OUTSIDE DIAMETERS

The outside diameter can be specified with minimum and maximum tolerances but it is then suggested to specify the inside diameter only with a reference dimension or only with a minimum dimension rather than a minimum/maximum tolerance to reduce cost.

BOTH DIAMETERS SPECIFIED

In situations which require both the inside and outside diameters to be specified with toleranced dimensions, a decision needs to be made as to which dimension should have the tighter tolerance so that the strip thickness tolerance can be properly allocated.

GAP

Spacers are usually butted with minimal or no gap. The gap can be specified from "no gap" to a toleranced or maximum specified gap.

SPECIAL WALL THICKNESS

The ideal thickness is 15% of the mean inside diameter up to a maximum of .140" and 3.5 mm. A range of 10% to 25% of the mean inside diameter is possible depending on material type and tolerancing requirements.

CONCENTRICITY

When necessary, with OD/ID reduced tolerance Spacers, concentricity can also be a specification.

SPECIAL LENGTH TOLERANCES

Standard Spacers have a generous length tolerance to keep the cost down. Reduced tolerances can be provided to .004" and 0.05 mm and in some instances even these tolerances can be further reduced. Tight tolerances increase costs. Tolerances should be tailored to the needs of the application to eliminate unnecessary expense.



SPECIAL MATERIALS

Virtually any material available in cold rolled strip form can be used. Some of the more frequently specified materials are brass and higher carbon steels for hardening purposes.

INCREASED COLUMNAR STRENGTH

Can be achieved through increased wall thickness, higher strength material, or by using materials that can be heat treated.

PERPENDICULARITY

The ends of standard Spacers are square to the axis of the Spacer but, to minimize cost, are not a controlled dimension. When required, perpendicularity can be specified.

SPECIAL FINISHES

Finishes are only limited by market availability. Finishes are specified for corrosion protection, color coding, and appearance. Stainless steel or brass should be considered in place of finishes, since these can result in a better product at a lower cost.

HEADED SPACERS/RIVETS

These are readily available in both Spacer and rivet dimensions and are used in place of expensive long semi-tubular rivets.

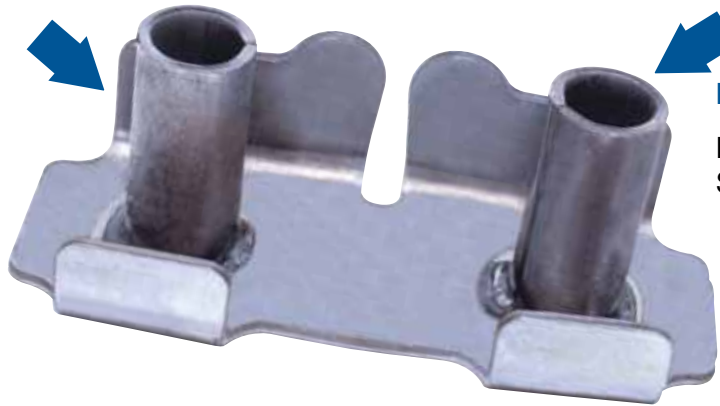
SHOULDER RIVETS

These have found a use in unique applications as a standoff, riveted in place.

OTHER SPECIALS

- ⊙ Stamped with identification numbers or letters, indentations and protrusions.
- ⊙ Holes and perforations
- ⊙ Chevron or dovetail seams
- ⊙ Outside diameter diamond knurls
- ⊙ Serrated ends
- ⊙ Inside diameter lead-ins or outside diameter chamfers
- ⊙ Oval Spacers and Tubular Products



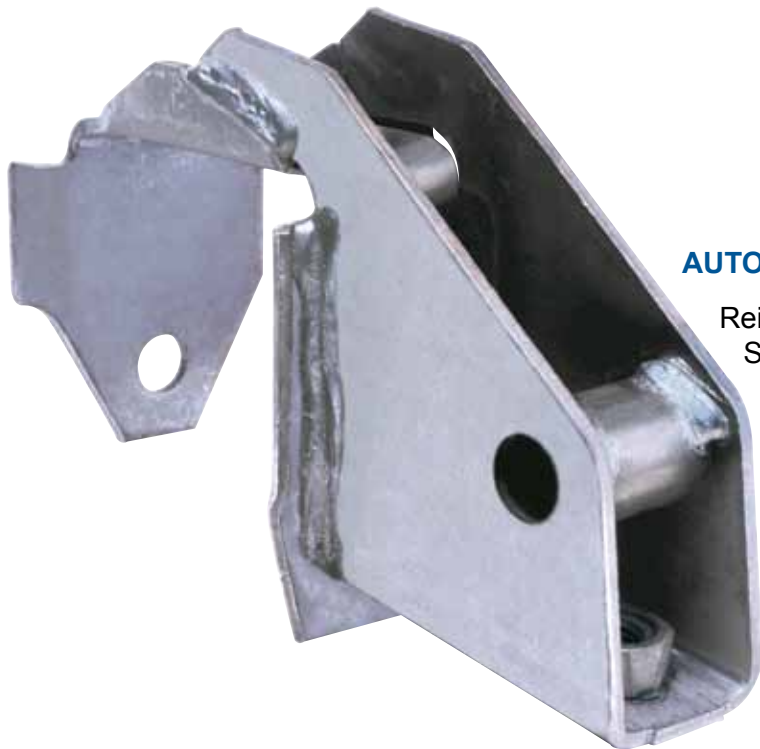


BUMPER BRACKET

Reinforces flange for bolt compression.
Spacer is welded into place.

WINDSHIELD WASHER FLUID RESERVOIR

Reinforces plastic inlet/outlet tubes for hose clamping.

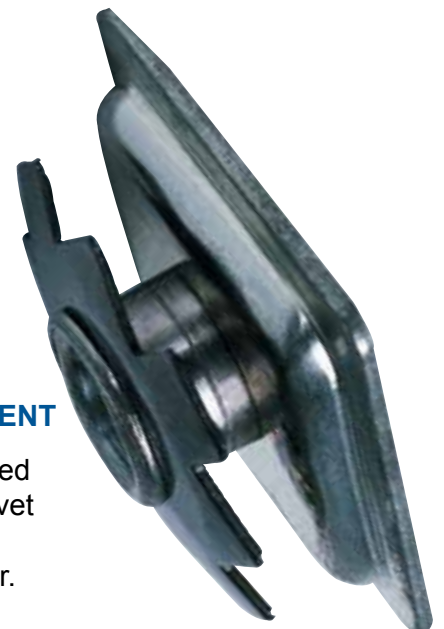


AUTOMOTIVE CHASSIS FRAME BRACKET

Reinforces hollow rectangular frame.
Spacer is welded to bracket that fits into frame.

FURNITURE/APPLIANCE FOOT COMPONENT

Separates the retention spring which is pushed into leg channel from the base. A threaded rivet passes through Spacer to hold the assembly together and receive adjustable foot or castor.



TWO CYCLE SMALL ENGINE MUFFLER EXHAUST TUBE

Rolled butted tube replaced cut tube and is welded into place.



UTILITY CART CASTOR WHEEL

Spacer is press fitted into wheel. It absorbs bolt pressure and prevents collapse of leg forks to ensure free rotation of wheel.

SHOULDER BOLT FOR DAMPENING FOOT

Spacer is staked to bolt, in some cases, after assembly of washer.

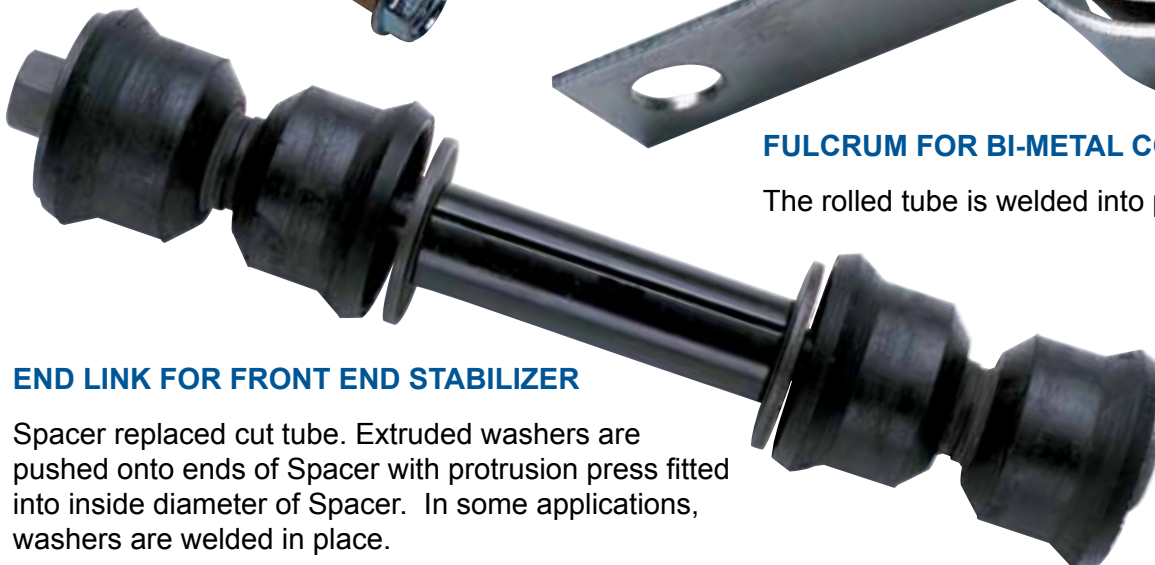


FULCRUM FOR BI-METAL COIL

The rolled tube is welded into place.

END LINK FOR FRONT END STABILIZER

Spacer replaced cut tube. Extruded washers are pushed onto ends of Spacer with protrusion press fitted into inside diameter of Spacer. In some applications, washers are welded in place.



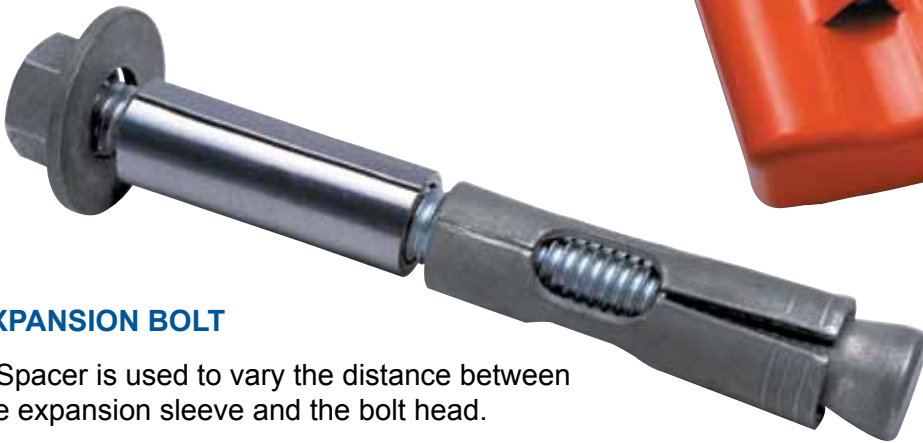
BATTERY PACK FOR MINER'S LIGHT

Spacers are used as belt retention loops and are held in place with a bolt passing through the inside diameter of the Spacer.



EXPANSION BOLT

A Spacer is used to vary the distance between the expansion sleeve and the bolt head.



UTILITY CART WHEEL ASSEMBLY

Headed Spacer is riveted into place to replace bolt or rivet. Wheel has Spacer to prevent fork compression.



RAIN GUTTER SPACER

Spacer reinforces rain gutter when being installed.



WHEEL CHAIR

Spacers are used to separate hand wheel from wheel as well as in several other locations to replace cut-off tubing.



RUBBER GROMMET RETAINER

The tubular part is used as a compression ring to hold a rubber grommet in position.



FLANGE HINGE

A traditional Spacer application to eliminate flange collapse when bolt is torqued on installation to achieve the desired friction fit.



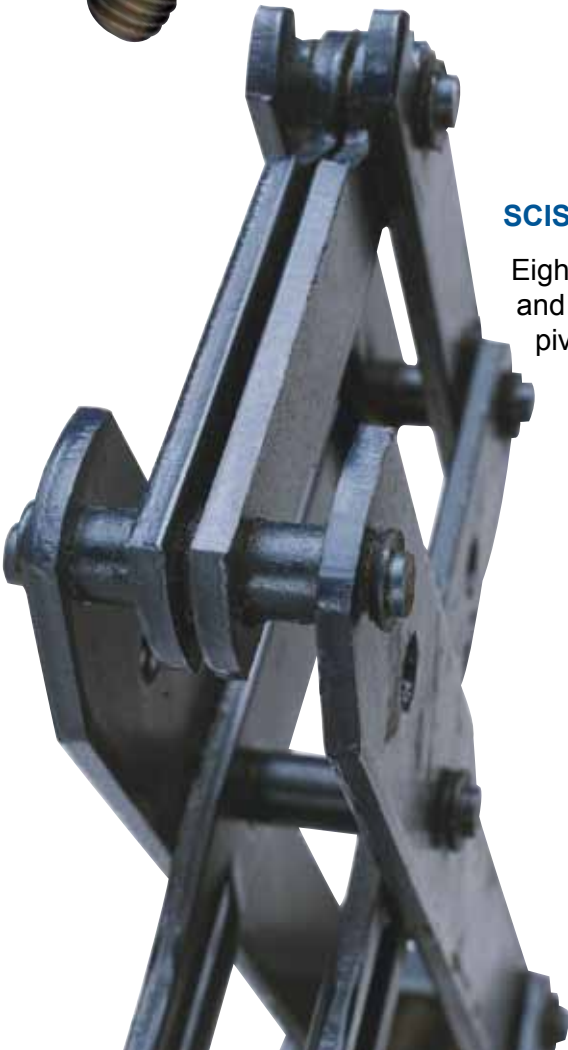
LEAF SPRING

Hardened Spacers are force fitted into the inside diameters of rubber absorption grommets. They absorb bolt compression force and isolate bolt pressure from the rubber grommet.



SCISSOR JACK

Eight Spacers are used as distance bushings and reinforcements (welded into place) in the pivot joints.



CASTOR WHEEL SOCKET (CASTOR NIB)

The rolled tube is welded to leg. Socket stem with locking ring is press fitted into inside diameter of the tube.



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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