SPIROL® Spacers are formed into closed seam tubes from cold rolled strip. The component cost savings are achieved through:

- Use of SPIROL’s proprietary, highly flexible and efficient production technology.
- SPIROL’s roll formed Spacer design has tolerances that meet typical application requirements. This prevents unnecessarily close tolerances associated with manufacturing technologies required to produce more expensive alternative products such as cut tubing, machined bushings, etc.

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

Spacers and other tubular components are also used as stand-offs, bushings, tension sleeves, compression limiters, spring guides, axles and pins. They often replace cut-off tubing, ferrules, grommets, rivets and machined parts.
STANDARD SPACERS

The standard range of SPIROL Spacers includes both metric and inch specifications in a variety of diameters and lengths. Most standard diameters are available in two wall thickness options, standard wall and heavy wall, to accommodate specific application strength and bearing requirements.

- **SP100** standard wall Spacers are typically used in static applications without excessive external forces acting on the joint.
- **SP150** heavy wall Spacers have greater compression strength and additional bearing surface. The additional bearing surface is often used to prevent witness marks or indenting when the Spacer is clamped between soft materials.

This provides an extensive range of sizes - which is broadened even further when metric sizes are converted to inch and vice versa. The benefits of using standard Spacers are as follows:

- Reduced cost and no tooling charges — particularly in low- or medium-volume applications.
- SPIROL stock allows for just-in-time delivery and reduced inventories.
- Standard Spacers can be ordered in bulk or small pack quantities to meet specific demand requirements.
- SPIROL’s expansive standard size range meets most application requirements and eliminates the need for custom-designed parts.

SPECIALS

If your application requirements cannot be met by a standard SPIROL Spacer, our Application Engineering department will assist you in designing a tubular part that meets your needs and can provide you with samples for prototype and testing purposes.
# SPIROL
## SERIES SP100 STANDARD WALL - METRIC

### MATERIAL
- F  Low Carbon Steel

### FINISHES
- K - Plain/Oiled
- H - ArmorGalv®

### DIMENSIONAL DATA

<table>
<thead>
<tr>
<th>NOMINAL SIZE</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>20</th>
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<tbody>
<tr>
<td><strong>SP100 STD WALL</strong></td>
<td></td>
<td></td>
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<td>0.7</td>
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<td>1.1</td>
<td>1.2</td>
<td>1.6</td>
<td>1.6</td>
<td>1.8</td>
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<td>6.7</td>
<td>8.1</td>
<td>10.55</td>
<td>12.75</td>
<td>15.67</td>
<td>17.73</td>
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| NOMINAL SIZE | 7   | 8   | 10  | 12  | 14  | 16  | 18  | 20  | 25  | 30  | 35  | 40  | 45  | 50  | 55  | 60  | 65  | 70  | 75  | 80  | 85  | 90  | 95  | 100 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| LENGTH       |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| L ≤ 40       | ±0.15| ±0.15| ±0.25| ±0.25| ±0.40| ±0.40| ±0.25| ±0.25| ±0.40| ±0.40| ±0.25| ±0.25| ±0.40| ±0.40| ±0.25| ±0.25| ±0.40| ±0.40| ±0.25| ±0.25| ±0.40| ±0.40| ±0.25| ±0.25| ±0.40| ±0.40|

* Generally stocked size
* All dimensions apply prior to the application of any special supplemental finish
* Shorter, longer and intermediate lengths are available upon request
* Custom diameters will be evaluated upon request

### CONTACT
SPIROL
for columnar strength and bearing surface requirements for your specific application.

### FLANGE HINGE
A traditional Spacer application used to eliminate flange collapse when the bolt is torqued during installation to achieve the desired friction fit.

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

### To Order:
- SPCR Size x Length Material Finish Series
- Example: SPCR 6 x 25 FK SP100
**MATERIAL**
- F  Low Carbon Steel

**FINISHES**
- K  Plain/Oiled
- H  ArmorGalv®

**DIMENSIONAL DATA**

<table>
<thead>
<tr>
<th>NOMINAL SIZE</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
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<tr>
<td>WALL THICKNESS</td>
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**LENGTH TOLERANCES**

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<th>NOMINAL LENGTH</th>
<th>LENGTH TOLERANCE</th>
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</thead>
<tbody>
<tr>
<td>3 - 6</td>
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<tr>
<td></td>
<td>40 &lt; L ≤ 100</td>
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<td>8 - 12</td>
<td>L ≤ 50</td>
<td>±0.40</td>
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<tr>
<td></td>
<td>50 &lt; L ≤ 100</td>
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<tr>
<td>14 - 16</td>
<td>L ≤ 100</td>
<td>±0.50</td>
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</table>

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

**AUTOMOTIVE CHASSIS FRAME BRACKET**
Reinforces hollow rectangular frame. Spacer is welded to bracket that fits into frame.

**To Order:** SPCR Size x Length Material Finish Series
**Example:** SPCR 8 x 20 FH SP150
**SPIROL**

**SPACERS**

**SERIES SP100 STANDARD WALL - INCH**

**DIMENSIONAL DATA**

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**LENGTH**

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<th>NOMINAL LENGTH</th>
<th>LENGTH TOLERANCE</th>
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<tbody>
<tr>
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<tr>
<td>.312 - .437</td>
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<td>.500 - .875</td>
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**INSPECTION METHODS**

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

**MATERIAL**

- F Low Carbon Steel

**FINISHES**

- K - Plain/Oiled
- H - ArmorGalv®

**LENGTH TOLERANCES**

- Generally stocked size
- All dimensions apply prior to the application of any special supplemental finish
- Shorter, longer and intermediate lengths are available upon request
- Custom diameters will be evaluated upon request

**RAIN GUTTER SPACER**

Spacers reinforce rain gutters when being installed on structure.

---

To Order: SPCR Size x Length Material Finish Series
Example: SPCR .250 x 1.125 FH SP100
## SPIROL

**SPC-R Size x Length Material Finish Series**

Example: SPCR .312 x 1.250 FH SP150

---

**MATERIAL**

F - Low Carbon Steel

**FINISHES**

K - Plain/Oiled

H - ArmorGalv®

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### DIMENSIONAL DATA

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<tr>
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**LENGTH TOLERANCES**

<table>
<thead>
<tr>
<th>NOMINAL SIZE</th>
<th>NOMINAL LENGTH</th>
<th>LENGTH TOLERANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>#4 - .250</td>
<td>L ≤ 1.500</td>
<td>±.008</td>
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<tr>
<td></td>
<td>1.500 &lt; L ≤ 4.000</td>
<td>±.012</td>
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<tr>
<td>.312 - .437</td>
<td>L ≤ 2.000</td>
<td>±.015</td>
</tr>
<tr>
<td></td>
<td>2.000 &lt; L ≤ 4.000</td>
<td>±.020</td>
</tr>
<tr>
<td>.500 - .875</td>
<td>L ≤ 4.000</td>
<td>±.020</td>
</tr>
</tbody>
</table>

---

**INSPECTION METHODS**

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

---

**SCISSOR JACK**

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

---

* Generally stocked size
* All dimensions apply prior to the application of any special supplemental finish
* Shorter, longer and intermediate lengths are available upon request
* Custom diameters will be evaluated upon request

---

**To Order:** SPCR Size x Length Material Finish Series

**Example:** SPCR .312 x 1.250 FH SP150
MATERIALS AND FINISHES

STANDARD MATERIAL

Low Carbon Steel (F)
Low carbon steel is the most economical material to manufacture roll formed Spacers from in the absence of any plating or coating. Additional coatings and finishes can be applied to low carbon steel to improve corrosion resistance.

STANDARD FINISHES

Plain, Oiled (K)
This finish is a thin coating of oil that provides corrosion resistance during storage and shipping.

ArmorGalv® (H)
ArmorGalv® is a zinc alloy thermal diffusion coating covered by ASTM A1059M-08(2013). SPIROL recommends ArmorGalv® for Spacers for many reasons; chief among them being uniform deposition of coating on all surfaces of the part. There are no insignificant surfaces and the entire inner diameter receives full coating and protection. ArmorGalv®, complimented by two sealers, offers a minimum of 1,000 hours corrosion resistance to red rust, and due to its slightly porous surface, it will retain paint and other coatings in the event that the complete assembly requires subsequent painting, powder coating, etc. Compared to some stainless steels, ArmorGalv® is an ideal coating for some of the most aggressive environments such as marine, automotive, agriculture, mining and industrial manufacturing.

SPECIAL 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.

Aluminum (A)
Aluminum is lightweight, lead free, and has sufficient columnar strength for many non-critical applications. Aluminum is 1/3 the weight of steel, and does not require any supplemental coatings or platings to provide the necessary corrosion protection in most environments.

SPECIAL FINISHES

Electroplated Zinc (T)
This finish consists of a minimum of 5μm (.0002”) thick electrodeposited zinc with a clear trivalent passivation topcoat. Zinc plate is primarily used for cosmetic purposes as this finish yields a bright, silvery appearance on the outside surfaces of the Spacer. Zinc plating is also commonly used to prevent galvanic corrosion. The major drawback to electroplated zinc on Spacers is that coverage on the inner diameter is limited to one diameter’s length of “throw” of the plating. If atmospheric corrosion protection is required throughout the entirety of the part, ArmorGalv® should be considered instead of zinc plate.

SPIROL is a licensee of ArmorGalv®, a registered trademark of Distek N.A LLC

STANDARD MATERIALS & FINISHES

<table>
<thead>
<tr>
<th>TYPE</th>
<th>GRADE</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>F - Low Carbon Steel</td>
<td>UNS G10060 / UNS G10080 / UNS G10100</td>
<td>K - Plain/Oiled</td>
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<td>DC04 (1.0338) / DC03 (1.0347) / DC01 (1.0330)</td>
<td>H - ArmorGalv®</td>
</tr>
</tbody>
</table>

SPIROL is a licensee of ArmorGalv®, a registered trademark of Distek N.A LLC
SPIROL specializes in replacing costly machined and cold-formed components with less expensive roll-formed product. SPIROL’s proprietary manufacturing technology enables the cost-effective production of special tubular products that meet the performance requirements of the comparatively more expensive alternatives.

**SPECIAL LENGTHS**

Any length from 2.5mm to 150mm (.094" to 6") subject to some limitations relative to diameter and wall thickness.

**SPECIAL INSIDE DIAMETERS**

Any diameter between Ø2mm to Ø26mm (Ø.078" to Ø1"). 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 with only a reference dimension or only a minimum dimension rather than a minimum/maximum tolerance to reduce cost.

**BOTH DIAMETERS SPECIFIED**

In situations that require both the inside and outside diameters to be specified with tolerated dimensions, a decision needs to be made as to which dimension should have the tighter tolerance so that the raw material 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 tolerated or maximum specified gap.

**SPECIAL WALL THICKNESS**

The ideal wall thickness is 15% of the mean inside diameter. Spacers can be manufactured to order with a special wall thickness to meet specific application requirements - subject to review by SPIROL Engineering.

**SPECIAL LENGTH TOLERANCES**

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

**INCREASED COLUMNAR STRENGTH**

Can be achieved through increased wall thickness, higher strength material, or by using materials that can be heat treated. Given that columnar strength is application dependent, SPIROL’s Applications Engineering team should be consulted whenever the Spacer will be used in a critical load bearing path.
SPECIAL SPACERS
AND ROLLED TUBULAR COMPONENTS

SPECIAL MATERIALS

Virtually any material available in cold rolled strip form can be used. Some of the more frequently specified materials are aluminum, stainless steel, brass, galvanized steel and high carbon steel.

SPECIAL FINISHES

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

HEADED SPACERS/TUBULAR RIVETS

This economical method of manufacturing, combined with the Headed Spacer’s/Tubular Rivet’s hollow construction, reduces costs and permits lower prices. They have straighter shanks than conventional Rivets for faster, easier assembly. SPIROL Engineering can provide recommended heading tool dimensions for clinching the non-headed side of the part.

SHOULDER RIVETS

Shoulder Rivets are produced to meet specific customer requirements. The clinch allowance can be varied according to the thickness of the panel to which the Shoulder Rivet is to be attached. The inside diameter can be designed to allow for the passage of rivets, screws, or shafts. The wall thickness can be varied to achieve the desired inside/outside diameter relationship. These are often used to replace expensive long Semi-Tubular Rivets.

APPLICATION-SPECIFIC SPECIALS

Lightweight and durable Conveyor Spacers are used to separate the skate wheel rollers from each other and the conveyor walls. Corrosion-resistant Garage Door Spacers for hinges cost less than cut-off tubing and plated parts.

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 and C-shaped configurations
SPIROL® SPACER AND TUBULAR COMPONENTS APPLICATIONS

GARAGE DOOR HINGE
Corrosion-resistant, galvanized steel Spacers cost less than cut-off tubing and plated parts.

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

CASTOR WHEEL SOCKET (CASTOR NIB)
The rolled Spacer is welded to the leg. Socket stem with locking ring is press fit into the inside diameter of the Spacer.

UTILITY CART WHEEL ASSEMBLY
Headed Spacer is clinched into place to replace a bolt or rivet.

WHEEL CHAIR
Spacers that replace cut-off tubing are used to separate the handrail from the rear wheel.

CONVEYOR SYSTEMS
Conveyor Spacers separate the skate wheel rollers from each other and the conveyor walls.

LEAF SPRING
Hardened Spacers are force fit into the inside diameters of rubber absorption grommets. They absorb bolt compression force and isolate bolt pressure from the rubber grommet.
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
Railroad Nuts
Disc Springs
Precision Shims & Thin Metal Stampings
Precision Washers
Parts Feeding Technology
Pin Installation Technology
Insert Installation Technology
Compression Limiter Installation Technology

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.com.

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