SKEGNESS SPRINGS LIMITED

> THE DRIVING FORCE IN SPRING MANUFACTURE

> Fourth generation of spring manufacture

Skegness Springs Ltd is a fourth generation family firm founded in London in 1923. In 1974 the company moved to Skegness, on the east coast of Lincolnshire. As a bespoke manufacturer no stock is carried. **Everything we produce is designed and made to order.** We offer an infinite range of compression, extension and torsion springs along with wire shapes and flat pressings.

We offer a complete design and development service on our full range of springs, and are always happy to advise on any aspect of spring design and application. In addition to our own knowledge, we are able to call upon the technical resources of the Institute of Spring Technology (IST) and the UK Spring Manufacturers' Association (UKSMA).

SKEGNESS SPRINGS LIMITED

Springs for any application >

MOTORSPORTS

AERONAUTICAL

AEROSPACE

MEDICAL

FOOD PROCESSING

MILITARY

ELECTRONICS

AGRICULTURAL

PETROCHEMICAL

MARINE TECHNOLOGY

ENERGY

ACADEMIC/RESEARCH

AND MANY MORE

www.skegsprings.co.uk

PLEASE CALL FOR MORE INFORMATION

01754 898330

SKEGNESS SPRINGS LIMITED

> Flexible, responsive and uncompromising....

Many of our clients operate in a 24/7 environment. With a complete range of materials in stock and a production team capable of meeting tight deadlines without compromising quality, we can offer the flexibility to respond to the most urgent of requirements – manufacturing and delivering on the same day if necessary.

From prototyping and one-off development items to emergency assistance for breakdowns and large multi-batch production runs, Skegness Springs apply the same exacting standards at every stage of production.

All the materials we use conform to recognised British, European or International standards and mechanical tests are performed throughout the production process. We work to tolerances requested by our customers, or to standard manufacturing tolerances specified in BS 1726.

We are able to supply printed load-test reports, material certificates and certificates of conformity when required.

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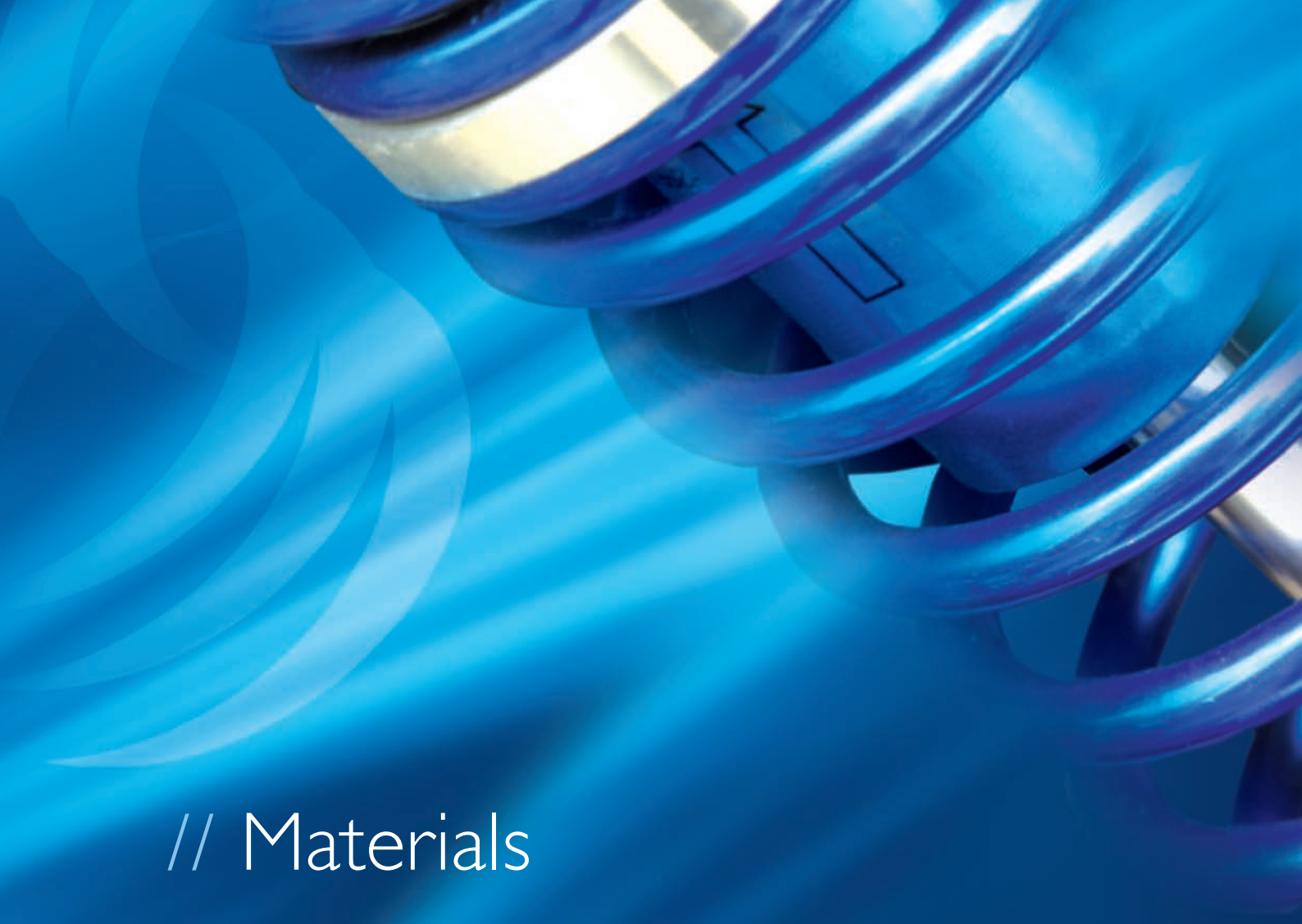
SKEGNESS SPRINGS LIMITED
Tel 0845 430 5000
Fax (01754) 610584
Forces
Stresses
24.00
ORIGIN
ON / OFF
ZERO / ABS



// Materials

The performance of a spring depends on choosing the right material for the application and the environment in which it will be operating. Skegness Springs can offer a complete range of materials from standard carbon and stainless steels to nickel alloys such as Inconel® and Elgiloy®. Most materials are available in both round wire and strip form.

- Carbon Spring Steels (including M-grade "Music" Wire)
- Stainless Spring Steels 302 / 316
- Oil Hardened and Tempered
- Elgiloy® (a.k.a Phynox®)
- Inconel® X750 / 718
- Hastelloy® C-276
- Nimonic® 90 (BS3075 NA19)
- Phosphor-Bronze (BS2873 PB102)
- Copper-Beryllium (BS2873 CB101)
- MP35N, 17-7 Stainless, Titanium, Silver, and many more!

PLEASE CALL FOR MORE INFORMATION

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SKEGNESS SPRINGS LIMITED

STANDARD CARBON SPRING STEELS

BS5216 / BS5770 Part 3
BS EN 10270-1 / BS EN 10132-4

We offer standard carbon spring steels in various grades depending on the application. This material offers good strength up to around 150°C, but poor corrosion resistance. Basic corrosion protection can be achieved through the use of a drawn-galvanised wire or electrolytic plating at additional cost. However we would generally recommend stainless spring steel or a nickel alloy if corrosion is likely to be an issue.

STAINLESS SPRING STEELS

BS2056 / BS5770 Part 4
BS EN 10270-3 / BS EN 10151
ASTM A313

Offers significantly better corrosion resistance and operates at temperatures up to about 300°C. Often used in marine applications and in the food processing industry. 302 grade stainless offers better spring properties but not such good corrosion resistance compared to 316 grade.

Stainless steel springs are slightly magnetic, and turn a golden brown colour after heat treatment, although they can be de-coloured if necessary.

ELGILOY®

ISO 5832
AMS 5833 / 5834
UNS R30003
W Nr 2.4711

Elgiloy® (also known as Phynox®) is a cobalt-chromium-nickel alloy offering high strength and excellent corrosion resistance, with low relaxation at temperatures up to 380°C. Applications include petro-chemical, marine engineering and medical devices. Elgiloy® springs are non-magnetic.

INCONEL® X750

AMS 5698 / 5699
ASTM B637
UNS N07750
W Nr 2.4669

Inconel® X750 is a nickel-chromium alloy offering similar properties to Elgiloy but without the addition of cobalt. It is suitable for applications including nuclear reactors, gas turbines, rocket engines and is highly recommended where sulphide stress cracking may be a problem (e.g. sour oil well tools). X750 is non-magnetic and offers excellent relaxation resistance in operating temperatures up to 550°C.

- Inconel® and Nimonic® are trade names of Special Metals Corp. Group of Companies.
- Hastelloy® is a trade name of Haynes International, Inc.
- Phynox® is a trade name of Imphy Ugine Precision.

SKEGNESS SPRINGS LIMITED

> Guide to springs

COMPRESSION SPRINGS

Compression springs provide an outward "pushing" force.
If you need a compression spring, think about the following:

Rate (strength)
How much force does the spring need to give?
Measured in N/mm, lbf/in, kgf/mm.

Diameter (inside or outside)
Does the spring need to fit over a rod, or inside a hole?
If so, specify the sizes and we will calculate safe clearances.

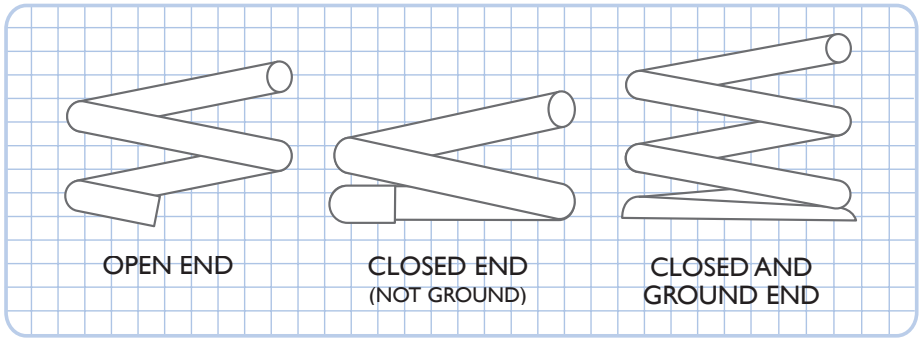
Free Length
The original length before any force is applied.

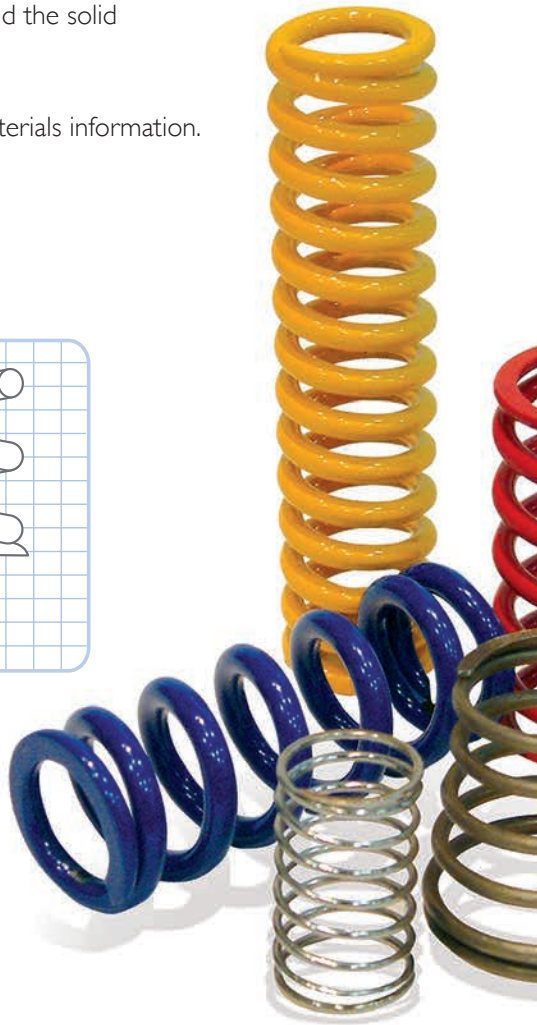
Coils (active or total, or the gap between coils)
The number or coils in the spring influences the strength, and the solid length of the spring.

Material (size and type)
See previous page for materials information.

End Configuration
See diagrams below:

COMPRESSION SPRINGS





PLEASE CALL FOR DESIGN ASSISTANCE

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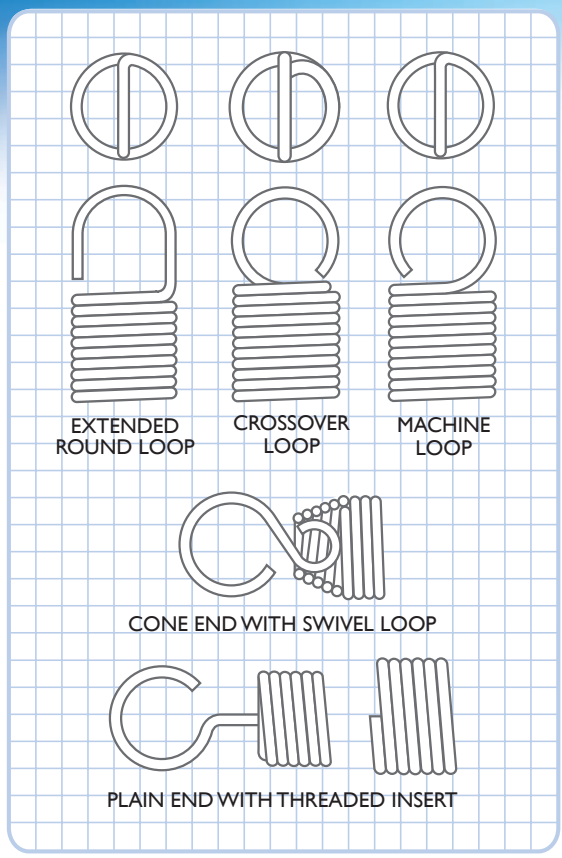
EXTENSION SPRINGS



EXTENSION SPRINGS

Extension springs (a.k.a. Tension springs) provide an inward 'pulling' force via loops or hooks at each end.

Rate (strength)
As for compression springs

Initial Tension
The initial force required to open the spring slightly.

Diameter (of the spring and hooks/loops)
Does the spring fit into a hole?
What do the hook/loops fit over?

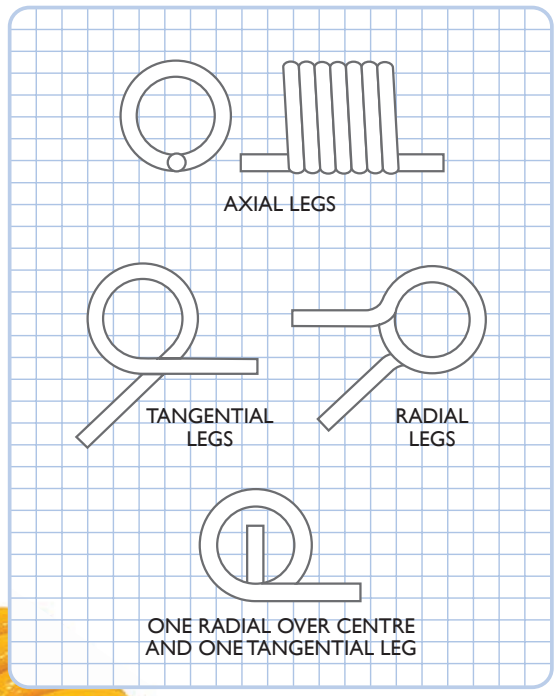
Number of Coils

Free Length
Body length, or inside loop length of the spring before it is stretched.

Material (size and type)
See materials information

Hook or Loop Configuration
See diagrams

TORSION SPRINGS



TORSION SPRINGS

Torsion springs provide a circular force (torque) through the legs of the spring.

Torsion Rate/Torque
Measured in Nmm/degree or lb-in/degree.

Inside Diameter
Allowance should be made for the decrease in diameter of the spring in operation.

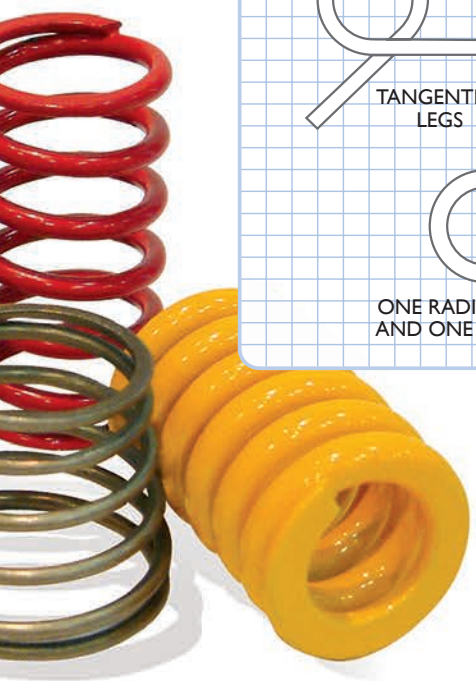
Leg Configuration (and angle)
See diagrams

Coils, or pitch
Torsion springs are usually closed-coiled (like extension springs) with no gap between each coil.

Left- or Right-hand wound?
Torsion springs should be designed to "wind up" when load is applied. See diagrams on next page for examples.

Material (size and type)

See materials information.



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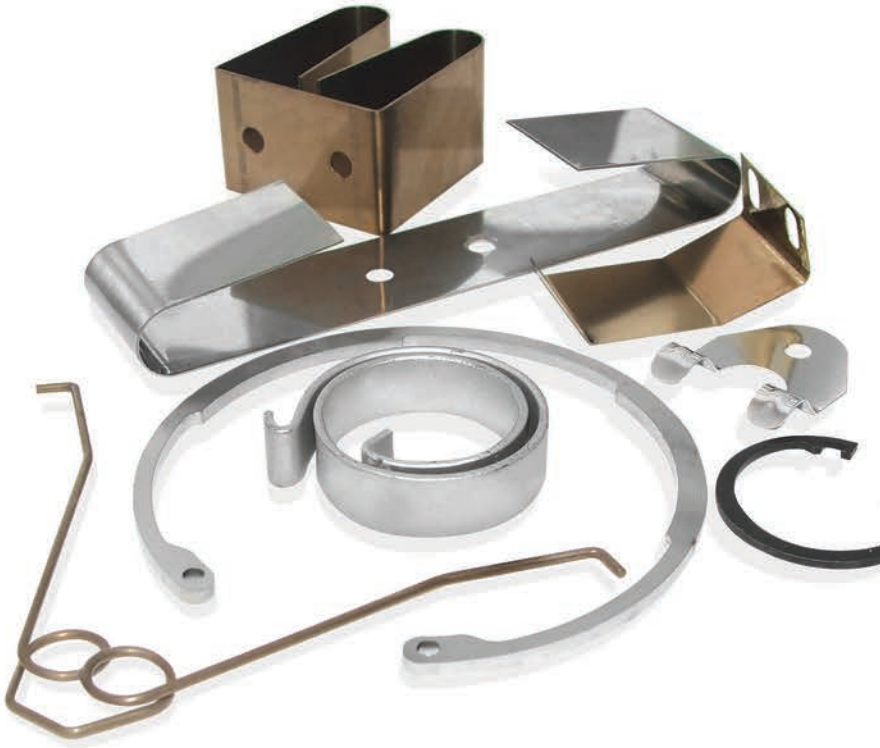
> Guide to springs



FLAT AND WIRE SHAPES

We are able to manufacture an infinite range of flat and wire shapes, including circlips. Depending on the design and quantity required, these are manufactured either by hand, on automatic machines, or a combination of both.

Full design assistance is available on request, but a few points to think about are listed below.

Material Dimensions

For flat strip we work up to about 3mm (0.116") thick, in virtually any width and length. If possible, using a standard thickness and width can reduce costs considerably.

Holes (Size and position)

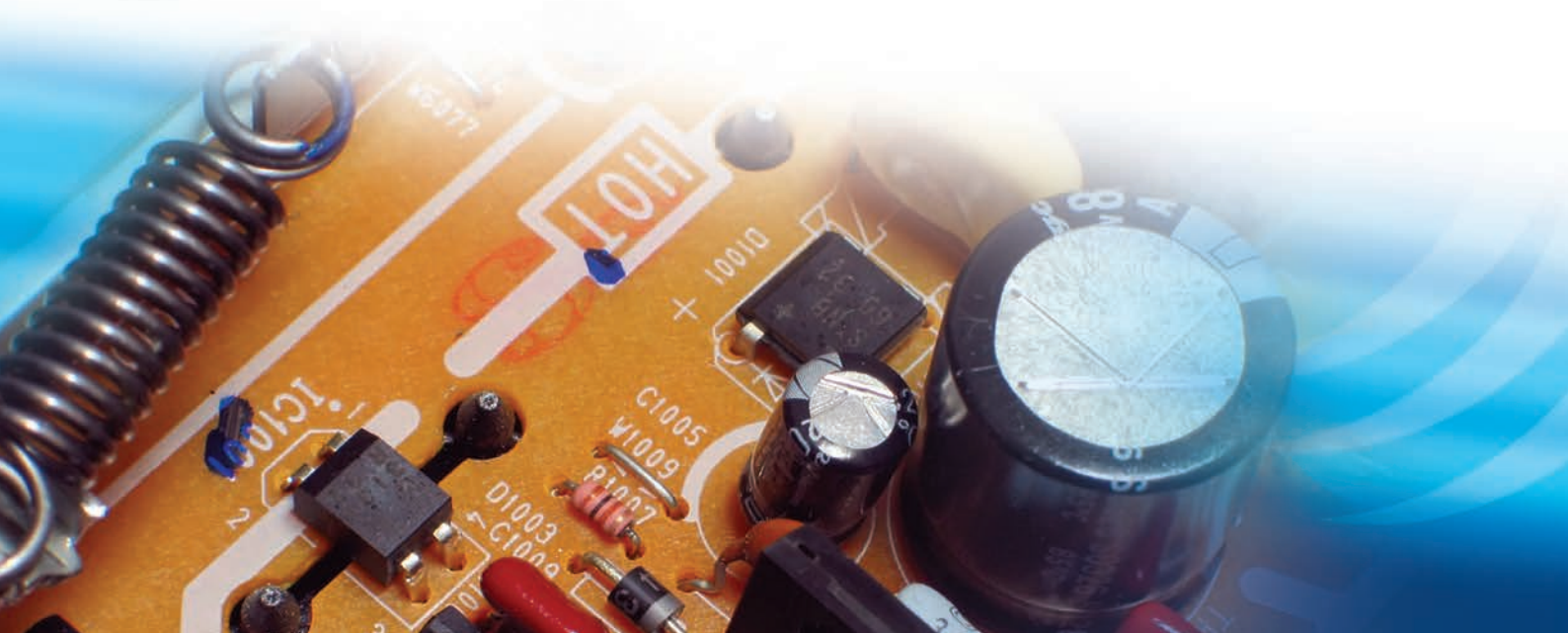
Ensure the holes in the strip do not result in weakness.

Diameters/Radii (on ends and corners)

For circlips, specify the internal, or external, size the clip should fit into, or over.

Bends (location and angles)

Applicable to both wire and flat shapes



LEFT AND RIGHT HAND

Often, the direction a spring is wound is unimportant - but in some cases it is crucial. The diagrams indicate the two "hands" - a right-hand spring will screw onto an ordinary thread:

USEFUL CONVERSIONS

Force

1kgf	=	2.20462lbf	=	9.80665N
1lbf	=	0.45359kgf	=	4.44822N
1N	=	0.224811bf	=	0.10197kgf

Length

1mm	=	0.03937in	1in	= 25.40mm

Rate

1N/mm	=	5.7101lbf/in	1lbf/in	= 0.1751N/mm

Stress

$1N/mm^2$	=	145.03774lbf/in	=	$1x10^6Pa$
$1lbf/in^2$	=	$0.006894757N/mm^2$	=	6894.76Pa
1Pa	=	$0.00014503774lbf/in^2$	=	$1x10^{-6}N/mm^2$

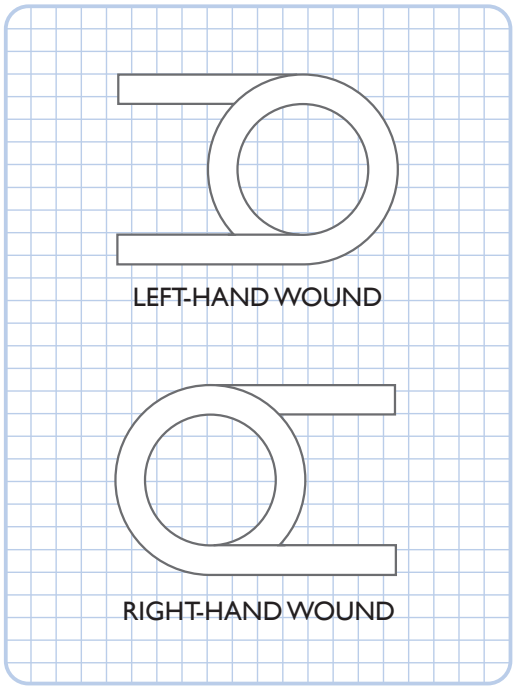
We are happy to work with either Imperial or metric measurements, or a combination of both. Please ensure units and tolerances are clearly stated if required.

COUNTING COILS

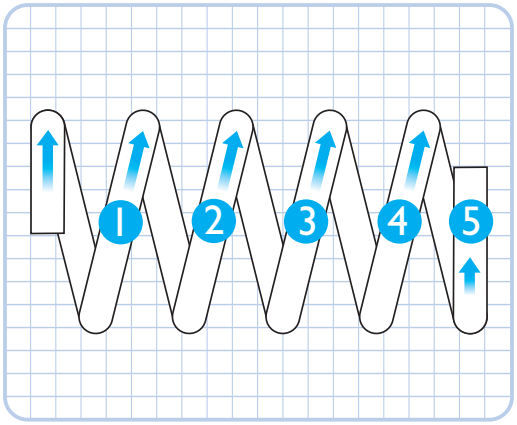
If you are going to specify the dimensions of a spring, it is crucial that the number of coils are counted correctly, as this can have a huge effect on the strength of the spring.

It is actually very straightforward, simply start at one end of the spring, where the wire has been cut, then follow the wire round - every time you go through 360° that counts as a full coil (180° = ½ coil; 90° = ¼ coil etc.) The compression spring pictured right has FIVE total coils (not six). The same method applies to extension springs and torsion springs.

LEFT AND RIGHT HAND WINDING



COUNTING COILS



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SPECIALISING IN THE
DESIGN AND MANUFACTURE
OF SPRINGS FOR USE IN
PERFORMANCE CRITICAL
APPLICATIONS

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