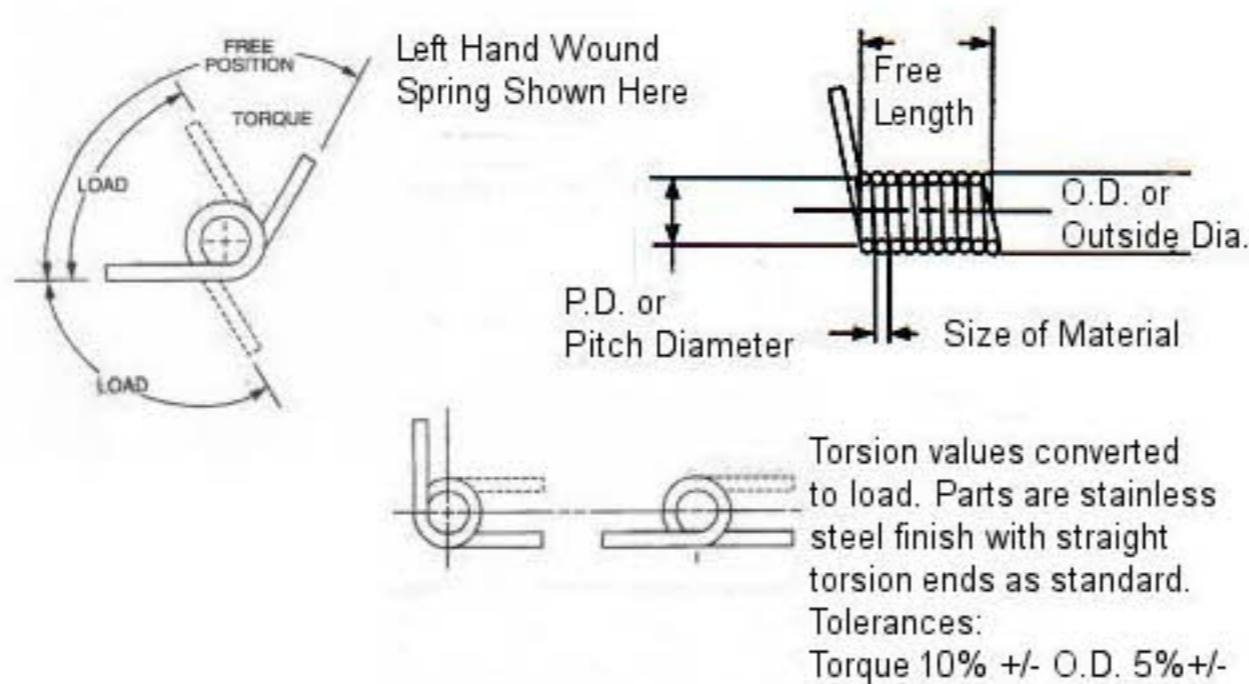


Torsion Springs

1. Wire diameter (Mid-West makes torsion springs from .003" to .625" round wire, square to .375" and rectangular to specification.)
2. Wire material (Torsion springs can be made from most metals and alloys. Click to see the [materials](#) specifications page. Mid-West Express stock springs are all stainless steel.)
3. Spring outside diameter (Maximum outside diameter is controlled by performance and space considerations)
4. Mandrel size (Usually torsion springs are used over a mandrel, shaft or arbor. Suggested mandrel diameter should leave 10% clearance within the inside diameter of the torsion spring for deflections shown in the examples. For greater deflections, as a manufacturer we suggest a suitable reduction in mandrel size.)
5. Inside diameter of spring (See mandrel information above.)
6. Free position of the ends in degrees
7. Expected deflection in degrees
8. Winding direction (Helix direction is either right hand or left hand and since force is applied to torque and not deflection, right and left can not be interchanged.)
9. Torque (Force of load as inch-pounds at stated deflection in degrees.)
10. Length of leg ends (Torsion spring end style is straight legs)
11. Maximum wound position in number of turns or degrees from free position
12. Frequency of rotation
13. Range of operating temperature



Torsion Spring Terminology



$$\theta^{\circ} = 3670 \text{ MND}/E d^4 \quad R = E d^4 / 3670 \text{ ND}$$

$$\theta^{\circ} = \text{Deflection in degrees} \quad S = 10.2 M / d^3$$

Click [here](#) to see a Glossary of Spring Terms.

Torsion Spring Formula Key

Symbol	Meaning
R	Rate per Inch
P	Load in pounds
S	Stress (uncorrected)
H	Solid height
G	Torsional modulus of elasticity
p	Pitch
M	Moment or torque, in-lb
E	Modulus of elasticity
n	Active coils
N	Total coils
D	Mean diameter of coil
d	Diameter of wire
π	Pi, 3.14
FL	Free Length
T	Revolutions of spring
S_K	Corrected stress

Torsional Modulus of Elasticity Data

Steel	11.5×10^6
Stainless Steel	10×10^6
Chrome Vanadium	11.5×10^6
Chrome Silicon	11.5×10^6
Phosphor Bronze	6.25×10^6
Brass	5.5×10^6

Mid-West Spring engineers are ready and eager to assist you in testing an appropriate design for your torsion spring application.

To request a quote or answers for your torsion spring design questions, please use this link to [submit your request](#)