

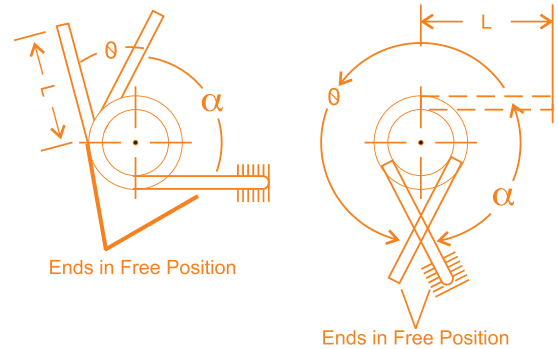
TORSION SPRING

Torsion Springs / Helical Coils Springs are designed to operate with torque / twisting / rotary force. A torsion spring is a spring that works by twisting its end along its axis. When it is twisted, it exerts a torque in the opposite direction, proportional to the amount (angle) it is twisted.

How to Design a Torsion Spring

- The permissible tensile in bending should be 60 – 80 % of ultimate tensile strength.
- Torque tolerance $\pm 10\%$
- Diameter tolerance $\pm 5\%$
- Spring Index should be between 6 and 12.

(Spring Index, $C = \text{Mean Diameter-D} / \text{Wire Diameter-d}$)



Design Formulae

- Outer Diameter – Wire Diameter = Mean Diameter
 - $OD - d = D$ Inner Diameter + Wire Diameter = Mean Diameter
 - $ID + d = D$
- Mean Diameter \div Wire Diameter = Index
 - $D \div d = C$
- Rate Per 360 Degrees
 - $(R) = Ed^4 / 10.8 DN$
- Load = Rate Per Degree * Distanced Traveled
 - $L = RpD * DT$
- Stress, $S = [32M / \pi d^3] \times [4C^2 - C - 1 / 4C(C - 1)]$

List of Parameters

| | | |
|----------------------------|-----------------------------|---------------------------|
| d - Wire Size (inches) | S - Stress (lbs / sq. inch) | E - Modulus of Elasticity |
| D - Mean Diameter (inches) | P - Load (lbs) | C - Spring Index |
| N - No. of Active Coils | M - Moment (inch-lbs) | |
| R - Rate per 360 Degrees | D / d - Index Correction | |

Key Parameters

Torque is the key parameter in torsion spring. Torque is basically the load or working loads of spring, because torsion springs exert a rotational force.

WIRE – RANGE : 0.25 MM - 5 MM

Material

The most common material types for extension springs are music wire, hard drawn, stainless steel (type 302 and type 316), oil tempered, chrome silicon, and phosphor bronze.

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TORSION SPRING



Finish

Torsion Springs are available in Nickel, Yellow and White Zinc Plating, Black Oxidizing, Lacquering, Green Passivation and Trivalent Passivation. Stainless Steel Springs are available with Bright Finish.

Manufacturing Process

Torsion Springs are manufactured on imported CNC Spring Multi forming Machines with its angle control by air control sensing device.

Testing & Certification Process

Each spring manufactured goes through a series of rigorous tests conducted on in house testing facilities such as Computerized Load Testing, UTS Testing, Torsion testing, Profile Projector amongst others. All springs are supplied with ROHS raw material compliant report. We also provide PPAP documents for automobiles and electrical industries as per requirement.

Common Applications

Automobile Components & Accessories, Hand Tools, Switches, Switchgears, Toys, Window & Car Curtains, , Doors and Hinges, Retractable Seating, Medical Equipment, All types of Locks, Photocopy & Printing Machine, Mouse Traps, Furniture & Hardware products, Clothing Pins, Stationary articles, amongst others.

Reference Standards

- **IS4454(Part 1) :2001** – Cold Drawn unalloyed Steel Wire - wire grades SL, SM, SH, DM & DH
- **IS4454 (Part 2) : 2001** – Stainless Steel Wire

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