

# CLUTCH SPRING



Clutch springs can be found in use on most motorcycle clutch assemblies. The function of these short coil springs is to continuously hold the friction & driven plates together through spring tension, preventing slippage except when the clutch lever is engaged.

## 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 clutch spring. Torque is basically the load or working loads of spring, because clutch springs exert a rotational force.

## Material

Spring steel material grade SH or DH (IS4454 – Part 1) and for a high seating pressure rectangular material is recommended.

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## Manufacturing Process

Clutch Springs are manufactured on imported CNC Spring Coiling Machines with SPC on line with free length sorting device for critical load value.

## 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

Clutch springs used in wrap spring clutch. Wrap spring clutch applications include power press, die-cutters, index systems, among others

## Reference Standards

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

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