

Spring Design 101

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What information is needed to properly design/order a spring?

1) What parameters do I Have?

- What does my spring fit into?
- What does my spring fit over?
- What is the atmosphere? (Moisture, Saltwater, Heat etc.)
- How is the spring being used/installed?
- Has there ever been a problem before?

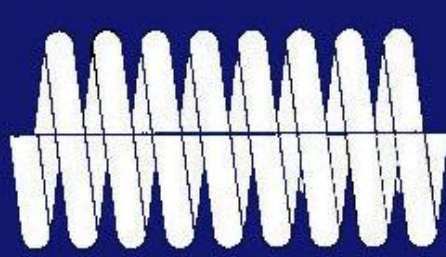
What information is needed to properly design/order a spring?

2) What are the spring's physical requirements?

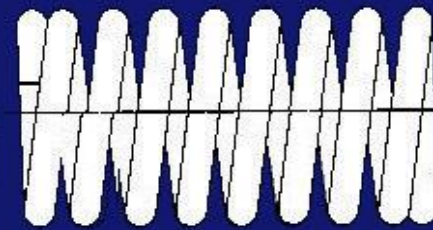
- What are the relaxed/installed lengths?
- How much travel is involved?
- What length are you traveling to? (Length/Deflection)
- What is the max solid/travel height?
- What force is needed at a specified length?
- What type of material is needed?
- What are the end types needed?
- Tight Tolerances Needed?
- Type of winding?

Compression Springs

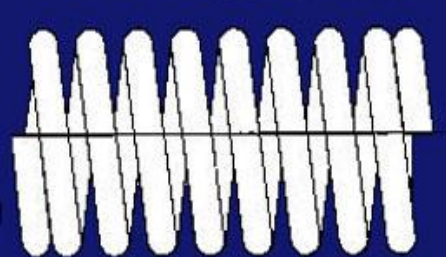
1) Type of ends?



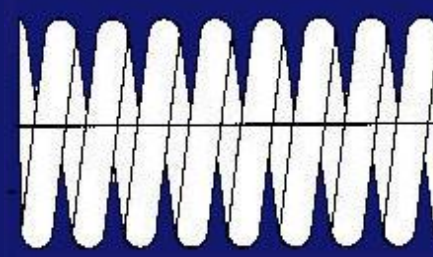
Open Ends Not Ground



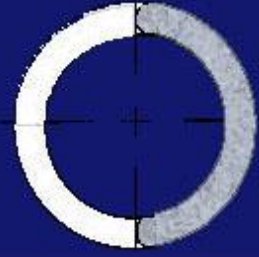
Closed, Squared & Ground Ends



Closed Ends Not Ground



Open Ends Ground Square

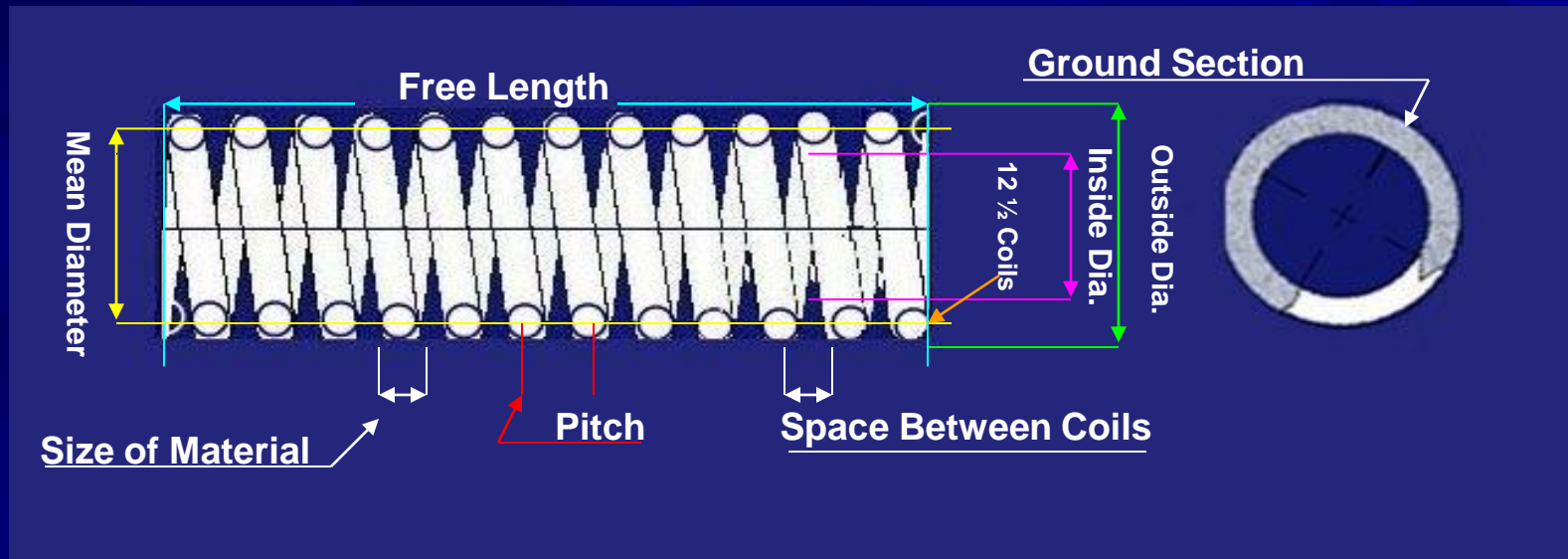


Compression Springs

2) What are my Physical Characteristics?

- Size/Type of Material?
- Outside Diameter?
- Inside Diameter?
- Free Length?
- Total Coils?
- Solid Height?
- Rate per Inch?
- Load @ Length?

Compression Springs

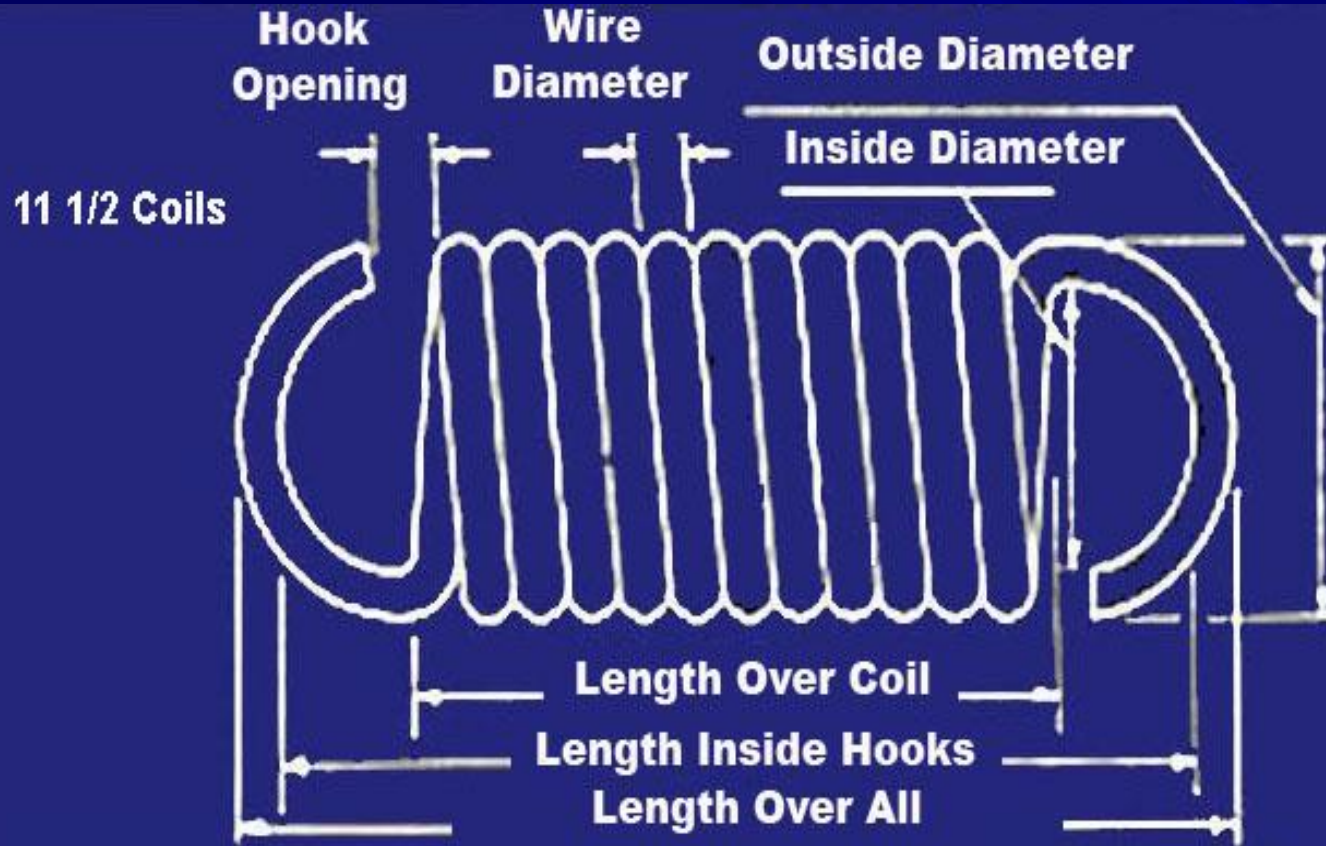


Extension Springs

2)What are my Physical Characteristics?

- Size/Type of Material?
- Outside Diameter?
- Inside Diameter?
- Free Length Body/Inside Hooks?
- Total Coils?
- Initial Tension?
- Rate per Inch?
- Load @ Length?
- Max Deflection?
- Gap Lengths of hooks?
- Straight Pull?

Extension Springs



Extension Springs



**Machine Half Hook
over Center**



**Hand Half Loop
over Center**



**Double Twisted
Full-Loop over Center**



Full Loop at Side



Small Eye at Side



Small Eye at Center



**Small Off-set
Hook at Side**








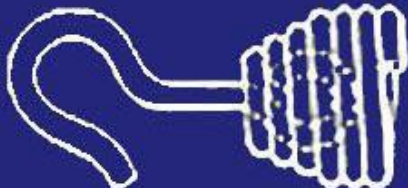
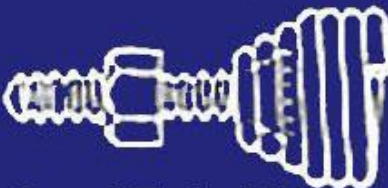


Plain Square Cut Ends



One End Ground Flat

Extension Springs

 <p>Loop Round End Hook over Center</p>	 <p>Long Square Ends Hook over Center</p>	 <p>V-Hook over Center</p>
 <p>Extended Eye from either Center or Side</p>	 <p>Straight End Annealed to allow Forming</p>	 <p>Coned End to Hold Long Swivel Eye</p>
 <p>Coned End with Short Swivel Eye</p>	 <p>Coned End with Swivel Hook</p>	 <p>Coned End with Swivel Bolt</p>

Extension Springs



Machine Loop and Machine Hook Shown in Line



Machine Loop and Machine Hook Shown at Right Angles



Hand Loop and Hook at Right Angles



Full Loop on Side and Small Eye from Center



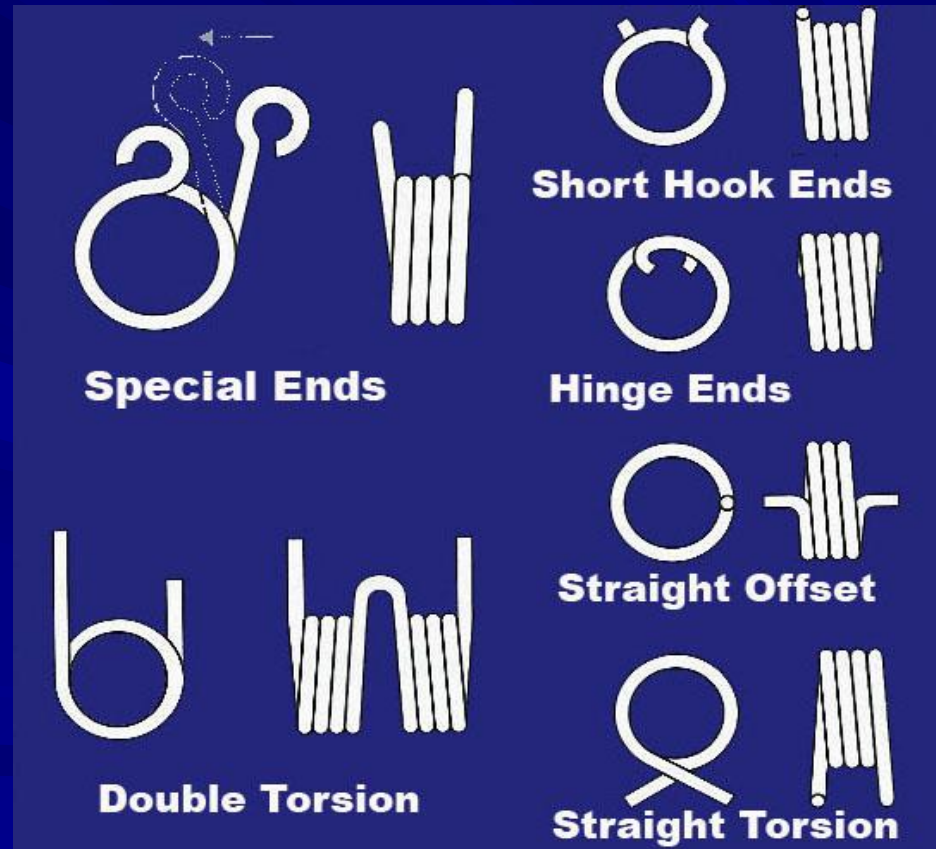
Torsion Springs

2)What are my Physical Characteristics?

- Size/Type of Material?
- Outside Diameter?
- Inside Diameter?
- Body Length?
- Total Coils?
- Angle at free position?
- Degrees of deflection?
- Rate Inch/lbs. Per Degree?
- Max degrees of Deflection?
- Closewound or Pitched?

Torsion Springs

1) Type of Ends?



Conclusion

- 1) Always offer as much information as possible!
- 2) Remember, price is not always everything!
- 3) Remember, lead times!

Spring Specification Sheet

<u>ACE WIRE SPRING SPEC SHEET</u>			
Date:		CO. & Address:	
Contact & Title:			
Phone:		Fax:	
Other Contacts:			
Email:			
Part Number:			
DESCRIPTION & TOLERANCES			
Torsion:	Compression:	Extension:	Wire Form:
Material Spec:			
Wire Size:		Plus or minus:	
OD		OD plus or minus:	
ID		ID plus or minus:	
Free Length:		Free Length plus or minus:	
Total Coils:		Plus or minus:	
Active Coils:		Body length:	
Type of ends:			
Winding (Hand):			
Weight			
Finish			
Grinding		Squareness	
DESIGN & TOLERANCES			
Initial Length:		Plus or minus:	
Initial Load:		Plus or minus:	
Final Length:		Plus or minus:	
Final Load:		Plus or minus:	
Solid:			
Will spring go to solid:			
Rate:		Plus or minus:	
SPACE REQUIREMENTS & TOLERANCES			
Maximum OD:		Plus or minus:	
Minimum ID:		Plus or minus:	
What does it fit into:			
What does it fit over:			
Maximum Free Length:		Plus or minus:	
Maximum Solid:		Plus or minus:	
COMMENTS			