

A

B

C

D

E

F

COMPARE SPRING RATE OF ORIGINAL
(Ø 7.5mm) SPRING WITH PROPOSED (Ø7.8mm)

Material = Oil tempered carbon steel
Modulus of Elasticity (E) = 196GPa

Number of Turns in Spring
Number of full turns in spring = 7
Number of body turns in spring (Nb):
= 7 + (225°/360°) (add in partial turn)
= 7.625

Number of active turns in spring (Na)
= Nb + (La+Lb)/(3*Pi*D)
= 7.625 + (30mm+30mm)/(3*Pi*34.5mm)
= 7.625 + 0.1845
= 7.8095

Geometry Original Spring
D = 34.5mm (overall spring diameter thru CL)
d = 7.5mm (wire thickness)
Lt = 72.8mm (length of spring with no end squaring)
La = 30mm (active length of first arm)
Lb = 30mm (active length of second arm)

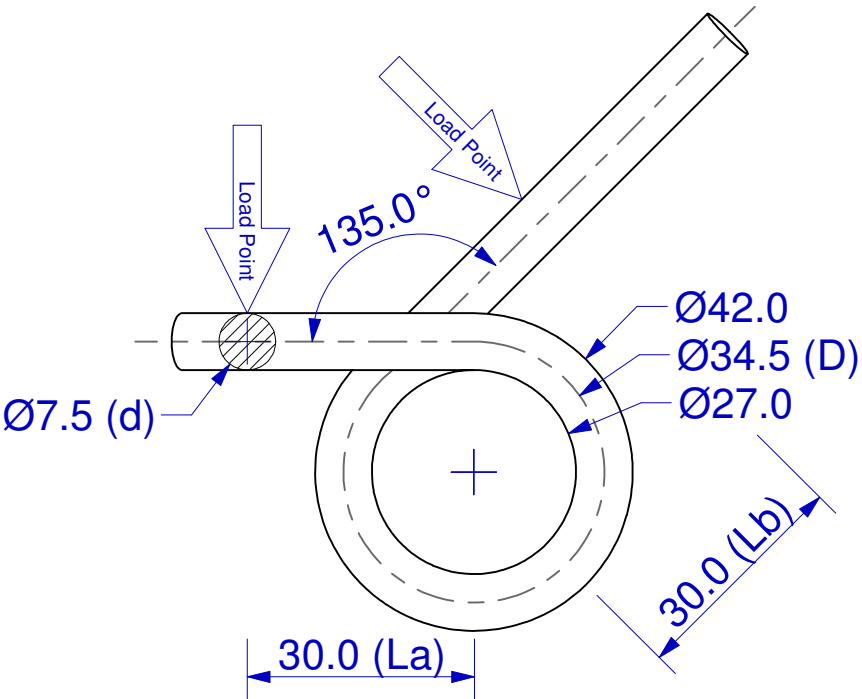
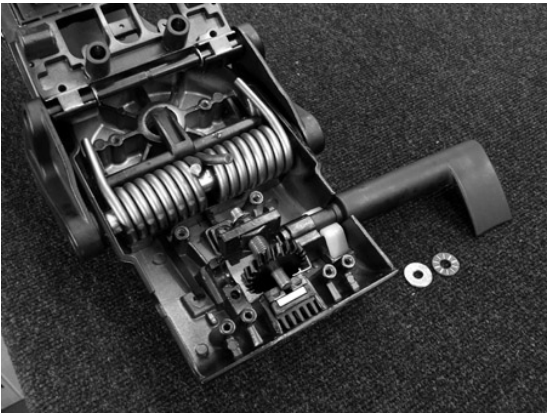
Spring Rate for Original
 $k' = (d^4 * E) / (10.8 * D * Na)$
= (7.5mm⁴ * 196000Pa) / (10.8 * 34.5mm * 7.8095)
= 213125N.mm/turn (592N.mm/deg)

Spring Rate for Proposed (Ø7.8mm Wire)
 $k' = (d^4 * E) / (10.8 * D * Na)$
= (7.8⁴ * 196000Pa) / (10.8 * 34.5 * 7.8095)
= 249326N.mm/turn (693N.mm/deg)

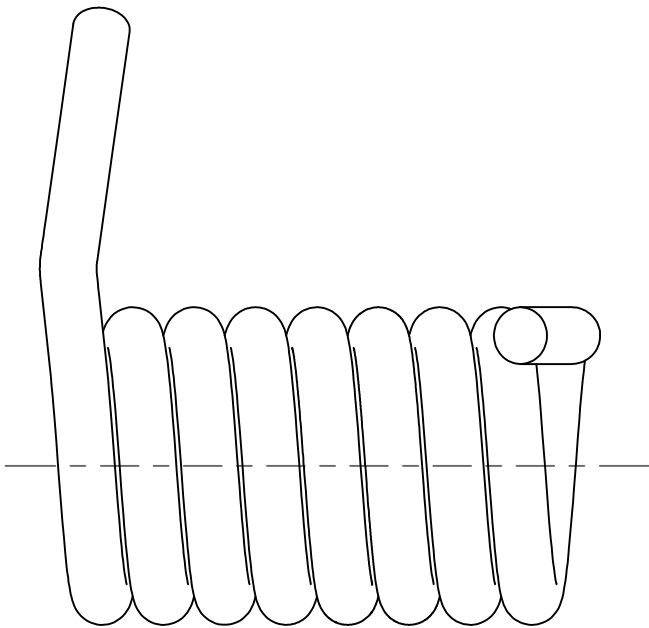
(Note: the constant 10.2 has been altered to 10.8 to compensate for friction.
Figures without friction are: Ø7.5 => 627N.mm/deg and Ø7.8 => 733N.mm/deg
The spring diameter Ø34.5mm is assumed to remain the same for both)

As Change in Percent
= (249326-213125)/(213125) * 100%
= 16.99%

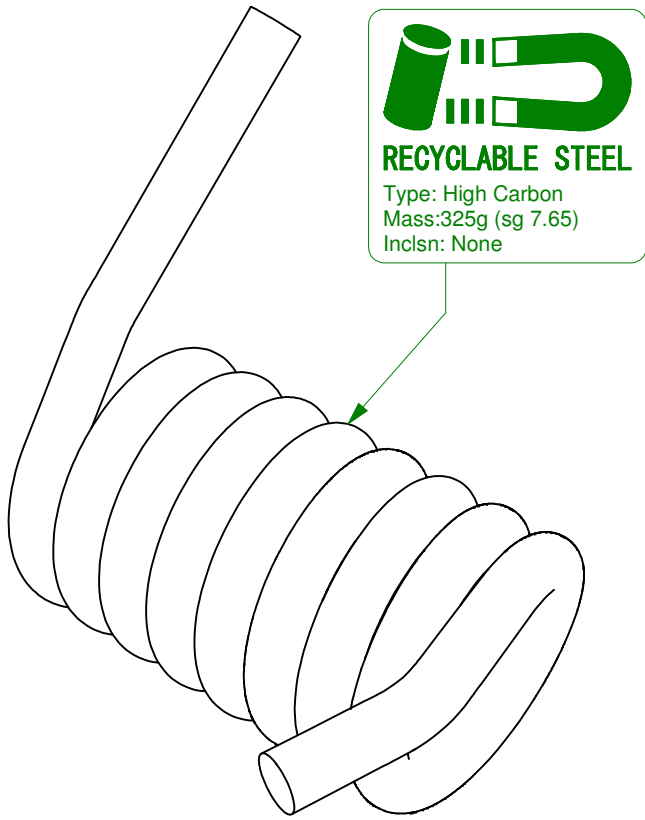
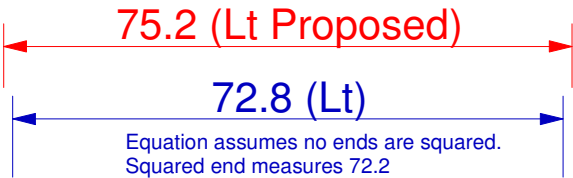
THE PROPOSED WIRE THICKNESS OF Ø7.8mm SUGGESTS AN
INCREASE IN SPRING RATE OF 17%



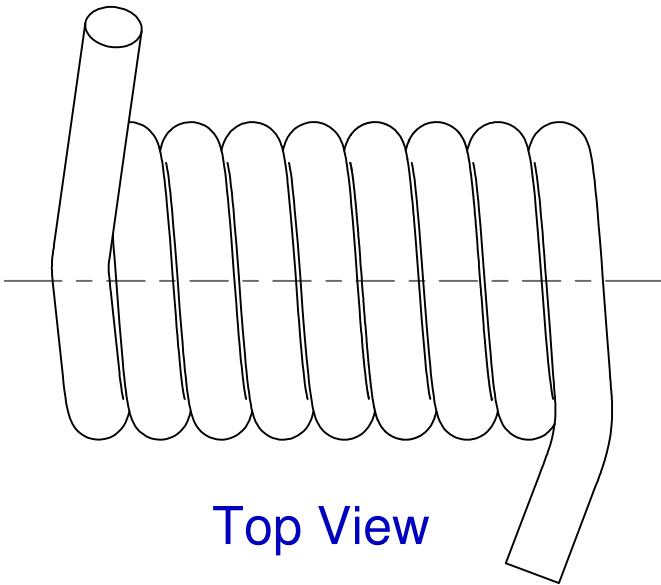
Side View



Front View



Perspective



Top View

	Straightness		Position		Parallelism		Circularity		Cylindricity		Profile of a line		Profile of a surface		Coaxiality
	Flatness		Symmetry		Perpendicularity		Run Out		Total Run Out						

NB: NOTE DEFAULT TOLERANCE

Symbol: Tolerance Value: +/- 0.5 A Datum: A Datum in Drg.

Check @ Receiving

Recently Revised (Liaise with R&D)

Specific Tolerance: (+/- 0.1)

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Product: "Dat-O"
Tol (default): +- 0.25mm
Material: Oil Tempered Wire
Finish: Oil

Title: Back Tension Spring (Original)
Drawn: IG Boyd
Date: 26 Oct 2010
Checked: ???
Page: 1 of 1

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Rev:	"a"	...
Drg No.	DatO_MECH_Spring_01b	
Part No.	...	
Scale:	A3 1:1 (USE DIMENSIONS!)	
Old #:	...	