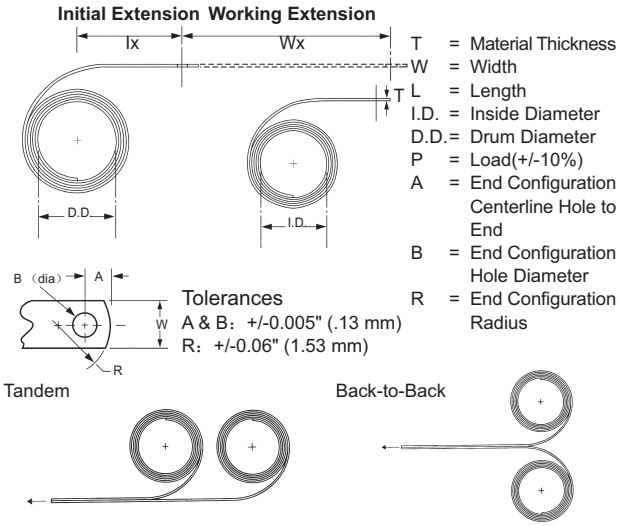
CONSTANT FORCE SPRINGS
恒力式弹簧

Stock sizes in stainless steel

Constant-force springs are a special variety of extension spring. They consist of a spiral of strip material with built-in curvature so that each turn of the strip wraps tightly on its inner neighbor. When the strip is extended (deflected)the inherent stress resists the loading force, just as in a common extension spring, but at a nearly constant (zero) rate.

The constant- force spring is well suited to long extensions with no load build-up. In use, the spring is usually mounted with the ID tightly wrapped on a drum and the free end attached to the loading force, such as in a counterbalance application. This relationship can be reversed, however, with the free end mounted stationary and the spring itself providing the working force, as with carbon brushes in electrical apparatus.



Material

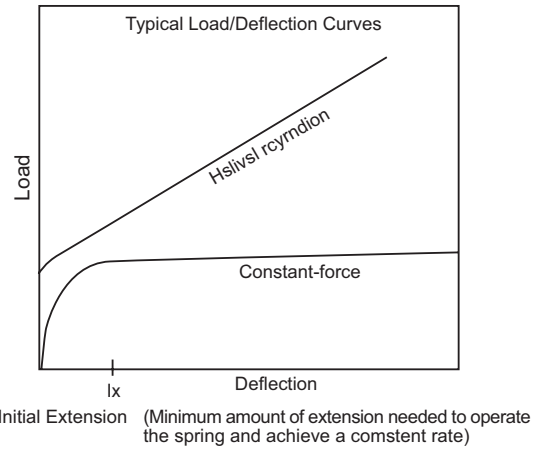
Type 301 Stainless Steel

Note

Be sure to allow at least 1 1/2 coils of material on the drum at full extension. The spring ID will wrap tightly on the drum so that in most applications no fastening method on the drum is required.

How to Multiply Constant Force Spring Load

Considerable flexibility is possible with constant-force springs because the load capacity can be multiplied by using two or more strips in tandem or back-to-back, as illustrated.



不锈钢材质的常备元件

恒力式弹簧是一种特殊的拉伸弹簧。它们由螺旋形的金属片组成，金属片的内侧弯曲，这样每圈金属片都紧紧地绕在它里面的一圈金属片上。当金属片拉伸（扭转）时，内应力抵抗负载力，这与普通的拉伸弹簧完全一样，但是弹性系数接近于恒定（零）。

恒力式弹簧适用于拉伸量大、无负载的应用场合。在使用中，通常将此弹簧的内径紧紧地绕在滚筒上，其自由端与负载相连，就象平衡锤一样。但是也可以反过来进行，让自由端固定，弹簧自身提供工作力，就象电气装置中的碳刷一样。

材质

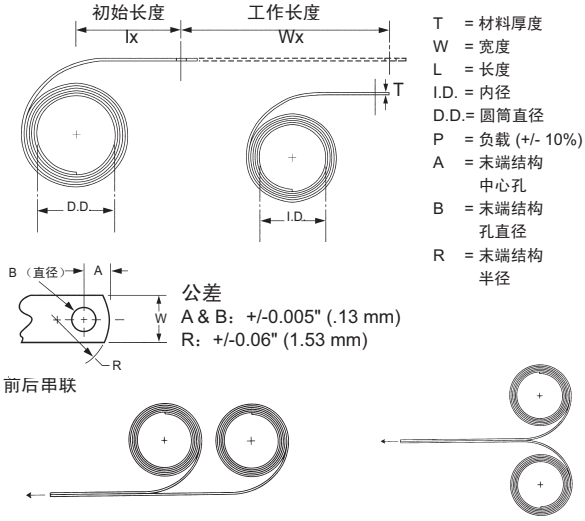
301 不锈钢材质。

注：

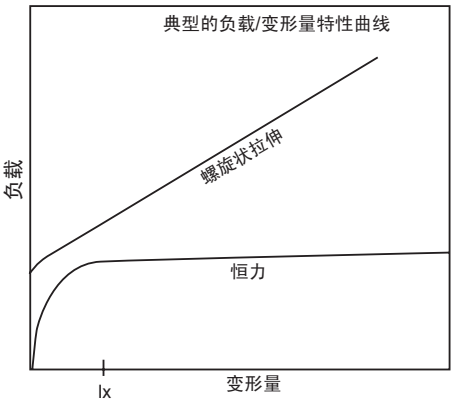
一定要保证至少让滚筒上有1 ½的线圈达到其全长。弹簧的内径应当紧紧地绕在滚筒上，这样的话，在多数场合下，滚筒上就不再需要使用其他紧固方法。

如何将恒力式弹簧的负载翻倍

恒力式弹簧可以产生相当大的弹性，因为，背对背地连接或者串联两个或者多个弹簧的话，负载容量可以成倍增加，如插图所示。



T = 材料厚度
W = 宽度
L = 长度
I.D. = 内径
D.D.= 圆筒直径
P = 负载 (+/- 10%)
A = 末端结构 中心孔
B = 末端结构 孔直径
R = 末端结构 半径



初始长度（使弹簧达到恒定弹性系数需要的最小长度）

CONSTANT FORCE SPRINGS-STAINLESS STEEL
恒力式弹簧 – 不锈钢材质

Catalog Number 编号	Thickness(T) (Reference) 厚度（T）（参考）		Width(W) (Reference) 宽度（W）（参考）		Length(L) (Reference) 长度（L）（参考）		Initial Extension(lx) (Reference) 初始长度（lx）（参考）		Working Extension(Wx) Max 工作长度（Wx）（最大）		Inside Diameter(I.D.) (Reference) 内径（I.D.）（参考）		Drum Diameter (Reference) 圆筒直径（参考）		Load (P) +/- 10% 负载 (P) +/- 10%		End Configuration 末端结构						Fatigue Life Cycles 疲劳寿命
																	A		B		R		
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	N	in	mm	in	mm	in	mm	
CF012-0037	0.003	0.08	0.187	4.75	12	305	0.50	12.70	9	229	0.21	5.33	0.25	6.35	0.37	1.65	3/8	9.5	0.13	3.3	1/2	12.7	2500
CF015-0049	0.004	0.10	0.187	4.75	15	381	0.61	15.49	12	305	0.29	7.37	0.34	8.64	0.49	2.18	3/8	9.5	0.13	3.3	1/2	12.7	2500
CF015-0066	0.004	0.10	0.250	6.35	15	381	0.61	15.49	12	305	0.25	6.35	0.30	7.62	0.66	2.94	3/8	9.5	0.13	3.3	1/2	12.7	2500
CF017-0103	0.005	0.13	0.312	7.92	17	432	0.75	19.05	14	356	0.37	9.40	0.44	11.18	1.03	4.58	3/8	9.5	0.13	3.3	1/2	12.7	2500
CF024-0148	0.006	0.15	0.375	9.53	24	610	0.92	23.37	20	508	0.45	11.43	0.54	13.72	1.48	6.58	3/8	9.5	0.13	3.3	1/2	12.7	2500
CF025-0197	0.006	0.15	0.500	12.70	25	635	0.92	23.37	21	533	0.45	11.43	0.54	13.72	1.97	8.76	3/8	9.5	0.20	5.1	1/2	12.7	2500
CF030-0263	0.008	0.20	0.500	12.70	30	762	1.22	30.99	25	635	0.59	14.99	0.70	17.78	2.63	11.70	3/8	9.5	0.19	4.7	1/2	12.7	2500
CF030-0329	0.008	0.20	0.625	15.88	30	762	1.22	30.99	25	635	0.61	15.49	0.73	18.42	3.29	14.63	3/8	9.5	0.20	5.1	1/2	12.7	2500
CF024-0400	0.008	0.20	0.750	19.05	24	610	1.22	30.99	20	508	0.61	15.49	0.73	18.42	4.00	17.79	3/8	9.5	0.19	4.7	3/4	19.1	2500
CF033-0495	0.010	0.25	0.750	19.05	33	838	1.53	38.86	27	686	0.71	18.03	0.85	21.59	4.95	22.02	3/8	9.5	0.19	4.7	3/4	19.1	2500
CF039-0594	0.012	0.30	0.750	19.05	39	991	1.84	46.74	32	813	0.88	22.35	1.00	25.40	5.94	26.42	3/8	9.5	0.19	4.7	3/4	19.1	2500
CF039-0792	0.012	0.30	1.000	25.40	39	991	1.84	46.74	32	813	0.88	22.35	1.00	25.40	7.92	35.23	3/8	9.5	0.19	4.7	3/4	19.1	2500
CF040-1060	0.016	0.41	1.000	25.40	40	1016	2.21	56.13	33	838	1.20	30.48	1.40	35.56	10.60	47.15	3/8	9.5	0.20	5.1	1/2	12.7	2500
CF050-1650	0.020	0.51	1.250	31.75	50	1270	2.82	71.63	43	1092	1.47	37.34	1.75	44.45	16.50	73.40	3/8	9.5	0.20	5.1	1/2	12.7	2500
CF015-0050	0.004	0.10	0.25	6.35	15	381	0.61	15.49	12	305	0.34	8.64	0.40	10.16	0.50	2.22	3/8	9.5	0.131	3.3	1/2	12.7	4000
CF018-0075	0.005	0.13	0.31	7.87	18	457	0.75	19.05	15	381	0.42	10.67	0.50	12.70	0.75	3.34	3/8	9.5	0.131	3.3	1/2	12.7	4000
CF022-0112	0.006	0.15	0.37	9.40	22	559	0.92	23.37	18	457	0.51	12.95	0.62	15.75	1.12	4.98	3/8	9.5	0.131	3.3	1/2	12.7	4000
CF026-0162	0.007	0.18	0.50	12.70	26	660	1.06	26.92	21	533	0.59	14.99	0.75	19.05	1.62	7.21	3/8	9.5	0.131	3.3	1/2	12.7	4000
CF030-0237	0.008	0.20	0.59	14.99	30	762	1.22	30.99	24	610	0.68	17.27	0.87	22.10	2.37	10.54	3/8	9.5	0.187	4.7	3/4	19.1	4000
CF034-0350	0.010	0.25	0.68	17.27	34	864	1.53	38.86	27	686	0.85	21.59	1.00	25.40	3.50	15.57	3/8	9.5	0.187	4.7	3/4	19.1	4000
CF038-0500	0.012	0.30	0.81	20.57	38	965	1.84	46.74	30	762	1.02	25.91	1.25	31.75	5.00	22.24	3/8	9.5	0.187	4.7	3/4	19.1	4000
CF043-0700	0.014	0.36	1.00	25.40	43	1092	2.14	54.36	33	838	1.19	30.23	1.50	38.10	7.00	31.14	3/8	9.5	0.187	4.7	3/4	19.1	4000
CF018-0023	0.004	0.10	0.25	6.35	18	457	0.62	16.00	15	381	0.53	13.45	0.59	14.98	0.23	1.02	3/8	9.5	0.13	3.3	1/2	12.7	25000
CF018-0043	0.005	0.13	0.38	9.52	25	635	0.78	20.00	22	558	0.65	16.50	0.73	18.53	0.43	1.91	3/8	9.5	0.13	3.3	1/2	12.7	25000
CF025-0052	0.006	0.15	0.38	9.52	25	635	0.90	23.00	21	533	0.77	19.55	0.86	21.83	0.52	2.31	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF025-0070	0.006	0.15	0.50	12.69	25	635	0.92	23.00	21	533	0.80	20.31	0.90	22.85	0.70	3.11	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF033-0093	0.008	0.20	0.50	12.69	33	838	1.23	31.00	28	711	1.07	27.16	1.20	30.46	0.93	4.14	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF035-0146	0.010	0.25	0.63	15.87	35	888	1.53	39.00	29	736	1.36	34.52	1.52	38.58	1.46	6.49	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF045-0209	0.012	0.30	0.75	19.04	45	1142	1.82	46.00	38	965	1.60	40.62	1.79	45.44	2.09	9.29	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF045-0280	0.012	0.30	1.00	25.38	45	1142	1.84	47.00	38	965	1.60	40.62	1.79	45.44	2.80	12.45	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF048-0350	0.015	0.38	1.00	25.38	48	1218	2.20	56.00	39	990	1.96	49.75	2.20	55.85	3.50	15.56	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF046-0410	0.016	0.41	1.00	25.38	46	1168	2.21	56.00	37	939	1.96	49.75	2.20	55.85	4.10	18.23	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF048-0437	0.015	0.38	1.25	31.73	48	1218	2.29	58.00	39	990	2.03	51.53	2.27	57.62	4.37	19.43	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF055-0583	0.020	0.51	1.25	31.73	55	1396	2.82	72.00	43	1092	2.53	64.22	2.83	71.84	5.83	25.92	3/8	9.5	0.20	4.9	1/2	12.7	25000
CF021-0025	0.006	0.15	0.37	9.40	21	533	2.03	51.56	12	305	1.13	28.70	1.36	34.54	0.25	1.11	3/8	9.5	0.131	3.3	1/2	12.7	40000
CF025-0037	0.007	0.18	0.50	12.70	25	635	2.36	59.94	15	381	1.31	33.27	1.58	40.13	0.37	1.65	3/8	9.5	0.131	3.3	1/2	12.7	40000
CF030-0050	0.008	0.20	0.59	14.99	30	762	2.72	69.09	18	457	1.51	38.35	1.81	45.97	0.50	2.22	3/8	9.5	0.187	4.7	3/4	19.1	40000
CF036-0075	0.010	0.25	0.68	17.27	36	914	3.38	85.85	21	533	1.88	47.75	2.26	57.40	0.75	3.34	3/8	9.5	0.187	4.7	3/4	19.1	40000
CF042-0112	0.012	0.30	0.81	20.57	42	1067	4.07	103.40	24	610	2.26	57.40	2.71	68.83	1.12	4.98	3/8	9.5	0.187	4.7	3/4	19.1	40000
CF048-0162	0.014	0.36	1.00	25.40	48	1219	4.74	120.40	27	686	2.63	66.80	3.16	80.26	1.62	7.21	3/8	9.5	0.187	4.7	3/4	19.1	40000