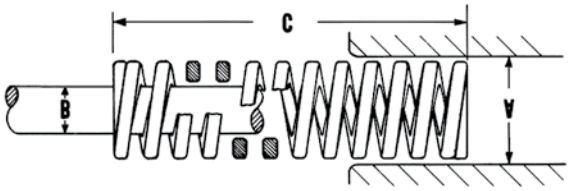
DieMax XL™ Extra Heavy Load Springs - Inch

product Features:

- ISO color - Yellow
- High tensile strength chrome silicon material
- Optimal rectangular wire design
- Long life design for increased spring run-time



Hole Diam. (in) A	Rod Diam. (in) B	Free Length (in) C	CATALOG NUMBER	RATE Pounds Reqd. to deflect 1/10 in.	LOAD-DEFLECTION TABLE							
					Total Deflection Recommended for Long Life (17% of C)		Total Deflection Recommended for Avg. Life (20% of C)		Maximum Operating Deflection (25% of C)		Total Travel to Solid	
					Load lbs.	Defl. in.	Load lbs.	Defl. in.	Load lbs.	Defl. in.	Load lbs.	Defl. in.
3/8	3/16	3/4	9-0603-36	25.2	32	0.13	38	0.15	47	0.19	53	0.21
		1	9-0604-36	18.7	31	0.17	37	0.20	46	0.25	54	0.29
		1 1/4	9-0605-36	14.6	31	0.21	37	0.25	46	0.31	53	0.37
		1 1/2	9-0606-36	12.1	31	0.25	36	0.30	45	0.37	55	0.45
		1 3/4	9-0607-36	10.1	30	0.29	35	0.35	44	0.43	52	0.51
		2	9-0608-36	8.8	30	0.34	35	0.40	44	0.50	52	0.59
		2 1/2	9-0610-36	7.0	30	0.43	35	0.50	44	0.63	52	0.75
		3	9-0612-36	5.8	30	0.51	35	0.60	43	0.75	53	0.92
		12	9-0648-36	1.4	29	2.04	34	2.40	42	3.00	52	3.71
1/2	9/32	3/4	9-0803-36	44.5	57	0.13	67	0.15	83	0.19	102	0.23
		1	9-0804-36	33.5	56	0.17	66	0.20	82	0.25	105	0.31
		1 1/4	9-0805-36	25.2	54	0.21	63	0.25	79	0.31	97	0.38
		1 1/2	9-0806-36	20.7	53	0.25	62	0.30	77	0.37	97	0.47
		1 3/4	9-0807-36	17.5	52	0.29	61	0.35	76	0.43	98	0.56
		2	9-0808-36	15.4	53	0.34	62	0.40	77	0.50	103	0.67
		2 1/2	9-0810-36	12.4	53	0.43	62	0.50	78	0.63	109	0.88
		3	9-0812-36	10.1	51	0.51	60	0.60	76	0.75	106	1.04
		3 1/2	9-0814-36	8.6	51	0.60	60	0.70	75	0.88	105	1.22
		12	9-0848-36	2.4	49	2.04	58	2.40	72	3.00	101	4.19
5/8	11/32	3/4	9-1003-36	97.0	124	0.13	146	0.15	182	0.19	213	0.22
		1	9-1004-36	72.7	122	0.17	143	0.20	179	0.25	227	0.31
		1 1/4	9-1005-36	53.7	115	0.21	135	0.25	169	0.31	205	0.38
		1 1/2	9-1006-36	43.3	110	0.25	130	0.30	162	0.37	201	0.46
		1 3/4	9-1007-36	36.3	107	0.29	126	0.35	157	0.43	199	0.55
		2	9-1008-36	31.7	108	0.34	127	0.40	159	0.50	205	0.65
		2 1/2	9-1010-36	24.7	106	0.43	124	0.50	156	0.63	201	0.81
		3	9-1012-36	20.3	103	0.51	121	0.60	152	0.75	199	0.98
		3 1/2	9-1014-36	17.3	103	0.60	121	0.70	152	0.88	201	1.16
		4	9-1016-36	15.1	103	0.68	121	0.80	152	1.00	203	1.35
		12	9-1048-36	4.9	100	2.04	117	2.40	146	3.00	204	4.17
3/4	3/8	1	9-1204-36	183.0	306	0.17	360	0.20	450	0.25	469	0.26
		1 1/4	9-1205-36	137.0	293	0.21	345	0.25	431	0.31	461	0.34
		1 1/2	9-1206-36	111.0	282	0.25	332	0.30	415	0.37	472	0.43
		1 3/4	9-1207-36	92.4	272	0.29	320	0.35	400	0.43	466	0.50
		2	9-1208-36	79.7	272	0.34	320	0.40	400	0.50	473	0.59
		2 1/2	9-1210-36	62.1	266	0.43	313	0.50	391	0.63	472	0.76
		3	9-1212-36	51.2	260	0.51	306	0.60	383	0.75	481	0.94
		3 1/2	9-1214-36	43.2	257	0.60	303	0.70	378	0.88	474	1.10
		4	9-1216-36	37.3	255	0.68	300	0.80	374	1.00	468	1.25
		4 1/2	9-1218-36	32.8	250	0.76	294	0.90	368	1.12	464	1.41
		5	9-1220-36	29.5	251	0.85	295	1.00	369	1.25	469	1.59
		5 1/2	9-1222-36	26.6	249	0.94	293	1.10	367	1.38	466	1.75
		6	9-1224-36	24.3	247	1.02	291	1.20	364	1.50	463	1.91
		12	9-1248-36	12.0	245	2.04	288	2.40	360	3.00	469	3.92

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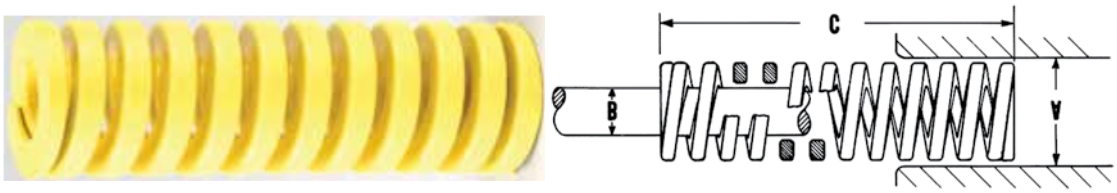
Inch Standard

Hole Diam. (in) A	Rod Diam. (in) B	Free Length (in) C	CATALOG NUMBER	RATE Pounds Reqd. to deflect 1/10 in.	LOAD-DEFLECTION TABLE							
					Total Deflection Recommended for Long Life (17% of C)		Total Deflection Recommended for Avg. Life (20% of C)		Maximum Operating Deflection (25% of C)		Total Travel to Solid	
					Load lbs.	Defl. in.	Load lbs.	Defl. in.	Load lbs.	Defl. in.	Load lbs.	Defl. in.
1	1/2	1 1/4	9-1605-36	202.0	433	0.21	509	0.25	636	0.31	709	0.35
		1 1/2	9-1606-36	160.0	407	0.25	479	0.30	598	0.37	692	0.43
		1 3/4	9-1607-36	132.0	389	0.29	457	0.35	572	0.43	686	0.52
		2	9-1608-36	113.0	386	0.34	454	0.40	567	0.50	681	0.60
		2 1/2	9-1610-36	87.8	376	0.43	442	0.50	553	0.63	684	0.78
		3	9-1612-36	71.4	363	0.51	427	0.60	534	0.75	676	0.95
		3 1/2	9-1614-36	60.2	359	0.60	422	0.70	527	0.88	671	1.11
		4	9-1616-36	52.0	355	0.68	418	0.80	522	1.00	667	1.28
		4 1/2	9-1618-36	46.2	353	0.76	415	0.90	518	1.12	681	1.47
		5	9-1620-36	41.2	350	0.85	412	1.00	515	1.25	677	1.64
		5 1/2	9-1622-36	37.5	351	0.94	413	1.10	516	1.38	686	1.83
		6	9-1624-36	34.4	351	1.02	413	1.20	516	1.50	695	2.02
		7	9-1628-36	29.3	349	1.19	410	1.40	513	1.75	697	2.38
		8	9-1632-36	25.5	347	1.36	408	1.60	510	2.00	700	2.74
		12	9-1648-36	16.9	345	2.04	406	2.40	507	3.00	704	4.18
1 1/4	5/8	1 1/2	9-2006-36	279.0	710	0.25	835	0.30	1044	0.37	1093	0.39
		1 3/4	9-2007-36	231.0	680	0.29	800	0.35	1000	0.43	1108	0.48
		2	9-2008-36	197.0	672	0.34	791	0.40	989	0.50	1119	0.57
		2 1/2	9-2010-36	152.0	651	0.43	766	0.50	957	0.63	1139	0.75
		3	9-2012-36	123.0	626	0.51	736	0.60	920	0.75	1121	0.91
		3 1/2	9-2014-36	104.0	619	0.60	729	0.70	911	0.88	1131	1.09
		4	9-2016-36	88.9	607	0.68	714	0.80	893	1.00	1100	1.24
		4 1/2	9-2018-36	77.5	591	0.76	696	0.90	870	1.12	1071	1.38
		5	9-2020-36	69.6	592	0.85	696	1.00	870	1.25	1090	1.57
		5 1/2	9-2022-36	63.6	596	0.94	701	1.10	876	1.38	1128	1.77
		6	9-2024-36	57.6	586	1.02	689	1.20	862	1.50	1108	1.92
		7	9-2028-36	48.9	583	1.19	685	1.40	857	1.75	1099	2.25
		8	9-2032-36	42.6	579	1.36	681	1.60	851	2.00	1111	2.61
		10	9-2040-36	34.0	578	1.70	680	2.00	850	2.50	1128	3.32
		12	9-2048-36	28.3	578	2.04	680	2.40	850	3.00	1139	4.03
1 1/2	3/4	2	9-2408-36	319.0	1089	0.34	1281	0.40	1601	0.50	1757	0.55
		2 1/2	9-2410-36	241.0	1032	0.43	1214	0.50	1518	0.63	1726	0.72
		3	9-2412-36	193.0	982	0.51	1155	0.60	1444	0.75	1698	0.88
		3 1/2	9-2414-36	160.0	953	0.60	1121	0.70	1402	0.88	1636	1.03
		4	9-2416-36	139.0	949	0.68	1116	0.80	1395	1.00	1710	1.23
		4 1/2	9-2418-36	122.0	931	0.76	1095	0.90	1369	1.12	1700	1.39
		5	9-2420-36	108.0	918	0.85	1080	1.00	1350	1.25	1687	1.56
		5 1/2	9-2422-36	97.6	915	0.94	1076	1.10	1345	1.38	1681	1.72
		6	9-2424-36	88.7	902	1.02	1062	1.20	1327	1.50	1672	1.89
		7	9-2428-36	75.0	894	1.19	1051	1.40	1314	1.75	1662	2.22
		8	9-2432-36	65.0	883	1.36	1039	1.60	1299	2.00	1655	2.55
		10	9-2440-36	51.6	877	1.70	1032	2.00	1290	2.50	1675	3.24
		12	9-2448-36	42.8	874	2.04	1028	2.40	1285	3.00	1686	3.94
2	1	2 1/2	9-3210-36	414.0	1773	0.43	2086	0.50	2608	0.63	2818	0.68
		3	9-3212-36	327.0	1663	0.51	1957	0.60	2446	0.75	2743	0.84
		3 1/2	9-3214-36	271.0	1614	0.60	1899	0.70	2374	0.88	2694	1.00
		4	9-3216-36	231.0	1577	0.68	1855	0.80	2319	1.00	2659	1.15
		4 1/2	9-3218-36	201.0	1534	0.76	1804	0.90	2255	1.12	2644	1.31
		5	9-3220-36	179.0	1522	0.85	1790	1.00	2238	1.25	2623	1.47
		5 1/2	9-3222-36	161.0	1509	0.94	1775	1.10	2219	1.38	2659	1.65
		6	9-3224-36	145.0	1475	1.02	1735	1.20	2169	1.50	2593	1.78
		7	9-3228-36	123.0	1465	1.19	1724	1.40	2155	1.75	2578	2.10
		8	9-3232-36	106.0	1440	1.36	1694	1.60	2118	2.00	2562	2.41
		10	9-3240-36	83.5	1420	1.70	1670	2.00	2088	2.50	2544	3.05
		12	9-3248-36	68.9	1406	2.04	1655	2.40	2068	3.00	2533	3.68

DieMax XL™ Extra Heavy Load Springs - Metric

product Features:

- ISO color - Yellow
- High tensile strength chrome silicon material
- Optimal rectangular wire design
- Long life design for increased spring run-time



*Note: 1 Newton=0.10197 Kg (Force)

Hole Diam. (mm) A	Rod Diam. (mm) B	Free Length (mm) C	CATALOG NUMBER	RATE Newtons Reqd. to deflect 1 mm	LOAD-DEFLECTION TABLE							
					Total Deflection Recommended for Long Life (17% of C)		Total Deflection Recommended for Avg. Life (20% of C)		Maximum Operating Deflection (25% of C)		Total Travel to Solid	
					Load N	Defl. mm	Load N	Defl. mm	Load N	Defl. mm	Load N	Defl. mm
10	5	19	9-0603-36	44.1	142	3.23	168	3.80	209	4.75	234	5.30
		25	9-0604-36	32.7	139	4.3	164	5.0	205	6.3	241	7.3
		32	9-0605-36	25.6	139	5.4	164	6.4	205	8.0	238	9.3
		38	9-0606-36	21.2	137	6.5	161	7.6	201	9.5	243	11.5
		44	9-0607-36	17.7	132	7.5	156	8.8	195	11.0	230	13.0
		51	9-0608-36	15.4	134	8.7	157	10.2	196	12.8	230	15.0
		64	9-0610-36	12.3	133	10.9	157	12.8	196	16.0	233	19.1
		76	9-0612-36	10.2	131	12.9	154	15.2	193	19.0	236	23.0
		305	9-0648-36	2.5	127	51.9	150	61.0	187	76.3	231	94.0
12.5	7	19	9-0803-36	77.9	252	3.23	296	3.80	370	4.75	452	5.80
		25	9-0804-36	58.7	249	4.3	293	5.0	367	6.3	468	8.0
		32	9-0805-36	44.1	240	5.4	282	6.4	353	8.0	431	9.8
		38	9-0806-36	36.3	234	6.5	276	7.6	344	9.5	433	12.0
		44	9-0807-36	30.6	229	7.5	270	8.8	337	11.0	434	14.2
		51	9-0808-36	27.0	234	8.7	275	10.2	344	12.8	460	17.0
		64	9-0810-36	21.7	236	10.9	278	12.8	347	16.0	486	22.0
		76	9-0812-36	17.7	229	12.9	269	15.2	336	19.0	469	26.0
		89	9-0814-36	15.1	228	15.1	268	17.8	335	22.3	465	31.0
		305	9-0848-36	4.2	219	51.9	257	61.0	322	76.3	450	107.0
16	8.5	19	9-1003-36	169.9	549	3.23	646	3.80	807	4.75	968	5.70
		25	9-1004-36	127.3	541	4.3	637	5.0	796	6.3	1012	7.9
		32	9-1005-36	94.0	512	5.4	602	6.4	752	8.0	911	9.7
		38	9-1006-36	75.8	490	6.5	576	7.6	720	9.5	895	11.8
		44	9-1007-36	63.6	476	7.5	559	8.8	699	11.0	887	13.9
		51	9-1008-36	55.5	481	8.7	566	10.2	708	12.8	912	16.4
		64	9-1010-36	43.3	471	10.9	554	12.8	692	16.0	895	21.0
		76	9-1012-36	35.6	459	12.9	540	15.2	675	19.0	885	25.0
		89	9-1014-36	30.3	458	15.1	539	17.8	674	22.3	894	30.0
		102	9-1016-36	26.4	459	17.3	539	20.4	674	25.5	903	34.0
		305	9-1048-36	8.5	443	51.9	521	61.0	652	76.3	907	106.0
20	10	25	9-1204-36	320.5	1362	4.3	1602	5.0	2003	6.3	2087	6.5
		32	9-1205-36	239.9	1305	5.4	1536	6.4	1919	8.0	2050	8.5
		38	9-1206-36	194.4	1256	6.5	1477	7.6	1847	9.5	2099	10.8
		44	9-1207-36	161.8	1210	7.5	1424	8.8	1780	11.0	2073	12.8
		51	9-1208-36	139.6	1210	8.7	1424	10.2	1780	12.8	2105	15.1
		64	9-1210-36	108.8	1183	10.9	1392	12.8	1740	16.0	2101	19.3
		76	9-1212-36	89.7	1159	12.9	1363	15.2	1704	19.0	2137	24.0
		89	9-1214-36	75.7	1145	15.1	1347	17.8	1683	22.3	2106	28.0
		102	9-1216-36	65.3	1133	17.3	1333	20.4	1666	25.5	2080	32.0
		115	9-1218-36	57.4	1113	19.4	1310	22.8	1637	28.5	2063	36.0
		127	9-1220-36	51.7	1115	21.6	1312	25.4	1640	31.8	2088	40.0
		139	9-1222-36	46.6	1109	23.8	1304	28.0	1630	35.0	2071	44.0
		152	9-1224-36	42.6	1100	25.8	1294	30.4	1617	38.0	2059	48.0
		305	9-1248-36	21.0	1090	51.9	1282	61.0	1602	76.3	2085	100.0

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ISO Standard Metric

Hole Diam. (mm) A	Rod Diam. (mm) B	Free Length (mm) C	CATALOG NUMBER	RATE Newtons Reqd. to deflect 1 mm	LOAD-DEFLECTION TABLE							
					Total Deflection Recommended for Long Life (17% of C)		Total Deflection Recommended for Avg. Life (20% of C)		Maximum Operating Deflection (25% of C)		Total Travel to Solid	
					Load N	Defl. mm	Load N	Defl. mm	Load N	Defl. mm	Load N	Defl. mm
25	12.5	32	9-1605-36	353.8	1924	5.4	2264	6.4	2830	8.0	3153	8.9
		38	9-1606-36	280.2	1810	6.5	2130	7.6	2662	9.5	3080	11.0
		44	9-1607-36	231.2	1729	7.5	2034	8.8	2543	11.0	3049	13.2
		51	9-1608-36	197.9	1716	8.7	2019	10.2	2523	12.8	3027	15.3
		64	9-1610-36	153.8	1673	10.9	1968	12.8	2460	16.0	3044	19.8
		76	9-1612-36	125.0	1616	12.9	1901	15.2	2376	19.0	3008	24.0
		89	9-1614-36	105.4	1595	15.1	1877	17.8	2346	22.3	2983	28.0
		102	9-1616-36	91.1	1579	17.3	1858	20.4	2322	25.5	2966	33.0
		115	9-1618-36	80.9	1568	19.4	1845	22.8	2306	28.5	3029	37.0
		127	9-1620-36	72.2	1558	21.6	1833	25.4	2291	31.8	3010	42.0
		139	9-1622-36	65.6	1561	24.0	1837	28.0	2296	35.0	3053	47.0
		152	9-1624-36	60.2	1557	25.8	1831	30.4	2289	38.0	3093	51.0
		178	9-1628-36	51.3	1553	30.3	1827	35.6	2283	44.5	3102	61.0
		203	9-1632-36	44.7	1541	34.5	1813	40.6	2266	50.8	3112	70.0
		305	9-1648-36	29.6	1535	51.9	1805	61.0	2257	76.3	3131	106.0
32	16	38	9-2006-36	488.6	3156	6.5	3713	7.6	4642	9.5	4860	10.0
		44	9-2007-36	404.6	3026	7.5	3560	8.8	4450	11.0	4930	12.2
		51	9-2008-36	345.0	2991	8.7	3519	10.2	4399	12.8	4979	14.5
		64	9-2010-36	266.2	2896	10.9	3407	12.8	4259	16.0	5068	19.0
		76	9-2012-36	215.4	2783	12.9	3274	15.2	4093	19.0	4987	23.0
		89	9-2014-36	182.1	2756	15.1	3242	17.8	4053	22.3	5030	28.0
		102	9-2016-36	155.7	2700	17.3	3176	20.4	3970	25.5	4892	31.0
		115	9-2018-36	135.7	2630	19.4	3095	22.8	3868	28.5	4764	35.0
		127	9-2020-36	121.9	2632	21.6	3096	25.4	3870	31.8	4849	40.0
		139	9-2022-36	111.0	2651	24.0	3119	28.0	3898	35.0	5018	45.0
		152	9-2024-36	100.9	2607	25.8	3067	30.4	3833	38.0	4929	49.0
		178	9-2028-36	85.6	2591	30.3	3049	35.6	3811	44.5	4886	57.0
		203	9-2032-36	74.6	2575	34.5	3029	40.6	3786	50.8	4941	66.0
		254	9-2040-36	59.5	2571	43.2	3025	50.8	3781	63.5	5017	84.0
		305	9-2048-36	49.6	2570	51.9	3023	61.0	3779	76.3	5068	102.0
40	20	51	9-2408-36	558.7	4844	8.7	5698	10.2	7123	12.8	7815	14.0
		64	9-2410-36	422.1	4592	10.9	5402	12.8	6753	16.0	7675	18.2
		76	9-2412-36	338.0	4367	12.9	5138	15.2	6422	19.0	7551	22.0
		89	9-2414-36	280.2	4240	15.1	4988	17.8	6235	22.3	7276	26.0
		102	9-2416-36	243.4	4221	17.3	4966	20.4	6208	25.5	7604	31.0
		115	9-2418-36	213.7	4141	19.4	4871	22.8	6089	28.5	7560	35.0
		127	9-2420-36	189.1	4084	21.6	4804	25.4	6005	31.8	7503	40.0
		139	9-2422-36	171.0	4066	24.0	4783	28.0	5979	35.0	7477	44.0
		152	9-2424-36	155.3	4014	25.8	4722	30.4	5903	38.0	7439	48.0
		178	9-2428-36	131.0	3975	30.3	4676	35.6	5845	44.5	7394	56.0
		203	9-2432-36	113.8	3928	34.5	4622	40.6	5777	50.8	7361	65.0
		254	9-2440-36	90.4	3902	43.2	4591	50.8	5738	63.5	7450	82.0
		305	9-2448-36	75.0	3886	51.9	4572	61.0	5715	76.3	7500	100.0
50	25	64	9-3210-36	725.0	7888	10.9	9281	12.8	11601	16.0	12535	17.3
		76	9-3212-36	572.7	7399	12.9	8705	15.2	10881	19.0	12200	21.0
		89	9-3214-36	474.6	7181	15.1	8448	17.8	10560	22.3	11981	25.0
		102	9-3216-36	404.6	7015	17.3	8253	20.4	10316	25.5	11827	29.0
		115	9-3218-36	352.0	6822	19.4	8026	22.8	10032	28.5	11761	33.0
		127	9-3220-36	313.5	6768	21.6	7963	25.4	9953	31.8	11666	37.0
		139	9-3222-36	282.0	6722	23.8	7908	28.0	9885	35.0	11825	42.0
		152	9-3224-36	253.9	6562	25.8	7720	30.4	9650	38.0	11530	45.0
		178	9-3228-36	215.0	6503	30.3	7650	35.6	9563	44.5	11466	53.0
		203	9-3232-36	185.6	6406	34.5	7537	40.6	9421	50.8	11394	61.0
		254	9-3240-36	146.2	6314	43.2	7429	50.8	9286	63.5	11316	77.0
		305	9-3248-36	120.7	6257	51.9	7361	61.0	9201	76.3	11265	93.0

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DieMax XL™ Maximum Life Springs

Four load classifications – in standard ISO sizes for dies, jigs, fixtures, and general tool work.

DANLY IEM springs are offered in a range of lengths, diameters, and load classifications that conform to the ISO 10243 International Standard and the NAAMS (North American Automotive Metric Standard), including color coding for easy identification of load range.

ISO 9002 registered Quality

All of our **DANLY IEM** die springs are manufactured to ISO 9001: 2008 quality standards consistent with the **DANLY IEM** reputation for providing the stamping industry with the most carefully engineered diemakers' supplies. Comparison testing of the operating life of **DANLY IEM** die springs and competitive products have shown that **DANLY IEM** springs offer significantly longer life.

The exceptional quality of **DANLY IEM** die springs has made them popular for a wide variety of applications. For example, **DANLY IEM** die springs are commonly used in general tool work, such as jigs and fixtures, as well as in industrial clutches and brakes and as components in farm machinery and aircraft mechanisms. Many manufacturers specify **DANLY IEM** die springs because the quality and service life of these springs improves the reliability and performance of their products.

Whatever your application might be, you can be sure that the springs you select from this catalog will consistently provide rugged, dependable spring performance. They will live up to the **DANLY IEM** reputation for quality and value.

For help with your selection, or to order die springs, contact **DANLY IEM** or your authorized **DANLY IEM** distributor.

LIGHT LOAD
Green Color Coded

MEDIUM LOAD
Blue Color Coded

HEAVY LOAD
Red Color Coded

EXTRA HEAVY LOAD
Yellow Color Coded

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DieMax XL™ Maximum Life Springs

DieMax XL™ Maximum Life Springs - springs you can rely on.

A combination of enhanced raw material, optimal spring design, innovative manufacturing processes, and broad distribution channels allow the DieMax XL™ spring to yield the best, most dependable performance and availability combination, time after time.

Spring Wire

Manufactured from spring quality chromium silicon alloy steel in accordance with ASTM A1000-99 specifications. The high tensile strength and superior heat resistance wire characteristics contribute to the low-stress, long life spring design.

Enhanced Design

Our spring starts with a modified trapezoidal cross section and changes to a "D" cross section after coiling. This wire cross section, exclusive to DANLY IEM, has significantly lower stress levels during compression compared to competitor designs. The "D" cross section also allows for more coils per spring while providing a greater amount of spring travel to solid when compared to competitor springs.

Physical Dimensions and Load Ratings

Computer controlled coiling and spring setting equipment allow tight control over the critical spring characteristics. Every manufactured lot of DieMax XL™ springs is carefully inspected for hole/rod fit, free length, spring rate, solid height, squareness and physical appearance. All inspection results are recorded and analyzed to ensure compliance to quality standards. These tight tolerances and highly inspected attributes guarantee the springs will work freely over the rods or freely in the holes specified without binding. They also ensure that the free lengths, solid heights and spring loads are compatible from spring to spring and lot to lot for predictable, long-life performance.

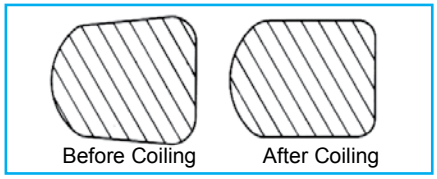
Manufacturing Processes

In addition to the optimal, low-stress spring design, the continual investment in the most advanced coiling and spring processing equipment allows DANLY IEM to offer a premium, long-life, mechanical spring solution. From the computer controlled spring coilers with in-line SPC data collection, the springs are routed through a series of steps including shot peening to reduce working stresses, and set removal which ensures the spring length and load will not relax in the tool.

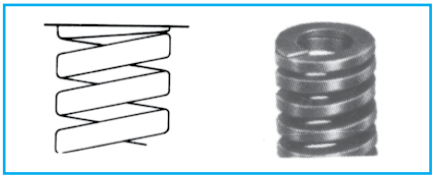
Coilers - *Using the latest in CNC coiling technology, springs are produced with much better predictability and consistency in performance, rates and lengths.*

SPC Quality Assurance - *Using SPC software, operators insure that every production process meets our high quality standards.*

Computer Controlled Spring Testing - *Utilizing custom software, spring testers track and verify consistency in spring dimensions and rates.*



Modified trapezoidal cross section of rectangular wire springs changes to a "D" cross section during coiling to achieve a low stress level that means longer spring life.



Ends of each spring are closed and ground square to assure that the spring will stand on either end and provide a maximum bearing surface.

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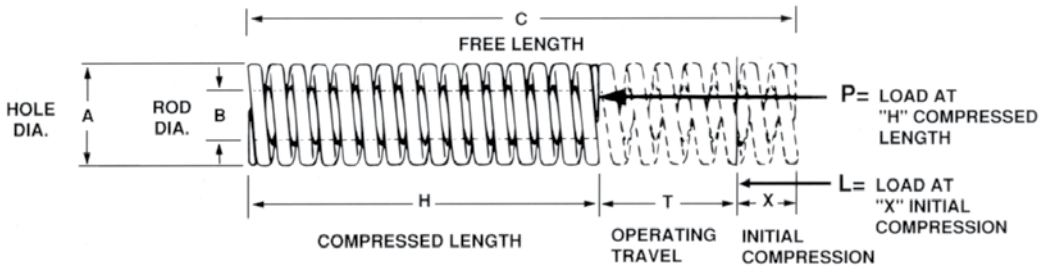
Spring Selection Steps



If the diameter and length are known, turn directly to dimension tables on pages 6 through 23 to select springs with desired total load.

If diameter and length are not known, use the following seven spring selection steps and refer to the rate column of the dimension tables for spring selection.

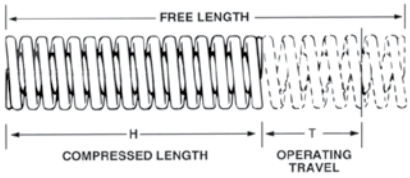
In determining the length of a spring, it should be remembered that maximum delivered spring load is obtained by selecting longer springs. For best economy and saving of space, choose Light and Medium Load springs or the Heavy Load spring having a free length equal to six times the travel, or an Extra Heavy Load spring having a free length equal to eight times the travel. If ratios lower than these are used because of height limitations, the number of springs required will be substantially increased.

Step 1

Estimate the level of production required of the die - short run, constant production, etc.

Step 2

Determine compressed spring length “H” and operating travel “T” from the die layout.



INCH

THIS CHART CONVERTS COMPRESSED LENGTHS TO FREE LENGTHS

C Free Length (in)	LIGHT LOAD H-COMPRESSED LENGTH (in)			MEDIUM LOAD H-COMPRESSED LENGTH (in)			HEAVY LOAD H-COMPRESSED LENGTH (in)			EXTRA HEAVY LOAD H-COMPRESSED LENGTH (in)		
	Long Life 25%	Average Life 30%	Maximum Deflection 40%	Long Life 25%	Average Life 30%	Maximum Deflection 37.5%	Long Life 20%	Average Life 25%	Maximum Deflection 30%	Long Life 17%	Average Life 20%	Maximum Deflection 25%
3/4	0.56	0.53	0.45	0.56	0.53	0.47	0.60	0.56	0.53	0.62	0.60	0.56
1	0.75	0.70	0.60	0.75	0.70	0.62	0.80	0.75	0.70	0.83	0.80	0.75
1 1/4	0.94	0.87	0.75	0.94	0.87	0.78	1.00	0.94	0.87	1.04	1.00	0.94
1 1/2	1.12	1.05	0.90	1.12	1.05	0.93	1.20	1.12	1.05	1.25	1.20	1.12
1 3/4	1.31	1.22	1.05	1.31	1.22	1.09	1.40	1.31	1.22	1.45	1.40	1.31
2	1.50	1.40	1.20	1.50	1.40	1.25	1.60	1.50	1.40	1.66	1.60	1.50
2 1/2	1.87	1.75	1.50	1.87	1.75	1.56	2.00	1.87	1.75	2.07	2.00	1.87
3	2.25	2.10	1.80	2.25	2.10	1.87	2.40	2.25	2.10	2.50	2.40	2.25
3 1/2	2.62	2.45	2.10	2.62	2.45	2.18	2.80	2.62	2.45	2.91	2.80	2.62
4	3.00	2.80	2.40	3.00	2.80	2.50	3.20	3.00	2.80	3.33	3.20	3.00
4 1/2	3.37	3.15	2.70	3.37	3.15	2.81	3.60	3.37	3.15	3.75	3.60	3.37
5	3.75	3.50	3.00	3.75	3.50	3.12	4.00	3.75	3.50	4.15	4.00	3.75
5 1/2	4.13	3.85	3.30	4.13	3.85	3.44	4.40	4.13	3.85	4.57	4.40	4.13
6	4.50	4.20	3.60	4.50	4.20	3.75	4.80	4.50	4.20	5.00	4.80	4.50
7	5.25	4.90	4.20	5.25	4.90	4.37	5.60	5.25	4.90	5.83	5.60	5.25
8	6.00	5.60	4.80	6.00	5.60	5.00	6.40	6.00	5.60	6.66	6.40	6.00
9	–	–	–	6.75	6.30	5.62	–	–	–	–	–	–
10	7.50	7.00	6.00	7.50	7.00	6.25	8.00	7.50	7.00	8.30	8.00	7.50
12	9.00	8.40	7.20	9.00	8.40	7.50	9.60	9.00	8.40	10.00	9.60	9.00

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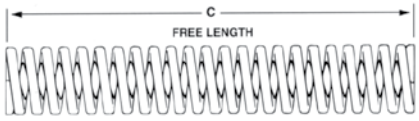
Spring Selection Steps

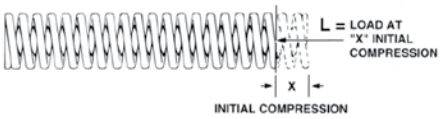
Step 3

Determine free length "C" as follows: Decide which load classification the spring should be selected from: Light, Medium, Heavy, or Extra-Heavy Load. Then choose the figure nearest the compressed length "H" required by the die design from the appropriate charts below on pages 4 and 5. Read corresponding "C" (free length).



Step 4

Estimate total initial spring load "L" required for all springs when springs are compressed "X" inches or millimeters.



Step 5

Determine "X" (initial compression) by using the following formula:

$$X = C\text{-}H\text{-}T$$

Step 6

Inch: Determine "R" (total rate for all springs in pounds per 1/10 inch) by using the following formula:

$$R = \frac{L}{10xX}$$

Metric: Determine "R" (total rate for all springs in newtons per millimeter) by using the following formula:

$$R = \frac{L}{X}$$

Step 7

Select springs as follows:

1. The free length "C" must comply with the length determined in Step 3.
2. Divide "R" in Step 6 by the number of springs to be used (if known) in order to get the rate per spring. Then refer to the following pages for the catalog number of springs having the desired rate. If the number of springs is not known, divide "R" from Step 6 by the rate of the spring you select for the correct number of springs.

METRIC

THIS CHART CONVERTS COMPRESSED LENGTHS TO FREE LENGTHS

C Free Length (mm)	LIGHT LOAD H-COMPRESSED LENGTH (mm)			MEDIUM LOAD H-COMPRESSED LENGTH (mm)			HEAVY LOAD H-COMPRESSED LENGTH (mm)			EXTRA HEAVY LOAD H-COMPRESSED LENGTH (mm)		
	Long Life 25%	Average Life 30%	Maximum Deflection 40%	Long Life 25%	Average Life 30%	Maximum Deflection 37.5%	Long Life 20%	Average Life 25%	Maximum Deflection 30%	Long Life 17%	Average Life 20%	Maximum Deflection 25%
19	14	13	11	14	13	12	15	14	13	16	15	14
25	19	18	15	19	18	16	20	19	18	21	20	19
32	24	22	19	24	22	20	26	24	22	27	26	24
38	29	27	23	29	27	24	30	29	27	32	30	29
44	33	31	26	33	31	28	35	33	31	37	35	33
51	38	36	31	38	36	32	41	38	36	42	41	38
64	48	45	38	48	45	40	51	48	45	53	51	48
76	57	53	46	57	53	47	61	57	53	63	61	57
89	67	62	53	67	62	56	71	67	62	74	71	67
102	76	71	61	76	71	64	82	76	71	85	82	76
115	86	80	68	86	80	71	91	86	80	95	91	86
127	95	89	76	95	89	79	102	95	89	105	102	95
139	105	98	84	105	98	87	112	105	98	116	112	105
152	114	106	91	114	106	95	122	114	106	126	122	114
178	133	125	107	133	125	111	142	133	125	148	142	133
203	152	142	122	152	142	127	162	152	142	168	162	152
229	–	–	–	172	160	143	–	–	–	–	–	–
254	190	178	152	190	178	159	203	190	178	211	203	190
305	229	213	183	229	213	191	244	229	213	253	244	229

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