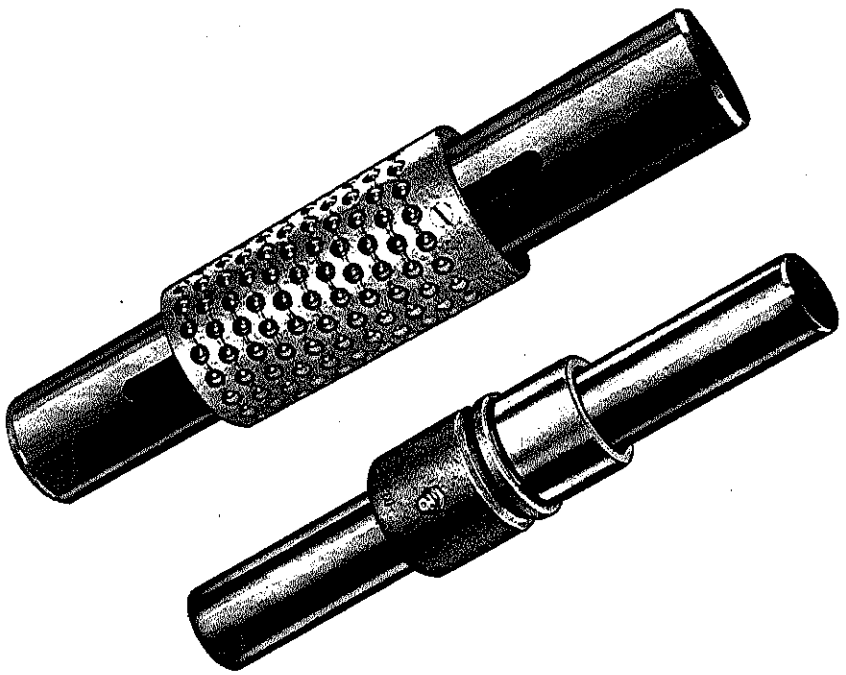
FACTORS IN DIE SET DESIGN



Today's fierce competition for the diminishing profit return means increasing attention to factors affecting profit and loss. This is true in small and large die shops, in toolrooms, in the stamping industry generally.

Have you reviewed the economic factors in die design and operation recently? And do you know that substantial savings often still can be made on the die designer's bench, in die tryout, in production?

To prove to you how this can be done, we offer information which since it was first published more than ten years ago has accounted for profitable savings to production stampers and die makers alike.

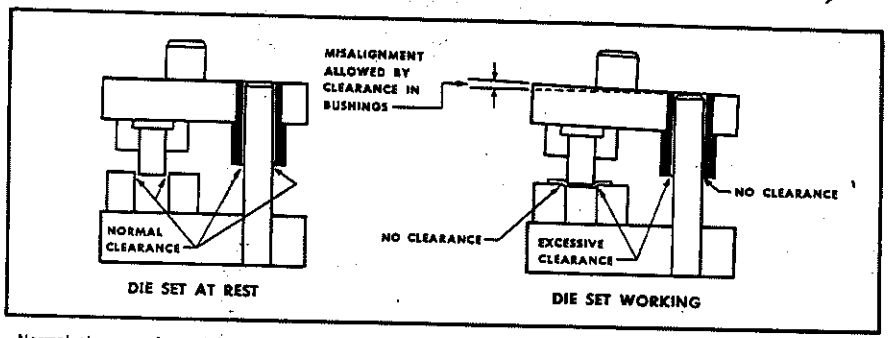
The stamper is interested in uninterrupted high press production. He wants held to a minimum the amount of downtime chargeable to regrinding and die set maintenance and repairs. He also wants scrap held to a minimal level.

Lempco's Ball Bearing Die Sets offer him this opportunity under a general heading of "accuracy". Because a Lempco Ball Bearing Die Set is so accurate there is less die wear, less scrap, less chance of seizure. These are profit factors.

The stamper also should know that less time consumed fitting in the die shop means cost reduction which can result in more favorable pricing. The die maker also should know this because such a saving makes him more competitive. Cost records show that from 30% to 50% of the die maker's time is consumed at the bench—fitting, mounting, aligning. The accuracy of a Lempco Ball Bearing Die Set reduces this time.

Then there's the ease of assembly and disassembly offered by a Lempco Ball Bearing Die Set. How many times are punch holder and die holder assembled, disassembled, reassembled before a new set of dies is ready for trying? Time consumed, times the number of men involved, times the labor cost, can represent important money. If you can reduce this amount substantially, as you can the Lempco ball bearing way; then why not take advantage of your opportunity?

FACTORS IN DIE SET DESIGN

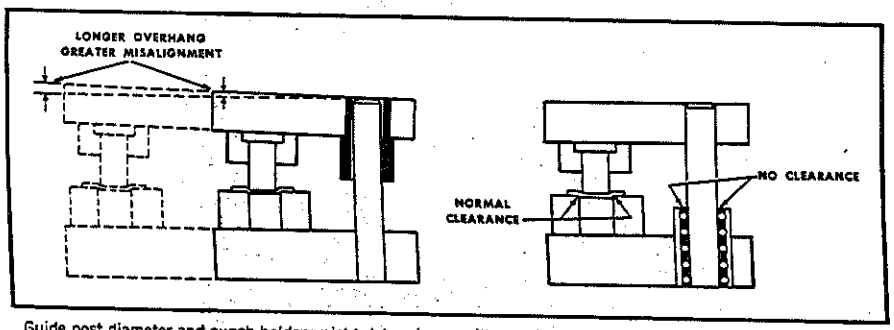


Normal clearance in a plain bearing die set can allow misalignment, as these sketches show. When working load is applied, normal clearance becomes "redistributed", ranging from zero to an excess. A slight lateral movement results which causes the die to wear faster in one direction. At points of zero clearance, there is danger of lubrication breakdown with resulting excessive wear and increasing misalignment.

Alignment of guide posts and bushings, and the clearances provided in fitting them, contribute as much as any other factors to the efficient operation and economic life of a die. The ideal condition would involve a press fit of guide post and bushing (negative clearance), so that the resulting rigidity would assure perfect parallelism between upper and lower die set members under all working stresses.

The pre-loaded ball bearing guide post and bushing offer the accuracy of a press fit, and the die set possesses at the same time an ease of operation which could otherwise be attained only by an impractically large clearance between plain bearing guide post and bushing. Further, the ball bearing assembly presents no lubrication problem such as exists when plain bearing assemblies are fitted with clearances too small for the maintenance of adequate lubrication films. Thus there is less dependence on the press operator for successful die performance since seizure due to inability of lubricant to cover all surfaces is completely eliminated.

(continued next page)



Guide post diameter and punch holder weight determine the overhang that can be tolerated before development of undue binding on plain bearing type posts and bushings. Overhang complicates punch and die alignment. A ball bearing die set maintains perfect closing action without binding, even under excessive overhang conditions. No misalignment due to clearance or overhang is found in a Lempco Ball Bearing Die Set. A ball bearing set offers free rolling movement vertically, and, therefore, the punch holder can be raised and lowered manually, weight permitting.

LEMPCO FACTORS IN DIE SET DESIGN

When plain bearing assemblies are fitted to closer tolerances, there is an increasing tendency toward binding and galling; this difficulty affects the accuracy with which the punch enters the die. A slight cocking in any direction develops excessive die wear in the direction of displacement. The result is reduced die life overall and more frequent interruptions for regrinding.

Clearance increases with wear in plain bearing assemblies. In a long run involving frequent resharpenings, the total time consumed in resetting becomes a costly nonproductive part of the job. A corollary evil stems from the higher rate of rejection due to burrs, mispunches and distortions.

The ball bearing assembly helps solve the problem of alignment which results from situations where large overhangs are required. Under conditions of severe and disproportionate overhang, the "rolling press fit" of the ball bearing assembly enables the upper and lower members of the die set to maintain perfect parallelism at the extremities. In the case of the plain bearing die set, a temporary, although troublesome, solution consists of increasing the diameters of guide posts and bushings. Slowing down the press production rate and exercising greater care to avoid mis-hits also offer additional alleviation of this problem inherent to plain bearing assemblies.

When small shut height reduces the thickness of die shoes, flexing of these members may result with consequent excessive wear on the dies. The ball bearing assembly offsets to a marked degree the lack of desirable rigidity in die shoes.

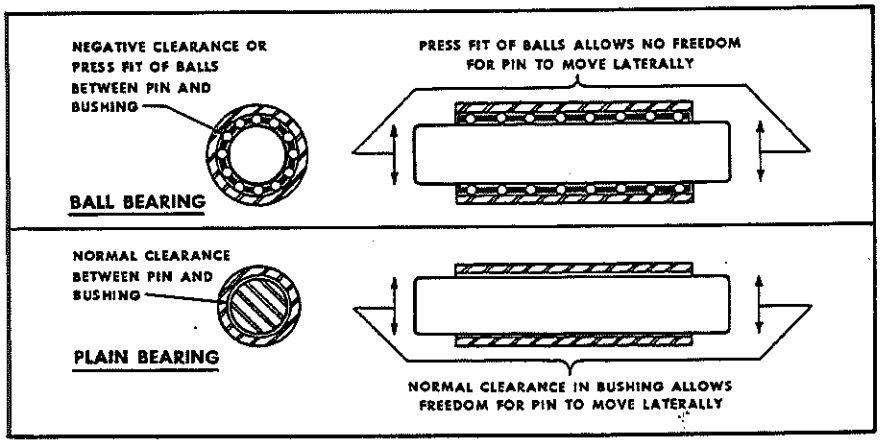
Ordinarily a pre-load (negative clearance) would seem conducive to binding, but because of the rolling action of the ball bearings, no such binding exists. The initial pre-load is maintained throughout the longest runs; careful tests have yielded many case histories showing that even after 25 million or more strokes a measureable pre-load still exists.

The success stampers and die makers have had with Lempco's ball bearing assemblies over the course of many years, together with an increasing demand for still greater parts accuracy, have resulted now in introduction of a new and even higher standard of ball bearing die set, Lempco's Precision Grade. The former precision standard now is designated Commercial Grade.

Acceptance of the anti-friction design has established Lempco as a prime source of supply to the stamping industry. In an effort to be of even greater service to the industry, Lempco now makes available a new line of Precision and Commercial Grade Plain Bearing Die Sets.

Lempco's Plain Bearing Die Sets are produced with the same quality of manufacture as its Ball Bearing Die Sets. The accuracies of Lempco's new Plain Bearing Die Sets are at least equivalent to those obtained from the best competitive materials available.

Lempco continues to recommend earnestly its Ball Bearing Die Sets for universal application by reason of the economic factors discussed in this article.

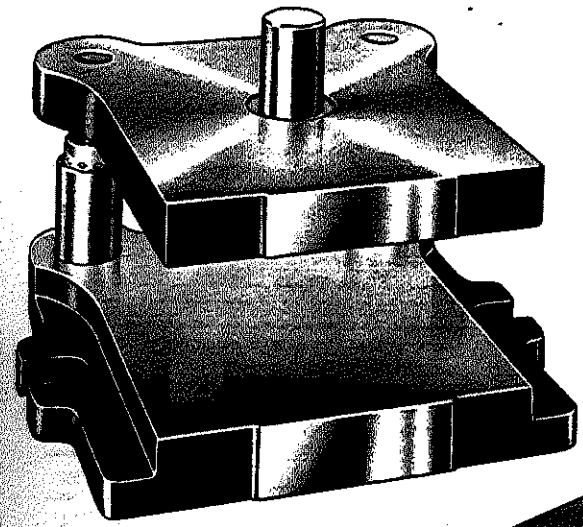


There is no lateral movement in a Lempco Ball Bearing Assembly because of the "rolling press-fit" action. This is not the case with the plain bearing assembly which requires clearance to function.

LEMPCO FLANGED STOCK DIE SETS

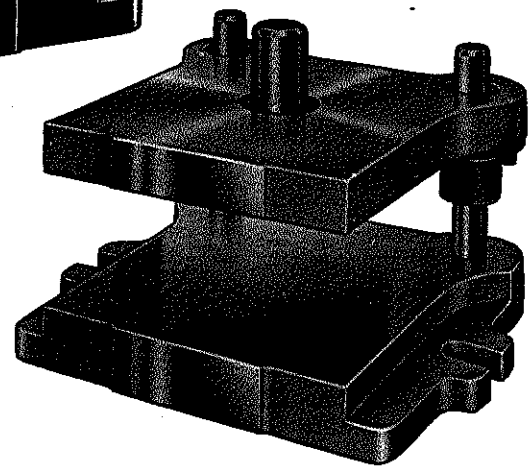
—Two Post Style

MAY 1, 1967



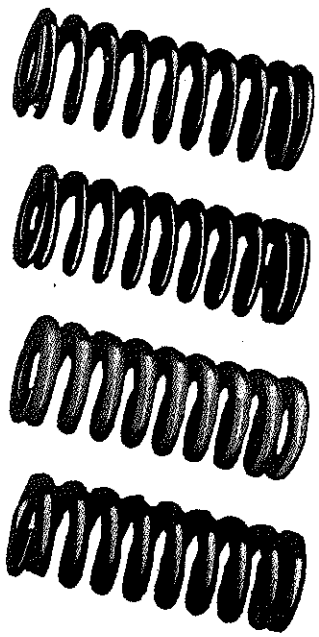
BALL BEARING SETS
Precision Commercial
Semi-Steel
Semi-Steel and Steel
All Steel

PLAIN BEARING SETS
Precision Commercial
Semi-Steel
Semi-Steel and Steel
All Steel



Lempco Ball Bearing and Plain Bearing Two Post Stock Die Sets are offered in both flanged and rectangular designs: the flanged type shown in Catalog Section 1 — Flanged Stock Die Sets—Two Post, and the rectangular in Catalog Section 1A — Rectangular Stock Die Sets—Two Post. Other styles of stock die sets are described in Catalog Section 1B — Rectangular Stock Die Sets—Four Post, Catalog Section 1C — Rectangular Stock Die Sets—Center Post, and Catalog Section 1D — Rectangular Stock Die Sets—Diagonal Post.

LEMPCO QUALITY DIE SPRINGS



MEDIUM PRESSURE — BLUE

MEDIUM HEAVY PRESSURE — RED

HEAVY PRESSURE — COPPER

EXTRA HEAVY PRESSURE — GREEN

Lempco's Die Springs represent quality in design, in material, and in manufacturing. Quality controls are strict, to assure you of an exceptional Die Spring—unmatched performance.

CHROME VANADIUM STEEL

Electric furnace Chrome Vanadium Steel is an extremely tough material. It withstands high stresses, considerable shock, impact loading, and increased deflection. It will operate satisfactorily at higher temperatures than carbon steel.

Because of these inherent qualities, Chrome Vanadium Steel was selected as the best material available for Lempco's Die Springs.

ROUND EDGE WIRE

Years of research and testing were necessary to achieve an efficient material cross-section and pitch design for Lempco Die Springs. Round edge material was chosen over square edge wire for its increased resistance to fracturing.

RIGID MATERIAL SPECIFICATIONS

All material must meet rigid specifications and is laboratory approved prior to use in production. Any material failing to meet our standard is rejected.

Modern manufacturing facilities assure our customers of uniform springs in size and in deflection tolerances. All Lempco springs are manufactured to the high side of tolerances, to further assure users of proper spring performance.

During manufacture, springs are taken from factory runs and thoroughly tested under working conditions. Springs are subjected to millions of deflection cycles, Rockwell hardness tests, and uniformity tests for all tolerances.

Lempco Die Springs are available in four pressure classifications, color-coded for quick visual identification: Blue, Medium Pressure; Red, Medium Heavy Pressure; Copper, Heavy Pressure, and Green, Extra Heavy.

WIDE SELECTION

Lempco Die Springs are available in a wide range of sizes, more than 260 in all. Lengths range between 1" and 12", and diameters from 3/8" to 2", one for every common commercial customer requirement.

The inherent qualities of Chrome Vanadium Steel combined with the rigid quality controls in design, material, and production assure you of an exceptional die spring, having high fatigue life, increased deflection, uniform loads and long dependable spring service.

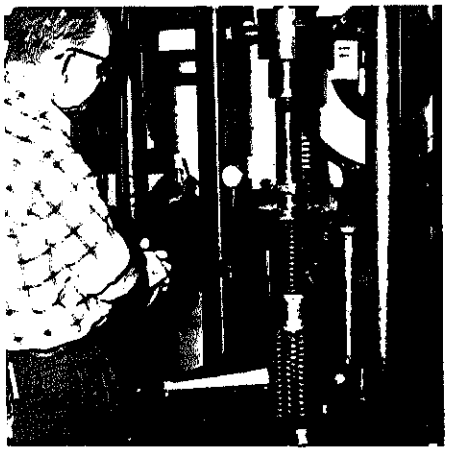
In addition to its Chrome Vanadium line, Lempco also offers for stock delivery a complete assortment of Oil Tempered Machinery Brake and Shear Springs, Carbon Steel Music Wire Die Springs, Carbon Steel Square Wire Die Springs in 12" and 36" lengths, and other compression and extension type springs. Spring Display Panels are available with a wide assortment of springs.

For our customers who require other than cataloged standards, Lempco will supply special compression or extension springs to specifications or print. Special springs are available in an almost infinite variety of design, material, and size combinations.

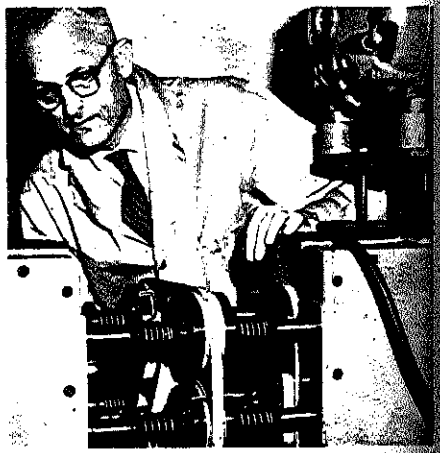
All standard Lempco springs are carried in stock. Strategically located distribution points permit quick shipment.

The purpose of this catalog is to assist you in selecting the proper spring from the finest stock available. We are certain that Lempco's standard and special springs will meet all your requirements, and do it with unmatched performance.

RUGGED DEPENDABLE SERVICE

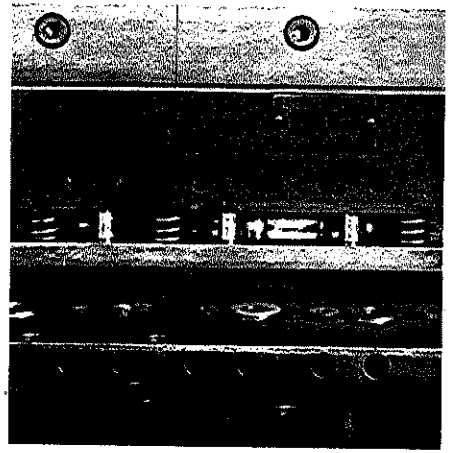


Lempco springs are subjected to many rigorous tests. Here, springs taken from production runs are tested for deflection and for uniformity of tolerances.



Springs are tested for millions of deflection cycles under actual working conditions. Tests such as these assure users of long dependable spring operating life.

Manufacturing processes, such as this coiling operation, produce springs uniform in size and tolerances. Each spring is measured before the succeeding operation, grinding the ends.



A typical die spring application, piercing plate with dies set up in a press brake. Quality springs are a good investment. Their performance is better, insuring against frequent replacement.

HOW TO SELECT DIE SPRINGS

The following formula will assist you in making the proper spring selection; however, because of variables, some trial-and-error computation may be necessary to select the exact spring best suited for your job.

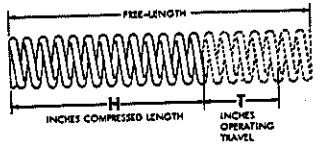
If the spring length and diameter are known, see the tables on Pages 6 to 12 and choose the spring pressure classification and spring with the maximum pressure desired.

Greater delivered spring pressures are realized through the use of longer springs. Longer springs offer more initial loading for "X" travel. Generally, shorter springs develop greater loads at bottom stroke to get even minimum pressures at top stroke, where working spring pressures are actually required.

For maximum spring service, Medium and Medium Heavy Pressure Springs should have a free length equal to five times travel; nine times is desirable for Heavy Pressure. If height limitations necessitate use of shorter springs, the number of springs required will increase accordingly. Rates and total maximum operating deflection can be found on Pages 6 to 12.

In calculating the number of springs required to meet the initial load, use the spring specification tables on Pages 6 to 12.

1 Determine compressed length of spring "H", and operating travel "T" from your die layout.



2 Determine free length "C" in the following manner: Choose the pressure classification – Medium, Medium Heavy, Heavy, Extra Heavy. Select the desired operating deflection from Long Life, Average Life, or Maximum Deflection (not recommended). Choose the compressed length "H" nearest your die layout requirements. Then read the correlated free length "C" from the tables.

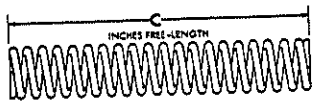
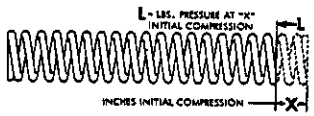


TABLE TO CONVERT COMPRESSED LENGTHS TO FREE LENGTHS

C	MEDIUM PRESSURE H COMPRESSED LENGTH			MEDIUM HEAVY PRESSURE H COMPRESSED LENGTH			HEAVY PRESSURE H COMPRESSED LENGTH			EXTRA-HEAVY PRESSURE H COMPRESSED LENGTH		
Free Length	Maximum Deflection 50% Comp. (Inches)	Average Life 40% Comp. (Inches)	Long life 25% Comp. (Inches)	Maximum Deflection 37% Comp. (Inches)	Average Life 25% Comp. (Inches)	Long Life 20% Comp. (Inches)	Maximum Deflection 30% Comp. (Inches)	Average Life 20% Comp. (Inches)	Long Life 15% Comp. (Inches)	Maximum Deflection 25% Comp. (Inches)	Average Life 20% Comp. (Inches)	Long Life 15% Comp. (Inches)
1"	.500	.600	.750	.6300	.7500	.800	.7000	.800	.8500			
1¼"	.625	.750	.9375	.7875	.9375	1.000	.8750	1.000	1.0540			
1½"	.750	.900	1.125	.9450	1.1250	1.200	1.0500	1.200	1.275	1.125	1.200	1.275
2"	1.000	1.200	1.500	1.260	1.500	1.600	1.400	1.600	1.700	1.500	1.600	1.700
2½"	1.250	1.500	1.875	1.575	1.875	2.000	1.750	2.000	2.125	1.875	2.000	2.125
3"	1.500	1.800	2.250	1.890	2.250	2.400	2.100	2.400	2.550	2.250	2.400	2.550
3½"	1.750	2.100	2.625	2.205	2.625	2.800	2.450	2.800	2.975	2.625	2.800	2.975
4"	2.000	2.400	3.000	2.520	3.000	3.200	2.800	3.200	3.400	3.000	3.200	3.400
4½"	2.250	2.700	3.375	2.835	3.375	3.600	3.150	3.600	3.825	3.375	3.600	3.825
5"	2.500	3.000	3.750	3.150	3.750	4.000	3.500	4.000	4.250	3.750	4.000	4.250
5½"	2.750	3.300	4.125	3.465	4.125	4.400	3.850	4.400	4.675			
6"	3.000	3.600	4.500	3.780	4.500	4.800	4.200	4.800	5.100	4.500	4.800	5.100
7"	3.500	4.200	5.250	4.410	5.250	5.600	4.900	5.600	5.950			
8"	4.000	4.800	6.000	5.040	6.000	6.400	5.600	6.400	6.800	6.000	6.400	6.800
10"	5.000	6.000	7.500	6.300	7.500	8.000	7.000	8.000	8.500	7.500	8.000	8.500
12"	6.000	7.200	9.000	7.560	9.000	9.600	8.400	9.600	10.200	9.000	9.600	10.200

HOW TO SELECT DIE SPRINGS

3 Calculate total initial spring pressure "L" necessary for all springs when all springs are compressed "X" inches.



4 Determine inches of initial compression "X" by using the formula shown below. If "X" is too low, then it is necessary to increase the compressed length "H" in the die.

$$X = C - H - T$$

5 Determine rate "R" (total rate for all springs required in pounds per ⅛") by using the formula shown below:

$$R = \frac{L}{8 \times X}$$

6 Select springs:

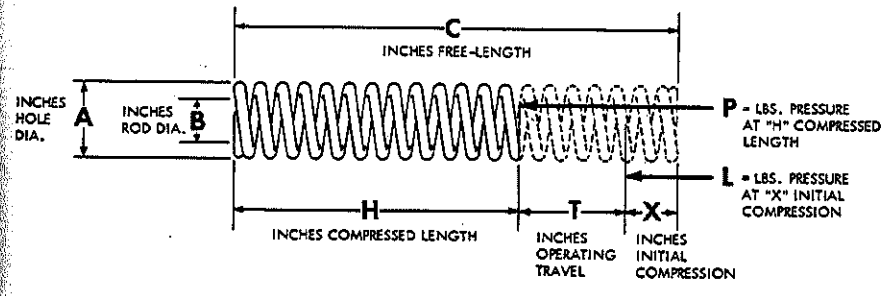
A. The free length "C" must agree with the free length determined in Step 2.

B. Determine the rate per spring by dividing "R" in Step 5 by the total number of springs to be used, if known.

C. Next, see "Loads Required to Deflect ⅛ inch" column in the die spring specifications, Pages 6 to 12, for the catalog number of the spring having the desired rate.

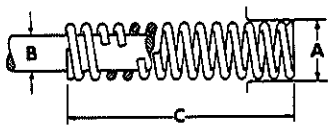
To determine the number of springs required (if not known) divide "R" from Step 5 by the rate of the spring you choose.

COMBINED DRAWING FOR STEPS 1—5



LEMPCO MEDIUM PRESSURE DIE SPRINGS

Electric Furnace Chrome Vanadium Steel



All Loads Shown Are Approximate

Hole Diameter A	Rod Diameter B	Free Length C	Catalog Number	Rate Pounds Required to Deflect ½ Inch	Maximum Operating Deflection 50% of Length "C"		Total Deflection For Average Life 40% of Length "C"		Total Deflection For Long Life 25% of Length "C"		Total Travel To Solid	
					Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches
⅜	3/16	1	9-0604-1	7	28	.500	22.5	.400	14	.250	31	.545
		1¼	9-0605-1	6	30	.625	24	.500	15	.312	35	.735
		1½	9-0606-1	4¾	28½	.750	23	.600	14	.375	34	.906
		2	9-0608-1	3½	28	1.000	22.5	.800	14	.500	35	1.248
		2½	9-0610-1	3	30	1.250	24	1.000	15	.625	38	1.581
		3	9-0612-1	2¼	27	1.500	21.5	1.200	13.5	7.50	37	1.931
		12	9-0648-1	⅜	36	6.000	29	4.800	18	3.000	47	7.961
½	5/32	1	9-0804-1	12½	50	.500	40	.400	25	.250	58	.578
		1¼	9-0805-1	11½	57½	.625	46	.500	29	.312	66	.722
		1½	9-0806-1	9½	57	.750	45.5	.600	28.5	.375	68	.893
		2	9-0808-1	8	64	1.000	51	.800	32	.500	79	1.234
		2½	9-0810-1	6½	65	1.250	52	1.000	32.5	.625	81	1.550
		3	9-0812-1	5	60	1.500	48	1.200	30	.750	76	1.891
		3½	9-0814-1	3¾	52½	1.750	42	1.400	26	.875	67	2.233
		12	9-0848-1	1	48	6.000	38.5	4.800	24	3.000	56	6.931
⅝	11/32	1	9-1004-1	16¼	65	.500	52	.400	32.5	.250	55	.420
		1¼	9-1005-1	16	80	.625	64	.500	40	.312	79	.617
		1½	9-1006-1	13½	81	.750	65	.600	40.5	.375	88	.815
		2	9-1008-1	11	88	1.000	70.5	.800	44	.500	102	1.157
		2½	9-1010-1	7½	75	1.250	60	1.000	37.5	.625	87	1.445
		3	9-1012-1	7	84	1.500	67	1.200	42	.750	103	1.840
		3½	9-1014-1	6	84	1.750	67	1.400	42	.875	104	2.159
		4	9-1016-1	5½	88	2.000	70.5	1.600	44	1.000	113	2.576
		12	9-1048-1	1¾	84	6.000	67	4.800	42	3.000	109	77.82
¾	⅜	1	9-1204-1	39	156	.500	125	.400	78	.250	173	.544
		1½	9-1206-1	25	150	.750	120	.600	75	.375	170	.854
		2	9-1208-1	18	144	1.000	115	.800	72	.500	167	1.162
		2½	9-1210-1	15	150	1.250	120	1.000	75	.625	177	1.474
		3	9-1212-1	12	144	1.500	115	1.200	72	.750	171	1.784
		3½	9-1214-1	10	140	1.750	112	1.400	70	.875	167	2.094
		4	9-1216-1	9	144	2.000	115	1.600	72	1.000	173	2.404
		4½	9-1218-1	8	144	2.250	115	1.800	72	1.125	174	2.714
		5	9-1220-1	7	140	2.500	112	2.000	70	1.250	169	3.024
		5½	9-1222-1	6	132	2.750	106	2.200	66	1.375	160	3.334
		6	9-1224-1	5	120	3.000	96	2.400	60	1.500	146	3.644
		12	9-1248-1	3	144	6.000	115	4.800	72	3.000	177	7.364

⌂ When ordering please prefix 7001- to catalog number shown.

MEDIUM PRESSURE DIE SPRINGS

LEMPCO

Electric Furnace Chrome Vanadium Steel

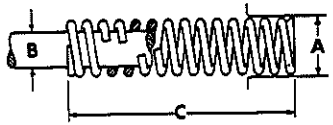
All Loads Shown Are Approximate

Hole Diameter A	Rod Diameter B	Free Length C	Catalog Number	Rate Pounds Required to Deflect ⅛ Inch	Maximum Operating Deflection 50% of Length "C"		Total Deflection For Average Life 40% of Length "C"		Total Deflection For Long Life 25% of Length "C"		Total Travel To Solid	
					Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches
1	½	1	9-1604-1	67	268	.500	214	.400	134	.250	264	.493
		1½	9-1606-1	42	252	.750	202	.600	126	.375	274	.816
		2	9-1608-1	29	232	1.000	186	.800	116	.500	258	1.114
		2½	9-1610-1	25	250	1.250	200	1.000	125	.625	282	1.411
		3	9-1612-1	19	228	1.500	182	1.200	114	.750	260	1.708
		3½	9-1614-1	16	224	1.750	180	1.400	112	.875	266	2.082
		4	9-1616-1	15	240	2.000	192	1.600	120	1.000	276	2.303
		4½	9-1618-1	13	234	2.250	187	1.800	117	1.125	271	2.601
		5	9-1620-1	12	240	2.500	192	2.000	120	1.250	278	2.898
		5½	9-1622-1	11	242	2.750	194	2.200	121	1.375	281	3.195
		6	9-1624-1	10	240	3.000	192	2.400	120	1.500	279	3.493
		7	9-1628-1	9	252	3.500	202	2.800	126	1.750	294	4.086
		8	9-1632-1	7	224	4.000	180	3.200	112	2.000	262	4.682
		12	9-1648-1	5	240	6.000	192	4.800	120	3.000	282	7.062
1¼	⅝	1½	9-2006-1	62	372	.750	298	.600	186	.375	399	.804
		2	9-2008-1	44	352	1.000	282	.800	176	.500	398	1.130
		2½	9-2010-1	36	360	1.250	288	1.000	180	.625	419	1.456
		3	9-2012-1	30	360	1.500	288	1.200	180	.750	428	1.782
		3½	9-2014-1	25	350	1.750	280	1.400	175	.875	422	2.108
		4	9-2016-1	22	352	2.000	282	1.600	176	1.000	428	2.434
		4½	9-2018-1	20	360	2.250	288	1.800	180	1.125	422	2.760
		5	9-2020-1	17	340	2.500	272	2.000	170	1.250	420	3.086
		5½	9-2022-1	16	352	2.750	282	2.200	176	1.375	471	3.412
		6	9-2024-1	15	360	3.000	288	2.400	180	1.500	449	3.738
		7	9-2028-1	13	364	3.500	291	2.800	182	1.750	457	4.390
		8	9-2032-1	11	352	4.000	282	3.200	176	2.000	444	5.042
		10	9-2040-1	9	360	5.000	288	4.000	180	2.500	457	6.346
		12	9-2048-1	7	336	6.000	269	4.800	168	3.000	428	7.650
1½	¾	2	9-2408-1	56	448	1.000	358	.800	224	.500	500	1.116
		2½	9-2410-1	46	460	1.250	368	1.000	230	.625	532	1.446
		3	9-2412-1	42	504	1.500	403	1.200	252	.750	597	1.776
		3½	9-2414-1	33	462	1.750	370	1.400	231	.875	547	2.072
		4	9-2416-1	27	432	2.000	346	1.600	216	1.000	525	2.436
		4½	9-2418-1	26	468	2.250	405	1.800	253	1.125	575	2.766
		5	9-2420-1	25	500	2.500	400	2.000	250	1.250	619	3.096
		5½	9-2422-1	21	462	2.750	370	2.200	231	1.375	576	3.426
		6	9-2424-1	18	432	3.000	346	2.400	216	1.500	540	3.756
		7	9-2428-1	17	476	3.500	381	2.800	238	1.750	601	4.416
		8	9-2432-1	16	512	4.000	410	3.200	256	2.000	650	5.076
		10	9-2440-1	11	440	5.000	352	4.000	220	2.500	563	6.396
		12	9-2448-1	10	480	6.000	384	4.800	240	3.000	606	7.580
2	1	2½	9-3210-1	112	1120	1.250	896	1.000	560	.625	1179	1.316
		3	9-3212-1	96	1152	1.500	922	1.200	576	.750	1243	1.619
		3½	9-3214-1	81	1134	1.750	907	1.400	567	.875	1245	1.922
		4	9-3216-1	69	1104	2.000	883	1.600	552	1.000	1228	2.224
		4½	9-3218-1	59	1062	2.250	850	1.800	531	1.125	1193	2.527
		5	9-3220-1	52	1040	2.500	832	2.000	520	1.250	1177	2.830
		5½	9-3222-1	49	1078	2.750	862	2.200	539	1.375	1228	3.132
		6	9-3224-1	44	1056	3.000	845	2.400	528	1.500	1209	3.435
		7	9-3228-1	39	1092	3.500	874	2.800	546	1.750	1260	4.040
		8	9-3232-1	32	1024	4.000	819	3.200	512	2.000	1189	4.464
		10	9-3240-1	26	1040	5.000	832	4.000	520	2.500	1218	5.857
		12	9-3248-1	21	1008	6.000	806	4.800	504	3.000	1187	7.067

⌂ When ordering please prefix 7001- to catalog number shown.

LEMPCO MEDIUM HEAVY PRESSURE DIE SPRINGS

Electric Furnace Chrome Vanadium Steel



All Loads Shown Are Approximate

Hole Diameter A	Rod Diameter B	Free Length C	Catalog Number	Rate Pounds Required to Deflect ½ Inch	Maximum Operating Deflection 37% of Length "C"		Total Deflection For Average Life 25% of Length "C"		Total Deflection For Long Life 20% of Length "C"		Total Travel To Solid	
					Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches
⅜	3/16	1	9-0604-2	11¼	33	.370	22.5	.250	18	.200	41	.456
		1¼	9-0605-2	9⅛	34	.4625	23	.312	18	.250	45	.611
		1½	9-0606-2	8⅜	37	.555	25	.375	20	.300	54	.802
		2	9-0608-2	6¼	37	.740	25	.500	20	.400	53	1.054
		2½	9-0610-2	5¼	39	.925	26	.625	21	.500	56	1.341
		3	9-0612-2	3¾	33	1.110	22.5	.750	18	.600	48	1.605
		12	9-0648-2	1⅛	40	4.440	27	3.000	21.5	2.400	64	7.081
½	9/32	1	9-0804-2	21	62	.370	42	.250	33.5	.200	84	.499
		1¼	9-0805-2	17⅜	64	.4625	43.5	.312	35	.250	90	.647
		1½	9-0806-2	15	66½	.555	45	.375	36	.300	97	.811
		2	9-0808-2	10⅞	64½	.740	43.5	.500	35	.400	96	1.108
		2½	9-0810-2	8½	63	.925	42.5	.625	34	.500	95	1.404
		3	9-0812-2	7⅛	63½	1.110	42.5	.750	34	.600	98	1.717
		3½	9-0814-2	5⅞	61	1.295	41	.875	33	.700	94	1.998
		12	9-0848-2	1½	53	4.440	35	3.000	29	2.400	80	6.616
⅝	11/32	1	9-1004-2	34⅝	102½	.370	69	.250	55	.200	138	.383
		1¼	9-1005-2	26	96	.4625	65	.312	52	.250	103	.498
		1½	9-1006-2	23¾	105½	.555	71	.375	57	.300	126	.664
		2	9-1008-2	18½	109½	.740	74	.500	59	.400	148	.997
		2½	9-1010-2	14⅜	106½	.925	72	.625	57.5	.500	143	1.246
		3	9-1012-2	12½	111	1.110	75	.750	60	.600	155	1.558
		3½	9-1014-2	10¼	110	1.295	74	.875	59.5	.700	155	1.828
		4	9-1016-2	9½	112	1.480	76	1.000	61	.800	166	2.182
		12	9-1048-2	3⅛	120	4.440	81	3.000	65	2.400	184	6.817
¾	⅜	1	9-1204-2	72	213	.370	144	.250	115	.200	259	.450
		1½	9-1206-2	40	178	.555	120	.375	96	.300	235	.735
		2	9-1208-2	31	184	.740	124	.500	99	.400	253	1.020
		2½	9-1210-2	24	178	.925	120	.625	96	.500	251	1.305
		3	9-1212-2	18	160	1.110	108	.750	86	.600	229	1.590
		3½	9-1214-2	16	166	1.295	112	.875	90	.700	240	1.875
		4	9-1216-2	15	178	1.480	120	1.000	96	.800	259	2.160
		4½	9-1218-2	14	186	1.665	126	1.125	101	.900	274	2.445
		5	9-1220-2	13	192	1.850	130	1.250	104	1.000	284	2.753
		5½	9-1222-2	12	195	2.035	132	1.375	106	1.100	289	3.014
		6	9-1224-2	10	178	2.220	120	1.500	96	1.200	264	3.300
		12	9-1248-2	4½	160	4.440	108	3.000	86	2.400	232	6.455

⌂ When ordering please prefix 7002- to catalog number shown.

MEDIUM HEAVY PRESSURE DIE SPRINGS

LEMPCO

Electric Furnace Chrome Vanadium Steel

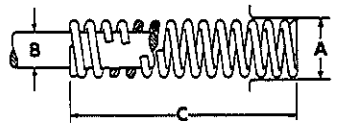
All Loads Shown Are Approximate

Hole Diameter A	Rod Diameter B	Free Length C	Catalog Number	Rate Pounds Required to Deflect ½ Inch	Maximum Operating Deflection 37% of Length "C"		Total Deflection For Average Life 25% of Length "C"		Total Deflection For Long Life 20% of Length "C"		Total Travel To Solid	
					Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches
1	½	1	9-1604-2	90	266	.370	180	.250	144	.200	297	.412
		1½	9-1606-2	62	275	.555	186	.375	149	.300	350	.706
		2	9-1608-2	46	272	.740	184	.500	147	.400	368	1.000
		2½	9-1610-2	36	266	.925	180	.625	144	.500	373	1.295
		3	9-1612-2	29	258	1.110	174	.750	139	.600	369	1.589
		3½	9-1614-2	27	282	1.295	189	.875	151	.700	407	1.883
		4	9-1616-2	23	272	1.480	184	1.000	147	.800	401	2.179
		4½	9-1618-2	19	253	1.665	171	1.125	137	.900	376	2.471
		5	9-1620-2	18	266	1.850	180	1.250	144	1.000	398	2.766
		5½	9-1622-2	16	260	2.035	176	1.375	141	1.100	377	2.942
		6	9-1624-2	14	249	2.220	168	1.500	134	1.200	362	3.236
		7	9-1628-2	12	249	2.590	168	1.150	134	1.400	367	3.825
		8	9-1632-2	11	260	2.960	176	2.000	141	1.600	388	4.413
		12	9-1648-2	7	246	4.440	168	3.000	134	2.400	379	6.767
1¼	⅝	1½	9-2006-2	143	635	.555	429	.375	343	.300	752	.657
		2	9-2008-2	108	639	.740	432	.500	346	.400	792	.917
		2½	9-2010-2	78	577	.925	390	.625	312	.500	734	1.176
		3	9-2012-2	64	568	1.110	384	.750	307	.600	735	1.435
		3½	9-2014-2	55	570	1.295	385	.875	308	.700	745	1.694
		4	9-2016-2	46	545	1.480	368	1.000	294	.800	719	1.954
		4½	9-2018-2	40	533	1.665	360	1.125	288	.900	708	2.213
		5	9-2020-2	34	503	1.850	340	1.250	272	1.000	672	2.472
		5½	9-2022-2	33	537	2.035	363	1.375	290	1.100	720	2.731
		6	9-2024-2	29	515	2.220	348	1.500	278	1.200	712	3.071
		7	9-2028-2	25	518	2.590	350	1.750	280	1.400	702	3.509
		8	9-2032-2	23	545	2.960	368	2.000	294	1.600	741	4.028
		10	9-2040-2	16	474	3.700	320	2.500	256	2.000	648	5.065
		12	9-2048-2	14	497	4.440	336	3.000	269	2.400	683	6.102
1½	¾	2	9-2408-2	135	799	.740	540	.500	432	.400	966	.894
		2½	9-2410-2	107	792	.925	535	.625	428	.500	988	1.154
		3	9-2412-2	78	693	1.110	468	.750	374	.600	882	1.414
		3½	9-2414-2	66	684	1.295	462	.875	370	.700	883	1.673
		4	9-2416-2	60	710	1.480	480	1.000	384	.800	928	1.933
		4½	9-2418-2	54	719	1.665	486	1.125	389	.900	946	2.192
		5	9-2420-2	46	681	1.850	460	1.250	368	1.000	902	2.452
		5½	9-2422-2	43	700	2.035	473	1.375	378	1.100	933	2.712
		6	9-2424-2	38	675	2.220	456	1.500	365	1.200	903	2.971
		7	9-2428-2	33	684	2.590	462	1.750	370	1.400	934	3.539
		8	9-2432-2	26	617	2.960	416	2.000	333	1.600	844	4.058
		10	9-2440-2	22	651	3.700	440	2.500	352	2.000	907	5.154
		12	9-2448-2	18	639	4.440	432	3.000	346	2.400	883	6.135
2	1	2½	9-3210-2	148	1095	.925	740	.625	592	.500	1326	1.120
		3	9-3212-2	120	1066	1.110	720	.750	576	.600	1334	1.390
		3½	9-3214-2	100	1035	1.295	700	.875	560	.700	1328	1.660
		4	9-3216-2	83	983	1.480	664	1.000	531	.800	1262	1.930
		4½	9-3214-2	75	999	1.665	675	1.125	540	.900	1320	2.200
		5	9-3220-2	70	1036	1.850	700	1.250	560	1.000	1383	2.470
		5½	9-3222-2	63	1026	2.035	693	1.375	554	1.100	1381	2.740
		6	9-3224-2	59	1048	2.220	708	1.500	566	1.200	1421	3.010
		7	9-3228-2	50	1036	2.590	700	1.750	560	1.400	1420	3.550
		8	9-3232-2	44	1042	2.960	704	2.000	563	1.600	1440	4.090
		10	9-3240-2	30	888	3.700	600	2.500	480	2.000	1241	5.170
		12	9-3248-2	28	995	4.440	672	3.000	538	2.400	1400	6.250

⌂ When ordering please prefix 7002- to catalog number shown.

LEMPCO HEAVY PRESSURE DIE SPRINGS

Electric Furnace Chrome Vanadium Steel



All Loads Shown Are Approximate

Hole Diameter A	Rod Diameter B	Free Length C	Catalog Number	Rate Pounds Required to Deflect ½ Inch	Maximum Operating Deflection 30% of Length "C"		Total Deflection For Average Life 20% of Length "C"		Total Deflection For Long Life 15% of Length "C"		Total Travel To Solid	
					Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches
⅜	3/16	1	9-0604-3	15½	37	.300	25	.200	18.5	.150	44	.354
		1¼	9-0605-3	12¼	37	.375	24.5	.250	18.5	.1875	45	.463
		1½	9-0606-3	12	43	.450	29	.300	21.5	.225	55	.573
		2	9-0608-3	9	43	.600	29	.400	21.5	.300	57	.792
		2½	9-0610-3	7½	45	.750	30	.500	22.5	.375	66	1.011
		3	9-0612-3	5¼	38	.900	25	.600	19	.450	51	1.216
		12	9-0648-3	1½	43	3.600	29	2.400	22	1.800	70	5.818
½	5/32	1	9-0804-3	29½	71	.300	47	.200	35	.150	107	.455
		1¼	9-0805-3	23¼	70	.375	46.5	.250	35	.1875	109	.587
		1½	9-0806-3	20½	74	.450	49	.300	37	.225	121	.737
		2	9-0808-3	13¾	66	.600	44	.400	33	.300	110	1.000
		2½	9-0810-3	10½	63	.750	42	.500	31.5	.375	106	1.264
		3	9-0812-3	9¼	66½	.900	44.5	.600	37.5	.450	113	1.528
		3½	9-0814-3	8	67	1.050	45	.700	33.5	.525	116	1.810
		12	9-0848-3	2	58	3.600	38	2.400	29	1.800	100	6.266
⅝	11/32	1	9-1004-3	53	127	.300	85	.200	63.5	.150	151	.357
		1¼	9-1005-3	37	111	.375	74	.250	55.5	.1875	140	.474
		1½	9-1006-3	34	122	.450	81.5	.300	61	.225	165	.606
		2	9-1008-3	26	125	.600	83	.400	62	.300	179	.860
		2½	9-1010-3	21¼	127½	.750	85	.500	64	.375	190	1.118
		3	9-1012-3	18	129½	.900	86	.600	65	.450	198	1.375
		3½	9-1014-3	15¼	128	1.050	85	.700	64	.525	199	1.633
		4	9-1016-3	13½	129½	1.200	86	.800	65	.600	204	1.890
		12	9-1048-3	5	144	3.600	96	2.400	72	1.800	201	5.016
¾	⅜	1	9-1204-3	135	324	.300	216	.200	162	.150	324	.300
		1½	9-1206-3	82	295	.450	197	.300	148	.225	337	.514
		2	9-1208-3	62	298	.600	198	.400	149	.300	361	.728
		2½	9-1210-3	47	282	.750	188	.500	141	.375	354	.942
		3	9-12123	39	281	.900	187	.600	140	.450	361	1.156
		3½	9-1214-3	33	277	1.050	185	.700	139	.525	361	1.369
		4	9-1216-3	29	278	1.200	186	.800	139	.600	367	1.583
		4½	9-1218-3	25	270	1.350	180	.900	135	.675	359	1.797
		5	9-1220-3	22	264	1.500	176	1.000	132	.750	354	2.011
		5½	9-1222-3	20	264	1.650	176	1.100	132	.825	356	2.225
		6	9-1224-3	18	259	1.800	173	1.200	130	.900	351	2.438
		12	9-1248-3	9	259	3.600	173	2.400	130	1.800	382	5.300

⌂ When ordering please prefix 7003- to catalog number shown.

HEAVY PRESSURE DIE SPRINGS

LEMPCO

Electric Furnace Chrome Vanadium Steel

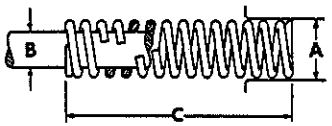
All Loads Shown Are Approximate

Hole Diameter A	Rod Diameter B	Free Length C	Catalog Number	Rate Pounds Required to Deflect ½ Inch	Maximum Operating Deflection 30% of Length "C"		Total Deflection For Average Life 20% of Length "C"		Total Deflection For Long Life 15% of Length "C"		Total Travel To Solid	
					Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches
1	½	1	9-1604-3	260	624	.300	416	.200	312	.150	614	.295
		1½	9-1606-3	148	533	.450	335	.300	266	.225	597	.505
		2	9-1608-3	105	504	.600	336	.400	252	.300	600	.714
		2½	9-1610-3	85	510	.750	340	.500	255	.375	628	.924
		3	9-1612-3	68	490	.900	326	.600	245	.450	617	1.134
		3½	9-1614-3	57	479	1.050	319	.700	239	.525	612	1.343
		4	9-1616-3	50	480	1.200	320	.800	240	.600	621	1.553
		4½	9-1618-3	44	475	1.350	317	.900	238	.675	621	1.763
		5	9-1620-3	39	468	1.500	312	1.000	234	.750	615	1.972
		5½	9-1622-3	36	475	1.650	317	1.100	238	.825	628	2.182
		6	9-1624-3	32	461	1.800	307	1.200	230	.900	612	2.392
		7	9-1628-3	28	470	2.100	314	1.400	235	1.050	630	2.811
		8	9-1632-3	24	461	2.400	307	1.600	230	1.200	620	3.230
		12	9-1648-3	15	438	3.600	288	2.400	216	1.800	589	4.906
1¼	⅝	1½	9-2006-3	265	954	.450	636	.300	477	.225	954	.450
		2	9-2008-3	187	898	.600	598	.400	449	.300	953	.635
		2½	9-2010-3	147	882	.750	588	.500	441	.375	964	.820
		3	9-2012-3	119	857	.900	571	.600	428	.450	957	1.005
		3½	9-2014-3	94	790	1.050	526	.700	395	.525	885	1.190
		4	9-2016-3	83	797	1.200	531	.800	398	.600	913	1.375
		4½	9-2018-3	73	788	1.350	526	.900	394	.675	911	1.560
		5	9-2020-3	62	744	1.500	496	1.000	372	.750	856	1.745
		5½	9-2022-3	59	779	1.650	519	1.100	389	.825	911	1.930
		6	9-2024-3	53	763	1.800	509	1.200	382	.900	897	2.115
		7	9-2028-3	46	773	2.100	515	1.400	386	1.050	914	2.485
		8	9-2032-3	41	787	2.400	525	1.600	394	1.200	936	2.855
		10	9-2040-3	32	768	3.000	512	2.000	384	1.500	920	3.595
		12	9-2048-3	26	749	3.600	499	2.400	374	1.800	902	4.335
1½	¾	2	9-2408-3	238	1142	.600	762	.400	571	.300	1346	.707
		2½	9-2410-3	186	1116	.750	744	.500	558	.375	1446	.972
		3	9-2412-3	153	1102	.900	734	.600	551	.450	1443	1.179
		3½	9-2414-3	133	1117	1.050	745	.700	559	.525	1535	1.443
		4	9-2416-3	114	1094	1.200	730	.800	547	.600	1505	1.650
		4½	9-2418-3	98	1058	1.350	706	.900	529	.675	1478	1.885
		5	9-2420-3	89	1068	1.500	712	1.000	534	.750	1510	2.120
		5½	9-2422-3	80	1056	1.650	704	1.100	528	.825	1508	2.357
		6	9-2424-3	73	1051	1.800	701	1.200	526	.900	1514	2.592
		7	9-2428-3	62	1042	2.100	694	1.400	521	1.050	1520	3.064
		8	9-2432-3	54	1037	2.400	691	1.600	518	1.200	1527	3.535
		10	9-2440-3	43	1032	3.000	688	2.000	516	1.500	1540	4.477
		12	9-2448-3	36	1037	3.600	691	2.400	518	1.800	1561	5.420
2	1	2½	9-3210-3	275	1650	.750	1100	.500	825	.375	1982	.901
		3	9-3212-3	232	1670	.900	1114	.600	835	.450	2129	1.147
		3½	9-3214-3	200	1680	1.050	1220	.700	840	.525	2227	1.392
		4	9-3216-3	167	1603	1.200	1069	.800	802	.600	2188	1.638
		4½	9-3218-3	147	1588	1.350	1058	.900	794	.675	2216	1.884
		5	9-3220-3	130	1560	1.500	1040	1.000	780	.750	2214	2.129
		5½	9-3222-3	116	1531	1.650	1021	1.100	766	.825	2204	2.375
		6	9-3224-3	104	1498	1.800	998	1.200	749	.900	2187	2.621
		7	9-3228-3	92	1546	2.100	1030	1.400	773	1.050	2290	3.112
		8	9-3232-3	80	1536	2.400	1024	1.600	768	1.200	2306	3.603
		10	9-3240-3	61	1464	3.000	976	2.000	732	1.500	2238	4.585
		12	9-3248-3	50	1440	3.600	960	2.400	720	1.800	2227	5.568

⌂ When ordering please prefix 7003- to catalog number shown.

LEMPCO EXTRA HEAVY PRESSURE DIE SPRINGS

Electric Furnace Chrome Vanadium Steel



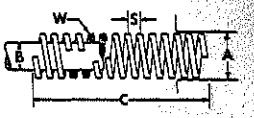
All Loads Shown Are Approximate

Hole Diameter A	Rod Diameter B	Free Length C	Catalog Number	Rate Pounds Required to Deflect ½ Inch	Maximum Operating Deflection 25% of Length "C"		Total Deflection For Average Life 28% of Length "C"		Total Deflection For Long Life 15% of Length "C"		Total Travel To Solid	
					Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches	Pressure Pounds	Deflection Inches
1"	½"	1½	9-1606-4	231	693	.375	555	.300	415	.225	632	.342
		2	9-1608-4	145	605	.500	464	.400	348	.300	567	.489
		2½	9-1610-4	112	560	.625	448	.500	336	.375	571	.637
		3	9-1612-4	92	552	.750	442	.600	332	.450	615	.835
		3½	9-1614-4	78	546	.875	437	.700	328	.525	613	.982
		4	9-1616-4	69	552	1.000	441	.800	331	.600	651	1.180
		4½	9-1618-4	61	549	1.125	439	.900	329	.675	672	1.378
		5	9-1620-4	54	540	1.250	432	1.000	324	.750	659	1.526
		6	9-1624-4	45	540	1.500	432	1.200	324	.900	674	1.871
		12	9-1648-4	22	528	3.000	423	2.400	317	1.800	694	3.944
1¼"	⅝"	2	9-2008-4	240	960	.500	768	.400	577	.300	1002	.522
		2½	9-2010-4	180	900	.625	720	.500	540	.375	1045	.726
		3	9-2012-4	148	889	.750	710	.600	533	.450	1102	.931
		3½	9-2014-4	126	882	.875	706	.700	530	.525	1144	1.135
		4	9-2016-4	105	840	1.000	673	.800	505	.600	1075	1.280
		4½	9-2018-4	98	880	1.125	705	.900	530	.675	1164	1.485
		5	9-2020-4	85	850	1.250	680	1.000	510	.750	1149	1.689
		6	9-2024-4	70	840	1.500	672	1.200	504	.900	1142	2.039
		8	9-2032-4	52	832	2.000	665	1.600	500	1.200	1164	2.797
		10	9-2040-4	42	840	2.500	672	2.000	504	1.500	1194	3.555
		12	9-2048-4	33	792	3.000	635	2.400	475	1.800	1058	4.077
1½"	¾"	2	9-2408-4	470	1880	.500	1505	.400	1123	.300	1624	.432
		2½	9-2410-4	368	1840	.625	1470	.500	1104	.375	1840	.625
		3	9-2412-4	289	1730	.750	1385	.600	1040	.450	1896	.820
		3½	9-2414-4	245	1712	.875	1372	.700	1028	.525	1911	.975
		4	9-2416-4	214	1710	1.000	1370	.800	1028	.600	2011	1.169
		4½	9-2418-4	185	1662	1.125	1332	.900	998	.675	2017	1.363
		5	9-2420-4	170	1700	1.250	1360	1.000	1020	.750	2118	1.557
		6	9-2424-4	138	1665	1.500	1325	1.200	1033	.900	2147	1.945
		8	9-2432-4	101	1616	2.000	1292	1.600	970	1.200	2199	2.721
		10	9-2440-4	84	1680	2.500	1342	2.000	1008	1.500	2350	3.497
		12	9-2448-4	68	1630	3.000	1304	2.400	980	1.800	2325	4.273
2"	1"	2½	9-3210-4	477	2380	.625	1905	.500	1430	.375	2928	.747
		3	9-3212-4	390	2340	.750	1870	.600	1405	.450	2745	.866
		3½	9-3214-4	318	2225	.875	1780	.700	1335	.525	2955	.908
		4	9-3216-4	275	2200	1.000	1760	.800	1320	.600	3000	1.405
		4½	9-3218-4	236	2123	1.125	1700	.900	1273	.675	2935	1.223
		5	9-3220-4	216	2160	1.250	1725	1.000	1296	.750	3000	1.389
		6	9-3224-4	177	2120	1.500	1700	1.200	1275	.900	2850	1.610
		8	9-3232-4	125	2000	2.000	1600	1.500	1200	1.200	3015	2.234
		10	9-3240-4	105	2050	2.500	1680	2.000	1260	1.500	3060	2.914
		12	9-3248-4	89	2138	3.000	1710	2.400	1280	1.800	2980	4.472

⌂ When ordering please prefix 7004- to catalog number shown.

SQUARE WIRE DIE SPRINGS — 12" LENGTHS

These 12" Square Wire Die Springs are made of oil tempered carbon steel. Because of the plain ends, customers can cut them to any desired length.



Catalog Number	Rod Diameter B	Hole Diameter C	Wire Size W	Space Between Coils S	Maximum Load
7005-9-0000-0	5/16"	3/8"	1/16"	3/64"	25
7005-9-0011-0	1/4"	7/16"	1/16"	3/64"	40
7005-9-0012-0	1/4"	1/2"	1/32"	3/64"	100
7005-9-0010-0	5/16"	7/16"	1/16"	3/32"	100
7005-9-0020-0	7/16"	11/16"	1/32"	1/8"	75
7005-9-0030-0	5/16"	13/16"	1/32"	1/8"	65
7005-9-0040-0	1/4"	7/16"	1/16"	1/16"	245
7005-9-0050-0	3/8"	11/16"	1/16"	3/32"	214
7005-9-0060-0	1/2"	13/16"	1/16"	7/64"	170
7005-9-0070-0	5/8"	15/16"	1/16"	1/8"	145
7005-9-0080-0	3/8"	1 1/16"	1/16"	3/64"	120
7005-9-0090-0	7/8"	1 3/16"	1/16"	1/64"	100
7005-9-0100-0	5/16"	11/16"	1/16"	1/16"	450
7005-9-0110-0	7/16"	13/16"	1/16"	7/64"	335
7005-9-0120-0	9/16"	1 1/16"	1/16"	7/64"	276
7005-9-0130-0	1 1/16"	1 1/16"	1/32"	1 1/64"	245
7005-9-0140-0	15/16"	1 3/16"	1/32"	1/64"	220
7005-9-0150-0	15/16"	1 5/16"	1/32"	1/64"	290
7005-9-0160-0	3/16"	1 3/16"	1/16"	1/32"	550
7005-9-0170-0	1/2"	1 3/16"	3/16"	3/32"	425
7005-9-0180-0	5/8"	1 1/16"	3/16"	1/32"	400
7005-9-0190-0	3/8"	1 3/16"	3/16"	3/16"	350
7005-9-0200-0	7/8"	1 5/16"	3/16"	3/16"	300
7005-9-0210-0	1"	1 7/16"	3/16"	3/16"	270
7005-9-0220-0	1 1/8"	1 7/16"	3/16"	5/16"	240
7005-9-0230-0	7/16"	1 1/16"	1/4"	7/64"	1200
7005-9-0240-0	9/16"	1 3/16"	1/4"	1/8"	1000
7005-9-0250-0	11/16"	1 5/16"	1/4"	1/32"	800
7005-9-0260-0	13/16"	1 7/16"	1/4"	1 1/16"	725
7005-9-0270-0	15/16"	1 5/16"	1/4"	1 3/64"	650
7005-9-0280-0	1 3/16"	1 13/16"	1/4"	1 1/32"	575
7005-9-0290-0	1 7/16"	2 1/16"	1/4"	7/16"	500
7005-9-0300-0	1 11/16"	2 5/16"	1/4"	1 3/32"	425
7005-9-0310-0	1 15/16"	1 15/16"	1/32"	3/16"	1350
7005-9-0320-0	1 1/16"	1 13/16"	1/16"	1/4"	1150
7005-9-0330-0	1 3/16"	2 1/16"	1/32"	1 9/64"	1000
7005-9-0340-0	1 7/16"	2 5/16"	1/16"	1 1/32"	850
7005-9-0350-0	1 15/16"	2 1/16"	1/16"	7/16"	750

MUSIC WIRE DIE SPRINGS

Lempco Music Wire Die Springs are available in 10" lengths with plain ends, in a wide range of diameters and wire sizes. Also available in lengths of one to four inches with squared and ground ends.

PLAIN ENDS

Catalog Number	Outside Diameter A	Free Length C	Wire Size W
7007-1-0010-0	3/16"	10"	.010
7007-1-0011-0	3/16"	10"	.014
7007-1-0020-0	1/8"	10"	.012
7007-1-0021-0	1/8"	10"	.016
7007-1-0030-0	5/16"	10"	.014
7007-1-0031-0	5/16"	10"	.018
7007-1-0032-0	5/16"	10"	.026
7007-1-0033-0	5/16"	10"	.035
7007-1-0040-0	1/4"	10"	.018
7007-1-0041-0	1/4"	10"	.022
7007-1-0042-0	1/4"	10"	.026
7007-1-0043-0	1/4"	10"	.031
7007-1-0044-0	1/4"	10"	.035
7007-1-0045-0	1/4"	10"	.041
7007-1-0046-0	1/4"	10"	.047
7007-1-0050-0	5/16"	10"	.022
7007-1-0051-0	5/16"	10"	.031
7007-1-0052-0	5/16"	10"	.037
7007-1-0053-0	5/16"	10"	.041
7007-1-0054-0	5/16"	10"	.047
7007-1-0055-0	5/16"	10"	.055
7007-1-0060-0	3/8"	10"	.031

PLAIN ENDS

Catalog Number	Outside Diameter A	Free Length C	Wire Size W
7007-1-0061-0	3/8"	10"	.035
7007-1-0062-0	3/8"	10"	.043
7007-1-0063-0	3/8"	10"	.047
7007-1-0064-0	3/8"	10"	.055
7007-1-0065-0	3/8"	10"	.062
7007-1-0066-0	3/8"	10"	.075
7007-1-0070-0	7/16"	10"	.035
7007-1-0071-0	7/16"	10"	.047
7007-1-0072-0	7/16"	10"	.055
7007-1-0073-0	7/16"	10"	.062
7007-1-0074-0	7/16"	10"	.075
7007-1-0075-0	7/16"	10"	*.085
7007-1-0080-0	1/2"	10"	.035
7007-1-0081-0	1/2"	10"	.047
7007-1-0082-0	1/2"	10"	.055
7007-1-0083-0	1/2"	10"	.062
7007-1-0084-0	1/2"	10"	.075
7007-1-0085-0	1/2"	10"	*.091
7007-1-0086-0	1/2"	10"	*.115
7007-1-2010-0	3/4"	36"	.042
7007-1-2020-0	1/2"	36"	.062
7007-1-2030-0	9/16"	36"	.072

*Carbon Steel

SQUARED AND GROUND ENDS

Catalog Number	Outside Diameter A	Free Length C	Wire Size W
7007-2-1000-0	3/8"	1"	.042
7007-2-1010-0	3/8"	1 1/2"	.042
7007-2-1020-0	3/8"	2"	.042
7007-2-1030-0	3/8"	2 1/2"	.042
7007-2-1040-0	3/8"	3"	.042
7007-2-1050-0	1/2"	1"	.062
7007-2-1060-0	1/2"	1 1/2"	.062
7007-2-1070-0	1/2"	2"	.062
7007-2-1080-0	1/2"	2 1/2"	.062
7007-2-1090-0	1/2"	3"	.062
7007-2-1100-0	1/2"	3 1/2"	.062
7007-2-1110-0	5/8"	1"	.072
7007-2-1120-0	5/8"	1 1/2"	.072
7007-2-1130-0	5/8"	2"	.072
7007-2-1140-0	5/8"	2 1/2"	.072
7007-2-1150-0	5/8"	3"	.072
7007-2-1160-0	5/8"	3 1/2"	.072
7007-2-1170-0	5/8"	4"	.072