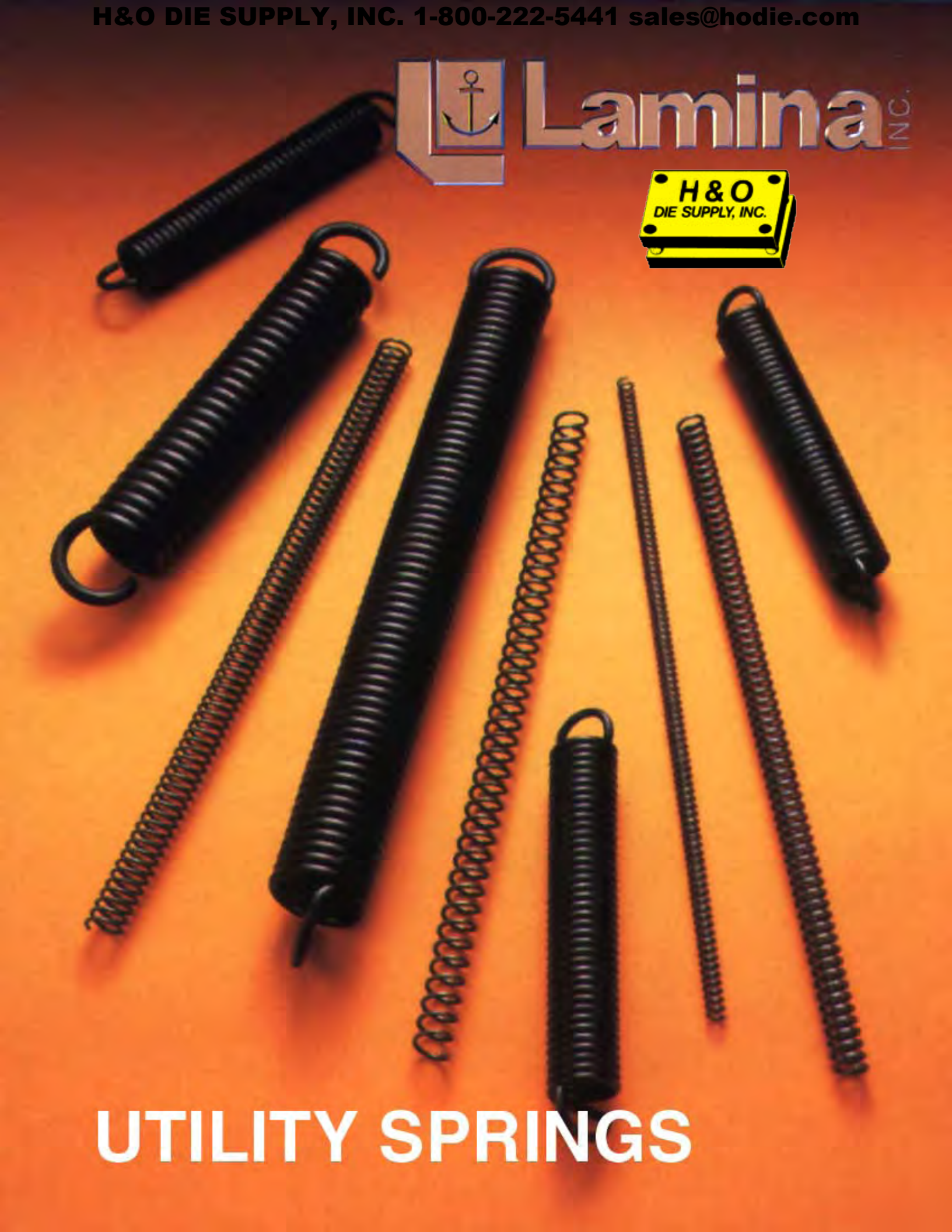
Lamina INC

H&O DIE SUPPLY, INC.



UTILITY SPRINGS

Lamina INC. ROUND WIRE

DIE & FIXTURE SPRINGS • 10 & 18-INCH LENGTHS • PLAIN ENDS

H&O DIE SUPPLY, INC.

INCHES X 25.4 = mm
LBS. X .454 = KG

MUSIC WIRE - 10-LENGTHS

O.D. Inches	Stock No.	Max. Rod Dia.	Wire Dia.	Coils Per Inch	Pounds Per Inch Of Compression	No. Per Box
.087	RW-1	.062	.010	28	.135	12
.089	RW-1A	.062	.014	28.5	.6	12
.116	RW-2	.092	.012	25	.11	12
.120	RW-2A	.078	.016	25	.4	12
.176	RW-3	.141	.014	14	.1	12
.180	RW-3A	.141	.018	14	.3	12
.180	RW-3B	.125	.026	13	1.95	12
.178	RW-3C	.094	.035	19	5.6	12
.240	RW-4	.188	.018	9.5	.31	12
.23	RW-4A	.188	.022	11	.26	12
.241	RW-4B	.188	.026	9.5	.78	12
.248	RW-4C	.171	.031	10	1.6	12
.242	RW-4D	.171	.035	13	2.3	12
.238	RW-4E	.141	.041	9	6.25	12
.243	RW-4F	.141	.047	10	11.0	12
.302	RW-5	.250	.022	10	.175	12
.304	RW-5A	.234	.031	11	.65	12
.304	RW-5B	.219	.037	11	1.5	12
.303	RW-5C	.219	.041	8	3.25	12
.305	RW-5D	.203	.047	7.5	6.5	12
.302	RW-5E	.165	.055	8	12.5	12
.366	RW-6	.304	.031	11	.57	12
.361	RW-6A	.281	.035	10	.675	12
.365	RW-6B	.266	.043	7	2.15	12
.368	RW-6C	.266	.047	8.5	2.8	12
.365	RW-6D	.250	.055	6	8.2	12
.365	RW-6E	.234	.062	6.5	13.0	12
.368	RW-6F	.203	.075	7	28.0	12
.426	RW-7	.344	.035	7	.55	12
.425	RW-7A	.328	.047	7	2.0	12
.425	RW-7B	.297	.055	6	4.7	12
.427	RW-7C	.281	.062	6.5	7.4	12
.429	RW-7D	.266	.075	5.5	20.0	12
.430	* RW-7E	.250	.085	6	35.0	12
.488	RW-8	.406	.035	9	.28	12
.488	RW-8A	.391	.047	7.5	1.2	12
.495	RW-8B	.375	.055	7	2.5	12
.492	RW-8C	.360	.062	4	7.4	12
.490	RW-8D	.325	.075	4.5	15.0	12
.495	* RW-8E	.310	.091	5	33.0	12
.500	* RW-8F	.270	.115	5.5	95.0	12

CARBON STEEL - 18-LINCH LENGTHS

O.D. Inches	Stock No.	Max. Rod Dia.	Wire Dia.	Coils Per Inch	Pounds Per Inch Of Compression	No. Per Box
.487	RW-9	.391	.041	4.5	.6	12
.493	RW-9A	.375	.054	4	2.1	12
.520	RW-9B	.375	.062	5.75	2.0	12
.532	RW-9C	.375	.072	4	5.25	12
.612	RW-10	.500	.054	3	1.31	12
.678	RW-10A	.531	.062	3	1.9	12
.676	RW-10B	.531	.072	3.25	3.25	12
.675	RW-10C	.531	.068	3.5	2.5	12
.805	RW-11	.672	.062	2.5	1.3	12
.805	RW-11A	.625	.080	2.5	3.5	12
.865	RW-11B	.656	.098	2.25	8.0	12
.922	RW-11C	.640	.125	2.75	15.0	12
.921	RW-12A	.750	.080	2.5	2.1	12
.975	RW-12B	.781	.098	2	5.75	6
1.020	RW-13	.844	.085	2.25	2.1	6
1.020	RW-12C	.750	.125	2	13.5	6
1.100	RW-12	.828	.125	2.75	7.75	6
1.055	RW-12D	.765	.135	3	11.0	6
1.145	RW-13A	.890	.125	2	9.0	6
1.145	W-14	.953	.090	1.75	2.5	6
1.343	RW-14A	1.031	.148	1.75	14.0	6
1.591	RW-15	1.281	.148	1.5	8.75	6
1.820	RW-16	1.500	.148	1.75	5.0	6

*INDICATES CARBON STEEL ALL OTHER ITEMS MUSIC WIRE

111-845 (R-45) COMPRESSION SPRINGS

ASSORTMENT CONSISTS OF 2 EACH OF ABOVE 10" LONG SPRINGS

Compression Spring Assortment

111-850 (R50)

ASSORTMENT CONSIST OF
1 EACH OF ABOVE 18" LONG SPRINGS

FORMULA TO CALCULATE LBS. PER INCH FOR ALL ALTERED SPRINGS

$$\frac{A \times B}{C} = D$$

A = CATALOG FREE LENGTH

B = RATE IN LBS. PER INCH, PER "A"

C = REQ'D CUT FREE LENGTH

D = LBS. PER INCH OF REQ'D FREE LENGTH

Specials Quoted Upon Request

Lamina INC COMPRESSION

H&O DIE SUPPLY, INC.

STEEL* FIXTURE SPRINGS
INCHES X 25.4 = mm
LBS. X .454 = KG

IN STOCK

O.D. Inches	Max. Rod Dia.	Length Inches	Stock No.	Wire Dia.	Comp.Rate Per Inch Lbs.	Total Coils	Type of Ends	No. Per Box
.078	.047	.53	020-074 (G-74)	.012	4.87	17	Plain	12
.078	.047	.56	020-073 (G-73)	.011	3.87	18	Plain	12
.108	.062	.81	020-076 (G-76)	.018	12.50	16	Plain	12
.110	.062	.91	020-075 (G-75)	.018	9.25	22	Plain	12
.120	.078	.62	020-125 (G-125)	.016	6.60	13	Squared	25
.120	.075	.75	020-126 (G-126)	.016	5.30	18	Squared	25
.170	.141	.21	020-077 (G-77)	.012	.75	7	Plain	12
.178	.141	10.00	020-056 (G-56)	.014	.03	138	Plain	12
.180	.125	.75	020-127 (G-127)	.022	8.60	11	Squared	25
.180	.125	1.00	020-128 (G-128)	.022	6.80	14	Squared	25
.180	.125	1.12	020-129	.022	6.00	15	Squared	25
.180	.125	1.25	020-130	.022	5.30	17	Squared	25
.185	.156	.93	020-084 (G-84)	.012	.03	19	Plain	12
.240	.188	10.00	020-055 (G-55)	.022	.25	112	Plain	12
.240	.172	1.00	020-131	.026	7.80	11	Squared	25
.240	.172	1.25	020-132	.026	6.10	14	Squared	25
.240	.172	1.50	020-133	.026	5.10	15	Squared	25
.280	.188	1.25	020-080 (G-80)	.040	18.00	15	Plain	12
.281	.234	2.06	020-098 (G-98)	.020	.25	5	Squared	12
.282	.188	1.31	020-079 (G-79)	.040	17.00	13	Plain	12
.300	.250	10.00	020-054 (G-54)	.022	.03	101	Squared	12
.313	.250	.87	020-085 (G-85)	.0254 Ph. Bronze	2.25	7	Squared	12
.315	.266	1.96	020-081 (G-81)	.022	.56	23.5	Squared	12
.315	.250	2.43	020-083 (G-83)	.0285 Brass	.87	23	Squared	12
.325	.250	2.43	020-082 (G-82)	.032 Brass	1.31	23	Squared	12
.340	.250	2.50	107-103 (WA-103)	.042	8.00	24	Sq. & Gr.	12
.345	.250	1.00	107-100 (WA-100)	.042	20.00	10.5	Sq. & Gr.	12
.345	.250	1.50	107-101 (WA-101)	.042	14.00	15	Sq. & Gr.	12
.345	.250	2.00	107-102 (WA-102)	.042	12.00	19.5	Sq. & Gr.	12
.350	.250	3.00	107-104 (WA-104)	.042	6.00	29	Sq. & Gr.	12
.360	.281	1.50	020-134	.035	7.30	10	Squared	25
.360	.281	1.75	020-135	.035	6.20	11	Squared	25
.360	.281	2.00	020-136	.035	5.40	13	Squared	25
.360	.250	12.00	020-053 (G-53)	.0475	2.25	92	Plain	12
.369	.281	.78	020-086 (G-86)	.042 Brass	7.37	9	Sq. & Gr.	12
.375	.266	11.50	020-052 (G-52)	.0475	2.25	88	Plain	12
.380	.250	2.12	020-094 (G-94)	.063	42.00	18.5	Sq. & Gr.	12
.385	.281	2.03	020-088 (G-88)	.0475	11.00	19	Sq. & Gr.	12
.440	.328	2.00	020-093 (G-93)	.054	13.00	17	Squared	12
.440	.344	2.56	020-071 (G-71)	.041	2.62	26	Squared	12
.440	.328	2.62	020-089 (G-89)	.0475	6.00	20	Sq. & Gr.	12
.460	.328	2.00	107-107 (WA-107)	.062	32.00	14.5	Sq. & Gr.	12
.465	.344	2.50	020-090 (G-90)	.054	12.00	17	Sq. & Gr.	12
.465	.328	1.50	107-106 (WA-106)	.062	42.00	11	Sq. & Gr.	12
.465	.328	2.50	107-108 (WA-108)	.062	25.00	17	Sq. & Gr.	12
.465	.328	3.00	107-109 (WA-109)	.062	24.00	20	Sq. & Gr.	12
.470	.328	1.00	107-105 (WA-105)	.062	58.00	8	Sq. & Gr.	12
.473	.344	3.50	107-110 (WA-110)	.062	18.00	24	Sq. & Gr.	12
.495	.360	2.50	020-091 (G-91)	.0625	18.00	16	Sq. & Gr.	12
.500	.344	.98	020-060 (G-60)	.072 Ph. Bronze	52.00	6.5	Sq. & Gr.	12
.505	.406	2.06	020-092 (G-92)	.048	5.50	16	Squared	12
.518	.375	12.00	020-051 (G-51)	.0625	2.75	73	Plain	12
.532	.313	1.03	020-059 (G-59)	.1055	210.00	7	Sq. & Gr.	12
.575	.484	2.15	020-069 (G-69)	.041	3.12	8.5	Squared	12

Specials Quoted Upon Request

Lamina INC.

COMPRESSION

H&O DIE SUPPLY, INC.

STEEL* FIXTURE SPRINGS
INCHES X 25.4 = mm
LBS. X .454 = KG

IN STOCK

O.D. Inches	Max. Rod Dia.	Length Inches	Stock No.	Wire Dia.	Comp. Rate Per Inch Lbs.	Total Coils	Type of Ends	No. Per Box
.581	.438	1.00	107-111 (WA-111)	.072	74.00	6	Sq. & Gr.	12
.585	.438	3.00	107-115 (WA-115)	.072	20.00	15	Sq. & Gr.	12
.588	.438	2.50	107-114 (WA-114)	.072	26.00	13	Sq. & Gr.	12
.590	.438	4.00	107-117 (WA-117)	.072	16.00	19.5	Sq. & Gr.	12
.594	.438	1.50	107-112 (WA-112)	.072	34.00	8	Sq. & Gr.	12
.594	.438	2.00	107-113 (WA-113)	.072	32.00	11.25	Sq. & Gr.	12
.600	.438	3.50	107-116 (WA-116)	.072	18.00	17.5	Sq. & Gr.	12
.615	.438	2.84	020-068 (G-68)	.080	30.00	13.5	Sq. & Gr.	12
.620	.500	11.50	020-050 (G-50)	.054	1.00	60	Plain	6
.690	.469	4.06	020-067 (G-67)	.1055	58.00	18.5	Sq. & Gr.	12
.735	.563	12.00	020-049 (G-49)	.080	3.80	55	Plain	3
.755	.532	2.60	020-072 (G-72)	.1055	66.40	11	Sq. & Gr.	12
.850	.688	1.09	020-070 (G-70)	.080 Brass	22.00	4.5	Sq. & Gr.	12
.860	.578	2.59	020-066 (G-66)	.135	154.00	10	Sq. & Gr.	12
.870	.672	3.06	020-064 (G-64)	.0915	21.80	12	Sq. & Gr.	12
.870	.640	12.00	020-047 (G-47)	.1055	8.00	48	Plain	3
.875	.625	2.03	020-065 (G-65)	.1205	110.00	8	Sq. & Gr.	12
.875	.703	10.00	020-048 (G-48)	.080	3.25	36	Plain	3
.920	.750	2.03	020-063 (G-63)	.080	16.00	8	Sq. & Gr.	12
1.000	.750	2.56	020-062 (G-62)	.1205	56.00	9.5	Sq. & Gr.	12
.28x.16	.125	.50	020-078 (G-78)	.013	.87	8	Squared	12
.53x.28	.125	.90	020-087 (G-87)	.072 Ph. Bronze	56.00	6	Squared	12
.53x1.03x.86	.421	3.50	020-061 (G-61)	.051	1.20	13	Sq. & Gr.	12
.62x.75	.453	1.00	020-058 (G-58)	.080 Brass	31.00	5.5	Sq. & Gr.	12
.66x.94	.531	.93	020-057 (G-57)	.057 Ph. Bronze	6.00	5	Squared	12

Order by stock number

EXTENSION

STEEL* FIXTURE SPRINGS

O.D. Inches	Length Inches	Stock No.	Wire Diameter	Coils	Approx. Initial Tension Lbs	Rate Per Inch Lbs.	Max. Est.	Max. Safe Load Lbs.	Type of Ends	No. Per Box
.120	.62	020-137	.016	27	.06	3.70	.641	2.04	Full loops	25
.120	.75	020-138	.016	34	.31	2.50	.714	2.07	Full loops	25
.120	.88	020-139	.016	44	.19	2.20	.990	2.07	Full loops	25
.156	2.06	020-035 (G-35)	.020 Brass	90	.25	.50	1.180	1.75	Full loops	12
.156	6.62	020-011 (G-11)	.0258	232	1.50	.81	4.000	6.75	Full loops	12
.172	9.06	020-008 (G-8)	.0286	302	1.50	1.00	5.500	7.50	Full loops	12
.180	1.00	020-140	.022	32	.19	2.8	1.238	3.50	Full loops	25
.180	1.12	020-141	.022	36	.31	2.4	1.344	3.50	Full loops	25
.180	1.25	020-142	.022	42	.04	2.2	1.700	3.50	Full loops	25
.187	1.00	020-042 (G-42)	.014	70	.12	.18	4.000	.87	Plain ends	12
.234	1.12	020-040 (G-40)	.020	34	.50	.75	2.380	2.25	Full loops	12
.240	1.37	020-143	.026	39	.06	1.8	2.450	4.27	Full loops	25
.240	1.50	020-144	.026	42	.22	1.60	2.540	4.27	Full loops	25
.240	1.75	020-145	.026	53	.25	1.37	3.177	4.27	Full loops	25
.250	4.00	020-020 (G-20)	.0286	118	.25	.81	1.500	4.00	Full loops	12

EXTENSION SPRING ASSORTMENT

020-835 R-35

(2) G-5	(2) G-9	(2) G-12	(2) G-8	(2) G-18
(2) G-7	(4) G-10	(2) G-22	(2) G-27	(5) G-17
(2) G-11	(2) G-28	(2) G-14	(2) G-15	(2) G-37

(35 SPRINGS)

Specials Quoted Upon Request

Lamina INC. EXTENSION

IN STOCK

STEEL* FIXTURE SPRINGS
INCHES X 25.4 = mm
LBS. X .454 = KG

H&O DIE SUPPLY, INC.

Order by stock number

O.D. Inches	Length Inches	Stock No.	Wire Diameter	Coils	Approx. Initial Tension Lbs.	Rate Per Inch Lbs.	Max. Ext.	Max. Safe Load Lbs.	Type of Ends	No. Per Box
.250	5.34	020-018 (G-18)	.041	118	5.50	5.00	3.000	17.00	Full loops	12
.250	5.75	020-017 (G-17)	.0286	181	.62	.44	2.250	4.50	Full loops	12
.265	6.12	020-016 (G-16)	.0348	153	1.75		5.500	9.25	Full loops, side	12
.296	1.12	020-039 (G-39)	.040 Brass	14.5	.50	3.80	.310	5.00	Dbl. loops	12
.296	5.75	020-015 (G-15)	.0475	108	2.00	3.60	3.500	17.00	Full loops, side	12
.312	5.00	020-026 (G-26)	.041	106	.75	1.60	4.950	11.25	Full loops	12
.328	6.50	020-010 (G-10)	.0348	162	1.25	.50	9.000	6.25	Dbl. loops, side	12
.343	1.44	020-037 (G-37)	.0475	17	4.37	15.00	.375	17.50	Full loops	12
.343	5.37	020-027 (G-27)	.0475	103	1.12	2.60	3.620	24.00	Full loops	12
.343	8.12	020-007 (G-7)	.0475	158	2.18	1.60	7.500	16.25	Full loops	12
.359	10.00	020-005 (G-5)	.054	193.5	1.50	2.30	8.000	20.00	Full loops	12
.360	1.50	020-146	.037	25	.19	3.40	2.385	7.80	Full loops	25
.360	1.75	020-147	.037	29	.38	2.60	2.700	7.83	Full loops	25
.360	2.00	020-148	.037	36	.56	2.20	3.268	7.80	Full loops	25
.370	3.25	020-019 (G-19)	.041	66	1.50	1.90	4.000	8.00	Half loops	12
.370	5.50	020-014 (G-14)	.054	90	2.00	4.00	3.250	15.50	Full loops	12
.370	10.00	020-006 (G-6)	.0475	193.5	2.00	1.10	8.500	11.50	Full loops	12
.440	5.25	020-028 (G-28)	.0625	74	3.00	6.50	4.000	58.00	Full loops	12
.440	6.44	020-009 (G-9)	.048	118.5	2.00	1.10	7.500	10.50	Dbl. loops	12
.480	4.50	020-022 (G-22)	.0625	57.5	1.00	6.20	3.000	17.00	Full loops	12
.500	1.62	020-034 (G-34)	.080	11	28.00	64.00	.620	67.00	Half loops	12
.500	10.00	020-004 (G-4)	.0625	144	4.50	1.87	8.500	20.50	Full loops	12
.530	5.25	020-025 (G-25)	.0625	49	3.75	5.00	4.000	21.75	Swiv. loops	12
.550	5.62	020-012 (G-12)	.080	58.5	4.00	10.00	2.620	31.00	Full loops	12
.560	5.50	020-013 (G-13)	.080	55	9.00	10.50	2.940	38.00	Half loops	12
.620	10.00	020-003 (G-3)	.072	118.5	2.44	2.10	9.500	21.50	Full loops	6
.680	4.00	*020-099 (G-99)	.1055	30.5	9.00	34.00	1.530	58.00	Half loops	6
.720	2.00	020-095 (G-95)	.105	9	11.00	80.00	.530	57.00	Full loops	12
.720	4.00	020-024 (G-24)	.1055	26	24.00	12.50	2.120	82.00	Half loops	12
.740	4.06	020-023 (G-23)	.0625	45	1.50	1.40	6.500	12.00	Full loops	12
.750	2.59	020-032 (G-32)	.1055	13	12.25	46.00	.810	44.00	Full loops	12
.750	2.66	020-033 (G-33)	.080	18.5	2.25	10.30	4.000	47.00	Full loops	12
.810	10.00	020-002 (G-2)	.072	119	4.12	.75	21.000	23.12	Full loops	3
.870	6.00	*020-029 (G-29)	.1205	38.5	8.00	18.50	2.380	68.20	Half loops	6
.870	10.00	020-001 (G-1)	.0915	94	4.38	2.50	11.000	30.50	Full loops	3
1.000	8.50	020-031 (G-31)	.1055	65	9.00	6.00	8.500	41.00	Half loops	3
1.060	8.00	*020-030 (G-30)	.135	49	13.00	24.00	5.000	45.00	Half loops	6
1.120	10.00	*020-100 (G-100)	.148	59	8.00	14.00	6.000	95.00	Half loops	6
1.250	12.00	*020-101(G-101)	.162	65	31.00	15.00	7.400	112.00	Half loops	6
1.370	14.00	*020-102(G-102)	.177	70	14.00	14.00	8.750	130.00	Half loops	6
1.560	16.00	*020-103(G-103)	.207	70	32.00	16.00	9.000	175.00	Half loops	6
1.250	7.62	020-104	.207	26	61.00	94.00	2.468	281.82	Full loops	2
1.812	8.19	020-105	.250	22	61.00	68.00	4.189	341.56	Full loops	2
.297	16.00	020-152	.041	15.30	2.94	.69	14.583	12.43	Full loops	12
.344	16.00	020-153	.048	15.125	3.19	1.06	14.445	16.72	Full loops	12
.375	16.00	020-154	.054	15.310	3.50	1.50	13.724	21.45	Full loops	12
.422	16.00	020-155	.063	15.150	5.00	2.25	11.903	29.58	Full loops	12
.438	16.00	020-156	.072	15.375	4.08	3.90	9.950	40.97	Full loops	12

MACHINERY BRAKE & SHEAR SPRINGS

The following stock numbers identify certain standard springs described in the table above that are of oil-tempered carbon steel and specially suited to heavy duty-extension spring use.

G - 29 G - 30 G - 99 G - 100 G - 101 G - 102 G - 103 *They are flagged with an asterisk to simplify finding them*

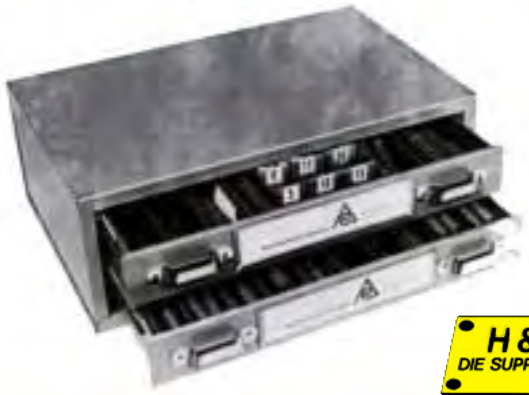
Specials Quoted Upon Request

Lamina INC.

No. 020-819-1
General Maintenance Assortment

ENGINEERED FOR DURABILITY, THESE QUALITY SPRINGS HAVE UNLIMITED APPLICATIONS FOR GENERAL UTILITY AND INDUSTRY.

ABBREVIATIONS:
EXT., EXTENSION
COMP., COMPRESSION



HEAVY DUTY
2-DRAWER CASE
NUMBERED DIVIDERS
DISPLAY READY
41 DIFFERENT NO'S
310 COMP. & EXT. SPG'S

Length 17-1/2"
Width 12-1/4"
Height 5-7/8"

Shipping Weight 57 lbs.

H&O DIE SUPPLY, INC.

Part No.	Type	Length In Inches	O.D. Inches	Wire Size	Lbs. Rate/ Inch	Approx. Load @ Reference Extension	Ass't Qty.	Unit Pack
020-042	Ext.	1.000	.188	.014	3 oz.	30 oz. @ 1.500	12	12
020-040	Ext.	1.125	.234	.020	12 oz.	9 oz. @ 1.625	6	12
020-039	Ext.	1.125	.297	.040 Brass	3.8	1.6 lbs. @ .875	12	12
020-037	Ext.	1.438	.344	.048	15.0	10.0 lbs. @ .375	12	12
020-034	Ext.	1.625	.500	.080	64.0	23.0 lbs. @ 1.250	6	12
020-032	Ext.	2.594	.750	.105	46.0	29.5 lbs. @ 2.375	6	12
020-033	Ext.	1.656	.750	.080	10.3	12.5 lbs. @ 3.968	6	12
020-019	Ext.	3.250	.375	.041	1.9	5.2 lbs. @ 5.250	12	12
020-020	Ext.	4.000	.250	.028	13 oz.	1.9 lbs. @ 6.000	12	12
020-024	Ext.	4.000	.719	.105	12.5	36.5 lbs. @ 5.000	6	12
020-023	Ext.	4.062	.734	.063	1.4	4.3 lbs. @ 6.062	6	12
020-022	Ext.	4.500	.484	.063	6.3	14.0 lbs. @ 6.500	6	12
020-025	Ext.	5.250	.531	.062	8.5	8.5 lbs. @ 6.250	6	12
020-012	Ext.	5.625	.547	.080	10.0	24.0 lbs. @ 7.625	6	12
020-017	Ext.	5.750	.250	.028	7 oz.	1.6 lbs. @ 7.750	12	12
020-009	Ext.	6.438	.438	.048	1.1	4.2 lbs. @ 8.437	10	12
020-010	Ext.	6.500	.328	.035	7.5	2.2 lbs. @ 8.500	12	12
020-031	Ext.	8.500	1.000	.105	6.0	16.75 lbs. @ 10.250	2	3
020-004	Ext.	10.000	.500	.062	1.8	10.2 lbs. @ 13.000	8	12
020-003	Ext.	10.000	.625	.072	2.1	8.8 lbs. @ 13.000	6	12
020-002	Ext.	10.000	.812	.072	12 oz.	5.6 lbs. @ 12.000	4	3

Part No.	Type	Length In Inches	O.D. Inches	Wire Size	Lbs. Rate/ Inch	Approx. Solid Extension	Ass't Qty.	Unit Pack
020-078	Tap.Comp.	.500	.281x.156	.013	14 oz.	.117	12	12
020-066	Comp.	.781	.375	.042 Brass	7.4	.376	6	12
020-064	Comp.	.938	.188	.012	5 oz.	.240	6	12
020-060	Comp.	.969	.500	.072	52.0	.612	6	12
020-059	Comp.	1.031	.531	.105	21.0	.950	6	12
020-080	Comp.	1.250	.281	.040	18.0	.640	12	12
020-081	Comp.	1.969	.312	.022	9 oz.	.528	12	12
020-065	Comp.	2.000	.875	.120	110.0	.964	6	12
020-063	Comp.	2.031	.938	.080	16.0	.640	6	12
020-069	Comp.	2.193	.590	.040	3.1	.380	6	12
020-091	Comp.	2.500	.500	.063	18.0	1.000	10	12
020-062	Comp.	2.562	1.015	.120	56.0	1.148	6	12
020-089	Comp.	2.625	.438	.048	6.0	.950	10	12
020-068	Comp.	2.844	.625	.080	30.0	1.080	6	12
020-064	Comp.	3.062	.875	.092	21.5	1.098	4	12
020-067	Comp.	4.062	.688	1.05	58.0	1.952	6	12
020-056	Comp.	10.000	.176	.014	.5 oz.	2.254	6	12
020-048	Comp.	10.000	.875	.080	3.2	3.000	4	12
020-052	Comp.	11.500	.375	.047	2.3	4.240	6	12
020-050	Comp.	11.500	.625	.054	1.0	3.564	6	12

Lamina INC.

105 Midget Springs Assortment NO. 020-801

H & O DIE SUPPLY, INC.

THIS IS THE BABY OF OUR GENERAL MAINTENANCE ASSORTMENT. SO WHEN A LARGER STOCK OF SPRINGS ARE NOT NEEDED. HAVE OUR MIDGET ASS'T IN ITS ENAMELED STEEL CASE READY IN EACH DEPARTMENT FOR QUICK APPLICATION. KIT CONTAINS 105 OF 18 DIFFERENT EXTENSION & COMPRESSION SPRINGS.

O.D. Inches	Length Inches	Extension Spring Stock No.	Wire Dia.	Coils	Appr.Init. Tension Lbs.	Rate Per Inch Lbs.	Max. Ext.	Max. Safe Load Lbs.	Type of Ends	Asst. Qty.	No. Per Box
.187	1.00	020-042 (G-42)	.014	70	.12	.18	4.000	.87	Plain ends	5	12
.234	1.12	020-040 (G-40)	.020	34	.50	.75	2.380	2.25	Full loops	5	12
.156	2.06	020-035 (G-35)	.020 Brass	90	.25	.50	1.180	1.75	Full loops	10	12
.370	3.25	020-019 (G-19)	.041	66	1.50	1.90	4.000	8.00	Half loops	9	12
.250	4.00	020-020 (G-20)	.0286	118	.25	.81	1.500	4.00	Full loops	10	12
.480	4.50	020-022 (G-22)	.0625	57.5	1.00	6.20	3.000	17.00	Full loops	5	12
.440	5.25	020-028 (G-28)	.0625	74	3.00	6.50	4.000	58.00	Full loops	5	12
.550	5.62	020-012 (G-12)	.080	58.5	4.00	10.00	2.620	31.00	Full loops	4	12
.250	5.75	020-017 (G-17)	.0286	181	.62	.44	2.250	4.50	Full loops	10	12
.440	6.44	020-009 (G-9)	.048	118.5	2.00	1.10	7.500	10.50	Dbl. loops	5	12
.328	6.50	020-010 (G-10)	.0348	162	1.25	.50	9.000	6.25	Dbl. loops, side	10	12

O.D. Inches	Max. Rod Dia.	Length Inches	Compression Spring Stock No.	Wire Diameter	Comp. Rate Per Inch Lbs.	Total Coils	Type of Ends	Asst. Qty.	No. Per Box
.369	.281	.78	020-066 (G-66)	.042 Brass	7.37	9	Sq. & Gr.	6	12
.282	.188	1.31	020-079 (G-79)	.040	17.00	13	Plain	5	12
.315	.266	1.96	020-081 (G-81)	.022	.56	23.5	Squared	5	12
.53x1.03x.86	.421	3.50	020-061 (G-61)	.051	1.20	13	Sq. & Gr.	4	12
.875	.703	10.00	020-048 (G-48)	.080	3.25	36	Plain	1	3
.375	.266	11.50	020-052 (G-52)	.0475	2.25	88	Plain	3	12
.620	.500	11.50	020-050 (G-50)	.054	1.00	60	Plain	3	6

300 Compression Springs Assortment NO. 020-802

FOR THE SMALL COMPRESSION SPRING REQUIREMENTS, THESE 12 ENGINEERED SIZES IN QUANTITIES OF 25 EACH MAKE THIS ASSORTMENT THE PERFECT HELPER.

O.D. Inches	Max. Rod Dia.	Length Inches	Stock No.	Wire Dia.	Comp. Rate Per Inch Lbs.	Total Coils	Type of Ends	No. Per Box
.120	.078	.62	020-125	.016	6.60	13	Squared	25
.120	.075	.75	020-126	.016	5.30	18	Squared	25
.180	.125	.75	020-127	.022	8.60	11	Squared	25
.180	.125	1.00	020-128	.022	6.80	14	Squared	25
.180	.125	1.12	020-129	.022	6.00	15	Squared	25
.180	.125	1.25	020-130	.022	5.30	17	Squared	25
.240	.172	1.00	020-131	.026	7.80	11	Squared	25
.240	.172	1.25	020-132	.026	6.10	14	Squared	25
.240	.172	1.50	020-133	.026	5.10	15	Squared	25
.360	.281	1.50	020-134	.035	7.30	10	Squared	25
.360	.281	1.75	020-135	.035	6.20	11	Squared	25
.360	.281	2.00	020-136	.035	5.40	13	Squared	25

300 Extension Springs Assortment NO. 020-803

LIKE THE ABOVE COMPRESSION KIT, ONLY EXTENSION SPRINGS. THIS KIT CAN BE A REAL HELPER. PACKAGED IN THE SAME QUANTITIES IN A CLEAR CONTAINER OF 300 LITTLE GIANTS.

O.D. Inches	Length Inches	Stock No.	Wire Dia.	Coils	Appr. Init. Tension Lbs.	Rate Per Inch Lbs.	Max. Ext.	Max. Safe Load Lbs.	Type of Ends	No. Per Box
.120	.62	020-137	.016	27	.06	3.70	.641	2.04	Full loops	25
.120	.75	020-138	.016	34	.31	2.50	.714	2.07	Full loops	25
.120	.88	020-139	.016	44	.19	2.20	.990	2.07	Full loops	25
.180	1.00	020-140	.022	32	.19	2.8	1.238	3.50	Full loops	25
.180	1.12	020-141	.022	36	.31	2.4	1.344	3.50	Full loops	25
.180	1.25	020-142	.022	42	.04	2.2	1.700	3.50	Full loops	25
.240	1.37	020-143	.026	39	.06	1.8	2.450	4.27	Full loops	25
.240	1.50	020-144	.026	42	.22	1.60	2.540	4.27	Full loops	25
.240	1.75	020-145	.026	53	.25	1.37	3.177	4.27	Full loops	25
.360	1.50	020-146	.037	25	.19	3.40	2.385	7.80	Full loops	25
.360	1.75	020-147	.037	29	.38	2.60	2.700	7.83	Full loops	25
.360	2.00	020-148	.037	36	.56	2.20	3.268	7.80	Full loops	25

Lamina INC SQUARE WIRE

INCHES X 25.4 = mm
LBS. X .454 = KG

CARBON STEEL DIE & FIXTURE SPRINGS • 12-INCH LENGTHS • PLAIN ENDS

Hole Dia.	Rod Dia.	Stock No.	Wire Size	Space Between Coils	Max. Safe Load Lbs.	Total Coils	Pounds Per Inch of Compression	Approx. Solid Height	No. Per Box
.375	.187	SR-0	.062	.047	25	111	12½	7.50	12
.437	.250	SR-1A	.062	.078	40	86	9	5.67	12
.500	.250	SR-1B	.094	.078	100	70	42	7.10	12
.562	.312	SR-1	.094	.094	100	64¼	29	6.425	12
.562	.250	SR-4	.125	.062	245	64¼	118	9.05	12
.687	.437	SR-2	.094	.125	75	55	15½	5.42	12
.687	.375	SR-5	.125	.094	214	55	60	7.52	12
.687	.312	SR-10	.156	.062	450	55	180	9.68	12
.812	.562	SR-3	.094	.125	65	55	8.6	5.34	12
.812	.500	SR-6	.125	.109	170	51¼	35	6.87	12
.812	.437	SR-11	.156	.109	335	45¼	110	7.79	12
.812	.375	SR-16	.187	.094	550	42¼	280	9.10	12
.937	.625	SR-7	.125	.125	145	48	21½	6.35	12
.937	.562	SR-12	.156	.109	275	51¼	44	7.50	12
1.062	.750	SR-8	.125	.187	120	38½	18	5.075	6
1.062	.687	SR-13	.156	.172	245	36¾	50	6.15	6
1.062	.625	SR-18	.187	.156	400	35	120	7.00	6
1.062	.437	SR-23	.250	.109	1200	33½	575	9.67	6
1.187	.875	SR-9	.125	.250	100	32	14½	4.20	6
1.187	.812	SR-14	.156	.187	220	35	45	5.80	6
1.187	.750	SR-19	.187	.187	350	32	90	6.30	6
1.187	.562	SR-24	.250	.125	1000	32	380	9.05	6
1.312	.937	SR-15	.156	.250	290	29½	29	4.88	6
1.312	.875	SR-20	.187	.187	300	32	65	6.25	6
1.437	1.000	SR-21	.187	.312	270	24	60	4.63	6
1.562	1.125	SR-22	.187	.312	240	24	42½	4.59	6
1.562	.937	SR-27	.250	.203	650	26½	155	7.26	6
1.562	.203	SR-31	.312	.187	1350	24	490	8.15	6
1.812	1.187	SR-26	.250	.343	575	20¼	115	5.52	6
1.812	1.062	SR-32	.312	.250	1150	21½	305	7.425	6
2.062	1.437	SR-29	.250	.437	500	17½	85	4.77	6
2.062	1.312	SR-33	.312	.297	1000	19¼	210	6.79	6
2.312	1.687	SR-30	.250	.531	425	15½	65	4.18	6
2.312	1.562	SR-34	.312	.406	850	16¼	160	5.75	6
2.562	1.812	SR-35	.312	.437	750	16	115	5.45	6

H&O DIE SUPPLY, INC.

GLOSSARY OF SPRING TERMINOLOGY

ACTIVE COILS - those coils which are free to deflect under load.

ANGULAR RELATIONSHIP OF ENDS - the relative position of the plane of the hooks of loops of extension springs to each other.

BLUE - a thin blue film of oxide on ferrous alloys, sometimes used to indicate that the material has been stress relieved.

BAKING - heating of electroplated springs to relieve hydrogen embrittlement.

BUCKLING - bowing or lateral deflection of compression springs when compressed, related to the slenderness ratio.

CLOSED ENDS - ends of compression springs where pitch of the end coils is reduced so that the end coils touch.

CLOSED AND GROUND ENDS - as with closed ends, except that the end is ground to provide a flat plane.

CLOSED LENGTH - see Solid Height.

CLOSE-WOUND - coiled with adjacent coils touching.

COILS PER INCH - see Pitch.

DEFLECTION - motion of spring ends or arms under the application of removal of an external load.

ELASTIC LIMIT - maximum stress to which a material may be subjected without permanent set.

ENDURANCE LIMIT - maximum stress at which any given material will operate indefinitely without failure for a given minimum stress.

GLOSSARY OF SPRING TERMINOLOGY

FREE ANGLE - angle between the arms of a torsion spring when the spring is not loaded.

FREE LENGTH - the overall length of a spring in the unloaded position.

FREQUENCY (NATURAL) - the lowest inherent rate of free vibration of a spring itself (usually in cycles per second) with ends restrained.

GRADIENT - see Rate.

HEAT SETTING - fixturing a spring at elevated temperature to minimize loss of load at operating temperature.

HELIX - the spiral form (open or closed) of compression, extension and torsion springs.

HOOKS - open loops or ends of extension springs.

HOT PRESSING - see Heat Setting.

HYDROGEN EMBRITTLEMENT - hydrogen absorbed in electroplating or pickling of carbon steels, tending to make the spring material brittle and susceptible to cracking and failure, particularly under sustained loads.

HYSTERESIS - the mechanical energy loss that always occurs under cyclic loading and unloading of a spring, proportional to the area between the loading and unloading load-deflection curves within the elastic range of a spring.

INITIAL TENSION - the force that tends to keep the coils of an extension spring closed and which must be overcome before the coils start to open.

LOAD - the force applied to a spring that causes a deflection.

LOOPS - coil-like wire shapes at the ends of extension springs that provide for attachment and force application.

MEAN COIL DIAMETER - outside spring diameter (O. D.) minus one wire diameter.

MODULUS IN SHEAR OR TORSION - coefficient of stiffness for extension and compression springs.

MODULUS IN TENSION OR BENDING - coefficient of stiffness used for torsion and flat springs (Young's Modulus).

MOMENT - see Torque.

OPEN ENDS, NOT GROUNDS - end of a compression spring with a constant pitch for each coil.

OPEN ENDS GROUND - "open ends, not ground" followed by an end grinding operation.

PASSIVATING - acid treatment of stainless steel to remove contaminants and improve corrosion resistance.

PERMANENT SET - a material that is deflected so far that its elastic properties have been exceeded and it does not return to its original condition upon release of load is said to have taken a "permanent set".

PITCH - the distance from center to center of the wire in adjacent active coils (recommended practice is to specify number of active coils rather than pitch).

PRESET - see Remove Set.

RATE - change in load per unit deflection, generally given in pounds per inch.

REMOVE SET - the process of closing to solid height a compression spring which has been coiled longer than the desired finished length, so as to increase the apparent elastic limit.

RESIDUAL STRESS - stressed induced by set removal, shot peening, cold-working, forming or other means. These stresses may or may not be beneficial, depending on the application.

SET - permanent distortion which occurs when a spring is stressed beyond the elastic limit of the material.

SHOT PEENING - a cold-working process in which the material surface is peened to induce compressive stresses and thereby improve fatigue life.

SLENDERNESS RATIO - ratio of spring length to mean coil diameter.

SOLID HEIGHT - length of a compression spring when under sufficient load to bring all coils into contact with adjacent coils.

SPRING INDEX - ratio of mean coil diameter to wire diameter.

SQUARED AND GROUND ENDS - Refer to Closed and Ground Ends.

SQUARED ENDS - Refer to Closed Ends.

SQUARENESS OF ENDS - angular deviation between the axis of a compression spring and a normal to the plane of the ends.

SQUARENESS UNDER LOAD - as in Squareness of Ends, except with the spring under load.

STRESS RANGE - the difference in operating stresses at minimum and maximum loads.

STRESS RELIEVE - to subject springs to low-temperature heat treatment so as to relieve residual stresses.

TORQUE - a twisting action in torsion spring which tends to produce rotation, equal to the load multiplied by the distance (or moment arm) from the load to the axis of spring body. Usually express in inch-oz., inch-pounds or in foot-pounds.

TOTAL NUMBER OF COILS - number of active coils plus the coils forming the ends.

TRAPPED STRESS - see Residual Stress.