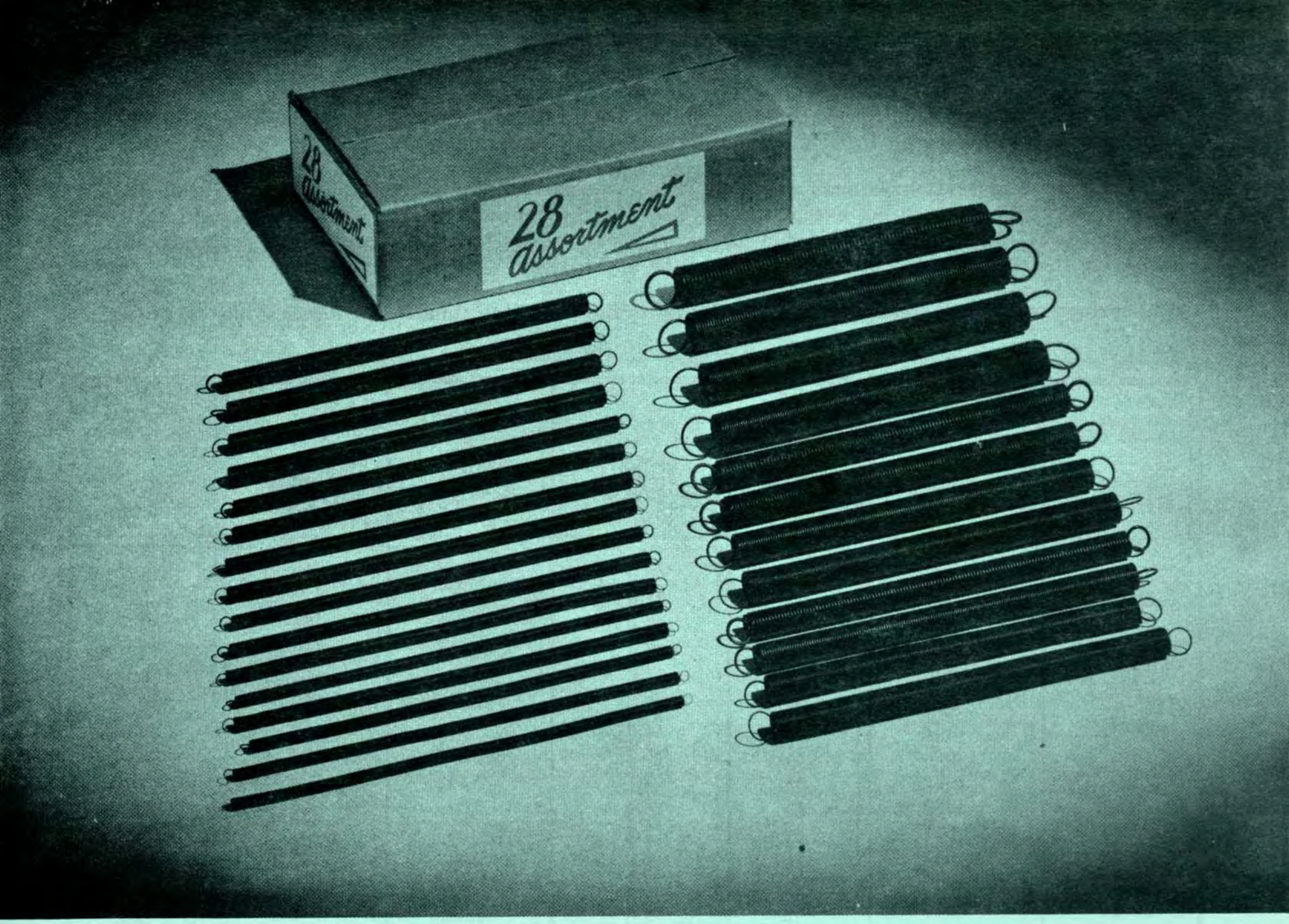

28 Assortment

**A Practical, Trouble Free,
Series of Round Wire Springs
for General Use . . . .**

Something new in commercial stock assortments for the average small user . . . engineered to fit the job

PARAGON *SPRING COMPANY*

4435-45 W. RICE STREET CHICAGO, ILLINOIS 60651 AREA CODE 312-489-6300 FAX 489-6356

The Paragon 28 Extension Spring Assortment has been carefully engineered for both General Shop Applications and for use in Development or Experimental Departments.

As Paragon's Engineers have made every effort to overcome the faults of ordinary assortments which seem to contain "every spring except the one needed," their design efforts were not confined to the springs alone; rather, loadings and dimensions were analyzed to assure the user of greater probability in having the correct spring on hand, whatever the application.

The springs are made especially for the assortment, to the same high standards as those of custom orders.

Spring Number	Wire Diam.	Outside Diam.	Full (Safe) Loading in Pounds at Max. Ext.	Initial Tension (Pounds)	Safe Travel (Movement per Coil)	Constant
28-1	.105	1	48.0	6.50	.120	345
28-2	.091	1	31.5	4.75	.162	165
28-3	.091	3/4	43.0	11.25	.074	330
28-4	.080	1	21.0	3.62	.186	93
28-5	.080	3/4	31.0	7.00	.160	150
28-6	.080	5/8	37.0	5.87	.087	356
28-7	.062	1	11.5	.37	.461	24
28-8	.062	3/4	15.3	1.62	.189	72
28-9	.062	5/8	18.7	3.81	.124	107
28-10	.062	1/2	24.0	6.62	.065	264
28-11	.047	3/4	7.2	.50	.131	50
28-12	.047	5/8	8.7	1.87	.102	63
28-13	.047	1/2	11.1	1.87	.096	95
28-14	.047	3/8	15.4	3.75	.045	254
28-15	.037	5/8	3.7	.65	.098	31
28-16	.037	1/2	4.5	.87	.058	62
28-17	.037	3/8	6.2	1.50	.057	83
28-18	.037	5/16	7.6	2.87	.045	103
28-19	.031	1/2	3.3	.44	.118	24
28-20	.031	3/8	4.7	.75	.108	36
28-21	.031	5/16	5.5	1.37	.042	97
28-22	.031	1/4	7.1	1.56	.038	145
28-23	.025	3/8	2.2	.47	.116	15
28-24	.025	5/16	2.6	.59	.067	30
28-25	.025	1/4	3.4	.84	.034	75
28-26	.020	5/16	1.4	.12	.034	37.5
28-27	.018	1/4	.87	.12	.070	10.6
28-28	.013	1/4	.43	.06	.026	13.8

All springs 11 inches long, over all (O. D. hooks,) with Hook ends.

Note: The above tables have been carefully checked and are commercially correct. We reserve the right to make changes at our discretion and without notification.

General Information:

SPRING NUMBER: Is given for easy identifications should it be necessary to re-order; either to keep the assortment complete, or to purchase a quantity (large or small) made to exact length needed. We can furnish the latter with hook ends or with loop ends.

WIRE DIAMETER: All sizes are shown in decimal (inches) dimensions.

INITIAL TENSION: This figure shows pressure (in pounds) necessary to apply, before coils of the spring start to open. This loading is wound into the spring during manufacture, (added stress induced by crowding one coil against another).

To be technically correct: Initial Tension depends directly on the spring index (2r/d): the greater the index, the lower the Initial Tension factor.

Nevertheless, for our purpose—to keep this data as simple and non-technical as possible—and because the 28 Assortment index ratios are within limits at which the theoretical tension outlined is possible, we will base our explanations and examples as follows:

Theoretically speaking, it is possible to wind 1/3 of the total (safe) load into initial tension. Thus, if a spr'ng capable of 30# total loading is wound to maximum initial tension—the initial tension would be 10#. The balance of the load (20#) would be distributed into "load rate per inch of travel."

To continue: Starting with a total load of 30#—an initial tension of 10#—a remaining load of 20#—we find a spring with 2" of travel to carry a "load rate" of 10# per inch—(or a spring with 4" of travel to carry a "rate" of 5# per inch of movement.) Moreover; the entire initial tension load is "used up" in the first inch of travel.

For example: A spring with a 30# total load—an initial tension factor for 10#—and a load rate of 10# per inch of travel; results in the following: 1st inch of movement: I.T.: (10#); plus travel load: (10#); equals 20#; (I.T. plus travel load of first inch equals 20#.) Add to this the 2nd inch of "travel load" buildup (10#) and the result is 30#. * * * The above is a complete text in itself. * * * To those wishing to add variations to the above we go on to add:

By heating (or by stretching beyond the elastic limit) in varying degrees, the initial tension loading can be transmitted into travel. In other words, by heating or stretching the initial tension out of existence you can add as much as 33-1/3% to the travel (movement) of the spring, if the spring is originally wound to max. theoretical initial tension. For example: A 30# total load spring will build up its loading at a true rate of 10# per inch. Thus the spring with no initial tension will travel 3" to reach 30#; while a spring with max. initial tension would only stretch 2" to result in the same load.

Remember: No tension is lost in an extension spring—it must either result in initial tension or travel loading. A spring of specified dimensions and material will always carry the same total load regardless of initial tension. The only difference being in the travel necessary to produce the loading.

TOTAL LOAD: Figure shown under this heading is the total maximum capacity, in pounds, spring is capable of carrying when extended to maximum safe deflection. Regardless of the length to which the spring is cut, the same extended (total) load will prevail. By way of explanation: The total load will not change—only the load rate (build up) per inch of travel changes. The longer the spring, the more gradual the "build up" in load (because of greater travel) —the shorter the spring, the more abruptly the total load is reached (because of less travel). This explains why two springs of identical wire, and diameter, but of different lengths will seem unrelated in loadings. The short spring will be strong, while the long spring will feel mushy—nevertheless, both springs will register identical loadings when fully extended. Therefore, when choosing a spring from this assortment by "feel" . . . hold the spring at the length you expect to use.

CONSTANT: This figure is a "key" for determining by calculation, the "load rate per inch of travel" of a cut length of spring. Moreover, this "key" enables the user to cut the spring to correct number of coils so as to obtain a definite, required, load rate. Always allow for initial tension in your calculations—the "constant" figure is adjusted to exclude the I. T. factor. The "constant" results in a true load per inch of travel.

Example for known number of coils: (Spring #28-5). This spring shows a constant of 150. Having a cut length with 10 coils, we divide 10 (number of coils) into 150 (constant) which equals 15. The load rate per inch of travel is 15 pounds. (Don't forget the initial tension factor of 7 pounds when calculating for load at a given extended length—the 7 pounds must be added to the load for the first inch—example: 7# I.T. plus 15# load rate equals 22# for 1st inch of travel.)

Example for desired load rate: (Spring #28-5). Having an application calling for a load rate of 5 pounds per inch of travel; we divide 5 (load rate needed) into 150 (constant) with a resulting figure of 30. The number of coils necessary is 30, to develop a load rate of 5 pounds per inch and we cut the spring accordingly. (Always be certain to allow for initial tension in your calculations.)

General Notes: You may have noticed that we have repeatedly called attention to the initial tension factor throughout this pamphlet. We hope our explanations have helped in some way to clear the confusion which has been common to this characteristic peculiar to extension springs.

Springs of the 28 Assortment may be depended upon to give highly satisfactory service. The "safe movement per coil" shown on the table, should be consulted for best results.

DON'T HESITATE TO CALL ON PARAGON WHATEVER YOUR SPRING REQUIREMENTS

INQUIRIES GIVEN PROMPT ATTENTION

WE HAVE A SPECIAL DEPARTMENT FOR *SMALL* ORDERS

Paragon Springs — Your product deserves the best!