MODEL L TESTER
INSTRUCTIONS

UNPACKING

The Tester should be handled as a delicate instrument - carelessness in handling may mean a factory overhaul to restore the Tester to operating condition. Follow the instructions below - step by step - and the Tester will operate smoothly and accurately.

CAUTION: DO NOT REMOVE ANY TWINE BINDINGS UNTIL AFTER THE TESTER IS MOUNTED SECURELY ON THE WALL.

1. Prepare for mounting. The Model L Tester requires a space 90 inches high by 36-inches wide. The Tester will project 14 inches from the wall. To allow sufficient space for the operator, a total space of 4 feet in width by 4 feet out from the wall must be allowed.

The wall on which the Tester is to be mounted must be free of all vibration and must be able to hold a load of at least 600 pounds.

The Tester may be mounted directly on the wall with four 5/8-inch steel holding screws or bolts; when so mounted holes should be drilled in the wall as indicated in Figure 1. Alternately, the Tester may be mounted on a 2-inch plank, 90 inches long by 12-inches wide; the plank should then be secured vertically to the wall with the lower end of the plank resting on the floor.

2. Unpack loose parts. The board to which these instructions were stapled acts as a cover for the space between the Tester dial and the end of the packing box. All loose parts for the Tester are individually wrapped and packed in this space. Remove the board by prying loose the nailed cleats inside the box and taking out the screws in the sides of the box that hold the board in place. Unpack the loose parts - open EVERY piece of paper to make sure that no small pieces are overlooked and thrown away.

3. Remove screws from sides of packing box. The Tester is held in the packing box by four hold-down bolts and several small boards. The boards are secured with screws through the sides of the box. Some of the boards are reinforced with lightly-nailed cleats inside the packing box. Remove all wood screws and pry loose the cleats.

4. Remove boards. Lift out the boards EXCEPT the lower board near the dial that is tied to the pendulum arm (5) - DO NOT REMOVE THIS BOARD UNTIL AFTER THE TESTER IS MOUNTED ON THE WALL.

5. Remove nuts from hold-down bolts. Remove the nuts from the four hold-down bolts at the ends of the mounting frame.

CAUTION: DO NOT REMOVE ANY TWINE BINDINGS UNTIL AFTER THE TESTER IS MOUNTED SECURELY ON THE WALL.

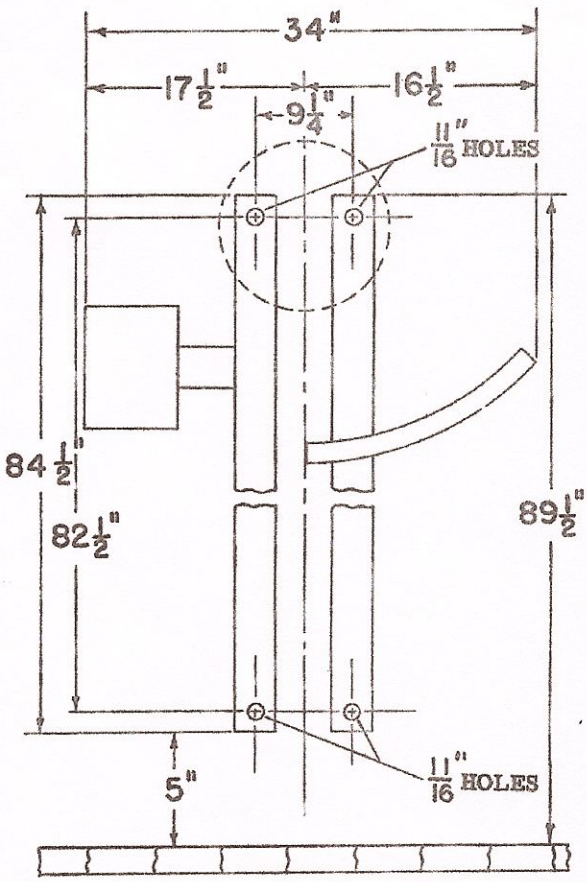


Fig. 1 - Mounting Dimensions

INSTALLATION

Note: Numbers in parentheses after part names indicate parts shown in Figure 2.

1. Lift the Tester out of the packing box; two men can easily do this. The dial end should be lifted clear of the box before lifting the other end. Lift the Tester by its mounting frame (2).

2. Attach Tester to wall. Attach the Tester with steel 5/8-inch screws or bolts directly to the wall. (Or attach it to a 2-inch plank and secure the plank to the wall - see UNPACKING, Step 1).

3. Level the Tester. Hold a spirit level against the tube (51) located between the rails, and plumb the Tester in both directions. Take up hard on the mounting screws and re-check to make sure the tube (51) is truly plumb. This check should again be made after the Tester has been in use a few weeks to make sure no "settling" has occurred.

Note: It is very important to level the tube (51) rather than the frame or other part of the Tester because the alignment of the entire machine is made with reference to the tube.

4. Cut binding twine and remove board. All binding twine and the board between the frame and the permanent weight (9) may now be removed.

5. Install quadrant. The Tester is shipped with the quadrant (4) out of position. Remove the nickel-plated screw holding the quadrant in place, and lift the quadrant clear of the Tester. Slide the same end of the quadrant in behind the pendulum arm (5) and replace the nickel-plated screw in the same position in which it was shipped. The ratchet (inside) of the quadrant should be up. Place the second nickel-plated screw through the second mounting hole just to the right of the pendulum arm (5); apply upward pressure to the outer right-hand end of the quadrant and tighten the securing screws.

6. Track pawls. Turn the knurled pawl locking knob (7) to lift the pawls clear of the quadrant. Swing the pendulum arm (5) all the way out and back; as this is done, watch the pawls to see that they "track" properly.

7. Attach pawl re-setting cord. Attach the re-setting cord and pawl release pull (50) to the pawls (19) as shown in Figure 2.

8. Install clamp counterweight. One clamp counterweight (6) is shipped with the loose parts for each type of clamp furnished. Each of these counterweights is stamped with the letter or number designation of the clamp it is designed to counterbalance. Select the proper counterweight for the clamps to be used. Lead the pulley chain at the back of the head onto the right side of the pulley; hook the counterweight (6) to the pulley chain.

9. Install clamps. Attach the clamps to be used to the Tester fixtures (13 & 14).

10. Zero the pendulum. Disengage the pawls (19) from the teeth of the quadrant (4) and keep them temporarily out of engagement by turning the pawl locking knob (7). Adjust the dial pointer (27), by hand, until it reads zero with the pendulum hanging free -- lock the pointer with the knurled knob (8) at the center of the dial. Turn the pawl locking knob (7) back so the pawls will again engage the teeth of the quadrant.

1 - Electric Motor
2 - Mounting Frame
4 - Quadrant
5 - Pendulum Arm
6 - Upper Clamp Counterweight
7 - Pawl Locking Knob
8 - Knurled Knob
9 - Permanent Weight
10 - Additional Weight
11 - Starting Handle
12 - Return Lever
13 - Upper Test Fixture
14 - Lower Test Fixture
15 - Pulley
16 - Gear Box
17A - 2-Speed or Multi-Speed Gear Box
19 - Pawls
27 - Pointer
28 - Dial
32 - Stop Dog
34 - Mounting Plate
35 - Upper Clamp
36 - Lower Clamp
39 - V-Belt
40 - Plastic Scale
41 - Guide Rod
50 - Pawl Release Pull
51 - Tube
52 - Indicator Rod
53 - Slideable Weight
54 - Belt Guard
55 - Auxiliary Weight
56 - Additional Capacity Weight
57 - Bracket

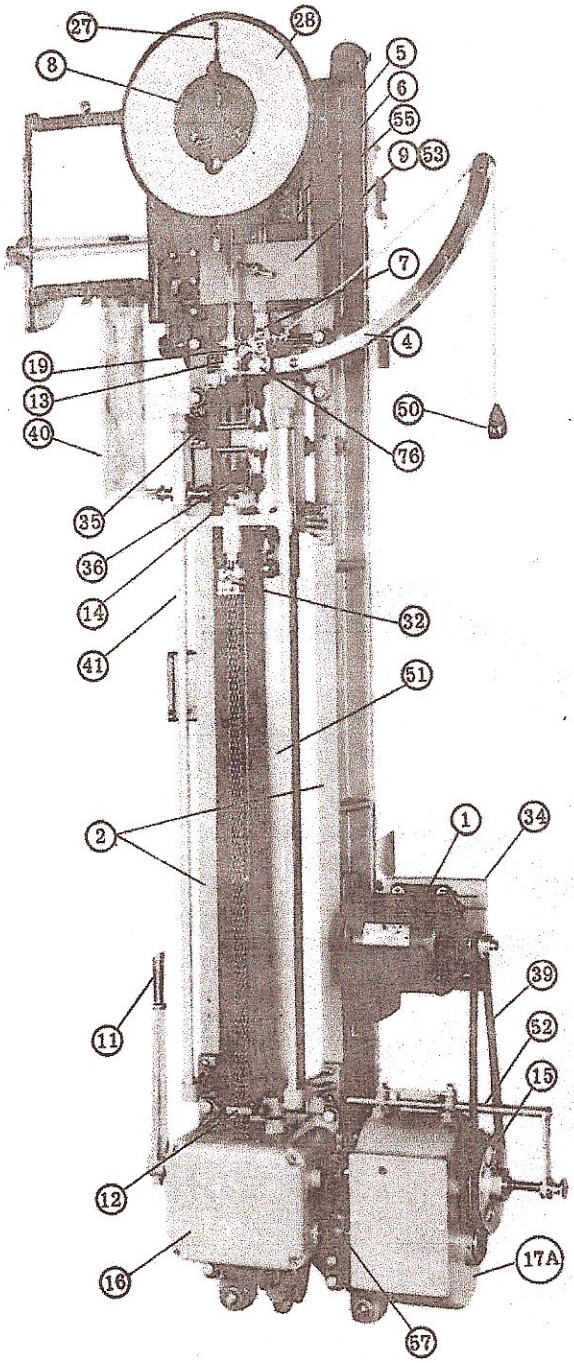


Fig. 2 - Nomenclature

Note: When making tensile strength tests, never let the pendulum move freely - that is, with the pawls disengaged.

11. Lubricate gear box. Open gear box (16) and lubricate all shafts and bearings with SAE 30 oil through the oil holes provided. Fill the reservoir in the lower left corner of the gear box with a good grade of cylinder oil (140 SSU at 210° F.) to the point where the worm will run in oil; this requires a little less than a pint. If too much oil is used, it will leak out of the gear box onto the floor.

12. Install electric motor. The electric motor is shipped on a mounting plate (34). Attach the mounting plate to the right-hand rail of the frame (2) with the two cap screws provided. Place the V-belt (39) over the gear box pulley (15) and motor pulley. Install the belt guard (54), attach to the mounting plate (34) with two screws and to the gear box (16) with the upper right-hand screw of the gear box cover.

IMPORTANT: The motor must be connected so that the direction of rotation of the V-belt (39) corresponds to the red arrow on the gear box (16).

Connect the motor to the power supply called for on the motor name plate.

14. Start the electric motor. Turn on the electric motor (1). Pull the starting handle (11) slowly forward. This will start the lower clamp (36) downward. The clamp will continue downward until the stop dog (32) contacts and depresses the return lever (12). The lower clamp may be made to return to its starting position before the stop dog (32) contacts the return lever (12) by pushing starting handle (11) backward.

A double air cylinder inside the tube (51) checks the end of the return stroke of the lower clamp. If the guide collar on the tube (51) hits the tube support sharply at the end of the up stroke after the machine has been operated a few times, the air cylinder is not checking properly. A teaspoonful of neat's-foot oil poured in the top of the tube (51) should lubricate the leather washers of the checking cylinder sufficiently to give proper checking action.

15. Set travel. Adjust the position of the stop dog (32) to get the desired downward travel of the lower clamp. A square head set screw on the dog holds it in position on the chain.

Note: If the machine has a single capacity dial only, the preceding steps make the Tester ready to test rubber samples up to the capacity of the maximum dial reading.

If the Tester has a dual-capacity dial, the preceding steps make the Tester ready to test samples up to the capacity of the inner dial readings. If greater capacity is required, the additional weight (10) included with the loose parts should be attached to the lower part of the pendulum arm (5) with the wing nut provided. THE PERMANENT WEIGHT (9) SHOULD NEVER BE MOVED. The additional weight (10) has the word "TOP" stamped in the slot that goes next to the pendulum - it is important that the weight be attached so that this word is upward.

OPERATION

The basic machine is designed for use by a single operator to test tensile strength of rubber samples. If a second person records readings, a stress-strain curve can be obtained in the manner described later.

Testing for tensile (breaking) strength.

1. Prepare and mark the rubber sample as prescribed in the specifications.

2. Place the sample in the Tester clamps.

3. Swing the plastic scale (40) into position in front of the sample and line up the Minus 1 mark (the lowest full line on the scale) with the lower line on the sample. Manually keep these lines opposite each other throughout the test.

4. With the electric motor (1) running, pull the starting handle (11) forward. As the lower clamp moves down, keep the Minus 1 mark on the plastic scale (40) opposite the lower line on the sample.

5. Note the position of the upper line through the plastic scale at the instant of rupture of the sample. Record this reading together with the dial pointer (27) reading; the number of inches the upper line is above the zero mark on the scale multiplied by 100 gives the percent elongation at the instant of rupture. Tensile pull in pounds is read from the dial (28).

6. Release the pawls (19) to return the dial pointer to zero by pulling down on the pawl release pull (50)

*Safety Switch Feature

When lower clamp travels the full length of its stroke a limit switch stops the motor. To start motor and return lower clamp to original starting position push starting handle backwards.

To obtain Stress-Strain curve.

1. Follow steps 1 to 4, inclusive, for testing tensile strength.

2. As the upper line on the sample comes opposite each full inch mark above the zero mark, call out "Mark". The second operator should note and record the dial reading at each "Mark" which represents each successive 100% elongation.

3. The machine operator should note the exact reading of the upper line opposite the plastic scale at the instant of rupture; this reading should be recorded by the second operator together with the final dial reading.

4. A Stress-Strain curve may then be plotted of tensile pull against elongation.

WARNING: Do not allow the stop dog (32) to contact the return lever (12) before the sample ruptures. If this is about to happen, STOP THE MACHINE and reset the stop dog to increase the stroke of the lower clamp. If this is not done, the Tester may be seriously damaged.

The electric motor should be left running during any series of tests; stop it only when the Tester is to remain idle for twenty minutes or more.

MAINTENANCE

For proper operation the Tester must be kept CLEAN and oiled.

Wipe off guide rods (41) daily with a clean, oiled rag.

Lubricate the gear box (16) and the motor (1) every three months as described under INSTALLATION, Paragraph 11.

REPLACEMENT PARTS

Replacement parts are carried in stock for immediate delivery. When ordering, please give the number of your Tester.

AUTOGRAPHIC RECORDER

FOR

MODEL L TESTER

The Autographic Recorder for the Model L Tester is used as an automatic recorder for laboratory ring tests of rubber samples, for tensile strength tests on plastic strips, for adhesive tests, etc. When also equipped for spark recording, it may be used for testing broad-end samples.

INSTALLATION

The Recorder is shipped assembled but separate from the Tester.

1. Attach the Recorder to the left rail of the Tester with the two cap screws provided. Dowels in the Recorder bracket (A) fit into dowel holes in the Tester frame to locate the Recorder accurately.

IMPORTANT: A short shaft with a groove in the lower end projects downward at the back of the Recorder next to the bracket (A). The groove of this shaft must be slipped over the corresponding tongue of the short shaft (K) projecting upward at the outside left of the frame just above the bevel gear to the left of the clutch (AC).

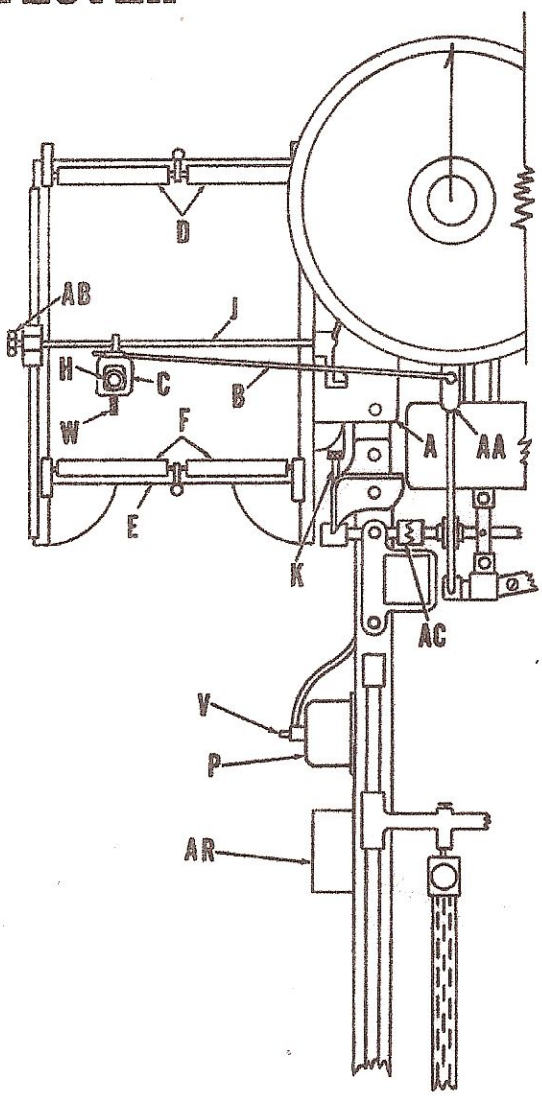
2. Cut the binding twine on the Recorder.

3. A Pitman rod (B) is threaded into the ball joint of the stylus carriage (C); the other end of the rod has a ball end. Spring the ball on the end of the Pitman rod into the socket on the weight arm (AA). To prevent breakage of the socket "ear" in operation, the ball must be sprung into its socket very carefully. Before springing the ball into its socket, see that the pendulum arm (5) is at the zero load position. Place the ball so that the rod (B) lies parallel to the cut in the socket and about 1/16" above it — then spring the ball into the socket.

When equipped for spark recording:

4. A single wire at the top of the Tester, behind the dial, delivers the spark current to the stylus. Remove one of the nuts from the carriage guide rod (J), slip the wire clip over the threaded end of the rod and replace the nut. Clamp the wire clip securely with the two nuts to make sure a good electrical connection is made.

5. Connect the switch (AR) to any convenient source of 110- or 220-volts A.C.



A - Bracket
B - Pitman Rod
C - Stylus Carriage
D - Rubber Roll
E - Platen
F - Rubber Roll
H - Stylus
J - Guide Rod.
K - Shaft
P - Transformer
V - Microswitch
W - Set Screw
AA - Weight Arm
AB - Hand Wheel
AC - Clutch
AR - Disconnect Switch

Note: When a 110- or 220-volt A.C. supply is not available, a high-capacity 6-volt battery is supplied with the Recorder. Connect this into the hand-operated microswitch circuit.

OPERATION

For automatic autographic recording:

1. Insert a Tensilgram under the rubber rolls (D & F) of the recorder platen (E).

2. Fill the ink stylus (H) with ink of a slow-drying nature. The pen is filled in the same manner as any sac-type fountain pen; it should be cleaned frequently with plain water. Place the filled stylus (H) in the pen carriage (C); clamp the stylus in place at about the same angle with the paper as a fountain pen is usually held. Move the platen (E) up and down by hand and adjust the position of the stylus so that a clear, even line is drawn on the chart.

3. Set the stylus point at zero elongation and zero load on the Tensilgram. To do this, move the platen so that the stylus point rests on the zero horizontal line. Then turn the Pitman rod (B) so that the stylus point rests on the left hand vertical line.

4. Set the compensating weights for the type of test in accordance with Instructions for Compensating Weights.

5. Engage the clutch (AC).

6. Insert the sample to be tested in the Tester clamps and pull the starting handle (11) forward; the autographic recorder will automatically record the true Stress-Strain curve.

Note: When making adhesive tests, disengage the pawls (19) from the quadrant (4) and keep them out of engagement by turning the pawl locking knob (7).

CAUTION: Do not allow the pendulum to swing freely back to zero when the sample ruptures; ease it back into position by hand.

When using for spark recording:

1. Replace the stylus pen with the glass-tipped stylus.

2. Connect the power supply to the switch (AR).

3. Disengage the clutch (AC).

4. Test in accordance with the Instructions for Compensating Weights.

MAINTENANCE

The Recorder platen is driven by a friction clutch at the back of the Recorder. Two check nuts position a spring to maintain the correct amount of drag on the friction clutch. Should the platen move too freely when it is clutched in (with clutch AC), adjust the friction clutch by the check nuts to increase the spring tension.

Wipe the stylus carriage rod daily with a clean rag.

The rack and gear at the back of the platen should be lubricated with a light machine oil occasionally.

REPLACEMENT PARTS

Replacement parts are carried in stock for immediate delivery. When ordering, please give the number of your Tester.

SPARK RECORDER FOR MODEL L TESTER

INSTALLATION

The recorder is shipped assembled but separate from the Tester.

1. Attach the Recorder to the left rail of the mounting frame (2) with the two cap screws provided. Dowels in the Recorder bracket fit into dowel holes in the Tester frame to locate the Recorder accurately.

2. Cut the lashings on the Recorder.

3. A Pitman rod (B) is threaded into the ball joint of the stylus carriage (C); the other end of the rod has a ball end. Spring the ball on the end of the Pitman rod into the socket on the weight arm (AA). To prevent breakage of the socket "ear" in operation, the ball must be sprung into its socket very carefully. Before springing the ball into its socket, see that the pendulum arm (5) is at the zero load position. Place the ball so that the rod (B) lies parallel to the cut in the socket and about 1/16" above it — then spring the ball into the socket.

4. The glass-tipped stylus (H) is shipped with the loose parts. Insert the stylus in the stylus carriage (C) so that the tip just touches the platen (E); secure the stylus in place with the set screw (W).

5. A single wire at the top of the Tester, behind the dial, delivers spark current to the stylus. Remove one of the nuts from the carriage guide rod (J), slip the wire clip over the threaded end of the rod and replace the nut. Clamp the wire clip securely with the two nuts to make sure a good electrical connection is made.

6. Connect the two tightly coiled wires at the bottom of the Tester to the foot tread (V).

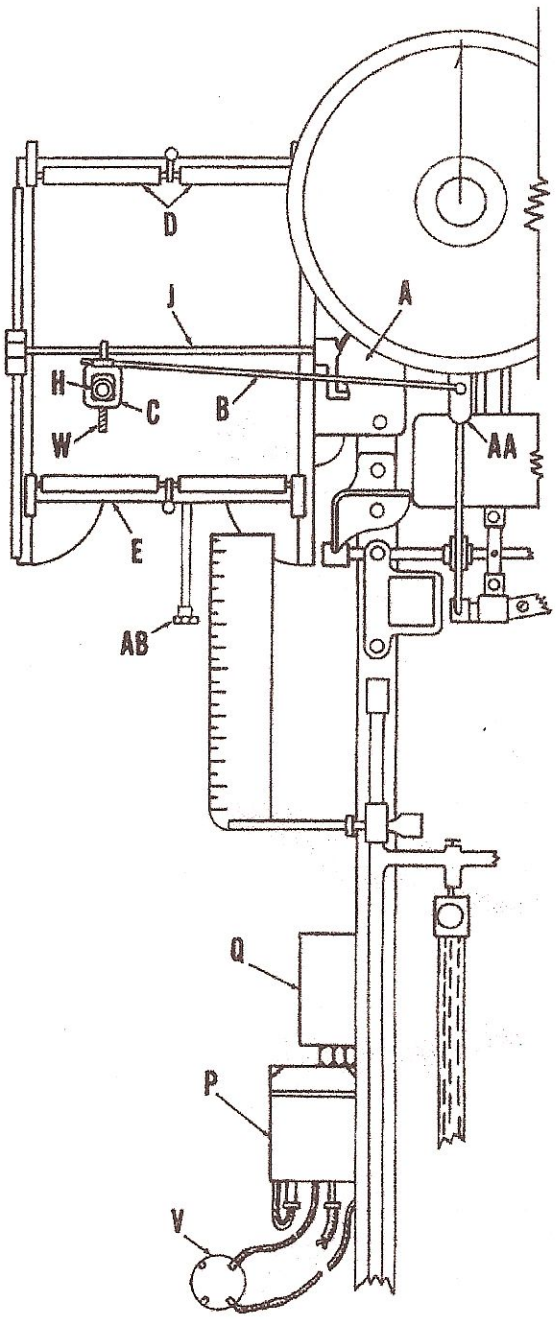
7. Connect the transformer (P) to a 110- or 220-volt A.C. supply.

Note: When a 110- or 220-volt A.C. supply is not available, a high-capacity 6-volt battery is shipped with the Recorder and should be connected in the foot tread-stylus circuit.

OPERATION

1. Place a Tensilgram, under the rubber rolls at the top and bottom of the Recorder platen. The Tensilgram should be placed so that the form faces the operator.

2. Turn the Pitman rod (B) until the stylus point rests on the left-hand vertical line of the Tensilgram.



A - Bracket
B - Pitman Rod
C - Stylus Carriage
D - Rubber Roll
E - Platen
J - Guide Rod
P - Transformer
Q - Spark Coil
V - Foot Tread
W - Set Screw
AA - Weight Arm
AB - Hand Wheel

3. Move the platen up or down to align the stylus point with the horizontal line for Sample 1. Use the handwheel (AB) to move the platen.

4. With the spark circuit turned on, depress the foot tread (V) to make sure the stylus burns a hole through the Tensilgram at the zero point for Sample 1.

5. Proceed to test the sample as described in the Model L Tester Instructions. (A second operator is not necessary with the spark Recorder in use.)

6. To obtain a Stress-Strain curve, the operator depresses the foot tread (V) for each 100% elongation of the sample. He also depresses the foot tread (V) at the instant of rupture, and writes the reading of the plastic scale (40) opposite the last hole burned by the spark. A Stress-Strain curve may then be re-plotted of tensile pull against elongation.

7. For each successive test of a series, move the Recorder platen (E) to bring the stylus point opposite the corresponding horizontal line on the Tensilgram.

MAINTENANCE

The carriage guide rod (J) should be wiped daily with a clean rag.

The rack and gear at the back of the Recorder should be lubricated with a light machine oil occasionally.

REPLACEMENT PARTS

Replacement parts are carried in stock for immediate delivery. When ordering, please give the number of your Tester.

MODEL L TESTER

COMPENSATING WEIGHTS - ENGLISH

For obtaining correct tensile pull per percent elongation with the Spark Recorder for the Model L Tester, a slideable permanent weight (53) - painted gray - replaces the fixed permanent weight (9) of the basic machine. Three auxiliary detachable weights (55) - painted red - are used with the slideable permanent weight (53) to give correct readings for standard 0.250-inch broad-end samples of any thickness from 0.040 inch to 0.120 inch.

The slideable permanent weight (53) is shipped in place on the graduated pendulum arm (5). Graduations on the arm are marked from 0 to 20. Each one of these graduations represents the compensation required for a change in sample thickness of .001 inch. The Zero graduation is the position of the lower edge of the weight for a sample thickness of .040 inch. Thus, the slideable weight alone will compensate for sample thicknesses from .040 inch to .060 inch, with the lower edge of the weight at 0 and at 20, respectively.

Adding the auxiliary weight stamped .060 inch to .080 inch to the back of the pendulum arm (5) compensates for an additional thickness of .020 inch. Alternately, the auxiliary weight .080-inch to .100-inch adds .040-inch compensation to the slideable weight. Or the auxiliary weight .100-inch to .120-inch may be used to add .060 inch compensation to that of the slideable weight. Only one auxiliary weight is used at a time.

As indicated in the following table, any thickness of sample from .040 inch to .120 inch can be compensated for by setting the slideable weight in conjunction with the proper auxiliary weight.

To obtain correct tensile pull per per cent elongation with a broad-end sample of 0.250-inch width, use compensating weights as listed in TABLE I.

TABLE I

Sample Thickness	Set Sliding Weight At	Use Auxiliary Weight
.040	0	None
.041	1	
.045	5	
.050	10	
.055	15	
.060	20	
.060	0	.060 to .080
.065	5	
.070	10	
.075	15	
.080	20	
.080	0	.080 to .100
.085	5	
.090	10	
.095	15	
.100	20	
.100	0	.100 to .120
.105	5	
.110	10	
.115	15	
.120	20	

Note: For thicknesses between values given in the above table, move slideable weight one unit for each .001 inch.

OPERATION

The compensating weights correct the plot of the stylus on the Recorder for different sample thicknesses, but do not correct the dial readings. The dial reading indicates the true pull in pounds only when the weights are set for a sample thickness of .100 inch. For other thicknesses, the dial readings must be multiplied by the actual thickness times 10. When testing broad-end samples with the Spark Recorder, dial readings are <u>not</u> recommended.

To use the Tester for regular tensile tests and adhesive tests, the compensating weights should be set for a thickness of .100-inch by using the additional .100 to .120 weight and setting the slideable weight at zero. The capacity of the machine is 150 pounds at this setting; dial readings must be divided by the cross-sectional area of the sample to obtain pounds per square inch.

For testing ring samples with an OD of 2.035 inch and ID of 1.785 inch, set the compensating weights for the sample thickness in accordance with the table above.

If the Tester has a dual-capacity dial, an additional capacity weight (56) with an arm attached is shipped with the loose parts. With the compensating weights set for .100 inch, the Tester can be used to test samples up to the capacity of the inner dial readings. If greater capacity is required, the additional capacity weight (56) should be attached to the pendulum arm (5) with the knurled nut (76).

If the Tester has a single-capacity dial, the knurled nut (76) should be removed before using the Tester.

Note: This arrangement differs from that of the Tester without compensating weights. The additional weight (10) used with the basic machine should not be used when compensating weights are used.

Testing broad-end samples of 0.250-inch width.

Broad-end samples can only be tested by using compensating weights in conjunction with spark recording.

1. Set the compensating weights for the thickness of the sample to be tested.

2. Place a Tensilgram under the rubber rolls (D & F) on the platen (E). The chart side of the Tensilgram should be placed against the platen so that the lines for Sample 1, 2, 3 etc. face the operator.

3. Test the sample as described in the Model L Tester Instructions. (A second operator is not necessary with the Recorder in use.)

4. To obtain a Stress-Strain curve, depress the foot tread (V) at each 100% elongation. Also, depress the foot tread at the instant the sample ruptures; write the reading of the plastic scale (40) opposite the last hole burned by the spark.

5. The back of the Tensilgram is used for plotting elongation versus tensile pull. No computations are necessary - the compensating weights make the spark readings correct for any thickness of sample from .040 inch to .120 inch.

The spark readings are first projected horizontally to the corresponding percent elongation vertical lines. The elongation curve is then drawn by connecting the points with a smooth curve.

FACTORS

FOR CALCULATING THE TENSILE STRENGTH OF RUBBER TEST-PIECES

By C. S. REDFIELD

In American practice the tensile strength of rubber samples is usually expressed as pounds per square inch. The tables below enable one to figure the tensile strength, pounds per square inch, of a rubber sample by multiplying the factor in the table by the number of pounds the testing machine registers.

GAUGE

By gauge is meant the thickness of the rubber sample in thousandths of an inch. This value is usually obtained by a micrometer, usually some type of spring micrometer. The value for the gauge is usually taken as the thinnest point of the test-piece. Since a test-piece is as strong as its weakest point, theoretically this point should be its thinnest point.

These are two tables. Table I is to be used when the test-pieces have a width of 1/4 of an inch. Table II is to be used when the width of the test-piece is 1/2 an inch.

EXAMPLES

Using 1/4 inch test-pieces:

a. Place test-piece under micrometer and thinnest point found to be .121" or 121 gauge.

b. Test-piece placed in testing machine and broken and machine registered 58 pounds at the breaking point.

What is the tensile strength in pounds per square inch?

Using Table I, which is for 1/4 inch test-pieces:

Opposite 121 gauge we find the factor 33.1; multiply the breaking strength in pounds by this factor, giving tensile strength in pounds per square inch of the test-piece used.

$$58 \times 33.1 = 1919.8 \text{ lbs. per square inch}$$

These results, Using Table I, will always be within .2% of the absolute result, which is well within the limit for rubber testing.

When the test-pieces are 1/2" wide use Table II and proceed as before.

TABLE I

Factors for 1/4-Inch Test-Pieces

Ga.	Factor	Ga.	Factor	Ga.	Factor	Ga.	Factor
30	133.3	60	66.6	90	44.4	120	33.3
31	129.0	61	65.6	91	43.9	121	33.1
32	125.0	62	64.5	92	43.5	122	32.8
33	121.9	63	63.7	93	43.0	123	32.5
34	117.6	64	62.5	94	42.6	124	32.3
35	114.2	65	61.5	95	42.1	125	32.0
36	111.1	66	60.6	96	41.7	126	31.8
37	108.1	67	59.9	97	41.2	127	31.5
38	105.2	68	58.8	98	40.8	128	31.2
39	102.5	69	57.8	99	40.4	129	31.0
40	100.0	70	57.1	100	40.0	130	30.8
41	97.5	71	56.2	101	39.6	131	30.5
42	95.2	72	55.6	102	39.2	132	30.3
43	93.0	73	54.6	103	38.9	133	30.1
44	90.9	74	54.1	104	38.5	134	29.9
45	88.8	75	53.2	105	38.1	135	29.6
46	86.9	76	52.6	106	37.7	136	29.4
47	85.1	77	51.9	107	37.4	137	29.2
48	83.3	78	51.3	108	37.1	138	29.0
49	81.6	79	50.6	109	36.7	139	28.8
50	80.0	80	50.0	110	36.4	140	28.6
51	78.3	81	49.3	111	36.0	141	28.4
52	76.9	82	48.8	112	35.7	142	28.2
53	75.4	83	48.2	113	35.4	143	28.0
54	74.1	84	47.6	114	35.1	144	27.8
55	72.7	85	47.0	115	34.8	145	27.6
56	71.4	86	46.5	116	34.5	146	27.4
57	70.1	87	45.9	117	34.2	147	27.2
58	68.9	88	45.5	118	33.9	148	27.0
59	67.8	89	44.9	119	33.6	149	26.9

TABLE II

Factors for 1/2-Inch Test-Pieces

Ga.	Factor	Ga.	Factor	Ga.	Factor	Ga.	Factor
30	66.67	60	33.33	90	22.22	120	16.67
31	64.51	61	32.78	91	21.98	121	16.53
32	62.50	62	32.26	92	21.74	122	16.39
33	60.60	63	31.75	93	21.51	123	16.26
34	58.82	64	31.25	94	21.28	124	16.13
35	57.14	65	30.77	95	21.05	125	16.00
36	55.55	66	30.30	96	20.83	126	15.87
37	54.05	67	29.85	97	20.62	127	15.75
38	52.62	68	29.41	98	20.41	128	15.63
39	51.28	69	28.96	99	20.20	129	15.50
40	49.99	70	28.57	100	20.00	130	15.39
41	48.77	71	28.17	101	19.80	131	15.27
42	47.62	72	27.78	102	19.61	132	15.15
43	46.51	73	27.39	103	19.42	133	15.04
44	45.45	74	27.03	104	19.23	134	14.93
45	44.44	75	26.67	105	19.05	135	14.82
46	43.48	76	26.32	106	18.87	136	14.71
47	42.55	77	25.97	107	18.69	137	14.59
48	41.67	78	25.64	108	18.52	138	14.49
49	40.82	79	25.32	109	18.35	139	14.39
50	40.00	80	25.00	110	18.18	140	14.29
51	39.22	81	24.69	111	18.02	141	14.18
52	38.46	82	24.39	112	17.86	142	14.09
53	37.74	83	24.09	113	17.69	143	13.99
54	37.04	84	23.81	114	17.54	144	13.89
55	36.36	85	23.53	115	17.39	145	13.79
56	35.71	86	23.26	116	17.24	146	13.69
57	35.09	87	22.99	117	17.09	147	13.61
58	34.48	88	22.73	118	16.95	148	13.51
59	33.89	89	22.47	119	16.81	149	13.42