TABLE 9. COMPARATIVE TEST DATA (4" VERSUS 6"-DIAMETER SPECIMENS)

Source : Pennsylvania Dept. of Transportation. (1989 data)
Mix type : ID-2 Binder Course
Aggregates : Dolomite coarse and Dolomite fine aggregate.
Design Gradation (% Passing) :

2"	1-1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
100	100	92	-	62	-	40	30	19	13	9	7	4.3

		4" Specimen	6" Specimen
% Asphalt Content		4.4	4.4
No. of Blows		50	75
Bulk Sp. Gr.	(1)	2.494	2.494
	(2)	2.504	2.491
	(3)	2.514	2.492
	(4)	2.530	2.502
	(5)	2.506	2.495
	(6).	2.611	2.483
	Mean	2.510	2.493
	Std. Dev.	0.012	0.006
	Coeff. of Var. (%)	0.5	0.2
Max. Sp. Gr.		2.613	2.613
% Air Voids		3.9	4.6
% VMA		13.4	14.0
X VFA		70.8	67.3

		4" Specimen	6" Specimen
Stability, pounds	(1)	2730	5350
	(2)	3640	5450
	(3)	2975	5500
	(4)	3430	5550
	(5)	2870	4700
	(6)	3185	5100
	Mean	3138	5275
	Std. Dev.	348	324
	Coeff. of Var. (%)	11.1	6.1
Flow, units	(1)	13.3	25.0
	(2)	19.3	21.6
	(3)	13.7	22.0
	(4)	16.3	24.0
	(5)	15.0	22.3
	(6)	22.5	25.3
	Mean	16.7	23.4
	Std. Dev.	3.6	1.6
	Coeff. of Var. (%)	21.6	6.8
Stability Ratio		1.68	
Flow Ratio		1.40	

TABLE 10. COMPARATIVE TEST DATA (4" VERSUS 6"-DIAMETER SPECIMENS)

Source : Jamestown Macadam, Inc. , Jamestown, N.Y.   Mix type : ID-2 Binder Course
Aggregates : Crushed gravel coarse aggregate (76%), gravel fine aggregate (12%) and concrete sand (12%).
Design Gradation (% Passing) :

2"	1-1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
100	100	98	-	62	-	24	20	16	11	7	5	3

		4" Specimen	6" Specimen			4" Specimen	6" Specimen
% Asphalt Content		4*5	4.6	Stability, pounds	(1)		2900
No. of Blows		50	76		(2)		3200
Bulk Sp. Gr.	(1)	2.357	2.369		(3)		3400
	(2)	2.350	2.340		Mean	1675	3167
	(3)	2.346	2.355	Flow, units	(1)		18.0
	Mean	2.351	2.355		(2)		20.0
Max. Sp. Gr.		2.430	2.439		(3)		18.5
% Air Voids		3.3	3.4		Mean	15.2	18.8
% VMA		13.5	12.9	Stability Ratio		1.89	
% VFA		76.0	73.3	Flow Ratio		1.24	

Remarks : Max. Sp. Gr. values of the mixes used In 4" and 6" specimens are different because the specimens were compacted in different years.

TABLE 11. COMPARATIVE TEST DATA (4" VERSUS 6"-DIAMETER SPECIMENS)

Source : American Asphalt Paving Co., Chase. PA. Mix type : ID-2 Binder Course (Special) Design #2

Aggregates : Siltstone coarse aggregate (64%), manufactured sand (27%) and natural sand (9%).

Design Gradation (% Passing) :

2"	1-1/2"	1"	3/4"	1/2"	3/8"	94	#8	#16	#30	#50	#100	#200
100	100	90	-	61	- .	40	30	18	15	12	7	4.5

	4" Specimen	6" Specimen		4" Specimen	6" Specimen
x Asphalt Content	4.0	4.0	Stability, pounds	2723	6450
No. of Blows	75	112			
Bulk Sp. Gr.	2.450	2.457	Flow, units	9.8	16.0
Max. Sp. Gr.	2.565	2.565	.		
% Air Voids	4.6	4.3	Stability Ratio	2.37	
% VMA	12.9	12.7	Flow Ratio	1.63	
% VFA	65.1	66.6			

Remark : 4" data is average of 3 specimens whereas 6" data Is average of 2 specimens only.

TABLE 12. COMPARATIVE TEST OATA (4" VERSUS 6--DIAMETER SPECIMENS)

Source : American Asphalt Paving Co., Chase. PA. **Mix** type : ID-2 Binder Course (Special) Design **#5**

Aggregates : **Siltstone** coarse aggregate .(64%), manufactured sand (27%) and natural sand (9%).

Design Gradation (% Passing) :

2"	1-1/2"	1"	3/4"	1/2"	**3/8"**	$4	$8	#16	**#30**	**#50**	#loo	$200
100	100	90	-	61	-	40	30	18	15	12	7	4.5

	4 Specimen	6 Specimen		4 Specimen	6 Specimen
% Asphalt **Content**	3.8	3.8	Stability, pounds	2416	6225
No. Of **Blows**	75	112			
Bulk Sp. Gr.	2.444	2.446	Flow, units	10.0	15.2
Max. Sp. Gr.	**2.573**	2.573			
% Air Voids	5.0	5.0	**Stability** Ratio	**2.58**	
% VMA	13.0	12.9	Flow Ratio	1.52	
% VFA	60.3	**61.5**			

Remark : 4" data Is average of 3 specimens whereas 6" data Is average of 2 specimens only.

TABLE 13. COMPARATIVE TEST DATA (4” VERSUS 6--DIAMETER SPECIMENS)

Source : American Asphalt Paving Co., Chase. PA. Mix type : 10-’2 Binder Course (Special) Design #3

Aggregates : Siltstone coarse aggregate (64%), and manufactured sand (36%)

Design Gradation (% Passing) :

2“	1-1/2"	1"	3/4”	1/2"	3/8”	94	$8	#16	$30	#50	#100	#200
100	100	90	-	61	-	40	30	18	15	12	7	4.5

	4“ Specimen	6“ Specimen		4" Specimen	6" Specimen
% Asphalt Content	4.2	4.2	Stability, (pounds)	2961	5850
No. of Blows	75	112			
Bulk Sp. Gr.	2.435	2.448	Flow, (units)	11.3	19.0
Max. Sp. Gr.	2.S51	2.551			
% Air Voids	4.5	4.1	Stability Ratio	1.98	
% VMA	13.5	13.1	Flow Ratio	1.68	
% VFA	66.6	69.2			

Remark : 4“ data Is average of 3 specimens whereas 6“ data is average of 2 specimens only.

TABLE 14. COMPARATIVE TEST DATA (4” VERSUS 6--DIAMETER SPECIMENS)

Source : American Asphalt Paving Co., Chase. PA. Mix type : ID-2 Binder Course (Special) Design #6

Aggregates : Siltstone coarse aggregate (64%), and manufactured sand (36%)

Design Gradation (% Passing) :

2“	1-1/2”	1“	3/4”	1/2”	3/0”	#4	#8	$16	#30	#50	#100	#200
100	100	90	-	61	-	40	30	18	15	12	7	4.5

	4 . Specimen	6 Specimen		4 Specimen	6 Specimen
% Asphalt Content	4.0	4.0	Stability, pounds	2791	6700
No. of Blows	75	112			
Bulk Sp. Gr.	2.432	2.559	Flow, units	14.0	17.8
Max. Sp. Gr.	2.559	2.559			
% Air Voids	5.0	3.9	Stability Ratio	2.40	
% VMA	13.5	12.6	Flow Ratio	1.27	
% VFA	63.3	68.9			

Remark : 4“ data Is average of 3 specimens whereas 6“ data Is average of 2 specimens only.

TABLE 15. SUMMARY OF STABILITY AND FLOW RATIOS FOR LARGE STONE MIXES

Agency (Year data obtained)	No. of Blows		Ratio	
	4"	6"	Stability	Flow
Penn. DOT (1969)	50	75	2.12	1.62
Penn. DOT (1970)	50	75	2.81	1.15
Penn. 00T (1988)	50	75	1.95	1.39
Penn. 00T (1988)	50	75	2.17	1.58
Penn. DOT (1989)	50	75	1.68	1.40
Jamestown Macadam (1989)	50	75	1.89	1.24
Kentucky DOH (1988) *	75	112	2.08	1.34
American Asphalt Paving (1989) *	75	112	2.37	1.63
American Asphalt Paving (1989) *	75	112	2.58	1.52
American Asphalt Paving (1989) *	7 5	112	1.98	1.68
American Asphalt Paving (1989) *	75	112	2.40	1.27
		No. of Mixes (N)	11	11
		Mean	2.18	1.44
		Std. Dev.	0.33	0.18

* Note : The average stability and flow ratio for these five mixes compacted with 75/112 blows are 2.28 and 1.49, respectively.

TABLE 16 . TYPICAL HARSHALL MIX DESIGN DATA (6"-DIAMETER SPECIMENS)

Source : Kentucky Dept. of Highways. (Lawrence Co. - Loulsa Bypass)
Mix Type : Class K Base
Aggregates : Limestone #467 (66%), limestone #8 (20%), limestone sand (25%).
No. of Blows : 112
Asphalt : AC - 20
Design Gradation (% Passing) :

2"	1-1/2"	1"	3/4"	1/2"	3/8"	#4	$8	#16	930	#50	#100	$200
100	99	86	75	58	50	29	21	15	10	8	s	3.6

	% Asphalt Content				% Asphalt Content		
	3.2	3.6	4.0		3.2	3.6	4.0
Bulk Sp. Gr. (1)	2.424	2.410	2.440	Stability (lbs) (1)	5037	4980	4915
(2)	2.428	2.430	2.440	(2)	5683	5326	4627
(3)	2.419	2.434	2.437	(3)	5625	5236	5376
Mean	2.424	2.425	2.439	Mean	5448	5181	4973
Max. Sp. Gr.	2.546	2.530	2.515	Flow (units) (1)	17.5	14.5	14.0
% Air Voids	4.8	4.2	3.0	(2)	19.0	19.5	17.0
% VMA	11.4	11.7	11.6	(3)	17.0	14.5	15.0
% VFA	57.8	64.5	73.8	Mean	17.8	16.2	15.3

Remarks : AASHTO Gradations #467 (1-1/2" to #4) and #8 (3/8" to #8) were used.
Stability values adjusted for specimen thickness.

APPENDIX "A"

DRAFT NO. 4
(July 26, 1989)

STANDARD TEST METHOD FOR
RESISTANCE TO PLASTIC FLOW OF BITUMINOUS **MIXTURES USING**
MARSHALL APPARATUS (6 INCH - DIAMETER **SPECIMEN)**

1. **Scope**

1.1 This method covers the measurement of the resistance to plastic flow of cylindrical specimens of bituminous paving mixture loaded on the lateral surface by means of the Marshall apparatus. This method is for use with mixtures containing asphalt cement and aggregate up to 2 in. (50.8 mm) maximum nominal size.

1.2 This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address **all** of the safety problems associated with its use. It is the **responsibility** of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2 **Significance** and Use

21 This method is used in the laboratory mix design of bituminous mixtures. Specimens are prepared in accordance with the method and tested for maximum load and flow. Density and voids properties may also be determined on specimens prepared in accordance with the method. The testing section of this method can also be used to obtain maximum load and flow for bituminous paving specimens cored from pavements or prepared by other methods. These results may differ from values obtained on specimens prepared by this method.

3. - -

3.1 Specimen Mold Assembly - Mold cylinders nominal 6.5 in. (165.1 mm) outside diameter steel tubing with 6.000 ± 0.008 in. (152.4 ± 0.2 mm) inside diameter by 4.5 in. (114.3 mm) in height, base plates, and extension collars shall conform to the details shown in Fig. 1 (a). All shall be plated. Nine mold cylinders are recommended.

32 Specimen Extractor, steel, in the form of a disk with a diameter from 5.950 to 5.990 in. (151.1 to 1521 mm) and 0.5 in. (13 mm) thick for extracting the compacted specimen from the specimen mold with the use of the mold collar. A suitable bar is required to transfer the load from the ring dynamometer adapter to the extension collar while extracting the specimen.

3.3 Mechanical Compactor and Compaction Hammer.- Compactor with 1/3 hp (250W) minimum motor, chain lift, frame and automatic sliding weight release. The compaction hammer (Fig. 2) shall have a flat, circular tamping face 5.88 in. (149.4 mm) in diameter and a 22.50 ± 0.02 lb (10.21 ± 0.01 kg) sliding weight with a free fall of 18.0A 0.1 in. (457.2& 2.5 mm). Two compaction hammers are recommended.

3.4 Compaction Pedestal - The compaction pedestal shall consist of an 8 by 8 by 18-in. (2032 by 2032 by 4572-mm) wooden post capped with a 12 by 12 by l-in. (304.8 by 304.8 by 25.4-mm) steel plate. The wooden post shall be oak, pine, or other wood having an average dry weight of 42 to 48 lb/ft3 (0.67 to 0.77 g/cm3). The wooden post shall be secured by four angle brackets to a solid concrete slab. The steel cap shall be firmly fastened to the post. The pedestal assembly shall be installed so that the' post is plumb and the cap is level.

3.5 Specimen Mold Holder, mounted on the compaction pedestal so as to center the compaction mold over the center of the post. Fig. 1 (b) or equivalent arrangement. It shall hold the compaction mold, collar, and base plate securely in position during compaction of the specimen.

3.6 Breaking Head - The breaking head (Fig. 3) shall consist of upper and lower cylindrical segments or test heads having an inside radius of curvature of 3 in. (76.2 mm) accurately machined. - The lower segment shall-be mounted on a base having two perpendicular guide rods or posts extending upward. Guide sleeves in the upper segments shall be in such a position as to direct the two segments together without appreciable binding or loose motion on the guide rods. When a 6.000 in. (152.4 mm) diameter by 4 in. (100 mm) thick metal block is placed between the two segments, the inside diameters and the gaps between the segments shall conform to Fig. 3. All steel components shall be plated.

3.7 Loading Jack - The loading jack (Fig. 4) shall consist of a screw jack mounted in a test frame and shall produce a uniform vertical movement of 2 in. (50.8 mm)/min. An electric motor may be attached to the jacking mechanism.

NOTE 1- Instead of the loading jack, a mechanical or hydraulic testing machine maybe used provided the rate of movement can be maintained at 2 in. (50.8 mm)/min while the load is applied.

3.8 Ring Dynamometer Assembly - One ring dynamometer (Fig. 4) of 10,000-lb. (4536-kg) capacity and sensitivity of 10 lb (4.536 kg) up to 1000 lb (453.6 kg) and 25 lb (11.340 kg) between 1000 and 10,000 lb (453.6 and 4536 kg) shall be equipped with a micrometer dial. The micrometer dial shall be graduated on 0.0001 in (0.0025 mm). Upper and lower ring dynamometer attachments are required for fastening the ring dynamometer to the testing frame and transmitting the load to the breaking head.

NOTE 2- Instead of the ring dynamometer **assembly,** any suitable load-measuring device may be used provided the capacity and **sensitivity** meet the above requirements.

3.9 Flowmeter - The **flowmeter** shall consist of a guide sleeve and a gage. The activating pin of the gage shall slide inside the guide sleeve with a slight amount of frictional **resistance.** The guide sleeve shall slide freely over the guide rod of the breaking head. The **flowmeter** gage shall be adjusted to zero when placed in position on the **breaking** head when each individual test specimen is inserted between the breaking head segments. Graduations of the **flowmeter** gage shall be in **0.01-in** (0.25-mm) divisions.

NOTE 3- Instead of the **flowmeter,** a micrometer dial or stress-strain recorder graduated in 0.001 in (0.025-mm) may be used to measure flow.

3.10 Ovens or Hot Plates - Ovens or hot **plates** shall be provided for heating aggregates, bituminous **material,** specimen **molds,** compaction **hammers,** and other equipment to the required mixing and molding temperatures. It is recommended that the heating units be thermostatically controlled so as to maintain the required temperature within 5 degrees Fahrenheit (2.8 degrees Celsius). Suitable shields, baffle plates or sand baths shall be used on the surfaces of the hot plates to minimize localized overheating.

3.11 Mixing Apparatus - Mechanical mixing is recommended. Any type of mechanical mixer may be used provided it can be maintained at the required mixing temperature and will provide a **well-coated,** homogeneous mixture of the required amount in the allowable **time,** and further provided that essentially **all** of the batch can be recovered. A metal pan or bowl of sufficient capacity (such **as,** standard 13 qt. size approximately 6-1/4 inch deep) and hand mixing may also be used.

3.12 Water Bath - The water bath shall be at least 9 in. (228.6 mm) deep and shall be thermostatically controlled so as to maintain the bath at 140 ± 1.8 degrees Fahrenheit (60 ± 1.0 degrees Celsius) or 100 ± 1.8 degrees Fahrenheit (37.8 ± 1 degree Celsius). The tank shall have a perforated false bottom or be equipped with a shelf for supporting specimens 2 in (50.8 mm) above the bottom of the bath.

3.13 Miscellaneous Equipment:

3.13.1 Containers for heating aggregates, flat-bottom metal pans or other suitable containers.

3.13.2 Containers for heating bituminous material, either gill-type tins, beakers, pouring pots, or saucepans maybe used.

3.133 Mixing Tool either a steel trowel (garden type) or spatula, for spading and hand mixing.

3.13.4 Thermometers for determining temperatures of aggregates, bitumen, and bituminous mixtures. Armored-glass or dial-type thermometers with metal stems are recommended. A range from 50 to 400 degrees Fahrenheit (9.9 to 204 degrees Celsius), with sensitivity of 5 degrees Fahrenheit (2.8 degrees Celsius) is required.

3.13.5 Thermometers for water and air baths with a range from 68 to 158 degrees Fahrenheit (20 to 70 degrees Celsius) sensitive to 0.4 degrees Fahrenheit (0.2 degrees Celsius).

3.13.6 Balance 10-kg capacity, sensitive to 1.0g.

3.13.7 Gloves for handling hot equipment.

3.13.8 Rubber Gloves for removing specimens from water bath.

3.13.9 Marking Cravens for identifying specimens.

3.13.10 Scoop, flat bottom, for batching aggregates.

3.13.11 Spoon, large, for placing the mixture in the specimen molds.

4. Test Specimens

4.1 Number of Specimens - Prepare at least three specimens for each combination of aggregates and bitumen content.

4.2 **Preparation of Aggregates - Dry** aggregates to constant weight at 221 to 230 degrees Fahrenheit (105 to 110 degrees Celsius) and separate the aggregates to dry sieving into the desired size fractions.[1] The following size fractions are recommended:

1-1/2 to 1 in. (38.1 to 25.4 mm)

1 to 3/4 in. (25.4 to 19.0 mm)

3/4 to 3/8 in. (19.0 to 9.5 mm)

3/8 in. to No. 4 (9.5 mm to 4.75 mm).

No. 4 to No. 8 (4.75 mm to 236 mm)

Passing No. 8 (236 mm)

‘Detailed requirements for these sieves are given in ASTM Specification E 11, for Wire-Cloth Sieves for Testing Purposes see Annual Book of ASTM Standards, Vol. 14.02.

4 3 **Determination of Mixing and Compacting Temperatures:**

43.1 The temperatures to which the asphalt cement and asphalt cut-back must be heated to produce a viscosity of 170 ± 20 cSt shall be the mixing temperature.

43.2 The temperature to which asphalt cement must be heated to produce a viscosity of 280 ± 30 cSt shall be the compacting temperature.

4.4 **Preparation of Mixtures**:

4.4.1 Weigh into separate pans for each test specimen the amount of each size fraction required to produce a batch that will result in a compacted specimen 3.75 ± 0.10 in (95.2 ± 2.54 mm) in height (about 4050 g). Place the pans on the hot plate or in the oven and heat to a temperature not exceeding the mixing temperature established in 43 by more than approximately 50°F (28°C). Charge the mixing bowl with the heated aggregate and dry mix thoroughly. Form a crater in the dry blended aggregate and weigh the preheated required amount of bituminous material into the mixture. Care must be exercised to prevent loss of the mix during mixing and subsequent **handling.** At this **point,** the temperature of the aggregate and bituminous material shall be within the limits of the mixing temperature established in 43. Mix "the aggregate and bituminous **material rapidly until** thoroughly **coated.**

45 **Compaction of Specimens:**

4.5.1 Thoroughly clean the specimen mold assembly and the face of the compaction hammer and heat them either in boiling water or on the hot plate to a temperature between 200 and **300°F** (933 and **148.9°C).** Place a piece of filter paper or paper toweling cut to size **in** the bottom of the mold before the mixture is introduced. Place approximately one half of the batch in the **mold,** spade the mixture vigorously

with a heated spatula or trowel 15 times around the perimeter and 10 times over the interior. Place the second half of the batch in the mold and repeat the foregoing procedure. Remove the collar and smooth the surface of the mix with a trowel to a slightly rounded shape. Place a piece of filter paper or paper toweling cut to size on top of the mix. Temperatures of the mixtures immediately prior to compaction shall be within the limits of the compacting temperature established in 43.

4.5.2 Replace the collar, place the mold assembly on the compaction pedestal in the mold holder, and unless **otherwise specified,** apply 75 blows with the compaction hammer with a free fall of 18 in (457.2 mm). Remove the base plate and collar, and reverse and reassemble the mold. Apply the same number of compaction blows to the face of the reversed specimen.

NOTE 4. It has been determined that 75 and 112 compaction blows applied to a 6-inch (38.1 mm) diameter specimen using the apparatus and procedure in this standard give densities equivalent to 50 and 75 compaction blows, respectively, applied to a 4-inch (101.6 mm) diameter specimen using ASTM D 1559.

4.5.3 After compaction, remove the base plate and place the sample extractor on that end of the specimen. Place the assembly with the extension collar up in the testing machine, apply pressure to the collar by means of the load transfer bar, and force the specimen into the extension collar. Lift the collar from the specimen. · Carefully transfer the specimen to a smooth, flat surface and allow it to stand Overnight at rmm temperature Weigh, measure, and test the specimen.

NOTE 5. In general, specimens shall be cooled. as specified in 4.53. When more rapid cooling 'is desired, table fans may be used. Mixtures that lack sufficient cohesion to result in the required cylindrical shape on removal from the mold immediately after compaction may be cooled in the mold in air until sufficient cohesion has developed to result in the proper cylindrical shape.

5 . Procedure

5.1 Bring the specimens to the specified temperature by immersing in the water bath 30 to 40 min. or placing in the oven for 2 hr. Maintain the bath or oven temperature at 140 ± 1.8°F (60& 1.0°C). Thoroughly clean the guide rods and the inside surfaces of the test heads prior to making the test, and lubricate the guide rods so that the upper test head slides freely over them. The testing-head temperature shall be maintained between 70 to 100"F (21.1 to 37.8°C) using a water bath when required. Remove the specimen from the water bath, oven, or air bath, and place in the lower segment of the breaking head. Place the upper segment of the breaking head on the specimen, and place the complete assembly in position on the testing machine. Place the flowmeter, where used, in position over one of the guide rods and adjust the flowmeter to zero while holding the sleeve firmly against the upper segment of the breaking head. Hold the flowmeter sleeve firmly against the upper segment of the breaking head while the test load is being applied.

5.2 Apply the load to the specimen by means of the constant rate of movement of the load jack or testing-machine head of 2 in. **(50.8mm)/min.** until the maximum load is reached and the load decreases as indicated by the dial. Record the **maximum** load noted on the testing machine or converted from the maximum micrometer dial reading. Release the **flowmeter** sleeve or note the micrometer dial **reading,** where **used,** the instant the maximum load begins to decrease. Note and record the indicated flow value or equivalent units in hundredths of an inch (twenty-tie hundredths of a millimeter) if a micrometer dial is used to measure the flow. The elapsed time for the test from removal of the test “specimen from the water bath to the maximum load determination shall not exceed 30 s.

NOTE 6. For mre **specimens,** correct the load when thickness is other than 3.75 in. (95.2 mm) by using the proper multiplying factor from Table 1. This table has been developed after Table 1 of ASTM **D1559** basing the correlation ratio on the percent change **in** specimen volume from standard specimen volume.

6. Report

6.1 The report shall include the following information:

6.1.1 **Type** of sample tested (laboratory sample or pavement core specimen).

NOTE 7. For core **specimens,** the height of each test specimen in inches (or millimeters) shall be reported.

6.1.2 Average maximum load **in** pounds-force (or newtons) of a least three specimens, corrected when required.

6.13 Average flow **value,** in hundredths of an inch, twenty-five hundredths of a . millimeter, of three **specimens,** and

6.1.4 Test temperature.

7. Precision and Bias

7.1 The precision and bias of this test method are being determined.

TABLE 1. Stability **Correlations Ratios**[A]

Approximate Thickness of Specimen[B]		Volume of Specimen, cm^3	Correlation Ratio
in.	mm		
3-1/2	88.9	1608 to 1626	1.12
3-9/16	90.5	1637 to 1665	1.09
3-5/8	92.1	1666 to 1694	1.06
3-11/16	93.7	1695 to 1723	1.03
3-3/4	95.2	1724 to 1752	1.00
3-13/16	%.8	1753 to 1781	0.97
3-7/8	98.4	1782 to 1810	0.95
3-15/16	100.0	1811 to 1839	0.92
4	101.6	1840 to 1868	0.90

[A] The measured stability of a specimen multiplied by the ratio for the thickness of the specimen equals the corrected stability for a 3-3/4-in. (95.2 mm) thick specimen.

[B] Volume - thickness relationship is based on a specimen diameter of 6 in. (152.4 mm).

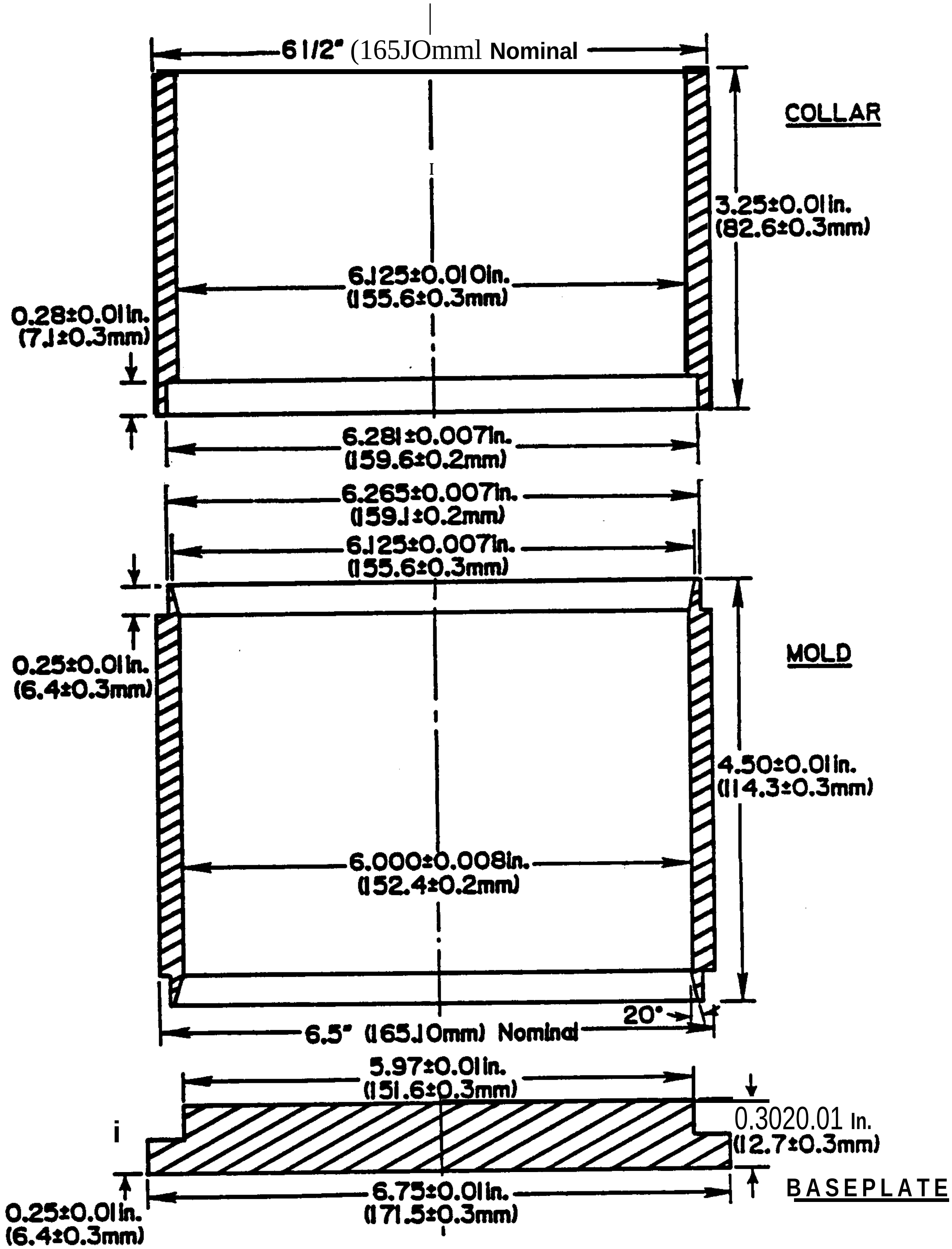
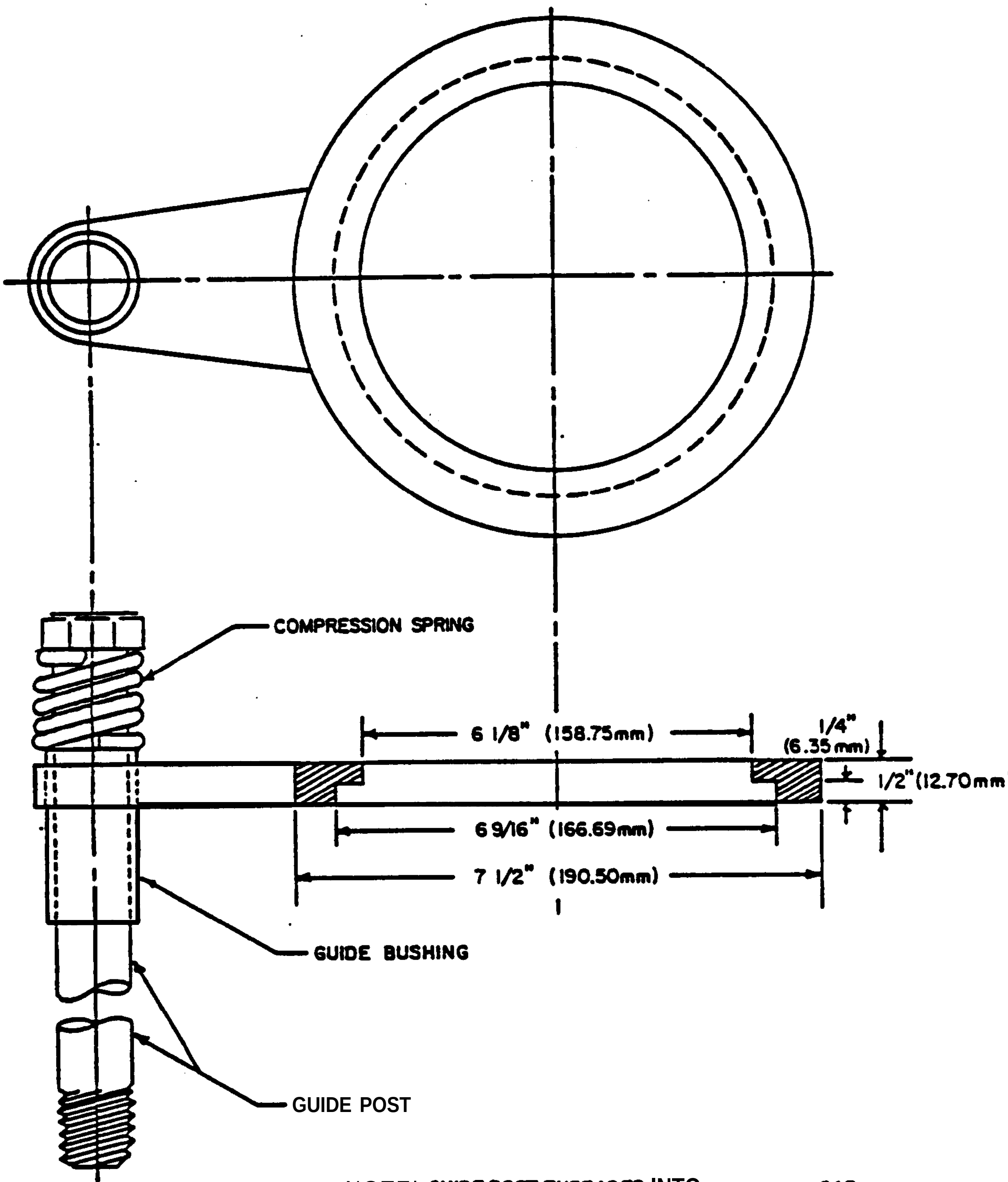


FIG. I(a). Compaction Mold



NOTE: GUIDE POST THREADED INTO PEDESTAL CAP. DIMENSIONS OF GUIDE POST, GUIDE BUSHING AND COMPRESSION SPRING NOT CRITICAL. ONLY REQUIREMENT IS THAT COMPACTION MOLD IS HELD FIRMLY.

FIG. 1(b). Specimen Mold Holder

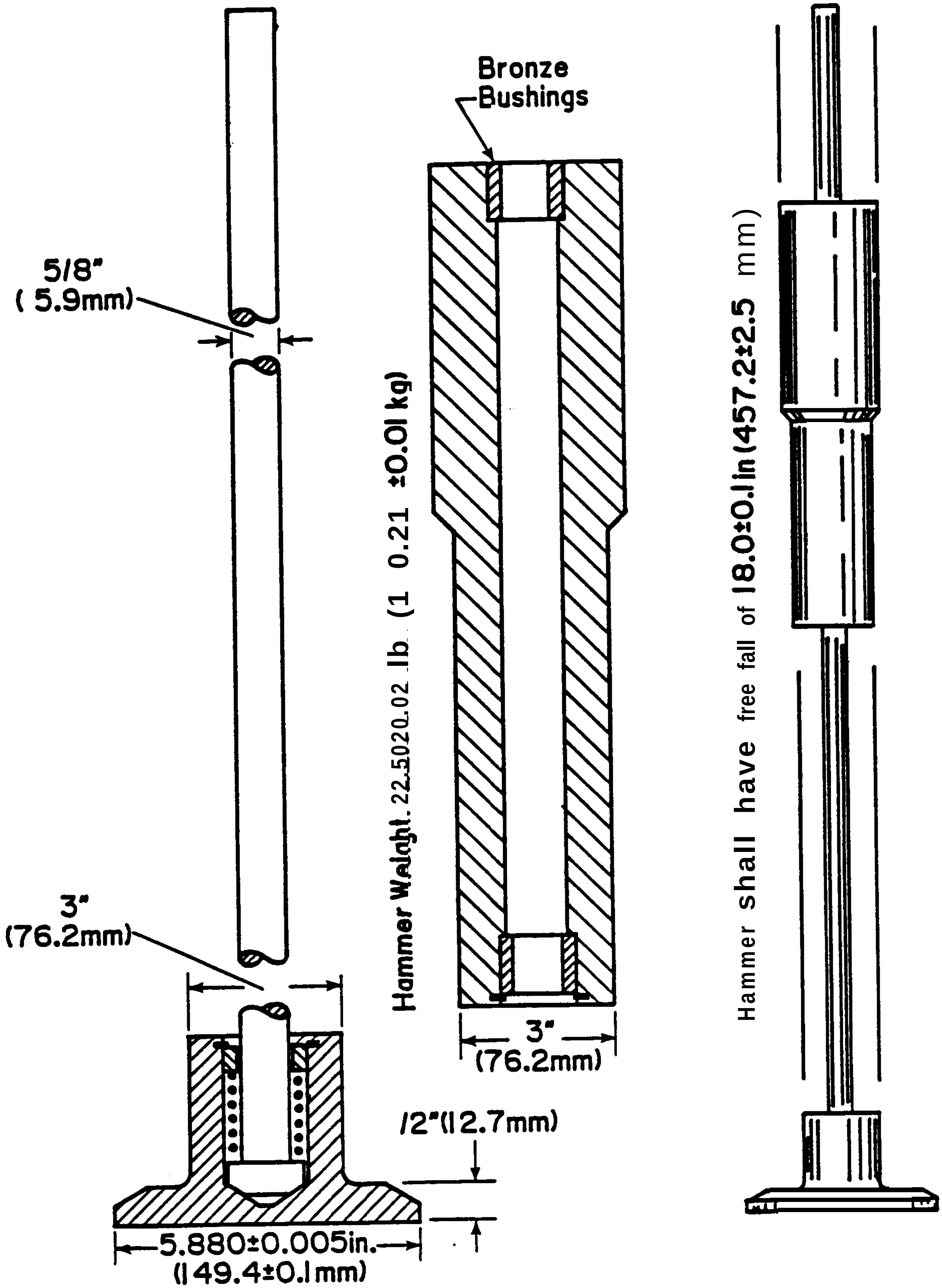


FIG. 2. Compaction Hammer.

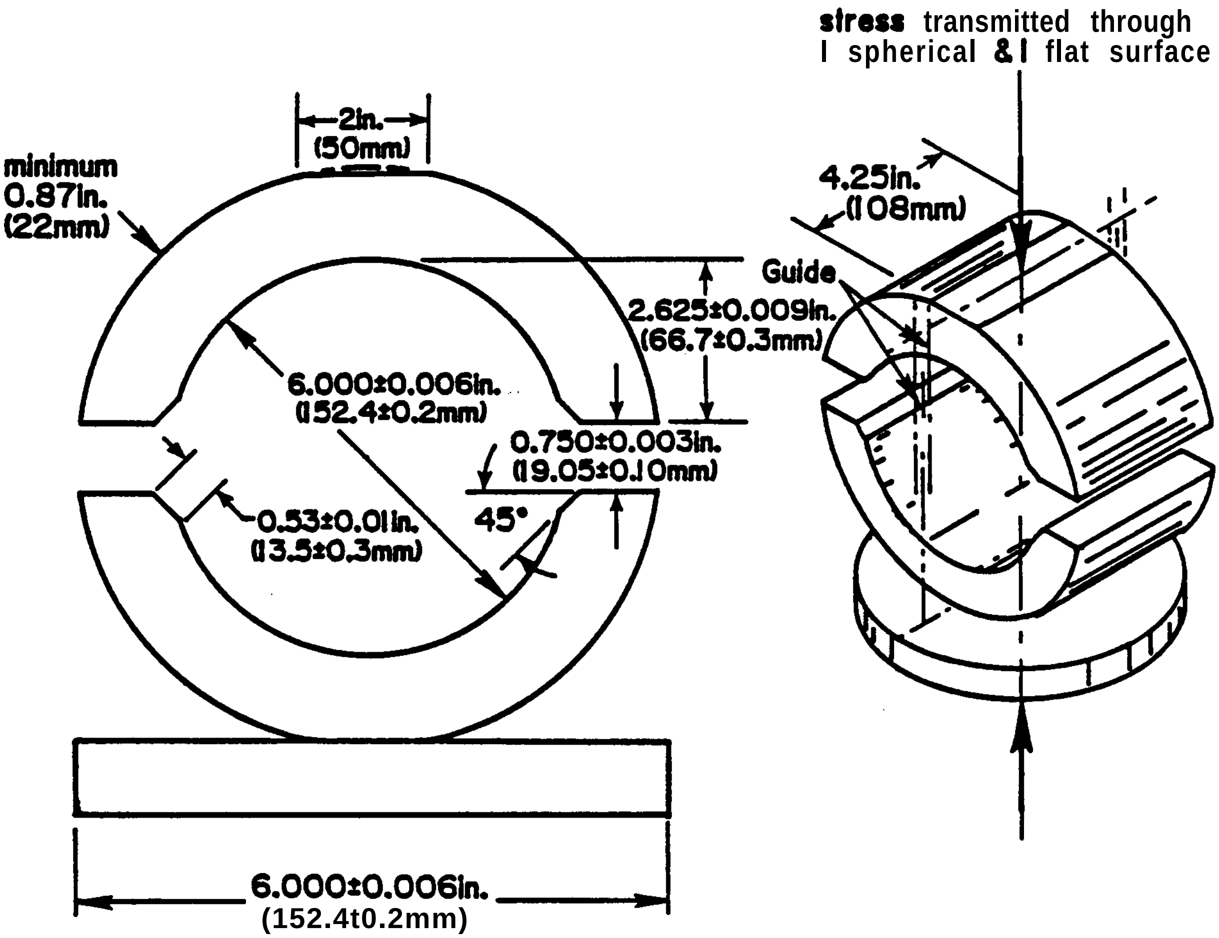


FIG. 3. Breaking Head

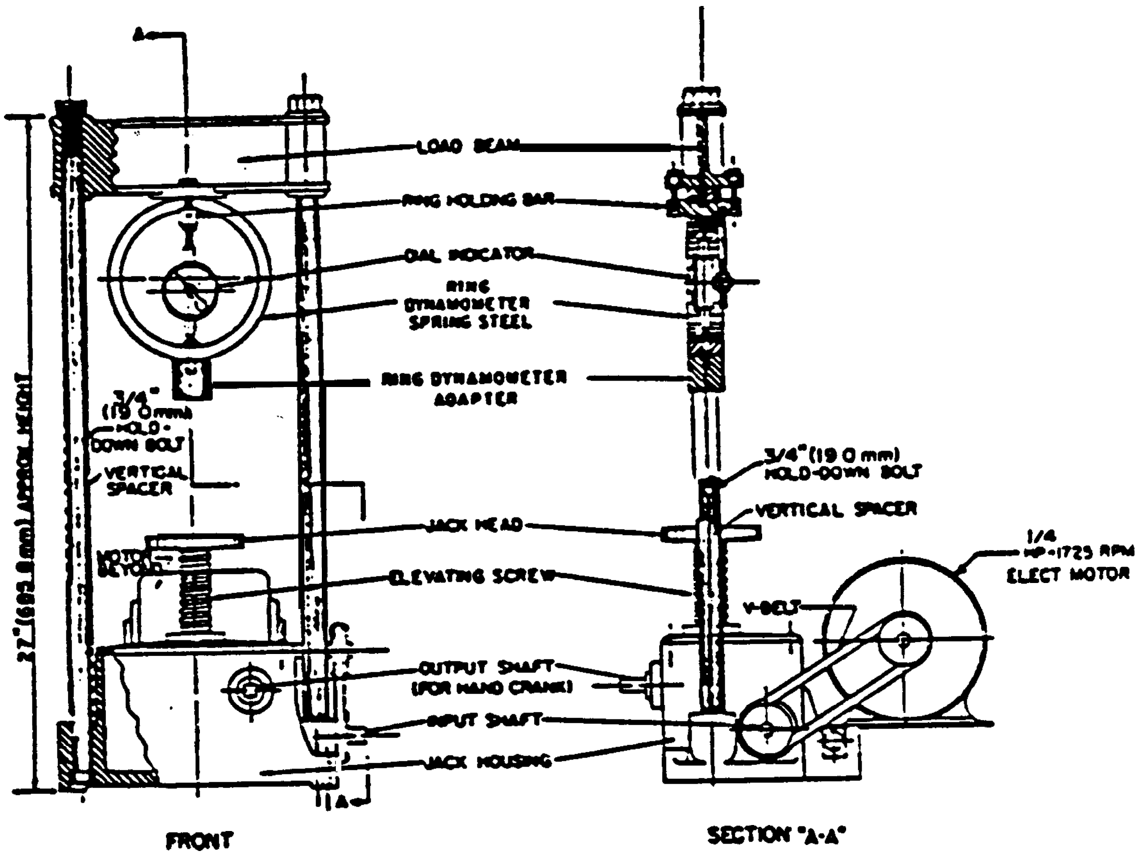


FIG 4 Compression Testing Machine