

4. Balance the beam on the scale by moving the counterpoise to the appropriate position or by placing a balancing tare weight on the scale beam. This balances out the weight of the stud on the pressure thimble.

NOTE: Make sure that the pressure thimble is not engaged in the spring steel bar on the expansion pressure device in this operation.

5. Add weight to the scale beam in 8 lb increments up to a total weight of 32 lb (lacking a tare value, leave counterpoise set at the weight above for a stud and pressure thimble). At each increment, balance the scale beam by adjusting the pressure thimble in an upward direction so that it applies the necessary pressure while balancing the weight against the spring steel bar in the expansion pressure device, and record the reading of the deflection gage. When the expansion pressure device is in proper adjustment, the readings obtained at each weight should correspond to those listed in Table 1 within ± 0.0001 in.

TABLE 1

**Required Deflection Values for the
Expansion Pressure Devices**

Weight (lb)	Dial Reading* (in.)
8	0.0021
16	0.0042
24	0.0063
32	0.0084

* The dial readings are determined from the formula:
 $D = 0.0002625 P$.

Where: D = Deflection gage dial reading in in.

P = Load applied to the spring steel bar in the
expansion pressure device in lb.

6. When the dial readings do not correspond to those in Table 1 within the tolerance of ± 0.0001 in., it will be necessary to alter the deflection characteristics of the spring steel bar on the expansion pressure device by repositioning the brass shims. This is accomplished by loosening the upper bar on the expansion pressure device and adjusting the position of the shims on the longitudinal axis of the spring steel bar until the dial checks within ± 0.0001 in. of the values given in Table 1 at each weight.

NOTE: The expansion pressure device may remain clamped on the hold-down table when loosening the nuts at the top of the device and adjusting the shims. However, the pressure thimble should be backed off until it does not engage the spring steel bar before starting this operation.

7. All expansion pressure devices should be recalibrated at least once every 2 months. In cases where extreme expansion pressure has left a permanent set in the spring steel bar, the expansion pressure device must be recalibrated before using again. It is generally considered that "extreme pressure" has occurred when a dial reading, at the end of a 16 to 24 hr test period, exceeds 0.01 in. (1 turn around the dial).

NOTE: Methods employing standardized proving levers are also acceptable for the direct calibration of expansion pressure devices where they yield the same results as the method outlined above.

E. PRECAUTION

Use caution when handling the expansion racks. Proper handling is illustrated in Figure 4.

F. HEALTH AND SAFETY

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

Caltrans Laboratory Safety Manual is available at:

http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf

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(California Test 103 contains 12 pages)

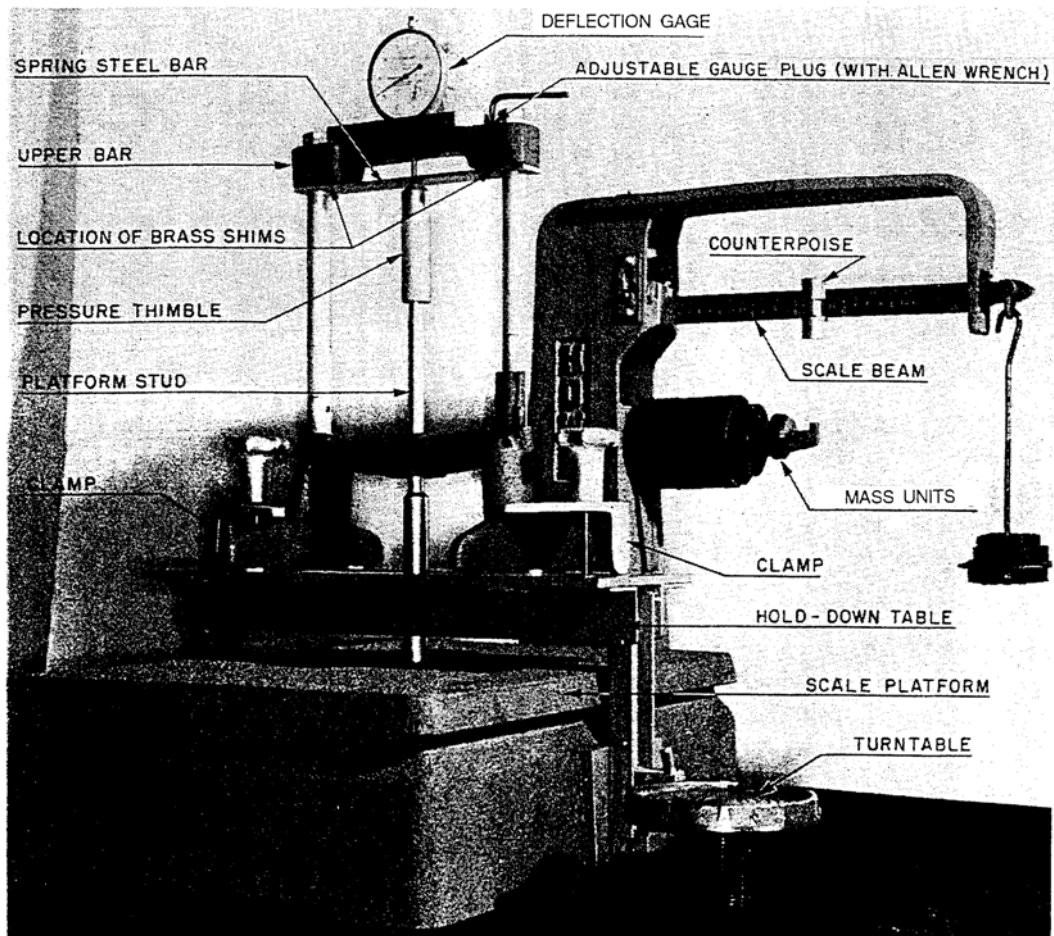


FIGURE 1. Calibration Apparatus

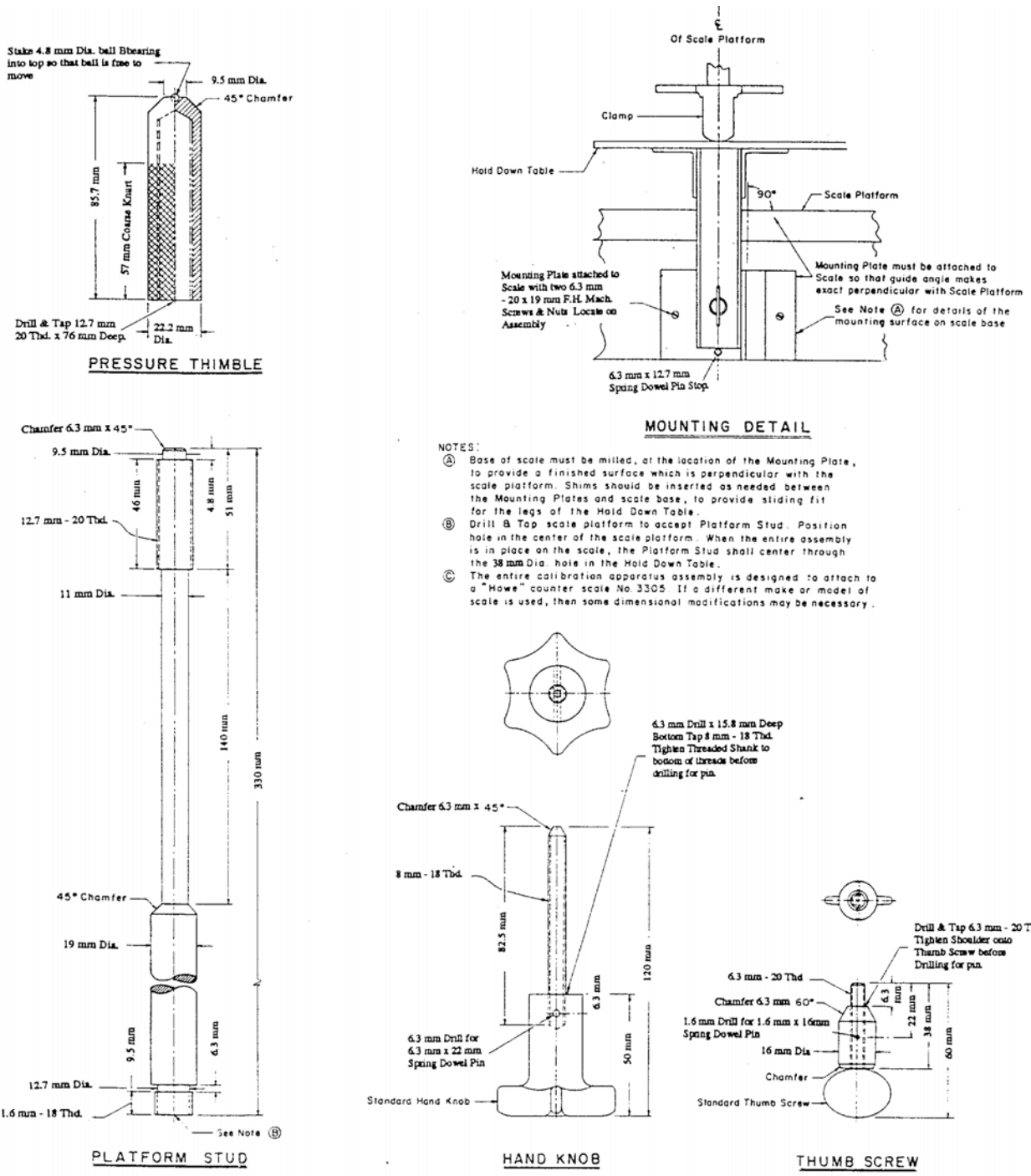
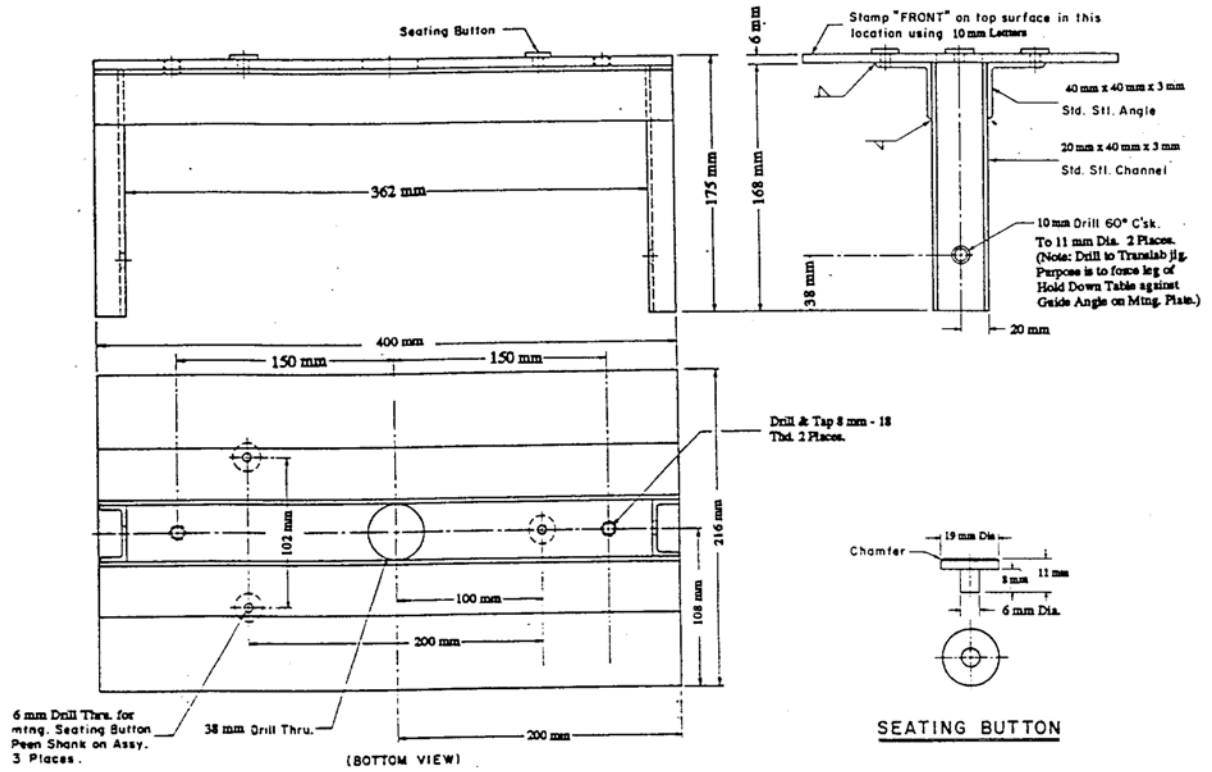


FIGURE 2. Mounting Device



HOLD DOWN TABLE
(Half Size)

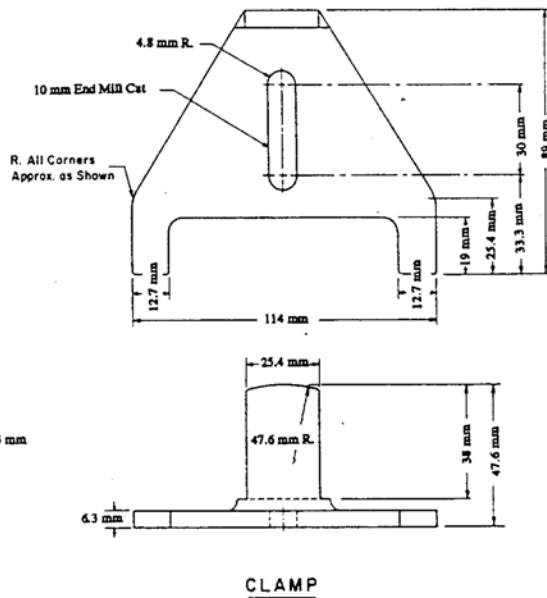
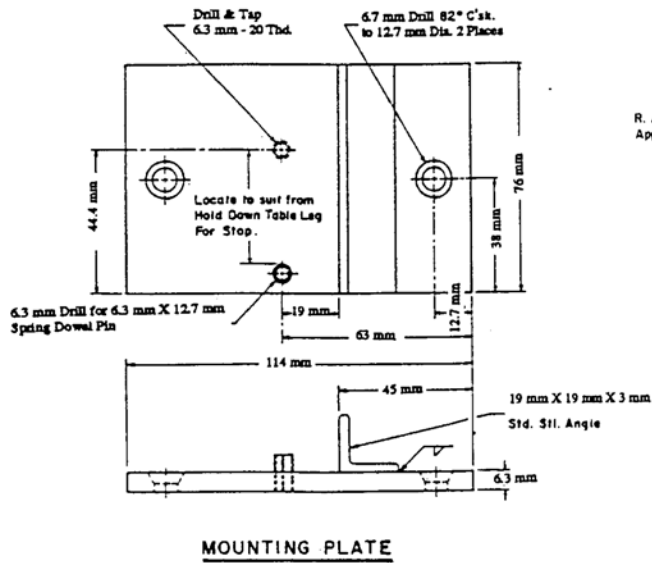


FIGURE 3. Hold-Down Table, Mounting Plate, and Clamp

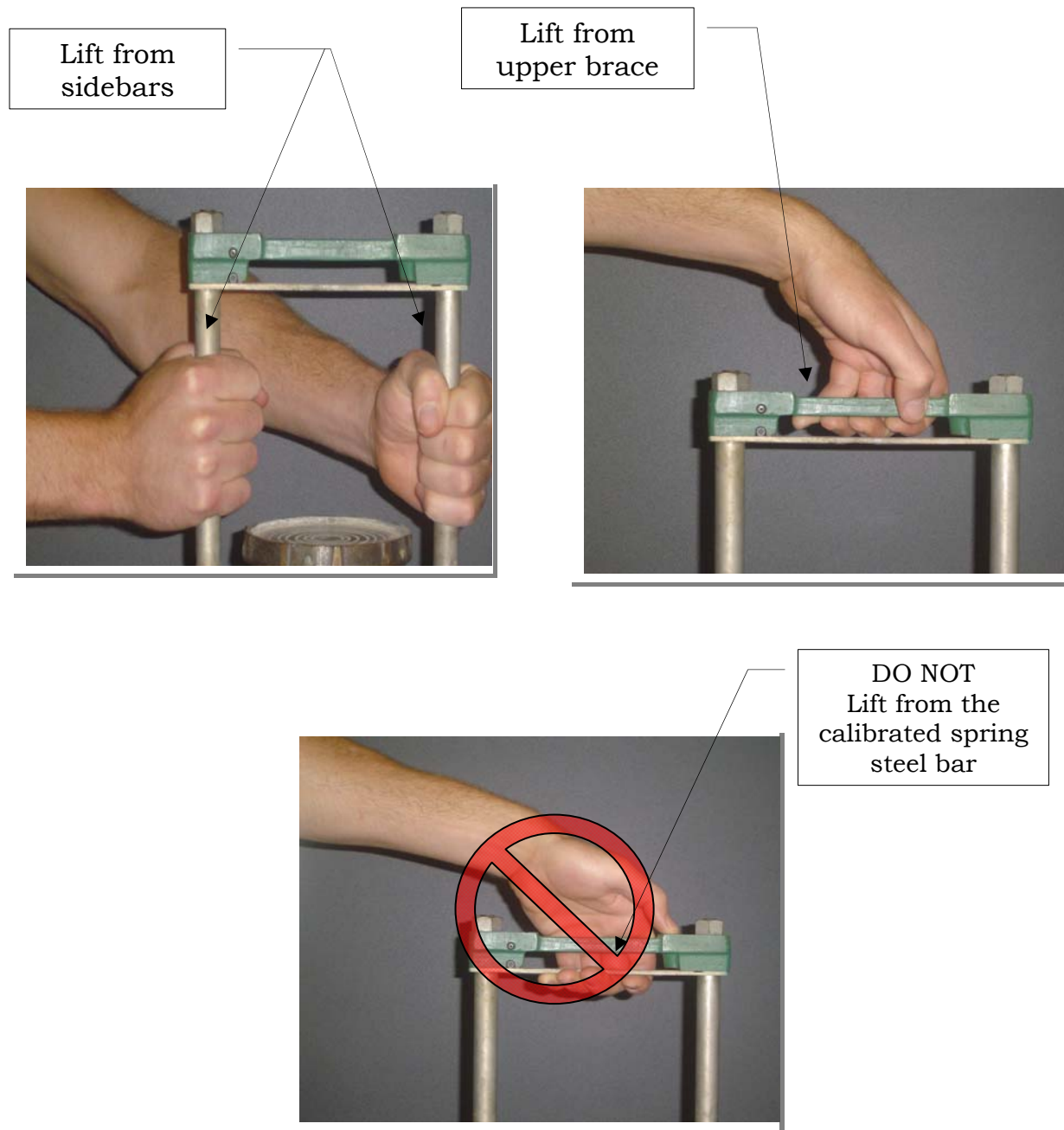


FIGURE 4. Proper Handling of Expansion Racks

APPENDIX A

PROVING LEVER

A. SCOPE

This is a very simple device that gives excellent results.

B. APPARATUS

1. Deflection Gage: a dial indicator mounted on a platform capable of reading 0.0001 in. increments (Figure A1).
2. Proving Lever: an aluminum stand, slotted beam, and hanging weight (Figure A2).

C. CALIBRATION PROCEDURE

Expansion Pressure Device Calibration Verification Procedure

To verify calibration of the expansion pressure device:

1. Place the aluminum stand of the proving lever on the bronze turntable of the expansion pressure device.
2. Place the beam in the slot at the top of stand and raise the turntable until the beam is level using a small bubble level.

NOTE: Extra care must be taken when placing the beam roller bearing directly aligned under the expansion pressure dial indicator stem.
3. Place the hanging weight on the beam.
 - a. The notch closest to the knife edge will simulate 8 lb and the dial indicator on top of the expansion pressure device should register 0.0021 in.
 - b. The next notch will simulate 16 lb and the dial indicator should register 0.0042 in.
 - c. The third notch will simulate 24 lb and the dial indicator should register 0.0063 in.
 - d. The fourth notch will simulate 32 lb and the dial indicator should register 0.0084 in.
4. The acceptable tolerance is ± 0.0001 in. for each interval reading (Figure A3).

Expansion Pressure Device Calibration Procedure

If the expansion pressure device is not in calibration:

1. Loosen the nuts at the top of the stress rods.
2. Move the brass shims to give greater or lesser movement of the blade.

NOTE: As a rule the shims are placed $\frac{1}{8}$ in. from the stress rods to give the necessary movement to simulate the 32 lb.

D. PRECAUTION

Check the action of the knife edges to see that they are not binding.

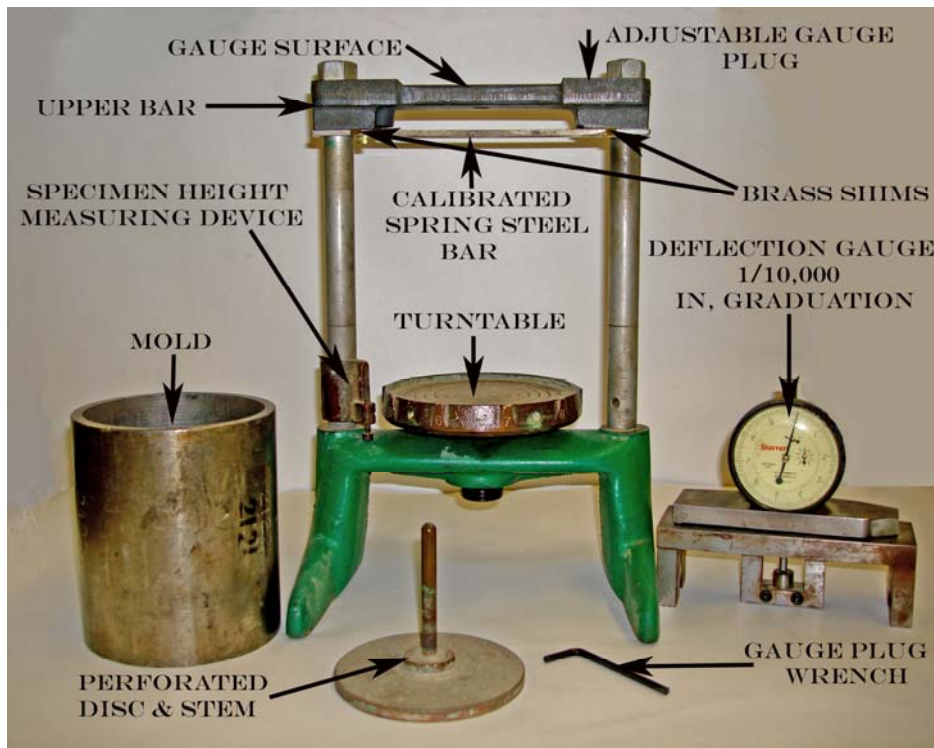


FIGURE A1. Expansion Pressure Device Components



FIGURE A2. Proving Lever Arm and Weight



FIGURE A3. Expansion Pressure Device Calibration Verification Procedure

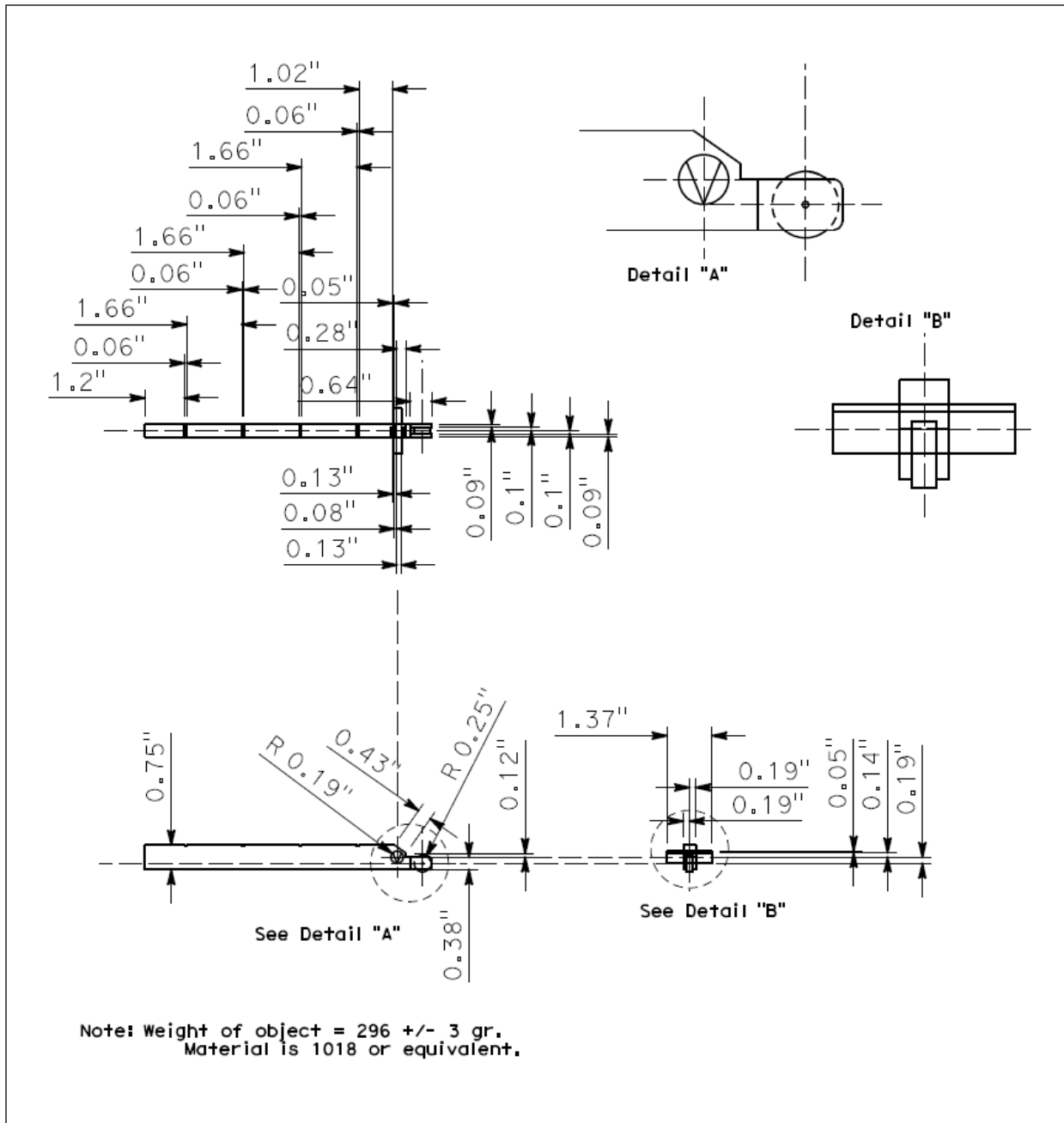


FIGURE A4. Proving Lever Arm

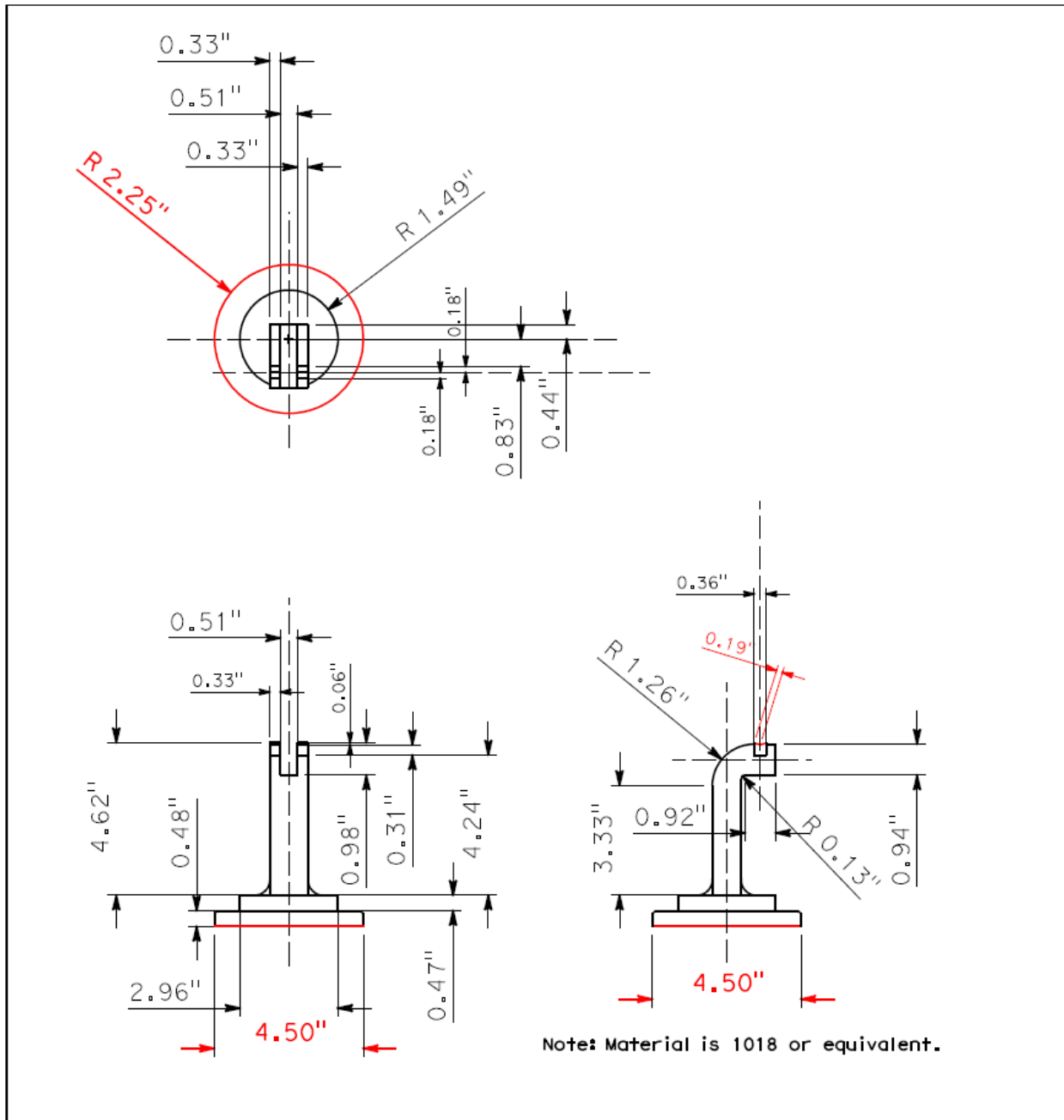


FIGURE A6. Proving Lever Base