

APPENDIX X

MECHANICAL TEST APPARATUS

GENERAL

This Appendix specifies certain apparatus necessary for the mechanical testing of electronic valves.

CONTENTS

1. Outline Drawings

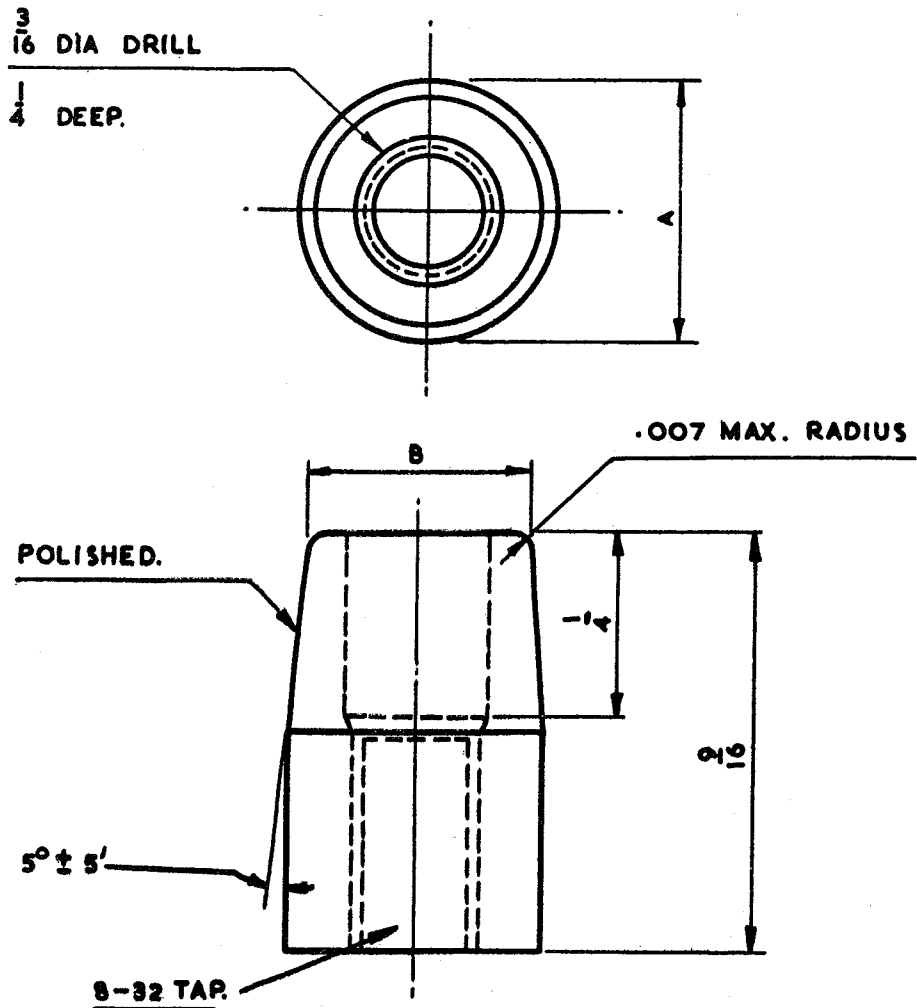
Drawing No.	Drawing Title
1	Deflection Cone for Miniature Valve Base Strain Test.
2	Shock Testing Machine.
3	Valveholder for Shock Tests.

2. Microphony Impact Tester.

3. Vibration Noise Tester.

DRAWING No. 1.

DEFLECTION CONE FOR MINIATURE VALVE BASE STRAIN TEST.



MAT^L STAINLESS STEEL.

DEFLECTION CONE.	VALVE TYPE.	DIMENSION A.	DIMENSION B.
A	B7G	.375 ± .002 DIA.	.325 ± .002 DIA.
B	B9A	.468 ± .002 DIA.	.418 ± .002 DIA.

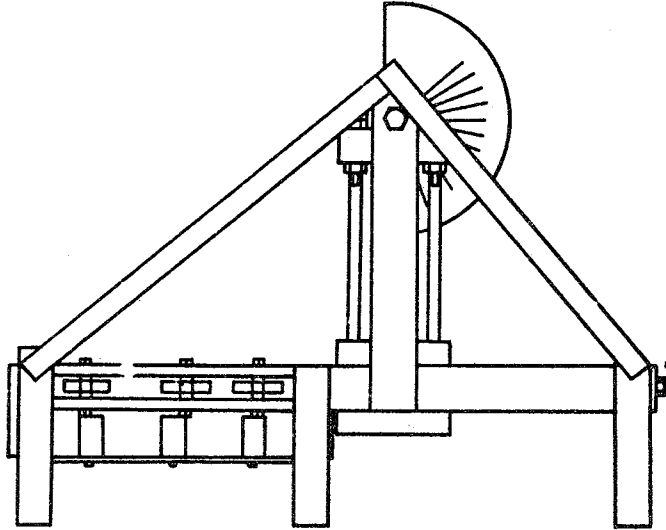
NOTE: VARIATIONS ON FRACTIONAL DIMENSIONS SHALL BE, UNLESS OTHERWISE STATED, 1/4 OR LESS ± .008, OVER 1/4 ± .015

DIMENSIONS IN INCHES.

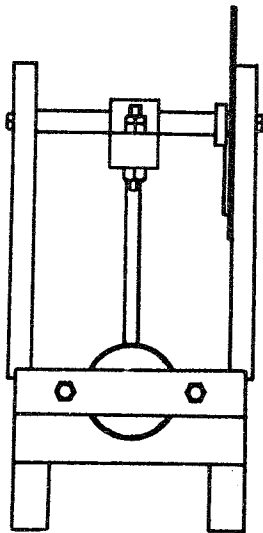
DRAWING No. 2

SHOCK TESTING MACHINE

ILLUSTRATIVE ONLY



SIDE VIEW



END VIEW

NOTE

FOR FURTHER INFORMATION APPLY TO : -

THE OFFICER-IN-CHARGE,

SERVICES VALVE TEST LABORATORY,

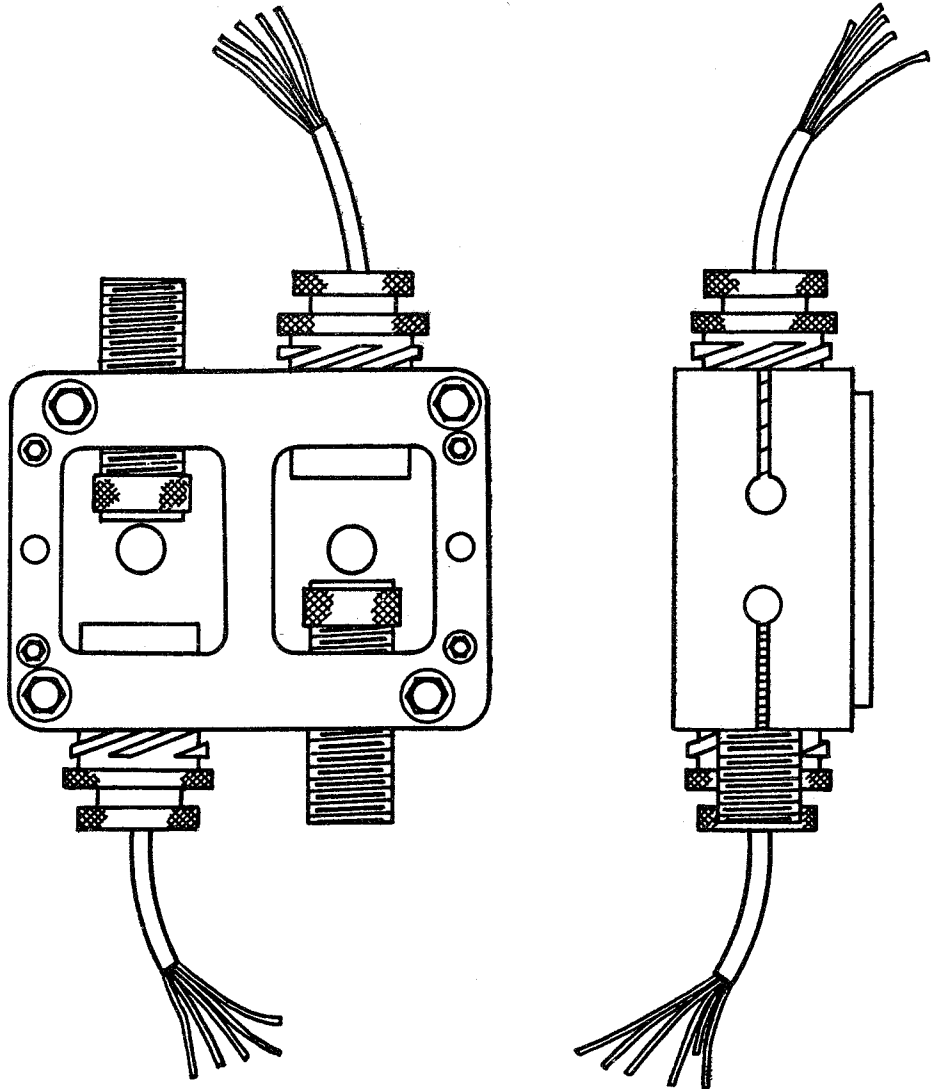
ADMIRALTY,

HASTE HILL,

HASLEMERE, SURREY.

DRAWING No. 3.**VALVE HOLDER FOR SHOCK TESTS**

ILLUSTRATIVE ONLY

**NOTE**

THESE ILLUSTRATIONS HAVE BEEN EXTRACTED FROM DRAWING 184-JAN. FOR FULL DETAILS AND CONSTRUCTIONAL DRAWINGS APPLY TO THE TVC OFFICE.

2. MICROPHONY IMPACT TESTER

- 2.1 The Microphony Impact Tester is suitable for testing miniature and sub-miniature valves. It subjects the valve under test to an impact of 50g with a sensibly sine-wave distribution - see figure 2 below.
- 2.2 The Block schematic shows the arrangement of the equipment. It consists of a light hammer freely pivoted about a horizontal axis and is electro-magnetically released to strike a duralumin block upon which the valve under test is rigidly clamped. The block is resiliently mounted upon foamed neoprene of suitable mechanical characteristics and in order to eliminate high order frequencies from the acceleration impulse the impact is given to the block through a thin rubber plug fitted to the hammer head. The hammer and block are calibrated to give 50g on standard type equipment. The microphony transient voltage output from the valve is measured on a peak to peak indicator, see figure 1.

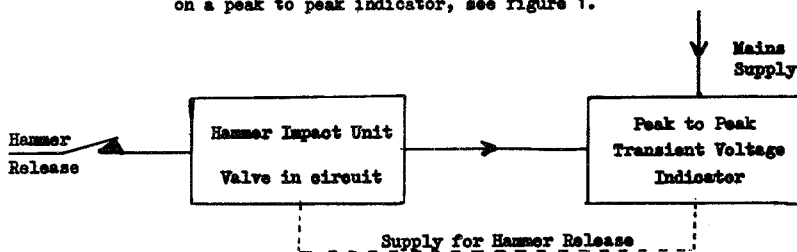


FIG. 1

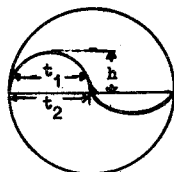


FIG. 2

t_1 at $\frac{1}{2}h = 200 \mu s$ (approx)
 t_2 at $0h = 350 \mu s$ (approx)
 $h = 50g$

- 2.3 The hammer with its rubber plug and the block with its rubber pad will be periodically returned to the design authority for check calibration. It is essential that the bearings of the hammer arm are regularly lubricated.
- 2.4 The operation of the peak to peak transient voltage amplifier/indicator is more fully described in Clause 4.2. of Appendix XII.

3. VIBRATION NOISE TESTING

- 3.1 The valve shall be vibrated in the specified directions at the required frequency. The required frequency and specified acceleration shall both be adjusted to an accuracy better than 10% of their stated values.
- 3.2. The waveform of the vibration shall be sensibly sinusoidal with a total harmonic distortion of not more than 5% at any frequency within the range.
- 3.3. Where the swept frequency vibration test is specified, the rate of change of frequency shall not exceed one octave per minute from 25 c/s to 200 c/s and 100 c/s per minute between 200 c/s and 500 c/s and 250 c/s per minute between 500 c/s and 2.5 Kc/s.

Where approved high sensitivity recording equipment is being used the rate of sweep shall not be less than 15 seconds per octave up to 200 c/s and not greater than 45 seconds per octave above 200 c/s and up to 2.5 Kc/s.

The time of rise of the indicator to full-scale deflection shall not be greater than one fiftieth ($1/50$) of the sweep time per octave up to 200 c/s and not greater than one one hundred and fiftieth ($1/150$) of the sweep time per octave above 200 c/s and up to 2.5 Kc/s.

- 3.4. The acceleration shall be measured using a barium titanate accelerometer mounted rigidly adjacent to the valve and capable of monitoring acceleration during actual test. The accelerometer shall not possess a resonance below 20 Kc/s.
- 3.5. The accelerometer and its associated amplifier shall be calibrated at 50 c/s and at the lowest frequency to be used in the test.
- 3.6. The output from the accelerometer and its associated amplifier shall be constant for constant g to within ± 0.5 dB over the range 40 c/s to 2.5 Kc/s and within ± 2 dB at 25 c/s.
- 3.7. The valve under test shall be rigidly mounted on the vibration table by means of a clamp. The table shall be of approved construction giving a minimum of spurious vibrations or resonances in the specified frequency range.