

ADMIRALTY SIGNAL AND RADAR ESTABLISHMENT

Specification AD/CV2379 Issue No. 1 dated 6/12/55 To be read in conjunction with K1001	<table> <tr> <th colspan="2"><u>SECURITY</u></th></tr> <tr> <th><u>Specification</u></th><th><u>Valve</u></th></tr> <tr> <td>Unclassified</td><td>Unclassified</td></tr> </table>	<u>SECURITY</u>		<u>Specification</u>	<u>Valve</u>	Unclassified	Unclassified
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<u>Specification</u>	<u>Valve</u>						
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TYPE OF VALVE:- Pulsed Attenuator, S-band, Plug-in Type. PROTOTYPE:- VX3177			<u>MARKING</u> See K1001/4
<u>RATINGS</u> Operating Frequency Range Max. Peak Power (W) Primer Current	Note A 3 B C		<u>DIMENSIONS</u> See drawing on Page 4.

NOTES

- A. The attenuator is designed for S-band operation using No. W.G.10 waveguide, and the operating frequency range will depend on the mounting.
- B. With duty ratio not exceeding 0.00125.
- C. The attenuator shall be supplied with a primer current of approximately 0.05 mA, D.C. The primer current may be pulsed to 0.7 mA maximum for pulses of duration not exceeding 40 microseconds.

TESTS

To be performed in addition to those applicable in K1001.

	Test Conditions	Test	Limits		No. Tested	Note
			Min.	Max.		
a	Test frequency = $2825 \pm 3$ Mc/s. The line shall be energised with $20 \pm 10$ mW, RF power through at least 10 dB resistive attenuator and shall be terminated in an impedance matched better than 0.98 VSWR over the frequency band 2755 to 2915 Mc/s.	<u>VSWR at 2825 Mc/s.</u>	0.90	-	100%	1
b	Test frequency = 1. $2755 \pm 3$ Mc/s 2. $2915 \pm 3$ Mc/s Other conditions as in test (a)	<u>VSWR at:-</u> 1. <u>2755 Mc/s</u> 2. <u>2915 Mc/s</u>	0.55 0.55	- -	10% 10%	1 1
c	The valve shall be mounted between impedances matched better than 0.91 VSWR. The line shall be energised with $20 \pm 10$ mW, RF power. Test frequency = $2825 \pm 3$ Mc/s.	<u>Low Power Level Insertion Loss</u>  (dB)	-	0.2	100%	1
d	The valve shall be mounted in a noise-factor-measuring equipment. Available primer current = $0.050 \pm 0.001$ mA, D.C. Frequency of local oscillator = $2825 \pm 3$ Mc/s.	Increase in noise power when the primer current is switched on. (dB)	-	0.8	100%	2,6,8
e	The valve shall be mounted on the side arm of a "T" junction. Power from a matched source shall be adjusted so that, with matched terminations on both the main run and the side arm, the RF peak power in the side arm is between 4 and 5 kW. Primer current to be $0.70 \pm 0.05$ mA. Nominal frequency = 3000 Mc/s. Nominal PRF = 500 p.p.s.	<u>High Power Leakage</u> 1. "Spike" energy (ergs/pulse) 2. Peak "flat" power (mW)	- -	0.05 20	100% 100%	2,3,4,7,9.
f	Primer current shall be $0.050 \pm 0.001$ mA, D.C. Other conditions as in test (e).	<u>Spike Energy</u> (ergs/pulse)	-	0.6	100%	2,3 4,6
g	The primer current shall be pulsed to $0.7 \pm 0.05$ mA for $35 \pm 2$ $\mu$ s. The RF power to be applied during the last 5 $\mu$ s of the 35 $\mu$ s pulse. (1) PRF = 500 p.p.s. and $T_p = 2.5$ $\mu$ s of (2) PRF = 300 p.p.s. and $T_p = 5$ $\mu$ s. Other conditions as in test (e)	<u>Life Test</u> (hrs)	500	-	TA	2,3 5

NOTES

1. The valve shall be tested in the mount shown in the drawing on Page 5.
2. The D.C. primer supply voltage shall have less than 1% peak-to-peak ripple. The primer shall be negative with respect to the valve body. The regulation of the supply shall be negligible for load currents up to 0.2 mA.
3. The valve shall be tested in the mount shown in the drawing on Page 6. Although the peak power in the side arm is between 4 and 5 kW, the peak power incident on the attenuator is only about 3 watts.
4. A variable-pulse-length method is suggested for determining the high power leakage characteristics. Using three pulse lengths  $t_1$ ,  $t_2$  and  $t_3$  microseconds the corresponding leakage powers are measured as  $p_1$ ,  $p_2$  and  $p_3$  microwatts respectively.

- (1) "Spike" Energy. If  $t_1$  is so short that  $p_1$  can be attributed entirely to the "spike".

$$\text{"Spike" energy} = \frac{10p_1}{\text{PRF}} \text{ ergs/pulse.}$$

- (2) Peak "Flat" Power. This is given by the expression,

$$\text{Peak "flat" power} = \frac{p_3 - p_2}{t_3 - t_2} \times \frac{10^3}{\text{PRF}} \text{ milliwatts.}$$

Suggested values of the pulse lengths are:-

$$\begin{aligned} t_1 &= 0.2 \mu\text{s} \\ t_2 &= 0.8 \mu\text{s} \\ t_3 &= 2.2 \mu\text{s} \end{aligned}$$

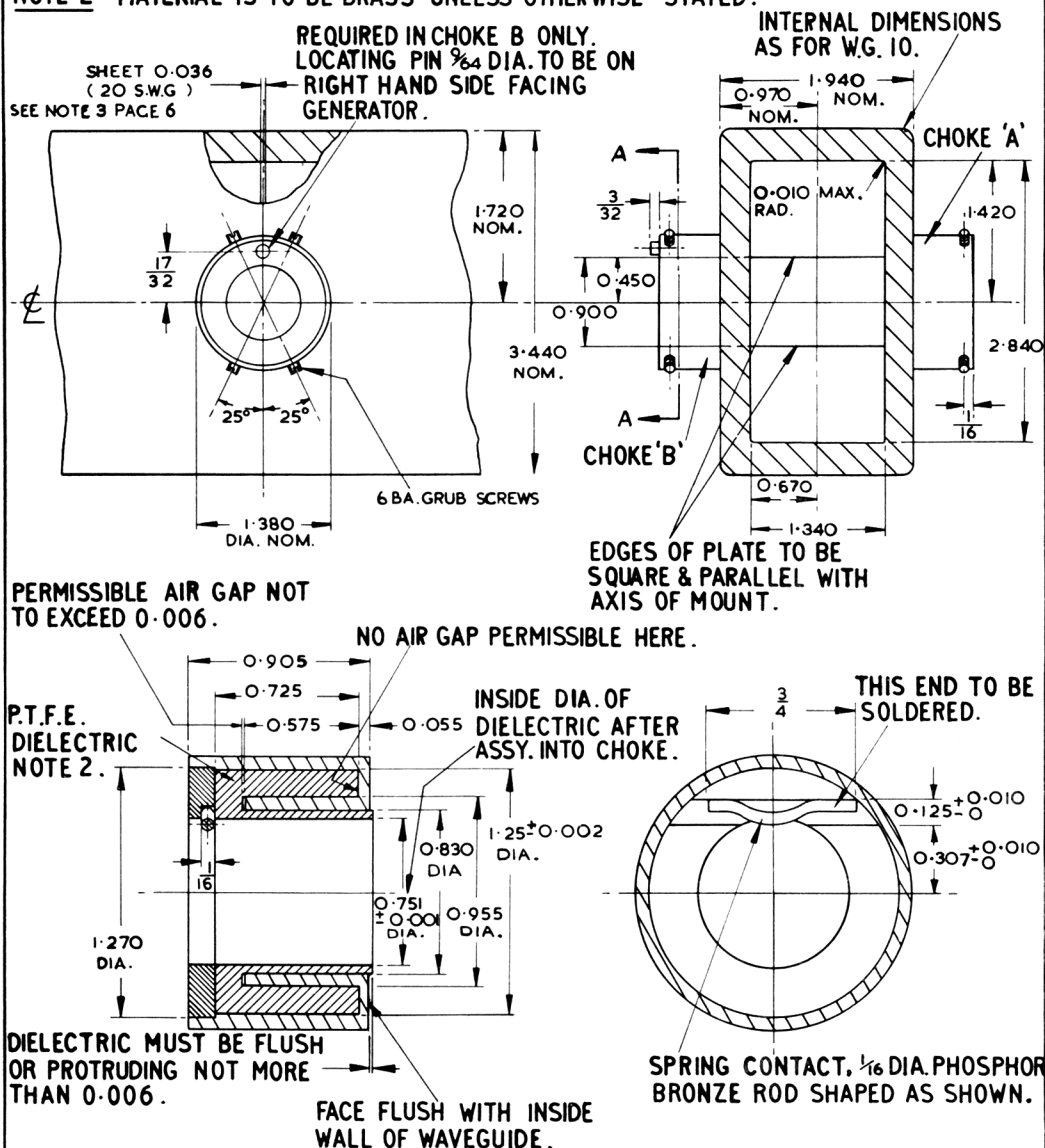
5. The valve shall be deemed to have reached the end of life when any one of the following conditions occurs:-
  - (1) VSWR at 2825 Mc/s is less than 0.85. Test conditions as in test (a).
  - (2) Insertion loss at 2825 Mc/s exceeds 0.3 dB. Test conditions as in test (c).
  - (3) "Spike" energy exceeds 0.07 ergs/pulse; or peak "flat" power exceeds 25 milliwatts when the primer current is 0.70 mA. Test conditions as in test (e).
6. The circuit supplying the primer shall include a 2 megohm series resistor connected at the primer terminal.
7. The circuit supplying the primer shall include a  $\frac{1}{2}$  megohm series resistor connected at the primer terminal.
8. A block diagram of the suggested noise-factor-measuring equipment is shown in drawing on Page 7. The overall noise factor of the measuring equipment shall not exceed 8 dB with no current flowing in the primer circuit of the CV2379. The gas discharge noise source is assumed to give 15 dB noise power above KTB when the current through it is  $180 \pm 10$  mA.
9. The primer current may be pulsed, as described in Note C on Page 1, or continuous D.C. may be used.



LOW POWER TEST MOUNT.

**NOTE 1** THE DIELECTRIC MUST FIT TIGHTLY INTO CHOKE LEAVING NO AIR GAPS BETWEEN THE CYLINDRICAL FACES.

**NOTE 2** MATERIAL IS TO BE BRASS UNLESS OTHERWISE STATED.



SECTIONAL VIEW OF CHOKE  
WITH DIELECTRIC IN POSITION.

SECTION A-A

TOLERANCES : DECIMAL DIMENSIONS ± 0.001  
FRACTIONAL DIMENSIONS ± 0.010  
UNLESS OTHERWISE STATED.

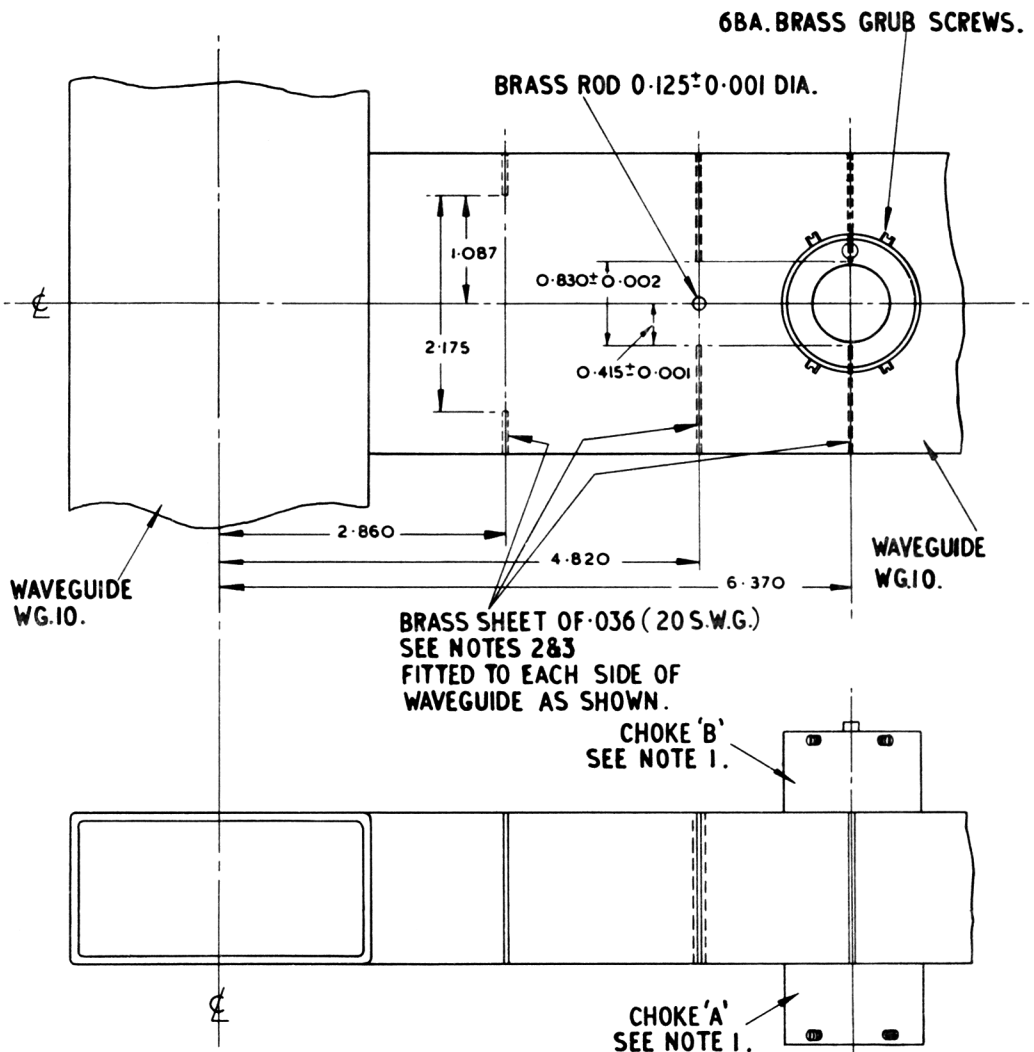
ALL DIMENSIONS IN INCHES.

**HIGH POWER & LIFE TEST MOUNT**

**NOTE 1.** THE DETAILS OF THE TWO CHOKES ARE GIVEN ON DRAWING PAGE 5.

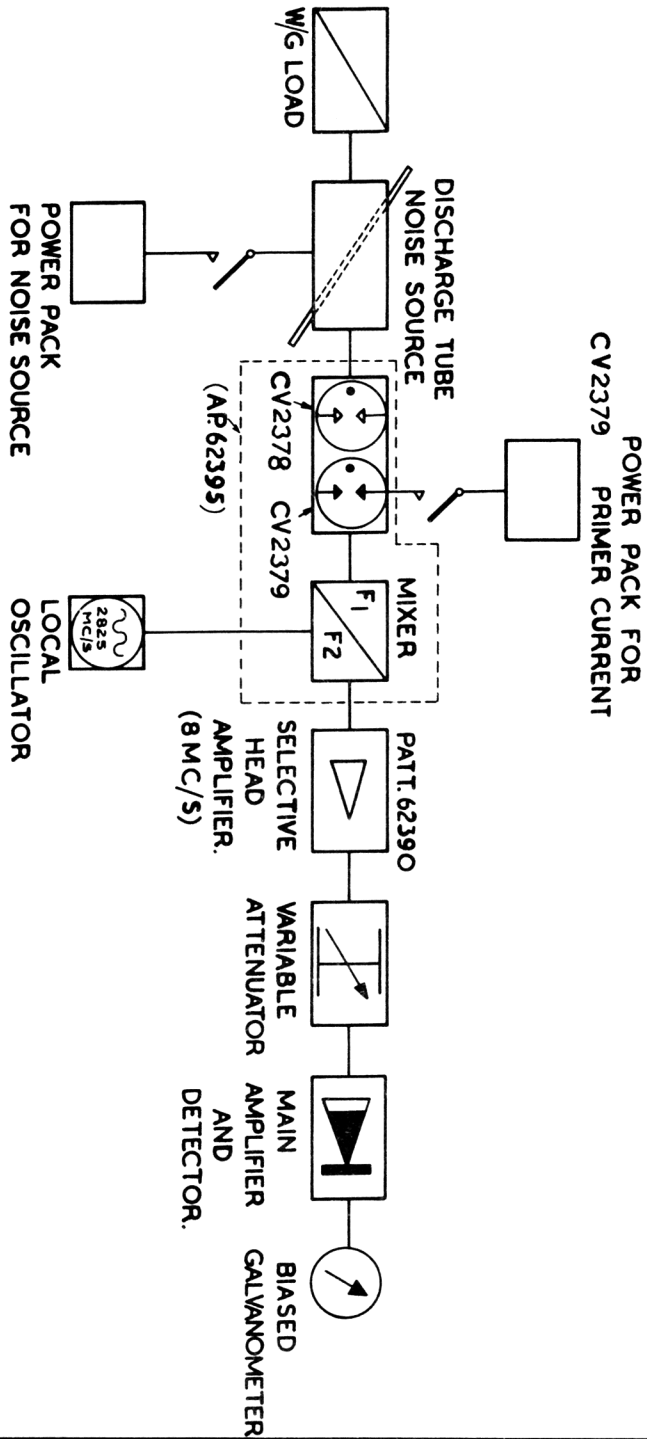
**NOTE 2.** THESE FITTINGS EXTEND FOR THE COMPLETE DEPTH OF WAVEGUIDE.

**NOTE 3.** THE CONTACT SURFACES BETWEEN BRASS IRISES & WAVEGUIDE ARE TO BE SOLDERED CONTINUOUSLY THROUGHOUT THEIR LENGTHS. THIS APPLIES TO LOW POWER TEST MOUNT ALSO.



**TOLERANCES:** DECIMAL DIMENSIONS $\pm$ 0.003  
FRACTIONAL DIMENSIONS $\pm$ 0.010  
UNLESS OTHERWISE STATED.

**ALL DIMENSIONS IN INCHES.**



NOISE TEST EQUIPMENT.