

ADMIRALTY SIGNAL AND RADAR ESTABLISHMENT

Specification AD/CV2378 Issue No. 1 dated 6/12/55 To be read in conjunction with K1001	<u>SECURITY</u>	
	<u>Specification</u> Unclassified	<u>Valve</u> Unclassified

<u>TYPE OF VALVE:-</u> T.R.Switch, S-band, Plug-in Type. <u>PROTOTYPE:-</u> VX3176	<u>MARKING</u> See K1001/4										
<u>RATINGS</u> <table> <tr> <td>Operating Frequency Range</td><td>-</td><td>A</td></tr> <tr> <td>Max. Peak Power (kW)</td><td>5</td><td>B</td></tr> <tr> <td>Min. Peak Power (W)</td><td>100</td><td></td></tr> </table>	Operating Frequency Range	-	A	Max. Peak Power (kW)	5	B	Min. Peak Power (W)	100		<u>DIMENSIONS</u> See drawing on Page 4.	
Operating Frequency Range	-	A									
Max. Peak Power (kW)	5	B									
Min. Peak Power (W)	100										

NOTES

- A. The valve 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.

TESTS

To be performed in addition to those applicable in K1001.

	Test Conditions	Test	Limits		No Tested	Note
			Min.	Max.		
a	Test Frequency = 2825 ± 3 Mc/s. The line shall be energised with 20 ± 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.	VSWR at <u>2825 Mc/s</u>	0.90	-	100%	1
b	Test Frequency = 1. 2755 ± 3 Mc/s 2. 2915 ± 3 Mc/s Other conditions as in Test (a)	VSWR at 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 ± 10 mW, RF power. Test Frequency = 2825 ± 3 Mc/s.	<u>Low Power Level Insertion Loss</u> (dB)	-	0.2	100%	1
d	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 shall be between 4 and 5 kW. 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. (W)	- 1	30 3	100% 100%	2,3
e	The valve shall be mounted on the side arm of a "T" junction and a resistive attenuator shall be placed between the valve and the detector. Power from a matched source shall be adjusted so that with a matched termination on the main run, the RF peak power in the side arm shall be between 4 and 5 kW. Nominal frequency of the simulated-echo pulse shall be within the range 2970 to 3030 Mc/s and its peak power incident on the T.R. switch shall not exceed 30 mW.	<u>Recovery Time</u> (usecs) The time shall be measured from the trailing edge of the transmitter pulse to the instant when the insertion loss is 6 dB greater than it was immediately before the transmitter pulse occurred.	-	25	100%	2
f	As for test (d) with 1. PRF = 500 p.p.s. and $T_p = 2.5 \mu s$. or 2. PRF = 300 p.p.s. and $T_p = 5 \mu s$.	<u>Life Test</u> (hrs.)	500	-	TA	4,5

NOTES

1. The valve shall be tested in the mount shown in the drawing on Page 5.
2. The valve shall be tested in the High Power test mount shown in the drawing on Page 6.
3. 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 milliwatts respectively.

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

$$\text{"Spike" energy} = \frac{10^4 p_1}{\text{PRF}} \text{ ergs/pulse}$$

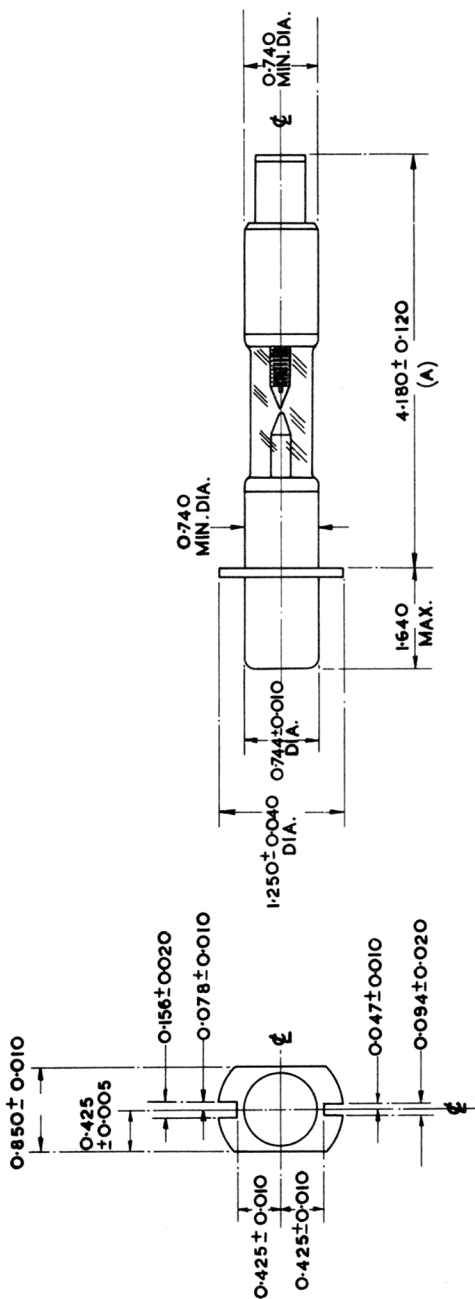
- (2) Peak Flat Power. This is given by the expression,

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

Suggested pulse lengths are:-

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

4. The valve shall be tested in the life-test mount shown in the drawing on Page 6.
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 35 ergs/pulse. Test conditions as in test (d).
 - (4) Recovery time exceeds 35 μs . Test conditions as in test (e).



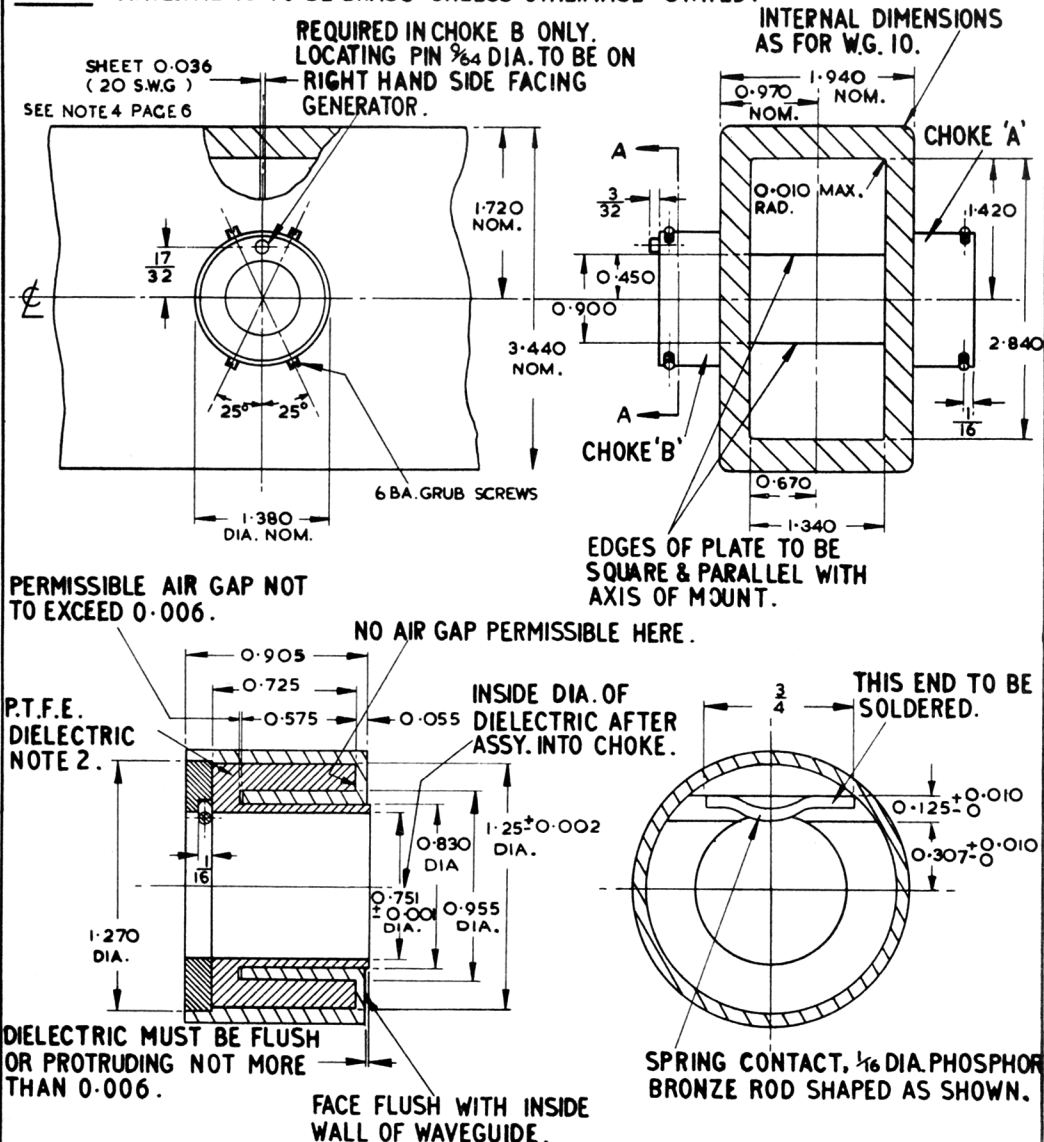
THE VALVE SHALL ENTER A STRAIGHT GAUGE TUBE
OF INTERNAL DIA. 0.7495^{+0.0000} AND LENGTH (A)
0.0005^{-0.0005}

ALL DIMENSIONS IN INCHES.

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.

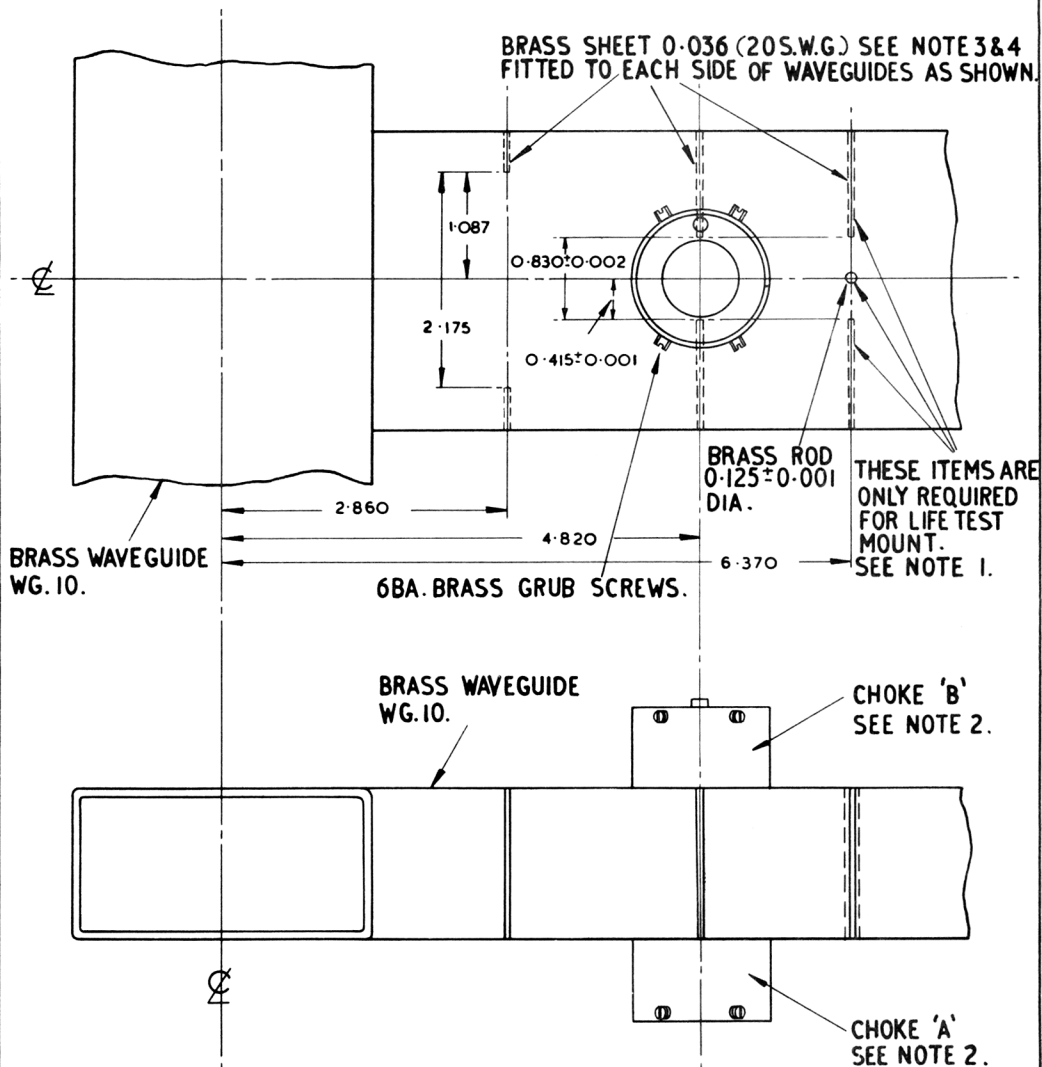
DETAILS OF HIGH POWER TEST MOUNT & LIFE TEST MOUNT.

NOTE 1. THE DESIGN IS TO BE MODIFIED WHERE INDICATED FOR LIFE TEST MOUNT.

NOTE 2. THE DETAILS OF THE TWO CHOKES ARE GIVEN ON DRAWING PAGE 5.

NOTE 3. THESE FITTINGS EXTEND FOR THE COMPLETE DEPTH OF WAVEGUIDE.

NOTE 4. 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.