MINISTRY OF SUPPLY (R.R.D.E.)

VALVE ELECTRONIC CV 2274

Specification MOS/CV2274/Issue 2. Dated:- 6.2.53 To be read in conjunction with K1001 ignoring clauses:- 5.2, 5.8	SECURITY Specification: Unclassified Valve: Unclassified

TYPE OF VALVE:- Broad Band T.B. Cell
PROTOTYPE:- VX4134

MARKING
See K1001/4

RATING		Note
Min. transmitter peak power (kW)	5.0	
Max. transmitter peak power at 0.001 duty cycle (kW)	100	
Frequency coverage (Mc/s)	9500 to 9700	

DIMENSIONS
See drawing page 4

PACKAGING
See K1005

NOTES

1. At least one washer of the dimensions shown in the drawing on page 4 shall be supplied with each valve.

To be performed in addition to those applicable in K1001.

	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
a	Valve mounted as shown in drawing on page 5 and terminated in a matched load. Test frequency = 9600 Mc/s ± 0.05%.	Tuning Susceptance	-0.06	+0.06	100%	1
b	As for test "a".	Equivalent Conductance		- 0.05	100%	2
c	Valve mounted as shown in drawing on page 5 and terminated in a matched load. Test frequency in band 9500-9700 Mc/s. Line to be energised with 4 kW peak RF with T_p = 1.0 µsec. ± 10% and p.r.f. = 1000 c/s ± 10%. Test to be performed at least 7 days after pumping, and at least 24 hours after any previous discharge.	Firing Time (secs) Time interval between application of power and tube firing.		- 10	100%	
d	As for test "c"	Arc Loss (db)		- 0.8	100%	3
e	Valve mounted as shown in drawing on page 5 and terminated in a matched load. Test frequency in band 9500-9700 Mc/s. Line to be energised with 12-15 kW peak RF test power derived from a higher power source through an attenuation of not less than 6 db with T_p = 1 µsec. ± 10% and p.r.f. = 1000 c/s ± 10%.	Recovery Loss (db) After 2 µsec. (measured between trailing edge of transmitter pulse and leading edge of signal pulse of frequency 9600 Mc/s ± 0.05%).		- 2.0	100%	
f	As for test "a"	Loaded Q		- 6.5	T.A.	4

TESTS (Contd.)

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	Test Conditions	Test	Limits		No. Tested	Note
			Min.	Max.		
g	As for test "e" Load standing wave ratio to be better than 0.97	High Level Standing Wave Ratio	0.91	-	5%	5

NOTES

1. The susceptance may be measured by comparing the phase of the reflector with that of the valve that is resonant at the test frequency. The susceptance is given by:-

$$\frac{B}{Y_o} = \frac{1 + 2\,G/Y_o}{2} \tan\frac{4\pi\Delta 1}{\lambda g} \simeq (1.1)\,\frac{2\pi\Delta 1}{\lambda g} \text{ for small } \Delta 1$$

Where λ_g is the guide wavelength and $\Delta 1$ is the phase shift measured in the same units as λ_g and where G/Y_o is assumed to be 0.05.

2. A curve of SWR vs. Frequency is plotted around a centre value of 9600 Mc/s. The valve is resonant (B = 0) at the frequency corresponding to the maximum SWR. The value of SWR is:-

$$\sigma = \frac{1}{G/Y_o} + 1 \text{ therefore } G/Y_o = \frac{1}{\sigma - 1}$$

If the valve has passed the susceptance test ($B < 0.06\ Y_o$), the SWR measured as 9600 Mc/s is very nearly equal to $\frac{1}{G/Y_o} + 1$ and may be used to measure G.

3. The power loss in the arc shall be less than 680 W peak:-

$$\frac{p}{p - pL} = \frac{4000}{4000-680} = 1.20\ (0.8\ db)$$

4. Loaded Q is defined as:-

$$QL = Fo\ \frac{dB/Y_o}{\frac{dF}{2(1 - G/Y_o)}} \qquad \text{where } F_o = 9600 \text{ Mc/s.}$$

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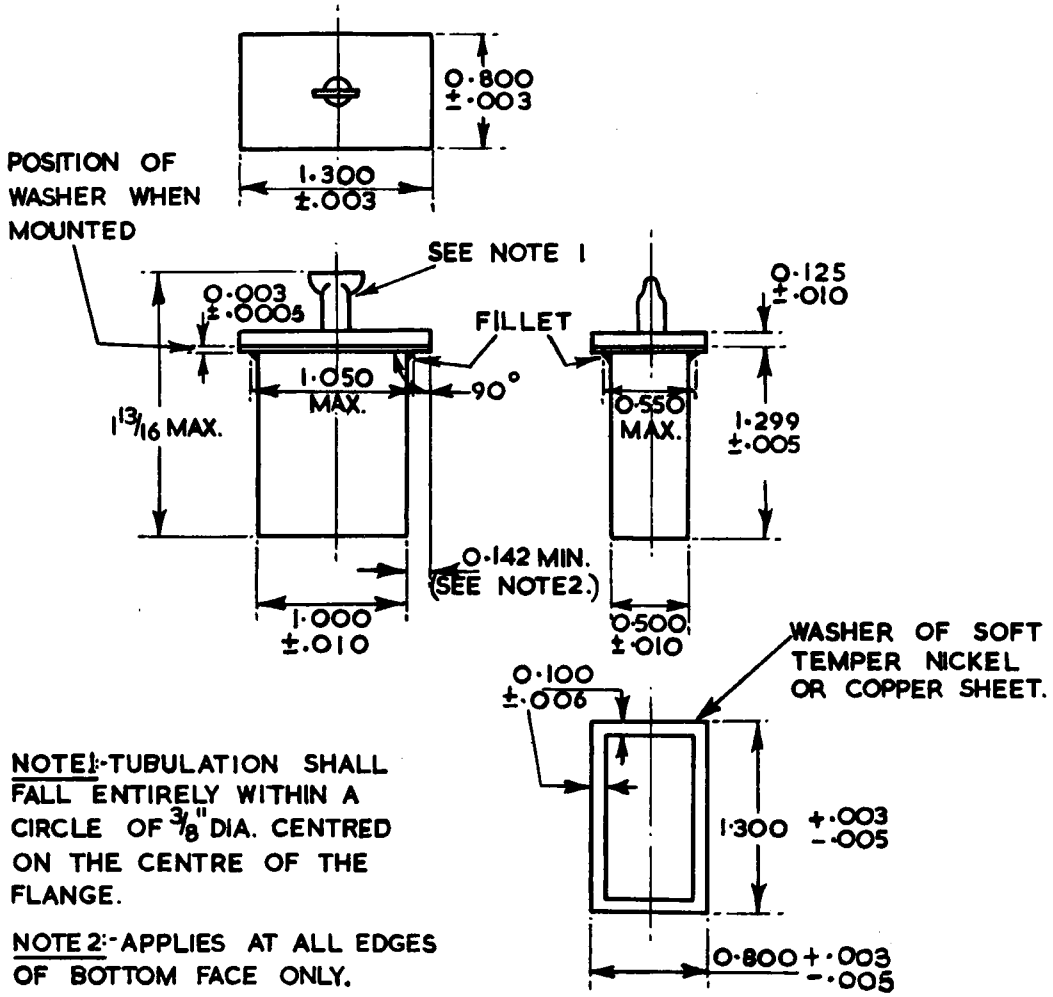


NOTE 1:- TUBULATION SHALL FALL ENTIRELY WITHIN A CIRCLE OF 3/8" DIA. CENTRED ON THE CENTRE OF THE FLANGE.

NOTE 2:- APPLIES AT ALL EDGES OF BOTTOM FACE ONLY.

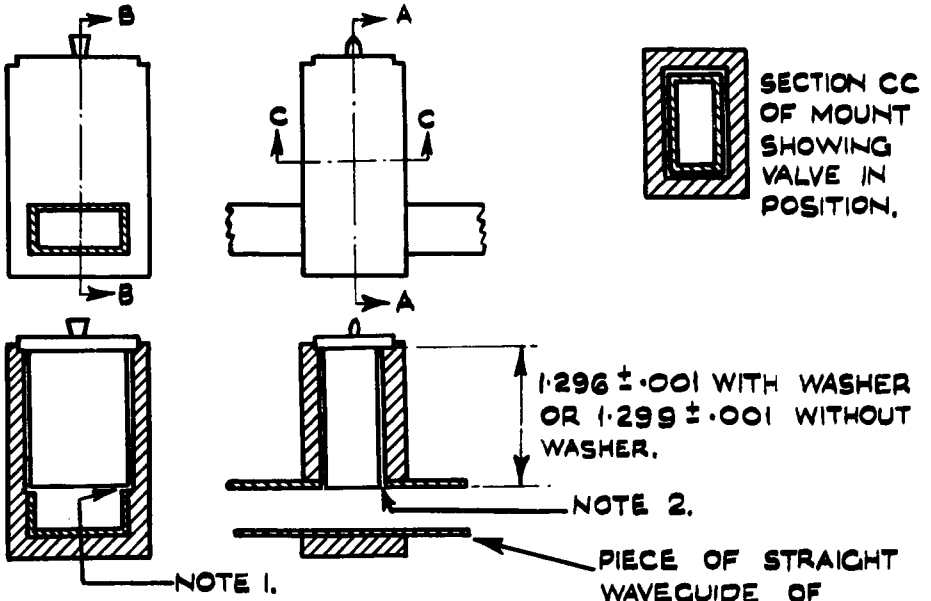
NOTE 3:- VALVE TO BE FINISHED TINNED.

ALL DIMENSIONS IN INCHES.

MOUNT FOR TESTING CV2274

NOTE 1. 0·015 CUT-AWAY AT SIDE OF WAVEGUIDE MEASURED FROM THE PLANE OF THE INNER SURFACE OF THE TOP OF THE WAVEGUIDE.

NOTE 2. 0·030 TO 0·040 SPACING ALL ROUND THE VALVE.



SECTION CC OF MOUNT SHOWING VALVE IN POSITION.

SECTION AA OF MOUNT SHOWING VALVE IN POSITION.

SECTION BB OF MOUNT SHOWING VALVE IN POSITION.

ALL DIMENSIONS IN INCHES.