

MINISTRY OF AVIATION - DLRD/RRE

VALVE ELECTRONIC CV6070

Specification MOA/CV 6070 Issue No. 1 dated 24th June, 1961. To be read in conjunction with K1001 excluding clauses 5.2 and 5.8		<u>SECURITY</u> Specification      Valve Unclassified      Unclassified	
—————→ indicates a change			
TYPE OF VALVE: Broad band T.B. cell PROTOTYPE: Vx 4176		<u>MARKING</u> See K1001/4	
<u>RATING</u> All limiting valves are absolute		<u>DIMENSIONS</u> See drawing on page 5 Note B	
Min. Transmitter Peak power (kW) Max. Transmitter Peak power (kW) Resonant Frequency (Mc/s)	Note 5 200 9375	A	
<u>NOTES</u> A. This valve may be used over frequency range 9315 to 9435 Mc/s. B. At least one washer of the dimensions shown in the Drawing on Page 5 shall be supplied with each valve.			
JOINT SERVICE CATALOGUE NUMBER: 5960/99/037/2297			

TEST CONDITIONS: unless otherwise specified:								
K1001	Test	Test Condition	AQL %	Insp. Level	Sym- bol	Limits		Units
						Min.	Max.	
5H.4.1.7.2 (a)	<u>GROUP A</u> Tuning Susceptance	Test Frequency (Fo) 9375 Mc/s $\pm$ 0.05% <u>Notes:</u> 1,2, and 3		100%		-0.06	$\pm$ 0.06	
5H.4.1.7.1 (b)	Equivalent Conductance	As for tuning susceptance <u>Notes:</u> 1 and 3		100%		-	0.1	
5H.4.2.1 (c)	Firing Time (secs) i.e. Time interval between application of power and tube firing.	Line to be energised with 4 kW peak R.F. Frequency = 9240Mc/s $\pm$ 1.5% tp = 1usec $\pm$ 10% Test to be performed at least 7 days after pumping and not less than 24 hrs. after any previous discharge <u>Notes:</u> 1		100%		-	10	secs
5H.4.2.2 (d)	Arc Loss (dB)	As for firing Test Time <u>Notes:</u> 4		100%		-	0.8	dB
5H.4.2.5.2 (e)	Recovery Loss (dB) Measured by a signal generator pulse injected 2usecs after trailing edge of the transmitter pulse	As for Firing Time test except that the line shall be energised with 40 - 50kW peak RF derived from a higher power source through an attenuator of at least 6 dB. Frequency= 9240 Mc/s $\pm$ 1.5% tp = 1usec $\pm$ 10% Simulated signal generator frequency 9375Mc/s $\pm$ 0.05%		100%		-	2.0	dB
	<u>GROUP B</u>	omitted						
5H.4.1.8.1.2	<u>GROUP C</u> Loaded Q	Test Frequency = 9375 $\pm$ 0.05% <u>Notes:</u> 1 and 5	2.5	1		-	6.5	

K1001	Test	Test Condition	AQL %	Insp. Level	Sym- bol	Limits		Units
						Min.	Max.	
5H.4. 2.3 (b)	<u>GROUP C Cont'd.</u> High level standing Wave Ratio	As for Recovery Test. Load Standing Wave ratio to be less than 1.03:1  <u>Notes:</u> 6	2.5	1		-	1.1	
	GROUP D and E omitted							
5H.5.3	<u>GROUP F</u> <u>Life Test</u> test point 1000 hrs.	Frequency 9375 Mc/s $\pm 5\%$ tp = 0.5 $\mu$ secs P.r.f. = 800 Line power = 200kW peak  <u>Note:</u> 7  Tests and limits to be as given in GROUP A		3%				
	<u>GROUP G</u>  Electrical retest after 24 days holding period.  Recovery time	     Test and limits as given in GROUP A	1	100%				

1. The Valve shall be fitted as shown in the drawing on page 6 and terminated in a matched load.
2. The susceptance may be measured by comparing the phase of the reflection with that of a Valve which is resonant at the test frequency. The susceptance is given by:-

$$\frac{B}{Y_0} = \frac{(1 + \frac{2G}{Y_0})}{2} \cdot \tan \frac{4 \pi \Delta l}{\lambda_g} = 1.1 \frac{2 \pi \Delta l}{\lambda_g}$$

for small  $\Delta l$  and where  $\frac{G}{Y_0}$  is assumed to be 0.05.

Where  $\lambda_g$  is the guide wavelength and  $\Delta l$  is the phase shift measured in the same units as  $\lambda_g$ .

3. A curve of V.S.W.R./frequency is plotted around a centre value of Test Frequency ( $F_0$ ). See Group A Test Clause (a). The Valve is resonant ( $B=0$ ) at the frequency corresponding to the maximum W.S.W.R. value. Whence:-

$$r_0 = \frac{1}{G/Y_0} + 1 \quad \text{therefore} \quad G/Y_0 = \frac{1}{r_0 - 1}$$

If the Valve has passed the susceptance test ( $B < 0.06 Y_0$ ), the V.S.W.R. measured at test frequency ( $F_0$ ) is very nearly equal to  $\frac{1}{G/Y_0} + 1$  and may be used to measure  $G$ .

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

$$\frac{P}{P-PL} = \frac{4000}{4000-680} = 1.20 (0.8dB)$$

5. Loaded Q is defined as :-

$$QL = \frac{F_0 \frac{dB/Y_0}{dF}}{2(1+G/Y_0)} \quad \text{where } F_0 = \text{Test Frequency.}$$

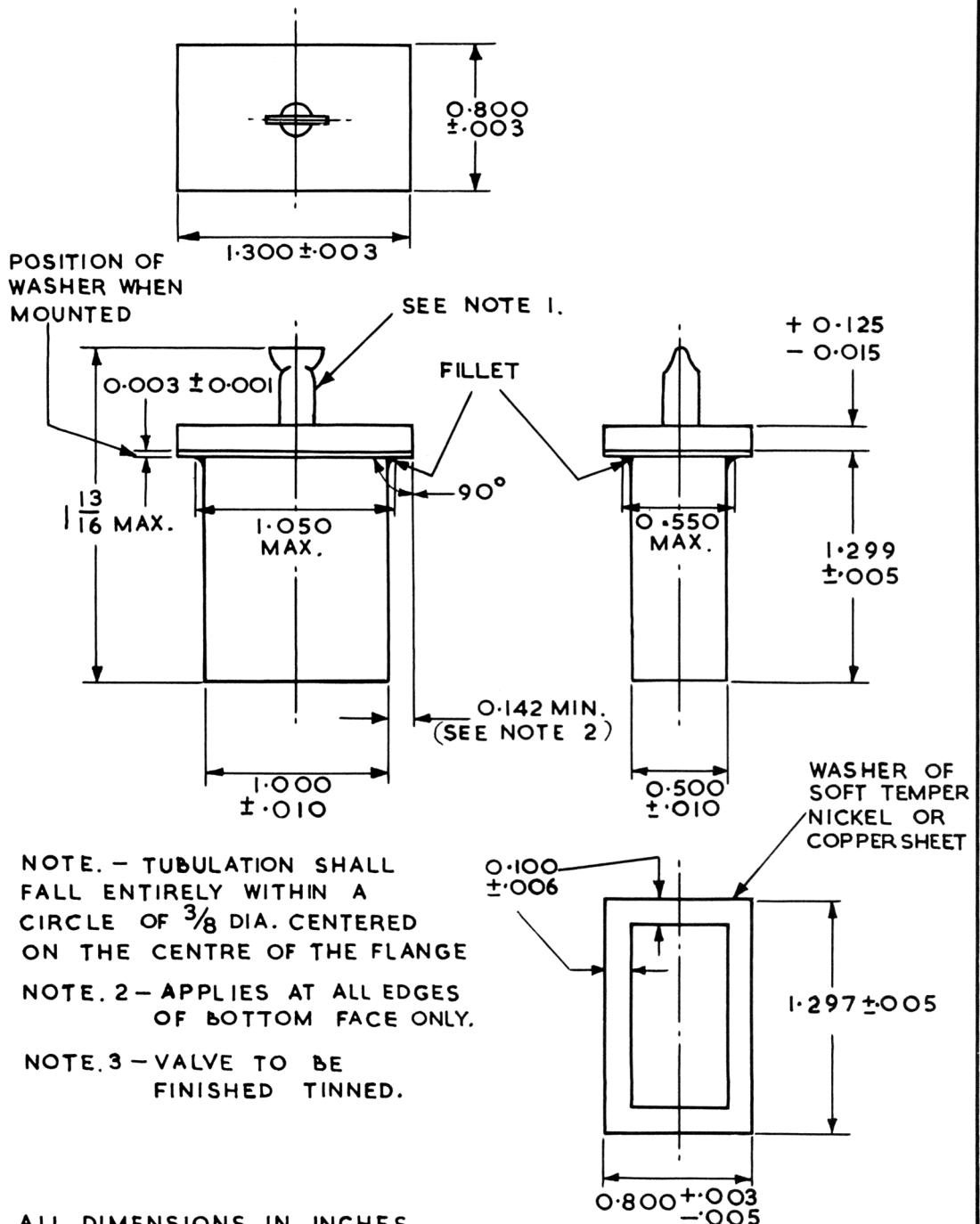
See Group A Test Clause (a)

6. This test may be made at low levels, simulating the arc by a metallic short in intimate contact with the inside of the window.
7. The manufacturer at his discretion may put twice the normal sample size on life test for a period of 500 hours. The criterion for acceptance shall be that the average life expectancy shall be at least 90% where

$$\text{Life Expectancy} = \frac{\text{Total hours of Life operation} \times 100}{\text{Total possible hours}}$$

Provided that earlier life tests results were acceptable, shipment of Valves may be permitted from the commencement of a supply contract.

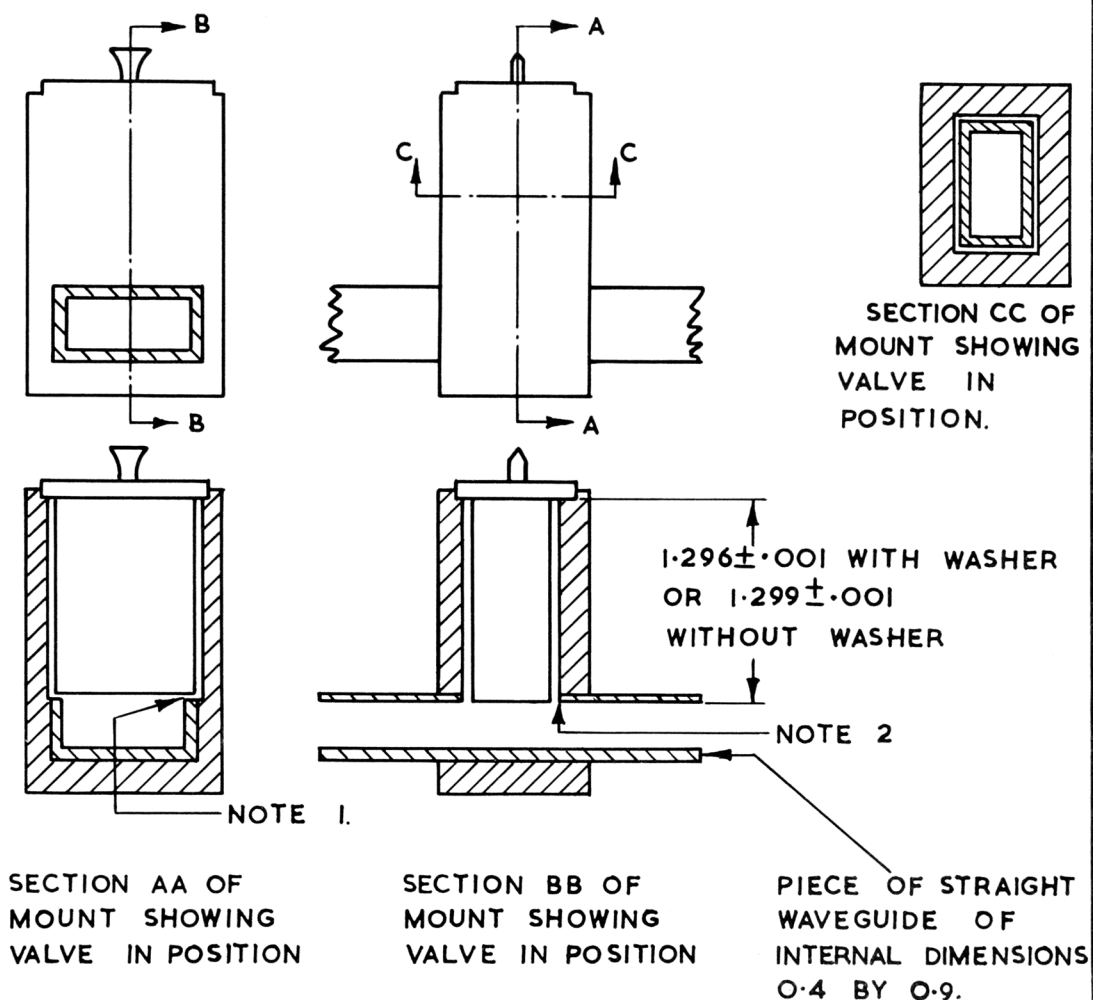
## DIMENSIONS OF CV 6070



## MOUNT FOR TESTING CV 6070

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.



ALL DIMENSIONS IN INCHES