

Specification MOS(A)/CV459 Issue 2 Dated 3.6.54 To be read in conjunction with K1001	<u>SECURITY</u>	
	<u>Specification</u> UNCLASSIFIED	<u>Valve</u> UNCLASSIFIED

→ Indicates a change

TYPE OF VALVE - Broad-band TR Cell PROTOTYPE - VX9019	<u>MARKING</u> See K1001/4
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<u>RATING</u>	<u>Dimensions & Connections</u>	
Operating Frequency Range (Mc/s)	8500 to 9300	See Drawing to CV458
Max. Peak Power (kW)	250	
Min. Peak Power (kW)	4	
Min. Primer Supply Voltage (-V)	950	
Max. Primer Current (mA)	185	
Min. Primer Current (mA)	100	



NOTES

- A. With duty cycle not exceeding 0.001.
- B. The primer current shall be limited by series resistances, of which at least one megohm must be placed adjacent to the valve.

To be performed in addition to those applicable in K1001

Test Conditions		Test	Limits		No. Tested	Note	
			Min.	Max.			
a	Primer Supply Voltage (V) 900 Test shall be performed at least 7 days after any previous discharge.	<u>Primer Breakdown</u> (secs) The delay shall be measured between application of primer voltage and breakdown.	-	5	100%	1	
b	1000	<u>Primer Operating Voltage</u> (V) The primer voltage shall be measured after breakdown has occurred.	180	280	100%	1	
c	1000	Line shall be energised with not more than 10 mW RF and terminated in a load matched better than 1.02 VSWR	<u>VSWR</u> (i) Measured at frequencies of 8500, 8700, 8900, 9100 & 9300 Mc/s. (ii) Measured over the frequency range of 8,500 - 9,300 Mc/s	-	1.20	100%	1
d	1000	Valve shall be mounted between impedances matched better than 1.10 VSWR. Line shall be energised with not more than 10 mW RF. Test frequency = 8,500 Mc/s.	<u>Insertion Loss</u> (db)	-	1.0	100%	1
e	1000	Line shall be energised using at least 30kW peak RF with ERF = 1000 c/s \pm 10% and terminated in a matched load. Total power shall be measured with $T_p = 1.0 \mu\text{sec} \pm 10\%$ Test frequency = 9080 \pm 50 Mc/s. The apparatus used for this test must be approved.	<u>High Power Leakage</u> (1) Spike Energy (erg pulse) (2) Total Power (mW peak)	-	0.3	100%	1, 2, 3 & 4
			35	100	100%		

Test Conditions		Test	Limits		No. Tested	Note	
			Min.	Max.			
f	Primer Supply Voltage (V) 1000	The test frequency of the simulated echo pulse shall be within the range 8,500 to 9,300 Mc/s, and its power, incident on the cell shall be less than 10 mW peak RF. The test frequency of the transmitter pulse shall be 9080 ± 50 Mc/s. Line shall be energised with at least 30kW peak RF FRF = $1000 \text{ c/s} \pm 10\%$ $T_p = 1.0 \text{ } \mu\text{sec} \pm 10\%$	<u>Recovery Time</u> (μsecs) The time shall be measured from the trailing edge of the transmitter pulse for an insertion loss exceeding that immediately before the transmitter pulse by:- (1) 6 db (2) 2 db	-	38	5% 5%	1 & 5
g	1000	The applied power shall be varied from 500 mW to 100 watts. $T_p = 1.0 \text{ } \mu\text{sec} \pm 10\%$ Other conditions as for Test (e)	<u>Low Power Leakage</u> (mW peak) The total leakage through the cell shall be measured as the applied power is varied from 500 mW to 100 watts.		500	5%	1
h	1000	Line to be energised at a convenient low power level. Test frequencies = 8500, 8900 and 9300 Mc/s.	<u>Electrical Length</u> (degrees) The length shall be determined of ROSC No. 16 Waveguide having the same effective electrical length as the cell. For a sampling test the mean values of a sample of not less than 6 cells must lie within the limits given: (i) at 8500 Mc/s (ii) at 8900 Mc/s (iii) at 9300 Mc/s	182 255 319	202 275 339	5% or 6 per week which- ever is the greater	

Test Conditions		Test	Limits		No. Tested	Note	
			Min.	Max.			
j	Primer Supply Voltage (v) 1000	As for Test (e)	<u>Position of Short</u> (ins) The distance shall be measured of the effective RF short behind the front flange of the cell	0.014	0.028	TA	1
k	1000	Line shall be energised with not more than 4 kW peak RF measured immediately after the cell. Other conditions as in Test (c)	Arc Loss (db)	-	0.8	TA	1
m	-	The cell shall be operated for one hour with the air pressure in the waveguide on the input side maintained at 30 lbs/sq.in. absolute. Tp = 1.0 /usec ± 10%. Other conditions as in Test (e)	High Pressure	-	-	TA	1

NOTES

1. The primer supply voltage shall be DC having a peak-to-peak ripple voltage not exceeding 1%, and shall be negative with respect to the body of the cell. The regulation of the supply shall be negligible at load currents up to 0.2 mA. The supply shall be connected to the primer electrode through resistances totalling 5.5 megohms $\pm 5\%$, of which at least one megohm must be placed adjacent to the valve.
2. The high power leakage tests shall be performed using a Magnetron, Type CV2167.
3. High power leakage may be measured by the two-pulse method, or other suitable methods using approval equipment. If the two-pulse method is used, the pulse lengths shall be approximately 0.1 (t_1) and 1.0 (t_2) microseconds. If the measured leakage powers are P_1 and P_2 , respectively:

(a) Spike Energy

With pulse length, t_1

$$\text{Spike energy} = \frac{10P_1}{1.8F}$$

(b) Total Power

With pulse length, t_2

$$\text{Total power} = \frac{10^3 P_2}{1.8F t_2} \quad \text{mW peak}$$

4. The minimum limit for total leakage is a manufacturing test limit applying to new cells only.
5. The limits for recovery time are manufacturing limits applying to new cells only. The recovery time will change with life, and a cell is considered to have reached its end-of-life when the recovery time to 6 db exceeds 10 microseconds, or to 2 db exceeds 20 microseconds