

SPECIFICATION CV461/2/3
ISSUE 3 DATED 25.11.52

AMENDMENT NO. 1

PAGE 1 RATING

Amend Max. Transmitter Peak Power to read 50KW NOTE B

ADD: NOTE B: Higher power levels up to 200KW may be used, but this will result in a shorter life period of less than 200 hours.

JULY 1961

ROYAL RADAR ESTABLISHMENT

CV 461
 CV 462
 CV 463

MINISTRY OF SUPPLY - DLRD(A)/TRE

VALVE ELECTRONIC

| | | |
|---|----------------------|--------------|
| Specification MOS(A)/CV461 Specification MOS(A)/CV462 Specification MOS(A)/CV463 Issue 3 Dated 25.11.52 To be read in conjunction with K1001, excluding clauses 5.2 and 5.8. | <u>SECURITY</u> | |
| | <u>Specification</u> | <u>Valve</u> |
| | UNCLASSIFIED | UNCLASSIFIED |

—————▶ Indicates a change

| | |
|--|----------------|
| TYPE OF VALVE - Broad-band TB Cell PROTOTYPE - VX4088; VX4089; VX4090 | <u>MARKING</u> |
| | See K1001/4 |

| | | | |
|----------------------------------|--------------|-----------------------|--|
| <u>RATING</u> | | <u>DIMENSIONS</u> | |
| | | See Drawing on Page 4 | |
| | Note | | |
| Min. Transmitter Peak Power (kW) | 5 | | |
| Max. Transmitter Peak Power (kW) | 200 | | |
| Frequency Coverage - CV461 (Mcs) | 9315 to 9435 | | |
| - CV462 (Mcs) | 9180 to 9300 | | |
| - CV463 (Mcs) | 9020 to 9140 | | |

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|---|
| <u>NOTE</u> |
| A. At least one washer of the dimensions shown in the Drawing on Page 4, shall be supplied with each valve. |

CV 461
CV 462
CV 463

TESTS

To be performed in addition to those applicable in K1001

| | Test Conditions | Test | Limits | | No. Tested | Note |
|---|--|--|--------|-------|------------|---------------|
| | | | Min. | Max. | | |
| a | Valve shall be mounted as shown in Drawing on Page 5 and terminated in a matched load. Test Frequency (Fo) CV461 = 9375 Mcs \pm 0.05% CV462 = 9240 Mcs \pm 0.05% CV463 = 9080 Mcs \pm 0.05% | Tuning Susceptance | -0.06 | +0.06 | 100% | 1 2,4. |
| b | As for Test (a) | Equivalent Conductance | - | 0.1 | 100% | 2 |
| c | Valve shall be mounted as shown in Drawing on Page 5 and terminated in a matched load. Line to be energised with 4kW peak RF. Frequency = 9240 Mcs \pm 1.5% Tp = 1 usec \pm 10% PRF = 1000 pps \pm 10% Test to be performed at least 7 days after pumping and not less than 24 hours after any previous discharge. | Firing Time (secs) i.e. Time interval between application of power and tube firing | - | 10 | 100% | |
| d | As for Test (c) | Arc Loss (db) | - | 0.8 | 100% | 3 |
| e | As for Test (c), except that the line shall be energised with 12 to 15 kW peak RF derived from a higher power source through an attenuator of at least 6 db. Frequency = 9240 Mcs \pm 1.5% Tp = 1 usec \pm 10% PRF = 1000 pps \pm 10% | Recovery Loss (db) Measured by a signal generator pulse injected 2 usecs after trailing edge of the transmitter pulse. Signal generator frequency: CV461 = 9375Mcs \pm 0.05% CV462 = 9240Mcs \pm 0.05% CV463 = 9080Mcs \pm 0.05% | - | 2.0 | 100% | |
| f | As for Test (a) | Loaded Q | - | 6.5 | TA | 4 |

CV 461
CV 462
CV 463

TESTS (Cont'd)

| | Test Conditions | Test | Limits | | No. Tested | Note |
|---|--|---|----------------------|-------------|------------|------|
| | | | Min. | Max. | | |
| g | As for Test (e) Load Standing Wave Ratio to be less than 1.03:1 | High-level Standing Wave Ratio CV461 CV462 CV463 | 0.91 0.91 0.87 | - - - | 8 | 5 |

NOTES

- 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:-

$$\frac{B}{Y_0} = \frac{(1 + 2 \frac{G}{Y_0})}{2} \tan \frac{4\pi\Delta l}{\lambda g} \approx (1.1) \frac{2\pi\Delta l}{\lambda g} \text{ for small } \Delta l$$

Where λg is the guide wavelength and Δl is the phase shift measured in the same units as λg and where G/Y_0 is assumed to be 0.05.

- A curve of SWR vs Frequency is plotted around a centre value of Test Frequency (F_0). See Test Clause (a). The valve is resonant ($B = 0$) at the frequency corresponding to the maximum SWR. The value of SWR is:-

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

If the valve has passed the susceptance test ($B < 0.06 Y_0$), the SWR measured at Test Frequency (F_0) is very nearly equal to $\frac{1}{G/Y_0} + 1$ and may be used to measure G .

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

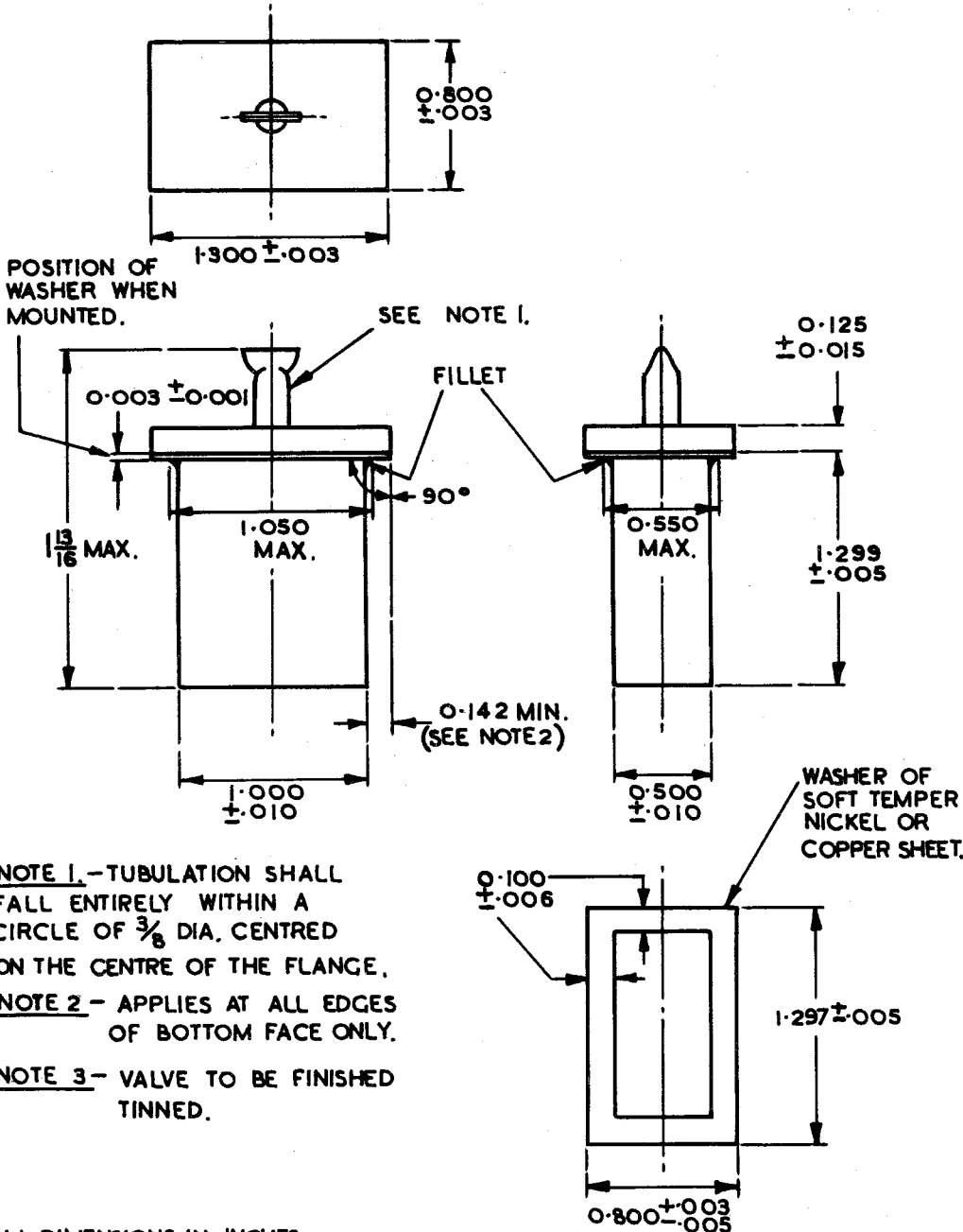
$$\frac{P}{P - P_L} = \frac{4000}{4000 - 680} = 1.20 \text{ (0.8db)}$$

- Loaded Q is defined as:-

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

- This test may be made at low levels, simulating the arc by a metallic short in intimate contact with the inside of the window.

DIMENSIONS OF CV 461, CV462 & CV 463.

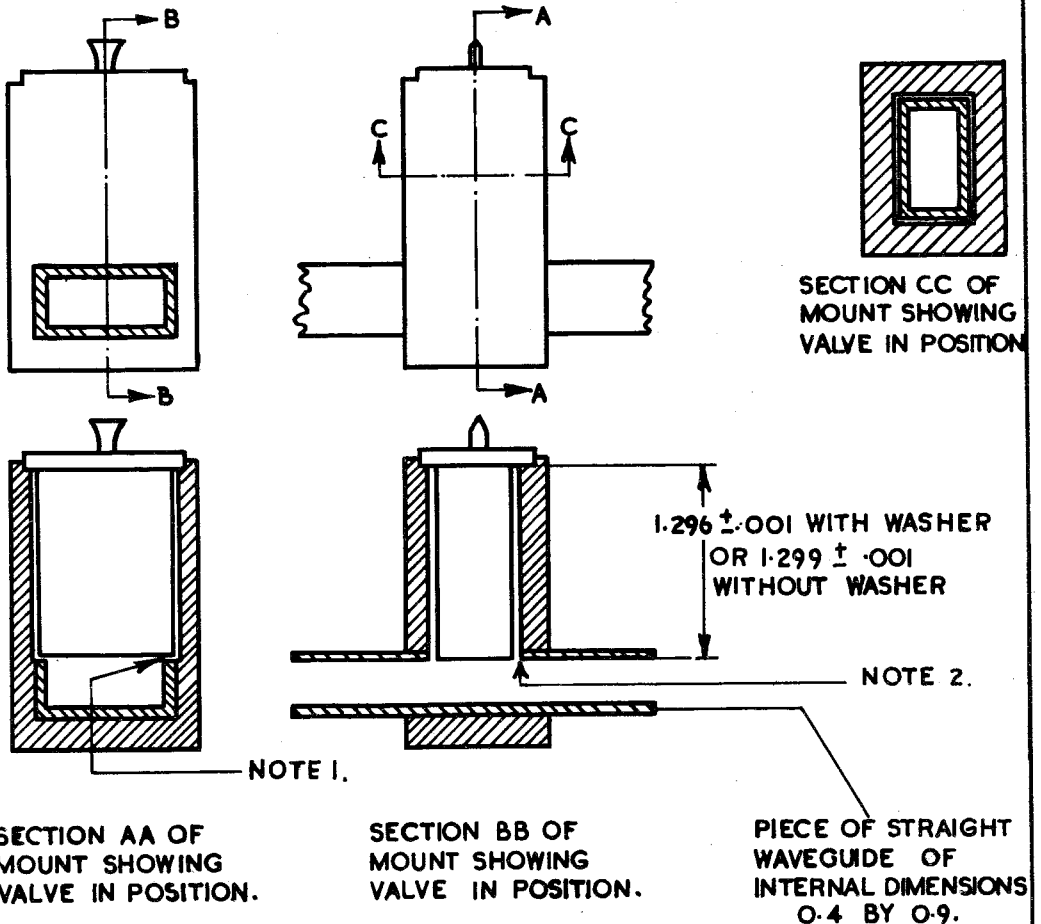


ALL DIMENSIONS IN INCHES.

MOUNT FOR TESTING CV461, CV462 AND CV463.

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