

Specifications No. : Spec/18/1/2005/TM/1004

Specifications of ceramic Tetrode (CQL 2-1)

Para wise compliance report for all the clauses of the specification must be done without it tender will be rejected.

1.Scope:

The ceramic Tetrode is being used in AIR's network of SW transmitters 50 KW SW BBC/BEL make and 100 KW & 250 KW SW BBC make Transmitters in intermediate RF power amplifier stage.

2. General characteristic of the valve:

The valves offered should be **New and of first quality.**

- a. Ceramic metal tetrode with co-axial structure.
- b. Thoriated tungsten cathode with indirect heating.
- c. Forced air cooled .
- d. Anode dissipation : 2.0 kW.
- e. Designed for RF Broadcasting applications amplifiers.
- f. Operating position : Vertical anode up.
- g. Weight: Approx.1.1 kg.

3. Eligibility of the supplier:

- a. The supplier must possess valid ISO 9001/ 2000 Certificate in production.
- b. Original Equipment Manufacturer or their Authorised agent shall only be eligible to quote. Name and address of the OEM and location of its manufacturing facilities is to be given.
- c. Authorisation letter must be ink signed by the OEM and submitted alongwith the tender.
- d. The supplier must possess an experience of at least 2years in manufacturing.
- e. The supplier must provide past record of timely and good quality supply of tendered items to Broadcast Organisations in the preceding two years supported with copies of orders placed by the Broadcast Organisation with the Manufacturing firm, and Broadcaster's satisfaction letters regarding the tendered item.

Any offer which fails to meet the above eligible condition will be summarily rejected.

4. Electrical Specifications :

4.1.1 Filament voltage : 3.8 Volt $\pm 5\%$

Filament current for $V_f 3.8\text{ V}$ 20.5 A

Mutual conductance 55 mA/V

At $A_v = 3\text{ KV}$, $G_2 = 500\text{V}$, $I_A = 0.5\text{A}$

4.1.2 Interelectrode Capacitance

$K - g_1 = 42\text{ pF}$ $g_1 - a = 0.05\text{ pf}$
 $g_1 - g_2 = 60\text{ pF}$ $K - a = 0.005\text{ pF}$
 $K - g_2 = 2,2\text{ pF}$ $g_2 - a = 8,0\text{ pF}$

4.1.3 Amplification Factor

$\mu_{g_2 g_1}$ 11
at $A_v = 3\text{ KV}$, $V_2 = 500\text{ V}$, $I_A = 0.5\text{A}$

5. Mechanical Specifications: Please see the attached diagram of the valve.

6. Operating Data

6.1 Maximum Ratings:

Cold plate voltage	3700 V
Plate Voltage	3500 V
G_2 Voltage	650 V
G_1 Voltage	- 100 V
Cathode current	1.1 A
Plate input Power	3.3 KW
Plate Dissipation	2 KW
G_2 Dissipation	30 W
G_1 Dissipation	05 W
Surface Temperature	250 °C

6.2 Operating values :

DC anode voltage	3400 V
DC screen grid voltage	600 V
DC control grid voltage	-100 V
Frequency	170-230 MHz
Power Gain	$\geq 19\text{dB}$
Zero signal plate current	300 mA
Plate current	800 mA

Grid 2 Current	22 mA
Anode dissipation	2.0 KW
Screen grid dissipation	30 W
Control grid dissipation	5 W

6.2 Tube Cooling:

Airflow ($P_a = 2$ KW)	2.0 m ³ /min
Air Pressure ($P_a = 2$ KW)	2.2 mbar

7. Certificate of Origin:

- i. In order to verify that each tube supplied by OEM comes from an ISO-9001/2000 certified factory, the vendor should provide country of origin and type of the tube, and Sr. No., if any, must be engraved or inked on the body of each tube and it must be visible easily even while in operation.
- b) In the absence of such a certificate of origin on the tubes, the tubes shall be considered as rebuilt or not manufactured by vendor.
- c) Rebuilt/ Refurbished/Reconditioned tube will not be accepted

8. Package and Marking

Please refer to the relevant clause in the booklet “ **Instructions to Bidders**”

9. INSURANCE AGAINST WAR AND MARINE RISK:

Please refer to Commercial terms for transportation by air, sea and land up to ultimate consignee.

10. Tube Appearance

The tube (Valve) brazing area, ceramic cleanliness, electrical connections, coolant connection, plating, shining silver plated surface around anode, cathode grid rings should be of high quality.

The shining of silver plated on cathode, grid and anode ring should be as good as new after the run of 500 hours operation of the tube.

11. Delivery

Delivery should complete in nine months after the issue of the AT. The lot of tubes should be duly insured (Insurance as per commercial terms) and be delivered at the destination of ultimate consignee (AIR Stations in India) mentioned in the AT.

12. Guarantee Conditions

The electron tubes shall be free from defects in design, material and workmanship. The tube will be operated within pre designed fixed parameters and dynamic broadcast parameters, by taking all cooling conditions into account.

The tube shall be guaranteed for 4000Hrs. of heater/filament operation or 2 years from the date of receipt which ever occur first. In case of failure of the tube within the first 500 Hrs. full free replacement with a **New and of first quality tube** is to be provided by the OEM/ supplier. Prorata credit will be for failure of tube between 500hrs. and 4000hrs. The claim shall be settled by the **Supplier/OEM without any option** as given below :

If the tube fails after 500 hours and within guaranteed 4000 hours, then prorata

$$C = \frac{P(G-H)}{G}$$

C - Credit

G - Guaranteed no. of hours

H - Useful filament hours served by the defective tube.

P - Purchased price of defective tube.

13. Performance Guarantee

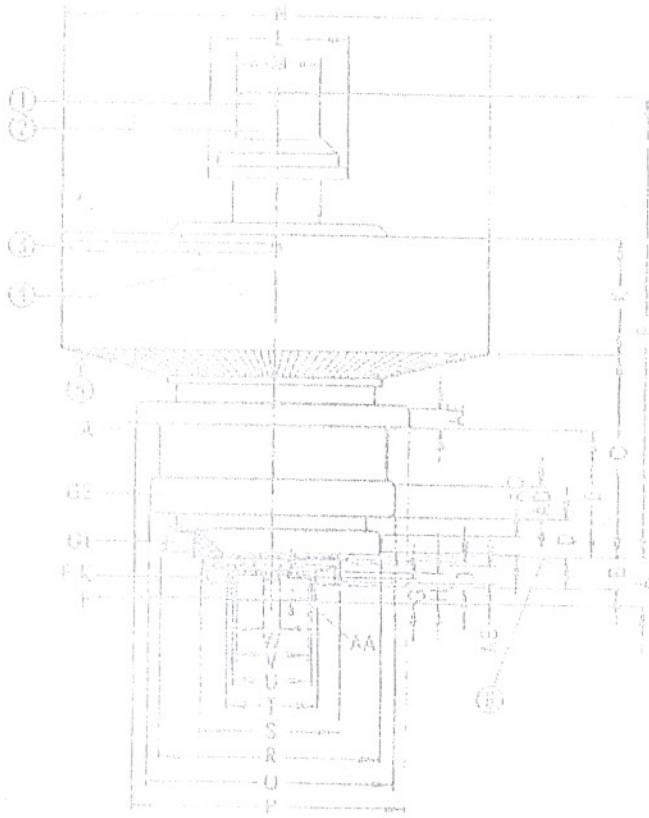
As per DGS and D rule

14. Literature

Necessary literature, catalogues concerning to the article in supply and the company profile including the manufacturing procedure etc. must be supplied by the Bidder.

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Dimensions

	MIN	MAX
A	10,3	12,1
B	6,4	7,8
C	44	45,4
D	8,1	9,7
E	27,9	29,5
F	99,6	103
G	6,2	
H	6,8	
J	6,8	
K	30,8	33,2
L		∅ 27
M		∅ 22
N	∅ 94,7	∅ 95,3
P	∅ 59,8	∅ 60,2
Q	∅ 53,8	∅ 54
R	∅ 45,8	∅ 46,2
S	∅ 29,9	∅ 30,1
T	∅ 17,9	∅ 18,1
U	∅ 16,5	∅ 16,9
V	∅ 15,5	
W		∅ 5
AA	5,2	
AB	4,7	
AC	2,7	
AD	5,6	
AE	3,7	

VALVE CQL 2-1

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