PRASAR BHARATI
BROADCASTING CORPORATION OF INDIA
DIRECTORATE GENERAL:ALL INDIA RADIO
(PLANNING & DEVELOPMENT UNIT)

No. 18/1/2005-E.I

Specification for :		**Valve type 4CX-5,000 A/CQL-5-1** High power ceramic Tetrode
Specification no.	:	Spec/18/1/2007/TM/1011
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Para wise compliance report for all the clauses of the specification must be done without it tender will be rejected.

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Dy. Director Engg. (T.M.)

Specifications No. : Spec/18/1/2007/TM/11

Specifications of ceramic Tetrode (4CX-5,000 A/CQL-5-1)
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 10 KW &250 KW SW transmitters . The valve is in use in modulator stage of 10 KW SW NEC make Transmitters and in IPA stage of 250 KW SW BBC make Transmitters .

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 direct heating.
c. Anode: forced air cooled.
d. Maximum frequency for full ratings (C)=220 MHz.
e. Anode dissipation: 5kW.
f. Designed for RF Broadcasting applications amplifiers.
g. Output power up to 16kW in broadcasting.
h. Operating position : Vertical anode up.
i. Net Weight: 4.31 Kg.

3. **Eligibility of the supplier:**

a. The supplier must posses 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** : 7.5 Volt

Filament current for V_f 7.5 V 75A

4.1.2 **Interelectrode Capacitance**

a) Cathode ground

Cin	115 pf
Cout	20.5 pf
Feed through	0.7 pf

b) Grid grounds

Cin	53.0 pf
Cout	20.5 pf
Feed through	0.1 pf

4.1.3 **Amplification Factor**

Grid to screen 4.5

5. Mechanical Specifications:

Maximum Length(Less boiler)	231.80mm
Maximum Diameter(Less boiler)	125.40mm.
Operating Position	Vertical
Weight	≈ 4.31kg

6. Operating Data

6.1 Absolute Max. Rating:

Class of operation	Type of service	Maximum Rating	
		Plate Voltage (V)	Plate Current (A)
C	RF power Amplifier	7500	3.0
C	RF power Amplifier plate modulated	5500	2.5
C	RF power Amplifier Screen modulated	7500	3.0
AB_1	RF linear Amplifier	7500	4.0
AB_1	AF Amplifier or Modulator	7500	4.0

6.2 Typical Operating Values : (Frequency 30 MHz)

Class of operation	Type of Service	Plate voltage (V)	Screen voltage (V)	Plate current(A)	Drive power (watts)	Output Power (watts)
C	RF power Amplifier	7500	500	2.8	150	16,000
C	RF Power Amplifier Plate modulated	5000	500	1.4	25	5800
C	RF power Amplifier Screen modulated	7500	350	1.1	11	3550
AB_1	RF Linear Amplifier	7500	1250	1.9	---	10000
AB_1	RF Amplifier or Modulator	7000	1250	3.7	---	17500

6.3 Tube Cooling:

Anode of the valve should be forced air cooled.

i) Operating Temperature Maximum

Ceramic/Metal seals and Anode Core 250^oC

7 **Certificate of Origin**:

a) 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 upto 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 100 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 2000Hrs. of heater/filament operation or 2 years from the date of receipt whichever occur first. In case of failure of the tube within the first 100 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 100hrs. and 2000hrs. The claim shall be settled by the **Supplier/OEM** **without any option** as given below :

If the tube fails after 100 hours and within guaranteed 2000 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.