

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

**No.18/1/2009-EI/**

**Specification for** : **Valve Type- BEL- 3000**  
Triode with coaxial structure .

**Specification No.** : Specs./18/1/2009/TM/1016

**No. of pages** : 5

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

**(R.C.SINGH)**  
**Asstt. Director Engg. (TM)**

**Specifications No.:** Specs./18/1/2009/TM/1016

**Specifications of Triode Valve Type: BEL - 3000**

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

**1. Scope:**

This Triode Valve is being used in PA & Modulator stage of 10 KW MW HMB-104 make Transmitters in AIR Network.

**2. General Characteristic of the valve:**

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

- a. Valve: Triode with co-axial structure.
- b. Filament: Thoriated tungsten cathode with direct heating.
- c. Anode: Air cooled.
- d. Operating frequency: Upto 110 MHz.
- e. Operating position: Vertical, Anode up.
- f. Weight: Approx. 2.6 kg(Approx)

**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.
- c. Authorisation letter must be ink signed by the OEM and submitted along with the tender. Name and address of the OEM and location of its manufacturing facilities is to be given.
- 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: 12.6 V (AC)  $\pm$ 5%
- Filament current: 29.0 A
- Filament starting current: 175 A Max
- Mutual Conductance: 14 m A/V
- (Eb=2.5kv,Ib=0.7A)
- Maximum heating time: 120 Sec

#### 4.1.2 Interelectrode Capacitance:

	<u>Typical</u>	<u>Unit</u>
Grid to plate	18.5	pf.
Input	19.0	pf.
Output	0.5	pf.

#### 4.1.3 Amplification Factor: $\mu_{g_2 g_1}$

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#### 5. Mechanical Specifications:

Max. Length-	181 <b>mm</b>
Max diameter-	120 <b>mm</b>
Net weight	2.6 kg(Approx)
Mounting position	Vertical Anode up

#### 6. Operating Data:

##### 6.1 AF Power Amplifier and Modulator, Class B

###### Maximum Rating:

DC Anode voltage	6.2 KV
Anode Current	1.5 A
Anode dissipation	3.0 KW
Anode Input Power	3.7 KW

##### 6.2 Plate Modulated RF Power Amplifier, Class C

Anode voltage	5.0 KV Max
Anode current	1.0 A Max
Anode Input Power	5.0 KW Max
Anode dissipation	2.7 KW Max
Grid voltage	-1 KV Max
Grid current	0.3 A Max

### Typical Operation Ratings for Two Tubes:

DC Anode voltage	4.7 KV
DC grid voltage	-200 V
Peak AF grid to grid voltage	900 V
Zero Signal anode current	0.3 A
Max signal Plate current	2.8 A
Effective load resistance Anode-to-anode	3.64 k $\Omega$
Maximum Signal Driving Power	195 W
Maximum Signal Output power	8.8 KW

### 6.3 Tube Cooling:

Forced air

Through radiator at a static pressure of 74mm of water	8.5 m <sup>3</sup> /min
To filament metal header	0.28 m <sup>3</sup> /min
Radiator temperature	180 °C max
Glass envelope temperature	180 °C max
Glass to metal seals temperature (Filament, Grid and Plate)	180 °C max

### 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 shell 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 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 which ever 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