

**BUREAU OF INDIAN STANDARDS**

**DRAFT FOR COMMENTS ONLY**

(Not to be reproduced without the permission of BIS or used as an Indian standard)

**मसौदा भारतीय मानक**  
**रोटेटिंग एनोड के साथ डायग्नोस्टिक एक्स-रे ट्यूब के लिए विनिर्देश**  
**भाग 2: टाइप डीआरए-2**  
**(पहला पुनरीक्षण)**

***Draft Indian Standard***  
***Specification for Diagnostic X-Ray Tube with Rotating Anode***  
***Part 2: Type DRA 2***  
***(First Revision)***

**ICS No. : 31.100**

**©BIS 2024**

LITD 04: Electronic Display Devices and  
systems Sectional Committee

**Last Date for Comments:** 22 November 2024

**NATIONAL FOREWORD**

(Formal clauses will be added later)

This Indian Standard (Part 2) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Smart Infrastructure Sectional Committee, had been approved by the Electronics and Information Technology Division Council.

This standard was first published in 1984. This first revision has been brought out to bring the standard in the latest style and format of the Indian standard and reflect the modified references.

The following changes has been required in the standards under this revision:

- Adding Front cover page.
- Addition of Hindi Title.

- c) National foreword to be written as current practice.
- d) UDC Number to be changed to ICS code.

Specification for Diagnostic X-Ray Tube with Rotating Anode are being covered in a series of standards consisting of the following individual parts:

- Part 1: Type Dra 1
- Part 2: Type Dra 2
- Part 3: Type Dra 3
- Part 4: Type Dra 4
- Part 5: Type Dra 5

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2: 2022 'Rules for rounding off numerical values (second revision)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

**INDIAN STANDARD**  
**SPECIFICATION FOR DIAGNOSTIC X-RAY TUBE WITH ROTATING ANODE**  
**PART 2: TYPE DRA 2**  
***(First Revision)***

**1. SCOPE**

Specifies the characteristics and dimensional requirements of high-power X-ray tubes with rotating anode Type DRA 2, with two foci, each focus having different target angle.

**2. TERMINOLOGY**

For the purpose of this standard, the terms and definitions given in IS: 1885 (Part 4/Sec 2):1973 Electrotechnical vocabulary: Part 4 Electron tubes, Sec 2 X-ray tubes (first revision) shall apply.

**3. TYPE DESIGNATION**

The X-ray tubes shall be designated by three letters, followed by a numeral, the first letter indicating the intended use of the tube, that is, diagnostic, therapeutic, etc, the second and the third letter indicating the type of anode, that is, stationary or rotating. The numeral shall indicate the serial number of the particular type.

**Example:**

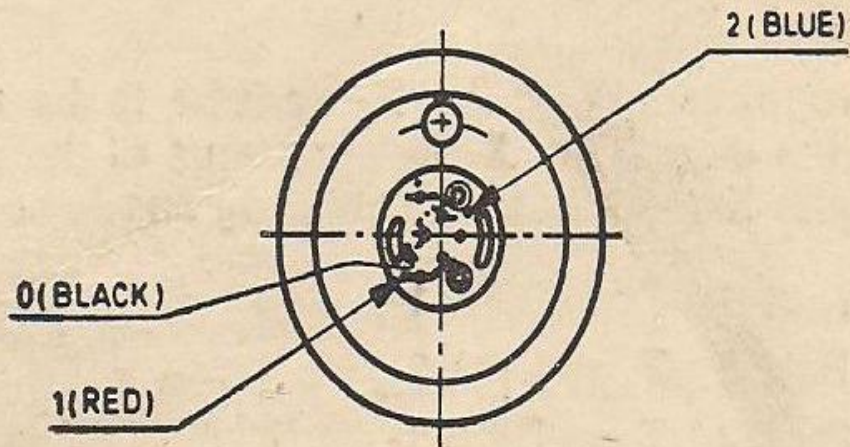
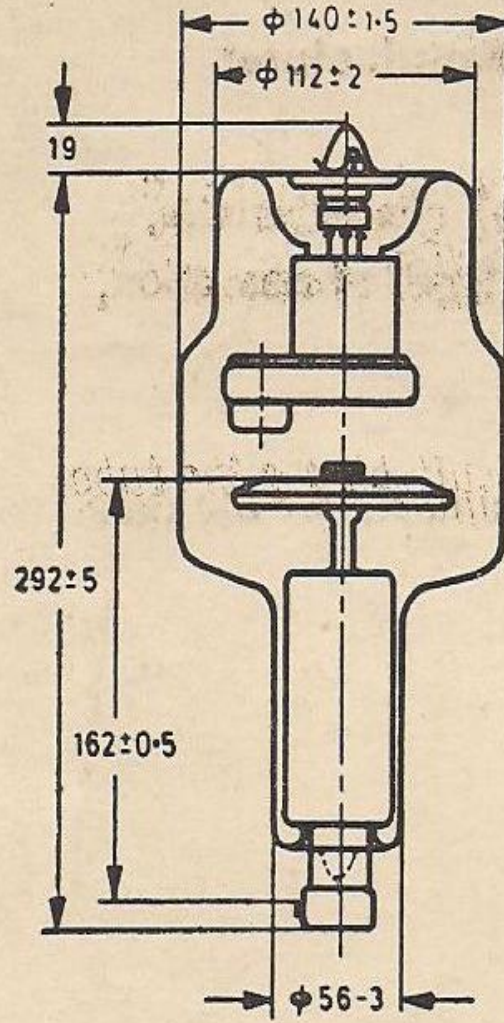
DRA 2 shall mean diagnostic X-ray tube with rotating anode, Type 2.

**4. DIMENSIONS**

The dimensions of the tube shall be within the limits specified in Fig. 1. The outline and shape of the tube may not necessarily correspond to the figure.

**4.1** The colour code for the terminals at the cathode end shall be as follows:

Common, Black, Small Focus, Red, Large Focus, and Blue.



All dimensions in millimetres.

FIG. 1 DIAGNOSTIC X-RAY TUBE WITH ROTATING ANODE

**5. CHARACTERISTICS**

	<b>For 1.2mm Focus</b>	<b>For 2mm Focus</b>
a) Type of operation	Full wave rectifying from single phase or three phase	
b) Maximum rated peak voltage shall be at least	125 kV	125 kV
c) Rated power at 0.1s (300W preloaded anode)	30 Kw, Min	50 Kw, Min
d) Optical focal spot [measured in accordance with IS: 4096:1973 Method of measurement of optical focal spot size of X-ray tubes (first revision)]	1.2 mm X 1.2 mm, Max	2 mm X 2 mm, Max
e) Target angle (measured by the use of optical projector)	17° to 19°	12° to 16°
f) Type of cooling	Oil Immersed	
g) Anode heat storage capacity (Calculated in accordance with IS 3154: 1965 Specification for X-ray tubes, diagnostic type)	170 000 Hu	
h) Anode speed (measured by stroboscopic method)	2800 rev/min approx. at 50 Hz	
j) Inherent filtration	0.7 mm Al, Min	
k) Mass	3.5 Kg, Max	

**6. PROTECTION**

The housing shall be in accordance with IS: 6567-1972 ‘Radiation protection for an X-ray tube in a protective tube housing, operating between 10 kV and 400 kV’.

**7. INFORMATION TO BE FURNISHED BY THE MANUFACTURER**

- a) Tube Rating Characteristic
  - i) Maximum current (mA) time(s) characteristic,
  - ii) Filament characteristic for all types of operation,
  - iii) Emission characteristic, and
  - iv) Cooling characteristics.
- b) Recommended Details of Housing Suitable for the Tube.

**EXPLANATORY NOTE**

This standard covers the requirements of the X-ray tube to be used for purpose of the radiography and fluoroscopy in medical diagnostic X-ray apparatus of the static type. Various parts of this Indian Standard on diagnostic X-ray tubes with rotating anode cover the following types:

- Part 1 Type DRA 1
- Part 2 Type DRA 2
- Part 3 Type DRA 3.
- Part 4 Type DRA 4
- Part 5 Type DRA 5

The diagnostic X-ray tubes with stationary anode are covered under IS: 3154: 1965.