

**HIGH PERFORMANCE SUPERGEN**  
**IMAGE INTENSIFIER TUBE WITH "EAGC"**  
**(Inverting Type)**

**1. INTRODUCTION:**

- 1.1 Double Proximity Focused 18mm High Performance SuperGen Image Intensifier Tube (Inverting Type) with glass in put and twisted fibre optics out put ( out put window radius plane ) is required for Passive Night Vision Device which operates on moonless night at low light levels of the order less than 1 milli-lux and at low contrast conditions.
- 1.2 The supplier shall offer quotation of their product which meets the specifications mentioned here-in.

**2. DESCRIPTION**

**2.1 In put Window**

- 2.1.1 Photo-cathode : S 25
- 2.1.2 In put Window : AVG Glass

**2.2 Out Put Window**

- 2.2.1 Screen : P 20
- 2.2.2 Out put window : Twisted Fiber Optics
- 2.2.3 Out put radius : Plane

**2.3 General**

- 2.3.1 Magnification : 1
- 2.3.2 Image Inversion : Yes
- 2.3.3 Optical Length : 21 mm (for reference only)
- 2.3.4 Mass : 100 grams (Maximum)
- 2.3.5 Connections : Flying Leads



*T. R. Agasthy*  
Sr. Dir. ODC

3. Optical Characteristics

## 3.1 Photocathode sensitivity

(a) White Light	Typ : 700	Min : 600 $\mu\text{A} / \text{lm}$
(b) Radiant Sensitivity at 830 nm	Typ : 55	Min : 43 $\text{mA} / \text{W}$

3.2 Luminance Gain at 20  $\mu\text{lx}$ 

Min : 6400	Max : 11000 $\text{cd}/\text{m}^2/\text{lx}$
Min : 20000	Max : 35000 $\text{lm}/\text{lm}$

## 3.3 Scr. Luminance Control Level

Min : 3	Max : 7	$\text{Cd}/\text{m}^2$
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## 3.4 E.B.I.

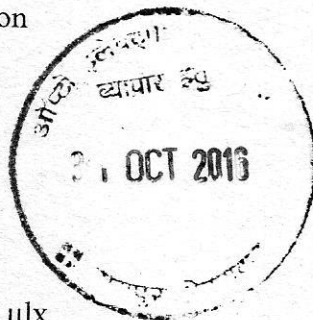
Max : 0.25	$\mu\text{lx}$
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## 3.5 Resolution

(a) Centre ( $\Phi$ 4 mm.)	Typ : 50	Min : 45	$\text{lp}/\text{mm}$
(a) Peripheral ( $\Phi$ 14 mm.)	Typ : 50	Min : 45	$\text{lp}/\text{mm}$

## 3.6 Modulation Transfer Function

at 2.5 $\text{lp}/\text{mm}$
at 7.5 $\text{lp}/\text{mm}$
at 15 $\text{lp}/\text{mm}$
at 25 $\text{lp}/\text{mm}$
at 30 $\text{lp}/\text{mm}$



Min : 86	%
Min : 65	%
Min : 42	%
Min : 22	%
Min : 15	%

3.7 Signal to Noise Ratio at 100  $\mu\text{lx}$ 

Min : 18
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## 3.8 Image alignment

Max : 0.5	mm
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## 3.9 Useful Input &amp; Output Diameter

Min : 17.5	mm
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4. Electrical Characteristics

## 4.1 Operating conditions and characteristics

(a) Operating Supply Voltage	Typ : 2.7V	Min : 2V	Max : 3.5 V
(b) Limiting Instant supply Voltage	Min : -3.7V		Max : 3.7 V
(c) Supply current at ambient temperature			Max : 16 mA

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5. **External Adjustment Gain Control (EAGC)**

- 5.1 The II Tube shall have the provision for adjustment of gain by means of External Adjustment Gain Control. The manufacturer shall specify the details of the circuit and the quality grade of the components to be used for varying the gain along with the quotation.

6. **Environmental Characteristics :**

- (a) Storage Temperature for four hours Min : -56 Max : + 65 ° C  
(b) Long Term Storage Min : -35 Max : + 35 ° C  
(c) Operating Temperature Min : - 52 Max : + 52 ° C

7. **Mean Time-To-Failure (MTTF) :** Min : 10000 hours

MTTF is measured at 20°C and 100  $\mu$ lux.

End of Life : S/N  $\leq$  9 or luminance gain  $\leq$  45% of the minimum value

8. Force on bearing surface Max : 200 N

9. Shock Acceleration  
During Six 2ms half sine impacts parallel and Max : 5000 m/s<sup>2</sup>  
Perpendicular to the Tube axis

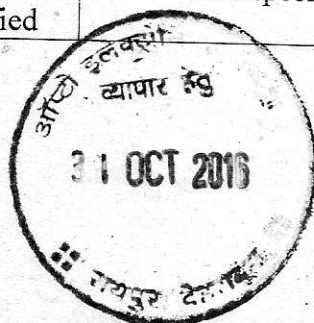
10. Vibration amplitude at Ten Cycles from 5 to 55 Hz  
parallel and perpendicular to the axis. Max : 2.54 mm

11. **Spots**

- 11.1 Maximum number of spots shall be in accordance with the Table 1

**TABLE - 1**

Diameter of Spots	Maximum Number of Spots allowed in area bounded by		
	ZONE DIAMTER		
	Zone 1 $\leq \text{Ø } 5.6 \text{ mm}$	Zone 2 $> \text{Ø } 5.6 \text{ mm} - \leq \text{Ø } 14.7 \text{ mm}$	Zone 3 $> \text{Ø } 14.7 \text{ mm}$
$> 380 \mu\text{m}$	0	0	0
$300 - 380 \mu\text{m}$	0	0	0
$230 - 300 \mu\text{m}$	0	1	1
$150 - 230 \mu\text{m}$	0	2	2
$75 - 150 \mu\text{m}$	1	3	3
$< 75 \mu\text{m}$	Not specified	Not specified	Not specified



7.1.1.1 signed  
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**12. Chicken Wire**

- 12.1 Maximum number of Chicken wire in area bounded by circle shall be specified by manufacturer in the quotation.

**13. Construction**

- 13.1 The assembly shall be fabricated in accordance with the Drawing No. OPT/R&D/IIT/ 197 (M1).
- 13.2 The distance between the screen phosphor and the encapsulation of the II Tube should be  $1.5 \pm 0.5$ mm. This important dimension is shown in the drawing and marked thus \*.
14. The supplier shall confirm that the testing procedures for the tests such as photometric, environmental, durability, life test etc. are in according with the specification MIL-I-49052F. **In case of any deviation, the same shall be clearly mentioned by the manufacturer in the quotation.**

**15. Warranty**

- 15.1 The supplier will provide warranty that the Image Intensifier Tubes are free from defects in materials, workmanship and performance within the specification of each for a usage period of 18 (eighteen) months from the date of its receipt at the consignee end.
- 15.2 The supplier will also provide warranty for a period of two years from the date of receipt of the consignment when the Image Intensifier Tubes are stored in dark environment at  $27^{\circ}\text{C}$  and  $45 \pm 5\% \text{RH}$ .

**16. Pre-Inspection of stores by Supplier**

- 16.1 The supplier should satisfy themselves that the stores are in accordance with the terms of contract and confirm to the required specification before actually dispatching consignment. Manufacturer's Test Certificate of each tube should accompany along with the shipping documents without extra charges.

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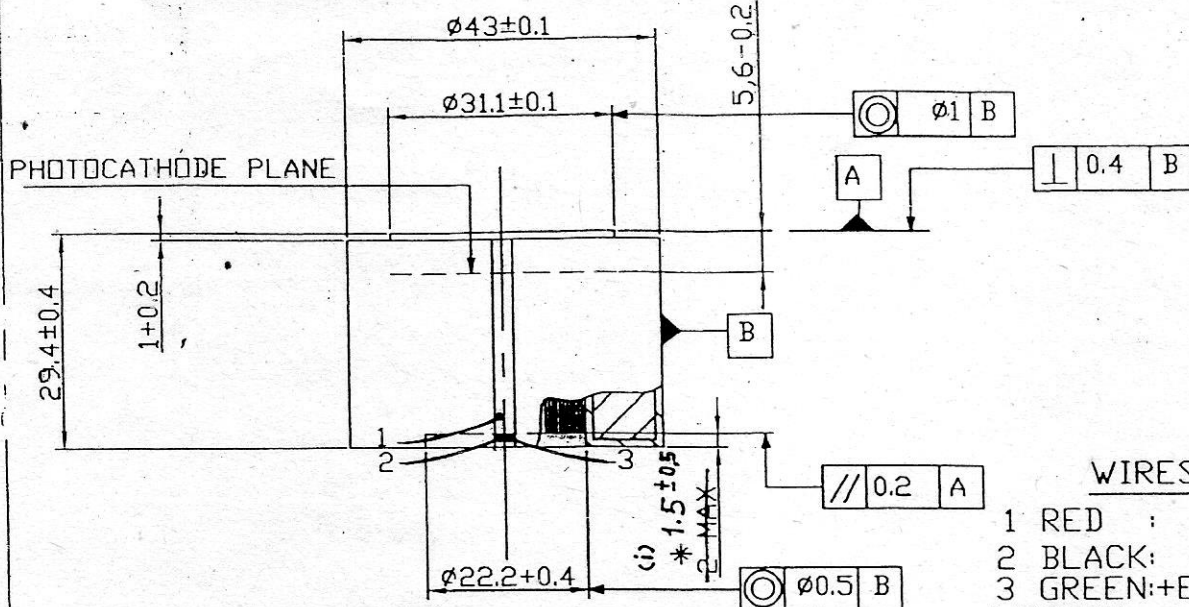
7.10.2013  
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DLF/DD/023

MATERIAL	—	TREATMENT	HARDNESS
SURFACE FINISH	—	PROTECTIVE FINISH	—



## WIRES

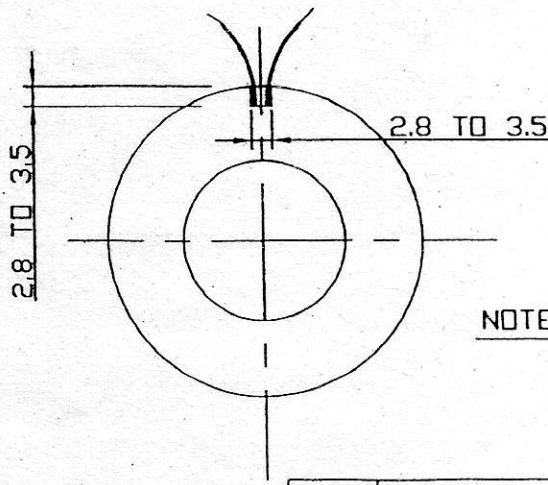
- 1 RED : +BATTERY  
2 BLACK: -BATTERY  
3 GREEN: +EXTERNAL GAIN  
LENGTH : 200 MIN  
PTFE : SHEATØ1

## INPUT WINDOW

FLATNESS : 30 FRINGES  
REFRACTIVE INDEX : 1.487

## OUTPUT WINDOW

FLATNESS : 4 FRINGES

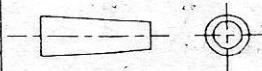


## NOTE:

1. ALL DIMENSIONS IN mm.  
2. IMPORTANT DIMENSION MARKED THUS.\*

D.C. 2813-I(P),

Q.3

				ITEM	DISCRIPTION	No.OFF	MATERIAL	REMARKS
				LIST OF PARTS				
				COMPT.No. ASSY. DRG		OPTO ELECTRONICS FACTORY DEHRADUN		
				2003	GEN.TOL.IS2102		TITLE HIGH PERFORMANCE SUPER	
O.C-2813-I(P).UPDATED DRG. PROV. SEALED IN SUPERSESSION OF EXISTING ONE.				DRAWN	V.THAPA	21/10	GEN.I.I.TUBE WITH 'EAGC' (INVERTING TYPE)	
				CHD	V.K.SHARMA	21/10	REF.	
				JWM	N.KUMAR	21/10	M1	
R&D/DA/84		24.2.2014	DIM. 1.5±0.5 WAS 2 MAX.		NAME	DATE	DRG.No. DLF/R&D/IIT/197	
D.A.No		DT/SIGN	DESCRIPTION		M/Y	SCALE 1:1		
AMENDMENTS				Jt.GM/TS		10/03	SHTS. 01 - SHT.No. 01	
				APPROVED				

O.C.-2813-I(P), UPDATED  
DRG. PROV. SEALED IN  
SUPERSESSION OF EXISTING  
ONE.

R&D/DA/84  
24.2.2014  
DIM. 1.5±0.5 WAS  
2 MAX.

D.A. No. DT/SIGN DESCRIPTION