

# **Preliminary SPECIFICATION**

## **M41EAA250WB00**

**41 cm / 17 inch  
rectangular monochrome CRT  
landscape format**

Modifications may be agreed upon after evaluation of about 200 products

<b>Contents</b>	<b>Page</b>
<b>APPLICATION</b>	<b>3</b>
<b>TECHNICAL RESPONSIBILITY</b>	<b>4</b>
<b>DISTRIBUTION LIST</b>	<b>5</b>
<b>CHARACTERISTICS</b>	<b>6</b>
<b>IMPORTANT NOTES</b>	<b>7</b>
<b>MECHANICAL DATA</b>	<b>8</b>
<b>MAXIMUM OF NON-DEFLECTED SPOT LANDING</b>	<b>9</b>
<b>OPTICAL DATA</b>	<b>10</b>
<b>PERMISSIBLE GLASS AND SCREEN DEFECTS</b>	<b>11</b>
<b>RESOLUTION (AT 50 % OF PEAK VALUE)</b>	<b>13</b>
<b>ELECTRICAL DATA</b>	<b>14</b>
<b>ABSOLUTE LIMITING VALUES</b>	<b>15</b>
<b>GRID DRIVE CHARACTERISTICS</b>	<b>17</b>
<b>ENVIRONMENTAL CONDITIONS</b>	<b>18</b>
<b>ESTIMATED LIFE TIME</b>	<b>19</b>
<b>ISO-EXPOSURE CALCULATED FOR 5 <math>\mu</math>SV/H</b>	<b>20</b>
<b>ISO-EXPOSURE CALCULATED FOR 1 <math>\mu</math>SV/H</b>	<b>21</b>
<b>PACKAGING</b>	<b>22</b>
<b>ATTACHMENT 1)</b>	<b>23</b>

## **Application**

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For displays in medical and alphanumerical applications.

**Technical responsibility**

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The committed details in this specification are obligatory upon both parties.

Changes and supplements to this specification during the development require the agreement of all persons responsible.

Responsible for the contents of this document are:

<i>Company/Department</i>	<i>Name</i>	<i>Tel.</i>	<i>Date</i>	<i>Signature</i>
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**Distribution list**

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	Name	Date	Release #	Copy #
			1.0	
			1.0	

## Characteristics

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- High resolution
- 110° 29 mm neck
- High contrast
- High luminance
- Flat & square colour bulb (low browning glass)
- Multicoated panel
- Conductive coated against charging
- Intrinsically safe
- Long life time
- Low phosphor noise
- Low drift
- Protected against internal flash

**Important notes**

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Implosion hazard                      CRT's are evacuated. In case of mechanical damage (e.g. by shock or scratches) implosion may occur.

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CRT is labelled according              UL 1418  
MPR II

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High voltage                              For reasons of the CRT's capacities, the anode connection can conduct high voltage for a long time after high voltage has been switched off.

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X-ray emission                              When operating the CRT within the limits, the x-ray dose rate will be under the allowed value of 1 µSv/h (equivalent to: 0.1 mR/h).

The tube is an intrinsic CRT type according the RöV (German Röntgenverordnung) dated Jan, 8th 1987, Part I; Attachment III, paragraph 6.

**Mechanical data**

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Useful screen	- Screen diagonal	min. 409.8 mm
	- Screen width	min. 329.0 mm
	- Screen height	min. 248.1 mm

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Inner radius of glass-bulb panel	Diagonal Axis	R = 1130 mm
	Long Axis	R = 1130 mm
	Short Axis	R = 1130 mm

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Position of operation	Anode connector on the right side (front view)
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Socket	JEDEC B7-218
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Neck diameter	28.6 ± 0.7 mm
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Anode connector	Bulb contact 7.92	J1-21
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Deflection yoke	-
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Weight	Approx. 7,2 kg
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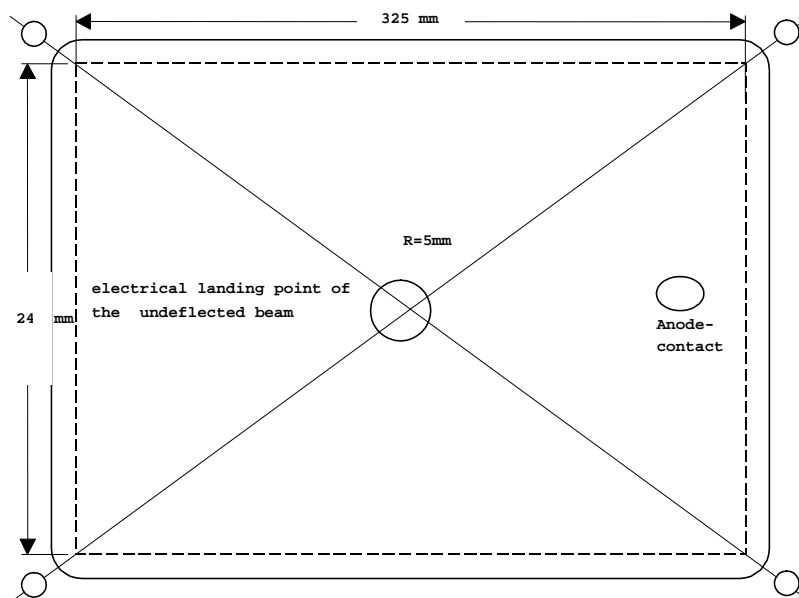
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Mechanical outlines	See attachment 1)
Overall length	max. 315 mm
Base Configuration	See attachment 2)



## Maximum of non-deflected spot landing

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- Phosphor material must be everywhere within a window of 244 × 325 mm. The centre of that phosphor window matches the mechanical centre of the CRT.
- The non-deflected spot landing must be within a circle with a radius of 3 mm around a point 3 mm left and 2 mm down from the mechanical centre of the CRT, provided that:
  - the CRT axis is in east-west direction and the front panel is facing east,
  - the anode connector is located on the right,
  - the deflection unit has been mounted to the tube,
  - there is a metal shield behind the deflection unit around the tube neck.
- The maximum rotation angle of the deflection unit may not exceed 0.2°.

**Optical data**

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Total transmission of bulb including coating / panel.

Approx. 27 % at 546 nm

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Phosphor

P45

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Colour co-ordinates:  
(during operation at a luminance of 250 cd/m<sup>2</sup>)

x = 0.250 ± 0.01  
y = 0.320 ± 0.01

measured with LMT Colormeter or Minolta CA100 adjusted to P45

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Front panel

Transmission 60 % (at 546 nm)  
Pilkington / Flabeg OEL-65 or equivalent  
Anti-static < 2 kΩ/□

The connection of the coating with the mounting device will be guaranteed 100 000 switch-on / switch-off cycles.

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Uniformity of luminance

At a luminance level of 60 cd/m<sup>2</sup> the luminance deviation between the centre and any point of the screen may not exceed 15 cd/m<sup>2</sup>.

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Glass bulb

NEG 17" 110° H28.6 or equivalent

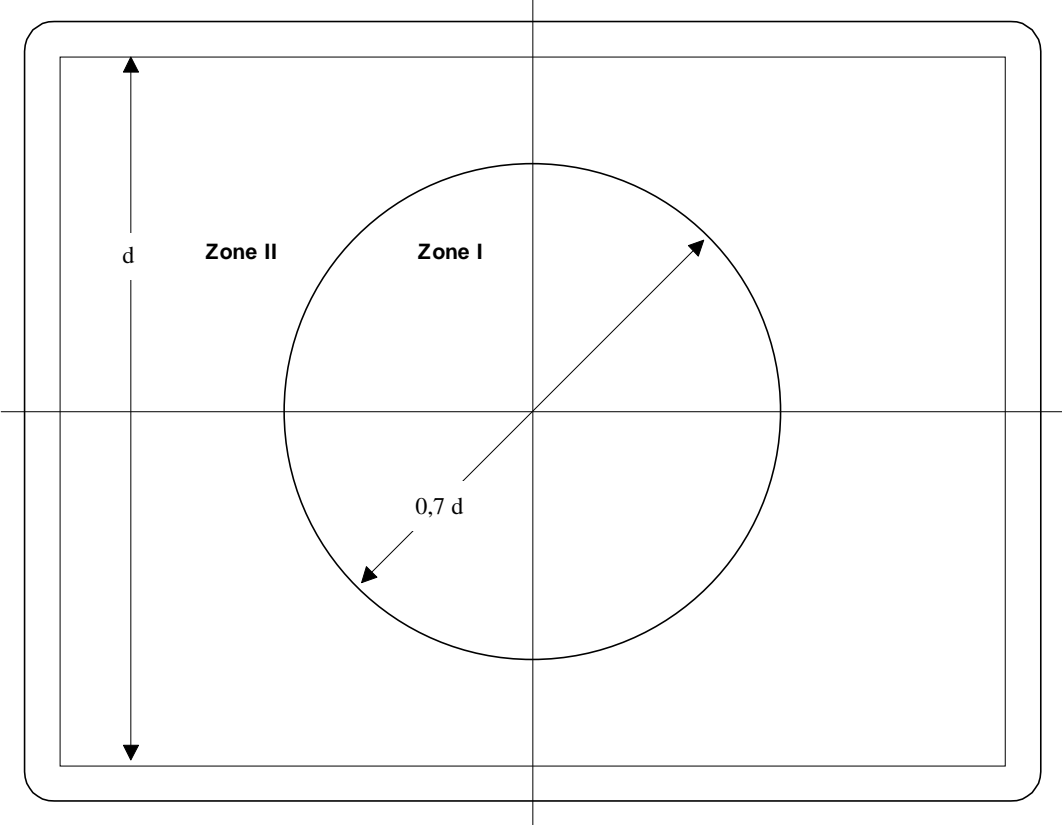
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Copper Strip Connection  
Getter mounting  
Silicon diameter  
Label Location

See attachment 2  
On top of gun  
> 80 mm  
See attachment 1)

**Permissible Glass and Screen Defects**

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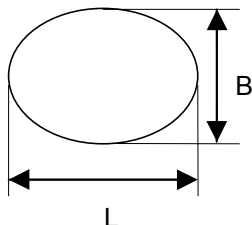


d = 244 mm

**Defect size G for the screen and glass specification**

L: max. length of defect

B: max. width of defect



for a side ratio of  
for a side ratio of

$$L/B \leq 3$$

$$L/B > 3$$

$$G = (L + B)/2$$

$$G = L/20 + 2B$$

**Permissible defects inclusive Panel**

Defect size G in mm	Number of defects		
	Zone I	Zone II	Sum <sup>1)</sup>
$\leq 0.2$	Any, but no accumulation		
$0.2 < G \leq 0.4$	2	3	4
$0.4 < G \leq 0.6$	-	3	3
Distance between defects	$\geq 50$ mm	$\geq 50$ mm	

<sup>1)</sup> Maximum number of all defects in zone I + II : 4

The maximum number of phosphor defects with defect size  $0,1 < G \leq 0,2$  within in area of  $30 \times 30$  mm : 3.

**Permissible panel scratches:**

Sum  $\leq 2$ , distance  $\geq 50$  mm, max. length/scratch  $\leq 10$  mm, max. width  $\leq 50$   $\mu$ m.

All defects are measured with Peak Stand Micro 25x

**Resolution (at 50 % of peak value)**

Limiting values

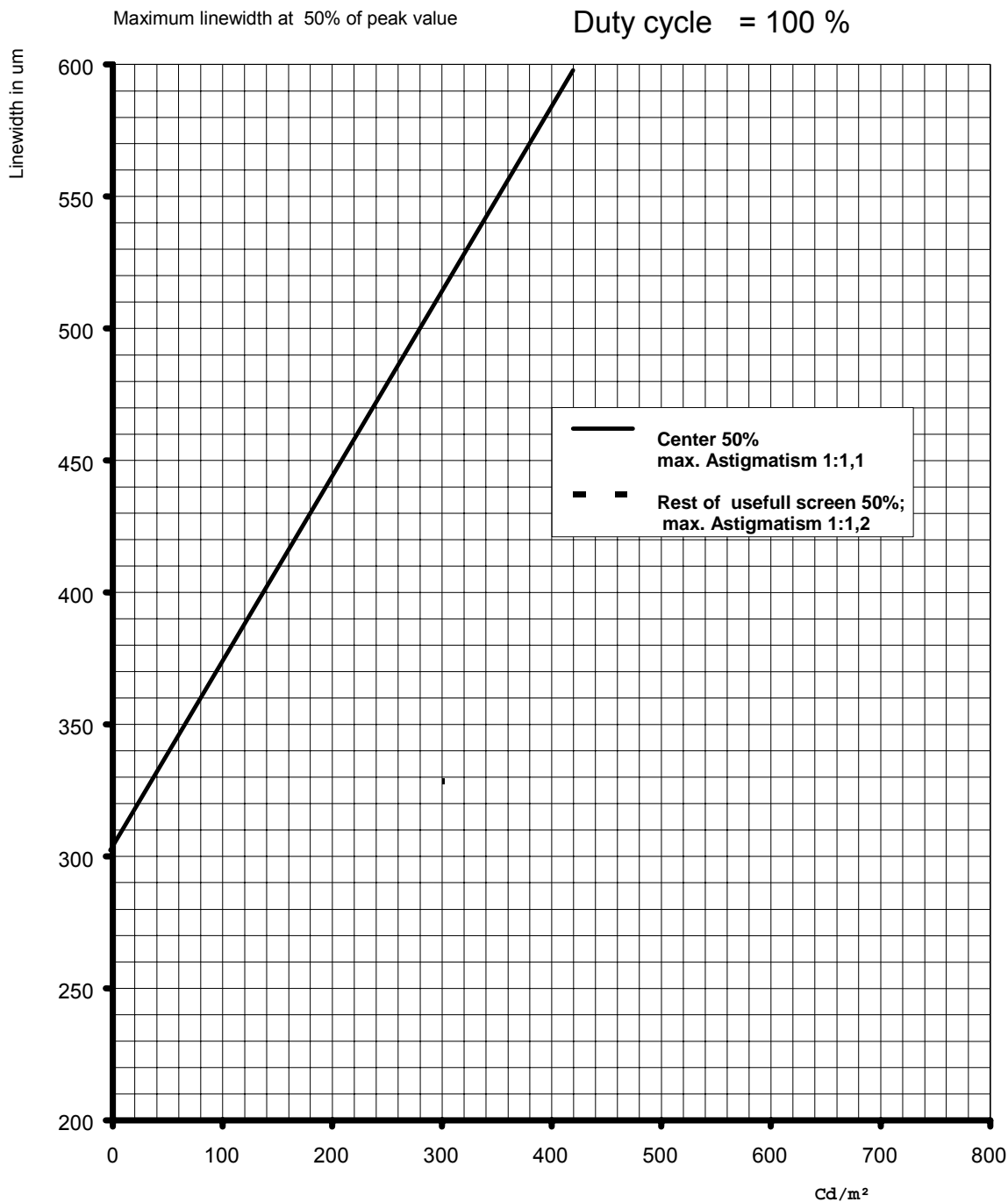
625 lines / 25 Hz

$U_a = 19 \text{ kV}$

$U_{g2A} = 700 \text{ V}$

Cathode drive

Duty cycle = 100 %



The focus is adjusted at 100 cd/m² and it is not allowed to readjust the focus voltage during the measurement. Measured with PDS spotvision system or Microvision SS100

**Electrical data**

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Deflection	Magnetically
deflection angle:	- horizontal approx. 99° - vertical approx. 84° - diagonal approx. 110°

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Focussing	Electrostatic
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Maximum leakage * currents	$I_{g2} \pm 5 \mu A$ $I_{g4} \pm 25 \mu A$
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Capacity (Grid 1 to all other electrodes)	$C_{g1} < 8 \pm 1 pF$
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Capacity (Cathode to all other electrodes)	$C_{Cat} 3 \pm 1 pF$
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Capacity (Focus to all other electrodes)	$C_{g3} 4 \pm 1 pF$
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Capacity (Anode to outer coating)	$C 600 - 1500 pF$
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**Absolute limiting values**

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**Cathode is reference point for all voltage values**

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First accelerating voltage	$U_{g2A}$	max. 1000 V min. 400 V
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Second accelerating voltage	$U_a$	max. 21 kV min. 13 kV
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Focus voltage	$U_{g3}$	max. 1000V -200 V
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Grid1 voltage	$- U_{g1}$	max. 400 V min. 3 V
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Heating against cathode	$U_{hc}$	100 V
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	$I_{hc}$	max. 15 $\mu$ A
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Anode current

Long time average value		max. 300 $\mu$ A
Peak value		max. 800 $\mu$ A

**Operating values**

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Cathode heating	- Indirect		
	- Heating voltage	$U_h$	6.15 V +2 % / -5 %
	- Heating current	$I_h$	approx. 240 mA

**Cathode is reference point for all following voltage values**

First accelerating voltage		$U_{g2}$	700 V
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Grid 1 voltage (for spot suppression)		$- U_{g1}$	max. 120 V min. 60 V
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Second accelerating voltage		$U_a$	19 kV
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Drive voltage (grid drive) (from $I_C = 0 \mu A$ to $I_C = 800 \mu A$ )		$\Delta U_{g1}$	max. 70 V
at $U_a = 19 \text{ kV}$			
$U_{g2} = 700 \text{ V}$ ( Spot cut-off)			
Duty cycle = 100 %			

Focus voltage (at centre of screen at $I_C = 100 \mu A$ )		$U_{g3}$	min. 0 V max. 400 V
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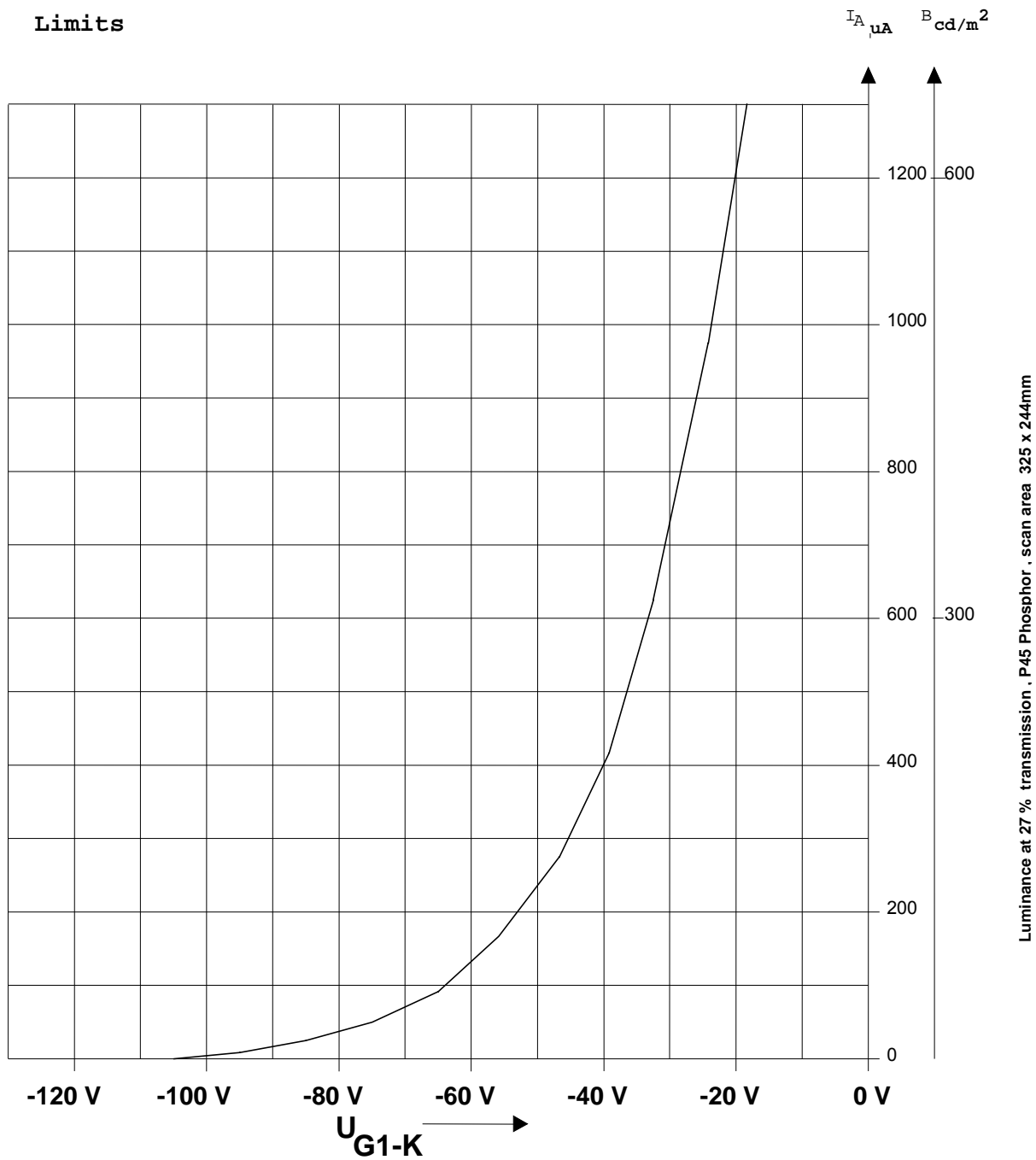
Dynamic focus voltage with reference yoke		$U_{g3 \text{ dyn.}}$	max. 450 V
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**Grid drive characteristics**

U<sub>a</sub> = 27.5 kV  
 U<sub>g2A</sub> = 600 – 930 V  
 U<sub>g2B</sub> = 50 – 250 V  
 U<sub>spot cut-off</sub> = 105 V  
 Duty Cycle = 100 %

Limits



**Environmental conditions**

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Temperature range:

Operation	0 to + 70 °C Max. relative humidity 75 % Non-condensing
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Storage	- 25 to + 70 °C
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Max. temperature gradient	20 °C/h
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Air pressure	400 hPa – 1060 hPa
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**Estimated life time**

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Decrease of measured brightness of 350 Cd/m<sup>2</sup> at constant drive.

After 2000 hours < 25 %

After 10 000 hours < 30 %

After 20 000 hours < 35 %

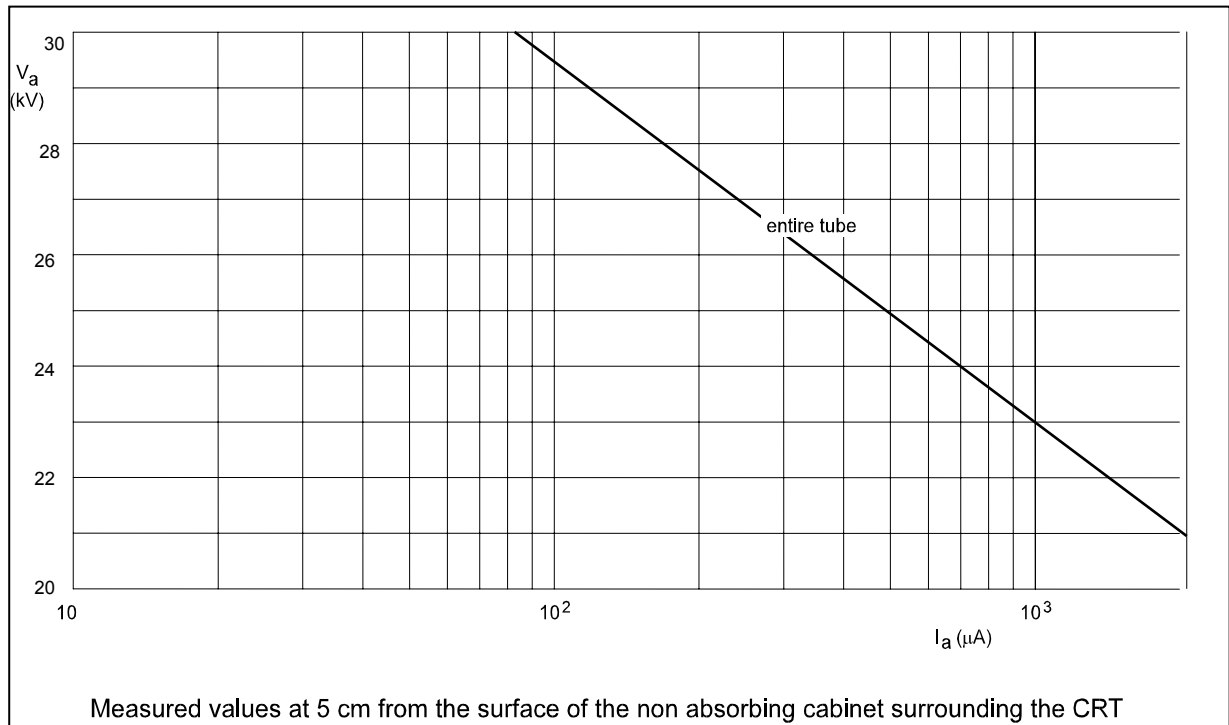
Burning Conditions      Duty cycle = 100%  
   Scan frequency = 15 kHz  
   Scan area 325 x 244 mm

**Iso-exposure Calculated for 5  $\mu$ Sv/h**

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Rate Limit Curve

Calculated for 5  $\mu$ Sv/h



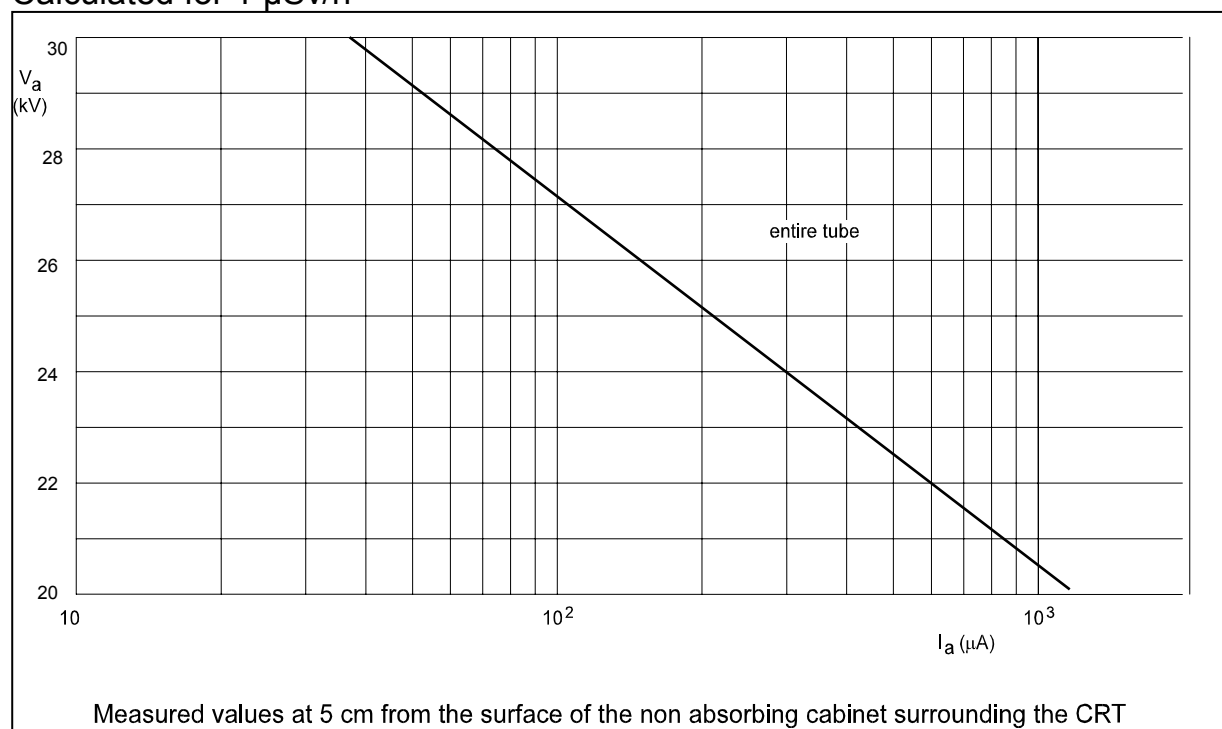
The X-radiation emitted will not exceed 1  $\mu$ Sv/h for anode voltage and current combinations shown in the iso-exposure-rate limit curve, according to *Eigensichere Kathodenstrahlröhre nach "Anlage III Röntgenverordnung"*.

**Iso-exposure Calculated for 1  $\mu$ Sv/h**

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Rate Limit Curve

Calculated for 1  $\mu$ Sv/h



The X-radiation emitted will not exceed 1  $\mu$ Sv/h for anode voltage and current combinations shown in the iso-exposure-rate limit curve, according to Eigensichere Kathodenstrahlröhre nach "*Anlage III Röntgenverordnung*".

## **Packaging**

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Packaging      t.b.f.

Attachment 1)

