

BRITISH STANDARDS INSTITUTION
2, PARK STREET, LONDON W1A 2BS

BS CECC 11 001-023



Specification available from:- AS SHOWN IN PD 9002,
CECC 00 200, AND

ISSUE 1 AUGUST 1986

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SIDCUP, KENT. DA14 6LZ.

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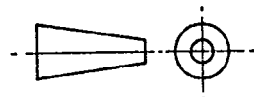
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ELECTRONIC COMPONENTS OF ASSESSED QUALITY : DETAIL
SPECIFICATION IN ACCORDANCE WITH BS CECC 11 000 : 1980

MANUFACTURER'S TYPE NUMBER
G 1337-S3

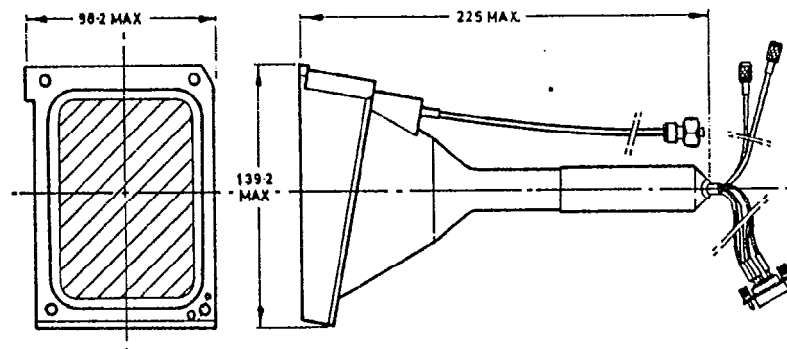
NATO Stock Number
5821-99-745-0815

Outline and dimensions Third angle
projection



SEE PD 9002 and CECC 00 200

For ordering information
see Clause 4.



RADAR DISPLAY CATHODE
RAY TUBE

DEFLECTION : MAGNETIC
(65° total angle)

FOCUS : ELECTROSTATIC

GUN : PENTODE
(ruggedised)

SCREEN : 107 mm x 75 mm

PHOSPHOR : S3 (JEDEC P43)

COLOUR : YELLOWISH GREEN
x = 0.282, y = 0.512

PERSISTENCE: MEDIUM

TUBE POTTED INTO MOUNTING
COLLAR (See Appendix C)

All dimensions in mm

For detail dimensions and base connections see
Appendix B

Marking information see Clause 3.

FULL ASSESSMENT
(ADDITIONAL)

1. DATA (not for inspection purposes)

Mechanical

Mounting position : Unrestricted (see additional information)

Mass (weight)

0.9 kg max.

Environmental

Shock

Peak acceleration

Min.

Max.

Unit

20

50

g

Time duration

11

ms

Vibration

Acceleration

20

g

Frequency range

2000

Hz

Acceleration

25

g

Air Pressure

11.5

kPa

Temperature (Operating)

-54

125

°C

Temperature (Storage)

-62

125

°C

Refer to Qualified Products List PD 9002 and/or CECC 00 200 for details of
manufacturers approved to this specification

Electrical - Limiting values (absolute maximum rating system - IEC 134)

	Min.	Max.	Units
Heater voltage	6.0	6.6	V
Heater to cathode, positive voltage		200	V
Heater to cathode, negative voltage		200	V
Intensity modulator electrode negative voltage	0.5	150	V
Intensity modulator electrode positive voltage	Must never become positive		V
Final anode voltage	8	14	kV
Focus electrode voltage	0.8	3.8	kV
Second grid voltage	200	700	V
Intensity modulator electrode cathode circuit resistance	-	1.5	MΩ

2. OPERATING CONDITIONS AND TYPICAL CHARACTERISTICS

When the tube is operated under the conditions given below, the characteristic values which follow them are attainable:

Vh = 6.3 Vac ; Vg2 = 500 V ; Vg3 = 2.3 kV ; Vg4 = 10 kV.

Deflection coil: Elliott part No. 7107-00018.

	Min.	Max.	Unit
Heater current at Vh = 6.3 V	0.45	0.55	A
Focusing requirements	1500	2300	V
Voltage required on the intensity modulator electrode for spot cut-off (negative)	40	70	-V
Useful screen dimensions	107 x 75		mm
Resolution (line width) measured to 50 % peak luminance		0.3	mm

3. MARKING

Each tube and package shall bear the following markings:

- Manufacturer's type number.
- NATO Stock Number if applicable.
- Special marking relating to hazards. Each tube and/or package contains a warning of hazards with respect to handling, implosion and Xrays.
- Factory Identification Code.
- Date Code.
- To BS CECC 11 001-023 Issue 1
- Manufacturer's serial number.

Special marking.

- Intensity modulator electrode cut-off voltage (negative).
- Focus electrode voltage.
- Intensity modulator drive voltage.

The modulator cut-off (-Vg1), focus electrode voltage (Vg3), and modulator drive voltage (Vd), measured in tests 4.6.2, 4.6.14.5 and 4.6.4(1), in Subgroup A1, shall be marked on the E.H.T lead approximately 50 mm from connector.

The first three indicate the cut-off voltage, e.g 55.5 V is shown as 555. The decimal point is assumed to be between the second and third figures.

3. MARKING (cont'd)

Special marking (cont'd)

The second four figures indicate the focus anode voltage, e.g 2130 V is shown as 2130.

The last three figures indicate the modulator drive voltage, e.g 40.0 V is shown as 400. The decimal point is assumed to be between the second and third figures.

The complete seven figure number represented in this example is shown as 555/2130/400.

4. ORDERING INFORMATION

Orders for components to this specification shall include the following minimum information:

- (1) Quantity
- (2) Manufacturer's type number.
- (3) NATO Stock Number if applicable.
- (4) Specification BS CECC 11 001-023 Issue 1
- (5) Any special requirements and packaging instructions shall be included in the order.

5. RELATED DOCUMENTS

BS 6001	Sampling procedures and tables for inspection by attributes.
BS 9000	General requirements for a system for electronic components of assessed quality.
BS CECC 11 000	Generic specifications : Cathode ray tubes.
CECC 00 200	CECC Qualified Products List.
IEC 68	Basic environmental testing procedures.
IEC 100	Methods for the measurement of direct interelectrode capacitances of electronic tubes and valves.
IEC 134	Rating systems for electronic tubes and valves and analogous semiconductor devices.
PD 9002	BS 9000 Component Selection Guide.

6. STRUCTURAL SIMILARITY

Not applicable.

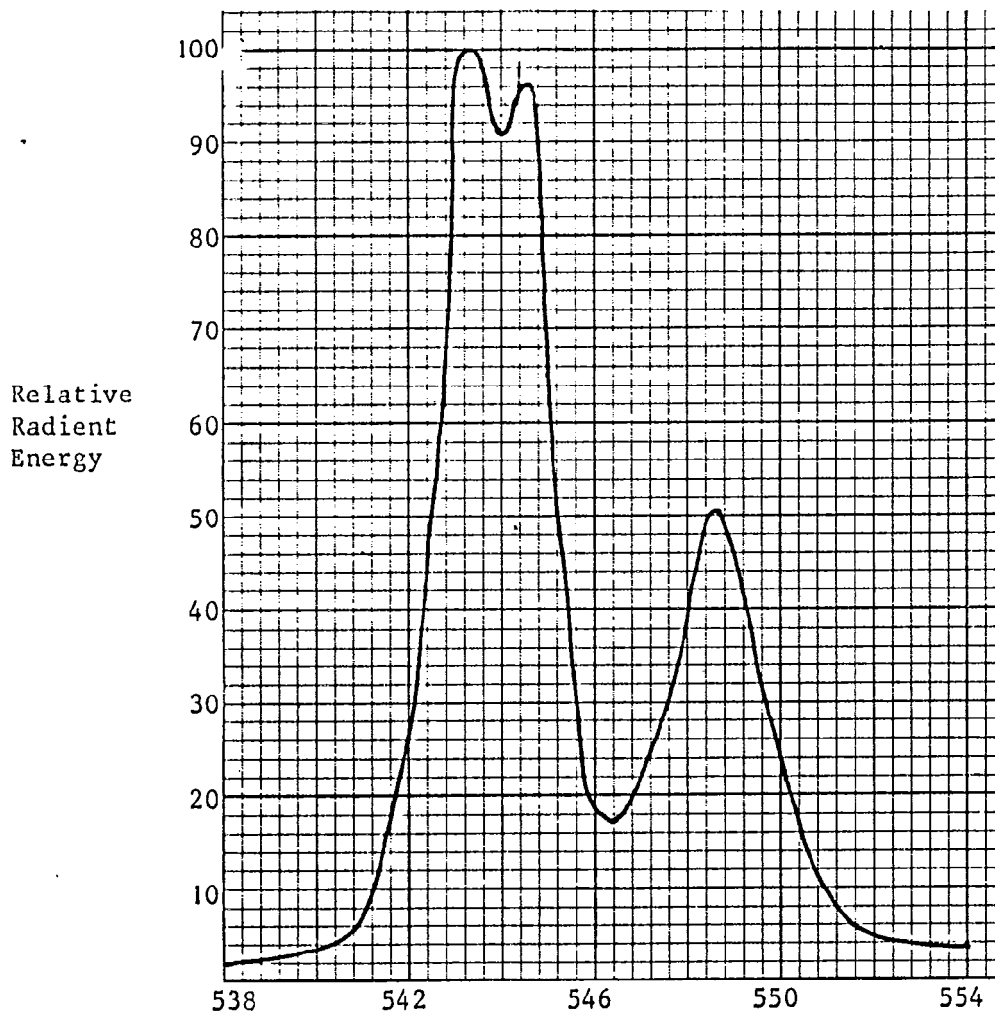
7. X-RADIATION

Not applicable.

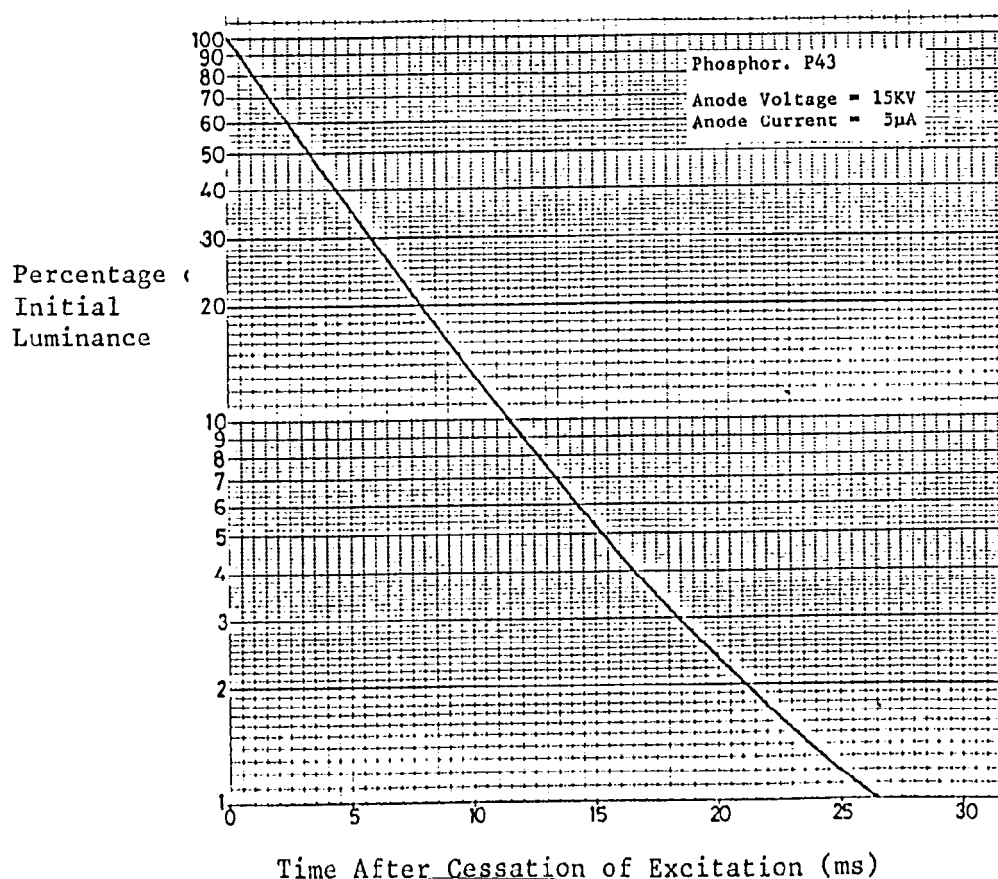
8. ADDITIONAL INFORMATION

- 8.1 The precautions taken in manufacture reduce the possibility of spontaneous implosion to a minimum, but any additional stress due to mishandling considerably increases the risk of implosion; such implosion may occur immediately or be delayed. Particular care should be taken not to scratch any part of the tube envelope, especially the faceplate as this will appreciably weaken the glass and may lead to implosion of the tube.
- 8.2 The tube should be shielded from magnetic fields which can be detrimental to its performance.
- 8.3 The screen material will be damaged if the spot remains stationary, particularly under d.c conditions.
- 8.4 The tube assembly must be secured by the mounting collar.
- 8.5 Both high and low voltage supplies are connected via flexible flying leads which form part of the cathode ray tube and are suitably anchored by silicone rubber mouldings.
- 8.6 The potting compound used to secure the mounting collar to the tube must not be exposed for long periods to atmospheres or liquids containing petroleum extracts including glycol.

TYPICAL RELATIVE SPECTRAL ENERGY DISTRIBUTION CURVE



TYPICAL PERSISTENCE CHARACTERISTIC



TEST CONDITIONS AND INSPECTION REQUIREMENT

GROUP A - Lot by Lot

GENERAL TEST CONDITIONS. (unless stated otherwise for a particular test)

Vh 6.3 Vac Vg2 500 V Final anode voltage Vg4 10 kV. All other electrode voltages as required.

Deflection coil details: Elliott part No. 7107-00018.

Position coil on the tube neck so that the rear face of the coil is 129 mm from the front face of the tube mounting collar. (See appendix B).

Raster details: 625 line TV standard. Field repetition frequency 50 Hz. Horizontal and vertical dimensions of the display to be beyond the edge of phosphor screen. (overscanned).

Pulse conditions: Single line scan with retrace suppression. Writing speed = 2.06 mm/ μ s.
Pulse duration = $\frac{\text{line length (mm)}}{\text{writing speed (mm}/\mu\text{s})}$

Pulse repetition frequency = 25 Hz. Rise and fall times to be within 10 % of pulse duration. Droop within 2 % of pulse amplitude.

Pre-heating: Apply Vh only for 60 s minimum.

All electrode voltages are with respect to the cathode unless otherwise stated.

Astigmatism correction is not applied.

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS					
			MIN.	MAX.	UNITS	IL	AQL	
Subgroup A1								
-Visual inspection	4.3							
-Burn-in		Defocused unsynchronised raster I _{g4} = 10 μA	25	-	h			
Pre non-operating endurance test								
-Cathode emission	4.6.3	Minimum cathode factor K = 2.2. Modulator voltage equal to half the value in 4.6.2 of BS CECC 11 000. Defocused raster.	*	-	μA			
-Non-operating endurance	4.9.1	Duration = 168 h minimum.						

* To be calculated

GROUP A (continued)

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	AQL
Subgroup A1 (cont'd)						100 %
-Post non-operating endurance tests	4.6.3	Min. cathode factor $K = 2.2$. Modulator voltage equal to half the value in 4.6.2. Defocused raster.				Ik to be within 10 % of the value recorded in 4.6.3 pre non-operating endurance test.
-Cathode emission	4.6.10	Adjust modulator electrode voltage for a convenient screen luminance				As blemish specification (Appendix A)
-Quality of fluorescent screen and faceplate and						
-Useful screen area			107 x 75		mm	
-Gas content coefficient (Ig3/Ig2)	4.6.1	Vg2 = 600 V. Vg3 = -25 V. Vg4 = 0 V. IK or Ig2 = 400 μ A. Measure at Vg3.	-	0.2	nA/ μ A	
-Intensity modulator electrode cut-off voltage (negative)	4.6.2	Raster cut-off. Meter measuring accuracy $< \pm 2$ %.	40 (record value)	70	-V	
-Luminance characteristics (Time averaged peak line luminance)	4.6.4/1	Single pulsed line display. Modulator voltage pulsed from cut-off to give a minimum average peak line luminance = 1370 cd/m ² . Focus voltage adjusted for optimum overall resolution. Measure luminance at the centre and corners of the display, see Appendix E. Photometer effective aperture < 0.04 mm dia. Photometer time constant shall be such that the time averaged signal is evaluated. Modulator drive voltage meter measuring accuracy $< \pm 1.0$ %. Record drive value, measure modulator volts and cathode current.	(record value)		V	
-Uniformity of luminance	4.6.4/1	Conditions as for luminance characteristic measurement. Measure luminance at centre and corners of the display, see Appendix E. (see Note 1).	-	850	μ A	
			-	20	%	

GROUP A (continued)

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	IL AQL
Subgroup A1 (cont'd)						100 %
-Resolution (narrow slit) measured to 50 % peak luminance	4.6.14.5	Single pulsed line display. Modulator voltage pulsed from cut-off to give a minimum average peak line luminance = 1370 cd/m ² . Photometer characteristics as in Proc. 4.6.4. Optimise focus to give a substantially uniform line width both horizontal and vertical axes. Measure line width at centre of display and at edge positions shown in Appendix E without readjustment of focus or modulator voltage.				
-Centre resolution and		Horizontal display Vertical display	-	0.3 0.3	mm mm	
-Edge resolution and		Horizontal display Vertical display	-	0.3 0.3	mm mm	
-Focus electrode voltage and		Meter measuring accuracy <±1 %	1500	2300	V (Record value)	
-Focus electrode current and		Set modulator volts as for luminance characteristic test above	-	400	µA	
-Trace deviation		Single line scan through the tube face centre, and along the major and minor axis respectively. Trace straightness to be measured in the two directions.	-	0.5	mm	
-Stray emission and flashover	4.6.6 and 4.6.7	Vg2 = 700 V. Vg3 = 3.5 kV. Vg4 = 15 kV. -Vg1 set to cut-off. Plane of screen horizontal and uppermost. Tap for 10 s at 4 taps per s.				
-Mechanical spot displacement	4.6.5	No deflection fields.	-	3	mm	
-Dimensions	4.4	Inspection drawing (See Appendix B)				
Subgroup A2		Not applicable				
Subgroup A3						
-Heater current	4.6.8	Apply Vh only	0.45	0.55	A	S4 6.5

GROUP A (continued)

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	AQL
Subgroup A3 (cont'd)						
-Heater to cathode leakage	4.6.9	Vh-k (heater positive) = 200 V Vk-h (heater negative) = 200 V	-	10	µA	6.5
-Intensity modulator electrode total negative current	4.6.12A or 4.6.12B	Set -Vg1 to cut-off. Vg3 = 3.8 kV. Rmod = 25 MΩ. Vg3 = 3.8 kV. Change of Vg1 for cut-off.	-	10	µA	
-Electrode leakage current	4.6.11		-	3	µA	
-Second grid		Vg2 = 700 V.	-	75	V	
-Third grid		Vg3 = 2.3 V.	-	5	µA	
-Fourth grid		Vg4 = 15 kV. Vg1 = -80 V.	-	10	µA	

GROUP B Lot by lot

General test conditions - as for Group A.

Only tests marked (D) are destructive

AQL: given in %

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	AQL
Dimensions	4.4	Inspection Drawing (See Appendix B)	See inspection drawing (Group B)			4.0

GROUP C - PERIODIC

General test conditions - as for Group A.

Only tests marked (D) are destructive

AQL: given in %

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	AQL
Subgroup C1						
-Dimensions	4.4	Inspection level 3 months interval Inspection drawing (See Appendix B)	As inspection drawing (Group C)			6.5

GROUP C (continued)

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS			
			MIN.	MAX.	UNITS	IL AQL
Subgroup C2	Inspection at yearly intervals					1 1.5
-Capacitances	IEC 100	No voltages. Measure across appropriate leads.				
-Modulator to all	IEC 68	Test M ₂ Severity: 11.5 kPa. Temperature 15 to 35 °C. Duration 60 s minimum. Apply Vg ₄ only = 10 kV. Measure external leakage current from anode to tube housing.	-	25	pF	
-Cathode to all		Note Sample size 2 tubes minimum or on the occasion of a new batch of potting compound.	-	20	pF	
-Low air pressure			-	1	μA	
Vibration	IEC 68	Test Fc. Mount tube assembly with the major axis horizontal. Apply vibration in the minor axis. Amplitude = 0.15 mm. Frequency = 25 Hz. Duration = 30 minutes.				
Post vibration tests						
-Visual inspection	4.3	No voltages				
-Cathode emission	4.6.3	As in subgroup A1. Change in value.	-	10	%	
-Intensity modulator electrode cut-off voltage (negative)	4.6.2	As in subgroup A1. Change in value	-	5	%	
-Quality of fluorescent screen and faceplate and	4.6.10	As in subgroup A1	As in subgroup A1			
-Useful screen area		As in subgroup A1	As in subgroup A1			
-Gas content coefficient	4.6.1	As in subgroup A1	As in subgroup A1			
-Luminance characteristics	4.6.4/1	As in subgroup A1. Change in value of Vdrive	-	5	%	
-Uniformity of luminance		As in subgroup A1	As in subgroup A1			
-Resolution	4.6.14.5	As in subgroup A1	As in subgroup A1			
Centre resolution		Change in resolution 10 %	-	0.3	mm	
Edge resolution		Change in resolution 10 %	-	0.3	mm	

INSPECTION OR TEST	REFERENCE BS CECC 11 000	CONDITIONS OF TEST	INSPECTION REQUIREMENTS				
			MIN.	MAX.	UNITS	IL	AQL
Subgroup C2 (cont'd)						I	1.5
-Focus electrode voltage		Change in value	As in subgroup A1				
-Focus electrode current			-	10	%		
-Mechanical spot displacement	4.6.5	As in subgroup A1. Change in position	-	1	mm		
-Trace deviation		As in subgroup A1	As in subgroup A1				
-Mass			-	0.9	kg		
-Heater modulation	4.6.31	Focused raster non-synchronised with heater supply frequency. Heater supply frequency = 50 Hz.					
-Damp heat (steady state)	IEC 68	Test Ca. Duration 4 days. No voltages.					
-Accelerated damp heat	IEC 68	Test Db. Severity: IV (6 cycles) No voltages.					
Post conditioning tests							
-Visual inspection	4.3	No voltages					
-Increased air pressure	4.8.9	Severity: 300 kPa. No voltages.					
-Post increased air pressure tests		Duration 60 - 90 s Pressure attained 20 - 60 s					
-Non-operating endurance	4.9.1	Duration 24 h minimum					
-Visual inspection	4.3	No voltages					
-Gas content coefficient	4.6.1	As in subgroup A1					
-Robustness of terminations	IEC 68	Test U. Ua1 - Tensile Force = 20 N. All terminations. Ub Bending Force = 10 N	-	0.2	nA/μA		
Post robustness of terminations tests							
-Visual inspection	4.3	No voltages.					
-Gas content coefficient	4.6.1	As in subgroup A1	-	0.2	nA/μA		