



7198

7198

IMAGE ORTHICON

MAGNETIC FOCUS

MAGNETIC DEFLECTION

*Shock and vibration resistant**For use under adverse environmental conditions*

DATA

General:

Heater, for Unipotential Cathode:

Voltage (AC or DC) $6.3 \pm 10\%$ volts

Current at 6.3 volts. 0.6 amp

Direct Interelectrode Capacitance:

Anode to all other electrodes . . . 12 μmf Wavelength of Maximum Response. . . . 4500 ± 300 angstroms

Photocathode, Semitransparent:

Response. S-10

Rectangular image (4 x 3 or 3 x 4 aspect ratio):

Useful size of. 1.8" max. diagonal

Note: The size of the optical image focused on the photocathode should be adjusted so that its maximum diagonal does not exceed the specified value. The corresponding electron image on the target should have a size such that the corners of the rectangle just touch the target ring.

Orientation of. . Proper orientation is obtained when the vertical or horizontal scan is essentially parallel to the plane passing through center of faceplate and pin 7 of the shoulder base.

Focusing Method Magnetic

Deflection Method Magnetic

Overall Length. $15.20" \pm 0.25"$ Greatest Diameter of Bulb $3.00" \pm 0.06"$ Minimum Deflecting-Coil Inside Diameter $2.38"$

Deflecting-Coil Length. 5"

Focusing-Coil Length. 10"

Alignment-Coil Length 0.94"

Photocathode Distance Inside End of Focusing Coil . . . 0.50"

Operating Position. See *Operating Considerations*

Weight (Approx.). 1 lb 6 oz

Shoulder Base Keyed Jumbo Annular 7-Pin

BOTTOM VIEW[■]

Pin 1—Grid No.6

Pin 5—Grid No.5

Pin 2—Photocathode

Pin 6—Target

Pin 3—Internal Connection—Do Not Use

Pin 7—Internal Connection—Do Not Use

Pin 4—Internal Connection—Do Not Use

[■] See basing diagram on next page.



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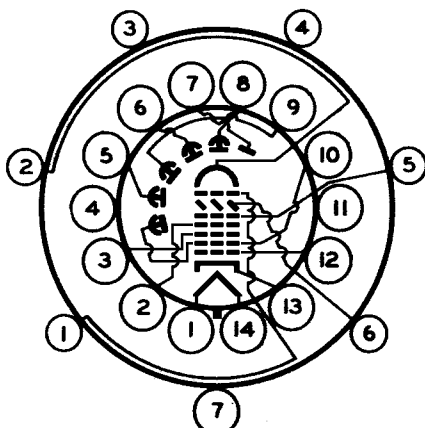
IMAGE ORTHICON

End Base. Small-Shell Diheptal 14-Pin
(JEDEC Group 5, No. B14-45)

BOTTOM VIEW

- Pin 1-Heater
Pin 2-Grid No.4
Pin 3-Grid No.3
Pin 4-Internal Connection—Do Not Use
Pin 5-Dynode No.2
Pin 6-Dynode No.4
Pin 7-Anode
Pin 8-Dynode No.5
Pin 9-Dynode No.3
Pin 10-Dynode No.1,
Grid No.2
Pin 11-Internal Connection—Do Not Use
Pin 12-Grid No.1
Pin 13-Cathode
Pin 14-Heater

DIRECTION OF LIGHT:
PERPENDICULAR TO
LARGE END OF TUBE



WHITE INDEX LINE
ON FACE

Maximum and Minimum Ratings, Absolute-Maximum Values:

PHOTOCATHODE:

Voltage	-650 max.	volts
Illumination.	50 max.	fc

OPERATING TEMPERATURE:

Of any part of bulb	71 max.	°C
Of bulb at large end of tube (Image section)	20 min.	°C

TEMPERATURE DIFFERENCE:

Between image section and any part of bulb hotter than image section . .	7.5 max.	°C
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STORAGE-TEMPERATURE RANGE	-65 to +71	°C
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GRID-No.6 VOLTAGE	-650 max.	volts
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TARGET VOLTAGE:

Positive value.	10 max.	volts
Negative value.	10 max.	volts

GRID-No.5 VOLTAGE	150 max.	volts
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GRID-No.4 VOLTAGE	300 max.	volts
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GRID-No.3 VOLTAGE	400 max.	volts
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GRID-No.2 & DYNODE-No.1 VOLTAGE	400 max.	volts
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GRID-No.1 VOLTAGE:

Negative-bias value	125 max.	volts
Positive-bias value	0 max.	volts

DYNODE-No.2-TO-DYNODE-No.1 VOLTAGE.	350 max.	volts
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DYNODE-No.3-TO-DYNODE-No.2 VOLTAGE.	350 max.	volts
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DYNODE-No.4-TO-DYNODE-No.3 VOLTAGE.	680 max.	volts
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DYNODE-No.5-TO-DYNODE-No.4 VOLTAGE.	350 max.	volts
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ANODE-TO-DYNODE-No.5 VOLTAGE.	100 max.	volts
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ANODE SUPPLY VOLTAGE*	1850 max.	volts
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IMAGE ORTHICON

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. . .	125 max.	volts
Heater positive with respect to cathode. . .	10 max.	volts

Typical Operating Values:

Photocathode Voltage (Image focus) . .	-400 to -600	volts
Grid-No.6 Voltage (Accelerator)—		
Approx. 75% of photocathode voltage . .	-300 to -450	volts
Target-Cutoff Voltage [•]	-3 to +1	volts
Grid-No.5 Voltage (Decelerator). . . .	0 to 125	volts
Grid-No.4 Voltage (Beam focus)	130 to 180	volts
Grid-No.3 Voltage [▲]	225 to 330	volts
Grid-No.2 & Dynode-No.1 Voltage. . . .	300	volts
Grid-No.1 Voltage for picture cutoff . .	-45 to -115	volts
Dynode-No.2 Voltage.	600	volts
Dynode-No.3 Voltage.	800	volts
Dynode-No.4 Voltage.	1000	volts
Dynode-No.5 Voltage.	1200	volts
Anode Voltage.	1250	volts
Target-Temperature Range	35 to 45	°C
Minimum Peak-to-Peak Blanking Voltage.	5	volts
Field Strength at Center		
of Focusing Coil [◆]	75	gausses
Field Strength of Alignment		
Coil (Approx.)	0 to 3	gausses

Performance Data:

*With conditions shown under Typical
Operating Values and altitude up to
60,000 feet (unless otherwise noted)*

Cathode Radiant Sensitivity		
at 4500 angstroms.	0.028	$\mu\text{a}/\mu\text{W}$
Anode Current (DC)—For Highlight		
Illumination on Photocathode at		
0.01 footcandle.	30	μa
Signal-Output Current (Peak to peak)	See Curve	
Ratio of Peak-to-Peak Video-Signal		
Current to RMS Noise Current for		
Bandwidth of 9 Mc.	See Curve	
Center Square-Wave Amplitude Response ^{**}	See Curves	

Vibration Tests. These tests are performed on a sample lot of tubes from each production run with highlight illumination on photocathode of 0.003 footcandle. Tubes and their associated components^{*} are vibrated on apparatus providing dynamic conditions similar to those described in MIL-E-5272A[□], paragraph 4.7.1.

Resonance. Tubes and associated components^{*} are vibrated (per the method of MIL-E-5272A[□], paragraph 4.7.1.1) at 25° C and at vibration accelerations not exceeding 10 g in each of three mutually perpendicular axes for 3 hours or one million cycles, whichever is less. After vibration,



IMAGE ORTHICON

the center resolution of the tubes will be at least 525 lines as determined with an RETMA Resolution Chart, or equivalent, with not more than 0.003-footcandle highlight illumination on the photocathode.

Cycling. Tubes and associated components* are vibrated (per the method of MIL-E-5272A[□], paragraph 4.7.1.2 pertaining to specimen without vibration isolators) in each of three mutually perpendicular axes at 25° C and at vibration accelerations not exceeding 5 g. One survey cycle is made for each axis. The cycle has a duration of one hour during which time the frequency is varied from 5 to 500 and back to 5 cycles per second. During this test, the tubes will maintain center resolution of at least 350 lines as determined with an RETMA Resolution Chart, or equivalent, with not more than 0.003-footcandle highlight illumination on the photocathode. After vibration the center resolution, determined under the same conditions as above, will be at least 525 lines.

Shock Tests. These tests are performed on a sample lot of tubes from each production run with no voltages applied to the tubes. Tubes alone are subjected in these tests (per the method of MIL-E-5272A[□], paragraph 4.15.2.1) to 12 impact shocks of 30 g, each shock impulse having a time duration of 11 ± 1 milliseconds. The intensity is within ± 10 per cent as measured with a filter having a bandwidth of 0.2 to 250 cycles per second. The maximum g is reached in approximately 5-1/2 milliseconds. The shock is applied in the following directions: a) vertically, perpendicular to longitudinal axis, 3 shocks in each direction; b) horizontally, perpendicular to longitudinal axis, 3 shocks in each direction. After shock tests, the tubes are operable and will have resolution of at least 525 lines as determined with an RETMA Resolution Chart, or equivalent, with not more than 0.003-footcandle highlight illumination on the photocathode.

Temperature-Humidity Tests. These tests are performed on a sample lot of tubes from each production run and with no voltages applied to the tubes. The tubes are subjected (per MIL-E-005272B(USAF)[®], paragraph 4.4.1, Procedure I) to relative humidities up to and including 95 per cent at temperatures up to and including +71° C. Following this test the tubes are operative, and there will be no picture streaking or other evidence of arcing when operated under the following conditions: grid-No.1 voltage adjusted for cutoff; photocathode voltage = -650 volts; grid-No.6 voltage = -650 volts; dynode-No.2 voltage = 700 volts; dynode-No.3 voltage varied from 780 to 1050 volts; dynode-No.4 voltage = 1400 volts; dynode-No.5 voltage = 1750 volts; and anode voltage = 1850 volts. In addition, the leakage resistance



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IMAGE ORTHICON

determined separately between each of six specific Diheptal-base pins (pins 5, 6, 7, 8, 9, and 10) and the 13 other Diheptal-base pins tied together and grounded will be greater than 500 megohms when a voltage of 350 volts is applied between that specific pin and the others.

- * Ratio of dynode voltages is shown under *Typical Operating Values*.
- Normal setting of target voltage is +2 volts from target cutoff. The target supply voltage should be adjustable from -3 to +5 volts.
- ▲ Adjust to produce maximum signal.
- ◆ Direction of current should be such that a north-seeking pole is attracted to the image end of the focusing coil, with the indicator located outside of and at the image end of the focusing coil.
- ** Measured with amplifier having flat frequency response.
- # Tube sockets and components assembly which consists of the deflecting coils, focusing coil, and alignment coil.
- 1 January 1956.
- ⊕ 5 June 1957.

OPERATING CONSIDERATIONS

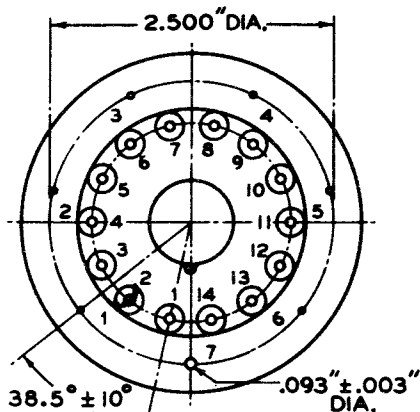
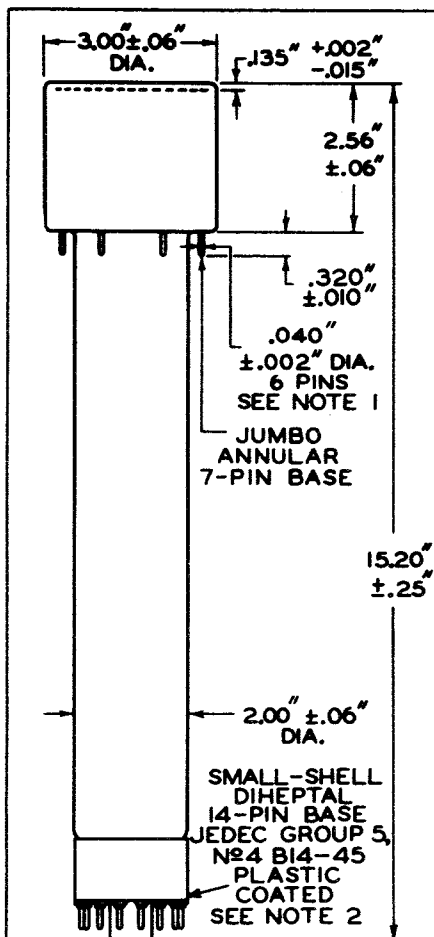
The *operating position* of the 7198 should preferably be such that any loose particles in the neck of the tube will not fall down and strike or become lodged on the target. Therefore, it is recommended that the tube never be operated in a vertical position with the Diheptal-base end up nor in any other position where the axis of the tube with base up makes an angle of less than 20° with the vertical.

Resolution capability of 7198 is in excess of 600 TV lines.

**SPECTRAL-SENSITIVITY CHARACTERISTIC
of Photosensitive Device having S-10 Response
is shown at the front of this Section**



IMAGE ORTHICON

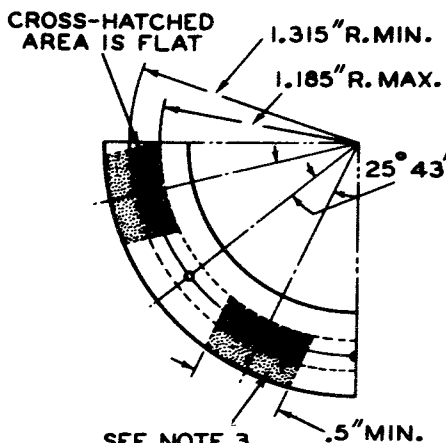


ENLARGED BOTTOM VIEW

92CM-10289

NOTE 1: ENDS OF PINS CHAMFERED 45° ; FLAT ENDS 0.020 ± 0.010 ".

DETAIL OF BOTTOM VIEW OF JUMBO ANNULAR BASE



NOTE 2: PLASTIC COATING MAY INCREASE DIAMETER OF BASE SHELL TO 2.08 " MAX. AND MAY INCREASE HEIGHT OF BASE SHELL BY 0.03 " MAX.

NOTE 3: DOTTED AREA IS FLAT OR EXTENDS TOWARD DIHEPTAL-BASE END OF TUBE BY 0.060 " MAX.

ANNULAR-BASE GAUGE

ANGULAR VARIATIONS BETWEEN PINS AS WELL AS ECCENTRICITY OF NECK CYLINDER WITH RESPECT TO PHOTOCATHODE CYLINDER ARE HELD TO TOLERANCES SUCH THAT PINS AND NECK CYLINDER WILL FIT FLAT-PLATE GAUGE WITH:

- SIX HOLES HAVING DIAMETER OF 0.065 ± 0.001 " AND ONE HOLE HAVING DIAMETER OF 0.150 ± 0.001 ". ALL HOLES HAVE DEPTH OF 0.265 ± 0.001 ". THE SIX 0.065 " HOLES ARE ENLARGED BY 45° TAPER TO DEPTH OF 0.047 ". ALL HOLES ARE SPACED AT ANGLES OF $51^\circ 26' \pm 5'$ ON CIRCLE DIAMETER OF 2.500 ± 0.001 ".
- SEVEN STOPS HAVING HEIGHT OF 0.187 ± 0.001 ", CENTERED BETWEEN PIN HOLES, TO BEAR AGAINST FLAT AREAS OF BASE.
- RIM EXTENDING OUT A MINIMUM OF 0.125 " FROM 2.812 " DIAMETER AND HAVING HEIGHT OF 0.126 ± 0.001 ".
- NECK-CYLINDER CLEARANCE HOLE HAVING DIAMETER OF 2.200 ± 0.001 ".

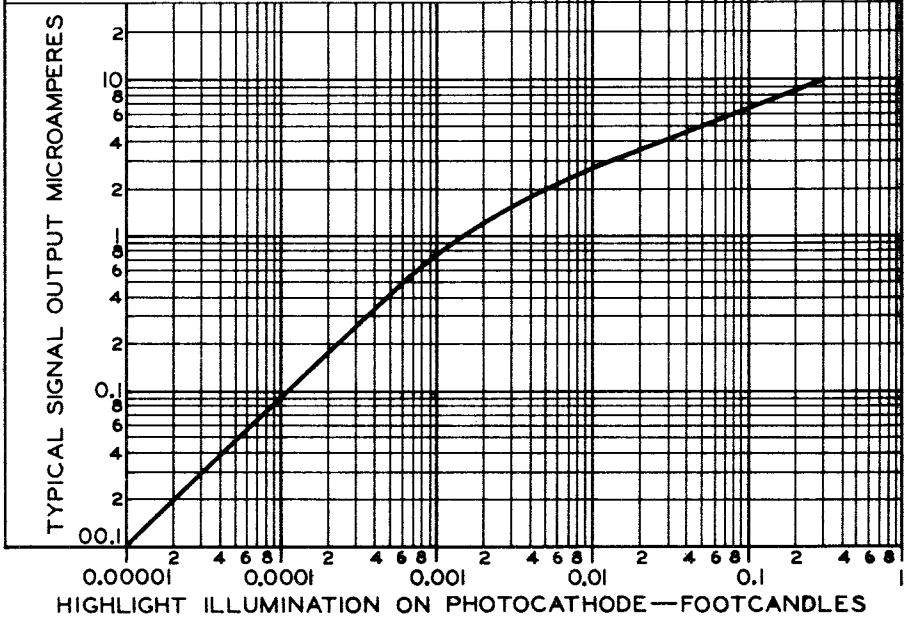


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BASIC LIGHT-TRANSFER CHARACTERISTIC

ILLUMINATION: WHITE FLUORESCENT,
2870° K INCANDESCENT, OR
DAYLIGHT.



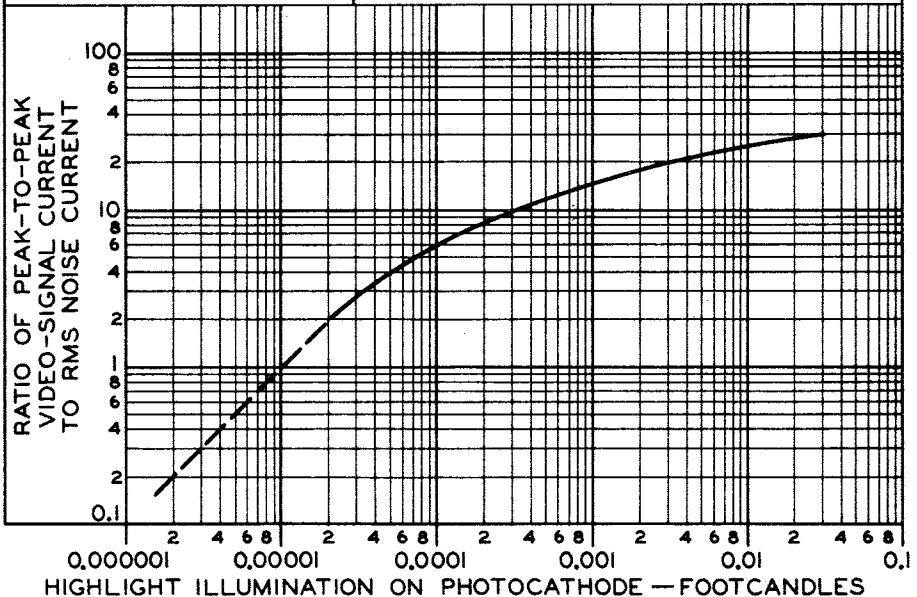
92CS-10288

TYPICAL CHARACTERISTIC

ILLUMINATION: 2870° K INCANDESCENT, DAYLIGHT, OR WHITE
FLUORESCENT.

BANDWIDTH OF SYSTEM = 9 Mc

TYPICAL 7198 AFTER 13 $\frac{1}{4}$ HOURS OF OPERATION.



92CS-10279

ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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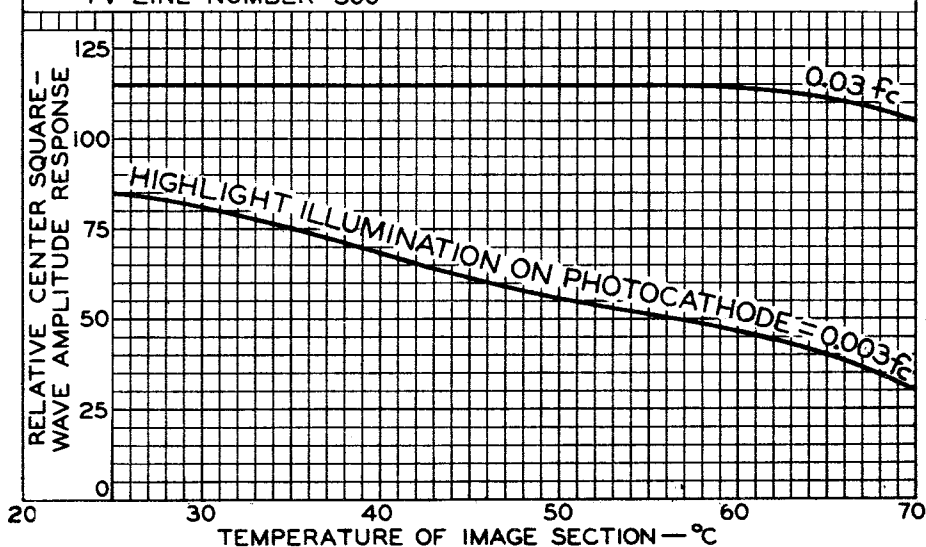
TYPICAL CHARACTERISTICS

ILLUMINATION: 2870° K INCANDESCENT, DAYLIGHT, OR WHITE
FLUORESCENT.

BANDWIDTH OF SYSTEM = 9 Mc

TEST PATTERN: SQUARE-WAVE RESOLUTION WEDGE.

TV LINE NUMBER = 300



92CS-10280



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TYPICAL CHARACTERISTICS

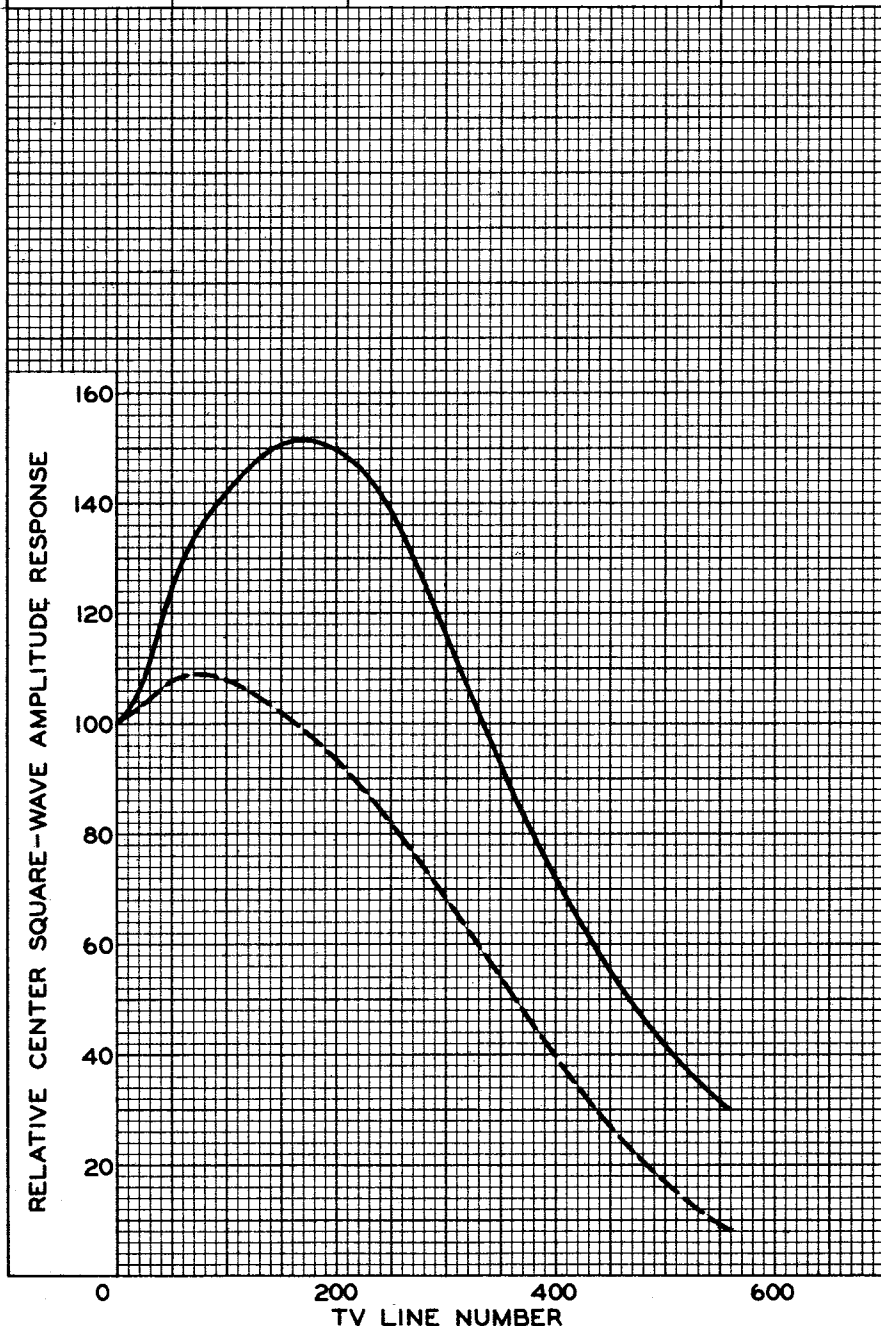
ILLUMINATION: 2870° K INCANDESCENT, DAYLIGHT, OR WHITE FLUORESCENT.

BANDWIDTH OF SYSTEM = 9Mc

TEMPERATURE OF IMAGE SECTION = 40° C

TYPICAL 7198 AFTER 1 $\frac{3}{4}$ HOURS OF OPERATION.

CURVE	HIGHLIGHT ILLUMINATION ON PHOTOCATHODE
— — — —	0.03 FOOTCANDLE
— — — —	0.003 FOOTCANDLE



ELECTRON TUBE DIVISION

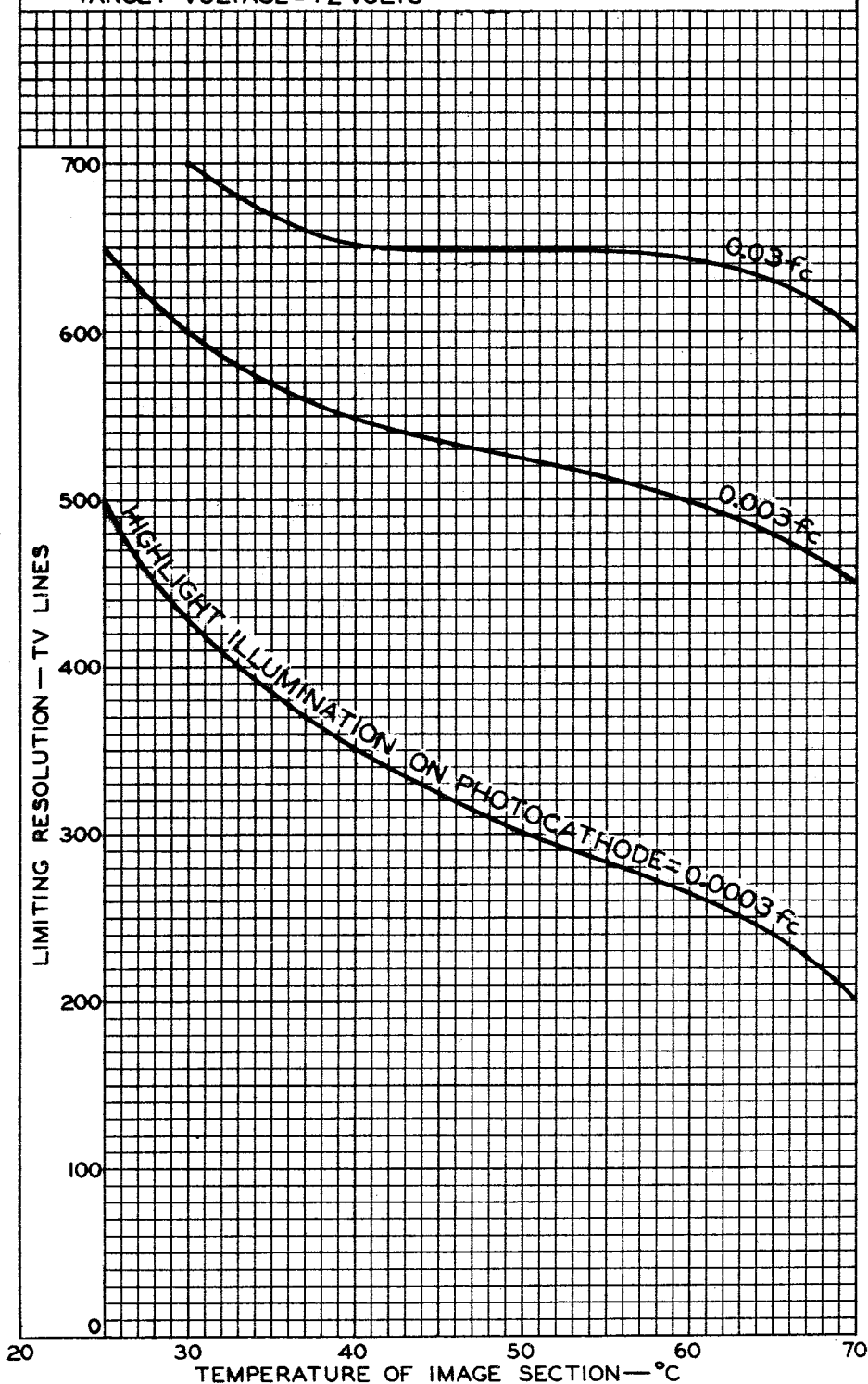
92CM-10281

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TYPICAL CHARACTERISTICS

ILLUMINATION: 2870° K INCANDESCENT, DAYLIGHT, OR WHITE
FLUORESCENT.
BANDWIDTH OF SYSTEM = 9 Mc
TARGET VOLTAGE = +2 VOLTS





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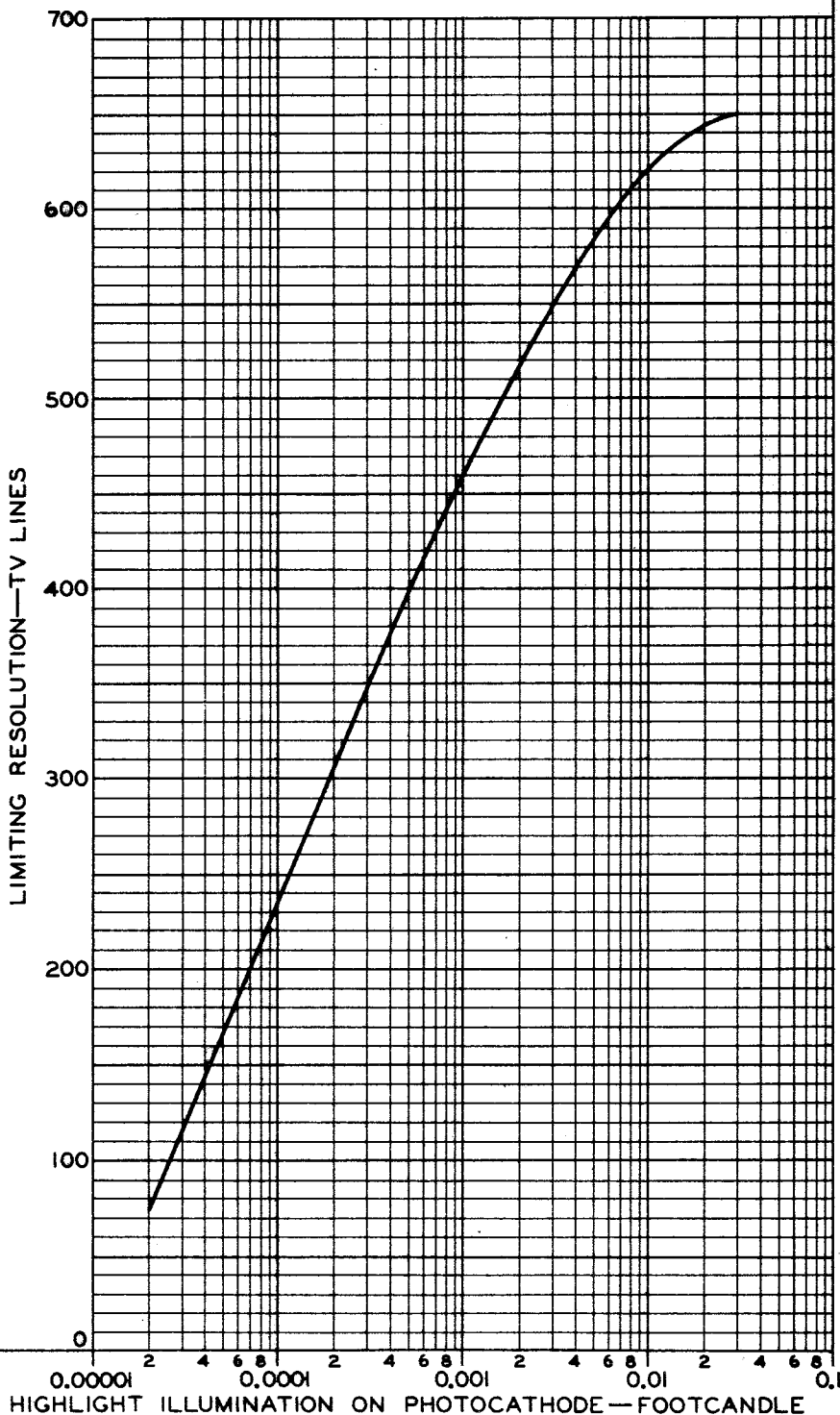
TYPICAL CHARACTERISTIC

ILLUMINATION: 2870° K INCANDESCENT, DAYLIGHT, OR WHITE FLUORESCENT.

BANDWIDTH OF SYSTEM = 9Mc

TEMPERATURE OF IMAGE SECTION = 40° C

TYPICAL 7198 AFTER 13¼ HOURS OF OPERATION.



ELECTRON TUBE DIVISION

92CM-10286

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY