



PICTURE TUBE

19-1/4" x 15-1/8" Screen
23-31/64" Max. Bulb Diagonal
14-11/16" Max. Overall Length

GENERAL DATA

23MP4 6-60
Printed in U.S.A.



GRID-DRIVE[▲] SERVICE

Unless otherwise specified,
voltage values are positive with respect to cathode

Maximum and Minimum Ratings, Design-Maximum Values:

ULTOR [●] VOLTAGE	{ 22000 max. volts 11000 min. volts
GRID-NO.4 VOLTAGE:	
Positive value	1100 max. volts
Negative value	550 max. volts
GRID-NO.2 VOLTAGE	{ 550 max. volts 200 min. volts
GRID-NO.1 VOLTAGE:	
Negative peak value	220 max. volts
Negative bias value	154 max. volts
Positive bias value	0 max. volts
Positive peak value	2 max. volts
HEATER VOLTAGE	{ 6.9 max. volts 5.7 min. volts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode:	
During equipment warm-up period not exceeding 15 seconds	450 max. volts
After equipment warm-up period . .	200 max. volts
Heater positive with respect to cathode	200 max. volts

Equipment Design Ranges:

With any ultor voltage (E_{c5k}) between 11000 and 22000
and grid-No.2 voltage (E_{c2k}) between 220 and 550 volts

Grid-No.4 Voltage for focus $\S$	0 to 400 volts
Grid-No.1 Voltage (E_{c1k}) for visual extinction of focused raster	See Raster-Cutoff-Range Chart for Grid-Drive Service
Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value (Peak positive)	Same value as determined for E_{c1k} except video drive is a positive voltage
Grid-No.4 Current	-25 to +25 μ a
Grid-No.2 Current	-15 to +15 μ a
Field Strength of Adjustable Centering Magnet Δ	0 to 8 gauss

Examples of Use of Design Ranges:

With ultor voltage of	18000 volts
and grid-No.2 voltage of	400 volts
Grid-No.4 Voltage for focus $\S$	0 to 400 volts
Grid-No.1 Voltage for visual extinction of focused raster	-36 to -94 volts
Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value	36 to 94 volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max. megohms
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CATHODE-DRIVE[■] SERVICE

Unless otherwise specified,
voltage values are positive with respect to grid No.1

Maximum and Minimum Ratings, Design-Maximum Values:

ULTOR [●] -TO-GRID-NO.1 VOLTAGE	{ 22000 max. volts 11000 min. volts
GRID-NO.4-TO-GRID-NO.1 VOLTAGE:	
Positive value	1100 max. volts
Negative value	550 max. volts
GRID-NO.2-TO-GRID-NO.1 VOLTAGE	{ 700 max. volts 200 min. volts
GRID-NO.2-TO-CATHODE VOLTAGE	550 max. volts

CATHODE-TO-GRID-NO.1 VOLTAGE:

Positive peak value	220 max. volts
Positive bias value	154 max. volts
Negative bias value	0 max. volts
Negative peak value	2 max. volts

HEATER VOLTAGE	{ 6.9 max. volts 5.7 max. volts
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PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode:	
During equipment warm-up period not exceeding 15 seconds	450 max. volts
After equipment warm-up period . .	200 max. volts
Heater positive with respect to cathode	200 max. volts

Equipment Design Ranges:

With any ultor-to-grid-No.1 voltage (E_{c5g1}) between 11000 and 22000 volts and grid-No.2-to-grid-No.1 voltage (E_{c2g1}) between 225 and 700 volts

Grid-No.4-to-Grid-No.1 Voltage for focus $\S$	0 to 400 volts
Cathode-to-Grid-No.1 Voltage (E_{kg1}) for visual extinction of focused raster	See Raster-Cutoff-Range Chart for Cathode-Drive Service
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value (Peak negative)	Same value as determined for E_{kg1} except video drive is a negative voltage
Grid-No.4 Current	-25 to +25 μ a
Grid-No.2 Current	-15 to +15 μ a
Field Strength of Adjustable Centering Magnet Δ	0 to 8 gauss

Examples of Use of Design Ranges:

With ultor-to-grid-No.1 voltage of	18000 volts
and grid-No.2-to-grid-No.1 voltage of	400 volts
Grid-No.4-to-Grid-No.1 Voltage for focus $\S$	0 to 400 volts
Cathode-to-Grid-No.1 Voltage for visual extinction of focused raster	36 to 78 volts
Cathode-to-Grid-No.1 Video Drive from Raster Cutoff (Black Level): White-level value	-36 to -78 volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max. megohms
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[▲] The maximum ratings in the tabulated data are established in accordance with the following definition of the Design-Maximum Rating System for rating electron tubes.

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron device of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device, taking responsibility for the effects of changes in operating conditions due to variations in device characteristics.

The equipment manufacturer should design so that initially and throughout life no Design-Maximum value for the intended service is exceeded with a bogey device under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, and environmental conditions.

[●] The "ultor" in a cathode-ray tube is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection. In the 23MP4, the ultor function is performed by grid No.5. Since grid No.5, grid-No.3, and collector are connected together within the 23MP4, they are collectively referred to simply as "ultor" for convenience in presenting data and curves.



- ▲ Grid drive is the operating condition in which the video signal varies the grid-No.1 potential with respect to cathode.
- Cathode drive is the operating condition in which the video signal varies the cathode potential with respect to grid No.1 and the other electrodes.
- § Individual tubes will have satisfactory focus at some value of grid-No.4 (or grid-No.4-to-grid-No.1) voltage between 0 and 400 volts under conditions with the combined bias voltage and video-signal voltage adjusted to produce an ultor current of 200 microamperes.
- ◆ Distance from Reference Line for suitable PM centering magnet should not exceed 2-1/4". Excluding extraneous fields, the center of the undeflected focused spot will fall within a circle having a 3/8-inch radius concentric with the center of the tube face. It is to be noted that the earth's magnetic field can cause as much as 1/2-inch deflection of the spot from the center of the tube face.

OPERATING CONSIDERATIONS

X-Ray Warning. When operated at ultor voltages

up to 16 kilovolts, the 23MP4 does not produce any harmful X-ray radiation. However, because the rating of this type permits operation at voltages as high as 22 kilovolts (design-maximum value), shielding of the 23MP4 for X-ray radiation may be needed to protect against possible injury from prolonged exposure at close range whenever the operating conditions involve voltages in excess of 16 kilovolts.

Shatter-Proof Cover Over the Tube Face.

Following conventional picture-tube practice, it is recommended that the cabinet be provided with a shatter-proof, glass cover over the face of the 23MP4 to protect it from being struck accidentally and to protect against possible damage resulting from tube implosion under some abnormal condition. This safety cover can also provide X-ray protection when required.

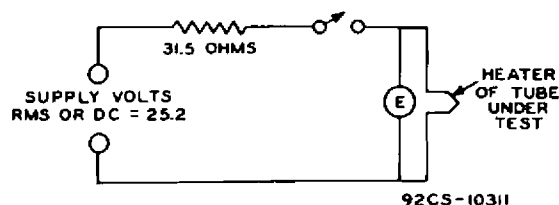


Fig. 1 - Test Circuit for Determining Heater Warm-Up Time.

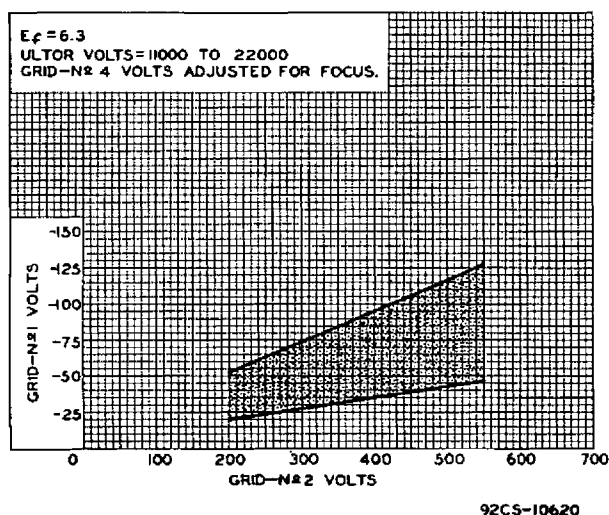


Fig. 2 - Raster-Cutoff-Range Chart for Type 23MP4 in Grid-Drive Service.

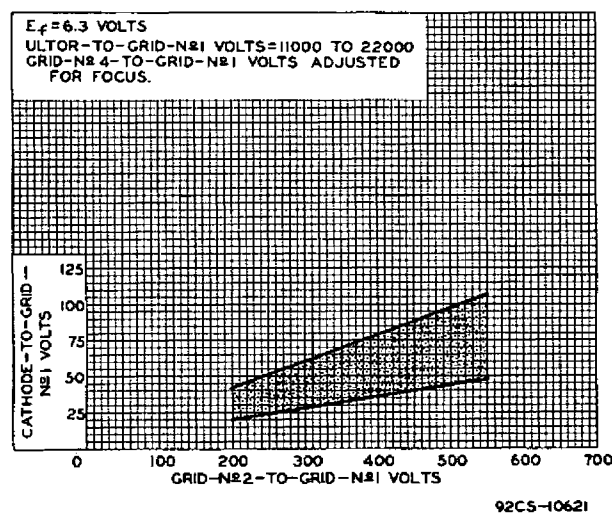


Fig. 3 - Raster-Cutoff-Range Chart for Type 23MP4 in Cathode-Drive Service.

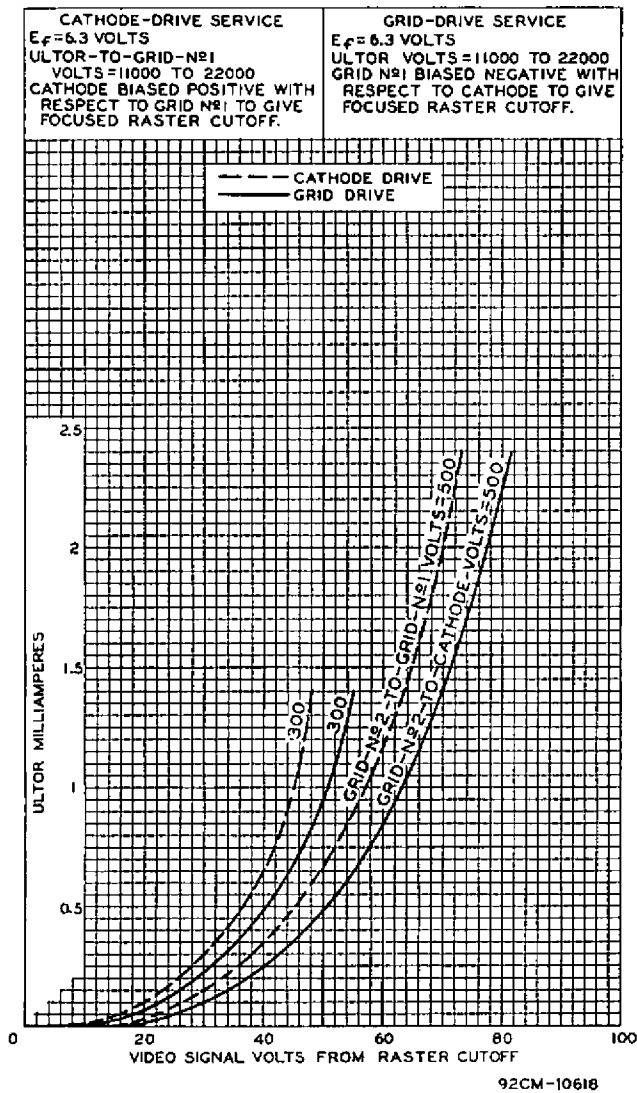


Fig. 4 - Average Drive Characteristics
of Type 23MP4.

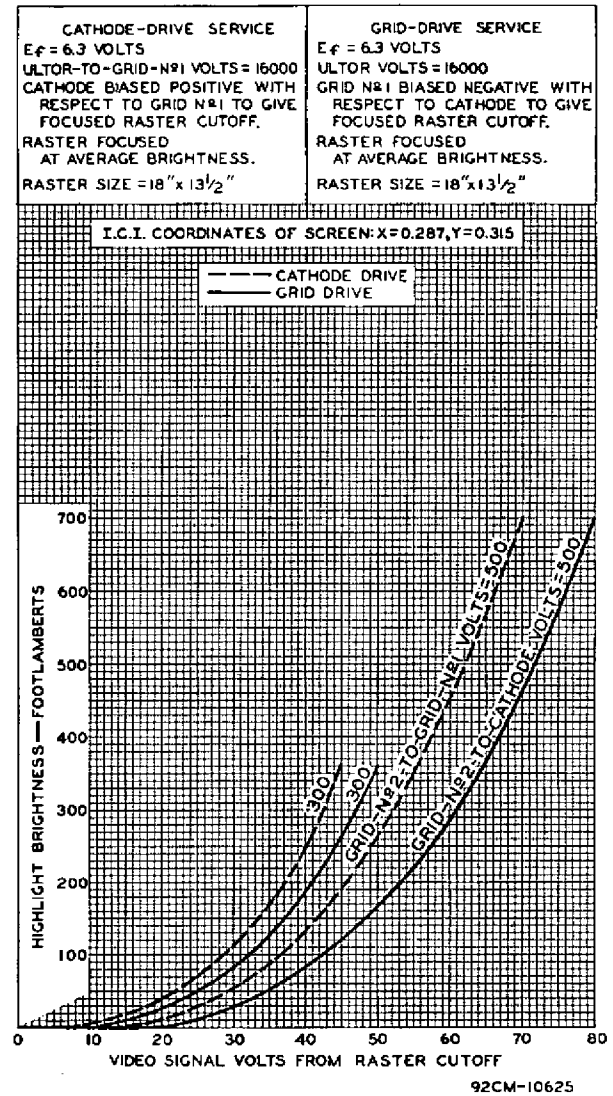
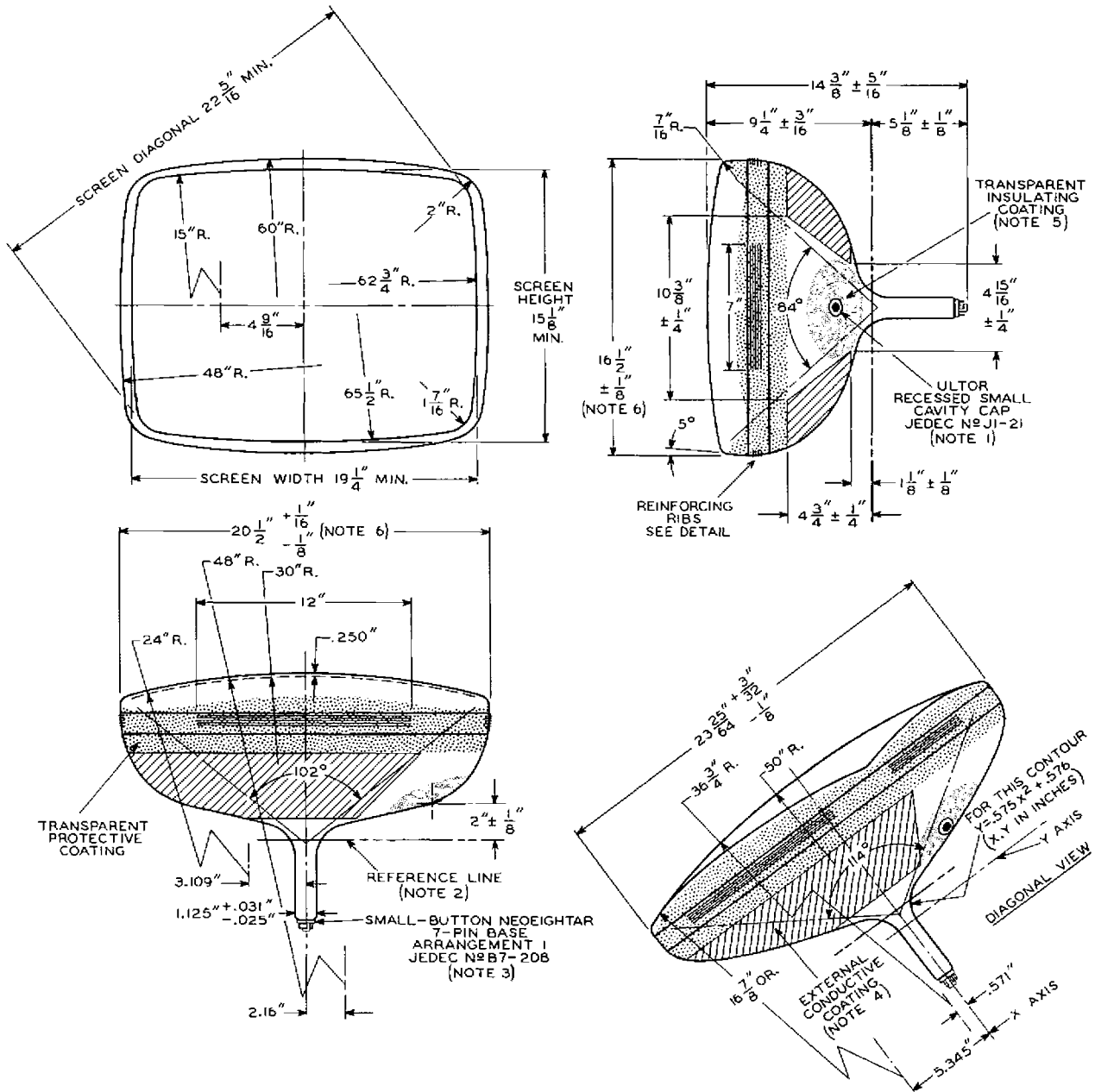


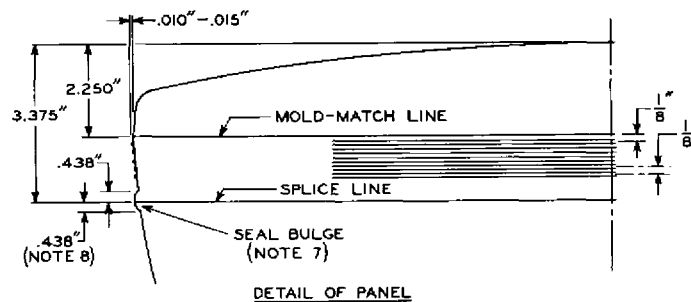
Fig. 5 - Average Drive Characteristics
of Type 23MP4.



DIMENSIONAL OUTLINE

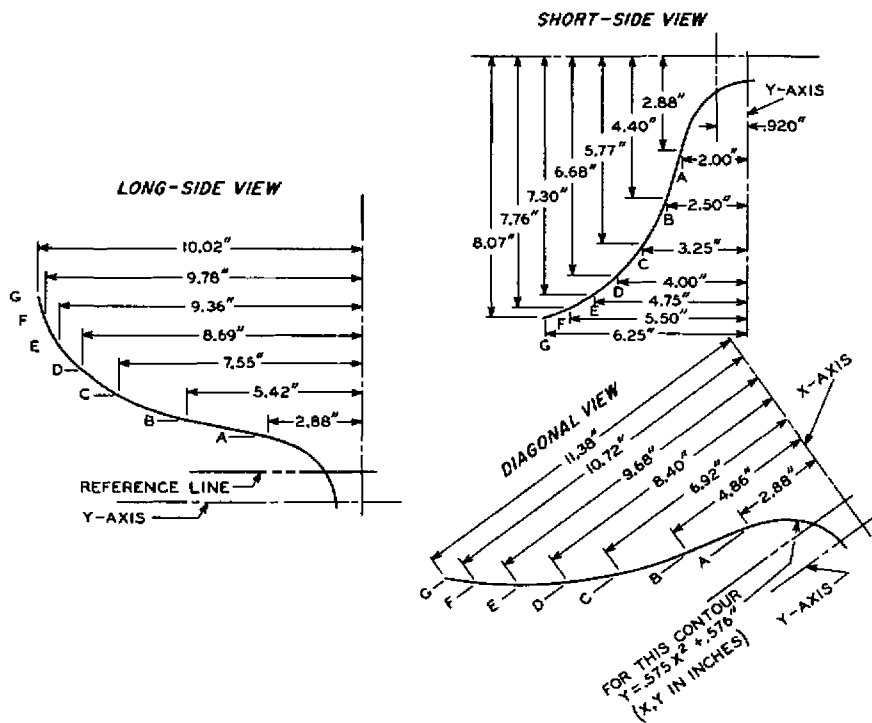


92CL-10642





BULB-CONTOUR DIMENSIONS



92CL-10652

NOTE: PLANES A THRU G ARE NORMAL TO THE TUBE AXIS AND AT FIXED LOCATIONS FROM THE Y AXIS. THESE COORDINATES DESCRIBE THE BULB EXTERNAL CONTOUR IN PLANES THROUGH THE TUBE AXIS AND THE RESPECTIVE FACEPLATE AXES.



NOTES FOR DIMENSIONAL OUTLINE

NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN NO.4 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 30^\circ$. ULTOR TERMINAL IS ON SAME SIDE AS PIN NO.4.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JEDEC NO.G-126 AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED; IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. THE DESIGN OF THE SOCKET SHOULD BE SUCH THAT THE CIRCUITRY CANNOT IMPRESS LATERAL STRAINS THROUGH THE SOCKET CONTACTS ON THE BASE PINS. BOTTOM CIRCUMFERENCE OF BASE WAFER WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF $1\frac{3}{4}$ ".

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

NOTE 5: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINTLESS CLOTH.

NOTE 6: MEASURED AT THE MOLD-MATCH LINE.

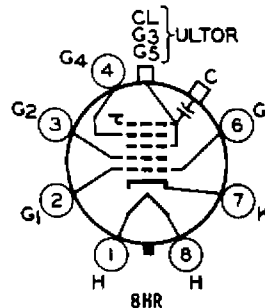
NOTE 7: BULGE AT SPLICE-LINE SEAL MAY INCREASE THE INDICATED MAXIMUM VALUE FOR ENVELOPE WIDTH, DIAGONAL, AND HEIGHT BY NOT MORE THAN $1/8$ ", BUT AT ANY POINT AROUND THE SEAL, THE BULGE WILL NOT PROTRUDE MORE THAN $1/16$ " BEYOND THE ENVELOPE SURFACE AT THE LOCATION SPECIFIED FOR DIMENSIONING THE ENVELOPE WIDTH, DIAGONAL, AND HEIGHT.

NOTE 8: AREA BETWEEN MOLD-MATCH LINE AND SEAL BULGE IS $1/2$ " MINIMUM. THIS SHOULD BE THE MAXIMUM WIDTH OF TUBE SUPPORT BAND. SUPPORTS MUST BE SPACED FROM THE TUBE BY THE USE OF CUSHIONING PADS MADE OF ASPHALT, IMPREGNATED FELT OR EQUIVALENT.

SOCKET CONNECTIONS

Bottom View

PIN 1: HEATER
PIN 2: GRID NO.1
PIN 3: GRID NO.2
PIN 4: GRID NO.4
PIN 6: GRID NO.1



PIN 7: CATHODE
PIN 8: HEATER
CAP: ULTOR (Grid No.3, Grid No.5, Collector)
C: EXTERNAL CONDUCTIVE COATING

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