

Picture Tube

RECTANGULAR GLASS TYPE
LOW-VOLTAGE ELECTROSTATIC FOCUS

ALUMINIZED SCREEN
MAGNETIC DEFLECTION

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Current at 6.3 volts	600 ± 30	ma
Heater Warm-Up Time (Average)	11	seconds
Focusing Method	Electrostatic	
Deflection Method	Magnetic	
Deflection Angles (Approx.):		
Diagonal.	92°	
Horizontal.	80°	
Vertical.	65°	
Direct Interelectrode Capacitances:		
Grid No.1 to all other electrodes	6	μμf
Cathode to all other electrodes	5	μμf
External conductive coating to ultor.	{2500 max. 1700 min.	{μμf μμf
Electron Gun.	Type Requiring No Ion-Trap Magnet	

Optical:

Faceplate	Filterglass	
Light transmission at center (Approx.)	78%	
Phosphor (For curves, see front of this Section).	P4—Sulfide Type	
	Aluminized	
Fluorescence	White	
Phosphorescence	White	
Persistence	Medium Short	

Mechanical:

Tube Dimensions:	
Overall length.	18" ± 3/8"
Greatest width.	20-1/2" + 1/16" - 1/8"
Greatest height.	16-1/2" ± 1/8"
Diagonal.	23-25/64" + 3/32" - 1/8"
Neck length.	5-1/2" ± 3/16"
Curvature of faceplate (Radii):	
Center.	50"
Edge.	36-3/4"
Screen Dimensions (Minimum):	
Greatest width.	19-1/4"
Greatest height.	15-1/8"
Diagonal.	22-5/16"
Projected area.	282 sq. in.
Weight (Approx.).	25 lbs
Operating Position.	Any
Cap.	Recessed Small Cavity (JEDEC No. J1-21)
Bulb.	J187C1

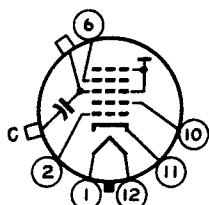


23AHP4

Base. Short Small-Shell Duodecal 6-Pin
(JEDEC Group 4, B6-203)

Basing Designation for BOTTOM VIEW. 12L

- Pin 1 - Heater
- Pin 2 - Grid No.1
- Pin 6 - Grid No.4
- Pin 10 - Grid No.2
- Pin 11 - Cathode
- Pin 12 - Heater



- Cap - Ultor
(Grid No.3,
Grid No.5,
Collector)
- C - External
Conductive
Coating

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. 11000 min.	volts volts
GRID-No.4 (FOCUSING) VOLTAGE:		
Positive value.	1100 max.	volts
Negative value.	550 max.	volts
GRID-No.2 VOLTAGE	{ 550 max. 200 min.	volts 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. 5.7 min.	volts 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

Typical Operating Conditions:

With ultor voltage (E_{c5k}) of	18000	volts
and grid-No.2 voltage (E_{c2k}) of	400	volts
Grid-No.4 Voltage for focus [●]	0 to 400	volts
Grid-No.1 Voltage for visual extinction of focused raster [★]	-36 to -94	volts
Field Strength of Adjustable Centering Magnet [♦]	0 to 11	gausses

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	1.5 max.	megohms
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CATHODE-DRIVE¹ 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 (FOCUSING) VOLTAGE:	
Positive value.	1250 max. volts
Negative value.	400 max. volts
GRID-No.2-TO-GRID-No.1 VOLTAGE.	{ 700 max. volts 350 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 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

Typical Operating Conditions:

With ultor-to-grid-No.1 voltage (E_{c5g1}) of	18000 volts
and grid-No.2-to-grid-No.1 voltage (E_{c2g1}) of	400 volts
Grid-No.4-to-Grid-No.1 Voltage for focus	0 to 400 volts
Cathode-to-Grid-No.1 Voltage for visual extinction of focused raster	36 to 78 volts
Field Strength of Adjustable Centering Magnet	0 to 11 gauss

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	1.5 max. megohms
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[▲] Grid drive is the operating condition in which the video signal varies the grid-No.1 potential with respect to cathode.

• The grid-No.4 (or grid-No.4-to-grid-No.1) voltage required for optimum focus of any individual tube will have a value anywhere between 0 and 400 volts, is independent of ultor current and will remain essentially constant for values of ultor (or ultor-to-grid-No.1) voltage or grid-No.2 (or grid-No.2-to-grid-No.1) voltage within design-maximum ratings shown for these items.

★ See Raster-Cutoff-Range Chart for Grid-Drive Service.

◆ Distance from Reference Line for suitable PM centering magnet should not exceed 2-1/4". The specified centering magnet compensates only for the effect which mechanical tube tolerances may have on the location of the undeflected focused spot with respect to the center of the tube



23AHP4

face. Maximum field strength of adjustable centering magnet equals:

$$\sqrt{\frac{E_{c5k} \text{ or } E_{c5g1} \text{ (volts)}}{16000 \text{ (volts)}}} \times 10 \text{ gauss}$$

The equipment manufacturer must determine and supply additional compensation for the effects of the earth's magnetic field and extraneous fields due to choice of circuitry and components. The additional compensation should preferably be applied as part of the magnetic field of the deflecting yoke.

• 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.

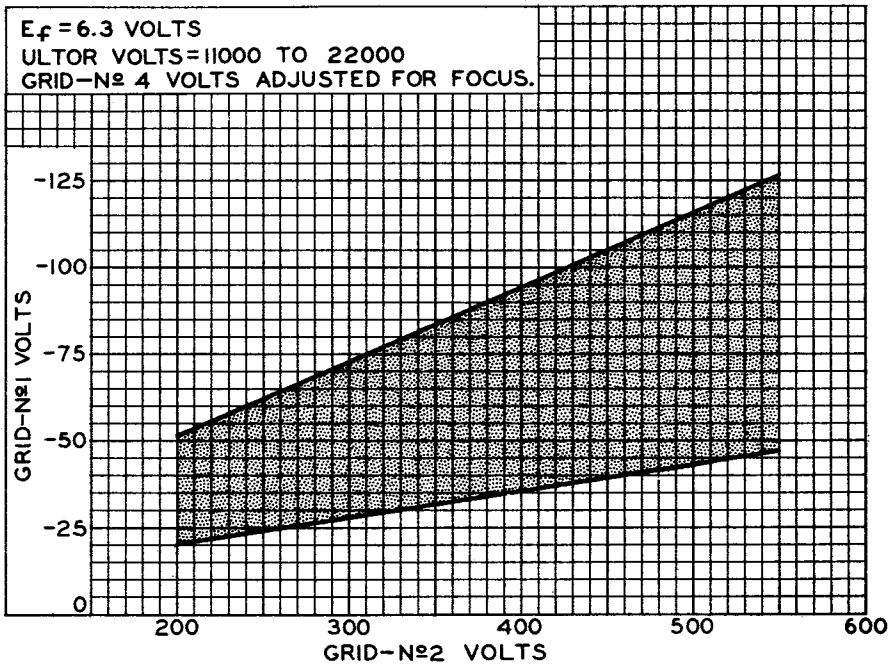
• See *Raster-Cutoff-Range Chart for Cathode-Drive Service.*

OPERATING CONSIDERATIONS

X-Ray Warning. When operated at ultor voltages up to 16 kilovolts, this picture tube 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 this picture tube 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.

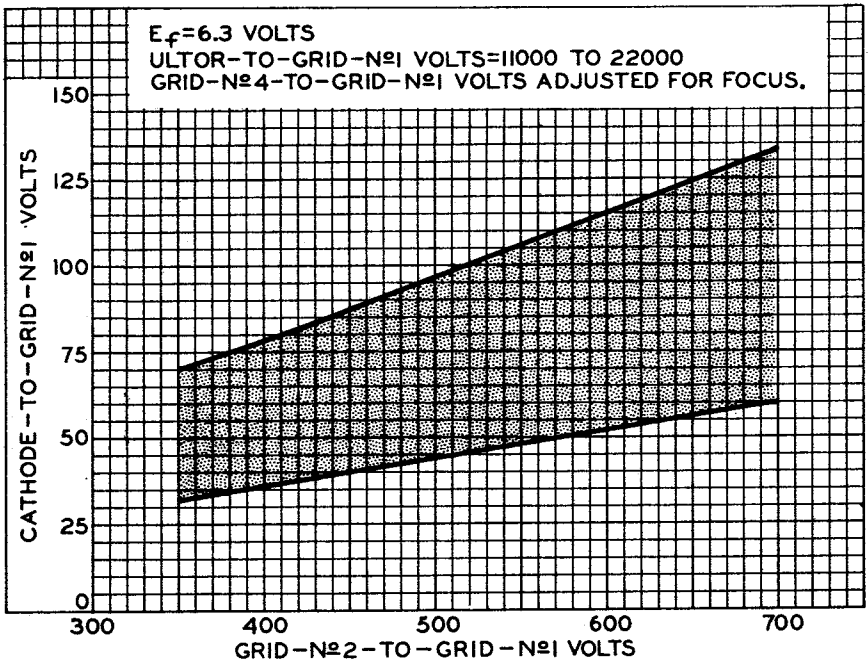
Shatter-Proof Cover Over the Tube Face. Following conventional picture tube practice, it is recommended that the cabinet be provided with a shatterproof, glass cover over the face of this picture tube to protect it from being struck accidentally and to protect against possible damage resulting from tube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

RASTER-CUTOFF-RANGE CHARTS Grid-Drive Service



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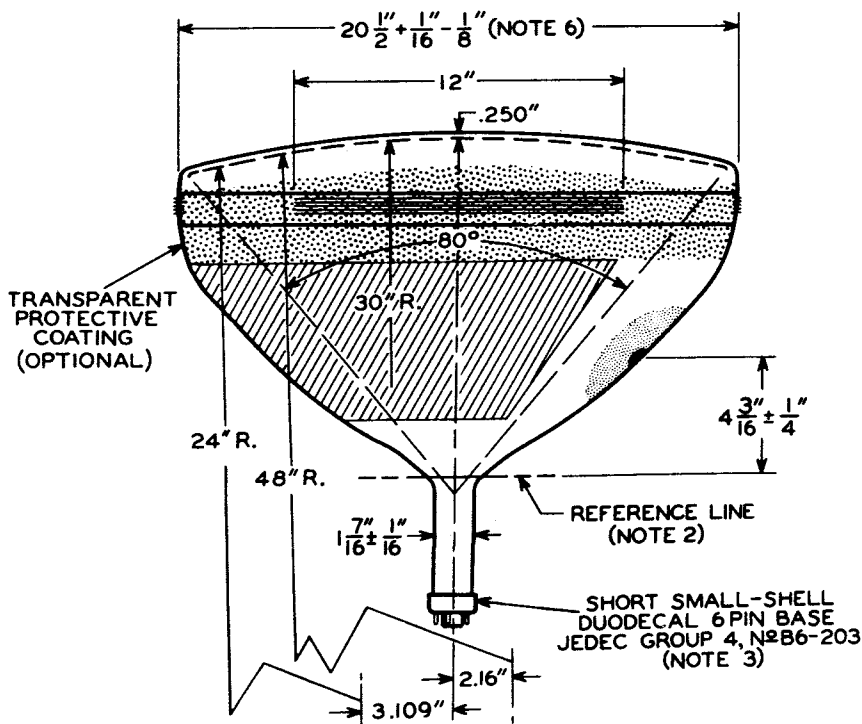
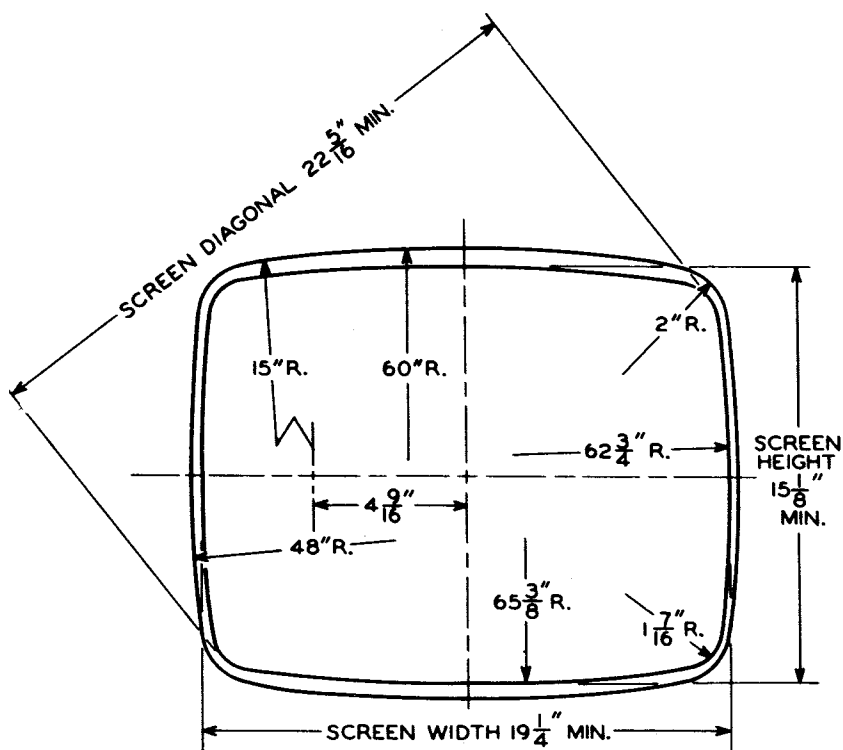
Cathode-Drive Service



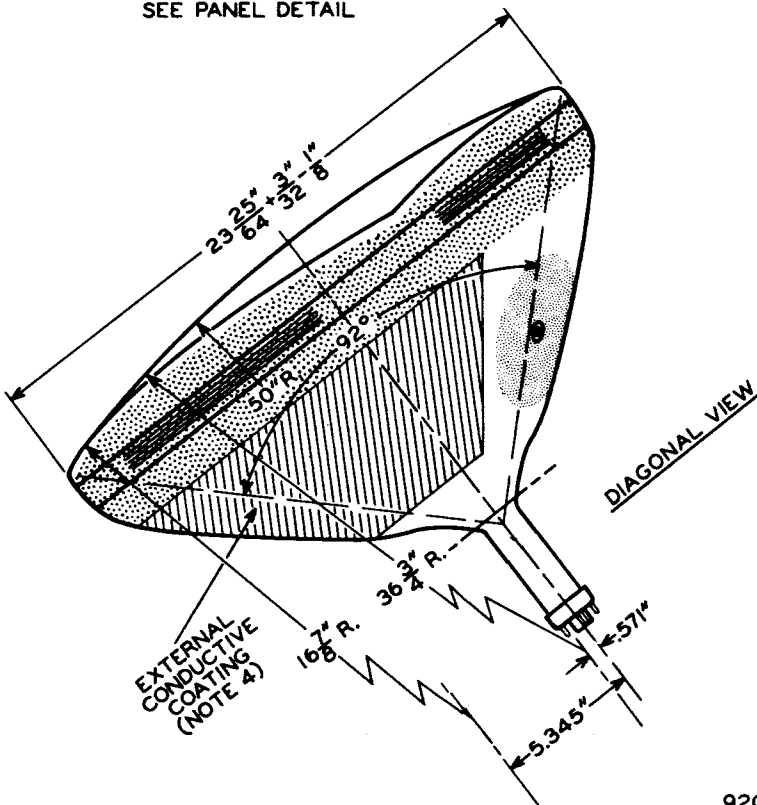
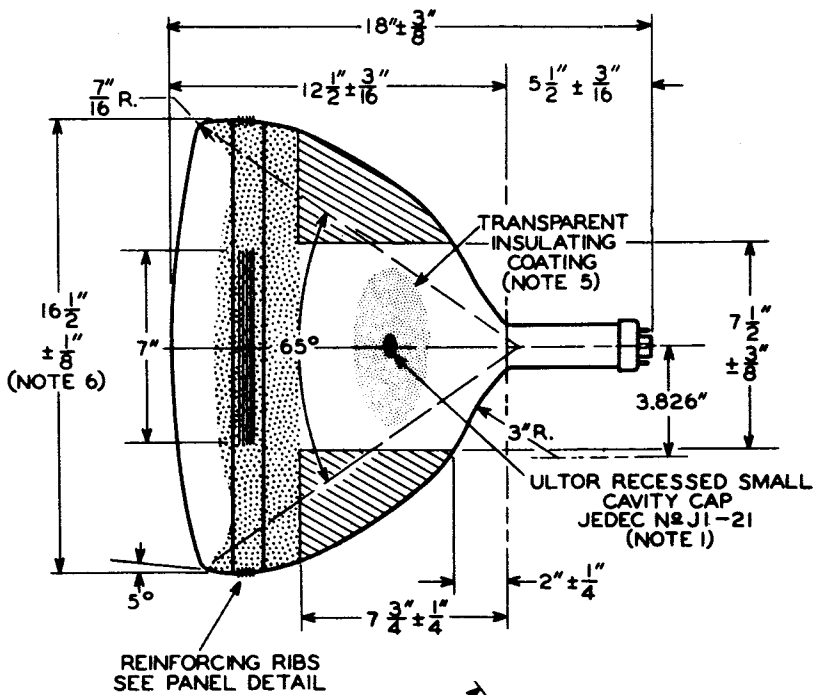
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23AHP4

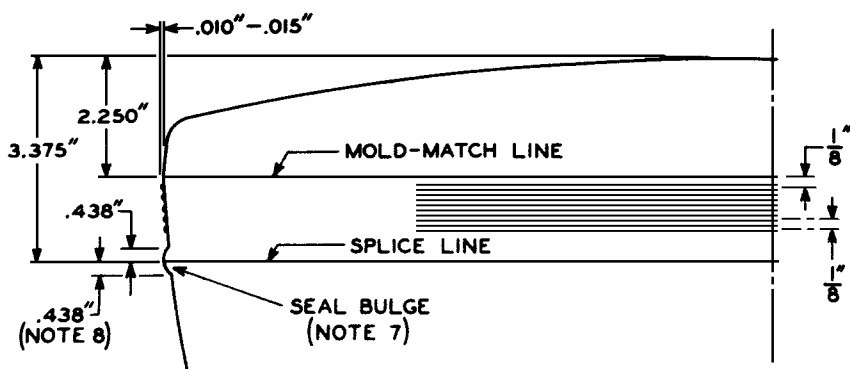


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DETAIL OF PANEL

NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND PIN 6 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 6.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JEDEC No. G-116 (SHOWN AT FRONT OF THIS SECTION) 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. BOTTOM CIRCUMFERENCE OF BASE WAFER WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 2-3/4".

NOTE 4: EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

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

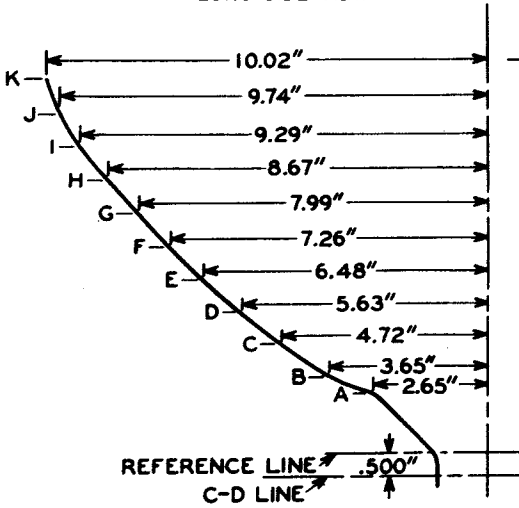
NOTE 6: MEASURED AT THE MOLD-MATCH LINE.

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.

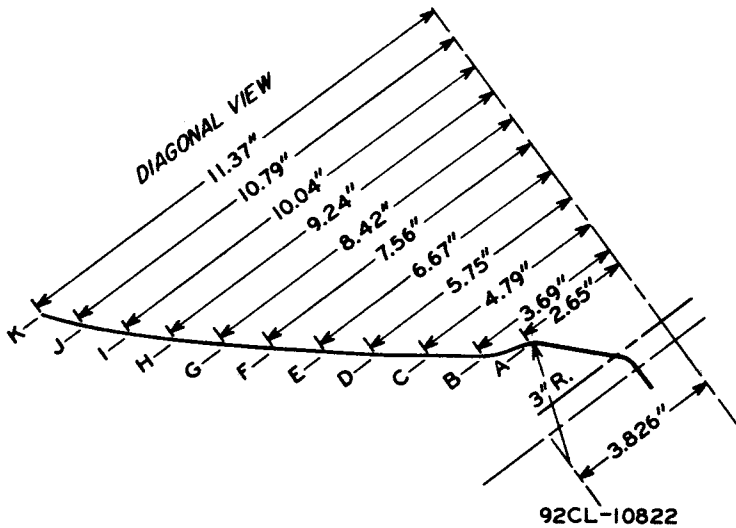
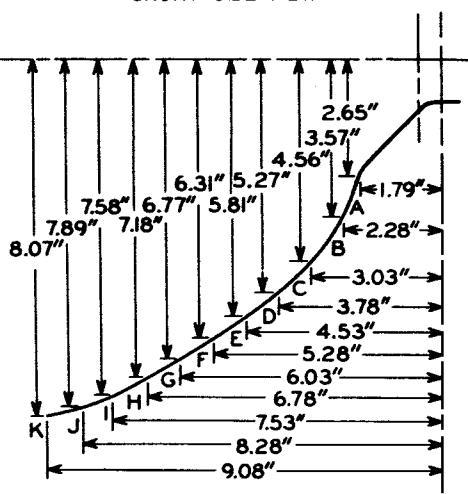
NOTE 8: AREA BETWEEN MOLD-MATCH LINE AND SEAL BULGE IS 1/2" MINIMUM. THIS SHOULD BE THE MAXIMUM WIDTH OF TUBE SUPPORT BAND. SUPPORTS MUST BE SPACED FROM THE TUBE BY THE USE OF CUSHIONING PADS MADE OF ASPHALT-IMPREGNATED FELT, OR EQUIVALENT.

BULB-CONTOUR DIMENSIONS

LONG-SIDE VIEW



SHORT-SIDE VIEW



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

