



**Screen Dimensions (Minimum):**

|                             |                                                                  |
|-----------------------------|------------------------------------------------------------------|
| Greatest width . . . . .    | 21-7/16"                                                         |
| Greatest height . . . . .   | 16-7/8"                                                          |
| Diagonal . . . . .          | 22-13/16"                                                        |
| Projected area . . . . .    | 332 sq. in.                                                      |
| Cap. . . . .                | Recessed Small Cavity (JETEC No. J1-21)                          |
| Bulb . . . . .              | J192 (110°)                                                      |
| Base . . . . .              | Small-Button Eightar 7-Pin,<br>Arrangement 2, (JETEC No. B7-183) |
| Weight (Approx.) . . . . .  | 28 lbs                                                           |
| Mounting Position . . . . . | Any                                                              |

**GRID-DRIVE<sup>▲</sup> SERVICE**

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

**Maximum Ratings, Design-Center Values:**

|                                                              |                                                                      |                                                          |
|--------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|
| ULTOR <sup>●</sup> VOLTAGE . . . . .                         | $\begin{cases} 20000 \text{ max.} \\ 12000 \text{ min.} \end{cases}$ | $\begin{cases} \text{volts} \\ \text{volts} \end{cases}$ |
| GRID-No. 4 VOLTAGE:                                          |                                                                      |                                                          |
| Positive value . . . . .                                     | 1000 max.                                                            | volts                                                    |
| Negative value . . . . .                                     | 500 max.                                                             | volts                                                    |
| GRID-No. 2 VOLTAGE . . . . .                                 | 500 max.                                                             | volts                                                    |
| GRID-No. 1 VOLTAGE:                                          |                                                                      |                                                          |
| Negative peak value . . . . .                                | 200 max.                                                             | volts                                                    |
| Negative bias value . . . . .                                | 140 max.                                                             | volts                                                    |
| Positive bias value . . . . .                                | 0 max.                                                               | volts                                                    |
| Positive peak value . . . . .                                | 2 max.                                                               | volts                                                    |
| PEAK HEATER-CATHODE VOLTAGE:                                 |                                                                      |                                                          |
| Heater negative with respect to cathode:                     |                                                                      |                                                          |
| During equipment warm-up period<br>not exceeding 15 seconds. | 410 max.                                                             | volts                                                    |
| After equipment warm-up period . .                           | 180 max.                                                             | volts                                                    |
| Heater positive with respect<br>to cathode . . . . .         | 180 max.                                                             | volts                                                    |

**Equipment Design Ranges:**

*With any ultor voltage ( $E_{c5k}$ ) between 12000 and 20000 volts  
and grid-No. 2 voltage ( $E_{c2k}$ ) between 200 and 500 volts*

|                                                                                          |                                                                                    |                 |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------|
| Grid-No. 4-Voltage for<br>Focus $\S$ . . . . .                                           | -50 to +350                                                                        | volts           |
| Grid-No. 1 Voltage ( $E_{c1k}$ )<br>for Visual Extinction of<br>Focused Raster . . . . . | See Raster-Cutoff-Range Chart<br>for Grid-Drive Service                            |                 |
| Grid-No. 1 Video Drive from<br>Raster Cutoff (Black Level):                              |                                                                                    |                 |
| White-level value<br>(Peak positive). . . . .                                            | Same value as determined for $E_{c1k}$<br>except video drive is a positive voltage |                 |
| Grid-No. 4 Current . . . . .                                                             | -25 to +25                                                                         | $\mu\text{amp}$ |
| Grid-No. 2 Current . . . . .                                                             | -15 to +15                                                                         | $\mu\text{amp}$ |
| Field Strength of Adjustable<br>Centering Magnet* . . . . .                              | 0 to 8                                                                             | gausses         |

**Examples of Use of Design Ranges:**

|                                                                            |             |             |       |
|----------------------------------------------------------------------------|-------------|-------------|-------|
| With ultor voltage of                                                      | 14000       | 16000       | volts |
| and grid-No. 2 voltage of                                                  | 300         | 400         | volts |
| Grid-No. 4 Voltage for<br>Focus . . . . .                                  | -50 to +350 | -50 to +350 | volts |
| Grid-No. 1 Voltage for<br>Visual Extinction of<br>Focused Raster . . . . . | -28 to -72  | -36 to -94  | volts |
| Grid-No. 1 Video Drive<br>from Raster Cutoff<br>(Black Level):             |             |             |       |
| White-level value . . . . .                                                | 28 to 72    | 36 to 94    | volts |

**Maximum Circuit Values:**

|                                         |          |         |
|-----------------------------------------|----------|---------|
| Grid-No. 1-Circuit Resistance . . . . . | 1.5 max. | megohms |
|-----------------------------------------|----------|---------|

**CATHODE-DRIVE<sup>■</sup> SERVICE**

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

**Maximum Ratings, Design-Center Values:**

|                                                     |                                                                      |                                                          |
|-----------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|
| ULTOR <sup>●</sup> -TO-GRID-No. 1 VOLTAGE . . . . . | $\begin{cases} 20000 \text{ max.} \\ 12000 \text{ min.} \end{cases}$ | $\begin{cases} \text{volts} \\ \text{volts} \end{cases}$ |
|-----------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|

**GRID-No. 4-TO-GRID-No. 1 VOLTAGE:**

|                                            |           |       |
|--------------------------------------------|-----------|-------|
| Positive value . . . . .                   | 1000 max. | volts |
| Negative value . . . . .                   | 500 max.  | volts |
| GRID-No. 2-TO-GRID-No. 1 VOLTAGE . . . . . | 640 max.  | volts |
| GRID-No. 2-TO-CATHODE VOLTAGE . . . . .    | 500 max.  | volts |

**CATHODE-TO-GRID-No. 1 VOLTAGE:**

|                               |          |       |
|-------------------------------|----------|-------|
| Positive peak value . . . . . | 200 max. | volts |
| Positive bias value . . . . . | 140 max. | volts |
| Negative bias value . . . . . | 0 max.   | volts |
| Negative peak value . . . . . | 2 max.   | volts |

**PEAK HEATER-CATHODE VOLTAGE:**

|                                                              |          |       |
|--------------------------------------------------------------|----------|-------|
| Heater negative with respect<br>to cathode:                  |          |       |
| During equipment warm-up period<br>not exceeding 15 seconds. | 410 max. | volts |
| After equipment warm-up period . .                           | 180 max. | volts |
| Heater positive with respect<br>to cathode . . . . .         | 180 max. | volts |

**Equipment Design Ranges:**

*With any ultor-to-grid-No. 1 voltage ( $E_{c5g1}$ ) between 12000  
and 20000 volts and grid-No. 2-to-grid-No. 1 voltage ( $E_{c2g1}$ )  
between 225 and 640 volts*

|                                                                                                     |                                                            |       |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------|
| Grid-No. 4-to-Grid-No. 1<br>Voltage for Focus $\S$ . . . . .                                        | -50 to +350                                                | volts |
| Cathode-to-Grid-No. 1 Voltage<br>( $E_{kg1}$ ) for Visual Extinction<br>of Focused Raster . . . . . | See Raster-Cutoff-Range Chart<br>for Cathode-Drive Service |       |

**Cathode-to-Grid-No. 1 Video**

|                                                             |                                                                                    |                 |
|-------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------|
| Drive from Raster Cutoff<br>(Black Level):                  |                                                                                    |                 |
| White-level value<br>(Peak negative). . . . .               | Same value as determined for $E_{kg1}$<br>except video drive is a negative voltage |                 |
| Grid-No. 4 Current . . . . .                                | -25 to +25                                                                         | $\mu\text{amp}$ |
| Grid-No. 2 Current . . . . .                                | -15 to +15                                                                         | $\mu\text{amp}$ |
| Field Strength of Adjustable<br>Centering Magnet* . . . . . | 0 to 8                                                                             | gausses         |

**Examples of Use of Design Ranges:**

|                                                                                          |             |             |       |
|------------------------------------------------------------------------------------------|-------------|-------------|-------|
| With ultor-to-grid-<br>No. 1 voltage of                                                  | 14000       | 16000       | volts |
| and grid-No. 2-to-grid-<br>No. 1 voltage of                                              | 300         | 400         | volts |
| Grid-No. 4-to-Grid-<br>No. 1 Voltage<br>for Focus . . . . .                              | -50 to +350 | -50 to +350 | volts |
| Cathode-to-Grid-No. 1<br>Voltage for Visual<br>Extinction of<br>Focused Raster . . . . . | 28 to 60    | 36 to 78    | volts |
| Cathode-to-Grid-No. 1<br>Video Drive from<br>Raster Cutoff<br>(Black Level):             |             |             |       |
| White-level value . . . . .                                                              | -28 to -60  | -36 to -78  | volts |

**Maximum Circuit Values:**

|                                         |          |         |
|-----------------------------------------|----------|---------|
| Grid-No. 1-Circuit Resistance . . . . . | 1.5 max. | megohms |
|-----------------------------------------|----------|---------|

● 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 24AHP4, the ultor function is performed by grid No. 5. Since grid No. 5, grid No. 3, and collector are connected together within the 24AHP4, 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.

§ This value is a working design-center minimum. The equivalent absolute minimum ultor, or ultor-to-grid-No. 1, voltage is 11000 volts, below which the serviceability of the 24AHP4 will be impaired. The equipment designer has the responsibility of determining a minimum design value such that under the worst probable operating conditions involving supply-voltage variation and equipment variation the absolute minimum ultor, or ultor-to-grid-No. 1, voltage is never less than 11000 volts.



§ The grid-No.4 voltage or grid-No.4-to-grid-No.1 voltage required for focus of any individual tube is independent of ultor current and will remain essentially constant for values of ultor voltage (or ultor-to-grid-No.1 voltage) or grid-No.2 voltage (or grid-No.2-to-grid-No.1 voltage) within design ranges shown for these items.

\* 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 7/16-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.

■ 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.

### OPERATING CONSIDERATIONS

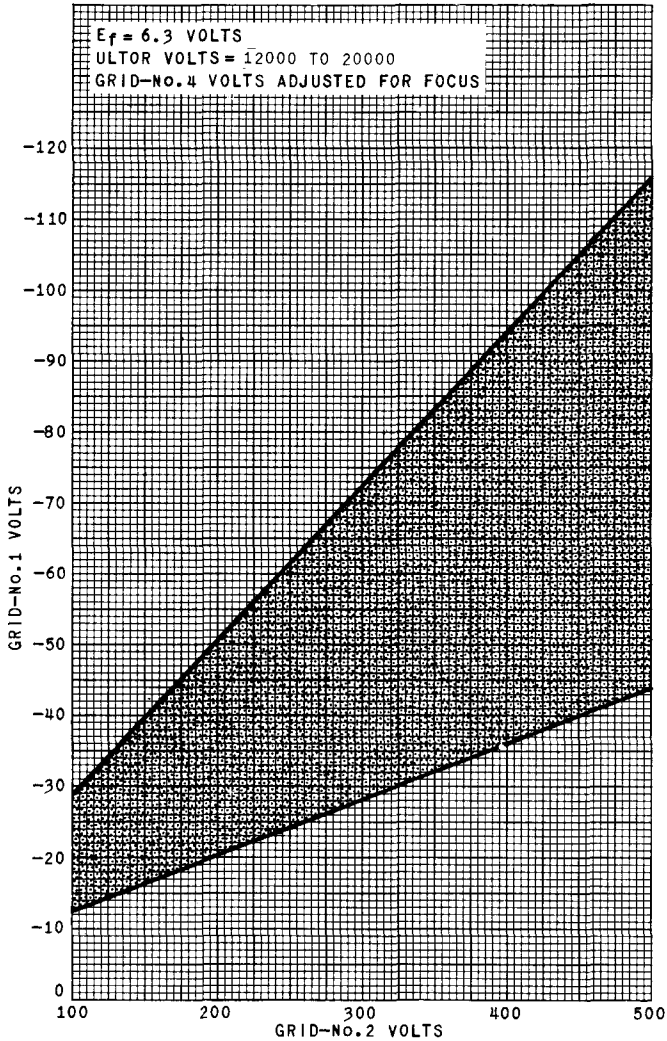
The *maximum ratings* in the tabulated data are working design-center maximums established according to the standard design-center system of rating electron tubes. Tubes so rated will give satisfactory performance in equipment designed so that these maximum ratings will not be exceeded when the equipment is operated from ac or dc power-line supplies whose normal voltage including normal variations falls within  $\pm 10$  per cent of line-center voltage value of 117 volts.

**X-Ray Warning.** When operated at ultor voltages up to 16 kilovolts, the 24AHP4 does not produce any harmful X-ray radiation. However, because the rating of this type permits operation at voltages as high as 22 kilovolts (absolute maximum value), shielding of the 24AHP4 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 24AHP4 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.

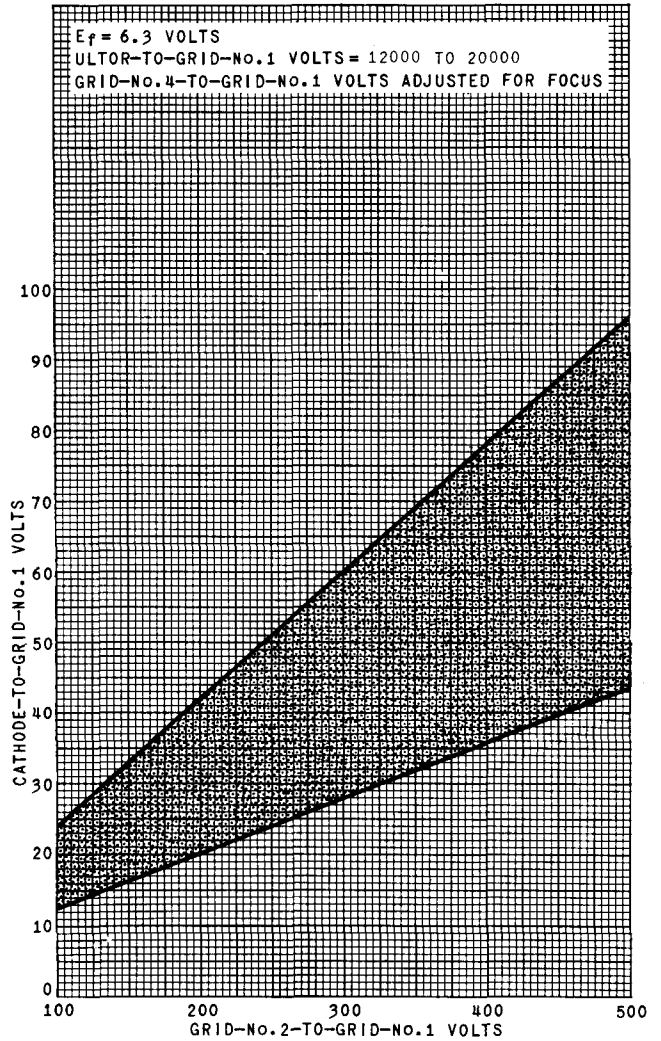
The *base pins* of the 24AHP4 fit the Eightar 8-contact socket, such as Ucinite Part No. 115446, or equivalent. The design of the socket should be such that the circuit wiring cannot impress lateral strains through the socket contacts on the base pins.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.



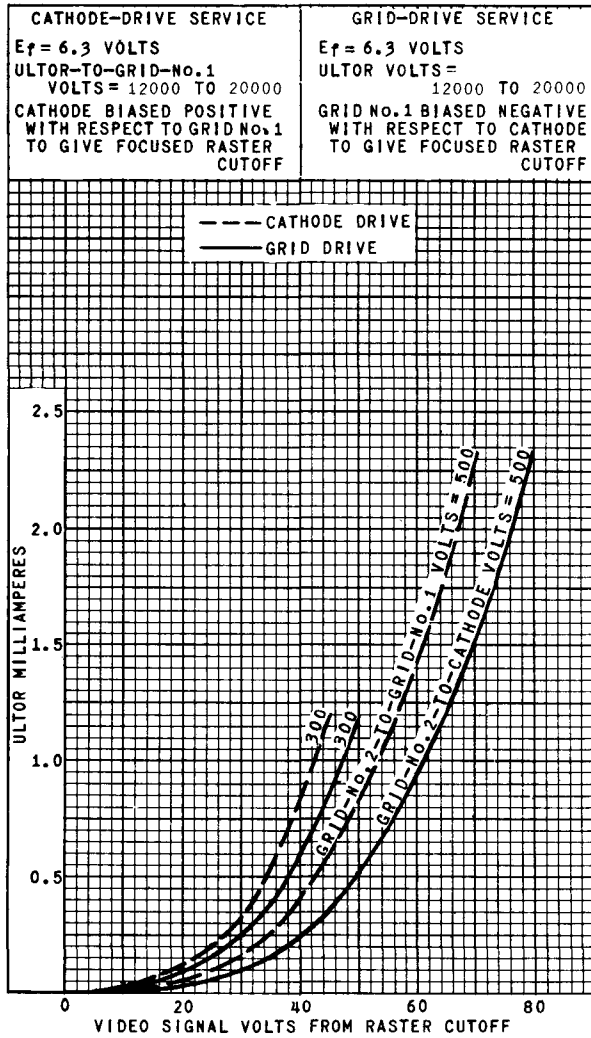
92CS-9349

Fig. 1 - Raster-Cutoff Range for Type 24AHP4  
in Grid-Drive Service.



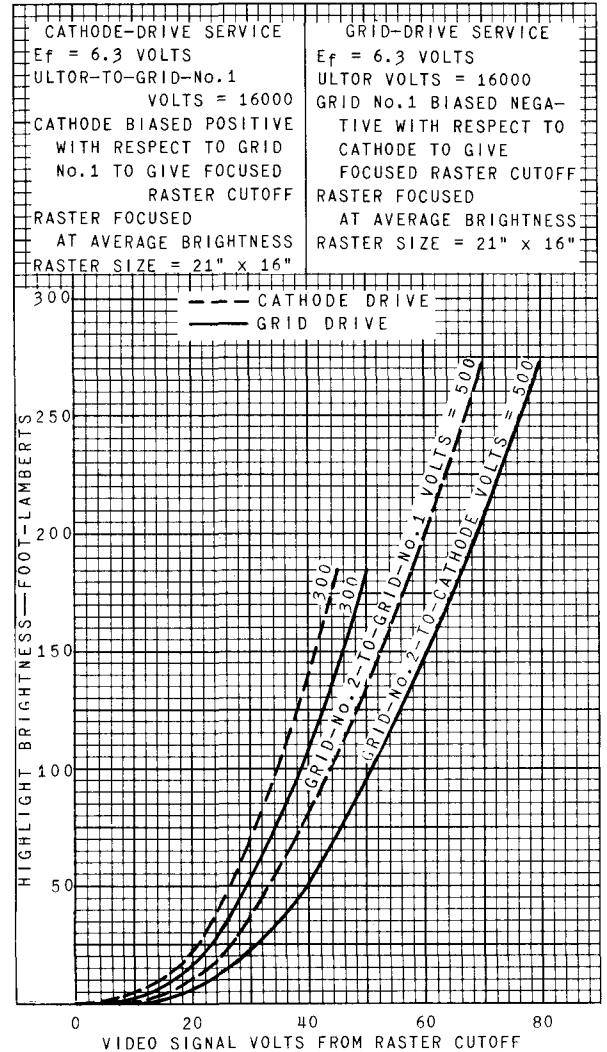
92CS-9350

Fig. 2 - Raster-Cutoff Range for Type 24AHP4  
in Cathode-Drive Service.



92CS-9351

Fig. 3 - Average Drive Characteristics  
of Type 24AHP4.

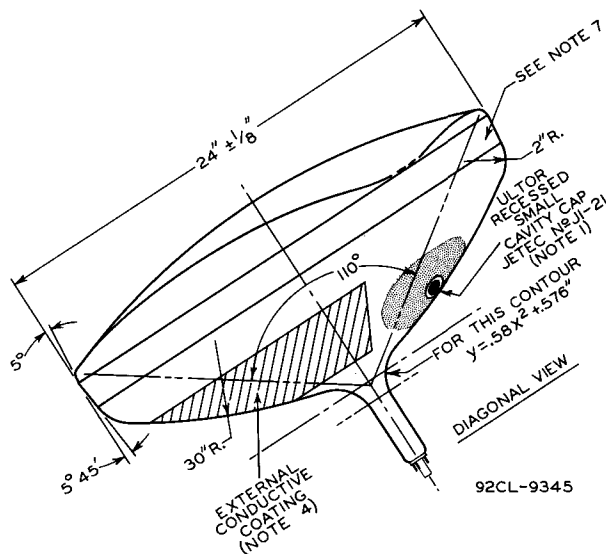
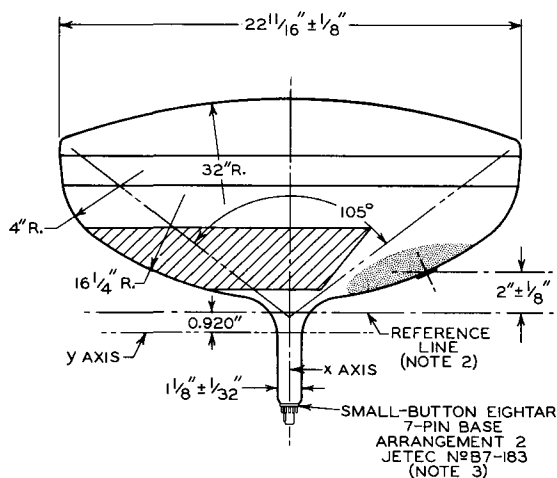
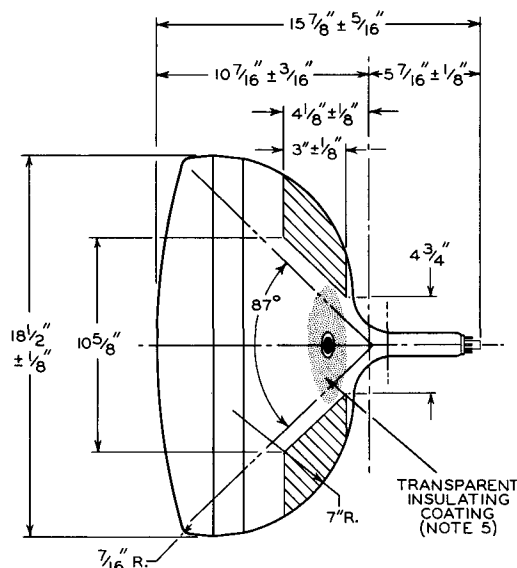
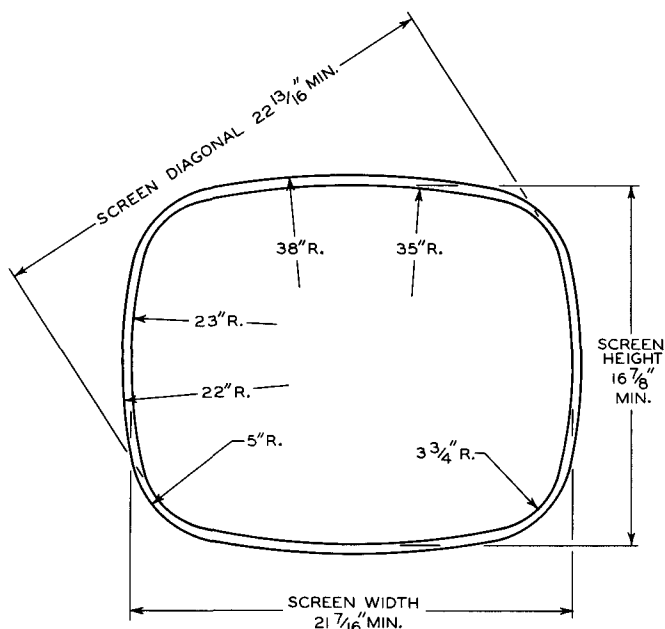


92CS-9352

Fig. 4 - Average Drive Characteristics  
of Type 24AHP4.



## DIMENSIONAL OUTLINE



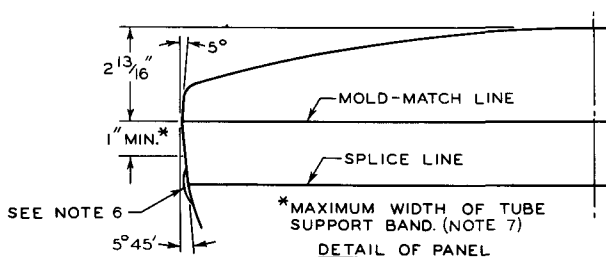
**NOTE 1:** THE PLANE THROUGH THE TUBE AXIS AND PIN No. 4 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF  $\pm 30^\circ$ . ULTOR TERMINAL IS ON SAME SIDE AS PIN No. 4.

**NOTE 2:** WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC No. 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 CIRCUIT WIRING 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 LINT-LESS CLOTH.

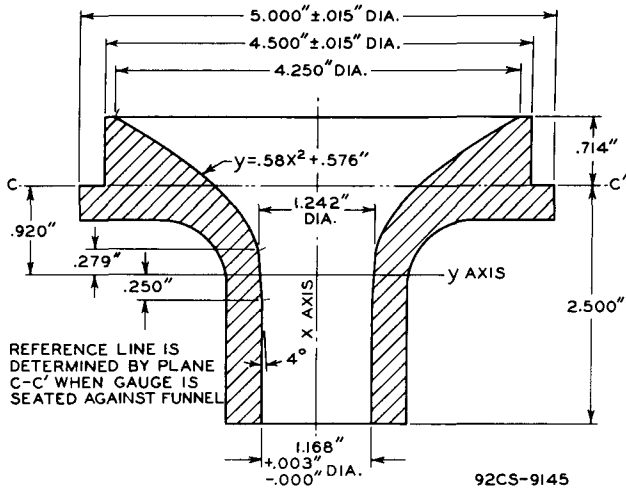


**NOTE 6:** BULGE AT SPLICE-LINE SEAL MAY INCREASE THE INDICATED MAXIMUM VALUE FOR ENVELOPE WIDTH, DIAGONAL, AND HEIGHT BY NOT MORE THAN  $\frac{1}{8}$ ", BUT AT ANY POINT AROUND THE SEAL, THE BULGE WILL NOT PROTRUDE MORE THAN  $\frac{1}{16}$ " BEYOND THE ENVELOPE SURFACE AT THE MOLD-MATCH LINE.

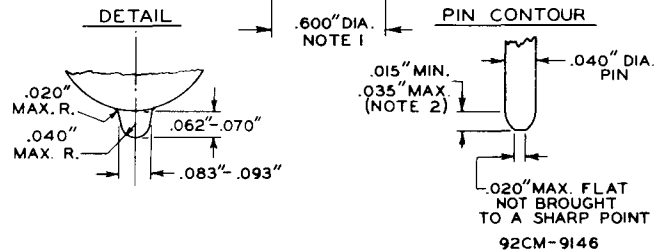
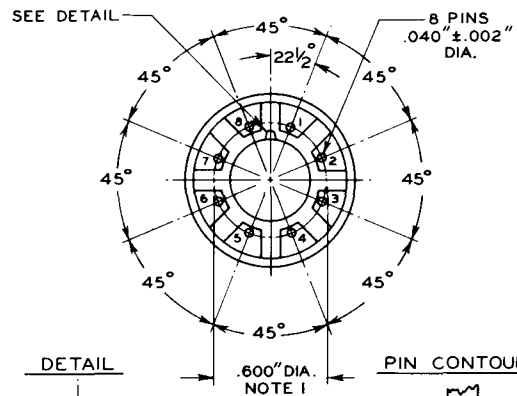
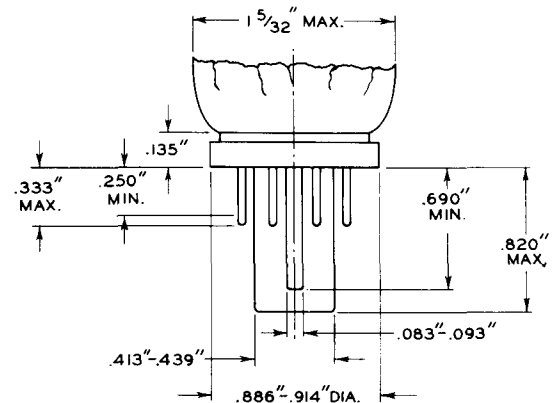
**NOTE 7:** UNDISTURBED AREA BETWEEN MOLD-MATCH LINE AND SPLICE LINE IS 1" MINIMUM. THIS SHOULD BE THE MAXIMUM WIDTH OF TUBE SUPPORT BAND.



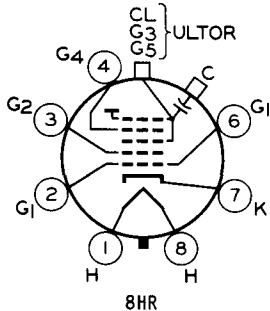
# REFERENCE-LINE AND NECK-FUNNEL-CONTOUR GAUGE JETEC No 126



## SMALL-BUTTON EIGHTAR BASE



## 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

**NOTE 1:** BASE-PIN POSITIONS ARE HELD TO TOLERANCES SUCH THAT THE BASE WILL FIT A FLAT-PLATE GAUGE HAVING A THICKNESS OF 3/8" AND EIGHT EQUALLY SPACED HOLES OF 0.0550" ± 0.0005" DIAMETER LOCATED ON A 0.6000" ± 0.0005" DIAMETER CIRCLE. THE GAUGE IS ALSO PROVIDED WITH A CENTER HOLE TO PROVIDE 0.010" DIAMETRIC CLEARANCE FOR THE LUG AND KEY. PIN FIT IN THE GAUGE SHALL BE SUCH THAT THE ENTIRE LENGTH OF PINS WILL, WITHOUT UNDUE FORCE, ENTER INTO AND DISENGAGE FROM THE GAUGE.

**NOTE 2:** THIS DIMENSION AROUND THE PERIPHERY OF ANY INDIVIDUAL PIN MAY VARY WITHIN THE LIMITS SHOWN.

| JETEC No. | No. OF PINS         | PINS            |
|-----------|---------------------|-----------------|
| B8-181    | 8-Pin               | 1,2,3,4,5,6,7,8 |
| B7-182    | 7-Pin Arrangement 1 | 2,3,4,5,6,7,8   |
| B7-183    | 7-Pin Arrangement 2 | 1,2,3,4,6,7,8   |