# 5563
## THYRATRON
### MERCURY-VAPOR TRIODE

### GENERAL DATA

**Electrical:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament, Coated: Voltage</td>
<td>5</td>
</tr>
<tr>
<td>Filament, Coated: Current</td>
<td>10</td>
</tr>
<tr>
<td>Minimum Heating Time:</td>
<td></td>
</tr>
<tr>
<td>At initial installation</td>
<td>15</td>
</tr>
<tr>
<td>Without anode voltage, for</td>
<td></td>
</tr>
<tr>
<td>Proper distribution of</td>
<td></td>
</tr>
<tr>
<td>Condensed mercury:</td>
<td></td>
</tr>
<tr>
<td>During subsequent operation</td>
<td></td>
</tr>
<tr>
<td>And prior to conduction, for</td>
<td></td>
</tr>
<tr>
<td>Bringing condensed-</td>
<td></td>
</tr>
<tr>
<td>Mercury temperature within</td>
<td></td>
</tr>
<tr>
<td>Operating range:</td>
<td></td>
</tr>
<tr>
<td>Not less than 60 seconds</td>
<td></td>
</tr>
<tr>
<td>To provide adequate filament heating; longer, if required by low ambient temperatures.</td>
<td></td>
</tr>
<tr>
<td>Direct Inter-electrode</td>
<td></td>
</tr>
<tr>
<td>Capacitance: Grid to Anode</td>
<td>10 max.</td>
</tr>
<tr>
<td>Ionization Time</td>
<td>10 approx.</td>
</tr>
<tr>
<td>Deionization Time</td>
<td>1000 approx.</td>
</tr>
<tr>
<td>Anode Voltage Drop</td>
<td>15 approx.</td>
</tr>
<tr>
<td>Grid Control Ratio</td>
<td>200 approx.</td>
</tr>
</tbody>
</table>

*With no external shield.*

**Mechanical:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Position</td>
<td>Vertical, base down</td>
</tr>
<tr>
<td>Overall Length</td>
<td>10-1/8&quot; to 11-1/16&quot;</td>
</tr>
<tr>
<td>Maximum Diameter</td>
<td>3-7/8&quot;</td>
</tr>
<tr>
<td>Cooling</td>
<td>Convection</td>
</tr>
<tr>
<td>Bulb</td>
<td>T-24</td>
</tr>
<tr>
<td>Cap</td>
<td>Skirted Medium No. 3985</td>
</tr>
<tr>
<td>Base</td>
<td>Medium-Metal-Shell Jumbo 4-Pin, Bayonet</td>
</tr>
</tbody>
</table>

**Maximum Ratings, Absolute Values:**

For Anode-Supply Frequencies between 25 and 150 cps

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Anode Voltage:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forward</td>
<td>10000 max.</td>
<td>15000 max.</td>
</tr>
<tr>
<td>Inverse</td>
<td>10000 max.</td>
<td>15000 max.</td>
</tr>
<tr>
<td>Grid Voltage:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before Anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduction (Peak or DC)</td>
<td>-500 max.</td>
<td>-500 max.</td>
</tr>
<tr>
<td>During Anode</td>
<td>-10 max.</td>
<td>-10 max.</td>
</tr>
</tbody>
</table>

*See next page.*

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**June 20, 1947**

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA
**5563 THYRATRON**

**CATHODE CURRENT:**
- Peak ................. 10 max. 6.4 max. amp
- Average ............. 1.8 max. 1.6 max. amp
- Surge, for max. duration of 0.1 second ... 200 max. 200 max. amp
- Averaging Time ........ 1 1 cycle

**GRID CURRENT:**
- Peak ................. +1 max. +1 max. amp
- Average ............. +0.1 max. +0.1 max. amp
- Averaging Time ........ 1 1 cycle

**Maximum Circuit Values:**
- Grid-Circuit Resistance ... 0.1 max. 0.1 max. megohm

▲ For conditions with 0.1-megohm grid resistor, circuit returns to pin No.2 as datum of potential, and filament voltage at pin No.4 180° out of phase with the anode voltage.

◆ Recommended operating value is 40°C ± 5°C.

○ Averaged over one conducting cycle.

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**Diagram:**
- Skirted medium cap
- Zone where condensed-mercury temperature should be measured
- Medium-metal-shell
- Jumbo 4-pin bayonet base

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**Dimensions:**
- 3 7/8" max.
- 10 1/8"-11 1/16"

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**Date:** June 20, 1947

**Tube Department**

Radio Corporation of America, Harrison, New Jersey
OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 5563
RANGE IS FOR CONDITIONS WHERE:
$E_F = 5$ VOLTS AC ±5%; CIRCUIT RETURNS TO
PIN N°2; FIL. VOLTAGE AT PIN N°4 IS (+) WHEN
ANODE VOLTAGE IS (+). THE RANGE INCLUDES
INITIAL & LIFE VARIATIONS OF INDIVIDUAL
TUBES. GRID RESISTOR = 10000 TO 100000
OHMS, COND. MERCURY TEMPERATURE =
25° TO 50°C.

CONDUCTING

CRITICAL

NON-
CONDUCTING

AC ANODE KILOVOLTS (PEAK -60\[\text{V}\])

-100 -80 -60 -40 -20 0 +20
DC GRID SUPPLY VOLTS

92CM-6842TI

SEPT. 15, 1949
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6842T1
THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION

TYPE 5563
E_p=5 VOLTS AC; CIRCUIT RETURNS TO
PIN #2; FILAMENT VOLTAGE AT PIN
#4 IS (+) WHEN ANODE VOLTAGE IS (-);
GRID RESISTOR (OHMS)=0; CONDENSED-
MERCURY TEMPERATURE = 46°C.

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION

TYPE 5563
E_p=5 VOLTS AC; CIRCUIT RETURNS TO
PIN #2; FILAMENT VOLTAGE AT PIN
#4 IS (+) WHEN ANODE VOLTAGE IS (-);
GRID RESISTOR (OHMS)=0; CONDENSED-
MERCURY TEMPERATURE = 46°C.
\textbf{AVERAGE CONTROL CHARACTERISTICS}

$E_f = 5$ VOLTS AC
CIRCUIT RETURNS TO PIN N\textsuperscript{o}2.
FILAMENT VOLTAGE AT PIN N\textsuperscript{o}4 IS (+) WHEN ANODE VOLTAGE IS (+).
GRID RESISTOR = 25000 OHMS.

\begin{center}
\begin{tabular}{|c|c|}
\hline
\textbf{CURVE} & \textbf{CONDENSED MERCURY TEMPERATURE} \\
\hline
A & 25\degree C \\
B & 40\degree C \\
C & 55\degree C \\
\hline
\end{tabular}
\end{center}

\begin{center}
\begin{tikzpicture}
\begin{axis}[
width=\textwidth,
height=\textwidth,
axis lines=middle,
axis line style={-},
grid style={dashed},
xmin=-80, xmax=+40,
xticklabels={-80,-60,-40,-20,0,+20,+40},
ymin=2, ymax=18,
yticklabels={2,4,6,8,10,12,14,16,18},
xlabel={CRITICAL GRID VOLTS},
ylabel={PEAK ANODE KILOVOLTS},
]
\addplot coordinates {(-80,18) (-60,16) (-40,14) (-20,12) (0,10) (+20,8) (+40,6)};
\addplot coordinates {(-80,17) (-60,15) (-40,13) (-20,11) (0,9) (+20,7) (+40,5)};
\addplot coordinates {(-80,16) (-60,14) (-40,12) (-20,10) (0,8) (+20,6) (+40,4)};
\end{axis}
\end{tikzpicture}
\end{center}
### Shift of Average Control Characteristics

**With Change in Filament Phasing and Circuit Return**

<table>
<thead>
<tr>
<th>CURVE</th>
<th>Phase Angle Degrees</th>
<th>Circuit Return</th>
<th>CURVE</th>
<th>Phase Angle Degrees</th>
<th>Circuit Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>PIN N°2</td>
<td>G</td>
<td>135</td>
<td>PIN N°4</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>CT°</td>
<td>H</td>
<td>180</td>
<td>PIN N°4</td>
</tr>
<tr>
<td>C</td>
<td>45</td>
<td>PIN N°2</td>
<td>J</td>
<td>135</td>
<td>CT°</td>
</tr>
<tr>
<td>D</td>
<td>45</td>
<td>CT°</td>
<td>K</td>
<td>180</td>
<td>CT°</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>PIN N°4</td>
<td>L</td>
<td>135</td>
<td>PIN N°2</td>
</tr>
<tr>
<td>F</td>
<td>90</td>
<td>ANY°</td>
<td>M</td>
<td>180</td>
<td>PIN N°2</td>
</tr>
</tbody>
</table>

* Between filament voltage at PIN N°4 and anode voltage
* Center tap of filament transformer
* PIN N°2, PIN N°4, or CT.
E_x = 5 VOLTS

OPERATION CHARACTERISTICS

MAY 4, 1949
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7267