DESCRIPTION AND RATING

KLYSTRON

GL-6237  GL-6238  GL-6239  GL-6240  GL-6241  GL-6242

<table>
<thead>
<tr>
<th>Tube Type</th>
<th>Frequency Range Megacycles</th>
<th>Television Channel Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>GL-6237</td>
<td>470 - 530</td>
<td>14 - 23</td>
</tr>
<tr>
<td>GL-6238</td>
<td>530 - 590</td>
<td>24 - 33</td>
</tr>
<tr>
<td>GL-6239</td>
<td>590 - 656</td>
<td>34 - 44</td>
</tr>
<tr>
<td>GL-6240</td>
<td>656 - 728</td>
<td>45 - 56</td>
</tr>
<tr>
<td>GL-6241</td>
<td>728 - 806</td>
<td>57 - 69</td>
</tr>
<tr>
<td>GL-6242</td>
<td>806 - 890</td>
<td>70 - 83</td>
</tr>
</tbody>
</table>

These tubes are three-resonator tunable klystrons for use as radio-frequency amplifiers. They cover the UHF television band, 470 to 890 megacycles, and each type will provide 12 kilowatts of power output at synchronizing peak level with a power gain of approximately 200 in broadband visual-amplifier service. Broadband operation is obtained by stagger-tuning the input and output resonators on the low side of the center frequency and the center resonator on the high side.

The tubes have unipotential tantalum disk-type cathodes heated by bombardment, collectors capable of dissipating 51 kilowatts, and require electro-magnetic focusing of the electron beam. The cathode seals and the output seals are forced-air cooled; the drift tubes and the collectors are water cooled. There will be two basic resonator diameters for the six types.

PRELIMINARY TECHNICAL INFORMATION

GENERAL

Electrical

<table>
<thead>
<tr>
<th></th>
<th>Bogey</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage *</td>
<td>6.3</td>
<td>Volts</td>
</tr>
<tr>
<td>Heater Starting Voltage</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Heater Current at 6.3 Volts</td>
<td>38</td>
<td>Amperes</td>
</tr>
<tr>
<td>Heater Current at 8 Volts</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Heater Starting Current</td>
<td>100</td>
<td>Amperes</td>
</tr>
<tr>
<td>Heater Cold Resistance</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>Cathode Bombarder Voltage</td>
<td>2.4</td>
<td>Kilovolts</td>
</tr>
<tr>
<td>Cathode Bombarder Current</td>
<td>460</td>
<td>Milliamperes</td>
</tr>
<tr>
<td>Cathode Bombarder Input</td>
<td>1200</td>
<td>Watts</td>
</tr>
<tr>
<td>Cathode Heating Time †</td>
<td>3</td>
<td>Minutes</td>
</tr>
<tr>
<td>Magnetic Field, approximate range ‡</td>
<td>300 to 400</td>
<td>Gausses</td>
</tr>
</tbody>
</table>

Mechanical

Mounting Position - Vertical-Collector End Up

Water Flow

| Collector                     | 15 Min | Gallons per Minute |
| Pressure Drop at Rated Flow, approximate | 65     | Pounds per Square Inch |
| Drift Tubes                   | 2 Min  | Gallons per Minute |
| Pressure Drop at Rated Flow, approximate | 65     | Pounds per Square Inch |
| Water Pressure                | 80 Max |                          |
| Outlet Water Temperature      | 70 Max | C                          |

Air Flow

| Cathode and Heater Seals      | 300 Min | Cubic Feet per Minute |
| Output Seals                  | 15 Min  | Cubic Feet per Minute |
| Glass Temperature             | 150 Max | C                          |
| Maximum Over-all Length, approximate | 4 1/2 to 5 | Feet                        |
| Maximum Over-all Diameter     | 21 1/2  | Inches                      |
| Net Weight, approximate $      | 180 to 280 | Pounds                      |
MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Radio-frequency Amplifier - Broadband Television Service

Synchronizing-level conditions per tube unless otherwise specified

Maximum Ratings, Absolute Values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-c Beam Voltage</td>
<td>18 Max Kilovolts</td>
</tr>
<tr>
<td>D-c Beam Current</td>
<td>3.25 Max Amperes</td>
</tr>
<tr>
<td>Collector Dissipation</td>
<td>51 Max Kilowatts</td>
</tr>
<tr>
<td>Drift Tube Collection Current</td>
<td>250 Max Milliamperes</td>
</tr>
<tr>
<td>Driving Power</td>
<td>150 Max Watts</td>
</tr>
</tbody>
</table>

Typical Operation - Bandwidth 6 Megacycles

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-c Beam Voltage</td>
<td>17 Kilovolts</td>
</tr>
<tr>
<td>D-c Beam Current Δ</td>
<td>2.5 to 3 Amperes</td>
</tr>
<tr>
<td>Driving Power</td>
<td>60 Watts</td>
</tr>
<tr>
<td>Pedestal Level</td>
<td>33.7 Watts</td>
</tr>
<tr>
<td>Power Output</td>
<td></td>
</tr>
<tr>
<td>Synchronizing Level</td>
<td>15 Kilowatts</td>
</tr>
<tr>
<td>Synchronizing Level</td>
<td>12 Kilowatts</td>
</tr>
<tr>
<td>Pedestal Level</td>
<td>6.72 Kilowatts</td>
</tr>
</tbody>
</table>

* The bogey value is the approximate value of bombarder heater voltage required to furnish just sufficient bombarder current which with a bombarder voltage of 2400 volts maintains the main cathode at an operating temperature adequate to furnish a beam current of 3 amperes. To avoid excessively long cathode-heating time the heater voltage should be started at approximately 8 volts and gradually reduced to the normal operating value as the cathode reaches the proper operating temperature. Voltage stability of the heater and bombarder supplies is important to prevent fluctuation in beam current.

† Approximate time required to permit normal operation. Beam voltage may be applied earlier.

‡ The magnetic field required will vary with the type and the channel to which the tube is tuned. It ranges between 300 and 400 gauss. Three independently regulated electromagnets around the body assembly and one around the cathode structure are required for proper electron-beam focusing. Details regarding the design and positioning of these magnets will be found in the Installation and Operation Instructions.

§ Approximate Weights

| GL-6237 | 280 Pounds |
| GL-6238 | 280 Pounds |
| GL-6239 | 280 Pounds |
| GL-6240 | 180 Pounds |
| GL-6241 | 180 Pounds |
| GL-6242 | 180 Pounds |

△ The amount of beam current for a given beam voltage and power output will be approximately 2.5 amperes for the GL-6237 and will range up to 3 amperes for the GL-6242 since efficiency decreases somewhat at the higher frequencies.

γ Saturation power level is the maximum radio-frequency power level which the tube will deliver for a given beam input power. Under operating conditions for a 15-kilowatt saturation level, the power output versus driving power characteristic is linear enough to permit application in video television up to a 12-kilowatt synchronizing peak level with a moderate amount of synchronizing peak pre-emphasis in the driver stage.