



MIL ACCEPTANCE TESTING
SPECIFICATIONS

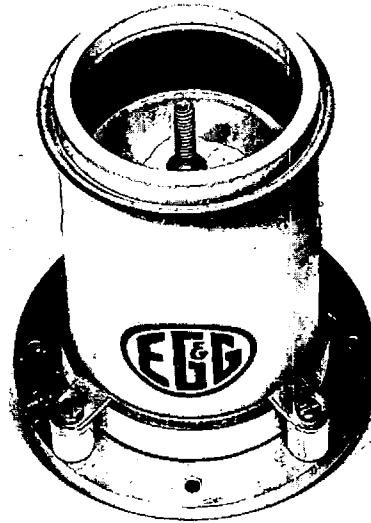
December 1958

HYDROGEN THYRATRON
CERAMIC-METAL ENVELOPE
JETEC TYPE DESIGNATION 7322
(EG&G TYPE NO. 1802)

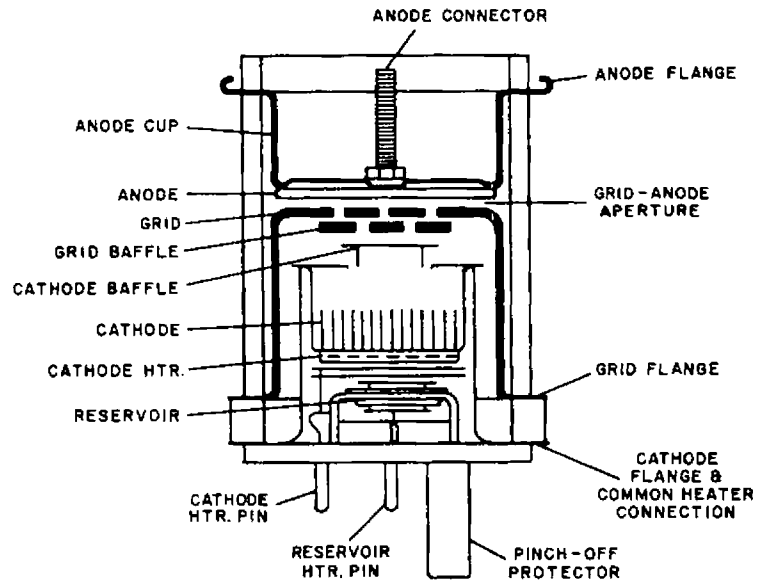
from JETEC release #2363, Jan. 19, 1959

EDGERTON, GERMESHAUSEN & GRIER, INC.
BOSTON, MASS. LAS VEGAS, NEV.

MIL ACCEPTANCE TESTING SPECIFICATIONS
EG&G Type 7322/1802 Hydrogen Thyatron



Overall View of Tube



Basic Arrangement of Tube Components

HYDROGEN THYRATRON
CERAMIC-METAL ENVELOPE
JETEC TYPE DESIGNATION 7322
(EG&G TYPE NO. 1802)
MIL ACCEPTANCE TESTING SPECIFICATIONS

General Characteristics

Electrical Data:

Cathode	unipotential oxide coated
Heater	one side common to cathode 6.3 v - 16 amp (max)
Reservoir	connected across heater externally 6.3 v - 4 amp (max)
Warm-Up Time	5 min
Anode Voltage Drop (Note 1)	300(max)

Mechanical Data:

Mounting Position	any
Cooling	no forced cooling below P_b rating of 20×10^9
Ambient Temp.	-55°C to +90°C
Clamping (Note 2)	ceramic cylinder and/or grid flange
Shock	500 g
Vibration	0-2000 cps at 10 g
Over-All Dim	dia. - 3-3/8 in, length - 5-1/2 in.
Net Weight	2 lb

Electrical Connections:

Heater	lug connection to pin, other side common to cathode
Reservoir	lug connection to pin, other side common to cathode
Cathode	ring connection to cathode flange
Grid	ring connection to grid flange
Anode	1/4 in. - 20 threaded anode stud

RATINGS

Absolute Maximum:

Peak Anode Voltage (e_{py})	25,000 v
Peak Inverse Voltage (e_{px})	25,000 v
(Note 3)	
Peak Anode Current (i_b)	1000 amp
Average Current (I_b)	1.5 amp
RMS Current (I_p) (Note 4)	40 amp
P_B Factor ($e_{py} i_b$ prr)	20×10^9
Pulse Repetition Rate	50,000 pps
(prp) (Note 5)	
DC Supply Voltage (E_{bb})	5000 v
(Min.)	
Filament and Reservoir Voltage	$6.3 \text{ v} \pm 7 \frac{1}{2} \%$

Grid Drive:

Peak Grid Trigger Voltage	550 v (min)
Peak Grid Trigger Voltage	1000 v (max)
Grid Drive Impedance	50-200 ohms
Grid Pulse Duration	2 μ sec (min)
Rise Time	0.35 μ sec (26% to 70%) amplitude (max)
Negative Grid Bias (Note 6)	-50 v (max)

ACCEPTANCE TEST CONDITIONS

Pulse Modulator - DC Resonant Charging

	<u>Life Test 1</u>	<u>Life Test 2</u>
Peak Network Voltage	25,000 v	20,000 v
Peak Anode Current	1.000 amp	667 amp
Pulse Repetition Rate	500 pps	1500 pps
Pulse Width	$2.5 \pm 0.25 \mu$ sec	1.0μ sec $\pm 10\%$
Average Current	1.25 amp	1.0 amp
P_b Factor	12.5×10^9	20×10^9
Peak Output Power	12.5 Mw	6.67 Mw
Average Output Power	15.0 kw	10.0 kw
Trigger Voltage (max)	450 v	450 volts
Trigger Impedance (min)	300 ohms	300 ohms
Trigger Pulse Duration (max)	2.0 μ sec	2.0 μ sec
Trigger Rise Time (min)	0.35 μ sec	0.35 μ sec
Time of Anode Delay (max)	0.5 μ sec	0.5 μ sec
Delay Time Drift (max)	0.15 μ sec	0.15 μ sec
Jitter (max)	0.005 μ sec	0.005 μ sec
Anode Starting Voltage (max)	4000 v	4000 v

OPERATING NOTES

Note 1. Anode Voltage Drop: Anode voltage drop during the steady portion ($t > 0.15 \mu\text{sec}$) of the current pulse is given approximately by:

$$V_A = 50 + 0.1 i_b$$

Note 2. Clamping: Clamping material must be designed to withstand tube temperatures up to 400°C . Do not use metal clamps on ceramic envelope.

Note 3. In pulsed operation, the peak inverse voltage, exclusive of a spike of $0.05 \mu\text{sec}$ max. duration shall not exceed 5.0 kv during the first $25 \mu\text{sec}$ following the anode pulse.

Note 4. The RMS current is computed as the square root of the product of I_b x i_b . The tube requires no filament derating for operation up to 40 amp.

Note 5. The tube is capable of operating up to 50,000 pps within the limitations of the P_b and I_b ratings.

Note 6. Negative Grid Bias: The use of negative bias permits operation at very high repetition rates by shortening the recovery time, i. e., the minimum time between the end of the current pulse and the instant anode voltage becomes positive by about 100 volts.

Fairly high positive ion currents flow to the grid during this interval and thus the bias source impedance and loading characteristics are important in determining the actual negative voltage appearing at the grid.

Satisfactory operation at repetition rates as high as 50,000 pps may be obtained using an applied bias of 50 volts and a coupling impedance of 300 ohms or a coupling inductance of 400 microhenry. The amplitude of the minimum trigger pulse must be increased by an amount equal to the negative bias.