The GL-6514 is a permanently sealed water-cooled rectifier igniton similar in construction and rating to the GL-5788. Special features are the addition of an integral temperature-control device with protective features, low water-pressure drop, and distinctive (larger diameter) ignitor terminals. The tube is designed for operation in 300, 600, and 900 volt d-c industrial rectifier circuits. The continuous average anode current rating is 200 amperes per tube in rectifiers rated up to 400 volts d-c. The control includes a switch which operates a solenoid valve in the water-supply line to the tube in response to increasing and decreasing tube temperature, thus maintaining the amount of cooling water to the minimum required by the operating conditions. It also includes an over-temperature switch which may be used to remove power from the igniton when its temperature exceeds a safe value.

This new design of tube eliminates the need for the heat exchangers and recirculating water systems required to ensure safe operation of the non-temperature-controlled tube when the available cooling water temperature is too low to provide the minimum reliable mercury-vapor pressure in the tubes. Another advantage is that the temperature-controlled tubes can be used to replace the usual safety devices such as water-flow relays, water over-temperature relays, and water-pressure inter-locks which have required considerable maintenance in the past. Another advantage is that these tubes may be used to prevent excessive moisture condensation over the external parts of the tubes under conditions of high humidity.

TECHNICAL INFORMATION

GENERAL

Electrical

Cathode Excitation - Cyclic
Cathode-Spot Starting - Ignitor
Number of Electrodes
Main Anodes 1
Main Cathodes 1
Auxiliary Anodes 1
Ignitors 2
Arc Drop
At 600 Amperes Peak 16.2 ± 0.5 Volts
Cathode Excitation Requirements
Ignitor Voltage Required to Fire 450 Volts
Ignitor Current Required to Fire 45 Amperes

Excitation Arc Current Required, minimum 8 Amperes
Excitation Arc-Drop Voltage 9 ± 0.5 Volts
Excitation Arc Open-Circuit Voltage, minimum 55 Volts AC

Mechanical

Envelope Material - Metal
Net Weight, Approximate 25 Pounds
Type of Cooling - Water
Characteristics for Water Cooling
Water Temperature Rise, maximum 4.5 °C
Pressure Drop at 3 Gallons per Minute, maximum 3 Pounds per Square Inch

Thermal

Water Cooling
Inlet Water Temperature, maximum
Peak Inverse Anode Voltage = 900 55 Centigrade
Peak Inverse Anode Voltage = 2100 50 Centigrade
Inlet Water Temperature, minimum 6 °C
Water Flow
At Continuous Rated Average Current, minimum 3 Gallons per Minute

MAXIMUM RATINGS

As Power Rectifier Tube *

Maximum Peak Anode Voltage
Inverse 900 2100 Volts
Forward 900 2100 Volts
Maximum Anode Current
Peak 1800 1200 Amperes
Average Continuous 200 150 Amperes
2 Hours 300 225 Amperes
1 Minute 400 300 Amperes
Surge 12000 9000 Amperes
Maximum Duration of Surge Current 0.15 0.15 Second
Frequency Range 25 to 60 25 to 60 Cycles per Second

* Ratings are for zero phase-control angle.

As AC Control Tube

Two Tubes in Inverse Parallel
Voltage 2400 RMS Volts
Maximum Demand 2400 Kilovolt-Amperes
Average Current at Maximum Demand 135 Amperes
Maximum Average Current
Demand at Maximum Average Current
Maximum Averaging Time at 2400 Volts
RMS
Maximum Surge Current

207 Amperes
1105 Kilovolt-Amperes
1.66 Seconds
6000 Peak Amperes

Ignitor
Maximum Voltage
Positive
Negative
Maximum Current
Peak
Root Mean Square
Average
Maximum Averaging Time
Starting Time at Required Voltage or Current

Anode Volts
5 Volts
100 Amperes
15 Amperes
2.0 Amperes
10 Seconds
100 Microseconds

Auxiliary Anode
Maximum Current
Peak
Average
Maximum Averaging Time
Root Mean Square
Maximum Peak Forward Voltage
Maximum Peak Inverse Voltage
Main Anode Conducting
Main Anode Not Conducting

30 Amperes
9 Amperes
10 Seconds
15 Amperes
160 Volts
25 Volts
160 Volts

Temperature-Control-Switch Ratings

Maximum Voltage
Maximum Current
Over-Temperature Switch
Water-Control Switch
Maximum Peak Potential Difference
Between Tube Water Cylinder and Switch Circuit
Switch Contact Arrangement
Over-Temperature Switch - Normally Closed
Water-Control Switch - Normally Open

575 Volts
6 Amperes
1.5 Amperes
1500 Volts

Suitable fuses should be provided in the switch circuits to prevent a power arc, should a ground occur in the switch or wiring.

January 31, 1955

TUBE DEPARTMENT
GENERAL ELECTRIC COMPANY
SCHENECTADY 5, N. Y.
NOTE: ONE IGNITOR USED AT A TIME.