

BR/BW/BY1124

Series

R.F. POWER
TRIODES

The data should be read in conjunction with the Power Triode Preamble.

ABRIDGED DATA

Five r.f. power triodes intended primarily for industrial service. They differ only in the method of anode cooling.

Anode cooling:

BR1124	forced-air
BW1124	water; separate jacket
BW1124J1	water; integral jacket
BW1124J2	water; integral jacket
BY1124	vapour; separate boiler unit
Anode dissipation	10 kW max
Anode voltage	8.5 kV max
Frequency for full ratings	100 MHz max
Output power (class C unmodulated conditions)	20 kW

GENERAL

Electrical

Filament	thoriated tungsten
Filament voltage (see note 1)	6.0 V
Filament current	115 A
Surge filament current (peak) (see note 2)	260 A max
Filament cold resistance	6.0 mΩ
Peak usable cathode current	20 A
Perveance	1.4 mA/V ^{3/2}
Amplification factor (V _a = 5.0kV, I _a = 1.0A)	37
Mutual conductance (V _a = 5.0kV, I _a = 1.0A)	19 mA/V
Inter-electrode capacitances:	
grid to anode	31 pF
grid to filament	41 pF
anode to filament	0.5 pF

Mechanical

Overall dimensions	see outline drawings
Net weights:	
BR1124	22 pounds (10kg) approx
BW1124	3½ pounds (1.6kg) approx
BW1124J1, BW1124J2	7½ pounds (3.4kg) approx
BY1124	15 pounds (6.8kg) approx
Mounting position	vertical, filament end up

Accessories

Filament leads	MA135
Grid connector	MA66A
Water jacket for BW1124	BW4029
Sealing ring (supplied with BW1124)	MA252
Boiler unit, separate condenser required, for BY1124	BY4048A
Boiler unit, integral condenser, for BY1124	BY4064
Sealing ring (supplied with BY1124)	MA253

COOLING

Anode

The BR1124 air cooling requirements are shown on pages 9 and 10. The required air flow should be delivered through the radiator before and during the application of any voltages. Filament power, anode power and air flow may be removed simultaneously.

The anode of the BW1124 must be fitted into a water jacket for cooling, the recommended jacket being type BW4029. A flow of water of 2imp.gal/min (9.1 l./min) is required; the temperature of the cooling water at the outlet must not exceed 65°C, nor should the temperature rise across the jacket exceed 15°C.

Types BW1124J1 and BW1124J2 have integral water jackets (see outline drawings). Minimum water cooling requirements are shown on page 11; higher rates of flow should be used where possible.

The BY1124 is vapour cooled and may be operated either in boiler unit BY4048A or BY4064. In BY4064, the steam generated by the anode is condensed by means of an internal water cooled condenser. The steam produced in BY4048A is led away by suitably insulated tubing for condensation at some convenient point external to the boiler unit.

Filament and Grid Seals

The temperature of the filament and grid seals must not exceed 140°C. A flow of air of 20ft³/min (0.57m³/min) directed into the filament header via a 1-inch (25mm approx) diameter nozzle before and during the application of any voltages is usually adequate for limiting the temperature of the seals.

Anode Seal and Bulb

The anode seal and bulb temperatures must not exceed 180°C.

R.F. POWER AMPLIFIER AND OSCILLATOR (Class C Telegraphy, key-down conditions, one valve)

MAXIMUM RATINGS (Absolute values)

Anode voltage (see note 3)	8.5	kV max
Anode current	3.5	A max
Anode dissipation (see note 4)	10	kW max
Grid dissipation	500	W max
Frequency (for full ratings)	100	MHz max

TYPICAL OPERATING CONDITIONS

Anode voltage	6.0	8.5	kV
Grid voltage	-300	-450	V
Grid resistor	640	1025	Ω
Peak r.f. grid drive voltage	820	950	V
Anode current	3.4	3.1	A
Grid current (approx)	0.47	0.44	A
Anode dissipation	5.4	6.4	kW
Grid dissipation	245	220	W
Driving power	385	420	W
Output power (see note 5)	15	20	kW
Efficiency	73.5	76	%
Load resistance	900	1400	Ω

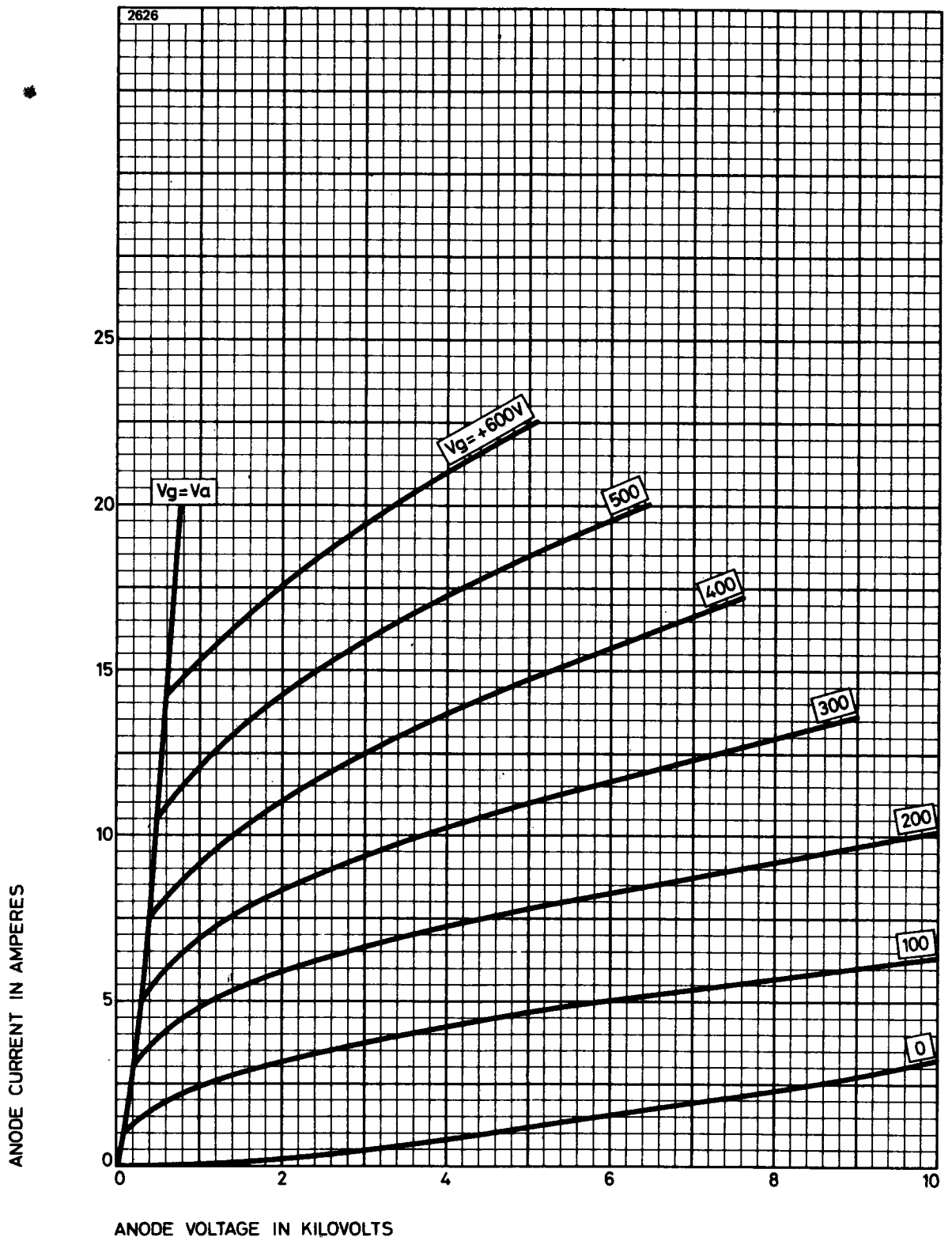
RANGE OF CHARACTERISTICS FOR EQUIPMENT DESIGN

	Min	Max	
Filament current at filament voltage 6.0V	107	121	A
Amplification factor ($V_a = 5.0\text{kV}$, $I_a = 1.0\text{A}$)	34	42	
Mutual conductance ($V_a = 5.0\text{kV}$, $I_a = 1.0\text{A}$)	15	23	mA/V
Grid voltage (negative value) ($V_a = 5.0\text{kV}$, $I_a = 1.0\text{A}$)	41	71	V
Grid voltage (negative value) ($V_a = 10\text{kV}$, $I_a = 0.1\text{A}$)	—	380	V
Anode current ($V_a = 2.0\text{kV}$, $V_g = +200\text{V}$)	5.1	6.9	A

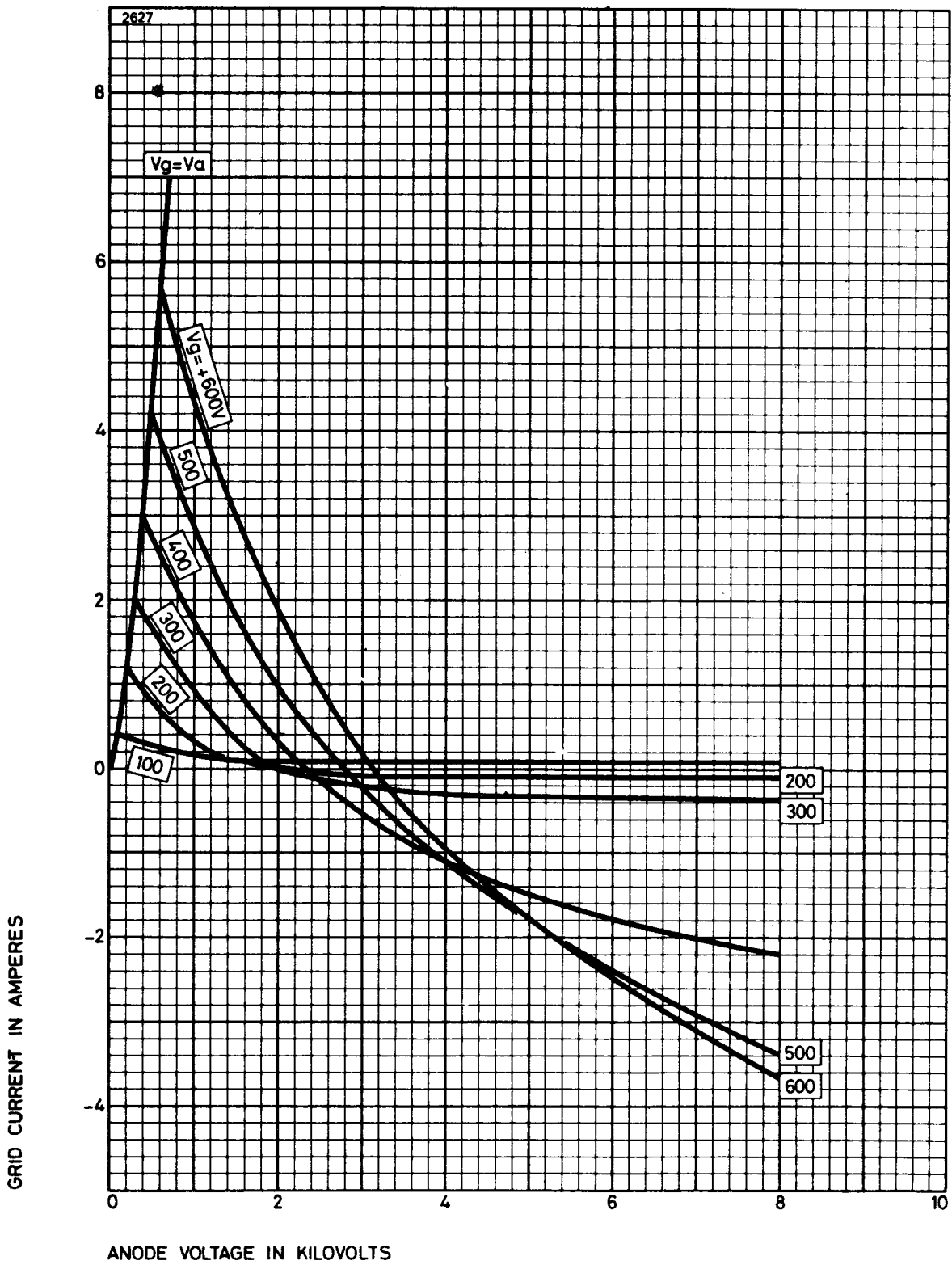
NOTES

1. The valve must be operated at the stated filament voltage. Fluctuation in filament voltage must not exceed $\pm 5\%$.
2. The filament current must not exceed 260A, even momentarily, at any time.
3. This is the highest nominal operating voltage to be used. It makes allowance for the normal mains voltage fluctuations as well as tolerances in the equipment.
4. The valve can dissipate higher powers for periods up to 15 seconds provided that the average over a long period does not exceed the maximum stated.
5. The output power specified does not take into account the anode circuit efficiency.

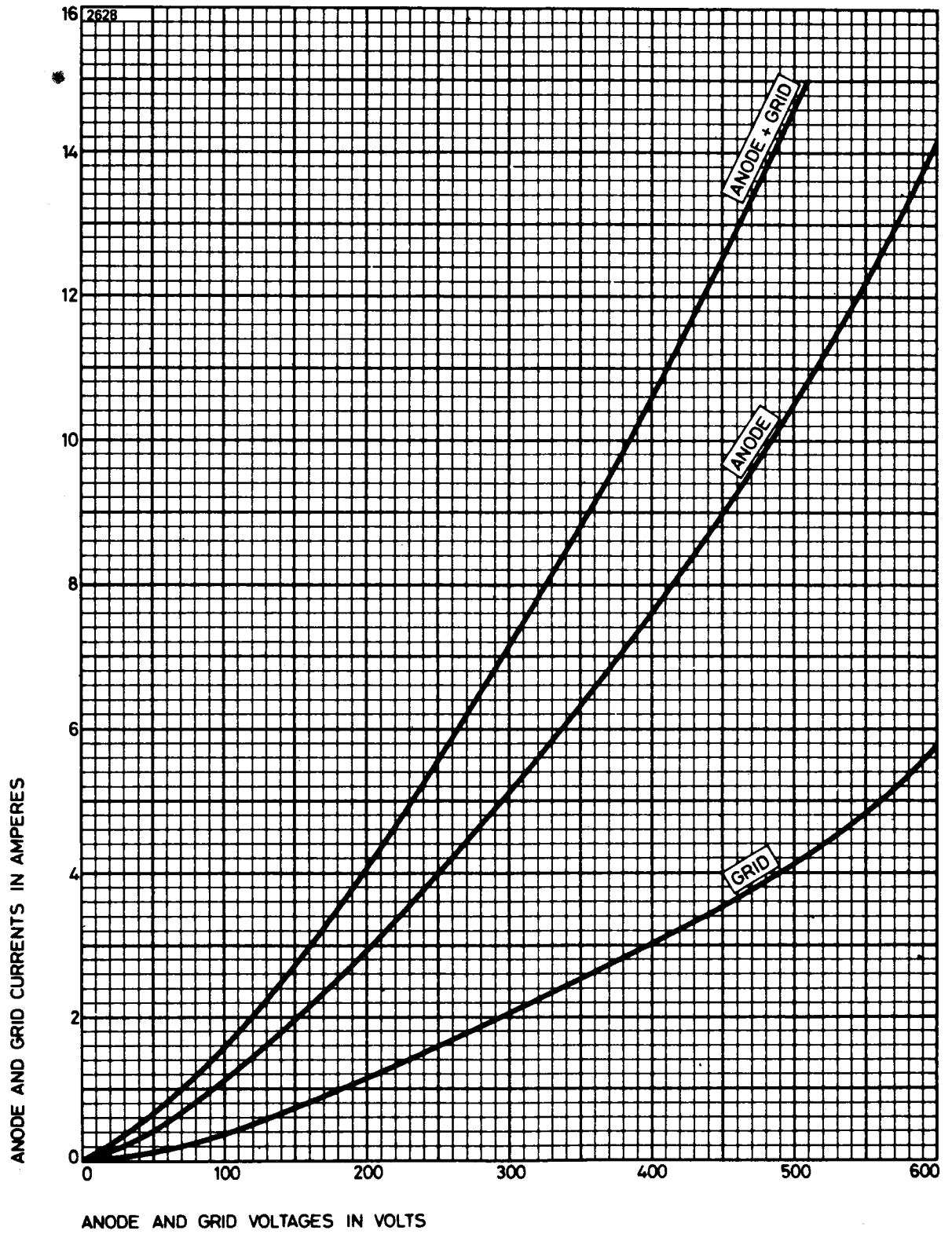
TYPICAL ANODE CHARACTERISTICS



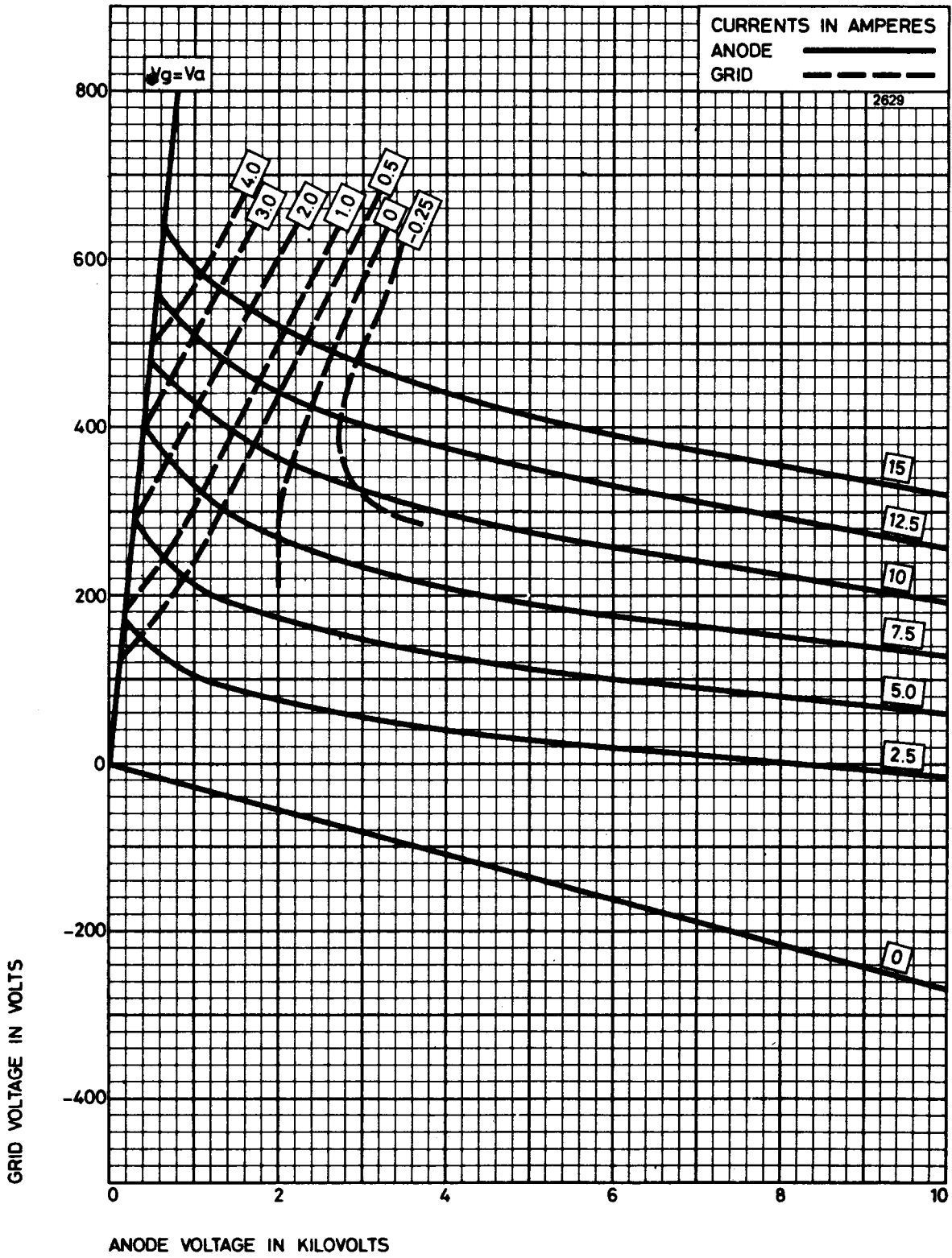
TYPICAL GRID CHARACTERISTICS



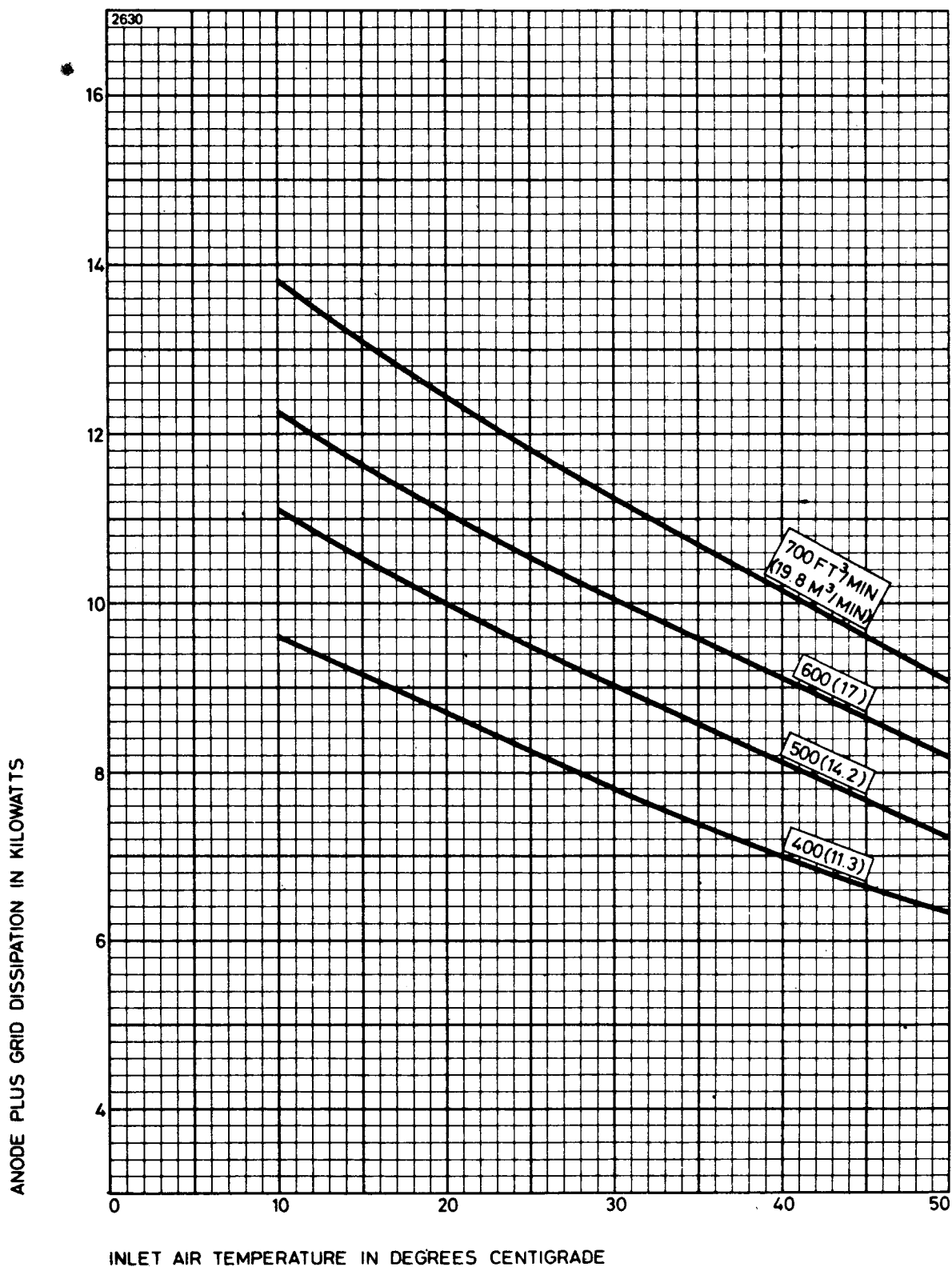
TYPICAL STRAPPED CHARACTERISTICS



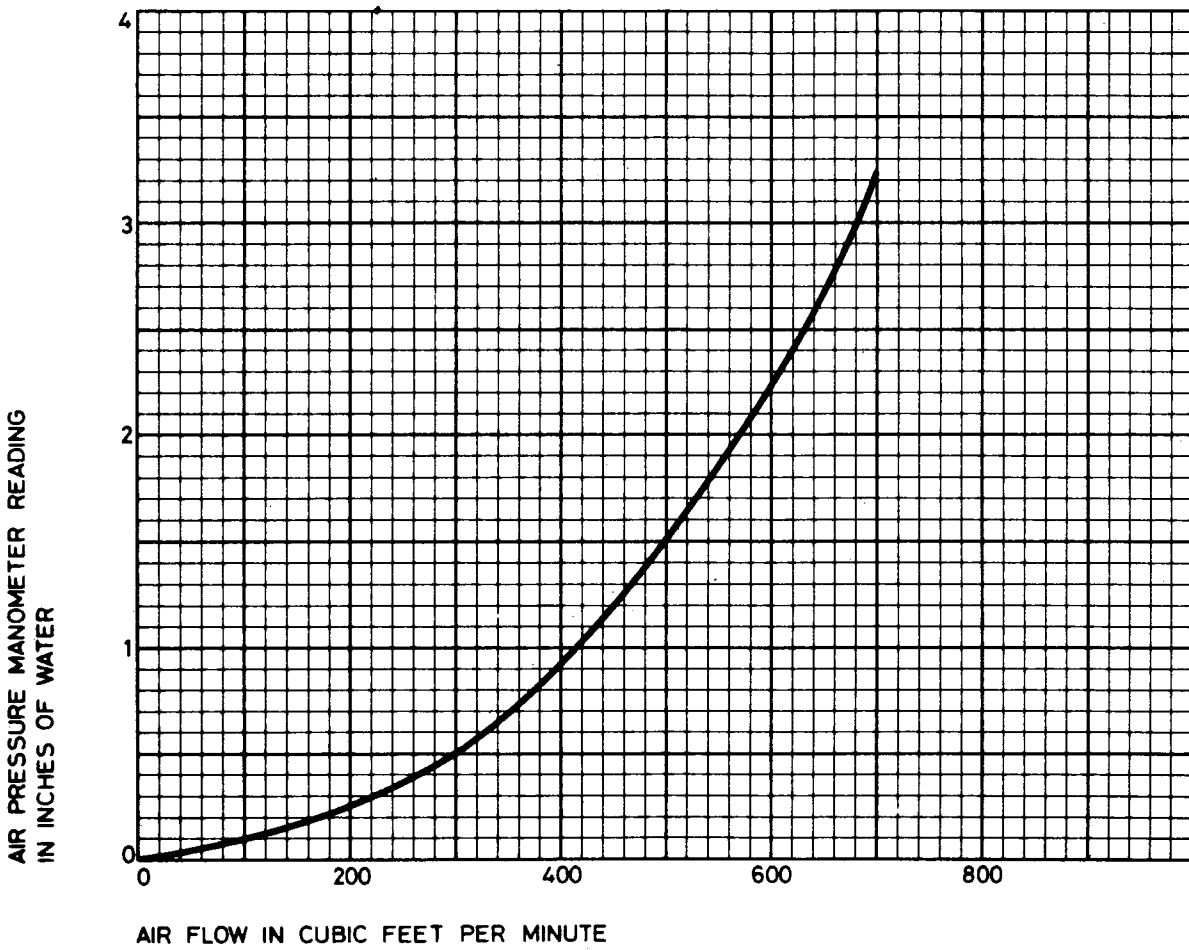
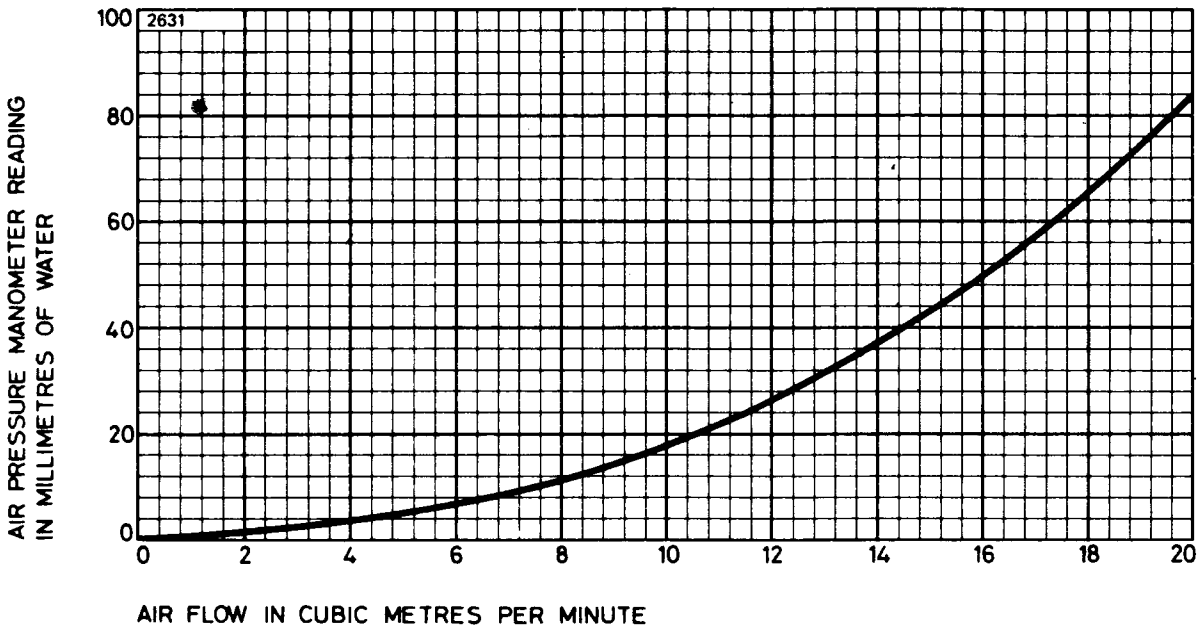
TYPICAL CONSTANT CURRENT CHARACTERISTICS



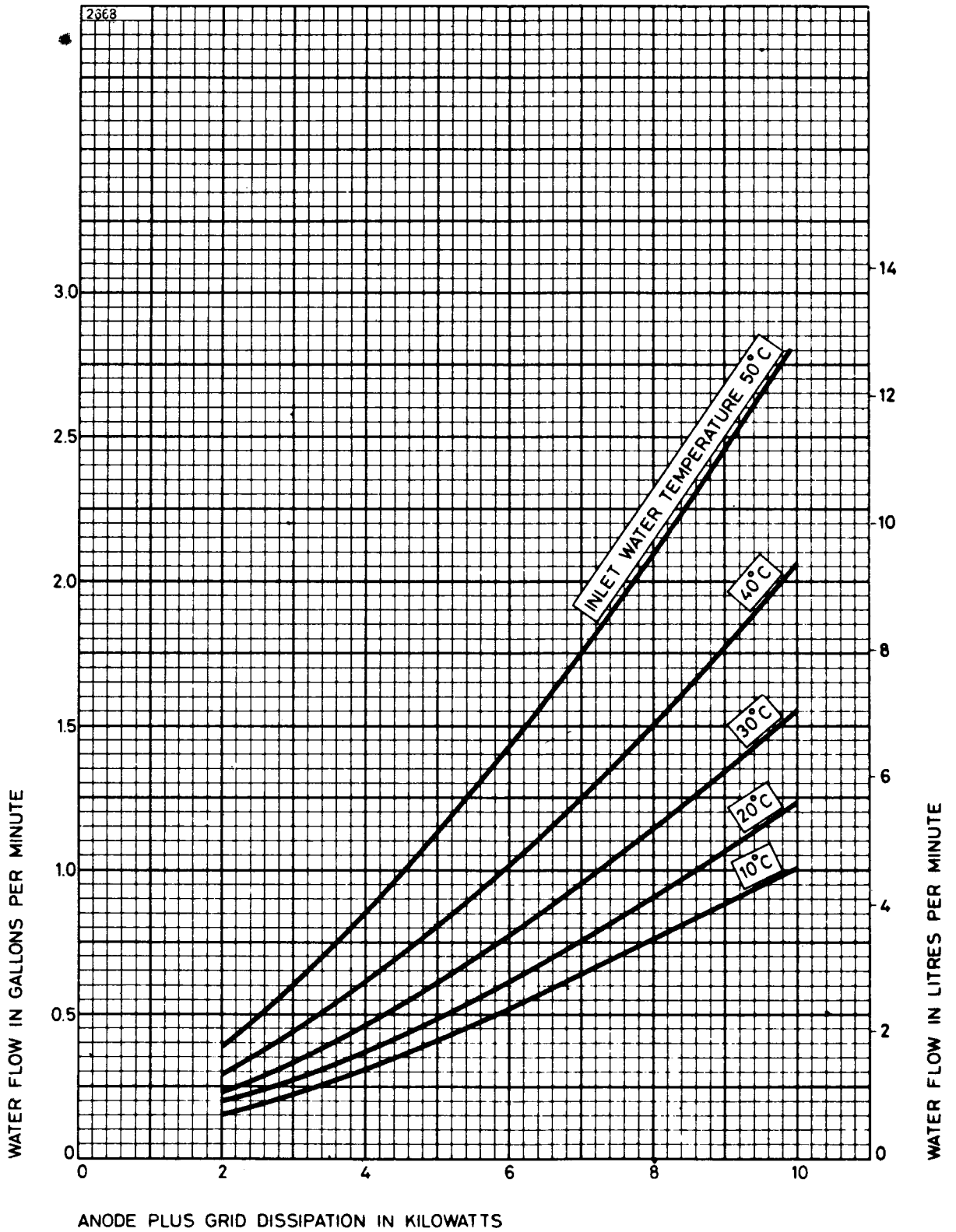
AIR COOLING REQUIREMENTS FOR BR1124



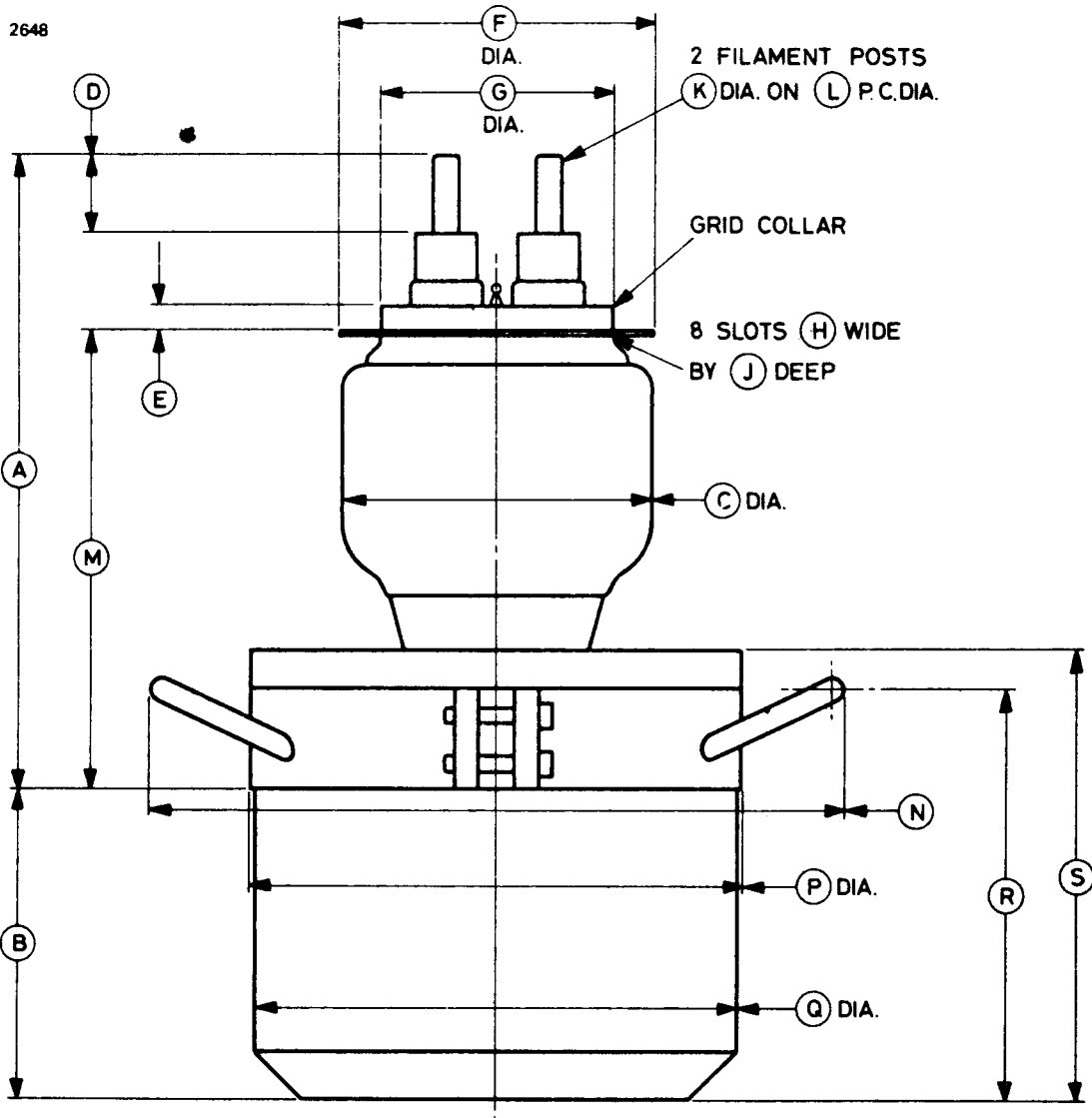
AIR FLOW CHARACTERISTIC FOR BR1124



MINIMUM WATER COOLING REQUIREMENTS – BW1124J1, BW1124J2
 (Higher rates of flow should be used where possible)



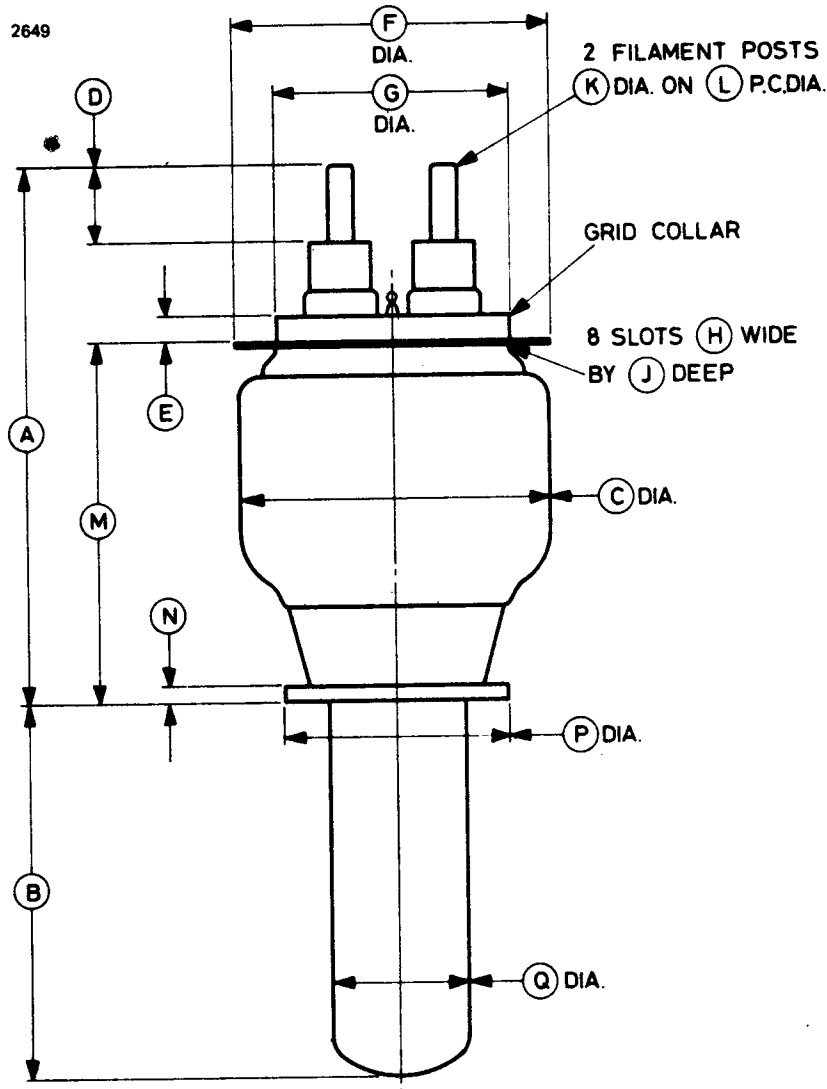
OUTLINE FOR BR1124 (All dimensions without limits are nominal)



Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	9.500 max	241.3 max	K	0.437	11.10
B	4.500	114.3	L	1.500	38.10
C	4.500	114.3	M	6.600 ± 0.200	167.6 ± 5.1
D	1.125	28.58	N	10.500 max	266.7 max
E	0.375	9.53	P	8.000 max	203.2 max
F	4.562	115.9	Q	7.062 max	179.4 max
G	3.750	95.25	R	5.937	150.8
H	0.182	4.62	S	6.500	165.1
J	0.205	5.21			

Millimetre dimensions have been derived from inches.

OUTLINE FOR BW1124 (All dimensions without limits are nominal)

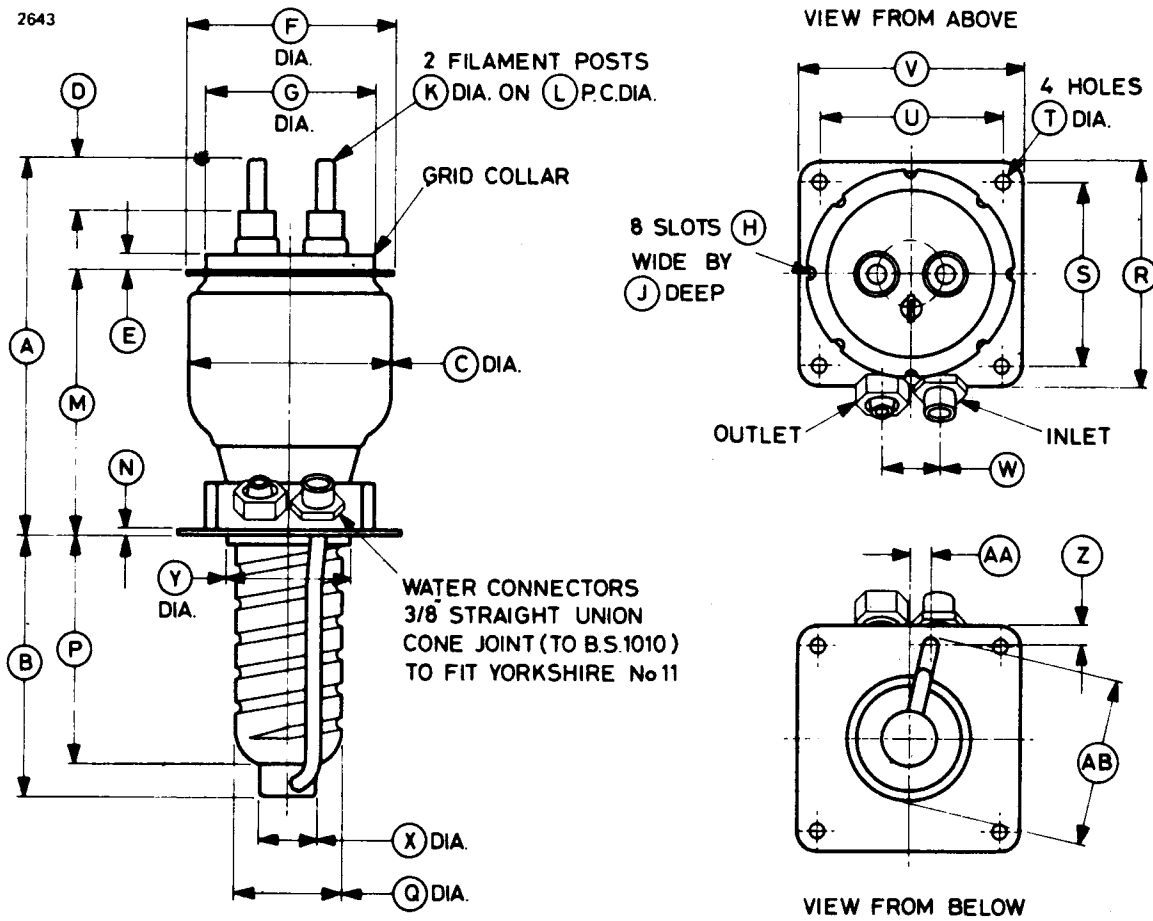


Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	8.125 max	206.4 max	J	0.205	5.21
B	5.375	136.5	K	0.437	11.10
C	4.500	114.3	L	1.500	38.10
D	1.125	28.58	M	5.200 ± 0.200	132.1 ± 5.1
E	0.375	9.53	N	0.250	6.35
F	4.562	115.9	P	3.250	82.55
G	3.750	95.25	Q	2.000	50.80
H	0.182	4.62			

Millimetre dimensions have been derived from inches.

OUTLINE FOR BW1124J1 (All dimensions without limits are nominal)

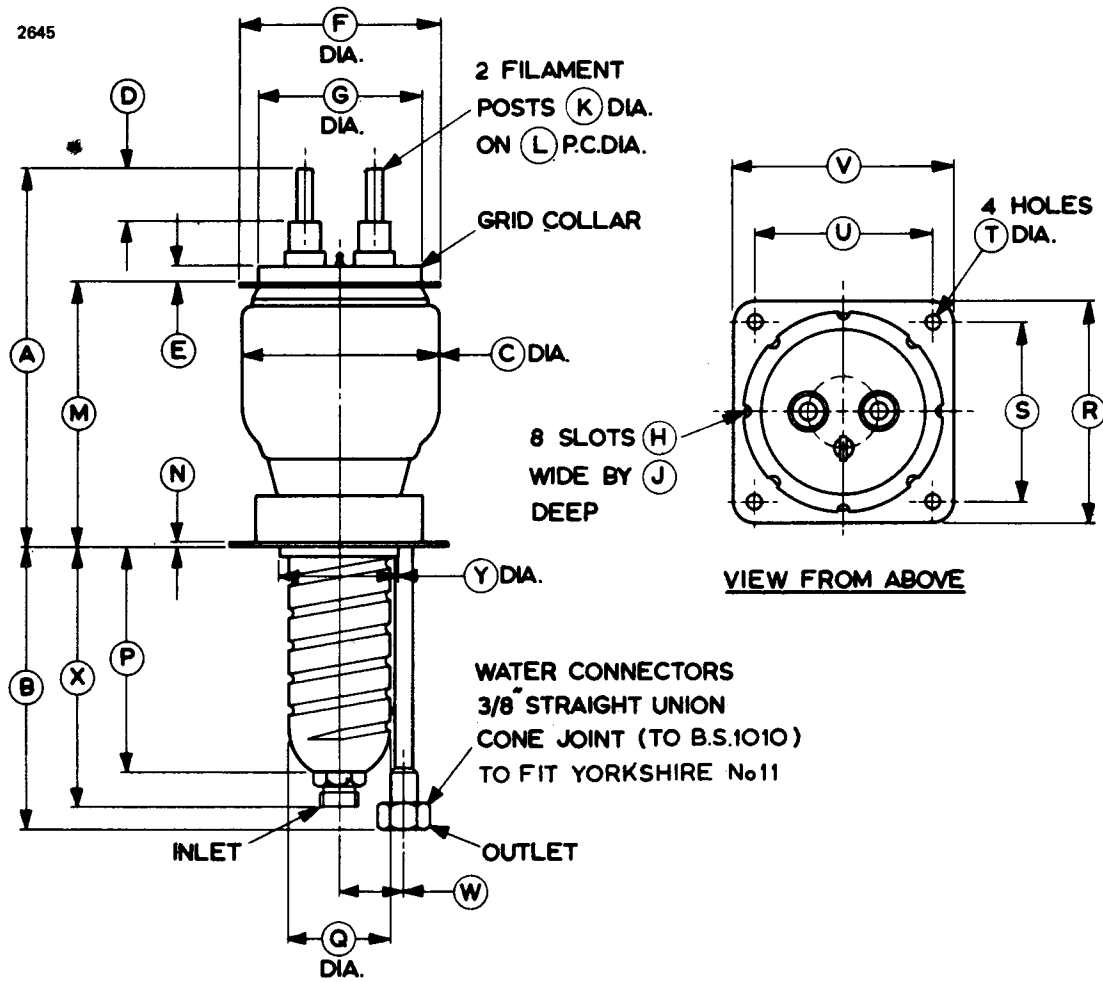
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Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	8.625 max	219.1 max	P	5.062	128.6
B	5.812	147.6	Q	2.306	58.57
C	4.500	114.3	R	5.000	127.0
D	1.125	28.58	S	4.000	101.6
E	0.375	9.53	T	0.257	6.53
F	4.562	115.9	U	4.000	101.6
G	3.750	95.25	V	5.000	127.0
H	0.182	4.62	W	1.250	31.75
J	0.205	5.21	X	1.250	31.75
K	0.437	11.10	Y	2.687	68.25
L	1.500	38.10	Z	0.469	11.91
M	5.896	149.8	AA	0.625	15.88
N	0.094	2.39	AB	3.625 max	92.08 max

Millimetre dimensions have been derived from inches.

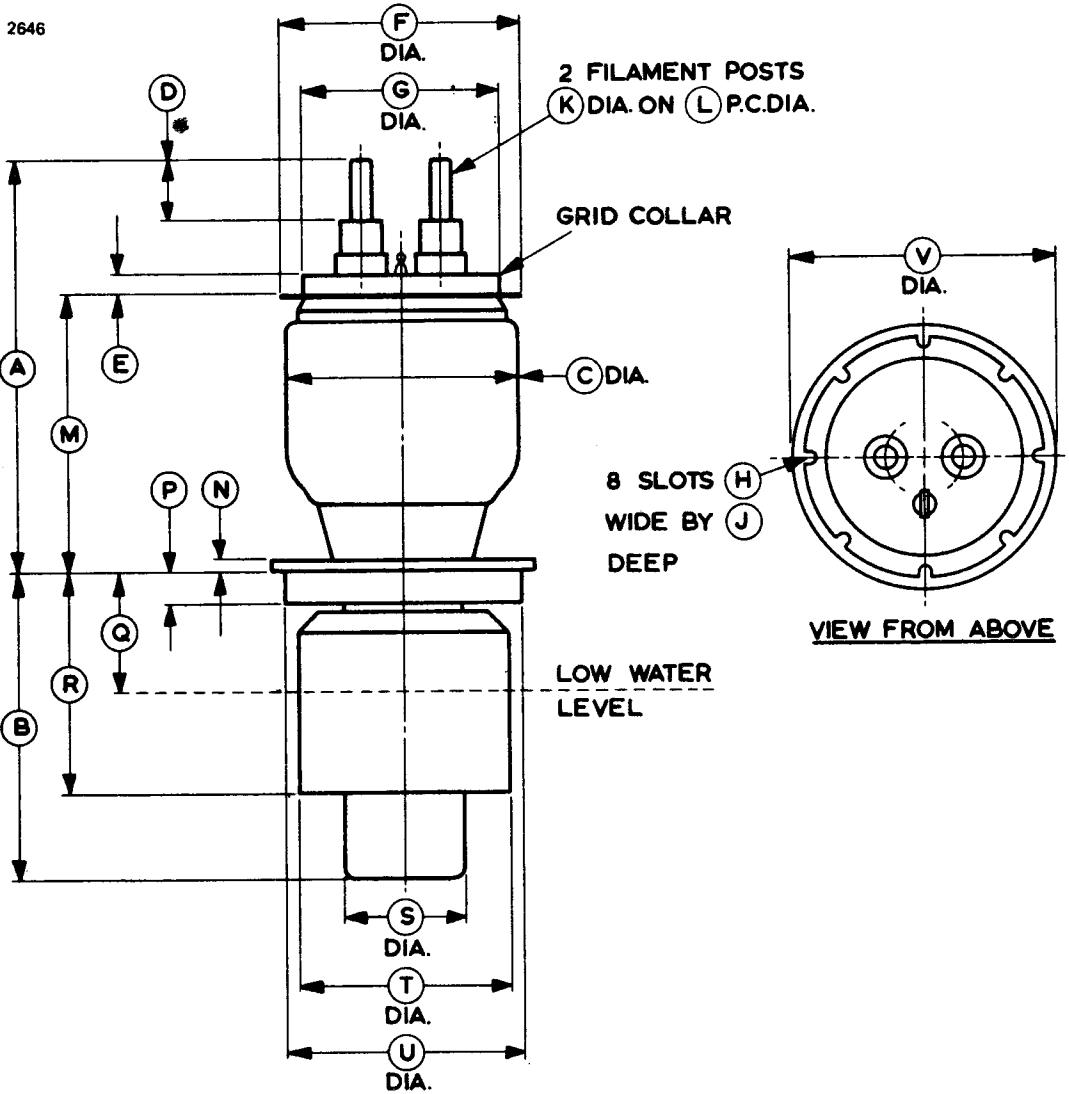
OUTLINE FOR BW1124J2 (All dimensions without tolerances are nominal)



Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	8.625 max	219.1 max	N	0.094	2.39
B	6.250	158.8	P	5.000	127.0
C	4.500	114.3	Q	2.306	58.57
D	1.125	28.58	R	5.000	127.0
E	0.375	9.53	S	4.000	101.6
F	4.562	115.9	T	0.257	6.53
G	3.750	95.25	U	4.000	101.6
H	0.182	4.62	V	5.000	127.0
J	0.205	5.21	W	1.422	36.12
K	0.437	11.10	X	5.750	146.1
L	1.500	38.10	Y	2.687	68.25
M	5.896	149.8			

Millimetre dimensions have been derived from inches.

OUTLINE FOR BY1124 (All dimensions without limits are nominal)



Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	8.000 max	203.2 max	L	1.500	38.10
B	5.813 max	147.7 max	M	5.350 max	135.9 max
C	4.500	114.3	N	0.250	6.35
D	1.125	28.58	P	0.625	15.88
E	0.375	9.53	Q	2.250	57.15
F	4.562	115.9	R	4.437	112.7
G	3.750	95.25	S	2.250	57.15
H	0.182	4.62	T	4.000	101.6
J	0.205	5.21	U	4.500	114.3
K	0.437	11.10	V	5.125	130.2

Millimetre dimensions have been derived from inches.