BR/BW/BY1143 Series

R.F. POWER TRIODES

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

ABRIDGED DATA

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

Anode cooling:	
BR1143	forced-air
BW1143	water; separate jacket
BW1143J2	water; integral jacket
BY1143	vapour; separate boiler unit
Anode dissipation:	
BR1143	20 kW max
BW1143, BW1143J2	30 kW max
BY1143	35 kW max
Anode voltage	10 kV max
Frequency for full ratings	10 MHz max
Output power (class C unmodulated)	77.5 kW

GENERAL

Electrical

Filament	thoriated tungsten	
Filament voltage (see note 1)	12	V
Filament current	240	A
Surge filament current (peak) (see note 2)	625	A max
Filament cold resistance	5.9	mΩ
Peak usable cathode current	95	A
Amplification factor (V_a = 5.0kV, I_a = 5.0A)	37	
Mutual conductance (V_a = 6.0kV, I_a = 3.5A)	85	mA/V
Perveance	5.8	$mA/V^{3/2}$
Inter-electrode capacitances:		
grid to anode	105	pF
grid to filament	185	pF
anode to filament	2.7	pF

Mechanical

Overall dimensions	see outline drawings
Net weight:	
BR1143	109 pounds (50kg) approx
BW1143	23 pounds (10.5kg) approx
BW1143J2	32 pounds (14.5kg) approx
BY1143	70 pounds (32kg) approx
Mounting position	vertical, filament end up

Accessories

Filament leads	MA130
Grid connector	MA66
Water jacket for BW1143	BW4050
Sealing ring (supplied with BW1143)	MA254
Single boiler unit, separate condenser required, for BY1143	BY4037A
Single boiler unit, integral condenser, for BY1143	BY4038
Double boiler unit, integral condenser, for BY1143	BY4038A
Sealing ring (supplied with BY1143)	MA255

COOLING

Anode

The BR1143 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 BW1143 must be fitted into a water jacket for cooling, the recommended jacket being type BW4050. BW1143J2 has an integral water jacket. Minimum water cooling requirements for both types are shown on page 11; higher values should be used where possible.

The BY1143 is vapour cooled and may be operated either singly in boiler unit BY4037A or BY4038, or in pairs in boiler unit BY4038A. In BY4038 and BY4038A, the steam generated by the anode is condensed by means of an internal water cooled condenser. The steam produced in BY4037A 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 20ft^3/min (0.57m^3/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 unmodulated conditions, one valve)

MAXIMUM RATINGS (Absolute values)

Anode voltage	10	kV max
Anode current	12	A max
Anode input power	100	kW max
Anode dissipation:		
BR1143	20	kW max
BW1143, BW1143J2	30	kW max
BY1143	35	kW max
Grid dissipation	1.75	kW max
Operating frequency (for full ratings)	10	MHz max

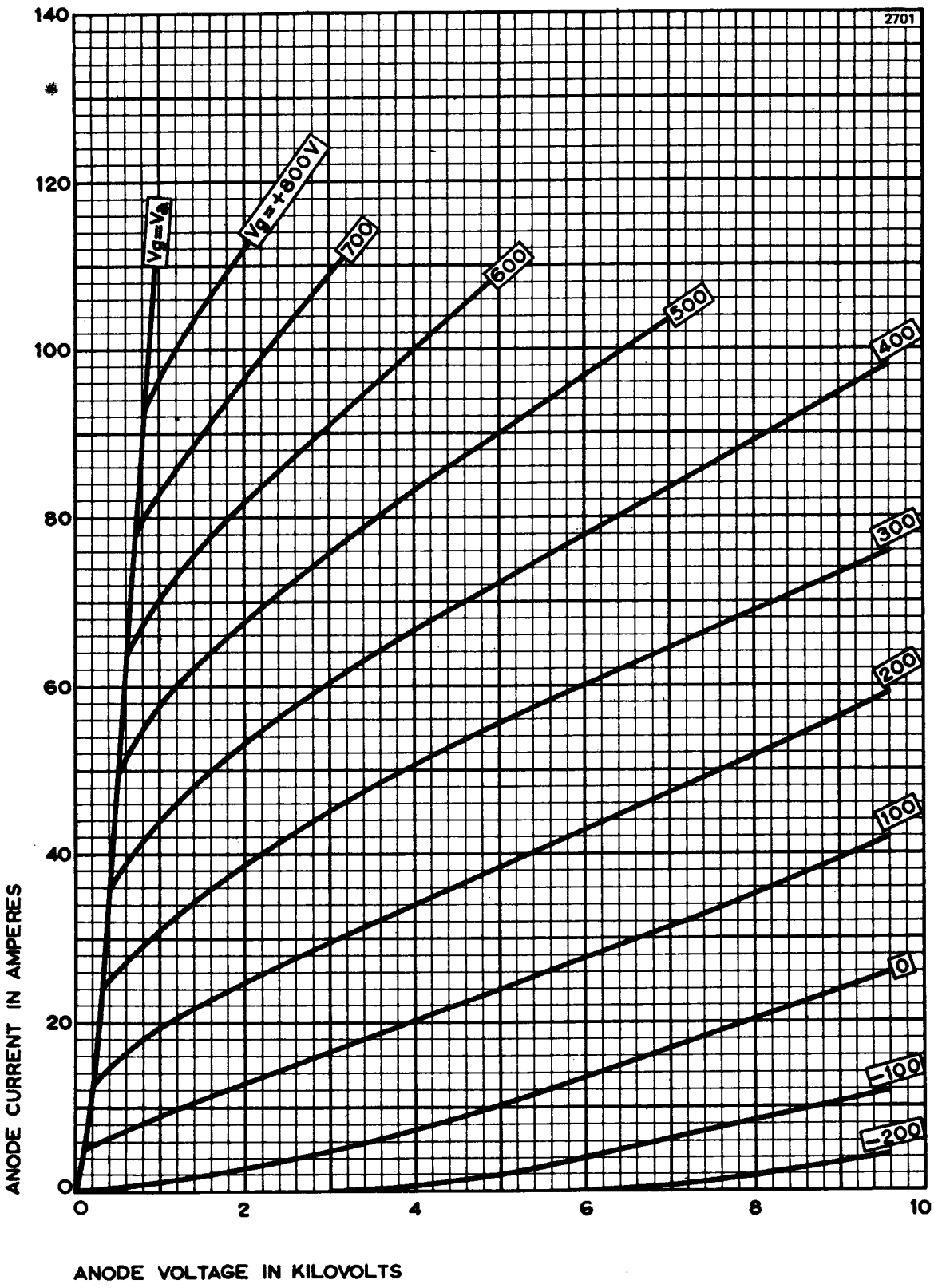
TYPICAL OPERATING CONDITIONS (for oscillator)

Anode voltage	6.0	10	kV
Grid voltage	−320	−540	V
Peak r.f. grid drive voltage	750	940	V
Anode current	11.2	9.4	A
Grid current (approx)	1.78	1.67	A
Anode dissipation	14.4	14.8	kW
Grid dissipation (approx)	760	670	W
Driving power (approx)	1330	1570	W
Output power (see note 3)	51.5	77.5	kW
Efficiency	78.5	84	%

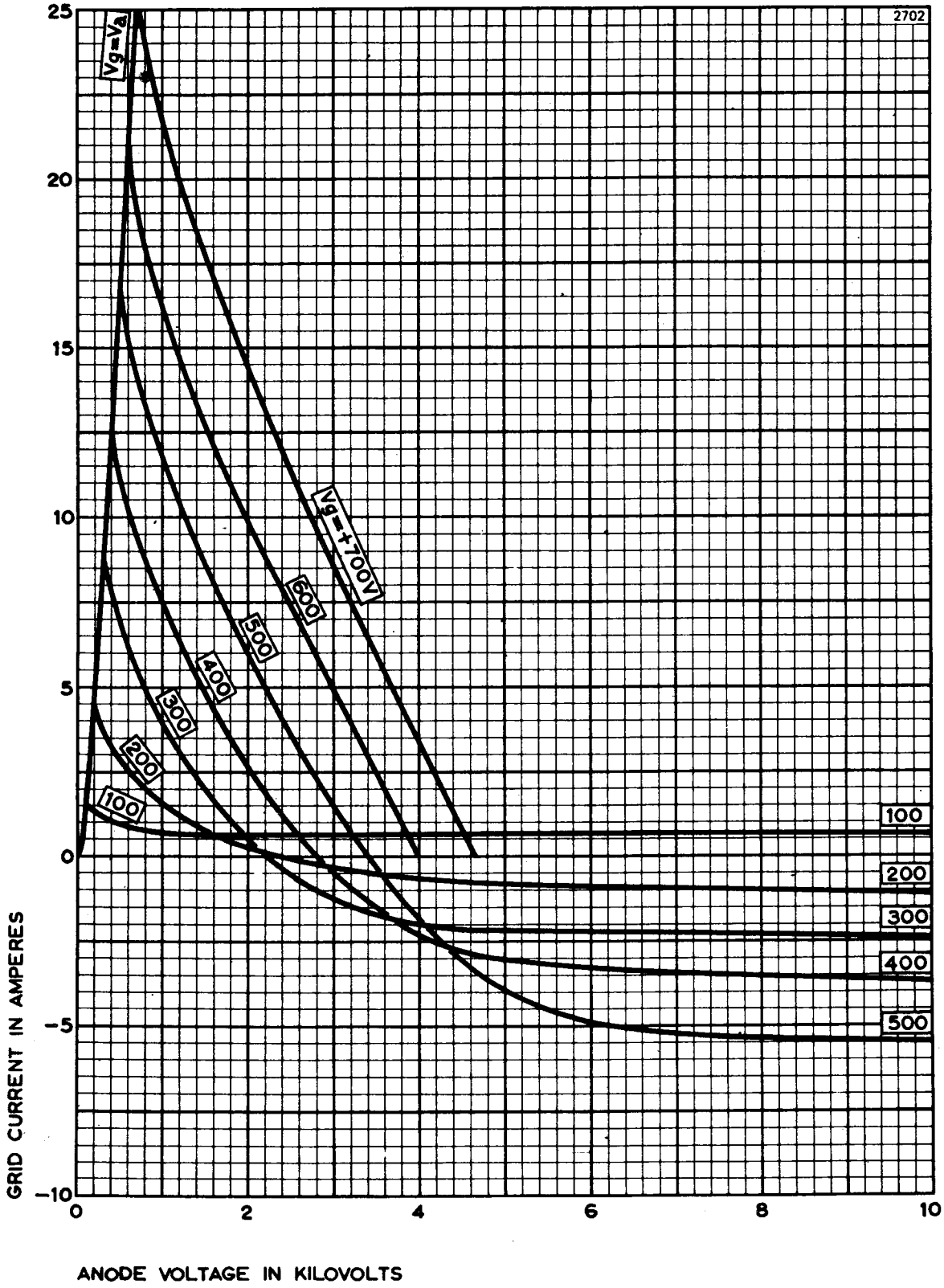
NOTES

1. The valve must be operated at the stated filament voltage. Fluctuation in filament voltage must not exceed ±5%.
2. The filament current must not exceed 625A, even momentarily, at any time.
3. Power in anode circuit after the grid circuit driving power has been deducted. This does not take into account the anode circuit efficiency.

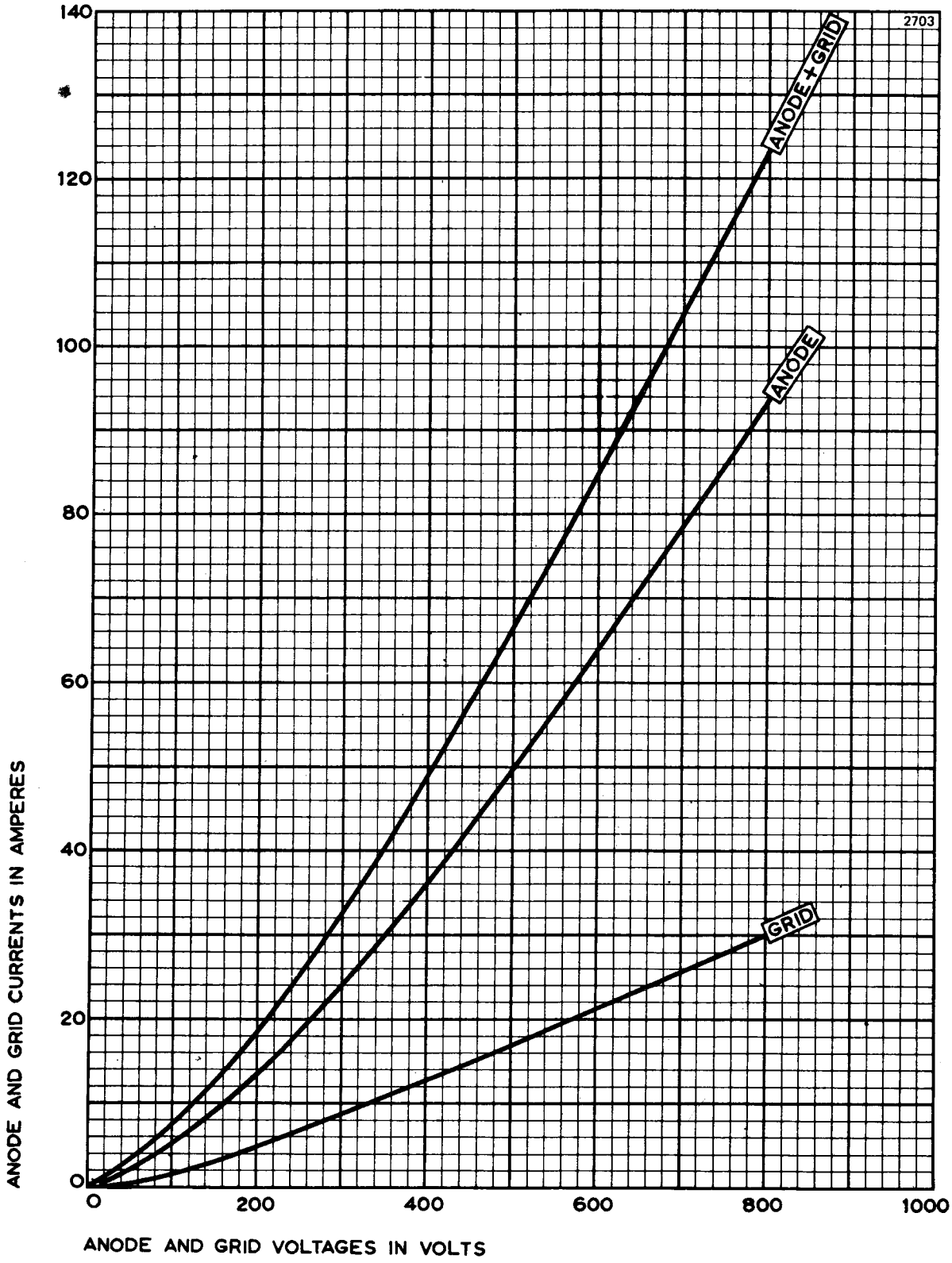
TYPICAL ANODE CHARACTERISTICS



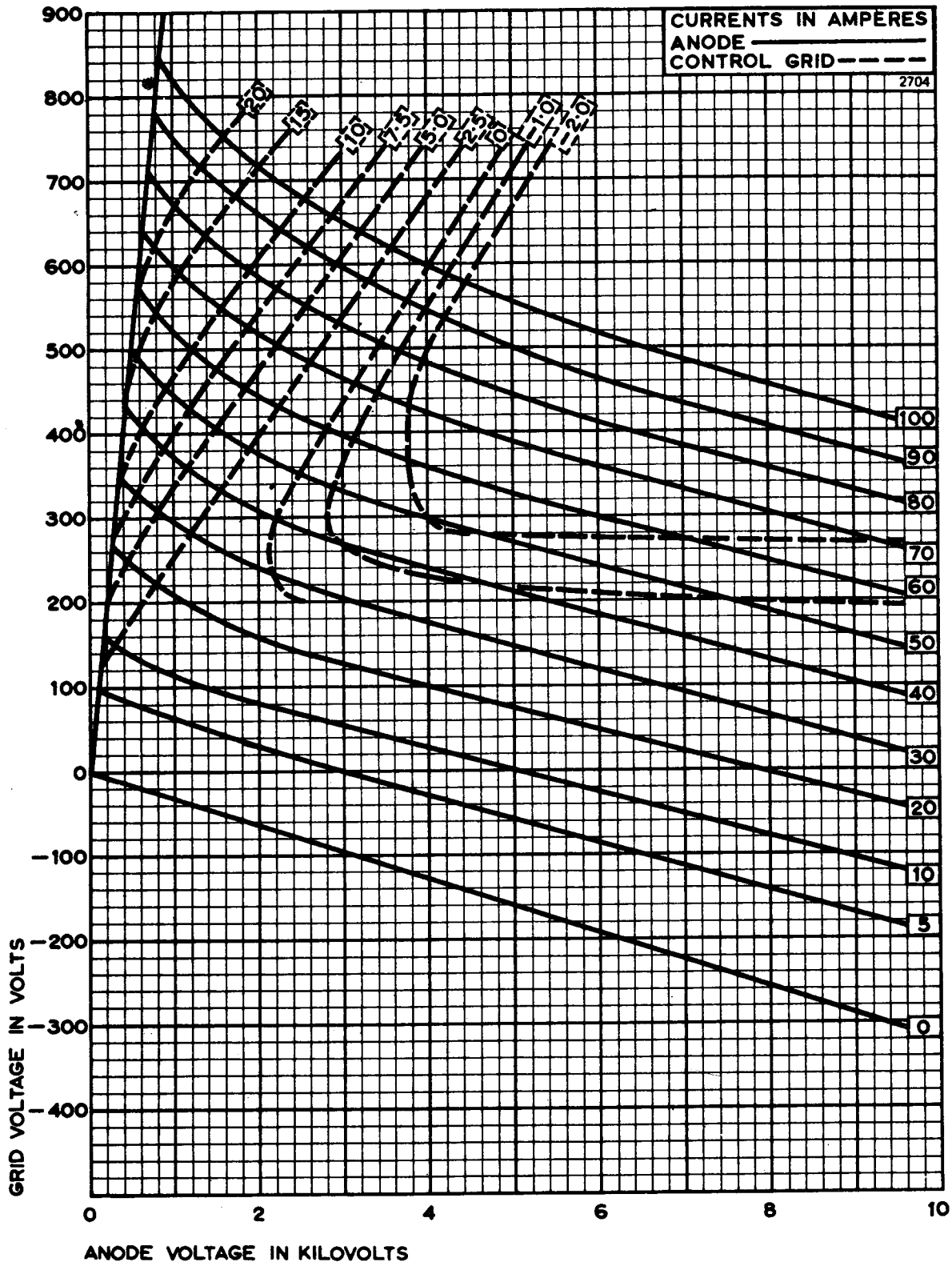
TYPICAL GRID CHARACTERISTICS



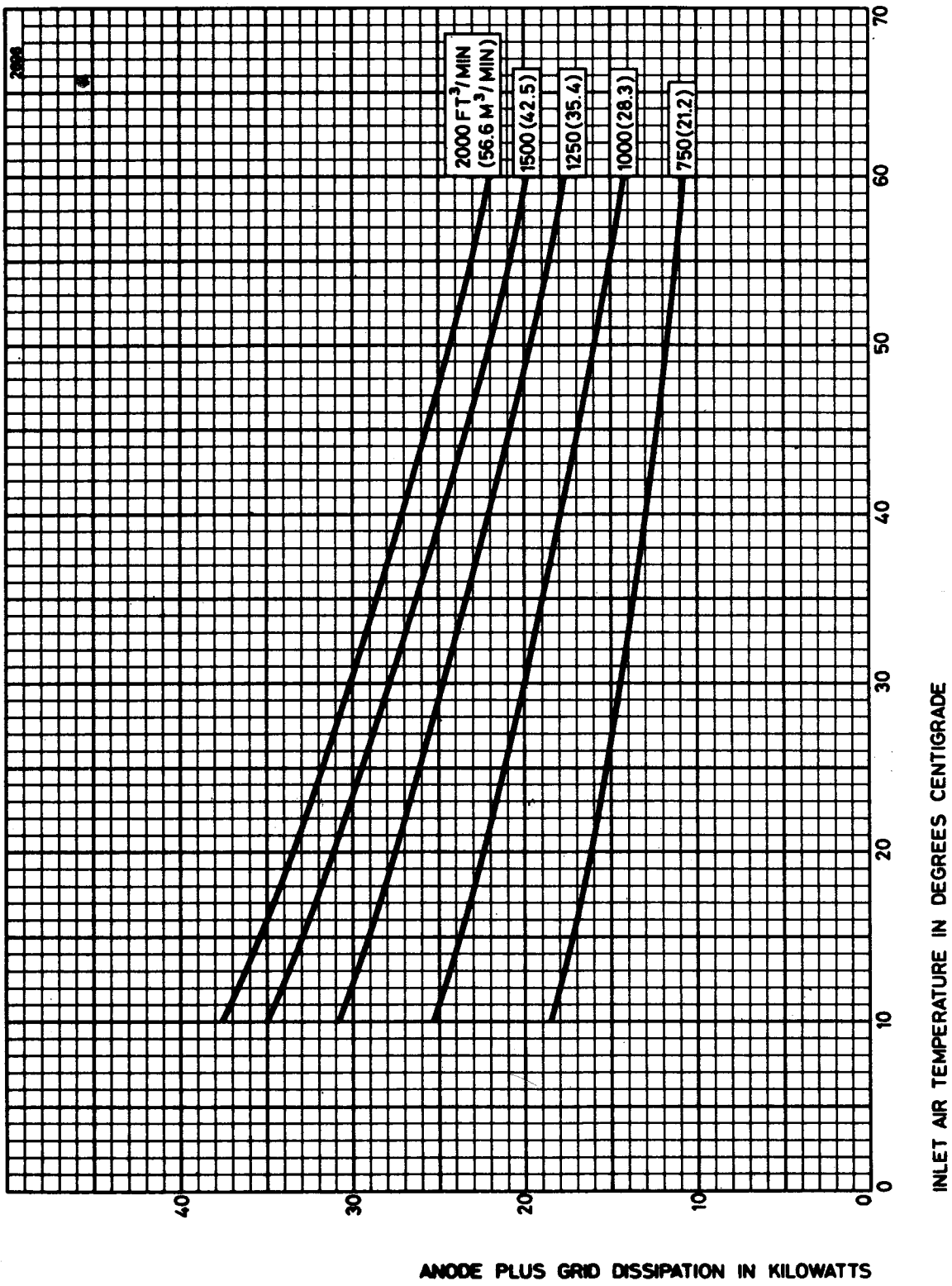
TYPICAL STRAPPED CHARACTERISTICS



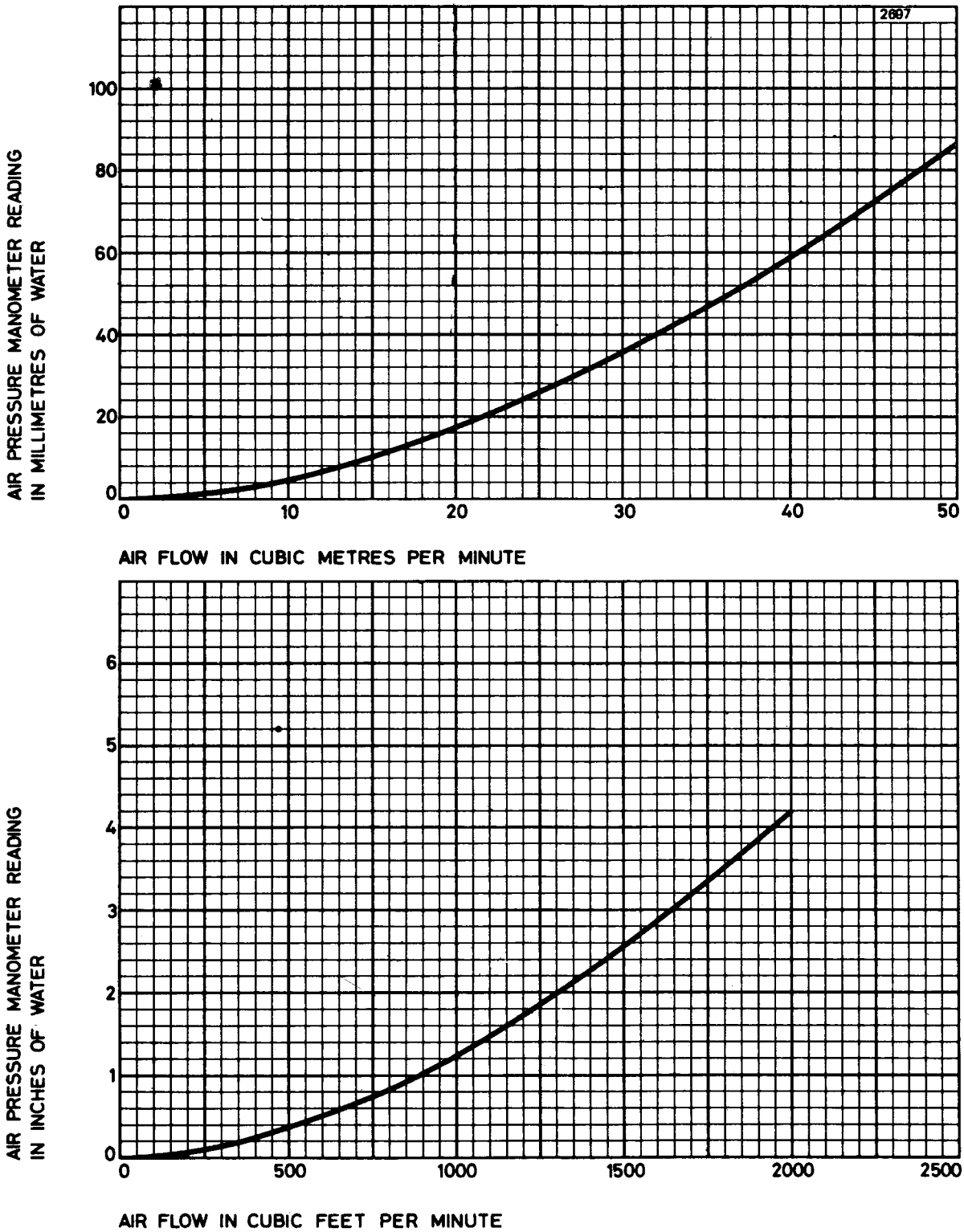
TYPICAL CONSTANT CURRENT CHARACTERISTICS



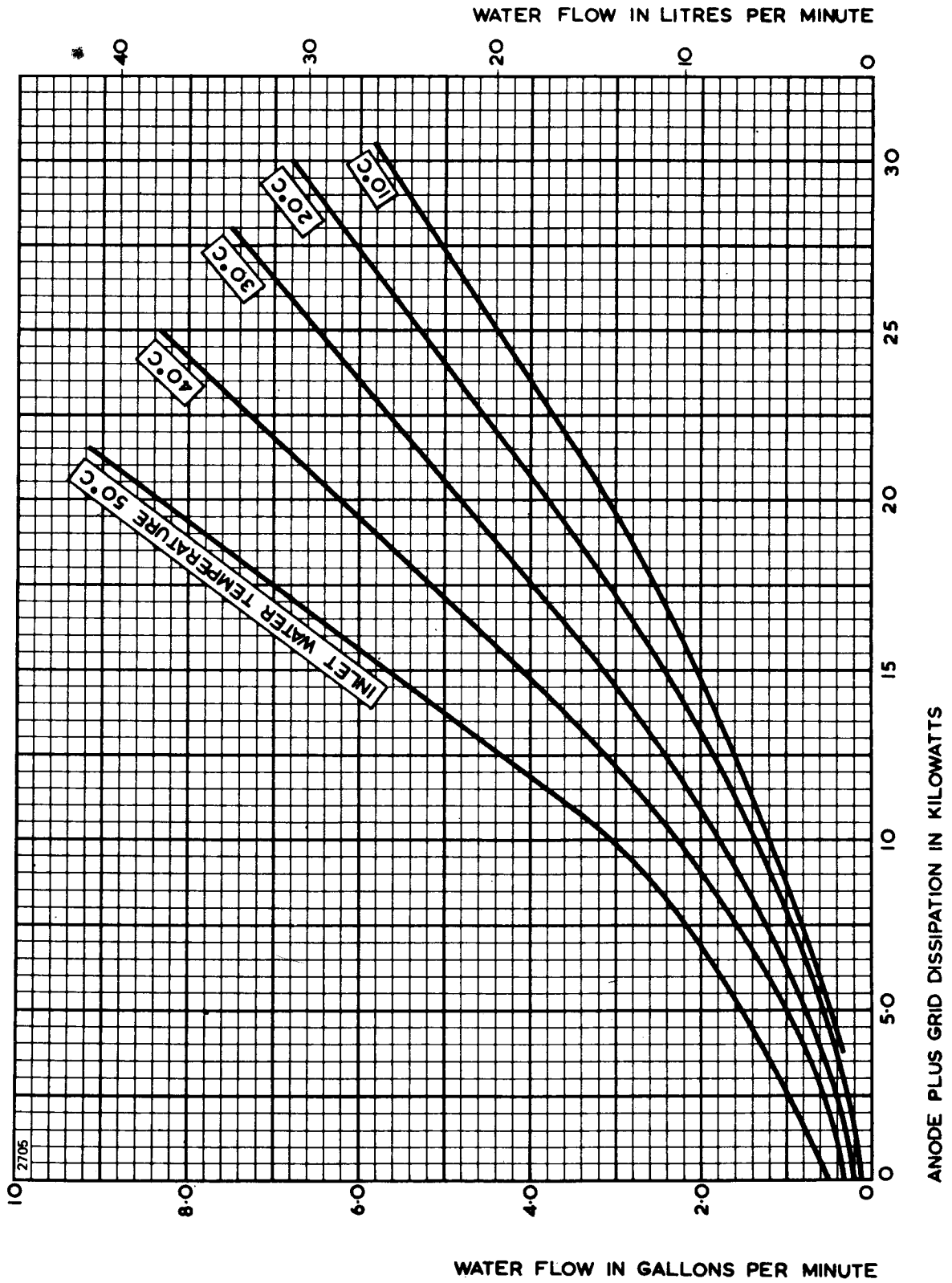
AIR COOLING REQUIREMENTS FOR BR1143



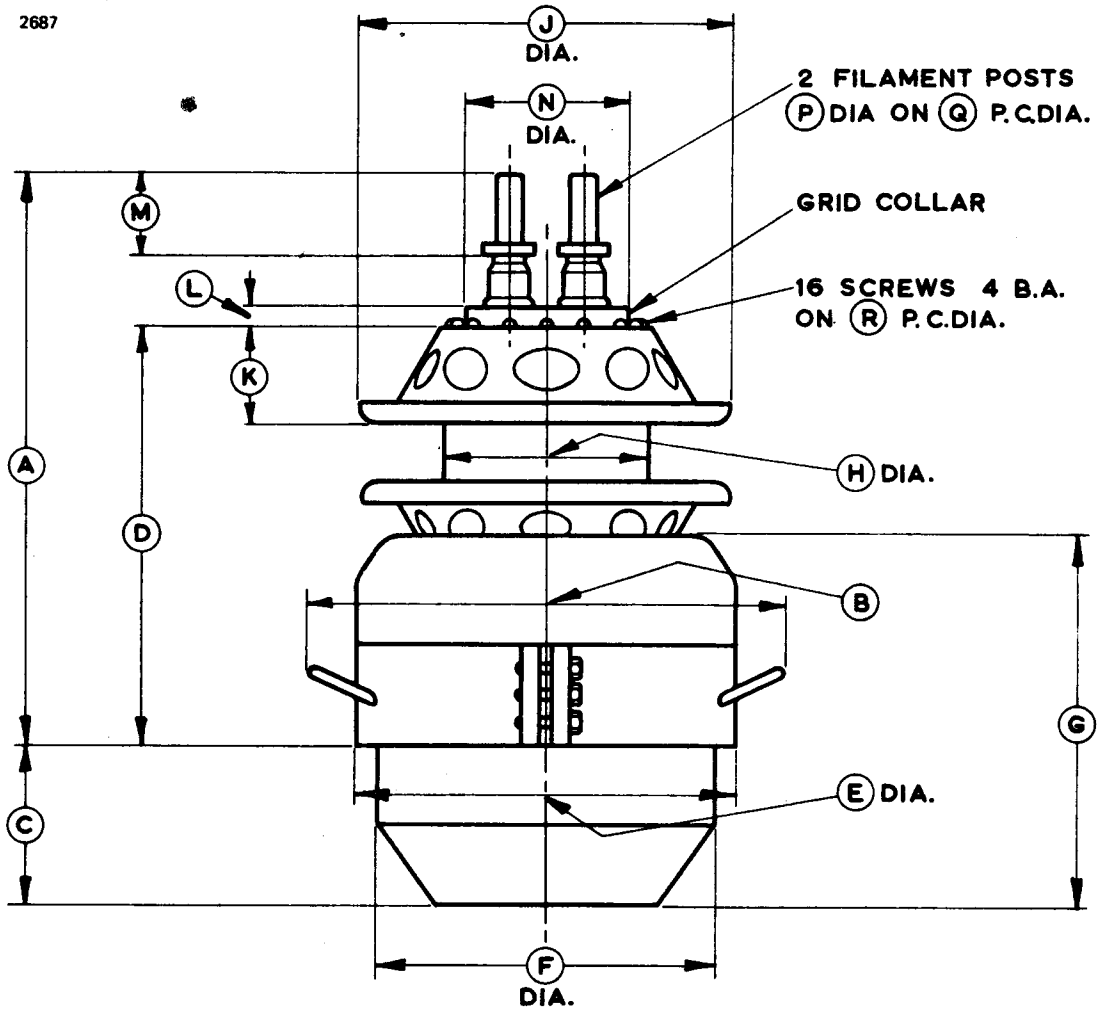
AIR FLOW CHARACTERISTIC FOR BR1143



MINIMUM WATER COOLING REQUIREMENTS FOR BW1143, BW1143J2
(Higher rates of flow should be used where possible)



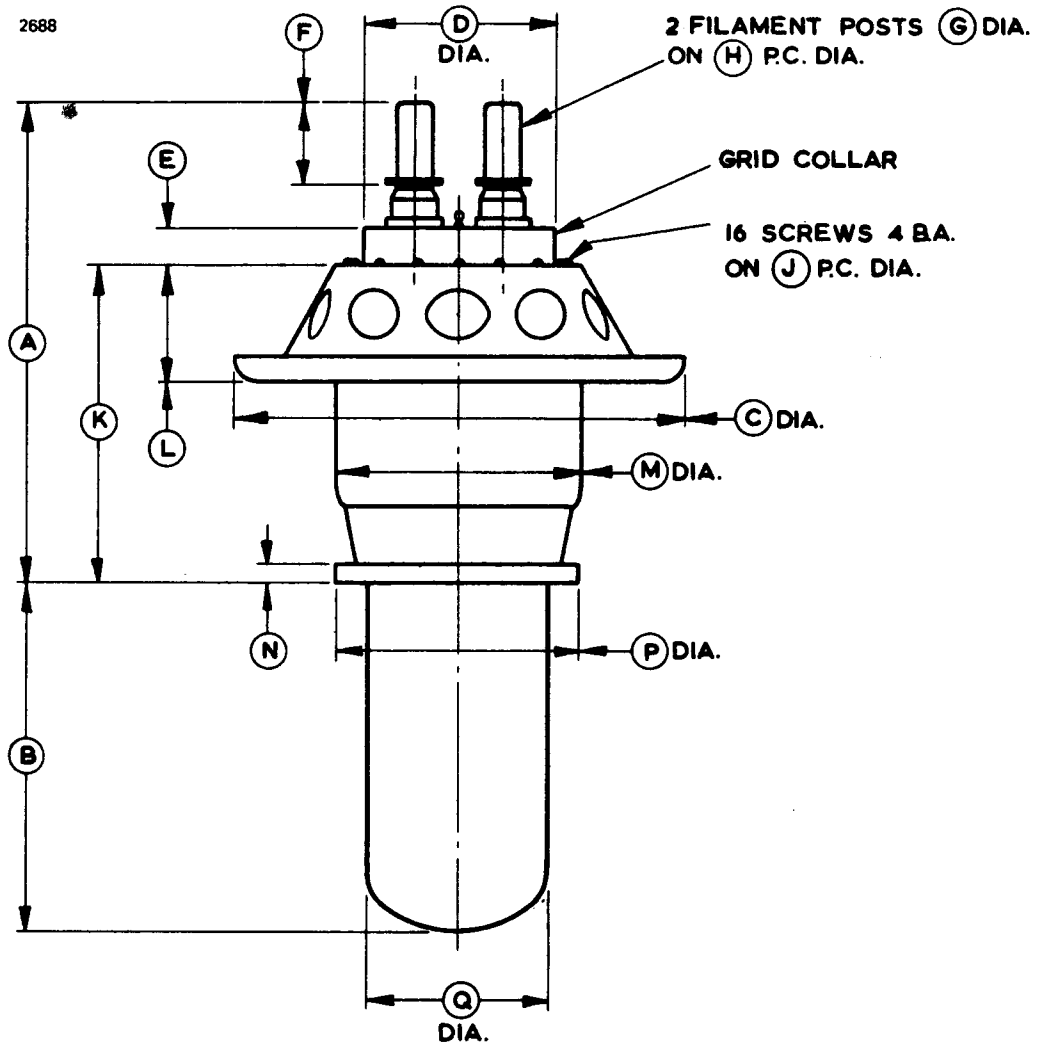
OUTLINE FOR BR1143 (All dimensions without limits are nominal)



Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	16.750 max	425.5 max	J	11.000 max	279.4 max
B	14.000 max	355.6 max	K	2.906 max	73.81 max
C	4.750	120.7	L	0.687	17.45
D	12.875 max	327.0 max	M	2.000	50.80
E	11.000	279.4	N	4.703	119.5
F	10.062 max	255.6 max	P	0.875	22.23
G	11.000	279.4	Q	2.250	57.15
H	6.000	152.4	R	5.375	136.5

Millimetre dimensions have been derived from inches.

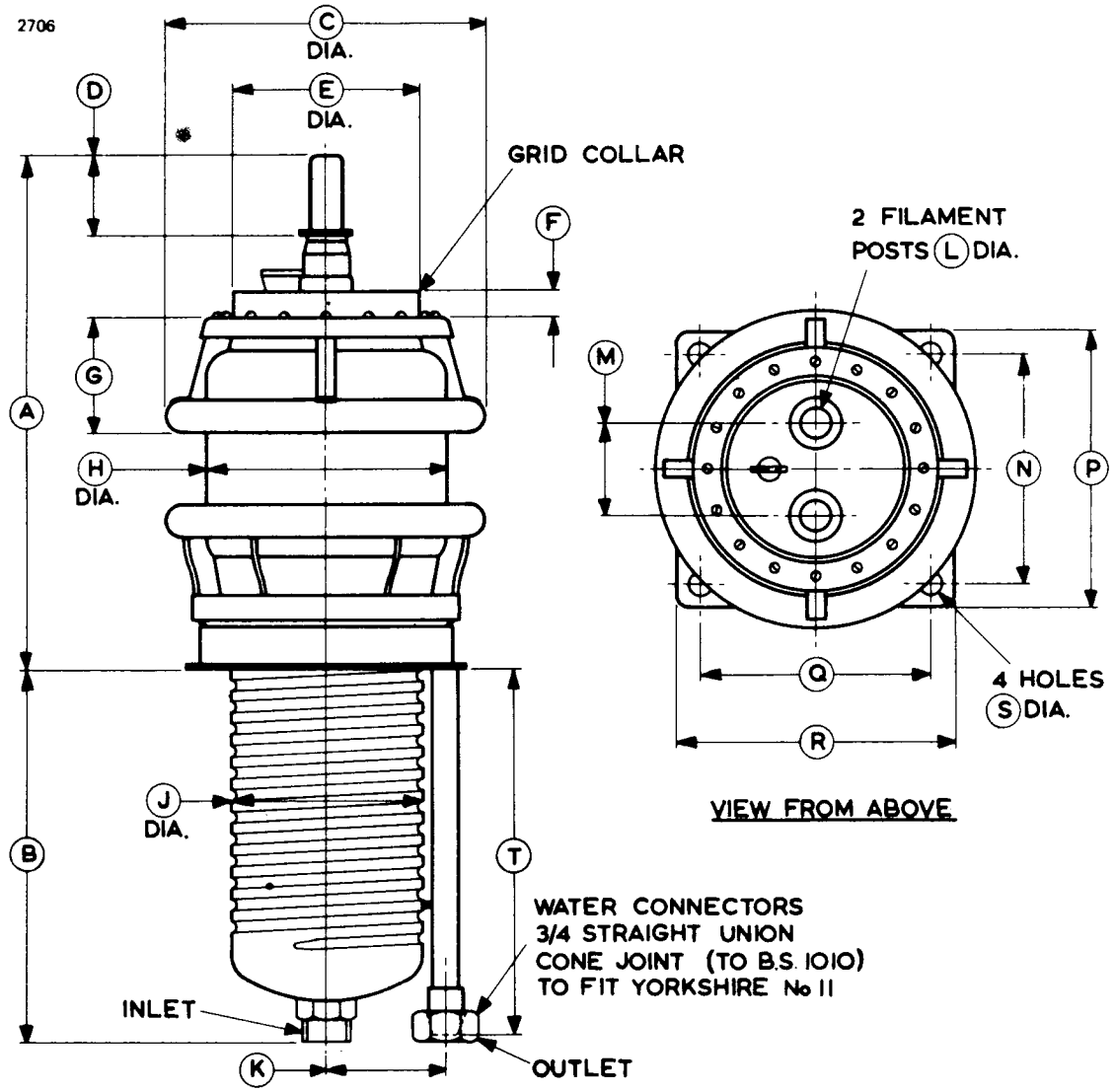
OUTLINE FOR BW1143 (All dimensions without limits are nominal)



Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	12.000 max	304.8 max	J	5.375	136.5
B	8.625	219.1	K	7.875 max	200.0 max
C	11.000 max	279.4 max	L	2.906 max	73.81 max
D	4.703	119.5	M	6.000	152.4
E	0.687	17.45	N	0.500	12.70
F	2.000	50.80	P	5.760 max	146.3 max
G	0.875	22.23	Q	4.500	114.3
H	2.250	57.15			

Millimetre dimensions have been derived from inches.

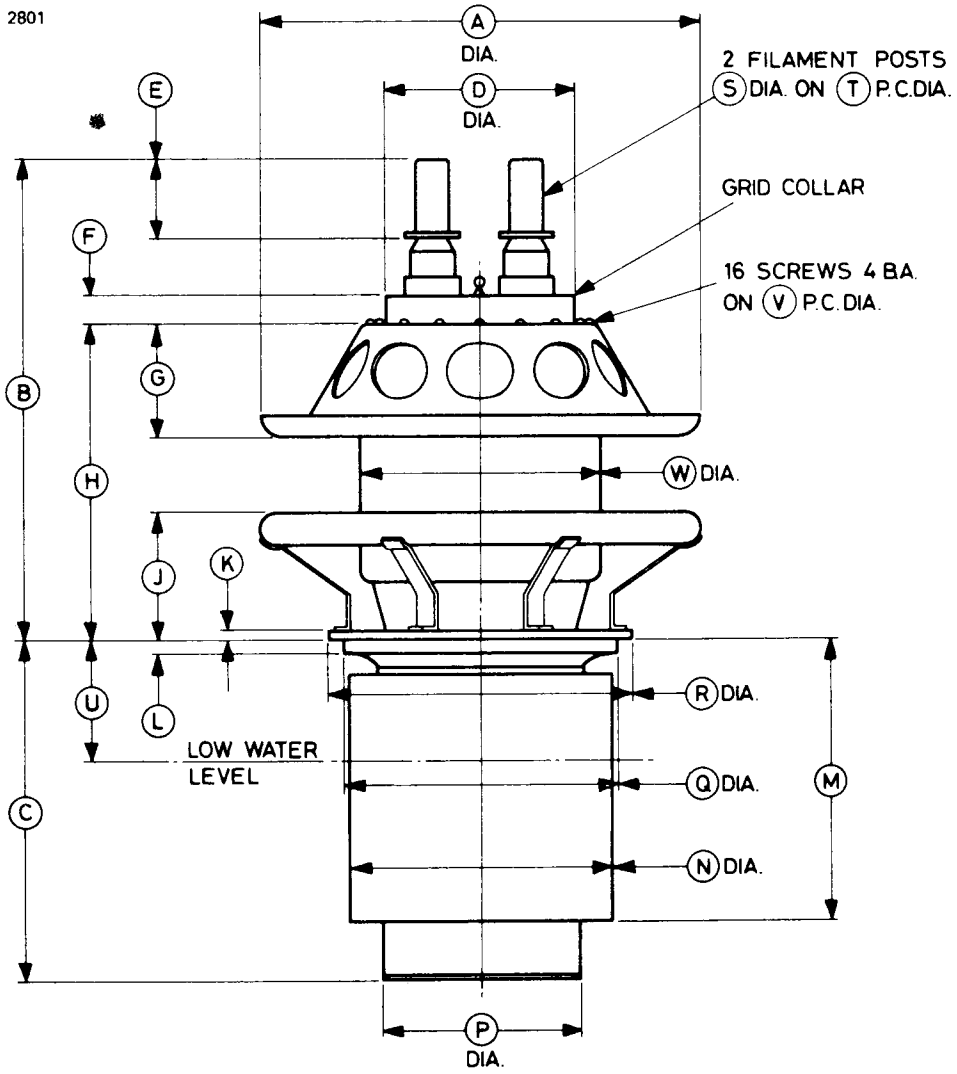
OUTLINE FOR BW1143J2 (All dimensions without limits are nominal)



Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	12.889 max	327.4 max	K	2.937	74.60
B	9.375	238.1	L	0.875	22.23
C	8.062 max	204.8 max	M	2.250	57.15
D	2.000	50.80	N	5.750	146.1
E	4.703	119.5	P	7.000	177.8
F	0.687	17.45	Q	5.750	146.1
G	2.906 max	73.81 max	R	7.000	177.8
H	6.000	152.4	S	0.375	9.53
J	4.817 max	122.4 max	T	10.000	254.0

Millimetre dimensions have been derived from inches.

OUTLINE FOR BY1143 (All dimensions without limits are nominal)



Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	11.000 max	279.4 max	M	7.000	177.8
B	12.109 max	307.6 max	N	6.562	166.7
C	8.452	214.7	P	5.240	133.1
D	4.703	119.5	Q	6.937	176.2
E	2.000	50.80	R	7.500	190.5
F	0.687	17.45	S	0.875	22.23
G	2.906 max	73.81 max	T	2.250	57.15
H	8.053 max	204.5 max	U	3.000	76.20
J	3.312 max	84.12 max	V	5.375	136.5
K	0.250	6.35	W	6.000	152.4
L	0.375	9.53			

Millimetre dimensions have been derived from inches.