AIR COOLED R.F. POWER TRIODE

QUICK REFERENCE DATA								
Frequency (MHz)	C telegraphy		C anode mod.		RF class B		AF class B Two tubes	
	V_a (kV)	W_o (kW)	V_a (kV)	W_o (kW)	V_a (kV)	W_o (kW)	V_a (kV)	W_o (kW)
10	15	120			15	110	12	78
30	12	90	11	66	12	110	10	78

HEATING: direct by A.C. or D.C.; filament thoriated tungsten

Filament voltage	V_f	=	12.6	V
Filament current	I_f	=	160	A

CAPACITANCES

Grid to filament	C_{gf}	=	120	pF
Anode to filament	C_{af}	=	1.4	pF
Anode to grid	C_{ag}	=	50	pF

TYPICAL CHARACTERISTICS

Anode voltage	V_a	=	3	kV
Anode current	I_a	=	1	A
Amplification factor	μ	=	58	
Mutual conductance	S	=	60	mA/V

TEMPERATURE LIMITS (Absolute limits)

Bulb temperature	t	= max.	220	°C
Seal temperature	t	= max.	220	°C

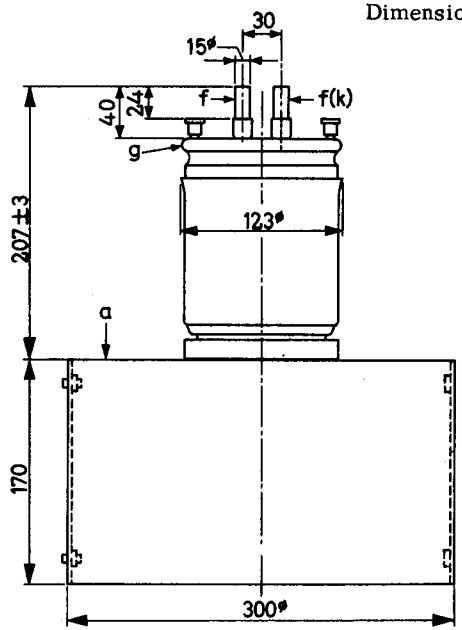
COOLING

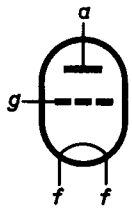
For cooling data see cooling curves. These curves are for an air inlet temperature of 25 °C.
At lower temperatures the amount of air should be the same.
At higher temperatures the amount of air should be increased so that the outlet air temperature is not higher than at t_i = 25 °C.
At frequencies higher than 10 MHz a low velocity air flow should be directed to the grid and filament seals.

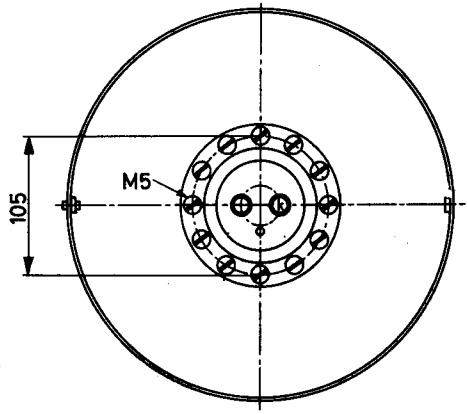
MECHANICAL DATA

Net weight: 39 kg

Dimensions in mm







ACCESSORIES

Insulating pedestal	40672	Mounting position: vertical with anode down
Filament connector	40670	
Grid connector	40671	

R.F. CLASS C TELEGRAPHY or **F.M. TELEPHONY**

LIMITING VALUES (Absolute limits)

Frequency	f		up to	10	up to	30	MHz
Anode voltage	V_a	=	max.	16	max.	12.5	kV
Anode dissipation	W_a	=	max.	35	max.	35	kW
Negative grid voltage	$-V_g$	=	max.	1000	max.	1000	V
Grid dissipation	W_g	=	max.	1.3	max.	1.3	kW
Anode current	I_a	=	max.	13	max.	13	A
Grid current	I_g	=	max.	3.3	max.	3.3	A

OPERATING CONDITIONS

Frequency	f	=	10	30	30	30	MHz
Anode voltage	V_a	=	15	12	10	8	kV
Grid voltage	V_g	=	-600	-550	-500	-450	V
Anode current	I_a	=	9.75	9.25	9.0	8.75	A
Grid current	I_g	=	2.2	2.2	2.1	1.85	A
Peak grid driving voltage	V_{gp}	=	1000	940	875	810	V
Grid driving power	W_{dr}	=	2.1	1.9	1.7	1.55	kW
Anode input power	Wi_a	=	146	111	90	70	kW
Anode dissipation	W_a	=	26	21	18	15	kW
Output power	W_o	=	120	90	72	55	kW
Efficiency	η	=	82	81	80	78.5	%

R.F. CLASS B AMPLIFIER

LIMITING VALUES (Absolute limits)

Frequency	f		up to	10	up to	30	MHz
Anode voltage	V_a	=	max.	16	max.	12.5	kV
Anode dissipation	W_a	=	max.	35	max.	35	kW
Negative grid voltage	$-V_g$	=	max.	1000	max.	1000	V
Grid dissipation	W_g	=	max.	1.3	max.	1.3	kW
Anode current	I_a	=	max.	13	max.	13	A
Grid current	I_g	=	max.	3.3	max.	3.3	A

OPERATING CONDITIONS

Frequency	f	=	10	10	30	30	MHz
Anode voltage	V_a	=	15	15	12	12	kV
Grid voltage	V_g	=	-260	-260	-210	-210	V
Anode current	I_a	=	10.1	7.75	12.7	9.85	A
Grid current	I_g	=	2.0	1.3	3.0	1.9	A
Peak grid driving voltage	V_{g_p}	=	600	520	650	520	V
Grid driving power	W_{dr}	=	1080	610	1770	880	W
Anode input power	W_{i_a}	=	151	116.3	153	118	kW
Anode dissipation	W_a	=	41	31.3	43	33	kW
Output power	W_o	=	110	85	110	85	kW
Efficiency	η	=	73	73	72	72	%

R.F. CLASS C ANODE MODULATION

LIMITING VALUES (Absolute limits)

Frequency	f		up to	30	MHz
Anode voltage	V_a	=	max.	11.5	kV
Anode dissipation	W_a	=	max.	30	kW
Negative grid voltage	$-V_g$	=	max.	1000	V
Grid dissipation	W_g	=	max.	1.3	kW
Anode current	I_a	=	max.	9	A
Grid current	I_g	=	max.	3.3	A

OPERATING CONDITIONS

Frequency	f	=	30	30	MHz
Anode voltage	V_a	=	11	10	kV
Grid voltage	Vg	=	-480	-440	V [1]
Anode current	I_a	=	7.6	6.9	A
Grid current	I_g	=	3.1	3.1	A
Grid resistor	R_g	=	90	80	Ω
Peak grid driving voltage	V_{gp}	=	880	810	V
Grid driving power	W_{dr}	=	2.7	2.4	kW
Anode input power	Wi_a	=	83.6	69	kW
Anode dissipation	W_a	=	17.6	14	kW
Output power	W_o	=	66	55	kW
Efficiency	η	=	79	79	%
Modulation depth	m	=	100	100	%
Modulation power	W_{mod}	=	41.8	34.5	kW

[1]) Partially obtained by the grid resistor and grid current.

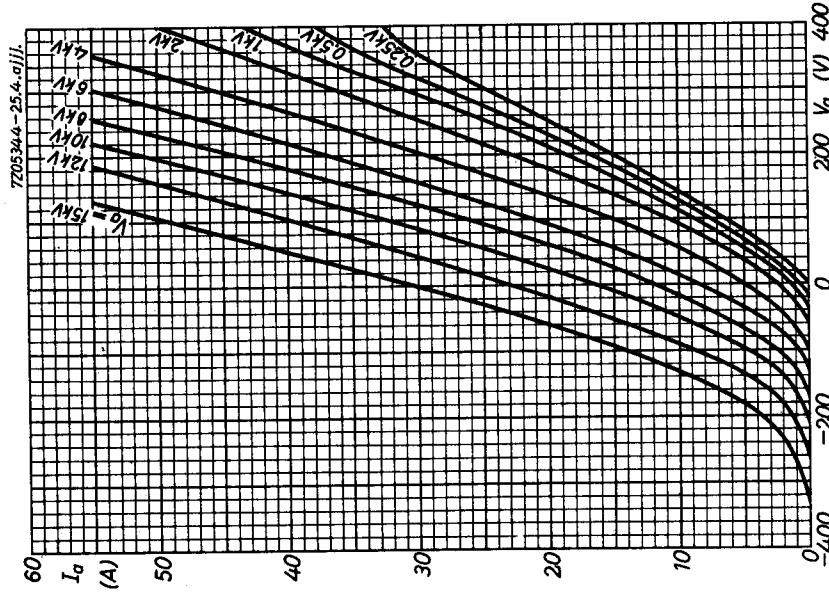
A.F. CLASS B AMPLIFIER AND MODULATOR

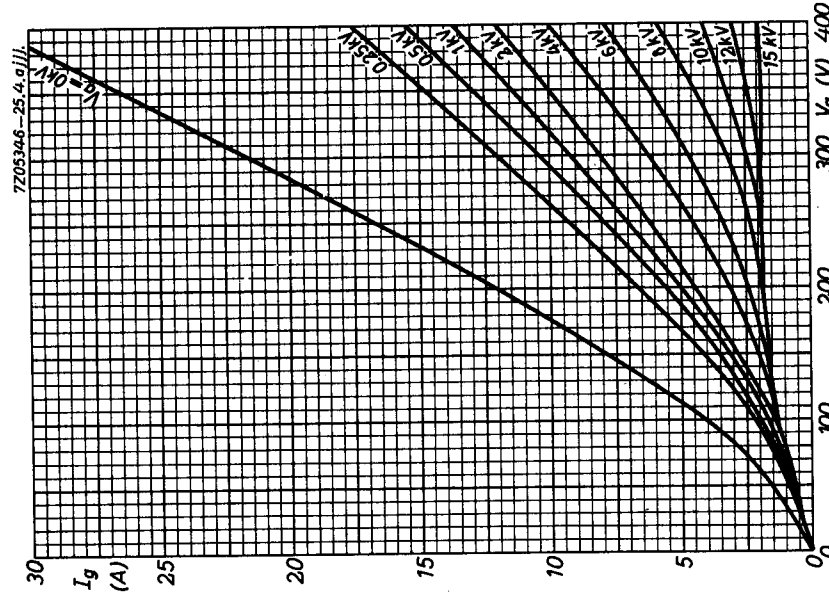
LIMITING VALUES (Absolute limits)

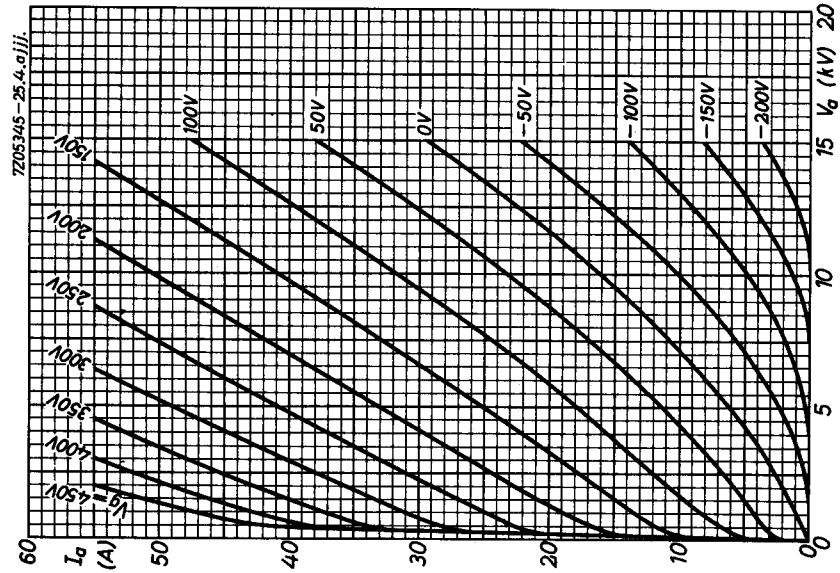
Anode voltage	V_a	= max.	12	kV
Anode dissipation	W_a	= max.	35	kW
Negative grid voltage	$-V_g$	= max.	1000	V
Grid dissipation	W_g	= max.	1.3	kW
Anode current	I_a	= max.	13	A
Grid current	I_g	= max.	3.3	A

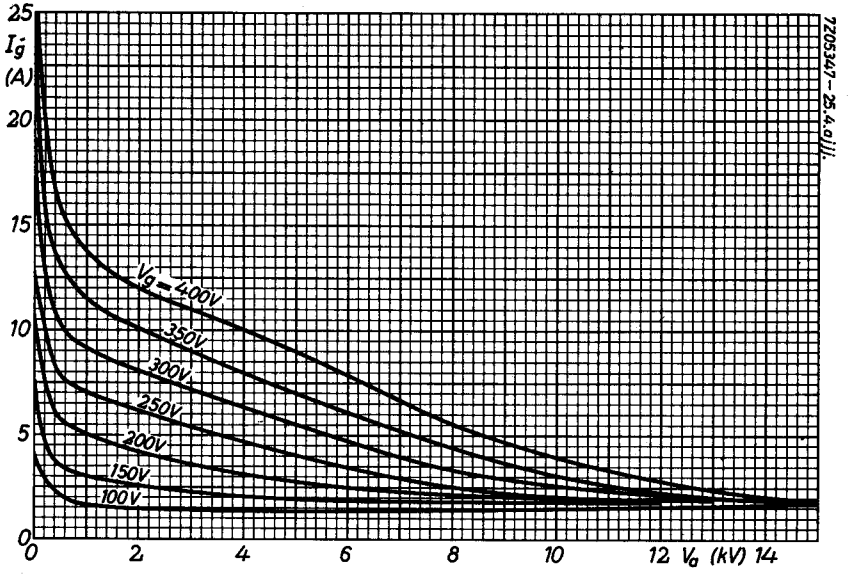
OPERATING CONDITIONS (two tubes in push-pull)

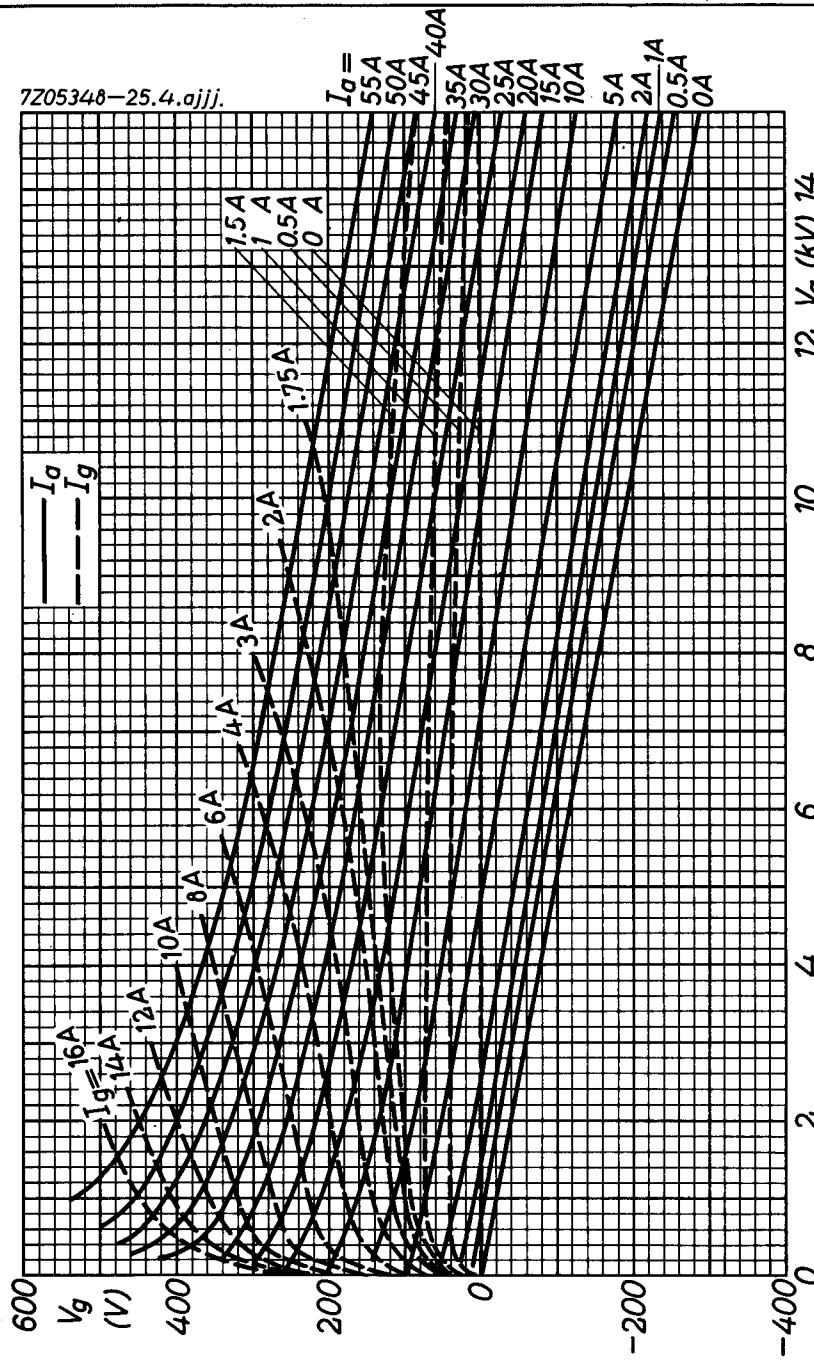
Anode voltage	V_a	=	12		10		kV
Grid voltage	V_g	=	-205		-170		V
Load resistance	$R_{aa\sim}$	=	2720		1810		Ω
Peak grid driving voltage	V_{ggp}	=	0	710	0	710	V
Anode current	I_a	=	2x0.4	2x4.75	2x0.4	2x5.75	A
Average grid current	I_g	=	0	2x0.45	0	2x0.72	A
Peak grid current	I_{gp}	=	0	2x2.9	0	2x4.0	A
Grid driving power	W_{dr}	=	0	2x150	0	2x235	W
Anode input power	W_{i_a}	=	2x4.0	2x57	2x4.0	2x57.5	kW
Anode dissipation	W_a	=	2x4.0	2x18	2x4.0	2x18.5	kW
Output power	W_o	=	0	78	0	78	kW
Efficiency	η	=	-	68.5	-	68	%

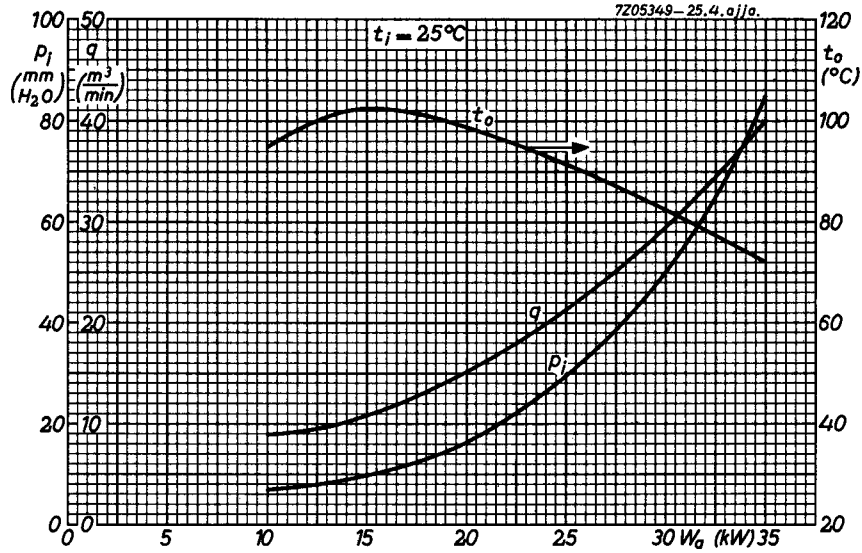

7Z05344-25.4.ojjj.
Va = 15kV
12kV
10kV
8kV
6kV
4kV
2kV
1kV
0.5kV
0.25kV
Ia (A)
60
50
40
30
20
10
0
-400
-200
0
200
400
Vg (V)


7Z05346-25.4.ojjj.
Va = 0kV
0.25kV
0.5kV
1kV
2kV
4kV
6kV
8kV
10kV
12kV
15kV
Ig (A)
30
25
20
15
10
5
0
0
100
200
300
400
Vg (V)


7Z05345-25.4.ojjj.
150V
100V
50V
0V
-50V
-100V
-150V
-200V
200V
250V
300V
350V
400V
450V
V_g
60
I_a (A)
50
40
30
20
10
0
20
15
V_a (kV)
10
5
0


7Z05347-25.4.ojjj.
25
I_g
(A)
20
15
10
5
0
V_g = 400V
350V
300V
250V
200V
150V
100V
0
2
4
6
8
10
12 V_a (kV) 14


7Z05348—25.4.ajjj.
I_a =
55A
50A
45A
40A
35A
30A
25A
20A
15A
10A
5A
2A
1A
0.5A
0A
1.5A
1 A
0.5A
0 A
1.75A
2A
3A
4A
6A
8A
10A
12A
14A
16A
I_g =
I_a
I_g
V_g (V)
600
400
200
0
−200
−400
0
2
4
6
8
10
12
V_a (kV) 14


7Z05349-25.4.ajja.
$t_i = 25°C$
p_i (mm H_2O)
q (m^3/min)
t_o (°C)
t_o
q
p_i
W_a (kW)
100
80
60
40
20
0
50
40
30
20
10
0
120
100
80
60
40
20
0
5
10
15
20
25
30
35