

13 kW

- Output power:  
13 kW in CW mode
- Anode voltage: 7.2 kV
- Anode dissipation: 6 kW
- Frequency up to 150 MHz



# INDUSTRIAL RF HEATING



ITL 5-1

The ITL 5-1 is a RF power triode designed specifically for industrial applications.

This tube uses a coaxial design and metal-ceramic technology. This triode may be operated in CW or pulse modes.

For operation in pulse mode, the parameters depend on each equipment characteristics. Contact us for specific information.

The ITL 5-1 is an air cooled triode.

This product is designed, developed and manufactured at an ISO 9001 registered production site.

## Electrical characteristics

Filament	thoriated tungsten		
Filament voltage (+ 5 %, - 10 %) (1)	6.3	V	
Filament current	65	A	
Surge current	250	A	max.
Cold resistance	12	mΩ	
Capacitances:			
• grid-anode	16	pF	
• grid-cathode	21	pF	
• cathode-anode (2)	0.6	pF	
Amplification factor	20		approx.
Transconductance (Va: 4 kV, Ia: 4 A)	23	mA/V	approx.

## Mechanical characteristics

Operating position	vertical, anode up or down		
Weight	2.9	kg	approx.
Dimensions	see outline drawing		

## Maximum ratings

Frequency (3)	150	MHz
Anode voltage:		
• up to 85 MHz	7.2	kV
• from 85 to 150 MHz	6	kV
Control grid voltage	- 1 000	V
Anode current	2.5	A
Control grid current:		
• at full load	0.55	A
• at no load	0.75	A
Peak cathode current, CW	15	A
Anode dissipation:		
• inlet air temperature = 25°C	6	kW
• inlet air temperature = 45°C	5	kW
Grid dissipation:		
• up to 85 MHz	200	W
• from 85 to 150 MHz	170	W
Grid resistance (tube non conducting)	10	KΩ

(1) At frequencies above 50 MHz, the filament voltage is reduced so that the ratio of filament voltage to current becomes the same as that without an anode voltage.

(2) Measured with a 40 x 40 cm shielding plate attached to the grid plate.

(3) Limited conditions above 30 MHz. Please consult Thales Electron Devices.

## Cooling

Anode cooling	forced air		
Inlet air temperature	45	°C	max.
Cooling air flow	1	m <sup>3</sup> /min	min.
Temperature at any point on tube envelope	220	°C	max.

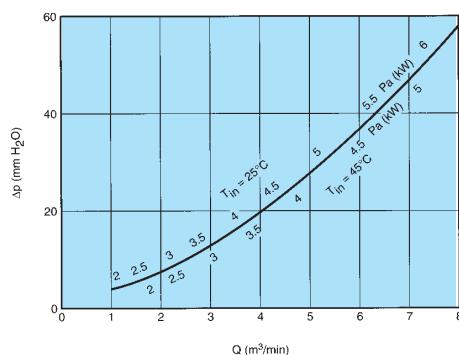
## Typical operation (4)

Examples	Class C RF oscillator for industrial applications		
	1	2	
Frequency	30	30	MHz
Anode voltage	6.8	5.5	kV
Grid bias	- 540	- 450	V
Grid voltage	890	780	V
Anode current	2.5	2.3	A
Grid current, on load	0.43	0.43	A
Anode input power	17	12.7	kW
Anode output power	12.9	9.5	kW
Anode dissipation	3.9	3	kW
Grid dissipation	142	127	W
Grid resistance	1 250	1 050	Ω
Feedback ratio	15	16	%
Oscillator efficiency	75.8	74.3	%

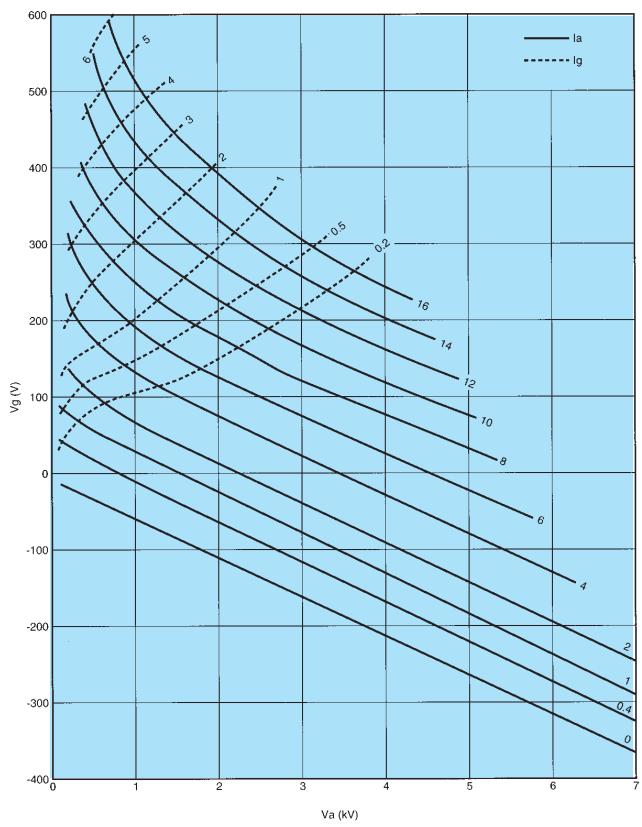
(4) Operation with higher frequencies on request.

## Cooling curve

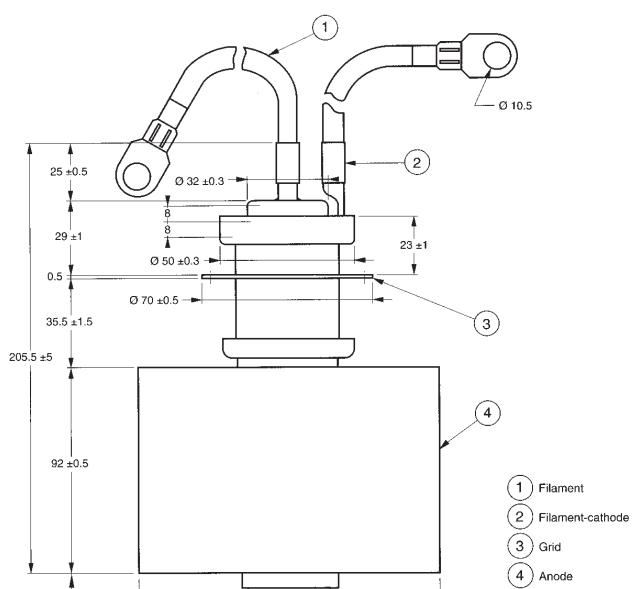
The required flow rates and pressures drop may be read off the cooling curve. This is valid for both air-flow directions.  
 Pa: anode dissipation  
 Δp: pressure drop across the cooler fins  
 q: air flow rate  
 T<sub>in</sub>: inlet air temperature



**Constant current characteristics**



**Outline drawing (dimensions in mm)**



**Top view (dimensions in mm)**

