INDUSTRIAL
RF HEATING

CTK 15-2

Industrial high μ triode

45 kW

- Output power :
  45 kW in CW mode
- Anode voltage : 13 kV
- Anode dissipation : 20 kW
- Frequencies up to 120 MHz
- Water cooled triode

THALES

CTK 15-2

The CTK 15-2 is a high-power high-μ triode designed specifically for industrial applications. The 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 depends on each equipment characteristics, contact us for specific information.

The CTK 15-2 is water cooled.
This product is designed, developed and manufactured at an ISO 9001 registered production site.

Electrical characteristics

Filament	thoriated tungsten		
Filament voltage (+5%, -10 %) (1)	7.2	V	
Filament current	180	A	
Surge current	700	A	max.
Cold resistance	5	mΩ	
Capacitances :			
• grid anode	27	pF	
• grid cathode	67	pF	
• cathode-anode (2)	0.25	pF	
Amplification factor	200		approx.
Transconductance (Va : 4kV, Ia : 4 A)	60	mA/V	approx.

Mechanical characteristics

Operating position	vertical, anode up or down		
Weight	3.8	kg	approx.
Dimensions	see outline drawing		

Maximum ratings

Frequency (3)	120	MHz	
Anode voltage up to 30 MHz	13	kV	
Anode voltage :			
• from 30 to 80 MHz	12	kV	
• from 80 to 100 MHz	10	kV	
• from 100 to120 MHz	8	kV	
Control grid voltage	- 1500	V	
Anode current, CW	8	A	
Control grid current, at full load, CW	2	A	
Control grid current, at no load, CW	3	A	
Peak cathode current, CW	40	A	
Anode dissipation up to 30 MHz	20	kW	
Grid dissipation :			
• up to 30 MHz	800	W	
• from 30 to 80 MHz	700	W	
• from 80 to 100 MHz	600	W	
• from 100 to 120 MHz	540	W	
Grid resistor (tube non conducting)	10	KΩ	max.

(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 80 MHz. Please consult Thales Electron Devices.

Cooling

Anode cooling	water		
Cooling water flow	see cooling curves		
Pressure gradient	see cooling curves		
Temperature at outlet, industrial water	60	°C	max.
Cooling water inlet pressure	5	bar	max.
Temperature at any point on tube envelope	220	°C	max.
Air flow on filament head	2	m^3/min.	

Typical operation (4)

	Class C RF amplifier or oscillator, CW		
Frequency	30	30	MHz
Anode voltage	11	10	kV
Grid bias	- 235	- 225	V
Grid voltage	580	560	V
Anode current (5)	5.4	5	A
Grid current (5)	1.9	1.8	A
Anode input power	59.4	50	kW
Anode output power (oscillator)	45	38	kW
Anode dissipation (5)	13.4	11.1	kW
Grid dissipation (5)	570	550	W
Grid drive power (6) (circuit losses not included)	1 000	900	W
Grid resistor (oscillator)	125	125	Ω

(4) Other type operation (higher frequencies, AB2-linear amplifier, class B RF amplifier in pulsed operation) possible on request.
(5) Average value.
(6) Cathode-grounded operation. Grid-grounded operation possible, on request.

Cooling curves

Distilled, deionized or tap water may be used for cooling.
The water flow rate and pressure drop required for a particular anode dissipation are indicated on the cooling curves.

Pa : anode dissipation

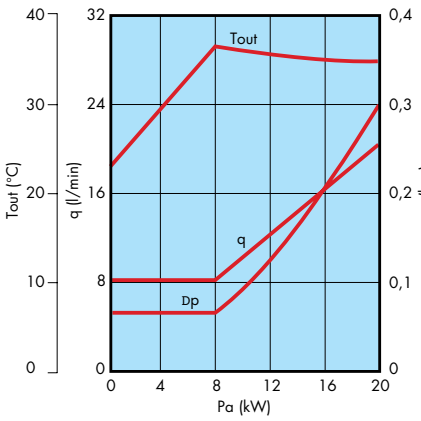
Δp : pressure drop across the water cooler

q : water flow rate

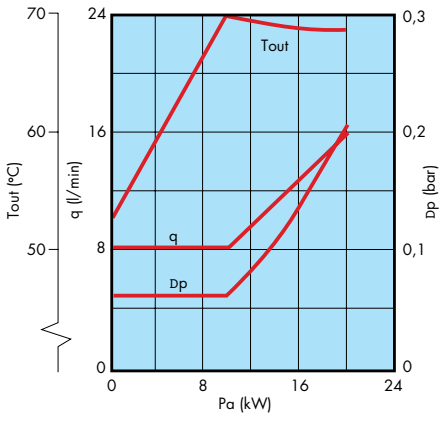
T_{out} : outlet water temperature

(for an inlet water temperature of 20°C for industrial water and 50°C for distilled or deionized water).

Industrial water - minimum resistivity : 5 kΩ.cm

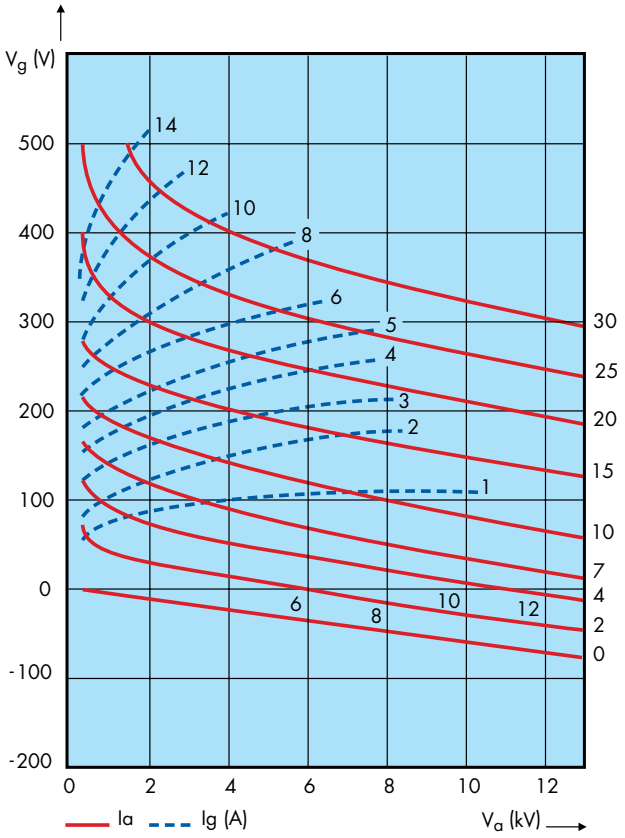


Distilled or deionized water - minimum resistivity : 50 kΩ.cm

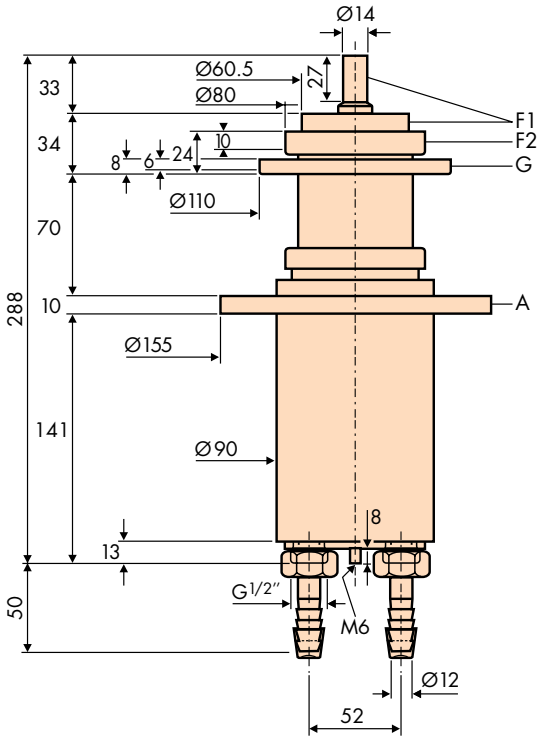


CTK 15-2

Constant current characteristics



Outline drawing (dimensions in mm)



For further information, please contact:

THALES ELECTRON DEVICES

2 bis, rue Latécoère - 78941 Vélizy Cedex - France
Tel: + 33 1 30 70 35 00 - Fax: + 33 1 30 70 35 35
www.thalesgroup.com/electrondevices

P.139/96-12 - Photos : Thales Electron Devices.