

ITK 60-2

Water cooled triode

180 kW

- Output power:
178 kW in CW mode
- Anode voltage: 14 kV
- Anode dissipation: 70 kW
- Frequency up to 30 MHz





ITK 60-2

The ITK 60-2 is a RF power triode designed specifically for industrial applications. This tube uses a coaxial design and metal-ceramic technology. This triode is designed to operate in CW mode. For operation in pulse mode, the

parameters depend on each equipment characteristics. Contact us for specific information.

The ITK 60-2 is an water 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)	13	V	
Filament current	250	A	
Surge current	900	A	max.
Cold resistance	7	m	
Capacitances:			
• grid-anode	60	pF	
• grid-cathode	130	pF	
• cathode-anode (2)	4	pF	
Amplification factor	23		approx.
Transconductance (Va: 12 kV, Ia: 10 A)	115	mA/V	approx.

Mechanical characteristics

Operating position	vertical, anode up or down		
Weight	10.6	kg	approx.
Dimensions	see outline drawing		

Maximum ratings

Frequency (3)	60	MHz	
Anode voltage:			
• up to 15 MHz	14	kV	
• from 15 to 30 MHz	13	kV	
Control grid voltage	- 1 500	V	
Anode current, CW	25	A	
Control grid current:			
• at full load, CW	4	A	
• at no load, CW	6	A	
Peak cathode current, CW	110	A	
Anode dissipation:			
• industrial cooling water	70	kW	
• distilled or deionized water	70	kW	
Grid dissipation:			
• up to 30 MHz	1.8	kW	
Grid resistance (tube non conducting)	10	K	

(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	water		
Cooling water flow and 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	0.5	m ³ /min.	

Typical operation (4)

Examples	Class C RF oscillator for industrial applications		
	1	2	
Frequency	15	30	MHz
Anode voltage	13	11	kV
Grid bias	- 870	- 790	V
Grid voltage	1 370	1 280	V
Anode current	18	17	A
Grid current, on load	3.5	3.5	A
Anode input power	234	208	kW
Anode output power	178	141	kW
Anode dissipation	55	41.5	kW
Grid dissipation	1.53	1.5	kW
Grid resistance	250	225	
Feedback ratio	11.7	12.9	%
Oscillator efficiency	76	75.4	%

(4) Operation with higher frequencies 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

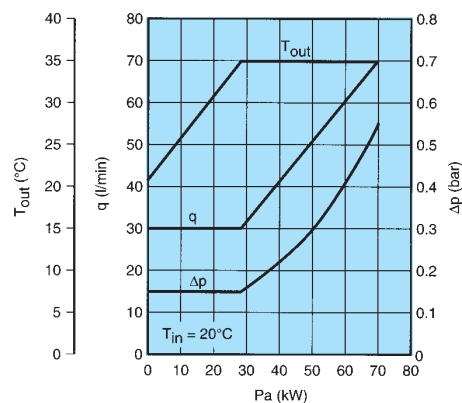
Δp : pressure drop across the water cooler

q : water flow rate

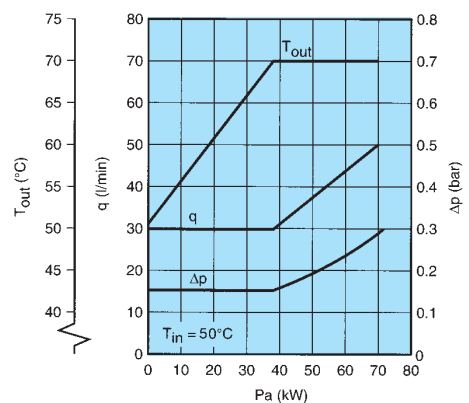
T_{out} : outlet water temperature

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

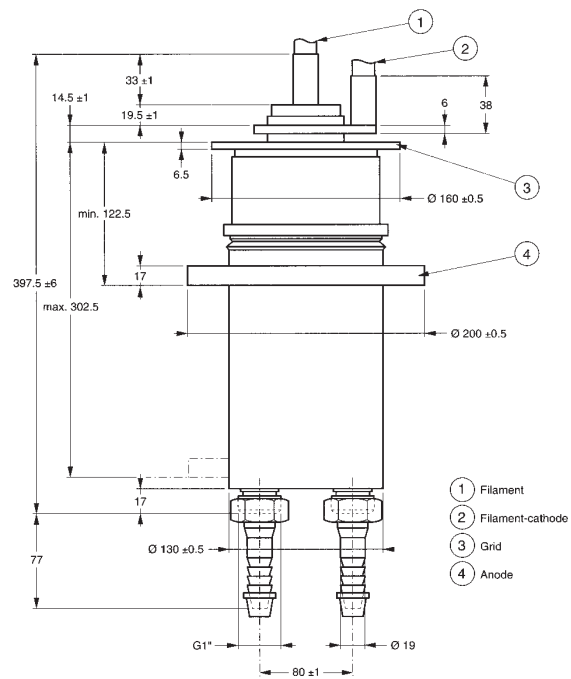
Industrial water - minimum resistivity : 5 kΩ.cm



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



Outline drawing (dimensions in mm)



Technical drawing of a semi-circular arch structure. The drawing shows a cross-section of the arch with various dimensions and labels. The top horizontal dimension is 39 ± 1 . The left vertical dimension is 10 . The right vertical dimension is 14 . The inner radius is labeled M5 and the outer radius is labeled M5 . The inner diameter is labeled $\text{Ø } 5.8 \pm 0.2$ and the outer diameter is labeled $\text{Ø } 6.8 \pm 0.2$. The bottom horizontal dimension is 39 ± 1 and 48 ± 1 . The bottom horizontal dimension for the inner arch is $\text{Tk Ø } 146 \pm 0.2$ and for the outer arch is $\text{Tk Ø } 180 \pm 0.2$.



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