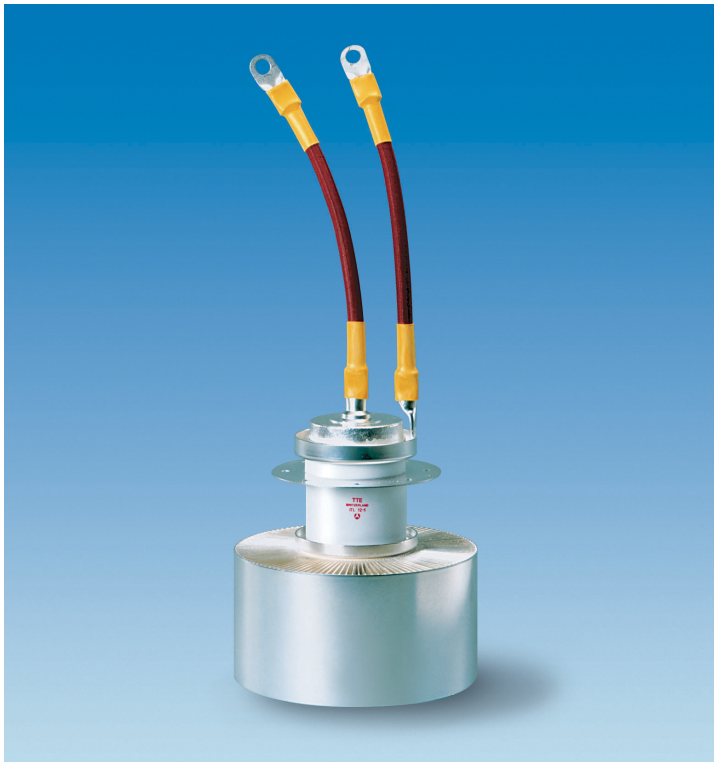
INDUSTRIAL
RF HEATING

# ITL 12-1

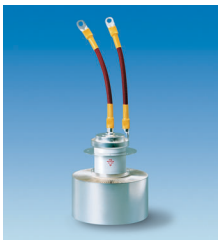
## Forced-air cooled triode

## 33 kW



- Output power:
  33 kW in CW mode
- Anode voltage: 12 kV
- Anode dissipation: 12 kW
- Frequency up to 120 MHz

THALES



*ITL 12-1*

The ITL 12-1 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 12-1 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) | 5.8 | V | |
| Filament current | 145 | A | |
| Surge current | 600 | A | max. |
| Cold resistance | 5 | mΩ | |
| Capacitances: | | | |
| • grid-anode | 21 | pF | |
| • grid-cathode | 55 | pF | |
| • cathode-anode (2) | 1 | pF | |
| Amplification factor | 22 | | approx. |
| Transconductance (Va: 10 kV, Ia: 4 A) | 50 | mA/V | approx. |

## Mechanical characteristics

| | | | |
|---|---|---|---|
| Operating position | vertical, anode up or down | | |
| Weight | 6.5 | kg | approx. |
| Dimensions | see outline drawing | | |

## Maximum ratings

| | | |
|---|---|---|
| Frequency (3) | 120 | MHz |
| Anode voltage: | | |
| • up to 30 MHz | 12 | kV |
| • from 30 to 60 MHz | 9 | kV |
| • from 60 to 90 MHz | 7 | kV |
| • from 90 to 120 MHz | 6 | kV |
| Control grid voltage | - 1 500 | V |
| Anode current | 5 | A |
| Control grid current: | | |
| • at full load | 0.8 | A |
| • at no load | 1,5 | A |
| Peak cathode current, CW | 28 | A |
| Anode dissipation: | | |
| • inlet air temperature = 25°C | 12 | kW |
| • inlet air temperature = 45°C | 10 | kW |
| Grid dissipation: | | |
| • up to 30 MHz | 350 | W |
| • from 30 to 60 MHz | 320 | W |
| • from 60 to 90 MHz | 300 | W |
| • from 90 to 120 MHz | 280 | 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 | 6 | $m^3$/min | min. |
| Temperature at any point on tube envelope | 220 | °C | max. |

## Typical operation (4)

| | Class C RF oscillator for industrial applications | | |
|---|---|---|---|
| **Examples** | **1** | **2** | |
| Frequency | 30 | 30 | MHz |
| Anode voltage | 10 | 8 | kV |
| Grid bias | - 640 | - 560 | V |
| Grid voltage | 960 | 900 | V |
| Anode current | 4.3 | 4.8 | A |
| Grid current, on load | 0.53 | 0.72 | A |
| Anode input power | 43 | 38.4 | kW |
| Anode output power | 33 | 29 | kW |
| Anode dissipation | 9.6 | 8.6 | kW |
| Grid dissipation | 145 | 220 | W |
| Grid resistance | 1 210 | 790 | Ω |
| Feedback ratio | 10.5 | 12.9 | % |
| Oscillator efficiency | 76.5 | 76 | % |

(4) Operation with higher frequencies on request.

### Cooling curve

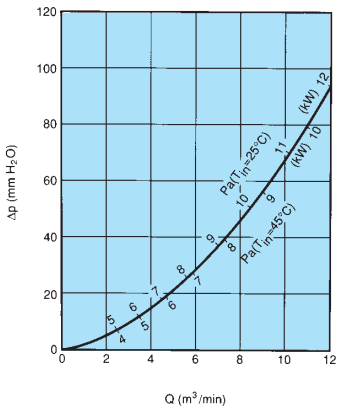
The required flow rates and pressures drop may be read off the cooling curve.
This is valid for both air-flow directions.

Pa: anode dissipation

Δp: pressure drop across the cooler fins

q: air flow rate

$T_{in}$: inlet air temperature



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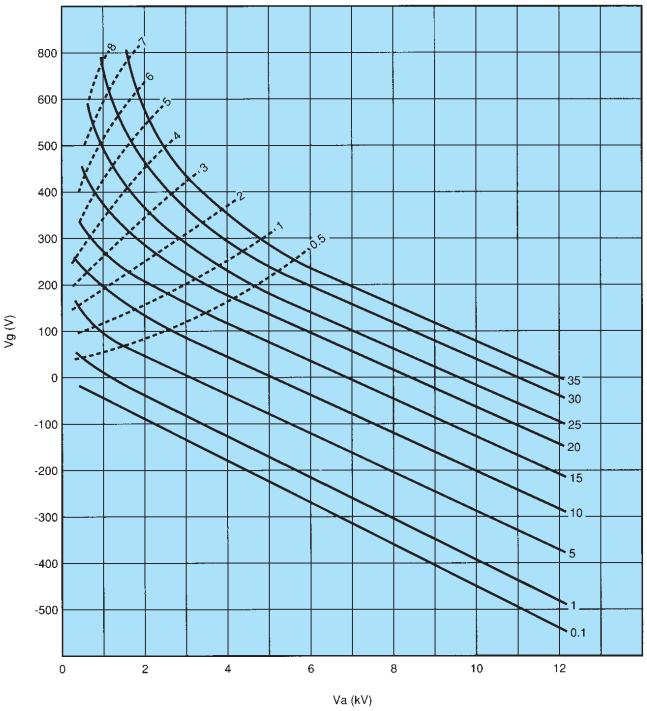
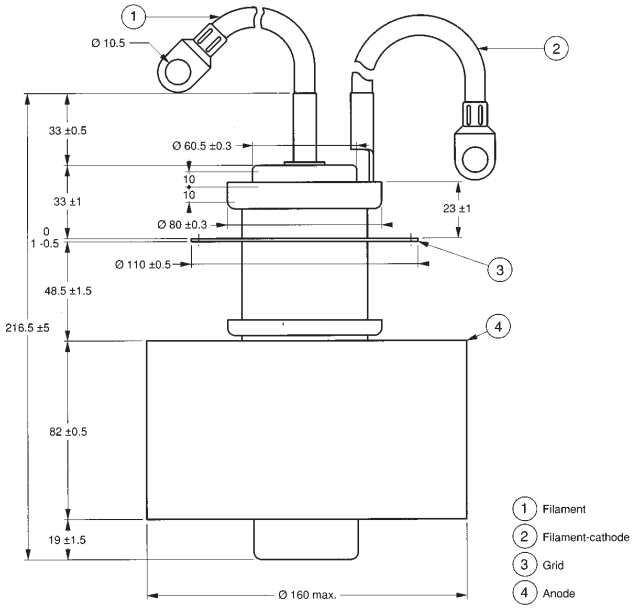
## Constant current characteristics

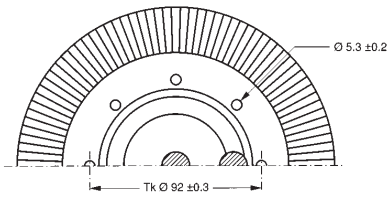



Ia  Ig (A)

## Outline drawing (dimensions in mm)




## Top view (dimensions in mm)






For further information, please contact:

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