

microLion Chamber Type 31018

Liquid filled ion chamber for dose distribution measurements in radiotherapy with high spatial resolution

The waterproof micro liquid ion chamber* (microLion) has been specially designed for relative beam profile and depth dose curve measurements in a motorized water phantom. It is used for characterization of LINAC radiation fields where superior spatial resolution is desired, like stereotactic fields. Due to the liquid filling, the microLion's chamber delivers a high signal in relation to its very small sensitive volume. The recommended chamber voltage of 800 V is delivered by an additional HV-Supply.

- ▶ Liquid filled sensitive volume of 0.002 cm³
- ▶ Suitable for dose scanning in radiotherapy beams with a superior spatial resolution
- ▶ Suitable for use in water

Specifications

Type of product.....	Liquid filled ionization chamber
Application	Dose distribution measurements in high-energy photon beams with high spatial resolution
Measuring quantity	Absorbed dose to water
Reference radiation.....	⁶⁰ Co
Sensitive volume	0.002 cm ³ (nominal) 1.7 mm ³ (exactly)
Design.....	Liquid filled, waterproof
Reference point	On chamber axis, 0.975 mm from entrance window
Preirradiation dose.....	≥ 3 Gy
Nominal response	9.8 nC/Gy
Long-term stability	≤ 1% per year
Chamber voltage	800 V (nominal) ±1000 V (maximum)
Polarity effect	<1%



Directional	≤ ±0.5% for rotation around the chamber axis,
response in water	≤ ±1% for tilting of the axis up to ±40°
Leakage current	≤ ±1 pA
Cable leakage.....	≤ 1 pC/(Gy·cm)
Cable length	1.3 m

Materials and measures

Entrance window	0.5 mm polystyrene 0.28 mm graphite 0.02 mm varnish
Total window	107 mg/cm ²
area density	
Water-equivalent	1.44 mm
window thickness	
Dimensions of.....	Radius 1.25, depth 0.35 mm
sensitive volume	
Central electrode	Graphite

Ion collection efficiency at nominal voltage

Ion collection time	5.3 ms
Max. dose rate at f ≤ 190 Hz for:	
	≥ 99.5% saturation: 13.1 Gy/min
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	≥ 99.0% saturation: 26.4 Gy/min
Max. dose per pulse at f ≤ 190 Hz for:	
	≥ 99.5% saturation: 1.36 mGy
	≥ 99.0% saturation: 2.73 mGy

Useful ranges

Chamber voltage	±400 to 1000
Radiation quality	Co-60 to 25 MV photons
Field size	1 x 1 to 20 x 20 cm ²
Temperature	10 to 35° C, 50 to 95° F
Humidity	10 to 80%, max. 20 g/m ³
Air pressure	700 to 1060 hPa

* The microLion chamber was designed in collaboration with Göran Wickman and Thord Holmstrom, University of Umeå, Sweden and is based on a well-tested and patented LIC concept

