Roos® Chamber Type 34001

Waterproof plane-parallel chamber for reference dosimetry in high-energy electron and proton beams

- Well-guarded (wide guard ring design) in accordance with TRS-398
- Minimized polarity effect
- Waterproof
- Sensitive volume 0.35 cm^3, vented

The 34001 Roos chamber is the golden standard for reference dose measurements in high-energy electron beams. Modern dosimetry protocols refer to the chamber's design and provide dosimetric correction factors. Its waterproof design allows the chamber to be used in water or in solid state phantoms. The Roos chamber is also well suited for the measurement of high-energy photon depth dose curves. The chamber can be used for dose measurements of proton beams.

General

Type of product	vented plane-parallel ionization chamber
Application	reference dosimetry in high-energy electron beams and proton beams
Measuring quantities	absorbed dose to water
Reference radiation quality	^{60}Co
Design	waterproof, vented
Direction of incidence	perpendicular to chamber plane, see label 'Focus'

Specification

Nominal sensitive volume	0.35 cm^3
Nominal response	12 nC/Gy
Long-term stability	≤ 0.5 % per year
Chamber voltage	200 V nominal ±400 V maximal
Polarity effect	< 0.5 %
Reference point	inner surface of the entrance window, at the center of the window or 1.13 mm below surface
Directional response in water	≤ ±0.1 % for chamber tilting ≤ ±10°
Leakage current	≤ ±4 fA
Cable leakage	≤ 1 pC/(Gy·cm)

Materials and measures

Entrance window	1.01 mm PMMA, 1.19 g/cm^3 0.02 mm graphite, 0.44 g/cm^3 0.1 mm laquer, 1.19 g/cm^3
Total window area density	132 mg/cm^2
Water-equivalent window thickness	1.29 mm
Sensitive volume	radius 7.8 mm depth 2 mm
Guard ring width	4 mm

Ion collection efficiency at nominal voltage

Ion collection time	125 µs
Max. dose rate for	
≥ 99.5 % saturation	5.2 Gy/s
≥ 99.0 % saturation	10.4 Gy/s
Max. dose per pulse for	
≥ 99.5 % saturation	0.46 mGy
≥ 99.0 % saturation	0.93 mGy

Ranges of use

Chamber voltage	±(50 ... 300) V
Radiation quality	(2 ... 45) MeV electrons ^{60}Co ... 25 MV photons (50 ... 270) MeV protons
Field size	(4 x 4) cm^2 ... (40 x 40) cm^2
Temperature	(10 ... 40) °C (50 ... 104) °F
Humidity	(10 ... 80) %, max 20 g/m^3
Air pressure	(700 ... 1060) hPa

Ordering Information

TN34001 Roos electron chamber 0.35 cm^3, connecting system BNT
TW34001 Roos electron chamber 0.35 cm^3, connecting system TNC
TM34001 Roos electron chamber 0.35 cm^3, connecting system M

Options

T48012 Radioactive check device ^{90}Sr
T48004 Chamber holding device for check device