



Farmer Chamber

Type 30010

Classical therapy chamber for absolute dosimetry in high-energy photon, electron and proton beams

Features

- ▶ Fully guarded chamber
- ▶ Sensitive volume 0.6 cm³, vented to air
- ▶ Acrylic wall, graphited
- ▶ Aluminum central electrode
- ▶ Radioactive check device (option)

The 30010 Farmer chamber is a wide spread ionization chamber for absolute dose measurements in radiation therapy. Correction factors needed to determine absorbed dose to water or air kerma are published in the pertinent dosimetry protocols. The acrylic chamber wall ensures the ruggedness of the chamber. The chamber is designed for the use in solid state phantoms and therefore not waterproof.

Specification

Type of product	vented cylindrical ionization chamber acc. IEC 60731
Application	absolute dosimetry in radiotherapy beams
Measuring quantities	absorbed dose to water, air kerma, exposure
Reference radiation quality	⁶⁰ Co
Nominal sensitive volume	0.6 cm ³
Design	not waterproof, vented, fully guarded
Reference point	on chamber axis, 13 mm from chamber tip
Direction of incidence	radial
Nominal response	20 nC/Gy
Long-term stability	≤ 0.5 % per year
Chamber voltage	400 V nominal ± 500 V maximal
Polarity effect at ⁶⁰ Co	< 0.5 %
Photon energy response	≤ ± 2 % (70 kV ... 280 kV) ≤ ± 4 % (200 kV ... ⁶⁰ Co)
Directional response in solid state phantom	≤ ± 0.5 % for rotation around the chamber axis and for tilting of the axis up to ± 5°
Leakage current	≤ ± 4 fA
Cable leakage	≤ 1 pC/(Gy·cm)

Materials and measures:

Wall of sensitive volume	0.335 mm PMMA, 1.19 g/cm ³ 0.09 mm graphite, 1.85 g/cm ³
Total wall area density	56.5 mg/cm ²
Dimension of sensitive volume	radius 3.05 mm length 23.0 mm
Central electrode	Al 99.98, diameter 1.1 mm
Build-up cap	PMMA, thickness 4.55 mm

Ion collection efficiency at nominal voltage:

Ion collection time	140 μs
Max. dose rate for ≥ 99.5 % saturation	5 Gy/s
≥ 99.0 % saturation	10 Gy/s
Max. dose per pulse for ≥ 99.5 % saturation	0.46 mGy
≥ 99.0 % saturation	0.91 mGy

Useful ranges:

Chamber voltage	± (100 ... 400) V
Radiation quality	30 kV ... 50 MV photons (10 ... 45) MeV electrons (50 ... 270) MeV protons
Field size	(5 x 5) 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

- TN30010-1 Farmer type chamber 0.6 cm³, PMMA/Al, connecting system BNT
- TW30010-1 Farmer type chamber 0.6 cm³, PMMA/Al, connecting system TNC
- TM30010-1 Farmer type chamber 0.6 cm³, PMMA/Al, connecting system M

Options

- T48012 Radioactive check device ⁹⁰Sr
- T48002.3.003 Chamber holding device for check device



Farmer Chamber

Type 30011

Pure graphite therapy chamber for absolute dosimetry in high-energy photon, electron and proton beams

Features

- ▶ Fully guarded chamber
- ▶ Sensitive volume 0.6 cm³, vented to air
- ▶ Graphite wall
- ▶ Graphite central electrode
- ▶ Radioactive check device (option)

The 30011 all graphite Farmer chamber is used for absolute dose measurements in radiation therapy in cases where a minimum of different materials in the radiation field is desired. Correction factors needed to determine absorbed dose to water or air kerma are published in the pertinent dosimetry protocols. Due to the sole use of graphite the energy response of the chamber at energies below ⁶⁰Co varies stronger than that of chambers with an aluminum electrode. The chamber is designed for the use in solid state phantoms and therefore not waterproof.

Specification

Type of product	vented cylindrical ionization chamber acc. IEC 60731
Application	absolute therapy dosimetry in solid state phantoms and air
Measuring quantities	absorbed dose to water, air kerma, exposure
Reference radiation quality	⁶⁰ Co
Nominal sensitive volume	0.6 cm ³
Design	not waterproof, vented, fully guarded
Reference point	on chamber axis, 13 mm from chamber tip
Direction of incidence	radial
Nominal response	20 nC/Gy
Long-term stability	≤ 0.5 % per year
Chamber voltage	400 V nominal ± 500 V maximal
Polarity effect at ⁶⁰ Co	< 0.5 %
Photon energy response	≤ ± 12 % (280 kV ... ⁶⁰ Co)
Directional response in solid state phantom	≤ ± 0.5 % for rotation around the chamber axis and for tilting of the axis up to ± 5°
Leakage current	≤ ± 4 fA
Cable leakage	≤ 1 pC/(Gy·cm)

Materials and measures:

Wall of sensitive volume	0.425 mm graphite, 1.85 g/cm ³
Total wall area density	79 mg/cm ²
Dimension of sensitive volume	radius 3.05 mm length 23.0 mm
Central electrode	graphite, diameter 1.0 mm
Build-up cap	PMMA, thickness 4.55 mm

Ion collection efficiency at nominal voltage:

Ion collection time	140 μs
Max. dose rate for ≥ 99.5 % saturation	5 Gy/s
≥ 99.0 % saturation	10 Gy/s
Max. dose per pulse for ≥ 99.5 % saturation	0.46 mGy
≥ 99.0 % saturation	0.91 mGy

Useful ranges:

Chamber voltage	± (100 ... 400) V
Radiation quality	140 kV ... 50 MV photons (10 ... 45) MeV electrons (50 ... 270) MeV protons
Field size	(5 x 5) 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

TN30011-1 Farmer type chamber 0.6 cm³, C/C,
connecting system BNT
TW30011-1 Farmer type chamber 0.6 cm³, C/C,
connecting system TNC

Options

T48012 Radioactive check device ⁹⁰Sr
T48002.3.003 Chamber holding device for check device



Farmer Chamber

Type 30012

Farmer chamber with graphite wall for absolute dosimetry in high-energy photon, electron and proton beams

Features

- ▶ Fully guarded chamber
- ▶ Sensitive volume 0.6 cm³, vented to air
- ▶ Graphite wall
- ▶ Aluminum central electrode
- ▶ Radioactive check device (option)

The 30012 Farmer chamber is intended for absolute dose measurements in radiation therapy. Correction factors needed to determine absorbed dose to water or air kerma are published in the pertinent dosimetry protocols. The graphite wall makes the chamber almost water-equivalent, the aluminum central electrode improves the energy response at energies below ⁶⁰Co. The chamber is intended for the use in solid state phantoms and therefore not waterproof.

Specification

Type of product	vented cylindrical ionization chamber acc. IEC 60731
Application	absolute therapy dosimetry in solid state phantoms and air
Measuring quantities	absorbed dose to water, air kerma, exposure
Reference radiation quality	⁶⁰ Co
Nominal sensitive volume	0.6 cm ³
Design	not waterproof, vented, fully guarded
Reference point	on chamber axis, 13 mm from chamber tip
Direction of incidence	radial
Nominal response	20 nC/Gy
Long-term stability	≤ 0.5 % per year
Chamber voltage	400 V nominal ± 500 V maximal
Polarity effect at ⁶⁰ Co	< 0.5 %
Photon energy response	≤ ± 2 % (70 kV ... 280 kV) ≤ ± 4 % (200 kV ... ⁶⁰ Co)
Directional response in solid state phantom	≤ ± 0.5 % for rotation around the chamber axis and for tilting of the axis up to ± 5°
Leakage current	≤ ± 4 fA
Cable leakage	≤ 1 pC/(Gy·cm)

Materials and measures:

Wall of sensitive volume	0.425 mm graphite, 1.85 g/cm ³
Total wall area density	79 mg/cm ²
Dimension of sensitive volume	radius 3.05 mm length 23.0 mm
Central electrode	Al 99.98, diameter 1.1 mm
Build-up cap	PMMA, thickness 4.55 mm

Ion collection efficiency at nominal voltage:

Ion collection time	140 μs
Max. dose rate for ≥ 99.5 % saturation	5 Gy/s
≥ 99.0 % saturation	10 Gy/s
Max. dose per pulse for ≥ 99.5 % saturation	0.46 mGy
≥ 99.0 % saturation	0.91 mGy

Useful ranges:

Chamber voltage	± (100 ... 400) V
Radiation quality	60 kV ... 50 MV photons (10 ... 45) MeV electrons (50 ... 270) MeV protons
Field size	(5 x 5) 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

TN30012-1 Farmer type chamber 0.6 cm³, C/Al, connecting system BNT

TW30012-1 Farmer type chamber 0.6 cm³, C/Al, connecting system TNC

Options

T48012 Radioactive check device ⁹⁰Sr

T48002.3.003 Chamber holding device for check device



Farmer Chamber

Type 30013

Waterproof therapy chamber for absolute dosimetry in high-energy photon, electron and proton beams

Features

- ▶ Waterproof, fully guarded chamber
- ▶ Sensitive volume 0.6 cm³, vented to air
- ▶ Acrylic wall, graphited
- ▶ Aluminum central electrode
- ▶ Radioactive check device (option)

The 30013 Farmer chamber is the standard ionization chamber for absolute dose measurements in radiation therapy. Correction factors needed to determine absorbed dose to water or air kerma are published in the pertinent dosimetry protocols. Its waterproof design allows the chamber to be used in water or in solid state phantoms. The acrylic chamber wall ensures the ruggedness of the chamber.

Specification

Type of product	vented cylindrical ionization chamber acc. IEC 60731
Application	absolute therapy dosimetry in water, solid state phantoms and air
Measuring quantities	absorbed dose to water, air kerma, exposure
Reference radiation quality	⁶⁰ Co
Nominal sensitive volume	0.6 cm ³
Design	waterproof, vented, fully guarded
Reference point	on chamber axis, 13 mm from chamber tip
Direction of incidence	radial
Nominal response	20 nC/Gy
Long-term stability	≤ 0.5 % per year
Chamber voltage	400 V nominal ± 500 V maximal
Polarity effect at ⁶⁰ Co	< 0.5 %
Photon energy response	≤ ± 2 % (70 kV ... 280 kV) ≤ ± 4 % (200 kV ... ⁶⁰ Co)
Directional response in water	≤ ± 0.5 % for rotation around the chamber axis and for tilting of the axis up to ± 5°
Leakage current	≤ ± 4 fA
Cable leakage	≤ 1 pC/(Gy·cm)

Materials and measures:

Wall of sensitive volume	0.335 mm PMMA, 1.19 g/cm ³ 0.09 mm graphite, 1.85 g/cm ³
Total wall area density	56.5 mg/cm ²
Dimension of sensitive volume	radius 3.05 mm length 23.0 mm
Central electrode	Al 99.98, diameter 1.1 mm
Build-up cap	PMMA, thickness 4.55 mm

Ion collection efficiency at nominal voltage:

Ion collection time	140 μs
Max. dose rate for ≥ 99.5 % saturation	5 Gy/s
≥ 99.0 % saturation	10 Gy/s
Max. dose per pulse for ≥ 99.5 % saturation	0.46 mGy
≥ 99.0 % saturation	0.91 mGy

Useful ranges:

Chamber voltage	± (100 ... 400) V
Radiation quality	30 kV ... 50 MV photons (10 ... 45) MeV electrons (50 ... 270) MeV protons
Field size	(5 x 5) 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

- TN30013 Farmer type chamber 0.6 cm³, waterproof, connecting system BNT
- TW30013 Farmer type chamber 0.6 cm³, waterproof, connecting system TNC
- TM30013 Farmer type chamber 0.6 cm³, waterproof, connecting system M

Options

- T48012 Radioactive check device ⁹⁰Sr
- T48002.3.003 Chamber holding device for check device

These products are available through **JRT Associates** 800-221-0111