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authorized distributor**

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**RPD Product Information**

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**Item Number Description**

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**300-610-BNC-M PTW Model 23331 / 30015 - 1.0 cc Rigid Stem Chamber**

# IONIZATION CHAMBER TYPE 23331

Radiation Therapy

Diagnostic Radiology

Nuclear Medicine

Radiation Protection

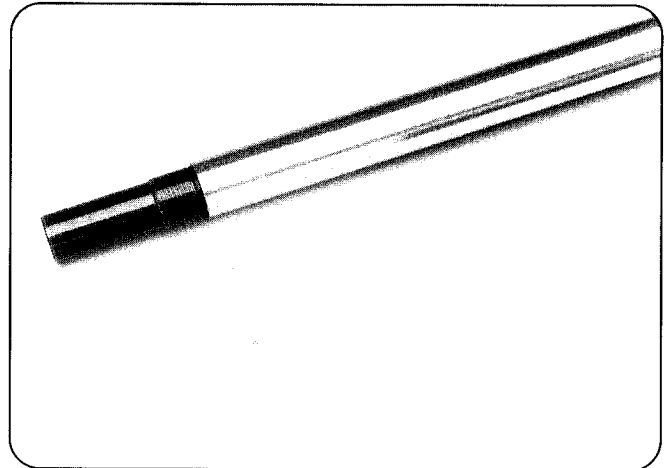
## Rigid Stem Chamber 1 cm<sup>3</sup>

### Description

The ionization chamber type 23331 has been designed as a reference chamber for absolute dosimetry to be used in radiation therapy or by secondary standard laboratories. This chamber has a very small variation of response with radiation quality. It is constructed with a long rigid stem for easy mounting in the radiation field; it can be equipped with a built-in temperature sensor. This chamber is type tested by the PTB Braunschweig.

### Technical data

|                         |                                                      |
|-------------------------|------------------------------------------------------|
| Volume:                 | 1 cm <sup>3</sup>                                    |
| Response:               | $3.3 \cdot 10^{-8}$ C/Gy                             |
| Leakage:                | $\pm 4 \cdot 10^{-15}$ A                             |
| Polarizing voltage:     | max. 500 V                                           |
| Cable leakage:          | $1 \cdot 10^{-12}$ C/(Gy · cm)                       |
| Wall material:          | PMMA (C <sub>5</sub> H <sub>8</sub> O <sub>2</sub> ) |
| Wall density:           | 1.18 g/cm <sup>3</sup>                               |
| Wall thickness:         | 0.55 mm                                              |
| Area density:           | 64.9 mg/cm <sup>2</sup>                              |
| Electrode:              | Aluminium, graphite coated;<br>1.5 mm Ø; 20 mm long  |
| Range of temperature:   | + 10 °C ... + 40 °C                                  |
| Range of rel. humidity: | 20 % ... 75 %                                        |
| Ion collection time:    | 300 V: 0.3 ms<br>400 V: 0.2 ms<br>500 V: 0.2 ms      |



- Guard ring up to measuring volume
  - Suitable for use in solid state phantoms
  - Guard ring at potential of the collecting electrode. Touchable parts free of high voltage
  - High voltage to be connected only with active current-limiting device ( $I_{max} < 0.5$  mA)
  - Open measuring volume, without check device air density correction is necessary
  - Lengthening cable up to 100 m available
  - Approved for official calibration, 23331
- German sign of certification: 8271

### Saturation behaviour

|                                          | Polarizing voltage      | 99.0 % saturation                | 99.5 % saturation                |
|------------------------------------------|-------------------------|----------------------------------|----------------------------------|
| Max. dose rate at continuous irradiation | 300 V<br>400 V<br>500 V | 2.0 Gy/s<br>3.7 Gy/s<br>5.8 Gy/s | 1.0 Gy/s<br>1.8 Gy/s<br>2.8 Gy/s |
| Max. dose per irradiation pulse          | 300 V<br>400 V<br>500 V | 350 µGy<br>460 µGy<br>580 µGy    | 150 µGy<br>190 µGy<br>240 µGy    |

PTW

PTW

# IONIZATION CHAMBER TYPE 23331

Rigid Stem Chamber 1 cm<sup>3</sup>

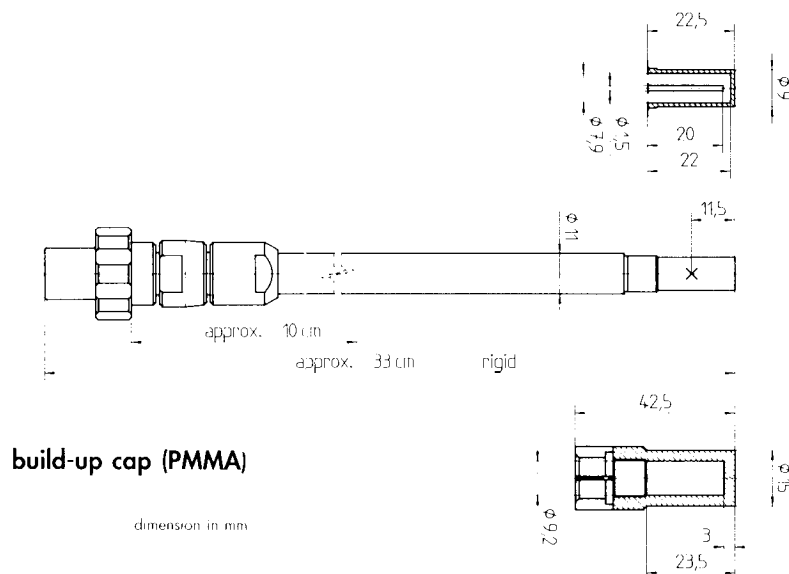
Radiation Therapy

Diagnostic Radiology

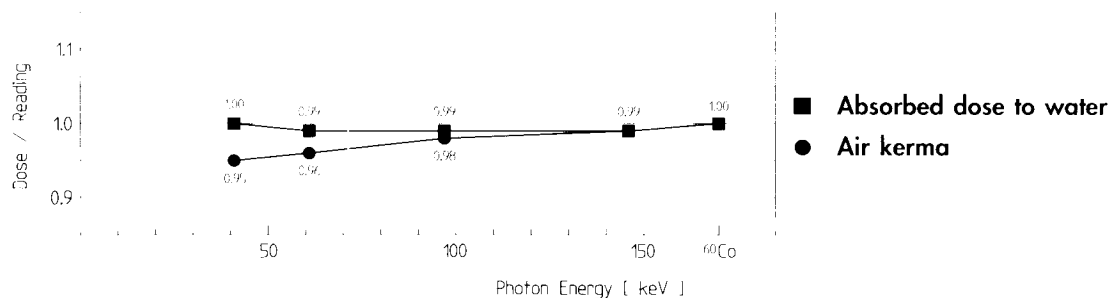
Nuclear Medicine

Radiation Protection

## Design

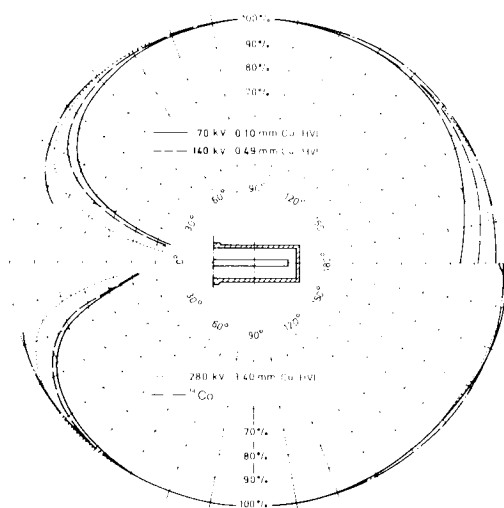


## Energy Dependence



## Directional Dependence

in air



in PMMA

Reading / Dose [%]

|                  | 6°   | 12°  | 18°  | 24°  | 30°  | 60°  | 90°   | 120°  | 150°  | 162° | 174° | 180° |
|------------------|------|------|------|------|------|------|-------|-------|-------|------|------|------|
| 70 kV            | 102  | 34.2 | 57.7 | 72.1 | 82.9 | 97.2 | 100.0 | 98.6  | 93.6  | 89.6 | 85.2 | 83.9 |
| 140 kV           | 12.0 | 36.0 | 62.1 | 78.3 | 88.2 | 99.1 | 100.0 | 99.4  | 97.0  | 95.1 | 91.9 | 90.6 |
| 280 kV           | 28.6 | 59.1 | 77.5 | 88.2 | 93.6 | 99.7 | 100.0 | 100.0 | 98.5  | 97.5 | 95.4 | 93.6 |
| <sup>60</sup> Co | —    | —    | 87.9 | 92.6 | 95.2 | 99.5 | 100.0 | 100.7 | 100.0 | 99.3 | 98.6 | 98.0 |

|                  | 6°   | 12°  | 18°  | 24°  | 30°   | 60°   | 90°   | 120°  | 150°  | 162°  | 174°  | 180°  |
|------------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 70 kV            | 47.0 | 60.0 | 75.8 | 85.9 | 92.2  | 99.5  | 100.0 | 99.8  | 101.4 | 102.9 | 102.9 | 99.7  |
| 140 kV           | 48.0 | 63.4 | 79.9 | 88.8 | 94.2  | 100.0 | 100.0 | 99.8  | 101.2 | 102.3 | 102.8 | 101.6 |
| 280 kV           | 57.7 | 81.0 | 91.6 | 97.1 | 99.3  | 100.4 | 100.0 | 100.0 | 101.1 | 101.9 | 102.7 | 102.9 |
| <sup>60</sup> Co | —    | —    | 98.7 | 99.8 | 100.2 | 99.8  | 100.0 | 100.4 | 102.1 | 102.3 | 102.3 | 101.8 |

The values given in the diagrams are typical for the construction

PTW

PTW