

## Appendix E

### PTW Freiburg – Spherical Ion Chamber Model TN32003 with Case and 10L Ion Chamber Jig

Radiation Monitoring Detectors



## 10 Liter Spherical Ionization Chamber Type 32003

*Spherical ionization chamber for  
radiation protection*

#### Features

- ▶ Vented sensitive volume of 10 liters
- ▶ Suitable for survey meter calibration and low level measurements
- ▶ Superior energy response, reproducibility, directional dependence and long-term stability
- ▶ Radioactive check device (option)

The spherical chamber is designed for the measurement of ionizing radiation in radiation protection. Superior features make the chamber suitable as standard chamber for calibration purposes. It fulfills the requirement for excellent reproducibility and long-term stability of the sensitive volume. The spherical construction ensures a nearly uniform response to radiation from every direction. The energy response is very flat. This is achieved by the thin layer of aluminum on the inner wall surface, which provides for an increased photoelectric yield to compensate for the absorption of soft X-rays. The outer chamber diameter is 276 mm.

#### Specification

|                          |                                      |
|--------------------------|--------------------------------------|
| Type of product          | vented spherical ionization chamber  |
| Application              | radiation protection measurements    |
| Measuring quantity       | air kerma, photon equivalent dose    |
| Nominal sensitive volume | 10 l                                 |
| Design                   | not waterproof, vented               |
| Reference point          | chamber center                       |
| Nominal response         | 330 $\mu\text{C}/\text{Gy}$          |
| Chamber voltage          | 400 V nominal<br>$\pm 500$ V maximal |
| Energy response          | $\leq \pm 3$ %                       |
| Leakage current          | $\leq \pm 10$ fA                     |

#### Materials and measures:

|                          |  |
|--------------------------|--|
| Wall of sensitive volume | 2.75 mm POM (polyoxymethylene)<br>0.02 mm graphite,<br>0.22 mm varnish |
| Total wall area density  | 417 mg/cm <sup>2</sup>   |
| Central electrode        | graphite coated polystyrene,<br>diameter 100 mm                        |
| Outer dimensions         | diameter 276 mm  |

#### Ion collection efficiency at nominal range:

|  |                    |
|--|--------------------|
| Ion collection time                              | 150 ms             |
| Max. dose rate for $\geq 99.5$ % saturation      | 13 mGy/h           |
| $\geq 99.0$ % saturation                         | 26 mGy/h           |
| Max. dose per pulse for $\geq 99.5$ % saturation | 0.3 $\mu\text{Gy}$ |
| $\geq 99.0$ % saturation                         | 0.8 $\mu\text{Gy}$ |

#### Useful ranges:

|                   |  |
|-------------------|--|
| Chamber voltage   | $\pm (300 \dots 500)$ V                |
| Radiation quality | 25 keV ... 50 MeV                      |
| Temperature       | (10 ... 40) °C<br>(50 ... 104) °F      |
| Humidity          | (10 ... 80) %, max 20 g/m <sup>3</sup> |
| Air pressure      | (700 ... 1060) hPa                     |

#### Ordering information

TN32003 Spherical chamber 10 l, connecting system BNT  
TW32003 Spherical chamber 10 l, connecting system TNC  
TM32003 Spherical chamber 10 l, connecting system M

#### Options

T48010 Radioactive check device <sup>90</sup>Sr  
T48001 Chamber holding device for check device

**A picture of the ion chamber in it's case is shown below.**

