

Shadow free ion chambers in combination with the UNIDOS C and UNIDOS E dosemeters for diagnostic X-ray quality measurements

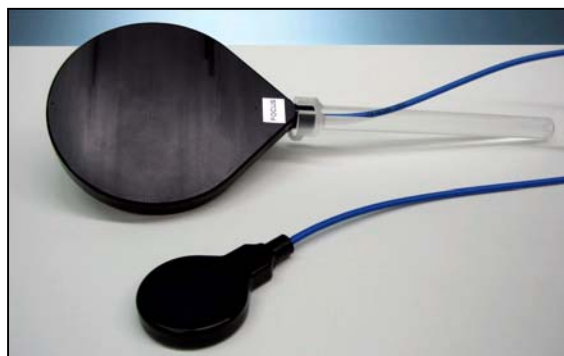
1 Introduction

According to international and national standards the dose and the dose rate have to be measured during acceptance and constancy tests in diagnostic radiology by using an ionization chamber or a semiconductor detector and a diagnostic dosimeter acc. to IEC 61674.

Therefore PTW offers two flat shadow free diagnostic ionization chamber types (SFD chambers) which can be used in combination with all dosimeter types of the UNIDOS family and especially with the models UNIDOS E and C. Apart from this PTW created three application specific UNIDOS C packages.

2 SFD chambers

The SFD chambers are plane parallel chambers for the measurement and monitoring of the radiation output of conventional and mammographic X-ray installations. Because of their shadow free construction both chambers cause hardly any interference with the automatic exposure control (AEC) and do not influence the X-ray image. Dose and dose rate measurements in front as well as behind a patient equivalent phantom can be performed.



SFD chambers 34060 (above) and 34069 (below)

2.1 SFD chamber type 34060

The SFD chamber for conventional radiology has a sensitive volume of 75 cm³. The energy response for qualities between RQR3 ... RQR10 (DV50 ... DV150) and RQA3 ... RQA10 (DN50 ... DN150) is better than $\pm 2\%$.

2.2 SFD chamber type 34069

The SFD chamber for mammography has a sensitive volume of 6 cm³. The energy response for qualities between RQR-M1 ... RQR-M4 (MV25 ... MV35) and RQA-M1 ... RQA-M4 (MH25 ... MH35) is better than $\pm 2\%$ (and better than $\pm 3\%$ in the conventional range).

2.3 Technical specifications

SFD chamber	Type 34060	Type 34069
Useful range		
Dose rate range (for 200 V chamber voltage and 95 % saturation)	0.05 μ Gy/s ... 0.78 Gy/s	0.5 μ Gy/s ... 2.65 Gy/s
	max. dose/pulse 0.57 mGy	max. dose/pulse 1.04 mGy
Quality	RQR, RQA	RQR-M, RQA-M
Chamber voltage	+(100 ... 400) V, nominal +200V	

3 Dosimeters type UNIDOS

3.1 UNIDOS E

The high quality dosimeter type UNIDOS E measures radiological units as well as electrical units. It features highest accuracy and excellent resolution. Air density correction factors can be set easily. The UNIDOS E and the SFD chambers can be ordered separately.

3.2 UNIDOS C

The UNIDOS C (connection system BNT) acc. to IEC61674 is a field class universal electrometer for simultaneous measurements of the current and charge. It measures exclusively electrical units. Different packages, based on the UNIDOS C are available:

- UNIDOS C with SFD chamber type 34060 and SFD chamber type 34069 (ordering number L981804)
- UNIDOS C with SFD chamber type 34060 (ordering number L981805)
- UNIDOS C with SFD chamber type 34069 (ordering number L981806)

3.3 Measuring ranges in combination with a dosimeter type UNIDOS

UNIDOS meas. range	Dose	Dose rate
Type 34060 Conventional	355 nGy ... 23.1 kGy	50 nGy/s ... 355 mGy/s
Type 34069 Conventional	4.3 μ Gy ... 280.9 kGy	500 nGy/s ... 4.3 Gy/s
Type 34069 Mammo	4.0 μ Gy ... 258.9 kGy	500 nGy/s ... 4.0 Gy/s