



## In-VIVO detectors Detectors for Teletherapy Based on Hi-pSi Semiconductors



The Ideal choice for in.vivo patient dosimetry, based on the Hi-pSi semiconductors offered by Scanditronix. These unique high doped p-type detectors provide dose-rate independence - both when new and after more than 10 000 measurements.

They are designed to minimize the need for correction factors, making frequent and accurate dosimetry achievable.

A 3 year warranty is standard on all detectors - demonstrating the unsurpassed accuracy and life expectancy of these detectors

Major advantages of the Scanditronix Hi-pSi patient detectors.

Base or use

- Fewer corrections needed
- Field size and directional dependencies minimized by IISC of bilidd np caps

Low re-calibration frequency  
 - Pre-irradiated to reduce sensitivity loss

3 year warranty  
 - Virtually no radiation damage effect,  
 - High usage capability  
 - Low lifetime cost

**Features  
 Of Hi-pSi patient detectors**

**Proven dose rate independence**

One of the main features of the Hi-pSi detectors is the proven dose rate independence. Even after receiving over 200 kGy of absorbed dose using high photon energies, where there is significant neutron contribution, the Hi-pSi continue to measure accurately. The use of Hi-pSi detectors guarantees minimum sensitivity decrease with absorbed dose and maintained dose rate independence. Thus reducing the need for re-calibration.

**Low temperature**

Dependence

The Hi-pSi detectors have very stable temperature dependency compared to other types of Si-detectors. The advantage is that temperature variations can be easily corrected for by applying a constant correction factor.

**Reducing the need for corrections**

The major reason for the need of corrections in patient dose measurements is the fact that, for photon beams, the ratio between the dose at surface and the dose at Dmax varies with field size, SSD, wedges etc.

By choosing a detector with a suitable build-up, the measurement is virtually performed close to Dmax which makes it independent of these physical aspects. Another benefit gained from the build-up caps is that any directional dependency in the actual detector is practically eliminated.

Build-up curves for 10x10, 20x20 and 30x30 fields in a 6 MV photon beam

**Field perturbation**

The build-up caps have been optimized to cause as little perturbation as possible, while the need for corrections is greatly reduced. However, in cases where measurements are performed for the majority of fractions in a treatment, then the field perturbation becomes an issue and a detector without build-up, though requiring more corrections, may be a better choice.

**Selection guide**

The table below is intended as a guide to select the most suitable detector for certain applications

	Photons	Electrons	Cobalt
Entrance dose, few corrections	EDP-10 (4-5 MV) EDP-15 (6 - 12 MV) EnP-20 (10 - 20 MV) EnP-30 (>20 MV)	(EDE-5)	EDE-5
Entrance dose, low perturbation	EDD-2 EDP-30 (> 16 MV)	EDD-2	EDD-2
Exit dose	EDD-2		EDD-2

Risk organ monitoring measurements outside the field	EDD-5	EDD-5	EDD-5
Intracavitary	IDF-1		

### Scanditronix patient detectors

EDE-5 has a 5mm water-equivalent build-up. Primarily designed for measurements in Cobalt and electrons.

EDP-10 has a 10 mm water-equivalent build-up. Primarily designed for measurements in 4-8 MV photons

EDP-15 has a 15 mm water-equivalent build-up. Primarily designed for measurements in 6-12 MV photons.

EDP-20 has a 20 mm water equivalent build-up. Primarily designed for measurements in 10-20 MV photons.

EDP-30 has a 17 mm water-equivalent build-up. Primarily designed for measurements in high energy photon beams where low field perturbation is critical.

EDD-2 has a 2 mm water-equivalent build-up. Primarily designed for low field perturbation and low directional dependence. This detector is very useful for electrons and exit dose measurements in all beam types.

EDD-5 has a drop shaped encapsulation, which is equivalent to 5 mm build-up in water. This detector is specially designed for risk organ monitoring outside the primary field.

IDF-1 is a detector specifically designed for intracavitary measurements in teletherapy.

## Accessories

### Calibration phantom

Since the temperature dependency of Hi p-Si detectors is stable, it is very easy to correct for. However, an easier way to handle this is to use a calibration phantom which allows the user recalibrate the detectors at skin temperature, thus eliminating the need for later corrections. To achieve skin temperature the phantom should be filled with 40°C water. The temperature can be checked with accompanying thermometer.

### Detector support

One of the most challenging tasks in everyday in vivo dosimetry is to reduce the time added during patient set up. An electrometer with 12 channels makes it possible to apply primarily detectors for all fields at the same time and a detector support with automatic detector retraction reduces the required time significantly. The detector support can be configured with either 4m (recommended) or 2m detector cables. The mechanics allow a detector to be pulled out to any length up to 3.5m (1.7m) at constant force. The detector cable locks into position by simply moving it towards the central axis of the support. The cable retracts automatically when it is moved out from the center. The support also has a clear index of the detectors.

## Technical specifications

### External detectors

	Build-up	Pantastlon, typical	Directional Enderice,	Physical dim
		6%	<2%	Width 13 mm Thickness 6.5 mm
		5-6%	<3%	Width 13 mm Thickness 6.5 mm
		1.5%	<9%	Width 13 mm Thickness 6.5 mm
		1%	Axial <2% Tilt <3%	Width 8 mm Thickness 2.2 mm
	PVC, epoxy and Si		Axial <2% Tilt <3%	Diam 5 mm Length 11 mm

### Intracavitary detectors

WP-1 PVC, epoxy Diam 7 mm

and Si - Axial <3% length 260 mm

### General specifications, Hi-p-Si detectors

0.3 nC/Gy

0.4\*0.1%/Centigrade

E to 0.6 mGy/pusc) \* <1EVo \* \* \* . '7.

Chip size (side/ thickness) 2.5 mm / 0.5 mm

Geometric shape of active area Circular

5mm

of E E -r -.

Cable length 2m or 4111

Connector SNC

Expected life > 2000 kGy

Order information

961c)D UDILS, am cable . 963E1 EDE-5, 4m'cable'  
955EOO KIZiP-IO ym cable 9654101 ED. F-la, 4rn cable  
961E S)P-15, 2w cable 9614101 EfIF-j5, 4rn cable  
9644)tlI EDP-20, 2m cable \* 9(,44)01 FDP-20, 4rn cable  
969Ax)() EfIP-30, 2m cable 9694)01 IDP-30, 4m cable  
9674)() IDTh2, 2w cablc 9674)01 EDD2, 4113 cable  
966E H)li-5, 2m cable' 966001 EDD-5, 4w cable  
962AX)O fnF-I  
9724)11 fletector Support for 12 dctcctonE, no cable included  
972-310 10 In dctctwmctcr cable with 12 fINC chassis connectors to D-sub for cmx  
972 311 20 in dctctromctcr cable with 12 BNC chassis connectors to li-sub for cE  
9714)52 nctecwr Sopport far E2 detectors Including 20ni cable for DFlli-510  
9714)12 Mounting console to be used when ceffing s higher tban 3 rn  
95G000 caLibration phantooi temperated

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