

# Barracuda & Piranha

## CT-SD16 Probe



*Innovative X-ray QA Solutions  
...of Course!*



Today computed tomography (CT) contributes with 70% of the total dose given to patients during X-ray examinations. The rapid advancements in CT technology are placing new demands on the methods and equipment that are used for quality assurance. The wide beam widths found in CT scanners with multiple beam apertures make it difficult to use existing CT dose ionisation chambers to measure CT dose,  $CTDI_{100}$  and  $CTDI_{vol}$ . Using a standard 10 cm CT ionisation chamber may result in inaccurate measurements due to underestimation of the dose profile for wide beams. The CT Slice detector CT-SD16 is a new type of CT probe. It can be used with the Barracuda or the Piranha and a PC running the CT-SD16 Software.

### CT-SD16 CT Slice Detector

The CT-SD16 is based on solid-state technology, it is robust and it fits into existing standard phantoms used for CTDI measurements. The CT-SD16 detectors are very thin (width 250  $\mu\text{m}$ ). Thanks to their small width, the detectors are completely irradiated when the table is moving and the CT scans over the probe. The dose is measured in every point of the X-ray beam and the total dose profile is acquired regardless of how wide the beam is. There is no limitation of the beam width due to limited length of the probe. This makes it possible to measure without the limitation of traditional CT probes:

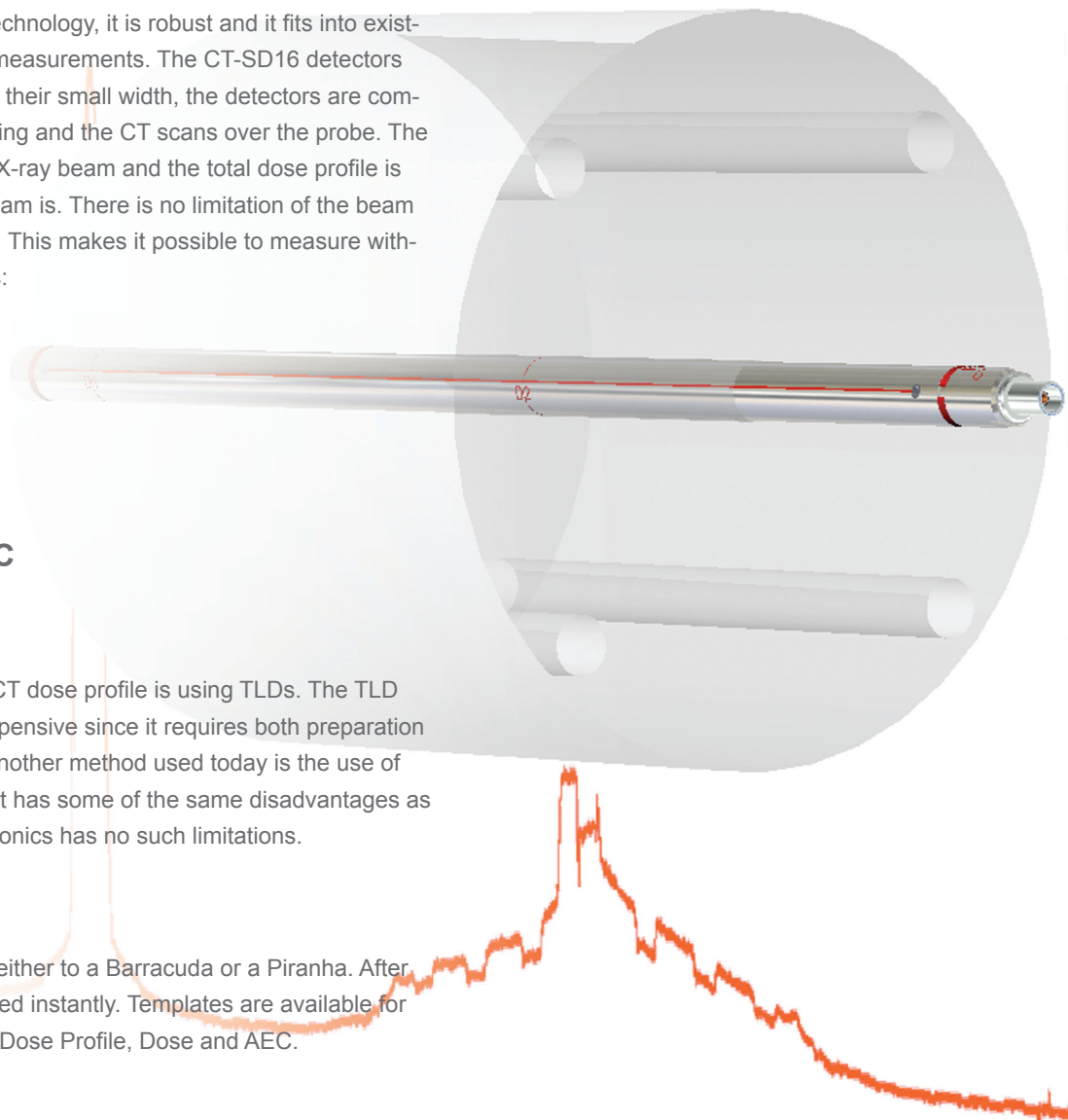
- $CTDI_{100}$
- $CTDI_{vol}$
- CT dose profile
- Scan speed
- Performance of the AEC

### Existing Methods

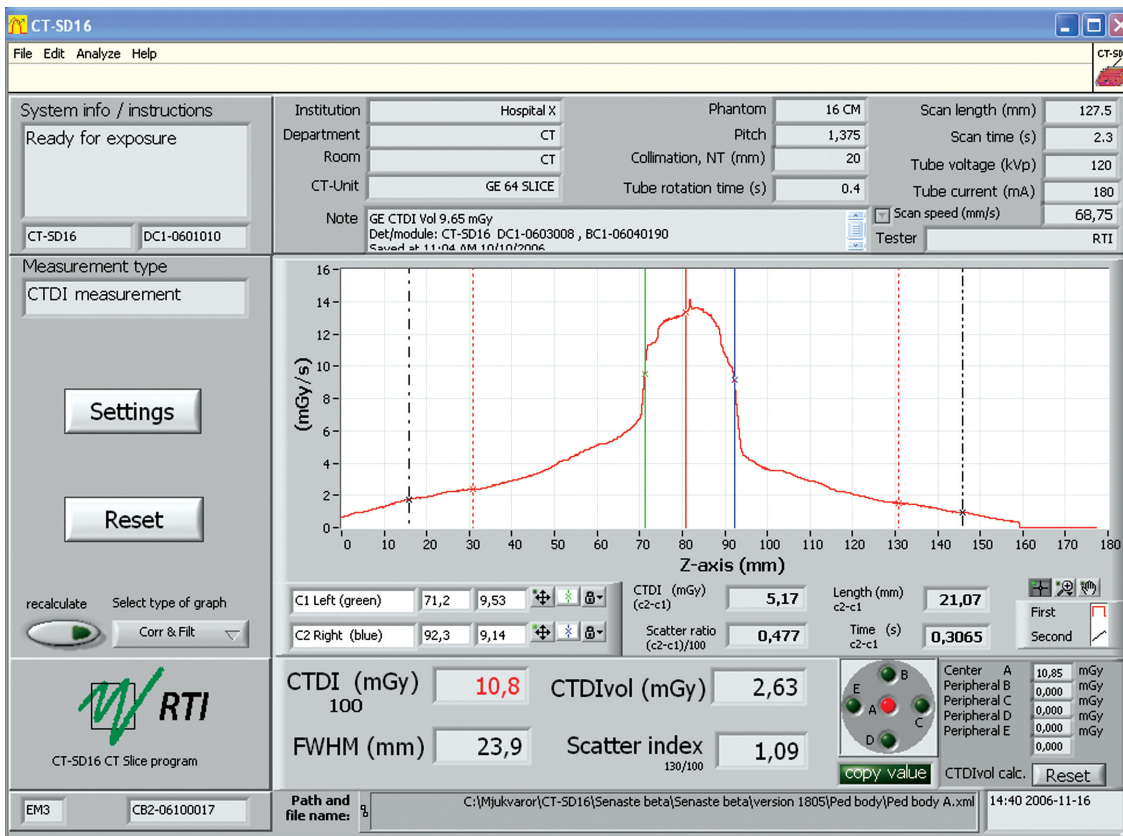
The conventional method to measure CT dose profile is using TLDs. The TLD method is very time-consuming and expensive since it requires both preparation before and read-out after each scan. Another method used today is the use of X-ray film for profile measurements that has some of the same disadvantages as the TLD. The CT-SD16 from RTI Electronics has no such limitations.

### CT-SD16 Software

The software runs on a PC connected either to a Barracuda or a Piranha. After each scan (exposure) data are presented instantly. Templates are available for different type of measurements; CTDI, Dose Profile, Dose and AEC.



# Theory of Operation



The picture shows a CTDI template. The whole dose rate profile has been acquired. The cursors are automatically placed and centered at a distance of 100 mm for the calculation of CTDI<sub>100</sub>. To measure CTDI<sub>vol</sub> five exposures at different positions in the phantom are required.

FWHM = Full Width at Half Maximum is the width of the dose profile at 50 % of its maximum.

The software also controls the Barracuda or Piranha. All settings for the meters and other pre-defined data are stored in the templates. Once templates are setup, measurement, storage and analysis of data can be done quickly for different types of CT scanners.

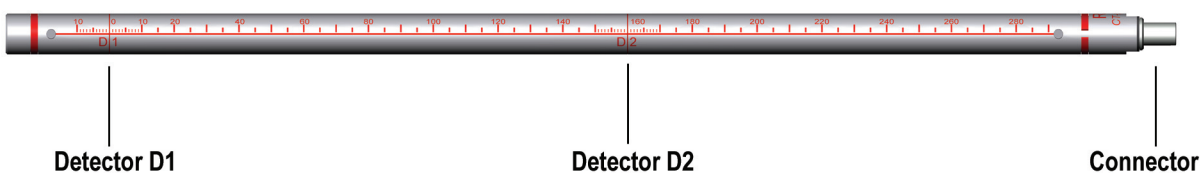
Measured data are saved and can be re-opened for later reviewing. Data can also be exported to Microsoft Excel for further analysis.

## Specifications for CT-SD16

Supporting Barracuda electrometer: EMM-1Ch, EMM-2Ch, EMM-Bias, EMM-BiasB, or EMM-BiasW  
 Typ calibration factor D1, D2, Nk: 0.3 mGy/nC  
 Material: Al and PMMA  
 Connector: Triaxial LEMO  
 Length: 361 mm  
 Distance between D1 and D2: 160 mm  
 Diameter: 12.5 mm  
 Detector width (D1 and D2): 250  $\mu$ m  
 Max sensitivity variation (0° - 360°): less than  $\pm 5$  %  
 Trig modes: Auto (using D1) and manual

Max scanning time: 40 s  
 Maximal time resolution: 0.5 ms  
 Weight: 80 g

Required: Electrometer module (any model) and the "CT kVp and Radiation output application"  
 Included: 8 m EXT-1 triaxial cable, calibration record for D2 and software



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