



INDEPENDENT X-RAY  
QUALITY ASSURANCE



## Piranha Specifications

# Easy & Fast X-ray Quality Control

### Fast for Real

Everything happens in a flash! The Piranha product line is quick, Ocean software is quick and therefore your daily QA-work will go quickly. Ocean can perform instant real-time analysis during your measurements. Ocean also prepares a report in the background as you go. So when the work is done, if you want a complete report of your work – just press print!

Use your tablet/laptop as both an interactive display during the measurements and as a powerful analysis tool when you are back at the office. All your measurements, along with the result and the report will be stored inside your tablet or laptop. No unnecessary, time-consuming data-transfer at the end of the day.

### Simply Plug n Play

Everything happens automatically – just plug n play. The Quick Check can almost feel what you are about to do. The Quick Check feature identifies your probe and selects the optimum Piranha settings for your measurements. It can also be programmed to always start with the kind of set up that you usually start your QA-work with. There is really not much you have to think about before you begin – sit back and let the Piranha do the work!

### A Piranha Never Forgets

During the measurements you will only see the desired values on your tablet or laptop but since the Piranha continues to work behind the scenes, you always have access to all of the data from each measurement. This enables you to perform for instance trend analysis and study the history of each X-ray equipment – even months after you have completed your measurements.

### A Complete QA Solution Instantly

The Piranha comes ready-to-use with everything you need included. It is really an all-in-one multifunction meter. Connect to your computer wireless or via USB and you have a complete QA-system! The number of Piranha models available ensures that you only pay for what you need. As your needs grow, you have unlimited ability to upgrade your Piranha.

### Position Check

Piranha has a unique feature that makes it possible to check the position of the detector before measuring. By using the “Position Check” function, you can verify that the detector area is fully irradiated. Possible field inhomogeneities are also neutralized.

### RTI Dose Probe

The RTI Dose Probe is an external dose probe, designed to perform very low dose rate measurements for instance on image intensifiers. To avoid or minimize interference with Automatic Exposure Control on X-ray equipment, the probe is very small. This also enables to fit it into the table bucky. Since it is a solid-state detector, no corrections for pressure or temperature are needed. Neither is bias voltage. With the extra ordinary sensitivity of the external Dose Probe it is even suitable for scatter and leakage measurements.



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### Piranha General Specifications

Size	133 x 75 x 26 mm
Weight	Approx. 400 g
Display	PC or Windows Tablet
Software	Ocean QA Platform for Complete X-ray QA
Database Support	Yes
Trend Analysis	Yes
Interface Type	Built-in Bluetooth and USB
Detector Position Check	Yes
Simultaneous Dose Measure	Yes (2 detectors)
Bluetooth Range	100 m (free-in-air)
USB Cables	Not needed but included
Power Source	Rechargeable Li ion battery External power supply
Battery Life	~ 15 hours
Battery Tested	According to UN 38.3
Exposures Needed	One
Min. Exposure Time	0.1 ms
Memory	Unlimited
Operating Temperature	15–35°C
Storage Temperature	-10–50°C
Backscatter Protection	Yes
Warranty	2 years
Extended Warranty	Up to 10 years
Calibration Cycle	2 years
Standard	Complies with relevant parts of the standards IEC 61674 and IEC 61676 for Dosimetric instruments.
EMC Tested	According to IEC 61326-1:2012
PTB Approval	DE-17-M-PTB-0070

Specifications in this document may be changed without notice



### Piranha R/F Specifications

Tube Potential	35-160 kV ±1.5%
Min dose rate	0.1 µGy/s
PPV and kVp	Yes
Dose <sup>1</sup>	0.1 nGy - 1500 Gy ±5%
Dose Rate <sup>1</sup>	4 nGy/s - 320 mGy/s ±5%
Resolution	0.2 nGy/s
Trigg level	40 nGy/s
Time	0.1 ms - 2000 s ±0.5% or 0.5 ms
Resolution	0.5 ms
Bandwidth	1 kHz
Effective Time	Yes
HVL	0.72 - 13 mm Al ±10% or 0.2 mm
Min dose rate	10 µGy/s
Quick HVL in one exposure	Yes
Total Filtration	1.0 - 90 mm Al ±10% or 0.3 mm
Min dose rate	10 µGy/s
Pulses <sup>1</sup>	1 - 65535 ±1 pulse
Min peak dose rate	0.23 µGy/s
Min pulse width	0.5 ms at 1.8 µGy/s
Pulse Rate <sup>1</sup>	0.5 - 180 ±0.5 pulses/s
Min peak dose rate	0.23 µGy/s
Min pulse width	0.5 ms at 1.8 µGy/s
Waveforms	0 - 524 s
Resolution	0.5 ms at 2 kHz sampling rate
Bandwidth kV	≤1 kHz
Bandwidth Dose Rate	≤1 kHz

#### Notice

<sup>1</sup> Specification valid together with RTI Dose Probe



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### Piranha CT Specifications

Tube Potential	45-155 kV $\pm 1.5\%$
Min dose rate	0.1 $\mu\text{Gy/s}$
PPV and kVp	Yes
Dose <sup>2</sup>	1.8 nGy - 22 kGy $\pm 5\%$
Dose Rate <sup>2</sup>	67 $\mu\text{Gy/s}$ - 2.2 mGy/s $\pm 5\%$
Time	0.1 ms - 2000 s $\pm 0.5\%$ or 0.5 ms
Resolution	0.5 ms
Bandwidth	1 kHz
Effective Time	Yes
HVL	0.72 - 13 mm Al $\pm 10\%$ or 0.2 mm
Min dose rate	0.1 $\mu\text{Gy/s}$
Quick HVL in one exposure	Yes
Total Filtration	1.0 - 90 mm Al $\pm 10\%$ or 0.3 mm
Min dose rate	0.1 $\mu\text{Gy/s}$
Waveforms	0 - 524 s
Resolution	0.5 ms at 2 kHz sampling rate
Bandwidth kV	$\leq 1$ kHz
Bandwidth Dose Rate	$\leq 1$ kHz
CT Dose <sup>2</sup>	
Dose Profile	Yes
Max beam width	Unlimited
Dose Length	1.8 nGycm - 22 kGycm at 10 mm collimation
CT Ion chamber and RTI Chamber Adapter <sup>3</sup>	
Active length	100 mm
Air kerma rate	0.3 mGycm/s to 3 Gycm/s
Uncertainty	$\pm 5\%$ or $\pm 0.03$ mGycm/s
Energy dependence	$\pm 1\%$ (70-150 kV)

#### Notice

<sup>2</sup> Specification valid together with RTI CT Dose Profiler

<sup>3</sup> Specification valid together with RTI CT Ion Chamber and RTI Chamber Adapter

### Piranha Mammography Specifications

Tube Potential	18-49 kV $\pm 1.5\%$ or 0.7 kV (W/Al)
Min dose rate	0.2 $\mu\text{Gy/s}$
PPV and kVp	Yes
Dose	1 nGy - 1000 Gy $\pm 5\%$
Dose Rate	25 nGy/s - 530 mGy/s $\pm 5\%$
Resolution	2.5 nGy/s
Trigg level	0.54 $\mu\text{Gy/s}$
Time	0.1 ms - 2000 s $\pm 0.5\%$ or 0.5 ms
Resolution	0.5 ms
Bandwidth	1 kHz
Effective Time	Yes
HVL	0.19 - 4.3 mm Al $\pm 10\%$
Min dose rate	0.2 $\mu\text{Gy/s}$
Quick HVL in one exposure	Yes
Waveforms	0 - 524 s
Resolution	0.5 ms at 2 kHz sampling rate
Bandwidth kV	$\leq 1$ kHz
Bandwidth Dose Rate	$\leq 1$ kHz
Supported Radiation Qualities	
W / 0.70 mm Al	20 - 49 kV, $\pm 0.5$ kV or $\pm 1.5\%$
W / 0.50 mm Al	20 - 48 kV, $\pm 1$ kV
W / 50 $\mu\text{m}$ Rh	20 - 49 kV, $\pm 0.5$ kV or $\pm 1.5\%$
W / 50 $\mu\text{m}$ Ag	20 - 40 kV, $\pm 0.5$ kV or $\pm 1.5\%$
W / 75 $\mu\text{m}$ Ag	20 - 40 kV, $\pm 1$ kV
W / 0.30 mm Cu	40 - 49 kV, $\pm 0.5$ kV or $\pm 1.5\%$
Mo / 30 $\mu\text{m}$ Mo	18 - 49 kV, $\pm 0.5$ kV or $\pm 1.5\%$
Mo / 25 $\mu\text{m}$ Rh	20 - 46 kV, $\pm 1$ kV
Mo / 1.0 mm Al	18 - 49 kV, $\pm 1$ kV
Mo / 0.25 mm Cu	40 - 49 kV, $\pm 0.5$ kV or $\pm 1.5\%$
Rh / 25 $\mu\text{m}$ Rh	25 - 49 kV, $\pm 1$ kV
Rh / 1.0 mm Al	22 - 35 kV, $\pm 1$ kV
Rh / 30 $\mu\text{m}$ Ag	27 - 40 kV, $\pm 0.5$ kV or $\pm 1.5\%$
Rh / 0.25 mm Cu	40 - 49 kV, $\pm 0.5$ kV or $\pm 1.5\%$



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QUALITY ASSURANCE



### Piranha Dental Specifications

Tube Potential	35-125 kV $\pm 1.5\%$
Min dose rate	0.1 $\mu\text{Gy/s}$
PPV and kVp	Yes
Dose	0.013 $\mu\text{Gy}$ - 1500 Gy $\pm 5\%$
Dose Rate	0.015 $\mu\text{Gy/s}$ - 320 mGy/s $\pm 5\%$
Resolution	0.01 $\mu\text{Gy/s}$
Trigg level	0.33 $\mu\text{Gy/s}$
Time	0.1 ms - 2000 s $\pm 0.5\%$ or 0.5 ms
Resolution	0.5 ms
Bandwidth	1 kHz
Effective Time	Yes
HVL	0.72 - 13 mm Al $\pm 10\%$ or 0.2 mm
Min dose rate	0.1 $\mu\text{Gy/s}$
Quick HVL in one exposure	Yes
Total Filtration	1.0 - 90 mm Al $\pm 10\%$ or 0.3 mm
Min dose rate	0.1 $\mu\text{Gy/s}$
Pulses	1 - 65535 $\pm 0.5$ pulses
Min peak dose rate	1 $\mu\text{Gy/s}$
Min pulse width	0.5 ms at 1.8 $\mu\text{Gy/s}$
Pulse Rate	0.5 - 180 $\pm 0.5$ pulses/s
Min peak dose rate	1 $\mu\text{Gy/s}$
Min pulse width	0.5 ms at 1.8 $\mu\text{Gy/s}$
Waveforms	0 - 524 s
Resolution	0.5 ms at 2 kHz sampling rate
Bandwidth kV	$\leq 1$ kHz
Bandwidth Dose Rate	$\leq 1$ kHz



### Invasive mA and mAs with RTI MAS-1

mAs	0.001-9999 mAs $\pm 1\%$
Resolution	0.001 mAs
mA	0.1 - 3000 mA $\pm 1\%$ or 0.01 mA
Resolution	0.01 mA
Time	0.1 ms - 34000 s $\pm 0.5\%$ or 0.5 ms
Resolution	0.5 ms
Bandwidth	0.5 kHz
Pulses	1 - 65535 $\pm 0.5$ pulses
Min pulse width	0.5 ms
Pulse Rate	0.5 - 100 $\pm 0.5$ pulses/s
Min pulse width	2 ms
mAs/Pulse	0.001 - 9999 $\pm 1\%$
Resolution	0.001 mAs
Waveforms	0 - 524 s
Resolution	0.5 ms at 2 kHz sampling rate
Bandwidth	0.5 kHz



### Non-Invasive mA and mAs with RTI MAS-2

mAs	0.1-9999 mAs $\pm 5\%$
Resolution	0.01 mAs
mA	10 - 4000 mA $\pm 5\%$ or 2 mA
Resolution	1 mA
Time	0.1 ms - 34000 s $\pm 0.5\%$ or 0.5 ms
Resolution	0.5 ms
Bandwidth	1 kHz
Pulses	1 - 65535 $\pm 0.5$ pulses
Min pulse width	0.5 ms
Pulse Rate	0.5 - 100 $\pm 0.5$ pulses/s
Min pulse width	2 ms
mAs/Pulse	0.1 - 9999 $\pm 5\%$
Resolution	1 mAs
Waveforms	0 - 524 s
Resolution	0.5 ms at 2 kHz sampling rate
Bandwidth	0.5 kHz

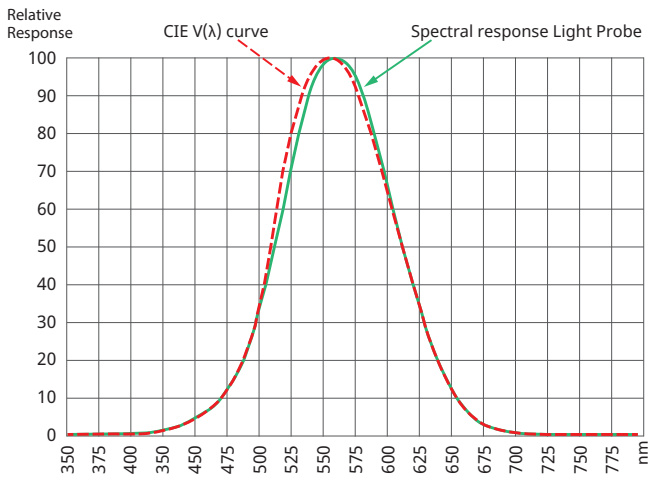


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### RTI Light Probe Specifications

Type	L100B
Spectral Response	CIE V(λ) (Photopic)
Field of view	
Lux adapter	180° (Cosine)
Monitor adapter	Ø 7 mm
Luminance	0.04 cd/m <sup>2</sup> - 128 kcd/m <sup>2</sup> ±5% or ±0.008 cd/m <sup>2</sup>
Illuminance	0.014 lx - 48 klx ±5% or ±0.003 lx



### RTI CT Ion Chamber 10 & 30 cm

Connector type	LEMO triaxial
Cable	2 m, low noise triaxial
Active volume	5.3 cm <sup>3</sup> (16 cm <sup>3</sup> )
Active length	100 mm (300 mm)
Diameter	12 mm, 12.6 incl O-rings
Typical leakage	±20 fA
Radiation quality	70 - 150 kV
Sensitivity	30 mGycm/nC
Energy dependence	±1%

#### Notice

Information within brackets ( ) are valid for the 30 cm chamber.

### with RTI Chamber Adapter

Air kerma rate	0.3 mGycm/s to 3 Gycm/s
Uncertainty	±5% or ±0.03 mGycm/s

