

# Piranha meters

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INDEPENDENT X-RAY  
QUALITY ASSURANCE



# Let's work together to ensure X-ray safety and quality

## A world-leading manufacturer of QA solutions.

In 1981, we invented the first X-ray QA system for diagnostic radiology. Since then, innovation has been at the heart of our corporate philosophy and we have pioneered many QA procedures.

We continue to invest heavily in R&D to push forward the very edge of X-ray QA, across all modalities.

Longer and more active lives, combined with a string of new examination techniques, have made diagnostic radiology the most widely used medical imaging technology.

Diagnostic imaging growth can be seen throughout the healthcare sector, including orthopaedic and vascular imaging, plus full body scanning. This will be a continuing trend, thanks to a shift in focus to more advanced healthcare globally.

As X-ray examinations increase, there is a higher risk of patient and staff exposure to levels of X-ray radiation that could result in negative health implications. As a long-standing member of, among others, IEC, AAPM, and MITA, we participate in work to research, develop, and evolve diagnostic radiology standards.

A key company-wide goal is also to educate customers and partners, sharing our deep knowledge of X-ray QA best-practice to protect patients and staff in an ever more complex operational environment.

Today, we are represented globally by subsidiaries in Europe, the USA, and Asia, as well as 100 distributors worldwide.



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# Piranha meters

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# Providing everything you need for X-ray QA

Get more from your Piranha X-ray Quality Control System with our comprehensive range of easy-to-use probes and accessories.

Everything you need from robust cases and stands to probes and adapters!

The Piranha comes ready-to-use and includes our powerful Ocean Next™ testing software.

Our complete QA portfolio is available at [www.rtigroup.com](http://www.rtigroup.com), or contact one of our Sales teams for more information.

## 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.

## Only pay for what you need

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.



# Piranha MULTI



## The complete solution for X-ray QA testing

The Piranha MULTI is **all** you need for qualified diagnostics and QA on Rad/Fluoro, CT, Dental, and Mammo X-ray scans.

It measures and presents all parameters instantly and simultaneously: kVp; Time; HVL; Total Filtration; Dose; Dose rate; and presents Waveform. Easy and fast X-ray Quality Control!

With the Piranha MULTI, you not only have a compact solution for fast and reliable testing but also extremely accurate measurements that can be used for in-depth analysis.

**9729657-00**

Piranha MULTI

### Key features

- All-in-one multifunction X-ray meter
- One-shot HVL
- Solid-state detectors = no need to compensate for temperature and pressure
- Optimized for X-ray equipment from a large number of manufacturers
- Built-in energy compensation
- Can be used together with ion chambers
- Wide-range detection of total filtration
- 100 meters Bluetooth range
- Unique detector design to minimize position and rotation dependence
- Automatic recognition of external probes
- Small, compact, and robust – easy to place
- Backscatter protected
- Long-lasting rechargeable battery
- Always free firmware upgrades
- Upgradable to any Piranha model
- Up to ten-year warranty
- Two-year Calibration Cycle

### General specifications

Size	133 x 75 x 26 mm
Weight	Approx. 400 g
Display	PC or Windows Tablet
Software	Ocean Next™ software for X-ray QA
Database Support	Yes
Interface type	Built-in bluetooth and USB
Detector Position Check	Yes
Simultaneous Dose Measurements	Yes (max. 2 detectors)
Use of Dose Detector with Active AEC	Yes - RTI Dose Probe or RTI T20
Bluetooth Range	100 m (free-in-air)
USB Cables	Included
Power Source	Rechargeable Li ion battery / Ext. power supply
Battery Life	~ 15 hours
Battery Tested	According to UN 38.3
No. exposures needed for measurement	One
Min. Exposure Time	0.1 ms
Memory	Unlimited
Operating Temperature	15 – 35 °C
Storage Temperature	-10 – 50 °C
Waveform Sampling Rate	4 – 2000 samples/s
Waveform Recording Time	1024 ms – 524 s
Backscatter Protection	Yes - main unit, RTI Dose Probe, and RTI T20
Warranty	Two years
Extended Warranty	Up to ten years
Calibration Cycle	Two years
EMC Tested	According to IEC 61326-1:2012
PTB Approval	DE-17-M-PTB-0070

### Variations

- 9729657-01** Piranha MULTI excl. Dose Probe
- 9729657-05** Piranha MULTI excl. Tablet
- 9729657-06** Piranha MULTI excl. Tablet & Dose Probe

# Piranha MULTI

## Specifications for Rad/Fluoro

Tube Voltage	35 – 160 kV ( $\pm 1.5\%$ )
PPV	Yes
Time	0.1 ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Dose	1.3 nGy – 1500 Gy 150 nR – 150 kR. ( $\pm 5\%$ )
Dose Rate	15 nGy/s – 320 mGy/s ( $\pm 5\%$ or $\pm 7$ nGy/s) 1.7 $\mu$ R/s – 37 R/s ( $\pm 5\%$ or $\pm 0.8$ $\mu$ R/s)
Auto Compensation	All dose parameters are automatically compensated for using measured kVp and TF over their specified ranges.
HVL	0.72 – 13 mm Al ( $\pm 10\%$ or $\pm 0.2$ mm)
Total Filtration	1.0 – 90 mm Al ( $\pm 10\%$ or $\pm 0.3$ mm)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)
Dose/Pulse	8 nGy/pulse – 0.9 Gy/pulse
Pulse Rate/Frequency	0.5 – 180 Hz
Pulse Width	4 ms – 2000 s

## Specifications for Mammography

Tube Voltage	
Target Filter: W/1 mm Ti	
Range: 40 - 49kV	
Inaccuracy: $\pm 0.5$ kV or $\pm 1.5\%$	
Target Filter: Mo / 30 $\mu$ m Mo	
Range: 18 – 49 kV	
Inaccuracy: $\pm 0.5$ kV or $\pm 1.5\%$	
Target Filter: Mo / 25 $\mu$ m Rh	
Range: 20 – 46 kV	
Inaccuracy: $\pm 1$ kV	
Target Filter: Rh / 25 $\mu$ m Rh	
Range: 25 – 49 kV	
Inaccuracy: $\pm 1$ kV	
Target Filter: Rh / 1.0 mm Al	
Range: 22 – 35 kV	
Inaccuracy: $\pm 1$ kV	
Target Filter: W / 50 $\mu$ m Rh	
Range: 20 – 49 kV	
Inaccuracy: $\pm 0.5$ kV or $\pm 1.5\%$	
Target Filter: W / 0.50 mm Al	
Range: 20 – 48 kV	
Inaccuracy: $\pm 1$ kV	
Target Filter: Mo / 1.0 mm Al	
Range: 18 – 49 kV	
Inaccuracy: $\pm 1$ kV	
Target Filter: W / 50 $\mu$ m Ag	
Range: 20 – 40 kV	
Inaccuracy: $\pm 0.5$ kV or $\pm 1.5\%$	
Target Filter: W / 75 $\mu$ m Ag	
Range: 20 – 40 kV	
Inaccuracy: $\pm 1$ kV	
Target Filter: W / 50 $\mu$ m Rh (Gio)	
Range: 22 – 35 kV	
Inaccuracy: $\pm 1$ kV	
Target Filter: W / 0.70 mm Al	
Range: 20 – 49 kV	
Inaccuracy: $\pm 0.5$ kV or $\pm 1.5\%$	



# Piranha MULTI

## Specifications for Mammography

### Tube voltage **continued (1)**

Target Filter: W / 50  $\mu$  m Ag (Sel)

Range: 22 – 39 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 50  $\mu$  m Rh (Sel)

Range: 22 – 39 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 0.30 mm Cu

Range: 40 – 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 0.70 mm Al (Inno/Crist)

Range: 20 – 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 50  $\mu$  m Rh (Inno/Crist)

Range: 20 – 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Mo / 25  $\mu$  m Rh (Sel)

Range: 20 – 46 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Rh / 30  $\mu$  m Ag (GE)

Range: 27 – 40 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Rh / Ag IQST (GE)

Range: 31 – 37 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Mo / 0.25 mm Cu (GE)

Range: 40 – 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Rh / 0.25 mm Cu (GE)

Range: 40 – 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Mo / 30  $\mu$  m Mo (GE)

Range: 22 – 32 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: Affirm Prone W / 50  $\mu$  m Ag

Range: 20 – 40 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

## Specifications for Mammography

### Tube voltage **continued (2)**

Target Filter: Affirm Prone W / 0.70 mm Al

Range: 20 – 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Time  
0.1 ms – 2000 s  
( $\pm 0.5\%$  or  $\pm 0.5$  ms)

Dose  
1 nGy – 1000 Gy  
3  $\mu$ R – 150 kR ( $\pm 5\%$ )

Dose Rate  
25 nGy/s – 530 mGy/s  
( $\pm 5\%$  or  $\pm 12$  nGy/s)  
30  $\mu$ R/s – 60 R/s  
( $\pm 5\%$  or  $\pm 1.5$   $\mu$ R/s)

HVL Range  
0.19 – 4.3 mm Al  
(depending on Target/Filter combination) ( $\pm 10\%$ )

Pulses  
1 – 65535 pulses ( $\pm 1$  pulse)

## Specifications for CT

Tube Voltage  
45 – 155 kV ( $\pm 1.5\%$ )

Time  
0.1 ms – 2000 s  
( $\pm 0.5\%$  or  $\pm 0.5$  ms)

Total Filtration  
1 – 90 mm Al  
( $\pm 10\%$  or  $\pm 0.3$  mm)

HVL  
0.72 – 13 mm Al  
( $\pm 10\%$  or  $\pm 0.2$  mm)

Pulses  
1 – 65535 pulses ( $\pm 1$  pulse)

# Piranha MULTI

## Specifications for Dental

Tube Voltage	35 – 125 kV ( $\pm 1.5\%$ )
PPV	Yes
Time	0.1 ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Dose	1.3 nGy – 650 Gy 150 nR – 74 kR. ( $\pm 5\%$ )
Dose Rate	15 nGy/s – 320 mGy/s ( $\pm 5\%$ or $\pm 7$ nGy/s) 1.7 $\mu$ R/s – 37 R/s ( $\pm 5\%$ or $\pm 0.8$ $\mu$ R/s)
Auto Compensation	All dose parameters are automatically compensated for using measured kVp and TF over their specified ranges.
HVL	0.72 – 13 mm Al ( $\pm 10\%$ or $\pm 0.2$ mm)
Total Filtration	1.0 – 90 mm Al ( $\pm 10\%$ or $\pm 0.3$ mm)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)
Dose/Pulse	8 nGy/pulse – 0.9 Gy/pulse
Pulse Rate/Frequency	0.5 – 180 Hz
Pulse Width	4 ms – 2000 s

## RTI Dose Probe specifications

Size	20 x 45 x 7.4 mm 0.79" x 1.8" x 0.29"
Weight	85 g (3 oz)
Cable Length	2.0 m (6.6 ft)
Backscatter Protected	Yes
Dose	100 pGy – 1.5 kGy 12 nR – 170 kR ( $\pm 5\%$ )
Dose rate	40 nGy/s – 150 mGy/s ( $\pm 5\%$ or $\pm 10$ nGy/s) 4.6 $\mu$ R/s – 16 R/s ( $\pm 5\%$ or $\pm 1$ $\mu$ R/s) 260 $\mu$ R/min – 1000 R/min ( $\pm 5\%$ or $\pm 6$ $\mu$ R/min)
Time	0.1 ms – 34000 s ( $\pm 1\%$ or $\pm 0.5$ ms)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)
Dose Per Pulse	1 nGy/pulse – 0.3 Gy/pulse
Pulse Rate/Frequency	0.5 – 100 Hz
Pulse Width	4 ms – 2000 s



# Piranha R/F



## All you need for advanced quality control

With the Piranha R/F, you have all you need for advanced quality control. A compact solution for fast and reliable testing, and extremely accurate measurements that can be used for in-depth analysis.

Presents all parameters instantly and simultaneously for Rad/Fluoro, CT, and Dental. Measures kVp, Time, HVL, Total Filtration, Dose, Dose rate, and presents Waveform.

**9729557-00**

Piranha R/F

### Key features

- All-in-one multifunction X-ray meter
- One-shot HVL
- Solid-state detectors = no need to compensate for temperature and pressure
- Optimized for X-ray equipment from a large number of manufacturers
- Built-in energy compensation
- Can be used together with ion chambers
- Wide-range detection of total filtration
- 100 meters Bluetooth range
- Unique detector design to minimize position and rotation dependence
- Automatic recognition of external probes
- Small, compact, and robust – easy to place
- Backscatter protected
- Long-lasting rechargeable battery
- Always free firmware upgrades
- Upgradable to any Piranha model
- Up to ten-year warranty
- Two-year Calibration Cycle

### General specifications

Size	133 x 75 x 26 mm
Weight	Approx. 400 g
Display	PC or Windows Tablet
Software	Ocean Next™ software for X-ray QA
Database Support	Yes
Interface Type	Built-in bluetooth and USB
Detector Position Check	Yes
Simultaneous Dose Measurements	Yes (max. 2 detectors)
Use of Dose Detector with Active AEC	Yes - RTI Dose Probe or RTI T20
Bluetooth Range	100 m (free-in-air)
USB Cables	Included
Power Source	Rechargeable Li ion battery / Ext. power supply
Battery Life	~ 15 hours
Battery Tested	According to UN 38.3
No. exposures needed for measurement	One
Min. Exposure Time	0.1 ms
Memory	Unlimited
Operating Temperature	15 – 35 °C
Storage Temperature	-10 – 50 °C
Waveform Sampling Rate	4 – 2000 samples/s
Waveform Recording Time	1024 ms – 524 s
Backscatter Protection	Yes - main unit, RTI Dose Probe, and T20
Warranty	Two years
Extended Warranty	Up to ten years
Calibration Cycle	Two years
EMC Tested	According to IEC 61326-1:2012
PTB Approval	DE-17-M-PTB-0070

### Variations

- 9729557-01** Piranha R/F excl. Dose Probe
- 9729557-05** Piranha R/F excl. Tablet
- 9729557-06** Piranha R/F excl. Tablet & Dose Probe

# Piranha R/F

## Specifications for Rad/Fluoro

Tube Voltage	35 – 160 kV ( $\pm 1.5\%$ )
PPV	Yes
Time	0.1 ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Dose	1.3 nGy – 650 Gy 150 nR – 74 kR ( $\pm 5\%$ )
Dose Rate	15 nGy/s – 320 mGy/s ( $\pm 5\%$ or $\pm 7$ nGy/s) 1.7 $\mu$ R/s – 37 R/s ( $\pm 5\%$ or $\pm 0.8$ $\mu$ R/s)
Auto Compensation	All dose parameters are automatically compensated for using measured kVp and TF over their specified ranges.
HVL	0.72 – 13 mm Al ( $\pm 10\%$ or $\pm 0.2$ mm)
Total Filtration	1.0 – 90 mm Al ( $\pm 10\%$ or $\pm 0.3$ mm)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)
Dose/Pulse	8 nGy/pulse – 0.9 Gy/pulse
Pulse Rate/Frequency	0.5 – 180 Hz
Pulse Width	4 ms – 2000 s

## Specifications for CT

Tube Voltage	45 – 155 kV ( $\pm 1.5\%$ )
Time	0.1 ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Total Filtration	1 – 90 mm Al ( $\pm 10\%$ or $\pm 0.3$ mm)
HVL	0.72 – 13 mm Al ( $\pm 10\%$ or $\pm 0.2$ mm)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)

## Specifications for Dental

Tube Voltage	35 – 125 kV ( $\pm 1.5\%$ )
PPV	Yes
Time	0.1 ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Dose	1.3 nGy – 650 Gy 150 nR – 74 kR ( $\pm 5\%$ )
Dose Rate	15 nGy/s – 320 mGy/s ( $\pm 5\%$ or $\pm 7$ nGy/s) 1.7 $\mu$ R/s – 37 R/s ( $\pm 5\%$ or $\pm 0.8$ $\mu$ R/s)
Auto Compensation	All dose parameters are automatically compensated for using measured kVp and TF over their specified ranges.
HVL	0.72 – 13 mm Al ( $\pm 10\%$ or $\pm 0.2$ mm)
Total Filtration	1.0 – 90 mm Al ( $\pm 10\%$ or $\pm 0.3$ mm)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)
Dose/Pulse	8 nGy/pulse – 0.9 Gy/pulse
Pulse Rate/Frequency	0.5 – 180 Hz
Pulse Width	4 ms – 2000 s

# Piranha R/F

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## RTI Dose Probe specifications

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Size	20 x 45 x 7.4 mm 0.79" x 1.8" x 0.29"
Weight	85 g (3 oz)
Cable length	2.0 m (6.6 ft)
Backscatter protected	Yes
Dose	100 pGy – 1.5 kGy 12 nR – 170 kR ( $\pm 5\%$ )
Dose Rate	40 nGy/s – 150 mGy/s ( $\pm 5\%$ or $\pm 10$ nGy/s) 4.6 $\mu$ R/s – 16 R/s ( $\pm 5\%$ or $\pm 1$ $\mu$ R/s) 260 $\mu$ R/min – 1000 R/min ( $\pm 5\%$ or $\pm 6$ $\mu$ R/min)
Time	0.1 ms – 34000 s ( $\pm 1\%$ or $\pm 0.5$ ms)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)
Dose Per Pulse	1 nGy/pulse – 0.3 Gy/pulse
Pulse Rate/Frequency	0.5 – 100 Hz
Pulse Width	4 ms - 2000 s

# Piranha CT



## Fast and accurate CT dose measurements

The Piranha CT is the perfect solution for fast and accurate CT dose measurements, whether routine compliance and dosimetry checks or more complex QA testing. This is a multi-functional, QA meter for a wide range of CT models, brands, and technologies.

It measures and presents all parameters instantly and simultaneously. It measures kVp, Time, Total Filtration, CTDI parameters, dose length product, and presents Waveform.

Several important parameters can also be measured such as CTDI100, CTDIw, CTDIvol, DLP, FWHM, Geometric efficiency, and tube current variations.

## Key features

- All-in-one multifunction X-ray meter
- One-shot HVL
- Solid-state detectors = no need to compensate for temperature and pressure
- Optimized for X-ray equipment from a large number of manufacturers
- Built-in energy compensation
- Can be used together with ion chambers
- Wide-range detection of total filtration
- 100 meters Bluetooth range
- Unique detector design to minimize position and rotation dependence
- Automatic recognition of external probes
- Small, compact, and robust – easy to place
- Backscatter protected
- Long-lasting rechargeable battery
- Always free firmware upgrades
- Upgradable to any Piranha model
- Up to ten-year warranty
- Two-year Calibration Cycle

## General specifications

Size	133 x 75 x 26 mm
Weight	Approx. 400 g
Display	PC or Windows Tablet
Software	Ocean Next™ software for X-ray QA
Database Support	Yes
Interface Type	Built-in bluetooth and USB
Detector Position Check	Yes
Simultaneous Dose Measurements	Yes (max. 2 detectors)
Use of Dose Detector with Active AEC	Yes - RTI Dose Probe or RTI T20
Bluetooth Range	100 m (free-in-air)
USB Cables	Included
Power Source	Rechargeable Li ion battery / Ext. power supply
Battery Life	~ 15 hours
Battery Tested	According to UN 38.3
No. exposures needed for measurement	One
Min. Exposure Time	0.1 ms
Memory	Unlimited
Operating Temperature	15 – 35 °C
Storage Temperature	-10 – 50 °C
Waveform Sampling Rate	4 – 2000 samples/s
Waveform Recording Time	1024 ms – 524 s
Backscatter Protection	Yes - main unit, RTI Dose Probe, and T20
Warranty	Two years
Extended Warranty	Up to ten years
Calibration Cycle	Two years
EMC Tested	According to IEC 61326-1:2012
PTB Approval	DE-17-M-PTB-0070

## Variations

<b>9729455-00</b>	Piranha CT with CTDP
<b>9729455-05</b>	Piranha CT with CTDP, excl. Tablet
<b>9729455-15</b>	Piranha CT with CT Ion Chamber
<b>9729455-20</b>	Piranha CT with CT Ion Chamber, excl. Tablet

# Piranha CT

## Measuring parameters

Tube Voltage	45 – 155 kV ( $\pm 1.5\%$ )
Time	0.1 ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Total Filtration	1 – 90 mm Al ( $\pm 10\%$ or $\pm 0.3$ mm)
HVL	0.72 – 13 mm Al ( $\pm 10\%$ or $\pm 0.2$ mm)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)

## Specifications with CT Dose Profiler

Dose Rate Range	67 nGy/s - 2.2 Gy/s 0.46 mR/min - 15000 R/min
Inaccuracy	$\pm 5\%$ or $\pm 15$ nGy/s
Spatial Resolution	0.25 mm

## Specifications with RTI CT Ion Chamber 10 cm

Air Kerma Rate	0.3 mGycm/s to 3 Gycm/s
Inaccuracy	$\pm 5\%$ or $\pm 0.03$ mGycm/s
Connector Type	LEMO triaxial
Cable	2 m, low noise triaxial
Active Volume	5.3 cm <sup>3</sup>
Active Length	100 mm
Diameter	12 mm, 12.6 incl O-rings
Typical Leakage	$\pm 20$ fA
Radiation Quality	70 - 150 kV
Sensitivity	30 mGycm/nC
Energy Dependence	$\pm 1\%$

## Specifications with RTI CT Ion Chamber 30 cm

Air Kerma Rate	0.3 mGycm/s to 3 Gycm/s
Inaccuracy	$\pm 5\%$ or $\pm 0.03$ mGycm/s
Connector Type	LEMO triaxial
Cable	2 m, low noise triaxial
Active Volume	16 cm <sup>3</sup>
Active Length	300 mm
Diameter	12 mm, 12.6 incl O-rings
Typical Leakage	$\pm 20$ fA
Radiation Quality	70 - 150 kV
Sensitivity	30 mGycm/nC
Energy Dependence	$\pm 1\%$

# Piranha MAMMO



## The ultimate solution for Mammo QA testing

The Piranha MAMMO is designed for anyone working with specialist diagnostic X-ray technology in hospitals or mammography clinics.

It measures kVp, time, HVL, Dose, Dose rate, and presents Waveform. Extremely accurate measurements you can use for your in-depth analyses.

A compact solution for fast and reliable testing!

We are proud that all of our mammography solutions comply with the guidelines and requirements of MQSA, EUREF, IAEA, and ACR to ensure safe and high-quality testing.

**9729355-00**

Piranha MAMMO

### Key features

- All-in-one multifunction X-ray meter
- One-shot HVL
- Solid-state detectors = no need to compensate for temperature and pressure
- Optimized for X-ray equipment from a large number of manufacturers
- Built-in energy compensation
- Can be used together with ion chambers
- Wide-range detection of total filtration
- 100 meters Bluetooth range
- Unique detector design to minimize position and rotation dependence
- Automatic recognition of external probes
- Small, compact, and robust – easy to place
- Backscatter protected
- Long-lasting rechargeable battery
- Always free firmware upgrades
- Upgradable to any Piranha model
- Up to ten-year warranty
- Two-year Calibration Cycle

### General specifications

Size	133 x 75 x 26 mm
Weight	Approx. 400 g
Display	PC or Windows Tablet
Software	Ocean Next™ software for X-ray QA
Database Support	Yes
Interface Type	Built-in bluetooth and USB
Detector Position Check	Yes
Simultaneous Dose Measurements	Yes (max. 2 detectors)
Use of Dose Detector with Active AEC	Yes - RTI Dose Probe or RTI T20
Bluetooth Range	100 m (free-in-air)
USB Cables	Included
Power Source	Rechargeable Li ion battery / Ext. power supply
Battery Life	~ 15 hours
Battery Tested	According to UN 38.3
No. exposures needed for measurement	One
Min. Exposure Time	0.1 ms
Memory	Unlimited
Operating Temperature	15 – 35 °C
Storage Temperature	-10 – 50 °C
Waveform Sampling Rate	4 – 2000 samples/s
Waveform Recording Time	1024 ms – 524 s
Backscatter Protection	Yes - main unit, RTI Dose Probe, and T20
Warranty	Two years
Extended Warranty	Up to ten years
Calibration Cycle	Two years
EMC Tested	According to IEC 61326-1:2012
PTB Approval	DE-17-M-PTB-0070

### Variations

**9729355-05** Piranha MAMMO excl. Tablet

# Piranha MAMMO

## Measuring parameters

Tube Voltage

Target Filter: W/1 mm Ti

Range: 40 - 49kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Mo / 30  $\mu$ m Mo

Range: 18 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target/Filter: Mo / 25  $\mu$ m Rh

Range: 20 - 46 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: Rh / 25  $\mu$ m Rh

Range: 25 - 49 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: Rh / 1.0 mm Al

Range: 22 - 35 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: W / 50  $\mu$ m Rh

Range: 20 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 0.50 mm Al

Range: 20 - 48 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: Mo / 1.0 mm Al

Range: 18 - 49 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: W / 50  $\mu$ m Ag

Range: 20 - 40 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 75  $\mu$ m Ag

Range: 20 - 40 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: W / 50  $\mu$ m Rh (Gio)

Range: 22 - 35 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: W / 0.70 mm Al

Range: 20 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

## Measuring parameters

Tube voltage **continued (1)**

Target Filter: W / 50  $\mu$ m Ag (Sel)

Range: 22 - 39 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 50  $\mu$ m Rh (Sel)

Range: 22 - 39 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 0.30 mm Cu

Range: 40 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 0.70 mm Al (Inno/Crist)

Range: 20 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: W / 50  $\mu$ m Rh (Inno/Crist)

Range: 20 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Mo / 25  $\mu$ m Rh (Sel)

Range: 20 - 46 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Rh / 30  $\mu$ m Ag (GE)

Range: 27 - 40 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Rh / Ag IQST (GE)

Range: 31 - 37 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Mo / 0.25 mm Cu (GE)

Range: 40 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Rh / 0.25 mm Cu (GE)

Range: 40 - 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Target Filter: Mo / 30  $\mu$ m Mo (GE)

Range: 22 - 32 kV

Inaccuracy:  $\pm 1$  kV

Target Filter: Affirm Prone W / 50  $\mu$ m Ag

Range: 20 - 40 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$



# Piranha MAMMO

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## Measuring parameters

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Tube voltage **continued (2)**

Target Filter: Affirm Prone W / 0.70 mm Al

Range: 20 – 49 kV

Inaccuracy:  $\pm 0.5$  kV or  $\pm 1.5\%$

Time	0.1 ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Dose	1 nGy – 1000 Gy 3 $\mu$ R – 150 kR ( $\pm 5\%$ )
Dose Rate	25 nGy/s – 530 mGy/s ( $\pm 5\%$ or $\pm 12$ nGy/s) 30 $\mu$ R/s – 60 R/s ( $\pm 5\%$ or $\pm 1.5$ $\mu$ R/s)
HVL Range	0.19 – 4.3 mm Al (depending on Target/Filter combination) ( $\pm 10\%$ )
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)

# Piranha DENTAL



## The no. 1 choice for dental X-ray QA

With the Piranha DENTAL, you can be sure of extremely accurate measurements that can be used for in-depth analysis. The meter measures kVp, Time, HVL, Total Filtration, Dose, Dose rate, and presents Waveform.

The Piranha DENTAL is your number one choice when you want a multifunction dental X-ray service and maintenance solution for complete QA. It offers an affordable solution for Dental QA, providing the best practices for Intraoral, Panoramic, and CBCT.

A complete solution for service and quality control of even the latest Panoramic X-ray systems.

**98729255-00** Piranha DENTAL with Panoramic Holder

### Key features

- All-in-one multifunction X-ray meter
- One-shot HVL
- Solid-state detectors = no need to compensate for temperature and pressure
- Optimized for X-ray equipment from a large number of manufacturers
- Built-in energy compensation
- Can be used together with DAP ion chambers
- Wide-range detection of total filtration
- 100 meters Bluetooth range
- Unique detector design to minimize position and rotation dependence
- Automatic recognition of external probes
- Small, compact, and robust – easy to place
- Backscatter protected
- Long-lasting rechargeable battery
- Always free firmware upgrades
- Upgradable to any Piranha model
- Up to ten-year warranty
- Two-year Calibration Cycle

### General specifications

Size	133 x 75 x 26 mm
Weight	Approx. 400 g
Display	PC or Windows Tablet
Software	Ocean Next™ software for X-ray QA
Database Support	Yes
Interface Type	Built-in Bluetooth and USB
Detector Position Check	Yes
Simultaneous Dose Measurements	Yes (max. two detectors)
Use of Dose Detector with Active AEC	Yes - RTI Dose Probe or RTI T20
Bluetooth Range	100 m free-in-air
USB Cables	Included
Power Source	Rechargeable Li ion battery / Ext. power supply
Battery Life	Approx. 15 hours
Battery Tested	According to UN 38.3
No. of exposures needed for measurement	One
Min. Exposure Time	0.1 ms
Memory	Unlimited
Operating Temperature	15 – 35 °C
Storage Temperature	-10 - +50 °C
Waveform Sampling Rate	4 – 2000 samples/s
Waveform Recording Time	1024 ms – 524 s
Backscatter Protection	Yes - main unit, RTI Dose Probe, and RTI T20
Warranty	Two years
Extended Warranty	Up to ten years
Calibration Cycle	Two years
Standard parts	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

### Variations

**9729255-05** Piranha DENTAL with Panoramic Holder, excl. Tablet

# Piranha DENTAL

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## Measuring parameters

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Tube Voltage	35 – 125 kV ( $\pm 1.5\%$ )
PPV	Yes
Time	0.1ms – 2000 s ( $\pm 0.5\%$ or $\pm 0.5$ ms)
Dose	1.3 nGy – 650 Gy 150 nR – 74 kR ( $\pm 5\%$ )
Dose Rate	15 nGy/s – 320 mGy/s ( $\pm 5\%$ or $\pm 7$ nGy/s) 1.7 $\mu$ R/s – 37 R/s ( $\pm 5\%$ or $\pm 0.8$ $\mu$ R/s)
Auto Compensation	All dose parameters are automatically compensated for using measured kVp and TF over their specified ranges.
HVL	0.72 – 13 mm Al ( $\pm 10\%$ or $\pm 0.2$ mm)
Total Filtration	1.0 – 90 mm Al ( $\pm 10\%$ or $\pm 0.3$ mm)
Pulses	1 – 65535 pulses ( $\pm 1$ pulse)
Dose/Pulse	8 nGy/pulse – 0.9 Gy/pulse
Pulse Rate/Frequency	0.5 – 180 Hz
Pulse Width	4 ms – 2000 s

# Piranha Premium Kit



## The all-in-one solution for X-ray QA testing

The Piranha Premium Kit is based on a Piranha MULTI with a number of its probes and accessories, safely stored in a robust, aluminum case.

The Piranha MULTI is all you need for qualified diagnostics and QA on Rad/Fluoro, CT, Dental, and Mammography X-ray scans. It measures kVp, Time, HVL, Total Filtration, Dose, Dose rate, and presents Waveform.

With the Piranha Premium Kit, you not only have a compact solution for fast and reliable testing but also extremely accurate measurements that can be used for in-depth analysis.

### Key features

- All-in-one multifunction X-ray meter
- One-shot HVL
- Solid-state detectors = no need to compensate for temperature and pressure
- Optimized for X-ray equipment from a large number of manufacturers
- Built-in energy compensation
- Can be used together with ion chambers
- Wide-range detection of total filtration
- 100 meters Bluetooth range
- Unique detector design to minimize position and rotation dependence
- Automatic recognition of external probes
- Small, compact, and robust – easy to place
- Backscatter protected
- Long-lasting rechargeable battery
- Always free firmware upgrades
- Upgradable to any Piranha model
- Up to ten-year warranty
- Two-year Calibration Cycle

### General specifications

Size	133 x 75 x 26 mm
Weight	Approx. 400 g
Display	PC or Windows Tablet
Software	Ocean Next™ software for X-ray QA
Database Support	Yes
Interface Type	Built-in bluetooth and USB
Detector Position Check	Yes
Simultaneous Dose Measurements	Yes (max. 2 detectors)
Use of Dose Detector with Active AEC	Yes - RTI Dose Probe or RTI T20
Bluetooth Range	100 m (free-in-air)
USB Cables	Included
Power Source	Rechargeable Li ion battery / Ext. power supply
Battery Life	~ 15 hours
Battery Tested	According to UN 38.3
No. exposures needed for measurement	One
Min. Exposure Time	0.1 ms
Memory	Unlimited
Operating Temperature	-15 – 35 °C
Storage Temperature	-10 – 50 °C
Waveform Sampling Rate	4 – 2000 samples/s
Waveform Recording Time	1024 ms – 524 s
Backscatter Protection	Yes - main unit, RTI Dose Probe, and RTI T20
Warranty	Two years
Extended Warranty	Up to ten years
Calibration Cycle	Two years
EMC Tested	According to IEC 61326-1:2012
PTB Approval	DE-17-M-PTB-0070

### Variations

<b>9729657-13</b>	Piranha Premium MAS-1 & CTDP
<b>9729657-53</b>	Piranha Premium MAS-1 & CT Ion Chamber
<b>9729657-14</b>	Piranha Premium MAS-2 & CTDP
<b>9729657-54</b>	Piranha Premium MAS-2 & CT Ion Chamber

# Piranha Premium Kit

## Specification for Rad/Fluoro, Mammo, CT, & Dental

See Piranha MULTI specifications, pp. 6-8.

## Specifications with RTI Dose Probe

Size	20 x 45 x 7.4 mm 0.79" x 1.8" x 0.29"
Weight	85 g (3 oz)
Cable Length	2.0 m (6.6 ft)
Backscatter Protected	Yes
Dose	100 pGy - 1.5 kGy 12 nR - 170 kR ( $\pm 5\%$ )
Dose Rate	40 nGy/s - 150 mGy/s ( $\pm 5\%$ or $\pm 10$ nGy/s) 4.6 $\mu$ R/s - 16 R/s ( $\pm 5\%$ or $\pm 1$ $\mu$ R/s) 260 $\mu$ R/min - 1000 R/min ( $\pm 5\%$ or $\pm 6$ $\mu$ R/min)
Time	0.1 ms - 34000 s ( $\pm 1\%$ or $\pm 0.5$ ms)
Pulses	1 - 65535 pulses ( $\pm 1$ pulse)
Dose Per Pulse	1 nGy/pulse - 0.3 Gy/pulse
Pulse Rate/Frequency	0.5 - 100 Hz
Pulse Width	4 ms - 2000 s

## Specifications with RTI MAS-1

Type	MAS-1B
Current Range	0.1 - 3000 mA
Inaccuracy	$\pm 1\%$ or $\pm 0.01$ mA
Frequency Range	DC-500 Hz (-3 dB)
Size	60 x 35 x 72 mm
Weight	125 g
Battery Life	Around 100 h
Rechargeable Battery	With mini-USB connector
Cable Length	4 m (extension available)
Connector	Hirose

## Specifications with RTI MAS-2

Type	MAS-2
Current Range	10 - 4000 mA
Inaccuracy	$\pm 5\%$ or $\pm 2$ mA ( $\pm 3\%$ at 250 mA)
Charge Range	0.1 mAs - 9999 mAs
Size	183 x 61 x 36 mm
Connector	Hirose
Maximum Cable Diameter	24 mm
Power Source	9 V "6LR61" Alkaline battery

# Piranha Premium Kit

## Specifications with RTI CT Dose Profiler

Dose Rate Range	67 nGy/s - 2.2 Gy/s 0.46 mR/min - 15000 R/min
Inaccuracy	±5% or ±15 nGy/s
Spatial Resolution	0.25 mm

## Specifications with RTI CT Ion Chamber

Air Kerma Rate	0.3 mGycm/s to 3 Gycm/s
Inaccuracy	±5% or ±0.03 mGycm/s
Connector Type	LEMO triaxial
Cable	2 m, low noise triaxial
Active Volume	5.3 cm <sup>3</sup> ( <b>10 cm</b> ) 16 cm <sup>3</sup> ( <b>30 cm</b> )
Active Length	100 mm ( <b>10 cm</b> ) 300 mm ( <b>30 cm</b> )
Diameter	12 mm, 12.6 incl O-rings
Typical Leakage	±20 fA
Radiation Quality	70 - 150 kV
Sensitivity	30 mGycm/nC
Energy Dependence	±1%

### RTI Support

One of our goals is to share our deep knowledge of best practices within the field of X-ray QA and testing. Contact the RTI Support team for technical, application, and software Quality Assurance assistance.

#### Global

+46 (0) 31 746 36 28  
support@rtigroup.com

#### USA & Canada

+1 800-222-7537  
support.us@rtigroup.com



# Piranha selection guide



## The premium platform for advanced and reliable QA

Our Piranha meters are divided into five main application groups: Multi; CT; Mammography; R/F; and Dental. The Piranha MULTI (657) can be used for X-ray QA of all modalities, whereas the other Piranhas are dedicated to one specific modality.

All meters have Bluetooth connectivity and are compliant with our powerful Ocean Next™ software.

Specifications in this guide may be changed without notice.

Piranha meters	MULTI	R/F	CT CTDP	CT IC	MAMMO	DENTAL
Tablet compatible	•	•	•	•	•	•
Ocean Next™ software compatible	•	•	•	•	•	•
Waveform	•	•	•	•	•	•
Dose & Dose Rate	•	•	•	•	•	•
Quick HVL	•	•	•	•	•	•
<b>Rad/Fluoro</b>	•	•				
<b>Mammography</b>	•				•	
<b>Dental</b>	•	•				•
<b>CT</b>	•	•	•	•		
KVp & Time	•	•	•	•	•	•
HVL & Total Filtration	•	•	•	•	•	•
RTI Dose Probe	•	•	•	•	•	•
RTI CT Dose Profiler	•	•	•	•	•	•
RTI CT Ion Chamber	•	•	•	•	•	•
RTI MAS-1, MAS-2, & Light Probe	•	•	•	•	•	•

• Standard function • Optional

Rad/Fluoro ..... Meters for radiography and fluoroscopy  
 Mammography ..... Meters for mammography  
 CT ..... Meters for CT  
 Dental ..... Meters for dental (intraoral, panoramic and CBCT)

Dose Probe ..... Useful when higher sensitivity and minimal perturbation of field are required  
 CT Dose Profiler ..... For CT dose profile measurement  
 CT Ion Chamber ..... To acquire all standard CTDI parameters



# Piranha probes & accessories



## RTI Dose Probe

An external dose probe, designed to perform very low dose rate measurements, for instance, on image identifiers.

The probe is very small to avoid or minimize interference with AEC (Automatic Exposure Control) on X-ray equipment. This also enables it to fit into the table bucky.

Since it is a solid-state detector, no corrections for pressure or temperature are needed. Neither is polarizing voltage.

The RTI Dose Probe is small and has a fast response which makes it ideal for pulsed fluoroscopy. It can detect individual pulses, determine pulse rate, and show waveforms at dose rate.

**Art. No:** 9730003-00

### Specifications with Piranha

Size	20 x 45 x 7.4 mm <sup>3</sup> 0.79" x 1.8" x 0.29"
Weight	85 g (3 oz)
Cable Length	2.0 m (6.6 ft)
Backscatter Protected	Yes
Dose	100 pGy - 1.5 kGy 12 nR - 170 kR (± 5%)
Dose Rate	4 nGy/s - 150 mGy/s (±5% or ±10 nGy/s) 4.6 µR/s - 16 R/s (±5% or ±1 µR/s) 260 µR/min - 1000 R/min (±5% or ±6 µR/min)
Time	0.1 ms - 34000 s (±1% or ±0.5 ms)
Pulses	1 - 65535 pulses (±1 pulse)
Dose Per Pulse	1 nGy/pulse - 0.3 Gy/pulse
Pulse Rate/Frequency	0.5 - 100 Hz
Pulse Width	4 ms - 2000 s

## RTI T20 Dose Detector

The RTI T20 Dose Probe is a solid-state detector dedicated for measurements on Rad/Fluoro systems, when it is crucial that the detector itself does not have any effect on the system output (due to AEC) or disturbs the X-ray beam.

It was developed for measurements of the patient entrance dose (skin dose) and the maximum dose rate in the radiographic and fluoroscopic field. Despite its small size, the RTI T20 Dose Detector is protected from picking up backscatter.

In contrast to many other detectors, the RTI T20 Dose Detector can be placed anywhere in the X-ray field. It has five times higher sensitivity than a typical ion chamber.

**Art. No:** 9730015-00

### Specifications with Cobia

Size of Detector House	26 x 5 mm <sup>2</sup>
Length	318 mm (rod 280 mm + detector 26 mm + back mount 12 mm)
Ranges	0.7 nGy - 10 kGy 0.08 µR - 1 MR 27 nGy/s - 500 m <sup>3</sup> Gy/s 3 µR/s - 57 R/s
Inaccuracy	±5% (RQR 50 - 150 kV)
Energy Dependence	Less than ±5% for RQR 50 - 150 kV
Angular Dependence	Less than ±2% for incident angles less than 10 degrees.
Typical Sensitivity	8 µC/Gy
Trig Modes	After exposure, continuous, timed, and free run

# Piranha probes & accessories



## RTI CT Dose Profiler

The RTI CT Dose Profiler has taken the CT quality assurance to the next level. Because of its revolutionary design, it has transformed CTDI measurement from being inaccurate, due to underestimation of the dose for wide beams, to becoming more exact. It also has the ability to further analyze the result – all in one shot!

The CT Dose Profiler is based on solid-state technology. It is robust, and it fits into existing standard phantoms used for CTDI measurements.

**Art. No:** **9730013-00**

### General specifications

Length	210 mm
Diameter	12.5 mm
Weight	50 g
Sensor Width	250 µm
Cable Length	4.0 m (13.1 ft)

### Specifications with Piranha

Dose Rate Range	67 nGy/s-2.2 Gy/s
	0.46 mR/min - 15000 R/min
Inaccuracy	±5% or ±15 nGy/s
Spatial Resolution	0.25 mm

### Following parameters are achieved from a single exposure

CTDI(100)	
Point Dose	
CT dose profile	
CTDI(w)	
CTDI(vol)	
DLP	
Performance of the AEC	
FWHM (Full Width at Half Maximum of the dose profile)	
Geometric efficiency	

## RTI CT Ion Chamber 10 cm & 30 cm (top)

The RTI CT Ion Chambers - 10 cm and 30 cm - are intended for CTDI and dose length product measurements on CT scanners in a Phantom or free-in-air. Both chambers can be connected via the RTI Chamber Adapter to the Piranha or the Cobia. The 10 cm chamber can also fit into standard phantoms used for CTDI measurements.

Both CT Ion Chambers fulfill applicable parts of the IEC 61674 standard for diagnostic dosimeters and are thereby compatible with IEC 61223-2-6 and 66601-2-44 for applicable CT dosimetry. The chambers come with RQT9, 120 kV, and W/AI + 0.25 mm Cu as standard calibration.

**Note:** The RTI Chamber Adapter is also required.

**10 cm Art. No:** **9730025-00**

**30 cm Art. No:** **9730026-00**

### General specifications 10 cm & 30 cm

Air Kerma Rate	0.3 mGycm/s to 3 Gy/cm/s
Inaccuracy	±5% or ±0.03 mGycm/s
Connector Type	LEMO triaxial
Cable	2 m, low noise triaxial
Active Volume	5.3 cm <sup>3</sup> ( <b>10 cm</b> ) 16 cm <sup>3</sup> ( <b>30 cm</b> )
Active Length	100 mm ( <b>10 cm</b> ) 300 mm ( <b>30 cm</b> )
Diameter	12 mm, 12.6 incl O-rings
Typical Leakage	±20 fA
Radiation Quality	70 - 150 kV
Sensitivity	30 mGycm/nC
Energy Dependence	±1%

# Piranha probes & accessories



## RTI MAS-1

The RTI MAS-1 is an invasive probe for the measurement of mA and mAs.

The probe connects to the mAs socket in the X-ray generator and to the multimeter. It can be used to measure tube current for both radiographic and fluoroscopic exposures.

**Art. No:** 9730005-00

### Specifications with Piranha

Type	MAS-1B
Current Range	0.1–3000 mA
Inaccuracy	±1% or ±0.01 mA
Frequency Range	DC–500 Hz (-3 dB)
Size	60 x 35 x 72 mm <sup>3</sup>
Weight	125 g
Battery Life	Around 100 h
Rechargeable Battery	With mini-USB connector
Cable Length	4 m (extension available)
Connector	Hirose



## RTI MAS-2

The RTI MAS-2 probe is a clamp-on probe for the non-invasive measurement of mA (tube current) and mAs.

The probe simply clamped onto the high voltage cable and then ready for measurements. No connection inside the X-ray generator is needed! Together with your meter, direct reading of mA and mAs, as well as waveform, are obtained.

**Art. No:** 9730006-00

### Specifications with Piranha

Type	MAS-2
Current Range	10 - 4000 mA
Inaccuracy	±5% or ±2 mA (±3% at 250 mA)
Charge Range	0.1 mAs - 9999 mAs
Size	183 x 61 x 36 mm <sup>3</sup>
Connector	Hirose
Maximum Cable Diameter	24 mm
Power Source	9 V "6LR61" Alkaline battery

# Piranha probes & accessories



## RTI Light Probe

The RTI Light Probe is designed to comply with the needs of QA in modern X-ray departments.

With a monitor and a lux adapter, the RTI Light Probe measures the brightness on monitors and film viewing boxes and the ambient light in the room. It has the same spectral response as the human eye! This makes it reliable for all different types of measurements, independent of the light source.

The spectral response complies with the CIE  $V(\lambda)$  curve.

**Art. No:** 9730007-00

### General specifications

Type	L100B
Spectral Response	CIE $V(\lambda)$ (Photopic)
Field of View - Lux Adapter	180° (Cosine)
Field of View - Monitor Adapter	Ø 7 mm
Connector	Hirose (Piranha, Cobia) with automatic identification

### Specifications with Piranha

Monitor, Viewing Box (Luminance)	0.04 cd/m <sup>2</sup> - 128 kcd/m <sup>2</sup> (±5% or ±0.008 cd/m <sup>2</sup> )
Ambient Light (Illuminance)	0.014 lx - 48 klx (±5% or ±0.003 lx)

## Ion Chamber Magna 1 cc

The Ion Chamber Magna 1cc is designed for mammography dose measurement. With an excellent energy response, the Ion Chamber Magna 1 cc can be used for radiographic applications too. It is the ideal choice for two reasons:

1. Evaluations of Magna ionization chambers show a response within ±1% over an extended mammography range of 20-50 kVp (HVL of 0.15 mm to 0.73 mm Al).
2. All mammographic mean glandular dose tables are based on in-air measurements.

The Magna's air equivalent construction makes it ideally suited for in-air exposure measurements of mean glandular dose. Delivered in a hard case for the best protection.

**Art. No:** 9706100-00

### General specifications

Connector Type	LEMO triaxial
Cable	2 m, low noise triaxial
Active Volume	1 cm <sup>3</sup>
Materials	Air equivalent plastic, acrylic
Entrance Window	Kapton conductive film
Reference Point	Scribed line around circumference of the outer ring is half way between the collector and the entry window.
Typical Leakage	±5 fA
Radiation Quality	20 - 150 kV
Energy Dependence	±2%
Typical Sensitivity	20 mGy/nC
<i>Chamber Dimensions</i>	
Height	25.4 mm
Diameter	41.3 mm
Inner Plate Separation	8 mm
Weight	200 g

# Piranha probes & accessories



## LoniMover™

The LoniMover™ has now been updated to version 4.2!

Together with the RTI CT Ion Chamber or CT Dose Profiler, the LoniMover™ is, without a doubt, the easiest way to measure CTDI and waveforms for Wide Beam and Cone Beam CT.

Measure CTDI for Wide Beam and Cone Beam CT according to the IEC 60601-2-44 Ed. 3:A1 standard. Remember, the LoniMover™ works well with any Pencil Ion Chamber of any brand.

The LoniCT software still operate simultaneously with the RTI Ocean Next™ software, so you can gather all your measured data in your sessions, as well as analyze, save, and autogenerate full reports.

With this solution, you can seamlessly use the LoniMover™ with a Piranha. Even better, with built-in Bluetooth, everything is wireless and easy to set up!

**Art. No:** **9730030-00**

### Version 4.2 new features

Scan up to 300 mm (and the Pencil Ion Chamber can cover 400 mm)

LoniCT software can be used with Cobia SENSE and Cobia FLEX Bluetooth connectivity

LoniCT software can measure FWHM on pulsed profiles

More flexibility in scanning parameters

Mechanical fixes

More software functions, saving data, and settings!



## RTI Scatter Probe

Solid-state detector for leakage and scatter detection in X-ray environments. Two separate detector areas of 10 cm<sup>2</sup> and 100 cm<sup>2</sup> fulfill current regulations and standards for X-ray leakage and scatter measurements. For barrier, leakage, and scatter measurements various industry standards apply: 21 CFR 1020.32; 21 CFR 1020.30; IEC 60601-2-3; IEC 60601-2-54; and IEC 60601-1-3. There are several more standards for various modalities.

**Art. No:** **9731001-00**

### General specifications

Connector Type	USB Type C
Cable	5 m USB A to C Extendable with optional USB Active extension cable
Power	5 V via USB
Active Area	10 cm <sup>2</sup> and 100 cm <sup>2</sup>
Dimensions	139 x 139 x 17 mm
Weight	370 g (430 g incl. handle)
Rated Range of Use	10 - 150 keV 80 - 110 kPa +10 - +40 °C 10 - 80% rel. humidity
Trig Mode	Auto or Manual
Trig Level (auto)	5 µGy/h (0.6 mR/h) or 10 µSv/h
Air Kerma Rate	0 - 100 mGy/h (0 - 10 R/h) ±10% or ±0.3 µGy/h 0.03 mR/h (ISO N20-N150)
H*(10) Rate	0 - 200 mSv/h ±10% or ±0.6 µSv/h (ISO N20-N150)
Mean Energy	10 - 150 keV ±10% or 5 keV (min rate: 25 µGy/h)
Half Value Layer (HVL)	0.1 - 17 mm Al ±10% or 0.05 mm Al (min rate: 25 µGy/h)
Time	0 - 9999 s
Sampling Rate	1 - 300 Hz
Bandwidth	0.5 to 50 Hz

# Piranha probes & accessories



## RTI Chamber Adapter

The RTI Chamber Adapter is an external module for connecting ion chambers to the Piranha, Cobia FLEX, or Cobia SENSE.

Supports ion chambers with LEMO triaxial connectors (e.g. RTI CT Ion Chamber, DAP Chamber, and Magna 1cc mammography ion chamber).

Measuring range: 10 pA – 0.7  $\mu$ A

Accessories: BNC and TNC triaxial to LEMO adapters, for connection of other types of triaxial ion chambers.

**Art. No:** 9730016-00



## Piranha Panoramic Holder/Vertical Holder v.4

The Piranha Panoramic Holder/Vertical Holder v.4 is designed for attaching the Piranha meter to dental panoramic equipment or vertical mounting. It can be mounted with an adjustable strap or magnets.

**Art. No:** 9744007-00



## DAP Chamber

Globally, DAP is taking over from CTDI in the dental market. RTI has long been in the lead with a solution that more than meets the new standard.

The DAP Chamber is the perfect tool for field calibration of orthodontic X-ray equipment. You can measure with just one click – fast, easy, and accurate, ensuring your quality control process runs safely and smoothly.

Available in two sizes - 86 mm x 86 mm and 147 mm x 147 mm - where the smaller one will fit perfectly also in the smallest RTI carrying case.

Optional rails on the 147 mm x 147 mm model enable it to fit on any standard collimator on Rad/Fluoro equipment.

Make sure your Piranha is complete! The DAP Chamber is the essential accessory for your dental X-ray QA kit.

**86 mm x 86 mm Art. No:** 9705070-00

**147 mm x 147 mm Art. No:** 9705060-00

### General specifications

Range	6 mGycm <sup>2</sup> /s - 1800 mGycm <sup>2</sup> /s 0.6 mGycm <sup>2</sup> - 1 kGycm <sup>2</sup>
Exp. Uncertainty	±6% at reference conditions RQR5, ±10% RQR2 to RQR10
Valid For	Exp. time >100 ms RTI Chamber Adapter v.1.1.

# Piranha cases

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## Piranha Premium ALU Case

The lightweight aluminum Piranha Premium ALU Case is not only attractive, but it is also just “the right size” to provide space for the Piranha and all its accessories included in the popular Piranha Premium Kits.

It gives the Piranha user the perfect solution for transporting and storing the RTI X-ray QA test tools.

Dimensions: 42 x 31 x 15 cm<sup>3</sup>.

**Art. No:** 9742006-04<sup>3</sup>



## Piranha Premium Outdoor Case

The Piranha Premium Outdoor Case is a tough, dent-resistant transport for your Piranha Premium System.

Made with a rugged, high-impact polypropylene exterior, this case is waterproof and can take a beating. Inside, it has many of the same design features as the Piranha Premium ALU Case. The Piranha and any desired accessories are stored in two convenient and compact layers.

If a tough, dent-resistant, transport option is preferable, the RTI Outdoor Carrying Case may be right for you.

Dimensions: 47 x 36 x 19 cm<sup>3</sup>.

**Art. No:** 9742005-00



## Soft-Shell Case

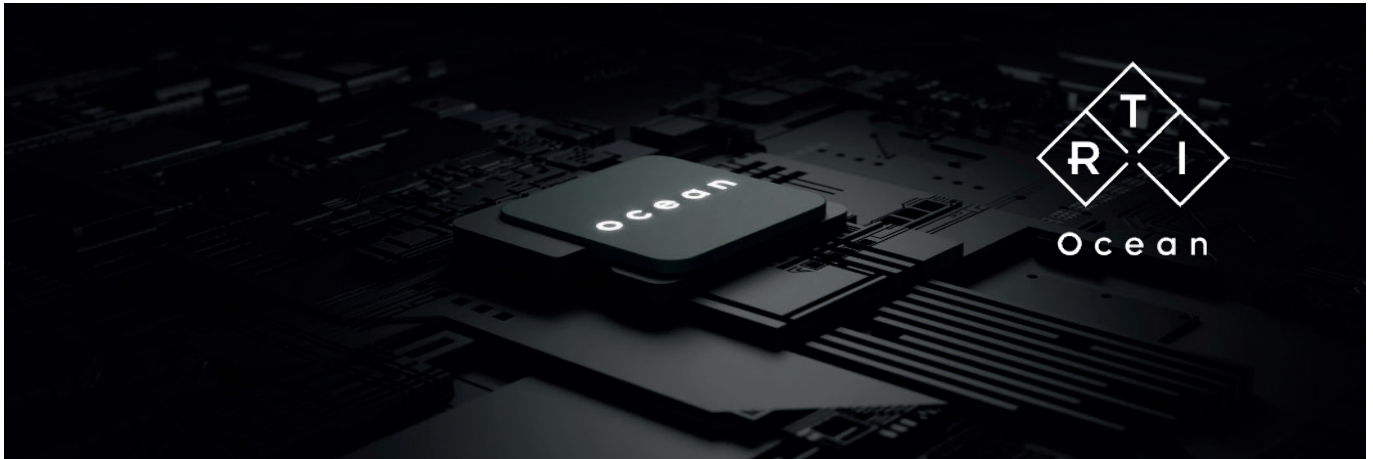
The Soft-Shell Case is a perfect solution for storing your Piranha (or Cobia) meter, a power supply, tablet, and a couple of probes.

Dimensions: 32 x 22 x 9 cm<sup>3</sup>.

**Art. No:** 9742008-00



# Ocean Next™ software



The importance of dedicated software applications to conduct professional QA is growing. Microsoft Excel is flexible but not enough to meet the growing demands for traceability, compliance, and efficiency.

By using Ocean Next™ software, you can plan the measurements in advance, create checklists, add information as a pop-up window for a specific exposure, and include instructions to simplify the work for you and your co-workers using a streamlined user interface.

Choose from the three different license levels of Quick, Advantage, and Professional.

## Quick: for swift QA

Start measuring within seconds! The application detects what instrument and probes you have connected to assist you the best way possible – just Plug n Play!

The interface adapts, and all the measured parameters are displayed on one screen.

The results and waveforms can be retained in the database for later review and compiled in a report.



## Advantage: for steamlined QA measurements

For more advanced QA measurements than Quick, the Advantage license enables customization of templates to suit your needs. Predefined workflows, automation of steps, and graphs.

In Studio View, you can design single-page templates (including analysis and checklists) and important reports, e.g. with your own logo and layout.

## Professional: complete QA system for superior efficiency and compliance

For trend analysis and full traceability of your measurements. You can build a holistic solution for your X-ray QA, by storing your measurements in a searchable database structured to your needs.

# RTI Academy

RTI Academy offers video and classroom-based product and application training.

The combination of classroom and hands-on training enhances the learning process, and lets participants develop new X-ray QA skills.

The Academy also offers customized training packages for specific skills development, as well as focused workshops, to improve QA procedures.



Scheduled training courses and sessions are held at all RTI locations with access to X-ray labs and experienced staff. However, sometimes it is more efficient to run the training at the customer site.

## Classroom training courses

Location: RTI Group Headquarters, Mölndal, Sweden. Access to the RTI Training Center and onsite staff and facilities.

### Piranha Basic Training

One-day training for first-time users to get familiar with their Piranha meter.

The theory is interlaced with hands-on in the lab. Ocean Next™ software Basic Training is included.

### Cobia Basic Training

One-day training for first-time users to get familiar with their Cobia meter.

The theory is interlaced with hands-on in the X-ray lab. Ocean Next™ software Basic Training is included.

### Ocean Next™ Basic Training

Half-day training for beginners. An overview of how Ocean Next™ software can help in their QA processes.

Theory and hands-on in the X-ray lab.

### Ocean Next™ Advanced Training

Two-day theoretical and practical training in Ocean Next™ software template design.

As part of the training, the templates are tested in the X-ray lab for realistic evaluation.



#### Contact

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#### Online

Visit [www.rtigroup.com/training/](http://www.rtigroup.com/training/) to find out more about the RTI Academy.

# Service & Warranty

Since 1982, when we released the DIGI-X system, we've been delivering world-leading X-ray QA solutions of meters, probes, and software.

Our calibration labs, at offices in Mölndal (Sweden) and Towaco (NJ, USA), are designed to serve users of RTI products around the globe with a traceable, reliable, and convenient service. All services are performed by our trained, in-house personnel and our calibrations are traceable to international standards and with true adjustments.

We are the only non-invasive X-ray QA test equipment manufacturer that includes all products in its ISO 17025 accreditation scope.

## Two-year calibration cycle

Due to the high reliability of RTI products, we recommend a two-year calibration cycle. To make it convenient for you, we offer to keep track of when your solution needs to be sent in for calibration. We will send you a reminder two months before your calibration is due, giving you time to plan and schedule your work.

## A reliable and dependable service

At our accredited calibration labs, your solution is always in the best hands! Our trained Service Engineers take the very best care of your meter(s) and probe(s), making sure they perform better for longer. As an owner and user of any RTI solution, you are guaranteed to always receive prompt and professional support if and when required.



We are proud of our ISO/IEC 17025:2017 accreditation – “General requirements for the competence of testing and calibration laboratories”. This is a guarantee that we comply with obligations under the international standards, and that we have a quality management system in place to assure that the calibrations we perform are of the highest quality - each and every time.



The RTI conditional Extended Warranty program, for the Piranha and Cobia, gives you up to ten-year warranty. Each instrument comes with a two-year warranty. By joining the Extended Warranty Program, you can increase your warranty two years at a time – up to ten years.

## RTI Service

All services are performed by specially-trained RTI personnel, and our calibrations are carried out with true adjustments and traceable to international standards.

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# c/o RTI

What we do matters. To patients. To professionals. To us.

It is more than algorithms, technology and design.

It is about setting the standard for quality assurance  
of X-ray imaging.



INDEPENDENT X-RAY  
QUALITY ASSURANCE