full catalogue

ESTABLISHED IN 1991 ®

Pro-Project

UNMATCHED SOLUTIONS FOR QUALITY CONTROL

ISO 9001 · ISO 13485 · ISO 14001 · OHSAS 18001

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www.pro-project.pl

UNMATCHED SOLUTIONS FOR QUALITY CONTROL

QAC24.COM

PHANTOMS

SOFTWARE

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Pro-Project

EXPERIENCE

THE FUTURE NOW

all Quality Control elements are now on one platform

DIAGNOSTIC DEVICES

DOSIMETRY DEVICES

kV mmAl MeV R mA Sv Gy/s

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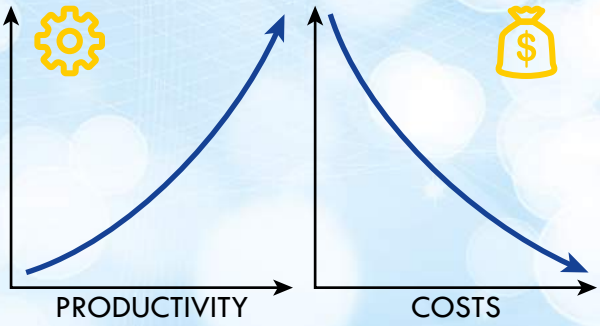
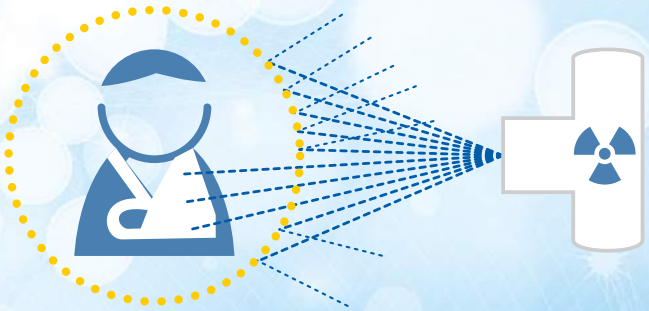
UNMATCHED SOLUTIONS FOR QUALITY CONTROL





1. increased productivity and cost reduction – we do not waste working time of qualified personnel for time-consuming image examinations or test results evaluation (also saving energy)

2. increased patient safety (the ALARA principle) – because all devices for image diagnostics are under control, there is no risk of excessive radiation or wrong diagnosis

3. increased trust in proper operation of diagnostic devices – objective tests show whether a device works properly or not, with any defects easily noticed, diagnosed and corrected

4. ease of implementation and operation – one platform using telemedicine (the DICOM protocol) to control the quality of any number of diagnostic imaging devices

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5. standardization and synergy
– one quality control system in the whole organization

6. unlimited access – test results are accessible online from anywhere in the world, and from any device equipped with an internet browser

7. access to an unprecedented amount of information
– the platform can combine an unlimited number of users from one organization; test results collected by each of them (via Pro-Control or QAC24.com) are accumulated in one place, providing easy and fast access to a huge amount of information from thousands of apparatus

8. unlimited usage potential
– the platform created and developed by us offers unmatched development and adaptation potential to individual needs of each and every user

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

About us

Pro-Project was established in 1991. We are specializing in Quality Assurance and Quality Control of medical imaging and radiotherapy devices. Long years of experience in this field have made it possible for us to develop and produce a wide range of quality assurance devices (phantoms) along with supporting applications. Our products comply with international standards and CE certification (ISO 9001:2008, ISO 13485:2003, ISO 14001:2004 and OHSAS 18001:2007 management systems).

We offer complex hardware and software solutions for quality control in dentistry, radiography, fluoroscopy, mammography, CT, MRI, nuclear medicine and radiotherapy. Thanks to the Pro-Control program and the Quality Assurance Centre cloud service, the entire quality assurance is not only automated, but also integrated on one software platform - the whole QA in one place.

If you have not found what you are looking for, please contact us. We can modify and customize our existing solutions or develop and manufacture tailored products to meet your needs and specifications. We do not impose our solutions on you, but listen to you and adapt to your specific needs.

Mission

Pro-Projects makes it possible to perform quality control with unmatched easiness and accuracy.

Vision

Innovation drives us forward, making our company a matchless global supplier of best quality assurance solutions for medical and industry imaging.

See our corporate video

Follow us on facebook

WATCH US ON YouTube

VISIT THE WEBSITE

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

ISO certificates

Our company has a certified Quality Management System according to:

- ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007 applicable to:
  - Development and production of instruments used for quality control of medical equipment for diagnostic imaging and radiation therapy
  - Domestic and foreign trade in technical medical equipment
  - Services in radiation protection
  - Development of software for management and support of quality control of medical equipment for diagnostic imaging and radiation therapy
- ISO 13485:2003 applicable to:
  - Development and production of instruments used for quality control of medical equipment for diagnostic imaging and radiation therapy.
  - Development of software for management and support of quality control of medical equipment for diagnostic imaging and radiation therapy

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

PRO-PROJECT Henryk Kartaszyński
ul. Kwiatowa 43A
22-105 Okszów, Poland

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 9001:2008

The Quality Management System is applicable to:

Development and production of instruments used for quality control of medical equipment for diagnostics imaging and radiotherapy. Domestic and foreign trade in technical medical equipment. Services in radiation protection. Development of software for management and support of quality control of medical equipment for diagnostic imaging and radiotherapy.

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

PRO-PROJECT Henryk Kartaszyński
ul. Kwiatowa 43A
22-105 Okszów, Poland

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 13485:2003

The Quality Management System is applicable to:

Development and production of instruments used for quality control of medical equipment for diagnostics imaging and radiotherapy. Development of software for management and support of quality control of medical equipment for diagnostic imaging and radiotherapy.

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Environmental Management System of:

Pro-Project Henryk Kartaszyński
ul. Kwiatowa 43A
22-105 Okszów, Poland

has been approved by Lloyd's Register Quality Assurance to the following Environmental Management System Standard:

ISO 14001:2004

The Environmental Management System is applicable to:

Development and production of instruments used for quality control of medical equipment for diagnostics imaging and radiotherapy. Domestic and foreign trade in technical medical equipment. Services in radiation protection. Development of software for management and support of quality control of medical equipment for diagnostic imaging and radiotherapy.

Lloyd's Register LRQA

CERTIFICATE OF APPROVAL

This is to certify that the Occupational Health & Safety Management System of:

Pro-Project Henryk Kartaszyński
ul. Kwiatowa 43A
22-105 Okszów, Poland

has been approved by Lloyd's Register Quality Assurance to the following specification:

OHSAS 18001:2007

The Occupational Health & Safety Management System is applicable to:

Development and production of instruments used for quality control of medical equipment for diagnostics imaging and radiotherapy. Domestic and foreign trade in technical medical equipment. Services in radiation protection. Development of software for management and support of quality control of medical equipment for diagnostic imaging and radiotherapy.

We have prepared several QA / QC kits consisting of must-have phantoms, accessories and software that you can use in different situations depending on your requirements.

These can be your go-to selections when you are not sure what to choose for tests of a given modality.

We have introduced gradation of kits depending on the purpose and level of sophistication required:

- **BASIC:** these sets are meant for constancy level testing purposes - tests that can be done practically by everyone who can use a diagnostic device
- **PRO:** sets meant for acceptance and specialized testing - performed by specialized personnel, for example a medical physicist

DENTISTRY

RADIOGRAPHY/ FLUOROSCOPY

MAMMOGRAPHY

COMPUTED TOMOGRAPHY

MAGNETIC RESONANCE

NUCLEAR MEDICINE

DENTISTRY

Pro-Dent 2D BASIC kit (dental intra-oral and OPG devices)

Pro-Dent Set All	25
Software	19
carrying case	

Pro-Dent 2D PRO kit (dental intra-oral and OPG devices)

Pro-Dent Set All	25
Pro-Slit	120
Pro-Stand	123
Software	19
carrying case	

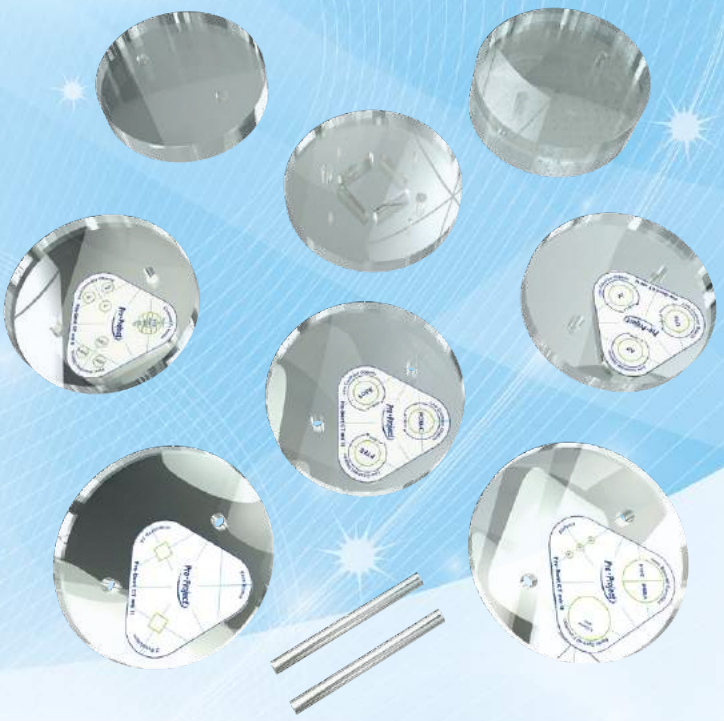
DENTISTRY

Pro-Dent 3D BASIC kit (CBCT, DVT and other 3D imaging devices)

Pro-Dent CT	27
Software	19
carrying case	

Pro-Dent 3D PRO kit (CBCT, DVT and other 3D imaging devices)

Pro-Dent CT mk II	29
Software	19
carrying case	



DENTISTRY

Pro-Dent All BASIC kit
(Intra-oral, OPG, CBCT, DVT and other 3D imaging devices)

Pro-Dent Set All	25
Pro-Dent CT	27
Software	19
carrying case	

Pro-Dent All PRO kit
(Intra-oral, OPG, CBCT, DVT and other 3D imaging devices)

Pro-Dent Set All	25
Pro-Dent CT mk II	29
Pro-Slit	120
Pro-Stand	123
Software	19
carrying case	

RADIOGRAPHY/FLUOROSCOPY

Pro-Digi BASIC kit (radiography)

Pro-Digi	34
Pro-RF Al 25	39
Pro-RF Cu 1	
Pro-RF Rack	37
Pro-RF Stand	38
Pro-RF AEC Cu	62
Software	19
carrying case	

Pro-Digi PRO kit (radiography)

Pro-Digi	34
Pro-RF Al 25	39
Pro-RF Cu 1	
Pro-RF Rack	37
Pro-RF Stand	38
Pro-RF AEC Cu	62
Pro-RF AEC PMMA	61
Pro-RF Contrast	54
Pro-Slit	120
Pro-Stand	123
Software	19
carrying case	

RADIOGRAPHY/FLUOROSCOPY

Pro-RF BASIC kit (radiography and fluoroscopy)

Pro-Fluo 150	36
Pro-RF Al 25	39
Pro-RF Rack	37
Pro-RF Stand	38
Pro-RF AEC Cu	62
Software	19
carrying case	

Pro-RF PRO kit (radiography and fluoroscopy)

Pro-Fluo 150	36
Pro-RF Al 25	39
Pro-RF Rack	37
Pro-RF Stand	38
Pro-RF AEC Cu	62
Pro-RF AEC PMMA	61
Pro-RF Contrast	54
Pro-Slit	120
Pro-Stand	123
Software	19
carrying case	

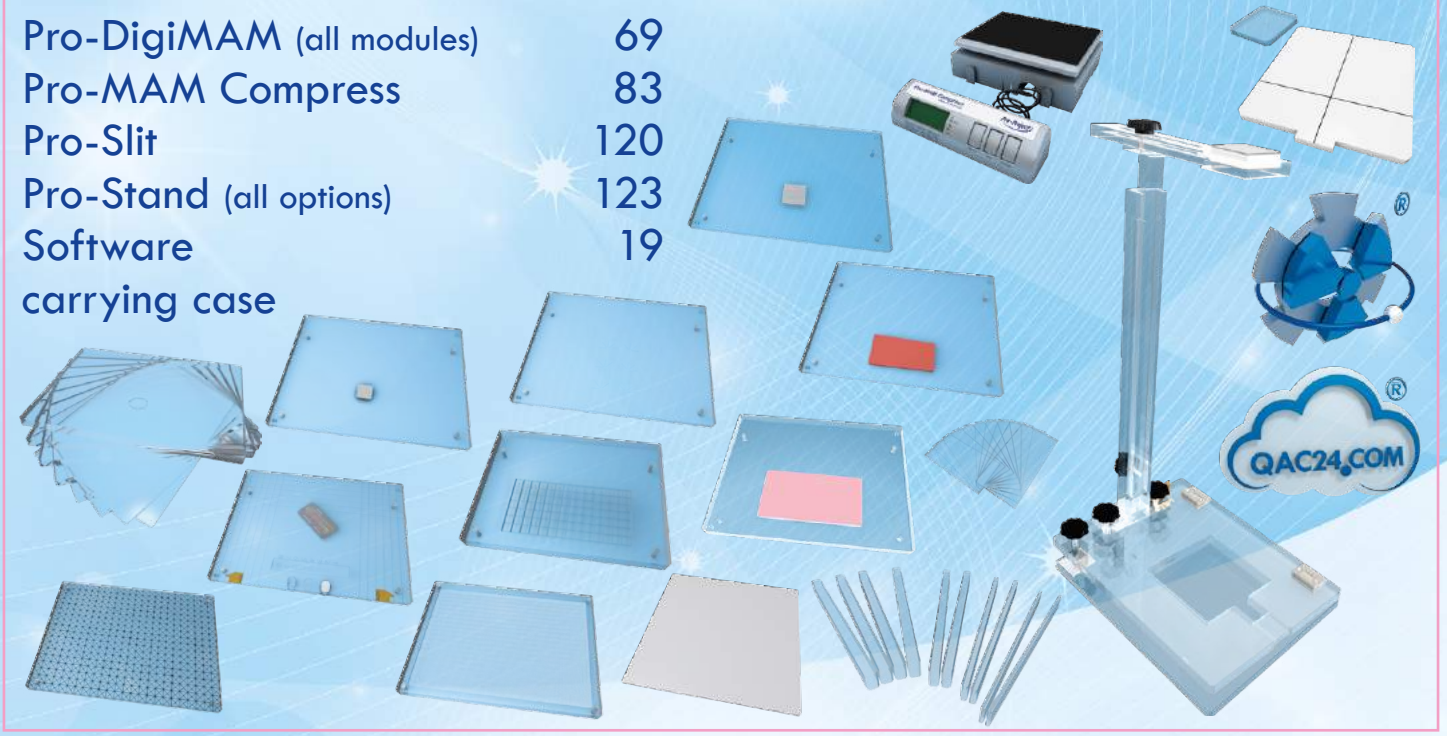
MAMMOGRAPHY

Pro-DigiMAM BASIC kit

Pro-DigiMAM (main module, resolution module, CNR module, contrast details module)	69
Pro-MAM Compress	83
Software	19
carrying case	

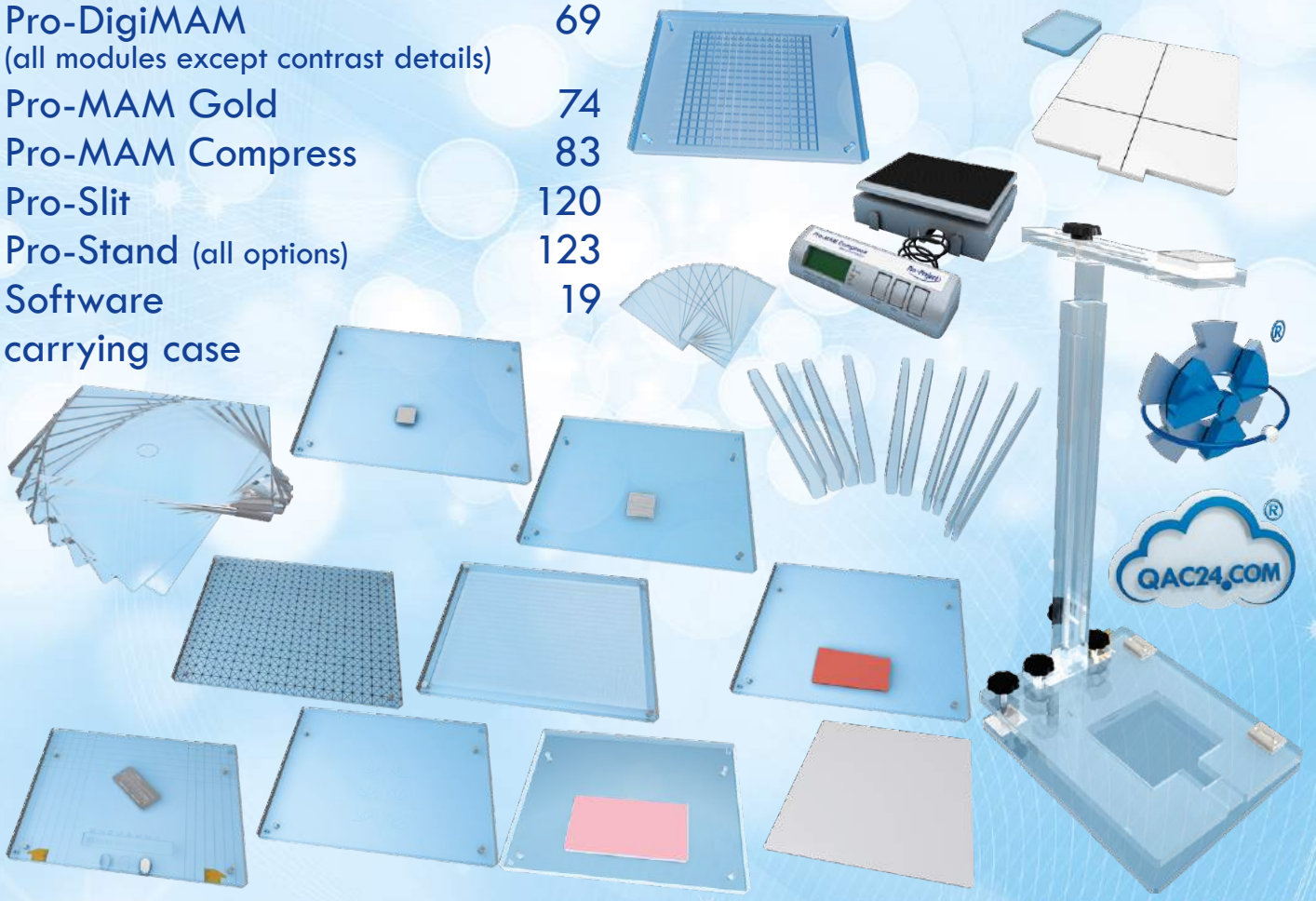
Pro-DigiMAM PRO kit

Pro-DigiMAM (all modules)	69
Pro-MAM Compress	83
Pro-Slit	120
Pro-Stand (all options)	123
Software	19
carrying case	



MAMMOGRAPHY

Pro-MAM PRO kit



COMPUTED TOMOGRAPHY

Pro-CT BASIC kit

Pro-CT	88
Software	19
carrying case	

Pro-CT PRO kit

Pro-CT	88
Pro-CT Align	92
Software	19
carrying case	

MAGNETIC RESONANCE

Pro-MRI kit

Pro-MRI	97
Software	19
carrying case	

NUCLEAR MEDICINE

Pro-NM BASIC kit

Pro-NM Performance 102
Software 19
carrying case

Pro-NM PRO kit

Pro-NM Performance ECT 103
Pro-NM Linear Source Module 104
Pro-NM Resolution 106
Pro-NM FloodRECT XL 114
Software 19
carrying case

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Pro-Control

Whole Quality Assurance in one place

Multiple-Language Support

VISIT THE WEBSITE

- **You will easily connect with the PACS archive** – DICOM communication.
- **The program will create for you a clear archive of test results from any number of radiological devices** – no more thousands of paper forms, now everything is on your computer.
- **The program will quickly and automatically analyze for you test images** of our phantoms taken directly from PACS or from a file (including a graphic one, e.g. from a film scanner).
- **When automatic image analysis is not enough** for you, the program will provide you with numerous useful analytical tools integrated in a fully functional DICOM viewer, e.g. SNR or MTF measurement.
- **You can assess tests on standard non-medical screens,** it is not necessary to use diagnostic workstations.
- **At a single glance** you will see which test has not been passed and why.

Other features:

- defining the range of tests conducted for each device individually
- defining the criteria for the approval of test results
- printing reports
- multiple-language support, among others: English, Spanish, Japanese, Russian, Polish
- easy and intuitive user interface
- automatic software updating via the Internet
- low purchase costs, plugings added free of charge to every phantom purchased

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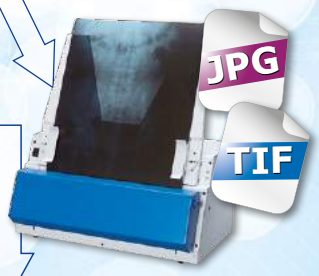
from dental apparatus to computer tomographs



film scanning

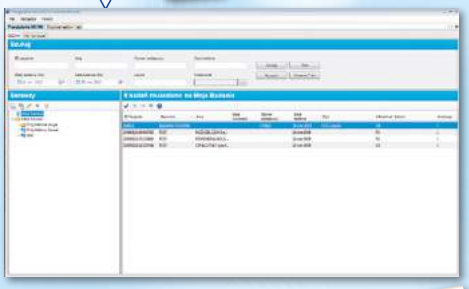
CONDUCTING A TEST

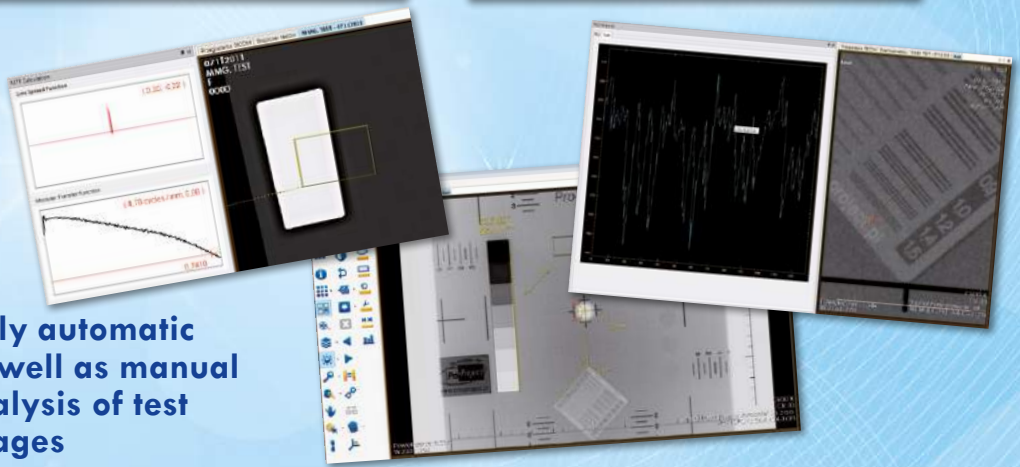
IMAGE SAVING

IMAGE IMPORT

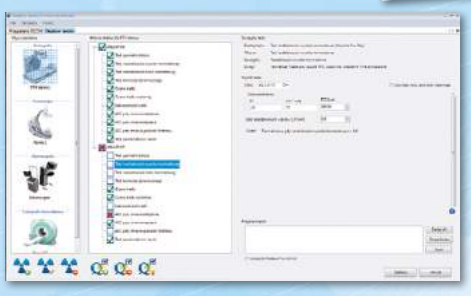
IMAGE ANALYSIS

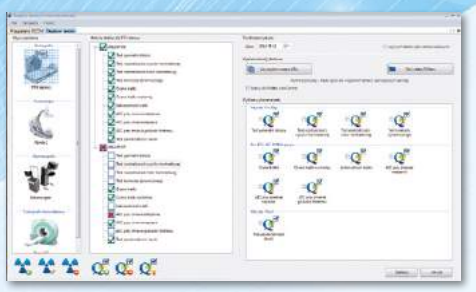
RESULT SAVING AND ANALYSIS





Fully automatic as well as manual analysis of test images





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Quality Assurance Centre

QAC24.COM®

VISIT THE WEBSITE

Let our cloud do Your work for You

The Quality Assurance Centre **is a cloud service** designed to **significantly reduce workload** needed to **perform QA and QC tests** and to **greatly improve its accuracy and reliability.**

After **performing tests** on diagnostic devices, **DICOM images are sent to QAC** where they are **analyzed by auto-analysis software** (Pro-Control based). Afterwards, a **report is produced** providing all important data that could be read from a phantom image. This report of several pages will give you information about, for example, geometry and collimation, or dynamic contrast of your X-ray device.

Additionally, **all test results and reports are stored** on our online server giving you not only **information about the current status of your devices** but also **reference values from the previous** tests. This way you can see **how your device is functioning over a longer period of time.**

The whole QA/QC process is **supported by our Knowledge Base** that gives you information on how tests should be done and **helps you understand image analysis** reports. Thanks to this you gain a better understanding and a **greater confidence in your diagnostic device performance.**

This results in:

- **increased productivity and cost reduction** – there is no need to waste time of qualified personnel for time-consuming image analysis or test results evaluation,
- **increased patient safety** – since all devices are controlled, there is no risk of unnecessary radiation or misdiagnosis,
- **increased confidence in imaging devices** – objective tests show how a device is performing and all glitches can be quickly spotted, diagnosed and repaired,
- **better understanding** of Quality Control and diagnostic device characteristic parameters

Product features:

- cloud-based service accessible from everywhere,
- unlimited number of supported diagnostic devices,
- complete test history for each device,
- detailed reports generated for each image/study sent,
- results of individual tests are collated into fluctuation reports / diagrams showing how each parameter behaves over time,
- low costs of participation,
- no additional software required on your side, just an internet browser,
- flexible and easy payment options: per image, per time period, etc.,
- easy and intuitive user interface.

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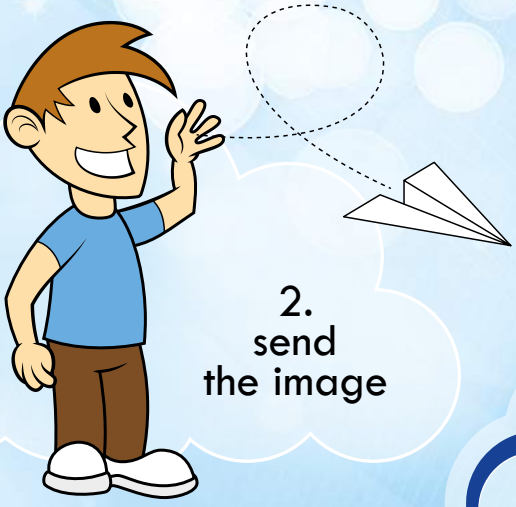
You need only 2-steps:

1. take a picture of the phantom



2. send the image

QAC24.COM®

get the results

- Detailed test reports
- Fluctuation reports
- Complete history of test results with DICOM images
- Knowledge Base

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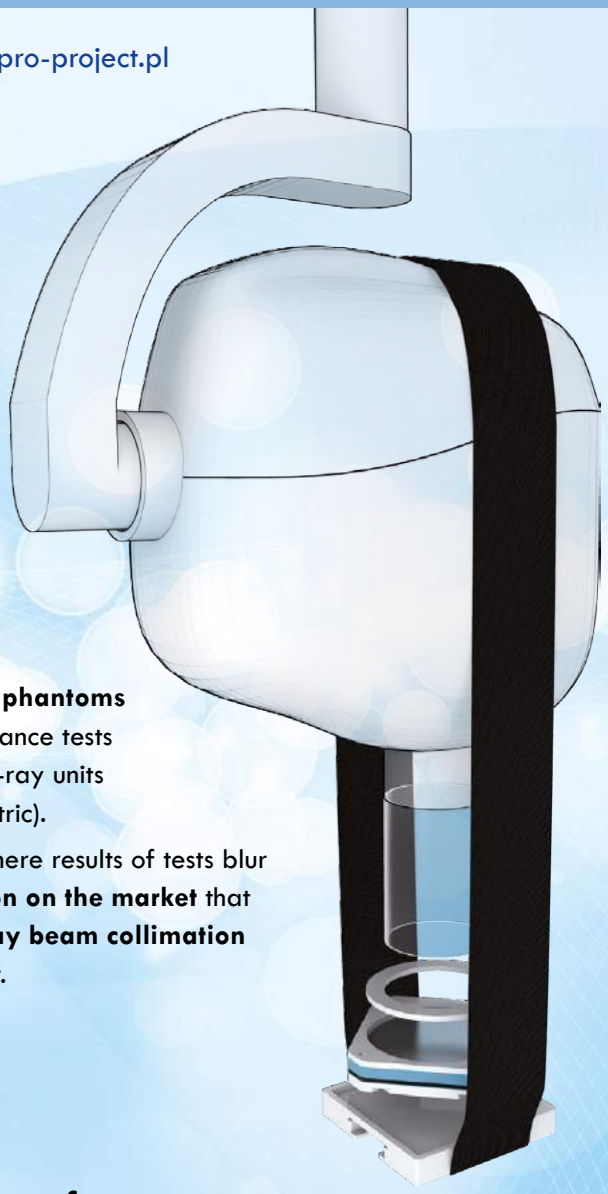
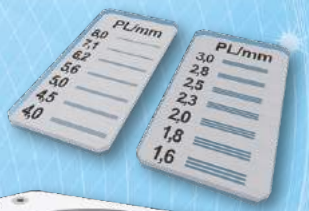


Pro-Dent Set

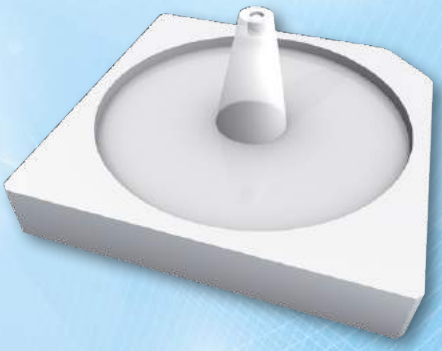
universal set of phantoms for analogue and digital units

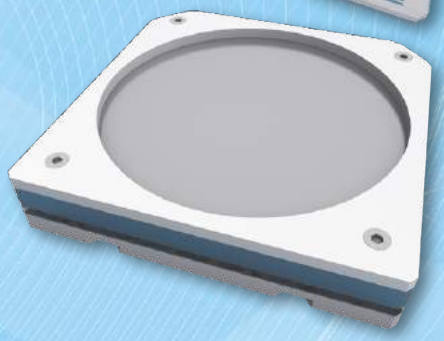
The Pro-Dent set is a **universal set of phantoms** for carrying out constancy and acceptance tests of **conventional and digital** dental X-ray units (intra-oral, panoramic and cephalometric).

This is **not an all-in-one device** where results of tests blur each other out. This is the **only solution on the market** that makes it possible to **measure the X-ray beam collimation** with a dental film or a digital detector.



The **Pro-Dent** set consists of:





Pro-Dent α phantom

Technical data (can be modified to customer specifications):

- 3 step wedge (first step made of copper foil 0.3 mm thick, the next ones are made of polytetrafluoroethylene 8 and 16 mm thick)
- cover made of PMMA

Pro-Dent β phantom

Technical data (can be modified to customer specifications):

- cone for perpendicular X-Ray beam control in the range of 0° ÷ 1.5°
- pattern for beam radius estimation
- cover made of PMMA

Pro-Dent γ phantom

Technical data (can be modified to customer specifications):

- pattern for line pair resolution evaluation (from 4 to 8 LP/mm)
- optional second pattern for line pair resolution evaluation (from 1.6 to 3 LP/mm) – OPG units
- four holes in 0.5 mm Al foil for low contrast resolution tests
- additional 6 mm aluminium filter
- cover made of PMMA

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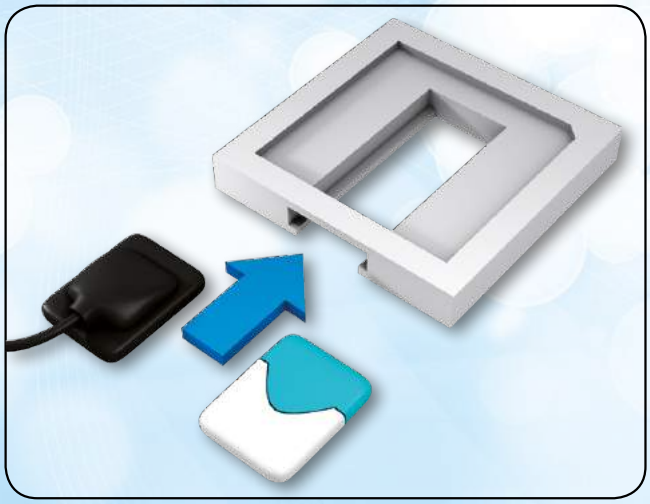
With the Pro-Dent set you can do the following tests:

- dose reproducibility
- development process stability
- perpendicular X-ray beam (range 0° ÷ 1.5°)
- limitation and alignment of the X-Ray beam (including beam radius measurement)
- spatial / line pair resolution (perpendicular, parallel and rotated 45° to anode-cathode line)
- low contrast resolution



Product features:

- complies with:
  – IEC 61223-2-7 and IEC 61223-3-4
  – DIN 6868-5 and DIN V 6868-151
  – ÖNORM S 5240-5 and ÖNORM S 5240-11
- CE certified
- the Manual provides detailed guidelines for carrying out each test,
  results assessment and registration

Accesories:

- 0.8 mm copper filter – patient's head equivalent
- positioning stand with place for an analogue film or a digital detector
- band for firm, perpendicular attachment of the phantom to the X-Ray unit's beam applicator
- rings for centering phantoms on the X-Ray unit's beam applicator
- CD with documentation
- elegant and convenient aluminium box for storing phantoms

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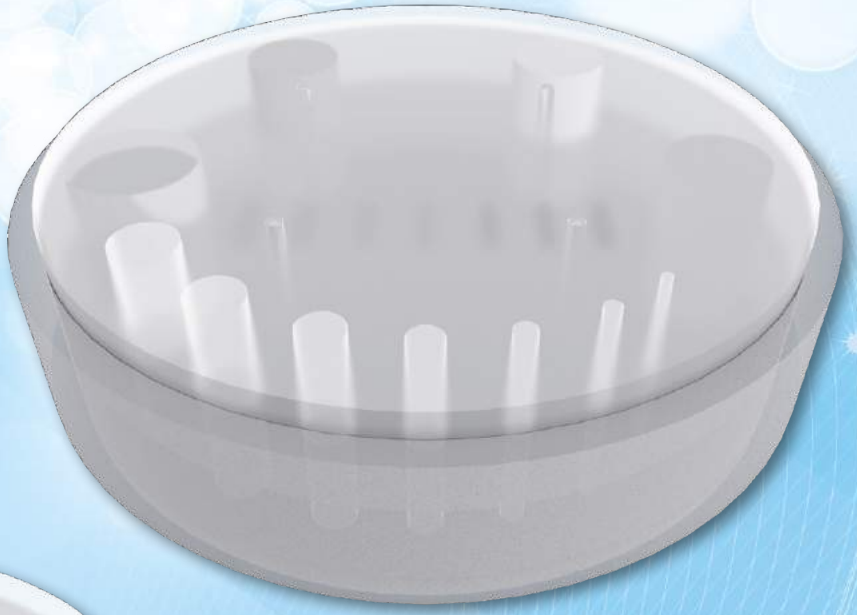
Pro-Dent CT

The Pro-Dent CT phantom is an innovative solution for **quality control of dental tomography systems and other X-ray devices with 3D function.** It was developed in cooperation with leading producers of dental tomography units.

The size of the phantom corresponds to a human skull (15cm in diameter) and **all test patterns are located in the area matching the maxilla.** This allows for a reliable and quick testing of X-ray devices, even with a limited field of visualization. Also, **quality is evaluated in the clinically essential region.**

With the Pro-Dent CT you can do the following tests:

- image geometry
- pixel (matrix) size
- artefacts, noise
- homogeneity
- linearity
- contrast
- high-contrast resolution
- low-contrast resolution (contrast sensitivity)



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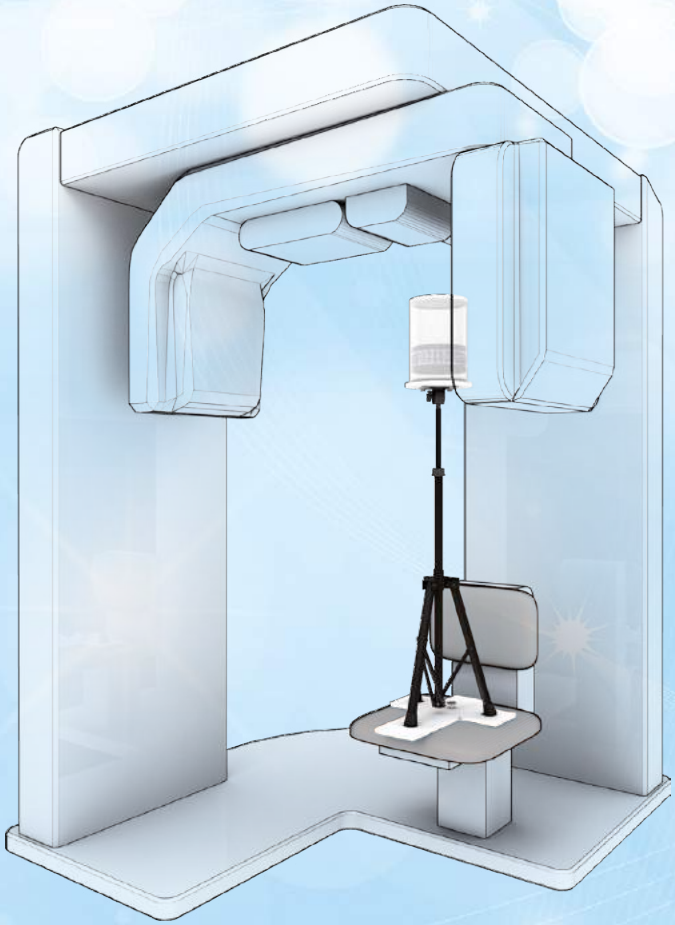
Technical data (can be modified to customer specifications):

- main test module dimensions: ø 150 mm, 40 mm thickness, containing:
  – four sensitometric samples ø 20 mm made of: PTFE (teflon), POM C (polyoxymethylene), PE 300 (polyethylene) and air
  – four o 3 mm rods, filled with air, placed in vertexes of a square (side length 50 mm)
  – seven low contrast rods of a different diameter: 2, 3, 4, 6, 8, 10, 12 mm, filled with a substance whose density is 3% different from the body of the module
  – seven high contrast patterns for line pair resolution evaluation, from 10 to 16 LP/cm
  – three beads: ø 0.2, 0.25, 0.3 mm
- optional ø 150 mm, 20 mm thick geometry modue with two pairs of aluminum ramps, empty rods in vertexes of a square and positioning markers for detailed evaluation of image geometry and laser position verification
- additional smaller homogenous cylinder filled with a substance with a density similar to water: ø 150 mm, 30 mm thickness
- additional larger homogenous cylinder filled with a substance with a density similar to water: ø 150 mm, 130 mm thickness
- test stand with a table for placing the phantom in the test position
- folding base for test stand positioning on the X-ray unit's chair
- convenient, portable case for storing and transporting the phantom



Product features:

- complies with:
  – IEC 61223-3-4 and IEC 61223-3-5
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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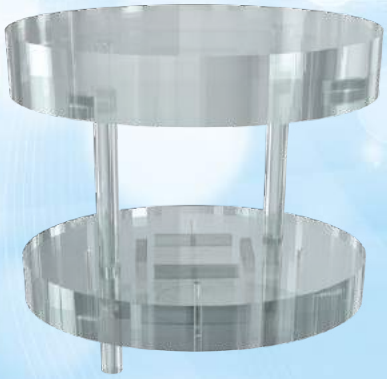
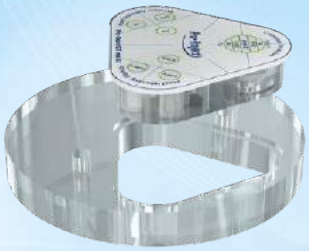
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Dent CT mk II

The **new Pro-Dent CT mk II** phantom is a versatile quality control tool of **dental Cone-Beam CT, Dental Volume Tomography (DVT)** and other **3D imaging devices** according to the **Radiation Protection Report no 172** by **SEDENTEXCT.**

The phantom consists of a main PMMA cylinder that houses modules with different test objects. Thanks to this design, you can perform tests with devices with a small FOV at different positions in the 160 mm phantom.





NEW

also for small FOV

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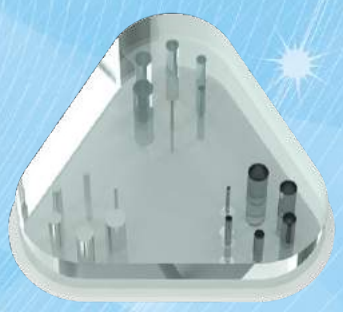
Technical data
(can be modified to customer specifications):

- diameter: 160 mm
- made of PMMA (1.19 g/cm^3)
- total length: 170 mm
- noise / uniformity section:
  - uniform PMMA part of the phantom
- geometric distortion section:
  - an array of 2.0 mm diameter, 3.0 mm long holes uniformly pitched at 10.0 mm intervals
- slice geometry section:
  - 20 mm thick module with two pairs of aluminum ramps and empty rods in vertexes of a square for detailed evaluation of slice thickness and geometry and laser position verification
- 5 layer modules section with modules containing
  - Linear Spread Function (LSF) PTFE / PMMA interface
  - Point Spread Function (PSF) - 0.25 mm stainless steel wire in air
  - XY high contrast resolution (aluminum/polymer) - 1.0, 1.7, 2.0, 2.5, 2.8, 4.0, 5.0 LP/mm
  - Z high contrast resolution (aluminum/polymer) - 1.0, 1.7, 2.0, 2.5, 2.8, 4.0, 5.0 LP/mm
  - 6 low-contrast groups of 1.0, 2.0, 3.0, 4.0, 5.0, 6.0 mm rods made of: aluminum, PTFE, POM-C (delrin), PE-300, air and water emulating epoxy; background made of PMMA
  - 10 mm rods made of aluminum, PTFE, POM-C (delrin), PE-300, air and water emulating epoxy suspended in PMMA - pixel intensity / HU values samples
  - stacked 20 mm diameter contrast-to-noise discs made of aluminum, PTFE, POM-C (delrin), PE-300 and air suspended in PMMA
  - three 5.0 mm diameter titanium rods embedded in PMMA - beam hardening artefacts
- positioning aids on the outside surface of the phantom
- test stand with spirit level for accurate placing of the phantom in the test position
- folding base for test stand positioning on the X-ray unit's chair
- convenient, portable case for storing and transporting the phantom
- optional additional homogeneity disc

Product features:

- Complies with:
  - Radiation Protection no 172 report by the SEDENTEXCT
  - IEC 61223-3-4 and IEC 61223-3-5
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration



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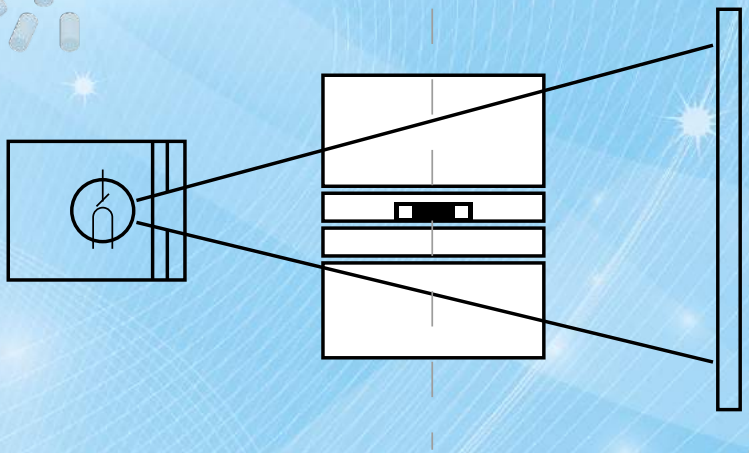
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Dent CT 161



Phantom for acceptance and constancy testing of **3D function of dental Cone-Beam CT, Dental Volume Tomography (DVT) and 3D imaging devices** according to **DIN 6868-161** and **QS-RL.**

Technical data (can be modified to customer specifications):

- diameter: 160 mm
- 20 mm thick main module containing:
  – test object containing equivalents of air, soft tissue and bone
  – positioning markers
  – bubble level
- 20 mm, 50 mm and 60 mm thick PMMA modules with positioning aids
- test stand with a table for placing the phantom in the test position
- folding base for test stand positioning on the X-ray unit's chair
- convenient, portable case for storing and transporting the phantom

Product features:

- Complies with:
  – DIN 6868-161
  – QS-RL
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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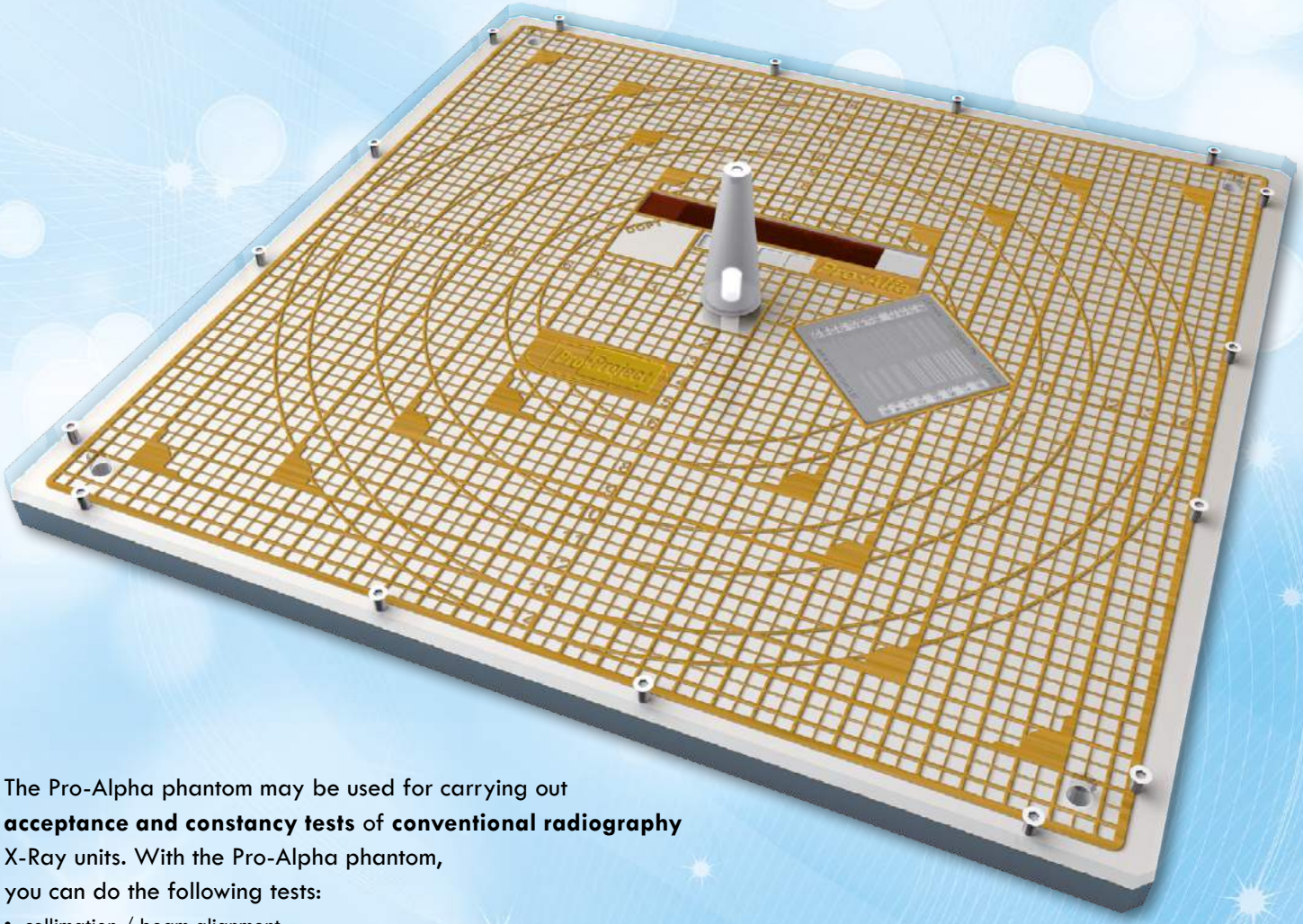
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Alpha



The Pro-Alpha phantom may be used for carrying out **acceptance and constancy tests** of **conventional radiography** X-Ray units. With the Pro-Alpha phantom, you can do the following tests:

- collimation / beam alignment
- position and size of the effective radiation field
- dynamic range
- spatial resolution
- contrast resolution
- image quality (distortion in fluoroscopy)

Technical data (can be modified to customer specifications):

- dimensions: 308 x 308 x 11 mm
- brass mesh pattern (5 mm scale) embedded in PMMA
- 7-step copper wedge
- 4 low contrast elements
- markings to determine the size and position of the effective radiation field
- pattern for line pair resolution evaluation (from 0.6 to 5.0 LP/mm)
- cone for the perpendicular X-Ray beam control in the range of 0° ÷ 1.5°

Product features:

- complies with:
  – IEC 61223-3-1
  – DIN 6868/3 and DIN 6868/4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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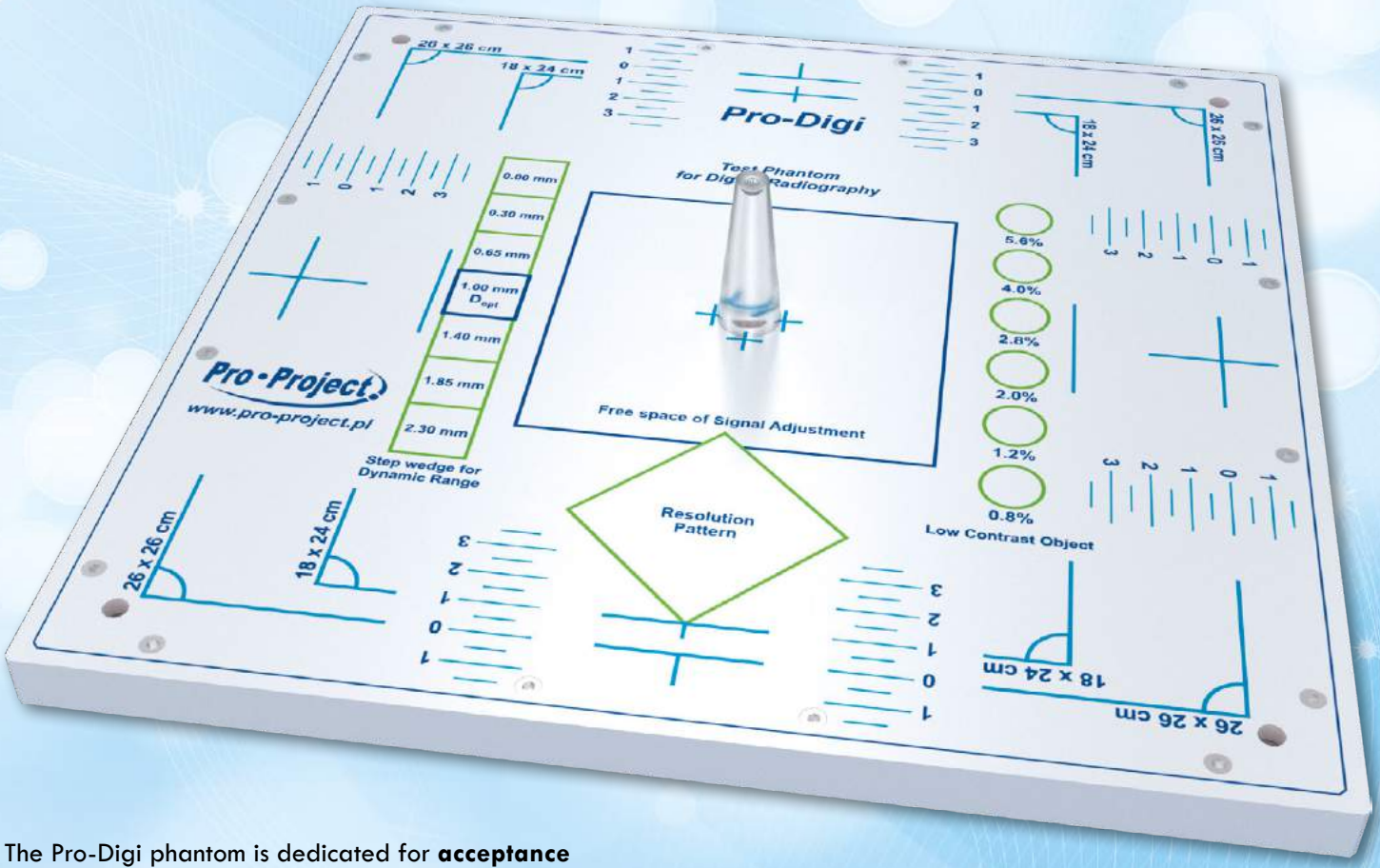
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Digi



The Pro-Digi phantom is dedicated for **acceptance and constancy tests** of **digital radiography** equipment. It can be used to measure:

- collimation/beam alignment
- position and size of the effective radiation field
- dynamic range
- spatial resolution
- contrast resolution
- homogeneity

Technical data (can be modified to customer specifications):

- dimensions: 308 x 308 x 12 mm
- 1mm thick copper plate embedded in PMMA
- 7-step copper wedge
- 6 low contrast elements
- free area for signal calibration
- markings to determine the size and position of the effective radiation field
- pattern for line pair resolution evaluation (from 0.6 to 5.0 LP/mm)
- optional cone for perpendicular X-Ray beam control in the range of 0° ÷ 1.5°

Product features:

- complies with:
  – IEC 61223-3-1
  – DIN 6868/58 and DIN 6868/13
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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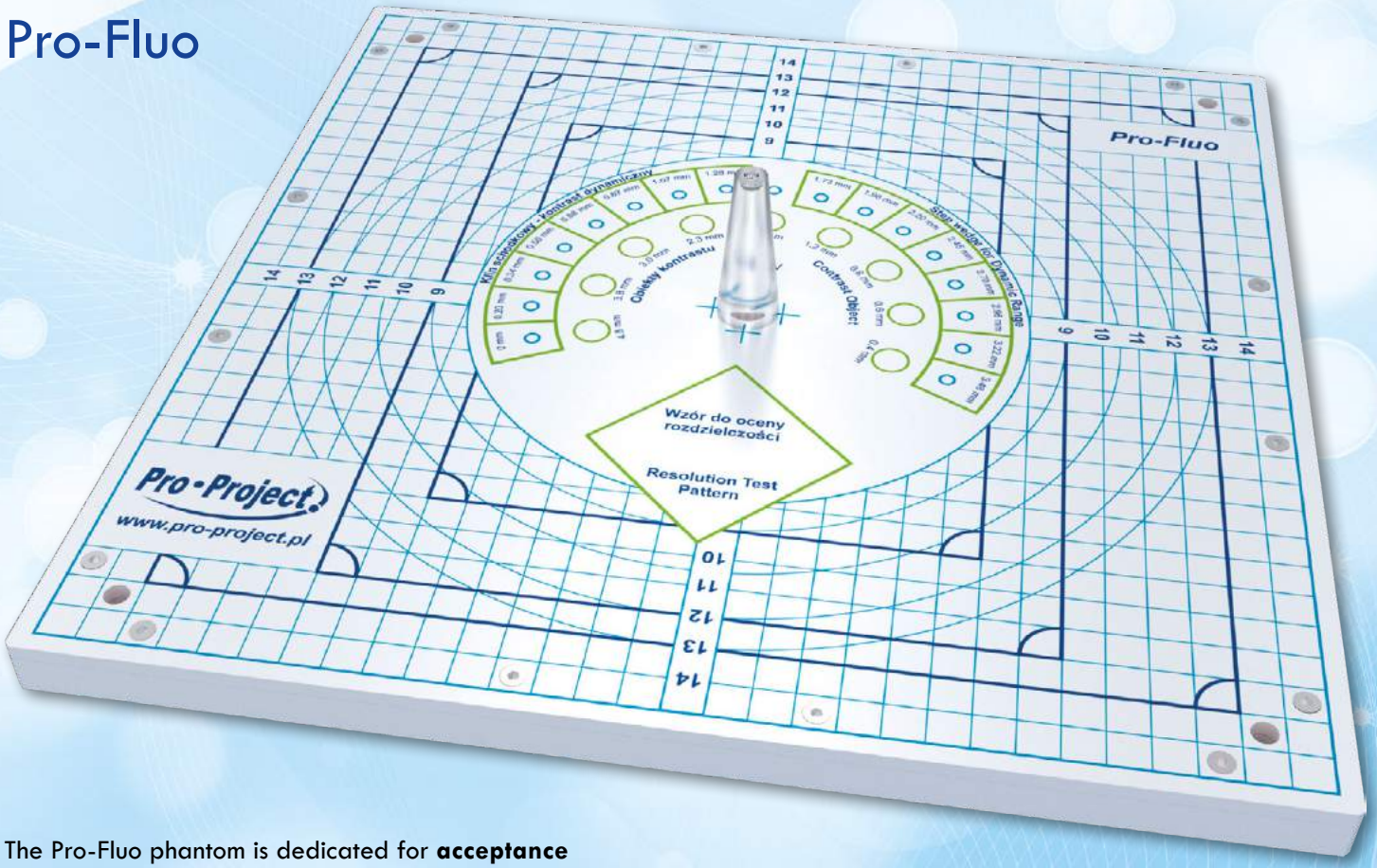
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Fluo



The Pro-Fluo phantom is dedicated for **acceptance and constancy tests** of **digital and analogue radiography and fluoroscopy** equipment. It can be used to measure:

- collimation/beam alignment
- position and size of the effective radiation field
- dynamic range
- spatial resolution
- contrast resolution
- homogeneity
- beam quality

Technical data (can be modified to customer specifications):

- dimensions: 308 x 308 x 15 mm
- 1.5 mm thick copper plate with mesh pattern embedded in PMMA
- 17-step copper wedge (thickness 0.0 mm to 3.5 mm) with additional low contrast details (4 mm diameter)
- 9 low contrast elements (15 mm diameter)
- pattern for line pair resolution evaluation (from 0.6 to 5.0 LP/mm)
- markings to determine the size and position of the effective radiation field
- optional cone for perpendicular X-Ray beam control in the range of 0° ÷ 1.5°
- optional object for verification of used kV-range

Product features:

- complies with:
  – IEC 61223-3-1
  – DIN 6868 – 4 (2007)
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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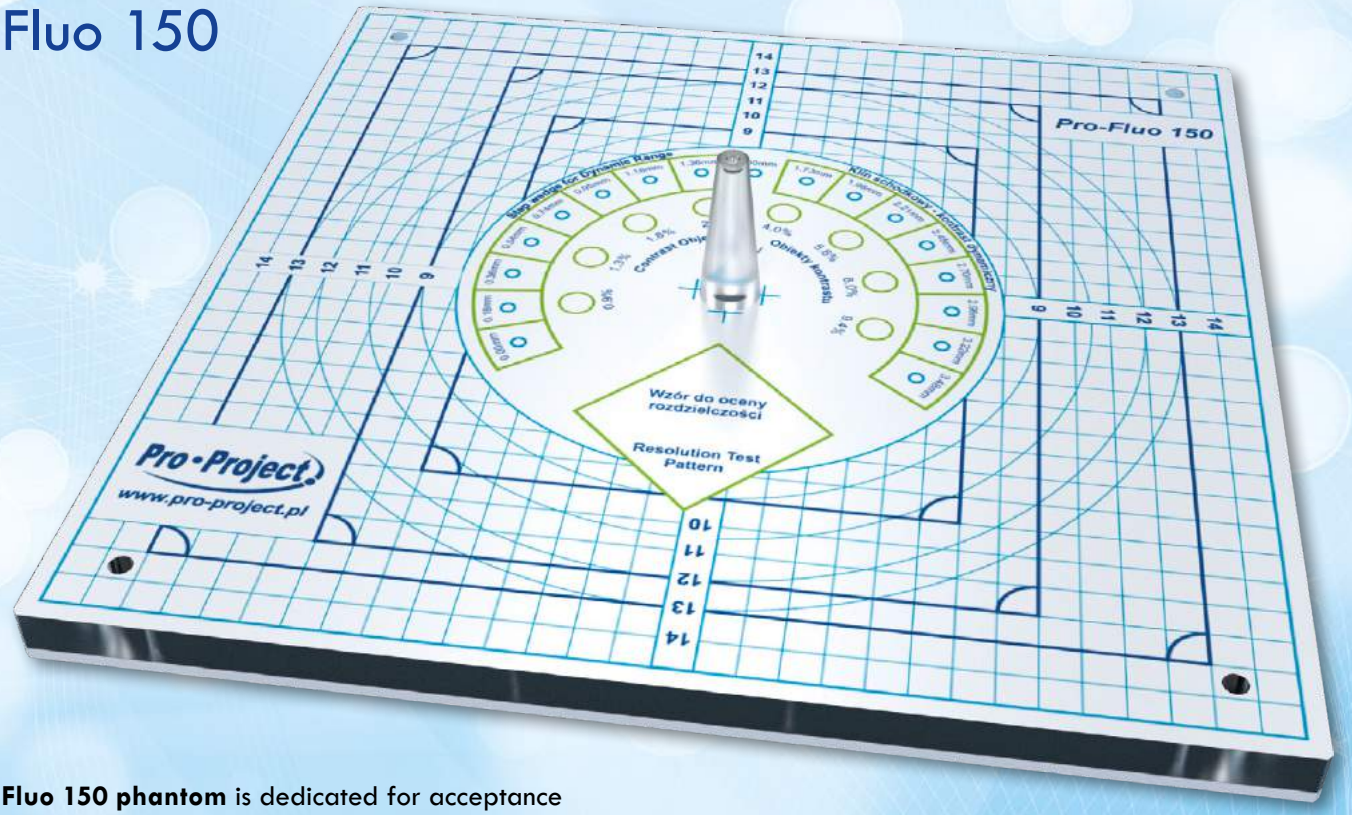
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Fluo 150



The Pro-Fluo 150 phantom is dedicated for acceptance and constancy tests of radiography and fluoroscopy equipment **according to the new DIN 6868-150 standard.**

It can be used to measure:

- collimation/beam alignment
- position and size of the effective radiation field
- dynamic range
- spatial resolution
- contrast resolution
- homogeneity
- beam quality

Technical data

(can be modified to customer specifications):

- dimensions: 308 x 308 x 18.5 mm
- 1.5 mm thick copper plate with mesh pattern embedded in PMMA
- total PMMA thickness 17 mm
- 17-step copper wedge (thickness 0.0 mm to 3.48 mm) with additional low contrast details (4 mm diameter)
- 8 low contrast elements (10 mm diameter)
- pattern for line pair resolution evaluation (from 0.6 to 5.0 LP/mm)
- markings to determine the size and position of the effective radiation field
- optional cone for perpendicular X-Ray beam control in the range of 0° ÷ 1.5°

Product features:

- complies with:
  – IEC 61223-3-1
  – DIN 6868-150
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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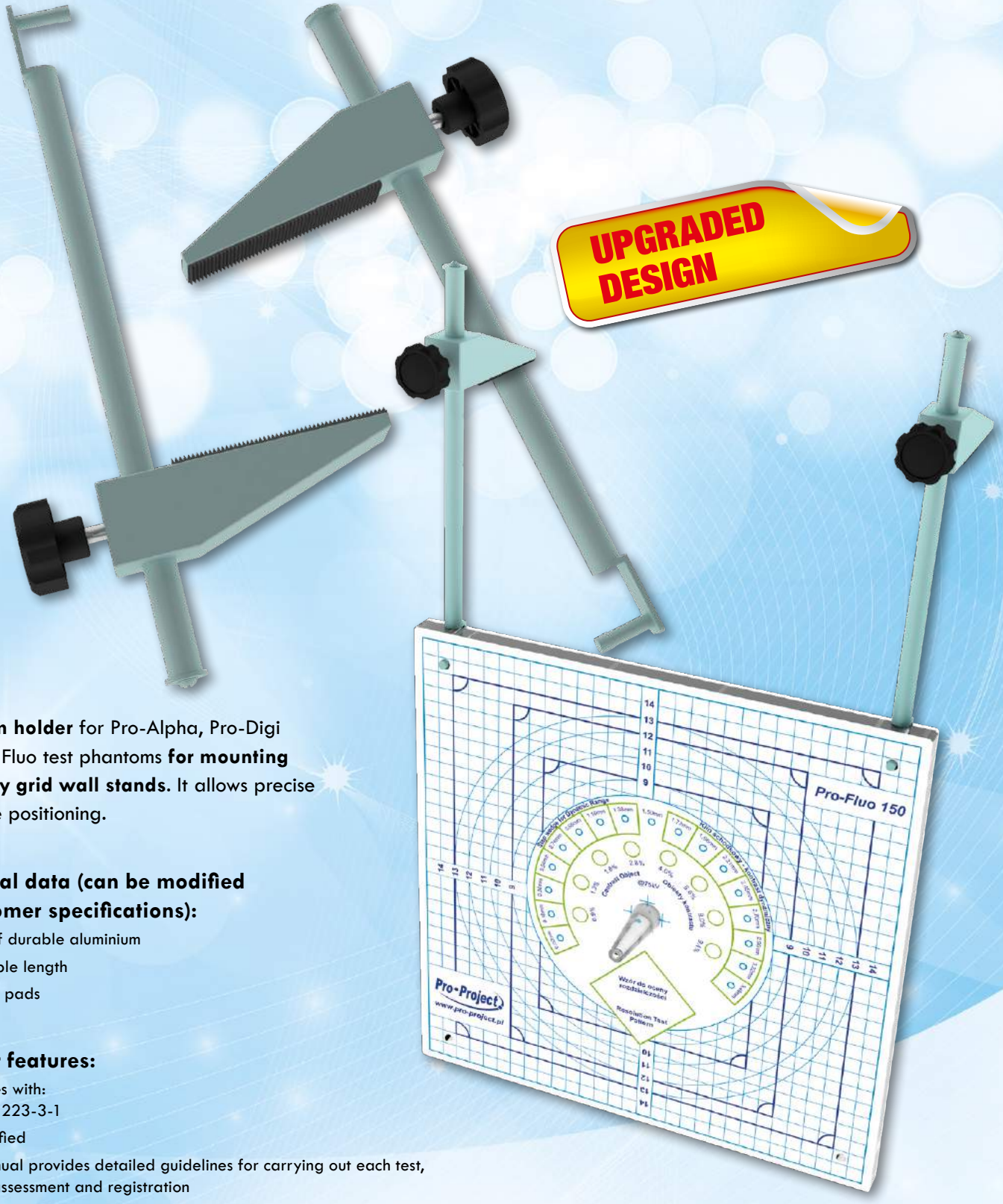
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Rack



Phantom holder for Pro-Alpha, Pro-Digi and Pro-Fluo test phantoms **for mounting on Bucky grid wall stands.** It allows precise and safe positioning.

Technical data (can be modified to customer specifications):

- made of durable aluminium
- adjustable length
- anti-slip pads

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Stand

Spacer plate with adjustable legs for positioning Pro-Alpha and Pro-Digi **test phantoms near the X-Ray tube** on units without insertion slots (e.g. over-table / under-table tubes, C-arms etc.).

Technical data (can be modified to customer specifications):

- table top made of PMMA
- legs made of aluminium
- dedicated space for the Pro-RF Al 25 absorption filter

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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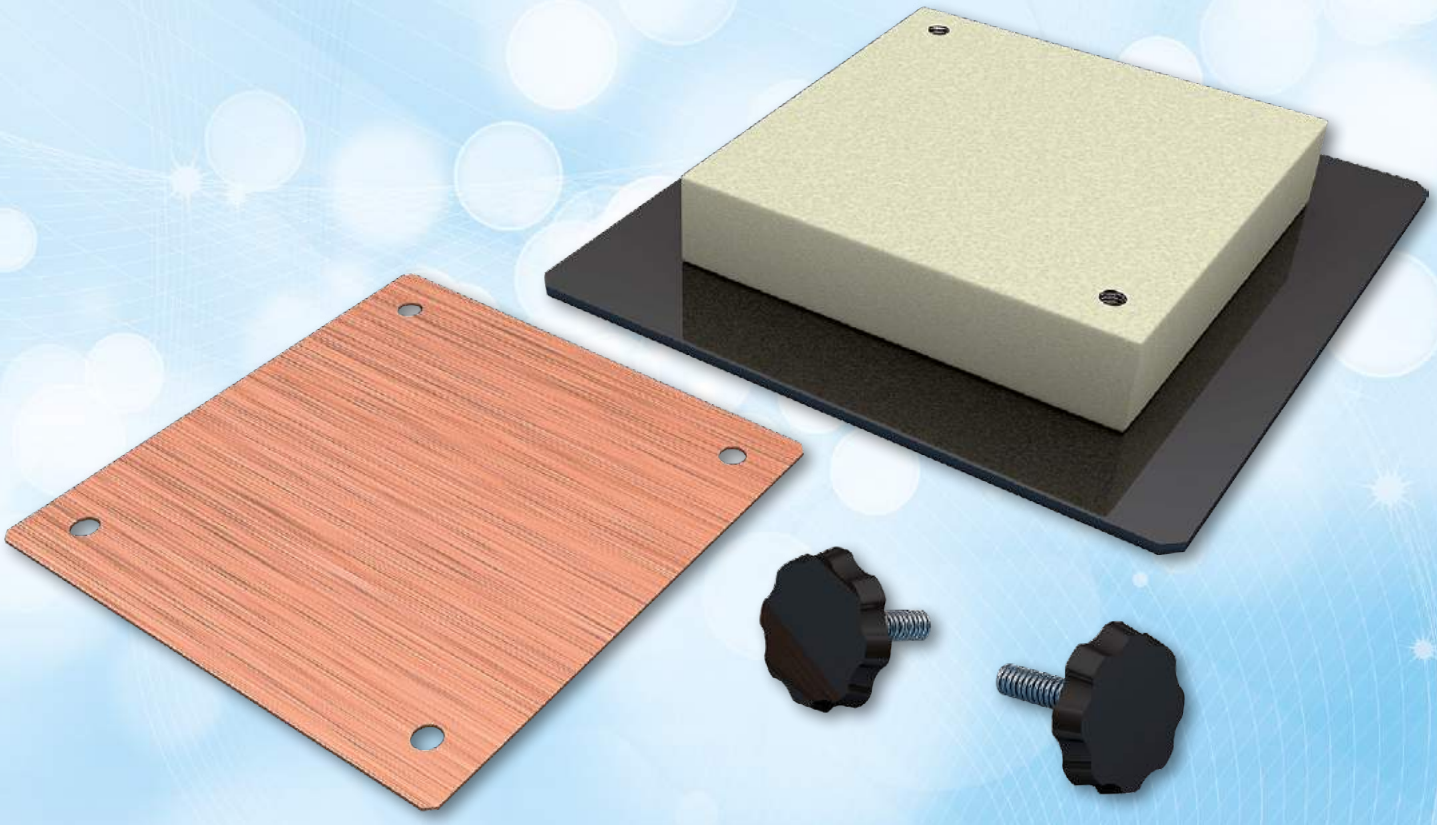
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Al 25



25 mm aluminum filter with insertion frame for mounting near the X-Ray tube.

Technical data (can be modified to customer specifications):

- filter dimensions: 120 x 120 x 25 mm
- mounting frame
- made of the purest aluminium
- optional 1 mm thick copper filter (that can be attached to the aluminium) for tests at and above 100 kV (Pro-RF Cu 1)
- other sizes of filters upon request

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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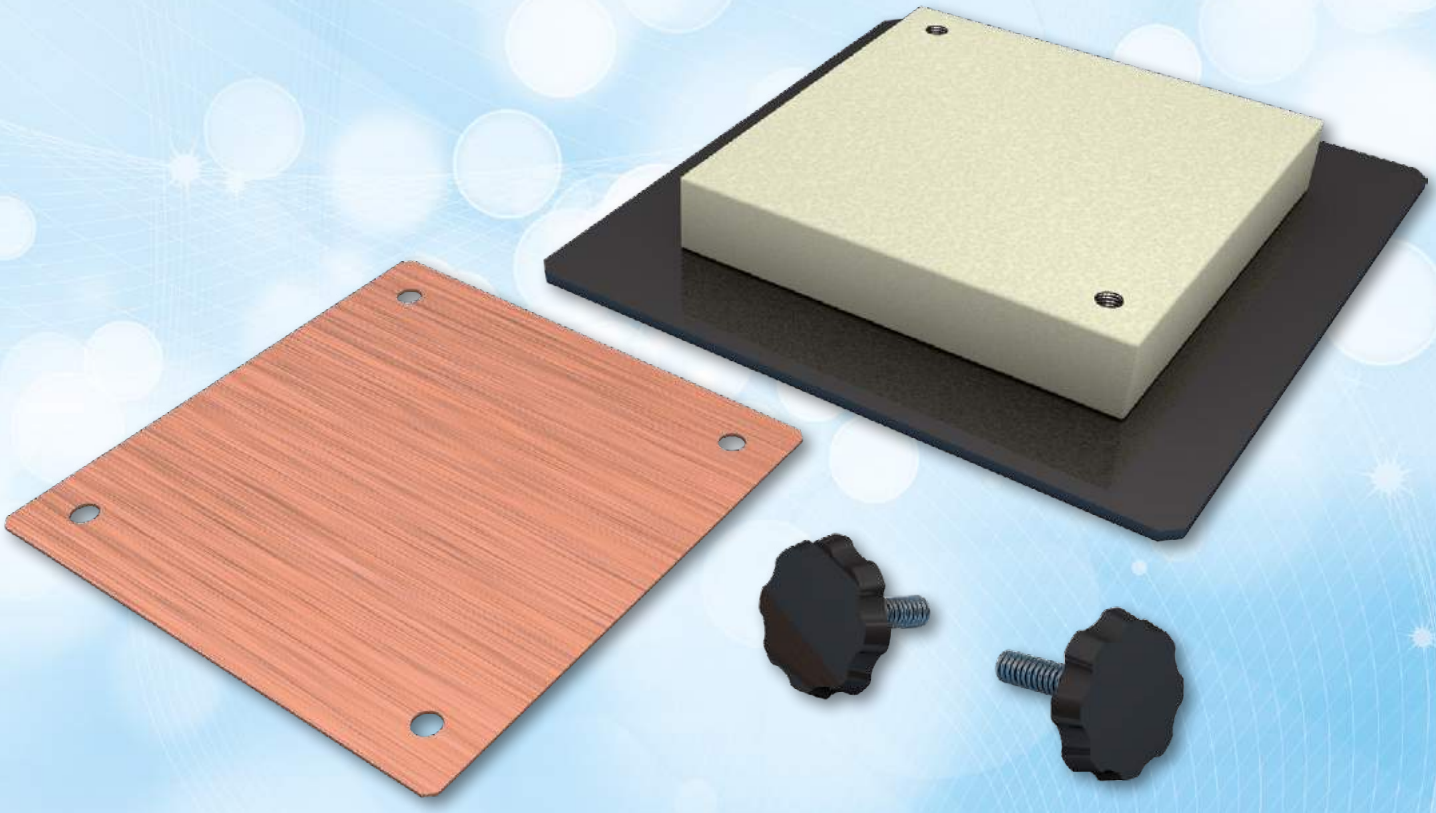
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Al 21



21 mm aluminum filter with insertion frame for mounting near the X-Ray tube.

Technical data (can be modified to customer specifications):

- filter dimensions: 120 x 120 x 21 mm
- mounting frame
- made of the purest aluminium
- optional 1 mm thick copper filter (that can be attached to the aluminium) for tests at and above 100 kV (Pro-RF Cu 1)
- other sizes of filters upon request

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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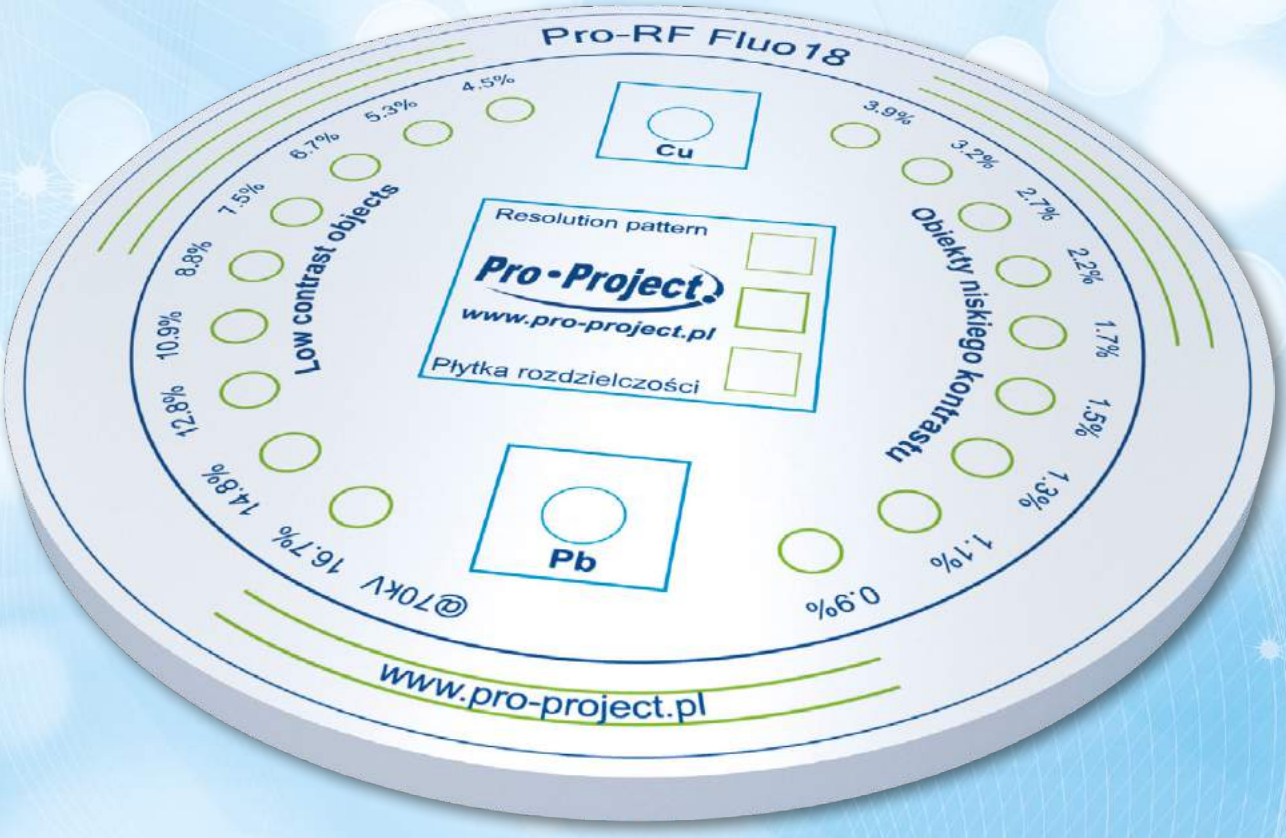
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Fluo18



Phantom for **evaluation of imaging performance of fluoroscopic systems.** It allows for **brightness and contrast adjustments, circular geometry check (scanning linearity) plus wide-range low-contrast and high-contrast resolution evaluation.** Available in two standard layouts plus any custom configuration.

Technical data (can be modified to customer specifications):

- diameter: 180 mm
- thickness: 10 mm
- two standard layouts available (others upon request)
- 3 circular rims on the outside of the phantom (Ø: 150, 160 and 170 mm) for a geometry and collimation check
- 18 low contrast objects, 8 mm in diameter, producing contrast values from 0.9 to 16.7%
- pattern for line pair resolution evaluation (from 0.6 to 5.0 LP/mm)
- Pb and Cu squares with circular bright and dark objects for contrast and brightness adjustment
- 1.0 and 0.5 mm high purity Cu attenuation filters (fit to the diaphragm housing)
- compact carrying case

Product features:

- Complies with:
  – IEC 61223-3-1
  – IPEM Report 91 (2005): Recommended Standards for the Routine Performance Testing of Diagnostic X-Ray Imaging Systems published by the Institute of Physics and Engineering in Medicine
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF CDR

Phantom for **evaluation of imaging performance of radiographic systems.** It allows for **wide-range low-contrast and high-contrast resolution evaluation and sensitometric measurements.** Available in standard layout plus any custom configuration.

Technical data (can be modified to customer specifications):

- diameter: 180 mm
- thickness: 10 mm
- 3 circular rims on the outside of the phantom (Ø: 150, 160 and 170 mm) for geometry and collimation check
- 17 low-contrast objects, 11 mm in diameter, producing contrast values from 0.2 to 7.5%
- 17 small high-contrast objects, 0.5 mm in diameter, producing contrast values from 3.9 to 95.4%
- 10 sensitometric measurement point details, 5.6 in diameter, producing contrast values from 0.11 to 1.0
- pattern for line pair resolution evaluation (from 0.5 to 14.3 LP/mm)
- 1.0 and 0.5 mm high purity Cu attenuation filters (fits to the diaphragm housing)
- compact carrying case

Product features:

- Complies with:
  – IEC 61223-3-1
  – IPEM Report 91 (2005): Recommended Standards for the Routine Performance Testing of Diagnostic X-Ray Imaging Systems published by the Institute of Physics and Engineering in Medicine
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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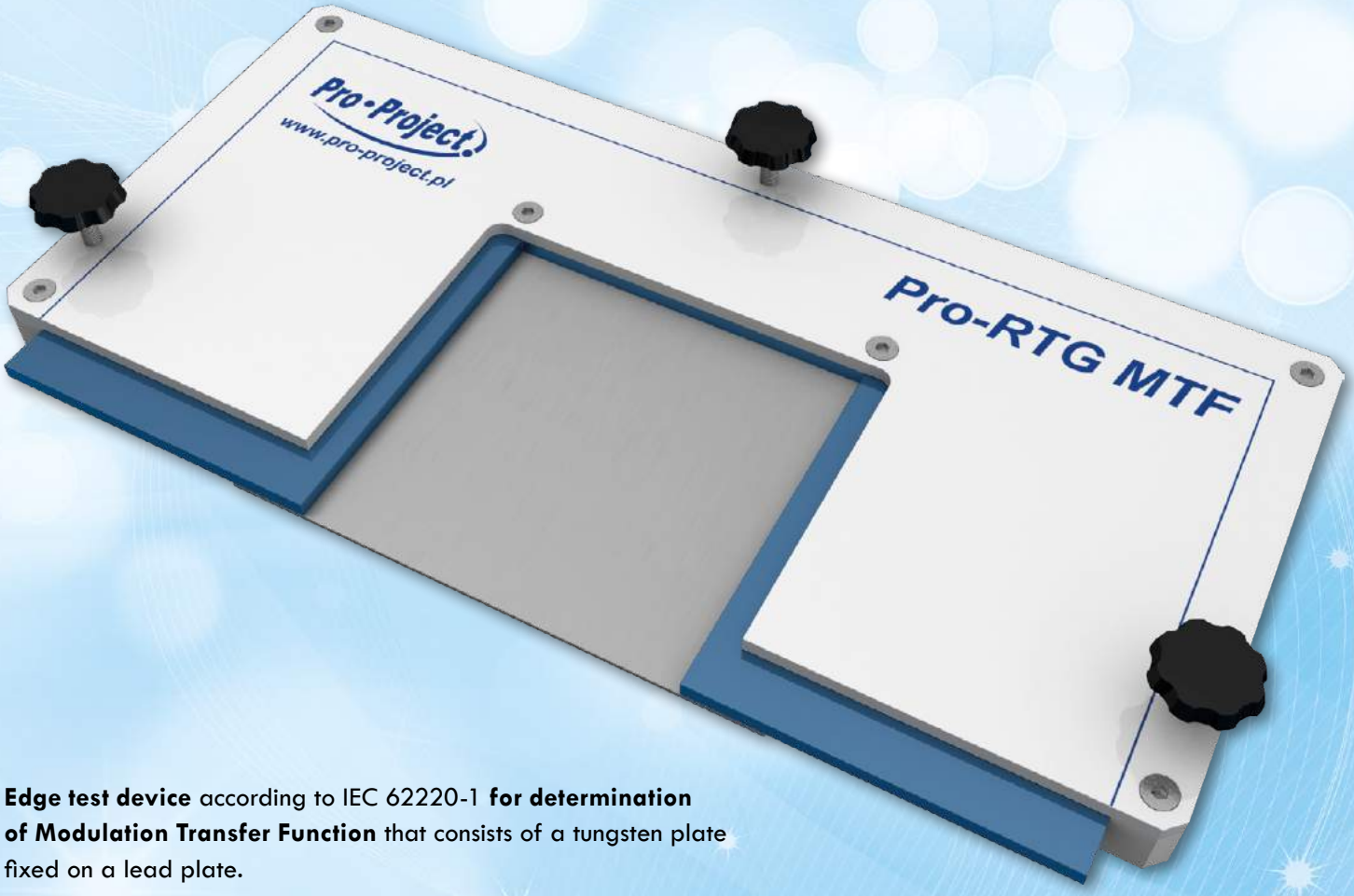
Pro-RF MTF



Edge test device according to IEC 62220-1 **for determination of Modulation Transfer Function** that consists of a tungsten plate fixed on a lead plate.

Technical data (can be modified to customer specifications):

- overall dimensions: 220 x 110 x 13 mm
- tungsten plate dimensions: 100 x 80 x 1 mm
- lead plate dimensions: 200 x 100 x 3 mm
- tungsten edge scragginess less than 5 µm
- PMMA cover
- three leveling screws

Product features:

- Complies with:
  – IEC 62220-1
  – DIN EN 62220-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF DSA

A special phantom for **Quality Assurance of Digital Subtraction Angiography Equipment (DSA)** according to **IEC 61223-3-3 and DIN 6868/Parts 8, (2007) and 54**. The phantom contains a movable insert with **aluminium strips to simulate blood vessels.** This **insert can be moved** via pneumatic system from a safe distance during exposure.

It can be used to measure:

- artifacts
- dynamic range
- logarithmic errors
- contrast media sensitivity

Technical data
(can be modified to customer specifications):

- overall dimensions: 200 x 170 x 59 mm
- total PMMA thickness in the test area: 57 mm
- dynamic 7 steps wedge of copper with thicknesses from 0.2 mm to 1.4 mm arranged perpendicular to the longitudinal direction of the insert
- additional step from 1.4 mm to 0.2 mm for compensation test
- additional step from 0.0 mm to 0.2 mm
- movable PMMA insert with 4 aluminum strips (0.05, 0.1, 0.2, 0.4 mm), purity 99.5%, simulating different vascular densities
- pneumatic 6 m hose with a valve allowing for remote movement of the insert in both directions

Product features:

- Complies with:
  – IEC 61223-3-3
  – DIN 6868/Parts 8, (2007) and 54
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

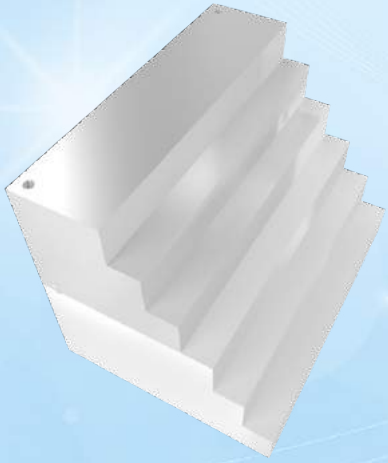
Pro-RF AAPM 15

This Digital Subtraction Angiography (DSA) Phantom follows the recommendation in **Report No. 15 by the AAPM (American Association of Physicists in Medicine)** - Digital Radiology/Fluorography Task Group of the Diagnostic X-Ray Imaging Committee.

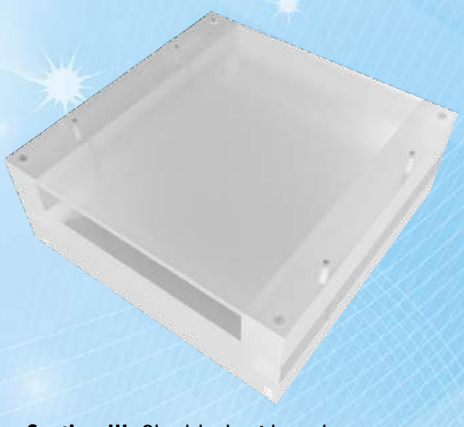
The phantom is designed to **evaluate digital functions of DSA systems** and can be used to check: contrast range, resolution, linearity, uniformity, amplifier dynamic range, registration accuracy and subtraction effectiveness.
Its modular construction allows to set up the desired test configuration in a very easy and accurate manner.

NEW

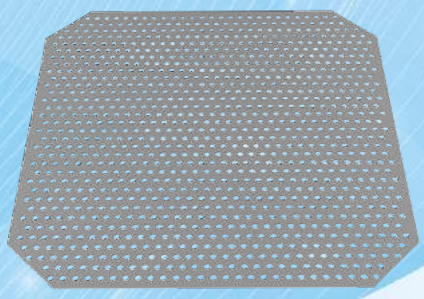
Technical data
(can be modified to customer specifications):



- **Section I and II:** Step Wedge module, 6 step wedges (each 25.4 mm high) to test dynamic range. Can be folded into 203.2 x 203.2 x 76.5 mm solid block.



- **Section III:** Slot block with a place to fit other test modules.
  Outer size: 203.2 x 203.2 x 76.5 mm.
  Slot size: 203.2 x 152.4 x 25.4 mm.



- **Registration Plate,** made of aluminium with array of 3.18 mm holes.
  Size: 203.2 x 203.2 x 1.5 mm

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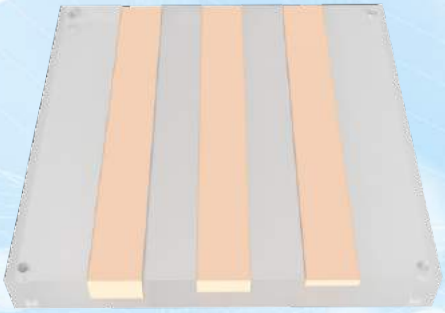
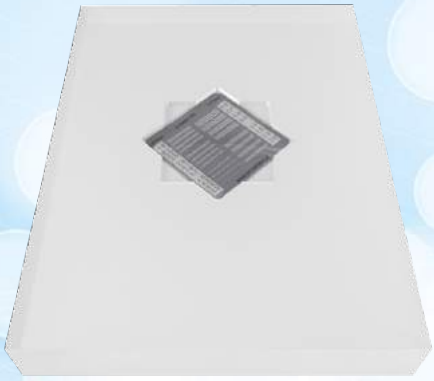
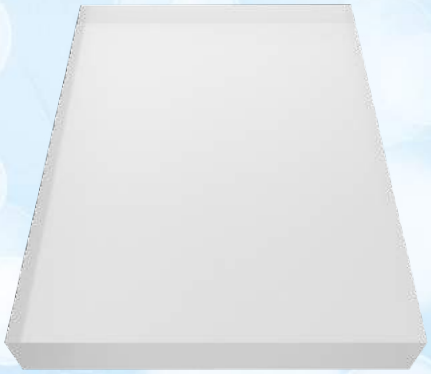


- **Bone Section** with three PTFE strips 25 mm width and 5, 10 and 15 mm in thickness. Size: 203.2 x 203.2 x 25.4 mm



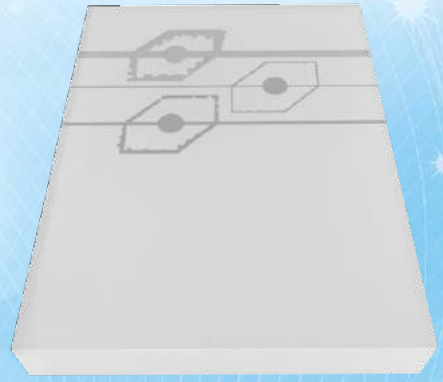
- **High Contrast Resolution Section** containing pattern for line pair resolution evaluation (from 0.6 to 5.0 LP/mm). Thanks to dedicated recesses test pattern can be placed in different orientations. Size: 203.2 x 203.2 x 25.4 mm



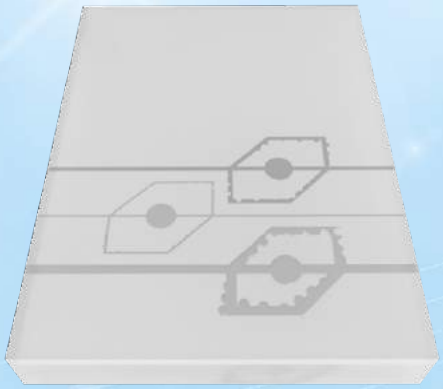
- **Blank Insert** that used with other modules forms mask plate. Size: 203.2 x 152.4 x 25.4 mm

- **Linearity Insert** contains 6 iodine areas (19 mm diameter) having different iodine thickness and concentration: 0.5, 1.0, 2.0, 4.0, 10.0 and 20.0 mg/cm^2. Size: 203.2 x 152.4 x 25.4 mm

- **Low Contrast Artery Insert** containing 3 sets of analogue blood vessels (diameters 0.5, 1.0, 2,0 and 4.0 mm), each vessels group includes different iodine concentrations: 2.5, 5.0 and 10.0 mg/cc. Size: 203.2 x 152.4 x 25.4 mm



- **150 mg/ml Iodine Artery Insert,** 3 sets of analogue blood arteries (thickness 1.0, 2.0, 4.0 mm) each includes arteriarctial and arterial aneurysm which sizes are 1/4, 1/2 and 3/4 of artery diameter. Size: 203.2 x 152.4 x 25.4 mm



- **300 mg/ml Iodine Artery Insert,** 3 sets of analogue blood arteries (thickness 1.0, 2.0, 4.0 mm) each includes arteriarctia and arterial aneurysm which sizes are 1/4, 1/2 and 3/4 of artery diameter. Size: 203.2 x 152.4 x 25.4 mm
- carrying case

Product features:

- complies with:
  – AAPM Report No. 15 - Performance Evaluation and Quality Assurance in Digital Subtraction Angiography - Diagnostic X-Ray Imaging Committee/Digital Radiography/ Fluorography Task Group - May 1985
  – IEC 61223-3-1
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration

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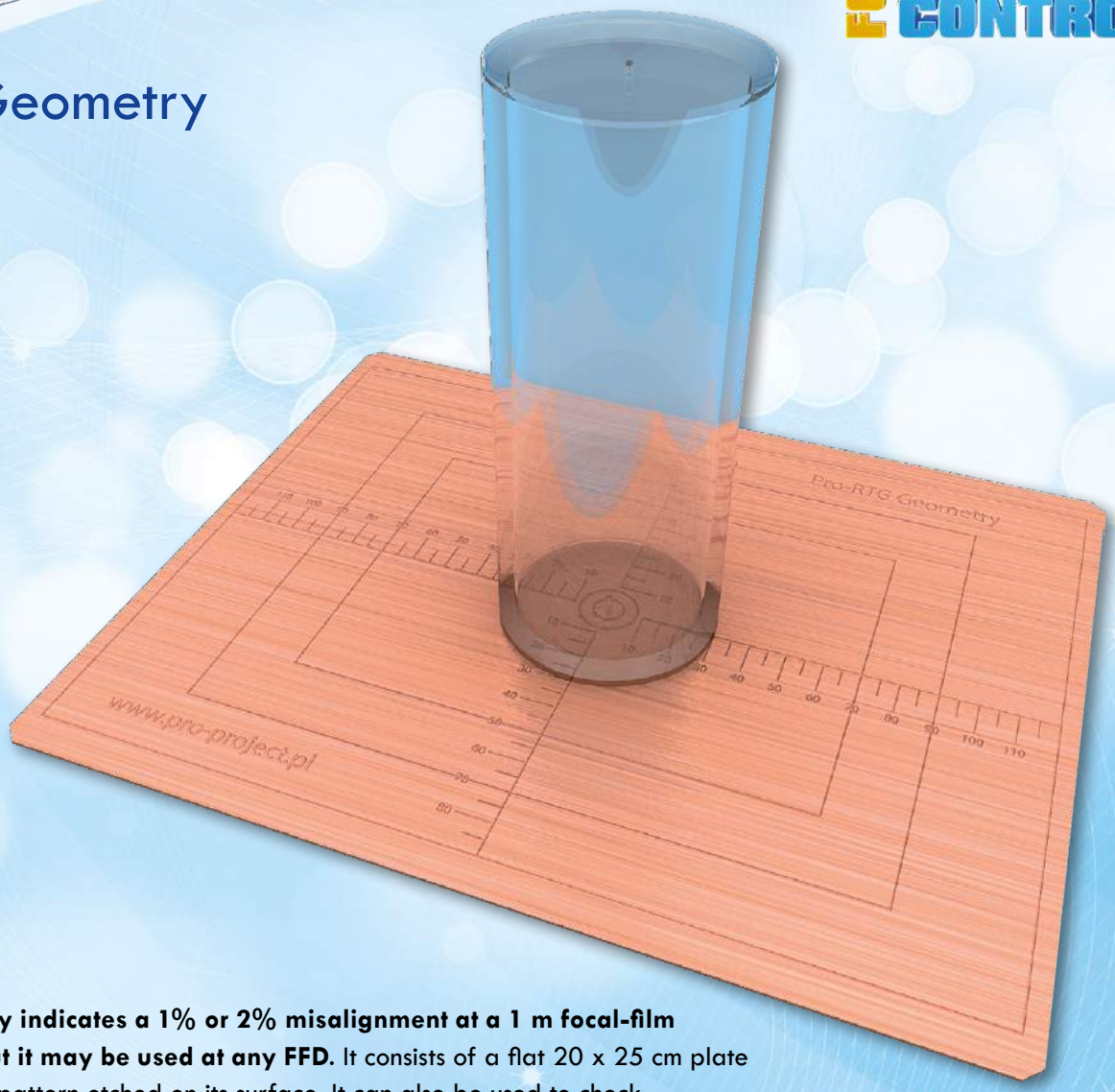
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Geometry



This device readily indicates a 1% or 2% misalignment at a 1 m focal-film distance (FFD), but it may be used at any FFD. It consists of a flat 20 x 25 cm plate with a 14 x 18 cm pattern etched on its surface. It can also be used to check fluoroscopy alignment and collimation.

A steel ball is mounted in the center of a disc at each end of the 15 cm high clear plastic cylinder. When the balls are positioned over one another and at a right angle to the film, their images will appear as one if the central ray is truly perpendicular to the film. The approximate degree of improper angulation can also be determined.

Technical data
(can be modified to customer specifications):

- dimensions: 200 x 250 mm
- copper plate with engraved 5 mm scale
- 150 x 60 mm cylinder with a steel ball embedded in the center of its bases – beam alignment
- cone for the perpendicular X-Ray beam control in the range of 0° ÷ 1.5° (option, instead of the cylinder – for simpler measurements)

Product features:

- Complies with:
  – IEC 61223-3-3
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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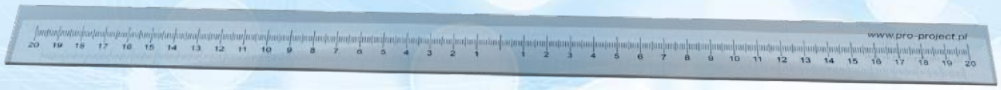
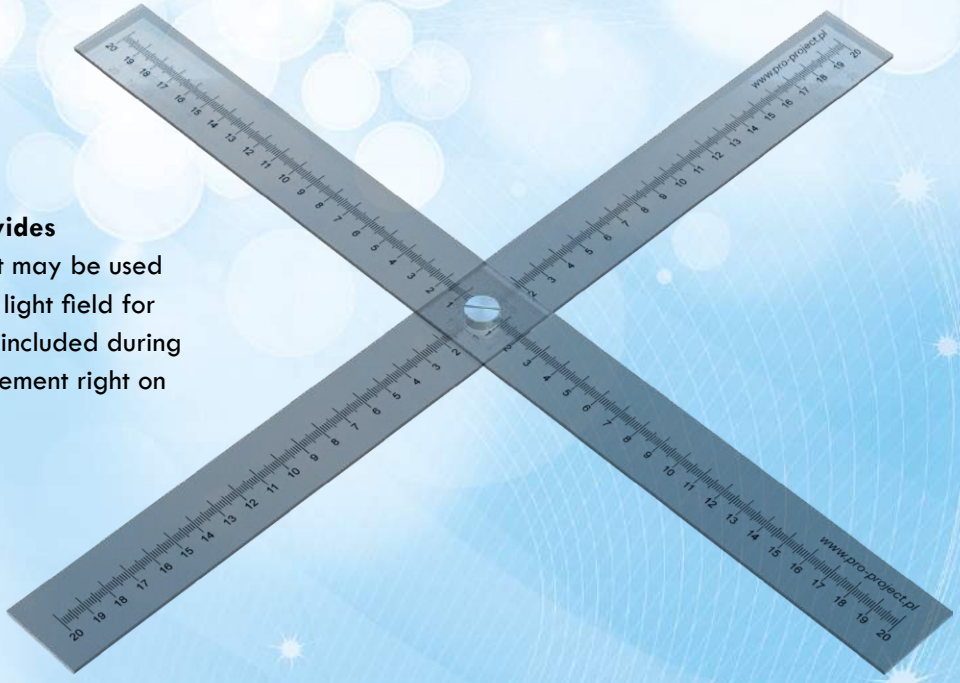
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Ruler





The radiopaque ruler in the image provides a permanent reference of image size. It may be used to check the accuracy and position of the light field for quality control and adjustment as well as included during x-ray procedures, leaving a clear measurement right on the x-ray image itself.

Technical data (can be modified to customer specifications):

- we manufacture many sizes and types of radiopaque rulers for many applications, with different scales and accuracy. Please contact us to find the best solution for you.

Product features:

- complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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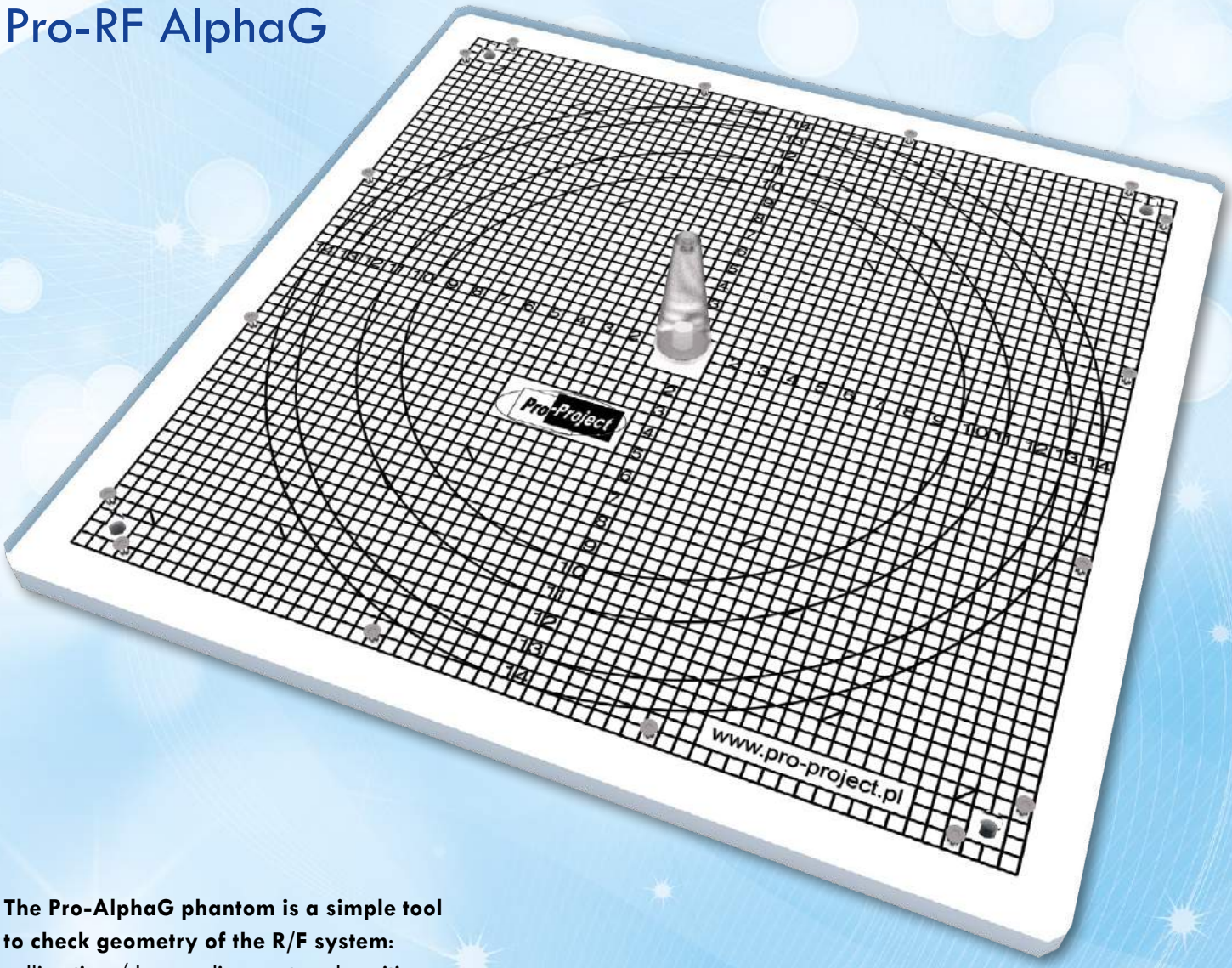
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF AlphaG



The Pro-AlphaG phantom is a simple tool to check geometry of the R/F system: collimation / beam alignment and position and size of the effective radiation field.

Technical data (can be modified to customer specifications):

- dimensions: 308 x 308 x 11 mm
- lead mesh pattern (5 mm scale) engraved in PMMA plate secured with transparent cover
- markings to determine the size and position of the effective radiation field
- cone for the perpendicular X-Ray beam control in the range of 0° ÷ 1.5°

Product features:

- complies with:
  – IEC 61223-3-1
  – DIN 6868/3 and DIN 6868/4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Tomo

Set of simple tools dedicated for measurements on tomography X-Ray equipment.
It may be used for the layer height adjustment and tomography movement tests.

Technical data (can be modified to customer specifications):

- 160 mm ruler made of PMMA with engraved detailed x-ray opaque scale
- ruler can be folded to very compact size for easy transportation
- stainless steel step with holes for displaying tomographic movement

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Res 150

Phantom for acceptance and constancy testing of **Cone-Beam CT / Volume Tomography (DVT) in fluoroscopy** according to **DIN 6868-150.**

Technical data
(can be modified to customer specifications):

- dimensions: 120 x 120 mm
- 10 mm thick test module containing sets of cylindrical holes, parallel to Z-Axis, of 0.5, 0.6, 0.7, 0.8, 0.9, 1.0 and 1.3 mm diameters
- two additional 25 mm PMMA plates
- carrying case

Product features:

- complies with:
  – DIN 6868-150
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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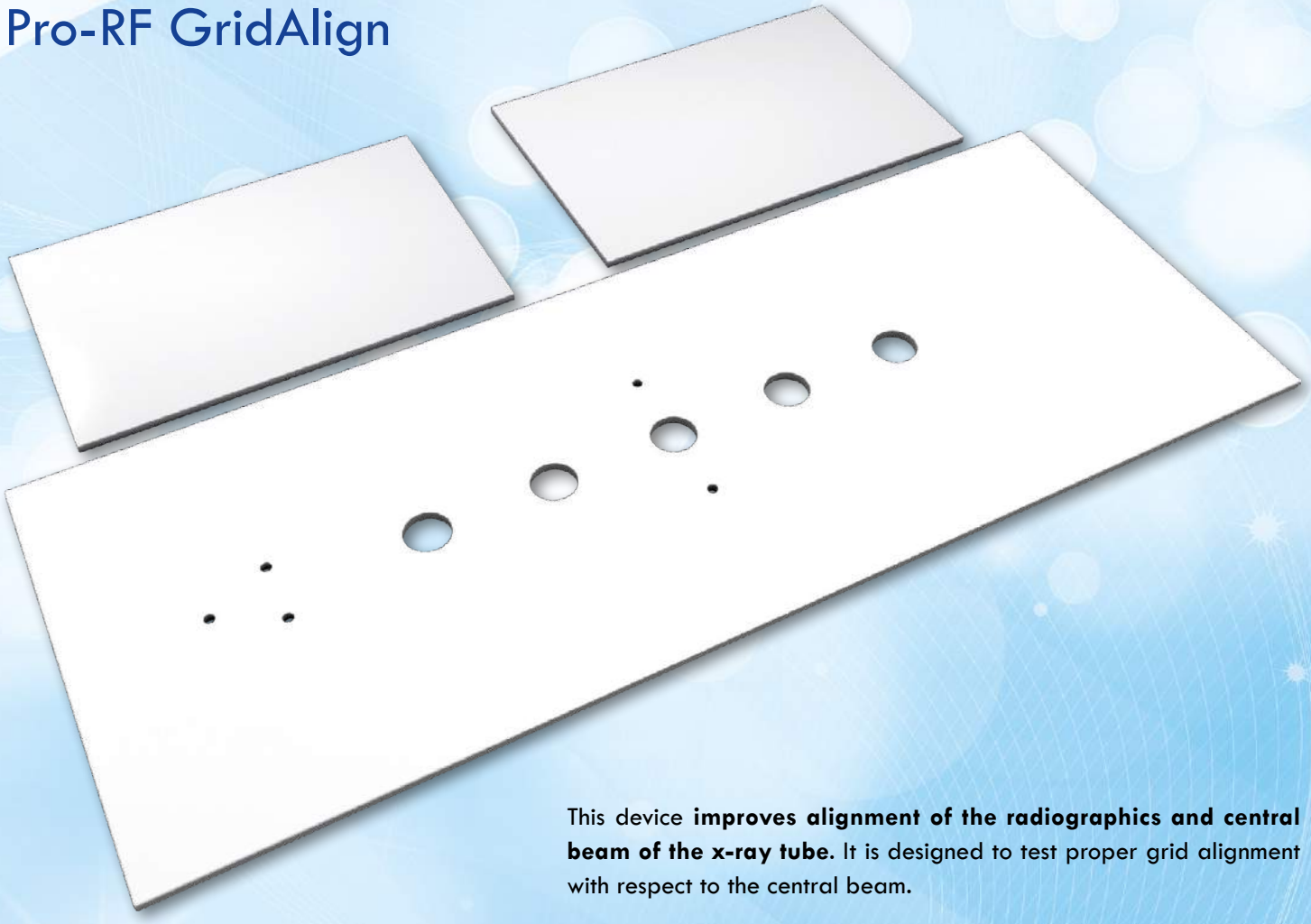
Pro-RF GridAlign



This device **improves alignment of the radiographics and central beam of the x-ray tube.** It is designed to test proper grid alignment with respect to the central beam.

Technical data
(can be modified to customer specifications):

- main plastic covered lead blocker
- dimensions: 90 x 230 x 2 mm
- five larger holes have centers spaced 25 mm apart (allow test exposures to a film cassette)
- smaller holes provide marking to show the tool orientation
- two additional small lead blockers

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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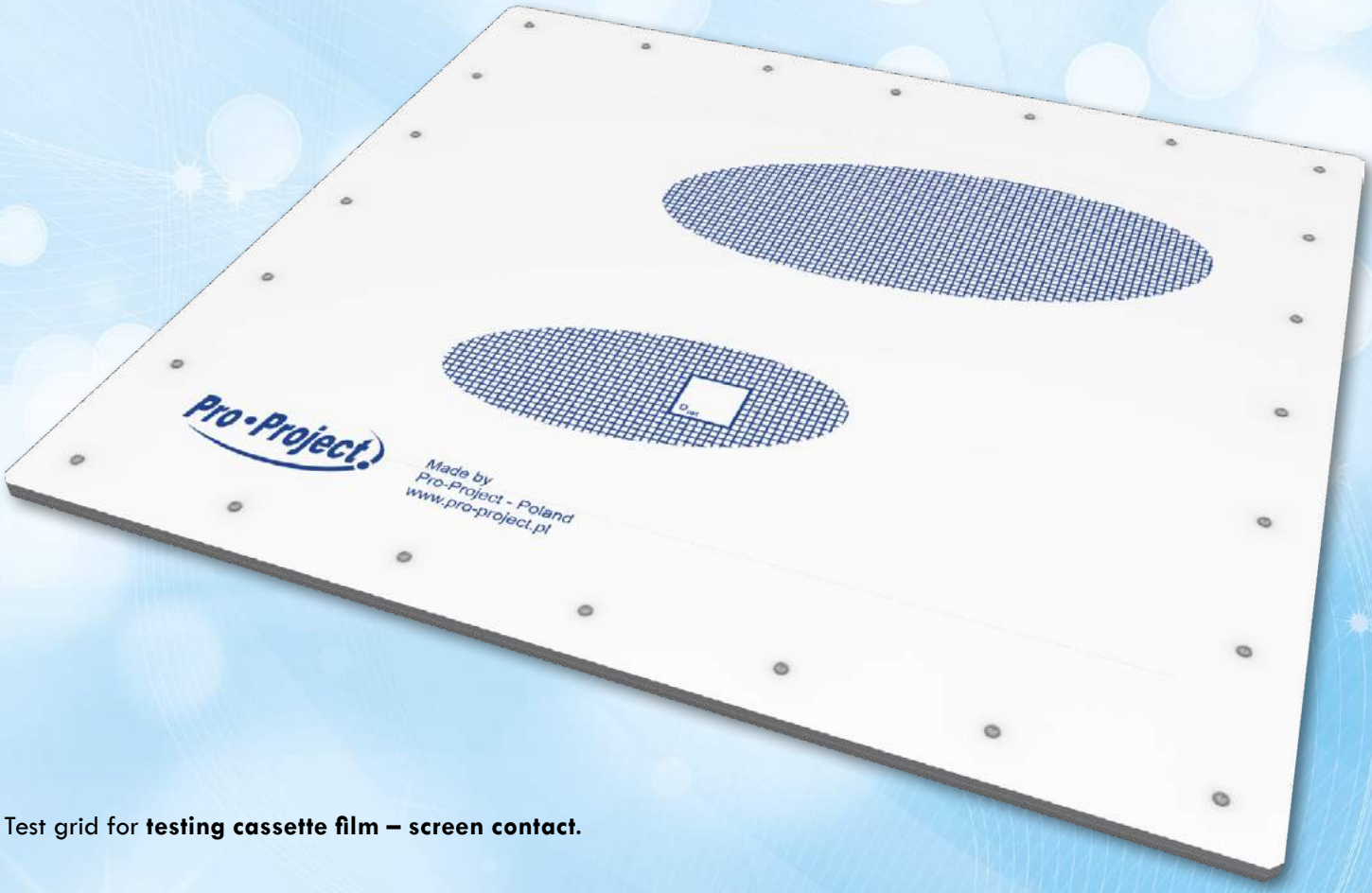
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Contact



Test grid for **testing cassette film – screen contact.**

Technical data (can be modified to customer specifications):

- dimensions: 430 x 450 x 8 mm
- 25 x 25 mm free field to measure optical density
- mesh size: 3.15 mm
- wire diameter: 0.71 mm

Product features:

- complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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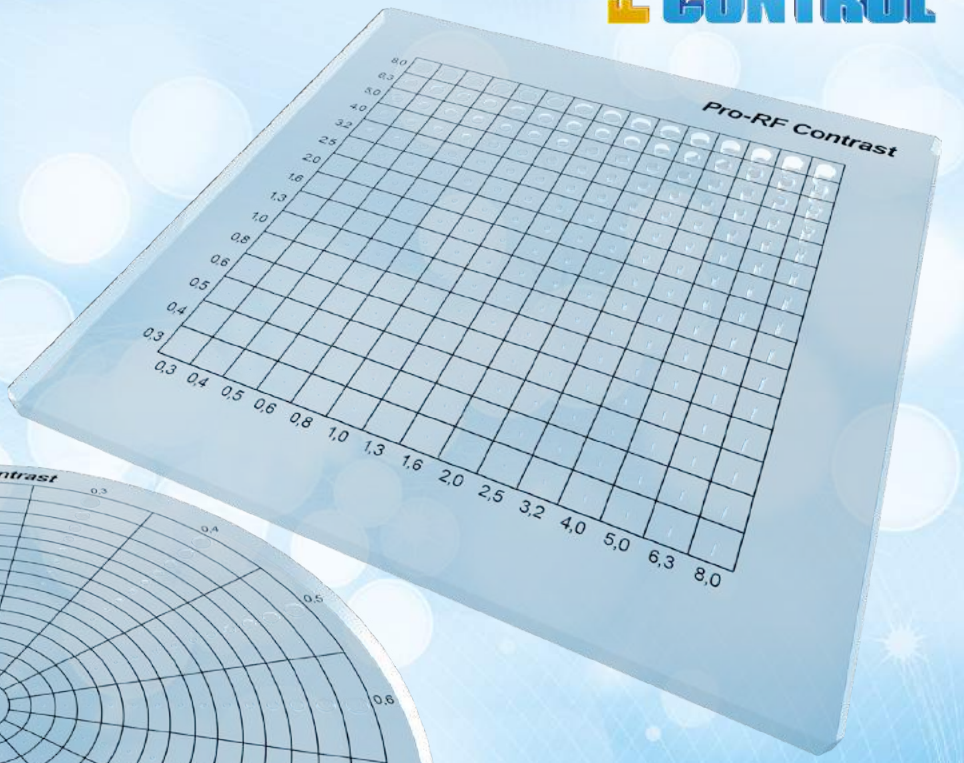
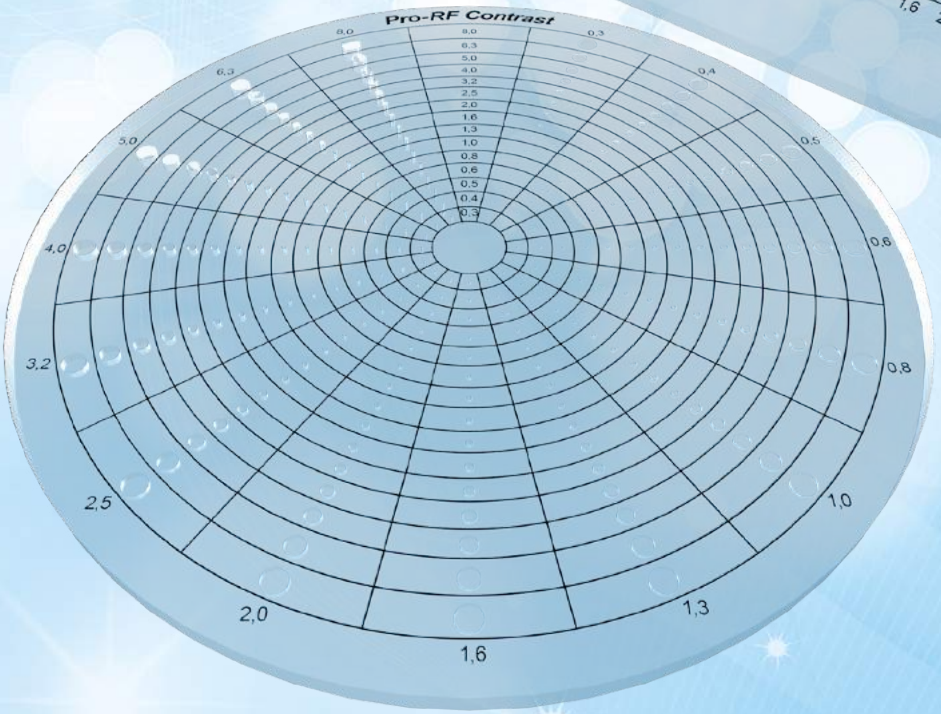
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Contrast





A **Contrast-Detail (CD) phantom** makes it possible to quantify both **detail and contrast as observed by the radiologist.** It can be used within the **entire range of radiography** diagnostic imaging systems, such as fluoroscopy and angiography. It has **225 holes** that generate subtle changes in contrast.

Technical data (can be modified to customer specifications):

- dimensions: 265 x 265 x 10 mm
- made of PMMA
- 15 columns and 15 rows of holes
- diameters of holes range from 0.3 to 8.0 mm
- depths of holes range from 0.3 to 8.0 mm
- tolerance of holes is at least 0,01 mm
- all markings on the phantom are opaque for X-rays
- available in rectangular and circular shapes

Product features:

- complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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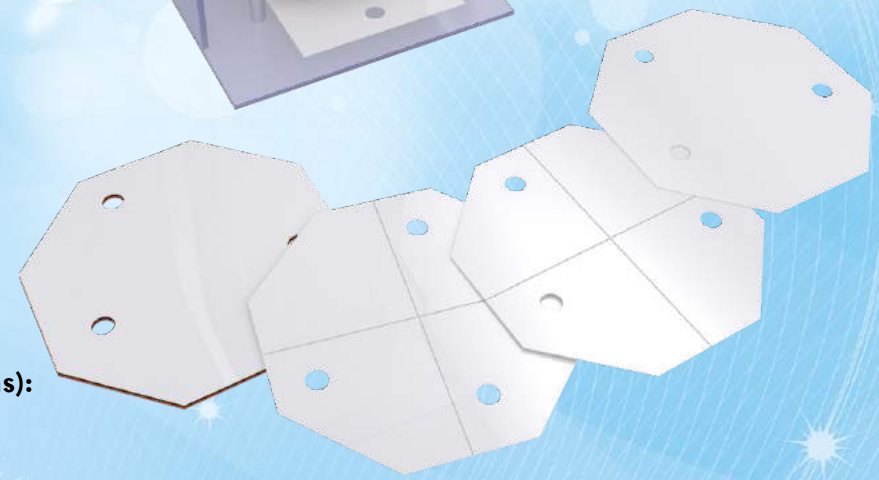
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF XR21

NEW

The phantom has been designed in accordance with the NEMA XR21 standard. This modular phantom made of PMMA consists of several plates allowing variation of phantom thickness setup in steps of 25 mm, up to a total of 300 mm, simulating a range of patient sizes.



It can be used to measure:

- collimation/beam alignment
- position and size of the effective radiation field
- dynamic range
- spatial resolution
- contrast resolution
- homogeneity
- beam quality

Technical data (can be modified to customer specifications):

- central target assembly - 1 piece
- WTR plate A - 25 mm test object - 1 piece
- WTR plate B - 25 mm plate with Al and Air cylinders - 1 piece
- WTR plate C - 25 mm plate with Al and Air cylinders - 1 piece
- WTR plate D - 25 mm plate with Air cylinders - 3 piece
- WTR plate E - 25 mm plate with Air cylinders - 1 piece
- blank 25 mm PMMA plate with alignment parts - 4 pieces
- field size plate - 1 piece
- alignment target for test stand - 1 piece
- alignment cross for test stand - 1 piece
- alignment target for small base - 1 piece
- alignment cross for small base - 1 piece
- test stand - 1 piece
- small base - 1 piece
- 3 mm thick lead plate with laminate - 1 piece
- 2 mm thick copper plate with laminate - 1 piece
- alignment pins (including spares) - 100 pieces
- optional heavy duty carrying case

Product features:

- complies with:
  - NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  - NEMA Standards Publication (NU 1-2012) Performance Measurements of Scintillation Cameras
  - AAPM Report No. 15 - Performance Evaluation and Quality Assurance in Digital Subtraction Angiography - Diagnostic X-Ray Imaging Committee/Digital Radiography/ Fluorography Task Group
  - Report NO. 60 Instrumentation Requirements of Diagnostic Radiological Physicists
  - Report NO. 31 by the American Association of Physicists in Medicine (AAPM)
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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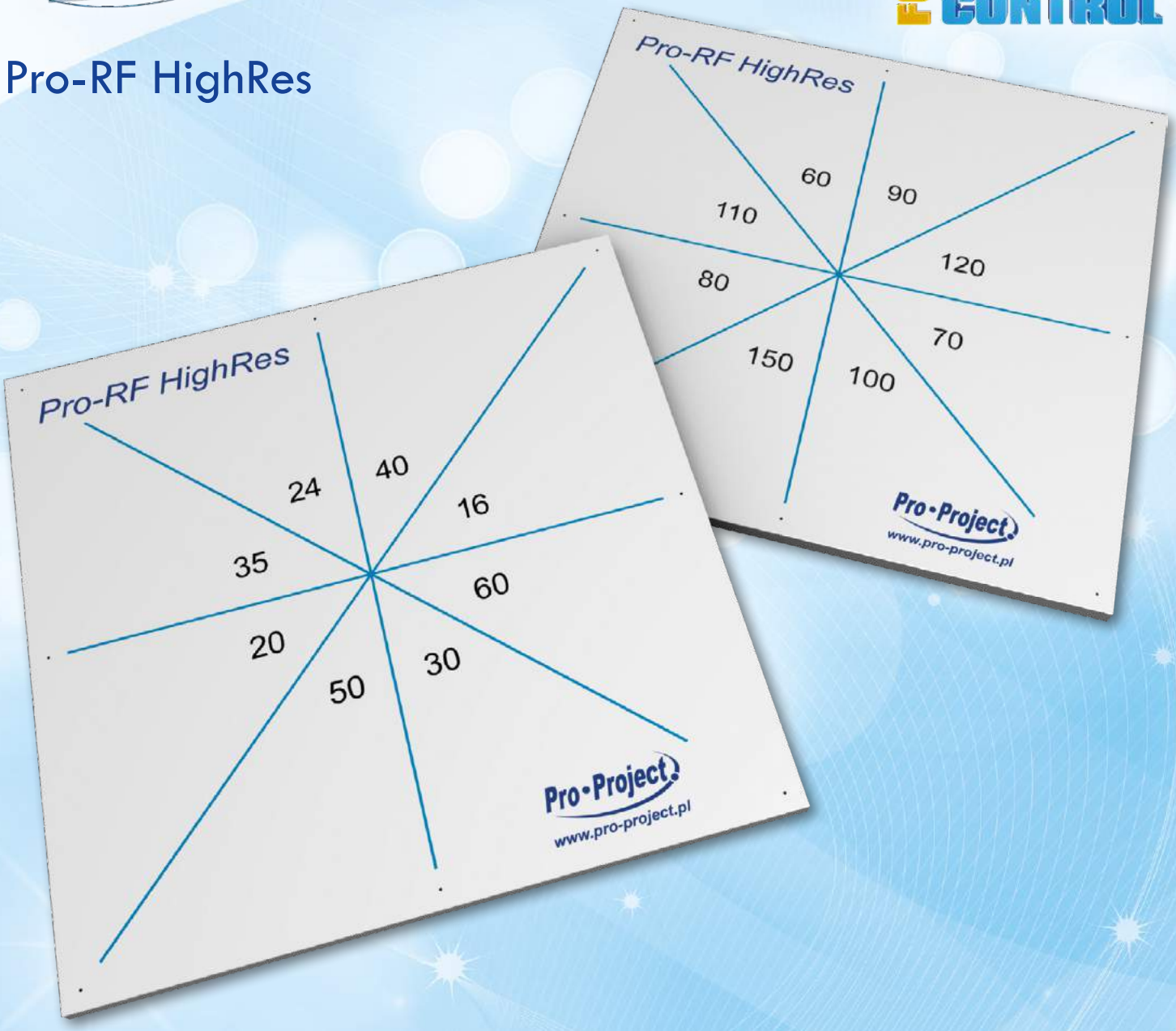
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF HighRes



Test phantom for **evaluation of high contrast resolution of fluoroscopy system in one exposition.** It consists of eight patterns of wire mesh in a pie shape.

Technical data
(can be modified to customer specifications):

- dimensions: 180 x 180 x 10 mm
- cover made of PMMA
- two standard configurations of high contrast wire mesh patterns:
  – for standard systems: 16, 20, 24, 30, 35, 40, 50, 60
  – for higher resolution systems: 60, 70, 80, 90, 100, 110, 120, 150

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF FluoCDRH

Compact and easy to use phantom for **performance evaluation of fluoroscopic systems according to Center for Devices and Radiological Health (CDRH) specifications.** It also meets recommendations of **AAPM Report No. 60 "Instrumentation Requirements of Diagnostic Radiological Physics".** It is optimized for both under- and over-table fluoroscopic tubes.

Technical data (can be modified to customer specifications):

- set of acrylic plates making total thickness of 193 mm
- thanks to modular construction different total thicknesses can be easily set up
- size of acrylic plates is 177.8 x 177.8 mm
- 2 x 2.3 mm aluminium filters can be screwed underneath the acrylic plates
- four beads embedded on the top plate can be used as orientation points for collimation setup
- phantom stands on two legs 100 mm above tabletop
- one leg is a probe holder
- back plate with a handle can be easily unscrewed for over-table measurements
- additional 1.6 mm copper filter simulates the presence of a 2 mm thick layer of barium sulfate, and can be used to measure the air kerma rate (free in air)
- 3.2 mm lead plate simulates maximum attenuation, and can be used to measure the maximum air kerma rate (free in air)
- two types of a fluoroscopic image quality test object containing 8 low-contrast holes in an aluminium disc and 8 high contrast meshes or a high contrast resolution lead plate (from 0.6 to 5.0 LP/mm).
- heavy duty carrying case

Product features:

- Complies with:
  - Nationwide Evaluation of X-ray Trends (NEXT) Protocol for 2003 Survey of Fluoroscopic X-Ray Systems
  - IEC 61223-3-1
  - AAPM Report No. 60 "Instrumentation Requirements of Diagnostic Radiological Physics"
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registrationt

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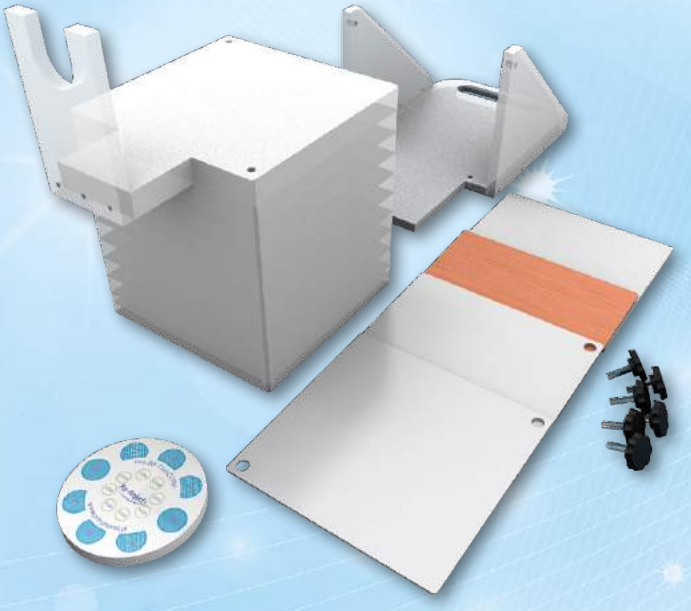
Under-Table set up:

Over-Table set up:



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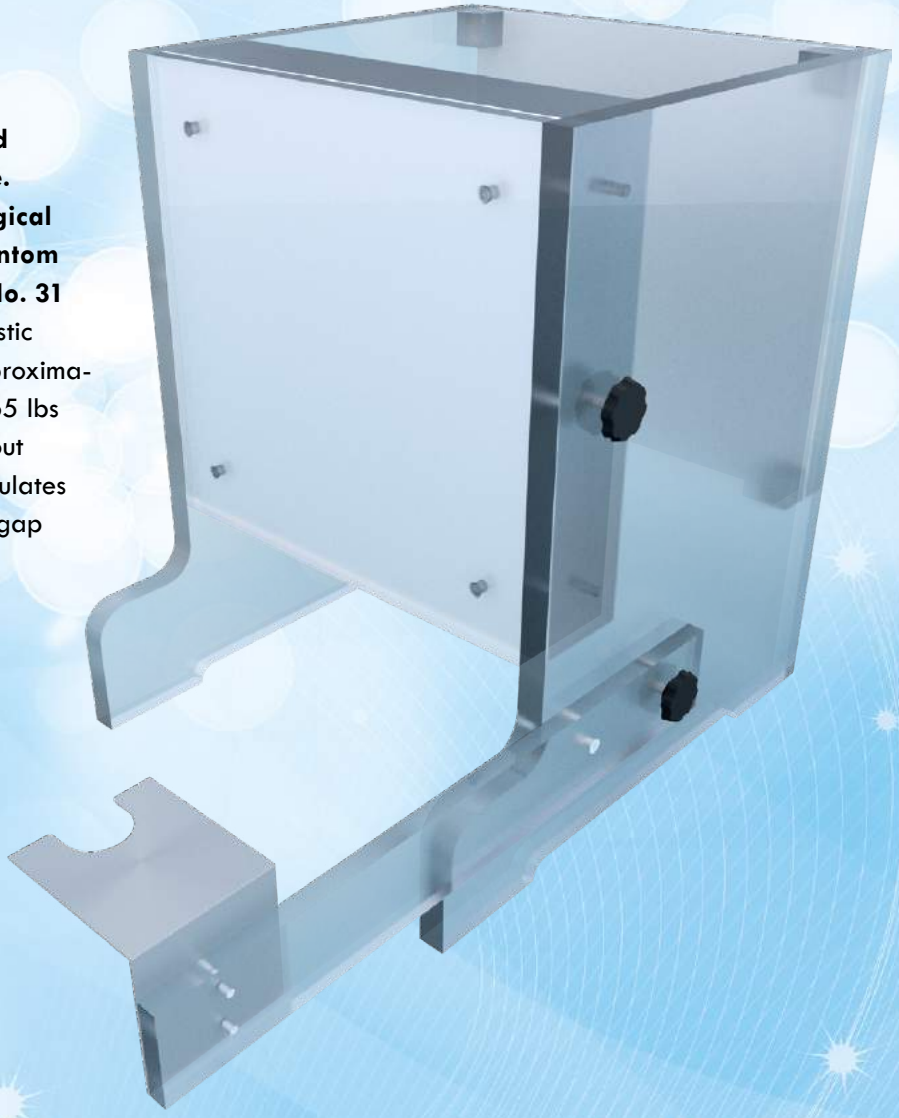
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF ChestCDRH



Compact and easy to use phantom designed to invoke a response of automatic-exposure. Follows the Center for Devices and Radiological Health (CDRH) specifications of a chest phantom and AAPM recommendations from Report No. 31 "Standardized Methods for Measuring Diagnostic X-Ray Exposure". The adult chest phantom approximates a 173 cm adult weighing approximately 165 lbs with an anterior-posterior (AP) thickness of about 23 cm. The anatomical region the phantom simulates is the lung field, and therefore contains an air gap within the center. The phantom is composed of polymethyl-methacrylate (PMMA).

Technical data (can be modified to customer specifications):

- set of acrylic and aluminium plates mounted on a frame with chamber holder
- approximates a 173 cm adult weighing approximately 165 lbs with an anterior-posterior (AP) thickness of about 23 cm
- 254 x 254 mm pieces of 1100 alloy and clear PMMA with 19.0 mm air gap
- the order of filters is: 9.5 mm PMMA, 2.5 mm Al, 54 mm PMMA, 19.0 mm Air, 1.6 mm Al, 9.5 mm PMMA
- heavy duty carrying case

Product features:

- complies with:
  – report No. 31 "Standardized Methods for Measuring Diagnostic X-Ray Exposure"
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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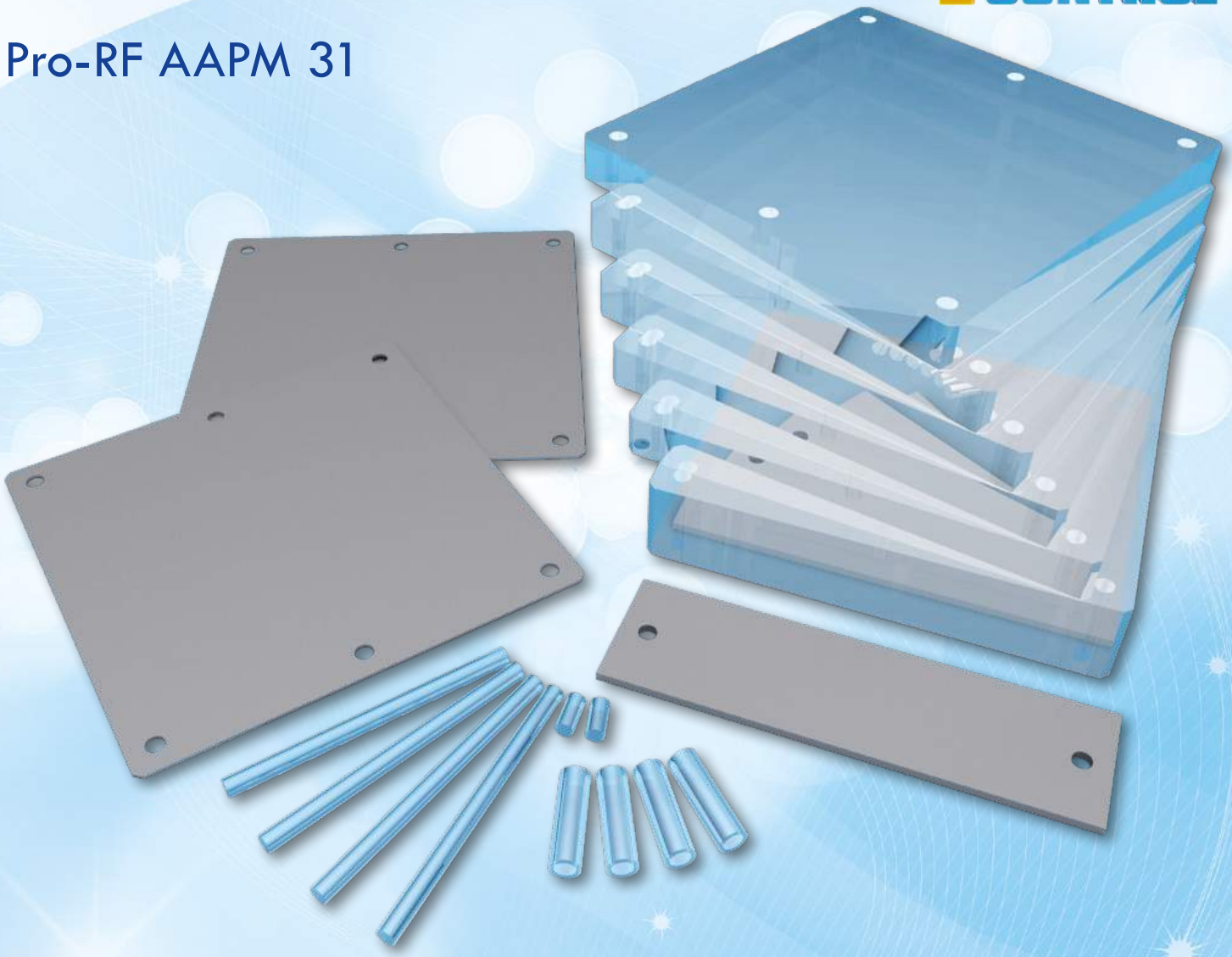
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF AAPM 31



Set of acrylic and aluminium filters for testing diagnostic X-rays according to **AAPM recommendations from Report No. 31** "Standardized Methods for Measuring Diagnostic X-Ray Exposure". Patient-equivalent acrylic and aluminium phantoms provide the necessary attenuation between the source and AEC or ABC detectors.

Technical data
(can be modified to customer specifications):

- 5 x acrylic plate 250 x 250 x 25.4 mm
- 1 x acrylic plate 250 x 250 x 50.8 mm
- 1 x 250 x 250 x 1 mm aluminium filter
- 1 x 250 x 250 x 2 mm aluminium filter
- 1 x 70 x 250 x 4.5 mm aluminium filter
- 4 x positioning rod
- 4 x 50.8 mm spacer tube
- optional heavy-duty transport case

Product features:

- complies with:
  – report No. 31 "Standardized Methods for Measuring Diagnostic X-Ray Exposure"
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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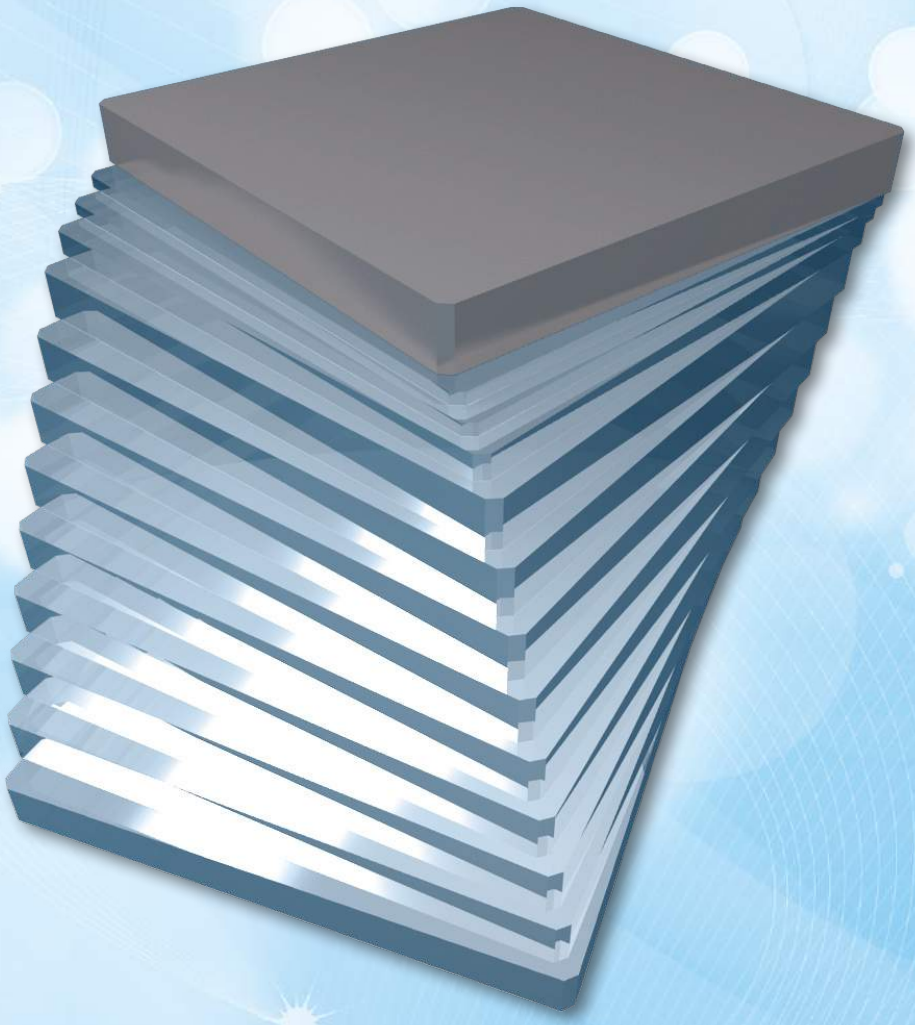
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF AEC PMMA



Set of acrylic plates for testing Automated Exposure Control of radiography equipment.

Technical data (can be modified to customer specifications):

- dimensions: 240 x 240 mm
- 9 x 20 mm thick
- 1 x 10 mm thick
- 2 x 5 mm thick
- made of transparent PMMA
- optional high purity 240 x 240 x 25 mm aluminium plate
- other sizes of filters upon request

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF AEC Cu

Set of high purity copper plates for testing Automated Exposure Control of radiography equipment. **It can be mounted near the X-Ray tube** and can be used instead of PMMA plates.

Technical data (can be modified to customer specifications):

- dimensions: 169 x 176 mm
- 1 x 1.0 mm thick
- 1 x 0.5 mm thick
- made of high purity copper
- other sizes of filters upon request

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RF Mask Pb

„L"-shaped **lead mask for testing chambers of the Automatic Exposure Control** system.

Technical data
(can be modified to customer specifications):

- dimensions: 350 x 450 mm
- „L"-shaped – ¼ of the field free
- 2 mm of lead embedded in laminate

Product features:

- Complies with:
  – IEC 61223-3-3
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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Pro-RF FocalSpot

Simple test device for the focal spot size evaluation. It consists of a precision bar pattern placed at the end of the cylinder that provides accurate and reproducible target-to-image receptor spacing.

Technical data (can be modified to customer specifications):

- cylinder dimensions: 152,4 x ø76 mm
- bar pattern mounted on the top of the cylinder
- 8 resolution bar patterns ranging from 0.84 to 5,66 LP/mm

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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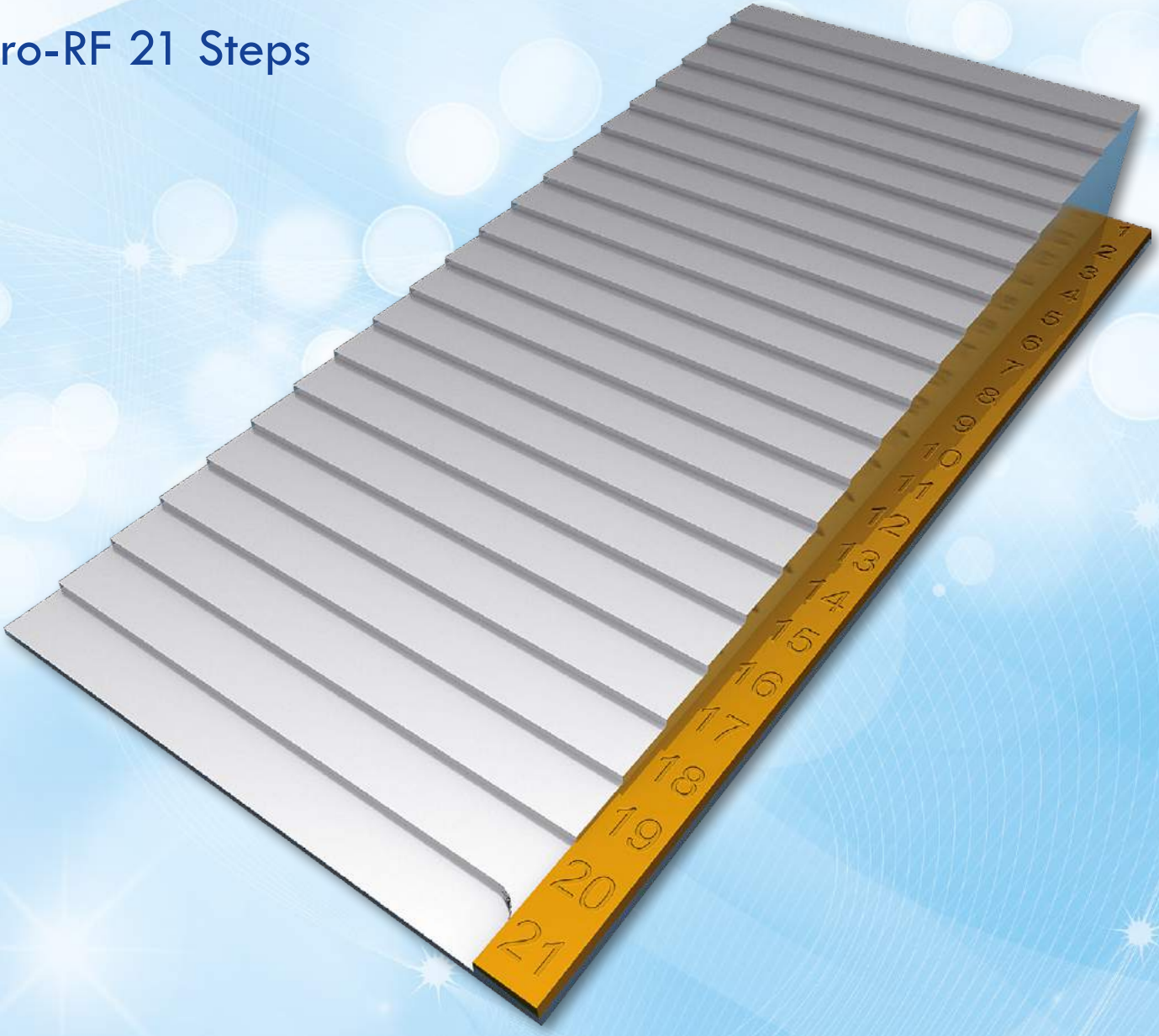
Pro-RF 21 Steps



21 step aluminium wedge for determination of the **dose reproducibility** and **sensitometric curve shape, speed and mid-gradient** of X-Ray screen-film radiography systems.

Technical data
(can be modified to customer specifications):

- dimensions: 231 x 110 x 31.5 mm
- 21 steps with a width of 11 mm
- 1.5 mm graduation per step
- made of a highest purity aluminium
- copper numbers marking each step
- other sizes of step wedges upon request

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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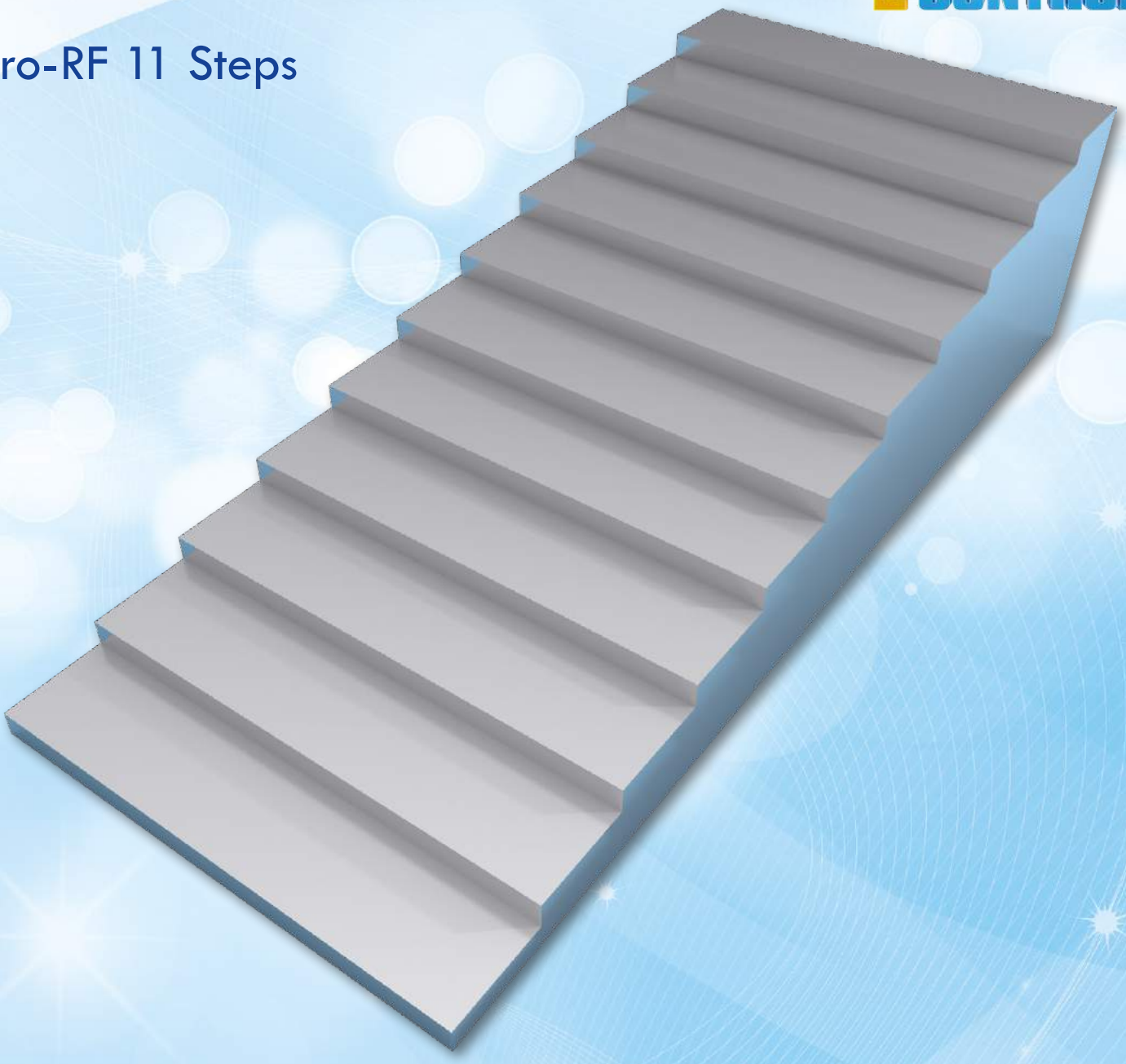
Pro-RF 11 Steps



11 step aluminium wedge for evaluation of **dynamic range of digital or film-screen systems.**

Technical data (can be modified to customer specifications):

- dimensions: 140 x 60 x 35.2 mm
- 11 steps 3.2 mm high and 12.7 mm deep
- made of a highest purity aluminium
- other sizes of step wedges upon request

Product features:

- Complies with:
  – IEC 61223-3-1
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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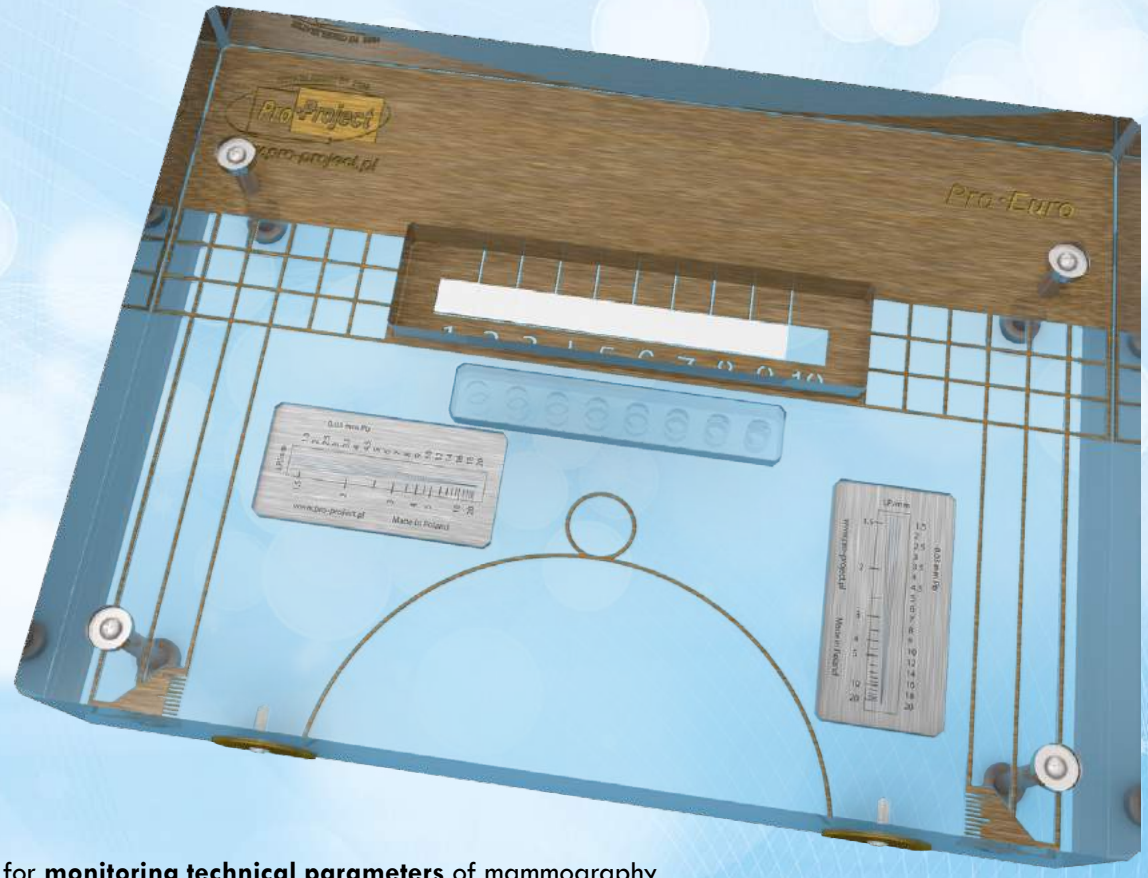
Pro-Euro



Pro-Euro phantom is used for **monitoring technical parameters** of mammography imaging systems according to the requirements of the **„European Guidelines for Quality Assurance in Mammography Screening"** and IEC 61223-3-2:

- optical density in the reference point
- spatial resolution
- dynamic range – image contrast
- threshold contrast visibility
- effective radiation field
- film processing
- automatic Exposure Control

Technical data (can be modified to customer specifications):

- dimensions: 240 x 180 x 45 mm
- additional 20 mm PMMA plate
- reference point (60 mm from the thorax side)
- pattern for line pair resolution evaluation (from 1.5 to 20.0 LP/mm) perpendicular and parallel to the thorax side
- 10-step aluminium wedge
- 8 low contrast objects
- markings (graduations) for assessment of the effective radiation field
- space covered with brass for sensitometric measurements
- area for the measuring chamber of the automatic exposure timer

Product features:

- complies with:
  – IEC 61223-3-2
  – "European Guidelines for Quality Assurance in Mammography Screening"
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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Pro-DigiMAM

This versatile phantom can be used for monitoring technical parameters of **digital mammography** imaging systems according to the requirements of the **"European Guidelines for Quality Assurance in Mammography Screening"** and **IEC 61223-3-2**:

- optical density / luminance in the reference point
- spatial resolution
- threshold contrast visibility
- contrast
- effective radiation field
- automatic exposure timer
- CNR, SNR
- NPS
- MTF
- ghostingw
- filaments
- artefacts evaluation
- geometric distortion check
- contrast details

Technical data (can be modified to customer specifications):

- dimensions: 240 x 180 mm or 300 x 240 mm
- modular construction – different modules can be firmly placed on the main module
- carrying case

Product features:

- complies with:
  – IEC 61223-3-2
  – "European Guidelines for Quality Assurance in Mammography Screening"
- plus supplement
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

main module

set of PMMA attenuation plates:
6 x 10 mm thick and 2 x 5 mm thick;
one plate contains marking of the reference point

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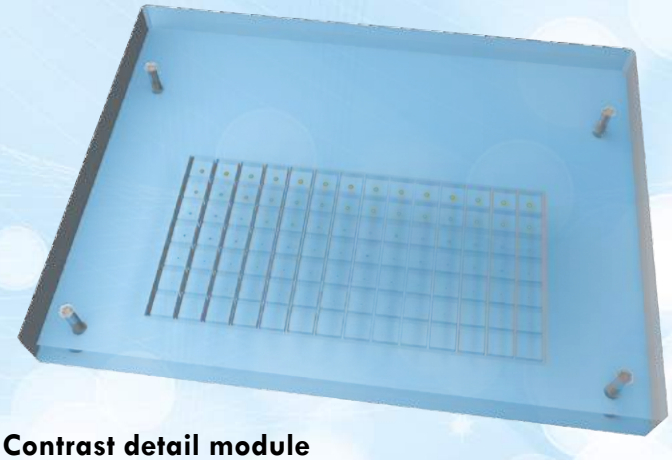
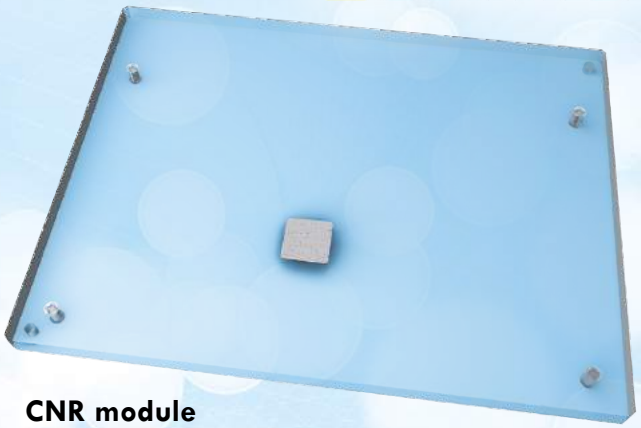


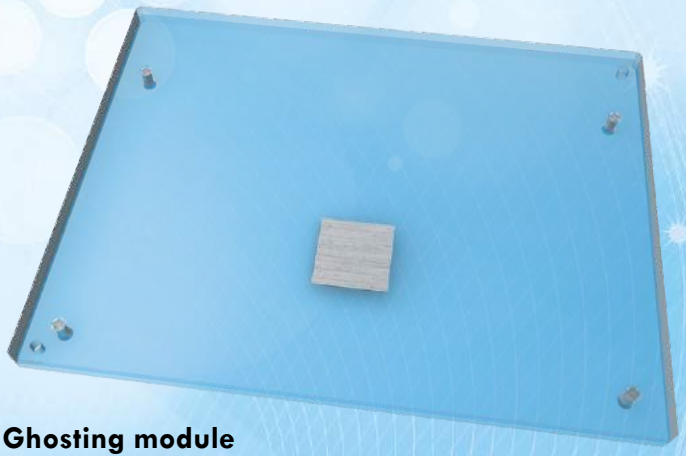
Contrast detail module

20 mm thick module containing gold (99.99%) discs organized in a 7 x 14 matrix (diameter x thickness). Discs have following diameters: 0.1, 0.25, 0.5, 0.75, 1.0, 1.5, 2.0 mm and 14 thicknesses ranging from 0.03 to 2.0 µm. Thickness accuracy: 1 nm (0.001 µm), diameter accuracy 0.001 mm (1 µm)



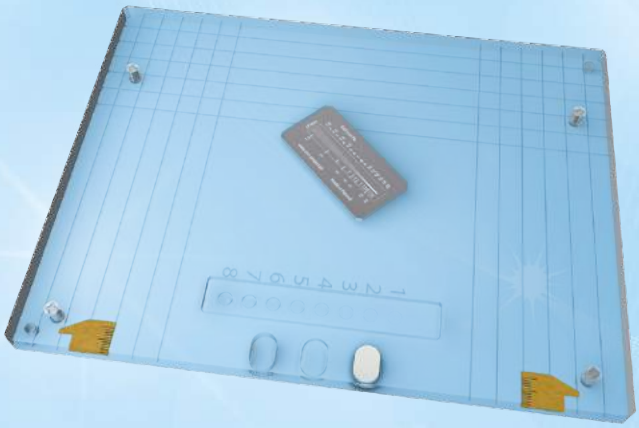
CNR module

10 mm thick module containing a 20 x 20 x 0.2 mm aluminium filter, located 6 cm from the chest side



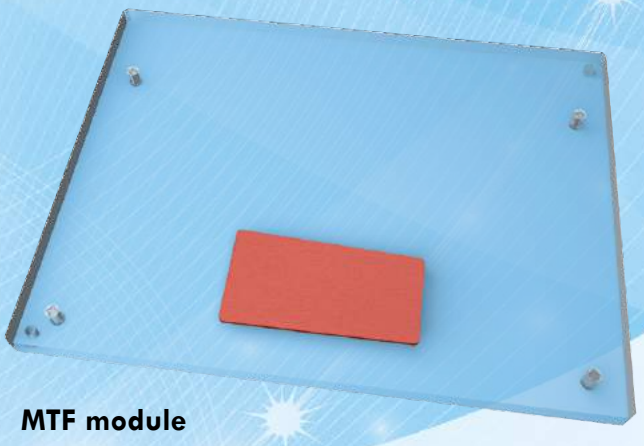
Ghosting module

10 mm thick module containing a 30 x 30 x 0.1 mm aluminium filter for a ghost test



Resolution and geometry module

10 mm thick module containing:
– pattern for the line pair resolution evaluation (from 1,5 to 20,0 LP/mm) rotated 45°
– 8 low contrast objects (ø 5.5 mm and depth from 0.1 mm to 0.45 mm)
– 3 objects of a different absorption level
– pattern for evaluation of the effective radiation field



MTF module

10 mm thick module containing a straight stainless steel edge accurate to ±2 µm at a 3° angle

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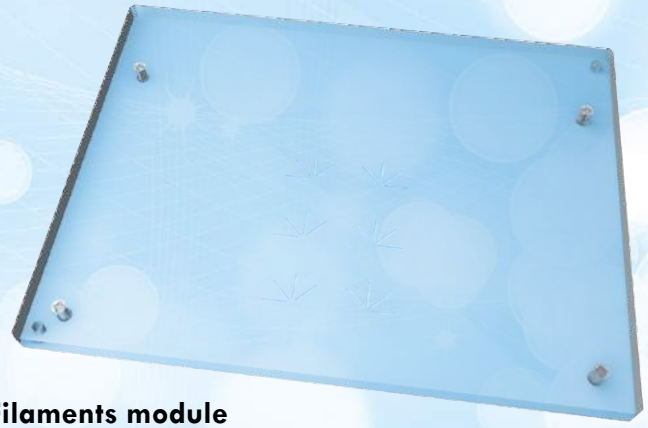
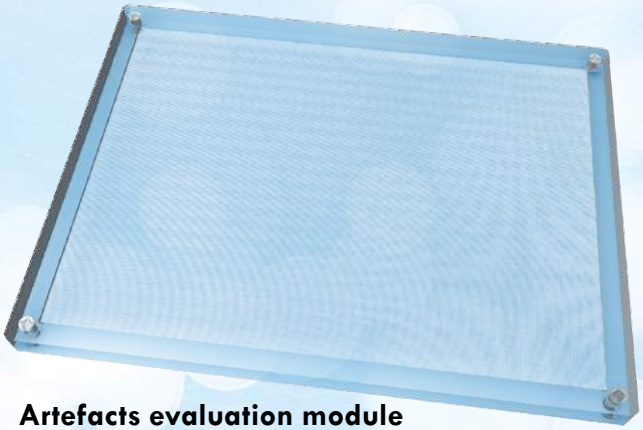


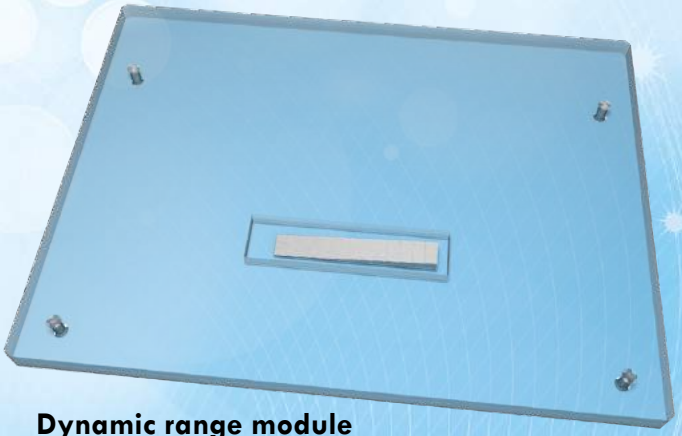
Filaments module

10 mm thick module containing 6 groups of multi-directional filaments 0.40 mm to 0.20 mm in diameter



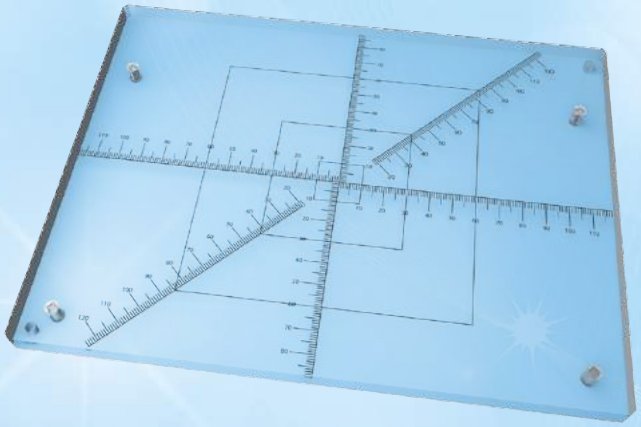
Artefacts evaluation module

10 mm thick module containing a mesh for artefacts evaluation



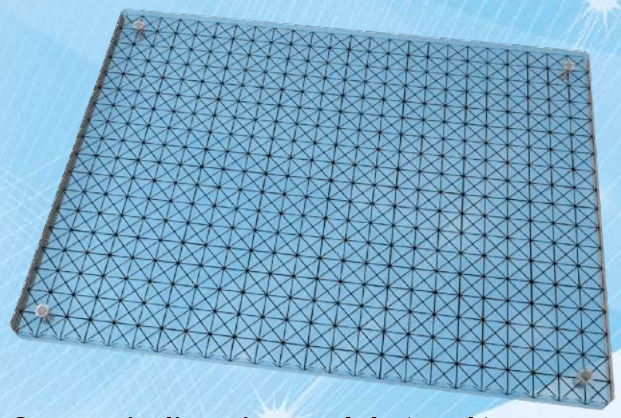
Dynamic range module

10 mm thick module containing Al step wedge with 14 steps from 0.0 to 5.2 mm



Geometry distortion module (scales)

10 mm thick module containing a grid with scales



Geometric distortion module (mesh)

10 mm thick module containing a wire mesh of horizontal, vertical and diagonal lines (45°)

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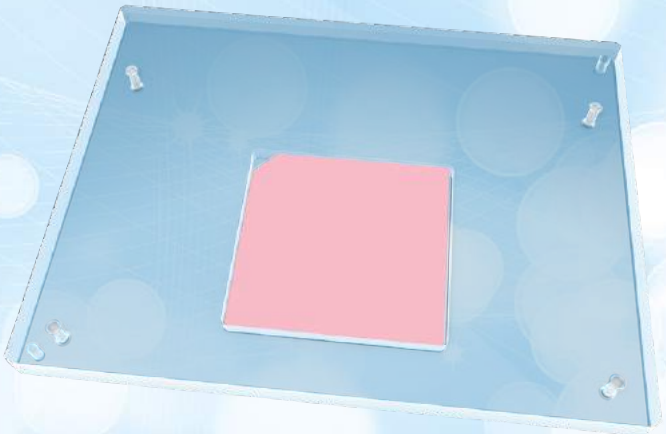
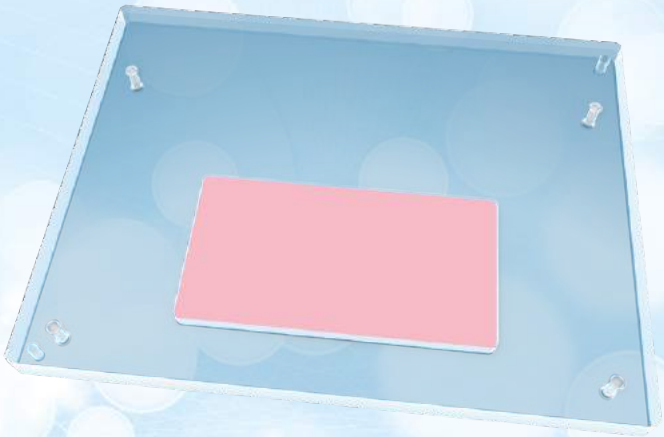


ACR Accreditation module

14 mm thick module containing a wax insert like in Pro-MAM Accreditation (when used with 3 x 10 mm plates from main module simulates 42 mm compressed breast of average glandular/adipose composition)



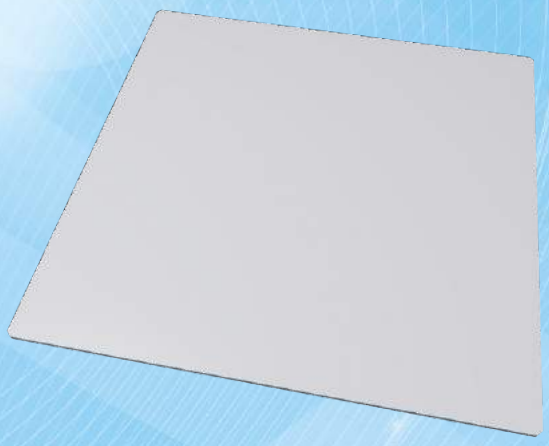
Full Field ACR Accreditation module

14 mm thick module containing a wax insert like in Pro-MAM Accreditation FF (when used with 3 x 10 mm plates from main module simulates 42 mm compressed breast of average glandular/adipose composition)

Spacers sets

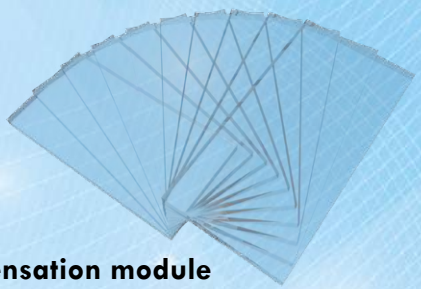
180 x 15 or 240 x 15 mm PMMA plates:

- 4 pieces 10 mm thick,
- 2 pieces 8 mm thick,
- 2 pieces 5 mm thick,
- 2 pieces 2 mm thick



Noise evaluation module

2 mm thick aluminium plate 200 x 200 mm



Compensation module

set of 10 PMMA plates 40 x 20 x 2 mm

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Tomosynthesis dedicated modules

MTF module

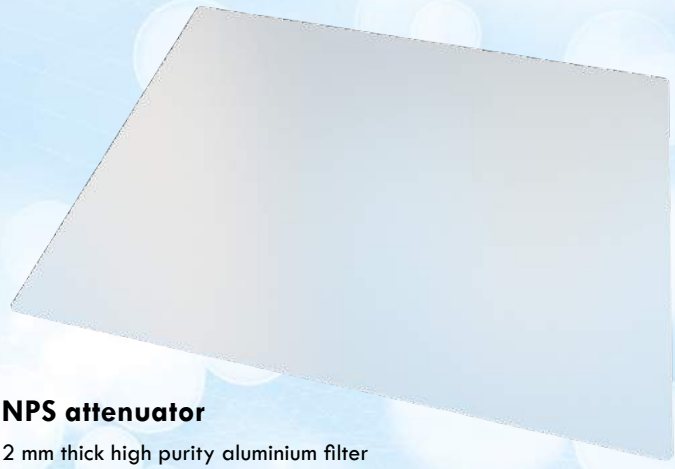
10 mm thick module containing a stainless steel square (50 x 50 mm) with straight edges accurate to ±2 µm rotated 3°

Wire MTF module

15 mm module containing 25 µm tungsten wire at a 3° angle 60 mm from the chest wall

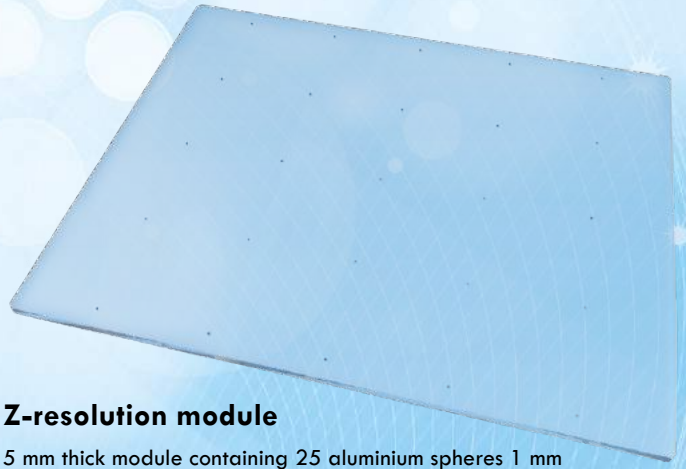
Spacers set

Two 240 x 20 x 30 mm spacers for appropriate positioning of test modules



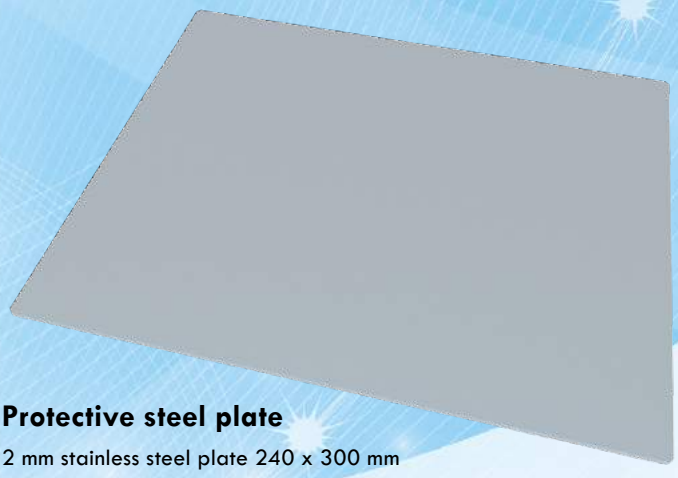
NPS attenuator

2 mm thick high purity aluminium filter



Z-resolution module

5 mm thick module containing 25 aluminium spheres 1 mm in diameter arranged in an array with 55 mm cell



Protective steel plate

2 mm stainless steel plate 240 x 300 mm covering the whole image receptor

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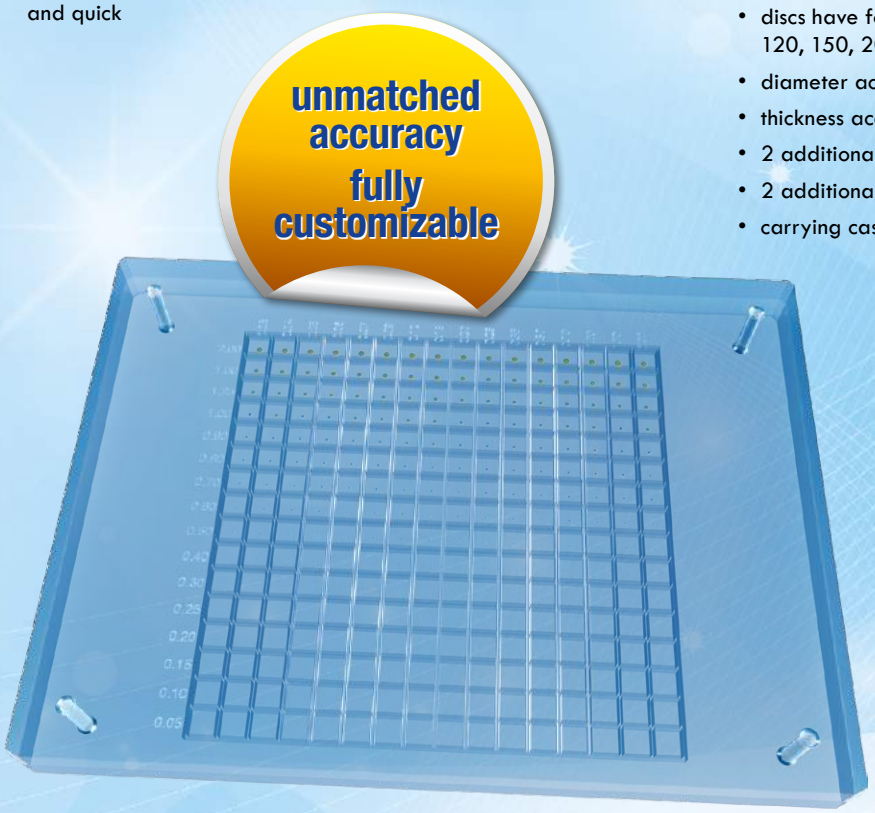
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM Gold

Contrast details mammography phantom according to **European Protocol** for quality assurance in Digital Mammography. It may be used to determine if mammographic images indicate objects with very low contrast and very small diameter, to find out the optimum exposure technique, or to compare image quality at various object thicknesses by variation of the amount of PMMA thickness.

Product highlights:

- unmatched accuracy – up to 30 times better than other products on the market
- gold disc objects positioned as per EUREF specs
- objects diameter, thickness and layout can be modified according to individual specifications
- no materials other than PMMA are used, so there is no need to calculate PMMA-equivalent attenuation for other materials such as aluminium
- for full-field analog and digital units
- Pro-Control software provides automatic and semi-automatic analysis of phantom's images, providing all necessary information like Contrast-Details curve, making quality assurance simple and quick



Technical data (can be modified to customer specifications):

- main PMMA module size: 240 x 180 x 20mm
- main module contains gold (99.99%) discs organized in a 16 x 16 matrix (diameter x thickness) placed at a depth of 10 mm
- **one or multiple discs per cell configuration**
- discs have following standard diameters: 0.05, 0.1, 0.15, 0.2, 0.25, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.25, 1.5 and 2.0 mm
- discs have following standard thicknesses: 30, 40, 50, 60, 70, 90, 120, 150, 200, 250, 350, 500, 700, 1000, 1700 and 2000 nm
- diameter accuracy 0.001 mm (1 µm)
- thickness accuracy: 0.1 nm (0.0001 µm)
- 2 additional 240 x 180 x 10 mm PMMA plates
- 2 additional 240 x 180 x 5 mm PMMA plates
- carrying case

Product features:

- complies with:
  - 4th edition of the European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis (EPQC)
  - EUREF type test protocol version 1.2
  - IEC 61223-3-2
  - NHSBSP Equipment Report 0604, Commissioning and Routine Testing of Full Field Digital Mammography Systems Published April 2009 (Version 3)

  CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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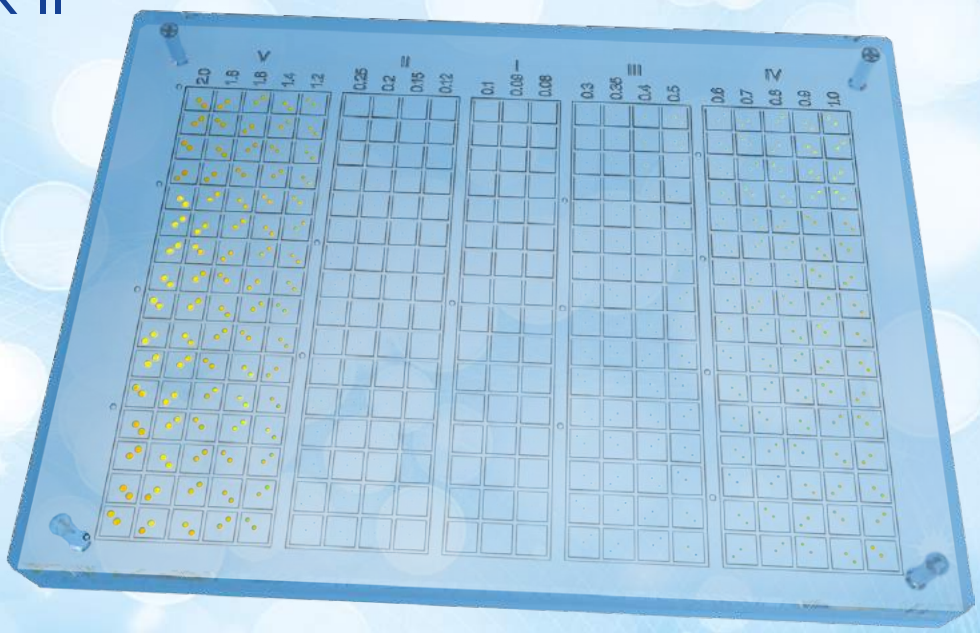
Pro-MAM Gold mk II



Upgraded contrast details mammography phantom according to European Protocol for quality assurance in Digital Mammography. It may be used to determine if mammographic images indicate objects with very low contrast and very small diameter, to find out the optimum exposure technique, or to compare image quality at various object thicknesses by variation of the amount of PMMA thickness.

Product highlights:

- **unmatched accuracy – up to 30 times better than other products on the market**
- gold disc objects positioned at depth suggested by EUREF
- **smallest objects are positioned in the middle of the phantom where sensitivity of the x-ray device is the best**
- **discs are grouped into five sections relative to the EUREF limiting diameters values (2.0, 1.0, 0.5, 0.25 and 1.0 mm)**
- disc thickness are optimized to result in contrast details curves for each diameter to correspond perfectly with EUREF limiting values
- no materials other than PMMA are used, so there is no need to calculate PMMA-equivalent attenuation for other materials such as aluminium
- for full-field analog and digital units
- Pro-Control software provides automatic and semi-automatic analysis of the phantom's images, providing all the necessary information like Contrast-Details curve, making quality assurance simple and quick

Technical data (can be modified to customer specifications):

- phantom size: 240 x 180 or 300 x 240 mm
- main 20 mm module contains 672 gold (99.99%) discs
- 21 diameters from 0.08 - 2.00 mm
- each diameter has its own optimized thickness range of 5 nm – 110 nm for the 2.00 mm diameter gold discs to 600 nm – 2800 nm for the 0.08 mm diameter, all in 16 steps
- discs are placed at a depth of 10 mm
- 2 discs per cell, one disc is placed in the middle and one near the random corner of the cell
- diameter accuracy 0.001 mm (1 µm)
- thickness accuracy: 0.1 nm (0.0001 µm)
- 2 additional 10 mm PMMA plates (thickness accuracy about 0.05 mm)
- 2 additional 5 mm PMMA plates (thickness accuracy about 0.05 mm)
- carrying case

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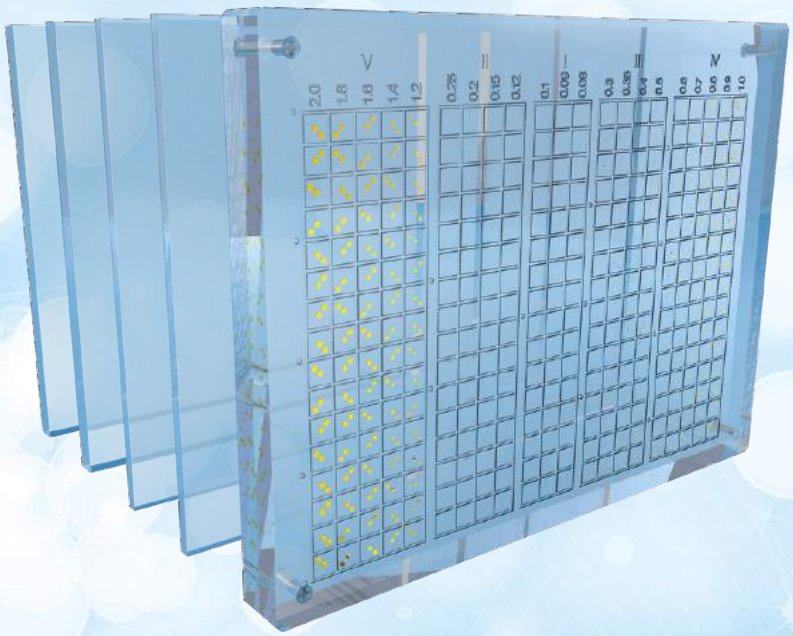
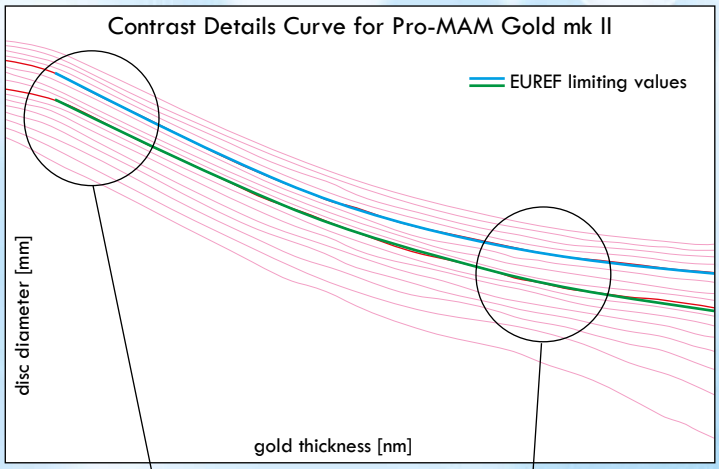
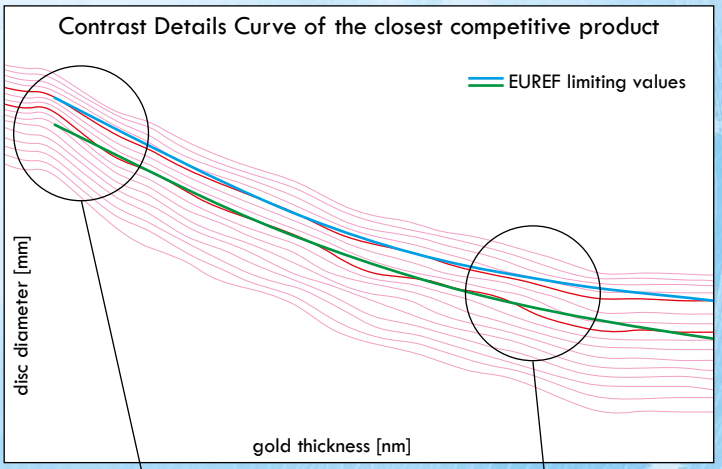
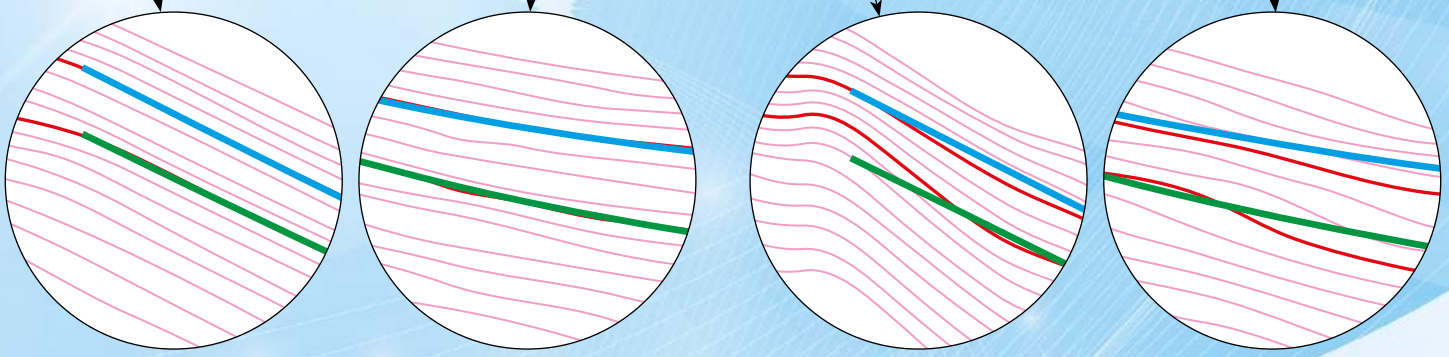


Product features:

- complies with:
  – 4th edition of the European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis (EPQC)
  – Euref type test protocol version 1.2
  – EN-IEC 61223-3-2
  – IEC 61223-3-2
  – NHSBSP Equipment Report 0604, Commissioning and Routine Testing of Full Field Digital Mammography Systems Published April 2009 (Version 3)
  – DIN 6868-162
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration







Note a very good correlation of Contrast Details Curves of the Pro-MAM Gold mk II phantom against the limiting values set by EUREF. This ensures unmatched evaluation of a mammography system performance according to requirements of European Protocol for quality assurance in Digital Mammography.

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Pro-MAM Contrast

Phantom for **performance testing of mammography** X-ray units. It has **49 holes** that generate subtle changes in contrast. It can be used to **detect small variations** in system performance.

Technical data (can be modified to customer specifications):

- dimensions: 62.7 x 62.7 x 62.7 mm
- hole depth (7 columns): 0.853, 0.533, 0.332, 0.208, 0.129, 0.080, 0.050 mm
- typical contrast for mammographic energies: 6.60, 4.20, 2.60, 1.70, 1.00, 0.65, 0.41%
- diameter of holes (7 rows): 4.292, 2.524, 1.485, 0.873, 0.513, 0.302, 0.177 mm
- optimized for digital units
- includes a rotating support plate
- comfortable carrying case

Product features:

- complies with:
  – IEC 61223-3-2
  – "European Guidelines for Quality Assurance in Mammography Screening"
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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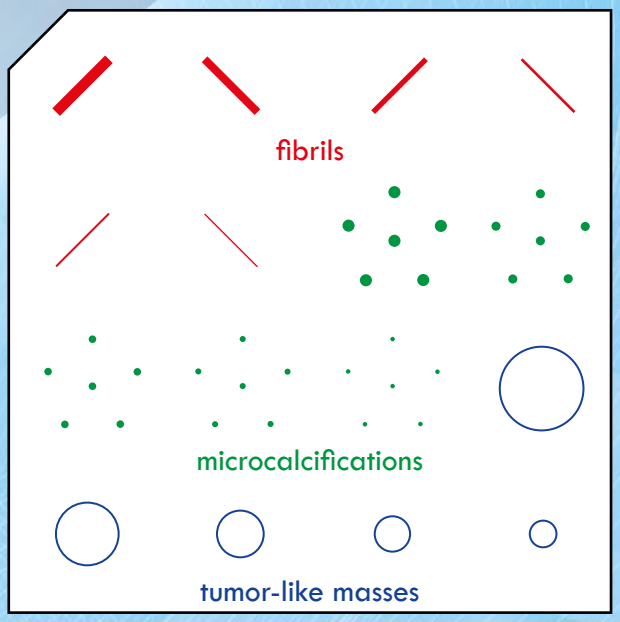
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM Accreditation

This phantom was designed to **meet ACR Mammography Accreditation Program Requirements as well as those of Mammography Quality Standards Act (MQSA) of 1992.** Phantom can test the performance of a mammographic system and its ability to image small structures similar to those found clinically: calcifications, fibrous calcifications in ducts and tumor masses.



Technical data (can be modified to customer specifications):

- dimensions: 102.0 x 108.0 x 44.0 mm
- simulates 42 mm compressed breast of average glandular/adipose composition
- total PMMA thickness: 36.75 mm
- wax insert:
  – thickness: 7.25 mm
  – nylon fibrils diameters: 1.56, 1.12, 0.89, 0.75, 0.54 and 0.40 mm
  – microcalcifications: 0.54, 0.40, 0.32, 0.24 and 0.16 mm Al_2O_3 specks
  – tumor-like masses: 2.00, l.00, 0.75, 0.50 and 0.25 mm thick
- 4 mm thick PMMA contrast disc
- rotating support plate (optional)
- comfortable carrying case (optional)

Product features:

- Complies with:
  – IEC 61223-3-2
  – ACR Mammography Accreditation Program Requirements (May 4, 2012)
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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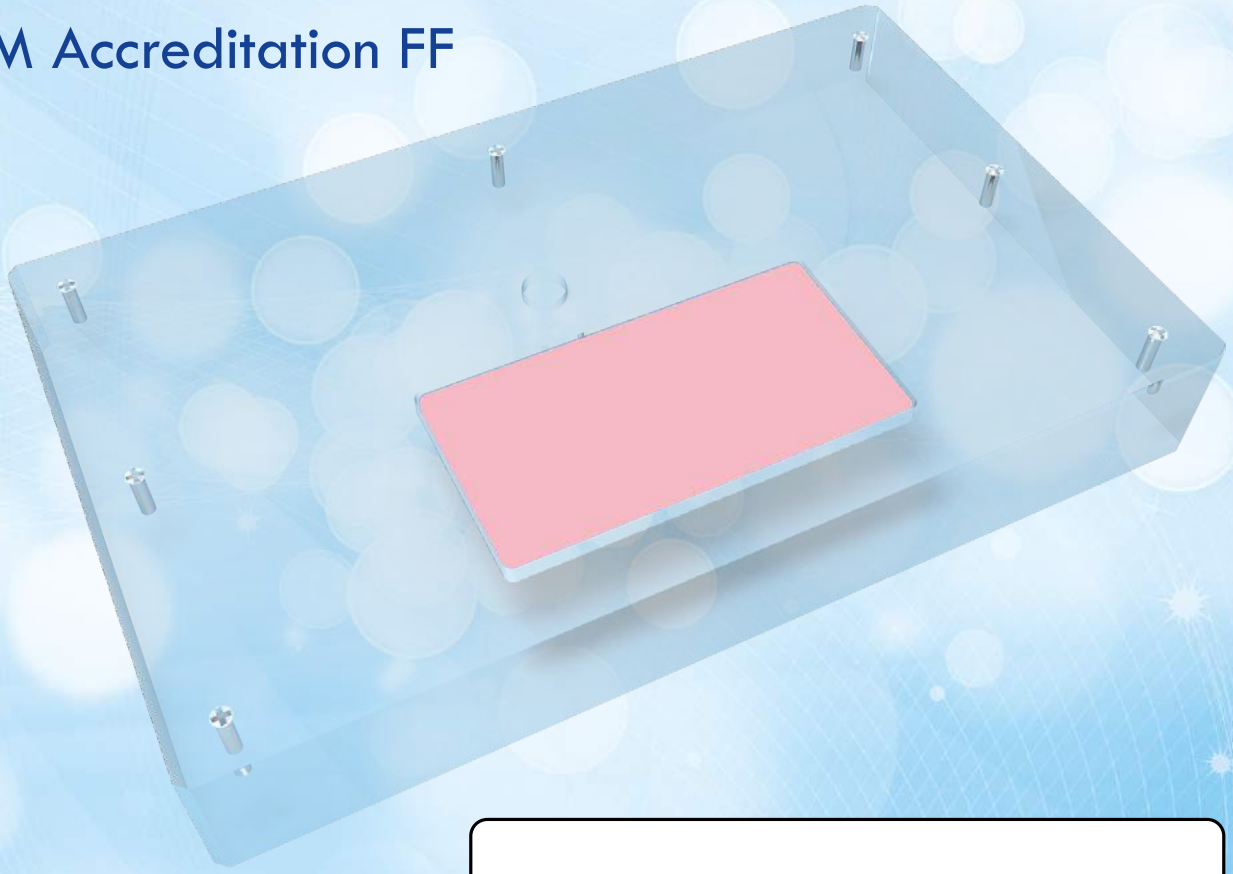
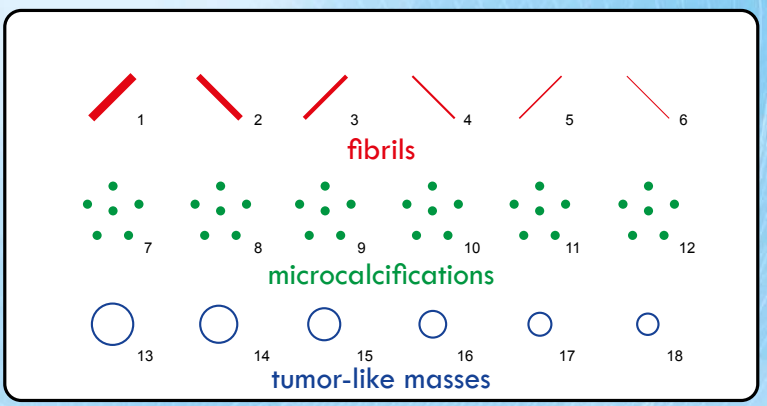
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM Accreditation FF





This Full Field phantom was designed to **test the performance of a digital mammographic system by evaluating the system's ability to image small structures similar to those found clinically**: micro-calcifications, fibrous structures in ducts and tumor-like masses. It is similar to the Pro-MAM Accreditation phantom, the main difference being the size: the FF (Full Field) version is larger and covers the entire image detector, thus eliminating scatter.

Technical data (can be modified to customer specifications):

- dimensions: 311.2 x 190.5 x 41.3 mm
- simulates 42 mm compressed breast of average glandular/adipose composition (50%/50%)
- wax insert:
  – nylon fibrils diameters: 0.89, 0.75, 0.61, 0.54, 0.40 and 0.30 mm
  – microcalcifications: 0.33, 0.28, 0.23, 0.20, 0.17 and 0.14 mm Al2O3 specks
  – tumor-like masses: 1.00, 0.75, 0.50, 0.38, 0.25 and 0.20 mm thick
- comfortable carrying case (optional)

Product features:

- Complies with:
  – IEC 61223-3-2
  – ACR Mammography Accreditation Program Requirements
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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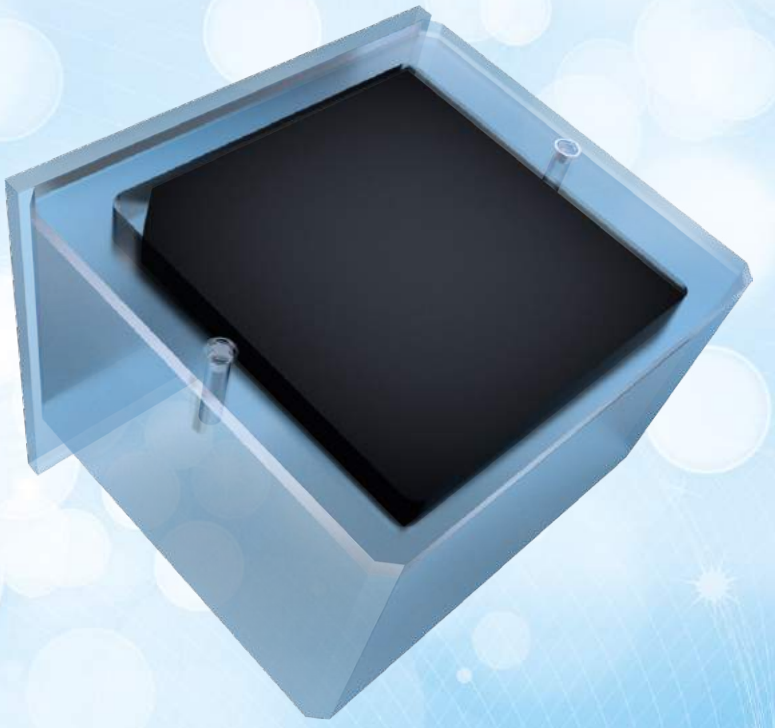
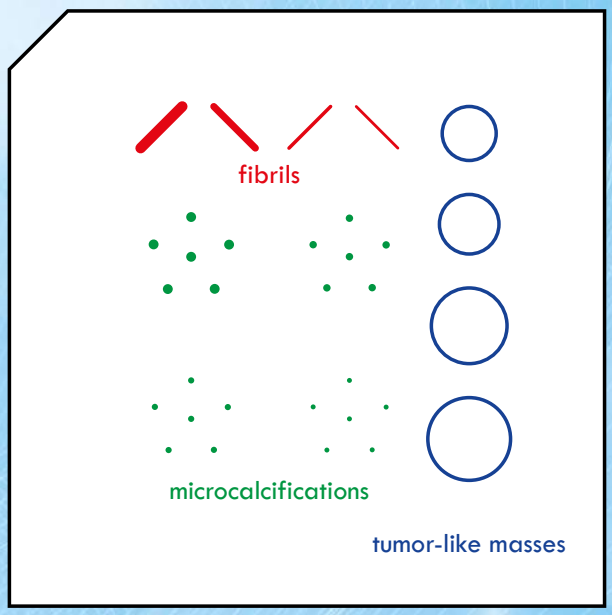
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM Biopsy



This phantom was **designed to provide a fast and easy way to test image quality on digital biopsy mammography units and qualify for ACR accreditation.** Accepted by the ACR for use in its Stereotactic Breast Biopsy Accredition Program, the phantom contains test objects that are similar to those found in the Mammographic Accreditation Phantom specified by the American College of Radiology (ACR). **The extended top edge of the phantom allows ease of positioning on recumbent biopsy units.** The phantom's small size allows the phantom to be imaged in its entirety in a single exposure when used with a digital biopsy unit. Enables you to determine if the images are similar to, or better than screen-film. Can be used in both an upright and prone machine.



Technical data (can be modified to customer specifications):

- dimensions: 80 x 70 x 46 mm
- simulates 42 mm compressed breast of average glandular/adipose composition
- cut-out (60 mm x 60 mm x 6 mm) for inserting test element AP or the test element KP ACR Biopsy
- test elements contain:
  – nylon fibrils diameters (fibers): 0.93, 0.74, 0.54 and 0.32 mm
  – Al2O3 microcalcifications (specs): 0.54, 0.32, 0.24 and 0.2 mm
  – tumor-like masses: 1.00, 0.75, 0.50 and 0.25 mm thick

Product features:

- Complies with:
  – IEC 61223-3-2
  – ACR Mammography Accreditation Program Requirements (May 4, 2012)
  – ACR Stereotactic Breast Biopsy Accreditation Program
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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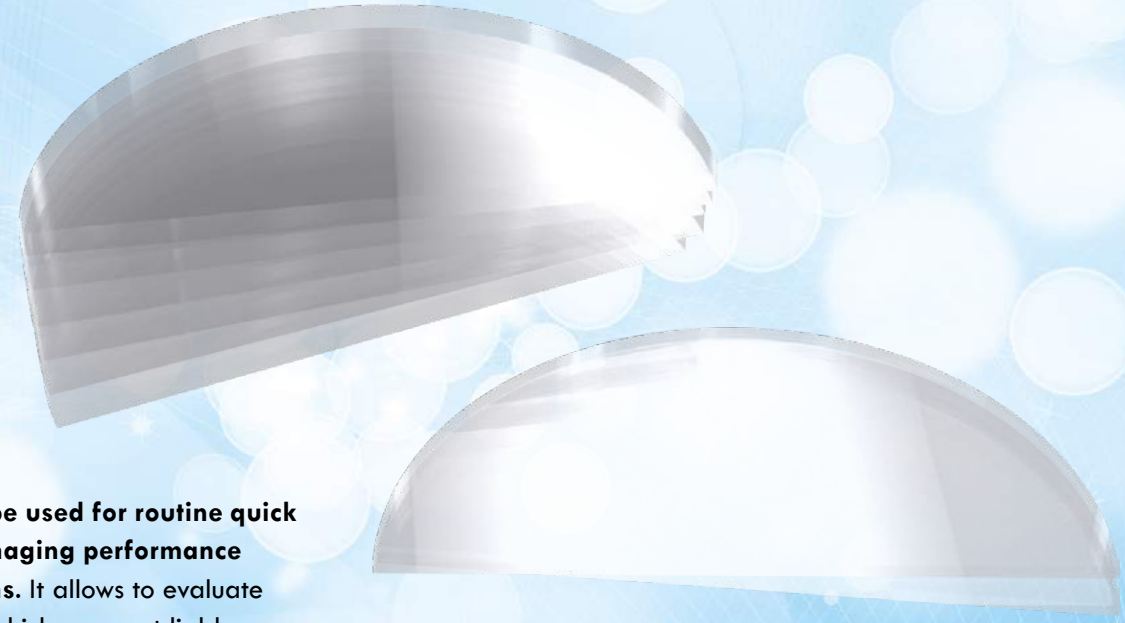
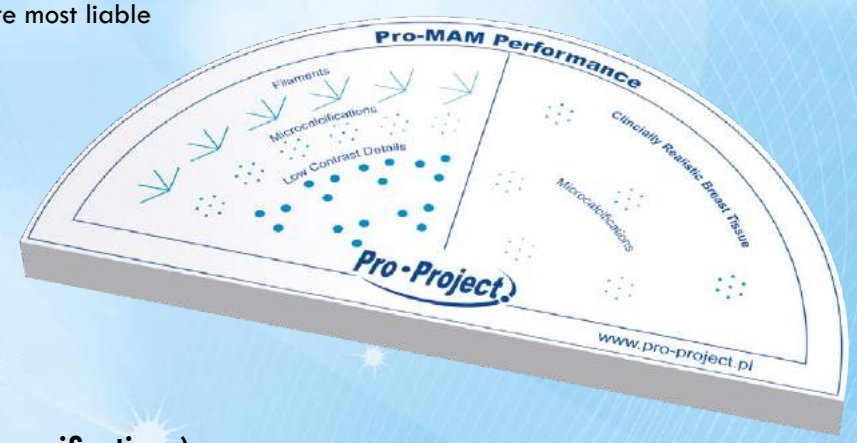
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM Performance



The phantom designed **to be used for routine quick and ongoing checks of imaging performance of mammography systems.** It allows to evaluate particularly those aspects which are most liable to deterioration.



Technical data (can be modified to customer specifications):

- 240 mm diameter semicircle
- first half of the test module contains:
  - 6 groups of 10mm long multi-directional filaments of the following diameters: 0.40, 0.35, 0.30, 0.25, 0.225, 0.20 mm
  - 6 groups of microcalcifications in the following ranges: 354-224, 283-180, 226-150, 177-106, 141-90, 106-63 µm
  - 6 groups of 3 low contrast details, 3mm in diameter, producing nominal contrast at 28 kVp of: 0.04, 0.03, 0.02, 0.015, 0.01, 0.005 (each contrast is presented 3 times)
- second half of the test module contains:
  - clinically realistic breast tissue (not tissue equivalent to but simulating the appearance of the breast tissue) containing 6 groups of low contrast details - same specifications as in the other half
- 6 PMMA plates 10 mm thick
- 2 PMMA plates 5 mm thick
- carrying case

Product features:

- Complies with:
  - IEC 61223-3-2
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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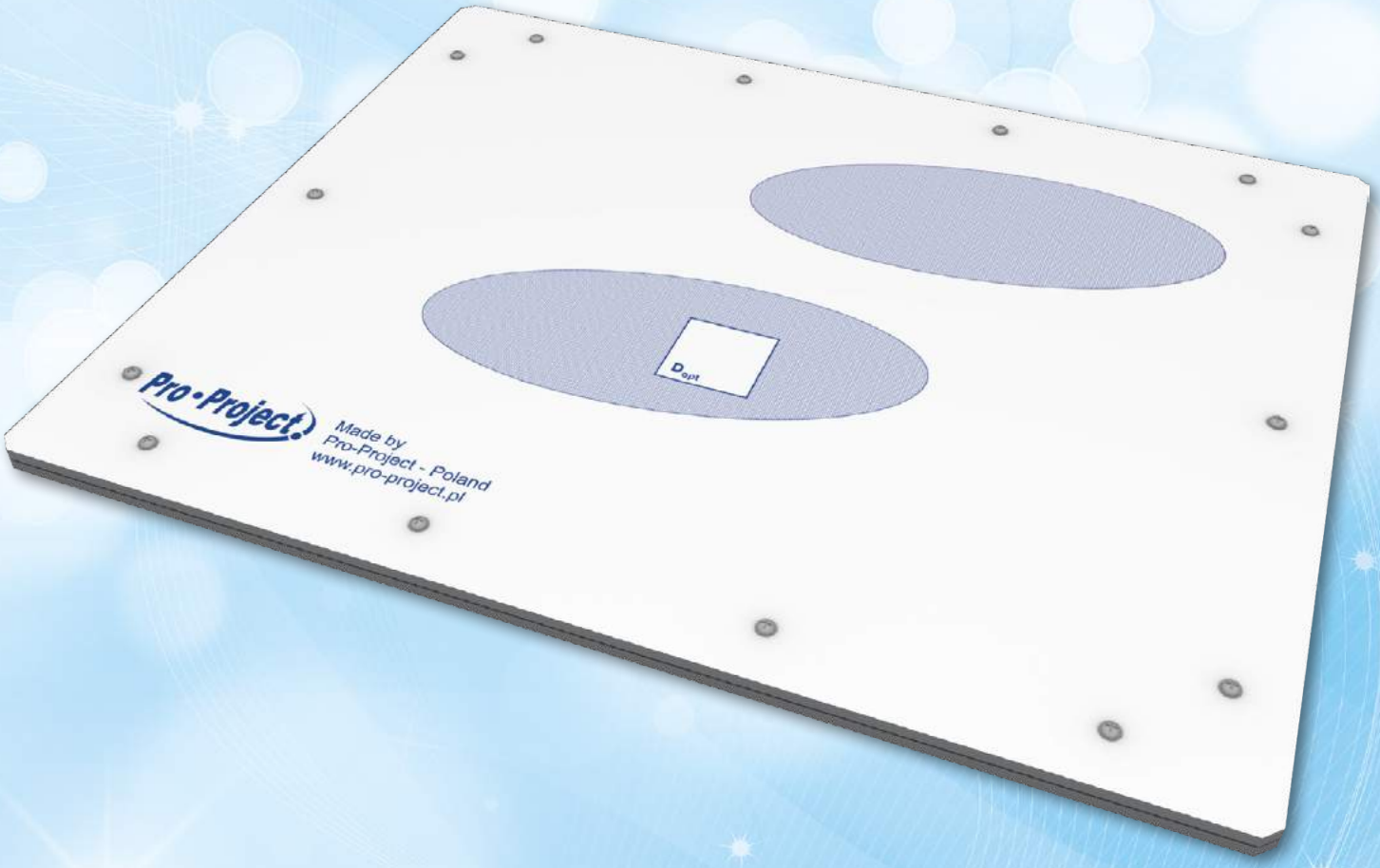
Pro-MAM Contact



Test grid for testing **mammography-cassette film-screen contact.**

Technical data (can be modified to customer specifications):

- dimensions: 240 x 300 x 8 mm
- 25 x 25 mm free field to measure optical density
- mesh size: 0.5 mm
- wire diameter: 0.1 mm

Product features:

- complies with:
  – IEC 61223-3-2
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM Compress

Calibrated scale for assessment
of the **breast compression force** of mammography systems.

Technical data
(can be modified to customer specifications):

- measuring range up to 25 kg
- accuracy 10 g
- large, backlit, detachable (130 cm long cable) LCD display
- simple operation with three buttons
- scale size: 20 x 16 cm
- battery and external power supply

Product features:

- complies with:
  – IEC 61223-3-2
  – "European Guidelines for Quality Assurance in Mammography Screening"
- CE certified
- calibration certificate
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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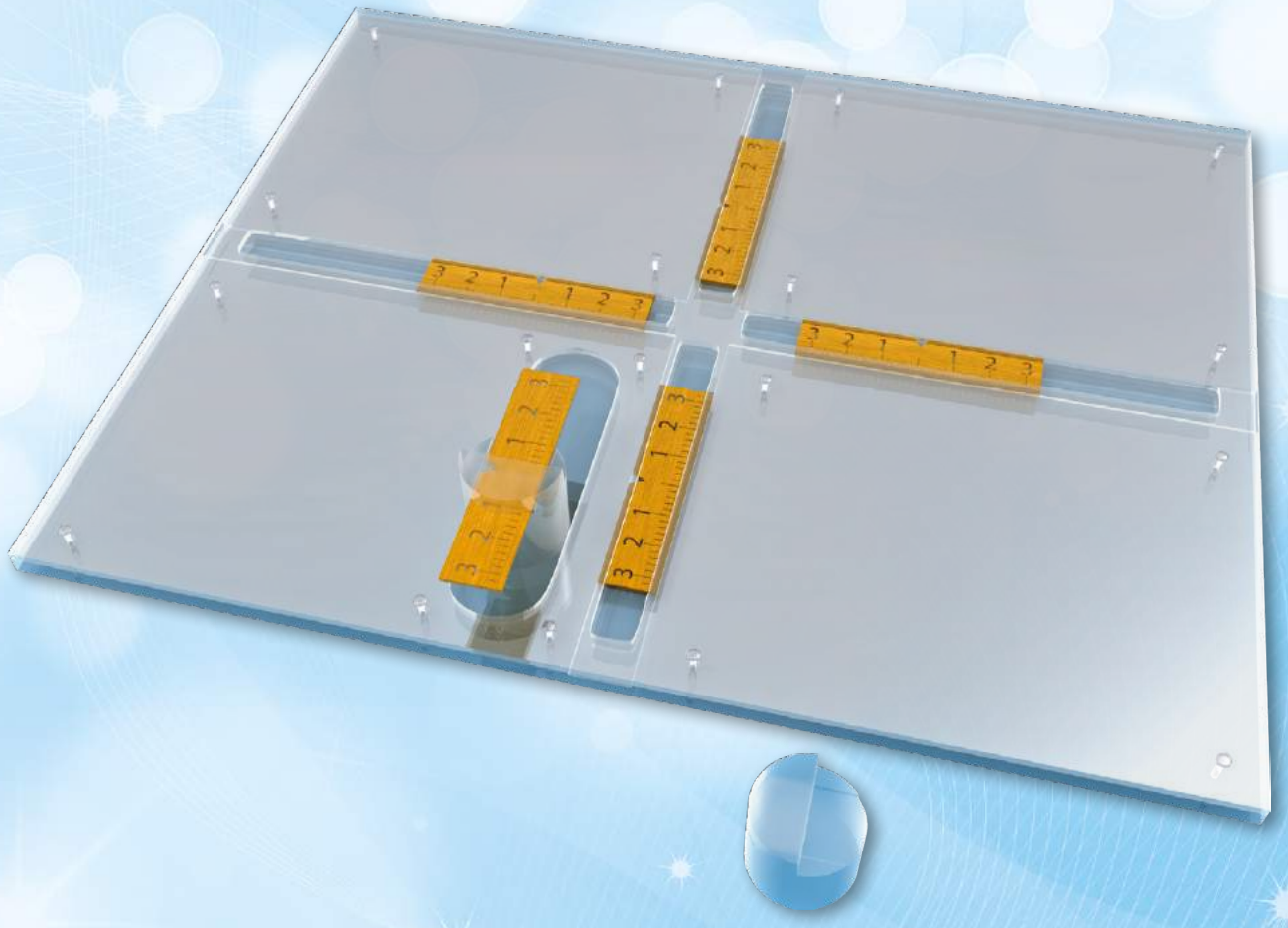
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM Geometry



This test device was developed to provide the user with **a convenient, quick and accurate way of testing collimation of mammography units.** It is very simple to use. Instead of using all those hard-to-find coins, you only use our test tool.

Technical data
(can be modified to customer specifications):

- dimensions: 300 x 240 mm
- measurement can be quickly and easily repeated
- compression paddle rests on peg exactly 4.2 cm above the Bucky – no measurement of compression paddle height needed
- adaptable for 18 x 24 cm, 24 x 30 cm and magnification stand testing

Product features:

- Complies with:
  – IEC 61223-3-2
  – MQSA testing requirements as contained in the ACR Mammography QC Manual
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registrationv

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM AEC PMMA

Set of acrylic plates for testing Automated Exposure Control of mammography systems.

Technical data (can be modified to customer specifications):

- dimensions: 240 x 180 mm
- 7 x 10 mm thick
- 2 x 5 mm thick
- made of a transparent PMMA
- other sizes upon request

Product features:

- Complies with:
  – IEC 61223-3-2
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MAM 21 Steps

21 step aluminium wedge for determination of **the dose reproducibility and sensitometric curve shape, speed and mid-gradient** of mammography X-ray film.

Technical data
(can be modified to customer specifications):

- dimensions: 10 x 105 x 6.3 mm
- 21 steps with a width of 5 mm
- 0.3 mm graduation per step
- made of a highest purity aluminium
- other sizes of step wedges upon request

Product features:

- Complies with:
  – IEC 61223-3-2
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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Pro-CT

The Pro-CT phantom may be used for carrying out **acceptance and constancy tests of computed tomography** systems according to **IEC 61223-3-5** and the **AAPM** (American Association of Physicists in Medicine) guidelines.

This phantom **consists of five test modules** placed on an adjustable stand allowing for accurate alignment on the CT table. Markings on modules provide further facilitation of the positioning process. There is **no need to fill the phantom with water,** which can be very inconvenient, because all modules are filled with **a substance whose density is similar to water.**

Go for a version that works without water filling or stick to the traditional water filled one!

The Phantom can be used to do the following tests:

- artefacts, noise
- homogeneity
- spatial resolution (high contrast resolution)
- sensitivity (low contrast resolution)
- size dependence
- contrast scale
- slice thickness
- alignment
- linearity
- beamwidth

Product features:

- complies with:
  – IEC 61223-3-5
  – IEC 61223-2-6
  – AAPM guidelines
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

NEW OPTIONS

Low contrast module

Technical data
(can be modified to customer specifications):

- diameter: 230 mm
- thickness: 30 mm
- contains three groups of low-contrast objects. In each group, there are rods of the same density, 20 mm in height and with a diameter ranging from 2 to 15 mm. Contrast difference between groups and surrounding material is 0.3, 0.6 and 1%
- optional subslice targets having a nominal 1.0% contrast and z-axis lengths of 3, 5, and 7 mm. For each of these lengths, there are objects of 3, 5, 7 and 9 mm in diameter.
- made of acrylic

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Sensitometric / contrast module

Technical data
(can be modified to customer specifications):

- diameter: 230 mm
- thickness: 45 mm
- contains 5 sensitometric samples shaped like rods (ø25 mm): PMMA, PTFE, air, polyamide and water
- module made of polythene

NEW OPTIONS

Geometry module

Technical data
(can be modified to customer specifications):

- diameter: 230 mm
- thickness: 50 mm
- contains two pairs of aluminium wire ramps whose slope angle tangent is equal to 0.5.
- middles of ramps intersect on the same plane allowing very precise evaluation of the slice location
- contains four PMMA rods (ø5 mm) placed in vertexes of a square (sides 100 mm long). Rods are placed on the vertical and horizontal axes of the module. This makes it possible to precisely evaluate the correctness of shape and geometry imaging.
- optional eight spheres to evaluate the scanner's imaging of subslice spherical volumes, diameters: 1.0, 1.5, 2.0, 3.0, 4.0, 6.0, 8.0 and 10.0 mm
- module density is similar to water

NOW UP TO 30 LP/cm

Spatial / high contrast resolution module

Technical data (can be modified to customer specifications):

- diameter: 230 mm
- thickness: 15 mm
- contains 11 concentrically placed aluminium elements for spatial resolution evaluation from 1 to 11 LP/cm
- optional, up to 19 additional concentrically placed aluminium elements for spatial resolution evaluation from 12 to 30 LP/cm
- two tungsten carbide beads ø0.28 mm for MTF and SSP calculation

Homogenous module

Technical data (can be modified to customer specifications):

- diameter: 230 mm
- thickness: 45 mm
- module can be filled with water or polythene

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-CT AAPM

The Pro-CT AAPM phantom may be used for **carrying out tests of computed tomography systems** according to **Report no. 1 of the AAPM** (American Association of Physicists in Medicine).

Technical data (can be modified to customer specifications):

- PMMA water tank:
  – inside cylinder diameter: 214 mm
  – outside cylinder diameter: 220 mm
  – lid has quick disconnect valves for ease of filling and draining
  – aluminum alignment pin (6.3 mm ø x 76 mm) or a polystyrene TLD insert (for dose measurements) can be attached to the lid
- low contrast section:
  – placed at one end of the water tank
  – 12 fillable cavities 40 mm deep
  – two pieces of each cavity with diameters: 25.4, 19.0, 12.7, 9.5, 6.4 and 3.2 mm
  – spaced twice their diameter apart from the centerline
  – cavities can be easily filled from the outside with dextrose or sodium chloride solutions of various concentrations
- bone insert:
  – PTFE annulus
  – wall thickness 6.4 mm, 70 mm long
  – fits over all inserts to harden the beam
- CT number linearity insert:
  – five 25 mm rods
  – material: polyethylene, PMMA (acrylic), polycarbonate, polystyrene and nylon
  – density values (g/cm^3): 0.95, 1.19, 1.20, 1.05 and 1.1 respectively
- resolution insert:
  – eight sets / rows of air thru holes (five holes per set)
  – diameters of holes: 1.75, 1.5, 1.25, 1.00, 0.75, 0.61, 0.50 and 0.40 mm
  – distance between each hole is equal to the hole diameter
  – distance between rows 5 mm
  – 0.2 mm stainless steel wire positioned longitudinally for calculation of line-spread function

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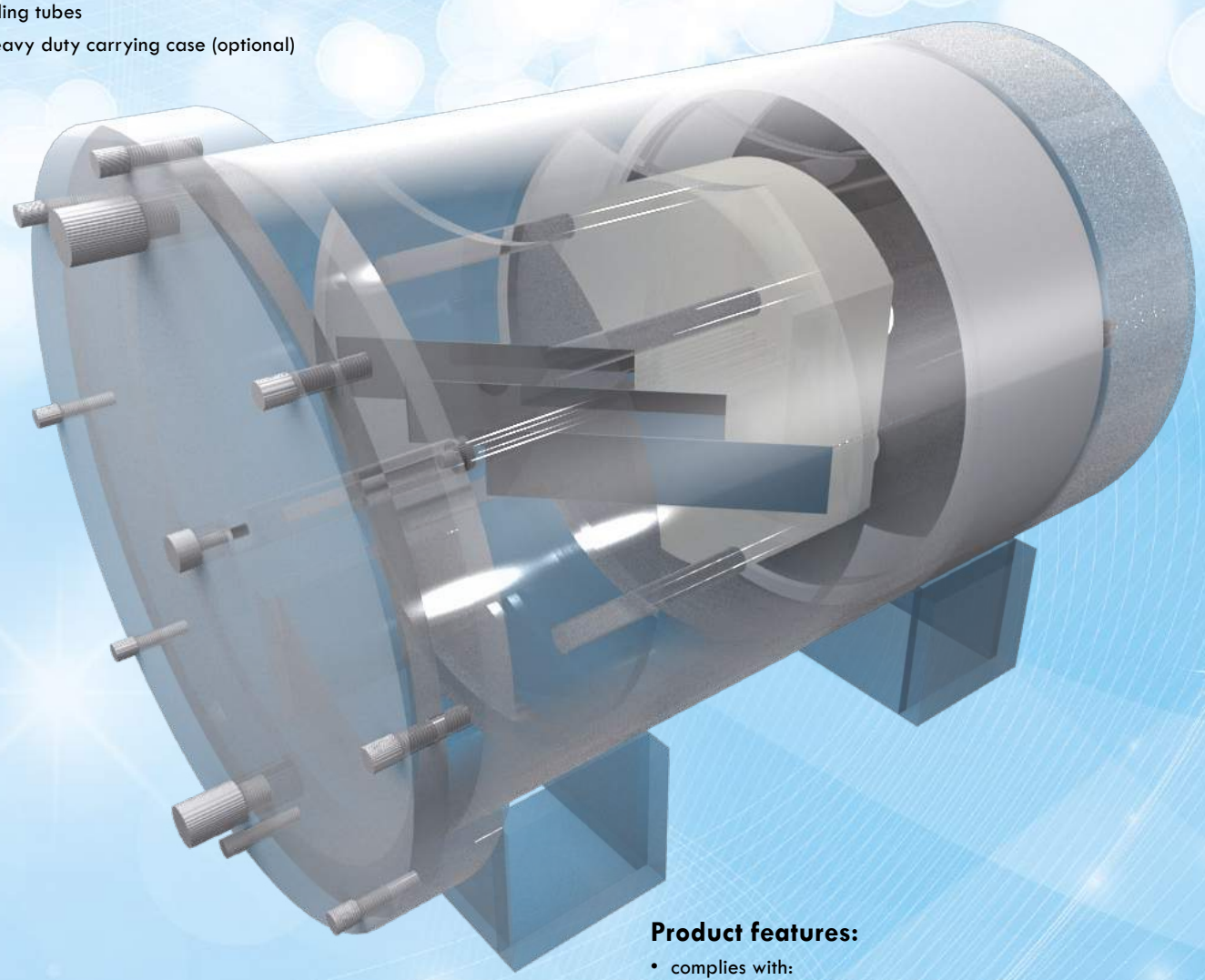
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

- slice thickness insert:
  – three aluminum strips, 0.5 mm thick and 25 mm wide angled at 45°, positioned at the centre and aligned vertically
- geometry insert (optional):
  – contains two pairs of aluminium wire ramps whose slope angle tangent is equal to 0.5
  – middles of ramps intersect on the same plane allowing for very precise evaluation of the slice location
  – contains two sets of four PMMA rods (ø10 mm) placed in vertexes of two squares (sides 100 mm long)
- triple low contrast insert (optional):
  – contains three groups of low-contrast objects. In each group, there are rods of the same density, 20 mm in height and with a diameter ranging from 2 to 15 mm. Density difference between groups and surrounding material is exactly 0.3%, 0.6% and 1.0%
  – made of PMMA
- filling tubes
- heavy duty carrying case (optional)



Product features:

- complies with:
  – Report no. 1 of the AAPM (American Association of Physicists in Medicine)
  – IEC 61223-3-5
  – IEC 61223-2-6
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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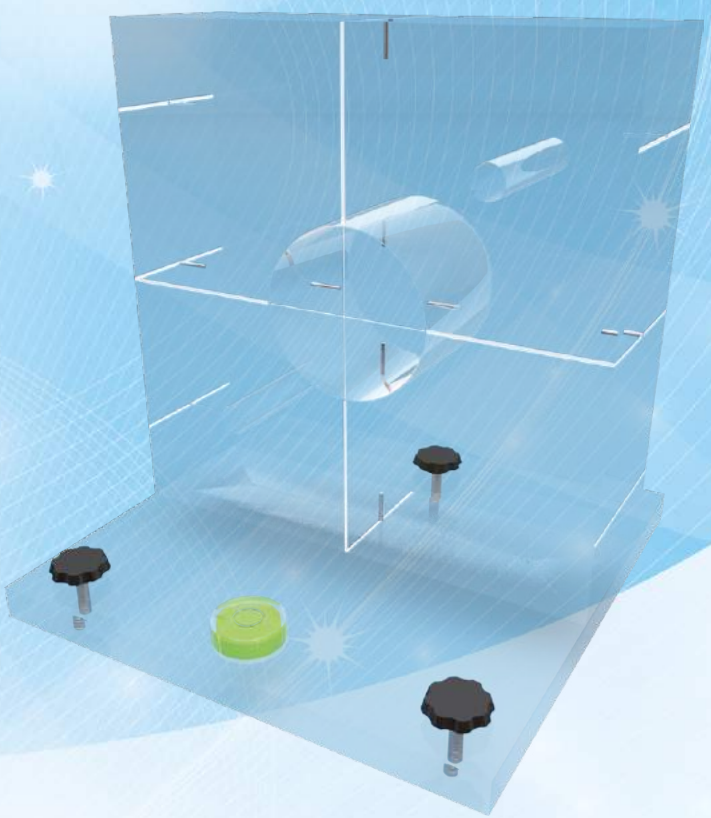
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-CT Align

This phantom can be used to **check the alignment of the internal and external lasers to the radiographic center of CT and PET/CT units and to verify lateral gantry angle.** It can also be used with **accelerator units to check vertical and lateral gantry angles, laser alignment and vertical table movement.**

Technical data (can be modified to customer specifications):

- made of transparent PMMA 150 x 150 x 50 mm
- large 150 x 150 mm sides include:
  – centering scribe lines that go across the phantom on one side
  – two large holes 9.5 mm in diameter, 106 mm apart center to center in the exact center of a quadrant of the phantom
- small 50 x 150 mm sides include:
  – scribed lines through the center of all four sides
  – 2 of those sides are also scribed 50 mm from center
  – 3 pinholes one at center and two 50 mm from center
  – center pinholes are 1.5 mm in diameter and hold a tungsten pin 15 mm long
  – off center pinholes are 1.0 mm in diameter
- scribed lines are 1.3 mm wide and white for ease of viewing
- optional 5.5 mm diameter tungsten ball in the center for sterotactic collimator verification (it is removable for CT applications)
- optional insert containing 5 aluminium seeds 1mm in diameter and 5 mm long with a chart indicating center to center spacing between seeds
- levelling platform:
  – made of transparent PMMA
  – dimensions: 150 x 150 x 10 mm
  – bubble level and three levelling screws



Product features:

- complies with:
  – IEC 61223-3-5
  – IEC 61223-2-6
- CE certified
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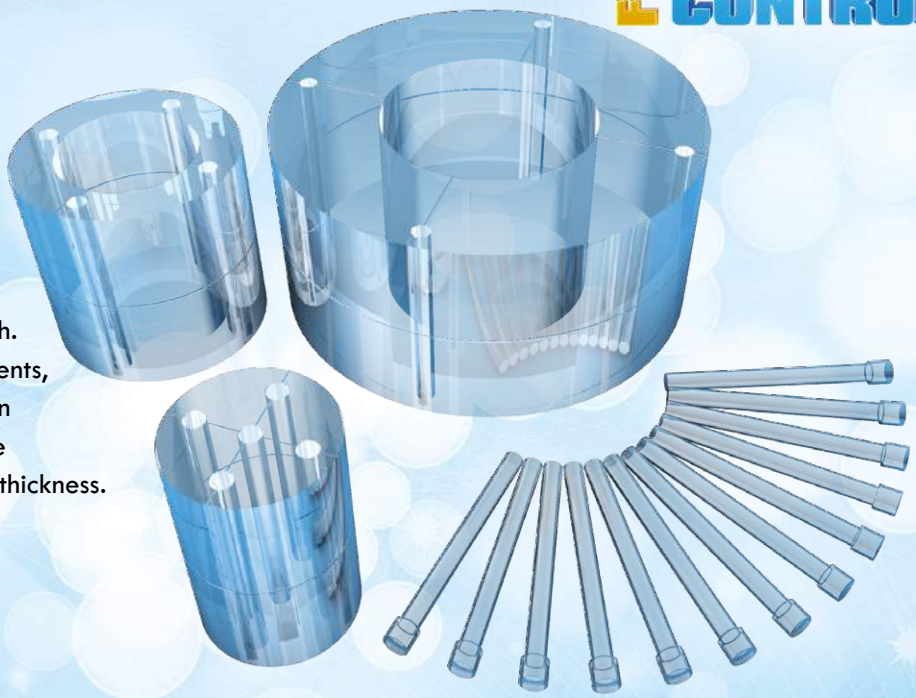
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

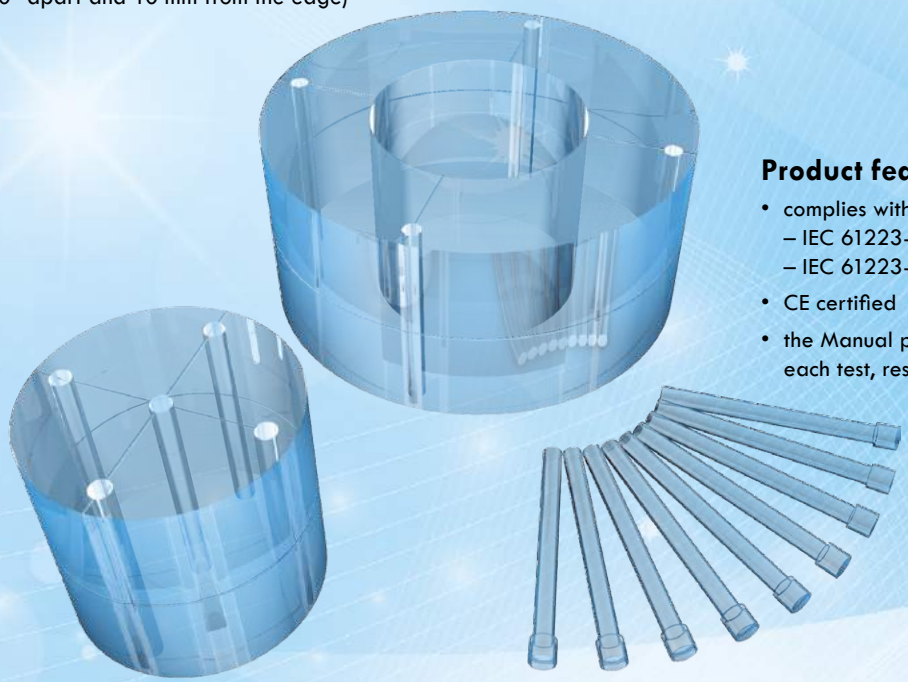
Pro-CT Dose



Set of homogenous cylinders designed to image paediatric and adult head and body.
Used for **CTDI measurement** and to separate dose information for each. When performing dose profile measurements, dose phantoms allow to collect information for the maximum, minimum and mid-range value of the nominal tomographic section thickness.

Technical data (can be modified to customer specifications):

- Pro-CT Dose L (adult body) – 150 mm thick homogenous PMMA cylinder, diameter: 320 mm, with five ø13.1 mm CT probe holes (one in the middle and 4 around the perimeter, 90° apart and 10 mm from the edge)
- Pro-CT Dose M (adult head / paediatric body) – 150 mm thick homogenous cylinder, diameter: 160 mm, with five ø13.1 mm CT probe holes (one in the middle and 4 around the perimeter, 90° apart and 10 mm from the edge)
- Pro-CT Dose S (paediatric head) – 150 mm thick homogenous cylinder, diameter: 100 mm, with five ø13.1 mm CT probe holes (one in the middle and 4 around the perimeter, 90° apart and 10 mm from the edge)
- engraved crosshair markings on phantoms for easier positioning
- acrylic rods for plugging all holes in the phantoms
- nested versions of above phantoms are also available, where smaller cylinders can be inserted into larger ones together creating one solid cylinder
- carrying case, also with a trolley option



Product features:

- complies with:
  – IEC 61223-3-5
  – IEC 61223-2-6
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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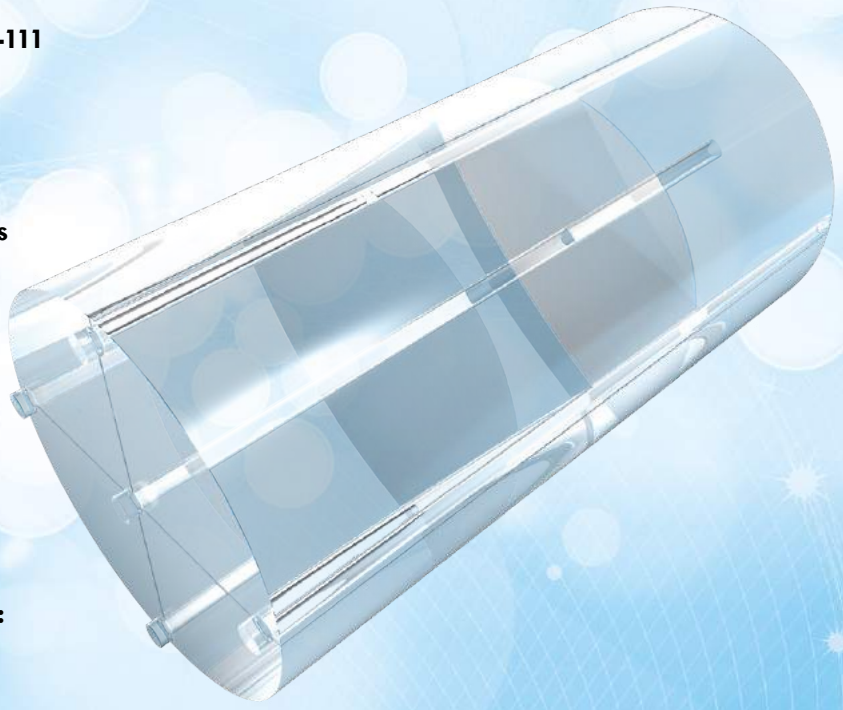
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-CT Dose AAPM TG-111

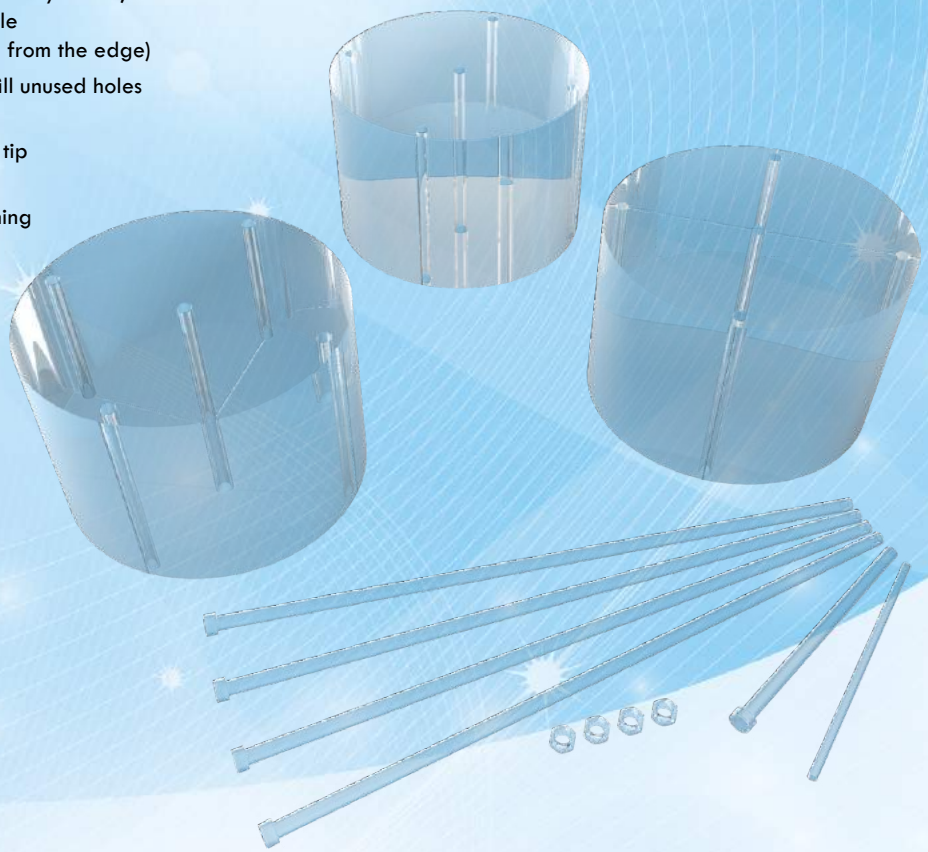
This phantom is **designed according to AAPM TG-111 findings**. The phantom comprises three 20 cm thick PMMA cylinders 300 mm in diameter similar to standard Pro-CT Dose phantom. The total length of the phantom is 600 mm. **This allows to capture the majority of the scattered radiation and gives more accurate results than standard PMMA cylinders – 150 mm long**, 320 mm in diameter.

Due to the large mass of the phantom, it is manufactured in three separate sections. In order to keep these sections aligned, mounting screws are included in the design.



Technical data (can be modified to customer specifications):

- total dimensions: diameter 300 mm, length 600 mm
- made of PMMA
- build of 3 separate 200 mm thick homogenous PMMA cylinders, with five ø13.1 mm CT probe holes (one in the middle and 4 around the perimeter, 90° apart and 10 mm from the edge)
- 4 x 620 mm long PMMA filler plug with thread to fill unused holes and hold all cylinders together
- 2 x additional PMMA rod to help center the probe tip in the middle of the phantom
- engraved markings on phantoms for easier positioning
- carrying case with a trolley



Product features:

- complies with:
  – AAPM TG-111
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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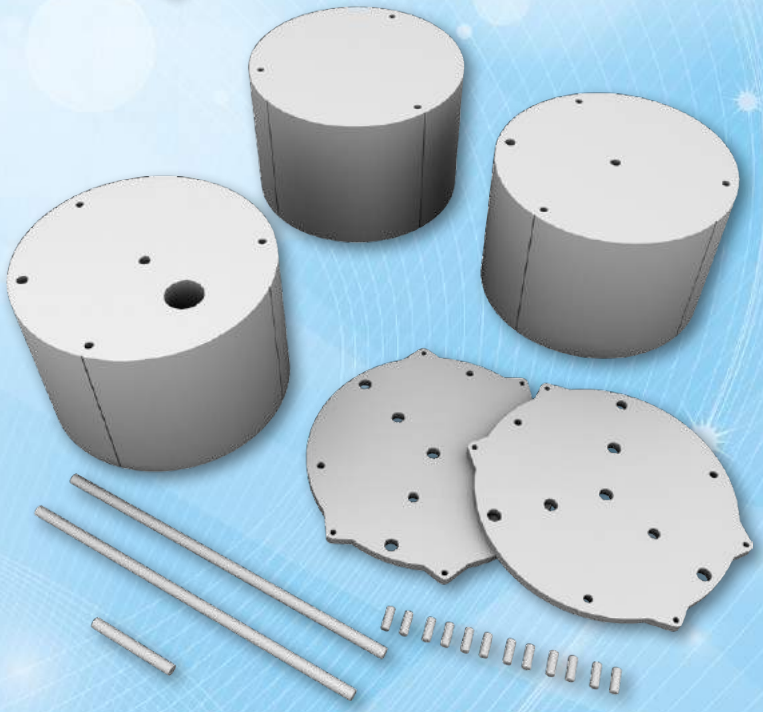
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-CT Dose AAPM TG-200
Pro-CT Dose ICRU 87

Official Supplier of CT phantoms to AAPM

This phantom is **designed according to ICRU 87 report and AAPM TG-200 specifications.**
The phantom comprises high-density polyethylene (mass density of 0.97 g/cm^3) and is 300 mm in diameter. The total length of the phantom is 600 mm. **This allows to capture the majority of the scattered radiation and gives more accurate results than standard PMMA** cylinders – 150 mm long, 320 mm in diameter.
Due to the large mass of the phantom, it is manufactured in three separate sections. In order to keep these sections aligned, alignment pegs are included in the design.



Technical data
(can be modified to customer specifications):

- total dimensions: diameter 300 mm, length 600 mm
- made of high-density polyethylene
- build of 3 separate 200 mm sections:
  – cable section (A) contains three holes ø13.1 mm where detector cable rests during measurements
  – functional section (B) contains three holes ø13.1 mm for positioning CT detector and ø44.45 mm, 50.8 mm deep hole for MTF (modular transfer function) calculation
  – blank section (C) is free of any structures that can be used for noise power spectrum (NPS) evaluation
- 2 x 12 mm thick polyethylene end cup to keep all modules together
- 2 x 420 mm long polyethylene filler plug to fill unused holes
- additional polyethylene rod to help center the probe tip in the middle section
- 12 x locating plug to help in correct phantom assembly
- engraved markings on phantoms for easier positioning
- carrying case with a trolley

Product features:

- complies with:
  – ICRU report 87
  – AAPM TG-200
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MRI

Phantom for **comprehensive evaluation of critical imaging parameters of magnetic resonance imaging (MRI)** in a time efficient manner. The phantom can be used for **the measurement of absolute values for calibration purposes.** However, its **design is optimized for time efficient daily quality assurance** too.

exchangeable vials option

available in two sizes: 220 and 180mm

It can be used to measure:

- Geometric Distortion
- Spatial Resolution
- Slice thickness and position
- Interslice Gap
- T_1 and T_2 values
- Estimate of Image Bandwidth
- Low Contrast Detectability
- Image Uniformity
- Signal-to-Noise Ratio (SNR)
- Physical and Electronic Slice Offset
- Point of reference
- Bandwidth: water-fat shift

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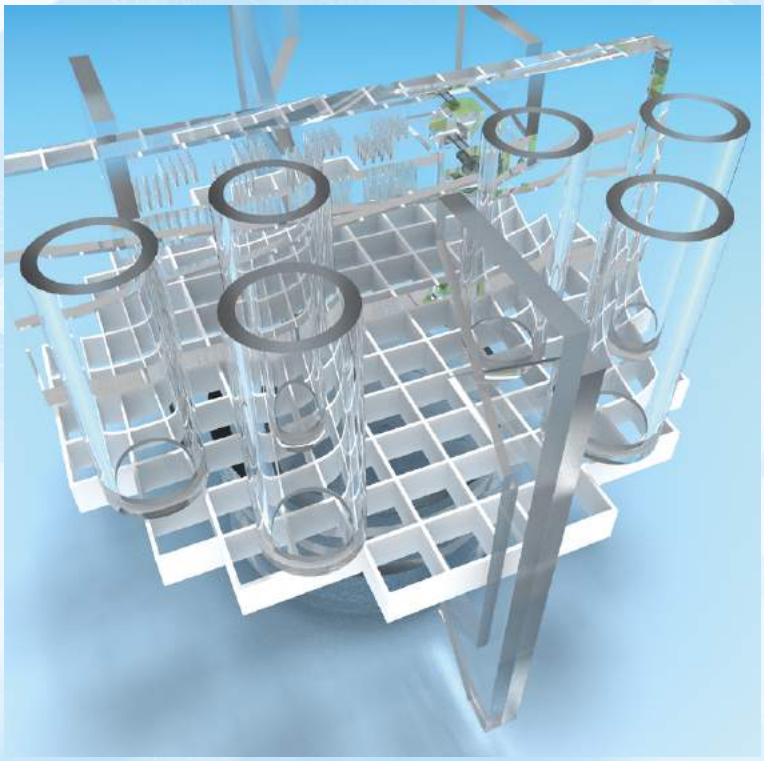

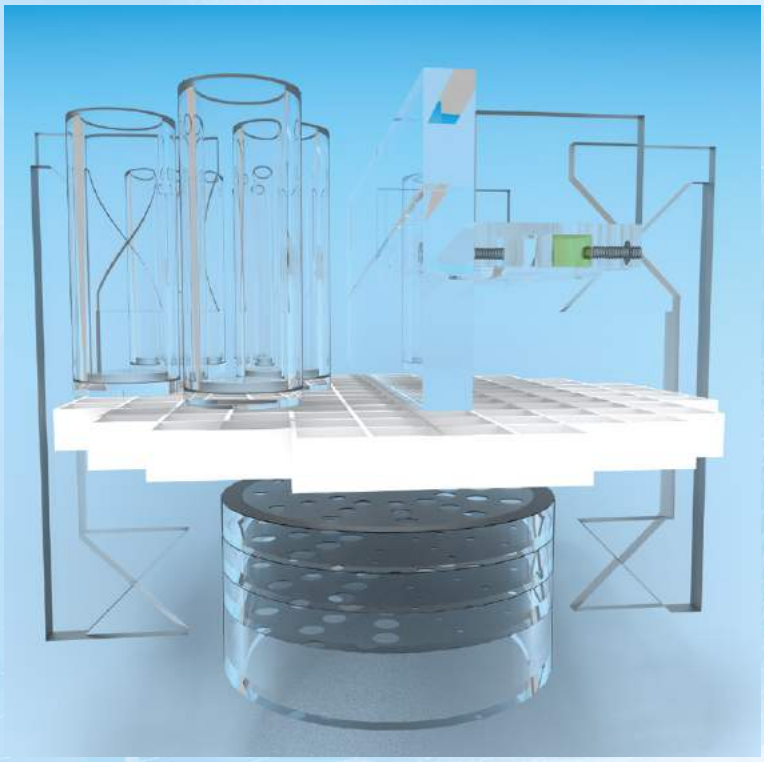

Technical data (can be modified to customer specifications):

- outside cylinder diameter: 220 mm (180 mm)
- outside cylinder height: 150 mm
- inside cylinder diameter: 204 mm (173 mm)
- inside cylinder height: 130 mm
- filled with 10 mmol nickel chloride solution containing sodium chloride 75 mmol
- T_1 and T_2 sample vials
  – 6 cylindrical vials ø19 x 41 mm
  – refillable from outside
  – by default filled with 20 mmol nickel chloride and 15 mmol sodium chloride solution
- resolution insert:
  – four matrices of holes, diameters: 0.8, 0.9, 1.0 and 1.1 mm
  – spaces between the holes are equal to hole diameters
  – two small containers with water and fat for water-fat shift evaluation
- slice thickness insert:
  – 180 x 46 x 10 mm PMMA plate
  – 1 mm wide and 5 mm deep counter-descending slits on both sides
  – slits form two ramps descending at 1:10
- geometric distortion insert:
  – 10 x 10 array of squares
  – 148 mm on a side
  – 10 mm thick
- low contrast insert:
  – 4 polycarbonate discs 0.05, 0.1, 0.15 and 0.2 mm in thickness
  – partial volume contribution of these sheets and filling solution produce contrasts: 1.4, 2.5, 3.6 and 5.1%
  – each disc contains 12 groups of 3 holes arranged in spokes
  – each spoke has the same diameter
  – diameters range from 7.0 to 1.5 mm (0.5 mm step)
- four sets of paired 45° wedges are located on both sides of the phantom. The lower pairs are 30 x 30 mm and the upper ones are 40 x 40 mm. The distance between intersection points of the lower and upper pairs is 90 mm
- optional 6 removable vials for test samples – replacing the „T_1 and T_2 sample vials", includes 6 additional vials (12 total)
- optional heavy duty carrying case

Product features:

- Complies with:
  – ACR MRI Accreditation Program
  – IPEM Report 80 "Quality Control in MRI", 1998
  – AAPM Rep. 28 "Quality Assurance methods & phantoms for MRI", 1990
  – AAPM Rep. 34 "Acceptance testing of MRI systems", 1992
  – AAPM Rep. 100 "Acceptance & Quality Assurance procedures for MRI facilities", 2010
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-MRI SpineRect

Rectangular MRI **phantom simulating attenuation of the human spine.**

Technical data
(can be modified to customer specifications):

- inner dimensions: 372 mm x 150 mm x 148 mm
- made of PMMA
- filled with nickel chloride and sodium chloride solution
- markings on the surface to show middle axes of the phantom
- carrying handles for easy transportation.

Product features:

- Complies with:
  - ACR MRI Accreditation Program
  - IPEM Report 80 "Quality Control in MRI", 1998
  - AAPM Rep. 28 "Quality Assurance methods & phantoms for MRI", 1990
  - AAPM Rep. 34 "Acceptance testing of MRI systems", 1992
  - AAPM Rep. 100 "Acceptance & Quality Assurance procedures for MRI facilities", 2010
- CE certified
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Pro-MRI Agar

This **stability (agar) phantom** consists of a cylindrical phantom and agar material inside.

Using this phantom a **Signal to Noise Ratio, Signal Fluctuation to Noise Ratio, drift, and other imaging measures** over a 100-volume or 200-volume fMRI scan can be performed. The agar phantom has **characteristics similar to the T2 measures of a human head, but provides no change in signal.**

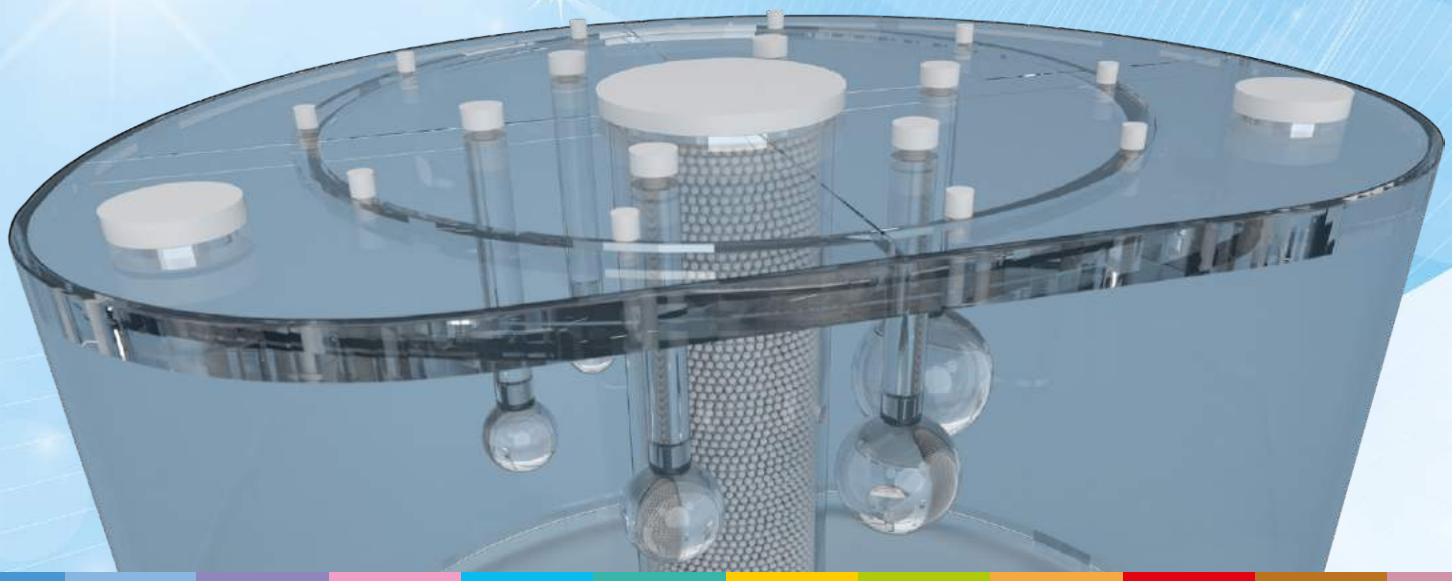
The T1 and T2 characteristics of the agar phantom at 3T are ~900 ms T1 and 30 ms T2.

Technical data (can be modified to customer specifications):

- overall cylinder dimensions: 140 mm in diameter, 150 mm in height
- cylinder made of PMMA
- filled with agar gel with T1 and T2 characteristics at 3T of ~900 ms T1 and 30 ms T2.
- optional carrying case

Product features:

- Complies with:
  – ACR MRI Accreditation Program
  – IPEM Report 80 "Quality Control in MRI", 1998
  – AAPM Rep. 28 "Quality Assurance methods & phantoms for MRI", 1990
  – AAPM Rep. 34 "Acceptance testing of MRI systems", 1992
  – AAPM Rep. 100 "Acceptance & Quality Assurance procedures for MRI facilities", 2010
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration



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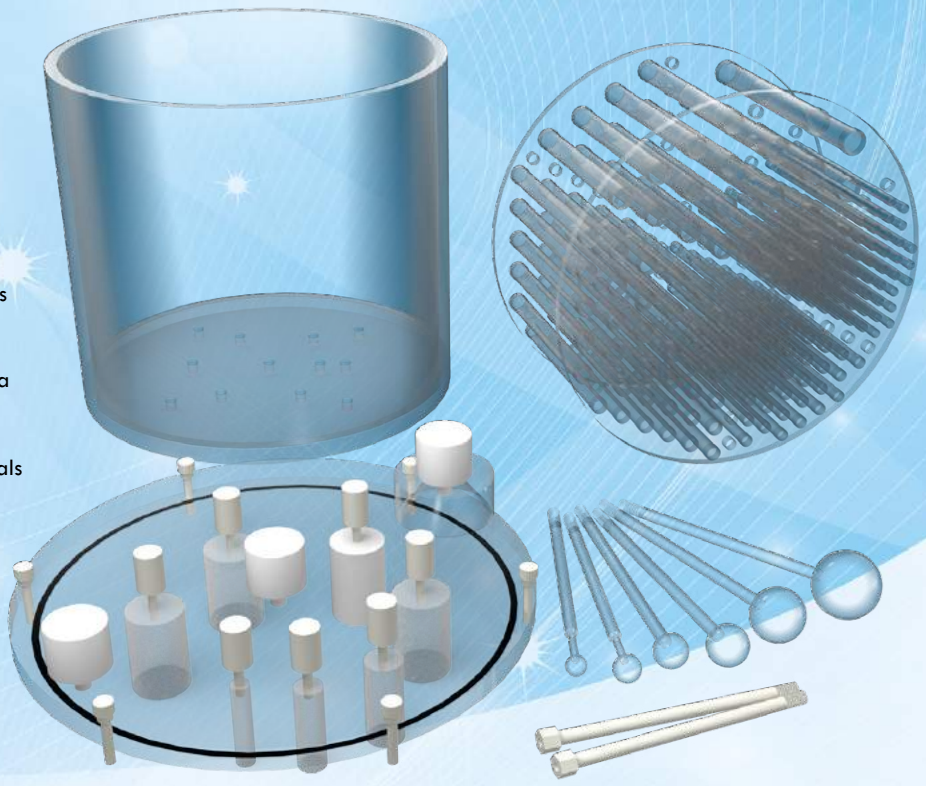
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM Performance

Phantom for NM and PET systems performance evaluation (collimator, artifacts, calibration, reconstruction parameters). It can be used to evaluate, for example: center-of-rotation error, non-uniformity artifacts, changes of radius-of-rotation on spatial resolution, reconstruction filters on spatial resolution, attenuation and scatter compensation.

Technical data
(can be modified to customer specifications):

- main cylinder:
  – inside cylinder diameter: 206 mm
  – inside cylinder height: 186 mm
  – cylinder wall thickness: 7 mm
- cold rods insert:
  – rod diameters: 4.8, 6.4, 7.9, 9.5, 11.1 and 12.7 mm
  – height of rods: 88 mm
- cold spheres:
  – solid sphere diameters: 9.5, 12.7, 15.9, 19.1, 25.4 and 31.8 mm
  – height of the center of the spheres from the base plate: 127 mm
- optional PET Lid with cylindrical samples:
  – refillable thin-walled cylinders, diameters: 8, 12, 16 and 25 mm
  – water filled cylinder diameter: 25 mm
  – air filled cylinder diameter: 25 mm
  – PTFE solid cylinder diameter: 25 mm
  – cylinder height: 38 mm
- heavy duty carrying case



Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  – AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  – ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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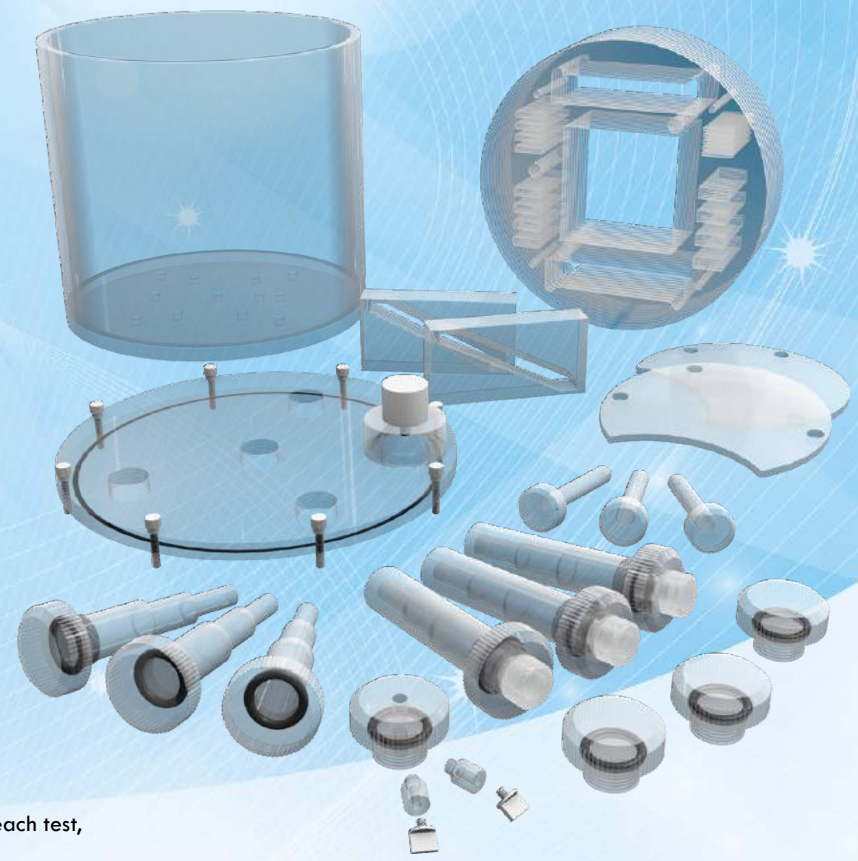
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM Performance ECT

Phantom for **NM systems performance evaluation: routine quality assurance tests, as well as extensive acceptance tests.** It can be used to evaluate: pixel size, spatial linearity, RMS noise, signal to noise ratio (SNR), slice width, uniformity, spatial resolution, point spread function, slice position verification, slice incrementation, accuracy, center of rotation, verification, volume sensitivity and low contrast sensitivity.

Technical data (can be modified to customer specifications):

- main cylinder:
  – internal cylinder diameter: 206 mm – internal cylinder height: 186 mm
  – cylinder wall thickness: 7 mm
- main insert (slice width, pixel size and high resolution):
  – external diameter 200 mm
  – free square internal 80 x 80 mm
  – consists of 10 x 5 mm discs, 2 spacers and 3 mounting screws
  – contains a pair of channels 20 x 10 mm thick forming two hot ramps whose slope angle tangent is equal to 0.5
  – contains four hot holes 5mm in diameter that are located in corners of the 120 x 120 mm square
  – contains four groups of hot and cold resolution patterns that are 2, 4, 6 and 8 mm thick and correspond to 2.5, 1.25, 0.83 and 0.625 LP/cm
- point source insert (PSF - point spread function):
  – the fill plug can be positioned at the center or at radial plug location
  – source screw contains a well (ø3 x 5 mm) that can be filled with appropriate solution
  – source screw can be mounted outside of or inside the phantom (for in air or scatter measurements)
- low contrast inserts:
  – can be threaded into the phantom in a radial pattern 75 mm of the center axis
  – three cold low contrast rods comprised of three parts: 10, 15 and 20 mm in diameter and 40 mm long
  – three optional hot low contrast rods comprised of three parts: 10, 15 and 20 mm in diameter and 40 mm long that can be filled from the outside
- heavy duty carrying case



Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  – NEMA Standards Publication (NU-1 2007) Gamma Cameras
  – AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  – ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
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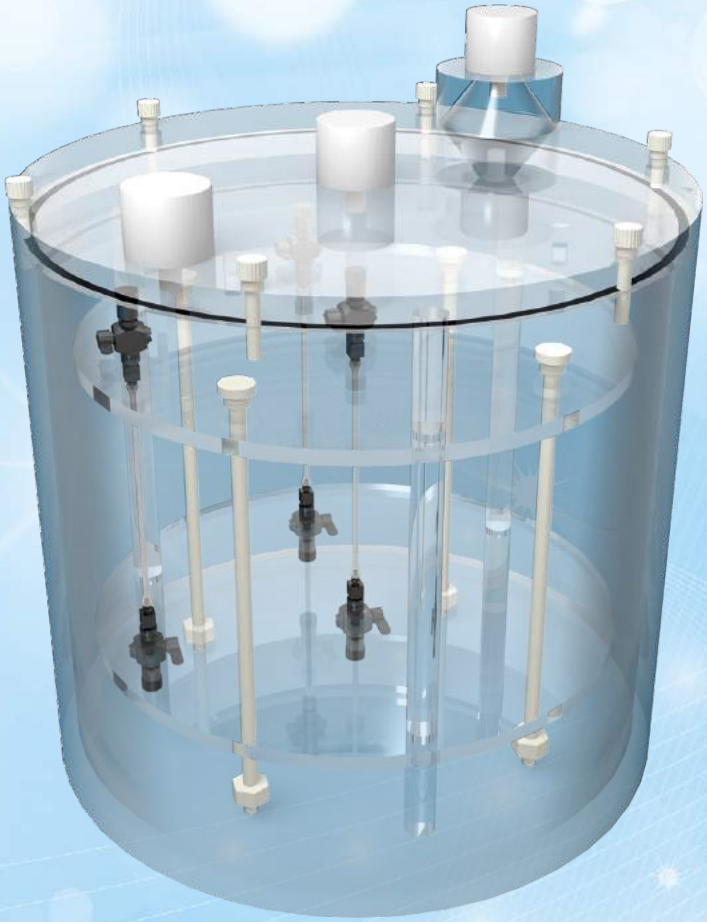
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM Linear Source Module

This module can be used as a standalone in air or in water if mounted in the Pro-NM Performance cylinder. It can be used to evaluate changes of radius-of rotation on spatial resolution, spatial resolution measurement in air and in water, quantitative evaluation of reconstruction filters and scatter compensation methods.



Technical data
(can be modified to customer specifications):

- insert diameter: 186 mm
- diameter of line sources: 1 mm
- spacing of line sources: 75 mm
- useful height of line sources: 70 mm
- stopcocks with luer connection allow for easy and safe filling and draining of line sources

Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  – AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  – ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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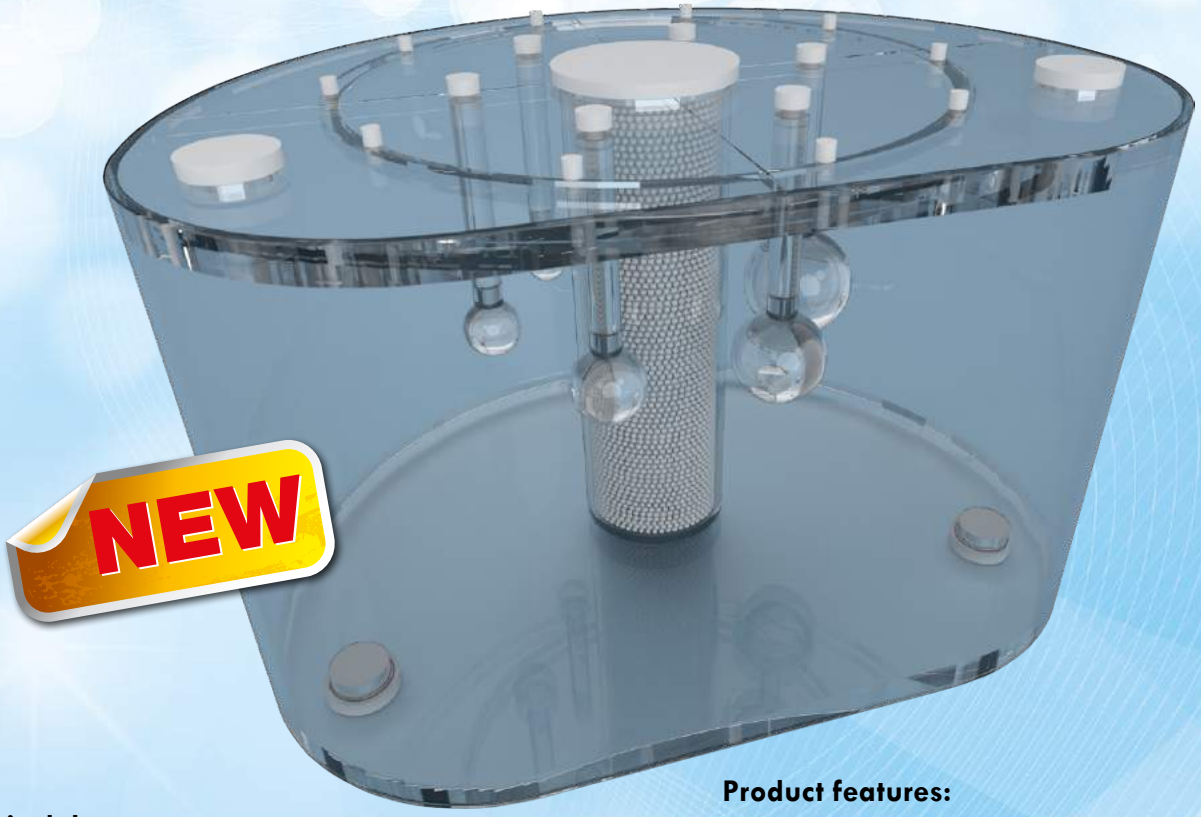
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM NEMA NU2

A phantom for evaluating performance of positron emission tomographs (PET). Recommended for use in the evaluation of reconstructed image quality in whole body PET imaging. **For simulation of whole-body imaging, especially that using PET and camera-based coincidence imaging techniques.**

Can also be used for determination of the coincidence count rate characteristics in brain and cardiac imaging, evaluation of the relationship between true coincidence count rate and radioactivity, determination of the address errors caused by address pile up, evaluation of the count loss correction scheme.

It has been designed in accordance with the recommendations by the International Electrotechnical Commission (IEC) and modified by the National Electrical manufacturers Association (NEMA).



Technical data (can be modified to customer specifications):

- interior length of the phantom: 180 mm
- volume of empty cylinder: 9.7 laters
- 6 fillable spheres:
  - inner diameter: 10 mm, 13 mm, 17 mm, 22 mm, 28 mm, and 37 mm
  - distance from sphere plane to inside wall: 70 mm
- cylindrical insert dimension:
  - outside diameter: 51 mm
  - length: 180 mm
- optional heavy duty carrying case

Product features:

- Complies with:
  - International Standard: Radionuclide imaging devices – Characteristics and test conditions – Part 1: Positron emission tomographs, International Electrotechnical Commission (IEC), 61675-1, Geneva, Switzerland, 1998.
  - Performance Measurements of Scintillation Cameras, NEMA Standards Publication No. NU2, National Electrical Manufacturers Association (NEMA), Washington, D.C., 2001.
  - NEMA2007/IEC2008
  - NEMA 2012/IEC 2008
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration

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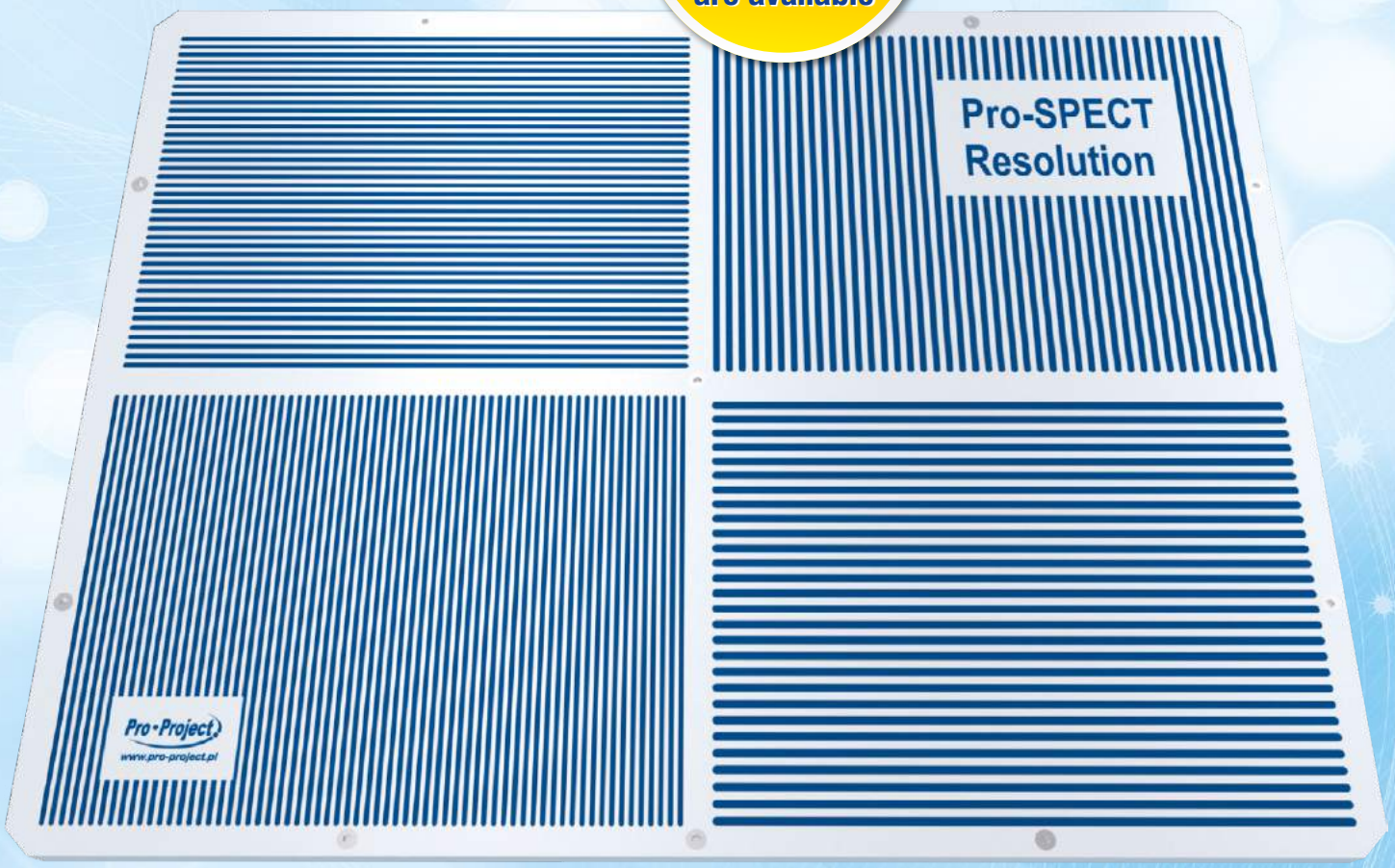
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM Resolution

holders for different cameras are available



Bar phantom for determination of resolution of Scintillation Cameras. Four-quadrant phantom offers precise determination of camera intrinsic resolution, collimator spatial resolution, field size and linearity. **Apart from this standard size phantom, we offer different sizes and configurations manufactured to the highest quality standards.**

Technical data (can be modified to customer specifications):

- dimensions: 564 x 432 x 15 mm
- lead bar widths: 2.0, 2.5, 3.0 and 3.5 mm
- field across bar configuration: 533 x 405 mm

Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  – AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  – ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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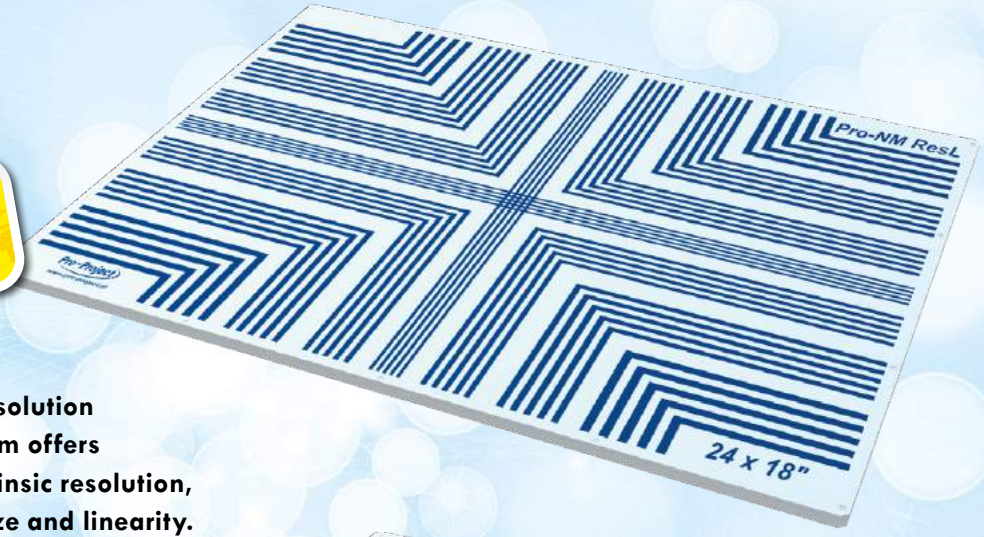
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM ResL

NEW



Pro-NM ResL for determination of resolution of Scintillation Cameras. The phantom offers precise determination of camera intrinsic resolution, collimator spatial resolution, field size and linearity.
In addition to the standard size phantoms, we offer different sizes and configurations manufactured to the highest quality standards.

- The most cost-effective means of performing routine quality control checks of gamma camera resolution or linearity on the market today
- One image per detector head is all that's needed to equally and effectively test all quadrants of the gamma camera
- Perform routine quality control tests of spatial resolution and linearity in approximately one quarter of the time needed at present, which will make it possible to save time and money!
- Quickly and easily perform extrinsic testing and intrinsic visual evaluation
- Outperforms any 90° bar phantom, single-frequency Parallel-Line Equal-Space (PLES), Hine-Duley or orthogonal hole test pattern
- Meets mandatory requirements of state quality control
- Optimized for dual and triple-head gamma cameras
- Ideal for large detectors. Its large size covers UFOV
- Increase patient throughput

Technical data (can be modified to customer specifications):

- dimensions: 447.2 mm (18") x 609.6 mm (24") x 15 mm (0.59")
- dimensions: 533.2 mm (21") x 533.2 mm (21") x 15 mm (0.59")
- lead bar widths: 6.35 mm (1/4"), 4.763 mm (3/16"), 3.969 mm (5/32"), 2.54 mm (1/10")

Product features:

- Complies with:
  - NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  - AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  - AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  - ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM Distortion

A simple phantom for quality assurance of geometric distortion and spatial resolution of gamma cameras.
An array of holes, which when filled with activity, allow to measure point-to-point distances and Point Spread Function (PSF) - spatial resolution - at each point and its homogeneity across the entire Field of View.

NEW

Technical data
(can be modified to customer specifications):

- dimensions 500 x 400 x 5 mm
- series of holes - 1 mm in diameter and 3 mm deep, at 80 mm pitch - to be filled with activity

Product features:

- Complies with:
  - NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  - NEMA Standards Publication (NU 1-2012) Performance Measurements of Scintillation Cameras
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM Slits

Slits phantom for **Intrinsic Spatial Resolution evaluation (Quantitative technique)** according to **NEMA Standards Publication NU 1-2012.** In addition to this standard size phantom, we offer different sizes and configurations manufactured to the highest quality standards.

Technical data
(can be modified to customer specifications):

- dimensions: 620 x 520 x 15 mm
- lead size 600 x 500 x 3 mm
- parallel 1mm thick slits with 30 mm spacing
- cover made of PMMA
- uniform PMMA part of the phantom

Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001)
  Performance Measurements of Scintillation Cameras
  – NEMA Standards Publication (NU 1-2012)
  Performance Measurements of Scintillation Cameras
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM PETsensi

PET sensitivity phantom is used to measure the sensitivity or ability of positron emission tomographs to detect positrons. The phantom used for this purpose is a set of five metal tubes with a similar wall thickness. A plastic tube homogeneously filled with 18F liquid is inserted for the measurement.

Successive measurements are made by accumulating the sleeve wall thickness with the uniform line source surrounded by known absorbers. From these measurements, the sensitivity without absorbers can be extrapolated to arrive at an attenuation free measurement. The measurement setup, data collection and analysis are described in section 5 of the NEMA standard NU 2-2007.

Technical data
(can be modified to customer specifications):

- Five internally stacked concentric aluminium tubes – all 700 mm in length.
- 1st Tube
  – Inside Diameter: 3.9 mm
  – Outside Diameter: 6.4 mm
- 2nd Tube
  – Inside Diameter: 7.0 mm
  – Outside Diameter: 9.5 mm
- 3rd Tube
  – Inside Diameter: 10.2 mm
  – Outside Diameter: 12.7 mm
- 4th Tube
  – Inside Diameter: 13.4 mm
  – Outside Diameter: 15.9 mm
- 5th Tube
  – Inside Diameter: 16.6 mm
  – Outside Diameter: 19.1 mm
- 6th Innermost Tube (a fillable polyethylene tube)
  – Inside Diameter: 2 mm
  – Outside Diameter: 3.2 mm

Product features:

- Complies with:
  – NEMA Standard (NU 2-2007)
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM PETscatter

The PET scatter phantom is an acceptance testing tool used to determine the imaging systems relative sensitivity to scatter radiation. It can be used to measure the effects of dead-time and the effects of random events generated at different levels of activity of the line source.

The test phantom is a right circular cylinder composed of polyethylene. For ease of handling, it consists of 3 segments that are assembled together during testing. A hole is drilled parallel to the central axis of the cylinder, at a radial distance of 45mm.

Technical data
(can be modified to customer specifications):

- cylinder
  - outside diameter: 203 mm
  - length: 700mm
  - hole diameter: 6.4 mm
  - hole offset from the central axis: 45 mm
- line source
  - outside diameter: 4.8 mm
  - length: 800 mm
  - inside diameter: 3.2 mm
- carrying case

Product features:

- Complies with:
  - NEMA Standard (NU 2-2007)
  - NEMA 2012 Standard
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM MultiAlign

Phantom designed for a simple and cost effective **verification of image alignment and distortion in hybrid scanning systems like PET/CT or NM/CT.** It consists of a cylinder that can be filled with a variety of fluids. Several non-parallel rods of varying diameter and at certain angles in relation to phantom axes, run the entire length of the cylinder. Images produced with different modalities allow for quick and **simple identification of misalignments on fused studies.**

Additionally phantom contains 2 cm calibration module that is used by Pro-Control software to accurately identify phantom position in space and accurately calculate any mismatches.

Technical data (can be modified to customer specifications):

- PMMA cylinder dimensions: 250 x 260 x 410 mm
- 2 cm thick calibration section with four through holes
- 4 PMMA rods: 30, 25, 20, 15 mm
- filling plugs and vent ports
- carrying handle

Product features:

- Complies with:
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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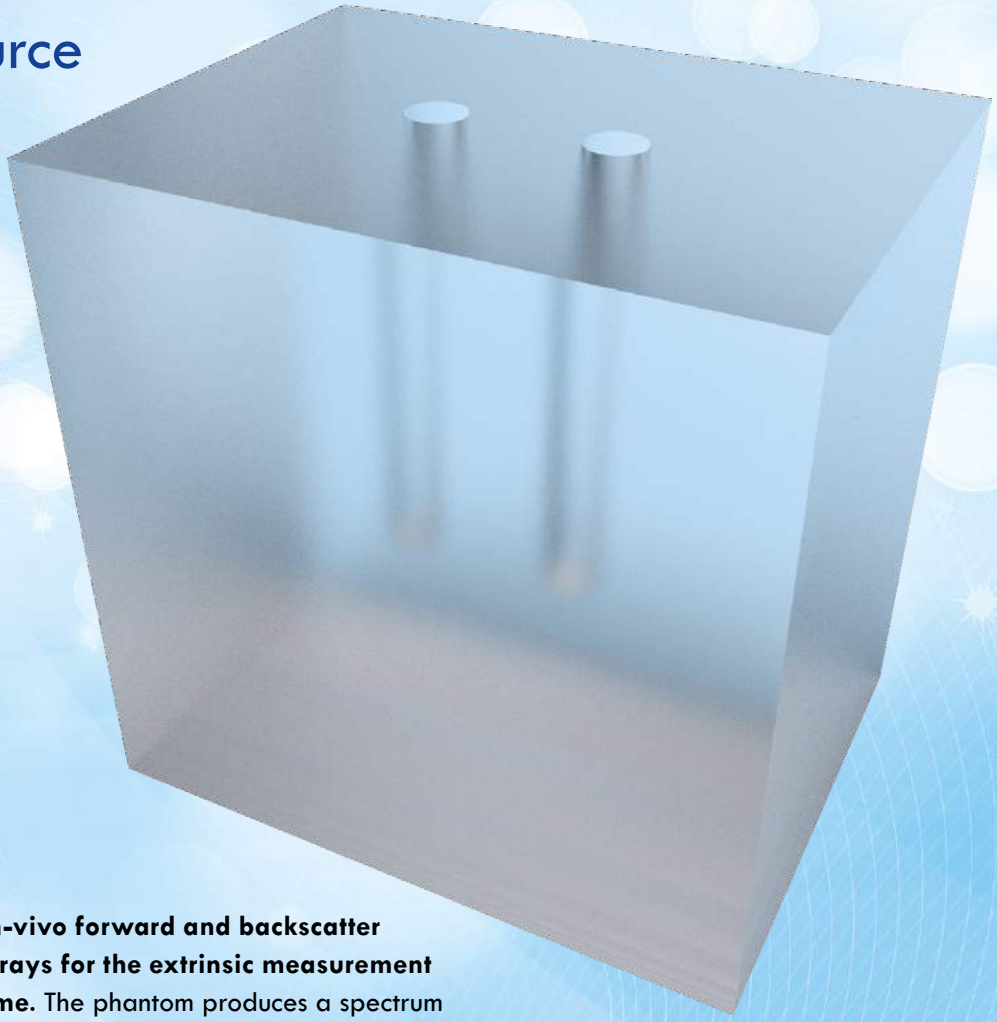
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM DualSource



This scatter phantom simulates in-vivo forward and backscatter characteristics of 99 mTc gamma rays for the extrinsic measurement of a scintillation camera's deadtime. The phantom produces a spectrum typical of that observed from 99 mTc in the myocardium.
Reference: Ralph Adams, Gerald J. Hine, and C. Duane Zimmerman, "Deadtime Measurements in Scintillation Cameras Under Scatter Conditions Simulating Quantitative Nuclear Cardiography," The Journal of Nuclear Medicine, 19 (1978), 538-544.

Technical data (can be modified to customer specifications):

- made of PMMA
- dimensions: 150 x 200 x 200 mm
- the two holes are used to hold the radioactive sources
  – hole dimensions: ø17 mm x 120 mm deep
  – spaced 50 mm apart (center-to-center)
  – distance from the face of the phantom: 50 mm

Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  – NEMA Standards Publication (NU-1 2007) Gamma Cameras
  – AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  – ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
- CE certified
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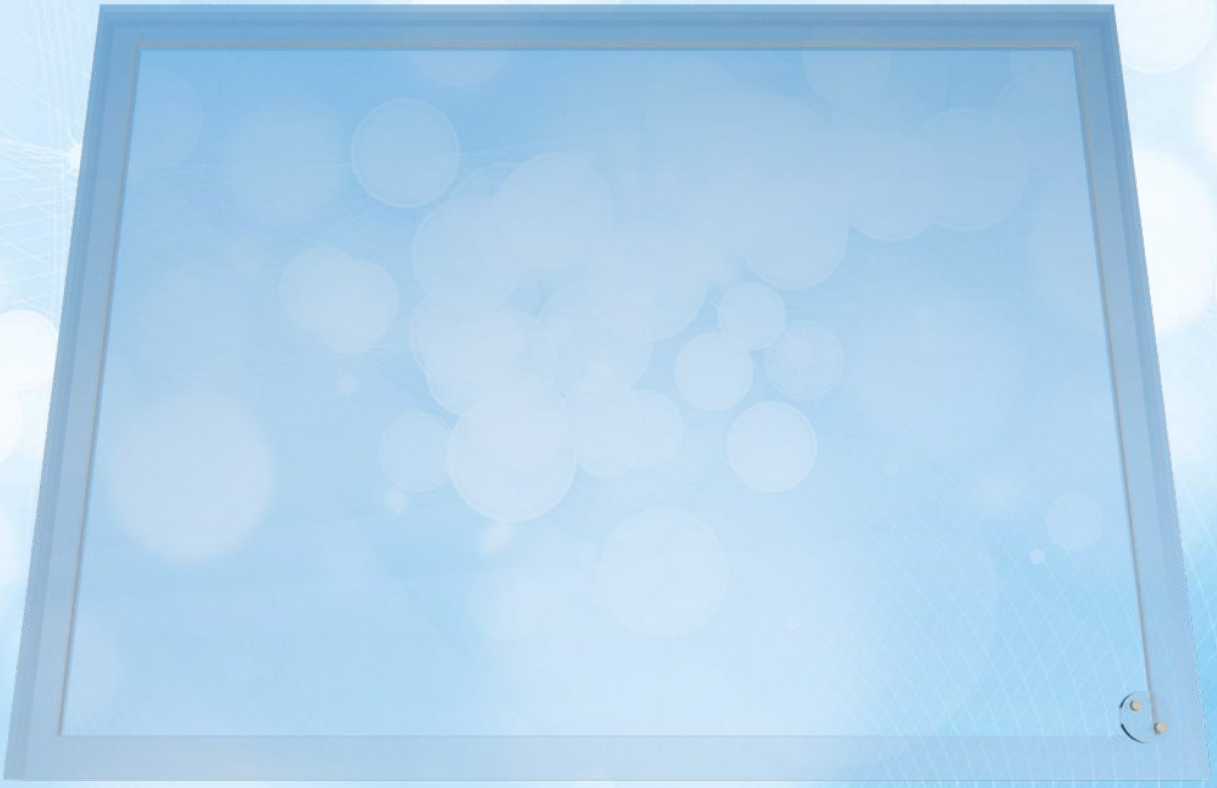
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM FloodRECT



Flood phantoms provide a simple and efficient means of **obtaining optimum camera performance with respect to uniformity of response over the entire crystal area.** These phantoms are **designed to be filled in horizontal position thus preventing slight bulging caused by water pressure during vertical filling.** Therefore, better uniformity in distribution of activity can be achieved.

Technical data (can be modified to customer specifications):

- Pro-NM FloodRECT:
  – outside dimensions: 460 x 580 x 23 mm
  – cavity dimensions: 410 x 530 x 13 mm
- Pro-NM FloodRECT XL:
  – outside dimensions: 710 x 570 x 33 mm
  – cavity dimensions: 660 x 520 x 13 mm

Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  – AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  – ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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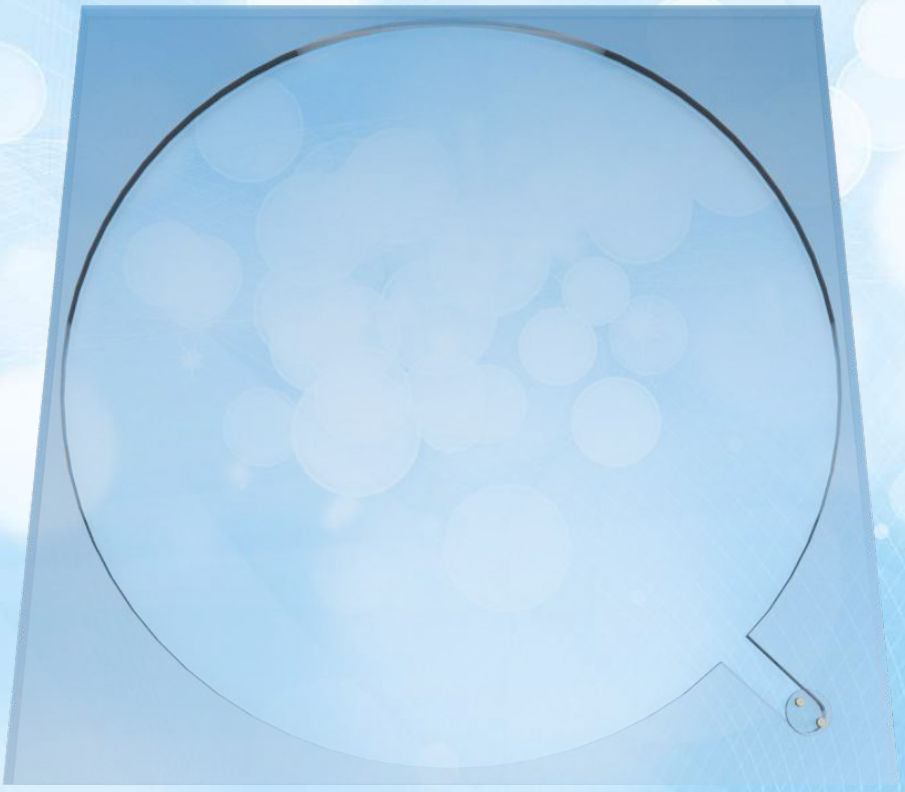
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NM FloodROUND



Flood phantoms provide a simple and efficient means of **obtaining optimum camera performance with respect to uniformity of response over the entire crystal area.** These phantoms are **designed to be filled in horizontal position thus preventing slight bulging caused by water pressure during vertical filling.** Therefore, better uniformity in distribution of activity can be achieved.

Technical data (can be modified to customer specifications):

- Pro-NM FloodROUND:
  – outside dimensions: 460 x 460 x 23 mm
  – cavity dimensions: ø430 x 13 mm
- Pro-NM FloodROUND XL:
  – outside dimensions: 580 x 580 x 23 mm
  – cavity dimensions: ø560 x 13 mm

Product features:

- Complies with:
  – NEMA Standards Publication (NU 1-2001) Performance Measurements of Scintillation Cameras
  – AAPM Report No. 9 - Computer Aided Scintillation Camera Acceptance Testing
  – AAPM Report No. 22 - Rotating Scintillation Camera SPECT Acceptance Testing and Quality Control
  – ACR–SNM (Res. 5 – 2011) technical standard for diagnostic procedures using radiopharmaceuticals
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-US MTF

NEW

The tissue-mimicking phantom for use in routine **technical quality assurance (TQA).** PVA based material mimics the sound velocity and acoustic attenuation of the human tissue, is nontoxic, durable and easy to handle and maintenance.

Comparable and reproducible results can be achieved from a single image, making this a perfect daily QA tool. To determine the spatial resolution of phantom images, a **modulation transfer function (MTF)** is calculated by the Pro-Control software using radial MTF algorithm.

Apart from radial MTF test object the phantom also **contains structures for geometry assessment.**

Technical data (can be modified to customer specifications):

- overal dimensions: 110 x 110 x 60 mm
- top and bottom cover made of PMMA
- test insert dimensions: 100 x 100 x 50 mm
- test insert contains:
  - 20 mm in diameter round object (20 mm and 10 mm from phantom faces) for radial MTF
  - 2 groups of four round rods (1 mm in diameter) with 15 mm horizontal and vertical spacing for geometry assessment
- tissue mimicking material is based on Poly(vinyl alcohol) (PVA) a synthetic polymer
- carrying case

Product features:

- Complies with:
  - "Quality Assurance for Ultrasound Scanners using a durable tissue-mimicking Phantom and radial MTF", Marcus Kaar, Friedrich Semturs, Michael Figl, Rainer Hoffmann1 and Johann Hummel, Center for Biomedical Engineering and Physics, Medical University of Vienna, Austria
  - Real-time B-mode US quality control test procedures: Report of AAPM Task Group No. 1
  - Quality assurance of U.S.-guided external beam radiotherapy for prostate cancer: Report of AAPM Task Group 154
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-US Uniform

NEW

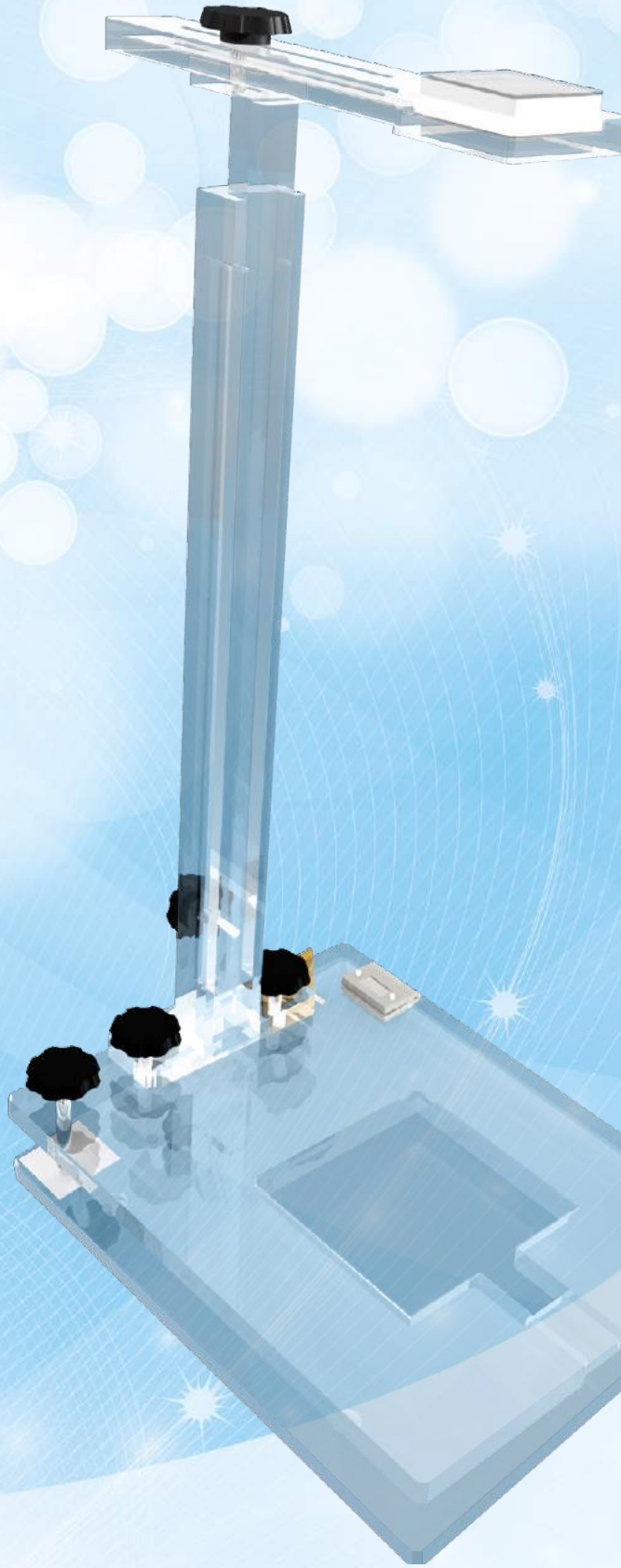
The **homogenous, tissue-mimicking phantom** for use in routine technical quality assurance (TQA). PVA based material mimics the sound velocity and acoustic attenuation of the human tissue, is nontoxic, durable and easy to handle and mantain.
Comparable and reproducible results can be achieved from a single image, making this a perfect daily QA tool.

Technical data
(can be modified to customer specifications):

- overal dimensions: 110 x 110 x 60 mm
- top and bottom cover made of PMMA
- test insert dimensions: 100 x 100 x 50 mm
- test insert is homogenous block of tissue mimicking material based on Poly(vinyl alcohol) (PVA) a synthetic polymer
- carrying case

Product features:

- Complies with:
  - Real-time B-mode US quality control test procedures: Report of AAPM Task Group No. 1
  - Quality assurance of U.S.-guided external beam radiotherapy for prostate cancer: Report of AAPM Task Group 154
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration



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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Slit

The Pro-Slit phantom is the so called **slit camera** for **accurate measurement** of the **focal spot size according to IEC 60336:2005.** Its main advantages are **repeatability, accuracy and possibility to measure the size of any focal spot.** Because of the small attenuation of the outer cover this tool can also be used with dental digital detectors - detector receives enough radiation to be triggered.

Technical data
(can be modified to customer specifications):

- dimensions: 40 x 40 x 11.5 mm
- 0.01 mm wide and 10 mm long slit with 8° spread
- diaphragm made of tungsten
- embedded in PMMA

Product features:

- complies with:
  – IEC 60336:2005
  – IEC 61223-3-1, 2, 4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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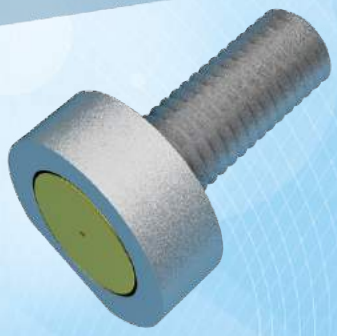
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Pinhole



The Pro-Pinhole phantom is the so called **pinhole camera for accurate measurement of the focal spot size according to IEC 60336:2005.** Its main advantages are repeatability, accuracy and possibility to measure the size of different focal spots.

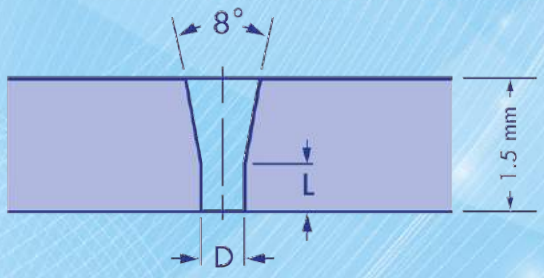
Technical data
(can be modified to customer specifications):

- diaphragm dimensions: ø5 x 1.5 mm
- diaphragm made from a 90:10 gold-platinum alloy
- four different pinhole diameters:
  – 0.010 mm for focal spot sizes from 0.5 to 0.10 mm
  – 0.030 mm for focal spot sizes below 1.0 mm
  – 0.075 mm for focal spots from 1.0 to 2.5 mm
  – 0.100 mm for focal spot sizes above 2.5 mm
- optional mounting screw
- optional mounting frame for Pro-Stand

Product features:

- complies with:
  – IEC 60336:2005
  – IEC 61223-3-1, 2, 4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

Pro-Pinhole
Cross-Sectional View



Pinhole Diaphragm Dimensions (Millimeters)		Nominal Pinhole Diameter (Millimeters)
D	L	
0.010 ± 0.005	0.020 ± 0.010	0.010
0.030 ± 0.005	0.075 ± 0.010	0.030
0.075 ± 0.005	0.350 ± 0.010	0.075
0.100 ± 0.005	0.500 ± 0.010	0.100

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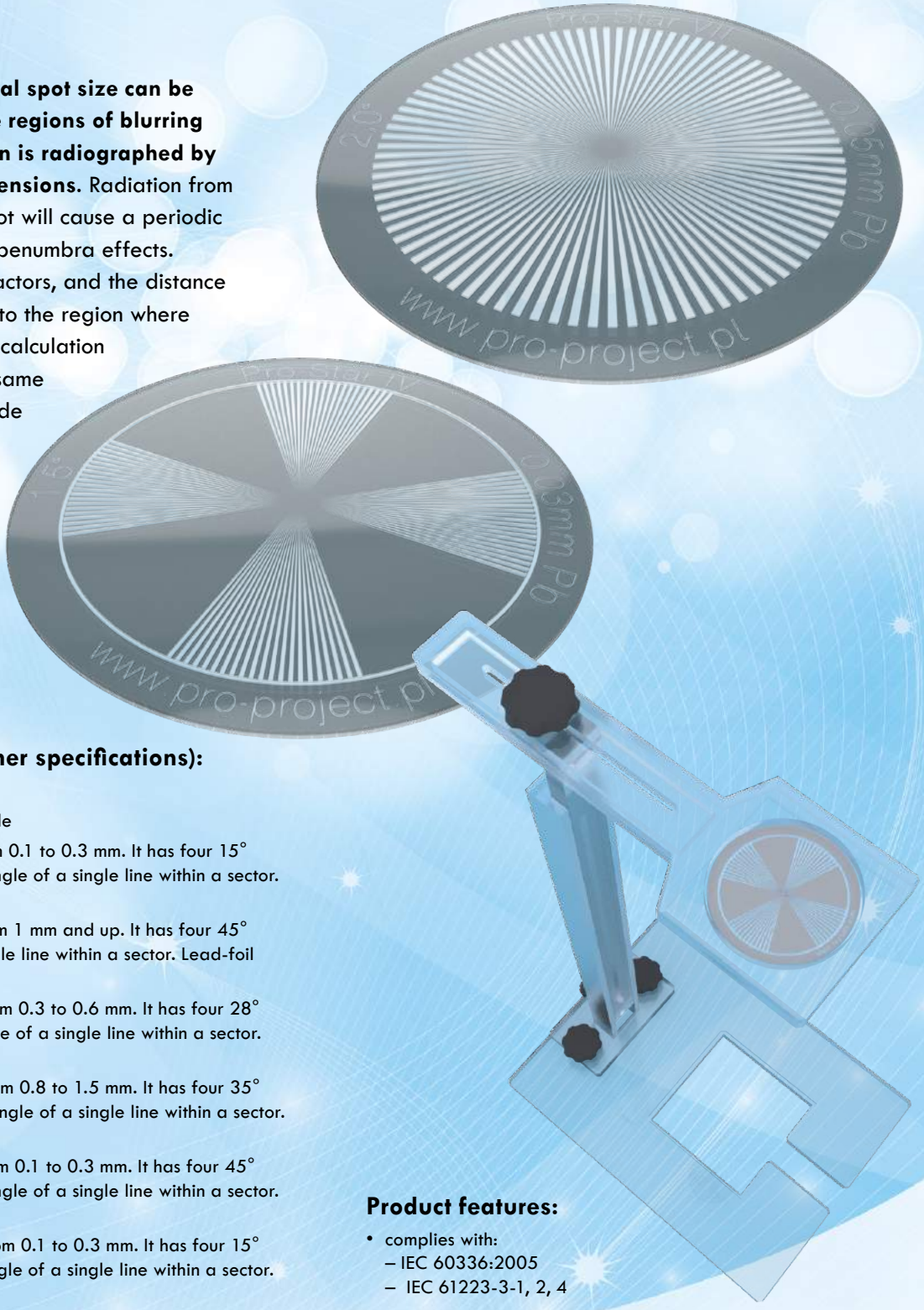
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Star

With Pro-Star test Patterns **focal spot size can be determined by observing the regions of blurring which occur when the pattern is radiographed by an x-ray source of finite dimensions.** Radiation from different areas of the focal spot will cause a periodic blurring of the pattern due to penumbra effects. Knowledge of the geometric factors, and the distance from the center of the pattern to the region where blurring occurs, will permit the calculation of the focal spot size with the same accuracy as measurements made with a pinhole camera.



Technical data (can be modified to customer specifications):

- Dimension: 55mm diameter
- The following versions are available
  - I: For measuring focal spots from 0.1 to 0.3 mm. It has four 15° patterned sectors with a 0.5° angle of a single line within a sector. Lead-foil thickness: 0.03 mm
  - II: For measuring focal spots from 1 mm and up. It has four 45° sectors with a 2° angle of a single line within a sector. Lead-foil thickness: 0.05 mm
  - III: For measuring focal spots from 0.3 to 0.6 mm. It has four 28° patterned sectors with a 1° angle of a single line within a sector. Lead-foil thickness 0.03 mm
  - IV: For measuring focal spots from 0.8 to 1.5 mm. It has four 35° patterned sections with a 1.5° angle of a single line within a sector. Lead-foil thickness 0.03 mm
  - V: For measuring focal spots from 0.1 to 0.3 mm. It has four 45° patterned sectors with a 0.5° angle of a single line within a sector. Lead-foil thickness: 0.03 mm
  - VI: For measuring focal spots from 0.1 to 0.3 mm. It has four 15° patterned sectors with a 25° angle of a single line within a sector. Lead-foil thickness: 0.03 mm
  - VII: For measuring focal spots from 1 mm and up. It has one 360° patterned sector with a 2° angle of a single line within a sector. Lead-foil thickness 0.05 mm

Product features:

- complies with:
  - IEC 60336:2005
  - IEC 61223-3-1, 2, 4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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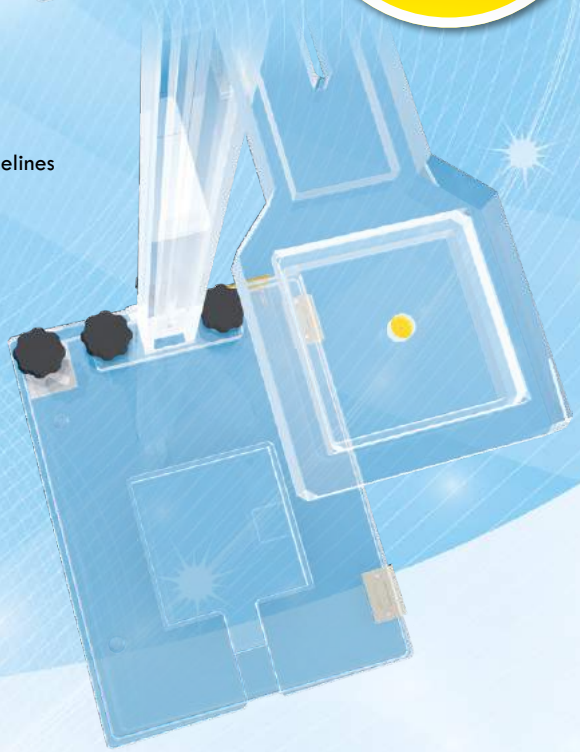
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-Stand

Adjustable stand, designed to make focal spot measuring procedures easy to perform, as well as **ensuring accurate results.** It can also be used for the HVL measurements.

new more stable and accurate frame

alignment verifiation



Technical data
(can be modified to customer specifications):

- adjustable height from 350 mm to over 600 mm (wide range of magnification)
- adjustable horizontal position and vertical angle (optional - for testing mammography systems) of the table top
- optional add-ons for stand alignment verification – especially useful for measurements on mammography units
- optional place in the base for the Pro-Dent positioning stand for accurate positioning of dental RVG detectors

Product features:

- complies with:
  – IEC 60336:2005
  – IEC 61223-3-1, 2, 4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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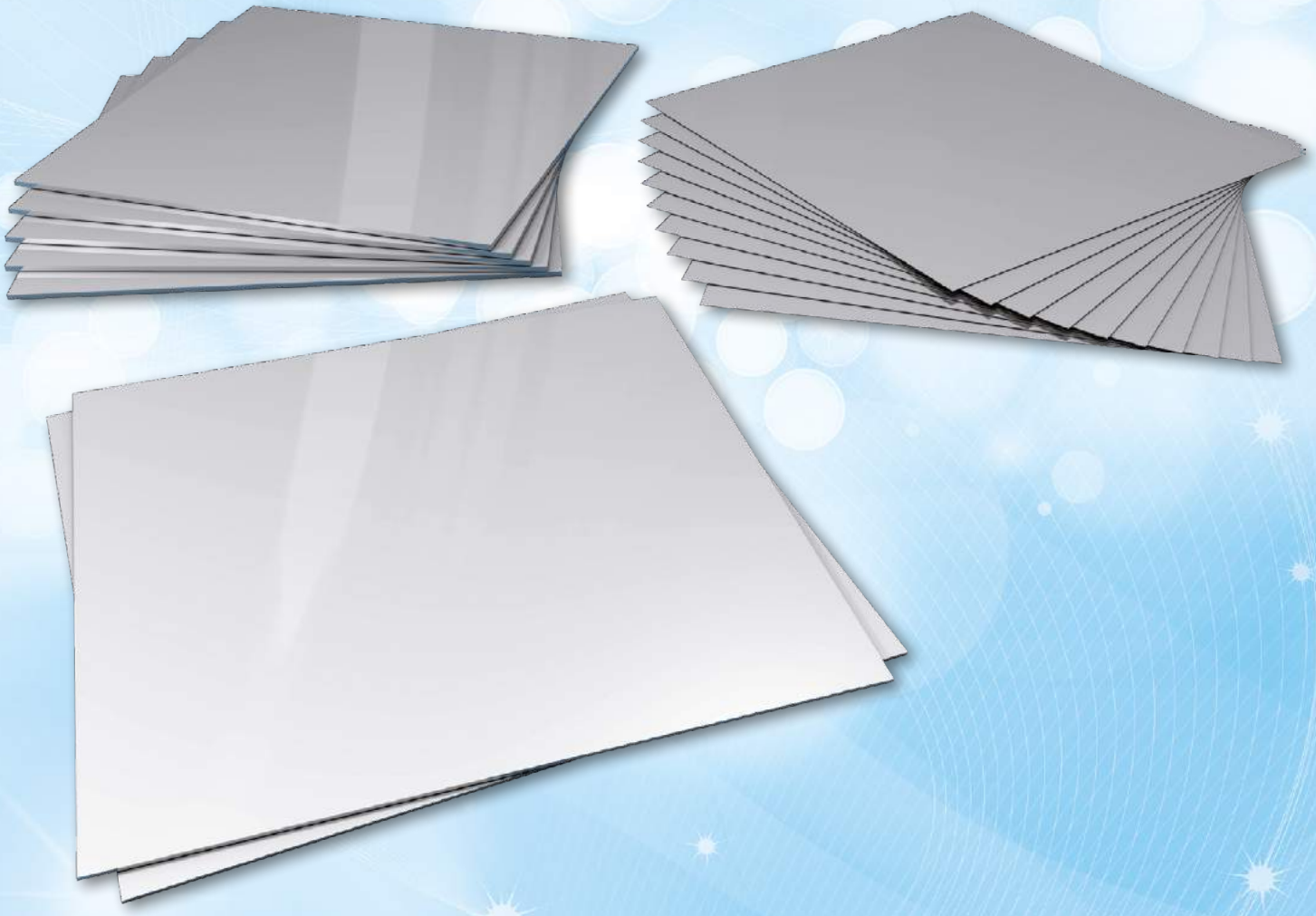
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-HVL



Different **sets of high (99.9%)** and **standard (99.5%) purity aluminium plates** for testing **Half Value Layer.**

Technical data
(can be modified to customer specifications):

- dimensions: 89 x 89 mm
- mammography set: 6 x 0.1 mm, aluminium purity 99.9%
- standard set: 5 x 1.0 mm, 2 x 0.5 mm, 4 x 0.1 mm, aluminium purity 99.5%
- other sizes upon request

Product features:

- Complies with:
  – IEC 61223-3-1, 2, 4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-HVL Cu

Different sets of **high purity copper plates** for testing **Half Value Layer.**

Technical data
(can be modified to customer specifications):

- dimensions: 100 x 100 mm
- standard set: 1 x 2.0 mm, 2 x 1.0 mm, 1 x 0.5 mm, 1 x 0.25 mm, 4 x 0.1 mm
- other sizes upon request

Product features:

- Complies with:
  – IEC 61223-3-1, 2, 4
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Resolution patterns

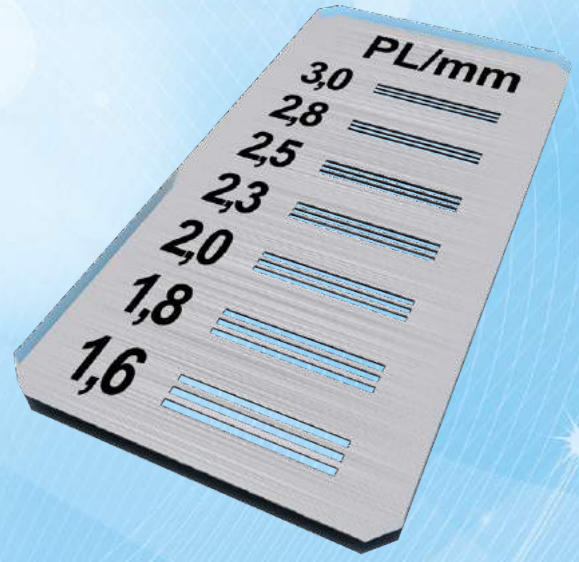
We offer a **wide range of test patterns** for **two and three dimensional** resolution evaluation. As we do not depend on other companies and each pattern is developed and manufactured in-house, **we can prepare all combination of shapes, layouts, templates and materials for you.** Our cutting-edge technology allows us to obtain **unmatched precision** and **resolution range** in **many types of materials.**

We present here only our standard test patterns. If you need something else, please contact us.

Dental resolution patterns

Pro-Res Dent Intra

lead thickness: 0.05 mm
resolution range: 4.0 - 8.0 LP/mm
number of groups: 7
bars per group: 3



Pro-Res Dent OPG

lead thickness: 0.05 mm
resolution range: 1.6 - 3.0 LP/mm
number of groups: 7
bars per group: 3

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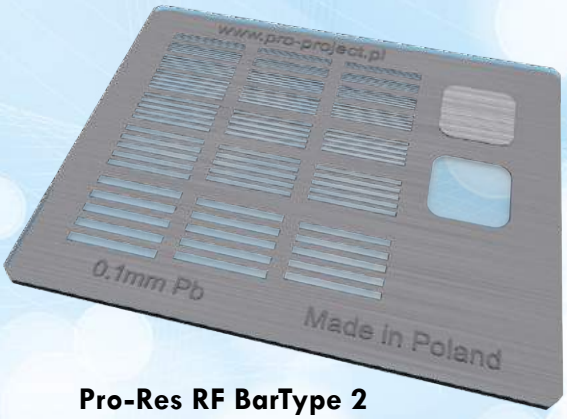
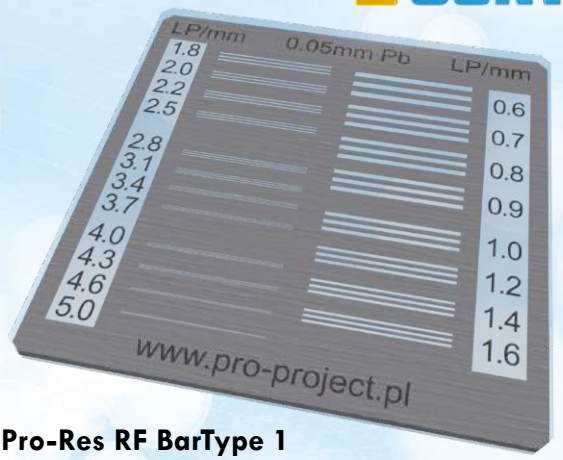
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Radiography resolution pattern



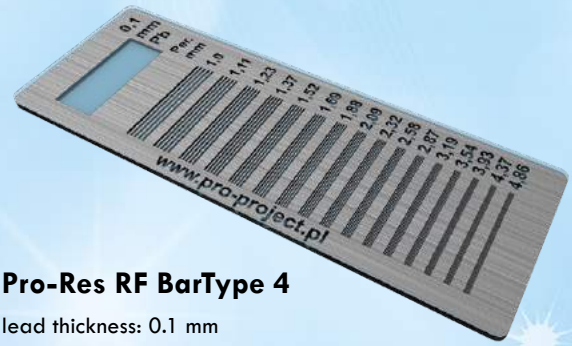
Pro-Res RF BarType 2

lead thickness: 0.1 mm
resolution range: 0.6 - 5.0 LP/mm
number of groups: 21
bars per group: 5
size: 57x47mm



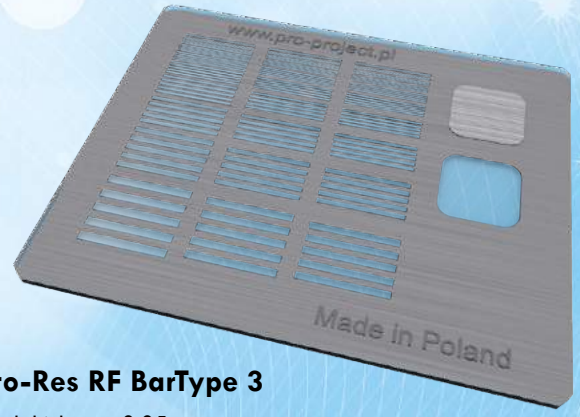
Pro-Res RF BarType 1

lead thickness: 0.05 mm
resolution range: 0.6 - 5.0 LP/mm
number of groups: 20
bars per group: 3
size: 50x50mm



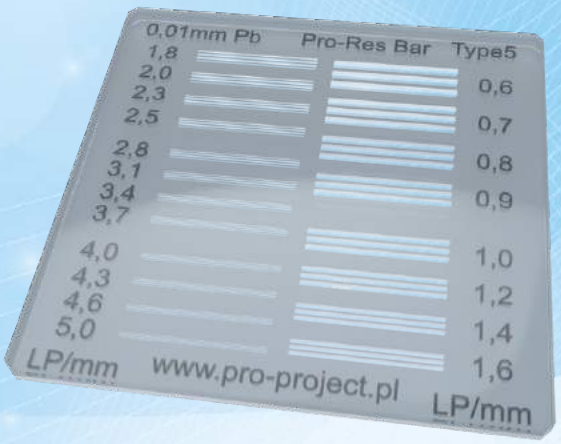
Pro-Res RF BarType 4

lead thickness: 0.1 mm
resolution range: 1.0 - 4.86 LP/mm
number of groups: 16
bars per group: 5
size: 110x40mm



Pro-Res RF BarType 3

lead thickness: 0.05 mm
resolution range: 0.5 - 14.3 LP/mm
number of groups: 30
bars per group: 5
size: 57x47mm



Pro-Res RF BarType5

lead thickness: 0.01mm
resolution range: 0.6 - 5.0 LP/mm
number of groups: 20
bars per group: 3
size: 50x50mm

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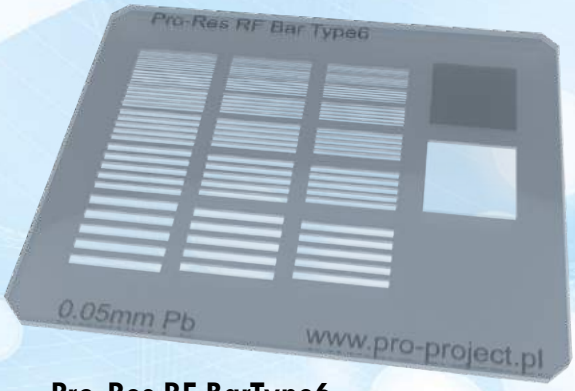
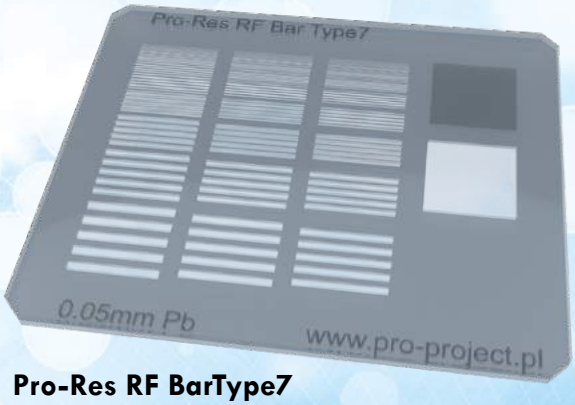
UNMATCHED SOLUTIONS FOR QUALITY CONTROL



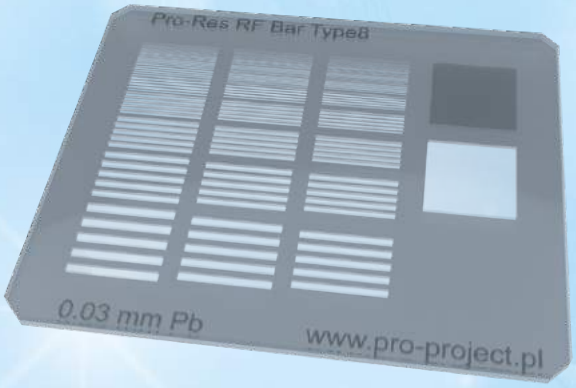
Pro-Res RF BarType6

lead thickness: 0.05mm
resolution range: 0.5 - 5.0 LP/mm
number of groups: 21
bars per group: 5
size: 57x47mm



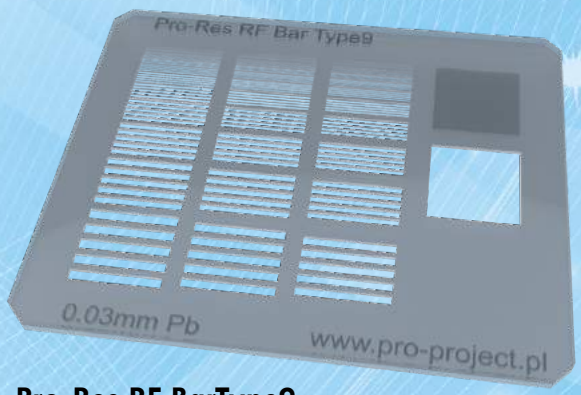
Pro-Res RF BarType7

lead thickness: 0.05mm
resolution range: 0.5 - 10.0 LP/mm
number of groups: 27
bars per group: 5
size: 57x47mm



Pro-Res RF BarType8

lead thickness: 0.03mm
resolution range: 0.5 - 14.3 LP/mm
number of groups: 30
bars per group: 5
size: 57x47mm



Pro-Res RF BarType9

lead thickness: 0.03mm
resolution range: 0.5 - 20.0 LP/mm
number of groups: 33
bars per group: 5
size: 57x47mm

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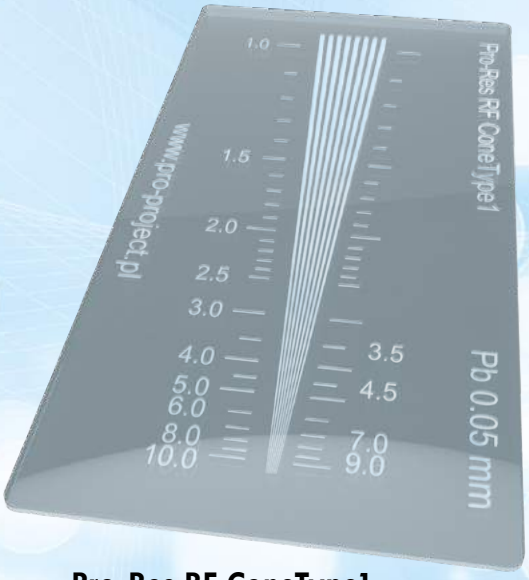
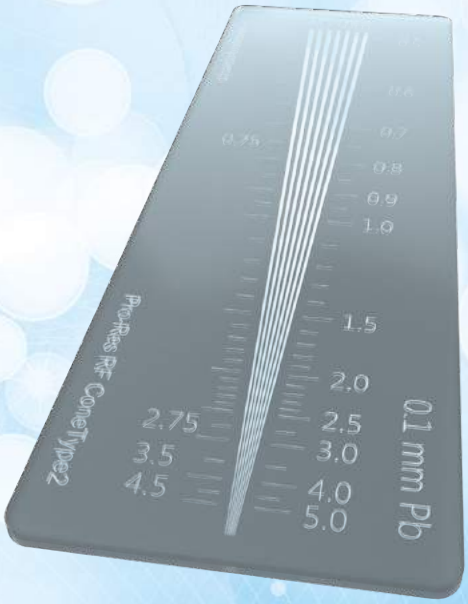


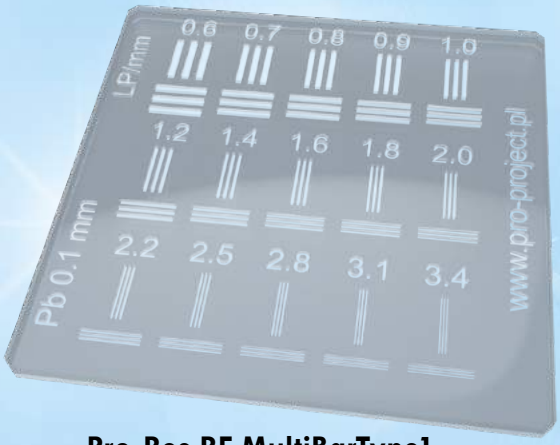
Pro-Res RF ConeType1

resolution range: 1.0 - 10.0 LP/mm
lead thickness: Pb 0.05mm
number of groups: 1
size: 80x40mm



Pro-Res RF ConeType2

resolution range: 0.5 - 5.0 LP/mm
lead thickness: Pb 0.1mm
number of groups: 1
size: 150x50mm



Pro-Res RF MultiBarType1

resolution range: 0.6 - 3.4 LP/mm
lead thickness: Pb 0.1mm
number of groups: 2x15 groups
size: 50x50mm

Pro-Res RF MeshType

standard wire meshes from 16 to 150
different sizes
different graduations

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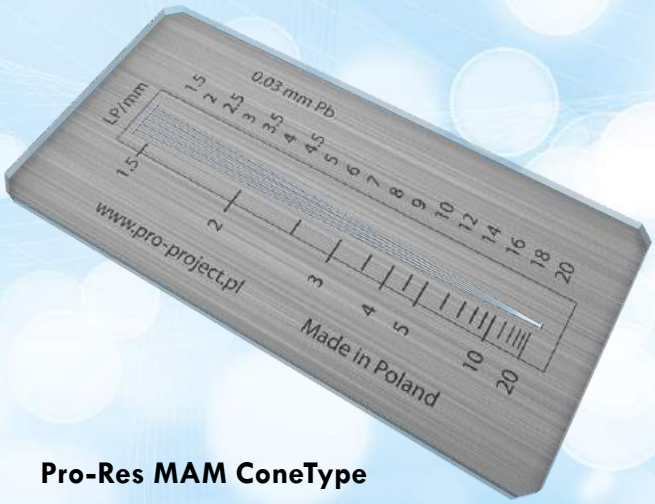
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

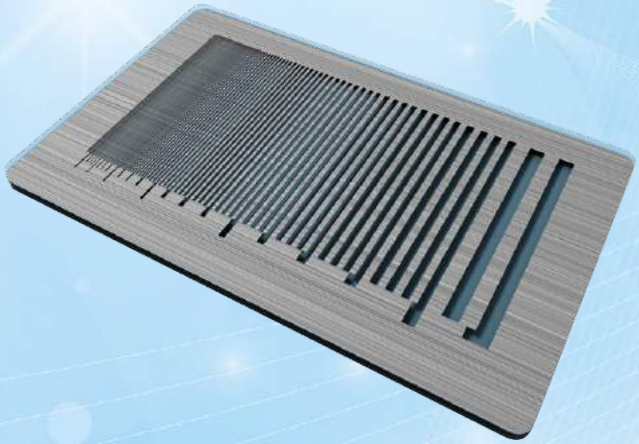
Mammography resolution pattern



Pro-Res MAM ConeType
lead thickness: 0.03 mm
resolution range: 1.5 - 20.0 LP/mm

Pro-Res MAM BarType 1
lead thickness: 0.03 mm
resolution range: 5.0 - 20.0 LP/mm number of groups: 16
bars per group: 3

Modulation Transfer Function measurement pattern



Pro-Res MTF 1
lead thickness: 0.05 mm
pattern size: 71 x 44 mm
resolution range: 0.25 - 10.0 LP/mm
number of groups: 22
resolutions: 0.25, 0.5, 0.6, 0.7, 0.85, 1.0, 1.2, 1.4, 1.7, 2.0, 2.4, 2.9, 3.5, 4.2, 5.0, 6.0, 7.0, 8.5, 10.0, 8.5, 7.0, 6.0 LP/mm

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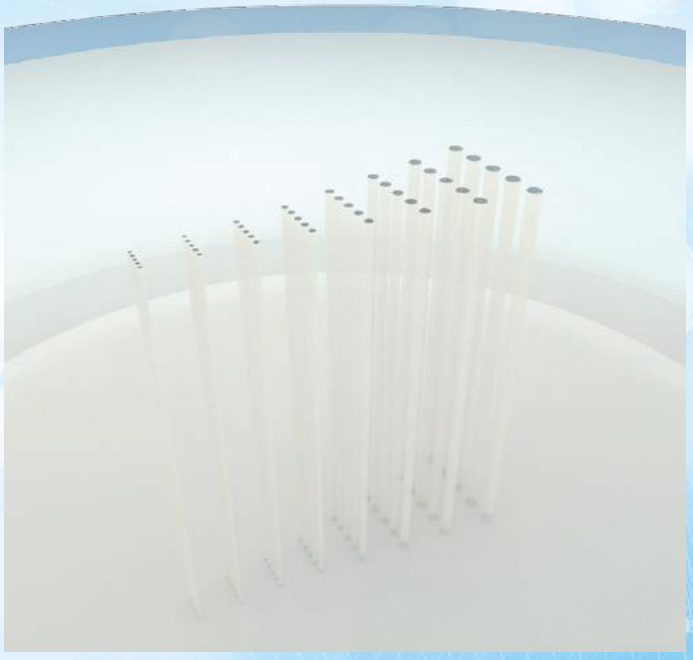
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Computed tomography resolution pattern

Pro-Res CT SandwichType

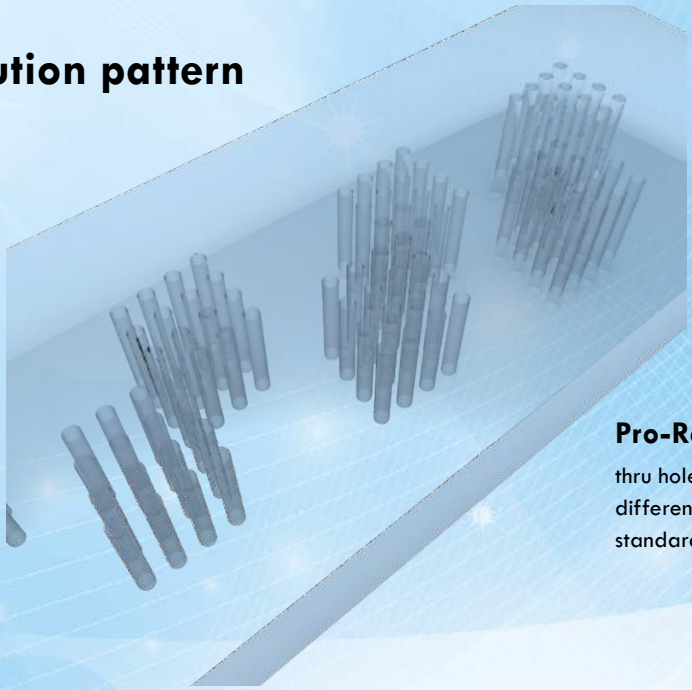
aluminium bars
different sheet sizes
standard resolution range: 1.0 - 30.0 LP/cm



Pro-Res CT HolesType

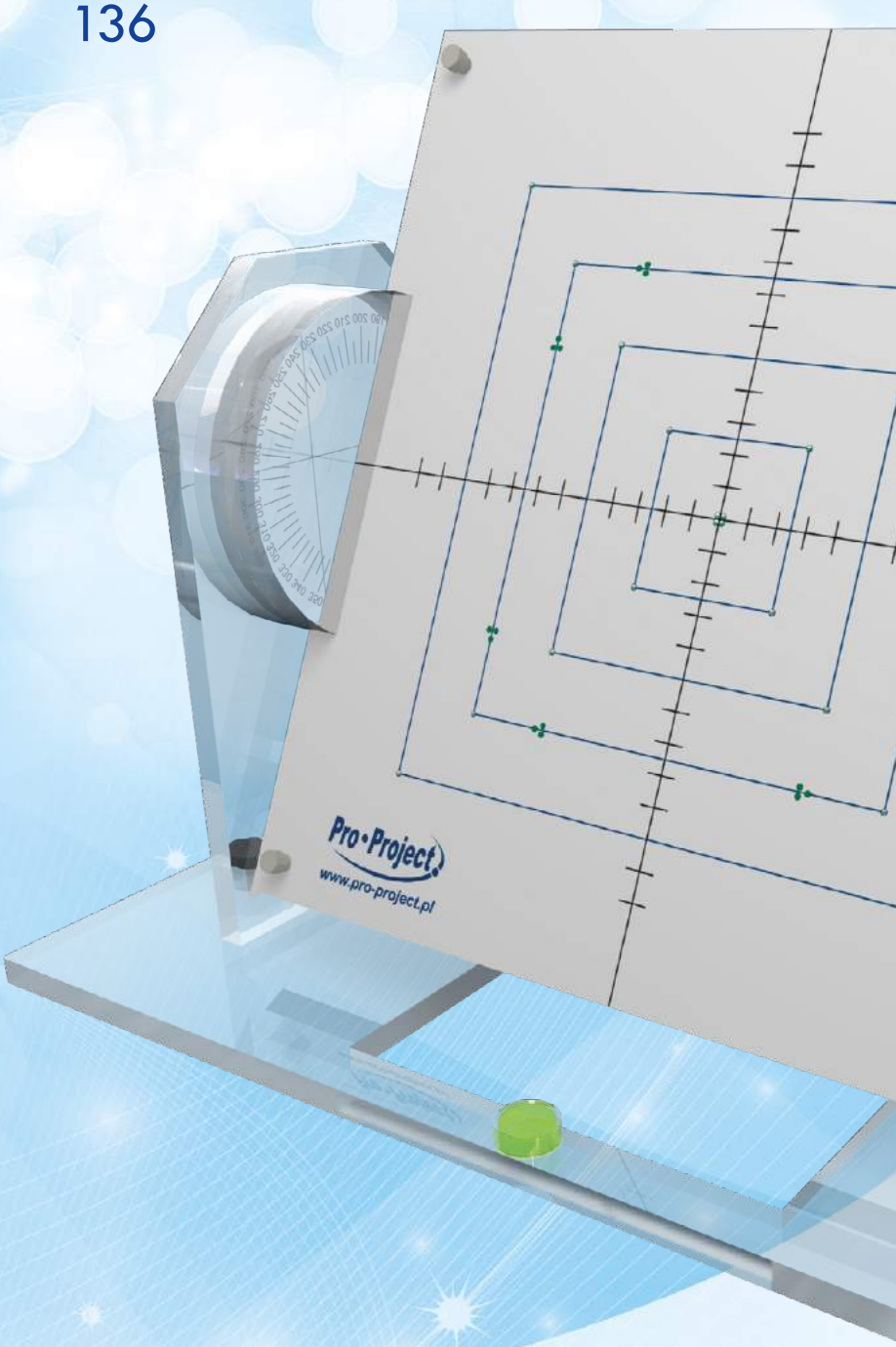
air thru holes
different hole diameters
standard diameters range: 0.4 - 1.75 mm

MRI resolution pattern



Pro-Res MRI HolesType

thru holes
different hole diameters
standard diameters range: 0.8 - 1.1 mm



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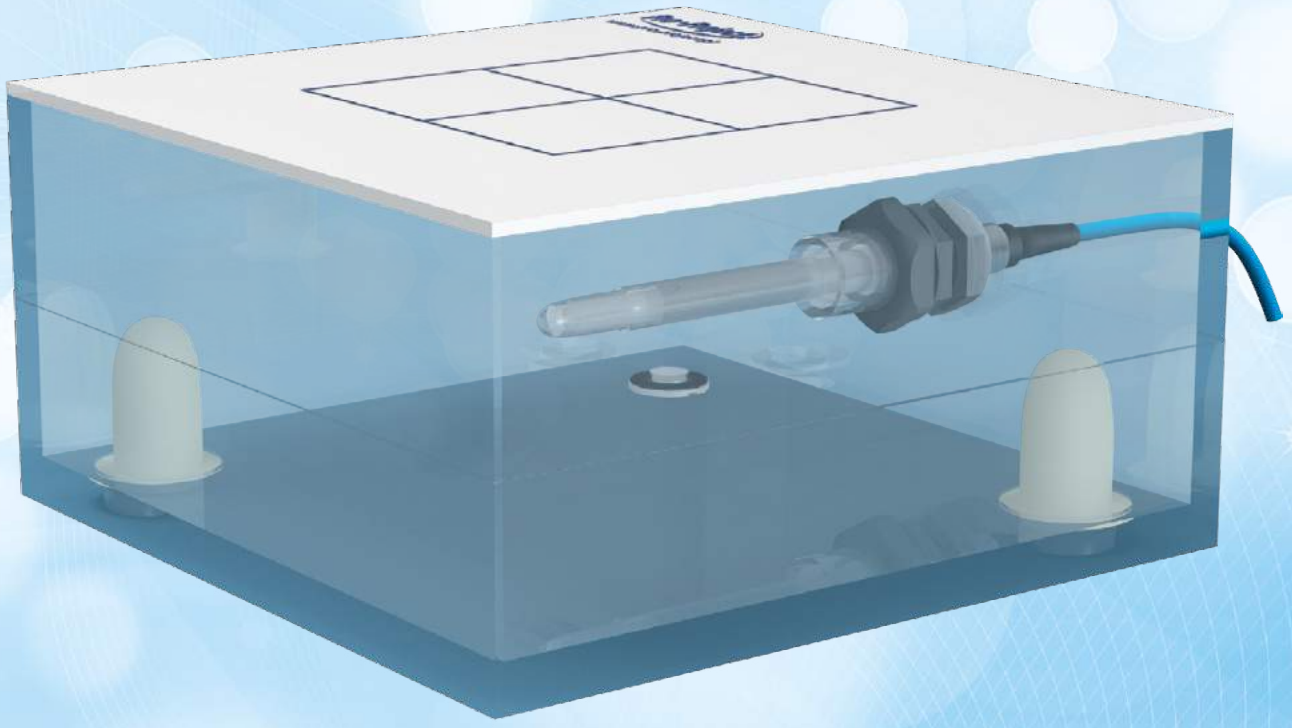
Pro-Dose Small Water



Stationary water phantom for high energy photon dosimetry with **all types of ionization chambers.**

Technical data (can be modified to customer specifications):

- dimensions: 200 x 200 x 110 mm
- cover made of PMMA
- solid construction ensures durability and no leaks
- entrance wall made of milky / opaque 3 mm thick PMMA
- fixed measuring depth at 50 mm
- positioning markers on the top and side surfaces
- phantom can be filled with water through a seal plug - a funnel is provided to facilitate the process
- two elastic extension vessels compensate changes of the water volume caused by ambient temperature changes
- well fitted holders are available for different chamber types
- chamber holders can be interchanged (option)
- heavy duty carrying case

Product highlights:

- opaque / white entrance wall with crosshair, makes it very easy to accurately position the phantom in the beam
- side markers at the measurement depth provide further assistance during positioning
- interchangeable holders for different ionization chambers
- extremely well fitted holders are very thin at the reference point – 1mm thick PMMA
- water-proof ion chamber holders are also available

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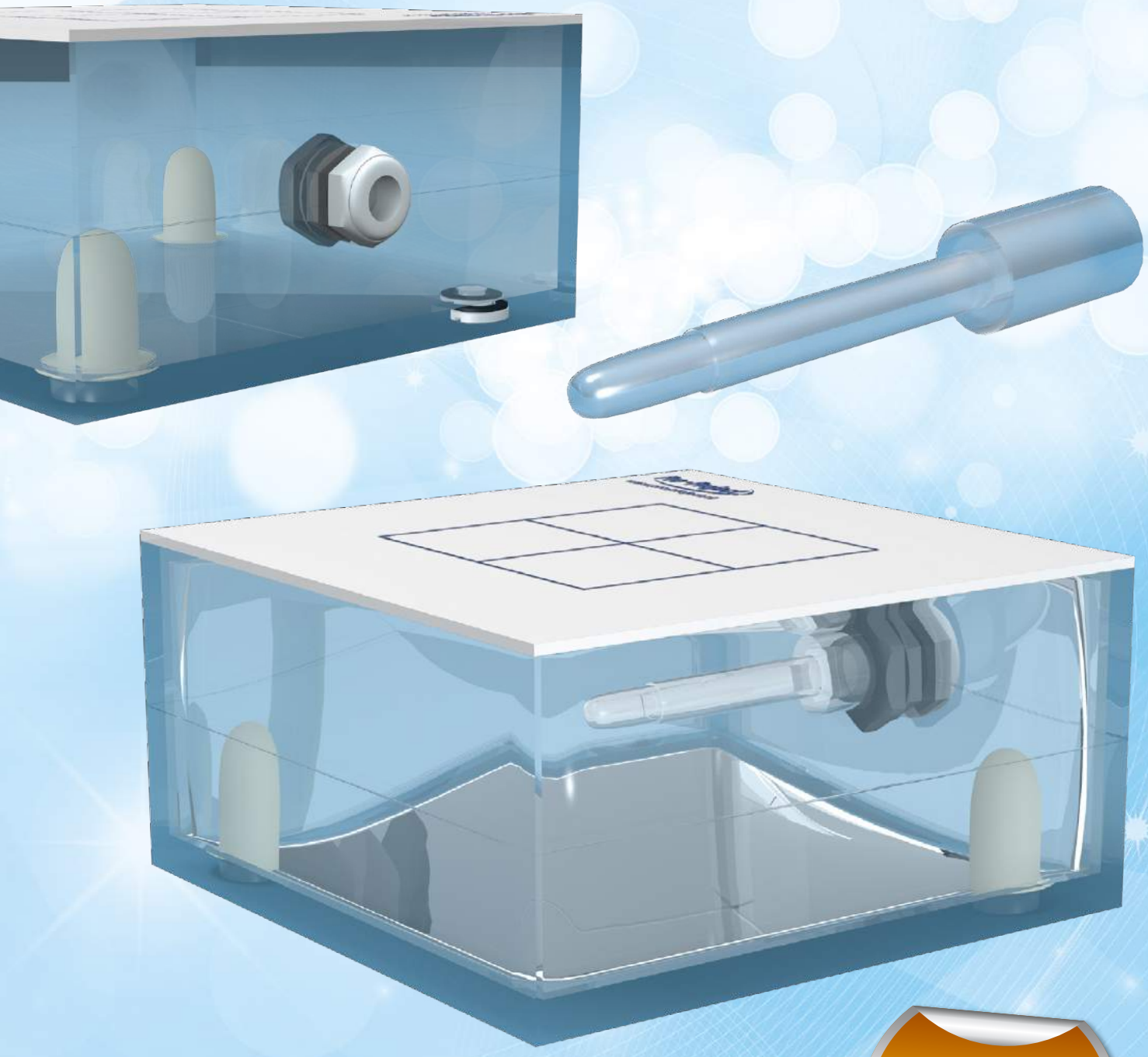

interchangeable holders for different ionization chambers

Product features:

- complies with:
  – IAEA Technical Reports Series No. 398
  – IAEA Technical Reports Series No. 430
  – IAEA Specification and Acceptance Testing of Radiotherapy Treatment Planning Systems (IAEA-TECDOC-1540)
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-RT IsoBeam

This is a **multifunctional, precision quality assurance tool** for daily, weekly or monthly quality assessments of **all mechanical and geometrical treatment parameters of linear accelerators or teletherapy units.**
It is designed to easily and accurately check **collimator isocentricity, gantry isocentricity, table isocentricity, collimator field size accuracy, radiation/light field congruence, isocenter rotational stability, ODI accuracy** and **laser light alignments.**

Technical data
(can be modified to customer specifications):

- overall dimensions: 203 x 457 x 330 mm
- screen
  – 305 x 305 mm
  – 2 opaque PMMA plates
  – space for 25 x 30 cm film
  – inscribed with lines precisely defining corners, edges, and centers of screen
  – field sizes: 2 x 2 mm, 50 x 50 mm, 100 x 100 mm, 150 x 150 mm and 200 x 200 mm
  – center lines scribed with short lines 10 mm apart
  – tungsten markers 2 mm in diameter in the center and corners of the field
  – can rotate 360° in 45° increments
- base with three leveling non-slip screws and bubble level
- optional off-the-table measurement possibility

Product features:

- Complies with:
  – IAEA Technical Reports (Series No. 398)
  – IAEA Technical Reports (Series No. 430)
  – IAEA-TECDOC-1540, Specification and Acceptance Testing of Radiotherapy Treatment Planning Systems
- CE certified
- the Manual provides detailed guidelines for carrying out each test, results assessment and registration

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UNMATCHED SOLUTIONS FOR QUALITY CONTROL

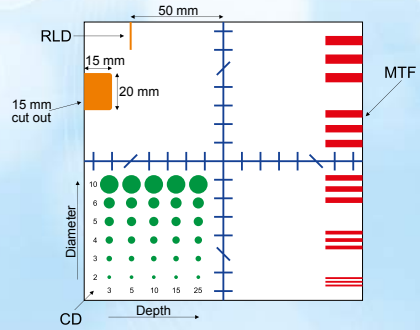
Pro-RT CTsim

This phantom is designed for quality control of a CT simulator, which usually consists of a CT scanner, virtual simulator software and a laser marking device (marking of the centre of target volume). Since geometrical planning is the core of CT simulation, periodic quality control is essential for maintaining optimum image quality and patient care.

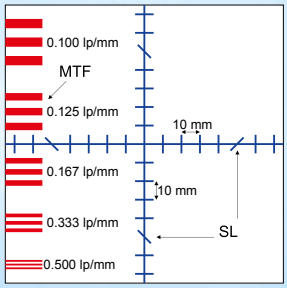
The phantom allows to perform detailed geometry and table movement tests as well as image quality assessment - low contrast resolution and high contrast detectability.

Technical data
(can be modified to customer specifications):

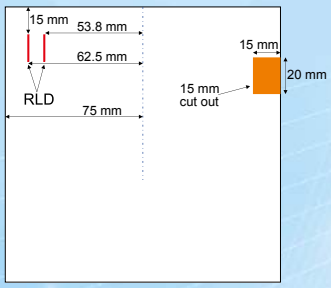
- overall dimensions: 150 x 150 x 150 mm
- made of PMMA
- test object placed on four faces of the cube
- Top Face contains contrast details objects (CD), MTF, ray line divergence (RLD) and spatial linearity (SL) patterns



- First Side Face contains MTF and spatial linearity (SL) patterns



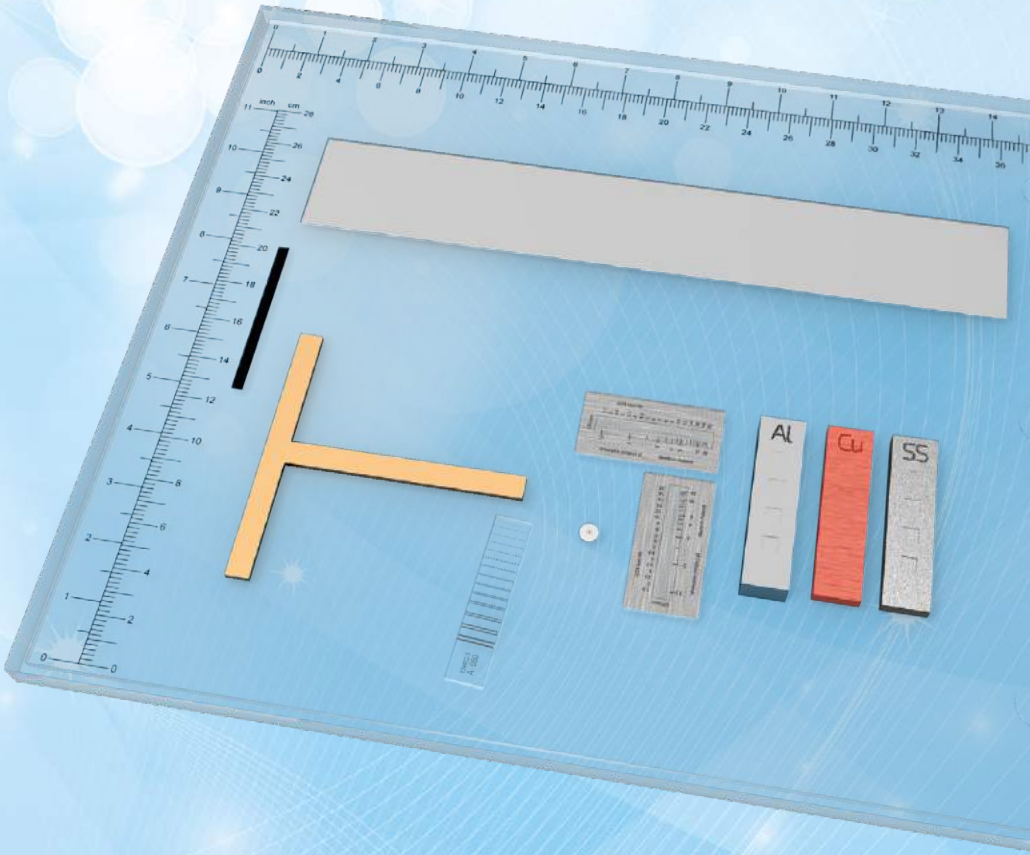
- Second and Third Side Face contains ray line divergence (RLD) pattern



- optional carrying case

Product features:

- Complies with:
  – IEC 61223-3-5
  – IEC 61223-2-6
- CE certified
- manual provides detailed guidelines for carrying out each test, results assessment and registration



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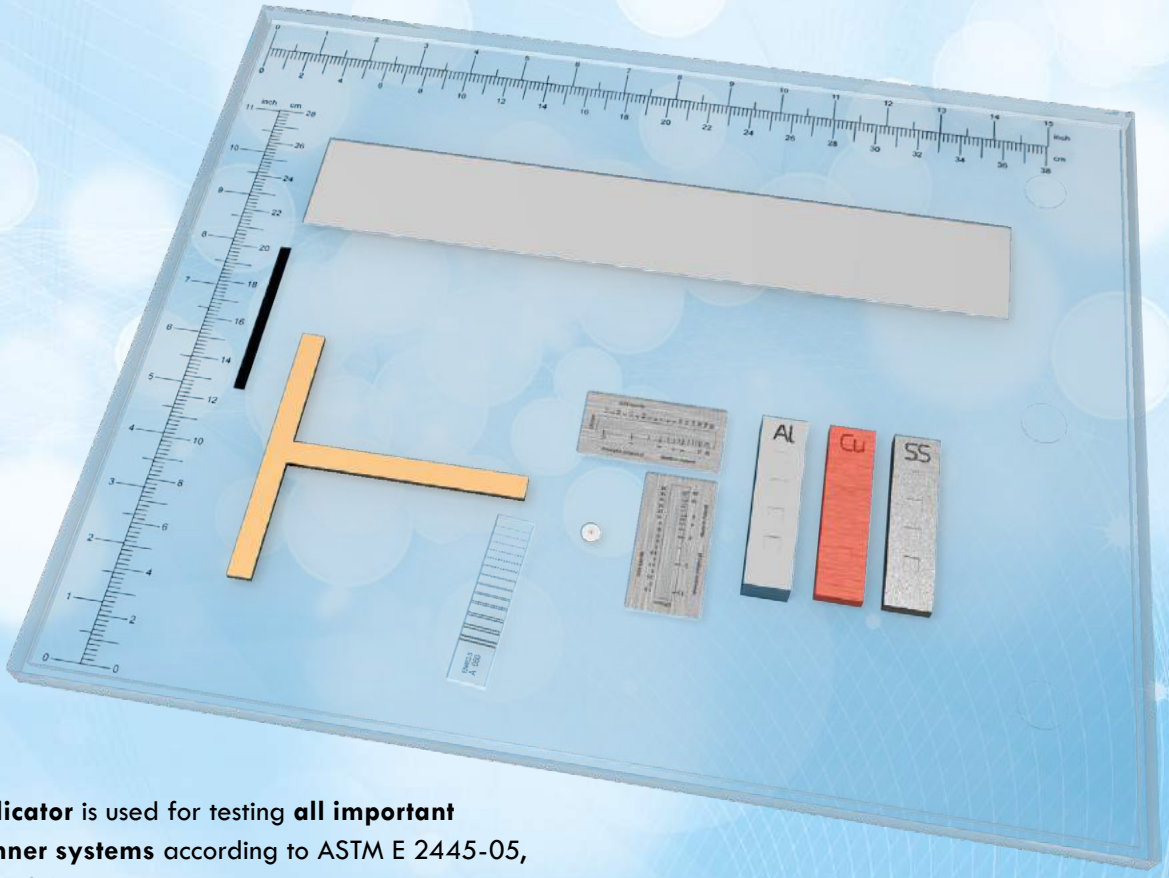
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NDT CR



This **Image Quality Indicator** is used for testing **all important parameters of CR scanner systems** according to ASTM E 2445-05, ISO 16371-1 and EN 14784-1 standards. It provides means to measure: **spatial resolution, unsharpness, contrast, MTF, laser beam jitter, scanner slipping and shading.**

Technical data (can be modified to customer specifications):

- dimensions: 350 x 430 x 15 mm
- made of PMMA (Lucite)
- T shaped brass target (laser beam jitter, MFT check, blooming / flare)
- Pro-NDT DuplexWireIQI test object (basic spatial resolution, unsharpness)
- BAM snail made of lead and low absorbent material (central beam alignment)
- two converging line pairs resolution patterns (Pro-Res MAM ConeType)
- three ø19 x 0.3 mm (EL, EC, ER) measuring points (shading correction)
- cassette positioning locator
- homogeneous 0.5 mm Al strip (scanning slipping, shading)
- two cm/inch rulers (linearity check)
- three contrast sensitivity gauges made of Al, Cu and stainless steel with four holes of different depth
- calibration / test certificate according to ASTM E 2445-05, EN 14784-1 and ISO 16371-1

Product features:

- • complies with:
  – ASTM E 2445-05
  – ISO 16371-1
  – EN 14784-1
- CE certified (declaration of conformity according to ISO/IEC 17050-1)
- the Manual provides guidelines for carrying out each test, results assessment and registration

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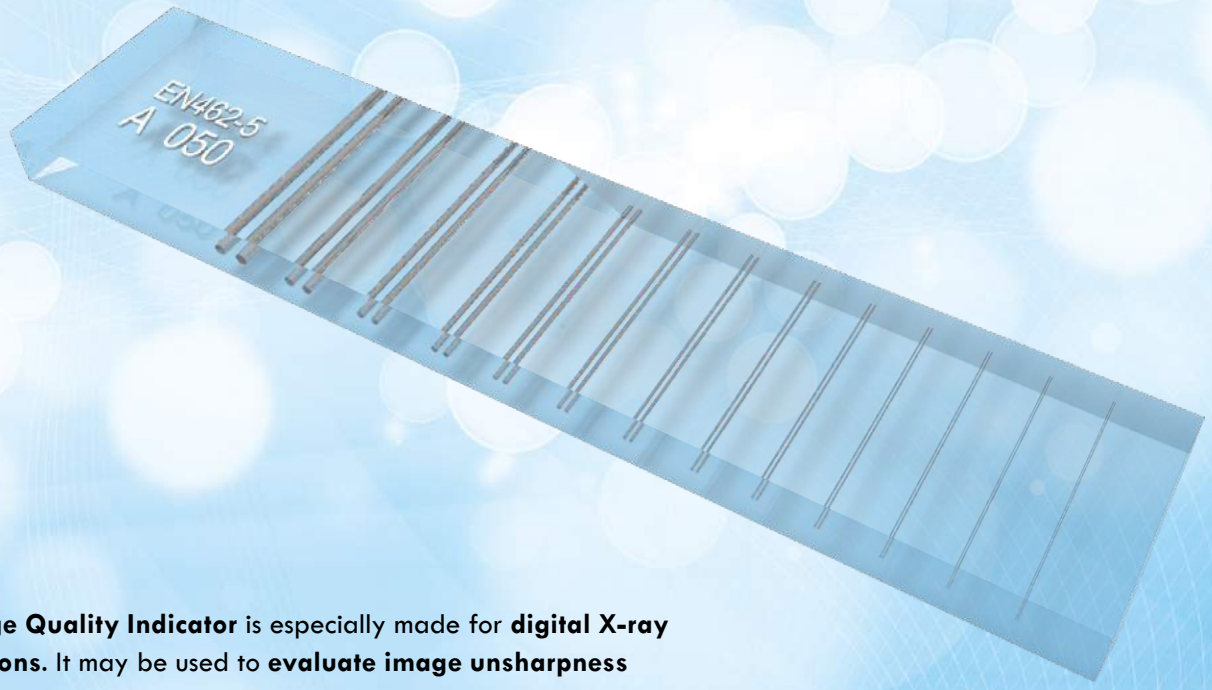
UNMATCHED SOLUTIONS FOR QUALITY CONTROL

Pro-NDT DuplexWireIQI



This **Image Quality Indicator** is especially made for **digital X-ray applications**. It may be used to **evaluate image unsharpness** (film and digital images) and **basic spatial resolution** in digital images according to EN 13068 (Radioscopy), EN 14784 and ISO 13671 (CR - Computed Radiography with imaging plates), ISO 17636-2 (digital radiography of welds - flat panel detectors) or ASTM E 2597 (characterization of digital detector arrays). It may also be used to determine focal spot sizes.

Technical data (can be modified to customer specifications):

- dimensions: 15 x 70 x 4 mm
- 13 groups of wire pairs (from 1D to 13D) embedded in PMMA
- groups 1D - 3D made of tungsten
- groups 4D - 14D made of platinum
- diameter of wires / spacing between wires ranges from 0.050 to 0.800 mm
- calibration / test certificate according to ASTM E 2002 and ISO 19232-5

Product features:

- complies with:
  – ISO 19232-5
  – EN 462-5
  – ASTM E2002-99 Duplex IQI
- CE certified (declaration of conformity according to ISO/IEC 17050-1)
- the Manual provides guidelines for carrying out each test, results assessment and registration

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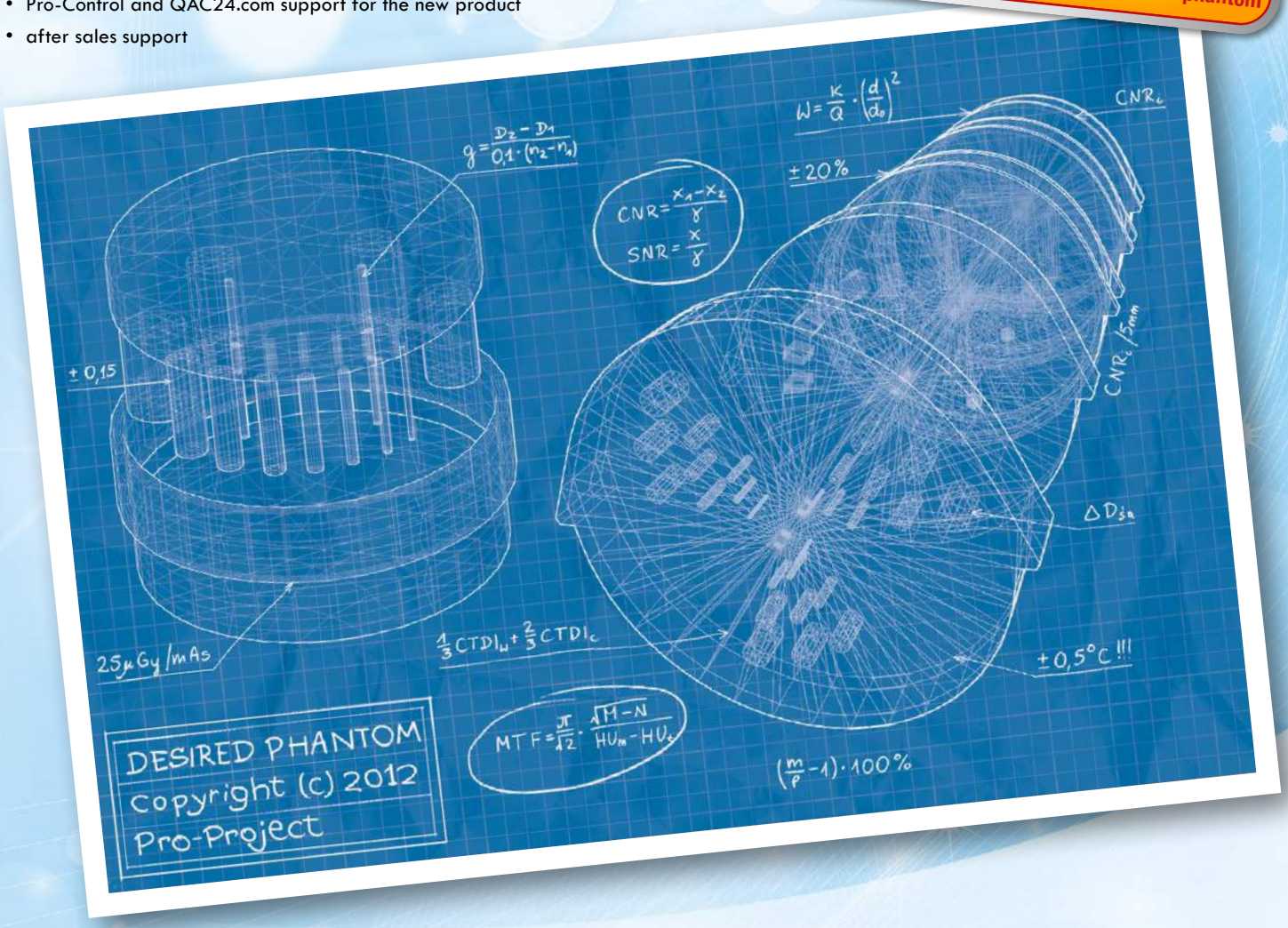
- short lead times, 2-3 weeks on average
- most competitive prices
- unlimited customization and adaptation of our desktop and cloud software
- Pro-Control and QAC24.com support for the new product
- after sales support

Haven't found what you've been looking for?

Contact us, we can manufacture your desired phantom



Specifications are subject to change without notice. Always read product labeling/inserts for complete instructions, warnings and restrictions

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