Quality Control in Medical Imaging

Table of Contents

Quality Control in Radiography / Fluoroscopy

Multimeter

For more technical information, please see the MagicMax family matrix at the end of the brochure!

Multimeter MagicMax-*rad/flu/dent*

VD0201940

The flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state micro footprint Multi-Detector "XR"
- Ability to attach an additional solid state detector for dose measurements
- Including robust aluminum carrying case
- Dosimeter part is designed according to IEC 61674

Measurement Parameters:

- Dose / dose rate
- Dose per pulse
- kVp
- Time
- Total filtration
- Half value layer (HVL)
- Waveform

Options / Additional Accessories:

EeePC VD0201930
Instead of your own laptop.

mAs-Clamp VD0201975
For use with MagicMax, invasive & non-invasive measurements.

Illuminance Detector (lx) VD0201951
For use with MagicMax.

Solid State Detector RQA VD0202850
For use with MagicMax.

Solid State Detector RQM VD0202860
For use with MagicMax.

Dosimeters

Dosimeter MagicMax-*rad/flu/dent*

VD0201945

According to IEC 61674; the flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state Dose-Detector RQA
- Ability to attach an additional solid state detector for simultaneous measurements of exit and entrance dose
- Including aluminum carrying case

Measurement Parameters:

- Dose / dose rate
- Dose per pulse
- Time

Options / Additional Accessories:

EeePC VD0201930
Instead of your own laptop.

mAs-Clamp VD0201975
For use with MagicMax, invasive & non-invasive measurements.

Illuminance Detector (lx) VD0201951
For use with MagicMax.

Solid State Detector RQA VD0202850
For use with MagicMax.

For more technical information, please see the MagicMax family matrix at the end of the brochure!

Dosimeter Dosimax *plus* A

(basic unit) VD0201747, Detector RQA VD0202850

PTP-approved single-channel dosimeter according to IEC 61674, designed for acceptance tests and for quality checks at radiographic, fluoroscopic, dental and mammographic X-ray units.
In Rad/Flu for use with solid state detector RQA.

Measurement Parameters with Detector RQA:

- Dose: 200 nGy - 9999 mGy
- Dose rate: 80 nGy/s - 70 mGy/s (50 - 150 kV)
- Time: 1 ms - 19999 s

Options / Additional Accessories:

Official Verification CF1E1003
Of dosimeter DOSIMAX *plus* A
by a German office of legal metrology.

Carrying Case VD0225720
For dosimeter DOSIMAX *plus* series;
offers space for 1 DOSIMAX *plus* and 2 solid state detectors (not DEDX/DE2DX).

Dosimeter DOSIMAX *plus* I,

(basic unit) VD0201748

According to IEC 61674; single-channel dosimeter for constancy tests at radiographic and fluoroscopic X-ray units.
In Rad/Flu for use with the appropriate solid state detector (RQA or DEDX).

Measurement Parameters with Detector RQA:

- Dose: 200 nGy - 9999 mGy
- Dose rate: 80 nGy/s - 70 mGy/s (50 - 150 kV)
- Time: 1 ms - 19999 s

Measurement Parameters with Detector DEDX:

- Dose: 2 µGy - 9999 mGy
- Dose rate: 20 µGy/s - 1 Gy/s
- Time: 1 ms - 19999 s

Option / Additional Accessory:

Carrying Case VD0225720

For dosimeter DOSIMAX *plus* series; offers space for 1 DOSIMAX *plus* and 2 solid state detectors (not DEDX/DE2DX).

Dosimeter DOSIMAX *plus* Duo incl. Sandwich Detector DE2DX

VD0201460

Dual-channel dosimeter especially for constancy tests at radiographic and fluoroscopic X-ray units with sandwich detector DE2DX. Entrance and exit dose / dose rate measurement with one single exposure.

Measurement Parameters:

- Dose: 2 µGy - 9.999 Gy
- Dose rate (entrance dose): 20 µGy/s - 1 Gy/s
- Dose rate (exit dose): 2 µGy/s - 1 Gy/s
- Time: 1 ms - 20 ms
- kV-range combined with DE2DX: 50 - 150 kV

The dosimeters DOSIMAX *plus* A, DOSIMAX *plus* I and DOSIMAX *plus* duo are medical devices (according to the directive 93/42/EWG) of class I m / 12.

kV-Meter

kV-Meter MagicMax-*rad/flu/dent*

VD0201948

The flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state kV-detector
- Including aluminum carrying case

Measurement Parameters:

- kVp
- Time
- Total filtration
- Half value layer (HVL)

Option / Additional Accessory:

EeePC VD0201930 Instead of your own laptop.

For more information, please see the MagicMax family matrix at the end of the brochure!

Detectors

Solid State Detector RQA VD0202850

For quality checks and acceptance tests at radiographic, fluoroscopic and dental X-ray units, 50 - 150 kV.

Solid State Detector DEDX VD0202100

Integrated in the patient equivalent attenuator, consisting of 25 mm Al, incl. one additional 1 mm Cu-filter for quality checks at radiographic and fluoroscopic X-ray units, 50 - 150 kV.

Length of detector cables: 2 m.

Detector RQA **Detector DEDX**

MagicMax-Current Probe VD0201975

For invasive and non-invasive measurements of the tube current in combination with the MagicMax-Multimeter.

Features:

- Unique combination of invasive and non-invasive
- Comprehensive analysis with MagicMax-Meter software
- Convenient selection of measurement range

Benefits:

- All in one device
- Cost efficient solution
- Workflow convenience

Test Devices

Test Device Primus S VD0203510

For quality checks at digital/conventional radiographic and fluoroscopic X-ray units (according to DIN 6868-4, 2007).

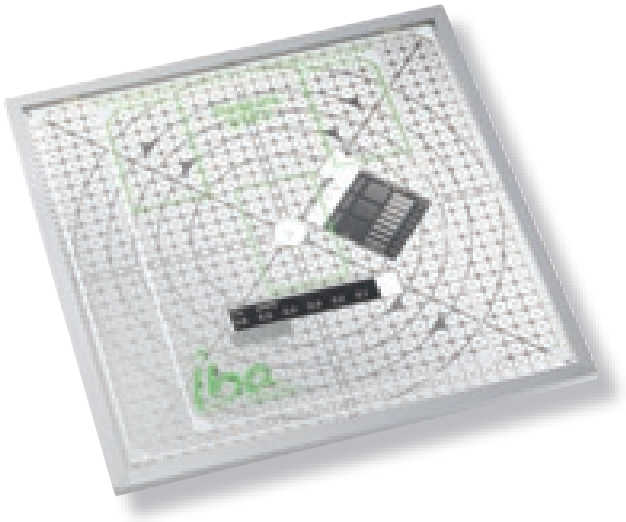
Test Parameters:

- Spatial resolution
- Verification of used kV-range
- Contrast resolution

Incl. 30 mm PMMA-Attenuation Body with 1 mm Copper.
Dimensions in mm: 200 x 200 x 18.5.

Test Device ETR1 incl. Centering Tube VD0203100

For quality checks in conventional radiography and fluoroscopy (DIN 6868-3, -4 and IEC 61223-2-9 / -2-11).



Test Parameters:

- Spatial resolution
- Alignment of light and X-ray field
- Geometry symmetry
- Contrast resolution
- Measuring areas for optional density

Option / Additional Accessory:

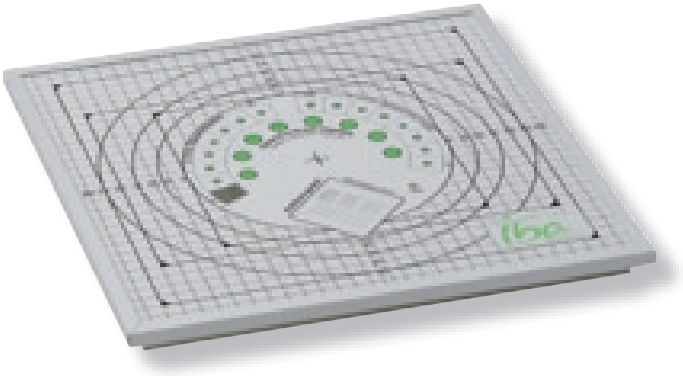
Stand for Test Device ETR1 VD0212160

For more information see page 48.

Test Device Primus L

(standard model) VD0203520

For quality checks at digital/conventional radiographic and fluoroscopic X-ray units (according to DIN 6868-4, 2007).



Test Parameters:

- Spatial resolution
- Verification of used kV-range
- Contrast resolution
- Alignment of light and X-ray field
- Geometry symmetry
- Image scale

Dimensions in mm: 300 x 300 x 18.5.

An Attenuation Body is necessary, if no Solid State Detector DEDX is available:

Aluminum Pre-Attenuator VD0503200

25 mm with supporting plate or

PMMA-Attenuation Body VD0203521

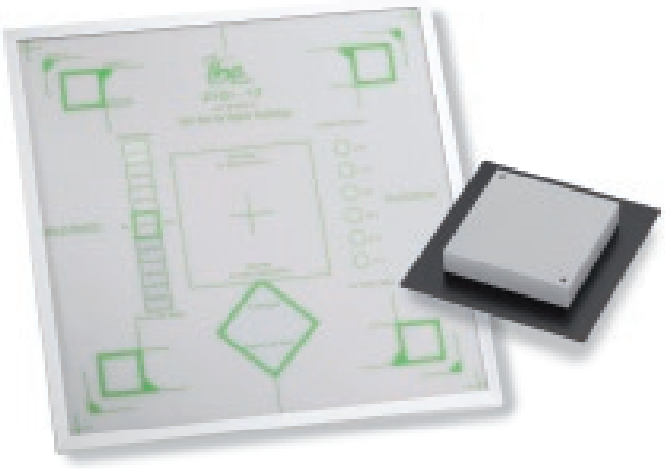
Dimensions in mm: 300 x 300 x 31.

Consisting of 30 mm PMMA and 1 mm Copper.

Option / Additional Accessory:

Stand for Test Device Primus L / Digi 13 VD0212170

For more information see page 48.



Test Device DIGI-13 VD0203560

For quality checks at all types of CR/DR radiographic systems.

Test Parameters:

- Signal standardization
- Check of dose indicator
- Homogeneity
- Spatial and contrast resolution
- Alignment of light and X-ray field
- Image scale
- Artifacts
- Geometry symmetry

An Attenuation Body is necessary, if no Solid State Detector DEDX is available:

Aluminum Pre-Attenuator VD0503200

25 mm with supporting plate (absolutely necessary in case of using the test device DIGI-13).

Additionally for Digi-13, if performing Acceptance Tests according to DIN V 6868-58:

High Contrast Resolution Test, Type 38 VD0219100

Option / Additional Accessory:

Stand for Test Device Primus L / Digi 13 VD0212170

For more information see page 48.

DSA Test Device incl. Carrying Case VD0203300

For quality tests in digital subtraction angiography (IEC 61223-3-3 and DIN 6868-4, 2007).

Test Parameters:

- Dynamic range
- DSA contrast sensitivity
- Artifacts
- Logarythmic check

Contrast-Detail-Phantom CDRAD VD0203750

(including analyzer-software and carrying case)

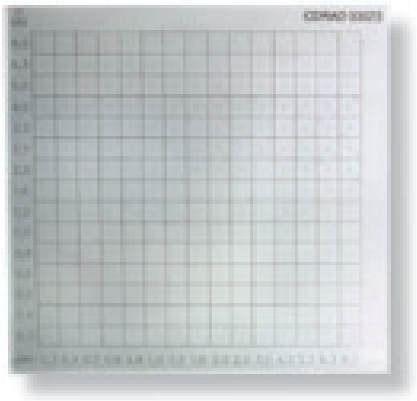
For quality control in radiography.

Monitoring of Image Information Content:

- Contrast-Detail curve/detectability
- Tests low contrast and spatial resolution

Test Parameters:

- Contrast and spatial resolution
- Optimization, evaluation and comparison of different radiologic systems
- Determination of the optimum exposure technique and background density
- Comparison of image quality at various thicknesses of PMMA
- Evaluation of the image quality versus dose relation



Four different versions available.
With aid of the accurate and easy to use analyser software quality reports can be generated.

Contrast-Detail-Phantom CD DISC 2.0 VD0203720

(including carrying case)

For quality control in radiology, considering the perception by the observer. Especially designed for evaluating fluoroscopic X-ray units.

Test Parameters:

- Contrast resolution
- Spacial resolution
- Optimization, evaluation and comparison of different fluoroscopic systems
- Determination of the optimum exposure technique
- Evaluation of the image quality versus dose relation

Test Device FFA 4090 R VD0203291

For checking the film-screen contact at radiographic cassettes according to ISO 4090.

Internal dimensions without frame in cm: 42 x 49 x 0.7.

External dimensions including the frame in cm: 44 x 51 x 0.9.

BATT – Beam Alignment Test Tool

VD0403850

Verifies that the alignment of the central beam is perpendicular to the image receptor. (Recommended in combination with test devices DIGI-13, ETR1 and Primus.)

Test Device Set LiRa (Collimator / Beam Alignment Test Tool) VD0403865

- Verification of the proper alignment of the collimator light field with the X-ray field
- Verification of the central beam alignment (perpendicular to the image receptor)

Consisting of:

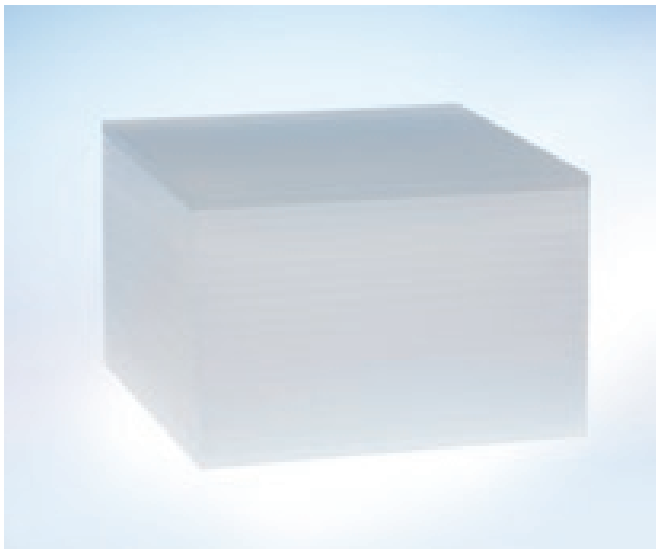
- Test device Primus L
  (Please see page 10 for more information)
- Beam Alignment Test Tool (Please see above)

Test Set AEC-Systems for Radiography VD0203800

Set of PMMA-slabs for checking the Automatic Exposure Control. For X-ray units working in the range of 40 - 150 kV according to IEC 61223-3-1.

Set consisting of:

- 3 PMMA slabs, dimensions in mm: 240 x 240 x 50
- 2 PMMA slabs, dimensions in mm: 240 x 240 x 20
- 1 PMMA slab, dimensions in mm: 240 x 240 x 10
- 1 Al slab, dimensions in mm: 240 x 240 x 25

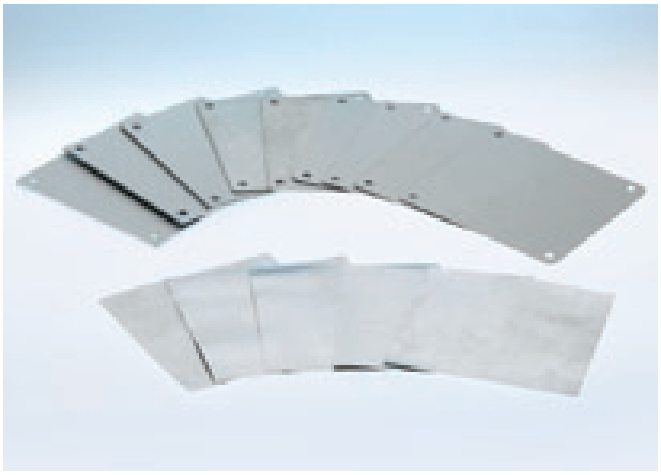


HVL Aluminum Filter Set for Radiography VD0403320

Aluminum attenuator set for HVL measurements at radiographic X-ray units working in the range of 40 - 150 kV. Dimensions: 100 mm x 100 mm each. Purity of Al: 99.5 %.

Set consisting of:

- 5 filter plates of 0.1 mm Al
- 2 filter plates of 0.5 mm Al
- 5 filter plates of 1.0 mm Al
- 2 filter plates of 2.0 mm Al

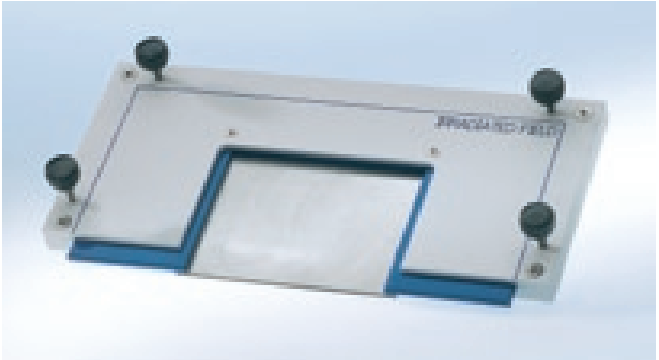


Tungsten Edge Test Device TX 5 VD0203580

For determination of modular transfer function (MTF). According to IEC 62220-1.

Consisting of:

- 1 mm thick tungsten plate, edge ± 5µm, fixed on a 3 mm thick lead plate



QC Kit IBA*rad-digital* incl. LX*can* VD0250202

Complete measuring kit for quality checks in digital radiology (CR/DR) acc. to DIN 6868-13 and at image display devices according to IEC 61223-2-5, DIN V 6868-57, AAPM TG18.

Consisting of:

- **Test Device DIGI-13**** VD0203560
- **Al-Pre-Attenuator, 25 mm**
  With supporting plate VD0503200
- **Dosimeter DOSIMAX *plus* I**
  (basic unit) VD0201748
- **Solid State Detector RQA** VD0202850
- **Detailed Check Instruction and Form R-F13 on CD** VD0230204
- **Spot-Luminance-Meter LX*can***
  Incl. mask for screen contact measurements VD0601400
- **Power Supply with 4 Adapters**
  (RoHs conform) VD0601410
- **USB-Cable*** VD0601450
  For automatic transfer of the measured data and for recharging batteries
- **Carrying Case** VD0225155

***Alternatively to USB-Cable, but exclusively for Automatic Transfer of the Measured Data:**

Interface Cable (2 m) RS 232 VD0601460
For automatic transfer of the measured data.

****Additionally for DIGI-13 for performing Acceptance Tests according to DIN V 6868-58:**

High Contrast Resolution Test, Type 38 VD0219100
Necessary for acceptance tests according to DIN V 6868-58.

Optional Accessories:

Illuminance Detector LX-LS VD0602960
For measuring illuminance (lux) / ambient light of image display devices and at viewing boxes.

Tripod VD0610200
For measuring device LX*can*, adjustable height 60 cm – 153 cm.

High Precision Mini Tripod VD0610210
For measuring device LX*can*.
(This tripod version fits into the carrying case of QC Kit IBA*rad-digital*.)

Mounting Frame RW-1 VD0213100
For test device DIGI-13.

QC Kit IBA*rad-digital* excl. LX*can* VD0250203

Same measuring devices as order number VD0250202 "QC Kit IBA*rad* ", without Spot-Luminance-Meter LX*can*, USB-cable and power supply.

For luminance / illuminance measurements of your image display device, please see chapter "Quality Control at Medical Displays", page 39.

Measuring Set IBA*rad*/*flu-L*, incl. LX*can* VD0250198

Complete measuring set for radiologists and hospitals with digital/conventional fluoroscopic/radiographic X-ray units.

Consisting of:

- **Test Device Primus L** VD0203520
  Dimensions in mm: 300 x 300 x 18.5
- **Dosimeter DOSIMAX *plus* I**
  (basic unit) VD0201748
- **Solid State Detector RQA**
  VD0202850
- **Detailed Check Instruction Fluoroscopy and Form according to DIN 6868-4, 2007**
  on CD VD0230409
- **Stand** VD0212170
  For test device Primus L and solid state detector DEDX
- **Carrying Case** VD0225115
- **QC Kit IBA*can*** VD0601405

Optional:

DSA Test Device VD0203300
(icluding manual and carrying case)

One Attenuation Body is necessary for Primus L:

Aluminum Pre-Attenuator, 25 mm
with supporting plate VD0503200
or:
PMMA-Attenuation Body VD0203521
For test device Primus L.
Dimensions in mm: 300 x 300 x 31.
Consisting of:
30 mm PMMA and 1 mm Cu.

Optional Accessories:

Illuminance Detector LX-LS VD0602960
For measuring illuminance (lux) / ambient light of image display devices and at viewing boxes.

Tripod VD0610200
For measuring device LX*can*, adjustable height 60 cm – 153 cm.

High Precision Mini Tripod VD0610210
For measuring device LX*can*.
(This tripod version fits into the carrying case of QC Kit IBA*can*.)

QC Kit IBA*rad*/*flu-L* excl. LX*can* VD0250199

Same measuring devices as order number VD0250198 "Measuring Set IBA*rad*/*flu-L*", without QC Kit IBA*can*.

For luminance / illuminance measurements of your image display device, please see chapter "Quality Control at Medical Displays", page 39.

QC Kit IBA*rad/flu-analog*

VD0250305

Complete measuring kit for QA tests at conventional radiographic and fluoroscopic X-ray units according to IEC 61223-2-1/-9/-11 and DIN 6868-2/-3/-4.

Consisting of:

- **Test Device ETR1** VD0203100
  Including centering tube
  Dimensions in mm: 280 x 280 x 18.5
- **Dosimeter DOSIMAX *plus* I**
  (basic unit) VD0201748
- **Solid State Detector RQA**
  VD0202850
- **Detailed Check instruction**
  on CD VD0230201
- **Stand for Test Device ETR1**
  VD0212160
- **Sensitometer / Densitometer DUOLIGHT**
  VD0204300
- **Power Supply**
  (for 110 V / 220 V DC) VD0214260
  Absolutely necessary for Sensitometer / Densitometer DUOLIGHT
- **Thermometer RT-1**
  (digital) VD0219250
- **Carrying Case RK-1**
  VD0225100

Recommended as Attenuation Body (not included in the Set):

Aluminum Pre-Attenuator, 25 mm

VD0503200

With supporting plate.

Optional:

Beam Alignment Test Tool – BATT

VD0403850

For measuring collimator beam alignment of the central beam.
Suitable for use in combination with test devices ETR1, DIGI-13 and Primus.

Quality Control in Mammography

Multimeters

For more technical information, please see the MagicMax family matrix at the end of the brochure!

Multimeter MagicMax-*rad/flu/mam*

VD0201970

The flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including 2 base units, each with one fixed Multimeter detector (XR and XM)
- Possibility to connect additional solid state detectors for dose measurements
- Including aluminum carrying case
- Dosimeter part is constructed according to IEC 61674

Measurement Parameters:

- Dose / Dose rate
- Dose per pulse
- kVp
- Time
- Total filtration
- Half value layer (HVL)
- Waveform

Options / Additional Accessories:

EeePC VD0201930
Instead of your own laptop.

mAs-Clamp VD0201975
For use with MagicMax, invasive & non-invasive measurements.

Illuminance Detector (lx) VD0201951
For use with MagicMax.

Solid State Detector RQM VD0202860
For use with MagicMax.

Solid State Detector RQA VD0202850
For use with MagicMax.

Also available as:

Multimeter MagicMax-*mam* VD0201950

Dosimeters

Dosimeter MagicMax-*mam* VD0201955

According to IEC 61674; the flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state Dose-Detector RQM
- Ability to attach an additional solid state detector for simultaneous measurements of exit and entrance dose
- Including aluminum carrying case

Measurement Parameters:

- Dose / Dose rate
- Dose per pulse
- Time

Options / Additional Accessories:

EeePC VD0201930
Instead of your own laptop.

mAs-Clamp VD0201975
For use with MagicMax, invasive & non-invasive measurements.

Illuminance Detector (lx) VD0201951
For use with MagicMax.

Solid State Detector RQM VD0202860
For use with MagicMax.

For more technical information, please see the MagicMax family matrix at the end of the brochure!

Dosimeter Dosimax *plus* A

(basic unit) VD0201747, Detector RQM VD0202860
PTP-approved single channel dosimeter according to IEC 61674, designed for acceptance tests and for quality checks at radiographic, fluoroscopic, dental and mammographic X-ray units.
In Mammo for use with solid state detector RQM.

Measurement Parameters with Detector RQM:

- Dose: 500 nGy - 9999 mGy
- Dose rate: 1.5 µGy/s - 300 mGy/s
- Time: 1 ms - 19999 s

Options / Additional Accessories:

Official Verification CF1E1003
Of dosimeter DOSIMAX *plus* A by a German office of legal metrology.

Carrying Case VD0225720
For dosimeter DOSIMAX *plus* series; offers space for 1 DOSIMAX *plus* and 2 solid state detectors (not DEDX/DE2DX).

Dosimeter DOSIMAX *plus* I,

(basic unit) VD0201748, Detector RQM VD0202860

Single-channel dosimeter for constancy tests at radiographic, fluoroscopic and mammographic X-ray units. In Mammo for use with the appropriate solid state detector (RQM).

Measurement Parameters with Detector RQM:

- Dose: 500 nGy - 9999 mGy
- Dose rate: 1.5 µGy/s - 300 mGy/s
- Time: 1 ms - 19999 s

Options / Additional Accessories:

Carrying Case VD0225720

For dosimeter DOSIMAX *plus* series; offers space for 1 DOSIMAX *plus* and 2 solid state detectors (not DEDX/DE2DX).

The dosimeters DOSIMAX *plus* A and DOSIMAX *plus* I are medical devices (according to the directive 93/42/EWG) of class I m / 12.

kV-Meter

For more technical information, please see the MagicMax family matrix at the end of the brochure!

kV-Meter MagicMax-*mam* VD0201958

The flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state kV-detector
- Including aluminum carrying case

Measurement Parameters:

- kV
- Time
- Total filtration
- Half value layer (HVL)
- Waveform

Option / Additional Accessorie:

EeePC VD0201930

Instead of your own laptop.

Detectors

Solid State Detector RQM VD0202860

For quality checks and acceptance tests in mammography, 25 - 35 kV.

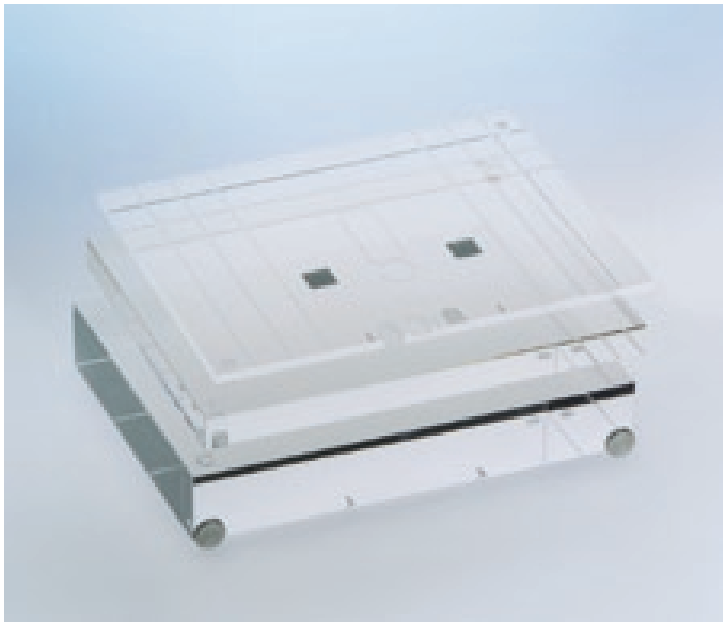
Length of detector cable: 2 m.

MagicMaX-Current Probe VD0201975

For invasive and non-invasive measurements of the tube current.

- All in one device
- Cost efficient solution
- Workflow convenience

Test Devices



Test Device Mammo-152 VD02034343

(including carrying case)

For acceptance and constancy tests (DIN V 6868-152, DIN EN 61223-3-2 and DIN 6868-7 / EPQC (EUREF) in conventional mammography.

Test Parameters:

- Object thickness and tube voltage compensation resp. AEC reproducibility
- Attenuation factor
- Spacial resolution
- Contrast and image resolution
- Artifacts
- Geometry
- Check of missed tissue at chest wall

Contrast-Detail-Phantom CDMAM

VD0203701

- Aid for optimization and evaluation of digital mammography systems
- For determination of the optimum exposure technique and background density
- Comparison of image quality at various thicknesses of PMMA and with various film-screen combinations
- Contrast detail curve test
- Low contrast and spatial resolution

Described in the "European Protocol for digital Mammography".

Consisting of:

- 1 x 0.5 mm Aluminum (99.5 %) base with gold discs (99.99 % pure gold) with 16 different thicknesses (0.03 .. 2.00 µm) and 16 different diameters (0.06 .. 2.0 mm), covered by a 5.5 mm PMMA plate
- 4 x 10 mm PMMA plates
- 1 x 5 mm PMMA plate
- CDMAM Analyzer-Software
- Carrying case

Option / Additional Accessorie:

PMMA Spacer Set VD0203782

10 pieces of spacers 180 x 15 mm, with the following thicknesses 10, 8, 5 und 2 mm.

Test device PASMAM 1054 C VD0203715

For Constancy Tests / Quality Checks of Mammographic Equipment according PAS 1054

Consisting of:

- 40 mm base plate with integrated Al step wedge with 14 steps from 0 to 5.2 mm and 2 rows of steel balls for checking the image limitations towards the thorax side
- 6 mm structural plate with recess for test inserts, 2 rows of steel balls with integrated turnable resolution test in line groups of 5, 6, 7, 8 and 10 lp/mm
- PMMA-test insert with square marking
- Test insert for constancy tests – ACR
- Test insert high contrast resolution
- Test insert contrast to noise ratio
- Attenuation body 2 x 20 mm
- Attenuation body 2 x 10 mm
- Carrying case

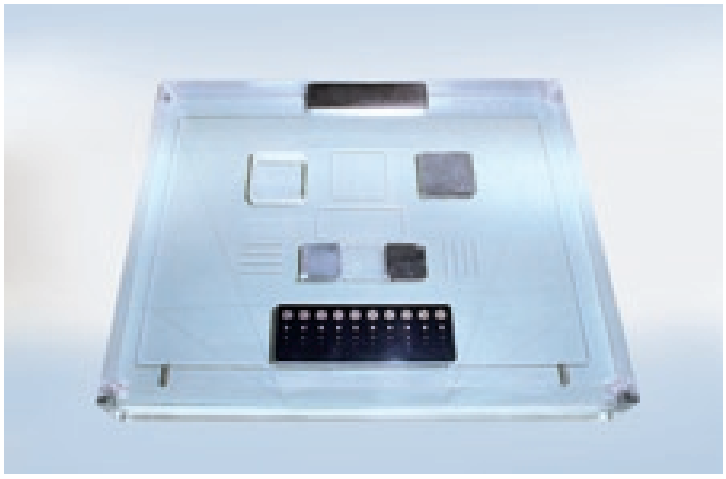
Test device PASMAM 1054 A/C VD0203710

For Acceptance- and Constancy Tests of Mammographic Equipment according PAS 1054

Consisting of:

- 40 mm basic body with integrated Al step wedge with 14 steps from 0 to 5.2 mm
- 6 mm structural plate with recess for test inserts, 2 rows of steel balls with integrated turnable resolution test in line groups of 5, 6, 7, 8 and 10 lp/mm
- Attenuation body 3 x 20 mm PMMA
- Attenuation body 1 x 10 mm PMMA
  Attenuation body 1 x 6 mm PMMA
  (at some X-ray units necessary)
- Test insert for acceptance tests with golden discs – AP
- Test insert PMMA with square marking
- Test insert for constancy tests – ACR
- Test insert high contrast resolution
- Test insert contrast to noise ratio
- Carrying case

For luminance / illuminance measurements of your image display device, please see chapter "Quality Control at Medical Displays", page 39.



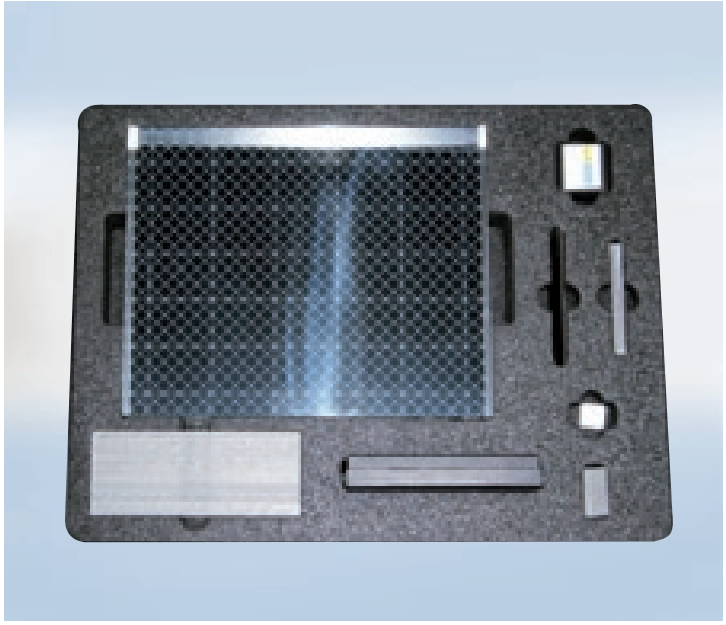
DIGIMAM Phantom VD0203760

(including carrying case)

For assessment of digital mammography. The phantom complies with the European Guidelines for Quality Assurance in digital Mammography Screening.

Test Parameters:

- Contrast detail analysis
- Geometry
- Quick check of bad columns
- CNR measurement
- SNR measurement (reference point)
- Check of missed tissue at chest wall
- Check of dynamic range in three types of tissue



EU Test Set VD0203785

Complete phantom test set for digital mammography. For type testing and testing according to EUREF protocol.

Consisting of:

- Homogeneous Phantom
- PMMA plates, 8 pcs. (180 x 240 x 75)
- Stainless steel plate
- MTF tool of stainless steel and Al plate
- X-ray ruler set, 4 pcs.
- PMMA spacer set, 10 pcs.
- Geometric Distortion Phantom
- Al Foil Set
- Lead plate set, 4 pcs.
- PMMA plate set, 10 pcs. (40 x 20 x 20)
- Carrying case

Test device FFA 4090 M VD0203281

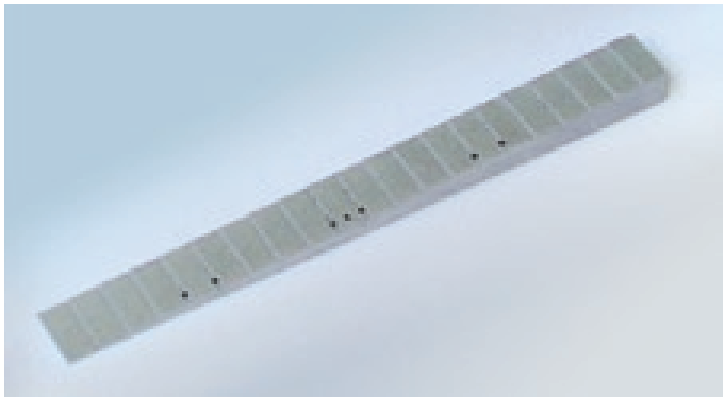
For checking the film-screen contact at mammographic cassettes according to ISO 4090. Consisting of a fine metal wire grid, which is inserted in 2 plates of acryl. For checking cassettes of a size up to 24 cm x 30 cm.

Specifications:

- Dimensions in cm: 31.5 x 25.5 x 0.7 (internal dimensions without frame)
- Dimensions in cm: 33.5 x 27.5 x 0.9 (external dimensions with frame)

Mammographic Step Wedge

VD0203602



Specifications:

- 21 steps (Al)
- Dimensions in mm: 10 x 6.3 x 105

Test Parameters:

- Sensitometric curve shape
- Geometry
- Speed
- Mid-gradient

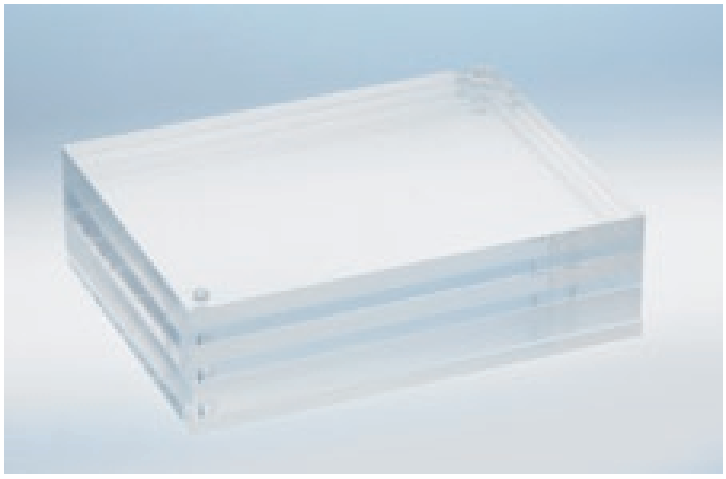
Breast Compression Test Device for Mammography VD0403910

Specifications:

- Force range: 3 - 30 kg (6 - 66 lbs)
- Contact area: 8.5 cm diameter

Test Parameter:

- Compression force in automatic and manual models for assuring accuracy and reproducibility



Test set AEC-Systems for Mammography VD0203810

Set of PMMA-slabs for checking the Automatic Exposure Control.

Consisting of:

- 3 PMMA slabs, dimensions in mm: 180 x 240 x 20
- 1 PMMA slab, dimensions in mm: 180 x 240 x 10

HVL Aluminum Filter Set for Mammography VD0403310

For determination of half value layer in mammography.

Specification:

- Dimensions in mm: 100 x 100 each
- Purity of Al: 99.9 %

Consisting of:

- 7 filter plates of 0.1 mm Al

Complete Solutions

QC Kit IBA*mam-analog* VD0250373

Complete measuring kit for quality checks at conventional mammographic installations according to DIN 6868-7 / DIN V 6868-152 / EPQC (EUREF).

Consisting of:

- **Test Device Mammo-152** VD0203434
  Dimensions in mm: 180 x 240
- **Dosimeter DOSIMAX *plus* I**
  (basic unit) VD0201748
- **Detector RQM** VD0202860
  For mammographic installations
- **Magnifying Glass** VD02192001
  For 8-fold magnification
- **Foam Material Cuboid** VD0203450
  For checking the compression pressure
- **Carrying Case** VD0225300

Additional Accessory:

Test Device FFA 4090 M VD0203281
For checking the film-screen contact in mammography – ISO 4090.

Measuring Set IBA*mam-digital* according to PAS 1054 VD0250155

Complete measuring set for constancy tests at digital mammographic installations according to PAS 1054.

Consisting of:

- **Test Device PASMAM 1054 C**
  Incl. carrying case VD0203715
- **Dosimeter DOSIMAX *plus* I**
  (basic unit) VD0201748
- **Detector RQM** VD0202860
  For mammographic installations
- **Carrying Case for Dosimeter DOSIMAX *plus* Series** VD0225720
  Offers space for 1 DOSIMAX *plus* and 2 solid state detectors (not DEDX/DE2DX)

Optional:

Contrast-Detail-Phantom CDMAM VD0203701
With software, incl. carrying case

For luminance / illuminance measurements of your image display device, please see chapter "Quality Control at Medical Displays", page 39.

Quality Control in Computed Tomography

Dosimeter

Dosimeter Dosimax *plus* A HV
(basic unit) VD0201790

PTB-approved single channel dosimeter with internal high voltage supply according to IEC 61674 for use with ionization chamber DCT10-RS. Designed for measurements at CT.

Measurement Parameters:
- Dose length product: 100 µGycm - 999 Gycm
- Dose length product rate: 1 mGycm/s - 0.5 Gycm/s
- Time: 1 ms - 19999 s

Options / Additional Accessories:

Official Verification CF1E1003
Of dosimeter DOSIMAX *plus* A HV by a German office of legal metrology.

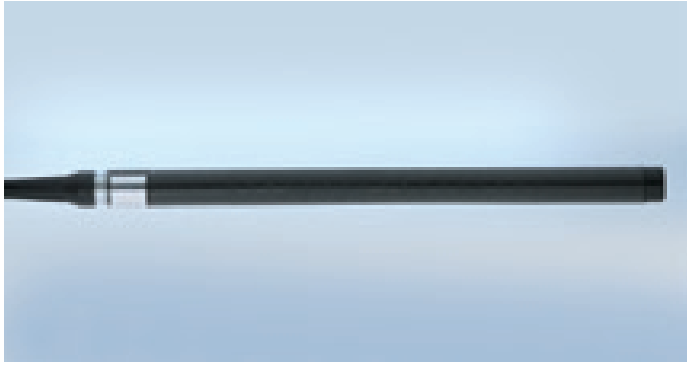
Carrying Case VD0225720
For dosimeter DOSIMAX *plus* series; Offers space for 1 DOSIMAX *plus* and 1 ionization chamber.

Ionisation Chamber

Ionization Chamber DCT10-RS / Lemo VD1020100

For DLP (in mGy*cm) and CTDI measurements at CT scanners, according to IEC 61223-2-6, -3-5, 100 - 150 kV.

Specification:
- Active length: 100 mm
- Length of chamber cable: 2 m

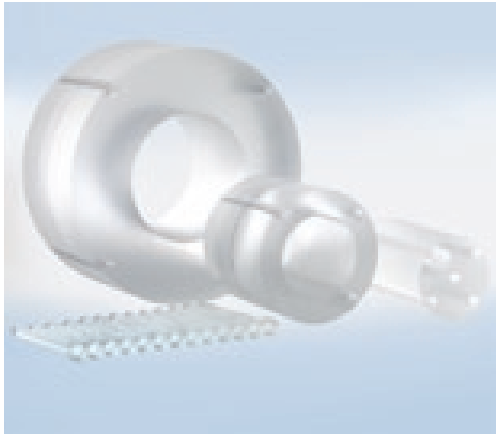


Software

Software CT QALite VD0010140

- Fast, automated CT analysis for routine QA or extensive performance evaluation
- User friendly Windows interface
- Comprehensive image parameter trend analysis

Test devices



3-part PMMA CT-Phantom

Adult Head & Body / Pediatric Head & Body VD1003105

Innovative 3-part nested PMMA phantom for CTDI measurements. Designed to image pediatric and adult head and body in accordance with FDA performance standard for diagnostic X-ray systems (21CFR 1020.33).

Consisting of:

- 1 pediatric head phantom, 10 cm diameter, 5 holes
- 1 adult head-/pediatric body phantom, 16 cm diameter, 4 holes
- 1 adult body annulus, 32 cm diameter, 4 holes
  (The above-mentioned 3 phantoms fit into each other!)
- 13 acrylic rods for plugging all the phantom holes
- 1 adapter for ionization chamber DCT10-RS / Lemo

2-part PMMA CT-Phantom

Adult Head & Body / Pediatric Body VD1003110

Phantom for CTDI measurements according to IEC 60601-2-44, IEC 61223-3-5, IEC 61223-2-6.

Consisting of:

- 1 adult head-/pediatric body phantom, 16 cm diameter, 5 holes
- 1 adult body annulus, 32 cm diameter, 4 holes
- 9 acrylic rods for plugging all the phantom holes
- 1 adapter for ionization chamber DCT10-RS / Lemo

Catphan 500 Phantom VD0403450

(including analyzer-software and carrying case)

For evaluating the maximum obtainable performance potential of axial and spiral CT scanners.

Test Parameters:

- Slice width
- Sensitometry (Teflon, Acrylic, LDPE, Air)
- Pixel size
- Low contrast with supraslice and subslice contrast targets
- Image uniformity module

Catphan 600 Phantom VD0403460

incl. carrying case

For evaluating the maximum obtainable performance potential of multi-slice CT scanners with enhanced sensitometry samples for radiation therapy planning.

Test Parameters (additional to Catphan 500):

- Sensitometry: Delrin Acrylic, Polystyrene, H_2O, PMP
- Slice geometry and point source bead module

Complete Solutions

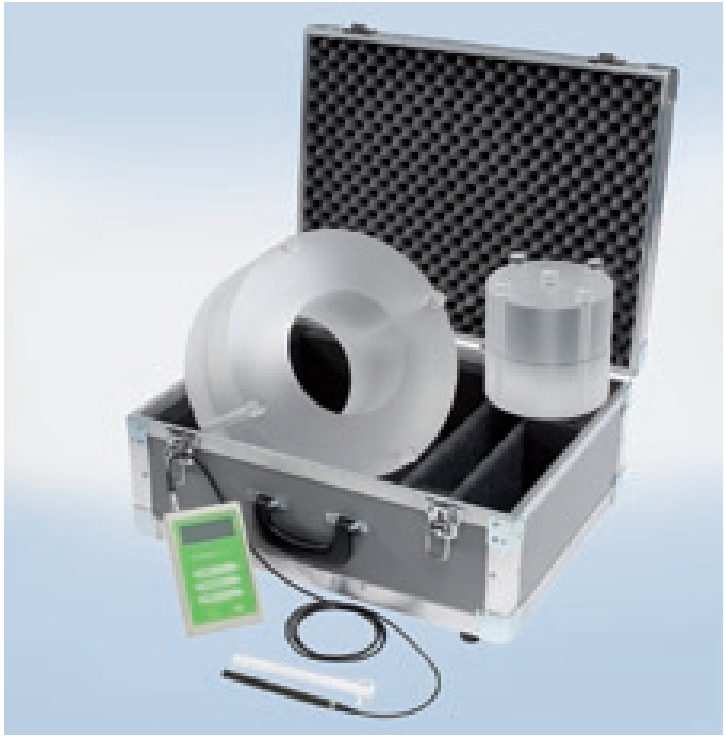
QC Kit IBA*ct* Advanced VD1050103

Adult Head & Body / Pediatric Head & Body

Complete measuring kit for CTDI measurements at all types of CT scanners.

Consisting of:

- **3-part Modular PMMA CT-Phantom for Dose Measurements** VD1003105
  Adult head & body / pediatric head & body
- **Dosimeter Dosimax *plus* A HV** VD0201790
  With internal high voltage supply for use with ionization chamber DCT10-RS
- **Ionisation Chamber DCT10-RS / Lemo** VD1020100
- **Extension Cable, 8 m** VD0211101
- **Specialist Booklet "Radiation Exposure in Computed Tomography"** VD1019101
- **Carrying Case** VD0225250
  With removable trolley



QC Kit IBA*ct* Standard VD1050102

Adult Head & Body / Pediatric Body

Complete measuring kit for dose measurements in computed tomography according to IEC 60601-2-44, IEC 61223-2-6, -3-5.

Consisting of:

- **2-parted Modular CT-Phantom for Dose Measurements** VD1003110
  Adult head & body / pediatric body
- **Dosimeter Dosimax *plus* A HV** VD0201790
  With internal high voltage supply for use with ionization chamber DCT10-RS.
- **Ionisation Chamber DCT10-RS / Lemo** VD1020100
- **Extension Cable, 8 m** VD0211101
- **Specialist Booklet "Radiation Exposure in Computed Tomography"** VD1019101
- **Carrying Case** VD0225250
  With removable trolley

For luminance / illuminance measurements of your image display device, please see chapter "Quality Control at Medical Displays", page 39.

Optional:

Official Verification CF1E1003

Of dosimeter DOSIMAX *plus* A HV by a German office of legal metrology.

Quality Control in Dental Radiography

Multimeter

For more technical information, please see the MagicMax family matrix at the end of the brochure!

Multimeter MagicMax-dent VD0201960

The flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state Multi-Detector "XR"
- Ability to attach an additional solid state detector for simultaneous measurements of exit and entrance dose
- Including aluminum carrying case
- Dosimeter part is constructed according to IEC 61674

Measurement Parameters:

- Dose / Dose rate
- Dose per pulse
- kVp
- Time
- Total filtration
- Half value layer (HVL)
- Waveform

Options / Additional Accessories:

EeePC VD0201930
Instead of your own laptop.

mAs-Clamp VD0201975
For use with MagicMax, invasive & non-invasive measurements.

Illuminance Detector (lx) VD0201951
For use with MagicMax.

Solid State Detector RQA VD0202850
For use with MagicMax.

Dosimeters

Dosimeter MagicMax-*rad/fluident*

VD0201945

According to IEC 61674; the flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state Dose-Detector RQA
- Ability to attach an additional solid state detector for simultaneous measurements of exit and entrance dose
- Including aluminum carrying case

Measurement Parameters:

- Dose / Dose rate
- Dose per pulse
- Time

Options / Additional Accessories:

EeePC VD0201930
Instead of your own laptop.

mAs-Clamp VD0201975
For use with MagicMax, invasive & non-invasive measurements.

Illuminance Detector (lx) VD0201951
For use with MagicMax.

For more technical information, please see the MagicMax family matrix at the end of the brochure!

Dosimeter Dosimax *plus* A

(basic unit) VD0201747, Detector RQA VD0202850

PTP-approved single channel dosimeter according to IEC 61674, designed for acceptance tests and for quality checks at radiographic, fluoroscopic, dental and mammographic X-ray units.
For dental applications to be used with solid state detector RQA.

Measurement Parameters with Detector RQA:

- Dose: 200 nGy - 9999 mGy
- Dose rate: 80 nGy/s - 70 mGy/s (50 - 150 kV)
- Time: 1 ms - 19999 s

Options / Additional Accessories:

Official Verification CF1E1003
Of dosimeter DOSIMAX *plus* A
by a German office of legal metrology.

Carrying Case VD0225720
For dosimeter DOSIMAX *plus* series;
offers space for 1 DOSIMAX *plus* and 2 solid state detectors (not DEDX/DE2DX).

The dosimeter DOSIMAX *plus* A is a medical device (according to the directive 93/42/EWG) of class I m / 12.

kV-Meter

For more technical information, please see the MagicMax family matrix at the end of the brochure!

kV-Meter MagicMax *radfluident* VD0201948

The flexible solution for thorough measurements at X-ray units – a new generation of measuring devices!

Features:

- USB based system to be used with PC/Laptop
- MagicMax-Meter measurement software
- Including solid state kV-detector
- Including aluminum carrying case

Measurement Parameters:

- kV
- Time
- Total filtration
- Half value layer (HVL)
- Wave form

Options / Aadditional Accessories:

EeePC VD0201930
Instead of your own laptop.

Detectors

Solid State Detector RQA VD0202850

For quality checks and acceptance tests at radiographic, fluoroscopic and dental X-ray units, 50 - 150 kV.

Length of detector cable: 2 m

MagicMax-Current Probe VD0201975

For invasive and non-invasive measurements of the tube current.

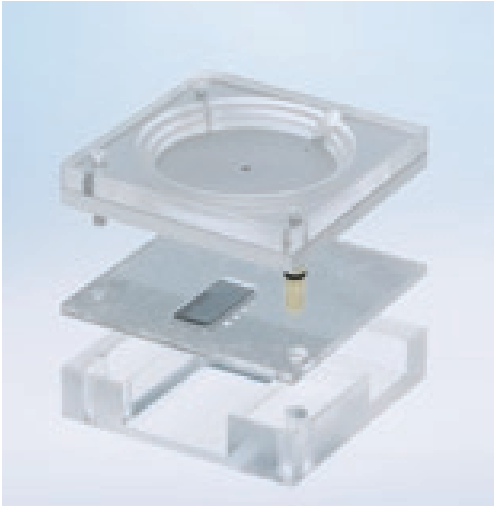
- All in one device
- Cost efficient solution
- Workflow convenience

For luminance / illuminance measurements of your image display device, please see chapter "Quality Control at Medical Displays", page 39.

Test Devices

According to IEC 61223-3-4 / IEC 61223-2-7 & DIN 6868-5 / DIN 6868-151.

Test Device DigiDent for Digital Dental Radiology (Acceptance- and Constancy Tests)



Specifications:

- Upper slab with centering rings for different cone sizes and absorber of 6 mm Al
- Resolution test (different types in different models as well as additional resolution tests are available - see below)
- 0.5 mm Al plate with contrast determination bore holes
- Basic plate with gaps for dose detector and sensor of the X-ray

The following Versions of DigiDent are available:

Test Device DigiDent U VD0903150
2.0 / 2.5 / 2.8 / 3.1 / 5.0 / 5.8 / 6.3 Lp/mm, diagonal arrangement

Test Device DigiDent I VD0903153
4.0 / 4.5 / 5.0 / 6.0 / 7.0 / 8.0 Lp/mm, diagonal (IEC) arrangement

Test Device DigiDent P VD0903154
1.6 / 1.9 / 2.2 / 2.5 / 3.0 Lp/mm, diagonal (IEC) arrangement

Test Device DigiDent G VD0903151
2.5 and 5.0 Lp/mm horizontal and vertical arrangement

The following Additional Resolution Tests are available for the DigiDent:

Additional Resolution Test - U VD0903158
2.0 / 2.5 / 2.8 / 3.1 / 5.0 / 5.8 / 6.3 Lp/mm, diagonal arrangement

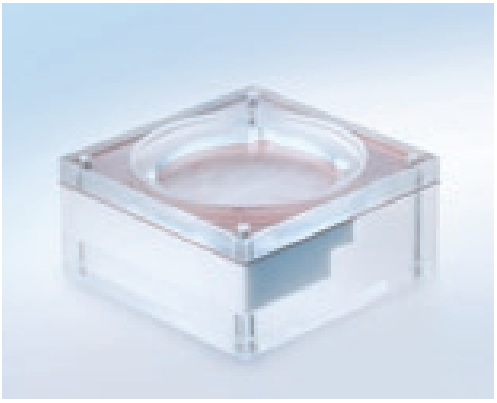
Additional Resolution Test - I VD0903156
4.0 / 4.5 / 5.0 / 6.0 / 7.0 / 8.0 Lp/mm, diagonal (IEC) arrangement

Additional Resolution Test - P VD0903152
1.6 / 1.9 / 2.2 / 2.5 / 3.0 Lp/mm, diagonal (IEC) arrangement

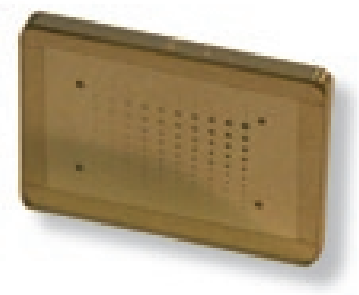
Additional Resolution Test - G VD0903157
2.5 and 5.0 Lp/mm, horizontal and vertical arrangement

Test Device Unident F VD0903170

Phantom for dental radiology using films.



Phantom housing with centering rings for different cone sizes, a foil of 0.3 mm Cu and two PTFE steps (8 and 16 mm).



Contrast-Detail-Phantom CDDENT VD0203719

(including analyzer-software and carrying case)

For quality control for dental X-ray systems. This Contrast-Detail-Phantom is an aid for improving image quality.

Monitoring of Image Information Content:

- Contrast-Detail curve/detectability
- Tests low contrast and spatial resolution

Specifications:

- 3 mm Al-tablet with 100 cylindrical holes:
- Depth: 0.04 .. 0.7 mm, ± 0.02 mm (10 exponential steps)
- Diameter: 0.1 .. 1.0 mm, ± 0.02 mm (10 exponential steps)
- Quality report generation, aided by the accurate and easy to use analyzer software.

Accessories

Secondary Attenuator VD0903220

Additional Filter, 1 mm Cu VD09032202

For use with Secondary attenuator at panoramic dental X-ray units.

Holder for Supporting Plate, Type GENDEX VD0903210

Holder for Supporting Plate, Type SIRONA VD0903230

Universal Holder for Dental Test Devices VD0903250

Including suction pad.

Quality Control at Medical Displays

Spot-Luminance-Meter / Colorimeter

Quality Assurance solutions for imaging devices, like medical displays and viewing boxes, are needed to ensure best image quality for improved diagnosis in all x-ray modalities, like Radiology, Fluroscopy, Mammography, CT and dental radiology.

Unique combination of distance and screen-contact measurements in one device:

Spot-Luminance-Meter LX*can* VD0601400

For QC-tests at image display devices (B/W) incl. photometric detector with achromatic optic, integrated scattered light tube and mask for screen contact measurements.

Measurement Parameters:

- Display: 1.2" TFT (65K color)
- Alignment sensor: user definable
- Distance sensor: ultrasonic
- Targeting: display finder
- F.O.V.: 1.6°
- Measuring range: 0.05 - 10,000 cd/m^2
- f1' uncertainty: ≤ 3%
- Interface: USB; RS232
- Stray-light-baffle: integrated
- Weight: 450 g

Spot-Luminance-Meter & Colorimeter LX*chroma* VD0601500

For QC-tests at image display devices (B/W and Color) incl. BTS-256P Bi-Tec-sensor for integral photometric and spectral colorimetric data, integrated scattered light tube and mask for screen contact measurements.

Measurement Parameters:

- Colorimetric measurement data: x, y, CCT
- Colorimetric measurement range: 1 to 10,000 cd/m^2
- Display: 1.2" TFT (65K color)
- Alignment sensor: user definable
- Distance sensor: ultrasonic
- Targeting: display finder
- F.O.V.: 1.5°
- Measuring range: 0.05 - 10,000 cd/m^2
- f1' uncertainty: ≤ 3%
- Interface: USB; RS232
- Stray-light-baffle: integrated
- Weight: 500 g
- Measurement accuracy x, y: ± 0.005

Recommended Accessory for LX*can*/LX*chroma* for additional Illuminance Measurements:

Illuminance Detector LX-LS VD0602960

For measurements of illuminance in lux in the range of 0.1-10,000 lx.

- The ambiant light of image display devices
- At viewing boxes

Software

DisplayQ International VD0602960

Easy to use SW for guided quality assurance at medical displays.
Best in combination with LX*can* / LX*chroma.*

- Support of following regulatory
  - AAPM – TG18 (worldwide)
  - IEC (worldwide)
  - JESRA (Japan)
  - DIN V 6868-57, PAS 1054 (Germany, Europe)
- Report generator
- Optional DICOM calibration

Complete Solutions

QC Kit IBA*can* VD0601405

Complete measuring kit for luminance measurements at image display devices (black/white) according to DIN V 6868-57 (acceptance tests) and IEC 61223-2-5 (constancy tests), AAPM TG18.

Consisting of:

- **Spot-Luminance-Meter LX*can*** VD0601400
  Incl. mask for screen contact measurements
- **Power Supply** VD0601410
  With 4 adapters (RoHs conform)
- **USB-Cable*** VD0601450
  For automatic transfer of the measured data and for recharging batteries
- **Label BWG** green VD0601109 & red VD0601108
- **Carrying Case** VD0225905

***Alternatively to USB-Cable, but exclusively for Automatic Transfer of the Measured Data:**

Interface Cable (2 m) RS 232 VD0601460
For automatic transfer of the measured data.

Optional Accessories:

Illuminance Detector LX-LS VD0602960
For measuring illuminance (lux) / ambient light of image display devices and at viewing boxes.

Tripod VD0610200
For measuring device LX*can*, adjustable height 60 cm – 153 cm.

High Precision Mini Tripod VD0610210
For measuring device LX*can*.
(This tripod version fits into the carrying case of QC Kit IBA*can*.)

QC Kit IBA*chroma* VD0601505

Complete measuring kit for luminance and color measurements at image display devices (black/white and colour) according to DIN V 6868-57 (acceptance tests) and IEC 61223-2-5 (constancy tests), AAPM TG18.

Consisting of:

- **Spot-Luminance-Meter & Colorimeter LX*chroma*,** VD0601500
  BTS-256P Bi-Tech-Sensor for photometric and spectral colorimetric data, with internal scattered light tube and mask for screen contact measurements
- **Power Supply** VD0601410
  With 4 adapters (RoHs conform)
- **USB-Cable*** VD0601450
  For automatic transfer of the measured data and for recharging batteries
- **Label BWG** green VD0601109 & red VD0601108
- **Carrying Case** VD0225905

***Alternatively to USB-Cable, but exclusively for Automatic Transfer of the Measured Data:**

Interface Cable (2 m) RS 232 VD0601460
For automatic transfer of the measured data.

Optional Accessories:

Illuminance Detector LX-LS VD0602960
For measuring illuminance (lux) / ambient light of image display devices and at viewing boxes.

Tripod VD0610200
For measuring device LX*chroma*, adjustable height 60 cm – 153 cm.

High Precision Mini Tripod VD0610210
For measuring device LX*chroma*. (This tripod version fits into the carrying case of QC Kit IBA*chroma*.)

Quality Control in Film Processing

Sensitometers

Sensitometer Unilight S VD0204110
Suitable for constancy tests.
For exposing an X-ray film with a standard 21-step wedge.

Sensitometer Unilight AS VD0204104
Suitable for acceptance tests.
For exposing an X-ray film with a high precision 21-step wedge, calibrated (DIN V 6868-55).

Densitometers

Densitometer Unilight D VD0204108
Suitable for constancy tests.
For a stepwise measurement of optical densities from a 21-step standard sensitometer wedge and for measurements of the optical density of X-rays (film size up to 35 x 35 cm).

Densitometer Unilight AD VD0204100
Suitable for acceptance and constancy tests.
Functionality as densitometer Unilight D, but including calculation of the processing parameters light sensitivity (LE) and light contrast (LK).

Densitometer Unilight ADA VD0204102
Suitable for acceptance and constancy tests.
Functionality as densitometer Unilight D, but alternatively suitable for auto-reading of optical densities (motorized measuring section) and auto-calculating of light sensitivity (LE) and light contrast (LK). Incl. RS 232 interface.

Densitometer Unilight D / TR VD0204109
Suitable for constancy tests.
Functionality as densitometer Unilight D, but especially also suitable for dry laser films.

Densitometer Unilight D i VD0204111
Suitable for constancy tests.
Functionality as Densitometer Unilight D, but including RS 232 interface.

A Power Supply is necessary for all Types of Densitometers:
Power Supply VD0214260
For 110 V / 220 V DC
Optional Accessory:
Interface Cable VD0204112
For Densitometer Unilight D i

Sensitometers and Densitometers are developped according to IEC 61223-2-1, German Standards DIN 6868-2 (Constancy Tests) resp. DIN V 6868-55 (Acceptance Tests) and classified as Medical Devices according to EU Directive 93/42 (MDD).

Combination Devices

Sensitometer and Densitometer in one Unit:

Sensitometer / Densitometer Duolight VD0204300

Suitable for constancy tests. Sensitometer Unilight S and densitometer Unilight D in one unit.

Sensitometer / Densitometer Duolight A VD0204302

Suitable for constancy tests. Sensitometer Unilight S and densitometer Unilight D in one unit with motorized measuring section for auto-reading of densities and an RS 232-interface.

Sensitometer / Densitometer Duolight AS VD0204304

Suitable for acceptance tests. Sensitometer Unilight AS and densitometer Unilight AD in one unit. Calibrated according to DIN V 6868-55.

Sensitometer / Densitometer Duolight AS A VD0204306

Suitable for acceptance tests. Sensitometer Unilight AS and Densitometer Unilight ADA in one unit. Calibrated according to DIN V 6868-55.

A Power Supply is necessary for all Types of Combination Devices:

Power Supply VD0214260

For 110 V / 220 V DC

Accessories

Thermometer RT-1 (Digital)

VD0219250

Software

Software for monitoring the X-ray Film Development Process:

Software Infosens Light VD0002404

For one processing unit.

Software Infosens Light VD0002405

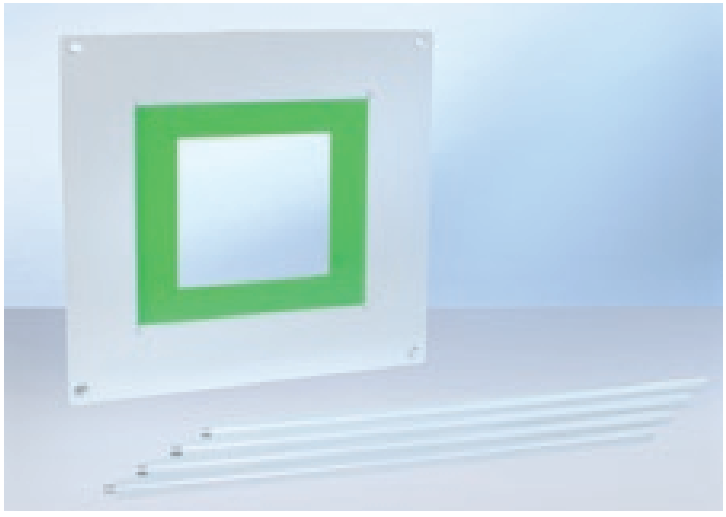
For two processing units.

Software Infosens Light VD0002406

For three processing units.

Accessories for Radiology

Frames and Stands



Stand for Test Device Primus L / DIGI-13 VD0212170

As well as for solid state detector DEDX and Aluminium Pre-Attenuator.

Specifications:

- Dimensions of the stand plate in mm: 300 x 300
- Height of the stand in mm: 435

Stand for Test Device ETR1

VD0212160

As well as for solid state detector DEDX and Aluminium Pre-Attenuator.

Specifications:

- Dimensions of the stand plate in mm: 280 x 280
- Height of the stand in mm 385

Mounting Frame, Type RW-1

VD0213100

For test devices ETR1 and DIGI-13, highly recommended for use with a chest unit.

Adapters

Adapter for Small Collimators VD0212190

Distance of collimator rails: 98 mm - 174 mm.

Adapter for Mobilett E/B VD0212220

To be used with Siemens systems.

Adapter for Mobilett Plus VD0212210

To be used with Siemens systems.

Adapter for Practix 2000 VD0212200

To be used with Siemens systems.

Adapter for Blue Handle Mobilett XP VD0212240

To be used with Siemens systems.

More adapters are available on request.

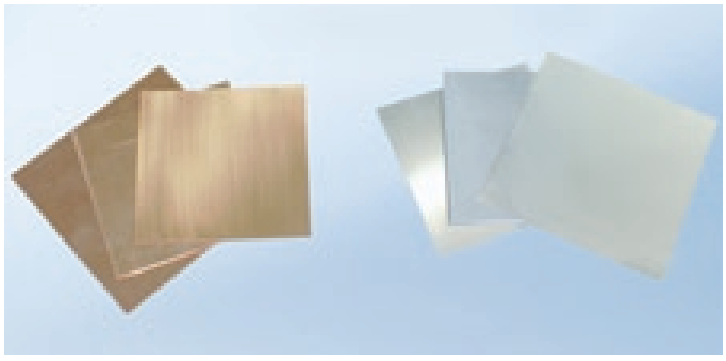
Filters

Additional Filter, 1mm Cu

VD0212110

For the patient equivalent attenuator 11.5 cm x 11.5 cm.

More Al & Cu Filters in different sizes and thicknesses are available on request.



Carrying Cases

Carrying Case "Dosimax *plus*"

VD02259720

For 1 Dosimax *plus* and 2 solid state detectors (RQA/RQM) or 1 ionization chamber.

Carrying Case "QC Kit IBA*rad-digital*" VD0225155

For equipment as listed on page 14.

Carrying Case "QC Kit IBA*flu-L*"

VD0225115

For equipment as listed on page 15.

Carrying Case "QC Kit IBA*rad/flu-analog*" VD0225100

For equipment as listed on page 16.

Carrying Case "QC Kit IBA*mam-analog*" VD0225300

For equipment as listed on page 27.

Carrying Case with Removable Trolley "QC Kit IBA*ct*" VD0225250

For equipment as listed on page 32.

Carrying Case "QC Kit IBA*can*"

VD0225905

For equipment as listed on page 42.

Carrying Case "Universal":

Without insert, suitable for the transport of smaller, special cases in one piece of luggage.

Carrying Case "Universal" VD0230850

Internal dimensions in mm: 459 x 319 x 110.

Carrying Case "Universal-Medium" VD0230860

Internal dimensions in mm: 459 x 319 x 160.

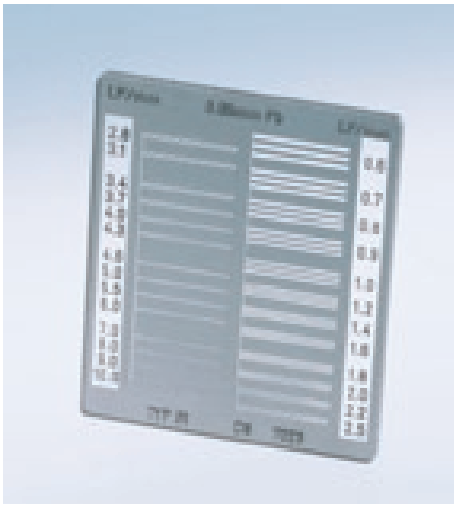
Carrying Case "Universal-Large" VD0230870

Internal dimensions in mm: 459 x 319 x 210.

Carrying Case "Universal with Trolley" VD0230880

Internal dimensions in mm: 600 x 600 x 235.

Resolution Tests – Line-Group Tests



Type 81

X-ray Test Pattern
Tests for Determination of the Visual Resolution
Line-Group Tests

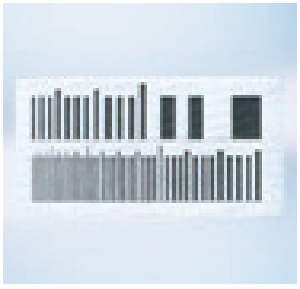
Order No.	Type	Range of Resolution in lp / mm	Dimensions in mm
VD0219122	1 - 83	0.5...5.0	110 x 42
VD0219132	4 a	0.5...8.0	45 x 45
VD0219133	4 b	0.8...5.5	45 x 45
VD0219134	4 c	1.4...8.0	45 x 45
VD0219135	6 - 1.0	1.0...2.0	Ø 32
VD0219136	6 - 2.0	2.0...3.0	Ø 32
VD0219137	6 - 3.0	3.0...4.0	Ø 32
VD0219138	6 - 4.0	4.0...5.0	Ø 32
VD0219139	6 - 1.8	1.8...3.15	Ø 32
VD0219141	6 - 2.8	2.8...5.0	Ø 32
VD0219125	16	0.5...4.0	120 x 40
VD0219142	18	0.5...5.0	55 x 45
VD0219128	18 b	0.5...10.0	47.5 x 57.5
VD0219129	18 c	0.5...16.6	47.5 x 57.5
VD0219124	18 d	0.5...20.0	47.5 x 57.5
VD0219143	21	2.0...10	94 x 50
VD0219100	38	0.6...5.0	50 x 50
VD0219146	41	0.6...3.4	50 x 50
VD0219147	42	2.0...6.0	50 x 50
VD0219130	43	3.4...10.0	50 x 50
VD0219131	68	1.4...8.4	74 x 35
VD0219103	80	2.0...6.0	60 x 38
VD0219101	81	0.6...10.0	65 x 55

Besom Tests

Order No.	Type	Range of Resolution in lp / mm	Dimensions in mm
VD0219123	23	0.5...5.0	150 x 50
VD0219127	39	1.5...20.0	60 x 30
VD0219149	82	1.0...10.0	80 x 40

Tests for measuring Modulation Transfer Function (MTF)

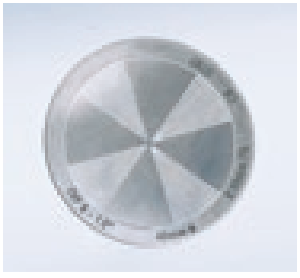
Order No.	Type	Range of Resolution in lp / mm	Dimensions in mm
VD0219110	52	0.05+0.1+ 0.25...3.4+3.7	95 x 50
VD0219126	53	0.25+ 0.5...10.0...6.0	71 x 44
VD0219150	54	0.5+0.1+ 0.25...3.55...2.8	80 x 44
VD0219151	56	0.25...10...5.2	62 x 44



Type 52

Tests for Determination of the Focal Spot Size Sector-Star Tests

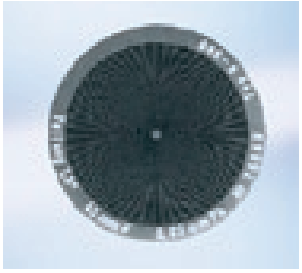
Order No.	Type	Angle of Single Line within a Sector	Number and Sizes of Patterned Sectors	Diameter in mm
VD0219104	9 / 0.5	0.5°	4 - 45°	55
VD0219105	9 / 1.0	1.0°	4 - 45°	55
VD0219106	9 / 1.5	1.5°	4 - 45°	55
VD0219107	9 / 2.0	2.0°	4 - 45°	55



Type 9 / 1.5

Tests for Determination of the Focal Spot Size Star Tests

Order No.	Type	Angle of Single Line within a Sector	Number and Sizes of Patterned Sectors	Diameter in mm
VD0219108	9 / 1.5 / 360	1.5°	1 - 360°	55
VD0219109	9 / 2.0 / 360	2.0°	1 - 360°	55



Type 9 / 1.5 / 360

Quality Control in Ultrasound

Ultrasound Phantoms

The new design of the IBA Ultrasound phantoms offers new advanced technology for measuring the image quality of high resolution ultrasound systems. Grey scale targets are provided for monitoring contrast and temporal resolution, distinguishing different intensities of brightness and border delineation capabilities of the ultrasound system.

IBA Ultrasound Phantom for Acceptance Tests VD0403330

Test Parameters:

- Axial and lateral resolution targets at depths of 3, 8 and 14 cm for precise resolution measurements of any ultrasound system
- Anechoic cysts of 2, 4 and 6 mm diameter
- -6 dB, +6 dB and high scatter grey scale targets
- Convertible water dam for gel or water coupled scanning
- Integral cover to protect scanning surface
- Durable ergonomic design for ease of handling

IBA Ultrasound Phantom for Basic Quality Checks VD0403325

Multi-purpose phantom for QA of image quality of high resolution ultrasound systems. Including grey scale targets and with an attenuation coefficient of 0.5 dB/cm/MHz.

Test Parameters:

- Axial and lateral resolution targets at depths of 2, 6 and 14 cm for precise resolution measurements of any ultrasound system
- Hypoechoic spheres of 5 mm diameter in different depths
- -6 dB, +6 dB grey scale targets
- Convertible water dam for gel or water coupled scanning
- Integral cover to protect scanning surface
- Durable ergonomic design for ease of handling

Test Image Generator

SonoTest – Test Image Generator for Ultrasound Systems VD0404200

For generating technical test images (grey scale and color) for analog Ultrasound systems. Incl. power supply, cable set Cinch / BNC and integrated NiMh-rechargeable battery.

Perfect in Combination with

QC Kit IBA*can* VD0601405

Complete measuring kit for luminance measurements at image display devices (black/white) according to DIN V 6868-57 (acceptance tests) and IEC 61223-2-5 (constancy tests), AAPM TG18.

Consisting of:

- **Spot-Luminance-Meter LX*can*** VD0601400
  Incl. mask for screen contact measurements
- **Power Supply** VD0601410
  With 4 adapters (RoHs conform)
- **USB-Cable*** VD0601450
  For automatic transfer of the measured data and for recharging batteries
- **Label BWG** green VD0601109 & red VD0601108
- **Carrying Case** VD0225905

***Alternatively to USB-Cable, but exclusively for Automatic Transfer of the Measured Data:**

Interface Cable (2 m) RS 232 VD0601460
For automatic transfer of the measured data.

Optional Accessories:

Illuminance Detector LX-LS VD0602960
For measuring illuminance (lux) / ambient light of image display devices and at viewing boxes.

Tripod VD0610200
For measuring device LX*can*, adjustable height 60 cm – 153 cm.

High Precision Mini Tripod VD0610210
For measuring device LX*can*. (This tripod version fits into the carrying case of QC Kit IBA*can*.)

Radiation Safety

Survey Meter

Survey Meter OD-01 VD0401113

For measurements of ambient and directional equivalent dose of pulsed radiation fields and dose rate of X-rays, gamma and beta radiation.

Measurement Parameters:

- Detector type: Air-opened ionization chamber
- Dose rate display: 0 ... 2000 µSv/h, 0 ... 2000 mSv/h
- Photon energy range: 6 keV - 7.5 MeV
  (15 MeV with optional PMMA-moderator lid)
- Beta energy range: 60 keV - 2 MeV

Optional Accessories:

Connecting Cable VD0401111
50 m for survey meter OD-01nec.

PMMA-Moderator Lid VD0401112
For measurements up to 15 MeV.

Software VD0401115
For survey meter OD-01.

Personal Dosimetry

Electronic Personal Dosimeter ED 150 VD0401510

For measuring gamma radiation and X-rays.

- Detector type: GM tube, energy compensated
- 4 dose / dose rate alarm threshholds
- Photon energy range: 55 keV - 3.0 MeV

Measurement Ranges:

- Dose: 0.1 µSv ≤ $H_p(10)$ ≤ 10 Sv
- Dose rate: 0.1 µSv/h - 1.5 Sv/h

Optional:

Official Verification CF1E1003
Of the ED 150 by a German office of legal metrology.

Personal Alarm Dosimeter DoseGUARD S 10

VD0401720

For measuring gamma radiation and X-rays.
Personal dosimeter appropriate for verification and capable of measuring the personal depth dose $H_p(10)$.

Measurement Parameters:

- Detector type: silicon diode with energy compensation filter
- Dose display: 1 µSv - 9.99 Sv
- Dose rate display: 1 µSv/h - 9.99 Sv/h
- X-ray and Gamma radiation, energy range: 60 keV - 3 MeV
- 6 preset alarm thresholds for dose and dose rate

Optional:

Official Verification CF1E1003
Of the DoseGUARD S 10 by a German office of legal metrology.

Dose Area Product Meters

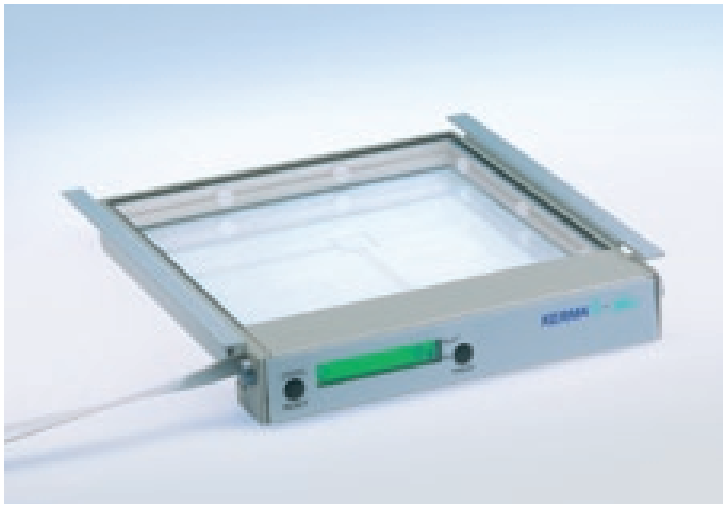
The Convenient Solution for the Determination of Diagnostic Reference Levels and Individual Patient Dose Values and QA Measurements

- **Complete Compliance with the following Standards:**
  – IEC 60580 "Medical Electrical Equipment - Dose area product meters"
  – IEC 60601-1 "Medical Electrical Equipment - General requirements for basic safety and essential performance".
- Medical device, class IIb, according to "Council Directive 93/42/EEC of 14 June 1993 concerning Medical devices".
- The light transparency of more than 75 % and the extended kV range starting from 40 kV underline the outstanding features of the system.
- Easy installation due to cost effective and flexible cabling system based on tele communication standard cable (no high voltage cable is used).

KermaX® *plus* TinO (Two in One)

DAP-meter and real-time dosimeter (time resolution: 500 µs) dedicated to measure simultaneously DAP/DAP rate as well as

- Cumulative air kerma (real time dosimeter)
- Air kerma rate
- Exposure time (KermaX® plus TinO DDP)
- Suitable for measurements in pediatric applications due to its digital resolution of 0.01 µGym^2



KermaX® *plus* TinO IDP 120-TinO-IDP

Rectangular, transparent ionization chamber with integrated electronics, a 10-digit internal background lighting LC-Display, interface optionally.

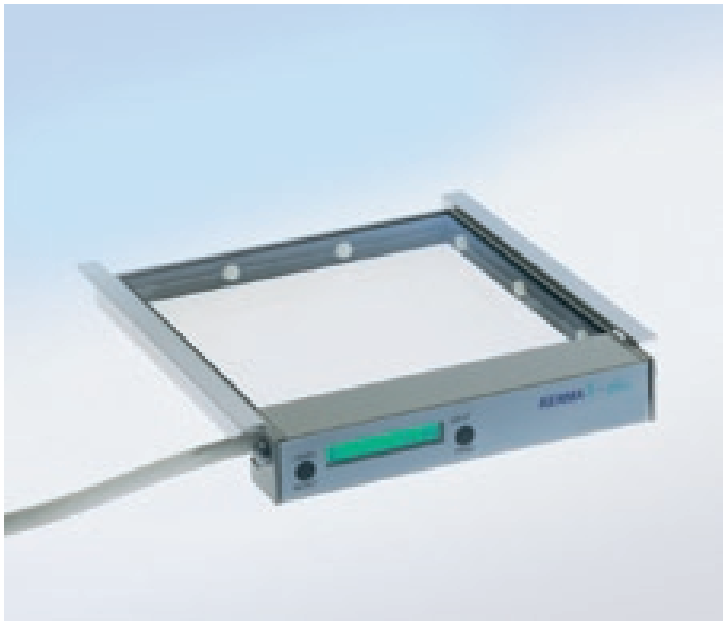
KermaX® *plus* TinO DDP 120-TinO-DDP

Rectangular, transparent ionization chamber with integrated electronics and a "Dual Line Display" with two very bright LED display lines indicating either DAP / DAP-rate and exposure time or dose/dose rate; printer interface.

Fully complies with:

- IEC 60601-2-43 "Medical Electrical Equipment - Particular requirements for the safety of X-ray equipment for interventional procedures"
- FDA 21CFR Part 1020 "Electronic Products; Performance standard for Diagnostic X-ray systems and their major components; Final Rule"

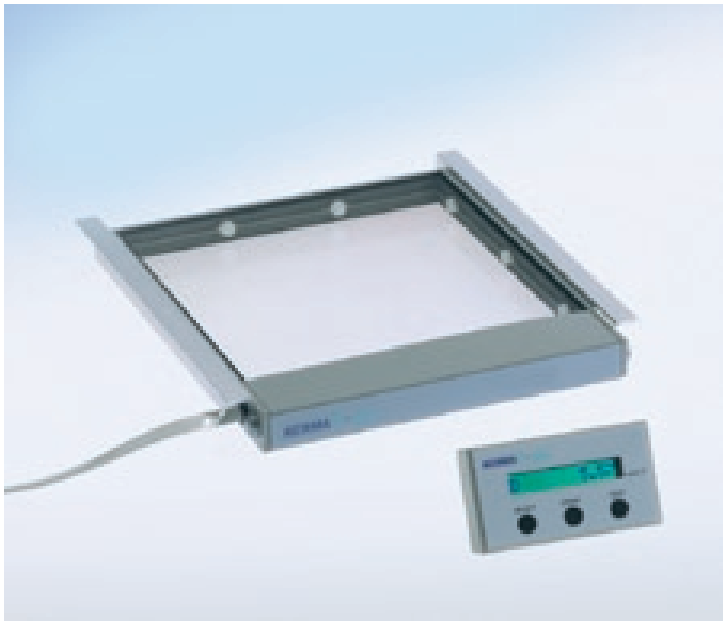
KermaX® *plus*



KermaX® *plus* IDP 120-IDP

Ideal solution for a quick and convenient retrofit installation dedicated to measure DAP and DAP rate for patient dose monitoring.

- Rectangular, transparent ionization chamber with integrated electronics and a 10-digit internal background lighting LCD display; optional RS 232 / RS 485 for computer or printer interface
- Suitable for measurements in pediatric applications due to its digital resolution of 0.01 µGym^2



KermaX® *plus* SDP 120-SDP

Easy to install standard dosimeter dedicated to measure DAP and DAP rate for patient dose monitoring.

- Rectangular, transparent ionization chamber with integrated electronics and a separate 10-digit background lighting LCD Single Line Display providing an RS 232 PC / Printer interface
- Suitable for measurements in pediatric applications due to its digital resolution of 0.01 µGym^2

KermaX® *plus* DDP "Single"

120-DDP S

Duo-channel multifunctional dosimeter dedicated to measure DAP or DAP rate or exposure time in patient dose monitoring.

- One rectangular, transparent ionization chamber with integrated electronics and "Dual Line Display D" with two very bright LED display lines indicating either the DAP / DAP rate or exposure time
- The system provides two RS 232 interfaces (RIS/HIS and printer connection)

The chambers can be delivered in the highly sensitive version on request.

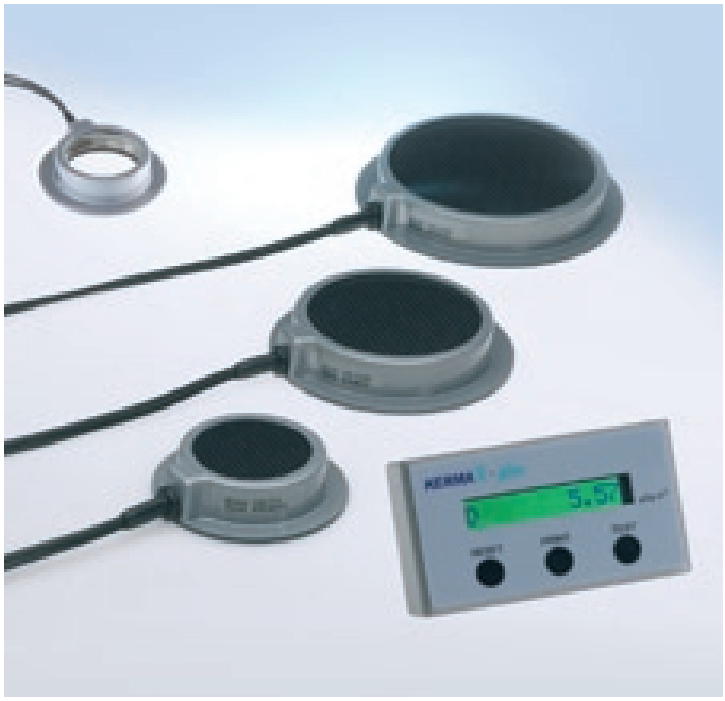
KermaX® *plus* DDP "Duo"

120-DDP D

Duo-channel multifunctional dosimeter dedicated to measure DAP or DAP rate or exposure time in patient dose monitoring.

- Two rectangular, transparent ionization chambers with integrated electronics and "Dual Line Display D" with two very bright LED display lines indicating either the DAP / DAP rate or exposure time
- The system provides two RS 232 interfaces (RIS/HIS and printer connection)

The chambers can be delivered in the highly sensitive version on request.



KermaX® *plus* C 120-C

Easy to install standard dosimeter dedicated to measure DAP and DAP rate for patient dose monitoring.

- Circular, nontransparent or transparent ionization chamber with separated electrometer box and a separate 10-digit background lighting LCD Single Line Display providing an RS 232 PC / Printer interface
- Standard resolution: 0.1 µGym^2 (High sensible chamber type with resolution of 0.01 µGym^2 for pediatric applications on request)

Four standard sizes are available; customized solutions on request.

Accessories

Printer Set "Star" 120-Star

Consisting of:

- Robust matrix-printer, type Star
- Printer cable
- Power supply
- 1 set of labels (1,000 pcs.)

Printer Set "Zebra S" 120-Zebra_S

Consisting of:

- Robust thermo-printer, type Zebra LP2824
- Printer cable
- Power supply
- 1 set of labels (1,680 pcs.)

Adapters, Rails, and Cables

There is multiple optional adapters, rails and cables which can be used with all KermaX plus and KermaX® *plus* TinO Systems.

More detailed information on request.

Product Overview Tables

MagicMaX Family Matrix

Multimeter **MagicMax Rad/Flu/Dent**	VD0201940
Measuring Values	**Measuring Ranges**
Dose	50 nGy - 50 Gy / ± 5%
Dose Rate	150 nGy/s - 160 mGy/s / ± 5%
kVp	40 kV- 160 kV
Time	0.2 ms - 300 s
HVL	Quick HVL: 1.2 - 8 mm Al equivalent / ± 10% or 0.2 mm
Total Filtration	2 - 22 mm Al equivalent / ± 10%
Optional Detectors	
mAs-Clamp	Detector RQM (dose. dose rate. time)
MM-LS (Illuminance)	Detector RQM (dose. dose rate. time)

Multimeter **MagicMax MAM**	VD0201950
Measuring Values	**Measuring Ranges**
Dose	0.2 µGy - 9999 mGy
Dose Rate	0.4 µGy/s - 700 mGy/s
kVp	22kV- 48 kV / ±1.5 % or ±0.7 kV
Time	0.2 ms - 300 s
Optional Detectors	
mAs-Clamp	Detector RQA (dose. dose rate. time)
MM-LS (Illuminance)	Detector RQA (dose. dose rate. time)

Multimeter **MagicMax Rad/Flu/MAM**	VD0201970
Measuring Values	**Measuring Ranges**
	see MagicMax Rad/Flu & Mam
Optional Detectors	
mAs-Clamp	Detector RQM (dose. dose rate. time)
MM-LS (Illuminance)	Detector RQA (doese. dose rate. time)

Multimeter **MagicMax Dent**	VD0201960
Measuring Values	**Measuring Ranges**
Dose	50 nGy - 50 Gy / ± 5%
Dose Rate	150 nGy/s - 160 mGy/s / ± 5%
kVp	40 - 110 kV
Time	0.2 ms - 300 s
Optional Detector	
mAs-Clamp	

kV-Meter **MagicMax Rad/Flu/Dent**	VD0201948
Measuring Values	**Measuring Ranges**
kVp	40 -160 kV
Time	0.2 ms - 300 s
HVL	Quick HVL: 1.2 - 8 mm Al equivalent / ± 10% or 0.2 mm
Total Filtration	Quick HVL: 1.2 - 8 mm Al equivalent / ± 10% or 0.2 mm

kV-Meter **MagicMax MAM**	VD0201958
Measuring Values	**Measuring Ranges**
kVp	22-48 kV / ±1.5 % or ±0.7 kV
Time	0.2 ms - 300 s

kV-Meter **MagicMax Dent**	VD0201949
Measuring Values	**Measuring Ranges**
kVp	40 - 110 kV
Time	0.2 ms - 300 s

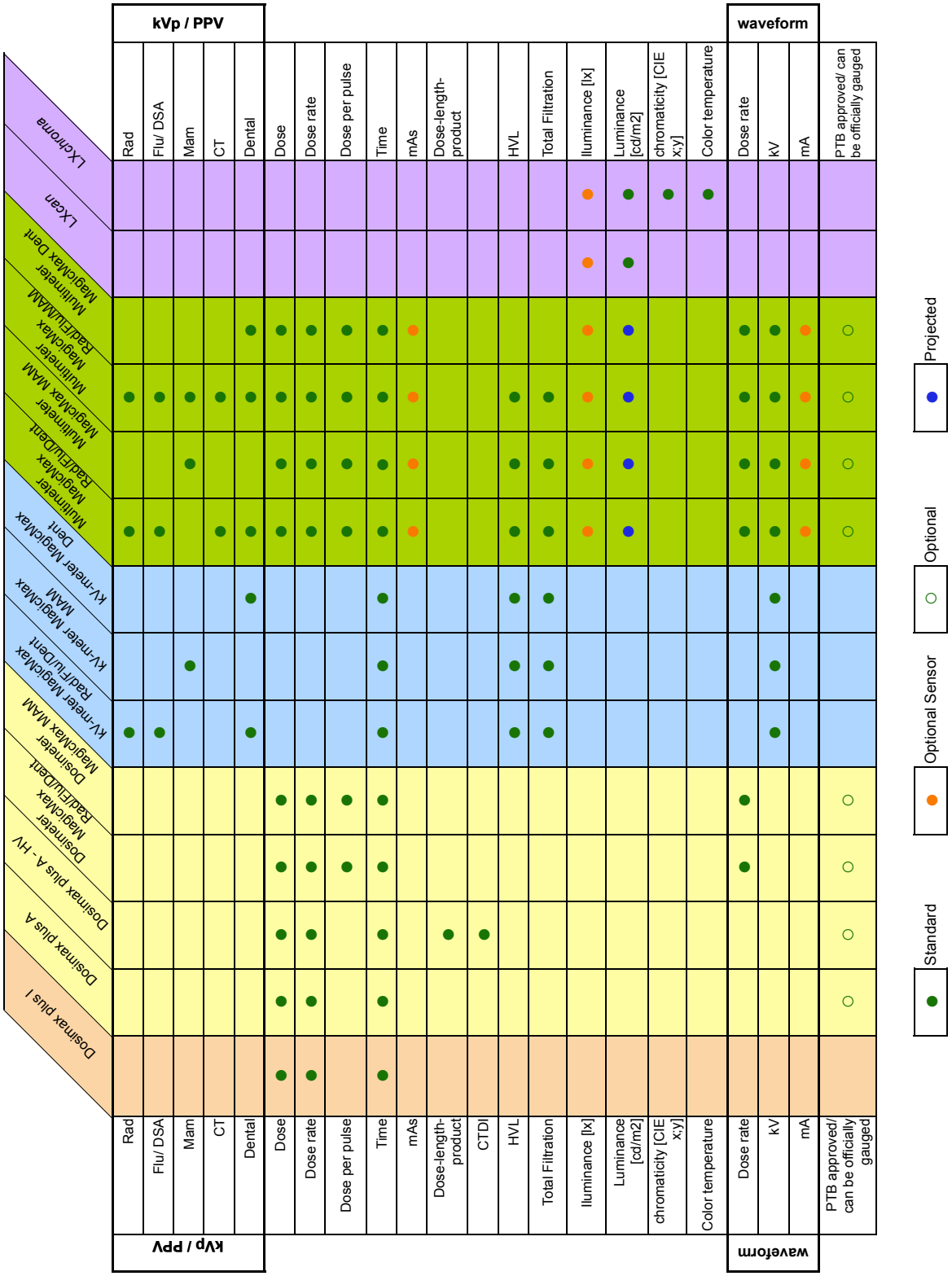
Dosimeter **MagicMax Rad/Flu/Dent**	VD0201945
Measuring Values	**Measuring Ranges**
Dose	100 nGy - 9999 mGy / ± 5%
Dose Rate	0.1 µGy/s - 120 mGy/s / ± 5% or ± 0.02 µGy/s
Time	0.2 ms - 300 s
Optional Detector	
Detector RQM	dose. dose rate. time

Dosimeter **MagicMax MAM**	VD0201955
Measuring Values	**Measuring Ranges**
Dose	0.2 µGy - 9999 mGy
Dose Rate	0.4 µGy/s - 700 mGy/s
Time	0.2 ms - 300 s
Optional Detector	
Detector RQM	dose. dose rate. time

Detector RQA **(Rad/Flu/Dent)**	VD0202850
Measuring Values	50 - 150 kV
Dose	50 nGy - 50 Gy
Dose Rate	100 nGy/s - 160 mGy/s

Detector RQM **(Mammo)**	VD0202860
Measuring Values	25-35 kV
Dose	350 nGy - 300 Gy
Dose Rate	700 nGy/s - 1 Gy/s

Measuring Devices Overview



Measuring Devices Matrix

		Dosimax plus I	Dosimax plus A	Dosimax plus A - HV	Dosimeter MagicMax Rad/Flu/Dent	Dosimeter MagicMax MAM	kV-meter MagicMax Rad/Flu/Dent	kV-meter MagicMax MAM	kV-meter MagicMax Dent	Multimeter MagicMaxRad/ Flu/Dent	Multimeter MagicMax MAM	Multimeter MagicMax Rad/Flu/MAM	Multimeter MagicMax Dent	LX*can*	LX*chroma*		
Radiography	kVp						●			●		●				kVp	**Radiography**
	Dose	●	●	○	●	○				●	○	●				Dose	
	Dose rate	●	●	○	●	○				●	○	●				Dose rate	
	Dose per pulse				●	○				●	○	●				Dose per pulse	
	Time	●	●	○	●	○	●			●	○	●				Time	
	mAs									○	○	○				mAs	
	Waveform									●		●				Waveform	
	HVL						●			●		●				HVL	
	Total Filtration						●			●		●				total Filtration	
Flu / DSA	kVp						●			●		●				kVp	**Flu / DSA**
	Dose	●	●	○	●	○				●	○	●				Dose	
	Dose rate	●	●	○	●	○				●	○	●				Dose rate	
	Dose per pulse			○	●	○				●	○	●				Dose per pulse	
	Time	●	●	○	●	○	●			●	○	●				Time	
	mAs									○	○	○				mAs	
	Waveform						●			●		●				Waveform	
	HVL						●			●		●				HVL	
	Total Filtration						●			●		●				total Filtration	
Mammography	kVp							●			●	●				kVp	**Mammography**
	Dose	●	●	○	○	●				○	●	●				Dose	
	Dose rate	●	●	○	○	●				○	●	●				Dose rate	
	Dose per pulse				○	●				○	●	●				Dose per pulse	
	Time	●	●	○	○	●		●		○	●	●				Time	
	mAs									○	○	○				mAs	
	Waveform							●			●	●				Waveform	
	HVL							●			●	●				HVL	
	Total Filtration							●			●	●				total Filtration	
Dental	kVp						●		●	●		●	●			kVp	**Dental**
	Dose	●	●	○	●	○				●	○	●	●			Dose	
	Dose rate	●	●	○	●					●	○	●	●			Dose rate	
	Time	●	●	○	●		●		●	●	○	●	●			Time	
	mAs									○	○	○	○			mAs	
	Waveform						●		●	●		●	○			Waveform	
	HVL						●		●	●		●	○			HVL	
	Total Filtration						●		●	●		●	○			total Filtration	
CT	kVp									●		●				kVp	**CT**
	Dose			●												Dose	
	Time			●												Time	
	Dose-length-product			●												Dose-length-product	
	CTDI			●												CTDI	
	Waveform															Waveform	
Light measurement	Luminance [cd/m²]									●	●	●	●	●	●	Luminance [cd/m²]	**Light measurement**
	Illuminance [lx]									○	○	○	○	○	○	Illuminance [lx]	
	chromaticity [CIE x;y]														●	chromaticity [CIE x;y]	
	Color temperature														●	Color temperature	
		Dosimax plus I	Dosimax plus A	Dosimax plus A - HV	Dosimeter MagicMax Rad/Flu/Dent	Dosimeter MagicMax MAM	kV-meter MagicMax Rad/Flu/Dent	kV-meter MagicMax MAM	kV-meter MagicMax Dent	Multimeter MagicMaxRad/ Flu/Dent	Multimeter MagicMax MAM	Multimeter MagicMax Rad/Flu/MAM	Multimeter MagicMax Dent	LX*can*	LX*chroma*		

● Standard
○ Optional Sensor
● Projected

Multimeter
Dose meter
Light Measurement Device
kV - Meter
Dose meter only for constancy check

Partners and External Manufacturers

Radiography / Fluoroscopy
Artinis:
Contrast-Detail-Phantom CDRAD
Contrast-Detail-Phantom CD DISC 2.0

Mammography
Artinis:
Test Device PASMAM 1054 C
Test Device PASMAM 1054 A/C
Contrast-Detail-Phantom CDMAM
PMMA Spacer Set
DIGIMAM Phantom
EU Test Set
Pehamed:
Mammographic Step Wedge
Gammex:
Breast Compression Test Device

Computed Tomography
IRIS:
Software CT QALite
The Phantom Lab:
Catphan 500 Phantom
Catphan 600 Phantom
QRM:
Test Phantom "3D-Spatial Resolution"
Slice Sensitivity Test Phantom

Dental Radiography
Artinis:
Contrast-Detail Phantom CDDENT

Film Processing
Pehamed:
Software Infosens

Accessories for Radiology
Hüttner:
Line Pair Tests

Radiation Safety
Graetz:
Electronic Personal Dosimeter ED 150
Rados:
Personal Alarm Dosimeter DoseGUARD S 10
STEP:
Survey Meter OD-01

Dose Area Product Meters
Seiko:
Printer Set “Star”
Zebra:
Printer Set “Zebra S”

IBA Activities in a Nutshell

IBA delivers solutions of unprecedented precision with a focus in the fields of cancer diagnosis and therapy.

Diagnostics Portfolio –
Safer Imaging, Earlier Cancer Detection

- Advanced quality assurance devices for Medical Imaging: Solutions for x-ray diagnosis and patient-dose monitoring
- Unique expertise in the design of cyclotrons: Solutions for radiopharmaceutical tracers incl. production and distribution

Radiation Therapy Portfolio –
Fighting Cancer

- Undisputed leader in Particle Therapy: enabling the most precise and effective radiation therapy
- Industry leading QA and dosimetry solutions: maximizing efficiency, minimizing errors, better outcomes
- Imaging fiducial markers: Visicoil enabling high precision tumor targeting

Sterilization & Ionization –
Improving Hygiene and Safety of Everyday Life

- Electron accelerators and high power X-Ray solutions: applied in many industries to sterilize medical devices, to cold pasteurize food products or to improve polymer properties

IBA a Belgian company, is listed on the paneuropean stock exchange EURONEXT and its Annual Reports can be downloaded on the Website: www.iba-group.com.

Depicted product images may differ from the actual scope of delivery.
Images and technical specifications are subject to change without prior notice.

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