Quality control in Medical Imaging

The Philosophy of Precision & Simplicity
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Multimeter

For more technical information, please see the MagicMax family matrix in 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 Multi-Detector “XR”
- Ability to attach an additional solid state detector 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, non-invasive.
- 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
- Ability to attach an additional solid state detector for dose measurements
- 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, non-invasive.

**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 in the end of the brochure!

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**Dosimeter Dosimax plus A**
(basic unit) VD0201747
PTP-approved 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

**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).

**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)

**Options/additional accessories:**

- **EeePC**  
  VD0201930  
  Instead of your own laptop.

- **mAs-clamp**  
  VD0201975  
  For use with MagicMax, non-invasive.

- **Illuminance detector (lx)**  
  VD0201951  
  For use with MagicMax.

For more information, please see the MagicMax family matrix in 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.

**Sandwich detector DE2DX**  
VD0202300  
Integrated in the patient equivalent attenuator, consisting of 25 mm Al, incl. one additional 1 mm Cu-filter for quality checks at radiographic, fluoroscopic and mammographic X-ray units, 50 - 150 kV.  
Simultaneous measurements of entrance and exit dose / dose rate.

Length of detector cables: 2 m.
Spot-Luminance-Meter / Colorimeter

**Spot-Luminance-Meter LXcan** 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/m²
- f1’ uncertainty: ≤ 3%
- Interface: USB; RS232
- Stray-light-baffle: integrated
- Weight: 450 g

**Spot-Luminance-Meter & Colorimeter LXchroma** 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/m²
- 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/m²
- f1’ uncertainty: ≤ 3%
- Interface: USB; RS232
- Stray-light-baffle: integrated
- Weight: 500 g
- Measurement accuracy x, y: ± 0.005
Recommended accessory 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 ambient light of image display devices
- At viewing boxes

**Software**

New international software for QC at image display devices available soon!
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:**
- Check of dose indicator
- 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 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:**
- Check of dose indicator
- 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.

**Test device ETR1 incl. centering tube**  VD0203100
For quality checks in analogue 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
**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  
**Attenuation body for DIGI-13:**  
**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  
Contrast-Detail-Phantom CDRAD, incl. Analyzer-Software and carrying case  
VD0203750  
For quality control in radiography.  
**It monitors the 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  
**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, incl. Analyzer-Software and carrying case**  
VD0203750  
For quality control in radiography.  
**It monitors the 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, incl. carrying case**
VD0203720

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.

Dimensions in cm: 42 x 49 x 0.7 (internal dimensions without frame).
Dimensions in cm: 44 x 51 x 0.9 (external dimensions including the frame).

**Test device VISI-X** VD0509100

For checking the light and radiation field coincidence on X-ray equipment.

The VISI-X can also be used for checking the centering of the bucky tray.

**Optional accessories:**

**Carrying case** for VISI-X VD0525300
**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)

**Grid Alignment Test Tool**  
VD0404100  
Is used to check whether a focused grid is aligned properly with the central beam and the center of the film cassettes.

**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  

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

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.

Al-step wedges

Test parameters:
- Sensitometric curve shape
- Speed
- Mid-gradient

Available in 2 versions:
11-steps Al-step wedge for Radiography
Dimensions in mm: 50 x 35 x 132.

21-steps Al-step wedge for Radiography
Dimensions in mm: 112 x 32,5 x 230.
**Complete solutions**

**QC Kit IBAcan** 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 LXcan** 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.

**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 LXcan, adjustable height 60 cm – 153 cm. (This tripod version does not fit into the carrying case of QC Kit IBAcan.)

**High precision mini tripod** VD0610210
For measuring device LXcan, adjustable height 24.5 cm – 36.5 cm.
**QC Kit IBAchroma 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 LXchroma, 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.

- **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 LXchroma, adjustable height 60 cm – 153 cm. (This tripod version does not fit into the carrying case of QC Kit IBAchroma.)

- **High precision mini tripod VD0610210**
  For measuring device LXchroma, adjustable height 24.5 cm – 36.5 cm.
QC Kit IBArad-digital incl. LXcan 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 LXcan VD0601400
Incl. mask for screen contact measurements.

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 18 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 LXcan, adjustable height 60 cm – 153 cm.
(This tripod version does not fit into the carrying case of QC Kit IBArad.)

High precision mini tripod VD0610210
For measuring device LXcan, adjustable height 24.5 cm – 36.5 cm.

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

QC Kit IBArad-digital excl. LXcan VD0250203
Same measuring devices as order number VD0250202 "QC Kit IBArad ", without Spot-Luminance-Meter LXcan, USB-cable and power supply.
**Measuring set IBArad/flu-L, incl. LXcan** 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 accord. 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 IBAcan** VD0601405

**Optional:**

**DSA test device** VD0203300
Incl. manual, 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 und 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 LXcan, adjustable height 60 cm – 153 cm.

**High precision mini tripod** VD0610210
For measuring device LXcan, adjustable height 24.5 cm – 36.5 cm.
(Both tripod versions do not fit into the carrying cases of measuring set IBArad/flu-L.)

**Measuring set IBArad/flu-L excl. LXcan** VD0250199
Same measuring devices as order number VD0250198 "QC Kit IBArad/flu-L", without Spot-Luminance-Meter LXcan, USB-cable and power supply.
Measuring set IBArad/flu-S
VD0250117
Complete measuring set for radiologists and hospitals with digital/conventional fluoroscopic/radiographic X-ray units.

Consisting of:

**Test device Primus S** VD0203510
Dimensions in mm: 200 x 200 x 18.5. Incl. 30 mm PMMA-attenuation plate with 1 mm copper.

**Dosimeter DOSIMAX plus I**
(basic unit) VD0201748

**Solid state detector RQA** VD0202850

**Detailed check instruction fluoroscopy and form accord. to DIN 6868-4, 2007**
on CD VD0230409

**Carrying case** VD0225110

**QC Kit IBAcan** VD0601405

Optional:

**DSA test device** VD0203300
Incl. manual, carrying case.

Optional accessories:

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

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

**High precision mini tripod** VD0610210
For measuring device LXcan, adjustable height 24.5 cm – 36.5 cm.
(Both tripod versions do not fit into the carrying cases of measuring set IBArad/flu-S.)
Measuring set
IBArad/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 price):
Aluminum pre-attenuator, 25 mm VD0503200
With supporting plate.

Option:
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

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 solid state Multi-Detectors
- Ability to attach an additional solid state detector 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, non-invasive.
- Illuminance detector (lx)  VD0201951
  For use with MagicMax.
- Solid state detector RQM  VD0202860
  For use with MagicMax.

Also available as:
- Multimeter MagicMax-mam  VD0201950

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

**Dosimeter MagicMax-mam**

VD0201995

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
- Ability to attach an additional solid state detector for dose measurements
- 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, non-invasive.

- **Illuminance detector (lx)** VD0201951
  For use with MagicMax.

- **Solid state detector RQM** VD0202860
  For use with MagicMax.

**Dosimeter Dosimax plus A**

(basic unit) VD0201747

PTP-approved 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** CFE1003
  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).

For more technical information, please see the MagicMax family matrix in the end of the brochure!
**Dosimeter DOSIMAX plus I,**  
(basic unit) VD0201748  
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 DEX/D2DX).

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

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**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  

**Options/additional accessories:**  
**EeePC** VD0201930  
Instead of your own laptop.  
**mAs-clamp** VD0201975  
For use with MagicMax, non-invasive.  
**Illuminance detector (lx)** VD0201951  
For use with MagicMax.

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

**Solid State Detector RQM** VD0202860
For quality checks and acceptance tests in mammography, 25 - 35 kV.

Length of detector cable: 2 m.

Software

**Software Mammosoft**
full version VD0201958

Incl. Interface cable.
Software for documentation / evaluation of quality checks for film processing in mammography according to “European Guidelines for quality assurance in Mammography Screening”.

Also available as:
**Software Mammosoft Light** VD0002411

For use with densitometer incl. interface.
Test devices

Test device Mammo-152, including carrying case VD02034343

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

Phantom Mammo AT, including carrying case VD0203701

Anthropomorphic, tissue equivalent phantom.

Designed for performance tests in CR / DR mammography by a quantitative evaluation of the image quality in terms of the spatial resolution of the white noise.

The outer cover is simulating fatty tissue and the objects are simulating micro calcifications, fibrous calcifications in ducts and tumor masses in glandular tissue.
Test device PASMAM 1054 C, including carrying case VD0203715
According to PAS 1054 for constancy tests / quality checks at mammographic equipment

Specifications:
- 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 – noise ratio
- Attenuation body 2 x 20 mm
- Attenuation body 2 x 10 mm

Test device PASMAM 1054 A/C, including carrying case VD0203710
According to PAS 1054 for acceptance- and constancy tests at mammographic equipment

Specifications:
- 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 PMMA with square marking
- Test insert for acceptance tests with golden discs – AP
- Test insert for constancy tests – ACR
- Test insert high contrast resolution – HK
- Test insert contrast-noise ratio – KRV
Contrast-Detail-Phantom CDMAM, including CDMAM Analyzer-Software and carrying case 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".

Specifications:

- 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

PMMA spacer set VD0203782
For use with mammographic phantoms. 10 pieces of spacers 180 x 15 mm, with the following thicknesses 10, 8, 5 and 2 mm.

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.

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 Accreditation Phantom (ACR-Phantom) VD0403900

For testing the image quality of a mammographic system. The system’s ability to display small structures similar to those found clinically is evaluated quantitatively. Objects with the phantom simulate calcification, fibrous calcifications in ducts and tumor masses.

Mammographic step wedge VD0203602

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

Test parameter:
- Compression force in automatic and manual models for assuring accuracy and reproducibility
  Force range: 3 - 30 kg (6 - 66 lbs)
  Contact area: 8.5 cm diameter
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.
Dimensions in mm: 100 x 100 each.
Purity of Al: 99.9 %.

Consisting of:
- 7 filter plates of 0.1 mm Al

DIGIMAM Phantom, incl. carrying case  VD0203760
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, incl. carrying case VD0203785**
Complete phantom test set for digital mammography. For type testing and testing according to EUREF protocol.

**Consisting of:**
- Homogeneous Phantom, incl. carrying case
- 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)

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**Complete solutions**

**QC Kit IBAmam-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 IBAmam-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
Dosimeter DOSIMAX plus series VD0225720
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

PMMA spacer set VD0203782
For use with mammographic phantoms.
10 pieces of spacers 180 x 15 mm, with the following thicknesses: 10, 8, 5 and 2 mm.

QC Kit IBAcan 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.

For more information see page 15.
Quality control in Computed Tomography
Dosimeter

Dosimeter Dosimax plus A HV
(basic unit) VD0201790
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.

Length of chamber cable: 2 m.
Software

Software Impact Dose
VD0010105

Training software (tutorial tool) for the demonstration of dose estimation in CT.

Software CT QALite
VD0010140

- Fast, automated CT analysis for routine QA or extensive performance evaluation
- Simple Windows interface
- Comprehensive image parameter trend analysis
**Test devices**

**PMMA CT-phantom (head & body)** VD1003110
Phantom for dose measurements according to IEC 60601-2-44, IEC 61223-3-5, IEC 61223-2-6.

**Specifications:**
- PMMA-head phantom, 16 cm diameter, 5 holes
- PMMA-body annulus, 32 cm diameter, 4 holes
- 9 insert parts for CT-phantom
- 1 adapter for ionization chamber DCT10-RS / Lemo
  (Adapters for other ionization chambers for measurements in CT on request.)

**Test device KIM (acceptance test)** VD0403800
For water value, noise, homogeneity and slice thickness examinations at spiral CT scanners; can be used in combination with the scanner manufacturer’s specific constancy test phantom.

**Test phantom ”3D-Spatial Resolution”, incl. carrying case** VD0403550
Designed to evaluate the spatial resolution capabilities of a CT scanner in x-y-plane as well as in z-x plane. The phantom is built of two orthogonal PMMA plates with 12 series of bore holes which represent spatial frequencies between 1.25 lp/cm and 12.5 lp/cm.

**Slice sensitivity test phantom** VD0403600
Designed to evaluate the slice sensitivity profiles (SSP) of a CT scanner’s spiral / helical scan modes. The phantom contains a 25 micron metal foil embedded in a cylinder of uniform tissue equivalent plastic material.
**Electron density phantom, model 062, incl. carrying case** VD0403895
To improve the accuracy of treatment planning in CT. The phantom enables precise correlation of CT data in Hounsfield units to electron density. Including inserts with 8 different tissue references and a syringe insert, which can be filled with any fluid. The inserts can be positioned at 17 different locations within the scan field.

**Electron density phantom** VD0403670
Consisting of a solid plastic cylinder holding six rods with materials of different electron densities (air, solid water-tissue, dense tissue, spongious bone, medium bone, dense bone).
Can be used to establish the relationship between the electron density of various tissues and the corresponding CT-number (in Hounsfield units HU).

**Catphan 500 phantom, incl. carrying case** VD0403450
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, incl. carrying case** VD0403460
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, H₂O, PMP
- Slice geometry and point source bead module

**AAPM CT performance phantom, model 610, incl. carrying case** VD0403897
Developed in accordance with AAPM Report #1 "Evaluation and QA of CT scanners". Enables the measurement of 10 distinct CT performance parameters, e.g. CT number linearity, high contrast resolution, slice width, contrast, alignment.
**Options/additional accessories:**
- Low contrast test insert AAPM CT performance phantom VD0403898

More CT phantoms are available on request!
**Complete Solutions**

**QC Kit IBAct** VD1050102
Complete measuring kit for dose measurements in computed tomography according to IEC 60601-2-44, IEC 61223-2-6, -3-5.

Consisting of:
- **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
- **Modular CT-phantom for dose measurements** VD1003110
- **Carrying case** VD0225250
  With removable trolley.
- **Specialist booklet "Radiation exposure in computed tomography"** VD1019101

Optional:
- **Official verification** CF1E1003
  Of dosimeter DOSIMAX plus A HV by a German office of legal metrology.

**QC Kit IBAcan** 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.

For more information see page 15.
Quality control in Dental Radiography
Multimeter

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 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, non-invasive.
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 in the end of the brochure!
**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
- Ability to attach an additional solid state detector for dose measurements
- 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, non-invasive.
- **Illuminance detector (lx)** VD0201951
  For use with MagicMax.

**Dosimeter Dosimax plus A**
(basic unit) VD0201747
PTP-approved 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** CFE1003
  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).

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

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

**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/additional accessories:**
- **EeePC** VD0201930
  Instead of your own laptop.
- **mAs-clamp** VD0201975
  For use with MagicMax, non-invasive.
- **Illuminance detector (lx)** VD0201951
  For use with MagicMax.

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

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**Detector**

**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

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**Software**

**New international software for QC at image display devices available soon!**
**Spot-Luminance-Meter / Colorimeter**

**Spot-Luminance-Meter**

**LXcan** 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/m²
- f1’ uncertainty: ≤ 3%
- Interface: USB; RS232
- Stray-light-baffle: integrated
- Weight: 450 g

**Spot-Luminance-Meter & Colorimeter LXchroma** 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/m²
- 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/m²
- f1’ uncertainty: ≤ 3%
- Interface: USB; RS232
- Stray-light-baffle: integrated
- Weight: 500 g
- Measurement accuracy x, y: ± 0.005
Test devices


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 models 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, including Analyzer-Software and carrying case VD0203719
For quality control for dental X-ray systems. This Contrast-Detail-Phantom is an aid for improving image quality.

It monitors the 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)
With aid of the accurate and easy to use analyser software quality reports can be generated.

Test device FFA 32 RK VD0203440
Film-screen contact tool for checking dental panoramic cassettes (size in cm: 34 x 20)
Dimensions in cm: 31.5 x 25.8 x 0.7
**Complete solution**

**QC Kit IBAcan 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 LXcan 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.

**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 LXcan, adjustable height 60 cm – 153 cm.
(This tripod versions does not fit into the carrying case of QC Kit IBAcan.)

**High precision mini tripod VD0610210**
For measuring device LXcan, adjustable height 24.5 cm – 36.5 cm.
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).

Sensitometers and Densitometers are developed 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).
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.

*Power supply (for 110 V / 220 V DC)*
VD0214260
For all types of densitometers and combination devices (absolutely necessary).
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.

**Accessories**

*Power supply (for 110 V / 220 V DC)\* VD0214260
For all types of densitometers and combination devices (absolutely necessary).

**Thermometer RT-1 (Digital)** VD0219250

**Interface cable** VD0204112
For Densitometer Unilight D i.

**Software**

**Software Infosens, full version incl. interface cable** VD0002401
Software for quick and easy documentation of the constancy test in X-ray film processing.

Also available as:

**Software Infosens Light** VD0002404
Frames and stands

Stand for test device
Primus L / DIGI-13 VD0212170
As well as for solid state detector DEDX & DE2DX.
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 solid state detector DEDX.
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 VD021220
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.*

**Compensating filter** VD0212300
For X-rays of the skull.

**Compensating filter** VD0212301
For X-rays of the shoulder joint.

**Compensating filter** VD0212302
Wedge filter, small.

**Compensating filter** VD0212303
Wedge filter, medium.

**Compensating filter** VD0212304
Wedge filter, large.

**Compensating filter** VD0212305
For X-rays of the abdomen.

**Compensating filter** VD0212306
For X-rays of the pelvis.

**Compensating filter** VD0212307
For exposures of the breast spinal column.

**Pediatric filters, transparent**
Available in 2 versions:
- 1.0 mm Al + 0.1 mm Cu (2.4 mm thickness)
- 1.0 mm Al + 0.2 mm Cu (4.3 mm thickness)
Carrying cases

**Carrying case “Dosimax plus”**
VD02259720
Offers space for the equipment as listed on page 6.

**Carrying case “QC Kit IBAcan”**
VD0225905
Offers space for the equipment as listed on page 15.

**Carrying case “QC Kit IBArad”**
VD0225155
Offers space for the equipment as listed on page 17.

**Carrying case “QC Kit IBAflu-S”**
VD0225110
Offers space for the equipment as listed on page 19.

**Carrying case “QC Kit IBAflu-L”**
VD0225115
Offers space for the equipment as listed on page 18.

**Carrying case “QC Kit IBArad/flu-analog”**
VD0225100
Offers space for the equipment as listed on page 20.

**Carrying case “QC Kit IBAmam-analog”**
VD0225300
Offers space for the equipment as listed on page 31.

**Carrying case with removable trolley “QC Kit IBAct”**
VD0225250
Offers space for the equipment as listed on page 38.

**Carrying case “Universal”**
VD0230850
The insert can be adjusted individually and in accordance with the customer’s wishes. Internal dimensions: 459 x 319 x 110 mm.

**Carrying case “Universal-medium”**
VD0230860
The insert can be adjusted individually and in accordance with the customer’s wishes. Internal dimensions: 459 x 319 x 160 mm.

**Carrying case “Universal-large”**
VD0230870
The insert can be adjusted individually and in accordance with the customer’s wishes. Internal dimensions: 459 x 319 x 210 mm.

**Carrying case “Universal with trolley”**
VD0230880
Without insert, therefore also especially suitable for the transport of several, smaller, special cases in one piece of luggage. Internal dimensions: 600 x 600 x 235 mm.
Resolution tests – Line-group tests

X-ray test pattern
Tests for determination of the visual resolution
Line-group tests

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

Besom tests

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Range of resolution in lp / mm</th>
<th>Dimensions in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD0219123</td>
<td>23</td>
<td>0.5...5.0</td>
<td>150 x 50</td>
</tr>
<tr>
<td>VD0219127</td>
<td>39</td>
<td>1.5...20.0</td>
<td>60 x 30</td>
</tr>
<tr>
<td>VD0219149</td>
<td>82</td>
<td>1.0...10.0</td>
<td>80 x 40</td>
</tr>
</tbody>
</table>
### Tests for measuring modulation transfer function (MTF)

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Range of resolution in lp / mm</th>
<th>Dimensions in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD0219110</td>
<td>52</td>
<td>0.05+0.1+0.25...3.4+3.7</td>
<td>95 x 50</td>
</tr>
<tr>
<td>VD0219126</td>
<td>53</td>
<td>0.25+0.5...10.0...6.0</td>
<td>71 x 44</td>
</tr>
<tr>
<td>VD0219150</td>
<td>54</td>
<td>0.5+0.1+0.25...3.55...2.8</td>
<td>80 x 44</td>
</tr>
<tr>
<td>VD0219151</td>
<td>56</td>
<td>0.25...10...5.2</td>
<td>62 x 44</td>
</tr>
</tbody>
</table>

### Tests for determination of the focal spot size

#### Sector-Star tests

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Angle of single line within a sector</th>
<th>Number and sizes of patterned sectors</th>
<th>Diameter in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD0219104</td>
<td>9 / 0.5</td>
<td>0.5°</td>
<td>4 - 45°</td>
<td>55</td>
</tr>
<tr>
<td>VD0219105</td>
<td>9 / 1.0</td>
<td>1.0°</td>
<td>4 - 45°</td>
<td>55</td>
</tr>
<tr>
<td>VD0219106</td>
<td>9 / 1.5</td>
<td>1.5°</td>
<td>4 - 45°</td>
<td>55</td>
</tr>
<tr>
<td>VD0219107</td>
<td>9 / 2.0</td>
<td>2.0°</td>
<td>4 - 45°</td>
<td>55</td>
</tr>
</tbody>
</table>

#### Star tests

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Type</th>
<th>Angle of single line within a sector</th>
<th>Number and sizes of patterned sectors</th>
<th>Diameter in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD0219108</td>
<td>9 / 1.5 / 360</td>
<td>1.5°</td>
<td>1 - 360°</td>
<td>55</td>
</tr>
<tr>
<td>VD0219109</td>
<td>9 / 2.0 / 360</td>
<td>2.0°</td>
<td>1 - 360°</td>
<td>55</td>
</tr>
</tbody>
</table>
Quality control in Ultrasound
Ultrasound phantoms

404 GS LE phantom (breast Ultrasound)
For QA of image quality of small parts and intra-cavity ultrasound scanning systems, also with high frequency transducers. Including grey scale targets and available with attenuation coefficients 0.5 dB/cm/MHz (VD0403335) or 0.7 dB/cm/MHz (VD0403340).

**Test parameters:**
- Contrast and detail definition
- System linearity
- Axial, lateral, temporal and background resolution
- System noise and distortion
- Distance and depth measurements
- Dead zone determination
- Grey scale contrast resolution

Universal Ultrasound phantom, type N-365, incl. carrying case VD0403355
Designed for daily assessment, further research and calibration of ultrasound probes. The phantom allows scanning from all four side walls.

**Test parameters:**
- Grey scale contrast evaluation
- Cyst targets with non-resonance cylinders
- Anechoic mass resolution
- Geometric distortion
- Close range (dead zone) resolutions
- Axial and angular resolutions

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

58 IBA DOSIMETRY RADIODOGNOSTICS
Multi-purpose multi-tissue phantom, type 040 GSE, incl. carrying case VD0403360
For QA of image quality at Ultrasound units with attenuation coefficients of 0.5 + 0.7 dB/cm/MHz in one unit.

Test parameters:
- Dead zone
- Horizontal and vertical distance accuracy
- Depth of penetration
- Image uniformity
- Axial and lateral resolution
- Resolution of anechoic masses and grey scale contrast
- Evaluation of image elasticity

Doppler-String-Phantom

Doppler-String-Phantom, type 043 VD0403885
for QA of Image Quality of Doppler Ultrasound systems by accurate generation of 16 pre-programmed pulsatile waveforms using a crystal controlled motor:
- 9 physiological waveforms
- 7 test waveforms (sinewaves, triangle waves, stepped ramp wave)
- Optional customer specified waveforms

Each waveform simulation contains 1000 points of resolution, or speed adjustments, enabling extremely complex simulation. The phantom offers a wide range of bidirectional speed and adjusts itself for plain tap water or velocity corrected water/glycol solution; RS-232 interface built-in.
Test image generator

SonoTest – test image generator for Ultrasound systems VD0404200

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

Perfect in combination with

QC Kit IBAcan 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 LXcan 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.

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 LXcan, adjustable height 60 cm – 153 cm.
(This tripod version does not fit into the carrying case of QC Kit IBAcan.)

High precision mini tripod VD0610210
For measuring device LXcan, adjustable height 24.5 cm – 36.5 cm.
Magnetic Resonance Imaging (MRI) & Multi-Modality phantoms
**3D Anthropomorphic Skull phantom, type 603** VD0403886

For rapid assessment of image displacement in gamma knife and other treatment planning systems. Suitable for use in X-ray, CT and MR. The phantom contains a 3D-orthogonal acrylic rod matrix through the cranial volume, enabling assessment of image distortions and also wire or point targets in various locations and a simulated tumor.

**Multi-modality, male pelvic phantom, type 048** VD0403887

Designed for realistic abdominal ultrasound scanning of bladder and prostate. Suitable for use in Ultrasound, MRI and CT and useful for applications that require multiple modalities such as radiation treatment planning. For assessment of volumetric measurement accuracy the phantom is provided with certified prostate and bladder volumes.

**Quantitative imaging phantom "Magphan"** VD0403890

Designed to perform a wide range of precision performance evaluations of MRI-scanners:
- Patient alignment system check
- Circular symmetry and geometric distortion (spatial linearity)
- Scan slice geometry (slice width) and selection
- Sensitometry (MRI numbers)
- Uniformity
- High resolution and low contrast sensitivity

More MRI and Multi-Modality Phantoms are available on request!
Dose calibrators

Dose calibrator ActIBAmeter
VD0401170
PC-based dose calibrator for all applications of nuclear medicine, radiotherapy and radiochemistry.
Consisting of:
- System software ActIBAmeter with extensive nuclide database
- Measurement chamber type 640 with 4 mm lead shielding
- Sample holder for positioning of samples

Available in 3 different versions:
- ActIBAmeter – Comfort VD0870010
  Incl. Display-PC system with touchscreen.
- ActIBAmeter – Plus VD0870020
  Incl. Display-PC system without touchscreen.
- ActIBAmeter – Basic VD0870030
  Basic dose calibrator without any PC System.

Accessories:
Test source Cs-137 VD0870060
3.7 MBq with shielding container.
Manipulator VD0870061
For transport and positioning of sample.
Molybdenum kit VD0870062
With holder.
Shielding for measurement chamber
VD0870063
20 mm lead, necessary for PET-applications.
Shielding for measurement chamber
VD0870064
50 mm lead, necessary for PET-applications.
Signal transfer set (active) VD0870065
For remoted measurement chambers, extension from 2 to 10 m.
Y-90 Set VD0870066
Special measuring sleeve and sample holder for Y-90-measurements.

Printer for ActIBAmeter:
Label printer Seiko SLP440 VD0870067
Label paper for SLP440 VD0870068
Size 16 x 28, 10 rolls, 180 labels.
Label paper for SLP440 VD0870069
Size 16 x 28, 100 rolls, 180 labels.

Software-/ interface extension for ActIBAmeter:
- Software extension ActIBAmeter VD0870070
- Extension for multi-chamber operation
- Extension for examination parameters
- Combinable with radiopharma-management-software

Interface extension on request.

Measurement chamber accessories / special options for ActIBAmeter:
Inset lining (standard) VD0870071
For measurement chamber.
Inset lining (long version) VD0870072
For "below the desk" measurement chambers.
Sample holder (standard) VD0870073
Sample holder (longer version) VD0870074
Y-90-Set (longer version) VD0870075
Hot Cell

Work bench – Hot Cell VD0401760
Dimensions (w x d x h) in mm:
ca 2,000 x 750 x 900.
Heavy duty table, carrying capacity ca 800 kg per stretching meter e.g. to carry lead castle and Tc-generators.

Modular components:
Waste container VD0401761
With lid, incl. 2 plastic containers (2 x 2 l), 10 mm lead shielding integrated in table surface (e.g. for Tc-waste).
Waste container VD0401762
With lid, incl. 2 plastic containers (2 x 2 l), 30 mm lead shielding integrated in table surface (e.g. for PET-nuclides).
Single/separate waste containers for collecting of radioactive waste.

Lead Castle, version A VD0401763
U-shaped, consisting of 50 mm lead bricks.

Lead Castle, version B VD0401764
Closed on all sides, consisting of 50 mm lead bricks.

Additional bottom plate VD0401765
For Lead Castle, version A, 10 mm lead.*
Additional bottom plate VD0401766
For Lead Castle, version B, 10 mm lead.*

Lead glass window, version A VD0401767
With frame to mount on the Lead Castle
5 mm lead equivalent for working with Tc-99m.
Lead glass window, version B VD0401768
With frame to mount on the Lead Castle.
20 mm lead equivalent for work with PET-nuclides.

Integration dose calibrator meas.-chamber in work bench surface VD0401769
10 mm shielding

Integration dose calibrator meas.-chamber in work bench surface VD0401770
30 mm shielding.

Integration Dose Calibrator meas.-chamber in work bench surface VD0401771
50 mm shielding.

Lead shielded safe versions:
Type 1 VD0401772
10 mm lead, outer dim. 330 x 450 x 380 mm,
inner dim. 160 x 290 x 250 mm.

Type 1 VD0401773
20 mm lead, outer dim. 330 x 450 x 380 mm,
inner dim. 160 x 290 x 250 mm.

Type 1 VD0401774
30 mm lead, outer dim. 330 x 450 x 380 mm,
inner dim. 160 x 290 x 250 mm.

Type 2 VD0401775
10 mm lead, outer dim. 450 x 600 x 380 mm,
inner dim. 270 x 430 x 250 mm.

Type 2 VD0401776
20 mm lead, outer dim. 450 x 600 x 380 mm,
inner dim. 270 x 430 x 250 mm.

Type 2 VD0401777
30 mm lead, outer dim. 450 x 600 x 380 mm,
inner dim. 270 x 430 x 250 mm.

Type 3 VD0401778
10 mm lead, outer dim. 500 x 700 x 450 mm,
inner dim. 285 x 525 x 285 mm.

Type 3 VD0401779
20 mm lead, outer dim. 500 x 700 x 450 mm,
inner dim. 285 x 525 x 285 mm.

Type 3 VD0401780
30 mm lead, outer dim. 500 x 700 x 450 mm,
inner dim. 285 x 525 x 285 mm.

Intermediate bottom VD0401781
Suitable for lead shielded safe, type 2 or 3.

* Only available in combination with Lead Castle version A or B.
Phantoms for Molecular Imaging

Jaszczak phantoms, flanged
For testing spatial resolution at SPECT and PET systems. Every phantom includes 6 rods and 6 solid spheres in different diameters.

**Ultra Deluxe Jaszczak phantom VD0870210**
For use with ultra-high spatial resolution SPECT and PET systems.
- 6 rod diameters: 3.2 - 11.1 mm
- 6 solid sphere diameters: 9.5 - 31.8 mm

**Deluxe Jaszczak phantom VD0870205**
For use with high to very high spatial resolution SPECT and PET systems.
- 6 rod diameters: 4.8 - 12.7 mm
- 6 solid sphere diameters: 9.5 - 31.8 mm

**Standard Jaszczak phantom VD0870200**
For use with medium to high spatial resolution SPECT and PET systems.
- 6 rod diameters: 6.4 - 19.1 mm
- 6 solid sphere diameters: 12.7 - 38 mm

Orthogonal hole phantoms
Hole plate made of lead for square cameras for routine checks of resolution and linearity of gamma cameras.

Available in 3 different Versions:
- **Orthogonal hole phantom VD0870250**
  5 mm - with a hole diameter of 5 mm.
- **Orthogonal hole phantom VD0870255**
  4 - 1.6 mm, set of 4 pieces with a hole diameter of 4.0, 3.2, 2.4, 1.6 mm.
- **Orthogonal hole phantom VD0870260**
  1.6 mm with a hole diameter of 1.6 mm.
Contamination monitors and meters

**Portable contamination monitor CoMo-170** VD0401715
For highly-sensitive alpha- and beta-/gamma-contamination measurement with thin-layer plastic-scintillation detector.
Data display in cps or nuclide-specific in Bq and Bq/cm².
Including preset calibration factors for 25 nuclides, user-specific nuclides may be added; integrated auto-calibration.
**Measuring range for beta-/gamma-contaminations:**
- 0-30,000 cps, dependend on type of nuclide
  (>50,000 cps = Overflow)

**Portable contamination monitor CoMo-170 D** VD0401716
Combination of contamination monitor CoMo-170 with a dose rate measurement instrument (GM-counter tube, integrated in the front surface of the CoMo-170).
**For dose rate measurements:**
- Measuring range: 1 microSv/h - 20 mSv/h
- Energy range: ca 40 keV - 1.3 MeV

**Accessories for CoMo-170 and CoMo-170 D:**
**Sr-90 Beta test source** VD0401713
For function check, 200 Bq, incl. storage case.
**Wallstation with integr. voltage supply and light barrier** VD0401714
Incl. charge unit and batteries
**Smear test measuring station (active)** VD0401718
For evaluation of smear tests.
**Floor bogey accomodating 1 CoMo-170** VD0401719

**MiniTRACE C-10 contamination meter** VD0401730
Small area contamination meter for gamma and beta-measurements with GM-pancake detector.
- Display and measurement range: 0.0 - 9990.0 cps.
- Sensitivity: 0.25 cps/Bq (Co-60)

**HFC Hand-Foot-Clothing contamination monitor** VD0401740
Suitable for alpha and beta/gamma contamination measurement, with large-area, thin-layer plastic scintillation detectors.
- Nuclide selection menu, user-related nuclide pre-selection possible
- Hand probe detachable
- Integrated calibration software for quality check
- Network-compatible and link to central database with parameter setting features
Survey radiation meters

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 mSv/h, 0 ... 2000 μSv/h
- Photon energy range: 6 keV - 7.5 MeV
  (15 MeV with optional PMMA-moderator lid)
- Beta energy range: 60 keV - 2 MeV

Additional Accessories:
Connecting cable VD0401111
50 m for survey meter OD-01 nec.
PMMA-moderator lid VD0401112
For measurements up to 15 MeV.

Survey meter SM 3 D VD0401170
For measurement of ambient equivalent dose rate of gamma-radiation.
- Detector type: halogen quenched GM tube, energy compensated
- Measuring range: 0.01 - 999 μSv/h.
- Gamma energy range: 40 keV - 1.3 MeV

Survey meter SM 5 D VD0401160
For measurement of alpha and beta area activity (Bq/cm²) and for local dosimetry of gamma radiation (μSv/h).
- Detector type: end window GM tube, not energy compensated.

Measurement ranges:
- Local dose rate of gamma radiation: 0.1 ... 300 μSv/h
- Area activity: 0.1 ... 199.9 Bq/cm² * kₐ (kₐ = 6 for Am 241)
  0.1 ... 999 Bq/cm² * k₉ (k₉ = 2 for Sr-90)

Energy ranges:
- Photons: 20 keV - 2 MeV
- Beta qualitatively: > 35 keV
**Room monitoring systems**

**Area monitor WS05C3** VD0401520
3-channel stationary room monitoring system for measurement of the ambient dose rate equivalent H*(10) regarding X-rays and γ-radiation. Including RS 232 interface. For simultaneous operation of max. 3 different or similar probes.

**Measuring probes and accessories:**
**Measuring probe, type 18509CE** VD0401525
0μSv/h - 1 Sv/h, low sensitivity; 55 keV – 1.3 MeV

**Measuring probe, type 18550CE** VD0401530
0 nSv/h - 20 mSv/h, medium sensitivity; 40 keV – 1.3 MeV

**Measuring probe, type 18545CE** VD0401535
0 nSv/h - 200 μSv/h, high sensitivity; 40 keV – 1.3 MeV

**Probe cable D** VD0401545
Length: 1.25 m.

**Cable extension** VD0401550
Extension up to 100 m possible.

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**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 thresholds
- 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.

**Additional accessories:**
**Software DOSMO** VD0401722
For keeping track of person-related dose values, for reading out and administration of the data.

**Dosimeter reading system ADR 1** VD0401721
For automatic read-out and parameter setting of the dosimeter.

**Radioactive dosimeter control device** VD0401723
With test source (3.7 MBq Cs-137) for control of the calibrated dosimeter.

**Rack** VD0401724
Accommodating 15 dosimeters for storage of up to 15 dosimeters.
Dose area product meters
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".
- 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 μGy/m²

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 μGy m²

Also available as the more compact “Micro IDP” Version (120-IDP MICRO).

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 μGy m²
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.

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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 μGy m²
  (High sensible chamber type with resolution of 0.01 μGy m² 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 “SPRINT”** 120-SPRINT
**Consisting of:**
- Compact thermo-printer, type CUSTOM PCDPT100S
- Printer cable
- Power supply
- 1 roll of endless-label paper
  (15 m: approx. 420 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.**
## MagicMax family matrix

<table>
<thead>
<tr>
<th>VD0201940</th>
<th>Multimeter MagicMax Rad/Flu/Dent</th>
<th>VD0201948</th>
<th>kV-meter MagicMax Rad/Flu/Dent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring values</td>
<td>Measuring ranges</td>
<td>Measuring values</td>
<td>Measuring ranges</td>
</tr>
<tr>
<td>Dose</td>
<td>100 nGy - 9999 mGy / ± 5%</td>
<td>kVp</td>
<td>40-155 kV</td>
</tr>
<tr>
<td>Dose rate</td>
<td>0.1 µGy/s - 120 mGy/s / ± 5% or ± 0.02 µGy/s</td>
<td>Time</td>
<td>Quick HVL: 1.2 - 8 mm Al equivalent / ± 10% or 0.2 mm</td>
</tr>
<tr>
<td>Dose per pulse</td>
<td>40 kV - 155 kV</td>
<td>HVL</td>
<td>Total filtration: 1.5 - 30 mm Al equivalent / ± 10% or 0.3 mm (60 - 120 kV, HF/DC)</td>
</tr>
<tr>
<td>Time</td>
<td>min. time: 0.2 ms</td>
<td>Total filtration</td>
<td>1.5 - 30 mm Al equivalent / ± 10% or 0.3 mm (60 - 120 kV, HF/DC)</td>
</tr>
<tr>
<td>HVL</td>
<td>Quick HVL: 1.2 - 8 mm Al equivalent / ± 10% or 0.2 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total filtration</td>
<td>1.5 - 30 mm Al equivalent / ± 10% or 0.3 mm (60 - 120 kV, HF/DC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>optional detectors:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose length product</td>
<td>Detector RQM (only dose measurement Mammo)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTDI-Calculation</td>
<td></td>
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</tr>
<tr>
<td>mAs-measurement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light measurement</td>
<td>Detector RQA (double dosemeter)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VD0201950</th>
<th>Multimeter MagicMax MAM</th>
<th>VD0201945</th>
<th>Dosimeter MagicMax Rad/Flu/Dent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring values</td>
<td>Measuring ranges</td>
<td>Measuring values</td>
<td>Measuring ranges</td>
</tr>
<tr>
<td>Dose</td>
<td>0.2 µGy - 9999 mGy</td>
<td>Dose</td>
<td>100 nGy - 9999 mGy / ± 5%</td>
</tr>
<tr>
<td>Dose rate</td>
<td>0.4 µGy/s - 700 mGy/s</td>
<td>Dose rate</td>
<td>0.1 µGy/s - 120 mGy/s / ± 5% or ± 0.02 µGy/s</td>
</tr>
<tr>
<td>kVp</td>
<td>20 kV - 49 kV / ± 1.5 % or ±0.7 kV</td>
<td>Time</td>
<td>0.2 ms</td>
</tr>
<tr>
<td>Time</td>
<td>min. time: 0.2 ms</td>
<td>Time</td>
<td>0.2 ms</td>
</tr>
<tr>
<td>HVL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose per pulse</td>
<td>optional detectors:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total filtration</td>
<td>Detector RQA (only dose measurement Rad/Flu)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mAs-measurement</td>
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<tr>
<td>Light measurement</td>
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<table>
<thead>
<tr>
<th>VD0201970</th>
<th>Multimeter MagicMax Rad/Flu/MAM</th>
<th>VD0201955</th>
<th>Dosimeter MagicMax MAM</th>
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</thead>
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<tr>
<td>Measuring values</td>
<td>Measuring ranges</td>
<td>Measuring values</td>
<td>Measuring ranges</td>
</tr>
<tr>
<td>Dose</td>
<td>0.2 µGy - 9999 mGy</td>
<td>Dose</td>
<td>0.2 µGy - 9999 mGy</td>
</tr>
<tr>
<td>Dose rate</td>
<td>0.4 µGy/s - 700 mGy/s</td>
<td>Dose rate</td>
<td>0.4 µGy/s - 700 mGy/s</td>
</tr>
<tr>
<td>kVp</td>
<td>Magic Max M Rad/Flu + Magic Max M MAM</td>
<td>Time</td>
<td>0.2 ms</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HVL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose per pulse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total filtration</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>mAs-measurement</td>
<td>Detector RQM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light measurement</td>
<td>Detector RQA (double dosemeter)</td>
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<td></td>
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<table>
<thead>
<tr>
<th>VD0201960</th>
<th>Multimeter MagicMax Dent</th>
<th>VD0201956</th>
<th>Dosimeter MagicMax Rad/Flu/Dent</th>
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</thead>
<tbody>
<tr>
<td>Measuring values</td>
<td>Measuring ranges</td>
<td>Measuring values</td>
<td>Measuring ranges</td>
</tr>
<tr>
<td>Dose</td>
<td>1 µGy - 9999 mGy / ± 5%</td>
<td>Dose</td>
<td>0.2 µGy - 9999 mGy</td>
</tr>
<tr>
<td>Dose rate</td>
<td>0.1 µGy/s - 120 mGy/s / ±5% or ± 0.02 µGy/s</td>
<td>Dose rate</td>
<td>0.4 µGy/s - 700 mGy/s</td>
</tr>
<tr>
<td>kVp</td>
<td>40 - 110 kV</td>
<td>Time</td>
<td>0.2 ms</td>
</tr>
<tr>
<td>Time</td>
<td>0.2 ms - 9999 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HVL</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Dose per pulse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total filtration</td>
<td></td>
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<tr>
<td>mAs-measurement</td>
<td>Detector RQA</td>
<td></td>
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<tr>
<td>Light measurement</td>
<td>Detector RQA (double dosemeter)</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>VD0202850</th>
<th>Detector RQA (Rad/Flu/Dent)</th>
<th>VD0202860</th>
<th>Detector ROM (Mammo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring values</td>
<td>Measuring ranges</td>
<td>Measuring values</td>
<td>Measuring ranges</td>
</tr>
<tr>
<td>Dose</td>
<td>50 - 150 kV</td>
<td>Dose</td>
<td>25-35 kV</td>
</tr>
<tr>
<td>Dose rate</td>
<td>200 nGy - 9999 mGy</td>
<td>Dose</td>
<td>500 nGy - 9999 mGy</td>
</tr>
<tr>
<td>kVp</td>
<td>80 nGy/s - 70 mGy/s</td>
<td>Dose</td>
<td>1.5 µGy/s - 300 mGy/s</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Measuring devices overview

| kVp | Dose | Dose rate | Dose per pulse | Time | mA | Dose-length-product | HVL | Total filtration | Luminescence [lP] | Luminance [cd/m²] | Chromaticity [CIE x; y] | Color temperature | Dose rate | mA | Dose length-product | HVL | Total filtration | Luminescence [lP] | Luminance [cd/m²] | Chromaticity [CIE x; y] | Color temperature | Dose rate | mA | Dose length-product | HVL | Total filtration | Luminescence [lP] | Luminance [cd/m²] | Chromaticity [CIE x; y] | Color temperature | Dose rate | mA | Dose length-product |
|-----|------|----------|---------------|------|----|---------------------|-----|-------------------|-----------------|------------------|---------------------|-------------------|------------|----|---------------------|-----|-------------------|-----------------|-------------------|---------------------|-------------------|------------|----|---------------------|-----|-------------------|-----------------|-------------------|---------------------|-------------------|------------|----|---------------------|-----|-------------------|-----------------|-------------------|---------------------|-------------------|------------|----|---------------------|
| Ra  | Flu | DSA | Mamm | CT | Dental | Dose | Dose rate | Dose per pulse | Time | mA | Dose-length-product | HVL | Total filtration | Luminescence [lP] | Luminance [cd/m²] | Chromaticity [CIE x; y] | Color temperature | Dose rate | mA | Dose length-product | HVL | Total filtration | Luminescence [lP] | Luminance [cd/m²] | Chromaticity [CIE x; y] | Color temperature | Dose rate | mA | Dose length-product |

- **PTB approved/can be officially gauged**

**Note:** The table illustrates the measuring devices and parameters for various imaging modalities. The devices include Dose, Dose rate, Dose per pulse, Time, mA, Dose-length-product, HVL, Total filtration, Luminescence [lP], Luminance [cd/m²], Chromaticity [CIE x; y], and Color temperature. The waveform column indicates the output signal for each parameter.
### Measuring devices matrix

<table>
<thead>
<tr>
<th>Measuring devices</th>
<th>Radiation</th>
<th>Flu / DSA</th>
<th>Mammography</th>
<th>Digital</th>
<th>CT</th>
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</thead>
<tbody>
<tr>
<td>Dose</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ● ●</td>
</tr>
<tr>
<td>Dose rate</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ● ●</td>
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<tr>
<td>Dose per pulse</td>
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<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ● ●</td>
</tr>
<tr>
<td>mAs</td>
<td>● ● ● ● ●</td>
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<td>● ● ● ●</td>
<td>● ● ● ● ●</td>
</tr>
<tr>
<td>Waveform</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
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<td>HVL</td>
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<td>Total filtration</td>
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</table>

- **Radiography**
  - kVp
  - Dose
  - Dose rate
  - Dose per pulse
  - Time
  - mAs
  - Waveform
  - HVL
  - Total Filtration

- **Flu / DSA**
  - kVp
  - Dose
  - Dose rate
  - Dose per pulse
  - Time
  - mAs
  - Waveform
  - HVL
  - Total Filtration

- **Mammography**
  - kVp
  - Dose
  - Dose rate
  - Dose per pulse
  - Time
  - mAs
  - Waveform
  - HVL
  - Total Filtration

- **Digital**
  - kVp
  - Dose
  - Time
  - Dose-length product
  - Waveform

- **CT**
  - Luminance (cd/m²)
  - Luminance [lx]
  - Chromaticity [CIE x; y]
  - Color temperature

- **Light measurement**
  - Light measurement Device
  - Dose meter only for constancy check
IBA activities in a nutshell

IBA delivers solutions of unprecedented precision in the fields of cancer diagnosis and therapy. The company also offers sterilization and ionization solutions to improve the hygiene and safety of everyday life.

Diagnostics
IBA has unique expertise in the design of cyclotrons and in the production and distribution of radiopharmaceutical tracers which are used every day in hospitals to quickly and accurately detect cancer, neurological and cardiac diseases. IBA also offers dosimetry products used in many hospitals for quality assurance in X-Ray diagnosis and for patient-dose monitoring.

Therapy
IBA has developed Radiotherapy solutions and dosimetry equipment to treat cancer with the greatest accuracy. IBA is the undisputed leader in Particle Therapy, acknowledged to be the most precise and effective clinical radiotherapy method in the selective destruction of cancer cells.

Sterilization & Ionization
IBA designs electron accelerators and high power X-Ray solutions used in many industries to sterilize medical devices, to cold pasteurize food products and to improve polymer properties. Over 250 IBA Industrial accelerators are used in the world today, some for more than 40 years. IBA a Belgian company, is listed on the pan-European stock exchange EURONEXT and its Annual Reports can be downloaded on the Website: www.iba-group.com.

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