iba-dosimetry.com

# MACHINE QA
# INDEPENDENT & INTEGRATED

## myQA® Machines

**Software, Detectors, Phantoms & Accessories**

PROTECT +
ENHANCE +
SAVE LIVES

# Machine QA ...

# ... Fundamental for Patient Safety

**1** **Dosimetry QA**
Linac beam and MLC checked

**2** **Imaging QA**
Linac imaging systems checked

**3** **Morning QA**
Treatment system ready for the day

**4** **Treatment Safety**
Peace of mind

**Accurate Linac Machine QA is a fundamental requirement for consistently safe and efficient patient treatments.**

**IBA Dosimetry is your proven partner to check and track all Machine QA needs, from daily to annual QA. Our imaging and dosimetry solutions provide highly efficient workflows and accurate analysis of your data.**

## IBA Dosimetry
## We Protect, Enhance and Save Lives.

At IBA we are passionate about providing innovative solutions for the diagnosis and treatment of cancer.

We focus on the well-being of patients, as well as the safe and efficient work of healthcare professionals worldwide.

IBA Dosimetry offers a full range of solutions for Integrated Quality Assurance (QA), calibration procedures, and imaging markers, as well as services and training.

All our activities share a common goal: to maximize efficiency and patient safety in Radiation Therapy and Medical Imaging.


## Innovation leadership in Machine QA

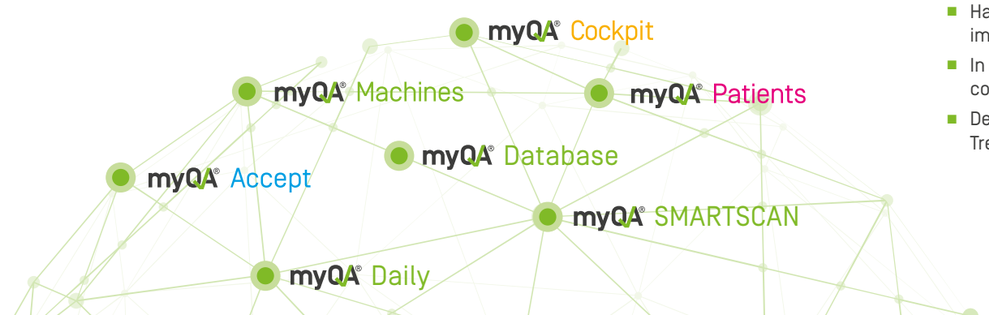
IBA Dosimetry's unique competence and leading innovations in Machine QA:

- ✔ > 1,500 satisfied customers worldwide
  trust IBA Dosimetry integrated Quality Assurance with myQA
- ✔ First complete Machine QA platform solution
- ✔ > 45 years of experience in Dosimetry and QA
- ✔ First Morning QA that combines efficiency with accuracy: myQA Daily
- ✔ 9 releases and software enhancements since the launch of myQA in 2015
- ✔ 24/7 support access from service teams in 3 time zones

**myQA Machines, the complete protocol-based independent machine QA integrated on one platform.**

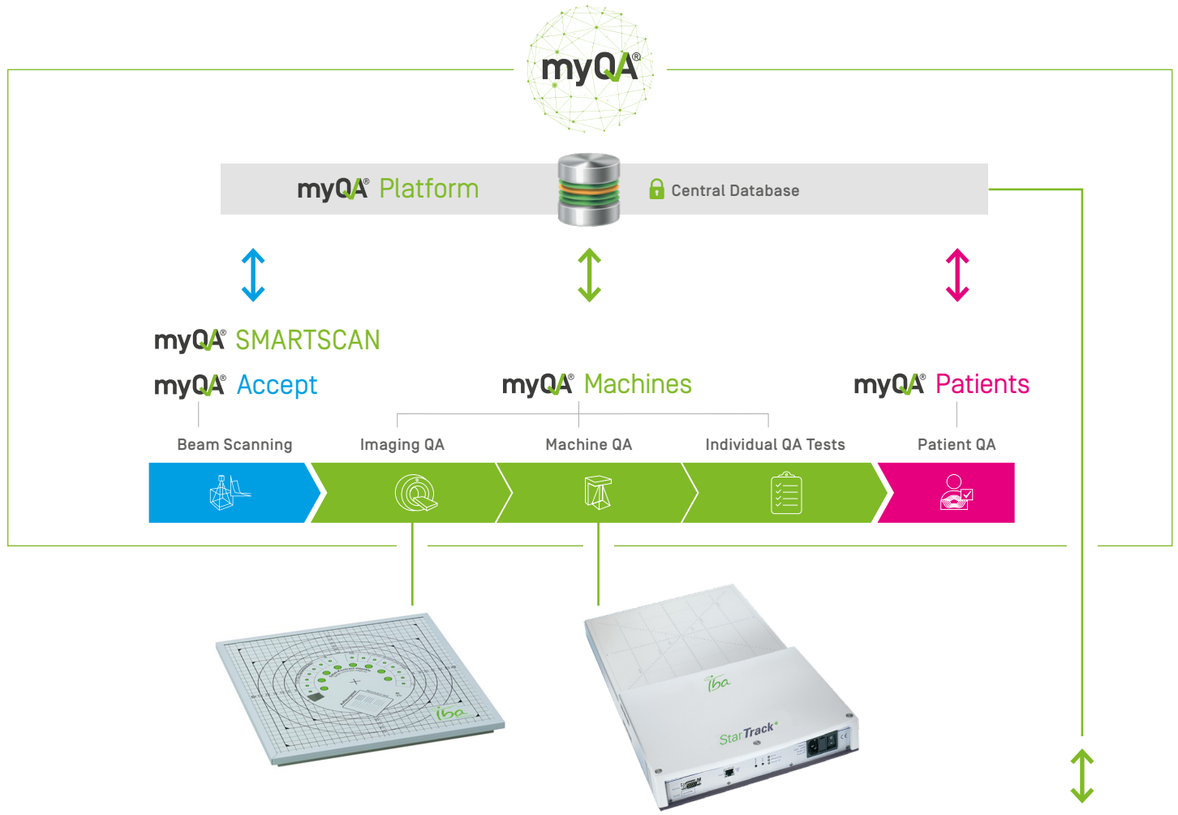
- Full coverage of tests related to dosimetry, imaging, MLC QA... and more!
- Easy QA execution with intuitive and consistent software menu for all machine QA software modules (Plug-Ins)
- Designed to integrate seamlessly with the myQA Plattform
- Protocol-based machine QA (including TG-142 and other customizable protocols)
- Flexible scheduling tool to manage your tasks, resources, and time
- Integrate any of your hospital-specific tests with the individual tests module
- Interface to myQA Cockpit for quick and easy access to all QA results and trends
- Export any QA test result to a comprehensive report, traceable anytime
- Comprehensive analysis, archiving, and reporting tools

Watch user webinar:
"Clinical experience with myQA"
**James P. Nunn,**
Senior Medical Physicist.






# Integrated Software Platform




## myQA® – The leading Quality Assurance Platform. Integrated & Independent

Over 1,500 healthcare centers in the world trust myQA as their independent global QA Platform.

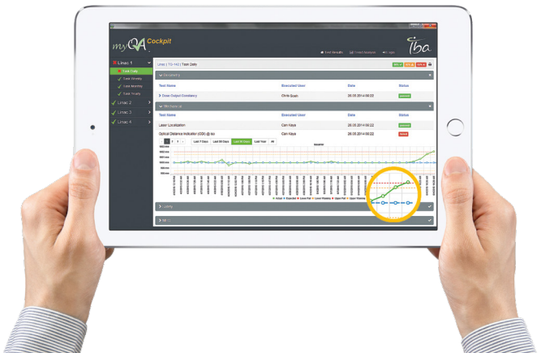
**myQA integrates myQA Machines to enable:**

- End-to-end QA from commissioning to patient QA
- Machine QA data integration and comparison with beam scanning and patient QA
- All QA data on a central database in your hospital

## myQA® Cockpit

### Never Miss Any Key Information

- Have full confidence and control over all your Linacs, imaging devices and other technology
- In one view: verify which Machine QA tests have been completed or are still due for completion per schedule
- Detect negative trends before major problems arise with Trend Analysis



# Dosimetry Plug-In

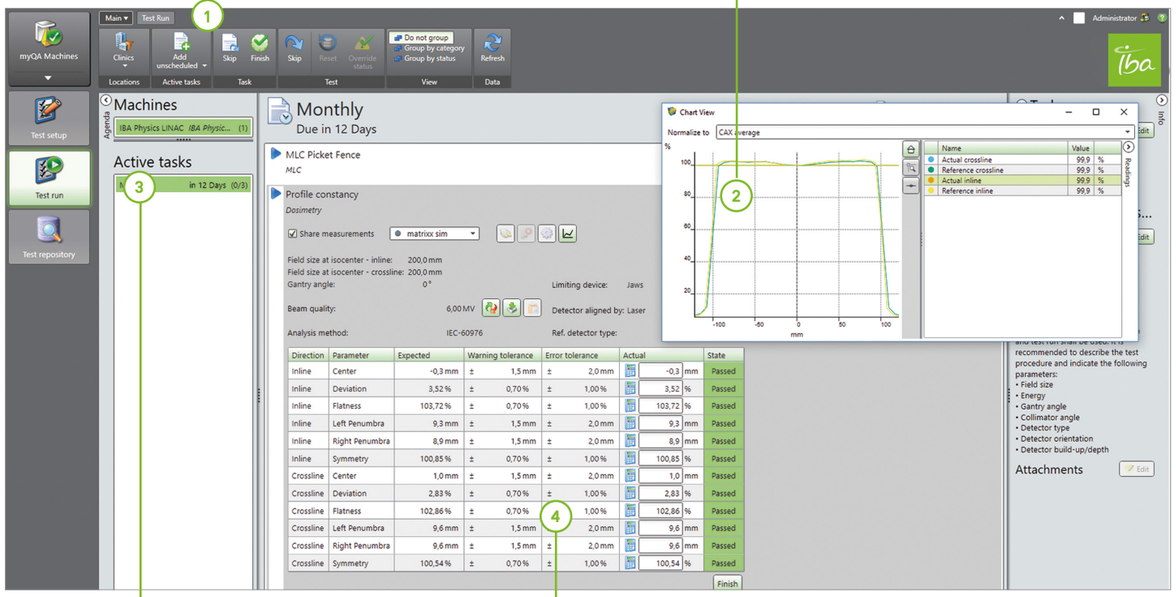
**Perform automated dosimetry tests with the StarTrack, MatriXX, or Dolphin detector arrays, or by loading water phantom measurements.**

### Efficiency

- Acquire all key beam parameters in just one shot (dose output, profile analysis, energy verification)
- Analysis of main axes and diagonals (field size, symmetry, flatness, center, penumbra, light field)

1 Test Run ribbon for managing your tasks and their status. Finished tasks can be tracked in myQA Cockpit.

2 Detailed view of the reference and actual measurements (profiles).




3 Select your machine and visualize tasks due or add unscheduled tasks e.g. in case of maintenance.

4 Run your dosimetry test: Connect the detector and compare the actual measurement with your reference. Passes and fails are automatically displayed and the test status is recorded accordingly.

## myQA FastTrack

# Instant Measurements Plug-In

**Real-time measurements & analysis with the StarTrack detector.**

- Easy measurements outside scheduled routine checks
- Instant display of results, profile comparison and analysis (e.g. for beam steering, start-up behavior)
- Allows the Linac technician to set up unscheduled tests
- Import and export of measurements (ASCII)






# MLC QA Plug-In

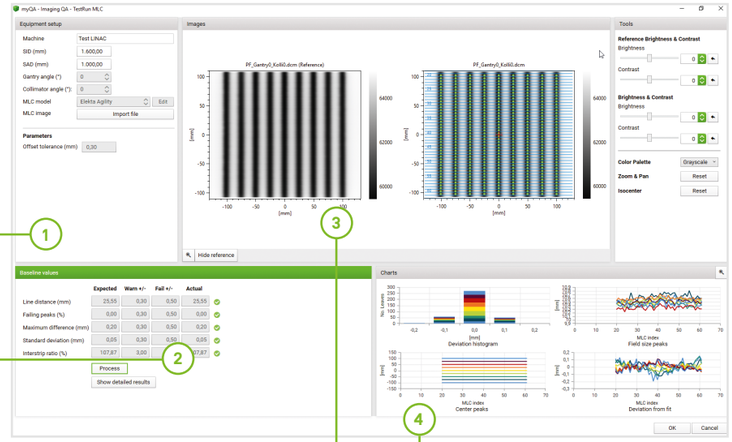
**Automated MLC stripe tests ('picket fence test')**

- EPID and film image analysis to determine leaf position accuracy & MLC transmission characteristics
- Identify if any MLC leaf is out of tolerance or which leaf number failed
- Verify your MLC at the 4 gantry cardinal angles
- Copy & paste detailed results for additional analysis

**New release**

**The New MLC Plug-In, for instant results and overview**

- Complete Overview: All data on one screen incl. reference image and pass / fail display
- Completely automatic image pre-processing




1 Intuitive and efficient: All MLC test parameters in one single interface view.

2 Test results at a glance: Review instantly if your MLC test passed, or see which test parameters exceeded your thresholds.

3 Compare reference and actual MLC test. Overview of deviations. Adjust brightness and contrast easily.

4 Leaves deviation charts: Easy and intuitive identification of the single stripe through color-coding.

# VMAT QA Plug-In

**Automated dynamic MLC QA and VMAT QA**

- Automatic test analysis to verify accurate dose delivery using different dose rates, gantry speeds, and MLC leaf speeds
- Ensure perfect synchronization of changing dose rates, gantry and MLC speeds
- Compatible with established VMAT commissioning guidelines

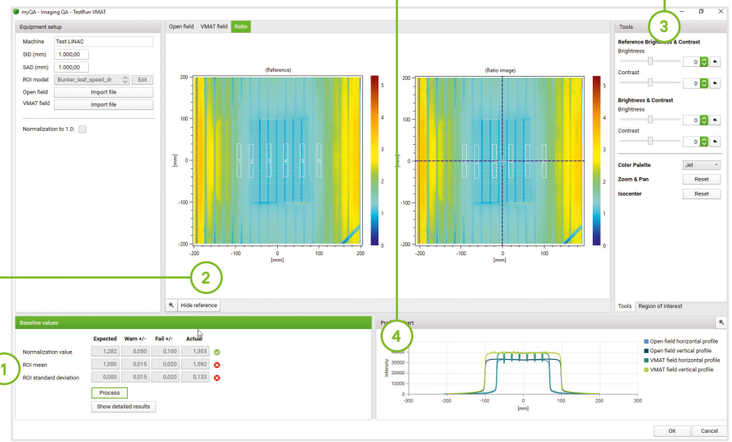
**New release**

**Automated VMAT check**

- Fully automated analysis of the Dicom files
- Instant QA results overview in one screen

4 Automatic verification and display of leaf transmission profiles

3 Adjustment of all image settings and ROI in epid




2 Test results at a glance: Instant analysis of the dose consistency between VMAT test fields vs. reference fluence.

1 Detailed numerical overview of the ROIs calculated characteristics.

## 2D-Imaging QA Plug-In

**TG-142 compliant and automated imaging QA for EPIDs and for planar imaging (kV and MV)**

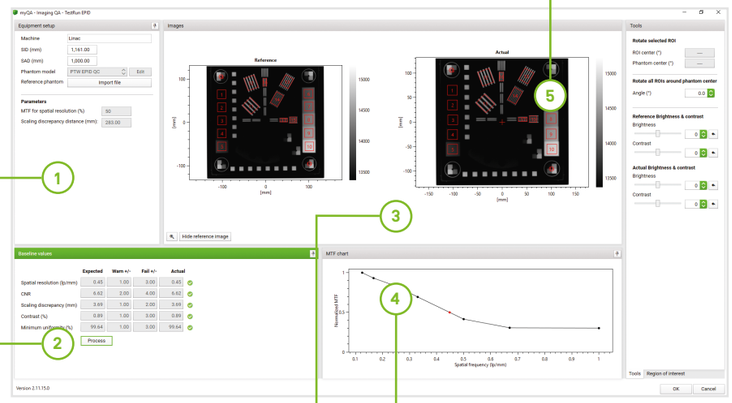
- Fully automatic with all calculations performed in 5 seconds or less
- Compatible with all common imaging phantoms

**New release**

**The New 2D-Imaging Plug-In, driving workflow efficiency**

- Test efficiency: Pass / Fail clearly displayed
- Analysis power with the new spatial resolution MTF chart
- Automated image analysis avoiding human subjectivity

5 User friendly „drag & drop“ ROI management.



1 Full overview:
All EPID test parameters in one single interface view.

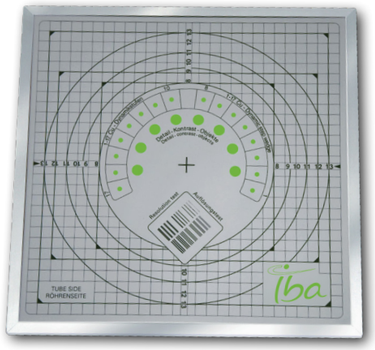
2 Test results at a glance:
Instant overview of the kV/MV image quality test results and failed tests.

3 Reference and actual EPID test images. All regions of interest (RoI) are automatically detected.

4 Quick overview of the EPID's spatial resolution with the MTF display (Modulation Transfer Function).

## Supported 2D Imaging Phantoms

| | | | |
|---|---|---|---|
| IBA DIGI-13 | Leeds TOR 18 FG | PTW EPID QC | SNC MV-QA Rev 2 |
| IBA Primus A | Mobius MC2 kV | SNC kV-QA | Standard Imaging QC-3 |
| Las Vegas | Mobius MC2 MV | SNC MV-QA | Standard Imaging QC-kV1 |



The IBA Dosimetry Primus A test phantom for automated 2D kV image QA with myQA Machines.
More information on page 16





## 3D-Imaging QA Plug-In

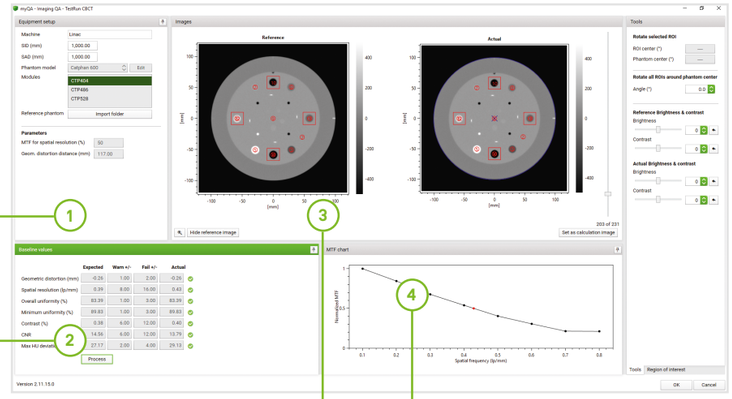
**TG-142 compliant automated imaging QA for CT and CBCT**

- Including contrast, contrast to noise ratio, uniformity, HU deviation, spatial resolution, imaging scaling, and more!
- Compatible with all common imaging phantoms
- Enables verification of CT scanner parameters with your CT phantom

**New release**

**The New 3D-Imaging Plug-In, now enhanced and even faster**

- Save time: Complete overview on one screen
- Instant Confirmation: Clear display of pass / fail
- Workflow ease of use: From image import to the MTF chart



1 Intuitive & efficient:
All CBCT test parameters in one single interface view.

2 Test results at a glance:
Instant overview of the CBCT test results and failed tests.

3 Reference and actual CT / CBCT test image. Automatic detection and analysis of Regions of Interest (ROI).

4 Instant overview of the spatial resolution of your CBCT system with the MTF display (Modulation Transfer Function).

## Supported 3D Imaging CBCT Phantoms

| | | |
|---|---|---|
| CatPhan 503 | CatPhan 604 | Gammex 464 |
| CatPhan 504 | CIRS 610 AAPM | GE QA Phantom |
| CatPhan 600 | CIRS 062 QA | Tomo Cheese Phantom |

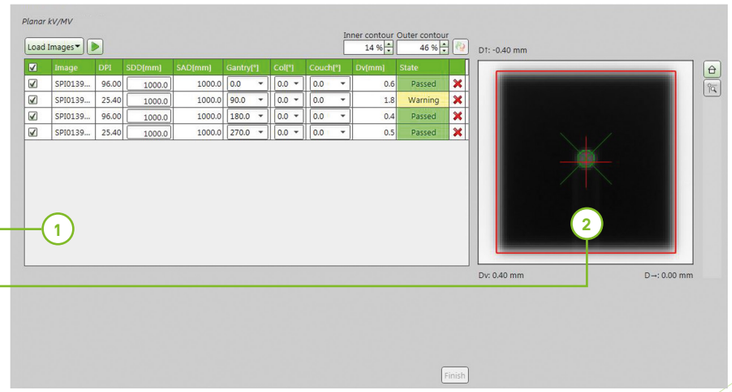
*myQA has given me full control of my data by connecting all QA applications on one platform and into one central database. With myQA, the quality assurance becomes schedulable - in every sense of the word. Another highlight for me is the web-based myQA Cockpit dashboard which allows us to quickly retrieve our machine QA status updates anywhere in the department. myQA is truly an all-in-one solution.*

**Luis Brualla González**
Hospital General Universitario,
ERESA, Valencia, Spain

## Integrated Winston Lutz Test

**Automated checks of the Linac isocenter via the “Winston Lutz” test**

- Supports most Winston-Lutz phantoms
- Supports circular fields (SRS cones) or rectangular fields (MLC)
- 3D offset calculations
- Offsets between radiation field & phantom centers
- Automated isocenter tests (also known as ‘Winston-Lutz test’) based on EPID or film images




1. Table with numerical analysis of Winston Lutz isocenter deviation.
2. Image of the Winston Lutz phantom. Intuitive display overlay of the isocenter deviation.






## Integrate Any Of Your Specific Tests In myQA Machines

**Your individual QA checks and any other tests are easily integrated with the myQA customizable generic tests functionality**

- Easily compose any test you need to check and document
- Import of existing data and tests from Excel
- Make myQA your complete solution for:
  - everything you need to check regularly
  - all tests you need to track and record in one database
- Examples
  - check the temperature of your medicine fridge
  - check your room lighting or security locks ...

> ***With the myQA’s Individual Test feature we even integrate and track checks such as “Doors Locked” or “Oxygen Off”.***

**James P Nunn, MS, CHP, DABR**
Senior Medical Physicist, LewisGale Regional Cancer Centre, Pulaski, USA

# Detectors for Machine QA

myQA Daily – Fast and easy wireless setup and morning QA test results

**Smartly designed measurement tools are your basis for efficient and accurate Linac QA.**

IBA Dosimetry offers a wide range of dedicated solutions to make your daily, monthly, and annual QA the fastest, most accurate, and most reliable.

- Designed to integrate seamlessly with myQA
- Robust for long lasting performance
- Accuracy based on ionization chamber technology

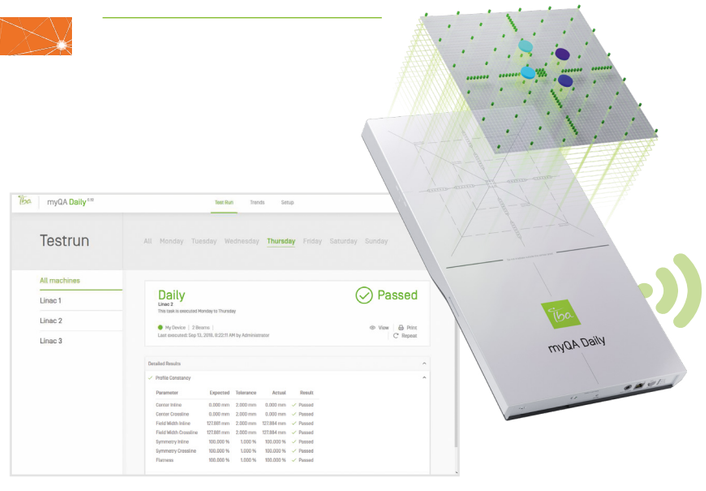
Watch the myQA Daily workflow for Linac morning QA.

**New release**

## myQA Daily

**The only solution for Fast, Easy, and Accurate Morning Linac QA.**

- The largest number of ionization chambers (125) of any morning QA detector provides more beam data for more accurate beam quality verification
- The web browser-based myQA Daily application allows flexible test execution from any network PC or tablet and easy access to test results
- Compatible with Varian Halcyon™ and all standard linacs
- Integrated absorber material for energy constancy verification



The software provides an intuitive overview of the accuracy of all tests. Each test result can be verified in a detailed view compared with the expected result.

## StarTrack

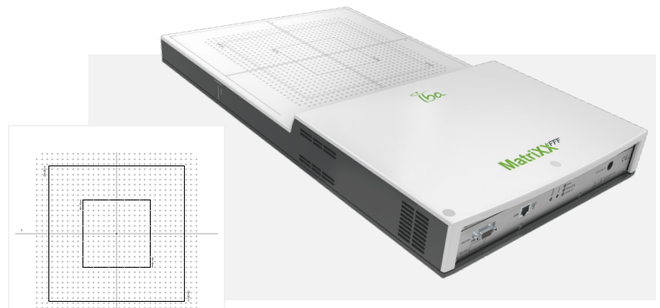
**Your High-End Detector for Advanced Machine QA**

- All main tests in one shot: dose, profiles, diagonals energy verification, etc.
- 453 air-vented ionization chambers with optimized geometry for Machine QA
- Convenient beam constancy verification in one single shot using specific build-up plates
- Automatic k(t,p) correction
- Parallel readout from independent electrometers
- Instant results and real-time analysis using the Dosimetry plug-in for myQA Machines
- Patented energy verification method
- Tabletop or gantry mount (optional)


## MatriXX

**Your Flexible Detector**

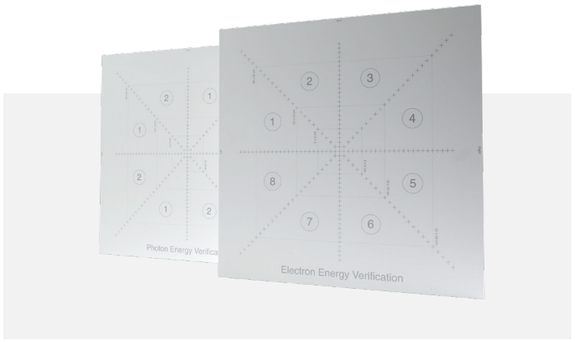
- Detector for Patient QA (with myQA Patients software) as well as for Machine QA
- Connect your MatriXX to myQA Machines for fast and accurate Linac Machine QA
- 1020 air-vented ionization chambers
- Choose the right detector from the MatriXX family (MatriXX Evolution / MatriXX FFF)
- Patented energy verification method
- Tabletop or gantry mount (optional)




## Build-Up Plates

**For Energy Constancy Verification**

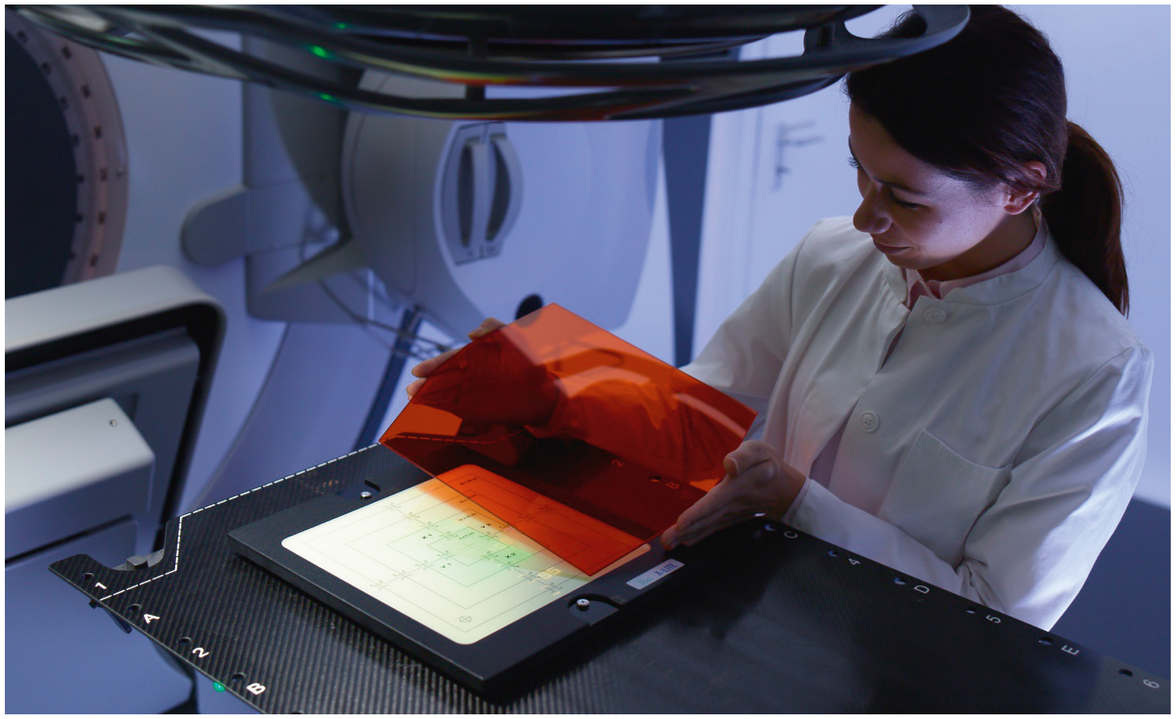
- Specific build-up plates for StarTrack and MatriXX detectors
- Convenient beam constancy verification in one single shot




## Gantry Mount

- To detect dosimetry errors introduced with Linac rotation angles
- Available for MatriXX and StarTrack to attach your detector to all major linac accessory mount interfaces
- Ideal for VMAT commissioning with StarTrack or MatriXX

# Phantoms for Machine QA



**Integrated phantoms and test devices for your comprehensive Machine and Imaging QA needs.**

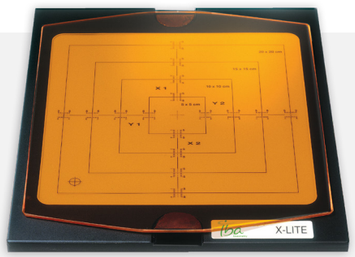
Select from a range of phantoms for dedicated machine QA tasks.

- IBA Dosimetry imaging phantoms for 2D and 3D image quality verification
- Integrate your existing phantoms
  (myQA supports most common imaging phantoms)

## X-LITE

**Light Field Alignment Checks**

- Fast and precise check of the radiation and light fields without film or additional hardware
- Easy setup against the light field
- Fluorescent plate visualizes your radiation field right after the irradiation without additional processing
- Field scales marked with 5 × 5, 10 × 10, 15 × 15, and 20 × 20 cm²

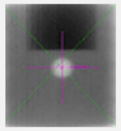



## Cylindrical Phantom

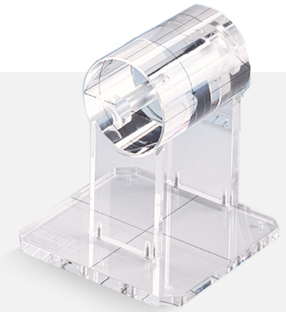
**Dose Constancy and Isocenter Check**

- Verify the mechanical stability of gantry/imager position (CBCT/ EPID) with a small steel ball insert (Winston-Lutz Test)
- Measurement of dose constancy in various gantry angles and in rotational beams
- Adaptors available for most common ion chambers

For more information please refer to the IBA white paper ‘Tg-142_Daily Generic Tests’ and ‘Winston-Lutz & Star Shot Test’



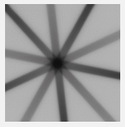
Example of a verification image using the IBA Cylindrical Phantom.



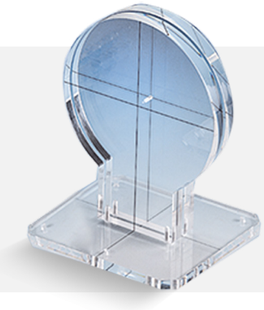
## Disk Phantom

**Isocenter Verification with Film**

- Easy and precise method of verifying isocenter accuracy (e.g. for stereotactic applications, star shot)
- Isocenter is determined by an appendant marker



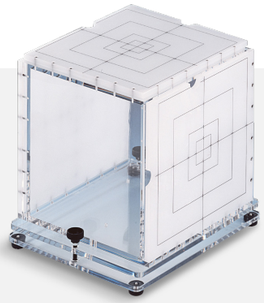
IBA Dosimetry
Disk Phantom: Film with a typical star shot pattern.



## Cubic Phantom

**For light field/radiation field conformance tests as well as for other constancy checks with radiographic film.**

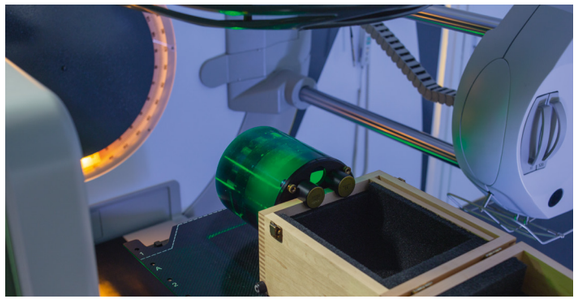
- Horizontal or vertical film placement behind a defined layer of build-up material
- Scribed lines for field size set-up
- Fiducial markers to measure deviations of the radiation field



## Additional QA Hardware Available

- Full set of chambers and diodes
- Reference class electrometers
- Plastic slab Phantoms and chamber inserts
- Round CT and RTPS Phantom

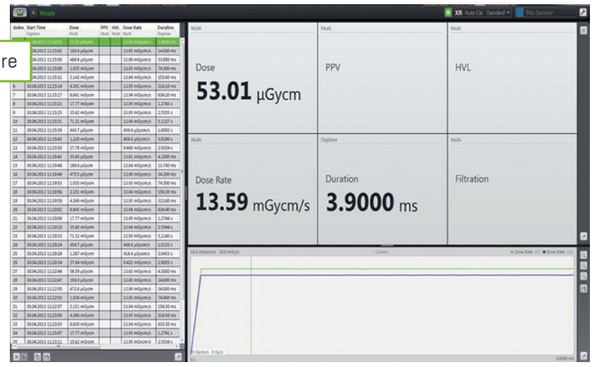
For more information visit iba-dosimetry.com

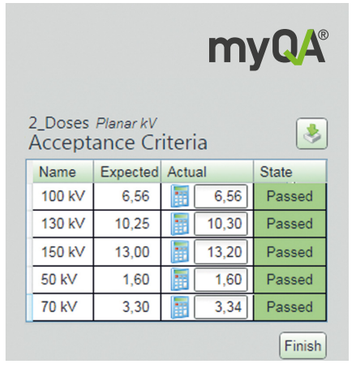


# Imaging QA in Radiation Therapy

1 Setup test plate & MagicMaX XR Multi-Detector for QA of kV imager

1 exposure




2 Comprehensive instant analysis of imaging dose

3 Reporting in myQA

## Image Quality & Imaging Dose QA

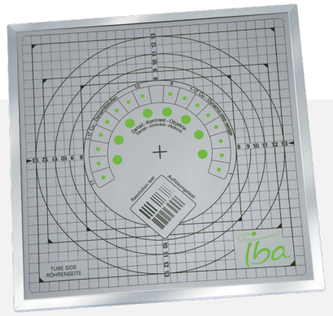
**The affordable solution for all your x-ray and CT imaging QA needs for image quality and dose. Also available as complete solution kits.**

- TG-142: Kit provides all the tools necessary for the Imaging Dose verification with Multimeter MagicMaX
- CyberKnife Imaging QA: Unique efficiency through support of serial exposures

## Primus A

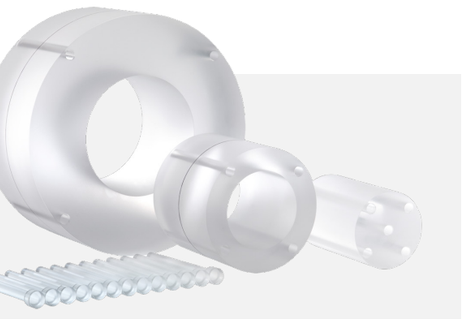
### Test plate for kV planar image QA

- Easy image QA of your IGRT imaging systems or flat-panel imager (EPID)
- Verify complete contrast determination, special resolution, scaling discrepancy, uniformity and positioning offsets



## CT Phantom

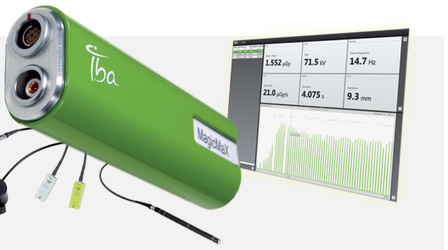
- Innovative 3-part nested PMMA phantom for CTDI measurements
- Designed to image pediatric and adult head and body
- According to FDA performance standard for diagnostic X-ray systems (21CFR 1020.33)



## MagicMaX

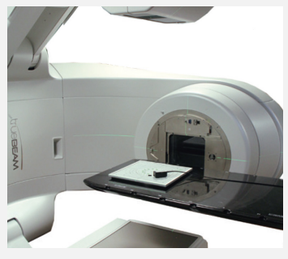
### Imaging-Dose Multimeter

- Fast, simple, and accurate beam analysis and dosimetry for your CBCT, OBI, and CT-Sim, and 2D/3D imaging
- Ideally suited for Varian OBI, Elekta or CyberKnife
- In a single exposure, evaluate your kV beam and imaging dose or flat-panel imager (with the Primus L Test Plate)
- MagicMaX with exchangeable detectors for kV or CT dose measurements

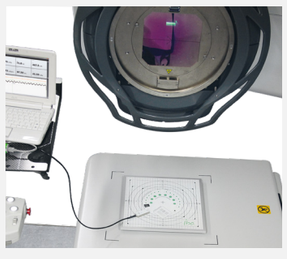



## The Flexible Solution For All Imaging QA Needs In The RT Department

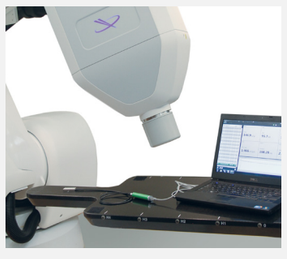
**CT virtual Sim**



**Varian OBI kV /CBCT**



**Elekta kV /CBCT**



**CyberKnife kV**

# Independent and Integrated Machine QA

PROTECT + ENHANCE + SAVE LIVES

## Technical Specifications

| | |
|---|---|
| **StarTrack Detector** | |
| Energy Range | Photons: $^{60}$Co, 4–18 MV, flattened and FFF beams.<br>Electrons: 6–21 MeV. |
| Dose Linearity | 0.5 % from 10 cGy to 5 Gy integral dose. 0.5 % from 0.1 Gy/min up to 4 Gy/min dose rate. |
| $k_{Tp}$ Correction | Temperature [10–40 °C], pressure [70–110 kPa]. |
| Sensor Layout | Chamber arrays organized along main axes and diagonals, 8 additional chambers for energy constancy check. |
| Spatial Resolution | 5mm for horizontal and vertical lines.<br>7mm for diagonals. |
| Chamber Type | Vented plane parallel ionization chambers. |
| Chamber Size | Cylindrical, 3 [ø] x 5 [h] mm, sensitive volume 35 mm$^3$. |
| Typical Sensitivity | 1.1 nC/Gy [$^{60}$Co] |
| Electrometer | 8 TERA ASICs [each contains 64 independent electrometers]. |
| Sampling Time | min. 10 ms |
| Readout | Parallel and synchronous readout with no dead time. |
| **myQA Daily Detector** | |
| Energy Range | Photons: $^{60}$Co, 4–25 MV, flattened and FFF beams.<br>Electrons: 4–25 MeV |
| Dose Linearity | <0,5 % for dose greater than 0,25 Gy and dose rate greater than 0,3 Gy/min |
| $k_{Tp}$ Correction | Yes |
| Sensor Layout | 125 ionization chambers, layout optimized for 10×10 and 20×20 cm$^2$ field measurements |
| Spatial Resolution | 5 mm grid |
| Chamber Type | Vented plane parallel ionization chambers |
| Chamber Size | 3,2 mm Ø, 2 mm height, volume 16 mm$^3$ |
| Typical Sensitivity | 0,53 nC/Gy [$^{60}$Co] |
| Electrometer | Integrated 128 channel electrometer chip |
| Sampling Time | 500 ms |
| Readout | Parallel and synchronous readout with no dead time. |

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