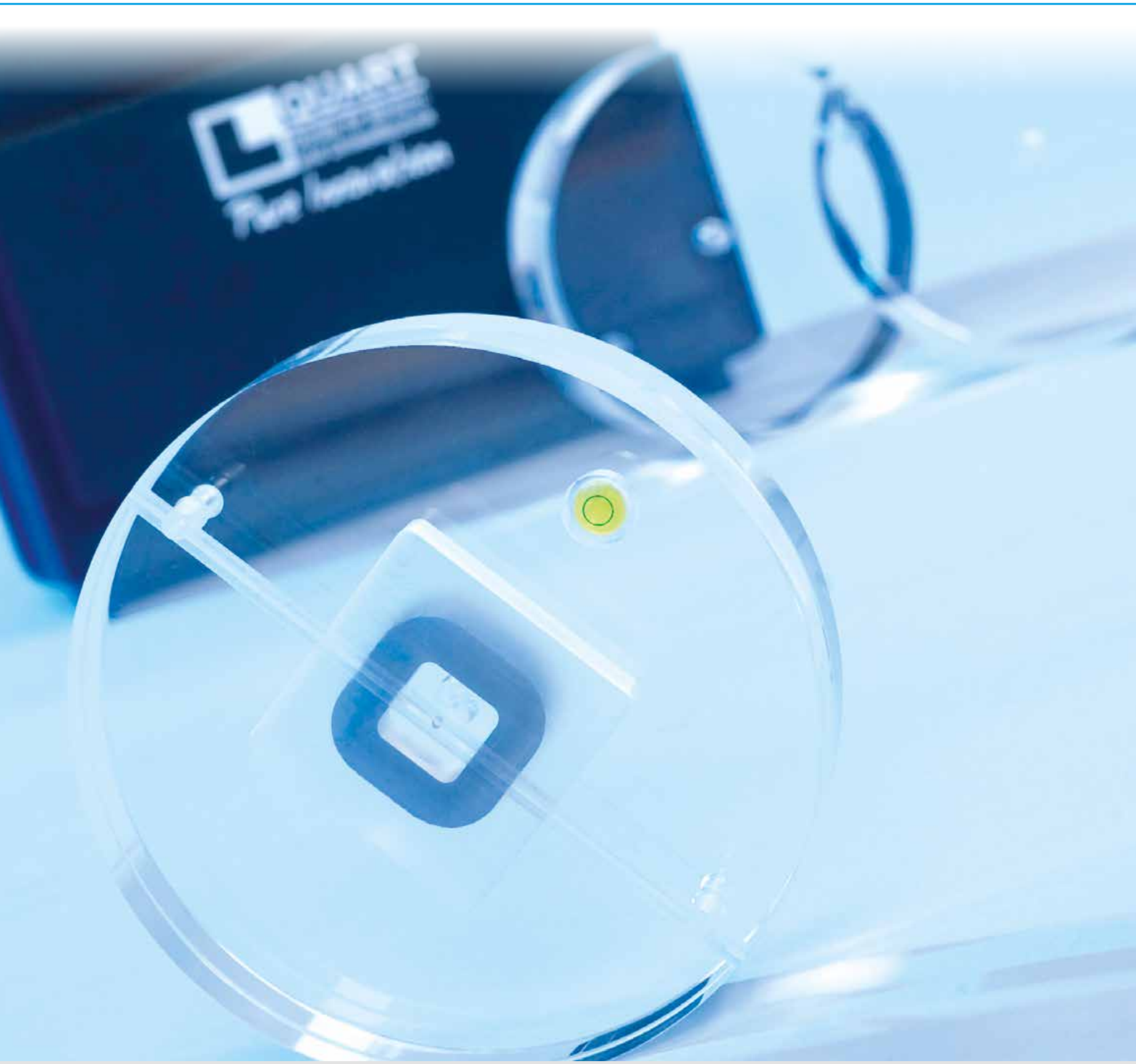
QUART
Quality Assurance in Radiological Technologies

QUART DVTap

ConeBeam CT / DVT Technical Test Phantom



QUART DVTap

Test Phantom for Critical Examination & Manufacturer Testing
of Cone Beam CT and Dental 3D X-Ray Equipment

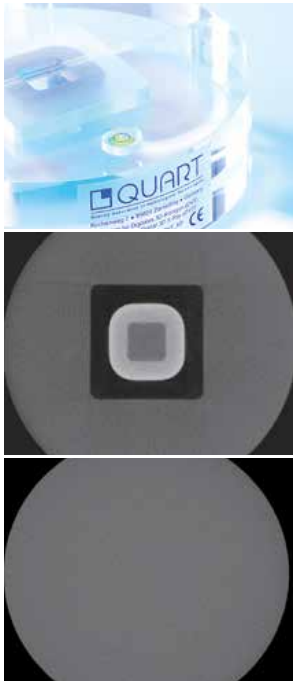
The *QUART DVTap* phantom is designed to be used as a technical tool for QA/QC testing in Cone Beam CT (CBCT), Dental Volume Tomography (DVT) and 3D Imaging applications.

Only one exposure is required to collect all necessary parameters to assess the imaging quality for the x-ray equipment. After the exposure, the image is automatically evaluated through the unique QUART QA/QC software. The test results can be saved or printed out for documentation purposes.

The *QUART DVTap* phantom can be used as QA/QC tool for a wide range of 3D imaging equipment with field sizes from about 4 x 4 cm field-of-view (FOV) and wider.

Customised phantom holders for easy and reproducible positioning are available.

The set consisting of phantom and software is
- DIN 6868-161 compliant for CBCT acceptance tests
- DIN 6868-15 compliant for CBCT constancy tests



Test Phantom

The phantom design is comparable with the design of a standard CT Head Phantom. However, the *QUART DVTap* has additional test objects which simulate structures and materials which are found in the specific anatomical region where the 3D x-ray imaging is applied to.

The standard materials, which are also integrated in the *QUART DVTkp* routine test phantom due to their generic attenuation properties, are free air, soft tissue and bone equivalent.

When imaged, the concentric configuration of the material equivalents directly puts them into the scanning centre of the x-ray equipment where the region-of-interest of an image is generally set.

The phantom body consists of four slabs. The parts which contain the test structures are solidly combined to ensure an easy handling when used for QA/QC procedures.

Two large cylindric slabs are added for scatter simulation purposes as scatter radiation measurement is also part of the Acceptance Test/Critical Examination of X-ray Equipment. Additionally, they are used for uniformity testing in the fringe areas of images compiled with a large FoV.

The *QUART DVTap* has a modular set up and can be modified in case future standards, a new national standard, or specific manufacturer specifications should re-quire additional test objects.

Test Procedure

The QC procedure is very easy and straight forward. It can be carried out by service experts as well as less experienced users.

After the phantom had been positioned in the scan centre, the exposure is initiated. After the exposure, DICOM slice images are directly loaded into the *QUART DVTtec* software. The software will guide the user step-by-step through the evaluation process, collect all data from the test images and create a test protocol.

Since the application of the *QUART DVTap* phantom tends to a technical and scientific validation of CBCT X-Ray equipment, the associated QA software evaluates and provides the exposure data and parameters in full.

(The ***QUART DVTpro*** software which comes with the *DVTkp* phantom is designed for routine test performance and is therefore laid out for ease-of-use in application.)

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QUART DVTtec Software Module

The unique QA/QC software automatically evaluates and displays all collected parameters.

Despite its technical character, the software is easy to use. It provides a walk-through function which assists users in carrying out the QA/QC procedures. The *QUART DVTtec* stores the result of each single test in its internal data bank. In addition, a protocol print-out function is provided for matters of documentation (hardcopy) or general reference.

Test Parameters

_ Nyquist Frequency (NF)
_ Voxel Values
_ Contrast
_ Noise
_ Contrast-to-Noise Ratio (CNR) for different material combinations
_ Homogeneity
_ Modulation Transfer Function (MTF) at 10 % and 50 %
_ Artefacts, Image Flaws, etc.
_ Patient / Phantom Positioning
_ Geometry Test

Phantom Description

_ Size: Ø 16 cm
_ Height: 4 disc setup (2 x 2 cm, 1 x 5 cm, 1 x 6 cm – 15 cm cylinder total)
_ Test Object Equivalents: Free Air, Soft Tissue, Bone
_ Positioning Tools: linear and/or selective markers, spirit level
_ Customised Holders for varying manufacturers available

Delivery includes

- QUART DVTap Test Phantom
- QUART DVTtec Technical Evaluation Software/License
- Manuals
- Transport Case with Foam Insert

Also available

	Variety of customised Holders
QUART DVT Uni Stand	Tripod holder for DVT phantoms
QUART DVTkp	Phantom for Routine QA/QC
QUART DVTpro	Software Tool for Routine QA/QC Testing
QUART dent/digitest	2D Phantom for Routine Dental QA/QC
QUART dent/digitest M2	2D Phantom for Manufacturer QA/QC

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