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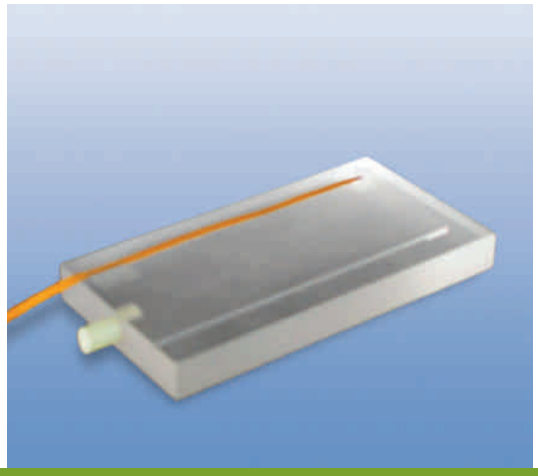
MOSFET Phantom
Phantom for MOSFET dosimeters & Superimposed Film/ Ion Chamber

The XWU-IMRT Phantom (TN-RD-52) is ideal for obtaining quantitative dose measurements for film and MOSFET dosimetry. This 20cm x 20cm block phantom houses film and a minimum of nine MOSFET dosimeters on two orthagonal planes. One of the planes, containing five MOSFET detection points, is the dividing plane of the two sub-phantoms where a film is housed. Five absolute MOSFET dose points on the plane of the film provide dose verification. Easy to use cassettes come with pre-manufactured slots for the dosimeters and allow for greater versatility. (Additional cartdrige for ion chamber comparison also available.)

XWU-IMRT Phantom for 3D dosimetry using MOSFETs.



Grooved cassette for accurate MOSFET positionning

A film placed between the two sub-phantoms using MOSFETs dosimeters for IMRT plan.

Advanced Applications: IMRT

Reliable and efficient MOSFETs are well suited for Quality Assurance in IMRT programs because they provide quantitative dose measurements. Due to their small size and excellent isotropic response, MOSFETs can be positioned in the XWU-IMRT Phantom for treatment planning QA of IMRT procedures. This can be done with single dosimeters or with the linear 5ive Array, both in the phantom and on the patient

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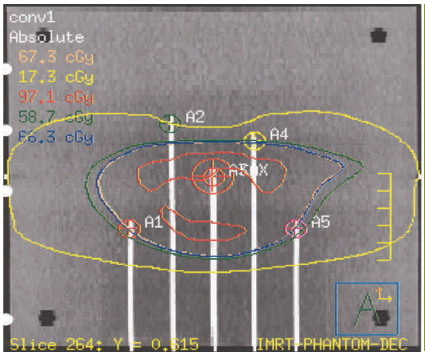
Method

CT images of the phantom are acquired and transferred to the RTP workstation. An IMRT plan is then applied to the phantom with a predetermined iso-center. Computed point doses of all detector locations are acquired and an iso-dose plot of the dividing plane is made. The iso-dose plot includes iso-dose lines correlated to the dose levels of the five detectors. All MOSFETs are calibrated to a known dose.

The phantom is then exposed per IMRT plan with a film placed between the two sub-phantoms. As such, five dosimeters are in direct contact with the film and the film correlates to the plane of the iso-dose plot made earlier. All point doses are accessed through the MOSFET Reader and compared to the data generated from the RTP system.

The film is then developed. A template indicating the five superimposed MOSFET dosimeters is used to mark their location on the film. The iso-dose plot is then superimposed on the film aligned by the five dosimeters. The iso-dose line(s) originated from the five dosimeter points are traced on the film. The dose distribution pattern is then visually compared with the film density pattern. This assures the orientation of the dose distribution, while the five dosimeter points superimposed on the film are used for direct dose verifications. In addition, the other dosimeters further verify point doses distributed on the plane perpendicular to the film.



ABOVE: Dose measurement set-up using mobileMOSFET Dose Verification System.

LEFT: 2D Dose profile using film, with absolute doses at isodoselines given by MOSFETs.

"A film dosimetry system is not necessary as the film is used to verify the pattern of dose distribution relatively. With five dose points' samples on the film and four dose points on an orthogonal plan, this QA procedure is adequate in theory and in practice."
(Dr. Wu, University of Miami)

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