

A comparison of the ISORAD diode and the EDP diode for in vivo dosimetry

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1. Conclusion

Yes, there is a difference between the two diodes. Patient like measurements confirms ISORADs 1% overestimation of the dose. They also confirm the EDP underestimation of dose at large angles of incidence.

The results indicate that by changing to the ISORAD diode, a correction factor for large angles of incidence can be avoided.

2. Introduction

In vivo dosimetry is mandatory during external radio therapy according to Swedish regulations (SSI FS 2000:4, §13)

Due to differences in design, different performance can be expected from different diodes.

The EDP diode is designed with the chip placed perpendicular to the beam incident direction (at zero degrees).

The ISORAD diode is designed with the chip placed parallel to the beam incident direction.

Is there a difference in performance between the two diodes?

3. Method

Two diodes of different design has been compared.

EDP15
(Scanditronix-Wellhöfer)



ISORAD-3
(SunNuclear)



Phantom measurements:

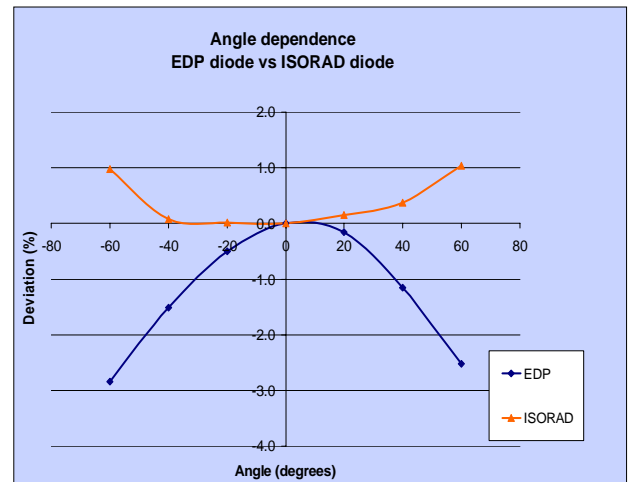
- Energy – 6 MV
- Diodes placed on a square polystyrene phantom along the longitudinal axis.
- Field size 10x10 cm², 150 MU
- Measurements for seven gantry angles; -60, -40, -20, 0, 20, 40, 60 degrees, three measurements per angle.
- Both diodes irradiated at the same time.

Patient like measurements:

- Energy – 6 MV
- Diodes placed on the pelvis of a Alderson Rando Phantom along the longitudinal axis and irradiated at the same time.
- Treatment plan for seven beams of varying angles of incidence created (0-60 degrees).
- Measured dose compared to planned dose.

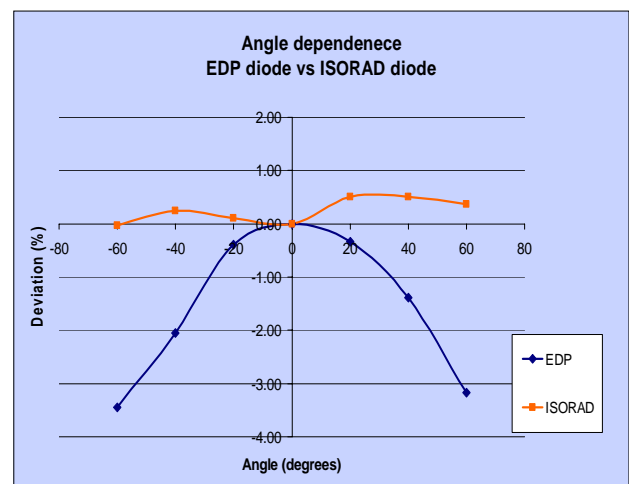
4. Results

Phantom measurements:



The phantom measurements show that the ISORAD diode is less angle dependent than the EDP diode, but it overestimates the dose with 1% as the angle increases. The EDP diode underestimates the dose with 2.5% and 2.8% respective at the same angles.

Patient like measurements:



For angles of incidence close to 0 degrees the difference between the two diodes is small. At larger angles the variation between the diodes increases. The EDP diode underestimates the dose with just over 3 % at 60 degrees while the ISORAD is closer to 0.

This is probably due to the design of the diode as well as the placement of the diode in the field.