

Measuring CT beam width with RaySafe X2



BACKGROUND

This application note explains how to measure CT beam width using the RaySafe X2 R/F sensor and the RaySafe X2 CT sensor.

This method can be used for beam widths of < 10 cm.

INSTRUCTIONS

PREREQUISITES

- RaySafe X2 system with:
 - RaySafe X2 R/F sensor
 - RaySafe X2 CT sensor
- Tools for positioning the X2 sensors in the isocenter.

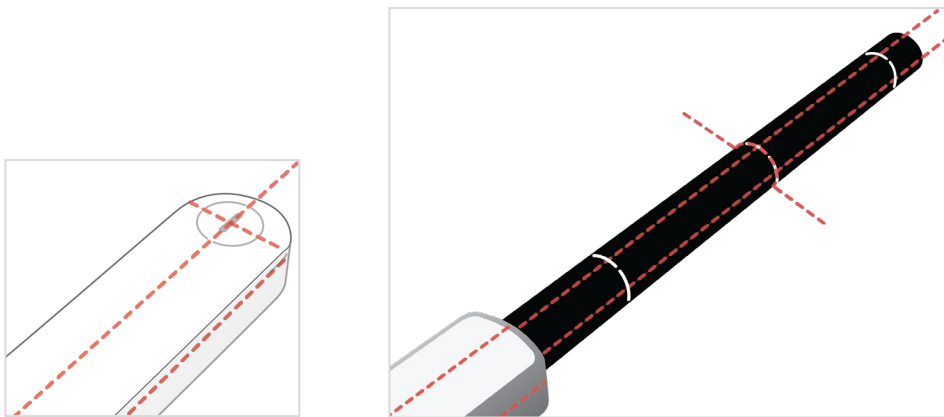


Figure 1 RaySafe X2 sensor positioning in isocenter.

MEASURING CT BEAM WIDTH, STATIONARY TUBE

If the CT machine can run exposures with the tube stationary, use this method.

1. Position the **X2 R/F sensor** at the isocenter, see figure 1. Make sure that the R/F sensor area can be fully exposed.
2. Expose with an exposure time of about 1 second. Note the **dose** (mGy)¹ from the X2 screen.
3. Change to the **X2 CT sensor**. Position it at the isocenter, see figure 1. Make sure that the whole beam is within the 10 cm outer markings on the CT sensor during the whole exposure.
4. Expose the CT sensor using the same settings that were used with the R/F sensor. Note the dose length product, **DLP** (mGy \cdot cm) from the X2 screen.
5. Calculate the beam width according to the formula:

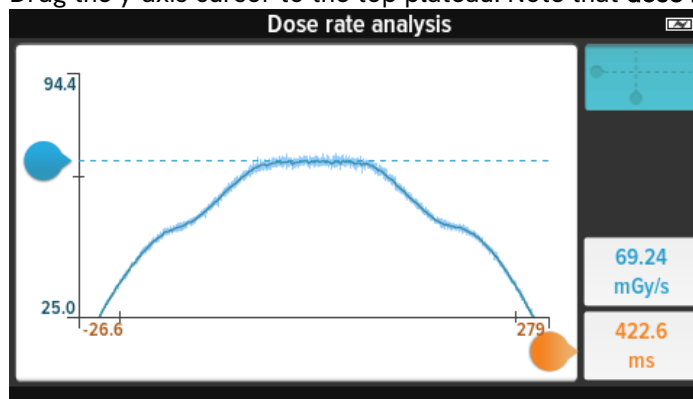
$$\text{Beam width [cm]} = \frac{DLP_{CT} [\text{mGy}\cdot\text{cm}]}{\text{dose}_{R/F} [\text{mGy}]}$$

¹ Gy and Gy \cdot cm can be substituted with R and R \cdot cm, using the same method and formula.

MEASURING CT BEAM WIDTH, AXIAL ROTATION

If the CT machine's gantry rotates during the exposure, use this alternative method.

1. Position the **X2 R/F sensor** at the isocenter, see figure 1. Make sure that the R/F sensor area can be fully exposed.
2. Expose with one axial rotation.
3. Find the dose rate using the dose rate waveform on the base unit screen:
 - a. Tap on the dose rate value to maximize.
 - b. Swipe left to view the waveform.
 - c. Tap the cursor button (upper right corner) to activate cursors.
 - d. Zoom in (pinch on screen) to see the part of the waveform where the R/F sensor is facing the radiation source.
 - e. Drag the y-axis cursor to the top plateau. Note that **dose rate** (mGy/s).



4. Change to the **X2 CT sensor**. Position it in the isocenter, see figure 1. Make sure that the whole beam is within the 10 cm outer markings on the CT sensor during the whole exposure.
5. Expose the CT sensor using the same settings that were used with the R/F sensor. Note the dose length product, **DLP** (mGycm) and the **time** (s) from the X2 screen.
6. Calculate the beam width according to the formula:

$$Beam\ width\ [cm] = \frac{DLP_{CT} [mGycm]}{dose\ rate_{R/F} [mGy/s] * time_{CT} [s]}$$

CONTACT

Please visit <http://www.raysafe.com> for contact information.