



**X-Line™**  
Radiopaque Adhesive

For radiotherapy, X-Line™ allows for easy and accurate body contouring of CT images within the extended field of view.



**The following CT simulators are most affected**

GE Lightspeed RT and Siemens SOMATOM RT series models need X-Line to treat obese patients

**Three radiopaque lines on an adhesive**

The lines are spaced 1" apart on a transparent skin adhesive roll with perforations every 2".

Adhere to regions that may fall within the eFOV, orienting the lines along the patient longitudinally.

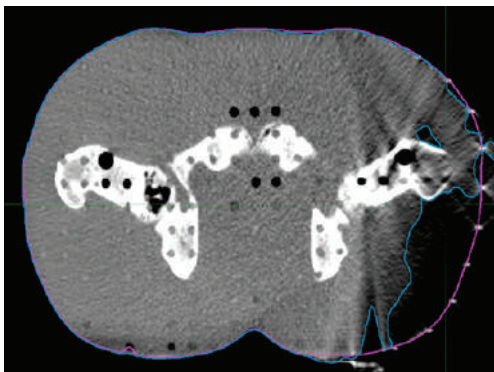
The lines create hyperdense dots in the CT slices; connect-the-dots™ to contour the body.

**Effectively contour obese patients**

More than 100,00 obese cancer patients in Canada and the United States<sup>1-3</sup> cannot be accurately contoured with most CT simulators.<sup>4,5</sup>

“X-Line allows for more accurate delineation of the external body contour in the extended field of view (eFOV) by simply connecting the dots on the CT image.”

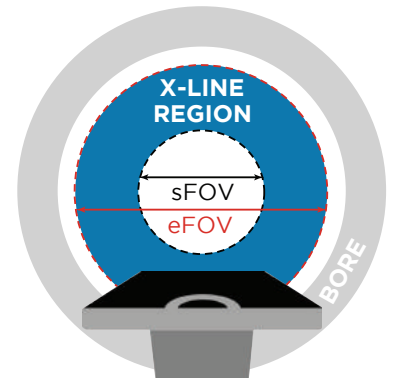
*Dr. Kirpal Kohli, Medical Physicist BC Cancer Agency*



Body shaped CT phantom that falls within the eFOV. The X-Line dots show the true contour in purple.



X-Line is applied over regions that are likely to protrude into the eFOV.



X-Line is useful for imaging patients within the eFOV of CT simulators.

Current methods of eFOV body contouring are inaccurate and may be harmful

**Guessing the body contour**

Guessing the body contour around distortion puts the patient at risk for improper treatment doses.<sup>6-10</sup> Displacement of 1-5 cm into the eFOV can result in distortions of up to 15% of the CT slice area.<sup>10</sup>

**Relying on software**

Image reconstruction software makes distorted regions appear clearer, but does not improve the accuracy of the resulting contour.<sup>5</sup> Patients are similarly at risk of improper radiation treatment doses.<sup>6-10</sup>

**Fusing multiple CT scans**

When multiple scans are used to image distorted regions,<sup>11,12</sup> patients are exposed to unnecessary X-ray radiation.<sup>9,13</sup> Extremely obese patients can experience up to 70-80 times the effective radiation dose of normal-weight patients.<sup>14</sup>

**A Proposed Solution to Accurate Delineation of External Body Contour Within CT Extended Field of View (eFOV) and the Evaluation of Dosimetric Impact From Image Distortion in eFOV**

Huang V, Kamarn J, D'Arcy R, Kohli K  
Presented at AAPM 2016, July 2016

“With the aid of X-Line, the external body contour was accurately delineated within the eFOV.”  
“X-Grid provides clear visualization of body anatomy extending beyond the sFOV.”



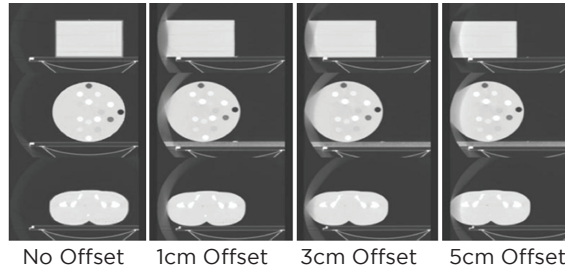
**An assessment of image distortion and CT number accuracy within a wide-bore CT extended field of view**

Beeksma B, Truant D, Holloway L, Arumugam S  
Published in Australasian Physical & Engineering Sciences in Medicine, June 2015



“For all phantom geometries, objects within the eFOV were geometrically **overestimated... from 0.22 to 15.94 %...**”

“... significant image artefacts from the eFOV reconstruction alter the... geometric contours of shapes within this region.”



**Figure 4**  
Rectangular, circular, and body-shaped phantoms offset 0, 1, 3, and 5 cm into the eFOV

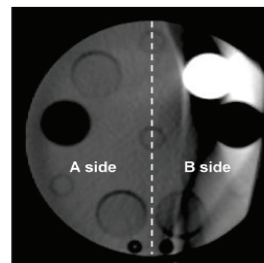
**Dosimetric impact of image artifact from a wide-bore CT scanner in radiotherapy treatment planning**

Wu V, Podgorsak M, Tran T, Malhotra H, Wang I  
Published in Medical Physics, June 2011



“... artifacts from eFOV reconstruction are inevitable, with image distortions spreading out laterally...”

“The SSD distortion alone can cause a target dose calculation reduction of 2%–3%”



**Figure 6**  
Image of the mini CT phantom located in the vicinity of the outer region of 65 cm eFOV where the “A” side was completely within the sFOV and the “B” side was within the eFOV.

**REF Code Description**

**X-Line™ 50L1 50ft roll**

Distributed by  
**Beekley Corporation**  
One Prestige Lane  
Bristol, CT 06010 USA  
Tel: 1-800-233-5539 or +1-860-583-4700

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