

**part number**  
**CCT228**

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### ATCM Phantom

Automatic Tube Current Modulation (ATCM) is used on CT scanners to obtain a target image quality across varying patient attenuations along a scan. ATCM is an invaluable tool when optimizing CT scans with respect to radiation dose and image quality. The effectiveness of ATCM varies with different technique parameters and the applied ATCM differs between manufacturers.

The CCT228 ATCM Phantom, developed in cooperation with researchers from the Karolinska University Hospital (Deborah Merzan, Patrik Nowik, Gavin Poludniowski and Robert Bujila)<sup>[1]</sup> assists CT operators in characterizing ATCM performance.

The phantom is cast in a single piece from rugged Catphan® Uniformity Material. This phantom allows for both the image noise as well as applied tube current to be evaluated in three different sized oval sections to demonstrate how the ATCM compensates for variations in torso sizes. The phantom can also be used to assess the effects of variations in patient alignment.

The 65cm long phantom consists of 3 ellipsoidal sections. Each ellipsoid is 15 cm in length with a 3:2 ratio; 25:16.7 cm, 30:20 cm and 35:23.3 cm sizes, which is appropriate for modern CT scanners with spiral collimation widths up to 80 mm and which use simultaneous longitudinal and angular ATCM. Smooth transitions are provided between the sections and the ends are rounded. The phantom

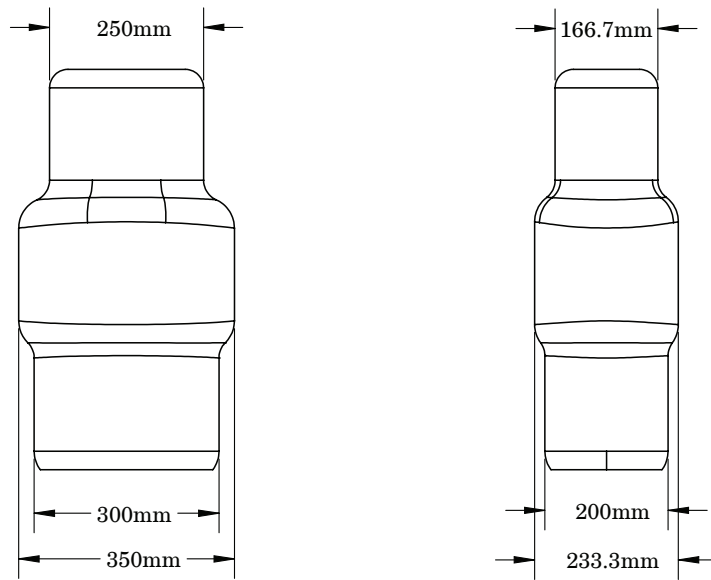


### The Phantom Laboratory

**phone**  
800-525-1190 or 518-692-1190  
**fax**  
518-692-3329

**mail**  
P.O. Box 511  
Salem, New York 12865  
**shipping**  
2727 State Route 29  
Greenwich, New York 12834

**email**  
info@phantomlab.com  
**web**  
www.phantomlab.com



has 1.6 mm diameter teflon markers on the side and top to assist with aligning the phantom using the CT scanner's positioning lasers.

The phantom is designed to be first scanned with a scan projection radiograph (SPR) which is used by ATCM algorithms to estimate patient attenuation. Various scan parameters or phantom repositioning may be applied to investigate how the ATCM is affected. The resulting CT image set is used to evaluate the applied tube current and resulting image noise at different slice locations along the phantom. This methodology can be used to both inform optimization efforts or in conjunction with QC to test the constancy of a scanner's ATCM.

To better understand the full effects of different imaging parameters the Catphan® phantoms can be used for a comprehensive image performance evaluation.

#### References

- [1] Merzan D, Nowik P, Poludniowski G, Bujala R. Evaluating the impact of scan settings on automatic tube current modulation in CT using a novel phantom. *The British Journal of Radiology*. 2016 Dec 20;90(1069)



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**phone**  
800-525-1190 or 518-692-1190  
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**mail**  
P.O. Box 511  
Salem, New York 12865  
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2727 State Route 29  
Greenwich, New York 12834

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**web**  
www.phantomlab.com