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# Nesting Doll Dimensional Analysis by X-ray CT

## About the sample: Nesting doll

Nesting dolls also called matryoshka dolls are a set of wooden dolls of decreasing size placed one inside another. We don't believe that there is a huge demand to analyze these wooden dolls non-destructively, but a matryoshka is a good example to use to demonstrate the ability of dimensional analyses using X-ray CT ([computed tomography](#)). [The largest set of matryoshka dolls](#) is a 51-piece set hand-painted by Youlia Bereznitskaia (Russia) with the largest at 1 ft 9.25 in (53.97 cm) tall and the smallest at 0.125 in (0.31 cm) tall.

## Analysis procedure

1. In this example, a five-piece matryoshka was scanned using a micro-CT scanner, [CT Lab HX](#).
2. The external and internal surfaces were detected using the [ISO-50 surface determination](#) technique.
3. The sizes of individual dolls were analyzed.

### 1. CT scan

A five-piece 3 1/4 inch (82 mm) tall matryoshka was scanned to produce the 3D grayscale CT image.

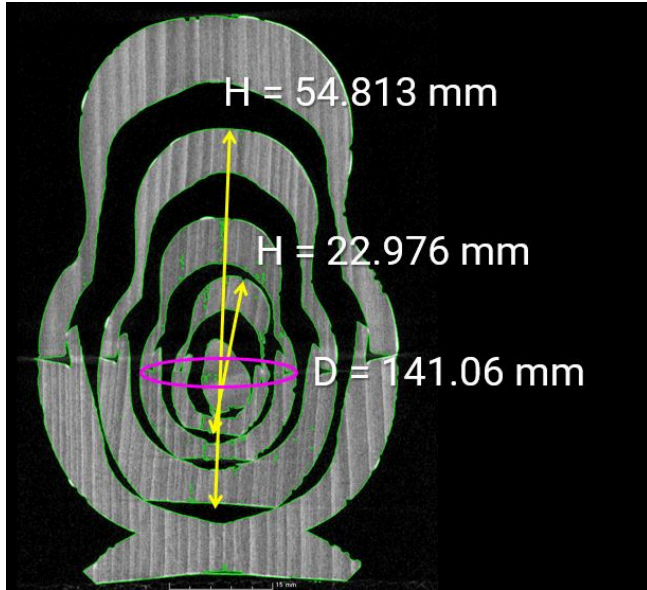


### 2. Surface detection

The X-ray CT cross-section reveals four dolls nested inside of the largest and most outer doll. The external and internal surfaces were detected using the [ISO-50 surface determination](#) technique.

### 3. Dimensional analysis

As shown in the figure, the height and diameter of each doll were measured without opening the nesting dolls.

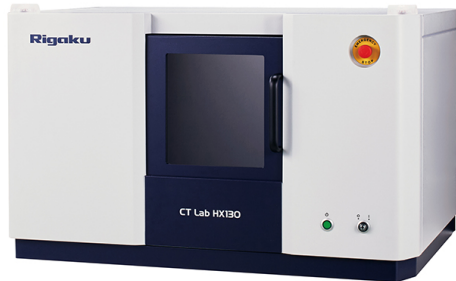


#### Extra: 3D rendering

This video shows a 3D rendered view and cross-sections of the X-ray CT scan collected on the matryoshka doll used in this example.

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## Related products



### CT Lab HX

High-resolution benchtop microtomography of large samples