

# MicroCT Bar Pattern Phantom

## QRM-Barpattern-Phantom

The Micro-CT Bar Pattern Chip Phantom is a perfect tool to assess in-plane and axial spatial resolution of many Micro-CT systems in a direct visible manner.

The bar pattern chip offers a good alternative for indirect methods to evaluate spatial resolution in high res X-ray imaging modalities. The phantom comprises two silicon chips, one orientated in-plane and one perpendicular (axial) orientated to it. The phantom is available with chips placed in a full resin cylinder or fixed on a slim support in a hollow (airfilled) cylinder (both machined with high mechanical accuracy).

The 5 x 5 mm<sup>2</sup> chip contains bar (trenches) and point pattern with diameters from 5 to 150 μm line/point thickness.

The depth of the structures varies between 80 and 120 μm.

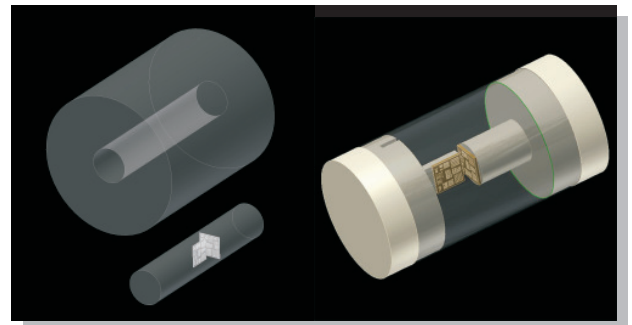
The different structures on the chip are arranged in such a way over the chip, that spatial resolution can be evaluated in the center as well as in the periphery of the image/chip in a single measurement.

linewidth [μm]	linepairs / mm
5	100
10	50
15	33.3
20	25
25	20
30	16.6
50	10
100	5
150	3.3

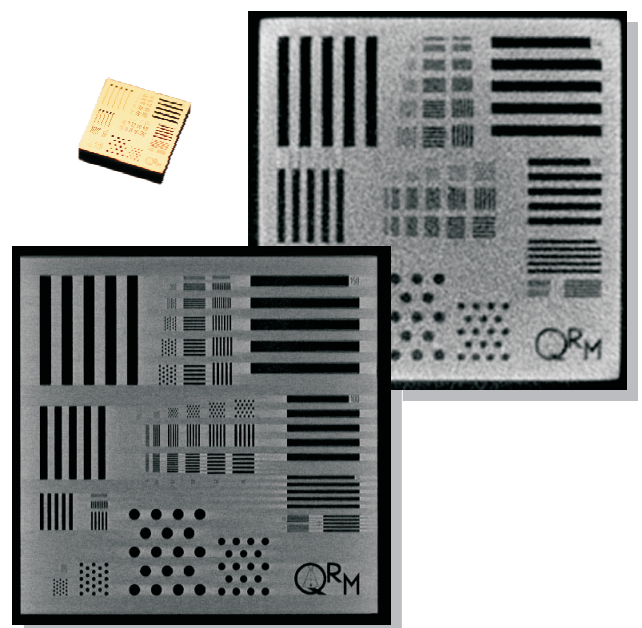
Bar / line pattern on the silicon chip



QRM-MicroCT-Barpattern  
(in air and resin)

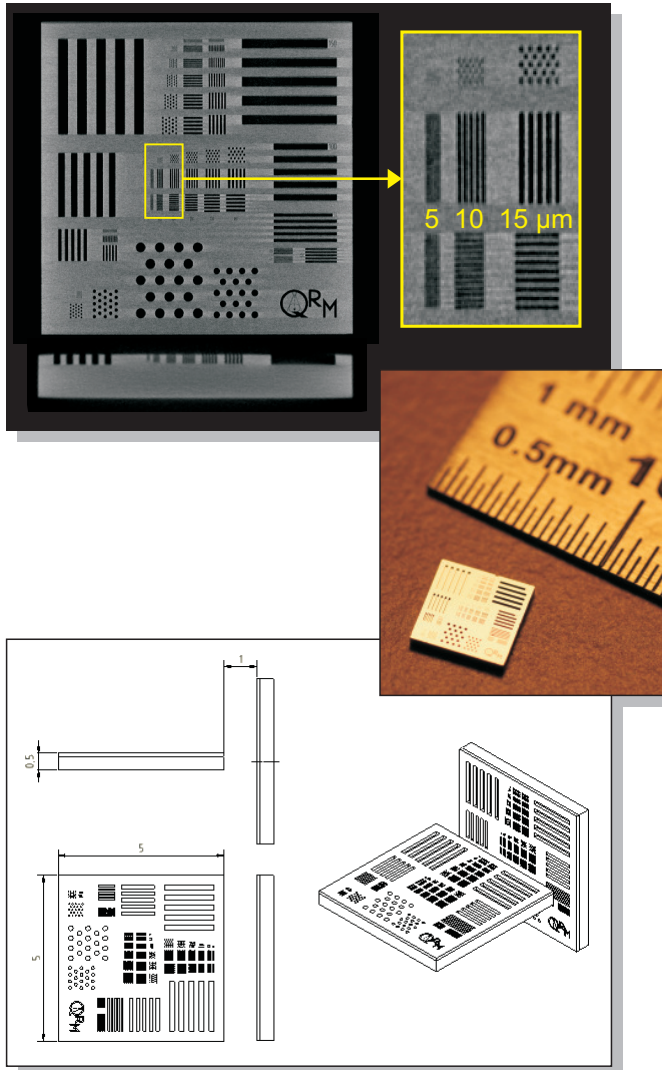


QRM-MicroCT-Barpattern (3D rendering)



Micro-CT scans in air (left) with 5.5 μm voxel size  
and in resin (right) with 40 μm voxel size

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orientation of the bar pattern chips in phantom

## Specifications

### QRM-MicroCT-Barpattern-Phantom (resin)

Material of phantom ..... resin  
 Material of chip ..... silicon  
 Contrast ..... silicon / resin  
 Diameter ..... 8 mm  
 Total length ..... 40 mm  
 Weight ..... ~ 10 g

The resin cylinder, including two chips, is available in other diameters above 8 mm upon request.  
 Adapter/Extension cylinders are available as well.

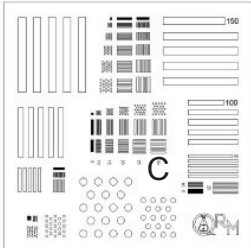
### QRM-MicroCT-Barpattern-Phantom (air)

Material of phantom ..... air / plastic  
 Material of chip ..... silicon  
 Contrast ..... silicon / air  
 Wall thickness ..... 0.2 mm  
 Diameter ..... 20 mm  
 Total length ..... 40 mm  
 Weight ..... ~ 8 g


Chips are placed centrally in the phantom on a slim support.

Please note that the chips are not intended to be used for planar radiography.


A




B



C



D



Block	linewidth (µm)	linepairs per pattern	points (µm)	points per pattern
A	5, 10, 25, 50, 100, 150	5		
B	5, 10, 15, 20, 25, 30	5	5, 10, 15, 20, 25, 30	18
C	5, 10, 15, 20, 25, 30	5	5, 10, 15, 20, 25, 30	18
D			5, 10, 25, 50, 100, 150	18
E	5, 10, 25, 50, 100, 150	5		

**References:** Langner O., Karolczak M., Rattmann G. and Kalender W. A.; Bar and Point Test Patterns Generated by Dry-Etching for Measurement of High Spatial Resolution in Micro-CT; 2009; IFMBE Proceedings, World Congress on Medical Physics and Biomedical Engineering, September 7 - 12, 2009, Munich, Germany Vol. 25/2, 428-431 Diagnostic Imaging