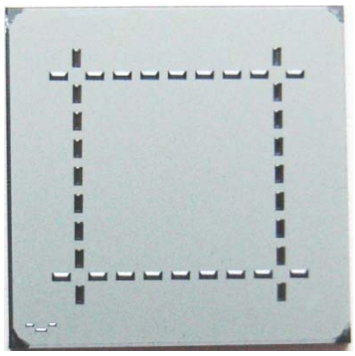
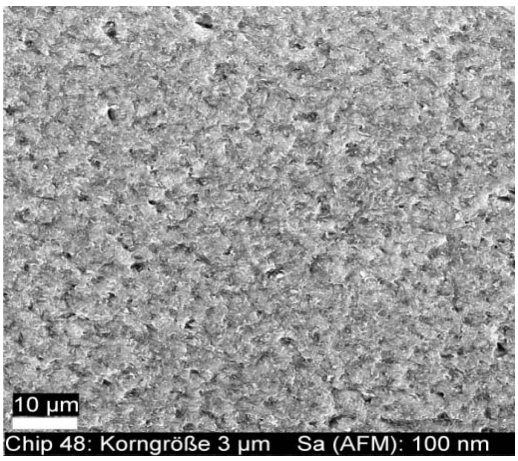


Roughness Standard **ARS** (areal)

Type ADT

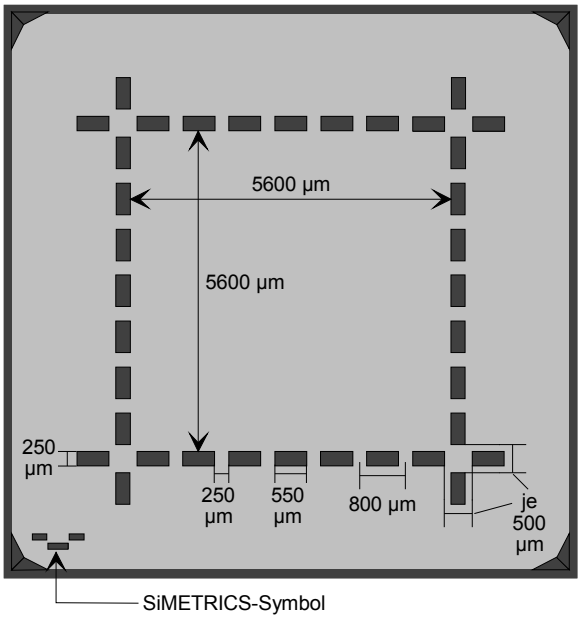
1. Surface Structure and Roughness Characteristics



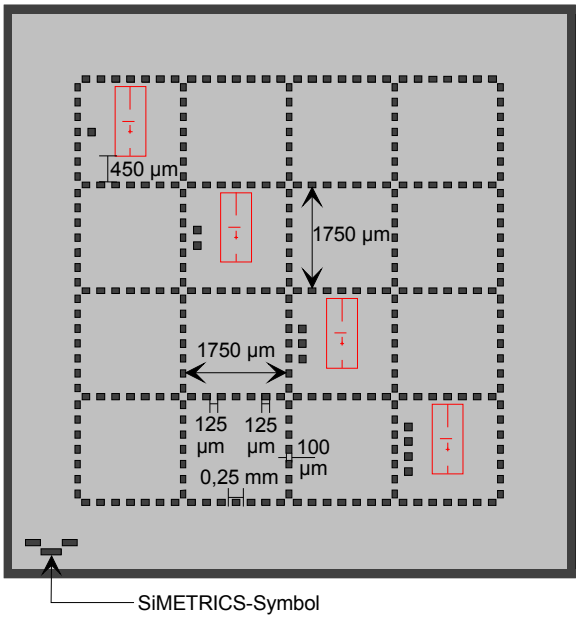
The rough surface is formed by a lapping process. The resulting roughness mainly depends on the size of the used grains. The rolling grains break off particles from the surface and produce deepenings which are randomly distributed. Consequently the roughness is uniform and independent on the direction at the surface and therefore suitable as an isotropical areal roughness standard.

2. Markers

In order to perform defined measurements the roughness standards contain different markers (etched grooves). Different kinds of marker systems are used:

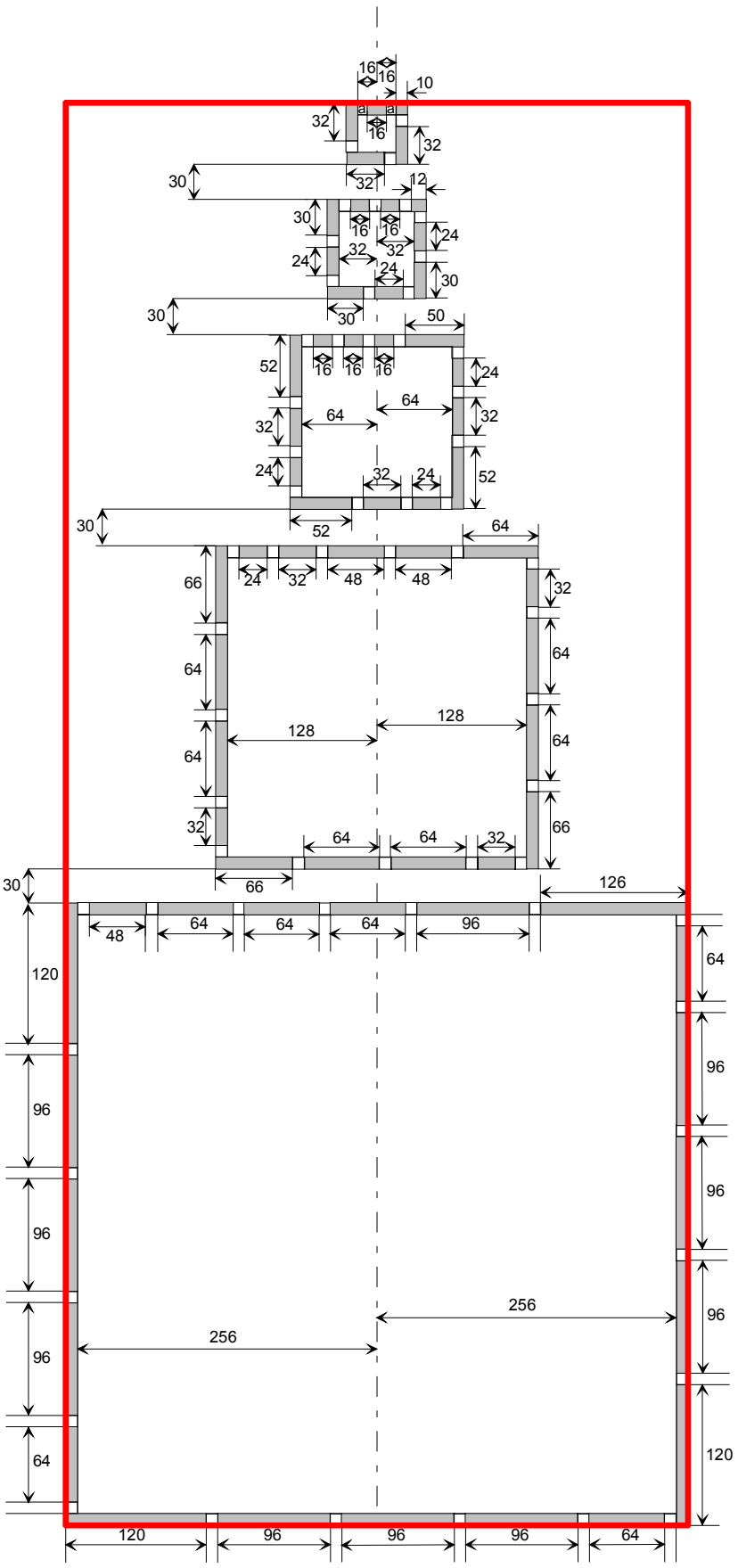


Type c (coarse)
Pattern of markers used in the case the roughness parameter Sa is **> 100 nm**. This pattern frames a quadratic field having an edge length of 5.6 mm according to 7 × λc with λc = 0.8 mm.



Type f (fine)
Pattern of markers used in the case the roughness parameter Sa is **< 100 nm**. This pattern frames 16 quadratic fields each having an edge length of 1.75 mm according to 7 × λc with λc = 0.25 mm.

Inside the red lines of the 4 fields along the diagonal of the pattern (numbered by quadratic grooves at left) further quadratic fields are marked with edge lengths of 512, 256, 128, 64 or 32 µm, see next picture. These quadrates frame areas for the measurement with interferometric or confocal microscopes or an AFM. By the characteristic sequences of grooves the quadrate can be identified in small optical fields of view.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3. Application

Operation Procedure

The ARS can be used with tactile or optical instruments or AFMs.
Different procedures are possible:

• Tactile measurement of roughness
According to DIN EN ISO 4287 12 profiles must be performed: 6 scans parallel to x-, 6 scans parallel to y-direction inside one of the fields, the distance between the scans and to the marker grooves is λc.
According to ISO/FDIS 25178 an areal measurement can be performed inside fields with definite distances to two perpendicular marker grooves.

• Optical measurement of roughness
According to ISO/FDIS 25178 an areal measurement can be performed inside fields with definite distances to two perpendicular marker grooves or inside one of the quadrats inside the diagonal fields in the case of Sa < 100 nm.

For calibration resp. measurement under definite conditions please contact SiMETRICS for more information.

4. Packaging, Handling and Cleaning

For a better handling the standards are mounted on borosilicate glass as substrate. The chips are mounted by an epoxy resin adhesive.
The standards are stored in a membrane box. The surface does not come into contact with the membrane.
Do not touch the standard especially the regions determined for measuring and calibration. Use suitable (plastic) tweezers for handling.
For cleaning the standards please contact SiMETRICS for a cleaning process.

5. Assortment and Specification

The ARS are available with coarse (c) and fine (f) roughness and polished surface

Type	Typical Roughness / nm (measured) Ra *	Sa **
ARS c1	950	1100
ARS c2	530	680
ARS c3	230	290
ARS f1	70	120
ARS f2	35	80
ARS f3	8	20
ARS p	1	< 5
	values filtered with λc 0,8 resp. 0,25 mm	values without filters

Type ARS p is available with both patterns of markers.

Typical values are measured with:
* a tactile surface profiler, tip radius 2 µm
** a confocal microscope 50 x