

A Quenching & Deformation Dilatometer (TA instruments DIL 805A/D/T) is now operational at the Heinz Maier-Leibnitz Zentrum (MLZ). It is customized for running neutron scattering measurements during temperature/deformation treatment of the sample, in particular neutron diffraction (phase, texture, stress/strain) at STRESS-SPEC and neutron small-angle scattering (nanostructure) at SANS-1. The dilatometer offers a simultaneous high-precision measurement of the length changes of bulk samples at all times, also when heating/cooling or deforming the sample, adding an additional measurement quantity that is sensitive to transformations in the sample. The combination of the neutron and dilatometry measurements yields a unique view on the microstructural evolution under thermomechanical treatment. The sample can be inductively heated and gas cooled according to a user-defined linear or exponential cooling rate. The temperature range is currently from room temperature up to 1500°C. The heating rate can be up to 100°C/s, while specimens can be deformed with deformation rates between 0.01 and 200 mm/s. Depending on user demand, the temperature range can be extended down to -160°C with an additional furnace configuration.

Information of Dilatometer at SANS-1:

	Alpha/Quenching mode	Compression mode	Tension mode
Temperature Range	50°C to 1400°C (depends on material and modes)		
Temperature Resolution	0.05°C		
Heating rate	60°C/s	40°C/s	20°C/s
Cooling rate	150°C/s	150°C/s	100°C/s
Length change	10 nm	50 nm	50 nm
Deformation force		Up to 20 kN	Up to 8 kN
Deformation rate		0.01 – 200 mm/s	0.01 – 20 mm/s
Strain rate		0.001 – 20 s ⁻¹	0.001 – 20 s ⁻¹

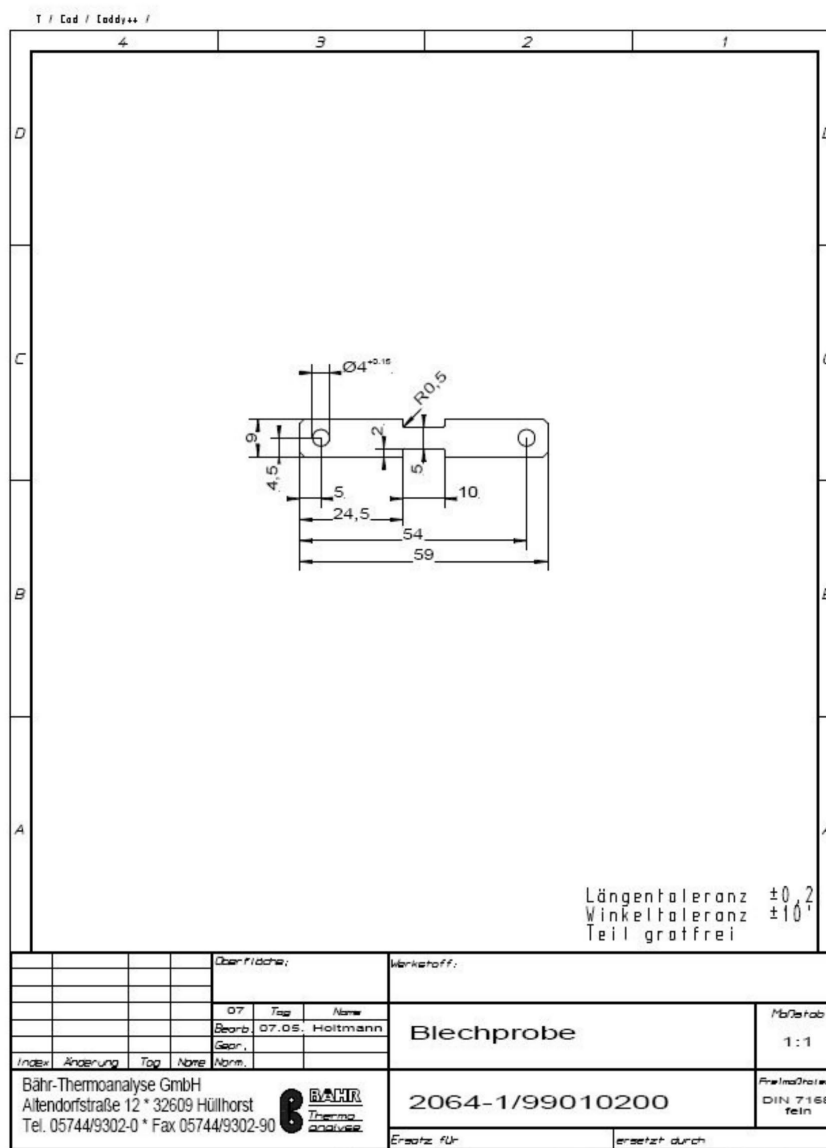
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7.0.2. Tension sample Iron Sheet 10x5



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7.0. Proben

7.0.1. Tension sample

