

In-situ testing stages for XRM/ μ XCT

Applications:

- Polymer & metal foams
- Metals & composites
- Rock core analysis
- Biological & life science

Features:

- 360° clear line of sight for complete reconstruction
- Tensile/compression & torsion options
- Heating and cooling
- Loads up to 20kN / 0.1kNm
- Liquid bath & gas chamber options
- Triaxial testing planned

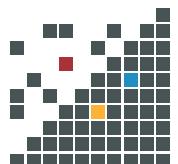
Conventional tensile testing provides information on the tensile and compressive strength of a material but no information on physical changes to the internal structure. By using X-Ray microscopy together with in-situ tensile testing and heating or cooling, dynamic microstructural observations can be observed from within the sample providing new insights into materials research.

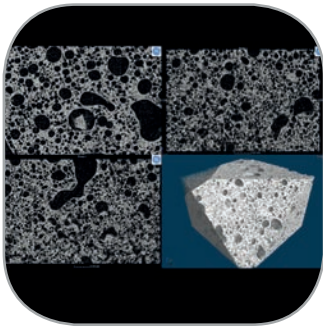
In-situ systems are specifically designed for X-Ray microscopy systems and provide tensile & compression loading from a few N up to 20kN and simultaneous torsion loading to 0.1kNm on the larger open frame systems.

Applications are varied with systems being used for testing paper/cardboard, fibres, polymer foams, biological & life science samples at low forces. At higher forces systems are being used to test metal foams, artificial joints, automotive components and turbine blades. In the petrochemical industry much work is carried out analysing core samples, we have users testing such cores in liquid baths and we are working on a full triaxial system for XRM.

Tensile stages are available with optional 3 & 4 point bending clamps and are controlled from comprehensive Windows software via USB or RS-232 interface.

Also available is a stage without tensile capability, providing heating/cooling only. This stage can be used for observing small frozen samples or samples at elevated temperatures.





XRM In-situ stage range summary:

CT160: Heating & cooling holder for cabinet based XRM (μ XCT) systems with Peltier temperature control from -20°C to $+160^{\circ}\text{C}$.

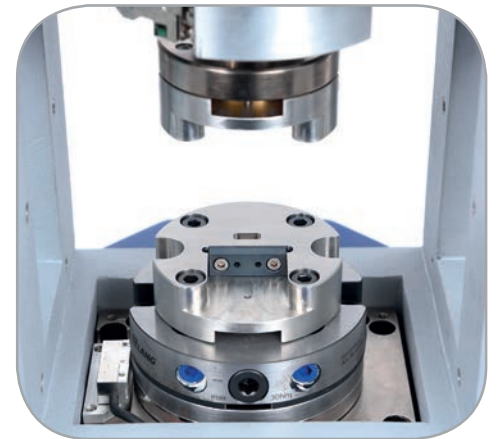
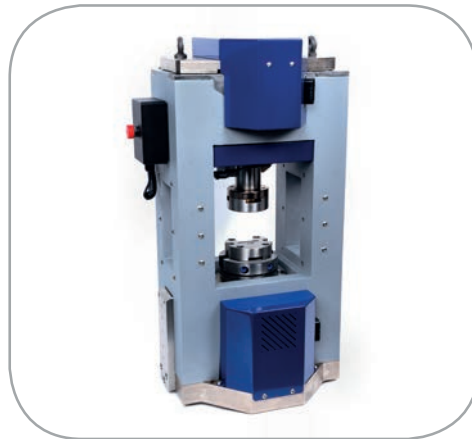
CT500: Low load stage for cabinet based XRM (μ XCT) systems with a polymer support tube holding the top jaw. Suitable for high resolution imaging of small samples under tension or compression with a maximum tension or compression force of 500N.

CT5000: Flexible 5kN stage for cabinet based XRM (μ XCT) systems with exchangeable loadcells. Available in room temperature, heating/cooling or heating only configurations as well as with a liquid bath. Applications include observation of rock cores, composite materials, man-made foams & metallic samples.

A 3mm thick vitreous glassy carbon tube supports the top jaw and provides low X-Ray attenuation. Loadcells from 500N to 5kN can be user exchanged. Room temperature version has no heating or cooling but can be upgraded at a later date. TEC version uses peltiers and cartridge heaters for temperature control in the range -20°C to $+160^{\circ}\text{C}$. H250 version has heating from room temperature to $+250^{\circ}\text{C}$.

CT10kN/CT20kN: Open frame tension/compression/torsion stages suitable for large cabinet or room based XRM (μ XCT) systems and beam lines. No support tube enables high resolution without attenuation, step rotation is controlled by the stage.

Applications include observation of turbine blades, rock cores, composite materials as well as testing of new super alloys and composites for aerospace and power generation industries. Various liquid and gas chambers are available, heating and cooling options with heated jaws and IR heating is possible to 750°C or more. The system can also continuously rotate for high speed synchrotron imaging applications.



Stage	Max load	Exchangeable Loadcells				Loadcell options	Heating	Cooling	In-Liquid
			Tensile	Compression	Torsion				
CT160	-	-	-	-	-	-	✓	✓	-
CT500	500N	-	✓	✓	-	50N,200N,500N	-	-	-
CT5000	5kN	✓	✓	✓	-	1kN,2kN,5kN	✓	✓	✓
CT10KN	10kN/0.1kNm	✓	✓	✓	✓	10kN/0.1kNm	✓	✓	✓
CT20KN	20kN/0.1kNm	✓	✓	✓	✓	(10kN, 20kN)/0.1kNm	✓	✓	✓

