

## Anisothermal stress relaxation test for characterizing elastomers and polymers

The C.W. Brabender® TSSR meter (TSSR = Temperature Scanning Stress Relaxation) measures the thermo-mechanical properties of elastomers and polymers subjected to a constant stress at a constantly rising temperature.

The measuring data supply reliable information about the phase morphology of the material tested. Apart from that, this instrument allows to assess the modification of polymers with various additives and to determine the properties of such modified substances.

**TSSR meter**

### The method

The anisothermal stress relaxation test (AISR) is a new test method for characterizing the thermo-mechanical properties of elastomers and polymers. It consists in subjecting a test specimen to a constant tensile stress at a constantly rising temperature. The stress relaxation is measured as a function of time and is recorded and evaluated.

The AISR test method, originally developed for determining the upper service temperature and relaxation spectrum of thermoplastic elastomers (TPE), has proven to be perfectly suited for testing conventional elastomers and polymers as well.

In contrast to conventional relaxation tests carried out at a constant temperature, the temperature in the AISR test rises continuously at a defined heating rate, allowing the determination of the maximum service temperature and relaxation spectrum of the sample material.



# Features and Specifications

## C.W. Brabender® - TSSR meter

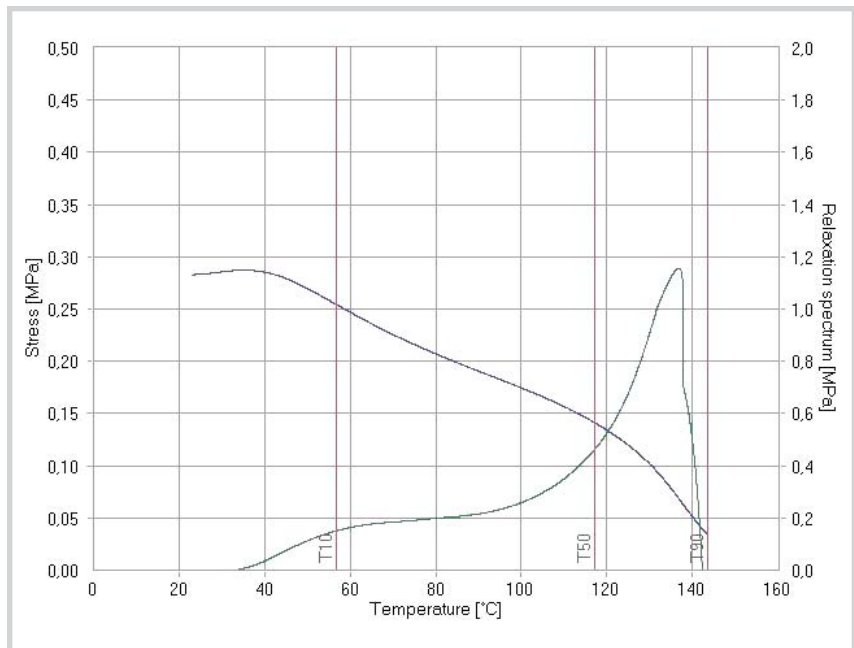
### Test procedure

The measuring system is housed in a sturdy cast iron case. The specimen, a type 5 A standard bar, is fixed in a running traverse driven by a linear lifting motor and is stretched at a temperature of 23°C by 50 % of its original length.

Subsequently, the relaxation of the specimen is measured over 2 hours at a constant temperature of 23°C (isothermal relaxation).

After these 2 hours, the integrated temperature controller starts heating the measuring chamber at a constant rate of 2°C/min up to 200°C max. The relaxation of the test specimen is measured until the tensile stress has decreased by 90 % of its original value (anisothermal relaxation).

The comfortable measuring and evaluation software under Windows enables an automatic test procedure, records the data, represents them on-line as a clear color diagram, and evaluates them fully, automatically, and immediately after the test.



- $\sigma_{(t)}/\sigma_{0(t)}$  Current tensile stress/tensile stress at the beginning of the test
- T 10 Temperature at a 10 % decrease of  $\sigma_{(t)}/\sigma_{0(t)}$
- T 50 Temperature at a 50 % decrease of  $\sigma_{(t)}/\sigma_{0(t)}$
- T 90 Temperature at a 90 % decrease of  $\sigma_{(t)}/\sigma_{0(t)}$  (end of test)
- $H_{(t)}$  Relaxation spectrum
- IH Integral of the relaxation spectrum
- IH/(T<sub>90</sub> - T<sub>0</sub>) TSSR index

Technical data	
Dimensions (W * H * D)	490 * 610 * 450 mm
Mains connection	230 V AC, 50 Hz, 16 A
Heating power	2 * 220 W
Test specimen	Type 5 A standard bar
Measuring system	<ul style="list-style-type: none"> <li>• heating/cooling chamber with electric heating and air cooling</li> <li>• temperature range 20 - 200°C</li> <li>• heating rate 2°C/min</li> <li>• running traverse, parallel and without play</li> <li>• tensile stress up to max. 180 %</li> <li>• load cell 0 - 100 N</li> </ul>
Connections	<ul style="list-style-type: none"> <li>• USB</li> <li>• compressed air</li> <li>• mains</li> </ul>



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