

Anisothermal stress relaxation test

Brabender: TSSR-Meter



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Anisothermal stress relaxation test for characterization of elastomers and determination of crosslinking density.

With the TSSR-Meter conventional isothermal relaxation experiments can be performed as well as the temperature scanning stress relaxation (TSSR), an anisothermal stress relaxation method (AISR method). Using this method the mechanical and thermal properties of TPE, plastics and elastomers can be characterized.

The TSSR-Meter is suitable for the development of materials for production support and quality control. With the increasing importance of TPE an important factor, especially in the automotive industry.

Technical Data

- Measurement principle: Heating / cooling chamber with electric heating and air cooling
- Temperature range: 20 – 300 °C
- Heating rate: 0 – 4 K/min
- Strain: 0 – 100 %
- Force load cell: 0 – 200 N
- Isothermal relaxation time: 0 – 1000 h
- Test body Standard rod S2 rod according to DIN 53504, corresponds to test body 5A according to EN ISO 527
- Connections: USB
- Heating rate: 2 x 220 W
- Operation temperature: 5 - 45 ° C
- Power supply: 1 X 230 V, 50/60 Hz, 16 A + N + PE
- Dimensions (W x D x H) / Weight: 490 mm x 610 mm x 450 mm / 29 kg



Highlights

Advantages:

- Reduced testing time and effort (4h TSSR vs. 72h compression set)
- Very good reproducibility
- Rapid determination of crosslink density
- Information about relaxation behavior and structure

TSSR-Index:

During the anisothermal stress relaxation, the area of the curve under the normalized force (F/F₀) is determined with respect to the temperature and set in relation to the area of the idealized elastomer material. This relation is the TSSR-Index and a relative measure of the rubber like behavior of a TPE or elastomer material.

Crosslink density

The crosslink density of TPV or conventional elastomers can be identified from the relaxation spectrum without great effort, quickly and well reproducible. The TSSR-Meter can also be used to demonstrate the effects of different concentrations of crosslink agent on the degree of crosslink density.

Temperature limits

Within the relaxation spectrum three distinct temperature limits are set, T10, T50, and T90. The temperature T_x stands for the temperature at which the force ratio F/F₀ has decreased about x% referring to the initial force F₀. Each value represents a specific characteristic of the sample.