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Messtechnik GmbH

Figure 1: Resimat 150 *is designed for the measurement of the recovery time of viscoelastic foams according to IKEA® specification IOS-MAT-0076. The cubic test sample (red) has an edge length of 150 mm.*

Resimat®
Recovery Measurement of Viscoelastic Foams

- **Meets IKEA® specification IOS-MAT-0076**

- **Pressure relaxation during compression**

- **Adjustable strain by mechanical alignment**

- **Viscoelastic appearance calculation**

- **Two mechanical setups for different sample size**

* Patent No. 10252211

Visco-Elasticity

Viscoelastic foams show a characteristic creep behavior when loaded by an external force, e.g. the weight of a body. This makes them comfortable when being used in bedding and seating applications. Resimat 100 and 150 (Fig. 2 and 1) are devices specially designed for testing the dimensional recovery properties and the pressure relaxation of viscoelastic foams. If a Resimat 150 is used, the recovery time according to IKEA® specification no. IOS-MAT-0076 can automatically be detected by the Windows based software RESIMAT. The device can be used for development as well as for quality assurance testing of viscoelastic foams.

Measurement Cycle

A test sample with the dimensions 100x100x50 mm³ (Resimat 100) or 150x150x150 mm³ (Resimat 150) is compressed vertically by means of a pressure plate (Fig. 3) onto an adjustable reference surface. At a certain compression clamps fix the pressure plate and keep the strain for a pre-selected hold time. The software RESIMAT supports this procedure.

While being compressed a force gauge measures the restoring force of the foam sample. Due to its viscous properties the force gradually decreases revealing the comfort parameters of the foam. After the hold time the clamps instantly release the pressure plate. The sample gradually recovers from the deformation regaining its original shape. An ultrasonic sensor positioned right above the pressure plate continuously records the kinetics of the sample surface. The thickness vs. time curve (Figs. 4, 5) shows the recovery process giving further insight into the dynamical features of the foam.

Test Results

The distance of the reference surface and the original thickness of the unstrained foam sample are measured in a zero measurement. This data determines the final sample strain. The hold time and the recovery duration are free selectable parameters. For tests according to IOS-MAT-0076 a strain of 75% and a hold time of 60 seconds is specified.

After compression and subsequent recovery, the time dependent data is displayed graphically. The recovery time according to IOS-MAT-0076 is detected when 90% of the original thickness is reached. The viscoelastic appearance is the area between the recovery curve and the original sample thickness. The recovery time, the appearance and other test parameters evaluated from the curves are listed in a parameter list together with the input data.

*Figure 2: Mechanical setup of **Resimat 100** for measuring viscoelastic foam samples of typical 100x100x50mm³.*

Technical Data   Resimat

Controller Unit

measurement rate	50 Hz
serial interface	RS 232 C, USB
electrical data	25 W, 100 ... 250 VAC
dimensions, mass	330x270x160 mm; 4.4kg

Mechanics / Sensors

max. force	500 N
force resolution	0.13 N
clamp force	
Resimat 100	2 x 300 N
Resimat 150	4 x 300 N
distance sensor	PFT, ultrasonic
resolution	0.1 mm
dimension	360x240x570 mm,
mass	
Resimat 100	10 kg
Resimat 150	14 kg

Test Sample

cross section	
Resimat 100	100x100 mm²
Resimat 150	150x150 mm²
thickness	25 … 150 mm
max. compression	10:1

Order No.

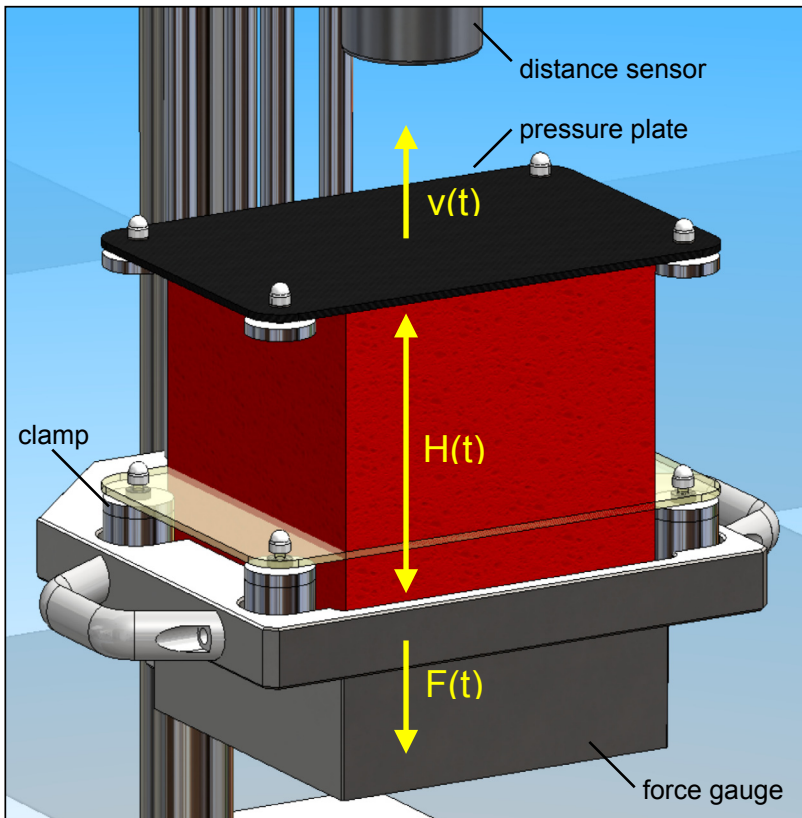|	
Resimat 150	283110
Resimat 100	283100

*Figure 3: Schematic view of the **Resimat 150** device. The foam sample is compressed by the pressure plate. The ultrasonic sensor measures the time dependent thickness (H) of the sample and the force gauge (F) reads the restoring force.*
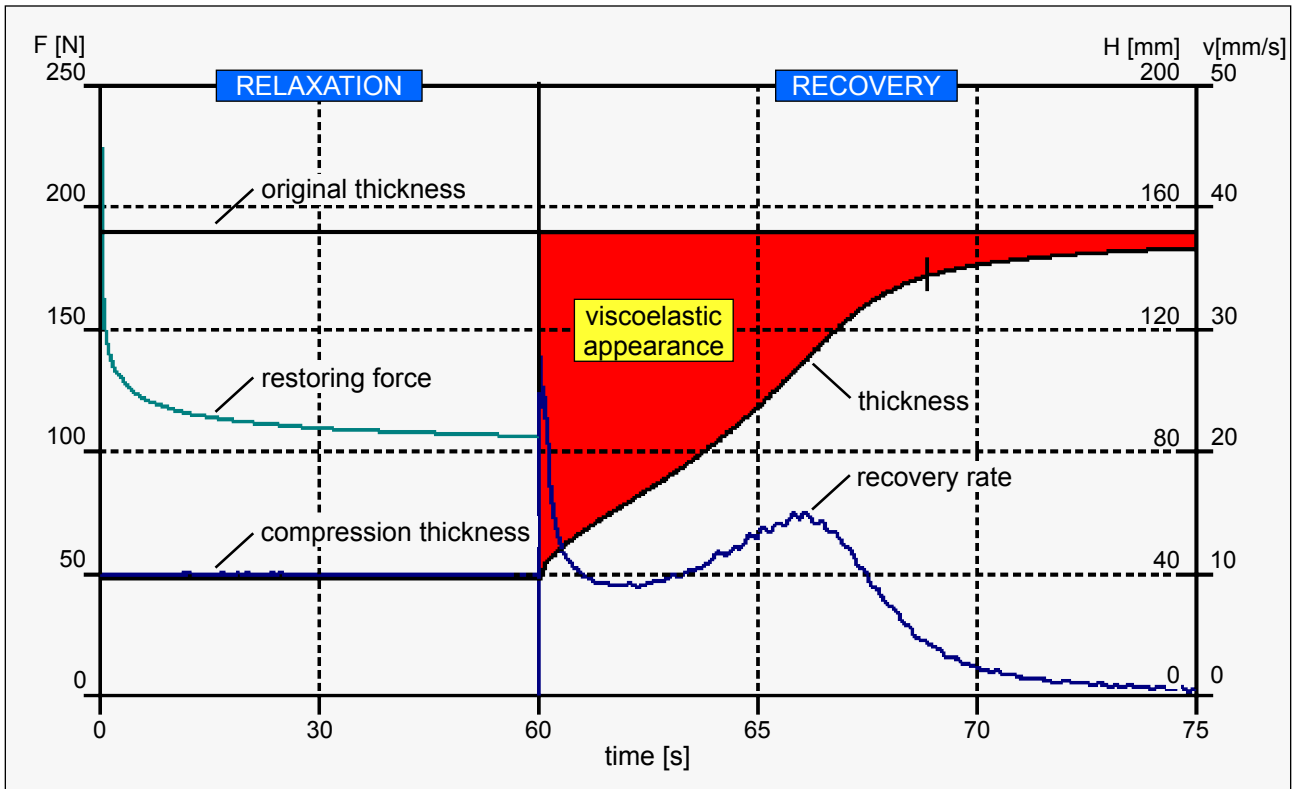
Figure 4: *The restoring force (F) shows the relaxation during the hold time. The thickness (H) vs. time curve shows the free recovery after releasing the pressure plate. The recovery rate (v) is the differential of the thickness curve. The red area shows the "appearance".*
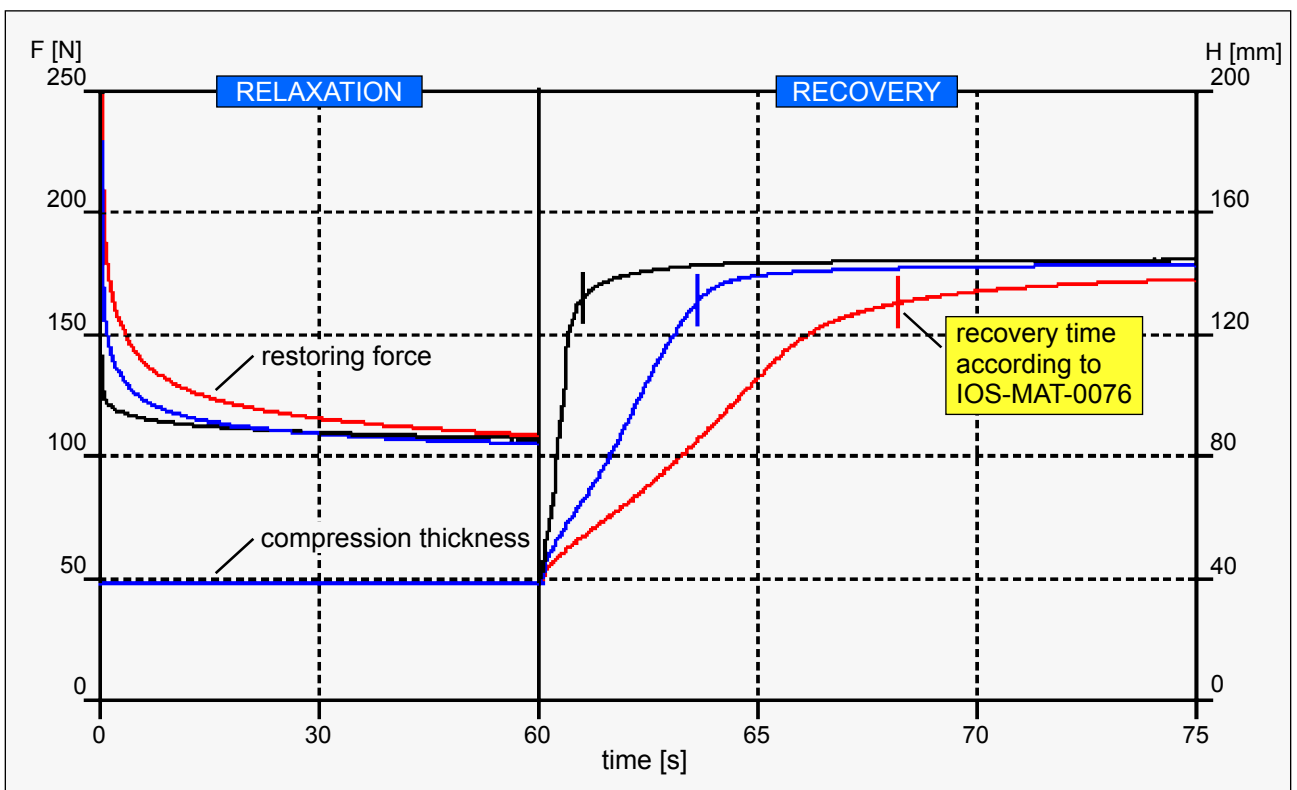

Figure 5: *Graphical overlay of three Resimat® 150 measurements of different foam samples. The recovery time according to IOS-MAT-0076, is the time needed to regain 90% of the original shape after a 75% compression for 60 seconds.*