

### Elastocon AB

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Our calibration and testing services are accredited according to ISO 17025. We are also certified according to ISO 9001



info@elastocon / # 1-2022 / Spring News

## Estimation of lifetime of rubber materials

Do you want to know the estimated lifetime of your rubber materials, or compare the ageing properties between different rubber materials?

An effective way is to run tests with stress relaxation according to ISO 3384.

Until 31 July we offer a promotional price that gives about 20 % discount on lifetime estimation, see the fact box on the next page.

### How does stress relaxation tests work?

In stress relaxation testing, a sample is compressed between two plates, usually 25%. In the test rig, the force and temperature are measured, which are registered continuously. The test usually takes place in air at a suitable ageing temperature for the material. It can also be performed in elongation and in liquid.



*Stress relaxation test system for continuous measurement of rubber in either compression or tension according to ISO 3384 and ISO 6914.*

When compressing a rubber material, you measure the force and how it decreases over time. In the beginning, there is usually a rapid decline in force and then it turns into a slower decline. The initial decrease in force comes from physical effects when the molecular chains and fillers find new resting positions during compression. The slower decline in force over longer periods is caused by breaks in the molecular chains and is a measure of ageing.

**Read more on next page.**

**Elastocon manufactures instruments for testing of rubber and plastic materials**

- Specimen preparation
- Ageing ovens
- Stress relaxation and creep
- Low temperature testing
- Windscreen fogging
- Computerised testing
- Electrical tests
- Custom built instruments
- Calibration service

# Estimation of lifetime of rubber materials

Continued from the first page.

The decrease in force during stress relaxation testing correlates well with the reduction of elongation at break in an aged tensile test. But with stress relaxation testing, you can continuously follow the decrease in force.

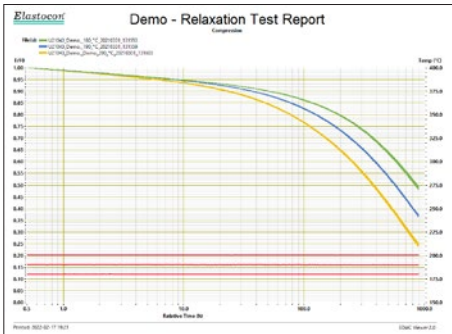
## How do you do an estimation of lifetime?

An estimation of lifetime of a rubber material is performed according to ISO 11346.

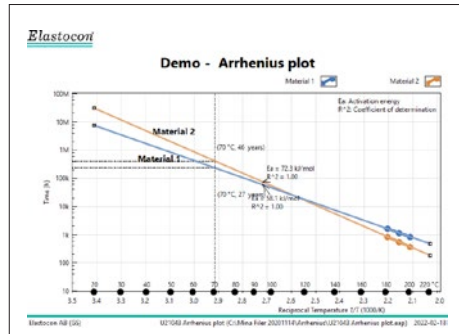
The standard states that one should test an important property, at least at 3 temperatures, until the property has decreased, so much so that the function of a material is over, at the respective temperature. The limit is usually set at 50% decline. In this way you get a time for each temperature. Measuring ageing through stress relaxation testing is a practical way to

accurately obtain the time-temperature points. These points are plotted in an Arrhenius plot, which is named after our first Swedish Nobel laureate, who received the chemistry prize in 1903. He has formulated an equation of how the rate of a chemical reaction depends on temperature.

The Arrhenius plot has the time in log scale on the Y-axis and the temperature as 1/K, the temperature as 1 through the temperature in degrees Kelvin. In such a plot one can make a linear extrapolation to lower temperatures. As a rule of thumb, it is usually said that a chemical reaction goes twice as fast at a temperature increase of 10 °C = factor 2. But by making a lifetime estimation according to the ISO 11346 standard, one finds that this factor varies greatly.



One material at three temperatures.



The same polymer but different results at high and low temperature.

## Promotional price on lifetime estimation and stress relaxation testing according to ISO 3384-1

Until 31 July, Elastocon offers the following package prices for lifetime estimation and stress relaxation testing according to ISO 3384-1, which gives a 20% discount.

- **Relaxation test** for 1,000 hours at the desired temperature: **Price: EUR 730**
- **Lifetime estimation** at three temperatures: **Price: EUR 1 850**

# Automatic relaxation and creep tester with temperature cycling, EB 32

The EB 32 is Elastocon's newly developed automatic creep and relaxation tester with temperature cycling.

The instrument has advantages both from our EB 18-II-3 and our temperature cycling stress relaxation system.

With EB 32 and the liquid circulator EB 17.01 you can run automatic tests with temperature cycling between  $-40\text{ }^{\circ}\text{C}$  to  $+200\text{ }^{\circ}\text{C}$ . You can test creep and stress relaxation in both compression or tension, and when testing in compression you can test either in air or in liquid.

## Some of the features

- Easy to choose between creep or relaxation test (both compression and tension).
- Temperature cycling between  $-40\text{ }^{\circ}\text{C}$  up to  $+200\text{ }^{\circ}\text{C}$ .
- Each of the three test stations has individual temperature control and air exchange control,
- Movement of the rigs as well as compression and stretching of the samples are done by a servo motor.
- The cell oven is fully compliant with ISO 188, and the system with ISO 3384-1, ISO 3384-2, ISO 6914-1 (with additional load cells and clamps), also creep test ISO 899-1 with additional clamps as well as other technically equivalent standards.
- The testing will be recorded, and the result presented in the specially developed application, EC 13.

## PRODUCT NEWS



Automatic relaxation and creep tester with temperature cycling, EB 32.

- Results are presented in graphical or table formats as absolute relaxation in N or as F/FO in absolute or relative time as well as linear or log time.
- Results are presented in graphical or table formats as absolute creep or creep index. In order to study the actual sample failure, the data logging rate is increased just before break occurs.
- High accuracy in the displacement measurement.
- With additional liquid containers both relaxation and creep in compression can be performed in liquid as well as in air.



The liquid circulator EB 17.01 allows you to run tests with temperature cycling between  $-40\text{ }^{\circ}\text{C}$  to  $+200\text{ }^{\circ}\text{C}$ .

# New employees at Elastocon



**Jacob Julander** is employed as a laboratory engineer since October 2021, and acting responsible for Elastocon's material testing, in a temporary position for Kim Bini, who is on parental leave until the autumn of 2022. Jacob comes most recently from Chalmers University of Technology, where he studied chemical engineering, with a special focus on polymer chemistry.



**Mona Flensby** is Elastocon's finance manager since March 2022.

Mona comes most recently from Unigraphics AB, where she also worked with economics.

## Does your relaxation system require calibration and service?

**Calibration is an important part of quality work today.** At Elastocon we are experts in calibration and have the necessary equipment and education as well as the accreditation.

The relaxation rig temperature sensors and the load cells are calibrated together with the data connection box according to the attached calibration certificate, at the delivery. The dial gauges are also included in the calibration certificate. Calibration should be done annually.

You can send in your equipment to our accredited lab for calibration and service.

### Would you like to know more?

You can find more information on [www.elastocon.com/calibration](http://www.elastocon.com/calibration). Please contact us via [info@kalibrera.se](mailto:info@kalibrera.se) or by phone +46 33 323 39 00, if you want to send in your equipment.



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