

Elastocon AB

Tvinnargatan 25
SE-507 30 Brämhult
SWEDEN

Phone: +4633 22 56 30
info@elastocon.se
www.elastocon.com



Our calibration lab is accredited by SWEDAC



info@elastocon / # 1-2017 / Spring News

Reflections about requirements on ageing ovens



Elastocon's cabinet ovens meet most ISO and ASTM standards for testing rubber and plastic materials. They can be equipped with a glass window and lamp, among other options.

You can find a lot of different type of ovens on the market today. All of these different types can have descriptive names such as Ageing Oven, Laboratory Oven, Drying Oven, Heating Oven/Cabinet, Geer Type Oven etc.

Unfortunately, some of these names are sometimes used a bit careless. With this text we hope to clear the differences between some types of ovens, and why they never should be

mistaken for another type of oven. The main part of the text will be about the high precision ageing ovens and their specifications.

Each type of oven has its advantages for a specific usage, but will not be suitable for other applications. Therefore it is very important that you know the differences and can specify your actual needs when to choose the correct oven for your testing. If not, you might end up with an oven not suitable for your application.

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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

Reflections about requirements on ageing ovens

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The EB 20 cell oven is equipped with 6 cells, each with individual temperatures. Each cell has individual control of the air exchange rate, and has room for 24 test pieces.



Geer Type Ovens

Initially, a few words about the so called Geer Type (Ageing) Oven. This is a name often used by different manufacturers. The problem is that there is no international standardization of the expression Geer Type Oven, which means that each manufacturer can use the name Geer Type Oven. This makes a comparison between different types of ovens with variations in the specifications very difficult, and also to find the best oven for a specific application.

Other common oven categories

Heating cabinets/ovens, drying ovens and laboratory ovens are other common categories among the ovens. These type of ovens are often not as expensive as ageing ovens, but remember to check which application they work best for. Usually they are not as good a choice as an ageing oven for polymeric material.

Ageing ovens

When it comes to the expression ageing oven, it is a standardised expression with very well specified requirements for different features. This certifies the function and therefore also the reproducibility (also between different laboratories), and the reliability of the results after using this type of ovens.

ISO standards

It is a proven fact that polymer heat ageing tests give poor reproducibility if the wrong type of oven is used. Thanks to studies of Interlaboratory Test Programmes made over

several years the *International Standardization Committee* has been able to develop the requirements for ageing ovens suitable for polymeric materials. These requirements can be found in standards like ISO 188 and other technically equivalent standards and specifies the reliability, reproducibility and repeatability for ageing tests.

The results of these studies confirms the importance of the control of

- Temperature variations in time
- Temperature variations in space (inside the oven)
- Air speed inside the oven
- Air exchange rate and naturally also the presence of the same.

Differences in test time

It is a fact that even a small temperature offset of 1 °C during ageing, can correspond to about 10 % difference in test time. Which means that you will have problems to predict e.g. the life time of your material already when you have a small variation in temperature.

Controlled air speed and exchange rate

Controlled air speed (without a fan inside the oven) and air exchange rate are important to ventilate off the volatiles from the material that is released to the air inside the oven, as well as ensuring that the oxygen content in the air around the samples remains constant, and as close as possible to the real environment your material is used in, often common air.

Anna Anderzén

Rubber and Elastomers – sustainably meeting tomorrow's challenges

Göran Spetz attended a rubber seminar on 15th May 2017, arranged by Manchester Polymer Group, in conjunction with the Rubber in Engineering Group.



Göran Spetz was one of the lecturers and held a seminar about Stress Relaxation and Lifetime Estimation of Rubber Materials. Below you can find a very brief summary.

Stress Relaxation and Lifetime Estimation of Rubber Materials

Stress relaxation tests are very effective for conducting ageing tests, as substantial amounts of information result with little effort, especially when using the continuous measurements system.

Factors influencing lifetime

- Heat
- Light
- Oxygen
- Humidity
- Mechanical influence

Ageing tests for Rubber

- Relaxation in compression, ISO 3384
- Relaxation in tension, ISO 6914

Important ageing factors

- Temperature
- Air exchange rate
- Air speed

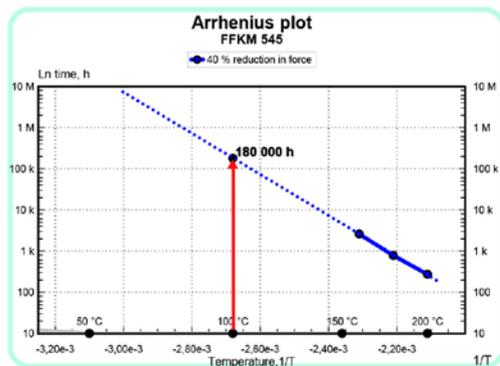
What happens in the material

- Physical relaxation
- Thermal degradation
- Oxidative degradation
- Continued crosslinking



Above: A complete Stress Relaxation test system.

Stress relaxation tests are ideal for making lifetime estimations using an Arrhenius plot (see an example below).



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Arrhenius FFKM 545:1 2017-04-24

Would you like to know more?
Please contact us at info@elastocon.se

Elastocon offers accredited calibration

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.

Elastocon started with calibration in 1993 and has been accredited since 2000. Accreditation is the recognition of proficiency in accordance with European and international standards.

SWEDAC,
Swedish Board
for Accreditation
and Conformity
Assessment,
continually
examines that



Akred. nr 1678
Kalibrering
ISO/IEC 17025

we are competent to perform the tests, calibrations, certifications and inspections.

Employing external calibration services, such as ours, can save money for your business.



Jonas Nilsson performs calibration of fogging equipment at Hexpol Tpe AB (former Elasto) in Åmål, Sweden.

Elastocon performs a large part of the calibration tasks in the field, on-site at the customer's facility. Many instruments are simply too large to be sent in for calibration in our laboratory. Other types of equipment, like balances, are greatly affected by their ambient environment.

New website with responsive design at www.elastocon.com

Elastocon will soon launch a new website with responsive design at www.elastocon.com. Here you will find all Elastocon's products for precision testing of rubber and plastic.

Responsive design means that the site adapts to different types of screen sizes, which makes reading easier in devices with smaller screens, such as smartphones and tablets.

Contacts

Martin Spetz
Managing Director
+4633-22 56 33
martin.spetz@elastocon.se

Göran Spetz
Manager Marketing and Sales
+4633-22 56 31
goran.spetz@elastocon.se

Ann-Cathrine Magnå
Sales Manager, Nordic area
+4633-22 56 32
ann-cathrine.magna@elastocon.se

Anna Anderzén
Sales Manager, Export area
+4633-22 56 37
anna.anderzen@elastocon.se

Gun Bengtsson
Economy and Administration
+4633-22 56 38
gun.bengtsson@elastocon.se

Jonas Nilsson
Calibration and Quality
+4633-22 56 36
jonas.nilsson@elastocon.se

Andreas Svensson
Construction and Support
+4633-22 56 34
andreas.svensson@elastocon.se

You can also reach us at:
info@elastocon.se