

The sun is shining, and what's about the polymer?

The problem:

Plastic materials are exposed to natural UV-light of the sun in many applications. Typical examples include injection-moulded parts for automotive use, textile (also coated) fabrics for sun blinds or roofs, ropes or nets.

The exposure to sunlight may lead to directly visible effects such as colour change or yellowing. In addition, the structure and thus a.o. the mechanical properties of the material may be affected, too. In order to assess and to influence such changes, it is necessary to simulate the sunlight exposure in an accelerated way. The exposed samples obtained this way need to be investigated with regard to optical, mechanical or structural properties in comparison with unexposed reference material.

The solution:

To simulate the sunlight exposure, the Analytical Services Obernbürg disposes since short of a light exposure and weatherability instrument Xenotest Beta (Fig. 1). This machine allows lightfastness and weatherability analyses according to DIN ISO 105-B06 as well as material and component tests according to all common automotive industry standards (example: VW/Audi standard PV 1303). In addition, all exposure conditions dependent on UV-light and environmental parameters (temperature, humidity) can be simulated. Compared with field exposure under real sunlight, the exposure time is reduced by a factor of 5-10. The Xenotest Beta can handle large samples up to 300 mm x 80 mm in size (Fig. 2), a clear advantage e.g. for subsequent tensile test often requiring longer gauge lengths (200-250 mm).

December 2005

Industries (A-Z)

Fibers
Textiles

Objectives

Light fastness

Materials (A-Z)

Yarns
Fabrics

Analytical Methods (A-Z)

Light exposure
Tensile test

Related Topics



Fig. 1: Xenotest Beta – general view.



Fig. 2: Xenotest Beta – detailed view on sample carousel with vertically mounted samples.

The effect of UV exposure on mechanical properties of polyester is shown in Fig. 3:

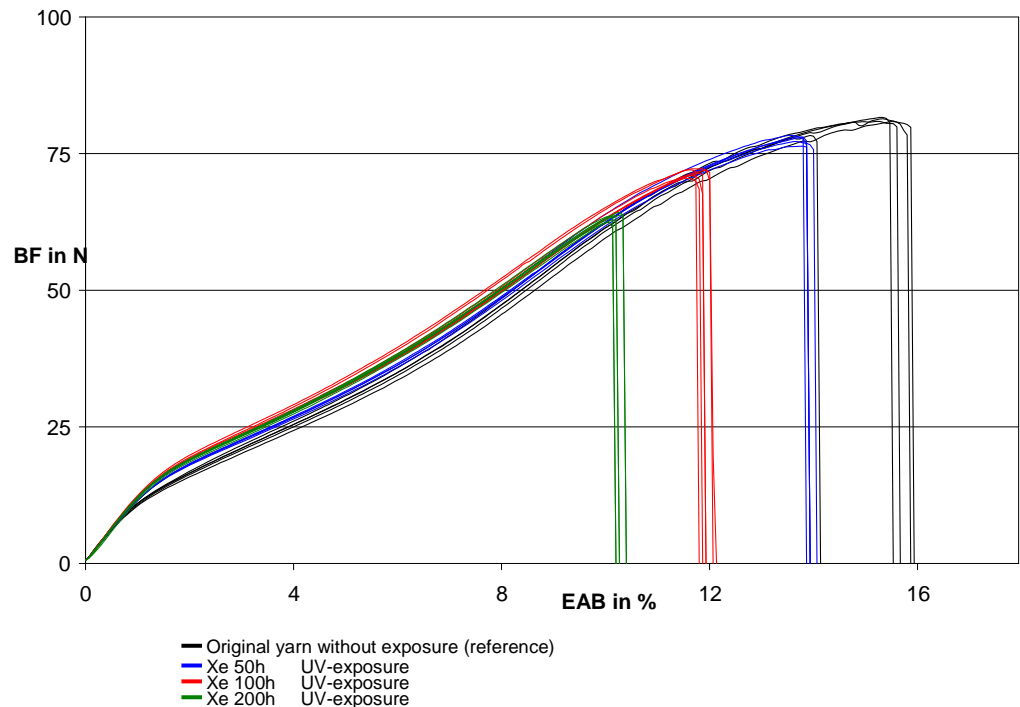


Fig. 3: Stress-strain behaviour of polyester yarn, unexposed (= reference) and exposed to UV light for 50 – 200 h.

Compared with the reference material (black lines), one sees distinct losses in strain already after 50 h exposure time (blue lines) that increase with increasing exposure.

The advantages:

First of all, the new Xenotest Beta instrument allows all common lightfastness tests for the automotive and textile industry, also on large samples. When combined with other analysis methods, also other differences between reference and exposed material can be detected, for example regarding their mechanical properties. Because of the acceleration factor inherent to Xenotest exposure, one obtains important data for product development and approval within a short period of time.

Interested?

The group textile and automotive testing of the Analytical Services Obernburg is ready to answer your questions and to help you.

Please contact
Cristopher Wolf
Tel. +49-6022-81-2964
Fax +49-6022-81-2896
or E-Mail
c.wolf@aso-skz.de