

On the long-term behavior of ETFE foils - evaluation of monoaxial creep tests after one hundred thousand hours

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ABSTRACT

As prestressed, light and transparent or translucent surface constructions in roofs, facades or as an entire building envelope, ETFE foil structures withstand high wind and snow loads in a large temperature range. Tests on dismantled ETFE foils show no changes in their optical and mechanical properties, even after a longer period of use. The service life of such foils can therefore exceed 25 years easily. As a permanently load-bearing component, it is therefore important to know the long-term behavior of this film as precisely as possible.

In this contribution the creep and relaxation behavior of an ETFE foil product is described, basing on evaluations of uniaxial long-term tests started more than 11 years ago and have now been demounted after more than one hundred thousand hours. The evaluation of the three load levels (6, 9 and 12 MPa) also enables the time- and stress-dependent assessment of the remaining strains after unloading. The duration of this long-term test is unique.