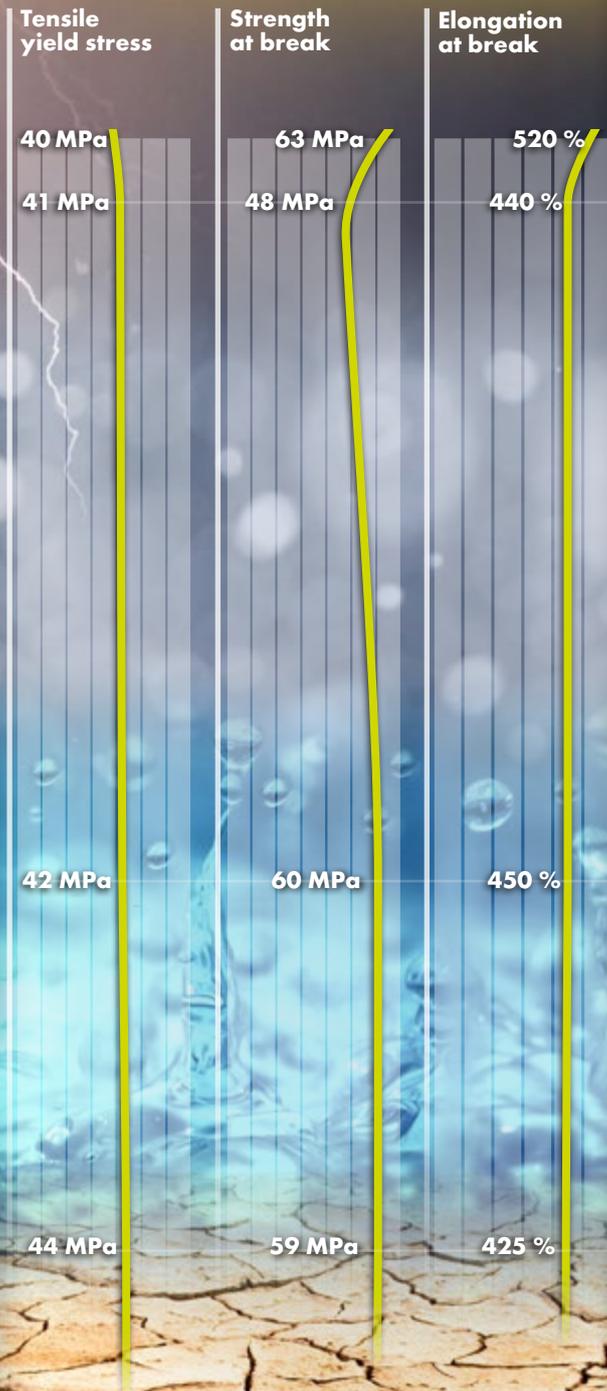


PVDF

Mechanical properties



0 years

0.5 years

6 years

9 years

Annual aging of PVDF test specimens exposed to natural weather conditions in outdoor areas



(traction test at 50 mm/min on 80 µm thickness films)

under the effects of weather

PVDF is a plastic that is highly UV resistant. However, what does “high” mean? How does the material change when it is exposed to the effects of weather over a prolonged period? An important question, especially regarding use in solar plants. We have been searching for an answer.

Customers require information regarding the long-term properties of our PVDF products. They want to know whether the mechanical properties of PVDF unions change after several years and under the influence of harsh weather conditions.

PVDF in the solar industry

Solar energy in particular is benefiting from the changeover to alternative energy sources. GTM Research forecast an increase in solar power output of 66 gigawatts for 2016, which would correspond to an increase of 21 % compared to the previous year's figures. erneuerbareenergien.de already expects increases of up to 95 gigawatts annually for the year 2020.

Groups of solar panels are combined to form modules and trackers (15 x 7 m), for which the piping is implemented with PTFE hoses and PVDF unions. The hoses and unions are exposed to direct sunlight whilst the solar plants themselves are set up in very dry regions with a great deal of sunlight that also have wide-ranging fluctuations in temperature.

Our tests

SERTO has been delivering these pre-assembled lines to the full satisfaction of customers for over 5 years. We have now asked customers to provide us with a few of these 5-year old PTFE hoses and PVDF unions for tests. We wanted to submit these components to intensive tests in the in-house SERTO testing and experimental workshop.

In these internal tests, the seal and pressure resistance of the system was checked. The result was clear and showed no technical defects after an intensive period of 10,000 hours exposure to light. No air leakage could be detected and the bursting pressure was still more than three times the rated pressure. However, there was visible yellowing as a result of UV radiation.

At the same time, we also investigated PVDF films in an independent laboratory and assessed the ageing of the material with regard to mechanical properties. The measurements show slight brittleness. Even after 9 years of exposure to the weather, the mechanical properties of the investigated PVDF films are rated as good.

Summary

The results from the test laboratory and in practice agree and show that our PVDF unions have great resistance to the effects of weather. Long-term tests have shown that large temperature fluctuations and intense UV only change the mechanical properties of PVDF unions to a negligible extent.

Our experience and know-how regarding materials grows continuously with each individual project which we implement with our customers – perhaps with yours as well?