

Case Study

Use of HALS in fiber & tapes

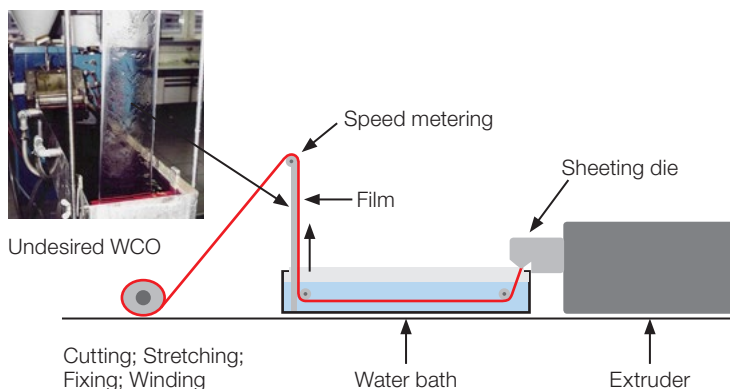
Fibers and tapes used in technical textiles for the construction industry have to withstand harsh climate conditions, including prolonged exposure to UV light, fluctuating and elevated temperature and environmental pollutants.

Fibers and tapes often made of polyolefin obtain their resistance to aging by adding a Hindered Amine Light Stabilizer (HALS) to the polymer with proven record of excellent durability. In addition to the mandatory light and thermal stability requirements, industrial processing is often a challenge. The producers of fibers and tapes can experience processing issues and stops can lead to capacity reduction or potentially quality inconsistency. HALS are sometimes impacting processing.

A very good example is the manufacturing of PE monofilaments for artificial turf, used for sport-floors or landscaping. The additives and colorants are usually added via a concentrated "combi"-batch and the filaments may be processed through a water bath. In the latter case, a phenomenon called water carry over is regularly observed on the line leading to production disruption. The incorrect choice of HALS in the overall formulation context can worsen this processing issue.

The solution: BASF introduces Tinuvin® XT 55, its latest generation of HALS, for the film, fibers and tapes industry. Its primary application is polyethylene monofilaments and tapes. Tinuvin® XT 55 is a high-performance light stabilizer that has very low contribution to water carry over and therefore enables the production line to run without disturbance.

Water carry over (WCO) phenomenon can be visualized in the following schematic representation

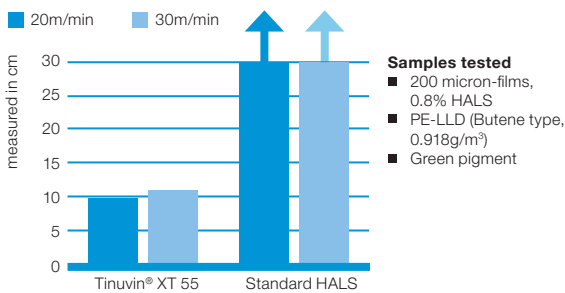




In summary, artificial grass yarns stabilized with Tinuvin® XT 55 can fulfill light and thermal stability requirements. Processing, in particular sensitivity to water carry over, is made easier in comparison with standard HMW HALS solutions.

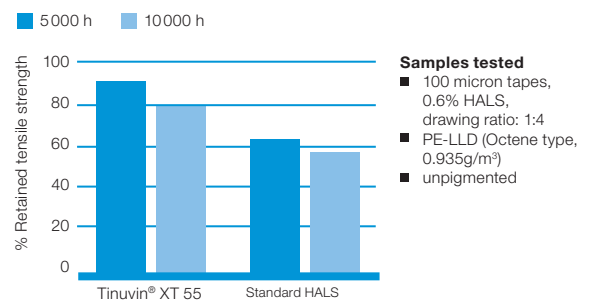
Lately, excellent results have also been obtained in polypropylene tapes stabilized with Tinuvin® XT 55 in combination with Uvinul® 4050 under Florida natural light weathering, confirming the excellent performance of this solution. With PP tapes as well, water carry over can also be mitigated when Tinuvin® XT 55 is used.

Water Carry Over test



Results showing water carry over on a pilot tape line clearly differentiates between Tinuvin® XT 55 and standard high molecular weight (HMW) HALS. WCO is maintained below 15cm of the film exiting the water bath for Tinuvin® XT 55, even at increasing line speed. With the standard HMW HALS, WCO cannot be managed.

QUV-A aging: 0.8W/m² at 340nm, 240min light, 120min condensed phase



With regards to light stability, Tinuvin® XT 55 imparts outstanding light stability when aged under artificial weathering conditions such as QUV-A.