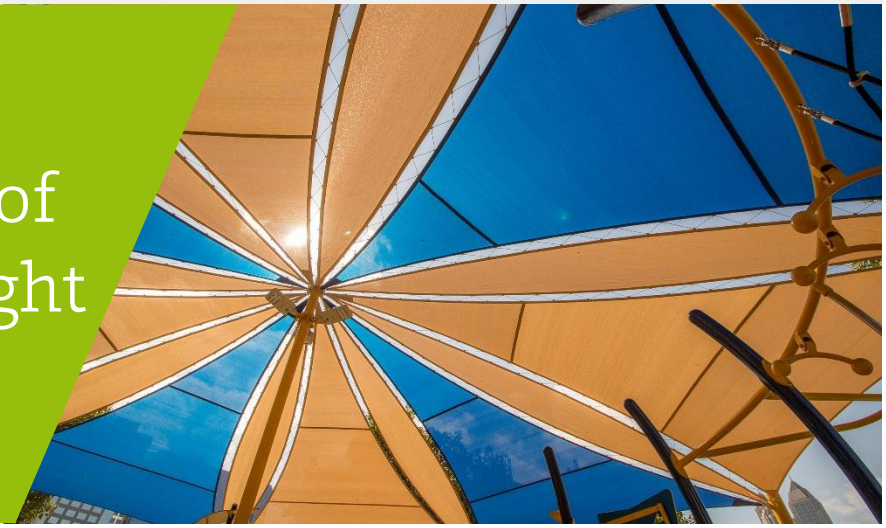
CASE STUDY

Increase durability of textile fibers with light stabilizers



Summary

Additive: **BASF Light Stabilizers for textile**
Applications: **Nonwoven for consumer goods, construction materials, textiles for automotive, mono-filaments for artificial grass used in sport fields or landscaping**
Key benefits: **Durability | Easy dispersion | Excellent weatherability**

The Challenge

Synthetic fibers have come a long way since polyamide was first used as a replacement for silk in parachutes and stockings during World War II. Today, more than half of all fibers consumed are synthetic, with various applications in numerous fields of fiber and textile processing technology.

Synthetic fibers are subject to thermo- and photo-oxidative degradation during polymer processing, spinning and later service life. Fibers used in applications such as artificial turf, barrier membranes or carpets and flooring must withstand very harsh climate conditions, including prolonged exposure to UV light and environmental pollution or contaminants. Very demanding long-term durability is essential in some end applications, such as construction and automotive.

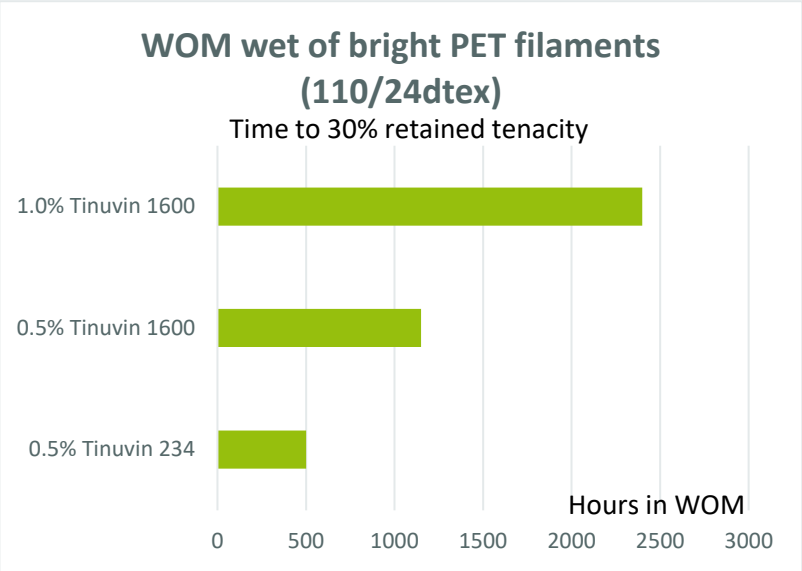
The Solution

In most mid- to long-term applications, where durability is of prime concern, Polypropylene, Polyester and Polyamide fibers are used. BASF offers high-performance additives that support a wide spectrum of applications for those 3 polymers, enabling to reach excellent durability.

1. Polyester fiber

For outdoor, Tinuvin® 1600 as UV absorber is more and more considered. It can be used at much lower concentration than the very frequently used Tinuvin® 234 and still provides outstanding performance.

Typical end-use applications such as tents, tarpaulins, sails, awnings and outdoor shade umbrellas are growing markets.



In addition, Tinuvin® 1600 is a fully meltable product. It can be easily dispersed and processed at the typical high processing temperatures for PET.

Typical addition level of Tinuvin® 1600 is in the range of 0.5%-1%.

2. Polyamide fiber

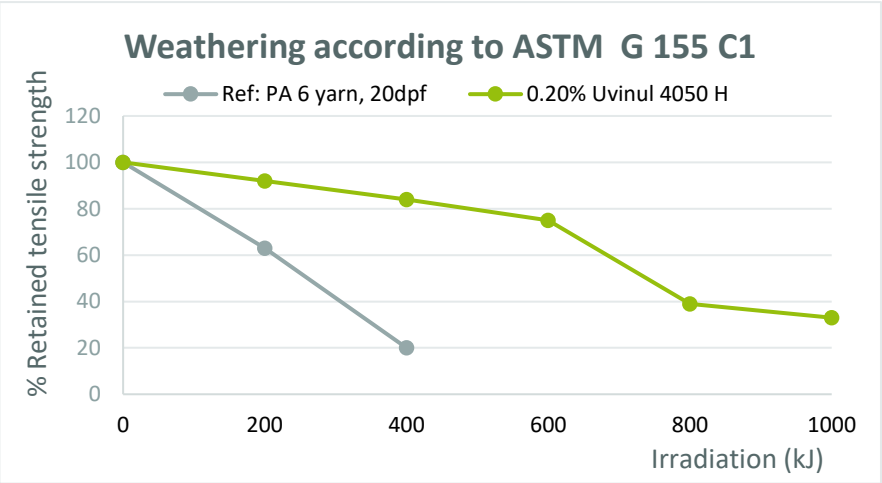
Polyamide main assets are its resistance to abrasion and its resilience property. This makes PA an excellent polymer for clothing, technical yarn and carpet applications.

As HALS (Hindered Amine Light Stabilizers), Uvinul® 4050 H is highly compatible with the polyamide matrix and is an extremely effective light stabilizer for polyamide yarn for example bulk continuous filament. Uvinul® 4050H is a white, crystalline powder. It can be incorporated with the usual mixing equipment found in the plastics industry.

Uvinul® 4050 H can be considered as primary stabilization of the polyamide itself, with Tinuvin® 234 as supplemental stabilization particularly useful for the protection of dyes used to color polyamide.

Typical addition levels for carpet application are in the range of:

Uvinul® 4050H: 0.1 – 0.5 % / Tinuvin 234: 0.1% - 0.3% depending on the application and required degree of stabilization.



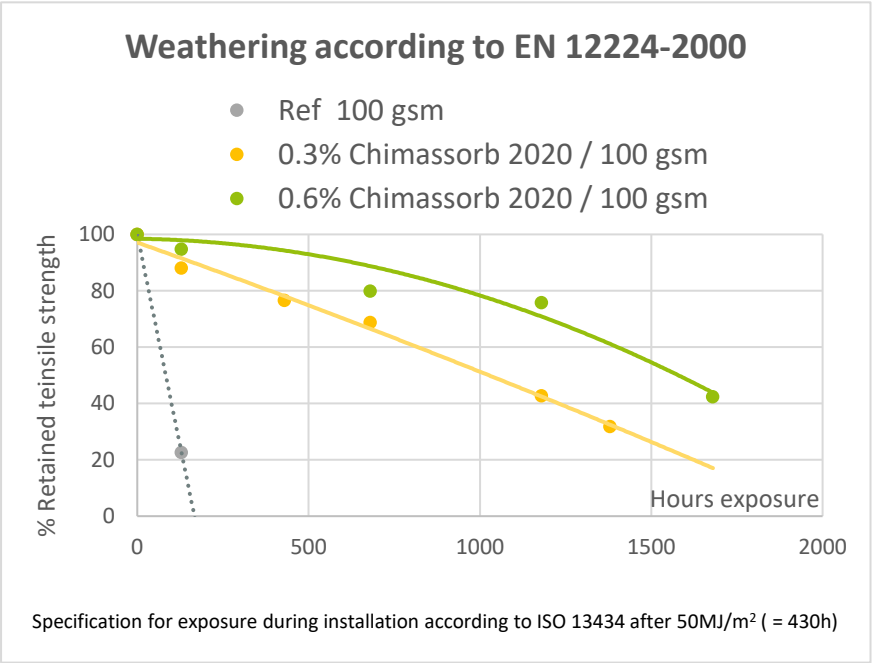
Uvinul® 4050H as a dual additive could also be considered as additive for tyre cord in addition to base stabilization.

3. Polypropylene fiber

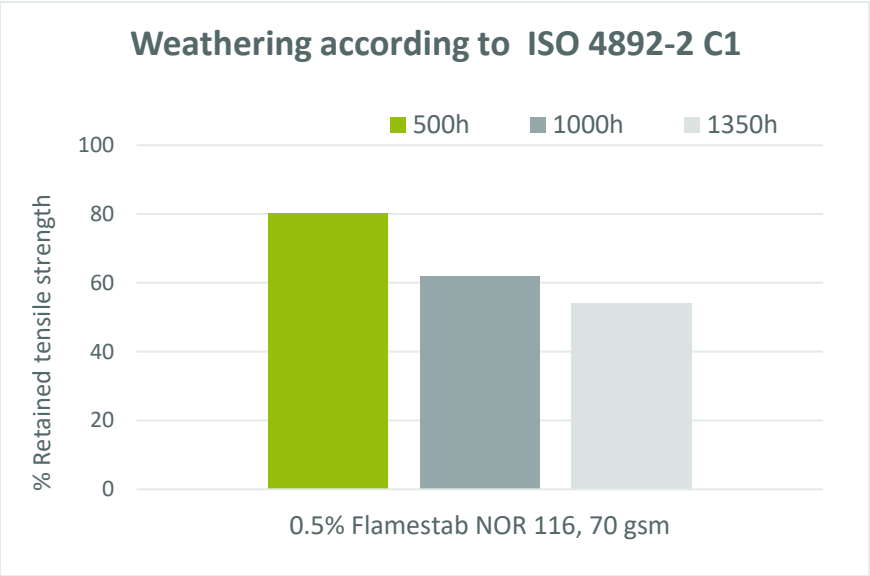
Polypropylene is a widely used polymer for carpet, automotive and construction applications. It is by far the most commonly used resin to produce meltspun nonwoven fabrics.

Chimassorb® 2020 is used for its outstanding performance as a HALS stabilizer paired with excellent processing performance (long filter pack-life, viscosity control).

Chimassorb® 2020 is the product of choice for high demanding articles in the construction industry for e.g. roof applications or geotextiles.



Typical addition levels of Chimassorb® 2020 for nonwoven applications are in the range of: 0.15 – 0.6 %.



Flamestab® NOR 116 is a specialty which adds durability together with fire resistance to non-woven polyolefins.

Typical addition levels of Flamestab® NOR 116 for nonwoven applications are in the range of: 0.25 – 1 %.

In conclusion, we can see in different examples, varying polymer nature and processing technologies, that a selection of light stabilization technologies is impairing excellent weatherability to synthetic fibers.

Learn More About BASF Light Stabilizers

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