CASE STUDY

Looking for longer lasting and extended warranty from your polycarbonate sheet?

Technology : **Tinuvin® 1600** UV absorber
Polymer : Polycarbonate
Application : Skylight, façade, cladding…

Key benefits of Tinuvin® 1600 in PC sheets

- **Superior weathering performance enabling extended warranty**
- **Very low surface erosion providing clarity retention and dust build up resistance**
- **Very low volatility enabling superior processing and throughput of PC sheets**

The Challenge

Extend the warranty of polycarbonate glazing for prolonged exposure to harsh climate conditions (UV radiation, heat, humidity and wind).

Polycarbonate is a versatile polymeric material which enables architects and builders to create structures with greater freedom of design, improved durability and insulation when compared to tempered glass.

Typical applications for polycarbonate include are facade and skylight. They must resist though climate conditions including prolonged exposure to UV light, low and elevated temperatures, rain, hail impact and storm.

When sunlight hits the polycarbonate sheet, the material absorbs the energy of certain wavelengths in the UV range namely UVb and UVa. Photo-oxidation occurs over time and makes the polycarbonate more fragile and susceptible to surface erosion.
An adequate UV absorber must be selected according to the end application, geographical location and desired warranty.

The Solution

BASF's **Tinuvin® 1600** is a high performance ultraviolet light absorber of the hydroxyphenyl triazine class exhibiting very low volatility and very high extinction coefficient.

Tinuvin® 1600 is the best in class solution for the most demanding polycarbonate thin-section applications in terms of exposure to UV light and heat providing extended lifetime and very low surface roughness after prolonged exposure to harsh climate conditions.
It enables reduced maintenance, enhances waste management and replaces of other materials like tempered glass.

A weathering study was jointly conducted with the company dott.gallina to evaluate the attributes of BASF Tinuvin® 1600 against standard UV stabilization in dott.gallina's multiwall polycarbonate sheets.

Figures 1 and 2 describe the selected weathering equipment: Atlas EMMAQUA

EMMAQUA is an outdoor ultra-accelerated weathering equipment comprising of numerous mobile mirrors which magnify the sun energy to accelerate the ageing. The study was performed in Arizona desert for 4 years.

Figure 1: *Emmaqua equipment (Source Atlas)*

Figure 2: *Sample holder with crystal and opal sheets*

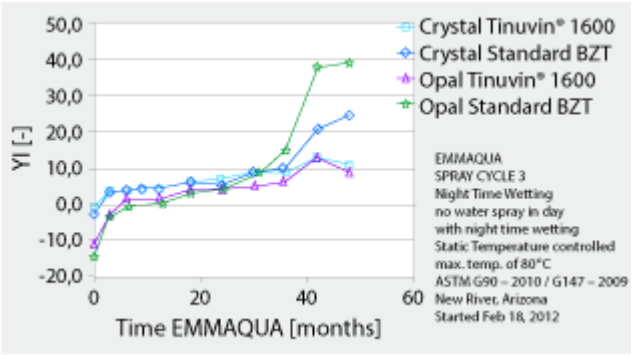


Figure 3: *Yellow Index*

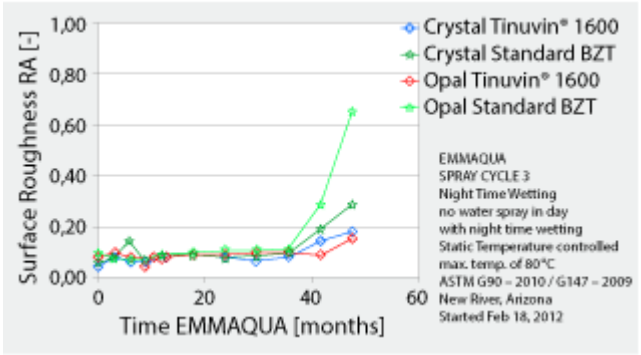


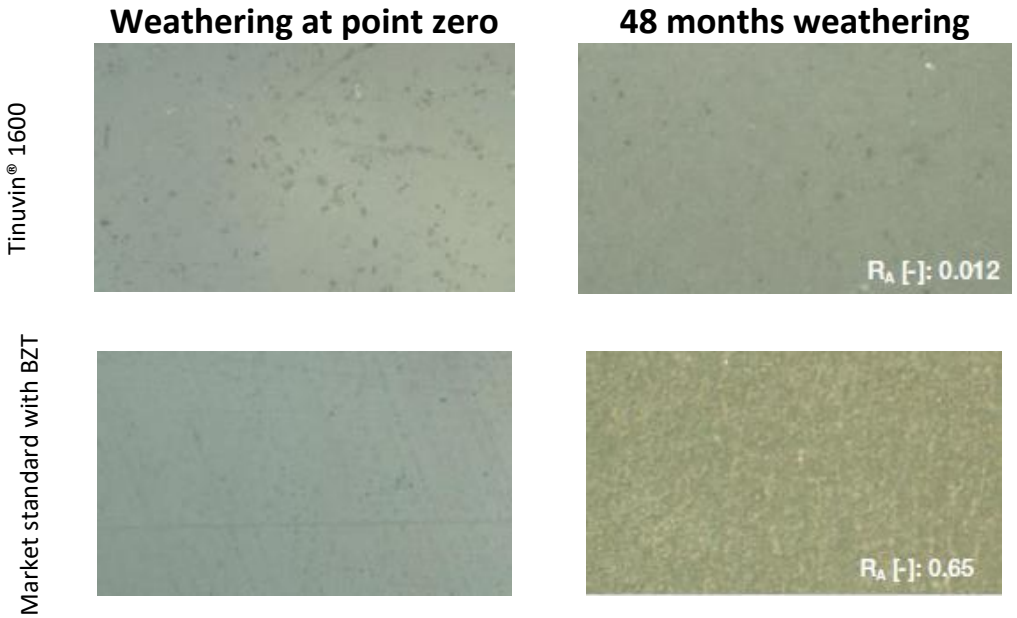
Figure 4: *Surface Roughness*
R_A [-]: arithmetical mean deviation of roughness profile (ISO 4287:1996)

Tinuvin® 1600 shows outstanding performance in yellow index retention and lower surface roughness after 48 months exposure for both crystal and opal multiwall sheets.

Note: 48 months of EMMAQUA ultra-accelerated weathering exposure is supposed to be equivalent to 25 years natural ageing in Florida and 32 years natural ageing in Basel (Switzerland).

Figure 5: Microscopic view of surface roughness

Sample: Opal multiwall sheet



R_A [-]: arithmetical mean derivation of roughness profile (ISO 4287:1996)

› A Testimonial

Architech Valdo Canepa from Chapman Taylor's Milan studio selected dott.gallina's arcoPlus® involving the UV-TECH technology for renovating the shopping mall "Porte del Laghi" in Rescaldina near Milan (Italy).
The roof of the two new spaces, the blue "Water Gallery" and the green "Mountain Gallery" were built from dott.gallina's arcoPlus® with UV-TECH technology comprising Tinuvin® 1600.
The first renovation phase was completed by end of 2018. A second construction phase involving an extension of existing building is ongoing.

Figure 6: The green "Mountain Gallery"
Courtesy of Ceetrus Italy and Chapman Taylor's Milan studio

Figure 7: the blue "Water Gallery"
Courtesy of Ceetrus Italy and Chapman Taylor's Milan studio

Tinuvin 1600® enables the design of PC smart materials for extended long term performance

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"The opportunity to work in collaboration with BASF's R&D department has allowed us to develop a high performing compound, opening up to new markets and opportunities for us."

Mr. Daniel Galllina, COO dott.gallina s.r.l.