



## **Solar Shingles and Plastic Shingles**

**Research into the major deficiencies of polymeric materials used in roofing applications from films, coatings, to the entire make-up of the shingles shows lifetime provided by the manufacturers do not take into consideration the rates of degradation of the materials they are using. In many cases no oversight in raw materials or analytical certificates are provided or attempted by the vendors!**

**We have examined the materials being used in the construction of shingles and now solar shingles and find their composition problematic.**

**To know a problem and to anticipate failures in the field we needed to know more about the composition and make up of the shingles. We focused on polyolefins and rubbers and thermoplastic polyesters in our initial screening.**

**We found that thermo-oxidative and ultraviolet stabilization of these materials were not close to the guarantee being given to the shingles.**

**Environmental cracking by heat and light and poly nuclear aromatic compounds and other pollution accelerated degradation. Pigments used were antagonistic to both light and heat protection of the matrix. Lubricants and fillers also affected long term thermo-oxidative degradation.**

**To mediate these problems solutions were found over the last few years to eliminate many of these known sources.**

**The following are a list of materials that have been proven to broaden and solve the problems of known plastic shingles and solar shingles:**

- 1. UVITA SME: Plasmonic broad permanent ultraviolet absorber. Absorbance from 200 to 800 nm with absorbance in the thermic and FIR. Synergistic with HALS and conventional organic UVA. Applicable to HDPE films, thermoplastic polyesters, polypropylene thick section and woven fabric.**
  
- 2. UVITA Low Temperature Modifier for polypropylene and composites. Low temperature applications for plastic shingles is limited by the glass transition temperature of the plastic. UVITA LTM changes the game by changing post polymerization glass transition temperatures of polypropylene homopolymers and copolymers and their composites.**

- 3. UVITA PETM: specific for thermoplastic polyester coatings and thick and thin sections protecting the polymer from yellowing and degrading from ultraviolet radiation.**
  
- 4. UVITA PAM: specific for polyamide composites both pigmented and unpigmented. Prevents ultraviolet degradation of the polyamide matrix while suppressing yellowing permanently and controlling fading of colorants and shade variations over time due to yellowing.**
  
- 5. UVITA BLK: New long term thermo-oxidative stabilization technology for black pigmented polypropylene. Extends the high temperature life time beyond all existing technologies to date. This is new license technology.**

**More to come.**