

UV INHIBITED VS WEATHERABILITY

This TekTip is intended to clear up some of the confusion regarding terms such as: **UV STABILIZED, UV RESISTANT, UV INHIBITED, WEATHERABLE, OUTDOOR USE** and how they are related to the various products available to and sold by Tekra.

But first a short course on **UV**, where it comes from and how it effects various materials.

UV stands for **Ultraviolet** radiation which is that portion of the electromagnetic spectrum that is adjacent (on the short wavelength side) to visible light (see fig. 1). The main sources of UV are the sun, lamps such as fluorescent tubes and UV curing appliances that are used for curing inks and coatings.

Most plastics absorb certain wavelengths of UV and in doing so will chemically degrade. The degradation usually shows up as discoloration or yellowing, embrittlement chalking and ultimately decomposition. All this depends on the plastic absorbing enough UV in the specific wavelength(s) that cause the degradation reaction. UV from the sun will cause most plastics to degrade within several months. UV curing appliances on the other hand are typically much more intense and can cause degradation in seconds or minutes. UV degradation from lamps depends on the distance between the plastic and the lamp and can vary from several months to several years. **With very few exceptions unprotected plastic will degrade in less than a year when exposed to sunlight outdoors.** Those exceptions are fluorocarbon films such as Tedlar and acrylic films. These films are unique in that they don't absorb UV in the wavelengths to which they are exposed and therefore do not degrade.

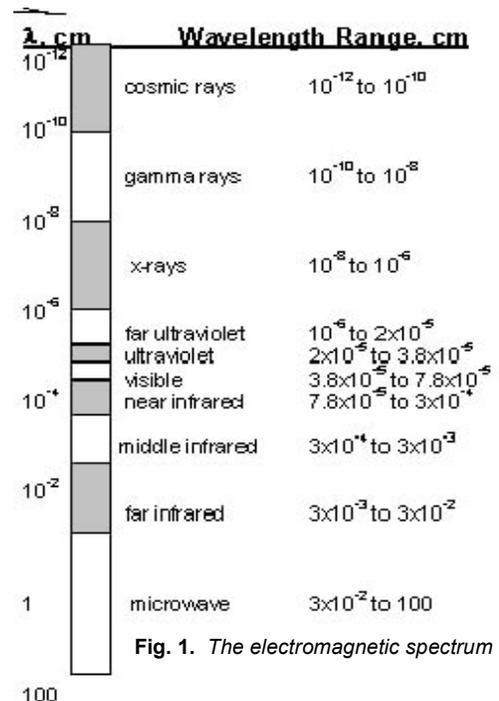


Fig. 1. The electromagnetic spectrum

So what do UV inhibited, UV stabilized, and UV resistant mean? These terms refer to plastics that contain an additive that will absorb certain wavelengths of UV with little or no degradation. They are usually added to plastics to retard degradation in fluorescent light or protect whatever may be behind the film from the effects of UV. Because these are bulk additives there will always be some unprotected areas of the plastic that will degrade. A rule of thumb is that resistance to degradation will double with the addition of UV stabilizers which means about a year outdoors at best. **To be a true outdoor, weatherable film (5 - 25 year life) it needs to have a surface protection.** This can be a highly UV stabilized Tedlar overlaminated film (**Makrofol EPC**), a film with a UV absorbing coating (Lexan HPxxW) or any product that claims to be **weatherable** and has a **warranty** or **test results** to back up the claim.

THE BEST WAY TO ADDRESS ISSUES INVOLVING UV OR WEATHERABILITY IS TO ASK WHAT THE APPLICATION REQUIRES TO DETERMINE WHETHER A SURFACE PROTECTION IS NEEDED OR A UV STABILIZER WILL DO.