

# UV Stability of HDPE Lumber

When testing a product the best test criteria is your product, fully formulated and exposed to the environment it will encounter. Since this is not always possible or practical, testing using artificial light sources were developed.

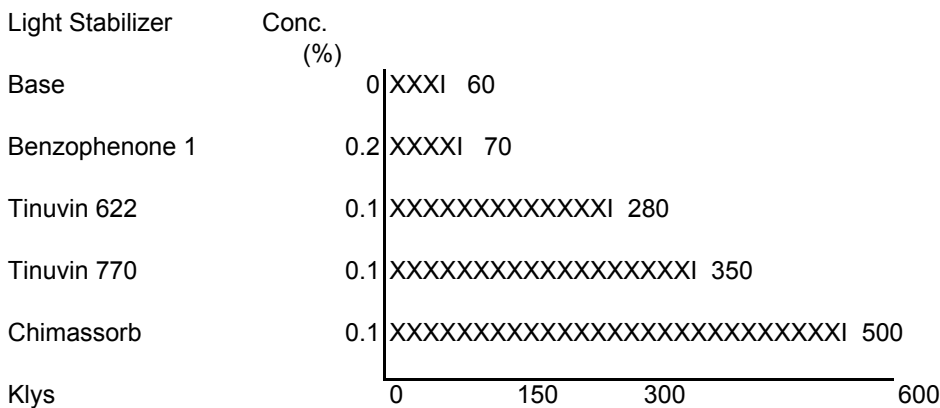
These tests have used some of the most commonly used light sources across the UV and visible wave lengths of light, and the data provided will give a very good representation of the real world results.

The performance data presented are based on Florida exposure studies where the results were reported in kilolangleys. The kilolangley is a unit of energy absorption: 1 kilolangley = 1 kcal/cm<sup>2</sup>. Typically, 140 kilolangley relate to one year of outdoor exposure in Florida.

Figure 9 (below) shows the result of a fixed amount of UV absorption and the affect it will have on Impact Strength. The loss of Impact Strength is of greatest concern in this particular application. Impact Strength will also be a very good indicator of the affects UV has on all of the other physical properties.

**Figure 9**  
**High Density Polyethylene Thick Section (2mm/80 ml)**

Resin: Ziegler HDPE  
 Base Stabilization: 0.025% Irganok 1076 + 0.1% Calcium Stearate  
 Exposure: Florida, Direct South 45°  
 Pigmentation: 0.5% T O (Rutile)  
 Criteria: Klys to 50% Retention of Impact Strength (Dynastat)



The parts tested are manufactured with HDPE and have various ranges of protection of UV stabilizer and Inhibitor. The base line is set up using unprotected HDPE. The part size is 2mm in thickness, (this is an important consideration).

The unprotected (base line) parts tested had a 50% reduction in Impact Strength in a five month period. These parts however are only 2mm thick. The parts to be supplied are over 305mm thick. Not taking into consideration the facts that a UV inhibitor is supplied, the absorption of over 80% of the UV rays by the water these parts will be covered by, the affect of thickness on UV absorption (i.e. UV rays will not penetrate past the immediate surface), and that these tests were based on days of sunlight (UV) on the Florida coast, this part will not lose 50% of its Impact Strength for over 64 years.

If you consider the "OTHER" factors listed above, the conclusion can only be a life time of well over 50+ years before any significant reduction of Impact Strength (and any other physical properties) can be measured.

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