

## Ultraguard® Material Formulation

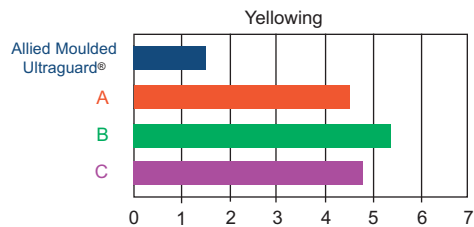
Ultraguard® -- Allied Moulded's new proprietary fiberglass reinforced polyester material formulation.

Allied's Materials Research and Development laboratory successfully optimized ingredients to create a formulation with the ability to resist the effects of UV degradation. The formulation was developed through the effective use of UV absorbers that provide protection by physically absorbing light in specific ranges of wavelengths, HALS (Hindered Amine Light Stabilizers), and antioxidants. Together, all three classes of stabilizers provide specific protection to modes of failure associated with outdoor exposure.

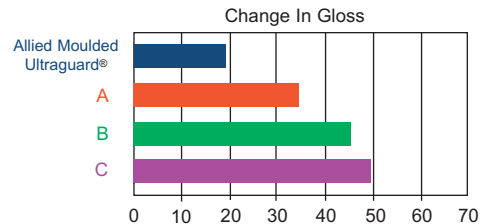
## Ultraguard® Versus the Competition

Allied's new Ultraguard® formulation out performed materials used by three leading fiberglass enclosure manufacturers. The following four key areas were benchmarked, with Ultraguard® easily coming out on top:

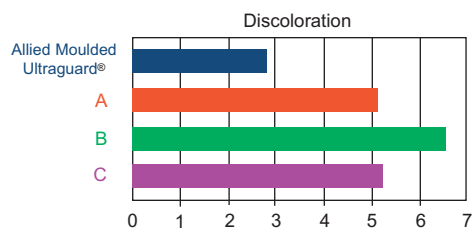
**Yellowing** (Delta b-change from original)  
 65-70% improvement over leading competitive enclosure manufacturers.



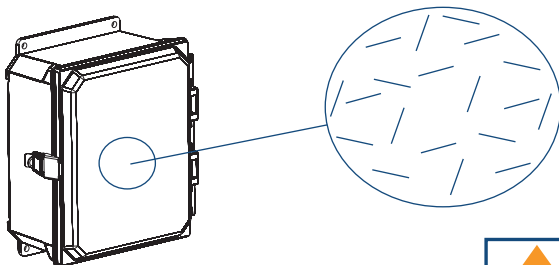
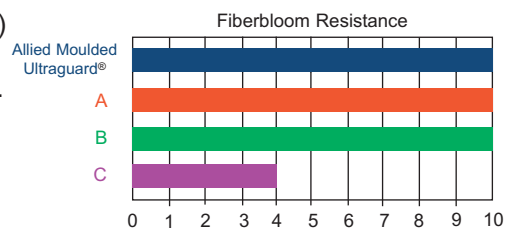
**Change In Gloss** (% change from original)  
 44-62% improvement over leading competitive enclosure manufacturers.



**Discoloration** (Delta E-change from original)  
 44-57% improvement over leading competitive enclosure manufacturers.



**Fiberbloom resistance** (change in aesthetics and texture)  
 60% improvement over one competitor.  
 Equivalent results compared to two remaining competitors.

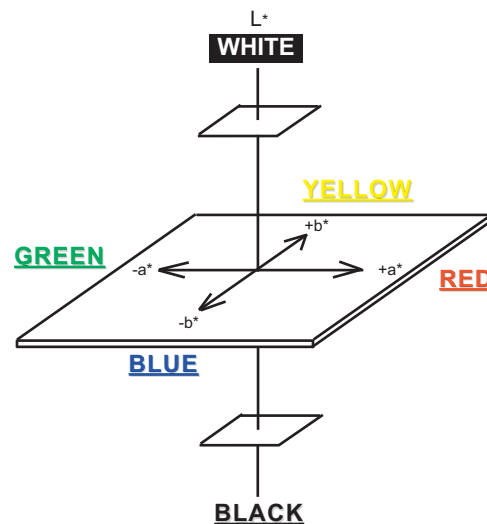


## Ultraguard® - How It Benefits Customers

Allied Moulded's new Ultraguard® formulation, while retaining its already robust structural integrity, now has an enhanced surface finish with improved aesthetics. Based upon customer feedback, Allied Moulded recognized an increased number of customer applications requiring outdoor capability and the related challenges to non-metallic enclosure designs. This is why Allied Moulded chose to invest in continuous improvement of our material formulations. Customer applications often require enclosures to be mounted on expensive systems where aesthetic appearance is critical. Changes in enclosure color, texture, and gloss in these applications are not acceptable. Fiberbloom, for example, not only is aesthetically unattractive, but can also be an issue if people come in physical contact with the enclosure surface. Literally defined, fiberbloom is degradation of the polyester compound surface during long-term outdoor exposure, resulting in the eventual exposure of glass fibers. Fiberbloom does not affect the structural integrity or NEMA rating of the enclosures.

## Ultraguard® - How The Results Were Proven

Allied Moulded's Materials R&D lab team accepted the continuous improvement project challenge of finding a synergistic combination of compounds that would improve material resistance to color change, gloss change, surface degradation, and exposure of surface glass particles. They successfully met the challenge of maintaining standard material characteristics: UL 94 5V flame test standards and RoHS directive (Restriction of Hazardous Substances). The new formulation also does not contain antimony or halogens, which reduce the risk of smoke borne toxicity. Allied's research and development lab replaced subjective test results found in normal field testing with objective test results that were achieved with industry accepted lab equipment. Internal lab tests and outsourced "Independent Lab" testing (Q-lab Weathers Research Service) was conducted with a QUV accelerated weathering tester. Gloss readings were recorded using a BYK Micro Tri-Gloss machine and color data was recorded using a Hunter Lab ColorQuest sphere instrument. All test results were obtained and reported per ASTM & ISO standards.



L\* a\* b\* Color Space - Instrumental color readings utilize three numbers to describe a color baseline.

## Ultraguard® Versus Steel Enclosures

While outdoor exposure appears to present problems for non-metal enclosures, there are many other reasons why non-metal enclosures are strongly preferred and why they actually provide better solutions. Weight, corrosion, ease of modification, resistance to dents and loss of seal integrity are all key issues that must be considered when choosing between non-metal and steel enclosures. Ultraguard® FRP is the preferred alternative.



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 MOULDED  
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