



## Outdoor Use and Exposure

Attabox Enclosures are intended to be utilized for outdoor and indoor applications. The polycarbonate contained in the Heartland Series as well as the enclosure have passed UL tests for suitability. The Lexan polycarbonate resin in the Heartland Series received the best rating, an "F1" per UL 746C. This means that the resin has passed tests for UV exposure and water immersion. The Heartland Series enclosures are rated 3R, 4, 4X, 12 per UL 50. This means that the enclosure provides ingress (rain, sleet, snow, splashing water, and hose directed water), impact, and flame protection. The material rating and the product rating can assure the user that the Heartland Series enclosures are suitable for outdoor use and exposure.

*Please read the UL Weatherability Summary below, for a description of what it means to have an F1 rating.*

A polymeric material used for the enclosure of electrical equipment intended for outdoor use must be acceptably resistant to degradation when exposed to the following tests per UL746C:

- UV exposure per clauses 27 & 59
- Water Exposure & Immersion per clauses 28 & 60

A polymeric material used for the enclosure of electrical equipment intended for indoor use where exposed to an ultraviolet light source must pass just the UV exposure tests.

Materials that have passed the UV exposure and Water immersion tests will be assigned an (f1) or an (f2) rating in the UL Plastics database and on the appropriate UL yellow card.

- An (f1) rated material is approved by UL for outdoor use as an electrical enclosure material (or for indoor use where exposed to an ultraviolet light source), provided the material meets all other non-weather related UL requirements.
- An (f2) rated material may be approved by UL for outdoor use. UL must review the details of the weatherability test data before approval.
- A non-rated material is not approved for outdoor use unless long term weatherability tests are performed on the end-product. Customers typically desire to avoid this by specifying an (f1) or approved (f2) material.
- The (f1) & (f2) ratings are applied to an entire grade, not to specific colors. All listed colors must be tested to get an (f1) rating.
  - For an "All color" rated material, testing must be performed on "Agency Light", "Agency Dark" and natural (if sold in natural).
  - If an "all color" rated material is tested in only certain colors, it will, at best, get an (f2) rating, even if it passes all of the tests.
- The (f1) & (f2) ratings are applied to an entire grade, not to specific thicknesses. All listed thicknesses must be tested to get an (f1) rating.
  - Tensile Strength samples tested at 4mm are representative of thicknesses down to 1.5mm
  - Tensile Impact samples tested at 4mm are representative of thicknesses down to 0.75mm
  - Flame samples must be tested at minimum thickness
  - If a material that is recognized in a range of thicknesses is tested in only certain thicknesses, it will, at best, get an (f2) rating, even if it passes all of the tests.

The UL746C weatherability tests are summarized as follows:

- 2 sets of test samples are exposed to Xenon-arc lamps per ASTM G151 in a weatherometer device per ASTM G155 with a repeating cycle of 102 minute light exposure followed by 18 minutes of water spray with light. One set is exposed for 500 hours and the 2nd set for 1000 hours.
- A 3rd set of samples is immersed in 70C water for 7 days (82C water for 5V flame rated materials).
- Each weathered set is then tested for Tensile Impact (TI), Tensile Strength (TS) and Flammability and compared with an unweathered control set.
- For a material to be rated (f1):
  - the 1000 hr UV exposed samples must retain  $\geq 70\%$  of the unexposed TS & TI values
  - the water immersed samples must retain  $\geq 50\%$  of the unexposed TS & TI values
  - the flammability performance must be unchanged for all samples
- If a material's TI retention levels after UV exposure are  $< 70\%$  but still  $\geq 25\%$  then the material will be assigned an (f2) rating provided the 1000 hr TI retention is  $\geq 80\%$  of the 500 hr exposed values and provided it passes all other tests. However, the material will be acceptable for use only if higher level ball-impact tests are performed on the unweathered enclosure:
  - 10 ft-lb ball-impact for UV exposed TI retention between 50% & 69%
  - 20 ft-lb ball-impact for UV exposed TI retention between 25% & 49%
- A material that fails to meet these minimum retention levels is not assigned any (f1) or (f2) and is not approved by UL for outdoor use (or for indoor use with exposure to an ultraviolet source).

Before using this product, the user is advised and cautioned to make its own determination and assessment of the safety and suitability of the product for the specific use in question and is further advised against relying on the information contained herein or previously represented as it may relate to any specific use or application. It is the ultimate responsibility of the user to ensure that the product is suited and the information is applicable to the user's specific application. ATTABOX LLC does not make, and expressly disclaim, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained herein, previously represented or the product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein, previously represented or the product itself. Further, information contained herein or previously represented is given without reference to any intellectual property issues, as well as federal, state or local laws which may be encountered in the use thereof. Such questions should be investigated by the user.