Car 4 Aerobody Manufacturing Documentation

Overview

This article serves to document our manufacturing processes and decision making behind the aerobody for Flare.

Materials

A significant array of materials were required for the manufacturing of Flare's aerobody. Important materials are listed below with notes about their sourcing and purpose. If looking to order any of these products, please do due diligence to see if they are available cheaper elsewhere.

Foam

The selected foam for this project was XPS foam. Specifically, we obtained 46 sheets of 4 inch thick, 4x8 feet XPS foam manufactured by Dupont. This foam was ordered from FBM Global. Originally, we had inquired for Owen's Corning FOAMULAR XPS foam, however received the Dupont foam, which worked well for our purposes. These foam slices were CNC'd to develop a positive pattern of the aerobody shell.

Primer

The primer used for this project was Duratec Styroshield Primer. This primer is optimal for using on foam products. Primer is required for making any foam plugs as it protects the plug from being damaged by polyester compounds. This creates the surface which is captured by the gelcoat mold.

Loctite Glue

The glue used for adhering the mold slices together was Loctite PL Premium Polyurethane (https://www.homedepot.com/p/Loctite-PL-Premium-10-oz-Polyurethane-Construction-Adhesive-Tan-Cartridge-each-1390595/202020473). This glue is water activated, meaning that each slice had to be lightly misted with water before being stuck together with this glue.

Fairing Compound

To make patch repairs to the surface of the plug, we used TotalBoat Epoxy Fairing Compound (https://www.amazon.com/TotalBoat-TotalFair-Compound-Fiberglass-Aluminum/dp/B00LLL9FXU?th=1). This is a 2 part, 1:1 epoxy-based filler used to fill voids or cracks on the plug surface. Fairing compound is typically left overnight to cure and is also susceptible to exotherm.

Sandpaper

The surface of the plugs were sanded up to 1000 grit. Thus, we used 60, 120, 220, 320, 400, 600, 800, and 1000 grit sandpaper throughout the manufacturing process.

PVC Piping

Several sections of 3/4" PVC piping were used as a method of aligning slices. Holes were made in the slices for each plug to allow the PVC pipe to fit between layers.

Canopy

Nose

Bottom Body

Top Body

Integration

Takeaways

1. Don't spend time trying to achieve absolute perfection. You can always post-process. This will save you a LOT of time.
2. No need for using another paint to go beyond 1000 grid on the plug, primer is fine.
3. Don't separate the nose from the bottom-body.
4. There's no need to overbuild your mold, 3-4 plies of fiberglass is sufficient.
5.

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