



Earnhardt Childress Racing engines and Windform LX alternator shroud.

With the jostling and bumping that occur, it is sometimes easy to forget that at its heart Stock Car racing is an endurance event. Top NASCAR teams work to ensure reliability for every race on every component. Each part is designed to ensure that 400 or 500 miles pass without incident. If there is a component that does show problems or appears to be a liability the challenge must be met with swift and decisive action.

Alternators are one of the most problem-prone parts on NASCAR race engines. The combination of high under-hood temperatures (up to 350F), high vibration (up to 600g), and high electrical current demand (up to 140A) present unprecedented design challenges. In mid-2009 NASCAR approved routing a maximum 1" duct from the side of the radiator shroud to the alternator. Initial attempts at implementing the duct involved fitting a secondary rear cover to the alternator with an integral hose attachment. Packaging was tight and cooling efficiency of the cover was sacrificed by retaining the original OEM rear cover.

A meeting with CRP at the first edition of MotorsportExpotech in 2008 in Italy gave Dr. Andrew Randolph, Engine Technical Director for Earnhardt Childress Racing (ECR), another option for this type of challenge. ECR designed a *replacement* rear cover for a standard NASCAR Bosch alternator that packaged well and provided maximum cooling efficiency. Once this potential solution was found, the next step was one of how to manufacture the parts needed using a reliable material in a fast method.



Traditional machining and molding offer reliable materials, but included the cost of tooling and the penalty of time. A call was made to CRP Technology, and after further discussions work began with the CRP USA team on options for the part that needed to be made.

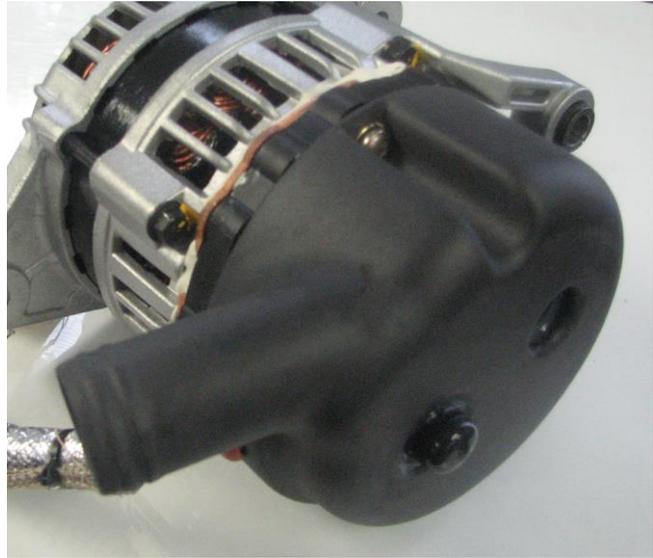
Windform XT would normally have been a clear choice, but in this case the added challenge of the current passing through the live contact post represented an obstacle for the partially conductive material. The compact design gave little room for creating isolation, so Windform XT with its carbon fiber content was not the correct fit. Into the spotlight stepped the newly developed Windform LX material. The Windform LX was given a thorough vetting as the possible candidate and had the correct combination of strength and thermal resistance for ECR's solution.

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Six alternator cooling covers were produced and run through initial testing. Subsequent track testing with temperature stickers showed a 20F reduction in maximum stator temperature with the new cover attached. Cover durability in the challenging underhood environment was excellent. The next step was to outfit the race teams with this new component. The move from rapid prototype to rapid production was made very simple, as the Windform LX material was suited for the exposures seen during race conditions. A production run of 50 parts was ordered and then installed on the race engines.



As the season drew to a close twelve races later, the success of the part had become as common place as finishing a 500 mile race. Randolph states "Windform LX alternator covers from CRP fit perfectly from the onset and we have not had a single alternator failure since instituting them on all ECR NASCAR Cup engines."

Windform LX combined with the design and engineering experience of the ECR team proved that a solution did not have to be limited to a test run on the Dyno. The depth of the Windform material line and CRP USA proved again that their work is not only track tested, but also race proven.

CRP USA would like to congratulate ECR engines on their victories in the season-opening 2010 Bud Shootout in Daytona, the 2010 Daytona NASCAR Nationwide 300, and the subsequent 2010 Daytona 500!

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