

AERO 101

With the finish of WTAC 2016, it's time to do our annual aerodynamic analysis of the winners! Let's get started with the winner of Pro Class, the MCA Suspensions "Hammerhead" driven by Tim Slade!



MCA Suspension's "Hammerhead" S13 has undergone some changes since last year. Starting at the front of the car, rather than utilizing a typical flat carbon splitter, the team has been using a carbon front end (front bumper, hood, and fenders come off as one) with a lip extension. It does not extend quite nearly as far as some of the other teams out there, which just goes to show that aerodynamics is all about balance. The bumper only has 3 inlets: the main radiator inlet, and what we suspect to be brake ducts. This maintains maximum surface area

for the air to stagnate against before being pushed around or over the car. On each side of the bumper are wing extensions, which give the Hammerhead its name. The wing extensions are dual element, allowing for a larger total camber angle without the expected flow separation from a single element with the same camber. The dual element design also allows the team to run less AOA than they would have to with a single element. The wing endplates are not very large, just enough to keep airflow from spilling over. This keeps wingtip vortices at a minimum. The wheels are fully covered by the bumper, keeping tire drag to a minimum. Moving along, we see that the front fenders are vented, which is a common occurrence amongst time attack cars today. The fender vent is shaped to help accelerate the turbulent slow air exiting the wheel well. If you look closely, the fender vent starts off wide, then chokes down to a smaller section, known as the throat. This accelerates the air as the throat area has a lower pressure relative to the wide exit of the wheel well. This air moves directly over side splitters which help generate some downforce.



The rear wheels are also fully covered; it seems no detail has been left untouched. The exhaust sticks out quite far from the bodywork, which does create some drag; however this was most likely done to keep the bodywork and paint from catching on fire or melting. The wing on the car is a triple element, intended for creating large amounts of downforce. It's also worth noting that the car still utilizes a spoiler, with a very shallow angle to mainly keep airflow attached to the body and extending the car's overall shape (like the Moby Dick tail). The endplates on the wing have been enlarged since last year, helping extract more downforce from the setup.



Finally, the rear diffuser of the Hammerhead is a unique design. It has been molded into the “rear bumper” so to speak. Airflow coming off the rear tire and in the rear wheel well is channeled into the upper section of the double diffuser. A double

diffuser works by drawing more air from the underbody of the car, due to having a larger volume. This helps reduce the amount of lift generated by the car greatly, in turn creating downforce. The angle of the diffuser is quite steep; you can be sure this car has a very flat underbody. With this aero package and Tim Spade behind the wheel, it is no wonder MCA Suspensions was able to clinch 1st in Pro Class!

Photos courtesy of SpeedHunters and World Time Attack Challenge.