

AERO 101

Yet another Aero 101 asked for by our followers. This one may be very useful to some of you: how to design for low drag! We will be talking purely about reducing drag, and any downforce created will be secondary.



Let's start at the front of the car. Now, the best way to reduce drag at the front is by having it be streamline. This is why Formula 1 cars have flat or narrow noses. The less surface area you have to interact with the airflow, the less drag is created. On a normal passenger car, this can be a bit of a problem, due to the shape of the car. There are two answers: either add more material to the front of the car to create a more squished nose section, say similar to an NSX; or, go with a NASCAR style air

dam and small splitter. Now you may be asking why we are suggesting going with the NASCAR style air dam when we just said you want to streamline the nose. Well, CFD has shown, at least on a Miata, that less drag is created by using a flat air dam in conjunction with a small splitter. This is because the flat air dam limits the air going under the car. There is less air to interact with the underside of the car, which reduces drag. The air dam should also cover the tires, as to reduce tire drag. The small splitter also prevents the air from traveling under the car, and as a side effect, creates downforce as well. As a rule of thumb, around 3" is as long as you want to go to not risk creating some drag as well. Dive planes should not be used as the vortices created induce drag.

Underneath the car, front diffusers should be used to help accelerate the air and lower pressure. Remember, this air needs a place to escape. A vented fender, not louvers, should be used, because the shape of louvers can result in more drag. A flat bottom would be the wisest choice. We suggest using sideskirts instead of side splitters/sills as the edge of the splitters/sills will create vortices and induce drag. Over the top of the car, a hardtop or fastback should be used. Ideally, a fastback would be the best choice. Although the shape of the fastback does create some lift, it is negated by the downforce created underneath the car. If a fastback is not attainable, the hardtop should make use of vortex generators to keep airflow attached.

At the rear of the car, much like Moti's Creampuff, a streamlined tail should be used. Streamlining of the tail allows airflow to remain attached, and this reduces drag. A long, shallow, diffuser will allow the airflow to expand while creating a bit of downforce itself. A rear wing will not be needed, however if you decide to run one, remember to choose one with a shallow profile. To reduce the drag even more, run large endplates with

slots in the endplate to reduce the drag even more. Endplate mounts, or swan necks should be utilized to maintain downforce and create less turbulence for the wing.