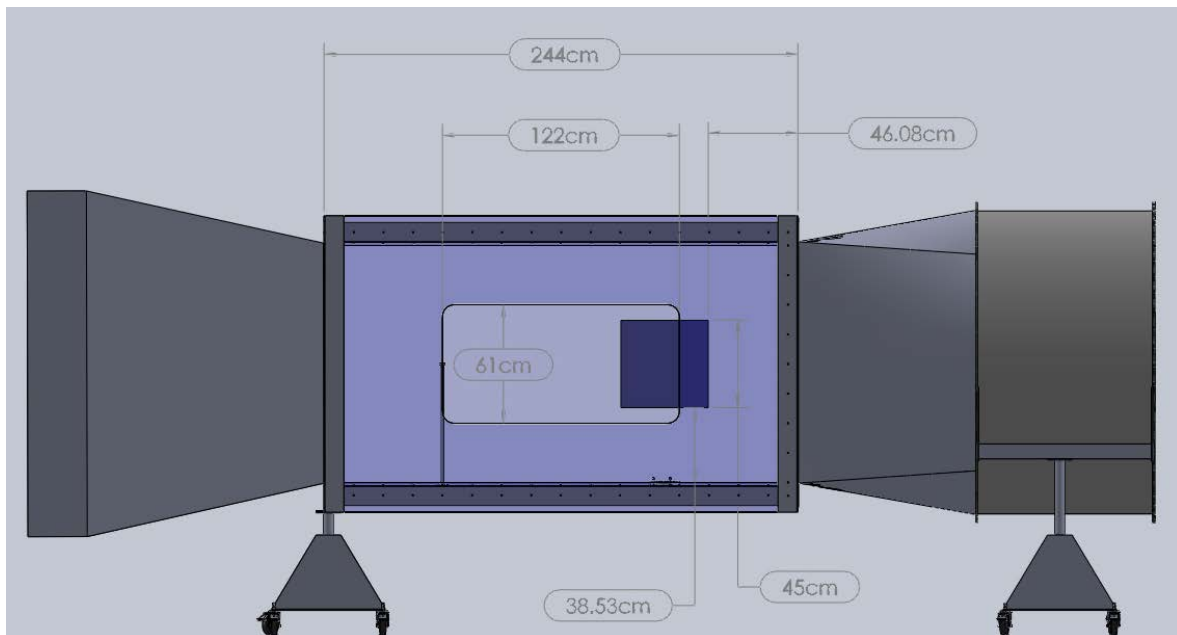
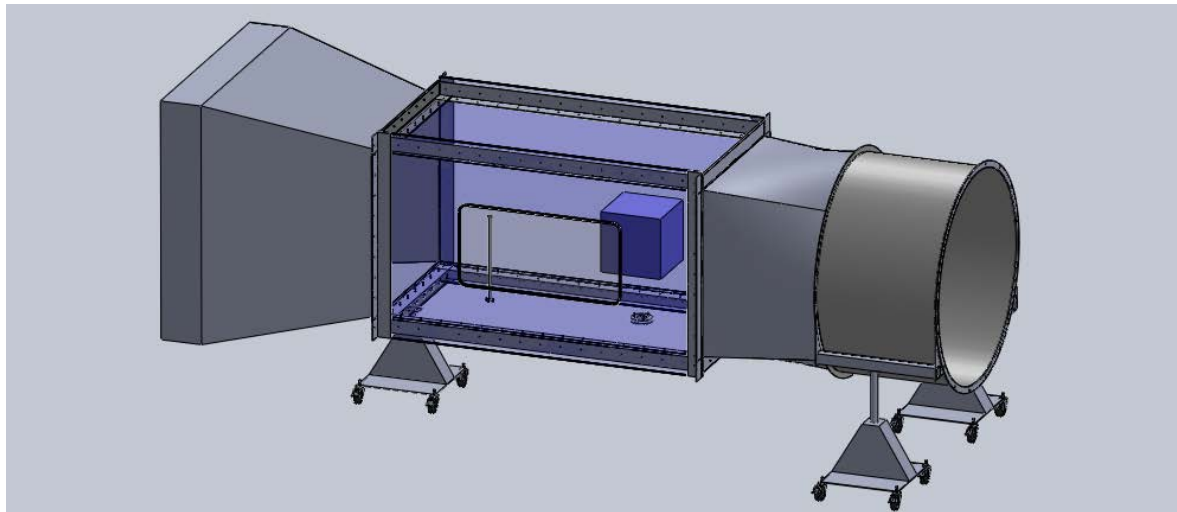


Wind Tunnel Specifications

The basic wind tunnel configuration is shown below. The dimensions of the test chamber are 4 ft x 4 ft x 8 ft (48 in x 48 in x 96 in). There are inlet and outlet components of the wind tunnel that extend beyond the test chamber as shown. The tunnel has a “draw down” configuration. That is, the air is “sucked through” the test section—entering at the left, exiting at the right—with the draw down being induced by the fan on the right side of the tunnel. A honeycomb flow straightener is at the inlet of the wind tunnel provides for near uniform mixing of the incoming air. There are two debris filters—one at each side of the fan section. The screen is composed of wire mesh to prevent turbine pieces from getting sucked into the fan unit or fingers from getting into the fan blades from the outside. The 60” diameter fan is made by Canada Blower, model TD60S, with a 60,000 CFM 10HP rating.



For the Collegiate Wind Competition, the rotor must fit within the 45 cm x 45 cm x 45 cm “cube” at the specified location within the wind tunnel and be on the tunnel centerline. This allows enough free flow area to maintain consistent operational speeds in the wind tunnel regardless of the turbine designs that are tested. Teams are not allowed to change the location of this hypothetical testing cube. The door is 61 cm by 122 cm. For the competition, all turbines to fit through that opening in one assembly with no additional assembly occurring inside the tunnel other than attachment to the base flange.

At the bottom of the cube there is an “attachment stand” (see figure below). The base flange in the tunnel is constructed as a 6” diameter, $\frac{1}{4}$ ” thick aluminum plate. The test turbine base plate should be constructed of material no thicker than $\frac{1}{2}$ ”, to fit the base flange, and to fit over three $\frac{1}{4}$ ” diameter studs where it is secured to the base flange with nuts. The base flange in the wind tunnel is a $\frac{1}{4}$ ” aluminum plate with a 3” diameter opening in the center to allow for routing electrical connections out of the wind tunnel. The drawing shows a top view of the turbine base plate with the top of the drawing oriented toward the tunnel inlet. The air flow will be from the top of the drawing to the bottom, parallel to the reference line from the top hole/stud to the center of the plate.

The base flange specification provided was intended to universally allow for a secure and properly aligned attachment. Teams are free to apply their engineering judgment to their own base plate design, keeping in mind that turbine bases **must** be designed such that they can be attached to the base flange in the wind tunnel. The base flange will be mounted to the floor of the wind tunnel with each team's base plate mounted on top. So, the bottom plane of the team's base plate will be $\frac{1}{4}$ ” above the floor of the wind tunnel. The attachment stand will be fixed in its position within the wind tunnel and teams will NOT be allowed to change the location or type of the attachment stand.

