

# **HOMEBUILT VORTELATOR PROPELLER KIT**

## **FLY FASTER AND USE LESS GAS**

Aircraft Development has developed a vortelator propeller kit that is capable of **INCREASING YOUR HOMEBUILT AIRCRAFT SPEED BY 2 TO 4 MPH AND YOUR RPM BY 20 TO 50 RPM.** That's if you have a fixed pitch propeller. If you have a constant speed propeller, for a given RPM and manifold pressure the propeller will be at a slightly larger pitch giving you more speed. This is accomplished by placing vortelators at certain critical locations on the propeller's most inefficient highest air drag areas. The vortelators will cause the boundary layer to stay attached to the propeller surface for a greater distance, and to keep the boundary layer thinner. The net result of these two actions is that it reduces both the profile drag and skin friction drag components of the parasite drag. Another way to think of it is that the wake behind the aircraft propeller will be smaller, thus requiring less horsepower to turn the propeller through the air for a given RPM. Figure 1 below shows how this is accomplished. Figure 1 shows the flow of black motor oil on a lift strut, with a short strip of Aircraft Development's vortelator attached, during a flight test. The reason a picture of the lift strut is shown, instead of a picture of a propeller, is that the centrifugal force on a rotating propeller distorts the oil flow. However, the mechanism that reduces the air drag on the lift strut is the same mechanism that reduces the air drag on the propeller. Notice that behind the vortelator mini vortices are created as can be seen by the lines of oil that form behind the vortelator. These mini vortices sweep the oil to a point in between the mini vortices, and that's how the oil lines are formed. Whenever one sees these characteristic oil lines forming behind the vortelator one knows the vortelator is working. The vortelator allows the air flow to stay attached to the lift strut for approximately 80% of the lift strut's chord. In the area where there is no vortelator, the air flow separates from the lift strut and becomes turbulent, at approximately 40% of the lift strut's chord, as can be seen from the pile up of oil at the 40% chord position. At the 40% chord position the lift strut is 2.01" thick, and at the 80% chord position the lift strut is 1.18" thick. That means the turbulent wake coming off the lift strut is only 59% as thick with the vortelator attached as without the vortelator attached. That also means with a narrower wake less horsepower is required to propel the lift strut through the air.

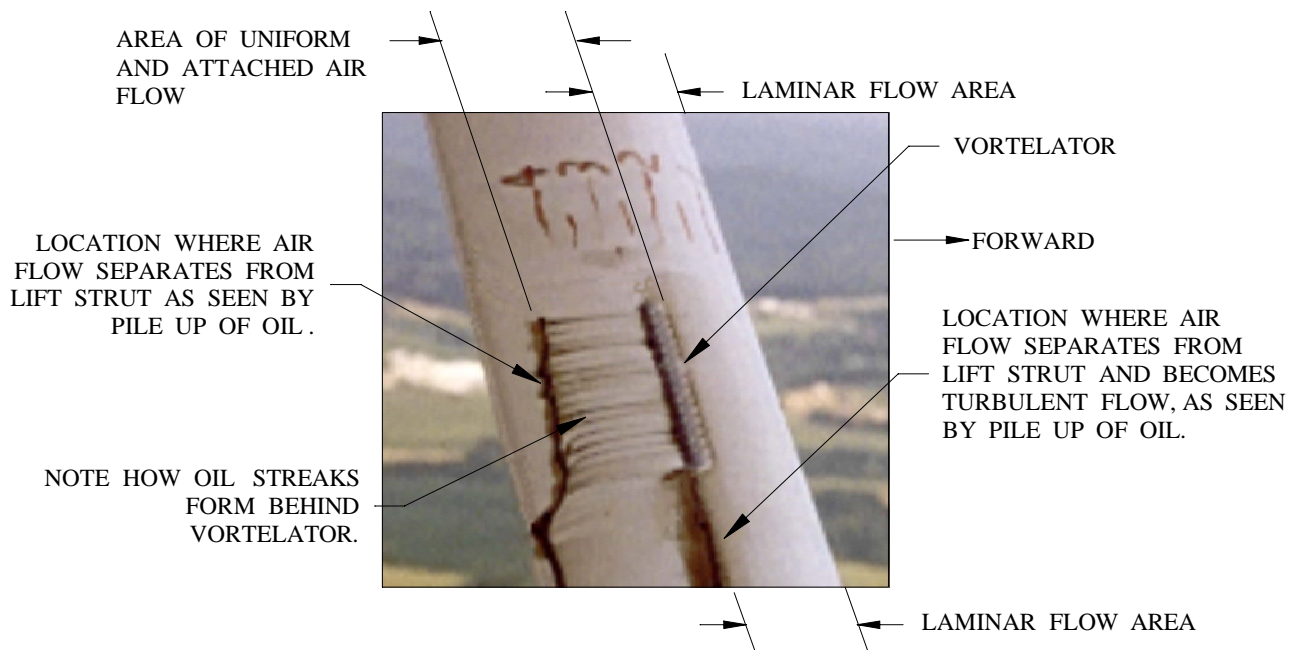


Fig. 1

There are several options the homebuilt vortelator propeller kit offers to the pilot. The pilot can take advantage of the increased speed thus getting to a location faster, if that is necessary. However, Aircraft Development believes a more important option is that the pilot can throttle back to achieve the same cruising RPM, thus the same air speed, that was being flown prior to the vortelator kit being installed on the propeller. This gives the advantage of less fuel being consumed at that engine cruising RPM. That means less fuel cost per flying hour. But that's not the only advantage, less fuel being consumed by the engine, at the same air speed and RPM means, the engine will be running cooler!

Though it's not a requirement for homebuilt aircraft these vortelators are FAA STC'd and manufactured under a FAA PMA because they are also approved for certified aircraft. That means you get the benefit of FAA certified aircraft parts. The homebuilt vortelator propeller kit 259-200 contains a three foot strip of vortelator, more than enough to vortelate up to a three bladed propeller. Plus clear instructions with pictures on where to place the vortelators on the propeller. And don't forget the savings of less gas being consumed per hour of flight will help pay for the kit. The vortelator kit weighs less than .05 ounces and takes less than a half hour to install. The vortelators have a pressure sensitive adhesive backing so the installation process is simply to clean the area of the propeller where the vortelators will be placed and stick them on to the propeller. It's that simple.

As an example of what vortelators on your propeller can do for your homebuilt aircraft we offer the test results of one of the more popular homebuilt aircraft the RV6A series of aircraft. This RV6A was flown straight and level at full throttle without and with vortelators installed on the propeller. With the vortelators installed on the propeller it had an increase in airspeed of 3 MPH. Figure 2 is a picture of the vortelator on the propeller of the RV6A. As you can see from the picture the vortelator strip is clear so it takes on the color of the surface to which it is applied. Vortelator strips are applicable to wood, composite, as well as metal propellers.



FIG. 2