

AIRCRAFT DEVELOPMENT
1220 RED OAK COURT
TROY, MO 63379

Title: Title: Installation Procedure Propeller Vortelator Kit

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No. 260-3

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Rev.

1.0 PURPOSE

To explain the installation procedure for this kit in the safest, most cost and time effective manner.

2.0 SCOPE

This procedure is applicable for vortelating aircraft propellers.

3.0 GENERAL

All work must be accomplished per Aircraft Development Installation Procedure 260-3. This kit 260-100 contains Installation Procedure 260-3 and a strip of 260-4 vortelator that is more than long enough to vortelate up to a three bladed propeller. However, do not use the extra material to vortelate the propeller more than the 12" specified. To do so will deteriorate propeller performance. This vortelator kit shall not be applied to propellers that are equipped with de-icing equipment.

4.0 GENERAL INSTALLATION PROCEDURE

4.1 It is important that the surface to which the vortelator is going to be applied be clean and dry. This can be accomplished by cleaning with a 50:50 mixture of isopropyl alcohol and water. Where heavy oils or greases are present there may be a need to first cut the oil with a degreasing solvent, but this should always be followed with an isopropyl water cleaning to help ensure that any residue or film is cleaned off. If there is oxidation on or a grimy finish to the propeller that will not clean off easily with the 50:50 mixture, first clean the surface lightly with Scotch-Brite pads. Then use the 50:50 solution. One way to assess cleanliness, is that a surface prepared for the vortelator should be as clean as one being prepared for painting. Spray or wipe the 50:50 cleaning solution onto the surface and scrub with a clean lint free rag or paper towel until the surface is clean.. Dry the surface with another clean lint free rag or paper towel.

4.2 After the surface to which the vortelator is to be applied, has been determined to be clean and dry, the vortelator can now be applied. Remove the liner, that protects the pressure sensitive adhesive, from the back of the vortelator. Stick the vortelator to the propeller surface, making sure it is properly positioned. In positioning the vortelator do not apply excessive tension to the vortelator, so as to prevent the vortelator from stretching. Use a small commercial roller and roll the roller along the vortelator applying approximately fifteen pounds of force to the roller. As an alternative use a plastic spoon and rub the spoon along the vortelator. Closely inspect the vortelator to make sure there are no tiny air bubbles visible. If tiny air bubbles are visible it is necessary to re-roll or re-spoon the vortelator until no air bubbles are visible. Apply the vortelator where the temperature is at least 65° Fahrenheit. The adhesive will come to full strength in 24 hours.

5.0 VORTELATOR INSTALLATION TO PROPELLERS

5.1 Measure a distance of 12" from the center of the propeller outward. With a water soluble marker (Mr. Sketch manufactured by Sanford) place a mark at the leading edge of the propeller at that 12" location.

With a pair of scissors cut the strip of vortelator long enough to reach from the marked 12" location to the edge of the propeller hub. Remove the protective liner from the vortelator exposing the adhesive side of the vortelator. Carefully place the leading edge points of the vortelator strip ahead of the maximum camber of the propeller, see figures 1 and 2. Figures 1 and 2 are drawn as if you are in front of the aircraft looking back and the propeller is rotating counter clockwise. If you are in front of the aircraft looking back and the propeller is rotating clockwise just assume a mirror image of figures 1 and 2. In other words the vortelator is placed on the forward side of the propeller blade. Note in figure 2 the placement of the vortelator as it approaches the round shank found on the root of constant speed propellers. Also see figure 6 for a picture of the same area. Some constant speed propellers have a pad for mounting counter weights near the base of the propeller blade. For those type propellers the vortelators should end about one quarter inch shy of the pad. In the event you are vortelating a wooden propeller with a leading edge brass protective strip, make sure that the inboard edge of the brass protective strip is more than 12" out from the center line of the propeller. If it is not, shorten the vortelator strip enough so that the vortelator strip does not overlap the brass protective strip. In the event the propeller has Prop-Guard installed one can remove the Prop-Guard so that the inboard edge of the Prop-Guard is 12" from the center of the propeller. Note: abrasion damage to the propeller normally accrues well beyond 12" from the center of the propeller. Caution: care must be taken not to cut through the Prop-Guard and into the propeller. This can be accomplished by holding a razor blade flat on the Prop-Guard and pulling the Prop-Guard up against and across the razor blade.

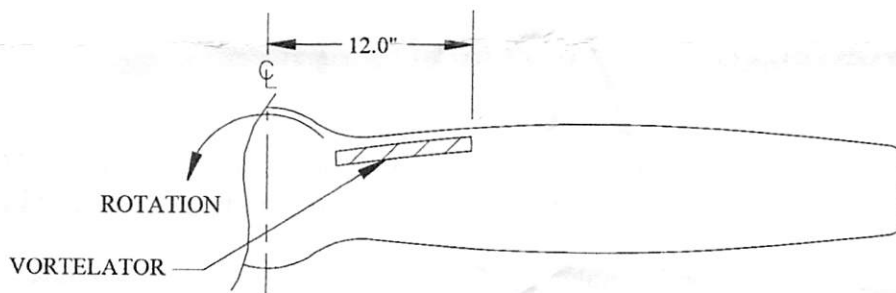


FIGURE 1 IN FRONT OF PROPELLER LOOKING BACK. VORTELATOR IS PLACED IMMEDIATELY AHEAD OF MAXIMUM CAMBER OF PROPELLER.

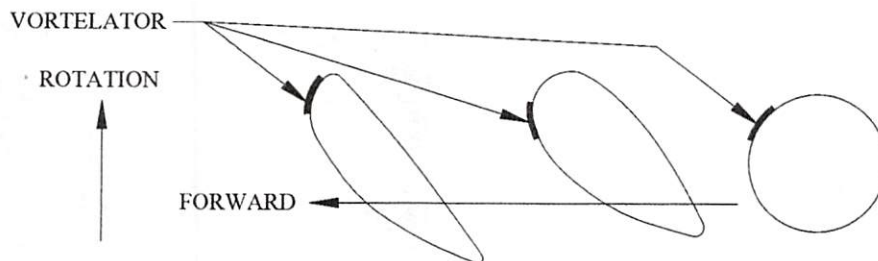


FIGURE 2 SHOWING THE CROSS SECTIONAL VIEWS OF THE VORTELATOR'S POSITION ON THE PROPELLER. ROUND ROOT OF THE PROPELLER SHOWN IS FOR CONSTANT SPEED PROPELLERS ONLY. THEN FROM RIGHT CLOSE TO PROPELLER HUB, TO LEFT FURTHER FROM PROPELLER HUB.

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Because of the large number of different manufactures of propellers plus the large number of different models of propellers covered by this propeller modification kit there will be differences in propeller chords and airfoil sections used. Using the procedure described in figure 2 will position the vortelator in the correct position to get the benefit of improved propeller performance. despite the differences found in all the different model propellers. To further assist you in determining if you are positioning the vortelator correctly on the propeller figure 3 can be consulted. Following the instructions of figure 2 the vortelator will measure from .25" to .40" as shown in figure 3. For propellers attached to engines from 65 HP to 250 HP the vortelator will tend to be closer to the low end of the range given in figure 3. For propellers attached to engines approaching 500 HP the vortelator will tend toward the high end of the range given in figure 3.

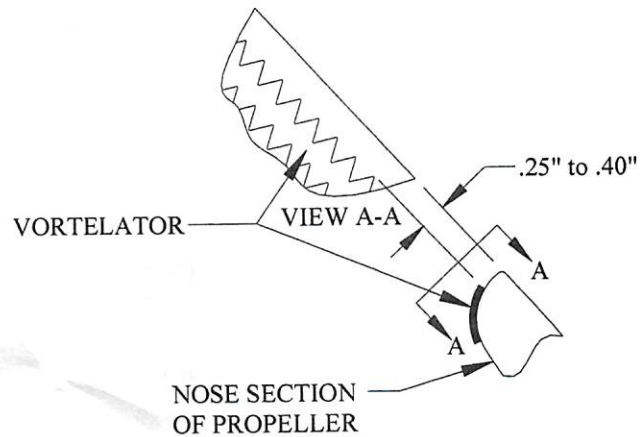


FIGURE 3

6.0 PICTURES OF VORTELATORS ON PROPELLERS

6.1 Following is a series of pictures that will give added insight on how the installed vortelators will appear if properly positioned on the propeller. Figure 4 is a picture of a strip of vortelator installed on a typical Sensenich metal propeller. Figure 5 is a picture of a strip of vortelator installed on a typical wooden propeller, with a brass protective strip, in this case a Sensenich propeller. Figure 6 is a picture of a strip of vortelator installed on a typical McCauley metal propeller. Figure 7 is a picture of a strip of vortelator installed on a typical constant speed propeller. Note: the normally clear vortelator strip is painted white for better contrast in figures 5 and 6.

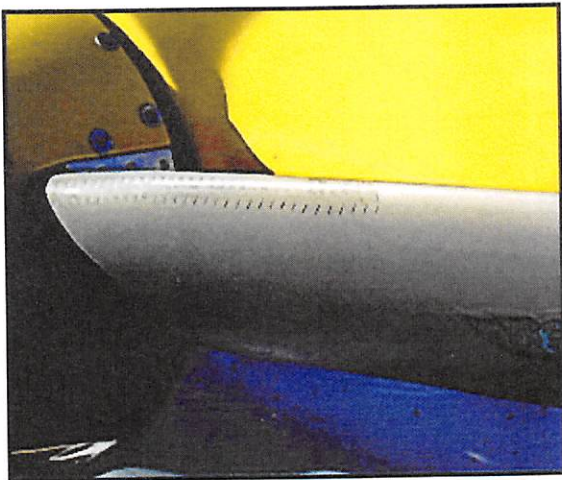


FIG. 4

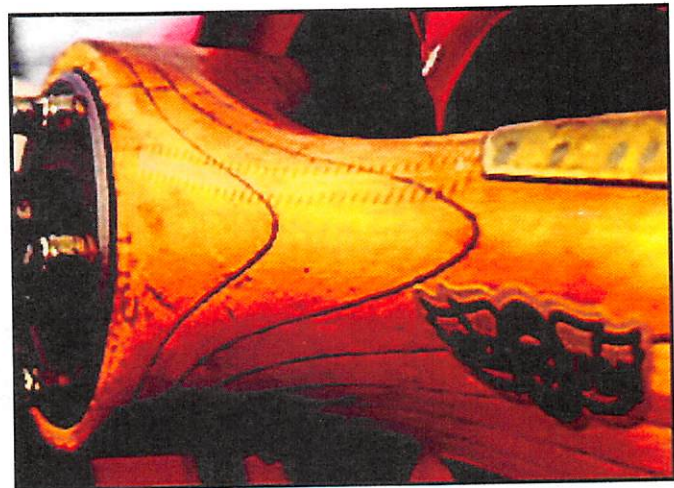


FIG. 5

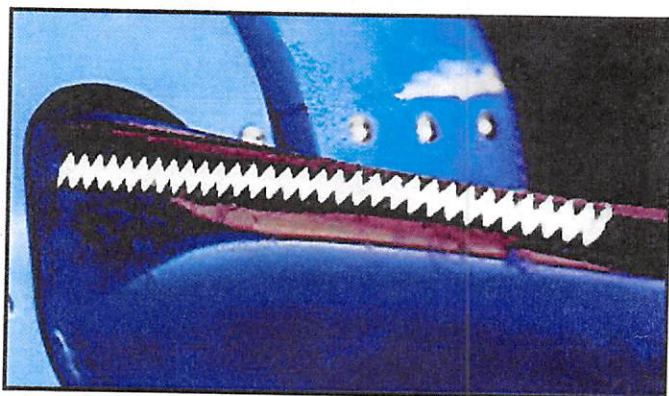


FIG. 6

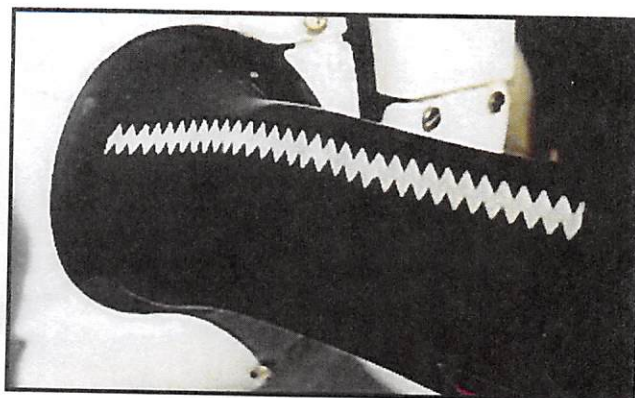


FIG. 7

7.0 GENERAL INFORMATION

- 7.1 Check all work to see that it has been properly accomplished.
- 7.2 The installation of propeller vortelator material on any of the approved model propellers is deemed to be a minor alteration to the propeller that may be installed by an A&P technician, and does not require the installation to be performed by an approved propeller repair station. Historical note: FAA Aircraft Certification required approved data to be developed to understand the effects of this material on a propeller, thus necessitating the requirement for an STC for this type of alteration.
- 7.3 Make entry in the propeller and airplane logbook as follows: "Installed Aircraft Development's propeller vortelator kit 260-100 in accordance with Aircraft Development installation procedure 260-3 approved by STC."
- 7.4 It is recommended that aircraft not be flown for 24 hours to give the adhesive time to come to full strength.
- 7.5 Instructions for Continued Airworthiness: To insure continued airworthiness of the vortelators, a visual inspection to see the vortelators are securely attached shall be part of the preflight inspection. In the unlikely event that a repair is required such as the start of a delamination of the vortelator, applying an adhesive such as super glue, or an equivalent commercial product, may be used to reattach the vortelator.
- 7.6 Weight and balance information: The weight of the vortelators is such that no change in weight and balance will be required in the aircraft records.
- 7.7 The weight of each vortelator is .015 ounces. Should for some reason a vortelator become partially or completely detached from the propeller the vortelators are light enough so as not to cause an unbalancing problem of the propeller. Therefore grounding of the aircraft with a vortelator partially or completely detached is not required. Replace the effected vortelator as soon as possible.