HELICES E-PROPS : BALANCING

The E-PROPS are known as ultra-light propellers, with a very low moment of inertia and very well balanced. At E-Props, each set of blades is balanced with its own hub and spacer.

Our team is using an electronic bench to balance the propellers, with two oscilloscopes, and all the data are registreted in our computer system.

=> Be careful : the blades do not necessarily have the same weight.
If you have blades with different weights, it doesn't matter.

To balance a propeller, the weight of blades is important, of course, but what is really critical is the weight distribution all along the blade, called **static moment**.

The weights P1 et P2 of each blade apply respectively to centre of gravity G1 and G2, which are not at an equal distance on the center of rotation O of the propeller.
The balancing must be realized to obtain : P1 x d1 = P2 x d2

The E-PROPS maximum static moment tolerance is 0,4 gr/m

Report of weight and static moment measures (coming from E-PROPS software) :

Commande	Nserie	moule	diametre	masse MS	DATE_pesee	percage
[illegible]	43806	S63L	150	348.58 83.43	2018-10-08 08:18:38	6M8d75
[illegible]	48875	S63L	150	350.43 83.53	2018-10-08 08:18:21	6M8d75

This propeller is a 2-blade for a 40hp engine, diameter 150 cm.
- blade 1 weights 348,58 gr and has a static moment of 83,43 gr/m
- blade 2 weights 350,43 gr and has a static moment of 83,53 gr/m
By E-PROPS, the static moment tolerance is 0,4 gr/m
=> here : the weights of the blades are different (gap 1,85 gr), and the gap between the 2 static moments is 0,1 gr/m. In the tolerance.
This propeller is perfectly balanced.

> Each E-PROPS blade is identified with a serial number (example above 43806, 48875).
> This number is written on the blade, and also in the RFID chip which is inside every blade (readable with a special RFID reader).
> Each blade is balanced with an other blade (or other blades, if the propeller has more than 2 blades).
> The obtained propeller is well-balanced. If you assemble non-paired blades, they would not be balanced together.

Please verify that the E-PROPS blades serial numbers are provided to go together.
This data is on your invoice, or delivery note, and if you do not have those documents, we can give this information to you. Please contact us by email.

In case of doubts, il is also possible to return the propeller to E-Props for balancing verification.

Never fly with an E-PROPS propeller if the blades are not paired.

If you want to verify the balancing of your propeller yourself, make sure the assembly is correct : blades on the right side, align the holes properly.
It is possible that the propeller leans a litle : it is due to the 0,4 gr/m tolerance. This tolerance has been calculated then deeply tested by our engineers.

=> Please note : those tests have been made on many motors; there are no vibrations up to 0,6 gr/m.

=> It is strongly FORBIDDEN to add weight to one blade, in order to have the same weight for all blades. The propeller would be then unbalanced, and can cause some vibrations.

DYNAMIC BALANCING

When vibrations are encountered, it may be thought that the propeller is not properly balanced. This is not necessarily due to the propeller alone, but to its positioning on the engine.

One can then be tempted to check if the balance of the propeller remains good on the engine during rotation (dynamic balancing).

The E-Props propellers being particularly light, the precision of the positioning of the propeller on the engine flange does not degrade the overall balance very little. Our team has tested the dynamic balancing of its models, without being able to measure any difference or make any improvement.

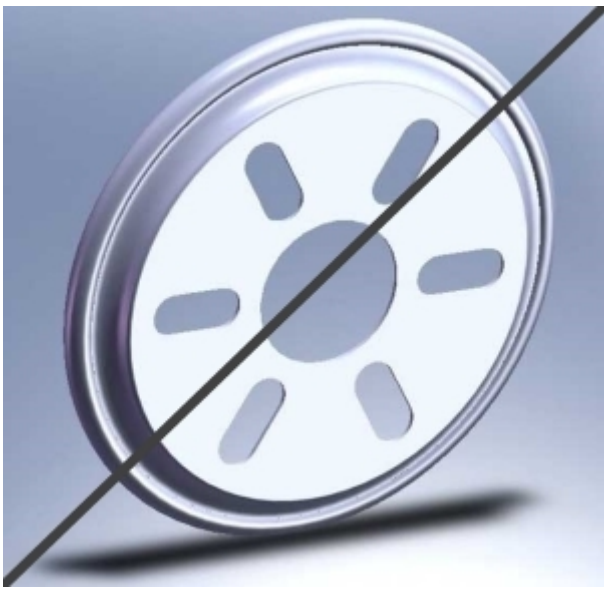
The very careful static balancing performed by E-Props in its workshops (blades and hub together) is sufficient to avoid vibrations. **A dynamic balancing does not bring anything.**

The ultra-light E-Props propellers are known to generate very little vibration.

Please note: the mounting of the E-Props hub directly on the engine, without using heavy aluminum spacers and more or less well made, greatly contributes to the guarantee of the correct positioning of the propeller on the engine flange.
This is one of the many interests of the E-Props carbon spacers(ESU).

Since the 1940's, devices have been available to restore dynamic balancing of rotating propellers.

On a geometrically good engine and with a propeller well balanced in static, this type of device is useless (just expensive and heavy).



dynamic balancing system = no need for E-Props propellers, ultra-light and finely balanced in static