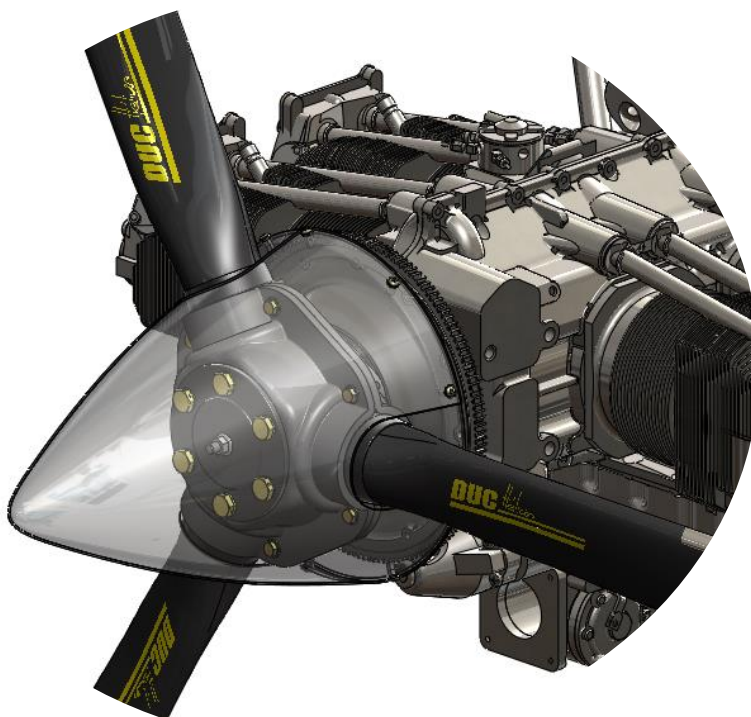


Instruction Manual

Inflight Variable Pitch Propellers

COBRA BLACK-R

Hydraulic



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Revision update

Date	Revision	Index	Object of modification
19/09/2024	A	-	Creation



BUREAU VERITAS
Certification

SOCIETE DUC
(trading under the name DUC HELICES PROPELLERS)

AERODROME DE VILLEFRANCHE-TARARE
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Bureau Veritas Certification France certifies that the management system of the above-mentioned organization has been audited and found to comply with the requirements of the standard:
Standard

ISO 9001:2015
Field of activity

DESIGN, MANUFACTURING OF AERONAUTICAL PROPELLERS, ROTORS, BLADES AND ACCESSORIES.

Certification cycle start date: 09 September 2019
Subject to the continuous and satisfactory functioning of the organization's management system, this certificate is valid until: 08 September 2022

Original certification date: 22 February 2010

Expiration date of the previous cycle: 21 February 2019
Date of re-certification audit: 10 July 2019

Certificate n°: FR054493-1 Date: 23 September 2019
Case n°: 7289632



Jean-Michel Audrain- General
Address of the certification body: Bureau Veritas Certification France
60, avenue du Général de Gaulle – Immeuble Le Guillaumet – 92046 Paris La Défense

Additional information regarding the scope of this certificate and the applicability of the management system requirements can be obtained by consulting the organization.
To check the validity of this certificate, you can telephone: +33 (0) 1 41 97 00 60.




This instruction manual is to be maintained throughout the life of the propeller. He may have to evolve. The owner must check with the DUC Hélices Company the latest version being valid applicable to the propeller.

Identification

Date		Delivery note n°	
Owner		Engine/Gearbox ratio	
Aircraft		Pitch range	<div style="display: flex; justify-content: space-between;"> Min : Max : </div>
Notes :			

Performances

	STATIC	TAKE OFF	CLIMB RATE		CRUISE			FULL TH.
ENGINE rpm								
VARIO ft/min or m/s		Distance (m) :			0	0	0	0
SPEED km/h or kt								
MAP in.Hg								

	STATIC	TAKE OFF	CLIMB RATE		CRUISE			FULL TH.
ENGINE rpm								
VARIO ft/min or m/s		Distance (m) :			0	0	0	0
SPEED km/h or kt								
MAP in.Hg								

	STATIC	TAKE OFF	CLIMB RATE		CRUISE			FULL TH.
ENGINE rpm								
VARIO ft/min or m/s		Distance (m) :			0	0	0	0
SPEED km/h or kt								
MAP in.Hg								

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1. Hydraulic COBRABLACK-R propeller

1.1. Description

The **Hydraulic COBRABLACK-R** propellers are innovative hydraulic variable pitch propellers of the latest generation achieving optimized performance for all phases of flight. They benefit from carbon / titanium blades and a carbon / aluminum hub manufactured using DUC Propeller technology.

These propellers allow to have **high efficiency** throughout the flight envelope i.e.:

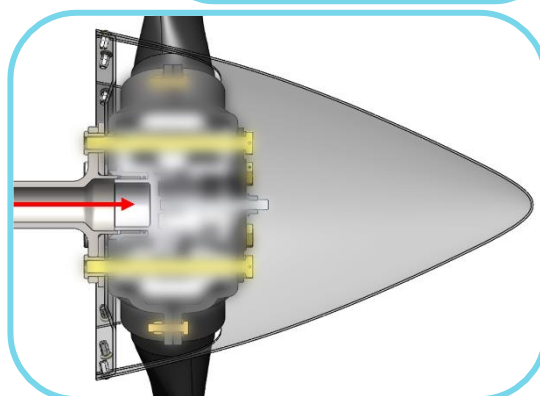
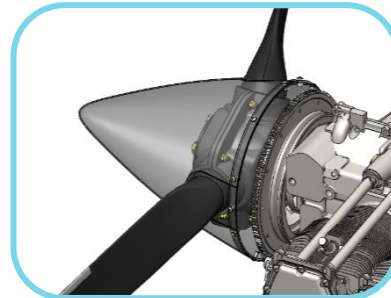
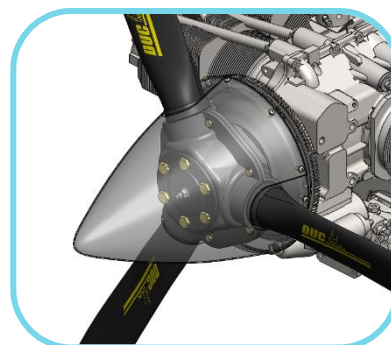
- **High efficiency during takeoff and high climb rate**
- **High efficiency during cruise and maximum speed**
- **High user comfort**
- **High efficiency during landing**

Their technological level and their level of manufacturing requirements have never been more advanced.

Their variable pitch carbon hub system allows a wide range of angle variation, while being secured by a small pitch safety stop.

The setting of the pitch angle of the blades is "Constant Speed", in other words managed automatically by a hydraulic governor which regulates the propeller pitch according to its engine speed setting.

The pitch variation is done by the hydraulic power and the governor adjustment control is simply mechanical (pusher or lever). **No electric current is consumed for this type of hydraulic variable pitch propeller.**



1.2. Characteristics

The **Hydraulic COBRABLACK-R** propeller range is available:

- **Tractor or Pusher configuration (Right or Left rotation)**
- **Diameters available: Ø1700 to Ø2100mm (Ø67 to 83 inches)**
- **2 or 3-blade**
- **Shielded leading edge in Inconel®**
- **Carbon composite hub**
- **Direct assembly on the propeller-shaft SAE2-AN6 (SAE II) / SAE2-AN7 (SAE V) / SAE2-AN8 (SAE VI)**

1.3. Shielding leading edge in Inconel

The leading edge of the **Hydraulic COBRABLACK-R** blades is composed of a metallic shielding in Inconel. This material is a superalloy including mainly nickel, with a very high hardness of the surface.

In addition, the color decorations (DUC logo + blade tip) are integrated during molding in the composite structure using technology specific to DUC. This makes them very robust and insensitive to wear or abrasion.



1.4. Accessories

- **Aluminum mounting spacer (Direct mounting on P.C.D 120.65mm)**

Moves the plane of the propeller to adjust the position in accordance with the engine hood

CAUTION: Special version for hydraulic sealing of the hydraulic propeller

- **Spinner available in diameter Ø290mm (Ø11.4") to Ø345mm (Ø13.6")**

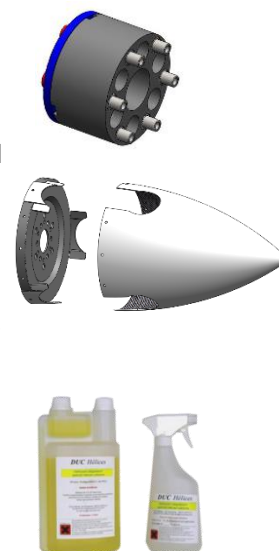
+ Spinner fillets to close the openings behind the blades

- **Adjusting tool for the setting of the pitch angle of the blades**

- **Neoprene cover protection of the blade**

- **Cleaning treatment for composite propellers**

Save money! A clean propeller is more efficient and decreases the fuel consumption.



1.5. Sales reference

Designation	Reference	Part number	Weight (kg)
2-blade Inconel Hydraulic COBRABLACK-R Right prop.	01-57-106	H-COB_2-D-PVH_R_I	
2-blade Inconel Hydraulic COBRABLACK-R Left prop.	01-57-107	H-COB_2-G-PVH_R_I	
3-blade Inconel Hydraulic COBRABLACK-R Right prop.	01-57-108	H-COB_3-D-PVH_R_I	
3-blade Inconel Hydraulic COBRABLACK-R Left prop.	01-57-109	H-COB_3-G-PVH_R_I	

Note:

Specify the flight regulation aircraft (E.g.: **EXPERIMENTAL...**).

For more information about the propeller marking, see section **12.5**.

2. Applications

The DUC Propellers Company has an **unlimited** flight potential in normal operation. To keep the unlimited potential, DUC Propellers Company defined a TBO (Time Between Overhaul) for a propeller depending on its engine. Refer to section **10. Potential use & Propeller maintenance** for more information.

ENGINE	Type	Gear Box	RECOMMENDED PROPELLER	Propeller diameter (mm)	Pitch angle amplitude (°)	TBO* (Hour)
3 AXES TRACTIF						
Lycoming O-320 series	4 strokes	-	2-blade Inconel COBRA propeller, Right	Contact us	33°	1500h or 5 years
Lycoming O-360 series			2-blade Inconel COBRA-R propeller, Right			
Lycoming O-390 series			3-blade Inconel COBRA propeller, Right			
			2-blade Inconel COBRA-R propeller, Right			
Lycoming O-540 series			3-blade Inconel COBRA propeller, Right			
			3-blade Inconel COBRA-R propeller, Right			
Titan X320 series			2-blade Inconel COBRA propeller, Right			
Titan X340 series			2-blade Inconel COBRA-R propeller, Right			
Titan X370 series			2-blade Inconel COBRA-R propeller, Right			
Titan X540 series			3-blade Inconel COBRA-R propeller, Right			
DELTAHAWK DHK180A4						
DELTAHAWK DHK200A4						
DELTAHAWK DHK235A4						
Continental 360 serie			2-blade Inconel COBRA-R propeller, Right			
			3-blade Inconel COBRA propeller, Right			
Continental 470 serie	2-blade Inconel COBRA-R propeller, Right					
Continental 500 serie	3-blade Inconel COBRA-R propeller, Right					
UL Power 390 series	2-blade Inconel COBRA-R propeller, Right					
	3-blade Inconel COBRA propeller, Right					
UL Power 520 series	3-blade Inconel COBRA-R propeller, Right					
OTHERS APPLICATIONS						
For all other applications, thank you to contact DUC Hélices company to study the possibility of adapting the Hydraulic COBRABLACK-R propeller.						

* Time Between Overhaul

Remark

The pitch angle's value are theoretical and combined with the engine. This setting should be adjusted according to the aircraft. Thus, dependent on the type of aircraft, a pitch angle range is defined. The magnitude of this range must not exceed the specified above (see section **0**).

First taxi tests and then fly tests of the propeller).

For proper use of the propeller, refer to section **10. Potential use & Propeller maintenance.**

3. Installation and using precautions



RECOMMENDATION

As recommended by the engine manufacturer, it's strongly recommended to use variable pitch propeller with an aircraft equipped with a vacuum indicator on engine intake manifold (**Pressure of the engine intake - PA**) to know the engine load. Refer to your engine manual or the section.

WARNING Make sure the ignition is turned off before starting any type of operation on the propeller. Do not run the engine without propeller, engine damage will result.

IMPORTANT The blades of a propeller are part of a whole. **DO NOT INTERCHANGE** with other similar blades from propeller. The propeller blades are manufactured to their application. Their structure, weight and balance are different from a propeller to another.

The spinner is an important element for cooling the engine. The aircraft must not fly without a spinner.

Fitting a different spinner will be an addendum to this manual approved by the DUC to confirm its compatibility with the mounting of the propeller.

The propeller is delivered with the appropriate screws. **The change of the screws is contrary to our recommendations unless validated by the manufacturers.**

WARRANTY CONDITIONS The user is still flying under his full responsibility (see. 6. General terms of sale).

4. Technical data of Hydraulic COBRABLACK-R propeller

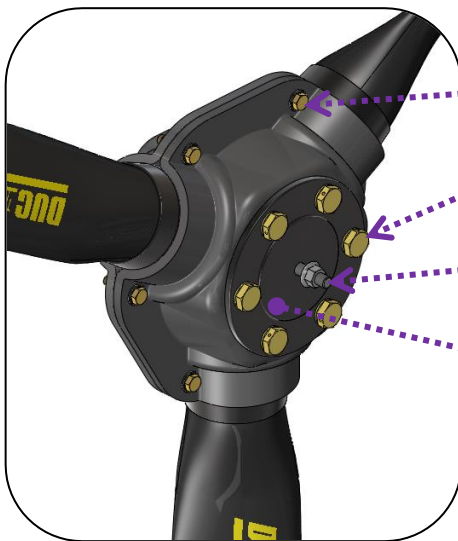
4.1. Mounting

Here is a configuration table of the Hydraulic COBRABLACK-R propeller mounting according the propeller-shaft of the engine.

If needed, see annex Erreur ! Source du renvoi introuvable.. Erreur ! Source du renvoi introuvable..

MOUNTING	FLANGE		
	SAE2AN6 _(SAE II)	SAE2AN7 _(SAE V)	SAE2AN8 _(SAE VI)
Direct on propeller-shaft (without spacer)	✓	✓	✓
With spacer	✓	✓	✓
With adaptor spacer	Contact us		

4.2. Hardware for standard mounting



Hub assembly:

AN5-12A bolts, Nylstop locking nuts & washers

Propeller fixation:

AN6, AN7 or AN8 bolts (Variable length according the mounting)

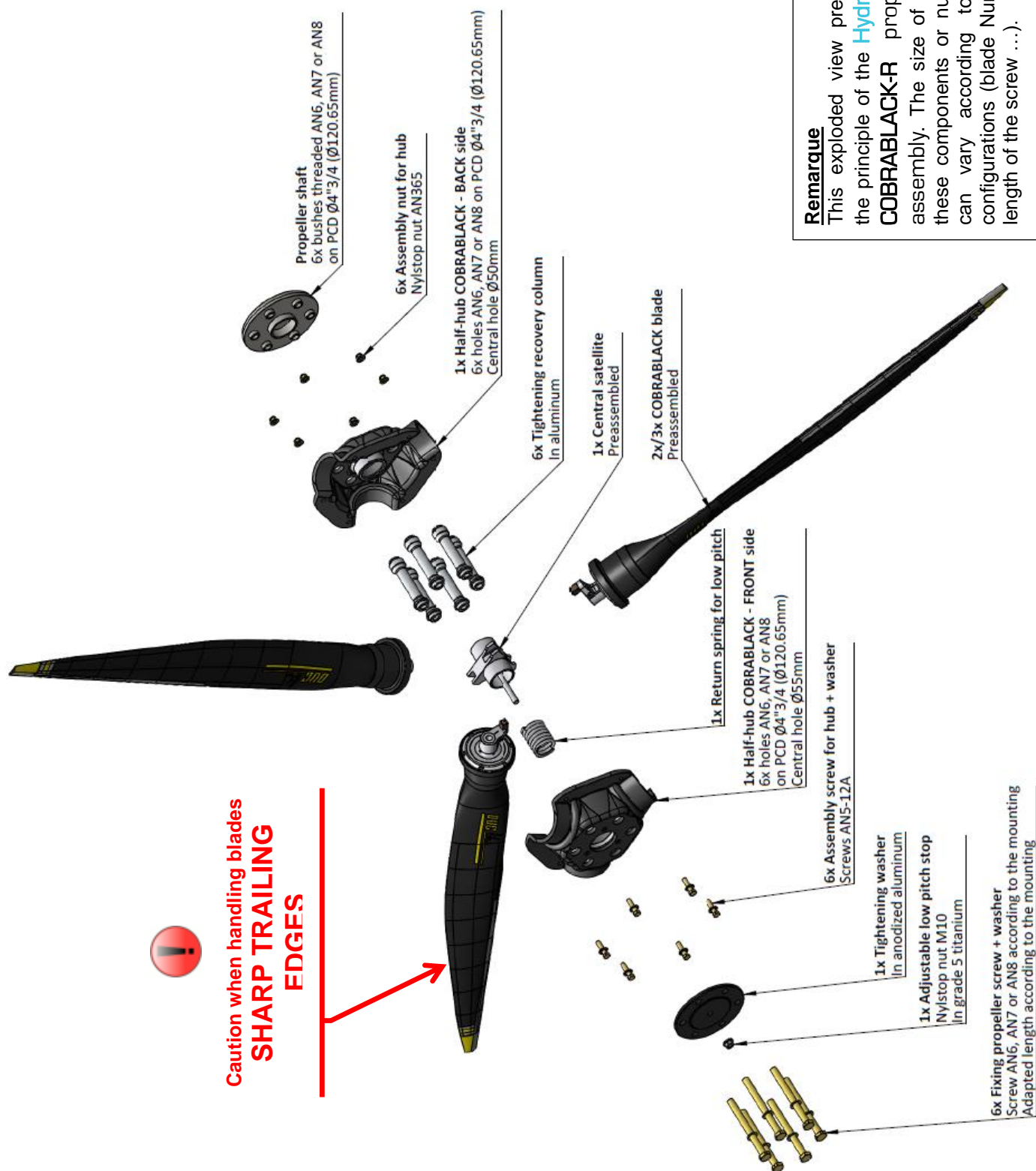
Adjustable low pitch stop:

Nylstop nut in grade 5 titanium

Tightening washer:

Anodized aluminum with holes AN6, AN7 or AN8 on PCD Ø4"3/4 (Ø120.65mm)

4.3. Exploded view of the propeller



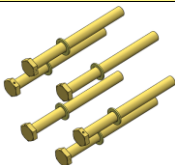


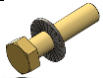




5. Mounting instruction of the Hydraulic COBRABLACK-R propeller





The mounting of the Hydraulic COBRABLACK-R propeller is showed hereafter. It's recommended to assembly the propeller on a table before to install it on the aircraft. The process is the same for the 2-blade or 3-blade propeller.

For further help, please contact DUC Propellers Company.

5.1. Package contents

The Hydraulic COBRABLACK-R propeller is sent in kit, composed of subsets. Thanks to perform the verification by checking the good package content:

View	Article	Quantity	Customer Verification
	Fixation screws of the propeller + Washer Screws AN6, AN7 or AN8 according to the mounting Adapted length according to the mounting	6	
	Adjustable low pitch stop Nylstop nut M10	1	
	Tightening washer In anodized aluminum	1	
	Assembly screw for hub + Washer Screws AN5-12A	6	
	Front half-hub 6x holes AN6, AN7 or AN8 On PCD Ø4"3/4 (Ø120.65mm) Central hole Ø55mm	1	
	Safety return spring for low pitch	1	
	Preassembled blade	2 or 3	
	Central satellite Preassembled	1	

View	Article	Quantity	Customer Verification
	Back half-hub + 6x Tightening recovery column 6x holes AN6, AN7 or AN8 On PCD Ø4"3/4 (Ø120.65mm) Central hole Ø50mm	1	
	Assembly nut for hub Nylstop nut M8	6	
	Blade neoprene cover protection	2 or 3	
	Instruction manual	1	

5.2. Operator & List of necessary tools

In the context of mounting the propeller, 1 operator is sufficient.

Here is the list of necessary tools:

SAE1/SAE2 Aircraft Mounting (Lycoming, Continental, ...)
<input type="checkbox"/> Flat key 5/16" and 3/8" or 7/16" or 1/2" torque wrench (Torque: 30-45 Nm) <input type="checkbox"/> DUC inclinometer (pitch adjusting tool) <input type="checkbox"/> Nylon mallet <input type="checkbox"/> Lubricating oil <input type="checkbox"/> Torque flat screwdriver (Torque : 4Nm)

5.3. Assembly of the propeller on table

↓ Check the steps gradually

☐ STEP 1.



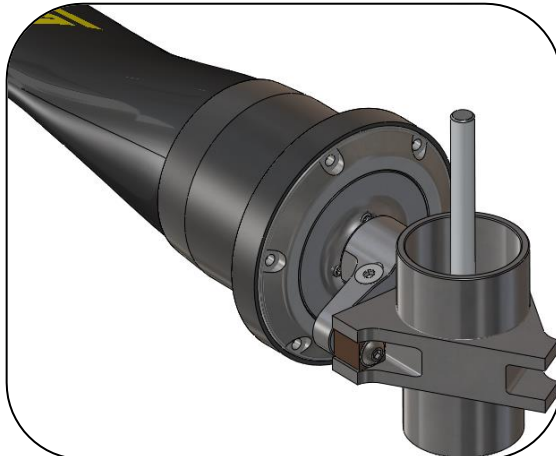
Place the **“engine back half-hub”** (Central hole Ø50mm) on a table.
Be careful not reverse with the “propeller front” half-hub.

☐ STEP 2.



Laid the **satellite** in the back half-hub without fitted into the carbon hole Ø50.
Check if you respect the right direction of the satellite’s mounting.

☐ STEP 3.



While keeping the satellite laid on the back half-hub, slot the **COBRABLACK-R** blades one after the others into the satellite groove and into the back half-hub.

Place the DUC sticker in front of you.

☐ STEP 4.

Ensure the good introduction of the blades in their place.

Place the **front half-hub**. This one must include **6 aluminum tightening recovery columns**.
Watch if the parts are aligned for the assembly.



Front half-hub



☐ STEP 5.



Place the **Screws AN5-12A + Washer** over the top and the **Nylstop nut** behind for the assembly of the 2 half-hubs. Make a first tightening to approach the screws.

Check if the blades are well placed in their place.

Pull slightly the blades outwards for a good placement of the blades.

☐ STEP 5.



Add the **safety return spring** in low pitch.

☐ STEP 6.



Place the **tightening washer in anodized aluminum**.

Put the safety return spring in compression by pushing the aluminum washer and screw the **Nylstop nut M10** at the **beginning of this one and keep this position for the M10 nut until the setting of the propeller.**

☐ STEP 7.

Put the **6 Fixation screws AN6, AN7 or AN8 + Washer** in the fixations drillings of the propeller.



At this point, the propeller is pre-assembled on the table but not tight.

5.4. Installation on the aircraft

As presented in section 4.1 Mounting, several mountings are possible:

1. Installing **directly on propeller-shaft** of the engine
2. Use a **spacer** for spacing propeller from the propeller-shaft

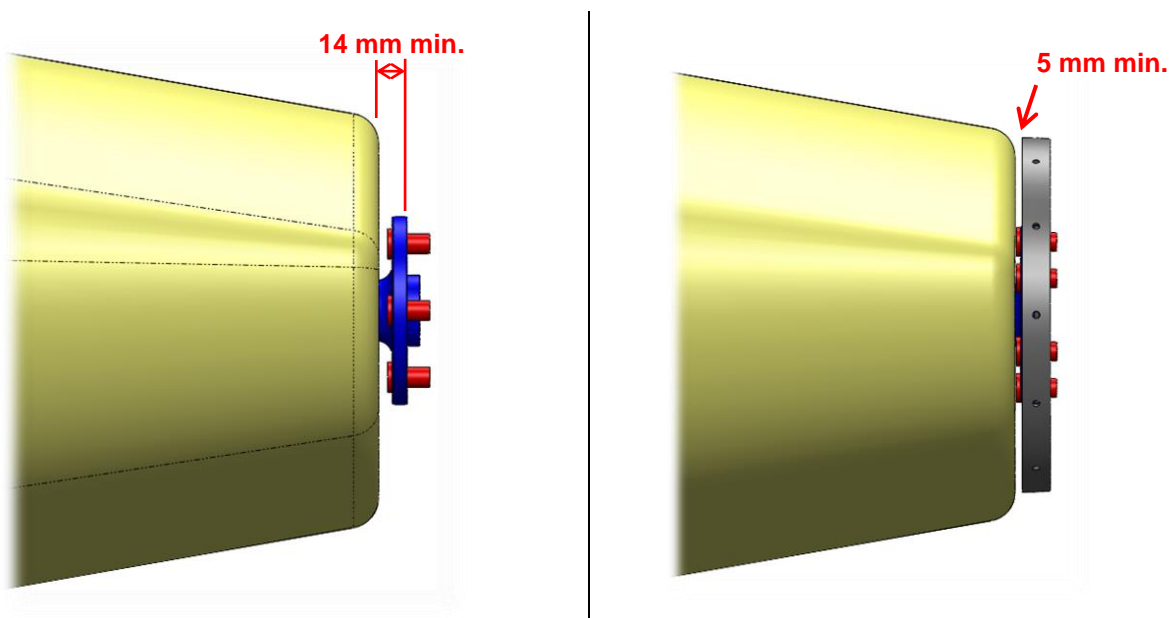
5.4.1. Direct installation on the aircraft

The direct installation of the **Hydraulic COBRABLACK-R** propeller is possible only with the following conditions:

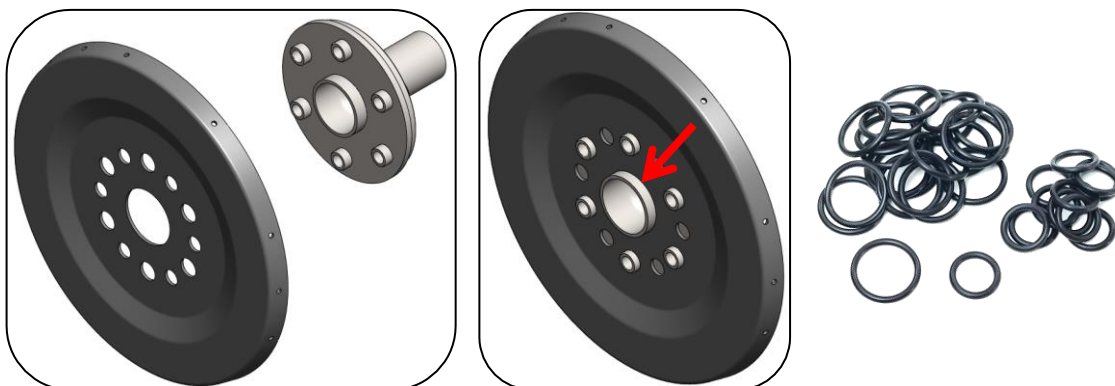
- ✓ Engine propeller-shaft with 6 lugs AN6, AN7 or AN8 on PCD SAE2 ($\varnothing 4\frac{3}{4}$)

If needed, see in annex 12.1 Dimension of the SAE2 propeller-shaft.

Remark: In the case of standard **COBRABLACK-R** hubs, **the drilling of the rear half-hub must be adapted according to the propeller-shaft lugs**. For any further information, contact DUC Hélices Propellers.



☐ STEP 8. DIRECT INSTALLATION



Place the **spinner mounting plate** on the **propeller-shaft** of the engine.

Then place around the centering and against the carbon plate the supplied O-ring gasket.

It is imperative to lubricate the seals before mounting.

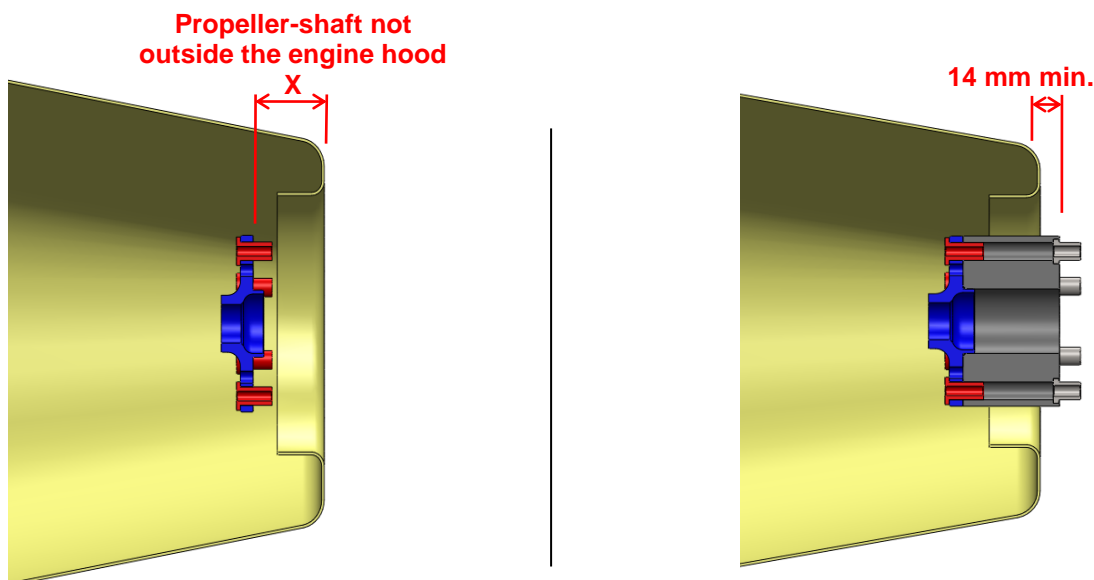
5.4.2. Use of a spacer

A spacer is necessary in the following case:

- ✓ Engine propeller-shaft SAE2-AN6, SAE-N7 or SAE2-AN8 on engine propeller-shaft placed inside the engine hood or not place at more than 14mm

Determination of the spacer length:

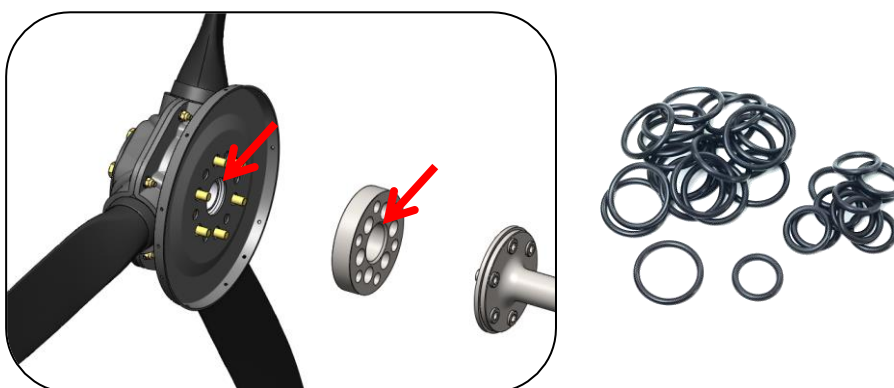
Measure the **distance X** between the propeller-shaft and the engine hood limit, then add **14mm**.



Spacer available:

Consult us to frame the mounting configuration.

☐ STEP 8. USE OF A SPACER



Place the **spinner mounting plate** on the **propeller-shaft** of the engine.

Then place around the centering and against the carbon plate the supplied O-ring gasket.

It is imperative to lubricate the seals before mounting.

☐ STEP 9.

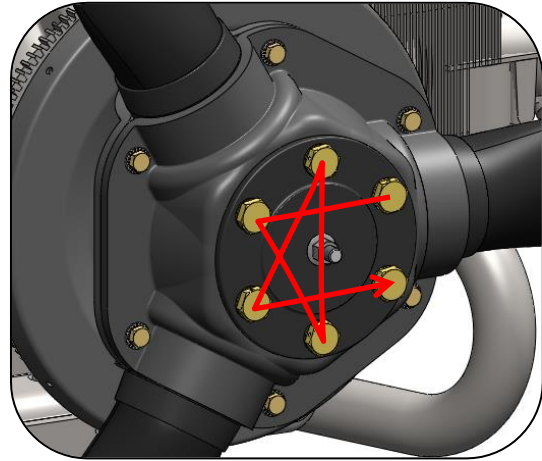


Now, make a **progressive tightening in cross** in 2 or 3 times to reach the **tightening torque 25 N.m**.

TIGHTENING TORQUE

2,5 kg/m 25 N.m

☐ STEP 10.



Gradually tighten in 2 or 3 times the 6 CHC M8 propeller fixing screws at 20 Nm.

TIGHTENING TORQUE

3 kg/m	30 N.m (AN6 3/8")
3.5 kg/m	35 N.m (AN7 7/16")
4.5 kg/m	45 N.m (AN8 1/2")

At this point, the propeller is preinstalled on the engine.

5.4.3. Bleeding the hydraulic system

When the governor, its cable control and the hydraulic propeller are completely installed, it is then necessary to perform the hydraulic purge of the system to expel the air and make the propeller pitch control 100% functional.

PROCEDURE

- 1) Heat the engine and oil to operating temperature
- 2) Then set the propeller pitch control to the "RPM Mini / Coarse pitch" instruction, in other words the coarse pitch position, or even the "Pulled" position of the command on the governor
- 3) Then gradually increase the engine power up to full power
- 4) Then vary the propeller pitch control 2 to 3 times in the position "RPM MAXI" to "RPM Mini".
- 5) Reduce everything to finish: Engine idle & Step control in "RPM Maxi" position, return / thrust

Important:

If the engine speed or the variation speed of the blade angle of the fluctuating propeller, this means that there may be air in the system and the system must be purged again. Repeat the entire procedure again.

If all these operations have been correctly applied, the hydraulic system is purged.

PRECAUTIONS

If you notice any faulty installation or operation, do not start a flight and immediately contact the company DUC Propellers.



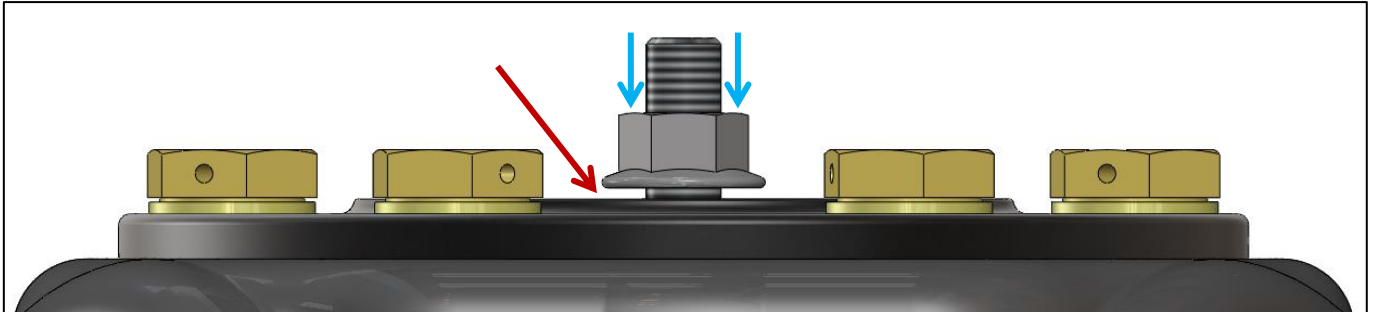
**Be aware of potential risks during assembly and first tests of the propeller.
Be focused, attentive and vigilant to your surroundings. Check the points to be observed several times.
Maintain large safety distances when operating.**

DUC Propellers products must be assembled and used in accordance with the instruction manuals provided. No modification can be made without the prior agreement of DUC Hélices. Failure to comply with these data releases DUC Hélices from all liability and renders the products concerned out of warranty (See section 11. General Conditions of Sale).

6. Setting the small pitch stop and static tests on ground of the propeller

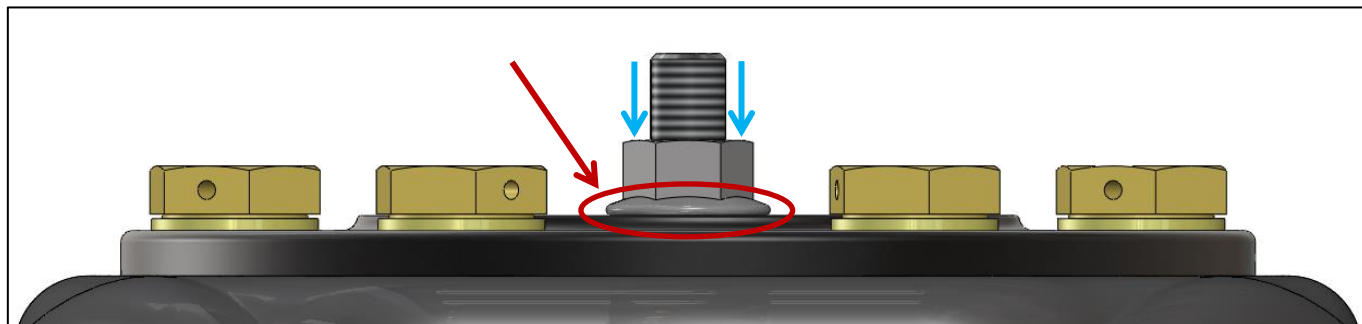
The preliminary tests are important

- 1) Tight the small-pitch stop (**M10 nut**) to let **a clearance of 1mm** with the tightening washer.



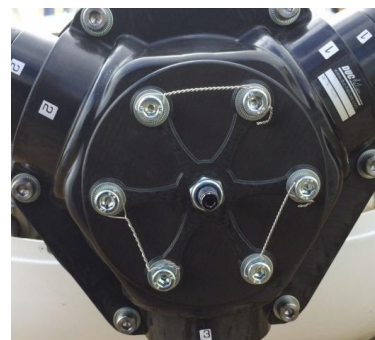
- 2) Placed the pitch control of the propeller in position "RPM Max / Small step"
- 3) Brake applied, start the engine and warm it as recommended by the manufacturer.
The aim of this ground test is to set the propeller, at full throttle, at 2600 rpm.
- 4) When the motor is in operational condition, do the following operation:
 - A. Increase the throttle smoothly to reach 2500 ± 50 rpm.
 - B. Acting on the pitch command to increase the pitch and adjust in parallel the position of the throttle to keep a stable engine speed at 2500 ± 50 rpm.
Make this operation to reach the fully depressed position of the throttle.
 - C. At full throttle, gently reduce the pitch to reach the engine speed of 5800 ± 20 rpm.
- 5) When this setting is achieved, **DO NOT TOUCHE ANYMORE THE PITCH COMMANDE.**
- 6) Reduce throttle, shut down the engine and secure environment to perform an action on the propeller.
- 7) Set the small-pitch stop as the **M10 nut press slightly a contact on the tightening washer.**





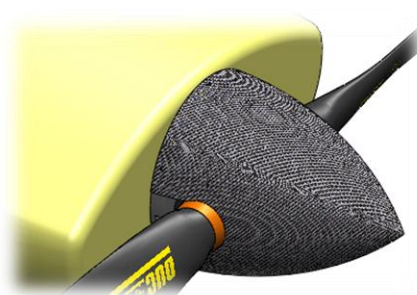
8) Replace the pitch controller in small-pitch position to reduce the pitch to the maximum.

9) When everything is set, set up the **safety wire Ø0.8mm (Ø0.03")** over the screw heads for safe installation.



10) After a final check (position and orientation of parts, tightening, ...), install the spinner on the spinner mounting plate by **tightening the screws to a torque of 4 Nm (0.4kg / m)** with the appropriate tools.

When the presence of a mark, be sure to follow the indexing of the spinner from the plate.



At this point, the fine pitch stops of your propeller is set for the first taxi tests and then fly tests.

The user must perform the appropriate regulations procedures to change the propeller in accordance with applicable regulations of the aircraft.

7. First taxi tests and then fly tests of the propeller

During the Vital Action (A-C-H-E-V-E-R) before each flight, it is recommended to check the proper functioning of the pitch variation of the propeller.

Before the first flights, do a run-up to get 2600 rpm. If not, change the setting of the fine-pitch stop.

During take-off or landing, it is imperative to return the propeller to fine-pitch.

In flight, changing the pitch angle by continuously monitoring the Manifold Pressure (MAP).

8. Management of the failure of the variable pitch system



In the unlikely event of hydraulic failure, the propeller comes naturally in fine-pitch stop thanks to the return spring.

9. Installation without spinner or with spinner other than DUC



In the case of installation of the propeller **without spinner mounting plate** or **other spinner mounting plate**, be careful to check the following points:

- ✓ **Length of the fixing screws of the propeller:** Must be adapted according to the thickness of the spinner mounting plate.
- ✓ **Mechanical resistance of the plate when tightening:** For a similar assembly of the DUC spinner, the plate takes the tightening of the propeller fixing screws. It is, therefore, necessary to ensure that the used plate can withstand the clamping and resist of the propeller operate efforts (crushing of the plate).

IMPORTANT

The spinner is an important element for engine cooling.

The aircraft must not fly without propeller spinner. Mounting a different cone will be an amendment to this instruction manual approved by the DUC in order to confirm its compatibility mounting the propeller.

WARRANTY CONDITIONS

The user is still flying under its full responsibility (see section **6. General terms of sale**).

10. Potential use & Propeller maintenance

10.1. Potential use of the propeller: **Unlimited**

The propellers DUC have an unlimited flight potential in normal operation conditions.

To keep the unlimited potential, DUC Propellers Company has defined a TBO (Time Between Overhaul) for a propeller depending on its engine.

This TBO according to the engine is indicated in this manual (see **2. Applications**). It is set at **1500 flight hours**. In all cases, it may not exceed 5 years.

To achieve this, the propeller must be returned to the DUC Propellers Company to perform a full control, verify its proper use and change the wearing parts if necessary.

Following this inspection and maintenance of the propeller, the propeller is credited again with the same TBO and is returned to you.

The maintenance will be charged to you and either the deliveries costs of sending and returning.

Remember, there is no imperative of logbook in experimental aviation. But know that this control is highly recommended for the continuing airworthiness and safety.

10.2. Propeller maintenance schedule

Type	Actor	Frequency
Regular	User	Each pre-flight
General	the user or an aeronautics workshop	Every 100 hours or annually
Complete	DUC Propellers Company	Each TBO

10.3. Regular maintenance (by the user)

For a safety use of the propellers, it is necessary that the user performs regular maintenance to detect any abnormalities. This maintenance is usually just a simple check.

The frequency of checking: Each pre-flight

Control methods: Visual inspection & Manual handling

Checkpoints:

- Fixation of the propeller: Manually maintaining the tip of a blade of the propeller, shake it firmly to feel if a too much clearance appears in the setting of the propeller.
- Degradation of material: Check visually the entire propeller without dismantling (blade root, Inconel leading edge, the surface of the blade, spinner, hub, etc.)
- Fixation of the spinner: Check visually the fixation screws of the spinner. A marking paint can be made between each screw and spinner to have a means of visual inspection of proper tightening the screws.

Possible problems:

- Too much clearance in the propeller fixation
- Surface degradation due to dirt or impact / Crack apparent

Corrective actions (depending on the importance):

1. Clean the propeller with the DUC cleaning treatment DUC (ref. 01-80-003)
2. Perform a repair with the DUC repair kit (ref. 01-80-004)
3. Tighten the screws to proper torque with a wrench
4. Replace(s) damage component(s)
5. Contact DUC Propellers Company to define a solution

10.4. General maintenance (by the user or an aeronautics workshop)

A general maintenance by the user or an aeronautics workshop must be made at a lower frequency.

The frequency of checking: Every 100 hours or annually

Control methods: Visual inspection & Torque wrench

Checkpoints:

Fixation of the propeller: By removing the spinner of the propeller, check the proper tightening of the screws to the wrench. These screws of the hub should be tightened to proper torque, defined in the installation instructions attached.

A marking paint of all the screw/washer/hub after tightening can be done to help make a visual check outside of the general maintenance.

- Degradation of material: Check visually the entire propeller (blade root, Inconel leading edge, the surface of the blade, spinner, hub, etc.)

Possible problems:

- Too much clearance in the propeller fixation
- Surface degradation due to dirt or impact / Crack apparent

Corrective actions (depending on the importance):

1. Clean the propeller with the DUC cleaning treatment DUC (ref. 01-80-003)
2. Perform a repair with the DUC repair kit (ref. 01-80-004)
3. Tighten the screws to proper torque with a wrench
4. Replace(s) damage component(s)
5. Contact DUC Propellers Company to define a solution

10.5. Complete maintenance (by DUC Propellers Company)

Upon reaching the TBO (potential flight time between overhaul) defined by DUC Propellers Company, the propeller must be returned to the corporation for a full inspection of all components of the propeller.

See section **2.Applications** for the potential value of an hour's flight engine.

The possible degradation of the propeller components may vary depending on the location of use.

11. General terms sale

11.1. Ordering procedure

Orders placed by fax, by phone or mail server engage the customer upon receipt by our Customer Service Order and the Regulations.

11.2. Delivery

DUC Propellers Company agrees to make every effort to deliver the order within the shortest time, and the receipt of the order together with the Regulation. The delivery times indicated on the order are only indicative and the possible delays do not entitle the buyer to cancel the sale, to refuse the goods or claim damages. Any claim for non-compliance or failure will be sent within one week following the date of receipt of order.

The DUC Propellers Company is released from its obligation to deliver for all fortuitous events or force majeure. As an indication, the total or partial strikes, floods, fires are cases of force majeure. The transfer of ownership of goods supplied or delivered is suspended until full payment of the price by the customer and without affecting the transfer of risk.

11.3. Price

The DUC Propellers Company may change its prices at any time.

The customer agrees to pay the purchase price in effect at the time of order entry. Regulation Order is payable in advance in one payment when sending the DUC Propellers Company purchase order.

11.4. Right of withdrawal

Under Article L121-16 of the Consumer Code, the customer shall have seven clear days after the delivery of his order to return the products to the DUC Propellers Company for exchange or refund, without penalties except for the return costs. Returned products must not have suffered modification, damage consequence of shock or improper use and be packaged in original packaging. Goods shipped with postage due will not be accepted.

11.5. Warranties

The DUC Propellers Company's products must be installed and used in accordance with instruction manuals provided. No changes can be made without the prior approval of the DUC Propellers Company. The failure of these data releases any liability of the DUC Propellers Company and makes non-warranty the considered products.

The user is still flying under its sole responsibility.

The legal guarantee of industrial products is six months or for the potential duration of the helix (depends on which engine it is installed) against defects and hidden defects. See the section **2.Applications** to determine the potential value of an hour's flight engine.

DUC Propellers Company guarantees its product defect under normal use in the manner described below: If the customer finds a defect, he must report it immediately to the DUC Propellers Company and features of one month after its purchase to return to Company DUC Helices, all structural defects will snuff into account (except for damage result of incorrect operation, shock, injury, impairment or neglect, water or generally inappropriate use by the engine type, power, speed, and gear). To qualify for this warranty, the customer must send at its expense within one month after its purchase to be returned to Company with DUC Propellers Company delivery order attached to the product. In return, the DUC Propellers Company takes no responsibility for damage or loss during transit due to improper or inadequate packaging. The Company DUC Propellers Company then returned at his expense to the customer at the address on the delivery note, an identical or equivalent.

In addition to these guarantees, the Company DUC Propellers Company provides no other warranties.

11.6. Privacy Policy

All the data you entrust to us are able to process your orders. Under Law No. 78-17 of January 6, 1978, relating to data, files and freedoms you have with the customer service Company DUC Propellers Company right to access, review, correct, correct and delete data you have provided.

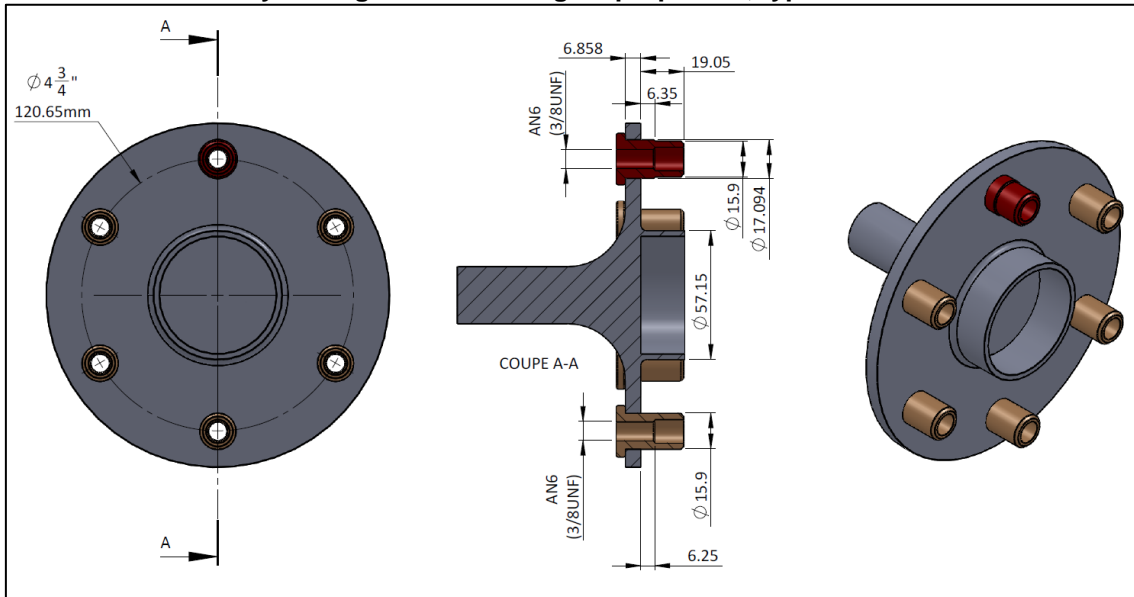
11.7. Litigation

Any order placed convincing the customer, without any restriction, the General Conditions of the sale of the DUC Propellers Company. Any dispute concerning the sale (price, GTS, product ...) will be subject to French law before the Tribunal de Commerce de Lyon.

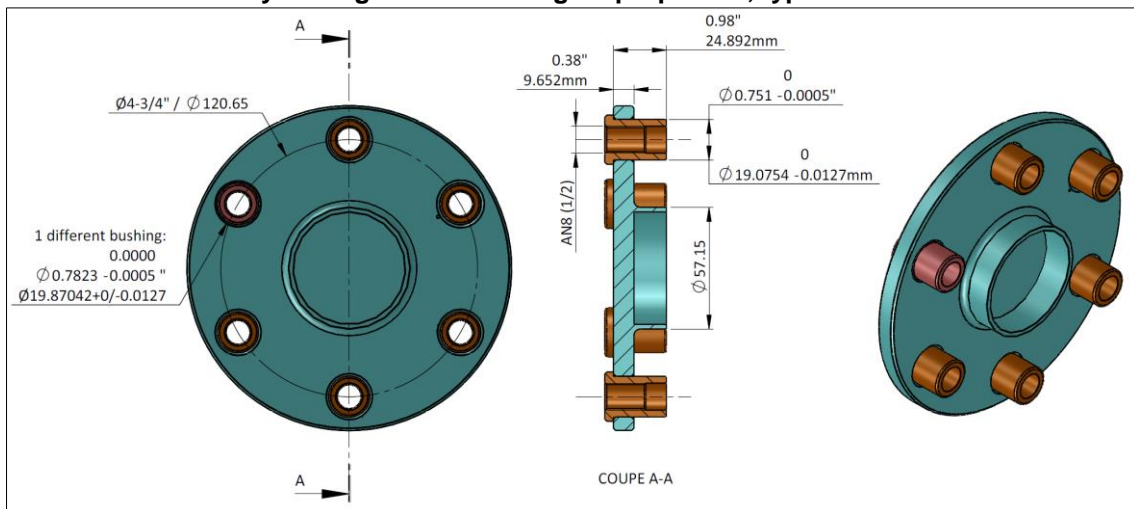
12. Annexes

12.1. Dimension of the SAE2 propeller-shafts

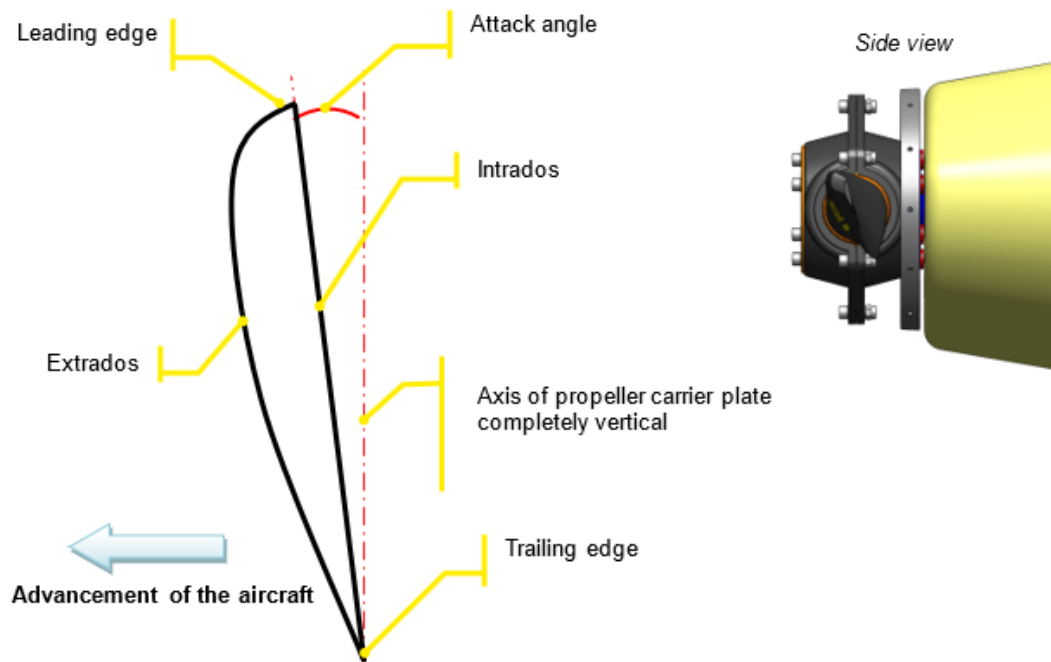
Lycoming O-320-A2A engine prop-shaft, type SAE 2



Lycoming O-360-A3A engine prop-shaft, type SAE 2



12.2. Airfoil



12.3. Moment of inertia

Type of propeller	Diameter (mm)	Inertia (kg.cm ²)
Hydraulic COBRABlack-R Propeller	67"	Thank you To consulting us
	68"	
	78"	
	80"	
	83"	




12.4. Operating limitation of the Hydraulic COBRABlack-R propeller

Designation	Maximum engine power	Maximum RPM
2-blade Inconel COBRABlack-R propeller, Right	215 hp	2700 rpm
3-blade Inconel COBRABlack-R propeller, Right	315 hp	2700 rpm

12.5. Identification marking of the propeller

12.5.1. Manufacturing label

As the propeller is dismountable, each component (blade and half-hub) has a manufacturing traceability label which identifies the component and specifies its own serial number:

COBRA-PV Right Blade	COBRA-PV Left Balde	Half-hub COBRA (2-blade / 3-blade)
 <p> COB-PV-D S/N: 1234 </p>	 <p> COB-PV-G S/N: 1234 </p>	 <p> P/COB-PV-G/3 S/N: 1235 </p>

12.6. Declaration of conformance of the Hydraulic COBRABLACK-R propellers

12.6.1. Design and Construction

The propellers were designed to be adapted to the applications described in section 0. Every designs features are reliable and mastered by DUC Hélices company.

The materials used in the propeller were selected for their technical properties to be conforms to the definition of the propeller and durable during the propeller life.

About the ground adjustable system, the design allows a fine and careful setting of the propeller blade pitch. Also, the system is robust to not change during normal and emergency operation of the propeller and also after many settings.

Definition propeller conforms to withstand the stresses of operation on all its lifetime.

12.6.2. Tests and Inspections

The FLASH propeller completes the tests and inspections described below, without failure or malfunction.

Strength Testing:

This test was done in a static pull test.

Endurance Testing:

The propeller conforms to endurance test.

Teardown Inspection:

After completion of each test described above, the tested propeller was completely disassembled and each propeller parts were inspected. No failure or crack was found.

Propeller Adjustments and Parts Replacements:

During the tests and inspections carried out, no parts have to be repaired or replaced. All propeller parts resisted the tests and were conform after inspections.

12.6.3. Design Control

The propeller was design on CAD software. All the CAD files and 2D drawings are stored in the Design Office of DUC Propellers Company. All the technical data (dimensions, materials and processes) are saved in manufacturing procedure. Also, a copy all these data are archived out of the company.

12.6.4. Quality Assurance

DUC Hélices Company is ISO 9001:2015 certified for its management of the quality system, which ensures manufactured propellers maintain conformity to the established design. Refer to page 2.

12.6.5. Certification of Conformity for ASTM F2506-13

"ASTM F2506-13 is the standard specification for design and testing of fixed-pitch or ground adjustable for Light Sport Aircraft propellers.

DUC Hélices Company declares that the FLASH propeller complies with the ASTM F2506-13 standard and after verification, it responds every requirement."

M. Vincent Duqueine
Manager
19/09/2024



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Neoprene cover — Commercial reference: 01-80-002

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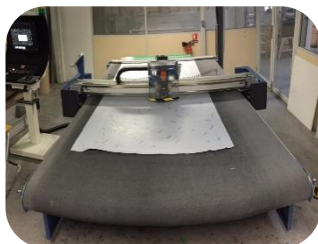
Save money!

Degrease your propeller

REDUCE CONSUMPTION

by improving performance

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