# AIRPLANE FLIGHT MANUAL - LUCIOLE MC30

May 13, 2023

MC30 aircraft no:

REGISTRATION:

BUILDER:

This is the MC 30 type aircraft flight manual It can, possibly, serve as a model.

But, in any case, it is up to it is up to each manufacturer to redo its own manual according to specific characteristics of HIS aircraft.

May 20102

# Contents

# 1 GENERAL

## 1.1 Dimensions

- Wingspan 6.9m
- Length 4.74m
- Wing area 4.60 $m^2$
- Length 10.35

## 1.2 Masses

- When empty equipped 97 kg
- Maximum take-off 200 kg

## 1.3 Category

- Utility.

## 1.4 Motor

- Briggs and Stratton 627 cc 25 HP engine at 3600 rpm

## 1.5 Propeller

- Two-blade Colomban-Arplast D = 1. 16 m

## 1.6 Reservoir

- A fuselage tank of 29.5 or 25 liters.

## 1.7 Fuel

- Unleaded car gasoline 95

## 1.8 Landing Gear

- Type: classic composite blade
- Stroke: 200mm
- 300 x 100 mm tires. Pressure: 1.0 to 1.6 bars depending on aircraft weight and condition ground.
- Differential cable drum brakes on the main wheels.
- 100 mm rear caster combined with the lifter

### 1.9 Cabin controls and fittings

- Depth and warping: central handle
- Artificial depth effort with glass rods on the right side.
- Depth trim lever on the right side.
- Rudder: Adjustable in flight. Extra artificial effort with glass rods.
- Flaps: Lever control on the left side. Turns 0, 10, 30 and 45°
- General contact: on the board.
- Engine and starter contact: Left side on panel.
- Brake handle on the handle
- Ventilation: 2 side scoops upstream of the canopy.
- Seat adjustment: front-back and height (on the ground)
- Backrest angle adjustment: on the ground.3
- Locking of the canopy at the front and at the rear on the left side.

### 1.10 Demountability

- Quick assembly and disassembly of the wing using two main axes and four secondary axes.
- Rod end connections for the shutters located on the right and on the left.
- Two connection screws for the aileron connecting rods on the right and on the left.

## 2 LIMITATIONS OF USE

### 2.1 Characteristic speeds

- Vne Speed never to exceed 225 km/h
- Goes Maneuvering speed 169 km/h

At this speed, the control surfaces and in particular the ailerons, can be deflected at bottom, without however exceeding the load factors prescribed later. Beyond this speed, the turns are gradually reduced so as not to exceed the angular accelerations obtained at Va.

- Vf: Maximum speed with flaps extended:
- Take-off steering (10°): 130 km/h
- Landing turns (30 and 45°): 114 km/h
- Maximum crosswind speed at take-off: 20 kt

### 2.2 Masses

- Maximum take-off weight: 200 kg

### 2.3 Centerings (Plate 2)

- Forward limit 20% of the wing chord.
- Rear limit 36% of the wing chord.

## 2.4 Limit load factors in symmetrical maneuvers

The limiting load factors are those from which certain points of the structure begin to undergo permanent deformations. They cannot be

reached only accidentally.

If these factors are reached, stop the aircraft and inspect the structure.

- Flaps retracted in positive g + 4.4

- Flaps retracted in negative g - 2.2

- Flaps extended + 2

The symmetrical maneuvering range of this aircraft, corresponding to these two cases, is shown in plate 1.

In asymmetrical evolutions, the load factors will be reduced to 2/3 of the values above.4

## 2.5 Skipped

## 2.6 Briggs and Stratton Engine

- Engine speed never to be exceeded: 4000 rpm.

- Maximum power: use of the engine at full throttle, take-off and climb, is limited to 5 minutes (only for questions of potential)

- Maximum continuous power: 20 HP (75 %) with 3500 rpm

- Carburation: If checked with the lambda probe, the idle (900 rpm) must be rich (1 Volt), cruising speed 3200 to 3300 rpm (0.5 to 0.8 Volt) and full rich gas (1 Volt)

## 2.7 Usable Lands

Thanks to its geometry and the flexibility of its suspension, the train of the MC30, does well in grassy areas. It is best, however, to avoid overly bumpy or rocky terrain.

# 3 USE

## 3.1 Transportation

- Aircraft moored and protected in its trailer.

- Empty tank.

- Accelerometer blocked (if it exists).

- Box of wing axes, and empennage nuts on board.

## 3.2 Assembly

- Airplane on the ground, fit the two wings, flaps in flight position.

- Push in and lock the 4 secondary pins then the 2 main pins.

- Connect the flap rods and ensure that the flaps are perfectly locked rod ends.

- Connect and screw the aileron connecting rods.

- Fit and lock the horizontal stabilizer.

## 3.3 Balance

Check that the centering always remains within the limits prescribed in paragraph "limits of use" (§ 2.3) To do this, use the centering chart of the board 2 starting from the center of gravity and the weight of the equipped empty airplane determined during the most recent weigh-in.

## 3.4 Full

Check fuel level. If necessary, top up with fuel prescribed in § 1 . 7. Screw the cap back on.

## 3.5 Pre-flight check

- Cabin: Ignition off. Fuel tank cap, screwed. Devices reset to zero. Seat height adjusted and checked. Backrest and shoulder straps checked.

- Tank venting clean and unclogged.5

- Fuselage: General condition.

- Static and total outlets clean, uncorked and sealed.

- Horizontal stabilizer: General condition. Articulations and fixing of the connecting rod.

- Vertical stabilizer: General condition. Governs. Joints. Fixings of cables.

- Canopy: General condition. Fittings and hinges of the shutters. Sealing of wing-fuselage connection.

- Main landing gear: Condition of blade support fittings. Brakes. Condition of tires and pressure (1.2 bars) Fixing of the fairings.

- Rear wheel: Normal flexibility of the suspension. Condition of fasteners and springs

- Engine: Spark plug caps well seated and in good condition. Discard always have a look at the tightening marks of all the screws visible (point of painted paint in sight) Identify the origin of any trace of oil.

Correct oil level.

- Engine bonnet: Check the fixings.

- Propeller and cone: Cleanliness. Condition. Screws.

- Canopy: Cleanliness. Condition. Hinges. Locks. Sealing.

- On-board documents: On board.

## 3.6 Pilot installation

- Adjust the seat height before boarding.

- Adjust the inclination of the backrest

- Settle in and lock the canopy.

- Adjust the rudder.

- Fasten the harness.

- Adjust the ventilation.

## 3.7 Starting the engine

- Fuel tap open.

- Priming the carburettor using the bulb if it has not run since a long time.

- Canopy closed and locked.

- Brakes applied.

- Choke pulled.

- Handle pulled.

- General contact on.

- Battery and full voltage check.

- Reduced gases.

- Propeller clear.

- Contact

- Startup.

Engine hot the throttle is pushed 5 mm. Check that the rise in diet is carried out without hole or reluctance.

## 3.8 Rolling

- Canopy closed and locked.

- Flaps in take-off position (10°)

- Brakes released.

- Drive slowly and try braking.6

- The turns are made with the rudder (rear wheel combined) We can help ourselves by braking on the side of the bend (differential brakes)

## 3.9 Takeoff

Before taking off, check the instruments then:

- A: Lander. Altimeter.

- C: Free orders. Proper carburetion. Battery charge.

- H: Pressure oil. Helix.

- E: Open essence. Reservoir full enough. Screw cap.

- V: Flaps at take-off deflection. Canopy closed. Harness lock.

Possible luggage and, once again, wing axes, aileron screws and rod ends of the flap rods.

- E: Exterior: no aircraft approaching.

- R: Tab adjustment in take-off position following centering.

Another good method is to check these operations using a "check aircraft-specific flight list".

To take off, line up and put full throttle. Bring the aircraft into flight line early enough. Around 90 km/h (approximately 9 seconds) pull gently on the handle. Takeoff then level (3 to 4 seconds) and the plane can attack its climb.

In crosswinds (max 20 kt) or irregular (gusts), slightly increase these speeds. Apply the classic rules of piloting.

## 3.10 Ascent

- Full throttle. Flaps at 10° up to Z = 100 ft.

- Flaps brought back to cruise position beyond Z = 100 ft and before reaching Vi = 130 km/h.

- Speed of steepest slope (obstacle)

- Vz max speed

- "Travel" climb speed (distance)

- Maximum temperatures:

- Oil 100°

- EGT 800°

- 130° cylinders

: 90 km/h with flaps at 0°

: 110 km/h with flaps at 0°

140 km/h

- Normal uphill speed at full throttle of the order of 3400 rpm.

- Trim set accordingly, stick released.

## 3.11 Flight in calm atmosphere

- Maximum speed at full throttle: engine speed of around 3600 rpm, Vi of the order of 190 - 200 km/h well streamlined aircraft.

- Cruising: use Vi = 90% of Vi max

- Full throttle overspeed: Vi not to be exceeded: 240 km/h. Max RPM 4000 rpm.

## 3.12 Flight in rough atmosphere

In extremely turbulent weather, the aircraft can reach, under very strong gusts, its limit load factor at a speed of 170 km/h. It is therefore appropriate, in such a case, to never exceed this speed. Also know that too low a speed (comfort) exposed to gust stalls. Use, still in the case cited, the range of speed 140 -170 km/h.

## 3.13 Stall

Reduced engine, in horizontal flight (varied at 0), at a mass of 200 kg:

- Cruising configuration Vs = 81 km/h

- Take-off configuration Vs = 72 km/h

- Landing configuration Vs = 65 km/h

The evolution of the stall speed with the mass is proportional to the root . square of the mass.

## 3.14 Warning

Spin prohibited

## 3.15 Approach

- Let the airplane decelerate to Vi = 130 km/h before applying the flaps take-off configuration (10°)

- Let the airplane decelerate to Vi = 114 km/h before setting the flaps "comfort landing" configuration (30°) The 45° steering angle is above all used as an airbrake to correct, if necessary, the approach slope.

- Approach speed= 100 km/h (90 in calm weather) with flap at 30°.

- Engine speed adjusted on demand.

- Trim adjusted accordingly.

- If necessary, know that the greatest finesse of approach is obtained with the flaps in the take-off position (10°), at Vi = 110 km/h.

- Go-around possible whatever the deflection of the flaps.

- Avoid suddenly retracting the flaps close to the ground.

## 3.16 Landing

- Round off gradually without looking for a stall. Pay attention to the unusual seat height. Do not round too high.

- Impact slightly pitched up at Vi = 75 - 80 km/h. An immediate return of flaps at the moment of impact helps prevent rebounds.

In the event of a missed landing, apply full throttle and allow the speed to increase. Only then, far enough from the ground, gently retract the flaps.

In irregular winds, increase the above speeds a little.

Rolling; retract the shutters.

## 3.17 Stopping the engine

Cut the radio. Cut contact. Switch off general contact. cut the load battery.

## 3.18 Parking and mooring

Aircraft facing into the wind, flaps in cruising position. Apply the brake. Moor by the rings provided for this purpose at the wingtips.

In sunny weather, cover the canopy with a white cover (temperature of the on-board devices)

## 3.19 Storage

The best way to store the aircraft, for any length of time, is to place it in its trailer sheltered from bad weather, dust, shocks, etc. and of preferably in a dry garage.

If possible, clean and dry the aircraft before closing the trailer.

To avoid condensation in the tank, it is best to refuel before warehouse, when the plane must fly again in the following days.

In the case of a long period of non-use (several months) it is preferable to drain the entire fuel system completely. This prevents deposits of resins and miscellaneous additives in the nozzles, as well as operational problems at the restart.

# 4 EMERGENCY PROCEDURES

## 4.1 Engine fire

- Close the fuel tap.

- Apply full throttle until the engine shuts down.

- Cut contact.

## 4.2 Icing

The arrangement of the air intake and the location of the carburettor cause a inlet temperature rise of the order of 6 to 10°.

However, in case of icing, pull the heater.

## 4.3 Engine failure

- Check the position of the tap on open.

- Check the amount of fuel.

- If necessary, try restarting.

## 4.4 Makeshift landing

Engine irretrievably broken down, locate a landing field and know that:

In cruising configuration flaps at 0°

- Max fineness = 13 to 14 at Vi = 110 km/h (streamlined and transparent engine)

- Vz mini = about 2 m/s at Vi = 100 km/h (streamlined and transparent engine)

In flap configuration at 10°

- Max fineness = 11 to 12 at V = 100 km/h (streamlined and transparent engine)

- Vz mini = approximately 2.20 m/s at V= 95 km/h (keeled and transparent engine)

In flap configuration at 30°9

- Max glide ratio= 7 to 8 at Vi = 85 km/h (streamlined and transparent engine).

_ Vz mini = around 2.80 set to Vi = 80 km/h (streamlined and transparent engine)

Loss of altitude during a 360° with flaps at 10° (with engine reduced)

z = 300 ft for bank angle of 15° at Vi = 112 km/h

z = 400 ft for bank of 30° at Vi = 120 km/h

z = 500 ft for bank angle of 45° at Vi = 130 km/h

# 5 RIEN ICI

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Because we are French, that is why.

# 6 ON-BOARD DOCUMENTS

The on-board documents for an aircraft are listed below:

## 6.1 Airplanes in CNRA category

### 6.1.1 Aircraft documents

- Flight manual.
- Weighing sheet.
- Registration certificate (blue sheet)
- Airworthiness certificate.
- Station license-radio certificate.
- Insurance certificate.
- Road book for those who go abroad for several days.

Note that this logbook is not mandatory on board for domestic flights

French territory (§ 6.1.1.2 (f) of the appendix to the decree of July 24, 1991) (See details in "lnfo Pilote" of April 6, 1997) It must, however, be presentable on the ground and completed every end of the day.

### 6.1.2 Personal documents

- Pilot's license.
- Navigation maps.
- Flight plan if necessary.

## 6.2 Airplanes in microlight category

### 6.2.1 Aircraft documents

- Identification card
- Machine liability insurance
- Pilot insurance: optional.
- Certificate of conformity and authorizations to operate the instruments of on-board radio communications.
- Weight sheet (optional)
- Flight manual (optional)

### 6.2.2 Personal documents

- Pilot license
- Navigation map

# SERVICE SCHEDULE

This program had been established for the prototype of the Luciole. But, in any case cause, it is up to each manufacturer or user to customize it according to peculiarities of his own machine.

In the columns below:

- d means: on demand
- 25, 50, 100 means: every 25, 50 or 100 hours.

## 1 CANOPY

Coating: general condition and cleanliness d 25

Rear sill: checking the bonding 50

Exposed part of the spar: condition and cleanliness 50

Assembly pins: play and lubrication 25

Flap and aileron hinges: fixing check 100

## 2 FLAPS - AILERONS

Coating: general condition and cleanliness of 25

Inter-pane link: verification 50

Hinge fixing screws: checking tightness 50

Root ball joint: condition and verification of the attachment 50

Trailing edge: checking the bonding and condition. 25

## 3 HORIZONTAL TAILPLATE

Coating: general condition and cleanliness of. 25

Articulation ball joints: play and lubrication with Mastinox 25

Articulation ball joints: replacement. d

Platform: condition, play and lubrication 100

Ball joint for the control rod: clearance and lubrication 50

Tailplane fixing screw 05: check condition. 50

## 4 RUDDER

Coating: general condition and cleanliness d 25

Steering control fitting: checking the mounting 50

Hardware cable connection: check for wear 50

Rudder joints: checking play and greasing 50

## 5 FUSELAGE

Exterior coating: general condition and cleanliness d 25

Interior condition: check and cleanliness 50

Front cover: fixing 25

## 6 CANOPY

cleanliness

Articulations: tightening, greasing 50

Locking system: adjustment, lubrication d 50

Gasket: refurbished. d

## 7 MAIN GEAR

Tyres: condition and pressure 1.2 bar d

Brakes: cleaning, adjustment Brake cables: play, condition and fixings 50

Gear blade: visual inspection. 50

Blade support fittings: check for wear 100

Fixing screws for wheels and tie rod.. 100

Fairings: condition, mounting, cleanliness of

## 8 REAR AXLE

Castor: condition and lubrication of the bearings 25

Support tubes: condition and welds 25

Glass rod: verification of fixings 25

Conjugation cables and springs: check 25

## 9 FLIGHT CONTROLS

Linkage, control horns, cables, ball joints: checking the condition,

games and cleanliness; greasing 50

Fasteners: tightening check 100

Spreader elastics: check and replacement. d

Spreader bar: checking the correct positions of

Cable ties: check 50

## 10 ANEMOMETRIC CIRCUIT

Flexible tubes: cleanliness, condition, check for leaks 25

## 11 OIL CIRCUIT

Engine: search for oil leaks d 25

## 12 FUEL SYSTEM

Tank: condition, cap, fixing, sealing 50

Hoses: condition, insulation, fixings, clamps, leakage 25

Filter: check, replace 50 100

Carburetor venting: check 50

Tank Venting: Check 50

## 13 ELECTRICAL SYSTEM

Battery: condition, mounting, terminals, insulation of large cables 25

Wiring: visual inspection of condition and fixings 50

## 14 AIR CIRCUIT

Verification of passage sections 50

## 15 PROPELLER

Saucepan: condition and mounting d

Blades: general condition d

Propeller: fixing on the motor flange 50

## 16 ENGINE FRAME

Silent blocks: verification 50

Fasteners: tightening check 50

Verification of the height and possible adjustment of the springs 50

Lower arms: cleanliness and visual check of condition. 100

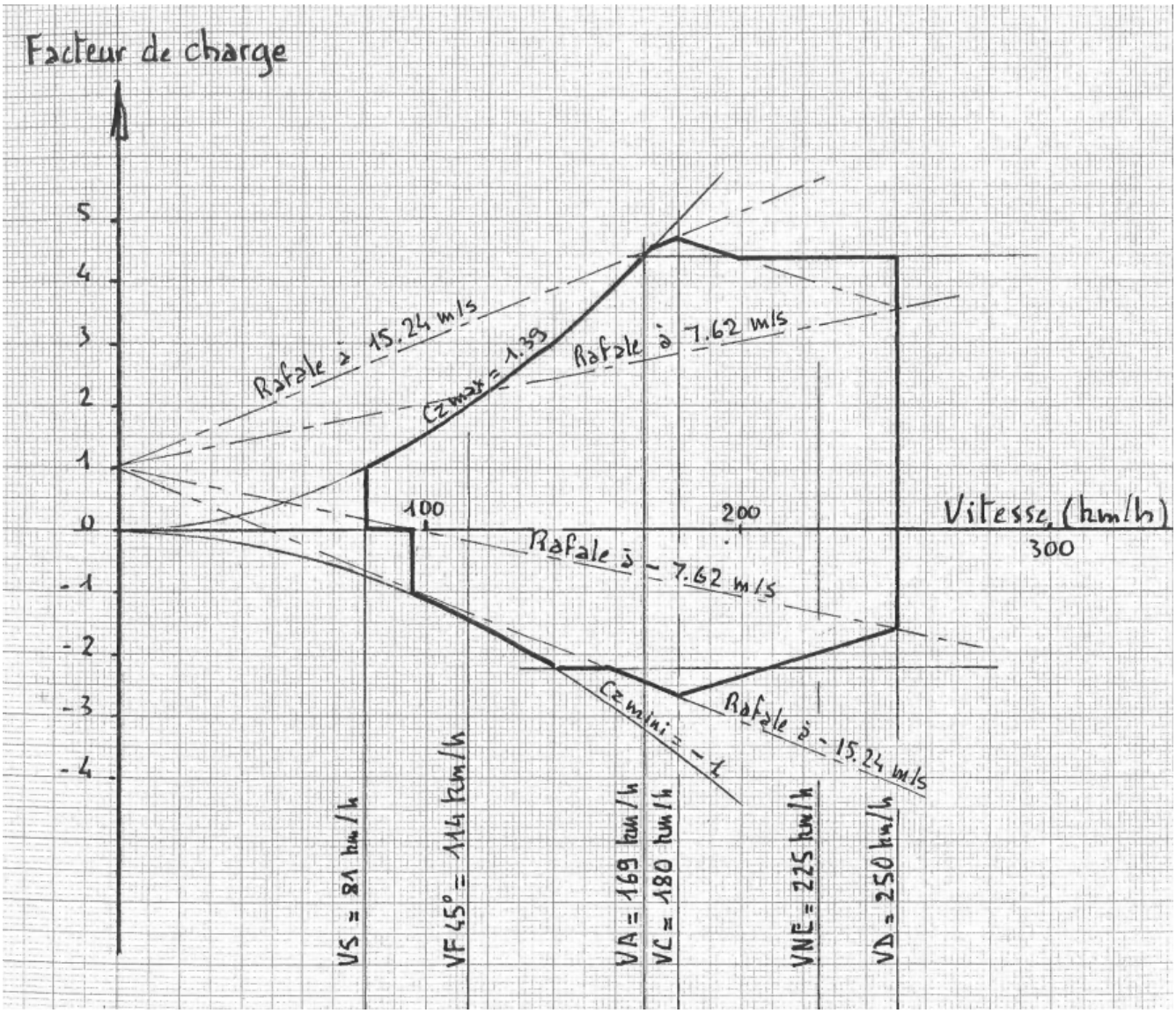
## 17 ENGINE

Refer to the maintenance manual provided by the engine manufacturer.

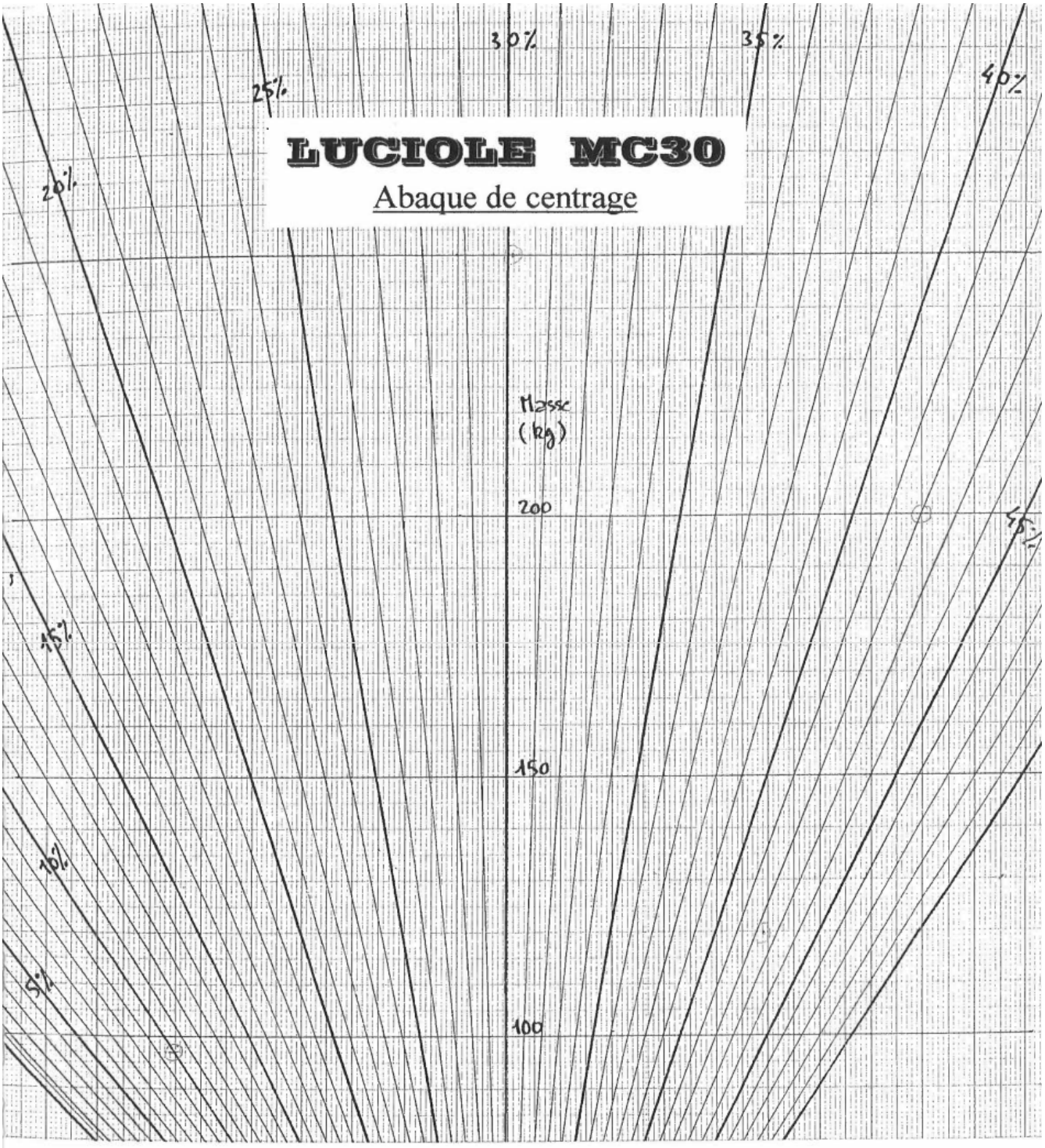
LUCIOLE MC30

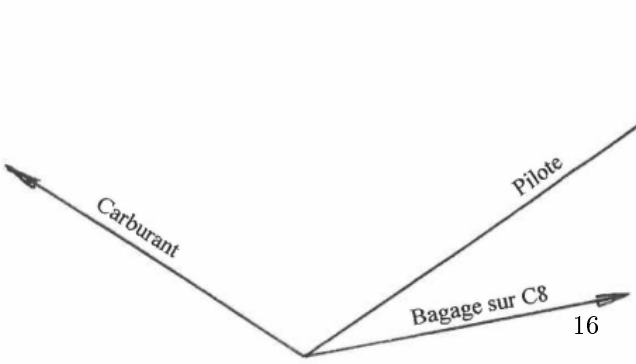
# APPENDIX 1

## FLIGHT ENVELOPE



## LOAD SHEET




**Calcul du centrage de l'avion en charge** :

1) Sur le graphique, pointer le centrage et la masse de l'avion à vide équipé.
2) A partir de ce point ajouter le poids du pilote en traçant un segment parallèle à la direction "pilote"
3) Puis idem pour le poids du carburant.
4) Puis idem pour le poids des bagages.

Le centrage avion se situe au point d'aboutissement de ces segments quel que soit l'ordre utilisé.

Calculation of center of gravity of the loaded aircraft:

I) On the graph, point the centering and the weight of the equipped empty aircraft.

2) From this point add the pilot's weight by drawing a segment parallel to the "pilot" direction

3) Then the same for the weight of the fuel.

4) Then the same for the weight of the luggage.

The airplane centering is at the end point of these segments regardless of the order used.