Letecká amatérská asociace ČR – Light Aircraft Association of the Czech Republic

Type Certificate

Issued by the Light Aircraft Association of the Czech Republic(hereinafter LAA CR), based on the delegation by the Ministry of Transport to perform the state administration in the matters of sports flying equipmentin accordance with the Section 82, Subsection 1 of Act No. 49/1997 Coll. On civil aviation and amending and supplementing Act No. 455/1991 Coll. On Trade Licensing (The Trade Licensing Act), as amended by later regulations of the Ministry of Transport

Aircraft type designation:

Two-seat, single-engine, aerodynamically controlled , all-composite low wing, aircraft– Sport Flying Equipment.

Type designation: **Ellipse Spirit**

Maximum take off mass 600 kg including the ballistic recovery parachute.
Detailed technical specification is stated in the Data Sheet.
Supplement a) dated January 1, 2021 - Ellipse Spirit b (classic control lever)
Supplement b) dated June 7, 2021 - Ellipse Spirit RG (retractable landing gear)

Type certificate holder:

ellipse aero s.r.o.
U Hellady 697/4
140 00 Praha 4 - Michle
Czech Republic
ID: 071 09 075

Approved by the LAA CR Technical commission on:

24 th june 2020

The Type certificate is registered at the LAA CR under the reference:

ULL 02 / 2020

LAA CR Chief Technical Inspector: ***ing. Petr Tax***

Type certificate number:	**ULL – 02 / 2020**
Type certificate holder:	ellipse aero s.r.o.
Type SLZ:	**Ellipse Spirit**
Date of issuance:	1/7/2020
Date of issuance supplement a):	1/1/2021
Date of issuance supplement b):	7/7/2021

Type certificate annex no. ULL - 02 / 2020

I. Generally

1. Type designation: **Ellipse Spirit**
2. Category: Light sport aircraft, microlight aerodynamically controlled aircraft
3. Type certificate holder: ellipse aero s.r.o.
   U Hellady 697/4, 140 00 Praha 4 – Michle, Czech Republic
   IČO: 071 09 075, DIČ: CZ071 09 075
5. Application date: 19th March of 2019
6. Approval date: 24th June of 2020

II. Certification specification

1. Airworthiness requirements: UL2 – část I. vydání 1. 2019. Ultralehké letouny řízené aerodynamicky, upravené znění ze dne 27.3.2019.
2. Special conditions: N/A
3. Exceptions: N/A

III. Technical data, performance, operation limitation

1. Type definition: Aircraft type is defined by set of drawings and Type definition

2. Description: Ellipse Spirit aircraft is fully made of composite materials. It is equipped with self-supporting low wing. Cockpit seats there are arranged side by side. Airframe structure is made of carbon or carbon/aramid composite structures, mostly with sandwich core. Fuselage has an oval cross section and it is made of composite sandwich structures. Wing consists of carbon composite sandwich skin with one main and one auxiliary spar. Spare cabs are made of unidirectional carbon layers and shear web is made of carbon fabrics with foam core. Main wing spars there are connected inside the fuselage using two main pins. Wings are connected to the fuselage using four pins located in root ribs. Ailerons and fowler flaps there are connected to the auxiliary wing spare. Flaps are actuated using electric motor situated inside the fuselage which is connected with flaps by flexible rods. Wing shape is elliptical and wing section is MS 0313, no geometric twist is used. In front of the ailerons there is SLOT on the leading edge. Tail section is a composite structure with one-piece horizontal stabilizer in T arrangement. In the centre of elevator there is a trim tap actuated by electric servo located in elevator.

3. Equipment: For technical airworthiness approval of light sport aircraft issue, basic equipment according certification specification listed in chapter II must be installed.

4. Basic technical data:

1. Dimensions

Span	8,00 m
Length	6,70 m
High	2,15 m

Wing

Area	9,474 m^2
Root wing section chord	1,45 m
Tip wing section chord	N/A - ellipse
Aspect ratio	6,756
Wing loading at MTOM 600kg	63,3 kg/m^2

Aileron

Area	0,341 m^2
Aileron deflection (up/down)	15 ^{0}/10 ^{0}

Wing trailing edge flap

Area	0,734 m^2
Flap deflection - cruise	0 ^{0}
Flap deflection – take-off	10 ^{0}
Flap deflection – approach, landing	20°, 30 ^{0}

Horizontal stabilizer

Span	2,6 m
Area	1,61 m^2
Elevator deflection (up/down)	18^0 / 12^0

Vertical fin

Area	1,247 m^2
Rudder deflection	+/- 22^0

Undercarriage

Main undercarriage wheelbase	2,08m
Main and front undercarriage wheelbase	1,57 m
Main and front wheel dimensions	350x100
Main undercarriage tire pressure	2,2-2,5 bar
Front undercarriage tire pressure	1,8-2 bar
Brakes	Hydraulic disc brakes
Main undercarriage suspension	Composite spring
Front undercarriage suspension	Steal spring

Undercarriage – retractable landing gear

Main undercarriage wheelbase	1,85m
Main and front undercarriage wheelbase	1,62 m
Main and front wheel dimensions	350x100
Main undercarriage tire pressure	2,2-2,5 bar
Front undercarriage tire pressure	1,8-2 bar
Brakes	Hydraulic disc brakes
Main undercarriage suspension	Steal spring – hydraulic damper
Front undercarriage suspension	Steal spring

2. Mass

Max. take-off mass	600 kg
Max. take-off mass with emergency parachute system	600 kg
Max. useful load	280 kg

Min. crew mass	65 kg
Max. baggage mass	15 kg
Wing fuel tanks	2x40 l (2x60l)
Standard Empty mass including emergency parachute system	381 kg

Airspeed and performance

Engine ROTAX 912 ULS (73,5 kW / 100 HP), propeller E-PROPS DURANDAL 100

Performance in ISA conditions.	Take-off mass 600 kg Airspeed CAS
Stall speed flaps extended V_{SO}	72 km/h
Stall speed flaps retracted V_{S1}	89 km/h
Max. speed – flaps extended (30°) V_{FE}	130 km/h
Design airspeed V_A	177 km/h
Max. horizontal flight airspeed V_H	238 km/h
Never exceed speed V_{NE}	302 km/h
Take-off length 15 m obstacle, grass	320 m
Rate of climb	4,4 m/s at 120 km/h
Rough airspeed V_{RA}	240 km/h

Engine ROTAX 912 ULS (73,5 kW / 100 HP), propeller Mühlbauer MTV-33-1-A/175-200

Performance in ISA conditions.	Take-off mass 600 kg Airspeed CAS
Stall speed flaps extended V_{SO}	72 km/h
Stall speed flaps retracted V_{S1}	89 km/h
Max. speed – flaps extended (30°) V_{FE}	130 km/h
Design airspeed V_A	177 km/h
Max. horizontal flight airspeed V_H	240 km/h
Never exceed speed V_{NE}	302 km/h
Take-off length 15 m obstacle, grass	320 m
Rate of climb	4,4 m/s at 120 km/h
Rough airspeed V_{RA}	240 km/h

3. CG position range

Limit front CG position: **21 %** MAC
Limit aft CG position: **35 %** MAC

The Datum is located at the leading edge of the wing at the root rib. Mean aerodynamic chord length MAC=1,257m, MAC shift aft of datum is 0,132m.

4. Flight load factors

Maximal positive / negative ……. +4,0 / -2,0.

5. Power-plant
   Rotax 912 ULS.
   Maximal take-off power 73,5 kW/ 5800 min^{-1} (max duration 5 min).
   Maximal continuous power 69 kW/5500 min^{-1}.

6. Propeller

a) Two-blade constant speed Mühlbauer MTV-33-1-A/175-200.

b) Three-blade on ground variable pitch E-PROPS DURANDAL 100.

7. Fuel

EUROSUPER RON 95 unleaded according DIN 51607,Ö- NORM 1100 AVGAS 100 LL.
BA 95 Natural recommended in Czech republic.

8. Oil

Oil specification API SF(SG) or higher, designated for 4-stroke motorcycles
(with gear lubrication additives).

9. Rescue parachute system

GRS 6 600 SD Speedy 115m^2 installed according Galaxy company standards.

IV. Operation and maintenance documents:

- Flight and maintenance manual together with appendix of optional equipment.
- Operation manual ROTAX 912.
- Propeller technical description and operation manual.

V. Annex:

Annex a): Classical control stick addition according type certificate Ellipse Spirit b chapter 3.4.

Controls in the cockpit there are doubled. Standard hand control sticks are used. Trim control there is situated on control sticks. Rudder paddles there are adjustable. Throttle is situated in the central console between seats.

Annex b): Retractable landing gear addition according type certificate Ellipse Spirit RG chapter 3.3.
Engine Rotax 912iS addition according type certificate Ellipse Spirit RG chapter 3.7.

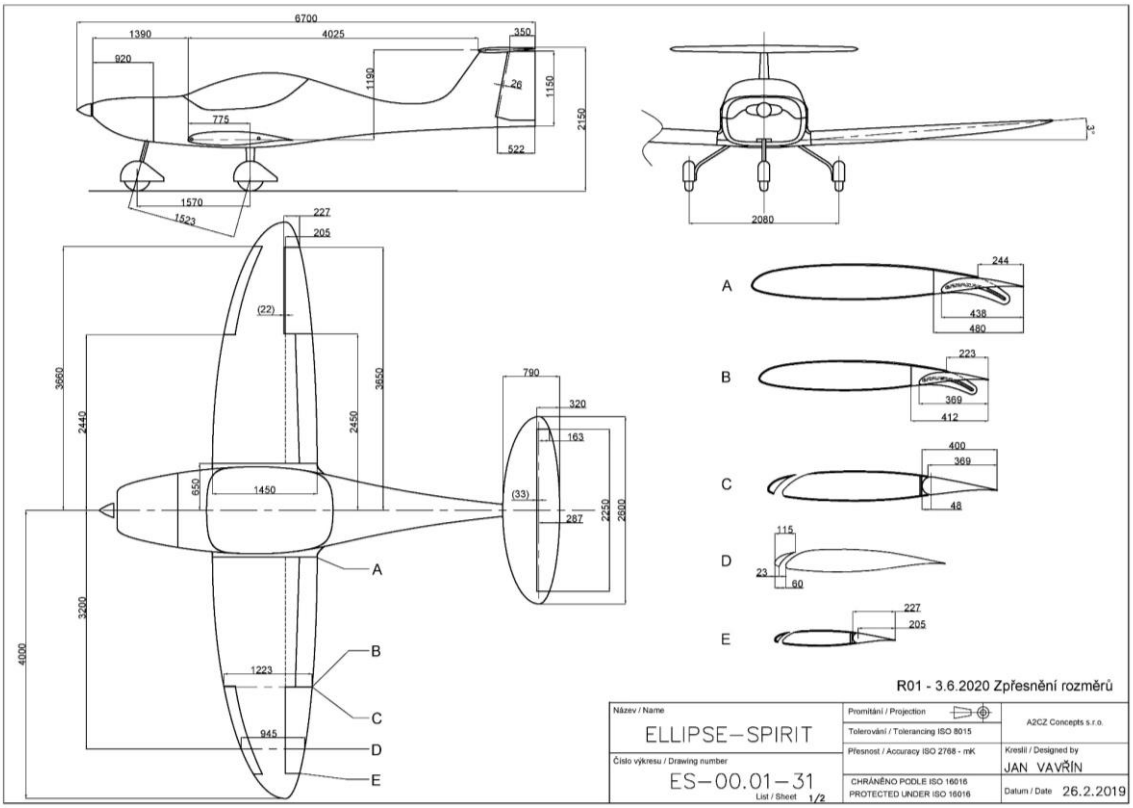
Notes:

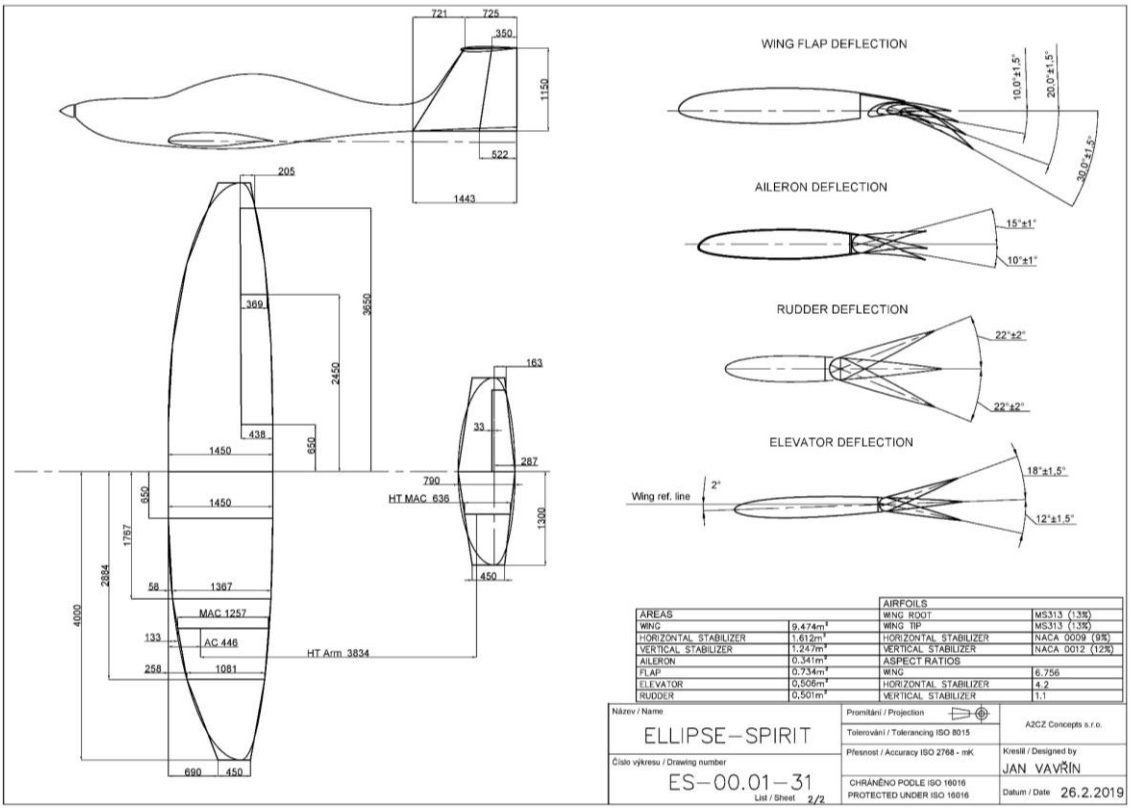
1. Each aircraft must be equipped with actual weight and balance protocol with equipment list to issue airworthiness technical approval
2. Aircraft must be equipped with placards listed in flight manual

VI. Appendix:

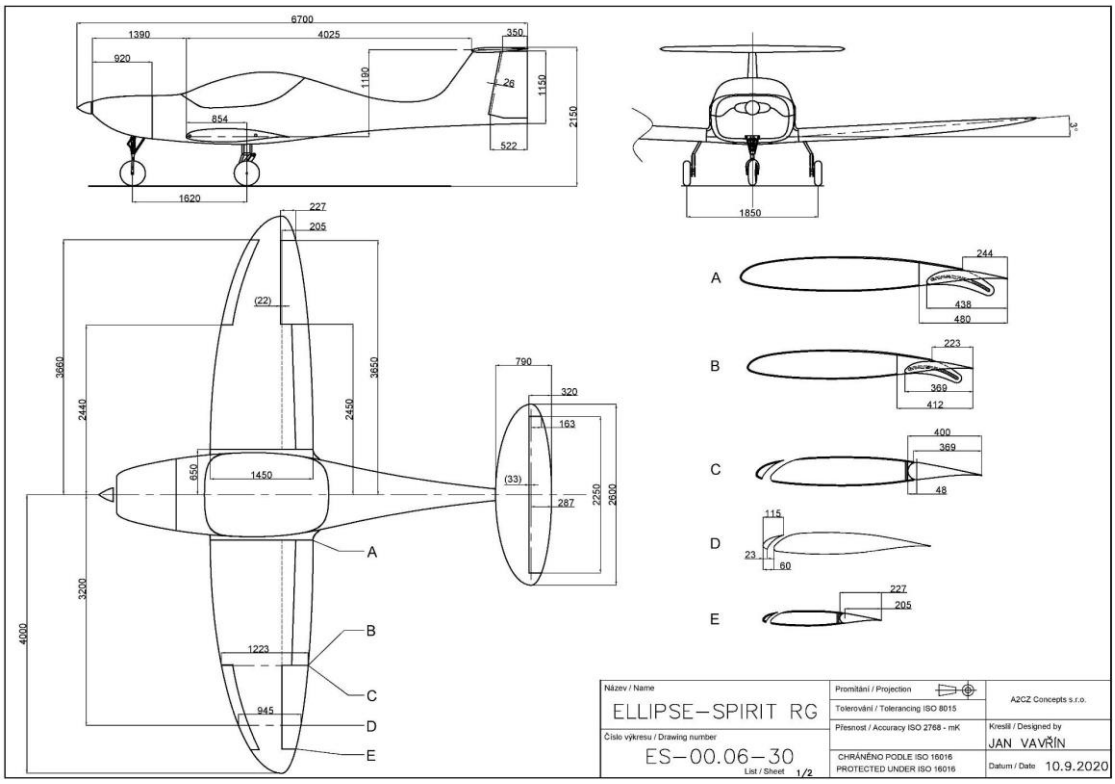
- 3D Ellipse Spirit aircraft drawing according type definition ULL 02/2020.
- 3D Ellipse Spirit RG aircraft drawing according type definition ULL 02/2020.

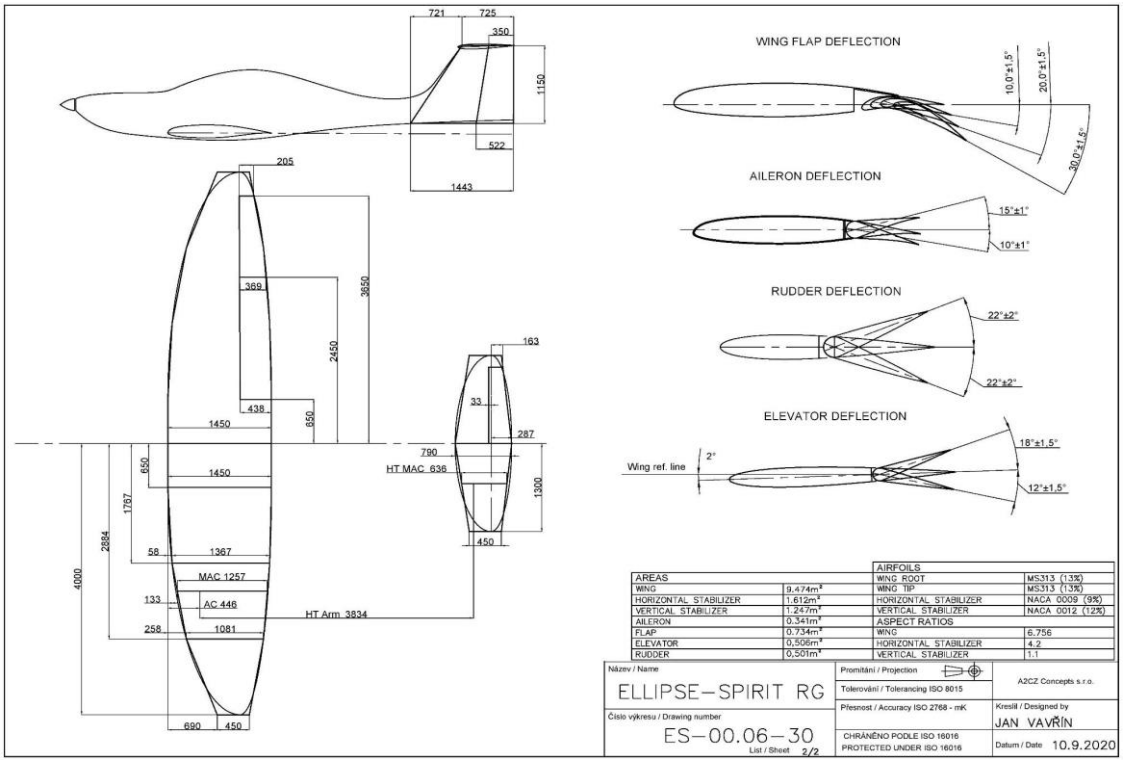
3D Ellipse Spirit aircraft drawing according ULL 02/2020.





3D Ellipse Spirit RG aircraft drawing according ULL 02/2020.




721
725
350
1150
522
1443
205
369
3650
2450
438
650
1450
650
1450
1767
2884
4000
58
1367
MAC 1257
133
AC 446
258
1081
690
450
163
33
287
790
HT MAC 636
1300
450
HT Arm 3834
WING FLAP DEFLECTION
10.0°±1.5°
20.0°±1.5°
30.0°±1.5°
AILERON DEFLECTION
15°±1°
10°±1°
RUDDER DEFLECTION
22°±2°
22°±2°
ELEVATOR DEFLECTION
Wing ref. line
2°
18°±1.5°
12°±1.5°
AREAS
WING 9.474m²
HORIZONTAL STABILIZER 1.612m²
VERTICAL STABILIZER 1.247m²
AILERON 0.341m²
FLAP 0.734m²
ELEVATOR 0,506m²
RUDDER 0,501m²
AIRFOILS
WING ROOT MS313 (13%)
WING TIP MS313 (13%)
HORIZONTAL STABILIZER NACA 0009 (9%)
VERTICAL STABILIZER NACA 0012 (12%)
ASPECT RATIOS
WING 6.756
HORIZONTAL STABILIZER 4.2
VERTICAL STABILIZER 1.1
Název / Name
ELLIPSE–SPIRIT RG
Promítání / Projection
A2CZ Concepts s.r.o.
Tolerování / Tolerancing ISO 8015
Přesnost / Accuracy ISO 2768 - mK
Kreslil / Designed by
JAN VAVŘÍN
Číslo výkresu / Drawing number
ES–00.06–30
List / Sheet 2/2
CHRÁNĚNO PODLE ISO 16016
PROTECTED UNDER ISO 16016
Datum / Date 10.9.2020

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