Amendment to Flight and Operations Manual of ATEC 321 Faeta UL aircraft

AEROTOW

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1.1 General

UL aircraft type Atec 321 Faeta is a certified UL aircraft for towing gliders according to UL-2 regulation, appendix III. For this purpose the aircraft is equipped with special technical systems which enables towing. This includes towing gear, which consists of TOST E85 release mechanism, tow shackle with which the release mechanism is attached to the aircraft, the rope release yellow lever in the cockpit and monitoring facilities. The monitoring of towed glider can be assured by two methods - using usual rear mirror on left side of the cockpit or monitoring by camera by which the glider is displayed on the screen of the device installed on the dashboard.

The Rotax 912S UL engine with maximum power of 73,5 kW when 5800 rpm and max. continuous power of 69 kW when 5500 rpm serves as towing drive unit. The aircraft is equipped with 3-blades Fiti EcoCompetition fix propeller of 1,63m diameter. As to assure engine cooling more efficient, the additional oil radiator including independent NACA inlet and oil circuit thermostat is installed on engine.

The fuel circuit consists of two independent fuel pumps. The main one with mechanical pump and the other one parallel back-up electric pump with independent inlet to fuel tank. Fuel circuit pressure is measured by fuel pressure gauge behind each pump. In case of failure of any pump, a failure is indicated as pressure decrease on fuel pressure indicator. The aircraft is fully airworthy on maximum engine performance with both pumps running simultaneously or with any of pumps single run. In the main fuel circuit is check valve installed.

The aircraft is equipped with continuous electronic monitoring system of rotations, temperatures and fuel pressures. In case of monitored limits are exceeded, the values on instrument are highlighted in red and additional red warning light on switchboard is switched-on to be well visible and noticed by the pilot. All flight and engine instruments are situated in a visual field of pilot. Watching the glider in a rear mirror simultaneously with flight and engine instruments do not cause any difficulties to the pilot.

The pilot of towing aicraft is obliged to be appropriately authorized and skilled in gliders towing. No other particular skills are required.

Each aerotow is performed at own risk of each person on board of the glider.

1.2 Maximum take-off weight of towing aircraft

When towing is performed, the towing aircraft can only be occupied with one pilot on board. Maximum take-off weight including pilot and fuel must not exceed 450 kg.

1.3 Maximum take-off weight of towed glider

Maximum weight of towed glider including crew and ballast must not exceed 750 kg.

1.4 Types of towed gliders

Glider types tested for towing with ATEC 321 Faeta UL aircraft are as follows:

• L 13 Blaník with 499 kg of MTOW and with 480m of take-off distance to 15m of altitude
• VSO 10 Gradient with 360 kg of MTOW and with 450m of take-off distance to 15m of altitude
• Discus CS with 360 kg of MTOW and with 450m of take-off distance to 15m of altitude

• Duo Discus with 650 kg of MTOW and with 600m of take-off distance to 15m of altitude

• ASH- 25 with 750 kg of MTOW and with 600m of take-off distance to 15m of altitude

The take-off distance might be prolonged in case of bad quality/deterioration of runway surface, high air temperature, high airfield elevation, dirty surface of towing aircraft or glider.

Glider types recommended for towing:

L-13 Blaník, L-23 Super Blaník, VSO-10, Discus CS, Duo Discus (max.650kg),
DG 1001, ASH-25 (max. 750 kg), ASW-15, ASW-19, ASK-21, VT-16, VT-116 and others with similar flight characteristics and performance.

1.5 Towing rope

The only non-metallic towing rope is allowed to use, e.g. polyamide, polyester etc.. When maximum loading, the stretchability of the rope can be max. 30%. Rope attachments must be protected from abrasion by appropriate cover. The rope rupture strength in tension must not be higher than 3000N. If using a rope with

higher strength, this must be equipped with safety pin of maximum strength of 3000N to protect the towing aircraft same as towed glider. The towing rope length is 40 to 60 meters.

1.6 Emergency procedures

a) If the rope is disconnected from the glider or from towing aircraft during the process between start and rope lifting up, the certain steps must be taken to avoid glider from rear-end collision with towing aircraft.

   If the runway is long enough to discontinue the take-off, the pilot of towing aircraft will yaw away from original take-off track to a freeway area after an adequate timeout and then stop the action.

   If the runway is too short to stop the action, or if it is too dangerous to stop the action, the towing aircraft will continue take-off.

b) In case of engine power lost or another failure which disables to continue take-off during the process between start and lift-up of the rope, the towing aircraft will yaw away from original take-off track via freeway area as soon as possible to provide enough space to the glider. The pilot must immediately release the towing rope and stop the action.

c) If the rope is self-released just after lift-up of the towing aircraft, the aircraft will continue the flight.

d) In case of engine power lost or another failure which disables to continue take-off just after lift-up of the towing aircraft, the pilot of towing aircraft will release the rope immediately and make emergency landing with respect to failure character.

e) Forced landing of towing aircraft with towing rope attached is prohibited (except emergency situations).

f) In case the pilot of towed glider does not release the towing rope even after repeated signal, the pilot of towing aircraft will release the glider when overfly the aerodrome.

g) When, after many attempts, the towing rope is not possible to release by the towing aircraft or by the glider, even the rope is not possible to cut, the landing of towing aircraft must be made together with towed glider connected. The pilot of towing aircraft will gradually descend and approach with respect to glider´s abilities.
After landing, the pilot of towing aircraft must keep an adequate engine run to keep enough distance from the glider.

h) In case of insoluble emergency situation, it is possible to use the rescue system (if equipped with). Before its activation, the pilots of both glider and aircraft must release the towing rope.

i) Attentively check and follow all flight and engine values and limits during aerotow!

1.7 Normal procedures

Before aerotow starts, the pilot of towing aircraft must be aware of glider´s take-off methodics and operation limits as described in appropriate glider´s flight and operations manual.

a) Before start up, all procedures described in Flight and Operations Manual of ATEC 321 Faeta must be followed same way as before usual flight.

b) Both, towing aircraft and towed glider must be positioned in the same take-off axis before the aerotow starts.

c) First, the towing rope is attached to the towing aircraft. Then, after pilot´s signal, the opposite end of the rope can be attached to the glider.

d) As reaction to assistant signalization, the pilot of towing aircraft will tension the rope and signalize start of the aerotow.

e) Lining up and take-off process is running at full engine power. After lift-up, it´s necessary to keep the engine continuous power until reaching the speed of 100 km/h and then to start climbing on stable speed of 100 - 120 km/h. During aerotow, the pilot of towing aircraft must do all manoeuvres fluently to enable glider to react in time and safely. When climbing, the pilot of towing aircraft must pay attention to towing speed, engine operating values and towed glider.

f) When appropriate altitude and area are reached, the pilot of towing aircraft starts waving by wings to signalize that the glider is possible to disconnect. Descending is possible only when pilot of towing aircraft is sure, that the glider is completely disconnected. In case of descending with towing rope attached, do not make any sudden changes of flight direction and altitude.

g) After descending over the aerodrome, the pilot of towing aircraft will release and drop down the rope along the runway in the altitude of 50m with respect to traffic at the aerodrome. Landing with rope attached is not recommended.

h) After the pilot of towing aircraft is assured by watching the rear mirror or screen that the rope is disconnected, he can start increasing the engine power and climbing to circuit altitude so that he can make usual approach and landing according to Flight and Operations Manual of ATEC 321 Faeta.

i) Attentively check and follow all flight and engine values and limits during aerotow!

1.8 Performances

- Take-off distance with towed glider of 750 kg of MTOW: 500 m
- Altitude reached after 600 m from start point: 15 m
- Maximum climbing rate with towed glider of 750 kg of MTOW: 1,75 m/s
- Optimum speed of towing (depending glider type): 100 – 120 km/h (55 – 65 kt)
- Average fuel consumption during aerotow: 15 – 18 l/h
- Maximum range of flight with max. fuel level of 70l during aerotow: 450 km

Start and take-off distance of aerotow can be prolonged by 15% in case of rainy conditions or high grass on runway.

Performances listed are considered when 750 kg of take-off weight and may vary depending on flight performances and characteristics of towed glider.

1.9 Operating limits

- Maximum glider´s weight: 750 kg
- Minimum towing speed: 90 km/h (45 kt)
- Maximum towing speed: 150 km/h (80 kt)
- Maximum strength of the rope release safety pin: 3000N

When aerotow is performed, the towing aircraft can only be occupied with only one pilot on board. The pilot must be holder of valid pilot licence and authorized to aerotow.

Aerotow towards air-wave area is prohibited. In case of unintended flight into air-wave area, the pilot of towing aircraft must leave this area immediately.

Aerotow with more than one glider is prohibited.

Aerotow from a terrain is prohibited.

Take-off of the glider with one wing touching the ground (without assistant) is prohibited.

1.10 Description labels

Towing aircraft must be equipped with description labels as follows:

- The label „Attention to towing speed“ must be next to the speed indicator.
- Towing rope release must be labelled as „Tow release“
- Back-up fuel pump switch must be labelled as „Fuel pump“
- Towed glider must be equipped with the label with clearly readable text, well visible to all crew: „LSA aerotow is performed at own risk of each person on board of the glider. LSA is not a subject to CAA authorization“.
- Towing gear must be labelled as „Maximum towing rope strength is 3000N“

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