FPS MOBILITY AND TRANSPORT
BELGIAN CIVIL AVIATION AUTHORITY

Belgian Airworthiness Code – Ultralight Motorised Airplanes – Compliance Checklist – *ULA – INITIAL – 28 February 2025*

Reference Number:		Registration Marks:	
Manufacturer:		Description of Change:	
Aircraft Designation:			
MTOM:			

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section A – GENERAL				
ULA.1 – Applicability				
This Airworthiness Code is applicable to land planes having no more than two seats, and				
a) a measurable stall speed or minimum steady flight speed in landing configuration V_{S0} as defined in ULA.49 not exceeding 65 km / h calibrated air speed (CAS), and (1) for single seat airplanes a maximum take-off mass (MTOM) of not more than 300 kg (315 kg when equipped with an airframe mounted total recovery parachute), or (2) for two seat airplanes a maximum take-off mass (MTOM) of not more than 450 kg (475 kg when equipped with an airframe mounted total recovery parachute); or				
b) a measurable stall speed or minimum steady flight speed in landing configuration V_{S0} as defined in ULA.49 not exceeding 83 km / h calibrated air speed (CAS), and a maximum take-off mass (MTOM) of not more than 600 kg.				
The airplanes specified under paragraph ULA.1 a) will be referred to as 'basic' ultralight motorised airplanes, whereas the airplanes specified under paragraph ULA.1 b) will be referred to as 'exempted' ultralight motorised airplanes.				
Unless specifically stated otherwise, the requirements of this Airworthiness Code are applicable to all airplanes.				
ULA.3 – Permitted operations				
Airplanes authorised under this Airworthiness Code are limited to day-VFR and non-aerobatic operations.				
Non-aerobatic operations include: a) any manoeuvre incident to normal flying; b) stalls (except whip stalls); and c) steep turns in which the angle of bank is not more than 60 degrees.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section B - FLIGHT				
GENERAL				
ULA.21 – Proof of compliance				
a) Each requirement of this Section B must be met by tests upon an airplane of the type for which an authorisation is requested at the most adverse combination of weight and centre of gravity within the range of loading conditions for which an authorisation is requested.				
b) Compliance must be established for all configurations at which the airplane will be operated, except as otherwise stated.				
ULA.23 – Load distribution limits				
a) The ranges of weight and centre of gravity within which the airplane may be safely operated must be selected by the applicant. Compliance must be shown over the centre of gravity range between the foremost limit of the centre of gravity and 1 % of the standard mean chord or 10 mm, whichever is greater, aft of the aftmost limit of the centre of gravity.				
b) The centre of gravity range within which the airplane may be safely operated without the use of removable ballast must not be less than that which corresponds to: (1) an occupant weight of 55 kg to 86 kg for single seat airplanes; or (2) an occupant weight of 55 kg to 172 kg for two seat airplanes. In each case the safe centre of gravity range should permit operation with a fuel load ranging from the lower limit of usable fuel up to fuel sufficient for 60 minutes of operation at maximum continuous power.				
ULA.25 – Weight limits				
a) *Maximum weight.* The maximum weight must be established so that it is: (1) not more than: (i) the highest weight selected by the applicant; (ii) the design maximum weight, which is the highest weight at which compliance with each applicable structural loading condition of this Airworthiness Code is shown; or (iii) the highest weight at which compliance with each applicable flight requirement of this Airworthiness Code is shown.				
(2) not less than the weight which results from: (i) the empty weight determined under ULA.29; (ii) the weight of the required minimum equipment; (iii) a weight of occupant(s) of 86 kg for a single seat airplane, or 172 kg for a two seat airplane; and (iv) the weight of sufficient fuel for at least 60 minutes of operation at maximum continuous power.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
(3) not less than the weight which results from: (i) the empty weight determined under ULA.29; (ii) the weight of the required minimum equipment; (iii) a weight of one occupant of 86 kg; and (iv) the weight of fuel to full tank capacity.				
b) *Minimum weight.* The minimum weight must be established so that it is not more than the sum of: (1) the empty weight determined under ULA.29; (2) the weight of one occupant of 55 kg; and (3) the weight of the fuel necessary for 30 minutes of operation at maximum continuous power.				
ULA.29 – Empty weight and corresponding centre of gravity				
a) The empty weight and corresponding centre of gravity must be determined by weighing the airplane: (1) with: (i) fixed ballast; (ii) the required minimum equipment; and (iii) unusable fuel, maximum oil and, where appropriate, engine coolant and hydraulic fluid; (2) excluding: (i) the weight of the occupant(s); and (ii) other readily removable items of load.				
b) The condition of the airplane at the time of determining empty weight must be one that is well defined and can be easily repeated.				
PERFORMANCE				
ULA.45 – General				
Compliance with the performance requirements of this Section B must be shown at maximum weight for still air and standard atmosphere at sea level.				
ULA.49 – Stalling speed				
a) V_{S0} is the stalling speed (CAS), if obtainable, or the minimum steady speed at which the airplane is controllable, with: (1) the engine idling (throttle closed) or engine off, whichever gives the higher value of V_{S0}; (2) the airplane in the landing configuration; and (3) the maximum weight.				
b) V_{S0} may not exceed: (1) 65 km / h for 'basic' ultralight motorised airplanes; (2) 83 km / h for 'exempted' ultralight motorised airplanes.				
c) V_{S1} is the stalling speed (CAS), if obtainable, or the minimum steady speed at which the airplane is controllable, with: (1) the engine idling (throttle closed) or engine off; (2) the airplane in the configuration existing in the test in which V_{S1} is being used; and (3) the maximum weight.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
d) V_{S0} and V_{S1} must be determined by flight tests using the procedure specified in ULA.201.				
ULA.53 – Take-off performance				
a) The take-off distance at maximum weight and in zero wind, from rest to attaining a height of 15 m must be determined when taking off from a dry, level, short grass surface, and must not exceed: (1) 300 m for 'basic' ultralight motorised airplanes; (2) 450 m for 'exempted' ultralight motorised airplanes.				
b) Upon reaching a height of 15 m above the take-off surface level, the airplane must have reached a speed of not less than 1.3 V_{S1}.				
ULA.65 – Climb				
The time for climb from leaving the ground up to 360 m above the field must be determined and, when corrected for standard atmosphere at sea level, must not exceed four minutes with: a) not more than take-off power; b) the landing gear retracted; c) the maximum weight; d) the cowl flaps (if any) in the position for climb; and without exceeding any temperature limits established under ULA.1041.				
ULA.75 – Landing				
a) The landing distance on a dry level short grass surface at maximum weight and in zero wind from a height of 15 m must be determined.				
b) The speed at 15 m should be the recommended approach speed, but not less than 1.3 V_{S0}, at a power setting to be stated in the Pilot's Handbook.				
CONTROLLABILITY AND MANOEUVRABILITY				
ULA.143 – General				
a) The airplane must be safely controllable and manoeuvrable during: (1) take-off at maximum take-off power; (2) climb; (3) level flight; (4) descent; (5) landing, power-on and power-off; and (6) with sudden engine failure.				
b) It must be possible to make a smooth transition from one flight condition to another (including turns, reversal of turns and slips) without exceptional piloting skill, alertness or strength, without danger of exceeding the limit load factor, under any probable operating condition, with the engine running at all allowable power settings, including the effect of power changes and sudden engine failure. Modest departures from any recommended techniques must not cause unsafe flight conditions.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) Any unusual flying characteristics observed during the flight tests required to determine compliance with the flight requirements and any significant variations in flight characteristics caused by rain must be determined with the engine running at all allowable powers.				
d) If marginal conditions exist with regard to required pilot strength, the 'strength of pilots' limits must be shown by quantitative tests. In no case may the limits exceed those prescribed in the following table. This requirement must be met with the engine running at all allowable powers.				

Force applied to the controls	Pitch (N)	Roll (N)	Yaw (N)	Flaps, landing gear, trim tabs, etc. (N)
(1) temporary application	200	100	400	100
(2) prolonged application	20	15	100	

ULA.145 – Longitudinal control				
a) It must be possible at any speed below 1.3 V_{S1}, to pitch the nose downwards so that a speed equal to 1.3 V_{S1} can be reached promptly. Test conditions: all possible configurations and engine powers with the airplane trimmed at 1.3 V_{S1}.				
b) It must be possible throughout the appropriate flight envelope to change the configuration (landing gear, wing-flaps, etc…) without exceptional piloting skill and without exceeding the control forces defined in ULA.143 d).				
c) It must be possible to raise the nose at V_{DF} at all permitted centre of gravity positions and engine powers.				
ULA.147 – Lateral and directional control				
Using an appropriate combination of controls it must be possible to roll the airplane from a steady 30 degree banked turn through an angle of 60 degrees, so as to reverse the direction of the turn within 5 seconds when the turns are made at speeds of 1.3 V_{S1} and V_{NE} and, where applicable, with the landing gear and wing-flaps retracted and with the landing gear and wing-flaps extended.				
ULA.155 – Elevator control force in manoeuvres				
The elevator control force during turns or when recovering from manoeuvres must be such that at a constant speed an increase in control force causes an increase in load factor. The elevator control force to achieve the positive limit manoeuvring load factor may not be less than 70 N for the airplane trimmed with wings level, at all speeds up to V_{NE} at which the required normal acceleration can be achieved without stalling, with wing-flaps and, where applicable, landing gear retracted.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
TRIM				
ULA.161 – Trim				
The speeds to achieve lateral, longitudinal and directional trim must lie within 1.3 V_{S1} and 2.0 V_{S1} at all engine powers and the extreme centre of gravity positions.				
STABILITY				
ULA.171 – General				
The airplane must meet the conditions of ULA.173 to ULA.181 inclusive. In addition the airplane must show suitable stability and control 'feel' in any condition normally encountered in service.				
ULA.173 – Static longitudinal stability				
a) Under the conditions and throughout the speed range specified in ULA.175 the slope of he curve, control force versus speed, must be positive and have a value such that any significant speed change will cause a variation in control force plainly perceptible to the pilot.				
b) The airspeed must return to within ±10 % of the original trim speed when the control force is slowly released at any speed within the speed range specified in sub-paragraph a) of this paragraph.				
ULA.175 – Demonstration of static longitudinal stability				
The control force versus speed curve must have a stable slope in the following conditions: a) *Climb:* (1) at 1.4 V_{S1}; (2) landing gear retracted; (3) wing-flaps in the position for climb; and (4) maximum power.				
b) *Cruise:* (1) at maximum level flight speed and V_{DF}; (2) landing gear retracted; and (3) wing-flaps retracted.				
c) *Approach:* (1) at the recommended approach speed; (2) wing-flaps in the landing position; (3) landing gear extended; and (4) engine at normal approach power and with engine off.				
ULA.177 – Lateral and directional stability				
a) With the airplane in straight steady flight, and when the aileron and rudder controls are gradually applied in opposite direction, any increase in sideslip angle must correspond to an increased deflection of the lateral control. This behaviour need not follow a linear law.				
b) In a sideslip the aileron and rudder control forces must increase steadily as the angle of sideslip is increased. This need not be linear but must not reverse.				

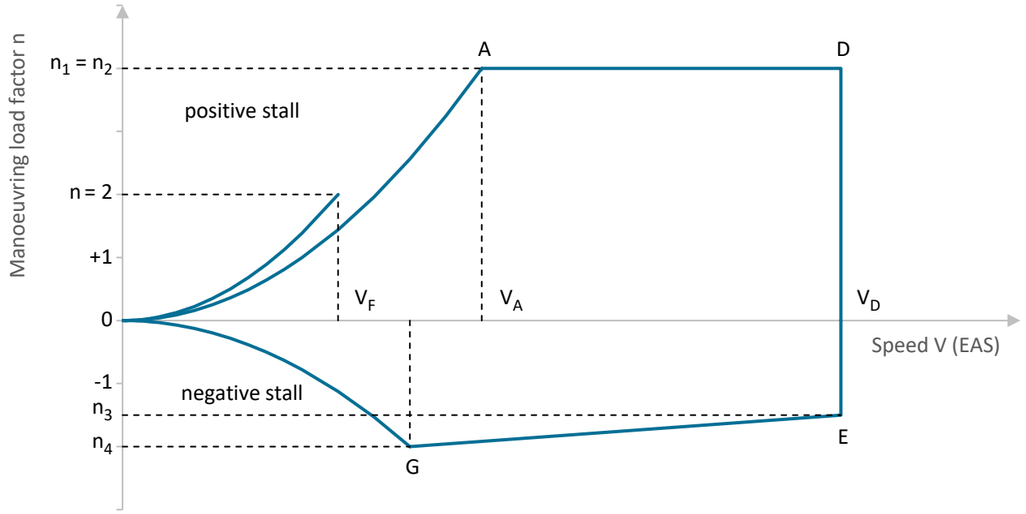
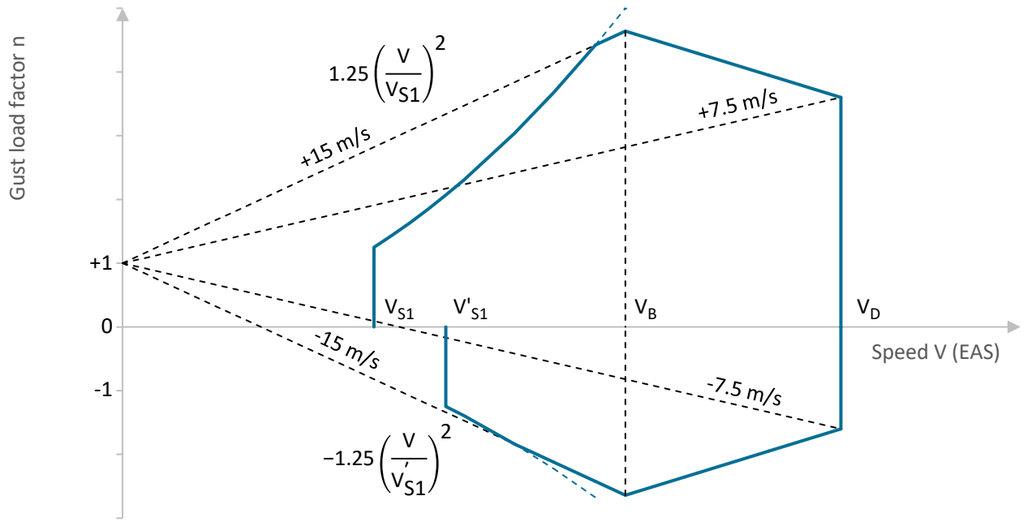
Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.181 – Dynamic stability				
a) Any short period oscillations not including combined lateral-directional oscillations occurring between the stalling speed and V_{DF} must be heavily damped with the primary controls: (1) free; (2) fixed.				
b) Any combined lateral-directional oscillations occurring between the stalling speed and V_{DF} must be damped with the primary controls: (1) free; (2) fixed.				
c) Any long period oscillation of the flight path (phugoid) must not be so unstable as to cause an unacceptable increase in pilot workload or otherwise endanger the airplane. When, in the conditions of ULA.175, the longitudinal control force required to maintain speeds differing from the trimmed speed by at least ±15 % is suddenly released, the response of the airplane must not exhibit any dangerous characteristic nor be excessive in relation to the magnitude of the control force released. These requirements must be met with the engine running at all allowable powers.				
STALLS				
ULA.201 – Wings level stall				
Stalling behaviour must be investigated at forward and aft centre of gravity limits and at the maximum and minimum weights established under ULA.25.				
a) Stall demonstrations must be conducted by reducing the speed by approximately 2 km / h per second from straight and level flight until either a stall results as evidenced by a downward pitching motion or downward pitching and rolling motion not immediately controllable or until the longitudinal control reaches the stop. It must be possible to produce and correct roll and yaw by unreversed use of the controls until the stall occurs.				
b) It must be possible to prevent more than 20 degrees of roll by normal use of the controls during recovery. There must be no tendency to spin.				
c) The loss of altitude from the beginning of the stall until regaining level flight by applying normal procedures and the maximum pitch below the horizon must be determined.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
d) Compliance with the requirements of sub-paragraphs a) to c) of this paragraph must be shown under the following conditions: (1) wing-flaps in any position; (2) landing gear retracted and extended; (3) airplane trimmed to 1.4 V_{S1} (if fitted with a trimmer); (4) power: (i) engine idling; and (ii) maximum continuous power, or, if the power-to-weight ratio at maximum continuous power results in extreme nose-up attitudes, demonstration may be carried out with the power required for level flight in the landing configuration at maximum landing weight and a speed of 1.4 V_{S0}, except that the power may not be less than 75 % maximum continuous power.				
ULA.203 – Turning flight stalls				
a) When stalled during a co-ordinated 30 degree banked turn, it must be possible to regain normal level flight without encountering uncontrollable rolling or spinning tendencies.				
b) The loss of altitude from the beginning of the stall until regaining level flight by applying normal procedures must be determined. This requirement must be met with the engine running in the conditions prescribed in ULA.201 d) (4) and the wing-flaps in any position.				
ULA.207 – Stall warning				
a) Except as provided by ULA.207 c), there must be a clear and distinctive stall warning with the wing-flaps and landing gear in any normal position, both in straight and turning flight.				
b) The stall warning must not occur at normal operating speeds, but must occur sufficiently before the stall to allow the pilot to recover safely. The stall warning may be furnished either through the inherent aerodynamic qualities (e.g. buffeting) or by a device that will give clearly distinguishable indications.				
c) Compliance with ULA.207 a) and ULA.207 b) is not required for an airplane provided that when a stall occurs from straight flight: (1) it is possible to produce and correct roll by using the ailerons, the rudder being held neutral; and (2) no appreciable wing-dropping occurs when both ailerons and rudder are held neutral.				
SPINNING				
ULA.221 – General				
The airplane must be able to recover from a one-turn erect spin or a 3 second erect spin, whichever takes longer, in not more than one additional turn, with the controls used in the manner normally used for recovery. In addition: a) For both the wing-flaps and the landing gear in any allowable position, the applicable airspeed limit and positive limit manoeuvring load factor may not be exceeded.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) It must be impossible to obtain unrecoverable spins with any use of the controls. For the wing-flaps extended condition, the wing-flaps may be retracted during recovery.				
GROUND HANDLING CHARACTERISTICS				
ULA.233 – Directional stability and control				
a) There must be no uncontrollable ground-loop tendency at any speed at which the airplane may be expected to be operated on the ground.				
b) The airplane must have adequate directional control during taxying.				
ULA.234 – Take-off and landing in crosswinds				
The ability to take off and land safely in crosswinds shall be investigated. Based on the results of these tests, advice on operation in crosswinds shall be given in the Pilot's Handbook.				
MISCELLANEOUS FLIGHT REQUIREMENTS				
ULA.251 – Vibration and buffeting				
Each part of the airplane must be free from excessive vibration at all speeds up to at least V_{DF}. In addition, there must be no buffeting, in any normal flight condition, severe enough to interfere with the satisfactory control of the airplane, cause excessive fatigue to the crew, or result in structural damage. Stall warning buffeting within these limits is allowable. This requirement must be met with the engine running at all allowable powers.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section C - STRUCTURE				
GENERAL				
ULA.301 – Loads				
a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads.				
b) Unless otherwise provided, the air and ground loads must be placed in equilibrium with inertia loads, considering each major item of mass in the airplane. These loads must be distributed so as to represent actual conditions or a conservative approximation to them.				
c) If deflections under load would significantly change the distribution of external or internal loads, this redistribution must be taken into account.				
ULA.303 – Factor of safety				
Unless otherwise provided, a factor of safety of 1.5 must be used.				
ULA.305 – Strength and deformation				
a) The structure must be able to support limit loads without detrimental permanent deformation. At any load up to limit loads, the deformation may not interfere with safe operation. This applies in particular to the control system.				
b) The structure must be able to support ultimate loads without failure for at least three seconds. However, when proof of strength is shown by dynamic tests simulating actual load conditions, the three second limit does not apply.				
ULA.307 – Proof of structure				
a) Compliance with the strength and deformation requirements of ULA.305 must be shown for each critical load condition. Theoretical structural analysis may be used only if the structure conforms to those for which experience has shown this method is reliable. In other cases, substantiating load tests must be made.				
b) Certain parts of the structure must be tested as specified in Section D of this Airworthiness Code.				
FLIGHT LOADS				
ULA.321 – General				
a) Flight load factors represent the ratio of the aerodynamic force component (acting normal to the flight path of the airplane) to the weight of the airplane. A positive flight load factor is one in which the aerodynamic force acts upward, with respect to the airplane.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) Compliance with the flight load requirements of this Section C must be shown: (1) at each critical altitude within the range in which the airplane may be expected to operate; and (2) at each practicable combination of weight and disposable load within the operating limitations in the Pilot's Handbook.				
ULA.331 – Symmetrical flight conditions				
a) The appropriate balancing loads on horizontal stabilising surfaces must be accounted for in a rational or conservative manner when determining the wing loads and linear inertia loads corresponding to any of the symmetrical flight conditions specified in ULA.333 to ULA.345.				
b) The incremental loads on horizontal stabilising surfaces due to manoeuvring and gusts must be reacted by the angular inertia of the airplane in a rational or conservative manner.				
c) In computing the loads arising in the prescribed conditions, the angle of attack is assumed to be changed suddenly without loss of flight speed until the prescribed load factor is attained. Angular accelerations may be disregarded.				
d) Aerodynamic data required for the establishment of the loading conditions must be verified by tests, calculations or by conservative estimation. (1) In the absence of better information the maximum negative lift coefficient in the normal configuration may be taken as -0.8. (2) If the zero lift pitching moment coefficient C_{mo} is less than ±0.025, a coefficient of at least ±0.025 must be used for the wing and horizontal stabilising surfaces.				
ULA.333 – Flight envelope				
a) *General.* Compliance with the strength requirements of this Section C must be shown at any combination of airspeed and load factor on and within the boundaries of the flight envelope specified by the manoeuvring and gust criteria of sub-paragraphs b) and c) of this paragraph respectively.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) *Manoeuvring envelope.* Wing-flaps in the enroute setting (see Figure 1).				
 **Figure 1 Manoeuvring envelope.**				
c) *Gust envelope.* Wing-flaps in the enroute setting (see Figure 2). (1) At the design gust speed V_B, the airplane must be capable of withstanding positive (up) and negative (down) gusts of 15 m / s acting normal to the flight path. (2) At the design maximum speed V_D, the airplane must be capable of withstanding positive (up) and negative (down) gusts of 7.5 m / s acting normal to the flight path.				
 **Figure 2 Gust envelope.**				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.335 – Design airspeeds				
The selected design airspeeds are equivalent air speeds (EAS). a) *Design manoeuvring speed* V_A $V_A = V_{S1}\sqrt{n_1}$ Where: V_{S1} = estimated stalling speed at design maximum weight with wing-flaps retracted and engine idling; n_1 = positive limit manoeuvring load factor prescribed in ULA.337.				
b) *Design flap speed* V_F. For each landing setting, V_F must not be less than the greater of: (1) 1.4 V_{S1}, where V_{S1} is the computed stalling speed with wing-flaps retracted at the maximum weight; (2) 2.0 V_{SF}, where V_{SF} is the computed stalling speed with wing-flaps fully extended at the maximum weight.				
c) *Design diving speed* V_D. The design maximum speed may be chosen by the applicant but must not be lower than 1.4 V_H, where V_H is the maximum level speed at maximum continuous power.				
d) *Design gust speed* V_B. The design gust speed may be chosen by the applicant but must not be less than the greater of: (1) 0.9 V_H; (2) V_A.				
ULA.337 – Limit manoeuvring load factors				
The limit manoeuvring load factors on the V-n diagram (see Figure 1) must have at least the following values: n_1 +4.0 n_2 +4.0 n_3 -1.5 n_4 -2.0				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.341 – Gust load factors				
In the absence of a more rational analysis, the gust load factors must be computed as follows: $n = 1 \pm \frac{\frac{1}{2} k_g \rho_0 U V a}{\frac{m g}{S}}$ Where: ρ_0 = density of air at sea level (kg / m³); U = gust velocities referred to in ULA.333 c); V = airplane equivalent speed (m / s); a = slope of wing lift curve per radian; m = mass of the airplane (kg); g = acceleration due to gravity (m / s²); S = design wing area (m²); k_g = gust alleviation factor calculated from the following formula: $k_g = \frac{0.88 \mu_g}{5.3 + \mu_g}$ where: μ_g = airplane mass ratio: $\mu_g = \frac{2 \frac{m}{S}}{\rho \bar{C} a}$ where: ρ = density of air (kg / m³) at the altitude considered; and $\bar{C}$ = mean geometric chord of the wing (m). The value of n calculated from the expression given above need not exceed: $n = 1.25 \left(\frac{V}{V_{S1}}\right)^2$				
ULA.345 – Loads with wing-flaps extended				
If wing-flaps are installed, the airplane, with the wing-flaps fully extended at V_F, is assumed to be subjected to symmetrical manoeuvres and gusts as follows: a) manoeuvring to a positive limit load factor of 2.0; and b) positive and negative gust of 7.5 m / s acting normal to the flight path in level flight.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.347 – Unsymmetrical flight conditions				
The airplane is assumed to be subjected to the unsymmetrical flight conditions of ULA.349 and ULA.351. Unbalanced aerodynamic moments about the centre of gravity must be reacted in a rational or conservative manner, considering the principal masses furnishing the reacting inertia forces.				
ULA.349 – Rolling conditions				
The airplane must be designed for the rolling loads resulting from the aileron deflections and speeds specified in ULA.455 in combination with a load factor of at least two thirds of the positive manoeuvring load factors prescribed in ULA.337.				
ULA.351 – Yawing conditions				
The airplane must be designed for yawing loads on the vertical tail surface specified in ULA.441 and ULA.443.				
ULA.361 – Engine torque				
a) The engine mount and its supporting structure must be designed for the effects of: (1) the limit torque corresponding to take-off power and propeller speed, acting simultaneously with 75 % of the limit loads from flight condition A of ULA.333 b); (2) the limit torque corresponding to the maximum continuous power and propeller speed, acting simultaneously with the limit loads from flight condition A of ULA.333 b).				
b) For conventional reciprocating engines with positive drive to the propeller, the limit torque to be accounted for in ULA.361 a) is obtained by multiplying the mean torque by the appropriate factor from the following table:				
Two-stroke engines **cylinders** **1** **2** **3 or more** — — **factor** 6 3 2 **Four-stroke engines** **cylinders** **1** **2** **3** **4** **5 or more** **factor** 8 4 3 2 1.33				
ULA.363 – Side load on engine mount				
a) The engine mount and its supporting structure must be designed for a limit load factor in a lateral direction, for the side load on the engine mount, of not less than one third of the limit load factor for flight condition A of ULA.333 b) (1/3 n_1).				
b) The side load prescribed in sub-paragraph a) may be assumed to be independent of other flight conditions.				

<table>
<tr><th>Requirement</th><th>Means of Compliance</th><th>Compliance Document</th><th>Remarks</th><th>Compliance Check</th></tr>
<tr><td>CONTROL SURFACE AND SYSTEM LOADS</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.395 – Control systems</td><td></td><td></td><td></td><td></td></tr>
<tr><td>a) Each flight control system, including stops, and its supporting structure must be designed for the loads corresponding to at least 125 % of the computed hinge moments of the movable control surfaces in the conditions prescribed in ULA.421 to ULA.455. In addition, the following apply:
(1) The system loads need not exceed the loads that can be produced by the pilot. Pilot forces used for design need not exceed the forces prescribed in ULA.397 b).
(2) The design must, in any case, provide a rugged system for service use, considering jamming, ground gusts, taxying downwind, control inertia and friction. Compliance with this sub-paragraph may be shown by designing for loads resulting from application of 60 % of the pilot forces specified in ULA.397 b).</td><td></td><td></td><td></td><td></td></tr>
<tr><td>b) Pilot forces used for design are assumed to act at the appropriate control grips or pads as they would in flight, and to react at the attachments of the control system to the control surface horns.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.397 – Loads resulting from limit pilot forces</td><td></td><td></td><td></td><td></td></tr>
<tr><td>a) In the control surface flight loading condition, the air loads on movable surfaces and the corresponding deflections need not exceed those that would result in flight from the application of any pilot force within the ranges specified in sub-paragraph b) of this paragraph. In applying this criterion, the effects of tabs must be considered.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>b) The limit pilot forces and torques are as follows:</td><td></td><td></td><td></td><td></td></tr>
<tr><td><table><tr><th>Control</th><th>Pilot force (N)</th><th>Method of application assuming single-lever control systems</th></tr><tr><td>Roll</td><td>200</td><td>Move handgrip of control stick sideways</td></tr><tr><td>Pitch</td><td>350</td><td>Push and pull handgrip of control stick</td></tr><tr><td>Yaw</td><td>900</td><td>Apply forward pressure on one rudder pedal</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>c) The rudder control system must be designed to a load of 1000 N per pedal acting simultaneously on both pedals in forward direction.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.399 – Dual control systems</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Dual control systems must be designed to withstand the loads resulting from each pilot applying 0.75 times the forces specified in ULA.397 b), with:

a) the pilots acting together in the same direction; and
b) the pilots acting in opposition.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.405 – Secondary control systems</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Secondary control systems such as those for landing gear retraction or extension, trim control, etc. must be designed for supporting the maximum forces that a pilot is likely to apply to those controls.</td><td></td><td></td><td></td><td></td></tr>
</table>

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.411 – Control system stiffness and stretch				
a) The amount of movement available to the pilot of any aerodynamic control surface may not, in any condition of flight, be excessively reduced by elastic stretch of the control circuits.				
b) For cable-operated systems, the allowable rigging tension in the cables must be established, taking into consideration the variations in temperature (see ULA.689) which may occur.				
HORIZONTAL STABILISING SURFACES				
ULA.421 – Balancing loads				
a) A horizontal stabilising surface balancing load is the load necessary to maintain equilibrium in any specified flight condition with no pitching acceleration.				
b) The horizontal stabilising surface must be designed for the balancing loads occurring at any point on the limit manoeuvring envelope and in the wing-flap positions as specified in ULA.333 and ULA.345.				
ULA.423 – Manoeuvring loads				
The horizontal stabilising surface must be designed for the most severe loads likely to occur in pilot-induced pitching manoeuvres, at all speeds up to V_D.				
ULA.425 – Gust loads				
In the absence of a more rational analysis, the incremental horizontal stabilising surface load due to the gust must be computed as follows: $\Delta L_{ht} = \frac{\rho_0 k_g U V a_{ht} S_{ht}}{2} \left(1 - \frac{d\varepsilon}{d\alpha}\right)$ Where: ΔL_{ht} = incremental horizontal stabilising surface load (N); ρ_0 = density of air at sea level (kg / m³); k_g = gust alleviation factor defined in ULA.341; U = gust velocity (m / s); V = airplane equivalent speed (m / s); a_{ht} = slope of horizontal stabilising surface lift curve per radian; S_{ht} = area of horizontal stabilising surface (m²); $\left(1 - \frac{d\varepsilon}{d\alpha}\right)$ = downwash factor.				
ULA.427 – Unsymmetrical loads				
The slipstream effect on fixed surfaces and on rudder loads must be accounted for if such loading is to be expected.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
VERTICAL STABILISING SURFACES				
ULA.441 – Manoeuvring loads				
The vertical stabilising surfaces must be designed for manoeuvring loads imposed by the following conditions: a) at speed V_A, full deflection of the rudder; b) at speed V_D, one third of full deflection of the rudder.				
ULA.443 – Gust loads				
a) The vertical stabilising surfaces must be designed to withstand lateral gusts of the values prescribed in ULA.333 c).				
b) In the absence of a more rational analysis, the gust load must be computed as follows: $L_{vt} = \frac{\rho_0 \, k_{gt} \, U \, V \, a_{vt} \, S_{vt}}{2}$ Where: L_{vt} = vertical stabilising surface load (N); ρ_0 = density of air at sea level (kg / m³); U = gust velocity (m / s); V = airplane equivalent speed (m / s); a_{vt} = slope of vertical stabilising surface lift curve per radian; S_{vt} = area of vertical stabilising surface (m²); k_{gt} = gust alleviation factor calculated from the following formula: $k_{gt} = \frac{0.88 \, \mu_{gt}}{5.3 + \mu_{gt}}$ where: μ_{gt} = lateral mass ratio: $\mu_{gt} = \frac{2 \, m}{\rho \, \bar{C}_t \, a_{vt} \, S_{vt}} \left(\frac{K}{l_{vt}}\right)^2$ where: m = mass of the airplane (kg); ρ = density of air (kg / m³) at the altitude considered; $\bar{C}_t$ = mean geometric chord of the vertical stabilising surface (m); K = radius of gyration in yaw (m); and L_{vt} = distance from airplane centre of gravity to lift centre of the vertical stabilising surface.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
SUPPLEMENTARY CONDITIONS FOR TAIL SURFACES				
ULA.447 – Combined loads on stabilising surfaces				
With the airplane in a loading condition corresponding to point A or D in the V-n diagram (whichever condition leads to the higher balance load) the loads on the horizontal stabilising surfaces must be combined with those on the vertical stabilising surfaces specified in ULA.441. It must be assumed that 75 % of the loads according to ULA.423 for the horizontal stabilising surfaces and ULA.441 for the vertical stabilising surfaces are acting simultaneously.				
ULA.449 – Additional loads applicable to V-tails				
An airplane with V-tail must be designed for a gust acting perpendicularly with respect to one of the tail surfaces at speed V_B.				
AILERONS				
ULA.455 – Ailerons				
The ailerons must be designed for control loads corresponding to the following conditions: a) at speed V_A the full deflection of the aileron; and b) at speed V_D one third of the full deflection of the aileron.				
GROUND LOADS				
ULA.471 – General				
The limit ground loads specified in this Section C must be considered to be external loads and inertia forces that act upon an airplane structure. In each specified ground load condition, the external reactions must be placed in equilibrium with the linear and angular inertia forces in a rational or conservative manner.				
ULA.473 – Ground loading conditions and assumptions				
a) The ground load requirements of this Section must be complied with at the design maximum weight.				
b) The selected limit vertical inertia load factor at the centre of gravity of the airplane for the ground load conditions prescribed in this Section may not be less than that obtained when landing with a vertical velocity (in m / s) of: $0.9\sqrt[4]{\frac{m}{S}}$ where: m = mass of the airplane (kg); S = design wing area (m^2), except that this velocity need not be more than 3 m / s and may not be less than 1.5 m / s.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) Wing lift not exceeding two thirds of the weight of the airplane may be assumed to exist throughout the landing impact and to act through the centre of gravity. The ground reaction load factor may be equal to the inertia load factor minus the ratio of the above assumed wing lift to the airplane weight.				
d) In the absence of load factors determined from drop testing, a limit vertical landing gear reaction factor of 3 must be used which may be based on static reactions for all the wheels in contact at touchdown.				
e) The minimum load factor used for design may not be less than 2.67 at maximum weight.				
ULA.477 – Landing gear arrangement				
Paragraphs ULA.479 to ULA.483 apply to airplanes with conventional arrangements of main and nose gear, or main and tail gear.				
ULA.479 – Level landing conditions				
a) For a level landing the airplane is assumed to be in the following flight attitudes: (1) For airplanes with tail wheels, a normal level flight attitude; (2) For airplanes with nose wheels, attitudes in which: (i) the nose and main wheels contact the ground simultaneously; and (ii) the main wheels contact the ground and the nose wheel is just clear of the ground.				
b) A drag component of not less than 25 % of the maximum vertical ground reactions (neglecting wing lift) must be properly combined with the vertical reactions.				
ULA.481 – Tail down landing conditions				
a) For a tail down landing, the airplane is assumed to be in the following attitudes: (1) For airplanes with tail wheels, an attitude in which the main and tail wheels contact the ground simultaneously. (2) For airplanes with nose wheels, a stalling attitude, or the maximum angle allowing ground clearance by each part of the aeroplane, whichever is less.				
b) For airplanes with either tail or nose wheels, ground reactions are assumed to be vertical, with the wheels up to speed before the maximum vertical load is attained.				
ULA.483 – One-wheel landing conditions				
For the one-wheel landing condition, the airplane is assumed to be in the level attitude and to contact the ground on one side of the main landing gear. In this attitude, the ground reactions must be the same as those obtained on that side under ULA.479.				
ULA.485 – Side load conditions				
a) For the side load condition, the airplane is assumed to be in a level attitude with only the main wheels contacting the ground, and with the shock absorbers and tyres in their static positions.				
b) The limit vertical load factor must be 1.33, with the vertical ground reaction divided equally between the main wheels.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) The limit side inertia factor must be 0.83, with the side ground reaction divided between the main wheels so that: (1) 0.5 (m g) is acting inboard on one side; and (2) 0.33 (m g) is acting outboard on the other side. Where: m = mass of the airplane (kg); g = acceleration due to gravity (m / s²).				
ULA.493 – Braked roll conditions				
Under braked roll conditions, with the shock absorbers and tyres in their static positions, the following apply: a) The limit vertical load factor must be 1.33.				
b) The attitudes and ground contacts must be those described in ULA.479 for level landings.				
c) A drag reaction equal to the vertical reaction at the wheel multiplied by a coefficient of friction of 0.8 must be applied at the ground contact point of each wheel with brakes, except that the drag reaction need not exceed the maximum value based on limiting brake torque.				
ULA.499 – Supplementary conditions for nose wheels				
In determining the ground loads on the nose wheel and affected supporting structures, and assuming that the shock absorbers and tyres are in their static positions, the following conditions must be met: a) For aft loads, the limit force components at the axle must be: (1) a vertical component of 2.25 times the static load on the wheel; and (2) a drag component of 0.8 times the vertical load.				
b) For forward loads, the limit force components at the axle must be: (1) a vertical component of 2.25 times the static load on the wheel; and (2) a forward component of 0.4 times the vertical load.				
c) For side loads, the limit force components at the ground contact must be: (1) a vertical component of 2.25 times the static load on the wheel; and (2) a side component of 0.7 times the vertical load.				
EMERGENCY LANDING CONDITIONS				
ULA.561 – General				
a) The airplane, although it may be damaged in emergency landing conditions, must be designed as prescribed in this paragraph to protect each occupant under those conditions.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) The structure must be designed to give each occupant every reasonable chance of escaping serious injury in a crash landing when proper use is made of belts and harnesses provided for in the design, in the following conditions: Each occupant experiences, separately, ultimate inertia forces corresponding to the accelerations shown in the following: upward: 4.5 g; forward: 9.0 g; sideward: 3.0 g; downward: 4.5 g.				
c) Each airplane with a retractable landing gear must be designed to protect each occupant in a landing with wheel(s) retracted under the following conditions: (1) a downward ultimate inertia force corresponding to an acceleration of 3 g; and (2) a coefficient of friction of 0.5 at the ground.				
d) Except as provided in ULA.787, the supporting structure must be designed to restrain, under loads up to those specified in sub-paragraph b) of this paragraph, each item of mass that could injure an occupant if it came loose in a minor crash landing.				
e) For an airplane with the engine located behind and | or above an occupants seat the engine mounting structure must be designed to withstand an ultimate inertial force in that direction corresponding to a load factor of 15 g.				
f) Fuel tanks must be capable of retaining their contents under the inertia conditions of sub-paragraph b) of this paragraph.				
OTHER LOADS				
ULA.597 – Loads from single masses				
The attachment means for all single masses, which are part of the equipment of the airplane (including ballast), must be designed to withstand loads corresponding to the maximum design load factors to be expected from the established flight and ground loads, including the emergency landing conditions of ULA.561.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section D - DESIGN AND CONSTRUCTION				
GENERAL				
ULA.601 – General				
The strength of any part having an important bearing on safety and which is not amenable to simple analysis must be established by test.				
ULA.603 – Materials				
The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must: a) be established by experience or tests; and b) meet specifications that ensure that they have the strength and other properties assumed in the design data.				
ULA.605 – Fabrication methods				
The methods of fabrication used must produce consistently sound structures which must be reliable with respect to maintaining the original strength under reasonable service conditions. If a fabrication process (such as gluing, spot welding, heat-treating, or processing of plastic materials) requires close control to reach this objective, the process must be performed under a defined process specification. Unconventional methods of fabrication must be substantiated by adequate tests.				
ULA.607 – Locking of connections				
a) An acceptable means of locking must be provided on all connecting elements in the primary structure and in control and other mechanical systems which are essential to safe operation of the airplane.				
b) In particular self-locking nuts may not be used on any bolt subject to rotation in operation, unless a non-friction locking device is used in addition to the self-locking device.				
ULA.609 – Protection of structure				
Each part of the structure must: a) be suitably protected against deterioration or loss of strength in service due to any cause, including: (1) weathering; (2) corrosion; and (3) abrasion; and				
b) have adequate provisions for ventilation and drainage.				
ULA.611 – Accessibility				
Means must be provided to allow inspection (including inspection of principal structural elements and control systems), close examination, repair, and replacement of each part requiring maintenance, adjustments for proper alignment and function, lubrication or servicing.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.612 – Provisions for rigging and de-rigging				
The design of the airplane must be such that during rigging and de-rigging by persons having no more than average skills, the probability of damage or permanent deformation, especially when this is not readily visible, is extremely remote. Incorrect assembly must be avoided by proper design provisions. It must be possible to inspect the airplane easily for correct rigging.				
ULA.613 – Material strength properties and design values				
a) Material strength properties must be based on enough tests of material meeting specifications to establish design values on a statistical basis.				
b) The design values must be chosen so that the probability of any structure being understrength because of material variations is extremely remote.				
c) Where the temperature attained in an essential component or structure in normal operating conditions has a significant effect on strength, that effect must be taken into account.				
ULA.619 – Special factors				
a) The factor of safety prescribed in ULA.303 must be multiplied by appropriate combinations of the special factors prescribed in ULA.619 b), ULA.621 to ULA.626, ULA.657 and ULA.693.				
b) For each part of the structure not covered by ULA.621 trough ULA.625, ULA.657 and ULA.693 but whose strength is: (1) uncertain; (2) likely to deteriorate in service before normal replacement; or (3) subject to appreciable variability because of uncertainties in manufacturing processes or inspection methods; the special factor must be chosen so that failure of the part due to inadequate strength is improbable.				
ULA.621 – Casting factors				
For castings the strength of which is substantiated by at least one static test and which are inspected by visual methods, a casting factor of 2.0 must be applied. This factor may be reduced to 1.25 providing the reduction is substantiated by tests on not less than three sample castings and if these and all production castings are subjected to an approved visual and radiographic inspection or an approved equivalent non-destructive inspection method.				
ULA.623 – Bearing factors				
a) The factor of safety for bearings at bolted or pinned joints must be multiplied by a special factor of 2.0 to provide for: (1) relative motion in operation; and (2) joints with clearance (free fit) subject to pounding and | or vibration.				
b) For control surface hinges and control system joints, compliance with the factors prescribed in ULA.657 and ULA.693, respectively, meets sub-paragraph a) of this paragraph.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.625 – Fitting factors				
For each fitting (a part or terminal used to join one structural member to another), the following apply: a) For each fitting whose strength is not proven by limit and ultimate load tests in which actual stress conditions are simulated in the fitting and surrounding structures, a fitting factor of at least 1.15 must be applied to each part of: (1) the fitting; (2) the means of attachment; and (3) the bearing on the joined members.				
b) No fitting factor need be used for joint designs based on comprehensive test data (such as continuous joints in metal plating, welded joints, and scarf joints in wood).				
c) For each integral fitting, the part must be treated as a fitting up to the point at which the section properties become typical of the member.				
d) Attachment points of each safety belt or harness to the main airplane structure must be shown by analysis, tests, or both, to be able to withstand at least 1.33 times the inertia forces corresponding to the emergency landing conditions of ULA.561.				
e) When using only two hinges at each control surface, or wing-flap, the safety factor for these hinges and the attached parts of the primary structure must be multiplied by a factor of 1.5.				
ULA.626 – Cable factor				
An ultimate factor of safety of 2.0 on nominal cable strength must be applied to cables used for structural applications and for all primary control systems.				
ULA.627 – Fatigue strength				
The structure must be designed, as far as practicable, to avoid points of stress concentration and high stresses, and to take account of the effects of vibration. Materials with poor crack propagation properties must be avoided and all assemblies, especially on the primary structure, shall be readily inspectable. Flexible paints or coatings shall not be used.				
ULA.629 – Flutter prevention and structural stiffness				
a) The airplane must be free from flutter, aerofoil divergence, and control reversal in each configuration and at each appropriate speed up to at least V_D. The control and stability of the airplane must not be dangerously sensitive to structural distortions and sufficient damping must be available at any appropriate speed so that aeroelastic vibration dies away rapidly.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) Compliance with sub-paragraph a) must be shown by: (1) systematic flight tests to induce flutter at speeds up to V_{DF}. These tests must show that there is no rapid reduction of damping as V_{DF} is approached; (2) flight tests to show that when approaching V_{DF}: (i) control effectiveness around all three axis is not decreasing in an unusually rapid manner; and (ii) no signs of approaching aerofoil divergence of wings, tailplane and fuselage result from the trend of the static stabilities and trim conditions.				
CONTROL SURFACES				
ULA.655 – Installation				
a) Movable control surfaces must be installed so that there is no interference between any surfaces or their bracings when one surface is held in any position and the others are operated through their full angular movement. This requirement must be met: (1) under limit load (positive or negative) conditions for all control surfaces through their full angular range; and (2) under limit load on the airplane structure other than the control surfaces.				
b) If an adjustable stabiliser is used, it must have stops that will limit its range of travel to that allowing safe flight and landings.				
ULA.657 – Hinges				
a) Control surface hinges, except ball and roller bearing hinges, must have a factor of safety of not less than 6.67 with respect to the ultimate bearing strength of the softest material used as a bearing.				
b) For ball and roller bearing hinges, the approved rating of the bearing may not be exceeded.				
c) Hinges must have enough strength and rigidity for loads parallel to the hinge line.				
ULA.659 – Mass balance				
The supporting structure and the attachment of concentrated mass balance weights used on control surfaces must be designed for: a) 24 g normal to the plane of the control surface; b) 12 g fore and aft; and c) 12 g parallel to the hinge line.				
CONTROL SYSTEMS				
ULA.671 – General				
Each control must operate easily, smoothly and positively enough to allow proper performance of its functions.				
ULA.675 – Stops				
a) Each control system must have adjustable stops that positively limit the range of motion of each movable aerodynamic surface controlled by the system.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) Each stop must be located so that wear, slackness, or take-up adjustments will not adversely affect the control characteristics of the airplane because of a change in the range of surface travel.				
c) Each stop must be able to withstand any loads corresponding to the design conditions for the control system.				
ULA.677 – Trim system				
a) Proper precautions must be taken to prevent inadvertent, improper, or abrupt trim operation. There must be means near the trim control to indicate to the pilot the direction of trim control movement relative to the airplane motion. In addition, there must be means to indicate to the pilot the position of the trim device with respect to the range of adjustment. This means must be visible to the pilot and must be located and designed to prevent confusion.				
b) Tab controls must be irreversible unless the tab is properly balanced and has no unsafe flutter characteristics. Irreversible tab systems must have adequate rigidity and reliability in the portion of the system from the tab to the attachment of the irreversible unit to the airplane structure.				
ULA.679 – Control system locks				
If there is a device to lock the control system on the ground, there must be a means to: a) give unmistakable warning to the pilot when the lock is engaged; and b) prevent the lock from engaging in flight.				
ULA.683 – Operation tests				
It must be shown by functional tests that the system designed to the loads specified in ULA.397 is free from: a) jamming; b) excessive friction; and c) excessive deformation; when operating the controls from the cockpit.				
ULA.685 – Control system details				
a) Each detail of each control system must be designed and installed to prevent jamming, chafing, and interference from baggage, passengers, loose objects, or the freezing of moisture.				
b) There must be means in the cockpit to prevent the entry of foreign objects into places where they would jam the system.				
c) There must be means to prevent the slapping of cables or rods against other parts.				
d) Each element of the flight control system must have design features, or must be distinctively and permanently marked, to minimise the possibility of incorrect assembly that could result in malfunctioning of the control system.				
ULA.687 – Spring devices				
The reliability of any spring device used in the control system must be established by tests simulating service conditions unless failure of the spring will not cause flutter or unsafe flight characteristics.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.689 – Cable systems				
a) Each cable, cable fitting, turnbuckle, splice, and pulley used must meet stated specifications. In addition: (1) no cable smaller than: (i) 2 mm diameter for 'basic' ultralight motorised airplanes; (ii) 3 mm diameter for 'exempted' ultralight motorised airplanes; may be used in primary control systems; (2) each cable system must be designed so that there will be no hazardous change in cable tension throughout the range of travel under operating conditions and temperature variations; and (3) there must be means for visual inspection at each fairlead, pulley, terminal, and turnbuckle.				
b) Each kind and size of pulley must correspond to the cable with which it is used. Each pulley must have closely fitted guards to prevent the cables from being misplaced or fouled, even when slack. Each pulley must lie in the plane passing through the cable so that the cable does not rub against the pulley flange.				
c) Fairleads must be installed so that they do not cause a change in cable direction of more than 3 degrees, except where tests or experience indicate that a higher value would be satisfactory. The radius of curvature of fairleads must not be smaller than the radius of a pulley for the same cable.				
d) Turnbuckles must be attached to parts having angular motion in a manner that will positively prevent binding throughout the range of travel.				
ULA.693 – Joints				
Control system joints (in push-pull systems) that are subject to angular motion, except those in ball or roller bearing systems, must have a special factor of safety of not less than 3.33 with respect to the ultimate bearing strength of the softest material used as a bearing. This factor may be reduced to 2.0 for joints in cable control systems. For ball or roller bearings, the approved ratings may not be exceeded.				
ULA.697 – Wing-flap controls				
a) Each wing-flap control must be designed so that, when the wing-flap has been placed in any position upon which compliance with the performance requirements is based, the wing-flap will not move from that position except when the control is adjusted, unless movement is demonstrated not to be hazardous.				
b) Each wing-flap must be designed to prevent inadvertent extension or movement. The pilot forces and the rate of movement at any approved flight speed must not be such as to impair the operating safety of the airplane.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.701 – Wing-flap interconnection				
The motion of wing-flaps on opposite sides of the plane of symmetry must be synchronized by a mechanical interconnection unless the airplane has safe flight characteristics with the wing-flaps retracted on one side and extended on the other.				
LANDING GEAR				
ULA.721 – General				
The landing gear must be so designed that the airplane can take off and land on short grass surfaces without endangering its occupants.				
COCKPIT DESIGN				
ULA.771 – General				
The cockpit and its equipment must allow each pilot to perform his duties without unreasonable concentration or fatigue.				
ULA.773 – Cockpit view				
Each cockpit must be designed so that: a) the pilot's field of view is sufficiently extensive, clear and undistorted for safe operation; and				
b) rain may not unduly impair his view along the flight path in normal flight and during landing.				
ULA.775 – Windshields and windows				
Windshields and windows, if fitted, must be constructed of a material that will not break into dangerous fragments or become opaque when damaged.				
ULA.777 – Cockpit controls				
a) Each cockpit control must be located to provide convenient operation, and to prevent confusion and inadvertent operation.				
b) The controls must be located and arranged so that each pilot, when properly secured by his safety harness, has full and unrestricted movement of each control without interference from either his clothing (including winter clothing) or from the cockpit structure.				
c) In airplanes with dual controls it must be possible to operate the following secondary controls from each of the two pilot's seats: (1) throttle lever(s); (2) wing-flaps; (3) trim; and (4) opening and jettisoning device of the canopy.				
d) Secondary controls must maintain any desired position without requiring constant attention by the pilot(s), and must not tend to creep under loads or vibration. Controls must have adequate strength to withstand operating loads without failure or excessive deflection.				

<table>
<tr><th>Requirement</th><th>Means of Compliance</th><th>Compliance Document</th><th>Remarks</th><th>Compliance Check</th></tr>
<tr><td>ULA.779 – Motion and effect of cockpit controls</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Cockpit controls must be designed so that they operate as follows:

a) For airplanes with 3-axis control systems:</td><td></td><td></td><td></td><td></td></tr>
<tr><td><table><tr><th>Controls</th><th>Motion and effect</th></tr><tr><td>Aileron</td><td>right (clockwise) for right wing down</td></tr><tr><td>Elevator</td><td>rearward for nose up</td></tr><tr><td>Rudder</td><td>right pedal forward for nose right</td></tr><tr><td>Trim</td><td>corresponding to sense of motion of the controls</td></tr><tr><td>Wing-flaps</td><td>pull for wing-flaps down or extended</td></tr><tr><td>Throttle control</td><td>forward to increase power</td></tr><tr><td>Propeller pitch</td><td>forward to increase rpm</td></tr><tr><td>Mixture</td><td>forward, or up for rich</td></tr><tr><td>Switches</td><td>down for off</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>b) For airplanes with other than 3-axis control systems the sense of motion of the primary controls must be defined in the Pilot’s Handbook. Secondary controls must comply with the sense of operation specified in ULA.779 a).</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.780 – Colour markings of cockpit controls</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Emergency controls must be coloured red.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.785 – Seats and safety harnesses</td><td></td><td></td><td></td><td></td></tr>
<tr><td>a) Each seat and its supporting structure must be designed for an occupant weight in accordance with ULA.25 a) (2) and for the maximum load factors corresponding to the specified flight and ground conditions, including the emergency landing conditions prescribed in ULA.561 b).</td><td></td><td></td><td></td><td></td></tr>
<tr><td>b) Seats including cushions may not deform under the flight loads of ULA.333 to such an extent that the pilot is unable to reach the controls safely, or that the wrong controls are operated.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>c) The strength of the safety harness must not be less than that following from the ultimate loads for the flight and ground load conditions and for the emergency landing conditions according to ULA.561 b) taking into account the geometry of the harness and seat arrangement.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>d) Each safety harness installation must be designed so that each occupant is safely retained in his initial sitting or reclining position under flight and emergency landing conditions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.786 – Protection from injury</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Rigid structural members or rigidly mounted items of equipment, must be padded where necessary to protect the occupant(s) from injury during minor crash conditions.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.787 – Baggage compartment</td><td></td><td></td><td></td><td></td></tr>
<tr><td>a) Each baggage compartment must be designed for its placarded maximum weight of contents and for the critical load distributions at the appropriate maximum load factors corresponding to the flight and ground load conditions of this Airworthiness Code.</td><td></td><td></td><td></td><td></td></tr>
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Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) Means must be provided to protect occupants from injuries by movement of the contents of baggage compartments under the ultimate inertia forces specified in ULA.561 b).				
ULA.807 – Emergency exit				
a) The cockpit must be so designed that unimpeded and rapid escape is possible in an emergency.				
b) Where the cockpit is enclosed, the opening system must be designed for simple and easy operation. It must function rapidly and be designed so that it can be operated by each occupant strapped in his seat and also from outside the cockpit. Reasonable provisions must be provided to prevent jamming by fuselage deformation.				
ULA.831 – Ventilation				
a) When there is an enclosed cockpit it must be designed so as to afford suitable ventilation under normal flying conditions.				
b) Carbon monoxide concentration must not exceed one part per 20 000 parts air.				
FIRE PROTECTION				
ULA.857 – Electrical bonding				
Electrical continuity must be provided to prevent the existence of differences of potential between components of the powerplant including fuel and other tanks, and other significant parts of the airplane which are electrically conductive.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section E - POWERPLANT				
GENERAL				
ULA.901 – Installation				
a) The powerplant installation includes each component that: (1) is necessary for propulsion; and (2) affects the safety of the propulsive unit.				
b) The powerplant must be constructed, arranged and installed to: (1) ensure safe operation; and (2) be accessible for necessary inspections and maintenance.				
c) Electrical interconnections must be provided to prevent differences of potential between major components of the powerplant installation and the rest of the airplane.				
ULA.902 – Compatibility				
The applicant must show that each combination of engine, exhaust system and propeller in an airplane, for which an authorisation is requested, is compatible with the airplane, functions in a satisfactory manner and can be operated safely within any limitations established under ULA.1505 and ULA.1521.				
ULA.903 – Engine				
The engine must meet the specifications of Section H.				
ULA.905 – Propeller				
The propeller must meet the specifications of Section J.				
ULA.925 – Propeller clearance				
Propeller clearances with the airplane at maximum weight, with the most adverse centre of gravity and with the propeller in the most adverse pitch position, may not be less than the following: a) *Ground clearance.* There must be adequate ground clearance between the propeller and the ground, with the landing gear statically deflected and in the level, normal take-off or taxying attitude, whichever is most critical. In addition, there must be positive clearance between the propeller and the ground in the level take-off attitude, with: (1) the critical tyre completely deflated and the corresponding landing gear strut statically deflected; and (2) the critical landing gear strut bottomed and the corresponding tyre statically deflected.				
b) *Structural clearance.* There must be adequate clearance between all rotating parts of the propeller and other parts of the airplane under all operating conditions with due allowance for airframe and propeller flexibility.				
c) *Clearance form occupant(s).* There must be adequate clearance between the occupant(s) and the propeller such that it is not possible for the occupant(s), when seated and strapped in, to contact the propeller inadvertently.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
FUEL SYSTEM				
ULA.951 – General				
a) Each fuel system must be constructed and arranged to ensure a flow of fuel at a rate and pressure established for proper engine functioning under any normal operating condition.				
b) Each fuel system must be arranged so that no fuel pump can draw fuel from more than one tank at a time. Gravity feed systems may not supply fuel to the engine from more than one tank at a time, unless the airspaces are interconnected in a manner to ensure that all interconnected tanks feed equally.				
c) The fuel system must be arranged to minimise the occurrence of vapour locks and to prevent the introduction of air into the system.				
ULA.955 – Fuel flow				
a) *Gravity systems.* The fuel flow rate for gravity systems (main and reserve supply) must be 150 % of the take-off fuel consumption of the engine.				
b) *Pump systems.* The fuel flow rate for each pump system (main and reserve supply) must be 125 % of the take-off fuel consumption of the engine at the maximum power established for take-off.				
ULA.959 – Unusable fuel				
The unusable fuel quantity for each tank must be established as not less than that quantity at which the first evidence of malfunctioning occurs under the most adverse fuel feed condition occurring under each intended operation and flight manoeuvre involving that tank. It shall not be greater than 5 % of the tank's capacity.				
ULA.963 – Fuel tanks: general				
a) Each fuel tank must be able to withstand, without failure, the vibration, inertia, fluid and structural loads that it may be subjected to in operation.				
b) Where surging of fuel within the tank could cause significant changes in the centre of gravity of the airplane, means must be provided to reduce the surging to within acceptable limits.				
ULA.965 – Fuel tank tests				
Each fuel tank must be able to withstand a pressure of 10 kPa without failure or leakage.				
ULA.967 – Fuel tank installation				
a) Each fuel tank must be supported so that the loads resulting from the weight of the fuel are not concentrated. In addition: (1) there must be pads, if necessary, to prevent chafing between each tank and its support; and (2) materials employed for supporting the tank or padding the supporting members must be non-absorbent or treated to prevent the absorption of fuel.				
b) Each tank compartment must be ventilated and drained to prevent the accumulation of flammable fluids and vapours. Each compartment adjacent to a tank must be treated in a similar manner.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) No fuel tank may be located where an engine fire could impinge on it.				
d) It must be demonstrated that the presence of the tank will in no way interfere with the operation of any part of the airplane, or the normal movement of the occupants, and that no leaking fuel will fall directly onto any occupant.				
e) Structural damage which may result from a heavy landing in excess of the ultimate capability of the landing gear but within the emergency landing conditions of ULA.561, must not result in rupture of the fuel tank or fuel lines.				
ULA.969 – Fuel tank expansion space				
Each fuel tank must have an expansion space of not less than 2 % of the tank capacity, unless the tank vent discharges clear of the airplane (in which case no expansion space is required). It must be impossible to fill the expansion space inadvertently with the airplane in the normal ground attitude.				
ULA.971 – Fuel tank sump				
a) Each fuel tank must have a drainable sump with an effective capacity, in the normal ground and flight attitudes, of 0.10 % of the tank capacity, or 120 cm^3, whichever is the greater, unless: (1) the fuel system has a sediment bowl or chamber that is accessible for drainage and has a capacity of 25 cm^3; and (2) each fuel tank outlet is located so that, in the normal ground attitude, water will drain from all parts of the tank to the sediment bowl or chamber.				
b) The drainage system must be readily accessible and easy to drain.				
c) Each fuel system drain must have manual or automatic means for positive locking in the closed position.				
ULA.973 – Fuel tank filler connection				
Each fuel tank must be vented from the top part of the expansion space. In addition:				
a) Each vent outlet must be located and constructed in a manner that minimises the possibility of it being obstructed by ice or other foreign matter;				
b) Each vent must be constructed to prevent siphoning of fuel during normal operation;				
c) Each vent must discharge clear of the airplane.				
ULA.977 – Fuel strainer of filter				
a) There must be a fuel filter between the fuel tank outlet and the carburettor inlet (or an engine driven fuel pump, if any).				
b) There must be a strainer at the outlet of each fuel tank.				
c) Each filter and strainer must be easily accessible for drainage and cleaning.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
FUEL SYSTEM COMPONENTS				
ULA.993 – Fuel system lines and fittings				
a) Each fuel line must be installed and supported to prevent excessive vibration and to withstand loads due to fuel pressure and accelerated flight conditions.				
b) Each fuel line connected to components between which relative motion could exist must have provisions for flexibility.				
c) Each flexible hose must be shown to be suitable for the particular application.				
d) Each fuel line and fitting in any area subject to engine fire conditions must be at least fire-resistant.				
e) Leakage from any fuel line or connection must not impinge on hot surfaces or equipment which could cause a fire, nor fall directly onto any occupant.				
ULA.995 – Fuel valves and controls				
a) There must be a means to allow the pilot to rapidly shut off, in flight, the fuel to the engine.				
b) The portion of the line between the fuel cock and the carburettor must be as short as possible.				
c) Each fuel cock must have either positive stops or effective detents in the ‘ON’ and ‘OFF’ positions.				
OIL SYSTEM				
ULA.1011 – General				
a) If an engine is provided with an oil system, it must be capable of supplying the engine with an appropriate quantity of oil at a temperature not exceeding the maximum established as safe for continuous operation.				
b) Each oil system must have a usable capacity adequate for the endurance of the airplane.				
ULA.1013 – Oil tanks				
a) Each oil tank must be installed to: (1) meet the requirements of ULA.967 a), b) and d); and (2) withstand any vibration; inertia and fluid loads expected in operation.				
b) The oil level must be easy to check without having to remove any cowling parts (with the exception of oil tank access covers) or to use any tools.				
c) If the oil tank is installed in the engine compartment it must be made of fireproof material.				
ULA.1015 – Oil tank tests				
Each oil tank must be able to withstand a pressure of 35 kPa without failure or leakage.				
ULA.1017 – Oil lines and fittings				
a) Oil lines must comply with ULA.993 and must accommodate a flow of oil at a rate and pressure adequate for proper engine functioning under any normal operating conditions.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) Each oil line and fitting must be made of fire-resistant material.				
c) *Breather lines.* Breather lines must be arranged so that: (1) condensed water vapour or oil that might freeze and obstruct the line cannot accumulate at any point; (2) the breather discharge will not constitute a fire hazard if foaming occurs or cause emitted oil to strike the occupant(s) or the pilot's wind shields; (3) the breather does not discharge into the engine air induction system.				
COOLING				
ULA.1041 – General				
The powerplant cooling provisions must be able to maintain the temperatures of powerplant components and engine fluids within the temperature limits established by the engine manufacturer, or as have been determined to be necessary by the airplane constructor, during all likely operating conditions.				
INDUCTION SYSTEM				
ULA.1091 – Air induction system				
The air induction system for the engine must supply the air required by the engine under all likely operating conditions.				
EXHAUST SYSTEM				
ULA.1121 – General				
a) The exhaust system must ensure safe disposal of exhaust gases without fire hazard or carbon monoxide contamination in any personnel compartment.				
b) Each exhaust system part with a surface hot enough to ignite flammable fluids or vapours must be located or shielded so that leakage from any system carrying flammable fluids or vapours will not result in a fire caused by impingement of the fluids or vapours on any part of the exhaust system, including shields for the exhaust system.				
c) Each exhaust system component must be separated by fireproof shields from adjacent flammable parts of the airplane that are outside the engine compartment.				
d) No exhaust gases may discharge dangerously near any oil or fuel system drain.				
e) Each exhaust system component must be ventilated to prevent points of excessively high temperature.				
ULA.1123 – Exhaust manifold				
a) Each exhaust system must be fireproof and corrosion resistant, and must have means to prevent failure due to expansion by operating temperatures.				
b) Each exhaust and silencing system must be supported to withstand the vibration and inertia loads to which it may be subjected in normal operation.				
c) Parts of the exhaust system connected to components between which relative motion could exist must have means for flexibility.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
POWERPLANT CONTROLS AND ACCESSORIES				
ULA.1141 – General				
a) Each control must be able to maintain any set position without: (1) constant attention by the pilot(s); or (2) tendency to creep due to control loads or vibration.				
b) The portion of each powerplant control located in the engine compartment that is required to be operated in the event of fire must be at least fire-resistant.				
ULA.1145 – Ignition switches				
a) A switch must be provided to enable each ignition circuit to be rendered inoperative.				
b) Each ignition circuit must be independently switched, and must not require the operation of any other switch for it to be made operative.				
c) Ignition switches must be arranged and designed to prevent inadvertent operation.				
d) The ignition switch must not be used as the master switch for other circuits.				
ULA.1149 – Propeller speed and pitch				
Propeller speed and pitch must be limited to values that ensure safe operation under normal operating conditions. a) During take-off and climb at the recommended best rate of climb speed, the propeller must limit the engine rotational speed at full throttle to a value not greater than the maximum allowable rotational speed.				
b) During a glide at VNE with throttle closed or the engine inoperative, the propeller must not permit a rotational speed to be achieved that is greater than 110 % of the maximum allowable rotational speed of the engine or propeller, whichever is the lower.				
ULA.1165 – Engine ignition systems				
Each battery ignition system must be supplemented by a generator that is automatically available as an alternative source of electrical energy to allow continued engine operation if any battery becomes depleted.				
POWERPLANT FIRE PROTECTION				
ULA.1191 – Firewalls				
a) Cowled engine installations must be isolated from the rest of the airplane by a firewall, shroud or equivalent means.				
b) The firewall or shroud must be constructed so that no hazardous quantity of liquid, gas or flame can pass from the engine compartment to other parts of the airplane.				
c) Each opening in the firewall or shroud must be sealed with close fitting, fireproof grommets, bushings or firewall fittings.				
d) The firewall and shroud must be fireproof and protected against corrosion.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.1193 – Cowling and nacelle				
When an engine installation is cowled: a) Each cowling must be constructed and supported so that it can resist any vibration, inertia and air loads to which it may be subjected in operation.				
b) There must be a means for rapid and complete drainage of each part of the cowling in the normal ground and flight attitudes. No drain may discharge where it will cause a fire hazard.				
c) The cowling must be at least fire-resistant.				
d) Each part behind an opening in the engine compartment cowling must be at least fire-resistant for a distance of at least 600 mm aft of the openings.				
e) Each part of the cowling subjected to high temperatures due to its nearness to exhaust system ports or exhaust gas impingement, must be fireproof.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section F - EQUIPMENT				
GENERAL				
ULA.1301 – Function and installation				
a) Each item of required equipment must: (1) be of a kind and design appropriate to its intended function; (2) be labelled as to its identification, function, or operating limitations, or any applicable combination of these factors; (3) be installed according to limitations specified for that equipment; and (4) function properly when installed.				
b) Instruments and other equipment may not in themselves, or by their effect upon the airplane, constitute a hazard to safe operation.				
ULA.1303 – Flight and navigation instruments				
The following are the required flight and navigation instruments: a) an airspeed indicator; b) an altimeter; and c) a magnetic direction indicator.				
ULA.1305 – Powerplant instruments				
The following are the required powerplant instruments: a) such pressure, temperature and rpm indications and | or warnings as the engine manufacturer may require or as necessary to operate the engine within its limitations; b) a fuel quantity indicator for each fuel tank, visible to each pilot when strapped in; c) an oil quantity indicator for each oil tank, e.g. dipstick; d) a manifold pressure indicator for an engine equipped with a variable pitch propeller, where manifold pressure and rotational speed are independently controllable.				
ULA.1307 – Miscellaneous equipment				
All occupants must be provided with a four- or five-point safety harness, capable of restraining the wearer against the forces resulting from the accelerations prescribed for emergency landing conditions in ULA.561.				
INSTRUMENTS: INSTALLATION				
ULA.1321 – Arrangement and visibility				
Each flight, navigation, and powerplant instrument must be clearly arranged and plainly visible to each pilot.				
ULA.1323 – Airspeed indicating system				
a) The airspeed indicating system must be calibrated to indicate true airspeed at sea level in standard atmosphere with a maximum pitot-static error not exceeding ±8 km / h or ±5 %, whichever is greater, through the following speed range: (1) 1.2 V_{S1} to V_{NE} with wing-flaps retracted; and (2) 1.2 V_{S1} to V_{FE} with wing-flaps extended.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) Calibration must be made in flight.				
c) The airspeed indicating system must be suitable for speeds between V_{S0} and at least 1.05 times V_{NE}.				
ULA.1325 – Pitot and static pressure systems				
a) Each instrument provided with static pressure case connections must be so vented that the influence of airplane speed, the opening and closing of windows, moisture or other foreign matter will not significantly affect the accuracy of the instruments.				
b) The design and installation of pitot and static pressure systems must be such that: (1) positive draining of moisture is provided; (2) chafing of the tubing, and excessive distortion or restriction at bends in the tubing, is avoided; and (3) the materials used are durable, suitable for the purpose intended, and protected against corrosion.				
ULA.1327 – Magnetic direction indicator				
a) The magnetic direction indicator required must be installed so that its accuracy is not excessively affected by the airplane's vibration or magnetic fields.				
b) The compensated installation must not have a deviation in level flight, greater than 10 degrees on any heading.				
ULA.1337 – Powerplant instruments				
a) *Instruments and instrument lines* (1) Each powerplant instrument line must meet the requirements of ULA.993. (2) Each line carrying flammable fluids under pressure must have restricting orifices or other safety devices at the source of pressure to prevent the escape of excessive fluid if the line fails.				
b) *Fuel quantity indicator.* Each exposed sight gauge used as a fuel quantity indicator must be protected against damage.				
ELECTRICAL SYSTEMS AND EQUIPMENT				
ULA.1353 – Storage battery design and installation				
a) Each storage battery must be designed and installed as prescribed in this paragraph.				
b) No explosive or toxic gases emitted by any battery in normal operation, or as the result of any probable malfunction in the charging system or battery installation, may accumulate in hazardous quantities within the airplane.				
c) No corrosive fluids or gases that may escape from the battery may damage surrounding structures or adjacent essential equipment.				
ULA.1365 – Electric cables and equipment				
a) Each electric connecting cable must be of adequate capacity and correctly routed, attached and connected so as to minimise the probability of short circuits and fire hazards.				
b) Overload protection must be provided for each item of electrical equipment. No protective device may protect more than one circuit essential to flight safety.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
LIGHTS				
ULA.1385 – External lights				
If external lights are to be installed they must be approved.				
MISCELLANEOUS EQUIPMENT				
ULA.1431 – Airborne radio and radio navigation equipment				
Each item of airborne radio equipment provided must comply with the following: a) The equipment and its aerials may neither in themselves, nor by their mode of operation or by their effect upon the operating characteristics of the airplane and its equipment, constitute a hazard to safe operation.				
b) The equipment and its control and monitoring devices must be arranged so as to be easily controllable. Their installation must be such that they are sufficiently ventilated to prevent overheating.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section G - OPERATING LIMITATIONS AND INFORMATION				
GENERAL				
ULA.1501 – General				
a) Each operating limitation specified in ULA.1505 to ULA.1521 and other limitations and information necessary for safe operation must be established.				
b) The operating limitations and other information necessary for safe operation must be made available to the pilot as prescribed in ULA.1541 to ULA.1585.				
OPERATING LIMITATIONS				
ULA.1505 – Airspeed limitations				
a) All flight speeds must be stated in terms of airspeed indicator readings (IAS).				
b) The never exceed speed, V_{NE}, must not exceed 0.90 times the maximum speed demonstrated in flight tests, V_{DF}.				
c) The maximum speed demonstrated in flight, V_{DF}, must not exceed the design maximum speed, V_D.				
ULA.1507 – Manoeuvring speed				
The manoeuvring speed must not exceed the design manoeuvring speed, V_A, as defined in ULA.335 a).				
ULA.1511 – Wing-flap operating speed				
For each positive wing-flap position, the maximum wing-flap operating speed, V_{FE}, must not be greater than 0.9 times the speed V_F as defined in ULA.335 for which the structure has been designed.				
ULA.1515 – Landing gear operating speed				
The maximum landing gear operating speed, V_{LO}, if lower than the never exceed speed V_{NE}, must be established for retractable landing gear.				
ULA.1517 – Rough air speed				
The rough air speed, V_{RA}, may not exceed the design gust speed in free flight V_B as defined in ULA.335.				
ULA.1519 – Weight and centre of gravity				
a) The maximum weight determined under ULA.25 a) must be established as an operating limitation.				
b) The centre of gravity limitations determined under ULA.23 must be established as operating limitations.				
c) The empty weight and the corresponding centre of gravity positions must be determined in accordance with ULA.29.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.1521 – Powerplant limitations				
The powerplant limitations must be established so that they do not exceed the corresponding limits specified by the engine and propeller manufacturers, except that where the airplane constructor has satisfactorily demonstrated that higher limitations can be used safely in the airplane, these may be stated.				
ULA.1527 – Maximum operating altitude				
The maximum altitude up to which operation is allowed, as limited by flight, structural, powerplant, functional, or equipment characteristics, must be established.				
ULA.1529 – Maintenance manual				
A maintenance manual containing the information that the applicant considers essential for proper maintenance must be provided. The applicant must consider at least the following in developing the essential information: a) description of systems; b) lubrication instructions setting forth the frequency and the lubricants and fluids which are to be used in the various systems; c) pressures and electrical loads applicable for the various systems; d) tolerances and adjustments necessary for proper functioning, including control surface travels; e) methods of levelling, raising and ground towing; f) methods of balancing control surfaces, and maximum permissible values of play at hinge pins and control circuit backlash; g) identification of primary and secondary structures; h) frequency and extent of inspections necessary for proper maintenance; i) special repair methods applicable to the airplane; j) special inspection techniques; k) list of special tools; l) rigging data necessary for proper operation; m) statement of service life limitations (replacement or overhaul) of parts, components and accessories subject to such limitations; n) the materials necessary for small repairs; o) care and cleaning recommendations; p) instructions for rigging and de-rigging; q) information on supporting points and measures to be taken to prevent damage during ground transportation; r) instructions for weighing the airplane and determining the actual centre of gravity; and s) list of placards and markings and their locations.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
MARKINGS AND PLACARDS				
ULA.1541 – General				
a) The airplane must be marked with: (1) the markings and placards specified in ULA.1542 to ULA.1557; and (2) any additional information, instrument markings, and placards required for safe operation.				
b) Each marking and placard prescribed in sub-paragraph a) of this paragraph: (1) must be displayed in a conspicuous place; and (2) may not easily be erased, disfigured, or obscured.				
c) The units of measurement used to indicate airspeed on placards must be the same as those used on the indicator.				
ULA.1542 – Operating limitations placard				
The following information must be placarded so that it is plainly visible to the pilot: a) Airspeed limitations: (1) the never exceed speed, V_{NE}; and, if appropriate, (2) the maximum speed(s) for wing-flaps extended, V_{FE}; (3) the maximum speed for the landing gear extended, V_{LO}; (4) the maximum manoeuvring speed, V_A.				
b) Powerplant limitations: such pressure, temperature, rpm and other limitations as may have been determined under ULA.1521.				
ULA.1543 – Instrument markings: general				
For each instrument: a) when markings are on the cover glass of the instrument, there must be means to maintain the correct alignment of the glass cover with the face of the dial; and				
b) each arc and line must be wide enough and located to be clearly visible to the pilot.				
ULA.1545 – Airspeed indicator				
The airspeed indicator must show the following markings: a) for the never exceed speed V_{NE}, a red radial line; b) for the caution range, a yellow arc extending from V_{NE} to the allowable rough air speed V_{RA}; c) for the normal operating range, a green arc with the lower limit at 1.1 V_{S1} and the upper limit at the rough air speed V_{RA}; d) for the wing-flap operating range, a white arc with the lower limit at the stall speed 1.1 V_{S0} and the upper limit at the allowable wing-flaps extended speed V_{FE}; e) for the manoeuvring speed V_A, a yellow radial line.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.1547 – Compass				
Unless the deviation is less than 5 degrees on all headings, the deviation values for magnetic headings in not more than 30 degree increments must be placarded near the compass.				
ULA.1549 – Powerplant instruments				
For each required powerplant instrument, as appropriate to the type of instrument: a) each maximum and, if applicable, minimum safe operating limit must be marked with a red radial or a red line; b) each normal operating range must be marked with a green arc or green line, not extending beyond the maximum and minimum safe limits; c) each take-off and precautionary range must be marked with a yellow arc or a yellow line; d) each engine range that is restricted because of excessive vibration stresses must be marked with red arcs or red lines.				
ULA.1551 – Oil quantity indicator				
Each oil quantity indicator must be marked to clearly indicate the maximum and minimum quantity of oil that is acceptable.				
ULA.1553 – Fuel quantity indicator				
Each fuel quantity indicator must be calibrated to read 'zero' during level flight, when the quantity of fuel remaining in the tank is equal to the unusable quantity determined in accordance with ULA.959.				
ULA.1555 – Control markings				
a) Each cockpit control, other than primary flight controls, must be clearly marked as to its function and method of operation.				
b) The colour markings of cockpit controls must be in accordance with those specified in ULA.780.				
c) For powerplant fuel controls: (1) each fuel tank selector control must be marked to indicate the position corresponding to each tank; and (2) if safe operation requires the use of any tanks in a specific sequence, that sequence must be marked on or near the selector for those tanks.				
ULA.1557 – Miscellaneous markings and placards				
a) *Baggage compartment.* Each baggage compartment must have a placard stating the loading limitations.				
b) *Fuel and oil filler openings.* The following apply: (1) Fuel filler openings must be marked at or near the filler cover with the minimum fuel grade and if applicable the fuel | oil ratio. (2) Oil filler openings must be marked at or near the filler cover: (i) with the grade; and (ii) if the oil is detergent or nondetergent.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) *Fuel tanks.* The usable fuel capacity of each tank must be marked either at the selector or on the gauge (when provided), or on the tank if this is translucent and visible to the pilot in flight.				
d) *In-flight engine starting.* A placard must be provided stating any limitations to be observed during in-flight engine starting.				
e) *Loading.* (1) *Placards.* The following data must be placarded in each airplane so that they are plainly visible to the pilot: (i) empty weight (actual); (ii) maximum weight; (iii) maximum and minimum cockpit load; (iv) maximum and minimum load in each seat; (v) cockpit load conditions for two seater flown solo; and (vi) fuel load limitations for the range of allowable cockpit loads. (2) *Removable ballast.* If removable ballast is used, the place for carrying ballast must have a placard stating instructions for the proper placement and securing of the removable ballast under each loading condition for which removable ballast is necessary.				
f) *Aerobatic manoeuvres.* A placard prohibiting aerobatic manoeuvres and intentional spinning must be plainly visible to the pilot.				
PILOT'S HANDBOOK				
ULA.1581 – General				
a) Each airplane must be furnished with a Pilot's Handbook. Each Pilot's Handbook must contain at least: (1) the information specified in ULA.1583 to ULA.1585; (2) *additional information.* Any information not specified in ULA.1583 to ULA.1585 that is required for safe operation because of unusual design, operating or handling characteristics.				
b) *Units.* The units of measurement used in the Pilot's Handbook must be the same as those used on the indicators.				
ULA.1583 – Operating limitations				
a) *Airspeed limitations.* The following limitations must be furnished: (1) the airspeed limits V_{NE}, V_{RA}, V_A and, if appropriate, V_{FE} and V_{LO} together with information on the significance of those limits; (2) maximum wind limitations; (3) airspeed indicator system calibration.				
b) *Powerplant limitations.* The following information must be furnished: (1) limitations required by ULA.1521; (2) information necessary for marking the instruments required by ULA.1549 to ULA.1553; (3) fuel and oil designation.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) *Weights.* The following limitations must be furnished: (1) the maximum weight; (2) the empty weight and the position of the empty weight centre of gravity; (3) the composition of the useful load.				
d) *Loading.* The following limitations must be furnished: (1) the weight and centre of gravity limits required by ULA.23 and ULA.25 together with the items included in the empty weight in ULA.29; (2) information enabling the pilot of the airplane to determine whether the centre of gravity and the distribution of the useful load in the different loading combinations are still within the allowable range; (3) information for the proper placement of removable ballast under each loading condition for which removable ballast is necessary.				
e) *Manoeuvres.* Authorised manoeuvres established in accordance with ULA.3, together with permissible ranges of wing-flap position for these manoeuvres.				
f) *Flight load factors.* The following positive load factors must be furnished: (1) the factor corresponding to Point A of Figure 1 of ULA.333 b) to be stated to be applicable at V_A; (2) the factor corresponding to Point D of Figure 1 of ULA.333 b) to be stated to be applicable at V_{NE}.				
g) *Kinds of operation.* The kind of operation, e.g. day VFR, in which the airplane may be used, must be stated. The minimum equipment required for operation must be listed.				
h) *Placards.* Placards required by ULA.1555 and ULA.1557 must be furnished.				
i) *Altitude.* The altitude established under ULA.1527 must be furnished.				
j) *Controls.* The sense of movement of the pilot's controls and the corresponding movements of the control surfaces must be furnished.				
ULA.1585 – Operating procedures				
a) Information concerning normal and emergency procedures and other pertinent information necessary for safe operation must be furnished.				
b) The techniques to achieve safe take-off and landing and the associated distances determined under ULA.53 and ULA.75 must be furnished together with advice on the techniques to be used in crosswinds. A statement must be made of the maximum crosswind components in which take-off and landing have been demonstrated and whether control was found to be limiting. Information must be provided on a safe technique for landing with the power off.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) The following information must be furnished: (1) the best rate of climb speed, which must not be less than that used to show compliance with ULA.65; (2) the height lost against ground distance covered, engine-off, in still air; (3) the stall speed in various configurations; (4) the loss of altitude from the beginning of a straight stall until regaining level flight, and the maximum pitch angle below the horizon, as determined under ULA.201; (5) the loss of altitude from the beginning of a turning flight stall until regaining level flight as determined under ULA.203.				
d) If special procedures are necessary to start the engine in flight, these must be furnished.				
e) Information must be provided on safe procedures for the assembly, rigging and disassembly likely to be undertaken by the pilot before and after flight, such that inadvertent damage to the airplane can be avoided.				
f) Procedures must be provided for the amendment of the empty weight and composition of the useful load limitations in the Pilot's Handbook and placards, including maximum fuel load to be carried, following periodic weighing of the airplane.				
g) Information must be provided on safe procedures for securing and ground handling of the airplane.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section H - ENGINES				
GENERAL				
ULA.1801 – Applicability				
This Section H is applicable to spark- and compression-ignition engines for ultralight motorised airplanes.				
ULA.1805 – Instruction manual				
An instruction manual containing the information that the applicant considers essential for installing, operating, servicing and maintaining the engine must be provided.				
ULA.1807 – Engine ratings and operating limitations				
Engine ratings and operating limitations must be established based on the operating conditions demonstrated during the bench tests prescribed in this Section H. These include power ratings and operational limitations relating to speeds, temperatures, pressures, fuels and oils which the applicant finds necessary for the safe operation of the engine.				
DESIGN AND CONSTRUCTION				
ULA.1815 – Materials				
The suitability and durability of materials used in the engine must: a) be established on the basis of experience or tests; and b) conform to specifications that ensure they have the strength and other properties assumed in the design data.				
ULA.1817 – Fire prevention				
a) The design and construction of the engine and the materials used must minimise the probability of the occurrence and spread of fire because of structural failure, overheating or other causes.				
b) Each external line or fitting that conveys flammable fluids must be at least fire resistant. Components must be shielded or located to safeguard against the ignition of leaking flammable fluid.				
ULA.1819 – Durability				
Engine design and construction must minimise the probability of occurrence of an unsafe condition of the engine between overhauls.				
ULA.1821 – Engine cooling				
Engine design and construction must provide the necessary cooling under conditions in which the airplane is expected to operate.				
ULA.1823 – Engine mounting attachments and structure				
a) The maximum allowable loads for engine mounting attachments and related structure must be specified.				
b) The engine mounting attachments and related structure must be able to withstand the specified loads without failure, malfunction or permanent deformation.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.1825 – Accessory attachment				
Each accessory drive and mounting attachment must be designed and constructed so that the engine will operate properly with the accessories attached. The design of the engine must allow the examination, adjustment or removal of each essential engine accessory.				
ULA.1833 – Vibration				
The engine must be designed and constructed to function throughout its normal operation range of crankshaft rotational speeds and engine powers without inducing excessive stress in any of the engine parts because of vibration and without imparting excessive vibration forces to the structure of the airplane.				
ULA.1835 – Fuel and induction system				
a) The fuel system of the engine must be designed and constructed to supply the appropriate mixture of fuel to the combustion chambers throughout the complete operating range of the engine under all starting, flight and atmospheric conditions.				
b) The intake passages of the engine through which air, or fuel in combination with air, passes must be designed and constructed to minimise ice accretion and vapour condensation in those passages. The engine must be designed and constructed to permit the use of a means for ice prevention.				
c) The type and degree of fuel filtering necessary for protection of the engine fuel system against foreign particles in the fuel must be specified. The applicant must show (e.g. within the 50 hour run prescribed in ULA.1849 a)) that foreign particles passing through the prescribed filtering means will not critically impair engine fuel system functioning.				
d) Each passage in the induction system that conducts a mixture of fuel and air, and in which fuel may accumulate, must be self-draining to prevent a liquid lock in the combustion chambers. This applies to all attitudes that the applicant establishes as those the engine can have when the airplane in which it is installed is in the static ground attitude.				
ULA.1839 – Lubrication system				
a) The lubrication system of the engine must be designed and constructed so that it will function properly in all attitudes and atmospheric conditions in which the airplane is expected to operate. In wet-sump engines this requirement must be met when the engine contains only the minimum oil quantity, the minimum quantity being not more than half the maximum quantity.				
b) The lubrication system of the engine must be designed and constructed to allow installing a means of cooling the lubricant.				
c) The crankcase must be vented to preclude leakage of oil form excessive pressure in the crankcase.				

<table>
<tr><th>Requirement</th><th>Means of Compliance</th><th>Compliance Document</th><th>Remarks</th><th>Compliance Check</th></tr>
<tr><td>BENCH TESTS</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.1843 – Vibration test</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Except where the engine is of a type of construction known not to be prone to hazardous vibration, the engine must undergo a vibration survey to establish crankshaft torsional and bending characteristics over a range of rotational speeds from idling to 110 % of the maximum continuous speed or 103 % of the maximum desired take-off speed, whichever is the greater. The survey must be conducted with a representative propeller. No hazardous condition may be present.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.1845 – Calibration test</td><td></td><td></td><td></td><td></td></tr>
<tr><td>The engine must be subjected to the calibration tests necessary to establish its power characteristics and the conditions for the endurance test specified in ULA.1849 a) to c). The results of the power characteristics calibration tests form the basis for establishing the characteristics of the engine over its entire operating range of crankshaft rotational speeds, manifold pressures, and fuel | air mixture settings. Power ratings are based on standard atmospheric conditions at sea level.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.1847 – Detonation test (spark ignition engines only)</td><td></td><td></td><td></td><td></td></tr>
<tr><td>The engine must be tested to establish that it can function without detonation throughout the range of intended conditions of operation.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ULA.1849 – Endurance test</td><td></td><td></td><td></td><td></td></tr>
<tr><td>a) The engine must be subjected to an endurance test (with a representative propeller) that includes a total of 50 hours of operation and consists of the cycles specified in ULA.1849 c).</td><td></td><td></td><td></td><td></td></tr>
<tr><td>b) Additional endurance testing at particular rotational speed(s) may be required depending on the results of the tests prescribed in ULA.1843, to establish the ability of the engine to operate without fatigue failure.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>c) Each cycle must be conducted as follows:</td><td></td><td></td><td></td><td></td></tr>
<tr><td>
<table>
<tr><th>Sequence</th><th>Duration (minutes)</th><th>Operating conditions</th></tr>
<tr><td>1</td><td>5</td><td>Starting -idle</td></tr>
<tr><td>2</td><td>5</td><td>Take-off power</td></tr>
<tr><td>3</td><td>5</td><td>Cooling run (idle)</td></tr>
<tr><td>4</td><td>5</td><td>Take-off power</td></tr>
<tr><td>5</td><td>5</td><td>Cooling run (idle)</td></tr>
<tr><td>6</td><td>5</td><td>Take-off power</td></tr>
<tr><td>7</td><td>5</td><td>Cooling run (idle)</td></tr>
<tr><td>8</td><td>15</td><td>75 % of maximum continuous power</td></tr>
<tr><td>9</td><td>5</td><td>Cooling run (idle)</td></tr>
<tr><td>10</td><td>60</td><td>Maximum continuous power</td></tr>
<tr><td>11</td><td>5</td><td>Cooling run and stop</td></tr>
<tr><td>Total:</td><td>120</td><td></td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td>d) During or following the endurance test the fuel and oil consumption must be determined.</td><td></td><td></td><td></td><td></td></tr>
</table>

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.1851 – Operation test				
The operation test must include the demonstration of backfire characteristics, starting, idling, acceleration, overspeeding and any other operational characteristics of the engine.				
ULA.1853 – Engine component test				
a) For engine components that cannot be adequately substantiated by endurance testing in accordance with ULA.1849 a) to c), the applicant must conduct additional tests to establish that components are able to function reliably in all normally anticipated flight and atmospheric conditions.				
b) Temperature limits must be established for each component that requires temperature controlling provisions to ensure satisfactory functioning, reliability and durability.				
ULA.1855 – Teardown inspection				
After the endurance test has been completed the engine must be completely disassembled. No essential component may show rupture, cracks or excessive wear.				
ULA.1857 – Engine adjustment and parts replacement.				
The applicant may service and make minor repairs to the engine during the bench tests. If major repairs or replacement of parts is found necessary during the tests or in the teardown inspection, any additional tests that the BCAA finds necessary must be conducted.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section J - PROPELLERS				
GENERAL				
ULA.1901 – Applicability				
This Section J is applicable to propellers for ultralight motorised airplanes.				
ULA.1903 – Instruction manual				
An instruction manual containing the information that the applicant considers essential for installing, servicing and maintaining the propeller must be provided.				
ULA.1905 – Propeller operating limitations				
Propeller operating limitations must be established based on the operating conditions demonstrated during the tests specified in this Section J.				
DESIGN AND CONSTRUCTION				
ULA.1917 – Materials				
The suitability and durability of materials used in the propeller must: a) be established on the basis of experience or tests; and b) conform to specifications that ensure they have the strength and other properties assumed in the design data.				
ULA.1919 – Durability				
Propeller design and construction must minimise the possibility of the occurrence of an unsafe condition of the propeller between overhauls.				
ULA.1923 – Pitch control				
a) Failure of the propeller pitch control may not cause hazardous overspeeding under intended operation conditions.				
b) If the propeller can be feathered the control system must be designed to minimise: (1) consequential hazards, such as a propeller runaway resulting from malfunction or failure of the control system; (2) the possibility of an unintentional operation.				
TESTS AND INSPECTIONS				
ULA.1935 – Blade retention test				
The hub and blade retention arrangement of propellers with detachable blades must be capable of withstanding a load equal to twice the centrifugal force occurring at the maximum rotational speed (other than transient overspeed) for which an authorisation is requested, or the maximum governed rotational speed, as appropriate.				
ULA.1937 – Vibration load limit test				
The vibration load limits of each metal hub and blade, and of each primary load-carrying metal component of non-metallic blades, must be determined for all reasonably foreseeable vibration load patterns.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ULA.1939 – Endurance test				
a) *Fixed-pitch or ground-adjustable wood or metal propellers.* Fixed-pitch or ground-adjustable wood or metal propellers must be subjected to one of the following tests: (1) A 50 hour flight test in level flight or in climb. At least five hours of this flight test must be with the propeller at the rated rotational speed and the remainder of the 50 hours must be with the propeller operated at not less than 90 % of the rated rotational speed. (2) A 50 hour endurance bench test on an engine at the power and propeller rotational speed for which an authorisation is requested.				
b) *Variable pitch propellers.* Wood or metal variable pitch propellers (propellers the pitch of which can be changed by the pilot or by automatic means while the propeller is rotating) must be subjected to one of the following tests: (1) A 50 hour test on an engine with the same power and rotational speed characteristics as the engine with which the propeller is to be used. The test must be made at the maximum continuous rotational speed and power rating of the propeller. If a take-off performance greater than the maximum continuous rating is to be established, an additional 10 hour bench test must be made at the maximum power and rotational speed for the take-off rating. (2) Operation of the propeller throughout the engine endurance tests prescribed in Section H.				
ULA.1941 – Functional tests				
a) Each variable pitch propeller must be subjected to all applicable functional tests of this paragraph. The same propeller used in the endurance test must be used in the functional test and must be driven by an engine on a test stand or on a ground running airplane.				
b) *Manually controllable propellers.* Not less than 50 complete cycles of control throughout the pitch and rotational speed ranges, excluding the feathering range.				
c) *Automatically controllable propellers.* Not less than 150 complete cycles of control throughout the pitch and rotational speed ranges, excluding the feathering range.				
ULA.1945 – Teardown inspection				
After the endurance test has been completed the propeller must be completely disassembled. No essential component may show rupture, cracks or excessive wear.				
ULA.1947 – Propeller adjustments and parts replacement				
The applicant may service and make minor repairs to the propeller during the tests. If major repairs or replacement of parts is found necessary during the tests or in the teardown inspection, any additional tests that the BCAA finds necessary must be conducted.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
# Annex 1 - GLIDER TOWING				
## A. GENERAL				
### A.1. Aerotow				
An aerotow consists of a towing ultralight motorised airplane with aerotowing equipment, and the towed glider.				
### A.2. Aerotowing Equipment				
The aerotowing equipment usually consists of the following components: a) an aerotowing hook; b) a release control; c) a measuring device for measuring the critical engine temperature; d) a device for observing the glider being towed; and e) an aerotowing cable with weak link(s).				
## B. FLIGHT				
### B.1. Proof of compliance				
For proof of compliance with the requirements of Section B of the Belgian Airworthiness Code for Ultralight Motorised Airplanes during the aerotowing of gliders by ultralight motorised airplanes, tests with at least three representative glider types covering the whole permissible range of aerotowed gliders should be conducted. During these tests, the weights of the ultralight motorised airplane and of the glider, the aerodynamic characteristics, speed range and ground handling characteristics should be combined appropriately so as to obtain conservative results.				
### B.2. Take-off				
The take-off distance of the aerotow at maximum weight and in zero wind, from rest to attaining a height of 15 m must be determined when taking off from a dry, level, short grass surface under normal conditions, and must not exceed 600 m. Compliance must be shown at 450 m above sea level.				
### B.3. Climb				
The time for climb from leaving the ground up to 360 m above the field must be determined and must not exceed four minutes with: a) not more than take-off power; b) the landing gear retracted; c) the maximum weight; d) the cowl flaps (if any) in the position for climb; and without exceeding any temperature limits established under ULA.1041. Compliance must be shown at 450 m above sea level.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
B.4. Aerotowing speeds				
The minimum aerotowing speed and the aerotowing speed for the best rate of climb must be determined by flight test. The minimum aerotowing speed must not be less than 1.3 V_{S1} of either the towing ultralight motorised airplane or the towed glider, whichever is higher.				
B.5. Aerotowing				
a) Compliance with the following requirements must be shown: (1) With the glider on tow in the normal towing position it must be displaced laterally relative to the towing ultralight motorised airplane by the use of rudder and aileron, to give an initial disturbance in bank of 30 degrees. The pilot of the towing ultralight motorised airplane must then be able to regain the normal towing position without exceptional piloting skill.				
(2) The glider must be flown in a high towing position (approximately 15 degrees above the flight path of the towing ultralight motorised airplane), and also in a low towing position (below the wake of the towing ultralight motorised airplane). In each case the pilot of the towing ultralight motorised airplane must be able to regain the normal towing position without exceptional piloting skill.				
(3) In conditions associated with the early stages of the aerotow, any pitching tendency of the glider must be immediately controllable, without exceptional piloting skill, under any combinations of allowable towing conditions.				
b) A suitable range of tow cable lengths must be determined.				
B.6. Stall warning				
An audible artificial stall warning giving a clear and distinctive indication must be provided for the towing ultralight motorised airplane, unless the stall warning is sufficiently clear and distinctive for the pilot, even under the additional work load when towing.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
C. STRUCTURE				
C.1. Towing loads				
a) It must be assumed that the aerotow initially is in stabilised level flight and that an aerotowing cable load of 500 N (in the absence of a more rational analysis) acts at the aerotowing hook in the following directions: (1) rearwards, in the direction of the fuselage longitudinal axis; (2) in the plane of symmetry rearwards and downwards at an angle of 20 degrees to the fuselage longitudinal axis; (3) in the plane of symmetry rearwards and upwards at an angle of 40 degrees to the fuselage longitudinal axis; (4) rearwards and sidewards at an angle of 30 degrees to the fuselage longitudinal axis.				
b) It must be assumed that the aerotow is initially subjected to the same conditions as defined in paragraph C.1.a) and the cable load due to surging suddenly increases to 1.0 Q_{NOM}. (1) The resulting cable load increment must be balanced by linear and rotational inertia forces. These additional loads must be superimposed on those arising from the conditions of paragraph C.1.a). (2) Q_{NOM} is the rated ultimate strength of the weak links to be used for the aerotowed gliders and shown to be suitable in operation.				
C.2. Strength of aerotowing hook attachment				
The aerotowing hook attachment must be designed to carry a limit load of 1.5 Q_{NOM} as defined in paragraph C.1.b) acting in the directions specified in paragraph C.1.a) of this Section.				
DESIGN AND CONSTRUCTION				
D.1. Release mechanisms				
a) The release mechanisms must be approved.				
b) It must be shown that the release force will not exceed that prescribed in ULA.143 d) when a cable load Q_{NOM} is applied in any direction (see paragraph C.1.a)), and that the release mechanism functions properly under any operating condition.				
c) The range of travel of the release lever in the cockpit, including free travel, must not exceed 120 mm.				
d) The release lever in the cockpit must be arranged and designed so that the pilot force as defined in ULA.143 d) can be easily applied.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
e) A visual inspection of the release mechanism must be easily possible.				
f) Release mechanisms for aerotowing gliders must be installed so that there is no interference between the aerotow rope and any control surface throughout their full angular movement, with the aerotowed glider in any position as defined in paragraph C.1.a).				
g) The release mechanism of the towing ultralight motorised airplane must be suitably protected against general degradation caused by mud and dirt, etc.				
h) It must be possible for the pilot to visually check the aerotow cable situation.				
i) The release control system must be designed to actuate the release mechanism of each launching hook at the same time, when more than one launching hook is fitted.				
D.2. Colour marking and arrangement of cockpit controls				
The aerotowing cable release must be of yellow colour and must be located and arranged for operation by the same hand as the throttle.				
E.1.Fuel pumps				
a) If for the purpose of ULA.951 a fuel pump is required for proper engine operation, an emergency fuel pump must be provided to immediately supply fuel to the engine if the main fuel pump fails. The power supply for the emergency pump must be independent of the power supply for the main pump.				
b) If both the main pump and the emergency pump operate continuously, there must be a means to indicate to the pilot a malfunction of either pump.				
c) Operation of any fuel pump may not affect engine operation so as to create a hazard, regardless of the engine power setting or the functional status of any other fuel pump.				
E.2.Cooling test procedures				
a) To determine compliance with the requirement of ULA.1041, a cooling test must be carried out as follows: (1) Engine temperatures must be stabilised in flight with the engine at not less than 75 % of maximum continuous power. (2) After temperatures have stabilised, a climb must be begun at the lowest practical altitude and continued for one minute with the engine at take-off power. (3) At the end of one minute, the climb must be continued at maximum continuous power for at least 5 minutes after the occurrence of the highest temperature recorded.				
b) The climb required in E.2. a) must be conducted at a speed not more than the best rate of climb speed with maximum continuous power.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) The maximum anticipated air temperature (hot-day conditions) is 38 °C at sea level. If the tests are conducted under conditions deviating from this value, the recorded temperatures must be corrected.				
F. EQUIPMENT				
F.1. Powerplant instruments				
A cylinder head temperature indicator or an indicator for the critical temperature determined in the cooling test of paragraph E.2. must be installed so that it is plainly visible to each pilot.				
F.2. Miscellaneous equipment				
For aerotowing flights the following additional equipment must be installed: a) an adjustable rear view mirror of sufficient strength and rigidity must be attached and so located that the pilot, when seated with the seat belts fastened, has full and unobstructed view of the aerotowed glider in any position as defined in paragraph C.1.a). It must be possible to permanently observe the aerotowed glider without other pilot's tasks being affected and without major turning movements of the head.				
b) an aerotow rope including at least one weak link and connecting ring.				
G. OPERATING LIMITATIONS AND INFORMATION				
G.1. Maintenance manual				
The maintenance manual must contain the additional information that the applicant considers essential for proper maintenance of the aerotowing equipment.				
G.2. Operating limitations				
Aerotowing of gliders. The following information concerning the aerotowing of gliders must be furnished in the Pilot's Handbook: a) maximum weight of the towing ultralight motorised airplane (if different from the value under ULA.1583 c) (1); b) maximum weight of the aerotowed glider; c) maximum weight of the combination towing ultralight motorised airplane and aerotowed glider; d) rated ultimate strength for the weak link to be used for the aerotowing cable; e) the specification of the aerotow rope (length, material, weak link).				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
G.3. Operating data and procedures				
The minimum aerotowing speed and the aerotowing speed for the best rate of climb for the aerotow must be furnished. Furthermore, glider types whose relevant characteristics are comparable to those of the types used in the flight tests must be furnished as examples.				
G.4. Performance information				
Information about the degradation of performance in take-off distance due to long grass, rain drops or contamination of the wing (leading edge) must be furnished.				

Name:	
Function:	
Organisation:	
Date:	
Signature:	

Instructions for completing the Compliance Checklist

The compliance checklist is intended as a tool to demonstrate that an ultralight motorised airplane type complies with the Belgian Airworthiness Code for Ultralight Motorised Airplanes (in this case, compliance must be demonstrated for all requirements).

Demonstrating compliance with the Belgian Airworthiness Code for Ultralight Motorised Airplanes is a condition for obtaining a type authorisation for an ultralight motorised airplane type and, subsequently, for obtaining a restricted flight authorisation for an individual ultralight motorised airplane of this type.

The compliance checklist can also be used to demonstrate that a major change to a type authorisation or an individual ultralight motorised airplane complies with the Belgian Airworthiness Code for Ultralight Motorised Airplanes (in this case, compliance must be demonstrated for the relevant requirements only).

The compliance checklist should be completed as follows:

Page 1 'Reference Number'

In case of a (new) type authorisation, the Belgian ULM Federation | the Belgian Civil Aviation Authority will assign a reference number when accepting the application.

In case of a major change, enter the reference number of the type authorisation the change refers to.

Page 1 'Manufacturer'

Enter the manufacturer of the ultralight motorised airplane, as (it will be) shown on the type authorisation.

Page 1 'Aircraft Designation'

Enter the complete aircraft designation for the ultralight motorised airplane, as (it will be) shown on the type authorisation.

Page 1 'MTOM'

Enter the maximum take-off mass of the ultralight motorised airplane.

Page 1 'Registration Marks'

In case of a major change to an individual ultralight motorised airplane, enter the registration marks.

Page 1 'Description of Change'

In case of a major change, enter a brief description of the change.

Column 'Requirement'

The first column repeats the paragraphs and sub-paragraphs from the Belgian Airworthiness Code – Ultralight Motorised Airplanes.

For definitions and abbreviations, as well as interpretative material, consult the Belgian Airworthiness Code for Ultralight Motorised Airplanes.

Column 'Means of Compliance'

Enter the means (or combination of means) used to show compliance with the respective paragraphs (or sub-paragraphs) of the Belgian Airworthiness Code – Ultralight Motorised Airplanes.

The following means of compliance can be used:

- Compliance Statement – reference should be made to design data, election of methods, factors, etc. and definitions.
- Design Review – reference should be made to descriptions and drawings.
- Calculation | Analysis – reference should be made to substantiation reports.
- Safety Assessment – reference should be made to safety analysis reports.
- Laboratory Tests – reference should be made to test programmes, test reports and test interpretations.
- Ground Tests – reference should be made to test programmes, test reports and test interpretations.
- Flight Tests – reference should be made to test programmes, test reports and test interpretations.
- Simulation – reference should be made to test programmes, test reports and test interpretations.
- Design Inspection – reference should be made to inspection reports.
- Equipment Qualification – reference should be made to existing approvals and their applicability.

In case a specific paragraph (or sub-paragraph) does not apply to the subject ultralight motorised airplane type or change, Not Applicable (N/A) should be entered. The reason the paragraph (or sub-paragraph) is not applicable should be entered in the '*Remarks*' column.

Column 'Compliance Document'

Enter the relevant document (title, reference, issue, revision), including the chapter(s) and | or section(s) containing sufficient elements to demonstrate compliance with the respective paragraphs (or sub-paragraphs) of the Belgian Airworthiness Code – Ultralight Motorised Airplanes.

Column 'Remarks'

Enter any other references and remarks clarifying how compliance is demonstrated with the respective paragraphs (or sub-paragraphs) of the Belgian Airworthiness Code – Ultralight Motorised Airplanes.

Column 'Compliance Check'

This column is primarily for use by the Belgian Civil Aviation Authority.

Page 60 'Name'

Enter the full name of the person responsible for completing and signing the compliance checklist.

Page 60 'Function'

Enter the function of the person responsible for completing and signing the compliance checklist. This function must provide evidence of this person holding a position with appropriate responsibilities within the organisation submitting the compliance checklist.

Page 60 'Organisation'

Enter the organisation submitting the compliance checklist.

Page 60 'Date'

Enter the date of completion of the compliance checklist.

Page 60 'Signature'

The compliance checklist must be signed by the person identified above.