FPS MOBILITY AND TRANSPORT
BELGIAN CIVIL AVIATION AUTHORITY

Belgian Airworthiness Code – Gyroplanes – Compliance Checklist – *GP – INITIAL – 28 February 2025*

Manufacturer:	
Aircraft Designation:	
MTOW:	

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
## Section A – GENERAL				
GP.1 – Applicability				
This Airworthiness Code is applicable to light gyroplanes which: a) are of orthodox design; b) have a maximum take-off mass (MTOM) of not more than 600 kg; c) have no more than two seats.				
For the purpose of this Airworthiness code a gyroplane is assumed to be of orthodox design: a) when incorporating: (1) a single teetering two-bladed rotor of fixed pitch; (2) a single piston engine driving a fixed or variable pitch propeller, pusher or tractor configuration; (3) one nose wheel and | or tail wheel, and fixed two main wheel undercarriage. b) but excluding: (1) an aerodynamic pitch control system (other than the rotor) which is operable in flight.				
GP.3 – Permitted operations				
Gyroplanes 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) steep turns in which the angle of bank is not more than 60 degrees; c) vertical descents which do not terminate at ground level.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section B - FLIGHT				
GENERAL				
GP.21 – Proof of compliance				
a) Each requirement of this Section B must be met by tests upon a gyroplane 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 gyroplane will be operated, except as otherwise stated.				
GP.23 – Load distribution limits				
a) The ranges of weight and centre of gravity within which the gyroplane may be safely operated must be selected by the applicant.				
b) The centre of gravity range within which the gyroplane may be safely operated must not be less than that which corresponds to: (1) an occupant weight of 55 kg to 86 kg for single seat gyroplanes; or (2) an occupant weight of 55 kg to 172 kg for two seat gyroplanes. 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.				
GP.25 – Weight limits				
Maximum Weight. The maximum weight must be established so that it is: a) not more than: (1) the highest weight selected by the applicant; (2) 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 (3) the highest weight at which compliance with each applicable flight requirement of this Airworthiness Code is shown.				
b) not less than the weight which results from: (1) the empty weight determined under GP.29; (2) the weight of the required minimum equipment; (3) a weight of occupant(s) of 86 kg for a single seat gyroplane, or 172 kg for a two seat gyroplane; and (4) the weight of sufficient fuel for at least 60 minutes of operation at maximum continuous power.				
c) not less than the weight which results from: (1) the empty weight determined under GP.29; (2) the weight of the required minimum equipment; (3) a weight of one occupant of 86 kg; and (4) the weight of fuel to full tank capacity.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.29 – Empty weight and corresponding centre of gravity				
a) The empty weight and corresponding centre of gravity must be determined by weighing the gyroplane: (1) with: (i) fixed ballast; (ii) 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 gyroplane at the time of determining empty weight must be one that is well defined and can be easily repeated.				
GP.31 – Removable ballast				
Removable ballast may be used in showing compliance with the flight requirements of this Section B.				
GP.33 – Rotor speed limits				
a) A range of rotor speeds must be established that allows each appropriate manoeuvre to be performed throughout the ranges of airspeed and weight for which an authorisation is requested.				
b) At the critical combinations of weight, altitude and airspeed, the rotor speed must remain within the established safe range.				
PERFORMANCE				
GP.45 – General				
The performance requirements in this Section B must be determined: a) with normal piloting skill under average conditions; b) for still air and standard atmosphere at sea level; c) at the most critical weight; d) with the most unfavourable centre of gravity for each condition; and e) using engine power not in excess of the maximum declared for the engine type, and without exceeding powerplant and propeller limitations established under GP.1521.				
GP.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 450 m.				
b) The take-off, with take-off power and rpm: (1) must not require exceptional piloting skill or exceptionally favourable conditions; and (2) must be made in such a manner that a landing can be made and demonstrated safely at any point along the flight path if the engine fails.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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 maximum weight; and without exceeding any temperature limits established under GP.1041.				
GP.71 – Rate of descent				
The minimum rate of descent, and the associated airspeed, in a power-off, enroute configuration at maximum weight must be determined.				
GP.73 – Minimum speed for level flight				
The minimum airspeed for level flight V_{MIN} must be determined. This speed must not be less than the minimum control speed ($V_{MC\ (power\text{-}on)}$) established under GP.149.				
GP.75 – Landing				
a) The distance necessary to land and come to a complete stop from a point 15 m above the landing surface, at maximum weight and in zero wind, must be determined.				
b) The gyroplane must be able to be safely landed: (1) at any airspeed, centre of gravity position and weight selected by the applicant; (2) with power-on and with power-off; and (3) without exceptional piloting skill or exceptionally favourable conditions.				
GP.79 – Height-speed envelope				
The combinations of height and forward airspeed from which a safe landing cannot be made following engine failure must be established as a limiting height-speed envelope (graph).				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
CONTROLLABILITY AND MANOEUVRABILITY				
GP.143 – General				
a) The gyroplane must be safely controllable and manoeuvrable with sufficient margin of control movement and rotor clearance to correct for atmospheric turbulence and to permit control of the attitude of the gyroplane at all power settings at the critical weight and centre of gravity, at sea level and at the maximum altitude at which the gyroplane will be operated: (1) during steady flight at speeds between $V_{MC\ (power\text{-}on)}$ or $V_{MC\ (power\text{-}off)}$, whichever is the lowest, and V_{DF}; (2) during speed changes; (3) during changes of engine power (including sudden loss of engine power); and (4) during any manoeuvre appropriate to the type, including: (i) take-off; (ii) climb; (iii) turning flight; (iv) descent (power-on and power-off) including vertical and spiral descents; (v) landing (power-on and power-off); (vi) recovery to power-on flight from a balked approach; and (vii) during dynamic manoeuvres including steep turns, straight pull-outs, and roll reversals.				
b) It must be possible to maintain any required flight condition and 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. If $V_{MC\ (power\text{-}on)}$ is less than $V_{MC\ (power\text{-}off)}$, it must be demonstrated that it is possible, without exceptional piloting skill or strength, to recover the gyroplane to $V_{MC\ (power\text{-}off)}$ after the engine has been made inoperative at $V_{MC\ (power\text{-}on)}$. Modest departures from any recommended techniques must not cause unsafe flight conditions.				
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.				

<table>
<tr><th>Requirement</th><th>Means of Compliance</th><th>Compliance Document</th><th>Remarks</th><th>Compliance Check</th></tr>
<tr><td>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.</td><td></td><td></td><td></td><td></td></tr>
<tr><td><table>
<tr><th>Force applied to the controls</th><th>Pitch (N)</th><th>Roll (N)</th><th>Yaw (N)</th></tr>
<tr><td>(1) temporary application</td><td>200</td><td>100</td><td>400</td></tr>
<tr><td>(2) prolonged application</td><td>20</td><td>15</td><td>100</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>e) A technique must be established, and demonstrated, for landing the gyroplane at maximum weight, with the engine at idle, without hazard to the occupants.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>f) The gyroplane must not exhibit any serious tendency to enter a pilot-induced oscillation (PIO) at all power settings at the critical weight and centre of gravity, at sea level and at the maximum altitude at which the gyroplane will be operated:
(1) during steady flight at speeds between $V_{MC\ (power\text{-}on)}$ or $V_{MC\ (power\text{-}off)}$, whichever is the lowest, and V_{DF};
(2) during speed changes;
(3) during changes of engine power (including sudden loss of engine power); and
(4) during any manoeuvre appropriate to the type, including:
(i) take-off;
(ii) climb;
(iii) turning flight;
(iv) descent (power-on and power-off) including vertical and spiral descents;
(v) landing (power-on and power-off);
(vi) recovery to power-on flight from a balked approach; and
(vii) during dynamic manoeuvres including steep turns, straight pull-outs, and roll reversals.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>GP.145 – Longitudinal lateral and directional control</td><td></td><td></td><td></td><td></td></tr>
<tr><td>a) It must be possible at any speed below 1.3 V_{MIN}, to pitch the nose downwards so that a speed equal to 1.3 V_{MIN} can be reached promptly.
Test conditions: all possible configurations and engine powers with the gyroplane trimmed at 1.3 V_{MIN}.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>b) It must be possible to raise the nose at V_{DF} at all permitted centre of gravity positions and engine powers.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>c) The maximum wind speed, maximum cross wind and maximum tail wind must be established in which the gyroplane can be operated without loss of control near the ground in any appropriate manoeuvre (such as cross wind take-off) with:
(1) critical weight; and
(2) critical centre of gravity.</td><td></td><td></td><td></td><td></td></tr>
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Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.149 – Minimum control speed				
The following minimum control speeds must be determined: a) minimum power-off control speed, $V_{MC\ (power\text{-}off)}$; b) minimum power-on control speed, $V_{MC\ (power\text{-}on)}$.				
GP.155 – Pitch control force in manoeuvres				
The pitch control forces during turns or when recovering from manoeuvres must be such that at a constant speed an increase in load factor is associated with an increase in control force.				
GP.161 – Trim control				
The trim control (if fitted): a) must trim any steady longitudinal and lateral control forces to zero in level flight at any appropriate speed; and b) may not introduce any undesirable discontinuities in control force gradients.				
STABILITY				
GP.171 – General				
The gyroplane must be able to be flown, without undue pilot fatigue or strain, in any normal manoeuvre for a period of time as long as that expected in normal operation. At least three landings and take-offs must be made during this demonstration.				
GP.173 – Static longitudinal stability				
a) The longitudinal control must be designed so that a rearward movement of the control is necessary to obtain a speed less than the trim speed, and a forward movement of the control is necessary to obtain a speed more than the trim speed.				
b) Throughout the full range of altitude for which an authorisation is requested, with the throttle held constant during the manoeuvres specified in GP.175 a) to d), the slopes of: (1) the control force versus speed curve; and (2) the control position versus speed curve must be positive or neutral (stable).				
GP.175 – Demonstration of static longitudinal stability				
The control force versus speed curve must have a positive or neutral (stable) slope in the following conditions: a) *Climb:* (1) critical weight; (2) critical centre of gravity; (3) maximum continuous power; and (4) at the speed for best rate of climb V_Y.				

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b) *Cruise:* (1) critical weight; (2) critical centre of gravity; (3) power for level flight; and (4) at the speed for best rate of climb V_Y, and at V_H or V_{NE}, whichever is less.				
c) *Descent:* (1) critical weight; (2) critical centre of gravity; (3) power-off; and (4) at the speed for minimum rate of descent.				
d) *Approach:* (1) critical weight; (2) critical centre of gravity; (3) approach power; (4) at the recommended approach speed.				
GP.177 – Lateral and directional stability				
a) Following an initial yaw disturbance, with controls held fixed, the gyroplane shall tend to correct automatically for moderate disturbance in yaw.				
b) The directional and lateral stability should be sufficient to prevent dangerous flight conditions following abrupt pedal displacements.				
c) In a sideslip any control force must increase steadily with sideslip. This need not be linear but must not reverse. Sufficient cues must accompany sideslip to alert the pilot when approaching sideslip limits.				
d) The characteristics detailed in sub-paragraphs a) to c) must be met at the following conditions: (1) in climb, at maximum continuous power, at V_Y; (2) in level flight, at: (i) the best climb speed VY; and (ii) the lower of V_{NE} or V_H. (3) at the minimum rate of descent speed (see GP.71) with and without the engine operating; and (4) at the recommended approach speed.				
GP.181 – Dynamic stability				
a) Any short period oscillations occurring under any permissible flight condition must be heavily damped with the primary controls: (1) free; (2) fixed; with the engine running at all allowable powers.				
b) The gyroplane, under smooth air conditions, must not exhibit any dangerous behaviour at any speed between the speed for best rate of climb and V_{NE}, when all controls are fixed or free for a period of five seconds.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GROUND HANDLING CHARACTERISTICS				
GP.231 – General				
The gyroplane must have satisfactory ground handling characteristics, including freedom from uncontrollable tendencies in any condition expected in operation, particularly in all take-off conditions.				
GP.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.				
GP.235 – Taxying condition				
a) The gyroplane must be safely controllable and manoeuvrable when it is taxied over the roughest ground that may reasonably be expected in normal operation.				
b) The ground speeds up to which it is safe to taxy, take off and touch down must be determined.				
GP.241 – Ground resonance				
The gyroplane may have no dangerous tendency to oscillate on the ground with the rotor turning. This must be shown for all intended combinations of rotor speed and gyroplane forward speed on the ground, including use of any rotor spin-up system.				
MISCELLANEOUS FLIGHT REQUIREMENTS				
GP.251 – Vibration				
Each part of the gyroplane must be free from excessive vibration under each appropriate combination of airspeed and engine power, throughout the flight envelope at speeds up to V_{DF}.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section C - STRUCTURE				
GENERAL				
GP.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 gyroplane. 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.				
GP.303 – Factor of safety				
Unless otherwise provided, a factor of safety of 1.5 must be used.				
GP.305 – Strength and deformation				
a) The structure and control systems 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.				
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.				
GP.307 – Proof of structure				
a) Compliance with the strength and deformation requirements of GP.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 to be 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.				
GP.309 – Design limitations				
The following values and limitations must be established to show compliance with the structural requirements of this Section C: a) the design maximum weight; b) the rotor rpm range; c) forward speeds up to V_D; d) the centre of gravity limitations; and e) the positive and negative limit manoeuvring load factors.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
FLIGHT LOADS				
GP.321 – General				
a) Flight load factors represent the ratio of the aerodynamic force component (acting normal to the flight path of the gyroplane) to the weight of the gyroplane. A positive flight load factor is one in which the aerodynamic force acts upward, with respect to the gyroplane.				
b) Compliance with the flight load requirements of this Section C must be shown: (1) at each weight from the design minimum weight to the design maximum weight; and (2) with any practical distribution of disposable load within the operating limitations in the Pilot's Handbook.				
GP.337 – Limit manoeuvring load factor				
The gyroplane's rotor must be designed for a positive limit manoeuvring load factor of 3.5, at all forward speeds from zero to the maximum design speed V_D. The rest of the gyroplane must be designed for positive and negative limit manoeuvring load factors of 3.5 and -0.5, respectively, at all forward speeds from zero to the maximum design speed V_D.				
GP.339 – Resultant limit manoeuvring loads				
The loads resulting from the application of limit manoeuvring load factors are assumed to act at the centre of the rotor hub and to act in directions, and with distributions of load among the rotors and auxiliary lifting surfaces, so as to represent each critical manoeuvring condition.				
GP.341 – Gust loads				
The gyroplane must be designed to withstand, at each critical airspeed, the loads resulting from a vertical gust of 9.1 m / s.				
GP.351 – Yawing conditions				
The gyroplane must be designed to withstand the yawing loads on the vertical tail surface specified in GP.413.				
GP.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 of GP.337; and (2) the limit torque corresponding to the maximum continuous power and propeller speed, acting simultaneously with the limit loads of GP.337.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) For conventional reciprocating engines with positive drive to the propeller, the limit torque to be accounted for in GP.361 a) and GP.547 d) 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

GP.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 of GP.337.				
b) The side load prescribed in sub-paragraph a) may be assumed to be independent of other flight conditions.				
CONTROL SURFACE AND SYSTEM LOADS				
GP.395 – Control system				
a) The part of each control system from the pilot's controls to the control stops must be designed to withstand pilot forces of not less than the forces specified in GP.397.				
b) The part of each control system from the control stops to the attachment to the rotor hub (or control areas) must be designed to at least: (1) withstand the maximum pilot forces obtainable in normal operation; and (2) if operational loads may be exceeded through jamming, ground gusts, control inertia, or friction, support without yielding 0.60 times the limit pilot forces specified in GP.397; (3) for yaw control, the load corresponding to the control surface load specified in GP.413.				
GP.397 – Limit pilot forces and torques				
For primary flight controls the limit pilot forces are as follows: a) for foot controls, 580 N; b) for stick controls: (1) 450 N fore and aft; and (2) 300 N laterally.				
GP.399 – Dual control system				
Dual control systems must be designed to withstand the loads resulting from each pilot applying 0.75 times the forces specified in GP.397, with: a) the pilots acting together in the same direction; and b) the pilots acting in opposition.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.405 – Secondary control systems				
Secondary control systems such as those for brakes, trim controls, etc. must be designed to withstand the maximum forces that a pilot is likely to apply to those controls.				
GP.413 – Control surface loads				
a) Each stabilizing and control surface (other than the rotor blades), and its supporting structure, must be designed so that limit loads are not less than the greater of: (1) 720 N / m² (evenly distributed over the control surface); or (2) the aerodynamic load resulting where the normal force coefficient equals 1.5 at the maximum design speed, V_D.				
b) Compliance with sub-paragraph a) of this paragraph must be shown with realistic or conservative load distributions with allowance for any relative slipstream effects.				
GROUND LOADS				
GP.471 – General				
a) *Loads and equilibrium.* The limit ground loads specified in this Section C must be considered to be external loads that act upon a gyroplane structure. In each specified landing condition, the external reactions must be placed in equilibrium by the linear and angular inertia forces in a rational or conservative manner.				
b) *Critical centres of gravity.* The critical centres of gravity within the range for which an authorisation is requested must be selected so that the maximum design loads are obtained in each landing gear element.				
GP.473 – Ground loading conditions and assumptions				
a) For specified landing conditions, the maximum weight as established under GP.25 must be used.				
b) The selected limit vertical inertia load factor at the centre of gravity of the gyroplane for the ground loading conditions prescribed in this Section may not be less than that obtained when landing with a vertical velocity of 2.55 m / s.				
c) Rotor lift not exceeding two thirds of the weight of the gyroplane may be assumed 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 rotor lift to the gyroplane 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.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.479 – Level landing conditions				
a) For a level landing the gyroplane is assumed to be in the following flight attitudes: (1) For gyroplanes with tail wheels, a normal level flight attitude; (2) For gyroplanes 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 just clear of the ground.				
b) In the absence of a rational analysis the following drag and vertical force combinations must be considered: (1) Max spin-up condition: $P_Z = 0.6\ P_{Z\ max}$; $P_X = -0.5\ P_{Z\ max}$· (2) Max spring back condition: $P_Z = 0.8\ P_{Z\ max}$; $P_X = 0.5\ P_{Z\ max}$· (3) Max vertical load condition: $P_Z = P_{Z\ max}$; $P_X = \pm 0.3\ P_{Z\ max}$· Where: P_X = horizontal component of ground reaction; P_Z = vertical component of ground reaction; $P_{Z\ max}$ = maximum value of the landing gear reaction derived from GP.473 d).				
GP.481 – Tail-down landing conditions				
a) For a tail down landing, the gyroplane is assumed to be in the following attitudes: (1) For gyroplanes with tail wheels, an attitude in which the main and tail wheels contact the ground simultaneously. (2) For gyroplanes with nose wheels, the maximum nose-up attitude that can be achieved as a steady state in the landing configuration or the maximum nose-up attitude allowing ground clearance by each part of the gyroplane, whichever is less.				
b) The ground reactions are assumed to act perpendicular to the ground.				
GP.483 – One-wheel landing conditions				
For the one-wheel landing condition, the gyroplane is assumed to be in the level attitude and to contact the ground on one side of the main landing gear. In this attitude: a) the ground reactions must be the same as those obtained on that side under GP.479 b); and b) the unsymmetrical ground reaction must be reacted by rolling and yawing accelerations.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.485 – Side load conditions				
a) For the side load condition, the gyroplane is assumed to be in the attitude specified in GP.479 a) 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.				
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 gyroplane (kg); g = acceleration due to gravity (m / s^2).				
GP.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 GP.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 it need not exceed the maximum value based on limiting brake torque.				
GP.499 – Supplementary conditions for nose wheels				
In determining the ground loads on nose wheels, 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.				
MAIN COMPONENT REQUIREMENTS				
GP.547 – Rotor structure				
a) Each rotor assembly (including rotor hubs and blades) must be designed as prescribed in this paragraph.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
b) The rotor structure must be designed to withstand the critical flight loads prescribed in GP.337 to GP.341. For this condition, the rotor rpm must be selected to include the effects of altitude.				
c) The rotor structure must be designed to withstand loads simulating: (1) for the rotor blades and hubs, the impact force of each blade against its teetering stop during ground operation; and (2) any other critical condition expected in normal operation.				
d) The rotor structure must be designed to withstand the maximum limit torque likely to be transmitted by any rotor spin-up device or rotor brake, at all speeds from zero to the maximum at which the device is designed to be engaged. This limit torque must be distributed to the rotor blades in a rational manner. Account must be taken of the factors prescribed in GP.361 b).				
GP.549 – Fuselage, landing gear, rotor pylon and engine structures				
a) Each fuselage, landing gear, rotor pylon and engine structure must be designed as prescribed in this paragraph. Resultant rotor forces may be represented as a single force applied at the rotor hub attachment point.				
b) Each structure must be designed to withstand: (1) the critical loads prescribed in GP.337 to GP.341; (2) the applicable ground loads prescribed in GP.471 and GP.473; and (3) the loads prescribed in GP.547 c) and d).				
c) The engine mount and adjacent fuselage structure must be designed to withstand the loads occurring under flight and landing conditions, including engine torque and gyroscopic moments.				
EMERGENCY LANDING CONDITIONS				
GP.561 – General				
a) The gyroplane, although it may be damaged in emergency landing conditions, must be designed as prescribed in this paragraph to protect each occupant under those conditions.				
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 ultimate inertia forces corresponding to the following load factors: upward: 4.5 g; forward: 9.0 g; sideward: 3.0 g; downward: 4.5 g These forces are independent of each other and are relative to the surrounding structure.				
c) 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.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
d) For a gyroplane with the engine located behind an occupants seat, the engine mounting structure must be designed to withstand an ultimate inertial force in the forward direction corresponding to a load factor of 15 g.				
e) Fuel tanks, fuel lines, oil tanks and oil lines must be capable of retaining their contents under the inertial forces of sub-paragraph b) of this paragraph without rupture.				
OTHER LOADS				
GP.597 – Loads form single masses				
The attachment means for all single masses, which are part of the equipment of the gyroplane (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 GP.561.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section D - DESIGN AND CONSTRUCTION				
GENERAL				
GP.601 – General				
a) The gyroplane may have no design features or details that experience has shown to be hazardous or unreliable.				
b) The suitability of any part having an important bearing on safety and which is not amenable to simple analysis must be established by tests.				
GP.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.				
GP.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 non-metallic 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.				
GP.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 gyroplane.				
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.				
GP.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.				
GP.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
GP.612 – Provisions for rigging and de-rigging				
The design of the gyroplane 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 gyroplane easily for correct rigging.				
GP.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.				
GP.619 – Special factors				
a) The factor of safety prescribed in GP.303 must be multiplied by appropriate combinations of the special factors prescribed in GP.619 b), GP.621 to GP.626, GP.657 and GP.693.				
b) For each part of the structure not covered by GP.621 to GP.625 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.				
GP.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.				
GP.623 – Bearing factors				
a) The factor of safety for bearing loads 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 GP.657 and GP.693, respectively, meets sub-paragraph a) of his paragraph.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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 gyroplane 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 GP.561.				
e) When using only two hinges at each control surface, the safety factor for these hinges and the attached parts of the primary structure must be multiplied by a factor of 1.5.				
GP.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.				
GP.627 – Fatigue strength				
The detail design of the gyroplane must be such that, as far as reasonably practicable, features that cause high stresses are avoided, unless it can be shown that features of a similar design have accumulated considerable satisfactory service experience in a similar application. 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.				
GP.629 – Flutter prevention and structural stiffness				
Each major part of the gyroplane must be free from flutter and resonance under each appropriate speed and power condition, and this must be demonstrated by flight tests up to V_{DF}.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
CONTROL SURFACES AND ROTORS				
GP.653 – Pressure venting and drainage of rotor blades				
a) For each rotor blade: (1) there must be a means for venting the internal pressure of the blade; (2) drainage holes must be provided for the blade; and (3) the blade must be designed to prevent water from becoming trapped in it.				
b) Sub-paragraphs a) (1) and (2) of this paragraph do not apply to sealed blades capable of withstanding the maximum pressure differentials expected in service.				
GP.655 – Control surface installations				
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 an the others are operated through their full angular movement. This requirement must be met: (1) under limit load conditions for all control surfaces through their full angular range; and (2) under limit load on the gyroplane 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.				
GP.657 – Control surface hinges (other than rotor blades)				
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 must not be exceeded.				
c) Hinges must have enough strength and rigidity for loads parallel to the hinge line.				
GP.659 – Mass balance				
a) The spanwise balance of the rotor blades must be such that excessive out-of-balance vibration is prevented.				
b) The chordwise balance of the blades must be such that the blades cannot be induced to flutter or weave in any flying condition. The chordwise balance of each blade in a pair must be the same. The aerodynamic centre should be at (or very close to) the 25 % chord.				
c) The supporting structure and the attachment of rotor blade mass balance weights must have an ultimate reserve factor in excess of 10 when subjected to the combined loads resulting from: (1) accelerations of ±20 g in the flap plane of the rotor; (2) accelerations of ±20 g in the lag plane of the rotor; and (3) the centrifugal force at the maximum rotor speed.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
d) The supporting structure and the attachment of mass balance weights used on control surfaces (other than rotor blades) must be designed for: (1) 24 g normal to the plane of the control surface; (2) 12 g fore and aft; and (3) 12 g parallel to the hinge line.				
GP.661 – Rotor blade clearance				
There must be enough clearance between the rotor blades and other parts of the structure to prevent the blades from striking any part of the structure, or passing through any area likely to cause injury to occupants during any operating condition.				
GP.665 – Rotor-hub bearings				
All rotor-hub bearings must have their suitability established by experience or tests.				
CONTROL SYSTEMS				
GP.671 – General				
Each control must operate easily, smoothly and positively enough to allow proper performance of its functions.				
GP.675 – Stops				
a) Each control system must have stops that positively limit the range of motion of the pilot's controls.				
b) Each stop must be located so that wear, slackness, or take-up adjustments will not adversely affect the control characteristics of the gyroplane because of a change in the range of travel of the control.				
c) Each stop must be able to withstand any loads corresponding to the design conditions for the control system.				
GP.677 – Trim system				
a) If a trim system is fitted which is operable in flight, 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 gyroplane 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 gyroplane structure.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.679 – Control system locks				
If there is a device to lock the control system with the gyroplane on the ground, there must be means to: a) give unmistakable warning to the pilot when the lock is engaged; and b) prevent the lock from engaging in flight.				
GP.683 – Operation tests				
It must be shown by functional tests that the system designed to the loads specified in GP.397 is free from: a) jamming; b) excessive friction; and c) excessive deformation; when operating the controls from the cockpit.				
GP.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, tubes, 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.				
GP.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.				
GP.689 – Cable systems				
a) Each cable, cable fitting, turnbuckle, splice, and pulley used must meet stated specifications. In addition: (1) no cable smaller than 2 mm diameter 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.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
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.				
GP.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 must not be exceeded.				
LANDING GEAR				
GP.721 – General				
The landing gear must be so designed that the gyroplane can take off and land on uneven grass surfaces without endangering its occupants.				
COCKPIT DESIGN				
GP.771 – General				
The cockpit and its equipment must allow each pilot to perform his duties without unreasonable concentration or fatigue.				
GP.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;				
b) rain may not unduly impair his view along the flight path in normal flight and during landing; and				
c) the pilot is easily able to establish a pitch attitude by reference to a fixed point on the airframe that appears near the horizon in the pilot's view when looking forward in level flight.				
GP.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.				
GP.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.				

<table>
<tr><th>Requirement</th><th>Means of Compliance</th><th>Compliance Document</th><th>Remarks</th><th>Compliance Check</th></tr>
<tr><td>c) In gyroplanes 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) trim; and
(3) opening and jettisoning device of the canopy.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>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.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>GP.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:</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="3"><table><tr><th>Controls</th><th>Motion and effect</th></tr><tr><td>Roll</td><td>right (clockwise) for right lateral roll</td></tr><tr><td>Pitch</td><td>rearward for nose up</td></tr><tr><td>Yaw</td><td>right pedal forward for nose right</td></tr><tr><td>Trim</td><td>corresponding to sense of motion and axis of the controls</td></tr><tr><td>Throttle control</td><td>forward, or clockwise, to increase power</td></tr><tr><td>Propeller pitch</td><td>forward to decrease pitch and | or 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></tr>
<tr><td>GP.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>GP.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 GP.25 b) and for the maximum load factors corresponding to the specified flight and ground conditions, including the emergency landing conditions prescribed in GP.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 GP.337 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 GP.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>GP.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>
</table>

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.787 – Baggage compartment				
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.				
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 GP.561 b).				
GP.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.				
GP.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.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Subpart E - POWERPLANT				
GENERAL				
GP.901 – Installation				
a) The powerplant installation includes the engine, propeller and each component that: (1) is necessary for propulsion; (2) affects the control of the propulsive unit; and (3) affects the safety of the propulsive unit between normal inspections and overhauls.				
b) The powerplant must be constructed, arranged and installed to: (1) ensure safe operation between normal inspection and overhaul; 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 gyroplane.				
GP.902 – Engine and propeller compatibility				
The applicant must show that each combination of engine, exhaust system and propeller in a gyroplane, for which an authorisation is requested, is compatible with the gyroplane, functions in a satisfactory manner and can be operated safely within any limitations established under GP.1505 and GP.1521.				
GP.903 – Engine				
The engine must meet the specifications of Section H.				
GP.905 – Propeller				
The propeller must meet the specifications of Section J.				
GP.917 – Rotor spin-up and brake systems				
a) If a rotor spin-up or brake system is installed, it must be designed to prevent: (1) it remaining engaged on take-off; and (2) it becoming engaged in flight.				
b) Any limitation(s) on the use of any rotor spin-up or brake system must be specified.				
GP.923 – Powerplant and rotor compatibility				
The applicant must show that the combination of powerplant and rotor system is compatible with the gyroplane, functions in a satisfactory manner and can be operated safely over the range of operating conditions and flight envelope.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.925 – Propeller clearance				
Propeller clearances with the gyroplane 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 positive clearance between all rotating parts of the propeller and other parts of the gyroplane 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.				
FUEL SYSTEM				
GP.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.				
GP.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 at least 125 % of the take-off fuel consumption of the engine at the maximum power established for take-off.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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.				
GP.961 – Fuel system hot weather operation				
Each suction lift fuel system and other fuel systems with features conducive to vapour formation must be shown by tests to operate satisfactorily (within the limits for which an authorisation is requested) when using fuel at a temperature of 43 °C.				
GP.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 gyroplane, means must be provided to reduce the surging to within acceptable limits.				
GP.965 – Fuel tank tests				
Each fuel tank must be able to withstand a pressure of 10 kPa without failure or leakage.				
GP.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.				
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 gyroplane, 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 GP.561, must not result in rupture of the fuel tank or fuel lines.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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 gyroplane (in which case no expansion space is required). It must be impossible to fill the expansion space inadvertently with the gyroplane in the normal ground attitude.				
GP.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.				
GP.973 – Fuel tank filler connection				
a) Fuel tank filler connections must be located outside the personnel compartment. Spilled fuel must be prevented from entering the fuel tank compartment or any part of the gyroplane other than the tank itself.				
b) Each filler cap must provide a fuel-tight seal for the main filler opening.				
GP.975 – Fuel tank vents				
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 gyroplane; and d) each vent must discharge clear of any electrical or exhaust components.				
GP.977 – Fuel strainer or filter				
a) There must be a fuel filter between the 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				
GP.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.				
GP.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				
GP.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 gyroplane.				
GP.1013 – Oil tanks				
a) Each oil tank must be installed to: (1) meet the requirements of GP.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.				
GP.1015 – Oil tank tests				
Each oil tank must be able to withstand a pressure of 35 kPa without failure or leakage.				
GP.1017 – Oil lines and fittings				
a) Oil lines must comply with GP.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; and (3) the breather does not discharge into the engine air induction system.				
COOLING				
GP.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 gyroplane constructor, during all likely operating conditions.				
INDUCTION SYSTEM				
GP.1091 – Air induction system				
The air induction system for the engine must supply the air required by the engine under all likely operating conditions.				
GP.1093 – Induction system icing protection				
The engine air induction system shall incorporate means for the prevention and elimination of ice accumulations unless it is demonstrated that this can be accomplished by other means.				
EXHAUST SYSTEM				
GP.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 gyroplane 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.				
GP.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.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
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) If the design of the exhaust system is such that, after a failure in the exhaust system, it can interfere with the propeller, additional restraint must be provided to ensure a degree of redundancy in the exhaust mounting.				
d) Parts of the exhaust system connected to components between which relative motion could exist must have means for flexibility.				
POWERPLANT CONTROLS AND ACCESSORIES				
GP.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.				
GP.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.				
GP.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 descent at V_{NE} 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.				
GP.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				
GP.1191 – Firewalls				
a) Cowled engine installations must be isolated from the rest of the gyroplane by a firewall, shroud or equivalent means.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
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 gyroplane.				
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.				
GP.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 opening.				
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
Subpart F - EQUIPMENT				
GENERAL				
GP.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 gyroplane, constitute a hazard to safe operation.				
GP.1303 – Flight and navigation instruments				
The following are the required flight and navigation instruments: a) an airspeed indicator; b) an altimeter; c) a magnetic direction indicator; and d) a slip indicator.				
GP.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; and e) a tachometer to indicate the rpm of the main rotor.				
GP.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 GP.561.				
INSTRUMENTS: INSTALLATION				
GP.1321 – Arrangement and visibility				
a) Each flight, navigation, and powerplant instrument must be clearly arranged and plainly visible to each pilot.				
b) Instrument panel vibration may not damage or impair the readability or accuracy of any instrument.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.1322 – Warning, caution, and advisory lights				
If warning, caution, or advisory lights are installed in the cockpit, they must be: a) red for warning lights (lights indicating a hazard which may require immediate corrective action); b) amber for caution lights (lights indicating the possible need for future corrective action); c) green for safe operation lights; and d) any other colour, including white, for lights not described in sub-paragraphs a) to c) of this paragraph, provided the colour differs sufficiently from the colours prescribed in sub-paragraphs a) to c) of this paragraph to avoid possible confusion.				
GP.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 ±9.3 km / h or ±5 %, whichever is greater.				
b) Calibration must be made in flight.				
c) The airspeed indicating system must be suitable for speeds between 0.8 V_Y and at least 1.05 times V_{NE}.				
GP.1325 – Static pressure system				
a) Each instrument provided with static pressure case connections must be so vented that the influence of gyroplane 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 drainage 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.				
GP.1327 – Magnetic direction indicator				
a) The magnetic direction indicator required must be installed so that its accuracy is not excessively affected by the gyroplane's vibration or magnetic fields.				
b) The compensated installation must not have a deviation in level flight, greater than 10 degrees on any heading.				
GP.1337 – Powerplant instruments				
a) *Instruments and instrument lines* (1) Each powerplant instrument line must meet the requirements of GP.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.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
ELECTRICAL SYSTEMS AND EQUIPMENT				
GP.1351 – General				
a) *Electrical system capacity.* Each electrical system must be adequate for its intended use. In addition: (1) electric power sources, their transmission cables, and their associated control and protective devices must be able to furnish the required power at the proper voltage to each load circuit essential for safe operation; and (2) compliance with sub-paragraph a) (1) must be shown by an electrical load analysis, or by electrical measurements that take into account the electrical loads applied to the electrical system in probable combinations and for probable durations.				
b) *Instruments.* There must be a means to indicate to the pilot that the electrical power supplies are adequate for safe operation.				
GP.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 gyroplane.				
c) No corrosive fluids or gases that may escape from the battery may damage surrounding structures or adjacent essential equipment.				
GP.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.				
LIGHTS				
GP.1385 – External lights				
If external lights are to be installed they must be approved.				
MISCELLANEOUS EQUIPMENT				
GP.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 gyroplane 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				
GP.1501 – General				
a) Each operating limitation specified in GP.1503 to GP.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 GP.1541 to GP.1587.				
OPERATING LIMITATIONS				
GP.1503 – Airspeed limitations: general				
a) An operating speed range must be established.				
b) When airspeed limitations are a function of weight, weight distribution, altitude, rotor speed, power, or other factors, airspeed limitations corresponding with the critical combinations of these factors must be established.				
c) All flight speeds must be stated in terms of airspeed indicator readings (IAS).				
GP.1505 – Airspeed limitations				
a) The never-exceed speed, V_{NE}, must not exceed 0.90 times the maximum speed demonstrated in flight tests, V_{DF}.				
b) The maximum speed demonstrated in flight, V_{DF}, must not exceed the design maximum speed, V_D.				
GP.1519 – Weight and centre of gravity				
a) The maximum weight determined under GP.25 must be established as an operating limitation.				
b) The centre of gravity limitations determined under GP.23 must be established as operating limitations.				
c) The empty weight and the corresponding centre of gravity positions must be determined in accordance with GP.29.				
d) A method must be provided or described to conduct the hang test or weight and balance without structurally endangering or overstressing critical components from which the gyroplane may be hung or supported.				
GP.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 gyroplane constructor has satisfactorily demonstrated that higher limitations can be used safely in the gyroplane, these may be stated.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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.				
GP.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 to the various systems; d) tolerances and adjustments necessary for proper functioning, including control surface travels and limits of rotor pitch angles relative to the hubs; e) method of determining centre of gravity position, e.g. hang check; f) methods of rotor tracking 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 gyroplane; j) special inspection techniques and maintenance 'cautions'; 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; and r) list of placards and markings and their locations. Note that the inspection techniques should include procedures to check that the primary structure, controls, rotor and propeller are free from cracks, corrosion or visible damage.				
MARKINGS AND PLACARDS				
GP.1541 – General				
a) The gyroplane must be marked with: (1) the markings and placards specified in GP.1542 to GP.1557; and (2) any additional information, instrument markings, and placards required for the safe operation of the gyroplane.				
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 be easily erased, disfigured or obscured.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
c) The units of measurement used to indicate airspeed on placards must be the same as those used on the indicator.				
GP.1542 – Operating limitations placards and instrument markings				
Limitations essential to safe operation of the gyroplane must be plainly visible to the pilot. Where this cannot be achieved by instrument markings, a placard must be provided. Where these limitations are shown by instrument markings, each maximum and minimum safe operating limit must be marked by a red line.				
GP.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.				
GP.1545 – Airspeed indicator				
Each airspeed indicator must show the following markings: a) a red radial line at V_{NE}; b) for the caution range, a yellow arc; c) for the safe operating range, a green arc.				
GP.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.				
GP.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.				
GP.1551 – Oil quantity indicator				
Each oil quantity indicator must be marked to clearly indicate the maximum and minimum quantity of oil that is acceptable.				
GP.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 GP.959.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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 GP.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.				
GP.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.				
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 gyroplane so that they are plainly visible to the pilot: (i) empty weight; (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 must be plainly visible to the pilot.				
g) *Reduction in normal g.* A placard, stating that manoeuvres involving a deliberate reduction in normal g shall be avoided, must be positioned so that it is in full view of the pilot(s).				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
PILOT'S HANDBOOK				
GP.1581 – General				
a) Each gyroplane must be furnished with a Pilot's Handbook. Each Pilot's Handbook must contain at least: (1) the information specified in GP.1583 to GP.1587; (2) *additional information.* Any information not specified in GP.1583 to GP.1587 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.				
GP.1583 – Operating limitations				
a) *Airspeed limitations.* The following limitations must be furnished: (1) the airspeed limit V_{NE} together with information on the significance of this limit; (2) maximum wind limitations; (3) airspeed indicator system calibration.				
b) *Powerplant limitations.* The following information must be furnished: (1) limitations required by GP.1521; (2) information necessary for marking the instruments required by GP.1542 to GP.1553; (3) fuel and oil designation.				
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 GP.23 and GP.25 together with the items included in the empty weight in GP.29; (2) information enabling the pilot of the gyroplane 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 GP.3.				
f) *Kinds of operation.* The kind of operation, e.g. day VFR, in which the gyroplane may be used, must be stated. The minimum equipment required for operation must be listed.				
g) *Placards.* Placards required by GP.1555 and GP.1557 must be furnished.				
h) *Altitude.* The altitude established under GP.1527 must be furnished.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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 GP.53 and GP.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.				
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 GP.65; (2) the airspeed associated with the minimum rate of descent determined in accordance with GP.71; (3) the minimum speed for level flight V_{MIN} established in accordance with GP.73; and (4) the minimum control airspeeds $V_{MC\ (power\text{-}off)}$ and $V_{MC\ (power\text{-}on)}$ established in accordance with GP.143 and GP.149.				
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 gyroplane 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 gyroplane.				
g) Information must be provided on safe procedures for securing and ground handling of the gyroplane.				
GP.1587 – Performance information				
The following information must be furnished: a) the take-off distance determined in accordance with GP.53; b) the best climb speed; c) the speed for minimum rate of descent; d) the landing distance determined in accordance with GP.75; and e) any limiting height speed envelope determined in accordance with GP.79.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
Section H - ENGINES				
GENERAL				
GP.1801 – Applicability				
This Section H is applicable to spark- and compression-ignition engines for gyroplanes.				
GP.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.				
GP.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				
GP.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.				
GP.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.				
GP.1819 – Durability				
Engine design and construction must minimise the probability of occurrence of an unsafe condition of the engine between overhauls.				
GP.1821 – Engine cooling				
Engine design and construction must provide the necessary cooling under conditions in which the gyroplane is expected to operate.				
GP.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
GP.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.				
GP.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 gyroplane.				
GP.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 GP.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 gyroplane in which it is installed is in the static ground attitude.				
GP.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 gyroplane 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>GP.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>GP.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 GP.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>GP.1847 – Detonation test (spark ignition engine 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>GP.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 GP.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 GP.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
GP.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.				
GP.1853 – Engine component test				
a) For engine components that cannot be adequately substantiated by endurance testing in accordance with GP.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.				
GP.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.				
GP.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				
GP.1901 – Applicability				
This Section J is applicable to propellers for gyroplanes.				
GP.1903 – Instruction manual				
An instruction manual containing the information that the applicant considers essential for installing, servicing and maintaining the propeller must be provided.				
GP.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				
GP.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.				
GP.1919 – Durability				
Propeller design and construction must minimise the possibility of the occurrence of an unsafe condition of the propeller between overhauls.				
GP.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				
GP.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.				
GP.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 foreseeable vibration load patterns.				

Requirement	Means of Compliance	Compliance Document	Remarks	Compliance Check
GP.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.				
GP.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 gyroplane.				
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.				
GP.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.				
GP.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.				