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Standard Specification for Design and Performance of Light Sport Gyroplane Aircraft¹

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1. Scope

1.1 This specification covers the manufacture of gyroplanes. This specification includes design and performance requirements for light sport gyroplane aircraft.

1.2 This specification applies to light gyroplane aircraft seeking civil aviation authority approval in the form of flight certificates, flight permits, or other like documentation.

1.3 A gyroplane for the purposes of this specification is defined as a rotorcraft to be used for day VFR only, with rotor blades that are not engine-driven in flight and are supported in flight by the reaction of the air on a single rotor that rotates freely on a substantially vertical axis when the aircraft is in horizontal flight.

1.4 These requirements apply to light gyroplanes of orthodox design. Aircraft having the following basic features will be so regarded:

1.4.1 Rotors of either fixed collective pitch or collective pitch control that are not adjustable in flight,

1.4.2 Single engine with fixed or ground adjustable pitch propeller,

1.4.3 No more than two occupant seats, and

1.4.4 A maximum gross weight (MGW) of 725 kg (1600 lb) or less.

1.5 Where it can be shown that a particular feature is similar in all significant respects to a feature that has historically demonstrated compliance with this specification and can be considered a separate entity in terms of its operation, that feature shall be deemed to be applicable and in compliance with this specification.

1.6 Where these requirements are inappropriate to particular design and construction features, it will be necessary to submit an appropriate amendment of this specification to ASTM Committee F37 on Light Sport Aircraft for consideration and approval.

¹ This specification is under the jurisdiction of ASTM Committee F37 on Light Sport Aircraft and is the direct responsibility of Subcommittee F37.50 on Gyroplane.

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1.7 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

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1.10 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

F2339 Practice for Design and Manufacture of Reciprocating Spark Ignition Engines for Light Sport Aircraft

F2483 Practice for Maintenance and the Development of Maintenance Manuals for Light Sport Aircraft

F2972 Specification for Light Sport Aircraft Manufacturer's Quality Assurance System

2.2 CAA Standard:³

CAP 643 British Light Gyroplane Airworthiness Requirements, Section T

2.3 Federal Aviation Regulations:⁴

FAR-33 Airworthiness Standards: Aircraft Engines

2.4 Joint Aviation Regulations:⁵

CS-E EASA Certification Standard—Engines

CS-22 EASA Certification Standard—Sailplanes and Powered Sailplanes

JAR-E Joint Aviation Requirements for Engines

JAR-22 Sailplanes and Powered Sailplanes

3. Terminology

3.1 Definitions:

3.1.1 *factor of safety, n*—multiplier of limit load to determine design ultimate load.

3.1.2 *fire proof, adj*—capable of withstanding for a period of at least 15 min the application of heat by the standard flame.

3.1.3 *fire resistant, adj*—capable of withstanding for a period of at least 5 min of heat by standard flame.

3.1.4 *limit load, n*—maximum expected static load on a component.

3.1.5 *power off, n*—for testing purposes, engine at idle.

3.1.6 *primary structure, n*—those parts of the structure the failure of which would endanger the gyroplane.

3.1.7 *ultimate load, n*—limit load multiplied by the factor of safety.

3.2 Acronyms:

3.2.1 **ASTM**—American Society for Testing and Materials

3.2.2 **CAS**—calibrated airspeed

3.2.3 **CG**—center of gravity

3.2.4 **CN**—normal force coefficient

3.2.5 **IAS**—indicated airspeed

3.2.6 **ICAO**—International Aviation Organization

3.2.7 **LSA**—light sport aircraft

3.2.8 **MGW**—maximum gross weight

3.2.9 **MPRS**—minimum power required airspeed

3.2.10 **POH**—Pilot Operating Handbook

3.2.11 **VFR**—Visual Flight Rules

3.2.12 V_H —straight and level airspeed at full power

3.2.13 V_{MIN} —minimum controllable level flight airspeed, IAS

3.2.14 V_{NE} —never exceed airspeed, IAS

3.2.15 V_Y —best rate of climb airspeed, IAS

4. Flight

4.1 General:

4.1.1 Conditions of Compliance:

4.1.1.1 Unless otherwise specified, each requirement of this section must be met for the most adverse combinations of weight and balance loading conditions within which the gyroplane will be operated.

4.1.1.2 Unless otherwise stipulated, performance requirements are at standard atmospheric conditions (15 °C (59 °F)) and sea level pressure altitude).

4.1.1.3 Each requirement of this section must be met for all configurations at which the gyroplane will be operated except as otherwise stated. (If, for example, a gyroplane is equipped with a canopy or doors and it is intended that the gyroplane may be operated with the canopy or doors removed, then the

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from Civil Aviation Authority (CAA), Aviation House, Beehive Ringroad, Crawley, West Sussex RH6 0YR, <https://www.caa.co.uk/>.

⁴ Available from Federal Aviation Administration (FAA), 800 Independence Ave., SW, Washington, DC 20591, <https://www.faa.gov>.

⁵ Available from IHS Market, 15 Inverness Way East, Englewood, CO 80112, <https://www.global.ihs.com>.