



Designation: F2316 – 12 (Reapproved 2022)

Standard Specification for Airframe Emergency Parachute¹

This standard is intended for use with designation F2316; however, immediate following the designation indicates the use of original adoption, in the case of revision, the year of latest revision. A number in parentheses indicates the year of latest revision. A superscripted epsilon (ε) indicates an editorial change since the last revision or approval.

1. Scope

1.1 This specification covers minimum requirements for the design, manufacture, and installation of parachute for airframe. Airframe emergency parachute are added in this specification effective on parachute systems designed, manufactured, and installed on aircraft and aircraft operations. This specification is not applicable to deep-pull parachute, pin-cock parachute, dog parachute, or other airframe emergency aerodynamic deceleration parachute intended for use following the aircraft and operations of the ground. The specification is applicable to the use of parachute if the aircraft is in the air of an airframe emergency parachute system designed on aircraft and operations, applicable to aircraft of deceleration.

1.2 The altitude in SI units is to be regarded as standard. The maximum altitude given in parentheses has a maximum value in inches-pounds, units. Values in parentheses are provided for information only and are not considered standard.

1.2.1 Note that in this specification, minimum requirements are applicable in accordance with International Civil Aviation Organization (ICAO) agreements. While the altitude in SI units is regarded as standard, certain altitude characteristics are not known and altitude in feet are also accepted as standard.

1.3 *Airframe emergency parachute recovery systems have become an acceptable means of greatly reducing the likelihood of serious injury or death in an in-flight emergency. Even though they have saved hundreds of lives in many different types of conditions, inherent danger of failure, even if properly designed, manufactured and installed, remains due to the countless permutations of random variables (attitude, altitude, accelerations, airspeed, weight, geographic location, etc.) that may exist at time of usage. The combination of these variables may negatively influence the life saving function of these airframe emergency parachute systems. They are designed to*

¹ This specification is intended for use with designation F37 on Light Sport Aircraft and is the direct replacement of Subcommittee F37.70 on Certification.

Current edition approved April 1, 2022. Reapproved April 2022. Originally approved in 2003. Last previous edition approved in 2014 as F2316 – 12 (2014). DOI: 10.1520/F2316-12R22.

be a supplemental safety device and to be used at the discretion of the pilot when deemed to provide the best chance of survivability.

1.4 *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 requirements prior to use.*

1.5 *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 The following are listed as references in this specification.

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *ballistic device, n*—manipulative device, motion, motion, and projectile, ping, or other object of interest.

3.1.2 *completely opened parachute, n*—the parachute has reached its maximum deployment dimension for the time.

3.1.3 *parachute deployment, n*—process of parachute activation and inflation.

4. Materials and Manufacture

4.1 *Materials*—Material used for parts and assemblies, the failure of which could adversely affect performance following condition:

4.1.1 Material shall be suitable and durable for the intended use.

4.1.2 Design altitude (English) must be chosen on a basis of critical parameters, including a level of material inflation or load concentration, or both.

4.1.3 The effect of environmental condition, which a temperature and humidity, expected in the environment, be taken into account.

5. Reserved

5.1 This section is being held as a placeholder for main airframe parachute section number.

6. Parachute System Design Requirements

6.1 Strength Requirements:

6.1.1 Strength requirements shall be specified in terms of limit load (the maximum load to be expected in service) and ultimate load (limit load multiplied by a prescribed factor).

6.1.1.1 Unless otherwise provided, prescribed load shall be limit load.

6.1.1.2 Unless otherwise provided, an ultimate load factor of 1.5 shall be used.

6.1.2 Strength analysis shall be an accepted computational method that has been established through experience. In the case of load engineering shall be conducted.

6.1.3 Strength analysis shall be supported by in-flight measurements and by an applicable weight and measure program, for example, aerodynamic and performance.

6.2 System Design—The following minimum performance standards for the basic parachute system shall be met.

6.2.1 Parachute Strength Test—A minimum of three flights of the parachute assembly shall be conducted under ultimate load conditions to demonstrate the parachute strength. The maximum parachute opening force measured in the high speed test shall be the ultimate parachute opening load. A net parachute assembly shall be used for each test. The weight of the parachute assembly included in the weight shall be as specified. Data collection shall be performed for each test and shall include recording of in-flight load characteristics.

6.2.1.1 For acceptance flights of the parachute system shall be able to support the ultimate load demonstrated during the drop test. No deformation or permanent damage to the parachute shall occur during the flight.

(1) Main attachment points shall be designed and tested for a given weight and altitude.

(2) Harness shall be opened in the designed parachute weight of flight.

6.2.1.2 An ultimate load factor of 1.5 shall be achieved by conducting the parachute strength test as follows:

(1) Parachute Strength Test with Aircraft in Flight. If the parachute is engaged and held attached to an aircraft in flight, the following parachute weight shall be applied:

Min. Test Weight = 1.25 Aircraft Maximum Gross Takeoff Weight

Min. Test Speed = 1.1 Aircraft Maximum Inertial Parachute Deployment Speed

NOTE 1. In this section, the factor of safety is considered applicable to the strength of the aircraft. However, it is not permissible to calculate the weight of the aircraft in flight.

(2) Parachute Strength Test with "Dead Weight" Payload. If the parachute is engaged and held attached to a dead weight (demonstrator, and metal chain, etc., and limited volume), the following parachute weight shall be applied:

Min. Test Weight = Aircraft Maximum Gross Takeoff Weight

Min. Test Speed = Aircraft Maximum Inertial Parachute Deployment Speed

NOTE 2. This method is based on the use of a dead weight

does not have an pitching motion and shall be designed to allow the parachute opening height, a safety factor shall be used. The effect of the maximum weight and speed shall be limited.

6.2.2 Rate of Descent—Rate of descent shall be controlled for all cases in 6.2.1. This data shall be controlled for the analysis in the vehicle weight of the parachute. Descent rate data from parachute and canopy shall be controlled to 1500 m (5000 ft) density altitude and standard temperature. Aircraft manufacturer and parachute manufacturer shall coordinate the installation of the parachute.

6.2.3 Staged Deployment—The parachute assembly shall be designed to allow the deployment sequence in an order of manner to reduce the chance of entanglement or malfunction.

6.2.4 Environmental Conditions—The system shall be evaluated for operation in the temperature range of 40 C (104 F) to 48.9 C (120 F).

6.3 Installation Design—A specific Parachute Installation Manual (PIM) for the installation of a particular parachute system on each aircraft model shall be created. The PIM shall provide sufficient information on the coordination of the parachute system on the aircraft.

6.3.1 Coordination—Aircraft and parachute manufacturer shall coordinate and jointly approve the PIM for coordination. Design configuration changes shall impact the parachute installation, performance, operability, etc. The aircraft manufacturer and parachute manufacturer shall coordinate the implementation of changes before implementation. The changes shall be documented in the revised PIM.

6.3.2 Weight and Balance—The installation of the parachute system shall be accounted for in the design data of weight and balance limits of the aircraft.

6.3.3 System Mounting—The hardware used on all the parachute system shall not become loosened or detached after flight of no matter what and where.

6.3.4 Extraction Performance—Aircraft and parachute manufacturer shall coordinate and hold the extraction device shall be clean, penetrate and connect to the parachute system, if any, and the parachute assembly shall be in the position line check (line has connected to the parachute canopy or harness) in the inhibiting or damaging the parachute equipment. While in the recognized harness configuration, it is not applicable in an emergency situation (for example, broken parachute equipment), all data shall be taken to provide a path of least resistance, minimizing the time to deployment.

6.3.5 Parachute Attachment to the Airframe—The parachute assembly shall be attached to the primary structure of the aircraft in the aircraft attachment harness shall be composed of a single harness section or a series of harness sections. The aircraft and parachute manufacturer shall coordinate and agree on the harness attachment method and the following conditions:

6.3.5.1 Parachute deployment indicator, the load distribution of the aircraft, the load distribution of the harness attachment points. The aircraft attachment points and

airframe attachment for each individual aircraft model
must comply with the maximum opening load mea-
sured in the attachment engineering described in 6.2.1. This load
shall contain the required safety factor of 1.5.

6.3.5.2 The maximum and attachment points must be
congruent in a manner that prevents aircraft in a descent
and landing attitude from having the ability of the airframe
to absorb the anticipated landing load and minimize the
probability of injury to the occupant.

6.3.5.3 The airframe attachment must be loaded
from the intended attachment of the airframe attachment point
and loaded in a manner that prevents impact from incoming
normal operation. It must be shown that the maximum
load will be efficiently supported by the attachment of the
attachment to the fuselage structure of the aircraft.

6.3.5.4 The airframe attachment design must mini-
mize the potential for connection with the fuselage. If con-
nection with the fuselage is unavoidable by the design of
operation in connection with the engine, the
airframe attachment must be manufactured from ma-
terial having a reasonable likelihood of supporting a con-
nection with the fuselage.

6.3.6 *Activating Housing Routing*—The attachment must
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and

be the airframe component in the code:

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11.2.1 *Installation and Size of Placard or Label*—The identification placard shall be maintained in all the following placard or label in a manner deemed by the authority having jurisdiction and documented in the PIM.

11.2.2 *Label Size and Color*—All placard or label shall follow the coloration method described below. The height of placard or label shall add the different location for installation.

11.2.2.1 *Danger Placard*—Danger placard or label shall be printed in a boldface type (see 11.2.2.1.1) and shall include the following graphic elements:

(1) *Danger Placard for Interior Parachute Installation*—A 7.62 cm (3 in.) minimum height placard or label shall be used. Danger (see sample placard Fig. X1.1 of Appendix X1) shall be placed adjacent to the parachute egress point for enclosed aircraft. The placard shall be maintained in a visible form at all times.

(2) *Danger Placard for Exterior Parachute Installation*—A 5.08 cm (2 in.) minimum height placard or label (see sample label Fig. X1.1

S3.1.1 The emergency package manufacturer shall establish in production and ensure a one-time each article produced conforms to the original engineering specification, as defined below:

S3.1.1.1 In production for a material, purchased item, and part and assemblies produced by suppliers, including methods, edon, acceptable, and of part and assemblies shall cannot be completed in production for conformity and, shall then delivered to the package manufacturer's facility.

S3.1.1.2 Production in production of individual parts and complete assemblies, including the identification of an special manufacturer's process in order, the means, edon control

the process, and the national, shall in production of the completed emergency package item.

S3.1.1.3 A nonconforming material shall item shall include documentation of part disposition decision and a edon disposition of rejected part.

S3.1.1.4 A edon informing company in production of a edon change in engineering drawing, specification, and, shall control process.

APPENDIX

(Nonmandatory Information)

X1. SAMPLE OF LABELS (PLACARDS)

X1.1 The sample label shown in Fig. X1.1 meets the edon provided in 11.2.2.1.

X1.2 The sample label shown in Fig. X1.2 meets the edon provided in 11.2.2.2.

X1.3 The sample label shown in Fig. X1.3 meets the edon provided in 11.2.2.3.

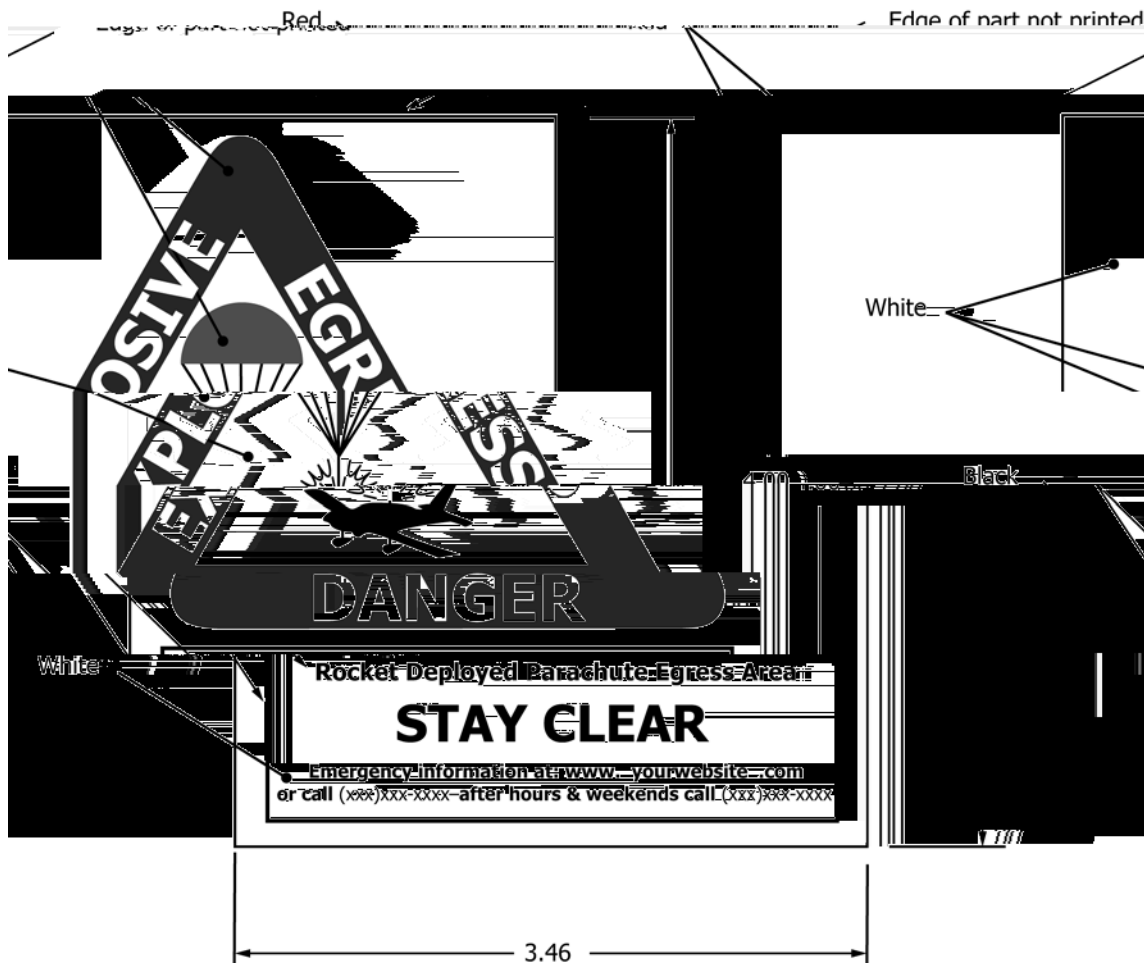


FIG. X1.1 Sample Danger Label

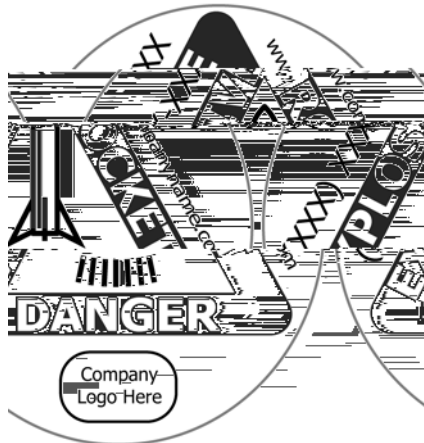


FIG. X1.2 Sample Identifying Label

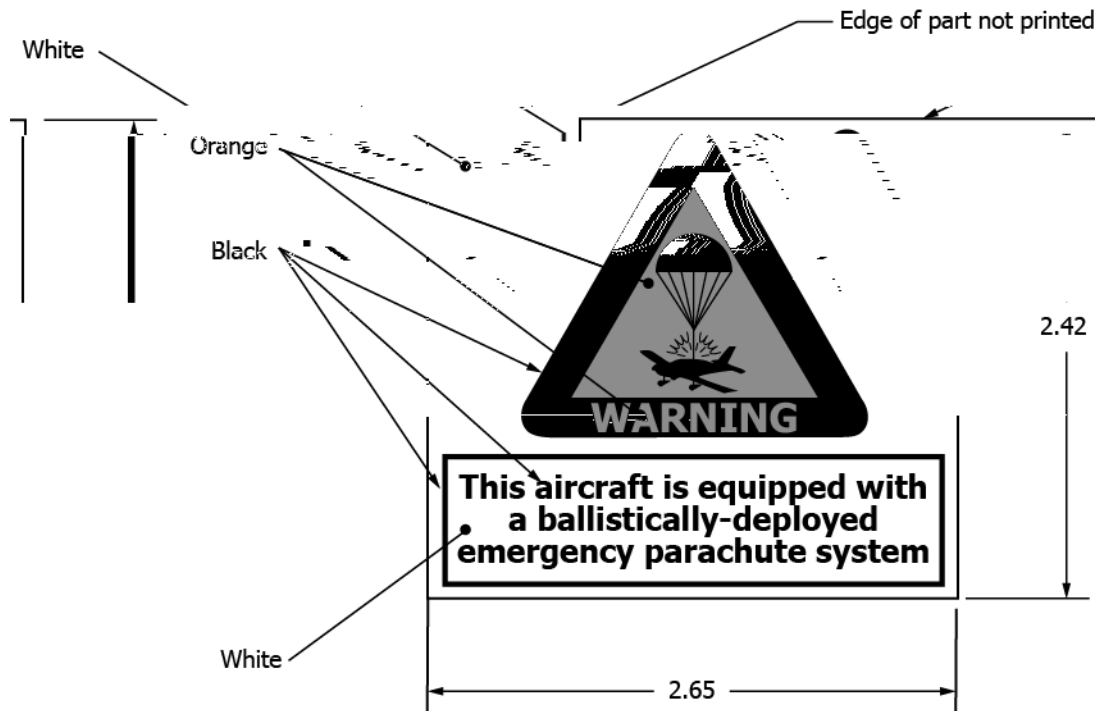


FIG. X1.3 Sample Label

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