SAE AS8015 REV. A

AEROSPACE STANDARD

MINIMUM PERFORMANCE STANDARDS FOR PARACHUTE ASSEMBLIES AND COMPONENTS, PERSONNEL

1. SCOPE:

This specification defines the minimum performance standards for personnel parachute assemblies to be carried in aircraft or worn by passengers, crew, or parachutists for emergency use.

This specification covers two types and three weight/speed categories of personnel carrying parachute assemblies:

1.1 Types:

1.1.1 Reserve parachute assembly (The term reserve and auxiliary are used synonymously).

1.1.2 Emergency parachute assembly.

1.2 Weight/Speed Ranges: The weights and speeds are maximum for each category.

1.2.1 Category A: 90 kg (198 lb)/130 knots.

1.2.2 Category B: 115 kg (254 lb)/150 knots.

1.2.3 Category C: 115 kg (254 lb)/175 knots.

2. Definitions:

2.1 RESERVE PARACHUTE ASSEMBLY: A parachute assembly which is worn in conjunction with a main parachute assembly used for a premeditated jump.

2.2 MAIN PARACHUTE ASSEMBLY: A parachute assembly, excluding the harness, that is used in conjunction with a reserve parachute assembly as the primary parachute assembly (the one intended for use) for premeditated jumps.

2.3 TANDEM (PIGGYBACK) PARACHUTE ASSEMBLY: A parachute assembly having a reserve and a main parachute, stowed separately, but in compartments on the same side of the body.

2.4 EMERGENCY PARACHUTE ASSEMBLY: An emergency parachute assembly worn for emergency, unpremeditated use only.

2.5 GENERAL: For purposes of this specification a parachute assembly normally consists of seven major components:

1. Canopy (includes suspension lines).
2. Deployment device (sleeve, bag, or equivalent), if used.
3. Pilot chute (including bridle), if used.
4. Riser(s), if used, when not integral with harness and/or canopy.
5. Stowage container (pack).
6. Harness.
7. Primary actuation device (ripcord assembly or equivalent)

3. MATERIAL AND WORKMANSHIP:

3.1 Materials and workmanship shall be of a quality which documented experience and/or tests have conclusively demonstrated to be suitable for the manufacture of parachutes. All materials shall remain functional for storage and use from -40 to +93.3 °C (-40 to +200 °F). All plated ferrous parts shall be treated to minimize hydrogen embrittlement.

4. DETAIL REQUIREMENTS

4.1 Design and Construction:

4.1.1 Fittings: All fittings shall be designed to support the proof loads specified in the applicable specification, drawing, standard, etc., without yielding.

4.1.2 Stitching: Stitching shall be of a type that will not ravel when broken.

4.1.3 Primary Actuation Device/Ripcord: The primary actuation device/ripcord, including joints between the handle and the release, shall withstand the test loads of 4.3.1 without failure and shall meet the functional requirements of 4.3.2. The actuation grip shall be located as to be readily visible and accessible.

4.1.4 Harness Release: The harness shall be so constructed that the rider can separate himself from the canopy and/or harness assembly unaided.

4.1.5 Main Canopy Release: A quick releasing device between the harness of a reserve parachute assembly and the main canopy is mandatory.

4.2. Marking: Except as noted below, the following information shall be legibly and permanently marked on each major component in a location subject to a minimum of obliteration:

Part number, including dash numbers
Manufacturer s name and address
Date of manufacture and/or serial number
FAA TSO-C23c
Category A, B, C placards (see table)

4.2.1 Stowage Container: The information in 4.2 shall be marked on or attached to the outside of the parachute stowage container (pack). In addition, the stowage container shall be provided with a parachute data card pocket constructed such that the card will not be easily lost but will be readily accessible.

4.2.2 Canopy: In addition to the above information, the canopy markings shall include the canopy serial number.

4.2.3 Primary Actuation Device/Ripcord: The following information shall be marked on the primary actuation device/ripcord:

Part number, including dash number
Manufacturer s identification
TSO-C23c
Batch or serial number, and/or date of manufacture

4.2.4 Documents: The manufacturer shall provide all necessary instructions and/or manuals.

4.3 Qualification Tests: The following minimum performance standards shall be met. There shall be no failure to meet any of the requirements during the qualification of this section. In case of a failure, the cause must be found, corrected, and all affected tests repeated.

4.3.1 Ripcord Test: The ripcord, including all joints between the handle and the release, shall not fail under a straight tension test load of 1335 N (300 lbf) applied for not less than three seconds. If the ripcord is to be static line operated, the test shall be 2670 N (600 lbf) for not less than three seconds. The pins, if used, shall not yield under a 36 N (8 lbf) load applied to the cable (or equivalent) perpendicular to the axis of the pin. The pin shall be supported for 13 mm (.5 in.) maximum at the end farthest from the cable attachment.

4.3.2 Pull Test, Primary Actuation Device/Ripcord: Reserve parachute assemblies shall be tested both with the main compartment(s) full and empty.

4.3.2.1 Human Factors: The primary actuation device shall be ground tested by use of a representative group of no less than five male and five female subjects. They shall be able to operate the actuation device without undue difficulty while is a suspended harness. The ripcord, or equivalent, shall be sealed for these tests.

4.3.2.2 Pull Tests: A load AT THE RIPCORD HANDLE of not less that 23 N (5 lbf) (applied in the direction giving the lowest pull load) nor more than 97 N (22 lbf) [APPLIED IN THE DIRECTION GIVING THE HIGHEST PULL LOAD UNDER NORMAL DESIGN OPERATIONS] shall be required to cause a positive and quick functioning of the parachute assembly on all tests. A minimum of ten pull tests is required. For chest-type parachute assemblies, the maximum pull force shall be 66 N (15 lbf)

4.3.3 Compressed Pack and Environmental Test: Three drops shall be made to the lowest applicable speed phase in 4.3.6 except that prior to the test the parachute assembly shall be subjected to the following conditioning:

4.3.3.1 Four hundred continuous hours with a 890 N (200 lbf) load applied to compress the pack. Sixteen hours at 93.3 °C (+200 °F) without the 890 N (200 lbf) load. Immediately re-apply 890 N (200 lbf) load and stabilize to ambient and test drop.

4.3.3.2 Sixteen hours at -40 °C (-40 °F) without the 890 N (200 lbf) load. Immediately apply 890 N (200 lbf) load and stabilize to ambient and test drop.

These tests may be combined with 4.3.6 when practical.

4.3.4 Strength Test: No material(s) or device(s) that attenuates shock loads and is not an integral part of the parachute assembly or component being certificated may be used. Tests may be conducted for either a complete parachute assembly or a separate canopy. There shall be no evidence of material, stitch, or functional failure that will affect airworthiness. The same canopy, harness and/or riser(s) shall be used for all 4.3.4 tests. Parachute assemblies may be tested in accordance with Category A, B, or C.

4.3.4.1 Parachute Assembly: Three drops shall be made with a 136 kg (300 lb) man-shaped dummy. The velocity of the dummy shall be in accordance with category A, B, or C schedule (see Table 1). Where easily detachable hardware (such as snap and ring) is used to attach the canopy or riser(s) to the harness, a cross connector must be used and one test shall be with only one attachment engaged to test the cross connector and hardware.

4.3.4.2 Canopy (Alternate Test for 4.3.4.1): Three drops shall be made with a suspended weight of 136 kg (300 lb) and a velocity in accordance with Category A, B, or C schedule (see Table 1). A test vehicle (e.g., a bomb) may be used. The canopy, deployment device (if used), a pilot chute (if used), and riser(s) (if used) shall be tested as a unit. The riser(s), or equivalent, shall be secured to the test vehicle in the same manner that it is intended to attach to the harness. Where easily detachable hardware (such as snap and ring) is intended to attach the canopy or riser(s) to the harness, one drop shall be made with only one attachment engaged to test the cross connector and hardware.

4.3.5 Functional Test (Twisted Lines): A minimum of five drops shall be made with a 77 kg (170 lb) dummy or person. The indicated airspeed at the time of release shall be 60 knots. Three twists (360° each) shall purposely be packed in the suspension lines adjacent to the lowest attachment point to the canopy. The parachute must be fully open within four seconds from the time of pack release.

4.3.6 Functional Test (Normal Pack): There shall be a minimum of 48 drops from an aircraft with a 77 kg (170 lb) dummy or person. The indicated airspeed at the time of pack release shall be as follows for 16 drops each: 60, 85, and 110 knots IAS. In addition, reserve parachute assemblies shall be dropped 8 times by breaking away

from an open and normally functioning main parachute canopy and releasing the reserve pack within two seconds of breakaway. The parachute canopy must be fully open within three seconds from the time of pack release. These tests may be live jumps by a 77 kg (170 lb) individual except that at least two dummy drops shall be made at 60, 85, and 110 knots IAS. Reserve parachute assemblies shall be tested with the main compartment(s) full and empty (24 tests full).

4.3.7 Rate of Descent Tests: There shall be at least 6 drops, of which at least 3 shall be dummy drops, from an aircraft with a 77 kg (170 lb) (min) individual and/or dummy. The average rate of descent shall not exceed 6.4 m (21 ft) per second for that last 30 m (98 ft) corrected to standard sea level altitude conditions. A method shall be employed for direct and accurate measurement of rate of descent such as the use of a weighted cord or cable by which the descent may be timed for the last 30 m (98 ft) from the time of ground impact of the weight to ground impact of the dummy. The oscillation shall not exceed 15 from the vertical. These tests may be combined with other tests in this section.

4.3.8 Live Drop Tests: There shall be a minimum of 4 live drop tests from an aircraft with an individual weighing 77 kg (170 lb) (PLUS the weight of the certificated reserve parachute assembly). Two drops shall include a freefall of not more than three seconds and two drops shall include a freefall of at least 15 seconds. These tests may be conducted in conjunction with functional and/or rate of descent tests when practical. (The user must suffer no significant discomfort from the opening shock and must be able to disengage himself unaided from the harness after landing.) For this test the standard harness may be altered to permit attachment of a certificated reserve parachute assembly (less harness) provided that such alteration does not interfere with the normal operation of the parachute assembly being tested. Reserve parachute assemblies shall be tested with the main compartment(s) both full and empty.

5. COMPONENT QUALIFICATION:

5.1 Parachutes may be qualified as complete assemblies or as components (e.g., just the harness/container assembly). The airworthiness of a parachute assembly, including other separately approved, non-original components, is the responsibility of the manufacturer who performs the certifying tests for the parachute assembly. The manufacturer shall publish and make available a list of interchangeable components which have passed the following tests in 4.3 when tested in conjunction with the assembly or component(s) being certificated.

TABLE 1
CATEGORIES A, B, OR C SCHEDULE

CATEGORY A TEST	136 kg (300 lb) at 150 knots.
Placard:	CATEGORY A: This parachute is limited to use by persons up to 90 kg (198 lb) fully equipped, and up to 130 knots.
CATEGORY B TEST	136 kg (300 lb) at 175 knots.
Placard:	CATEGORY B: This parachute is limited to use by persons up to 115 kg (254 lb) fully equipped, and up to 150 knots.
CATEGORY C TEST	136 kg (300 lb) at 230 knots.
Placard:	CATEGORY C: This parachute is limited to use by persons up to 115 kg (254 lb) fully equipped, and up to 175 knots.

SPEEDS ARE GIVEN IN KEAS, AND ARE INTENDED TO BE AT PACK OPENING.

5.1.1 Canopy Including Suspension Lines: 4.3.2, 4.3.3, 4.3.4.1 (or 4.3.4.2), 4.3.5, 4.3.6, 4.3.7, 4.3.8

5.1.2 Deployment Device: 4.3.2, 4.3.3, 4.3.4.1, (or 4.3.4.2), 4.3.5

5.1.3 Pilot Chute (Including Bridle): 4.3.2, 4.3.3, 4.3.4.1 (or 4.3.4.2), 4.3.5, 4.3.6, 4.3.8

5.1.4 Stowage Container (Pack): 4.3.2, 4.3.3, 4.3.6

5.1.5 Harness: 4.3.4.1, 4.3.6, 4.3.8

5.1.6 Actuation Device (Ripcord): 4.3.1, 4.3.2, 4.3.6, 4.3.8

5.1.7 Riser(s): 4.3.4.1 or 4.3.4.2, 4.3.6, 4.3.8