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MILITARY STANDARD

TESTING STANDARD FOR PERSONNEL PARACHUTES

FSC 1670

DEPARTMENT OF DEFENSE
WASHINGTON, D. C. 20301

Testing Standard for Personnel Parachutes

MIL-STD-858

1. This military standard is mandatory for use by all departments and agencies of the Department of Defense.

2. Recommended corrections, additions, or deletions should be addressed to Commander, Systems Engineering Group, Attention: ASD (ASNPS), Wright-Patterson Air Force Base, Ohio 45433, or Commander, Naval Air Systems Command, Attention: Code AIR-5312, Washington, D.C. 20360, or Commanding General, U.S. Army Natick Laboratories, Attention: AMXRE-QSA, Natick, Massachusetts 01762.

FOREWORD

The military standard, Testing Standard for Personnel Parachutes has been prepared to define engineering methods, procedures and data requirements which would serve the RDT & E community primarily within the Department of Defense and its contractors. This standard specifies detailed qualification test methods and procedures, and lists minimum data acquisition requirements. The establishment of acceptability criteria for a specific test, item or system shall remain the responsibility of the cognizant project officer. The procuring activity (cognizant project officer, specification writer, contracting officer or engineer) must specifically define which test method or test methods are required when incorporating this standard or contract.

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1. SCOPE

1.1 Purpose. - This standard establishes test methods and procedures for the developmental and qualification testing of experimental man-carrying parachute assemblies and components thereof, and outlines the general categories of personnel parachutes. The test methods and procedures contained herein are intended to specify suitable static and dynamic test conditions, to provide a wide range of data applicable to actual service conditions, and to obtain repeatability of the test results. It is not intended that this document contain detailed acceptance criteria for all test methods but that it provide the necessary performance standard relative to the escape requirements established for various weapons systems. Neither is it intended to eliminate test requirements of CCC-T-191 or MIL-STD-810.

This standard is intended for newly designed items and should not be applied retroactively to existing government contracts or to future contracts intended for follow-on procurement of inventory items.

1.2 Classification. - This standard covers, but is not limited to, the parachute assemblies listed below, and can be applied to total escape and recovery systems, as applicable.

(1) Seat
(2) Back
(3) Chest
(4) Reserve
(5) Troop
(6) Rescue
(7) Maneuverable
(8) Training
(9) Special purpose

1.3 Application. - The test methods contained in this standard apply broadly to entire parachute assemblies and major subassemblies, and generally represent the extreme conditions which usually constitute the minimum acceptable conditions for evaluation purposes.

When it is known that the equipment will encounter conditions more severe or less severe than those tests stated herein, the tests may be modified or waived, in the applicable documents by the activity having engineering responsibility.

1.4 Order of desired characteristics. - Unless waived by specific contract requirements, the following characteristics, listed in order of relative importance, shall be considered for a new system, assembly, or concept.

(1) Reliability of inflation
(2) Bulk and weight
(3) Opening shock, strength
(4) Rate of descent, drag
(5) Operational envelope
(6) Stability
(7) Ease of maintenance, cost and repack requirements
(8) Comfort and fit
(9) Equipment interface
(10) Human factor considerations

1.5 Test method numbering system. - The test methods are designated by numbers 101 through 199, inclusive. The test methods are numbered in the order in which they are introduced into this standard and intended use.

1.5.1 Revision of test methods. - Any revision of test methods is indicated by a decimal following the method number. For example, the original number assigned to the first test method is 101; the first revision to that method is 101.1, the second revision is 101.2, and so forth. It is intended that each test method be independently revised, either totally or in part, when the need arises.

1.6 Identification. - The test methods contained in this standard are identified as follows:

Test Method No.	Method title
T101	Basic Design Evaluation, General
T102	Basic Evaluation, Harness (Drop Tower)
T103	Basic Evaluation, Volume and Weight
T104	Basic Evaluation, Parachute Assembly or Components, (Whirl Tower)
T105	Design and Structural Integrity Evaluation (Parachute Harness)
T106	Design Evaluation (Parachute Assembly)
T107	Ultimate Strength Evaluation (Destruction)
T108	Physiological and Psychological Evaluation of a Prototype Parachute Assembly Using Test Subject

Test Method No.	Method title
T109	Parachute Container; Airblast Integrity, Environmental and Ripcord Pull Tests
T110	Performance Demonstrations and Ratings
T111	Service Evaluation and Maintainability
T112	Design and Structural Verification (Parachute Assembly)

2. REFERENCED DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

Federal

CCC-T-191	Textile Test Methods

Military

MIL-H-7195	Hardware, Parachute, General Specification For
MIL-Q-9858	Quality Program Requirements
MIL-H-19089	Harness, Integrated Parachute
MIL-R-21468	Release, Parachute, Ripcord Automatic

STANDARDS

Military

MIL-STD-810	Environmental Test Methods
MIL-STD-849	Inspection Requirements, Definitions and Classifications of Defects for Parachutes

PUBLICATIONS

US Army

Air Delivery Engineering Handbook Vol. 1, Basic Information

US Navy

NAVAER 00-80R-30	Aeronautical Dictionary
NAVWEPS 00-65-502	Handbook, Reliability Engineering
NAVAERORECOVFAC INST. 3900.1	Instructions for Authors of Technical Reports

US Air Force

ASD TR 61-579	Performance of and Design Criteria for Deployable Aerodynamic Decelerators
WADC TR 52-321	A Compendium of Anthropometry

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. DEFINITIONS AND TERMS USED IN TESTING PARACHUTES AND RELATED COMPONENTS

3.1 Terms and definitions. - The terms used to describe all aspects of parachute testing and reporting and detailed information concerning parachute technical terminology can be obtained from NAVWEPS 00-65-502, MIL-STD-849, NAVAER 00-80R-30, ASD-TR-61-579, and US Army Air Delivery Handbook, Volume 1.

4. GENERAL REQUIREMENTS

4.1 Formulation of test. - Tests shall be performed in the manner specified in the individual equipment procurement specification. When the test sequence or method is not specified, it is the responsibility of the test activity to determine the order in which test methods shall be used. Only those conditions that reflect actual service usage plus margin of safety, including shipping and ground handling, should be employed. Those conditions which would adversely affect operation, or most probably include a malfunction of the test item, should be given emphasis.

4.1.1 Acceptability criteria. - Normally the procuring activity, activity having engineering responsibility, or contractor requiring testing will determine the acceptability criteria for a given series of tests, and will establish the minimum confidence level and reliability factor. In the absence of this information, the testing laboratory shall establish these criteria as part of its formal test plan. Calculations and terms can be found in NAVWEPS 00-65-502.

4.1.2 Inspection and documentation. - The procuring activity, activity having engineering responsibility, or contractor will determine the extent of inspection in accordance with MIL-STD-849 or MIL-Q-9858, and degree of documentation required for test configuration certification and test standards. In the absence of such information, the testing laboratory shall establish these values and shall detail them in the testing laboratory test plan document.

4.1.3 Safety. - The testing laboratory shall keep interested activities and contractors advised of range safety, flight safety, special ground handling, or checkout device requirements to insure a high level of safety during testing. The test sponsor or contractor shall keep the testing laboratory apprised of known or potential hazards.

4.1.4 Construction. - Articles tested under this laboratory standard shall be constructed of materials covered by MIL-H-7195, MIL-H-19089, and MIL-R-21468 unless design requirements dictate use of a new material. In this case, the activity having engineering responsibility or contractor requesting tests, or the testing laboratory shall perform tests which will demonstrate an acceptable degree of reliability of the item in the particular design concept to be tested.

4.2 Performance of tests. -

4.2.1 Pretest record. - Prior to performing any of the tests, the test item shall be examined for conformance with the controlling sketches, drawings or specifications. The procuring activity, activity having engineering responsibility, or contractor shall supply an engineering data package the necessary sketches, drawings, specifications, or check lists.

4.2.1.1 Test sequence. - Written description of the planned sequence of operation of the test item system shall include: Event times, System schematics, Backup system, and Trajectories (maximum and minimum).

4.2.1.2 The test item shall be assembled, rigged, packed or serviced in accordance with the applicable manual or check list as specified in the procurement document or furnished by the procuring activity, activity having engineering responsibility, or contractor, or as prepared by the testing activity. This step is necessary to insure that the desired configuration will be achieved.

4.2.1.3 A test plan (program) shall be prepared by the testing activity to indicate the selected test methods, test configuration, test objectives, test conditions, and any other required parameters.

4.2.1.3.1 Bench tests shall be performed to insure that a proper fit and assembly of parts has been obtained, and that the test item(s) functions in accordance with the specified planned sequence of events.

4.2.2 Item identification. - Configuration control sheets shall include the drawing number breakdown and serial numbers of all test item parts, if applicable, and also shall include types, size, construction details of particular significance or importance to the test item.

4.2.2.1 Listing shall indicate contractor or Government furnished equipment, as applicable.

4.2.2.2 List and identify those actuators, sensing devices, ballistic guns or disconnects and protechnic devices used on the test item. Include serial numbers, lot numbers, and loading dates where applicable.

4.2.3 Pretest general. - Installation and/or rigging for the drop test dummy, vehicle or subject shall be accomplished using check lists, drawings, or sketches showing the planned test configuration.

4.2.3.1 The launch device(s) and/or systems for a test vehicle or dummy planned to be launched from aircraft shall be tested prior to take off, whenever possible. The test dummy shall be painted in such a manner to assist in photographic acquisition, performance evaluation, and post-test recovery. Flight suits of test parachutists, when practical, are to be distinctively color coded.

4.2.3.2 Communications. - Where a communication system is required for test, or when it provides a signal for a reserve backup recovery system, it shall be functionally cycled prior to test time.

4.2.3.3 Final test configuration. - A final examination of the entire configuration, including test item(s) and all supporting equipment, shall be made prior to takeoff.

4.2.3.4 Coordination. - Coordination briefings are to be performed prior to the tests, on a scale commensurate with the test item(s) degree of complexity, or data requirements. This normally will consist of, but not be limited to, the following:

(a) Test range identification
(b) Test data, aircraft type and airspeed at launch, altitude of launch and other major factors, planned course track, type control, and trajectories
(c) Data acquisition information including cinetheodolite, range timing, drawing requirements, photographic requirements (movie and still)
(d) Range safety requirements
(e) Post-test handling plans

4.2.4 In-flight, pretest check. - Prior to release, exit or dropaway of test subject vehicle, a checkoff to assure meeting of minimum requirements as required by 4.2.1.1 shall be performed.

4.2.5 Inspection reliability and failure criteria. - When inspection is specified as a part of the test method in accordance with MIL-Q-9858, the test item shall be monitored during preparation, test, and post-test periods. A record shall be maintained to establish damage patterns and trends. A comprehensive failure analysis and corrective action feedback loop shall be established to determine confidence factors and reliability levels in accordance with NAVAER 00-65-502.

4.2.6 Acceptability criteria. - The activity having engineering responsibility or contractor shall define by specific contractural documents and/or specifications, acceptability criteria for evaluation of test results. In the absence of these guide lines, the test conductor of the testing laboratory shall determine for individual tests their classifications.

4.3 Test conditions. - Unless otherwise specified in a task authorisation document, all measurements and tests shall have the following information recorded prior to, or during test:

(a) Ambient temperature, wind velocity and direction, relative humidity, barometric pressure, pressure altitude at launch, dynamic pressure at launch and major events during deployment.
(b) The instruments used to measure test conditions shall have their accuracy established and checked by the testing laboratory, and calibrated to a minimum of secondary standards traceable to the U.S. Bureau of Standards.

4.4 Testing methods. - The following test methods are established to detail minimum acceptable standards for testing personnel parachute assemblies and components thereof. Parachute assemblies or components which have been proven under conditions identical to those prescribed herein shall conform to CCC-T-191 and MIL-STD-810.

4.4.1 Reports. - A technical report shall be prepared at the conclusion, completion or cancellation of a test program. Additionally, interim reports shall be submitted as required by the activity having engineering responsibility. The format shall be in accordance with requirements of the activity having engineering responsibility (NAVAER 00-80R-30, NAVAERORECOVFAC Inst. 3900.1, US Army Air Delivery Engineering Handbook Vol. 1, Basic Information and ASD TR 61-579).

5. TEST METHODS

5.1 Individual methods follow.

Custodians:
Army - GL
Navy - AS
Air Force - 11

Reviewer activities:
Army - AV, GL, MD
Navy - AS
Air Force - 11, 82

Preparing activity:
Air Force - 11

Project No. 1670-0181

METHOD T101

BASIC DESIGN EVALUATION, GENERAL

1. Purpose. - In-flight parachute dummy drop tests are performed to obtain initial engineering design data and to determine if subsequent broad-base detailed tests are warranted or justified, for a specified design concept. Under varied conditions, test data shall be obtained for: Deployment characteristics, rate of descent, oscillation, force history, reliability level and minimum operational envelope.

2. Procedure. - Test program will not necessarily be limited to procedures listed as follows:

(a) Preparation for tests. - Confirm that records, test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. - A torso dummy shall be used.

(1) Launching and deployment. Devices and techniques which do not simulate actual usage conditions shall not be used.

(c) Parachute re-use limitations. - Parachutes may be used more than one time as indicated in table T101-I or in accordance with specific directions of the activity having engineering responsibility or contractor. However, parachutes which have had major repairs shall not be used.

(d) Test schedule. -

(1) Total number of new parachute assemblies required: 12
(2) Total number of tests: 36
(3) Permeability tests shall be performed on each parachute canopy, prior to initiation and after final tests of the parachutes are complete, in accordance with Test Method 5450 of CCC-T-191. If a single canopy is used, permeability shall be measured after each test condition is complete.

TABLE T101-I. Parachute reuse tests

(Launch altitude 2,000 pressure altitude) Suspended weight: 220 ±2 lbs.

Test condition number	Number of new parachutes required 3/	Number of tests each parachute 3/	Launch airspeed - knots equivalent airspeed (KEAS ±5 percent)	Delay time/ activation methods 1/
1	2	3	110	Static line
2	2	3	40-80 2/	Static line
3	2	3	200 2/	Static line
4	2	3	110	4-6 sec.
5	2	3	40-80 2/	4-6 sec.
6	2	3	200 2/	4-6 sec.

1/ Unless part of design, static lines shall open parachute container, but shall not be attached to canopy apex.
2/ Telemetry measurement (TM) can be waived at discretion of the testing laboratory.
3/ Alternate tests may be performed by using a single canopy. If no significant damage is noted, four tests under each test condition in the following order can be performed: 2, 5, 1, 4, 3, and 6.

3. Minimum data requirements. -

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids and ground support equipment.
(3) Packing, rigging, inspection check lists, and launch procedure instructions.
(4) Damage charts as required.
(5) Repair and modification records.
(6) Test setup description and planned sequence of operations.
(7) Data covering average permeability of each canopy.

(B) Cinetheodolite coverage, using a minimum of three stations, and recording binary time of day and corrected for meterological conditions resulting in:

(1) Event times vs. altitude.
(2) Rate of descent vs. altitude.
(3) Drag coefficient vs. time.
(4) Lift to drag ratio vs. time for special configurations.
(5) Oscillation vs. time.
(6) Dynamic pressure vs. time.

(C) Testing condition information.

(1) Record drop date and place of drop.
    (a) Record drop airspeed.
    (b) Record drop altitude.
(2) Record drop time.
(3) Record testing laboratory test identification (test program and drop number).
(4) Record weather conditions.
    (a) Record launch altitude free air temperature.
    (b) Surface winds (knots).
    (c) Barometric pressure (inches Hg.).
    (d) Surface temperature (°F).
(5) Test dummy.
    (a) Record percentile.
    (b) Record suspended weight to nearest pound (lb).
    (c) Record gross weight to nearest pound (lb.).
(6) Data
    (a) Riser forces vs. time.
    (b) Oscillation vs. time.
    (c) Accelerations vs. time.

(D) Photographic coverage.

(1) Motion picture, 16mm, 200 frames per second, color with timing pulses, and flash record of zero event.
(a) Ground-to-air.
(2) Sequence stills, 70mm, black and white, with binary time of day.
(3) Still coverage, black and white.
(a) Packing and rigging coverage as may be required.
(b) Damage and descent still coverage as may be required.

METHOD T102

BASIC EVALUATION, HARNESS (DROP TOWER)

1. Purpose. - Dynamic ground test methods are performed to obtain the degree of structural soundness of a new parachute harness design, modification or change without the high costs in manpower, equipment, aircraft or other related requirements of an in-flight parachute drop test. These tests will provide the data necessary to improve harness design during the early developmental stage of a qualification program.

2. Procedure. - (Test programs will not necessarily be limited to the procedures listed below as the design intent shall have to be a major consideration.)

(A) Checkout of test item.

(1) Confirm that the test configuration and test conditions are in accordance with section 4, paragraph 4.2.
(2) A harness to be tested by this method shall be constructed of new straps and hardware. Any major change of design, (i.e., stitch pattern, change of materials, rerouting of straps, relocation of hardware, change of type or style of hardware) shall be considered an invalidation of previous test results.

(B) Test support equipment.

(1) Load requirements. A torso bent-shaped dummy shall be used (300 ±2 pounds).
(2) A quick release device incorporated in the hoist cable, near the dummy, permits release on command. The dummy shall be dropped from a sufficient height to generate a force of 7,000 to 9,000 pounds. Average force for five tests on same harness must be 8,000 pounds, or above.
(3) A drop cord attached to the dummy base may be used as a height indicator. This cord shall be divided and marked off in increments sufficient for the measurements to be taken.

(C) Test preparation.

(1) The risers, shoulder or attach points shall be attached to the snubbing cable which is attached to fixed point on drop tower.
(2) Forces shall be measured by the introduction of a force transducer in each riser and by a single force transducer recording total load in the snubbing cable.

(D) Test conduct.

(1) Normally, the dummy with test item harness shall be drop tested in a feet down attitude. However, if the requirements of a specific harness assembly require other attitudes, special slings adapted to achieve the specific desired drop away angle can be used.

(2) Determine amount of slippage of web straps through the hardware by marking with a contrasting thread on each side of the web at a convenient reference point (use edge of slide bar). Unless waived by detailed contract requirements, or the activity having engineering responsibility, slippage of any piece in excess of 1/2 inch or breakage of a web strap, major stitch pattern damage, or piece of hardware shall be considered a test failure and redesign shall be required of failed parts before testing is resumed.

(E) Minimum test requirements.

(1) Five successive tests (with only minor damage, slippage,, or a specific number prescribed by detailed contract requirements, or the activity having engineering responsibility shall be made on one harness. An average force of at least 8,000 pounds will be required without slippage in excess of 1/2 inch or structural failure with the same harness. A detailed inspection shall be performed prior to and after each test.

(F) Minimum data requirements.

(1) Configuration control.
- (a) Drawings and/or sketches of test item.
- (b) Drawings and/or sketches of auxiliary support items.
- (c) Rigging and inspection checklist and instructions.
- (d) Line drawings of harness to record damage.
- (e) Repair and modification record.
- (f) Test setup description and planned sequence of operations.

(2) Test condition information.
- (a) Record drop date and place of drop.
- (b) Record drop time.
- (c) Record testing laboratory test identification (test program or drop number).
- (d) Record type of dummy.
- (e) Record suspended weight (lbs.) to nearest pound.
- (f) Record imposed forces and point at which measured.

(3) Photographic coverage.
- (a) Motion picture, 16 mm, color, 400 to 1,000 frames per second, with timing pulses, at least two cameras to be about 90 degrees apart from subject.
- (b) Rigging and damage stills, black and white, as may be required.

METHOD T103

BASIC EVALUATION, VOLUME AND WEIGHT

1. Purpose. - A standard method of obtaining volume and weight measurements is performed to assist those persons charged with system effectiveness in the evaluation of a proposed assembly or system.

2. Procedure. - This procedure shall be followed to obtain data concerning parachute systems, subassemblies, and components.

(A) Item shall be checked for conformance to approved drawings or sketches.

(B) Equipment requirements.

(1) Scales, 0-5 lb. range, (1/10-lb. accuracy), 0-50 lb. range, (1/10 lb. accuracy), 0-500 lb. range, (1/4-lb. accuracy), calibrated every 6 months to U.S. Bureau of Standards secondary standards.

(C) Packed configuration. - Pack parachute assembly in accordance with applicable packing instructions. Record weight of entire assembly to the nearest one-quarter pound.

(D) Detailed part weight. Reduce the parachute assembly in paragraph (C) above to the following detailed parts, components or subassemblies. Record weight to nearest tenth of pound. The list below is typical, however, breakdown will depend on type of assembly.

(1) Pilot parachute with connector bridle.
(2) Drag parachute with connector bridle.
(3) Deployment bag (or sleeve).
(4) Container.
(5) Ripcord, housing, and pockets.
(6) Automatic actuator, housing, cables, cartridges, deployment mortars.
(7) Static lines.
(8) Canopy, suspension lines, connector links.
    (a) Harness subassemblies.
(9) Harness and related hardware.
(10) Back, seat, and special purpose cushions.
(11) Raft or survival kit with related hardware and straps.

(E) Density and volume. To determine the volume of a parachute canopy, the following steps shall be performed.

(1) Assembly to be checked for volume shall consist of the parachute canopy and suspension lines with connector links. Detach the pilot parachute, container, cushions and other related parts.

(2) Insert test item into the cylindrical container, of a suitable size, manufactured as shown on figure 1. The test item shall be spread evenly into the bottom of the cylindrical container, the suspension lines shall be evenly placed on top of the test item. Minor adjustments to test item to allow the 15 pound pressure plate to lie flat can be made. The plate shall then be allowed to rest on top of the test item for 30 ±5 minutes. At the end of time period, the distance from the base of the container to the bottom surface of the pressure plate shall be measured to the nearest 1/4 inch. Subsequent measurements shall be taken at 30-minute intervals with the following weights to be added to the pressure plate: 60 pounds, 165 pounds, 205 pounds, and 295 pounds.

(3) To calculate the volume obtained for each weight condition use the following formula:

$$V = \pi R^2 H$$

Let V = Volume

π = 3.1416

R = Radius of container

H = Height reading

(4) Parachute assembly volume. Measure the physical size of a packed assembly. Prepare a sketch to show dimensions measured Calculate the volume of the packed assembly to the nearest cubic inch.

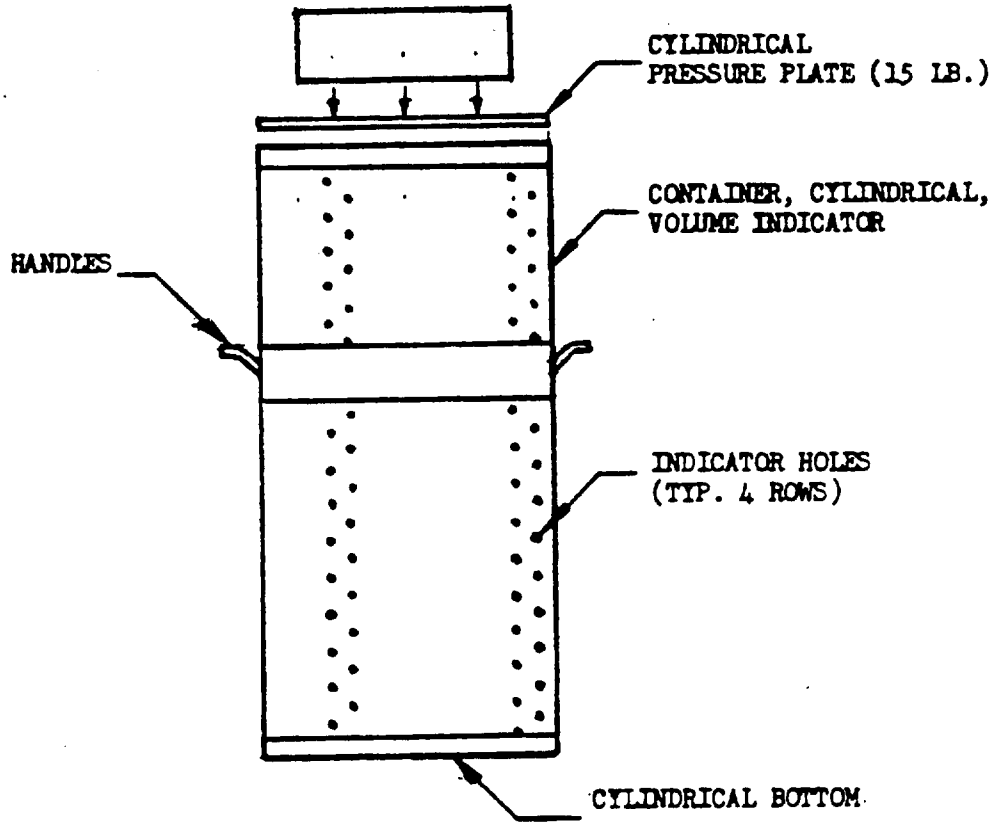
3. Minimum data requirements. -

(a) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings of cylindrical container volume indicator device.
(3) Checklists and instructions.

(b) Testing information.

(1) Record test date and place of test.
(2) Record test time(s).
(3) Record testing laboratory test identification (test program or drop number).
(4) Ambient temperature (°F).
(5) Humidity, percent.
(6) Barometric pressure (inches Hg.).
(7) Measurements for each corresponding weight (lb.)



NOTES:
1. PRESSURE PLATE AND CONTAINER SHALL BE FREE OF DENTS, BURRS, SLIVERS OR ROUGH SPOTS.

FIGURE 1. Cylindrical container, parachute canopy standard, volume indicator device

METHOD T104

BASIC EVALUATION, PARACHUTE ASSEMBLY OR COMPONENTS (WHIRL TOWER)

1. Purpose. - Personnel parachute tests, by whirl tower, are performed where precision of drop control, visual observation and economy are primary considerations and when having to perform a large number of tests to obtain reliability, functional, structural and performance data. This method of testing has a distinct advantage in that a large number of tests can be conducted with a low cost factor as compared to in-flight aircraft drop tests. This test method is also intended to augment Test Method T106 by providing additional engineering data which is used to establish a reliability level and confidence factor for an assembly. Portions of this test method may have to be waived or amended because of specific design considerations or safety, by the requesting contractor, activity having engineering responsibility, or testing laboratory.

2. Procedure. - (Test Program will not necessarily be limited to procedures listed below.)

(A) Preparation for test. - Confirm that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(B) Load and dummy requirements. - A torso-shaped dummy; the required weights are indicated on table T104-I of this test method. This dummy shall contain a chest, neck, or suitable space prepared for a telemetry package.

(C) Launching. - A flashbulb or suitable equivalent device shall be mounted on the carrying vehicle or nacelle of the whirl tower. This flashbulb indicated Ø time (launch) and can be used to correlate the photographic film coverage with the telemetering data.

(D) Parachute assembly reuse limitations. - Parachutes may be reused as indicated in table T104-I of this test method or in accordance with specific directions of the activity having engineering responsibility, or contractor. However, parachute assemblies which have had major repairs shall not be used.

(E) Test schedule.

(1) Minimum total number of new parachute assemblies required: 8
(2) Minimum total number of tests: 56
(3) Permeability tests are to be performed on each canopy prior to commencement of tests, and after tests of the parachutes are completed in accordance with Test Method 5450 of CCC-T-191.

(4) Acceptability criteria shall be established by the activity having engineering responsibility, contractor, or the testing laboratory. In the absence of specific requirements, parachutes shall be fully inflated prior to impact. On those tests where telemetry is required, all force readings and events shall be obtained to be considered a satisfactory "test".
(5) New pack opening bands shall be used for start of each test condition.

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids and ground support equipment.
(3) Packing, rigging, inspection check lists and instructions.
(4) Damage charts as required.
(5) Repair and modification records.
(6) Test setup, description, and planned sequence of events.

(B) Cinetheodolite coverage, recording binary time of day to obtain:

(1) Event time vs. altitude.
(2) Dynamic pressure vs. time.

(C) Telemetry (as indicated in table T104-I.).

(1) Launch events vs. time.
(2) Riser forces vs. time.
(3) Tri-axial accelerometer vs. time.

(D) Test condition information.

(1) Record drop test date and location.
  (a) Record release speed.
(2) Record drop test time.
(3) Record testing laboratory test identification (test program or drop number).
(4) Record weather conditions.
  (a) Surface temperature (°F)
  (b) Barometric pressure (inches Hg.)
(5) Torso dummy weight to nearest pound.
  (a) Gross weight of parachute/dummy to nearest pound.

(E) Photographic coverage.

(1) Motion picture, 16 mm., 200 frames per second, color, with timing pulses, launch to impact coverage.
(2) Still coverage, black and white.
  (a) Packing and rigging coverage as may be required.
  (b) Damage record as may be required.

T104

TABLE T104-.I Suspended weight requirement

(All tests activated by static line)

Test condition number	Number of new parachutes required	Number of tests each parachute	Release speed (KEAS ±5 percent)	Suspended weight
1	1 3/	2 1/	200	300
2	1 3/, 5/	4 2/	200	300
3	Note 4/	4 2/	150	300
4	Note 4/	4 2/	100	300
5	1	2 1/	250	250
6	1 3/	4 2/	250	250
7	Note 4/	4	150	250
8	Note 4/	4 2/	200	250
9	Note 4/	4 2/	100	250
10	1	2 1/	250	200
11	1 5/	4 2/	250	200
12	Note 4/	4 2/	200	200
13	Note 4/	4 2/	150	200
14	Note 4/	4 2/	100	200
15	1	2 1/	250	300
16	1 5/	4 2/	250	300

1/ No TM coverage.
2/ TM required if previous tests successful.
3/ If not damaged use on subsequent tests.
4/ Use undamaged parachutes from previous tests.
5/ Success required from previous test condition.

METHOD T105

DESIGN AND STRUCTURAL INTEGRITY EVALUATION PARACHUTE HARNESS

1. Purpose. Inflight drop tests are performed as a follow-on to prove the adequacy of the design concept developed during Test Method No. T102. These tests will provide the necessary data from which a determination can be made concerning structural integrity and design suitability for qualification as a "service" harness.

2. Procedure. Test program will not necessarily be limited to the procedures listed below, as design intent shall be a major consideration.

(a) Preparation for tests. Confirm that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. A torso-shaped dummy shall be used which will weigh 300 ±2 pounds.

(c) Canopy and suspension lines. The fabric drag surface shall be of a low porosity 4 ounces per square yard nylon material (NPU 55149, or equivalent). Design of this testing aid with its related container, pilot parachute and pack opening device is the responsibility of the testing laboratory as this is a non-service special item.

(d) A harness to be tested by this method shall be constructed of new web straps and hardware. Any major change of design, (i.e., stitch pattern, change of materials, reroute of web straps, relocation of hardware, change of type or style of hardware) should be considered as an invalidation of previous test results.

(e) Forces are measured by the introduction of a force transducer in each riser, installed as close as practicable to the shoulder adapters. (Normally, two gages are required.)

(f) The dummy shall exit the launch aircraft hatch, escape chute, bomb bay or special pod in as near stable attitude as possible.

(g) To determine amount of slippage of web straps through the hardware, hand tack a light weight contrasting thread on each side of the web at a convenient reference point (use edge of slide bar). Unless waived by detailed contact requirements, or by the activity having engineering responsibility, slippage of any piece in excess of 1/2 inch, or breakage of a web strap, major stitch pattern damage, or piece of hardware shall be considered a test failure. Redesign shall be required of failed parts before testing is resumed.

(h) Test schedule.

(1) Total number of new parachute harness assemblies required: one
(2) Total number of tests: minimum of five.
(3) Detailed examination of the harness shall be performed prior to, and after each test.
(4) Launch speed 175 KEAS.
(5) Static line deployed (length of static line to depend on type of aircraft used, and shall be the responsibility of the testing laboratory.
(6) Launch altitude, 1,000 feet pressure altitude.

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids and ground support equipment.
(3) Packing, rigging, and inspection checklists and instructions.
(4) Line drawings of harness to record damage.
(5) Repair and modification records.
(6) Test setup description, and planned sequence of operations.

(B) Test condition information.

(1) Record drop date and place of drop.
  (a) Record drop airspeed.
  (b) Record drop altitude.
(2) Record drop time
(3) Record testing laboratory test identification (test program or drop number).
(4) Record weather conditions.
  (a) Surface winds (knots).
  (b) Surface temperature (°F).
  (c) Barometric pressure (inches Hg.).
  (d) Humidity (percent).
(5) Torso dummy.
  (a) Record suspended weight to nearest pound (lb.). (including TM package).
  (b) Gross weight to the nearest one pound.
(6) Telemetering.
  (a) Riser forces
(7) Photographic coverage.
  (a) Motion picture, 16 mm, 100 frames per second.
  (b) Still coverage, black and white.
    1 Rigging coverage as may be required.
    2 Damage coverage as may be required.

METHOD T106

DESIGN EVALUATION (PARACHUTE ASSEMBLY)

1. Purpose. In-flight parachute dummy drop tests are performed to obtain broad basic engineering data and to determine if assembly, system or sub-assembly meets design requirements. Varied flight test conditions are intended to provide sufficient engineering data for evaluation of design characteristic areas.

(a) Rate of descent.
(b) Twisted line.
(c) Reliability level.
(d) Minimum opening altitude.
(e) Force history.
(f) Deployment characteristics.
(g) Oscillation.

Portions of this test method may have to be waived or amended because of specific design considerations or safety, by the requesting contractor, activity having engineering responsibility or testing laboratory.

2. Procedure. Test program will not necessarily be limited to the following procedures:

(a) Preparation for test. Confirm that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. Table T106-I indicates in appropriate column the style dummy to be used. Where an articulated dummy is used, the arm and leg adjustment shall allow normal range and freedom of movements to simulate extreme, adverse deployment conditions. Second dummy to be used shall be torso-shaped (less head, arms, and legs). For all test conditions listed in table T106-I, the weight tolerance is ±2 pounds.

(1) Launching and deployment. Special devices and techniques shall not be used to stabilize the dummy starting at dummy launch and extending through deployment events.

(c) Parachute assembly re-use limitations. Parachutes may be reused as indicated in table T106-I or in accordance with specific directions of the activity having engineering responsibility or contractor. However, parachute assemblies which have had major repairs shall not be used.

(d) Test schedule.

(1) Minimum total number of new parachute assemblies required: minimum 5
(2) Minimum total number of tests: 72 each
(3) Permeability tests are to be performed on each canopy prior to commencement of tests and after first test and at completion of the test program.
(4) Twisted line evaluation. Parachute canopies constructed of materials having an average permeability in the lower half of the specification permeability range may constitute not more than one-half of the test quantity. The parachute canopy shall be folded in the prescribed or proposed manner. For parachutes utilizing deployment bags or other deployment aids, the stows of lines which close or lock the deployment bag, or the lines which emerge from a closed deployment bag shall be inserted in the manner proposed for standard usage. Three 360-degree twists in either direction shall then be placed in the suspension lines immediately below the point at which the bag is locked closed, or the point at which the lines emerge from the bag when locked closed by other than the suspension lines. The three twists shall extend from the locking or emergency point a maximum of 30 inches. The twisted and non-twisted portions of suspension line shall then be stowed in the manner proposed, particular care being exercised to prevent the twisted portion of the lines from exceeding the 30-inch maximum length. If, due to increased girth, difficulty is encountered in stowage of the twisted portion, the line retaining member, for test purposes, may be modified to obtain the desired retention characteristics. For parachutes that do not utilize a deployment bag, the three 360-degree twists shall be placed immediately below the canopy skirt for a length not in excess of 30 inches and the lines stowed as proposed for standardization.
(5) Acceptability criteria shall be established by the activity having engineering responsibility, contractor or the testing laboratory. In the absence of specific requirements, all parachutes shall be fully inflated and in equilibrium with no more than a 500-foot altitude loss for test condition 5 (twisted line). For all other tests, the parachute shall be open with no more than a 200-foot altitude loss. Rate of descent shall be obtained by averaging all points taken for last 500 feet of descent. Oscillation data shall be recorded from canopy full open event to impact.

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids and ground support equipment.
(3) Packing, rigging, inspection checklines and instructions.
(4) Damage charts as required.
(5) Repair and modification records.
(6) Test setup, description and planned sequence of events.

(B) Cinetheodolite coverage, using minimum of three stations and recording binary time of day and wind corrections resulting in: (correct as required to a standard day condition).

(1) Event time vs. altitude.
  (a) Typical events; aircraft launch and container opening, pilot parachute inflated, canopy out of container, suspension line stretchout, first inflation and full inflation.
(2) Rate of descent vs. altitude.
(3) Drag coefficient vs. time.
(4) Lift-to-drag ratio vs. time. for special configuration.
(5) Oscillation vs. time.
(6) Dynamic pressure vs. time.

(C) Telemetering.

(1) Riser forces vs. time.
(2) Oscillation vs. time.
(3) Launch event.

(D) Test condition information.

(1) Record drop date and place of drop.
  (a) Record drop airspeed.
  (b) Record drop altitude.
(2) Record drop time.
(3) Record testing laboratory test identification (test program or drop number).
(4) Record weather conditions.
  (a) Surface wind direction (knots).
  (b) Surface temperature (°F).
  (c) Barometric pressure (inches Hg.).
(5) Test dummy.
  (a) Record weight of dummy to nearest pound (to include battery and TM package).
  (b) Gross weight to nearest pound.

(E) Photographic coverage.

(1) Motion picture, 16 mm., 200 frames per second, color, with timing pulses.
(a) Ground-to-air.
(b) Launch to impact coverage.
(2) Sequence stills, 70 mm., black and white, with binary time of day.
(a) Launch to full open coverage.
(3) Still coverage, black and white.
(a) Packing and rigging coverage as may be required.
(b) Damage and descent still coverage as may be required.

TABLE T106-I. Suspended weight requirement

(All tests actuated by static line, 2,000 feet pressure altitude ±100 feet)

Test Condition Number	Number of new parachutes required	Number of tests	Launch airspeed (KEAS ±5 percent)	Suspended type/weight ±2 pounds
1	4	20 10 10	100	200 Torso 1/ 160 Torso 1/ 135 Torso 1/
2	Note 2/	4	50	200 Torso 3/, 4/
3	Note 2/	4	75	Torso 200 3/, 4/
4	Note 2/	4	100	Torso 200 3/, 4/
5	Note 2/	4	125	Torso 200 3/, 4/
6	Note 2/	4	150	Torso 200 3/, 4/
7	Note 2/	4	175	Torso 200 3/, 4/
8	Note 2/	4	200	Torso 200 3/, 4/
9 5/	1	4	225	Torso 200 3/, 4/

1/ Twisted line procedure.
2/ Use parachutes from previous tests. Repairs of 2 percent of canopy area are permissible. Replace parachutes damaged more than 2 percent.
3/ No TM coverage on first test.
4/ TM coverage required if torso dummy test is successful.
5/ Continue with test condition additions in speed increments of 25 knots. When parachute fails, repeat test with new parachute and continue test if no failure.

METHOD T107

ULTIMATE STRENGTH EVALUATION (DESTRUCTION)

1. Purpose. Inflight dummy drop tests are performed to determine if the maximum limits to which a parachute assembly can be subjected to compare favorably with design limits. These tests are a follow-on to Test Method T106. The various test conditions are contained in table T107-I. These tests are planned to provide additional force/time history data with the following variables: weight, airspeed and indicated altitude. Portions of this test method may have to be waived or amended because of specific design considerations or safety by the requesting contractor, activity having engineering responsibility or testing laboratory.

2. Procedure. - (Test programs will not necessarily be limited to the following procedures:

(a) Preparation for tests, Conform that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. Table T107-I indicates the style dummy to be used with weight requirements and tolerance for each test condition.

(c) Parachute assembly re-use criteria. Parachutes may be reused as indicated in table T107-I or in accordance with specific directions of the activity having engineering responsibility or contractor. However, parachute assemblies which have had major repairs shall not be used.

(d) Acceptability criteria shall be established by the activity having engineering responsibility, contractor or the testing laboratory.

(e) Test schedule.

(1) Minimum total number of new parachute assemblies required: 3
(2) Minimum total number of tests: 12
(3) Permeability tests are to be performed on each canopy, prior to and after tests of the parachutes are completed.
(4) In the event a used parachute has a destructive failure, the test shall be repeated with a new parachute to determine if testing shall continue.

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids and ground support equipment.

(3) Packing, rigging, and inspection checklists and instructions.
(4) Damage charts as required.
(5) Repair and modification records.
(6) Test setup description and planned sequence of events.
(7) Laboratory test results.
    (a) Pretest permeability readings.
    (b) Post test permeability readings.

(B) Cinetheodolite coverage, using 3 stations (minimum) and recording binary time of day and wind corrections, resulting in:

(1) Event times vs. altitude.
(2) Rate of descent vs. altitude.
(3) Drag coefficient vs. time.
(4) Lift-to-drag ratio vs. time for special configuration.
(5) Oscillation vs. time.
(6) Dynamic pressure vs. time

(C) Telemetering.

(1) Riser forces vs. time.
(2) Oscillations vs. time.
(3) Accelerations vs. time.

(D) Test condition information.

(1) Record drop date and place of drop test.
(2) Record drop time
(3) Record testing laboratory test identification (test program or drop number).
(4) Record weather conditions.
    (a) Surface winds and direction (kts).
    (b) Surface temperature (°F).
    (c) Barometric pressure (inches Hg.).
    (d) Relative humidity (percent).

(E) Test dummy.

(1) Recorded weight of dummy within one pound to include instrumentation, battery, and telemetry package.
(2) Record gross weight within one pound (lb.).

(F) Photographic coverage.

(1) Motion picture, 16 mm., 200 frames per second, color, with timing pulses.
    (a) Ground-to-air launch to impact coverage.
(2) Sequence stills, 70 mm., black and white, with binary time of day.
    (a) Launch to full open coverage.
(3) Still coverage, black and white.
    (a) Packing and rigging coverage as may be required.
    (b) Damage and descent coverage as may be required.

METHOD T107

ULTIMATE STRENGTH EVALUATION (DESTRUCTION)

1. Purpose. Inflight dummy drop tests are performed to determine if the maximum limits to which a parachute assembly can be subjected to compare favorably with design limits. These tests are a follow-on to Test Method T106. The various test conditions are contained in table T107-I. These tests are planned to provide additional force/time history data with the following variables: weight, airspeed and indicated altitude. Portions of this test method may have to be waived or amended because of specific design considerations or safety by the requesting contractor, activity having engineering responsibility or testing laboratory.

2. Procedure. - (Test programs will not necessarily be limited to the following procedures:

(a) Preparation for tests, Conform that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. Table T107-I indicates the style dummy to be used with weight requirements and tolerance for each test condition.

(c) Parachute assembly re-use criteria. Parachutes may be reused as indicated in table T107-I or in accordance with specific directions of the activity having engineering responsibility or contractor. However, parachute assemblies which have had major repairs shall not be used.

(d) Acceptability criteria shall be established by the activity having engineering responsibility, contractor or the testing laboratory.

(e) Test schedule.

(1) Minimum total number of new parachute assemblies required: 3
(2) Minimum total number of tests: 12
(3) Permeability tests are to be performed on each canopy, prior to and after tests of the parachutes are completed.
(4) In the event a used parachute has a destructive failure, the test shall be repeated with a new parachute to determine if testing shall continue.

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids and ground support equipment.

(3) Packing, rigging, and inspection checklists and instructions.
(4) Damage charts as required.
(5) Repair and modification records.
(6) Test setup description and planned sequence of events.
(7) Laboratory test results.
    (a) Pretest permeability readings.
    (b) Post test permeability readings.

(B) Cinetheodolite coverage, using 3 stations (minimum) and recording binary time of day and wind corrections, resulting in:

(1) Event times vs. altitude.
(2) Rate of descent vs. altitude.
(3) Drag coefficient vs. time.
(4) Lift-to-drag ratio vs. time for special configuration.
(5) Oscillation vs. time.
(6) Dynamic pressure vs. time

(C) Telemetering.

(1) Riser forces vs. time.
(2) Oscillations vs. time.
(3) Accelerations vs. time.

(D) Test condition information.

(1) Record drop date and place of drop test.
(2) Record drop time
(3) Record testing laboratory test identification (test program or drop number).
(4) Record weather conditions.
    (a) Surface winds and direction (kts).
    (b) Surface temperature (°F).
    (c) Barometric pressure (inches Hg.).
    (d) Relative humidity (percent).

(E) Test dummy.

(1) Recorded weight of dummy within one pound to include instrumentation, battery,and telemetry package.
(2) Record gross weight within one pound (lb.).

(F) Photographic coverage.

(1) Motion picture, 16 mm., 200 frames per second, color, with timing pulses.
    (a) Ground-to-air launch to impact coverage.
(2) Sequence stills, 70 mm., black and white, with binary time of day.
    (a) Launch to full open coverage.
(3) Still coverage, black and white.
    (a) Packing and rigging coverage as may be required.
    (b) Damage and descent coverage as may be required.

TABLE T107-I. Parachute reuse tests

Launch altitude 1,000 feet ±100 feet pressure altitude, torso-shaped dummy, actuated by static line three quarter second time delay in automatic actuator.

Test condition number	Number of parachutes required	Number of tests each parachute	Launch airspeed (KEAS ±5 percent)	Suspended weight ±2 pounds
1	1 (new)	1	250	300 1/
2	1 (used)	1	250	300 2/
3	1 (used)	1	250	250 2/
4	1 (used)	1	250	200 2/
5	1 (new)	1	300	300 1/
6	1 (used)	1	300	300 2/
7	1 (used)	1	300	250 2/
8	1 (used)	1	300	200 2/
9	1 (new)	1	325	300 1/
10	1 (used)	1	325	300 2/
11	1 (used)	1	325	250 2/
12 3/	1 (used	1	325	200 2/

1/ No TM.
2/ TM required.

3/ If "destruction" of a canopy or assembly has not occurred by this test condition, increase airspeed in 25 knot increments. If a destruction failure is with a used parachute, repeat with new assembly with a Brinell dynamometer instead of the TM package to determine if tests are to continue.

METHOD T108

PHYSIOLOGICAL AND PSYCHOLOGICAL EVALUATION OF A PROTOTYPE PARACHUTE ASSEMBLY USING TEST SUBJECT

1. Purpose. To determine, under various inflight test conditions, the suitability of a personnel type parachute assembly or component for premeditated or emergency exit from an aircraft. A test subject within a suitable anthropometric range shall wear the prototype assembly or harness during these tests. Portions of this test schedule can be used to test the operational suitability of hardware incorporated into a previously qualified parachute harness or assembly. Portions of this test method may have to be waived or amended because of specific design or safety considerations by the requesting contractor, activity having engineering responsibility, or testing laboratory.

1.1 Pretest requirement. The test item shall have satisfactorily passed all tests in Test Method Nos. T101 through T107, T109 and T112 before Test Method No. T108 can be accomplished.

2. Procedure. Test programs will not necessarily be limited to the following procedures:

(a) Preparation for tests. Confirm that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. Test subjects shall weigh no less than 132.5 pounds (5 percentile) nor more than 200.8 pounds (95 percentile) unless the limitations are waived by the activity having engineering responsibility, contractor or by specific contract requirements.

(c) Measurements of test subjects. Measurements shall be taken under the direction of qualified medical personnel. Measurements shall be noted and recorded as specified in WADC-TR-52-321.

(d) The testing laboratory shall insure that:

(1) Test subject has been given an up-to-date physical examination as may be required by the laboratory's medical department.
(2) Test subject holds appropriate qualifications required by the testing laboratory, and that these qualifications are current.
(3) Test subject is briefed by qualified engineering and operations personnel on the following: test objectives, planned sequence of events, required test observations, post-test debriefing and reports required. Special emphasis shall be given to emergency techniques to be used in the event of a test item failure.

(e) Parachute assembly reuse criteria. At the start of any specific test condition in table T108-I, new parachutes in the quantities indicated or in accordance with specifications of the activity having engineering responsibility or contractor shall be required. However, parachute assemblies which have had major repairs shall not be used.

(f) Acceptability criteria shall be established by the activity having engineering responsibility, contractor or the testing laboratory.

(g) Bio-medical kit. Unless waived by the activity having engineering responsibility, a bio-medical kit shall be used to either record or transmit to a ground station those minimum body and forces functions listed in table T108-I, footnote 2/.

(h) If the assembly has an unqualified harness, a second harness worn under the test assembly or harness, shall be used to attach the reserve chute assembly. The testing laboratory shall insure that the reserve parachute assembly selected is qualified and suitable for the planned test.

(i) The testing laboratory shall normally furnish items of equipment as required to support a flight test program such as jump boots, helmet, reserve parachute, instrumentation, and flight suit.

(j) Test schedule.

(1) Total number of new parachute assemblies required: 17
(2) Number of tests: 600
(3) Permeability tests are to be performed on each canopy prior to and after the completion of the parachute tests.
(4) Perform tear and tension tests of canopy materials as post-test conditions warrant.

(k) Test subject shall wear a suitable indicating device to provide a positive means of establishing time of ripcord pin pull (such as flashbulb).

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids, reserve parachute assembly, ground support and checkout equipment.
(3) Packing, rigging, and inspection checklist and instructions.
(4) Anthropometry of test subjects.
(5) Briefing and debriefing notes (or tape recordings).
(6) Damage charts, as required.
(7) Repair and modification records.
(8) Test description and planned sequence of events.

METHOD T108

PHYSIOLOGICAL AND PSYCHOLOGICAL EVALUATION OF A PROTOTYPE PARACHUTE ASSEMBLY USING TEST SUBJECT

1. Purpose. To determine, under various inflight test conditions, the suitability of a personnel type parachute assembly or component for premeditated or emergency exit from an aircraft. A test subject within a suitable anthropometric range shall wear the prototype assembly or harness during these tests. Portions of this test schedule can be used to test the operational suitability of hardware incorporated into a previously qualified parachute harness or assembly. Portions of this test method may have to be waived or amended because of specific design or safety considerations by the requesting contractor, activity having engineering responsibility, or testing laboratory.

1.1 Pretest requirement. The test item shall have satisfactorily passed all tests in Test Method Nos. T101 through T107, T109 and T112 before Test Method No. T108 can be accomplished.

2. Procedure. Test programs will not necessarily be limited to the following procedures:

(a) Preparation for tests. Confirm that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. Test subjects shall weigh no less than 132.5 pounds (5 percentile) nor more than 200.8 pounds (95 percentile) unless the limitations are waived by the activity having engineering responsibility, contractor or by specific contract requirements.

(c) Measurements of test subjects. Measurements shall be taken under the direction of qualified medical personnel. Measurements shall be noted and recorded as specified in WADC-TR-52-321.

(d) The testing laboratory shall insure that:

(1) Test subject has been given an up-to-date physical examination as may be required by the laboratory's medical department.
(2) Test subject holds appropriate qualifications required by the testing laboratory, and that these qualifications are current.
(3) Test subject is briefed by qualified engineering and operations personnel on the following: test objectives, planned sequence of events, required test observations, post-test debriefing and reports required. Special emphasis shall be given to emergency techniques to be used in the event of a test item failure.

(e) Parachute assembly reuse criteria. At the start of any specific test condition in table T108-I, new parachutes in the quantities indicated or in accordance with specifications of the activity having engineering responsibility or contractor shall be required. However, parachute assemblies which have had major repairs shall not be used.

(f) Acceptability criteria shall be established by the activity having engineering responsibility, contractor or the testing laboratory.

(g) Bio-medical kit. Unless waived by the activity having engineering responsibility, a bio-medical kit shall be used to either record or transmit to a ground station those minimum body and forces functions listed in table T108-I, footnote 2/.

(h) If the assembly has an unqualified harness, a second harness worn under the test assembly or harness, shall be used to attach the reserve chute assembly. The testing laboratory shall insure that the reserve parachute assembly selected is qualified and suitable for the planned test.

(i) The testing laboratory shall normally furnish items of equipment as required to support a flight test program such as jump boots, helmet, reserve parachute, instrumentation, and flight suit.

(j) Test schedule.

(1) Total number of new parachute assemblies required: 17
(2) Number of tests: 600
(3) Permeability tests are to be performed on each canopy prior to and after the completion of the parachute tests.
(4) Perform tear and tension tests of canopy materials as post-test conditions warrant.

(k) Test subject shall wear a suitable indicating device to provide a positive means of establishing time of ripcord pin pull (such as flashbulb).

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids, reserve parachute assembly, ground support and checkout equipment.
(3) Packing, rigging, and inspection checklist and instructions.
(4) Anthropometry of test subjects.
(5) Briefing and debriefing notes (or tape recordings).
(6) Damage charts, as required.
(7) Repair and modification records.
(8) Test description and planned sequence of events.

(9) Laboratory test results.
  (a) Pretest permeability readings.
  (b) Post-test permeability readings.
  (c) Tension test and tear test of canopy samples (post-test), as may be required.

(B) Cinetheodolite coverage, using three stations (minimum), and recording binary time of day and wind corrections, resulting in:

(1) Exit from aircraft, ripcord pin pull vs. time and altitude, plus pilot parachute clear of container, main canopy clear of container, full line stretch, first full open of main canopy, second full open of main canopy and touchdown events.
(2) Rate of descent vs. altitude.
(3) Drag coefficient vs. time.
(4) Test subject turn rate during free-fall (RPS) (about all axes).
(5) Oscillation vs. time.
(6) Dynamic pressure vs. time.

(C) Telemetering (test conditions 2, 5, and 11).

(1) Riser forces vs. time.
(2) Oscillation vs. time.
(3) Accelerations vs. time.
(4) Bio-medical (electrocardiograph and respiration).

(D) Test condition information.

(1) Record drop date and place of drop.
(2) Record drop time.
(3) Record testing laboratory test identification (test program or drop number).
(4) Record weather conditions.
  (a) Surface winds direction (knots).
  (b) Surface temperature (°F).
  (c) Barometric pressure (inches Hg.).
  (d) Relative humidity (percent).
(5) Egress altitude.
(6) Egress velocity.

(E) Test subject.

(1) Record weight of all equipment and clothing less test item.
(2) Record weight of test item.

(F) Photographic coverage.

(1) Motion picture, 16 mm., 200 fps, color with timing pulses.
  (a) Ground-to-air - egress to full open - plus - ten seconds.
  (b) Plane-to-air - egress to full open - plus - ten seconds.
  (c) Air-to-air - egress to full open - plus - ten seconds.
(2) Still coverage, black and white.
  (a) Packing and rigging coverage as required.
  (b) Damage and descent coverage as required.

TABLE T108-I. Parachute reuse tests

(Exit airspeed, 110 KEAS)

Test condition number	Number of parachutes required	Number of tests	Time delay exit to assembly activation (seconds)	Pressure altitude (feet)
1	10 (new) 1/	40	3	5,000
2 2/	2 (used) 5/	10	3	5,000
3	10 (used) 5/	50	5	5,000
4	10 (used) 3/,5/	50	7	5,000
5 2/	2 (used) 5/	10	7	5,000
6	2 (used) 5/	10	14	6,000
7	2 (used) 5/	10	21	7,000
8	2 (used) 5/	10	28	8,000
9	2 (used) 5/	10	35	9,000
10	(new) 5/	30	24 4/	18,000
11 2/	(new) 2/	10	24 4/	18,000

1/ First 40 tests in the series, using at least 4 assemblies are considered to be a check of inflight operation suitability of hardware. If unqualified hardware is introduced into an otherwise qualified assembly, only this portion would apply.

2/ Parachutist to wear bio-medical instrumentation kit to record electro-cardiogram, respiration, acceleration and riser loads.

3/ First 10 tests in the series, using at least 2 new assemblies are considered to be a check of inflight operation suitability of hardware as in footnote 1/.

4/ Assembly to include an automatic actuator which shall be armed leaving the aircraft. Bailout oxygen supply shall be activated as test parachutist leaves aircraft oxygen supply. The objectives of this test series include operational evaluation of these components.

5/ Use serviceable parachute from previous tests of this test method.

METHOD T109

PARACHUTE CONTAINER, AIRBLAST INTEGRITY, ENVIRONMENTAL AND RIPCORD PULL TEST

1. Purpose. To determine airblast integrity of a specific parachute container design being considered for qualification either as a part of a new assembly or intended as a replacement item. Acceptability criteria shall normally be determined by the requesting contractor, activity having engineering responsibility, or by the testing laboratory. Primary consideration is given to observation of the container and its ability to retain the pilot parachute, parachute canopy and suspension lines in its enclosed envelope until the planned release time. A secondary objective is to observe and report on the reaction and security of other related parts. Portions of this test method may have to be waived or amended because of specific design or safety considerations by the requesting contractor. Where a wind tunnel and holding fixtures (figure 2) are not available, equivalent test conditions can be substituted.

2. Procedure. Test program will not be limited to procedures listed below.

(A) Preparation for tests. Confirm that test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(B) Load requirements. An articulated dummy shall be used. Arm and leg adjustment shall allow normal range and freedom of movement to simulate the more extreme, adverse deployment conditions.

(1) Weight. The gross weight of the dummy shall be 200 ±2 pounds.
(2) Launching and deployment, Special devices and techniques shall be used to subject the parachute container to the maximum airblast effect that is expected for the design envelope for which the parachute assembly is being evaluated.
(3) Parachute container conditioning. As shown in table T109-II, certain tests will require pre-conditioning prior to test.
  (a) Parachute assembly with test item container shall be packed as for service use.
  (b) Parachute shall be cycled in an environmental chamber for 340 hours in accordance with simulated mission profile established in table T109-I.
  (c) Parachute to be drop tested under conditions specified in table T109-II.
(4) Unless waived by the activity having engineering responsibility or contractor, a new parachute container assembly and new pack opening bands shall be used for each test.

(5) Ripcord pin pull test. Prior to each test, the parachute shall be packed as for service use, except that prior to final closing of the container, a ripcord pull test shall be performed in accordance with applicable activity instructions, and the force will be recorded to the nearest quarter-pound. The assembly shall then be completely closed.
(6) When container re-use is authorized by specific directions of the activity having engineering responsibility or contractor, only minor repairs shall be performed if required.

(C) Test schedule (in accordance with table T109-I).

(1) Minimum total number of new parachute assemblies required: 6
(2) Minimum total number of tests: 12

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special air, ground support, or wind tunnel equipment.
(3) Packing, rigging and inspection checklist and instructions.
(4) Damage charts, as required, of container.
(5) Repair and modification record.
(6) Test set-up, description, and planned sequence of events.

(B) Cinetheodolite coverage, using 3 stations (minimum), and recording binary time of day and wind corrections, resulting in:

(1) Event times vs. altitude

(C) Testing information.

(1) Record drop date and place of drop test.
(2) Record drop time.
(3) Record testing laboratory test identification (test program or drop number).
(4) Weather conditions.
  (a) Surface conditions (knots).
  (b) Surface temperature (°F).
  (c) Barometric pressure (inches Hg.).
  (d) Relative humidity (percent).
(5) Dummy launch altitude.
(6) Dummy launch velocity.

(D) Pull test; ripcord pin (lbs.).

(E) Recorded weight of dummy to nearest pound.

(F) Photographic coverage.

(1) 16mm. , ground-to-air, 200 frames per second, launch to full open.
(2) Still coverage, black and white.
(a) Packing and rigging as required.
(b) Damage and descent coverage as required.

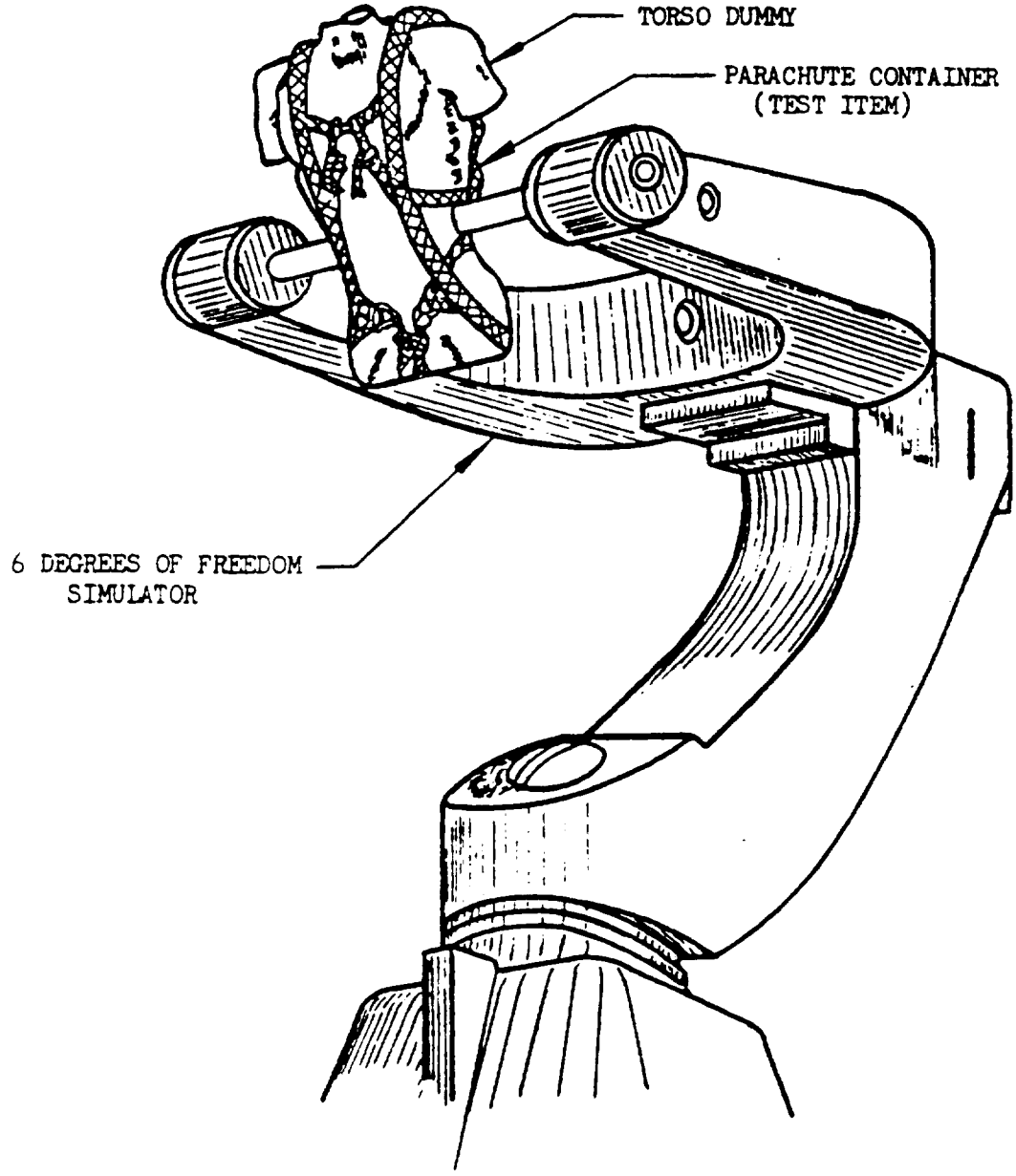


FIGURE 2. Wind tunnel test fixture

TABLE T109-I. Simulated mission profile environmental chamber conditioning

Steps	1	2	3	4	5	6	7 1/
Conditions							
Time	1/2 hour	1/2 hour	2 hours	16 hours	1 hour	1/2 hour	1/2 hour
Temp. (cabin)	160° ±3.6° F	90° ±3.6° F	70° ±3.6° F	-69° ±3.6° F	-12° ±3.6° F	95° ±3.6° F	-20° ±3.60° F
Altitude (MSL)	Sea level	Sea level	40,000	40,000	20,000	Sea level	Sea level
Weight on pack	None	None	-------	-------	--------	-------	--------
Back	------	10 lb.	10 lb.	10 lb.	10 lb.	10 lb.	--------
Seat	------	220 lb.	220 lb.	220 lb.	220 lb.	220 lb.	--------
Chest	------	None	None	None	None	None	--------
Salt fog	509.1 2/	None	None	None	None	509.1 2/	None
Humidity	15 percent (max.)	50 percent (max.)	20-50 percent	None	20-60 percent	50 percent (max.)	None

1/ Recycle steps for 5 days.
2/ Test method preparations per MIL-STD-810.

TABLE T109-II. Airblast integrity tests

Parachute activation shall be by a suitable static line/automatic actuator combination that will deploy assembly 5 seconds from launch at 2,000 pressure altitude.

Test condition	Number of new parachutes required	Number of tests each parachute	Airspeed (KEAS ± 5 percent)	Remarks
1	1	2	300	
2 1/	1	2	350	
3	1	2	375	
4	1	2	400	
5 2/	1	2	2/	Container conditioning required.
6 3/	1	2	3/	Container conditioning required.

1/ Continue test series as indicated in 25 knot increments to determine point at which container fails and/or premature parachute deployment occurs.
2/ Airspeed to be 25 knots below the airspeed at which the parachute container fails and/or premature parachute deployment occurs.
3/ Only perform tests if failure occurs on test condition 5. Airspeed to be 15 knots less than test condition 5.

METHOD T110

PERFORMANCE DEMONSTRATIONS AND RATINGS

1. Purpose. - To determine a safe deployment altitude for a specific parachute assembly under dynamic flight conditions with an instrumented torso-shaped dummy. Portions of this test method may have to be waived or amended because of specific design or safety considerations by the requesting contractor, activity having engineering responsibility or testing laboratory.

2. Procedure. - Test program will not necessarily be limited to procedures listed below.

(a) Preparation for tests. Confirm that test item configuration and test conditions are in accordance with section 4, paragraphs 4.2.1, 4.2.1.2, 4.2.3, and 4.2.3.1.

(b) Load requirements. Tables T110-I through T110-IV specify the weight requirements and the tolerance for each test condition. The dummy shall be of the torso type.

(c) Parachute assembly re-use limitations. Parachutes may be reused as indicated in tables T110-I through T110-IV, inclusive, or in accordance with specific directions from the activity having engineering responsibility or contractor. However, parachute assemblies which have had major repairs shall not be used.

(d) Acceptability criteria shall be established by the contractor or the testing laboratory.

(e) Test schedule.

(1) Minimum total number of new parachute assemblies required: as required.
(2) Minimum total number of tests: 192
(3) Permeability tests are to be performed on each canopy prior to and after tests (including failures) are complete. Acceptable readings taken after drop tests shall fall within 10 percent of normal acceptance standards.
(4) After drop tests have been completed on each assembly, two test samples shall be removed from along the center line of 4 gores in sections A, B, and C. The gores shall be selected at random and shall be 90 degrees apart. This shall provide 12 test samples for tear tests and 12 for tension tests. (See figure 3.)

A. Instructions: Symbols on chart should show in a proportionate manner the total area affected.

B. Serial Number: _____
Date of Manufacture: _____
Contract No: _____
Inspector: _____ Date: _____

C. Symbol Key:

SYMBOLS	
6	Tear, 6" long.
3 4	Tear, "L" shaped w/legs of 3 and 4 inches.
3 4	Tear, "T" shaped, w/4 inch base & 3 inch leg.
8	Rupture, 8" diameter at widest point.
	Burn marks.
	Strain area.
	Pulled fabric thread.
	Single broken fabric thread.
#	Weave separation.
P/D	Stains/discoloration.
3	Broken seam stiches, 3 inches.
	Pulled or loop seam thread.
	Other: explain.

PARACHUTE CANOPY DAMAGE CHART
28 Gore, 28' Flat Diameter

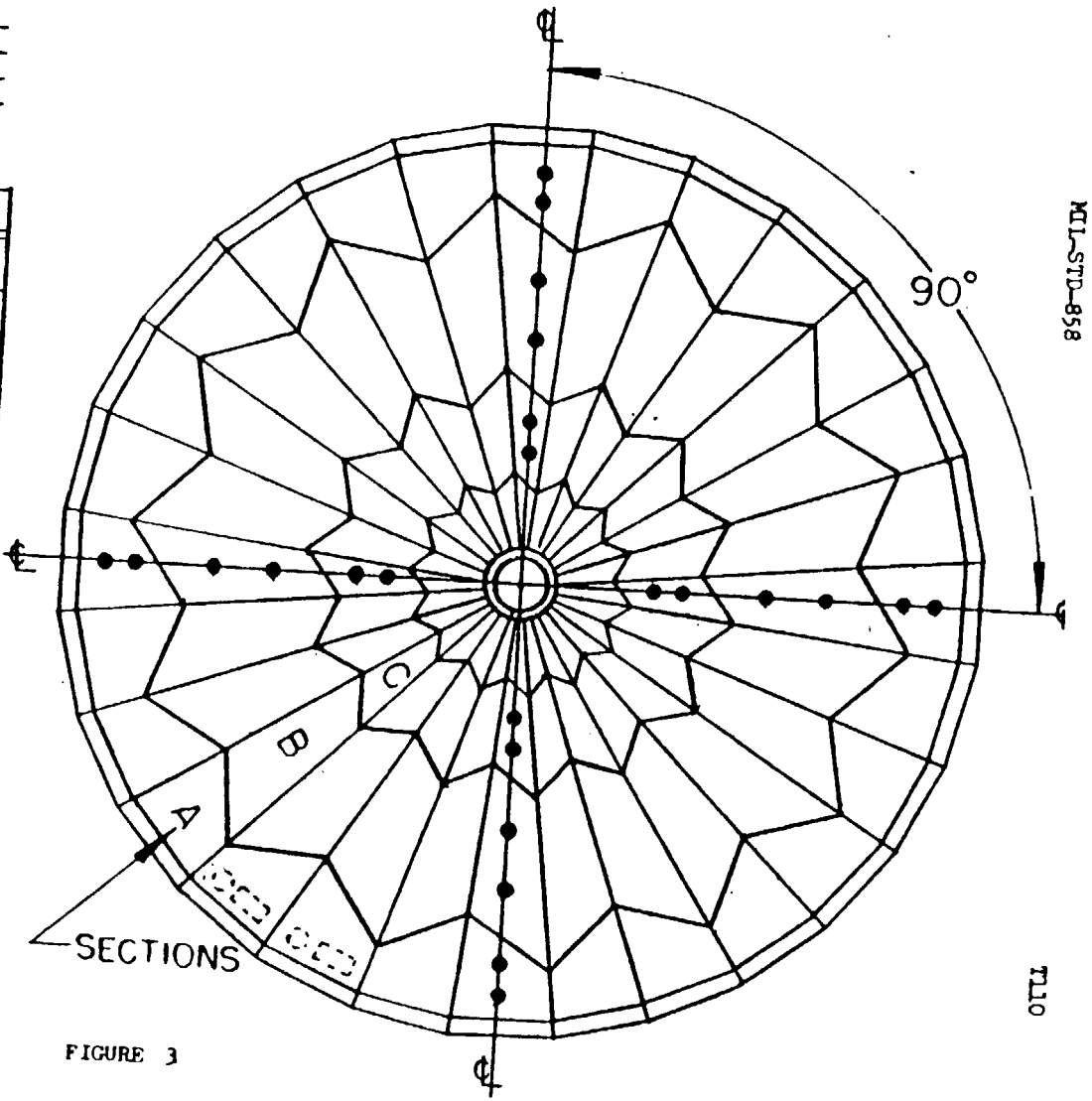


FIGURE 3

3. Minimum testing data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special air and ground support equipment.
(3) Packing, rigging and inspection checklists and instructions.
(4) Damage charts as required.
(5) Laboratory test records.
  (a) Pretest permeability readings.
  (b) Post-test permeability readings.
  (c) Post-test tear test readings.
  (d) Post-test tension test readings.
(6) Repair and modification record.
(7) Test setup, description and planned sequence of events.

(B) Cinetheodolite coverage, using three stations (minimum), and recording binary time of day, and wind corrections, resulting in:

(1) Event times vs. altitude.
(2) Space position vs. time in feet.
(3) Drag coefficient vs. time.
(4) Lift to drag ratio vs. time for special configuration.
(5) Oscillation vs. time.
(6) Dynamic pressure vs. time.

(C) Telemetering.

(1) Riser forces vs. time.
(2) Oscillation vs. time.
(3) Accelerations vs. time.
  (a) Force transducer shall be inserted into the risers, as near the shoulder fittings as is practicable. The dummy shall be installed with a tri-axial accelerometer. The dummy shall be equipped with telemetering transmitter.

(D) Test condition information.

(1) Drop date and place of drop test.
(2) Drop time.
(3) Testing laboratory test identification (test program or drop number).
(4) Weather conditions.
  (a) Surface conditions (knots).
  (b) Surface temperature (°F).
  (c) Barometric pressure (inches Hg.).
  (d) Relative humidity (percent).

(E) Test dummy.

(1) Recorded weight of dummy to nearest pound (to include instrumentation, battery and telemetry package.)
(2) Record gross weight to nearest pound (lb.).

(F) Photographic coverage.

(1) Motion picture, 16 mm., 200 frames per second, color, with timing pulses.
(a) Air-to-air launch to full open.
(2) Still coverage, black and white.
(a) Packing and rigging coverage as may be required.
(b) Damage and descent coverage as may be required.

TABLE T110-I. Suspended weight requirement (5,000 feet)

Parachute actuation shall be by a suitable short static line/automatic actuator combination that will deploy assembly at 5,000 feet pressure altitude.

Test condition number	Number of tests required 1/	Speed at launch (KEAS ±5 percent)	Suspended weight (±2 pounds)
1	4	110	200
2	4	110	250
3	4	110	300
4	4	150	200
5	4	150	250
6	4	150	300
7	4	200	200
8	4	200	250
9	4	200	300
10	4	225	200
11	4	225	250
12	4	225	300

If destructive failure has not occurred prior to this point, continue this test series in 25-knot increments. Repeat a test failure with a new parachute canopy under same conditions to determine if tests are to continue.

1/ Perform tests with used parachutes having only minor repairs until a failure occurs for a given weight and airspeed. Repeat the test with a new parachute at same weight and airspeed. If successful, continue tests at same weight +25 knots airspeed.

TABLE T110-II. Suspended weight requirement (10,000 feet)

Parachute actuation shall be by a suitable static line/automatic actuator combination that will deploy assembly no more than 3 seconds from launch at 10,000 feet pressure altitude.

Test condition number	Number of tests required 1/	Speed at launch (KEAS ±5 percent)	Suspended weight (±2 pounds)
1	4	110	200
2	4	110	250
3	4	110	300
4	4	150	200
5	4	150	250
6	4	150	300
7	4	200	200
8	4	200	250
9	4	200	300
10	4	225	200
11	4	225	250
12*	4	225	300

* If destructive failure has not occurred prior to this point, continue this test series in 25-knot increments. Repeat a test failure with a new parachute canopy under same conditions to determine if tests are to continue.

1/ Perform tests with used parachutes having only minor repairs until a failure occurs for a given weight and airspeed. Repeat the test with a new parachute at same weight and airspeed. If successful, continue tests at same weight +25 knots airspeed.

TABLE T110-III. Suspended weight requirement (15,000 feet)

Parachute actuation shall be by a suitable static line/automatic actuator combination that will deploy assembly no more than 3 seconds from launch at 15,000 feet pressure altitude.

Test condition number	Number of tests required 1/	Speed at launch (KEAS ±5 percent)	Suspended weight (±2 pounds)
1	4	110	200
2	4	110	250
3	4	110	300
4	4	150	200
5	4	150	250
6	4	150	300
7	4	200	200
8	4	200	250
9	4	200	300
10	4	225	200
11	4	225	250
12*	4	225	300

* If destructive failure has not occurred prior to this point, continue this test series in 25-knot increments, repeat a test failure with a new parachute canopy under same conditions to determine if tests are to continue.

1/ Perform tests with used parachutes having only minor repairs until a failure occurs for a given weight and airspeed. Repeat the test with a new parachute at same weight and airspeed. If successful, continue tests at same weight +25 knots airspeed.

TABLE T110-IV. Suspended weight requirement (20,000 feet)

Parachute actuation shall be by a suitable static line/automatic actuator combination that will deploy assembly no more than 3 seconds from launch at 20,000 feet pressure altitude.

Test condition number	Number of tests required 1/	Speed at launch (KEAS ±5 percent)	Suspended weight (±2 pounds)
1	4	110	200
2	4	110	250
3	4	110	300
4	4	150	200
5	4	150	250
6	4	150	300
7	4	175	200
8	4	175	250
9	4	175	300
10	4	200	200
11	4	200	250
12*	4	200	300

* If destructive failure has not occurred prior to this point, continue this test series in 25-knot increments, repeat a test failure with a new parachute canopy under same conditions to determine if tests are to continue.

1/ Perform tests with used parachutes having only minor repairs until a failure occurs for a given weight and airspeed. Repeat the test with a new parachute at same weight and airspeed. If successful, continue tests at same weight +25 knots airspeed.

METHOD T111

SERVICE EVALUATION AND MAINTAINABILITY

1. Purpose. - To demonstrate, under actual service conditions, a proposed assembly, subassembly or components suitability, and to determine if it meets the stated design intent criteria. Also, to develop logistic statistical data.

2. Procedure. - Test program will not necessarily be limited to the procedures listed below, as design intent shall be a major consideration.

(A) Preparation for tests. Confirm that item being evaluated conforms to section 4, paragraph 4.2.

(B) A representative who shall act for the testing laboratory to witness the evaluation of the following:

(1) Test item being evaluated is inspected, rigged, packed and maintained in accordance with applicable documents and drawings.
(2) A briefing of potential aircrewmen and pilots concerning operation of evaluation item is performed.
(3) Post-flight critique of evaluation item is performed.
(4) Condition of evaluation items by visual examination for safety of flight deficiencies is monitored.

(C) Test schedule.

(1) Total number of new assemblies, subassemblies or design change components to be evaluated: three or more as required.
(2) Evaluation to cover a time period of not less than 126 and not more than 372 days.
(3) Evaluation to be performed in aircraft types and models for which the evaluation test item is intended, or a reasonable equivalent.
(4) Pre-flight briefing shall include:
  (a) Description of test item.
  (b) Description of operation of test item.
  (c) Specific points for observation.
  (d) Anthropometry of test personnel.
  (e) Safety of flight information.
  (f) Identification of test personnel.
(5) Post-flight critique shall include:
  (a) Comments concerning design comfort.
  (b) Comments concerning design deficiency, i.e., slippage of webbing through hardware.
  (c) Comments on effect on aircraft control or operation of equipment.

(d) Time periods of each evaluation.
1 Clock time of day.
2 Taxi time.
3 Flight time.
(e) Suggestions concerning the proposed design under evaluation.

(6) Monitor inspection, maintenance and repack cycle of evaluation items.
(a) Prepare damage charts of the container, harness and canopy of test assembly to indicate wear, damage or items of engineering interest.
(b) Take documentary black and white photographs (8 x 10 inch) of assembly prior to release of parachute from the packed condition.
(c) Record items replaced to place the item in an "in-service" condition.
1 Part description.
2 Part number.
3 Quantity required.
(d) Record parts repaired to place evaluation item in an "in-service" condition.
1 Part name and number of part repaired.
2 Brief narrative description of repair.
3 Photograph repaired area, 8 x 10 inch, black and white views.
(e) Record parts modified to place item in an "in-service" condition.
1 Name and number of part modified.
2 Brief narrative description of modification.
3 Photograph modified area, black and white photograph, (8 x 10 inches).
(f) Obtain statements concerning following:
1 Description of handling and aircraft installation problems or recommendations.
2 Description and sketches of recommended changes or modifications other than that in (d) and (e) to evaluation item.
3 Description in inspection, rigging and packing problems or recommendations.
4 Recommended changes to documents to inspect and pack assembly.

3. Minimum data requirements.

(a) Summary sheet of all data obtained in accordance with paragraph 2.

(b) 16mm. color motion pictures of inspection and repack methods used.

(c) 16mm. color motion pictures of flight line inspection and handling methods used.

METHOD T112

DESIGN AND STRUCTURAL VERIFICATION (PARACHUTE ASSEMBLY)

1. Purpose. To perform in-flight parachute dummy drop tests to obtain specific basic engineering data and to determine if assembly, system or subassembly meets design requirements prior to use by test subjects. Varied flight test conditions are intended to provide sufficient engineering data for evaluation of design characteristic areas. This test will be performed after commission of test method T105 and prior to performing test method T108.

(a) Rate of descent.

(b) Twisted line.

(c) Reliability level.

(d) Minimum opening altitude.

(e) Force history.

(f) Deployment characteristics.

(g) Oscillation.

Portions of this test method may have to be waived or amended because of specific design considerations or safety, by the requesting contractor, activity having engineering responsibility, or testing laboratory.

2. Procedure. Test program will not necessarily be limited to procedures listed below.

(a) Preparation for test. Confirm test item configuration and test conditions are in accordance with section 4, paragraph 4.2.

(b) Load requirements. Table T112-I indicates test conditions. Dummy shall be torso-shaped (less head, arms and legs). For all test conditions listed in table T112-I, the weight tolerance is ±2 pounds.

(1) Launching and deployment. Special devices and techniques shall not be used to stabilize the dummy starting at dummy launch and extending through deployment events.

(c) Parachute assembly re-use limitations. Parachutes may be reused as indicated in table T112-I or in accordance with specific directions of the contractor or activity having engineering responsibility. However, parachute assemblies which have had major repairs shall not be used.

(d) Test schedule.

(1) Minimum total number of new parachute assemblies required: minimum 3.
(2) Minimum total number of tests: 15 each.
(3) Permeability tests are to be performed on each canopy prior to commencement of tests and after first test and at completion of the test program.
(4) Acceptability criteria shall be established by the contractor, activity having engineering responsibility or the testing laboratory. In the absence of specific requirements, all parachutes shall be fully inflated and in equilibrium with no more than a 200-foot altitude loss. Rate of descent shall be obtained by averaging all points taken for last 500 feet of descent. Oscillation data shall be recorded from canopy full open event to impact.

3. Minimum data requirements.

(A) Configuration control.

(1) Drawings and sketches of test item.
(2) Drawings and sketches of special aids and ground support equipment.
(3) Packing, rigging, inspection checklines and instructions.
(4) Damage charts as required.
(5) Repair and modification records.
(6) Test setup, description and planned sequence of events.

(B) Cinetheodolite coverage, using minimum of three stations and recording binary time of day and wind corrections resulting in: (Correct as required to a standard day condition.)

(1) Event time vs. altitude.
  (a) Typical events; aircraft launch and container opening, pilot parachute inflated, canopy out of container, suspension line stretchout, first inflation and full inflation.
(2) Rate of descent vs. altitude.
(3) Drag coefficient vs. time.
(4) Lift to drag ratio vs. time for special configuration.
(5) Oscillation vs. time.
(6) Dynamic pressure vs. time.

(C) Telemetering.

(1) Riser forces vs. time.
(2) Oscillation vs. time.
(3) Launch event.

T112

(D) Test condition information.

(1) Record drop date and place of drop.
  (a) Record drop airspeed.
  (b) Record drop altitude.
(2) Record drop time.
(3) Record testing activity test identification (test program or drop number).
(4) Record weather conditions.
  (a) Surface wind direction (knots).
  (b) Surface temperature (°F).
  (c) Barometric pressure (inches Hg.).
(5) Test dummy.
  (a) Record weight of dummy to nearest pound (to include battery and TM package).
  (b) Gross weight to nearest pound.

(E) Photographic coverage.

(1) Motion picture, 16mm., 200 frames per second, color, with timing pulses.
  (a) Ground-to-air.
  (b) Launch to impact coverage.
(2) Sequence stills, 70mm., black and white, with binary time of day.
  (a) Launch to full open coverage.
(3) Still coverage, black and white.
  (a) Packing and rigging coverage as may be required.
  (b) Damage and descent still coverage as may be required.

TABLE T112-I. Parachute reuse tests

All tests actuated by static line.

Test condition number	Number of new parachutes required	Number of tests	Launch airspeed (KEAS ±5 percent)	Suspended type/weight ±2 pounds	Pressure altitude(ft.) ±100 feet
1	3	5	100	200 torso	5,000
	*	5	100	200 torso	10,000
	*	5	100	200 torso	18,000

* Use parachutes from previous tests. Repairs of 2 percent of canopy area are permissible. Replace parachutes damaged more than 2 percent.

FOLD

POSTAGE AND FEES PAID

OFFICIAL BUSINESS

Commander, Aeronautical Systems Division

Attn: ASNPS

Wright-Patterson Air Force Base, Ohio 45433

FOLD

SPECIFICATION ANALYSIS SHEET

Form Approved Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.

SPECIFICATION MIL-STD-858 TESTING STANDARD FOR PERSONNEL PARACHUTES

ORGANIZATION	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT $

MATERIAL PROCURED UNDER A

( ) Direct Government Contract ( ) Subcontract

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

   A. GIVE PARAGRAPH NUMBER AND WORDING.

   B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID.

3. IS THE SPECIFICATION RESTRICTIVE?

   ( ) YES ( ) NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.)

SUBMITTED BY (Printed or typed name and activity) DATE

DD Form 1426