

MIL-T-82341  
7 March 1969

MILITARY SPECIFICATION  
TRAINER, EJECTION SEAT, AIRCRAFT;  
GENERAL SPECIFICATION FOR

This specification is mandatory for use by all Department and Agencies of the Department of Defense.

1. SCOPE

1.1 This specification covers the general requirements for aircraft ejection seat trainers, (see 6.1).

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

Military

MIL-T-23991

Training Devices, Military; General Specification for

STANDARDS

Military

MIL-STD-1472

Human Engineering Design Criteria for Military Systems, Equipment and Facilities

PUBLICATIONS

Air Systems Command

WADC Technical Report 56-171

WADC Technical Report 56-172

Layout of Work Places  
Design of Controls

(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 Procuring Contracting Officer.)

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### 3. REQUIREMENTS

3.1 Materials, parts and processes. - Except as specified in 3.1.1 of this specification and otherwise specified in the detail specification, materials, parts and processes used in the design and construction of the trainer shall conform to MIL-T-23991.

3.1.1 Totalizing meter. - A cycle totalizing meter shall be supplied in lieu of the time totalizing meter, specified in MIL-T-23991.

3.2 Design. - Design shall be in accordance with MIL-T-23991 and the requirements of this specification.

3.2.1 Design basis. - Trainer design shall be based on that of a particular aircraft seat installation, as specified in the detail specification.

3.2.2 Mechanical. - Mechanical design shall be in accordance with MIL-T-23991 and as specified in the detail specification.

3.2.3 Electrical and electronic design. - Electrical and electronic design shall be in accordance with MIL-T-23991 and as specified in 3.2.3.1 of this specification.

3.2.3.1 Power cords. - Power cords from equipment shall be at least 30 feet long.

3.3 Reliability. - Except as specified in 3.3.1 of this specification, the reliability requirements shall be as specified in MIL-T-23991.

3.3.1 Availability requirements. - Availability for scheduled training time shall be as specified in the detail specification and shall be based on the model, 
$$A = \frac{MCBF}{MCBF - MTTR}$$

where:

MCBF = mean cycles between failure

MTTR = mean time to repair, where mean cycles are equated to repair time.

3.3.1.1 Totalizing meter. - A cycle totalizing meter as specified in 3.1.1 of this specification shall be used to record the number of cycles between failures.

3.4 Maintainability. - The quantitative maintainability requirements of the trainer shall be as stated in the contract. Except as noted

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in 3.4.1 and 3.4.2 of this specification, the qualitative maintainability requirements of MIL-T-23991 shall apply.

3.4.1 Wiring board extender cards. - The wiring board extender cards shall not be required unless specified in the detail specification.

3.4.2 Test - recorder provisions. - A panel containing outputs for the recording of parameters for static and dynamic checkout of the training device shall not be provided unless specified in the detail specifications.

3.5 Transportability. - The trainer shall be designed and constructed for efficient transportability in accordance with detail specification.

3.6 Performance. - Performance shall be in accordance with the detail specification and as specified in 3.6.1 through 3.6.5.3 of this specification. The trainer shall be operable, to the extent necessary to simulate the kinesthetic effects of aircraft seat ejection, to provide basic training in cockpit procedures incident to ejection, and to provide for general trainer operation and control.

3.6.1 Ejection simulation. - Ejection simulation shall be as specified in 3.6.1.1 and 3.6.1.2 of this specification.

3.6.1.1 Ascent. - The seat assembly with a 165 lb. dummy load shall travel up the tower guide rails until stopped by gravity at a height between 8 and 15 feet to meet the test requirements of 4.1.2 of this specification.

3.6.1.1.1 Emergency braking. - Emergency braking shall ensure a positive safe stop at a height of 20 feet.

3.6.1.2 Descent. - Immediately following the attainment of maximum height, the seat assembly shall descend, at a rate not exceeding 4.0 feet per second, so as to reach the preload position within 6 seconds, where it shall automatically stop and hold. Cushioning to prevent excessive shock shall be effective in case of failure of the descent speed controls. Release of the preload holding mechanism, by means of the release valve, shall cause the seat to descend to the preejection position, with the ejection piston aligned and guided so as to enter the cylinder smoothly and without binding. Thereafter, the seat catch shall automatically return to the preload position as necessary to permit free passage of the next ascent and stopping of the ensuing descent.

3.6.3 Interference warning. - Contact of any part of the trainee's body, or personal equipment with the interference warning pads, during ascent, shall be indicated by the loud sounding of a warning bell, continuing until deactivated by instructor control.

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3.6.4 Procedure training.- Execution, by the trainee, of the pertinent aircraft normal and emergency ejection procedure steps, shall be indicated by illumination, in proper sequence, of the procedure telltale lights at the operator console. The lights shall be visible and distinguishable at a distance of 20 feet from the console, and within an azimuth angle of  $\pm 60$  degrees from the center line of the console when facing a background of bright sunshine.

3.6.5 Trainer operation.- General trainer operation and control shall be as specified in 3.6.5.1 through 3.6.5.3 of this specification.

3.6.5.1 Master control.- A trainer master control switch shall be provided at the operator console to enable the instructor to connect or disconnect all power to the trainer. A white indicator light, adjacent to the master control switch, shall illuminate whenever the master switch is in the ON position.

3.6.5.2 Catapult safety release control.- A catapult safety release control, instructor operable, shall be provided at the operator console to permit removal of the safety pin from the firing mechanism so as to arm it for firing. The armed condition shall be indicated by illumination of an adjacent red indicator light.

3.6.5.3 Tower erection and leveling.- Tower construction shall be such as to permit erecting the tower and level the trainer within a period of thirty minutes. The torque applied to each jack necessary for leveling, with all equipment installed, shall not exceed fifty foot-pounds.

3.7 Details of components.- The details of components shall be as specified in the detail specification and 3.7.1 through 3.7.6 of this specification. The trainer shall consist of the following major components:

- (a) Ejection assembly
- (b) Cockpit
- (c) Catapult
- (d) Tower
- (e) Operator console
- (f) Tower Support base.

3.7.1 Ejection assembly.- The ejection assembly shall consist

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of the ejection seat, auxiliary equipment, seat sled and descent control, as specified in 3.7.1.1 through 3.7.1.4 of this specification.

3.7.1.1 Ejection seat.- The ejection seat shall be an accurate replica of the design basis seat.

3.7.1.2 Auxiliary equipment.- Auxiliary equipment such as; instruments, controls, switches, safety pins, seat cushion, personnel parachute and harness assembly, survival kit container (less contents) and furnishings shall be included with the seat.

3.7.1.3 Seat sled.- The ejection seat shall be provided with a seat-sled type arrangement.

3.7.1.4 Descent control.- A descent control mechanism shall be provided to regulate the seat assembly descent at a rate not to exceed 4.0 feet per second, so as to reach the preload position within 6 seconds, where the seat assembly shall automatically stop and hold.

3.7.2 Cockpit.- The cockpit shall consist of a sheet metal or plastic housing with a top opening and seat location dimensionally similar to that of the pilot position in the design basis aircraft, except that additional forward cockpit clearance shall be provided, as necessary, to assure safe trainee ejection in accordance with the performance requirements of 3.6. This clearance shall be adequate to accommodate the physical, anthropological measurements of 99 percentile man as described in MIL-STD-1472.

3.7.2.1 Aircraft controls.- Aircraft controls, as specified in 3.7.2.1.1 and 3.7.2.1.2 of this specification, shall be provided in the cockpit, simulating those of the design basis aircraft in appearance and location.

3.7.2.1.1 Flight controls.- A simplified movable control wheel, or stick, and rudder pedals shall be provided. The pedals shall incorporate means for fore and aft adjustment.

3.7.2.1.2 Engine controls.- Engine controls shall be provided as specified in the detail specification.

3.7.3 Catapult.- A catapult with piston-cylinder assembly, and safety release shall be provided for ejecting the seat assembly. The cylinder shall be mounted within the seat sled and shall be designed to separate from the piston during ejection. The piston shall be mounted on the base of the tower of 3.7.4 of this specification.

3.7.4 Tower.- A tower having a strong rigid support with guide rails to hold the seat sled captive and guide it to the required height during ascent shall be provided. The tower shall have one

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end pivoted to the tower support base of 3.7.6 of this specification, and when raised to operating position, shall be held by braces.

3.7.5 Operator console .- The operator console, located on the front end of the cockpit, shall contain all controls, lights and other indicators necessary for operating the trainer and monitoring trainee responses and reactions. The operator console design, layout and arrangement shall conform to the applicable recommendations of the Wright Air Development Center (WADC) Technical Reports 56-171 and 56-172.

3.7.5.1 Controls.- Controls for the operator console shall include, but not necessarily be limited to, a master power switch and two catapult safety pin release controls, one of which shall be a remote type at the end of a 30-foot extension cable, attached at the console with a quick attach/disconnect type connector.

3.7.5.2 Lights.- Procedure telltale, and other indicator lights, shall be provided on the operator console, as necessary, to meet the performance requirements of 3.6, and as required by the detail specification.

3.7.6 Tower support base.- The trainer assembly shall be supported on a rigid base furnished with self contained castors for mobility. Leveling jacks shall be provided to enable balancing and anchoring of the trainer assembly.

3.8 Color.- The color requirements of MIL-T-23991 shall apply.

3.9 Dimensions.- Dimensions and tolerances shall be in accordance with the detail specification requirements.

3.10 Finish.- Finishes shall be suitable for outdoor use and storage and shall be in accordance with MIL-T-23991.

3.11 Government-furnished property.- Government-furnished property shall be as specified in the detail specification.

3.12 Government loaned property.- Government-loaned property shall be as specified in the detail specification.

3.13 Workmanship.- Workmanship shall be in accordance with MIL-T-23991.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 General.- With the exceptions noted in 4.2 and 4.3 of this specification, quality assurance provisions shall be in accordance

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with MIL-T-23991 as specified in 4.1.2 through 4.1.4 of this specification and the detail specification.

4.1.2 Dummy ejection tests.- At least nine successful ejection shots shall be performed, consisting of three shots, each with dummy loads of 125, 165 and 200 pounds respectively. The ejection height shall be recorded for each shot and be available for Government inspection. The ejection height with the dummy load of 165 pounds shall be to a height between 8 and 15 feet to meet the performance requirements of 3.6.1.1.

4.1.3 Seat-catch-release test.- A seat catch release test shall be conducted using a 125-pound dummy seat load to test the seat catch release operation.

4.1.4 Live ejection tests.- At least five successful live ejection shots shall be performed. The ejection height and weights shall be recorded and be available for Government inspection.

4.2 Reliability test.- Reliability test requirements shall be as specified by the detail specification. The reliability test requirements of MIL-T-23991 shall not apply.

4.3 Reliability/Availability demonstrations.- The reliability/availability demonstration requirements specified in MIL-T-23991 shall not apply.

## 5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery and marking for shipment shall be as specified in the detail specification.

## 6. NOTES

6.1 Intended use.- Ejection seat trainers will be used to indoctrinate pilots in the kinesthetic effects of, and train them in, the correct procedures for ejection from aircraft, and is intended for operation outdoors or in hangar spaces free from fire hazards.

6.2 Ordering data.- Ordering data shall be as specified in the detail specification.

6.3 Definitions.- Definitions are set forth in MIL-HDBK-220 and 6.3.1 through 6.3.3 of this specification.

6.3.1 Design criteria.- Design criteria are defined as those criteria, derived from the design and performance of the design basis equipment, which have been established, and so approved by the procuring activity, as applicable to the trainer design and performance.

6.3.2 Terms for equipment divisions.- Terms for equipment divisions are defined in MIL-T-23991.

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6.3.3 Reliability, maintainability, human-factors and safety.-  
Unless otherwise specified in this specification or the detail specification, reliability, maintainability, human-factors, and safety definitions are defined in MIL-T-23991.

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