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MILITARY SPECIFICATION

AIRCREW ESCAPE SYSTEM DESCRIPTIVE AND PERFORMANCE DATA PRESENTATIONS, REQUIREMENT AND FORMATS FOR; GENERAL SPECIFICATION FOR

This specification has been approved by the Naval Air Systems Command, Department of the Navy.

1. SCOPE

1.1 This specification defines the data requirements for aircrew escape systems and, in addition, establishes standard formats for (a) the presentation of data depicting aircrew escape system capabilities under varying conditions of speed, altitude, attitude, and sinkrate (b) system operation descriptions, and (c) system and ballistic component configuration. The formats established herein are compatible with the requirements for pilot's handbooks and other publications, as herein specified.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

Military

MIL-T-005474	Technical Manuals: General Preparation of
MIL-M-7700	Manuals: Flight
MIL-M-8910	Manuals, Technical: Illustrated Parts Breakdown; Preparation of

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Military (Continued)

MIL-E-9426	Escape System Testing, Ejection Seat Type Ground and Flight Tests; General Specification for
MIL-N-17792	Negatives for Reproduction, General Preparation of
MIL-S-18471	Seat System, Ejectable, Aircraft, General Specification for
MIL-A-23121	Aircraft Environmental, Escape and Survival Cockpit Capsule System, General Specification for
MIL-M-23618	Manuals, Technical: Periodic Maintenance Requirements, Preparation of
MIL-M-38784	Manuals, Technical: General Requirements for Preparation of
MIL-M-81260	Manuals Technical, Aircraft Maintenance
MIL-M-81273/5	Manuals, Maintenance, Technical (Equipment Type), Specifications for

STANDARDS

Military

MIL-STD-846	Escape System Testing: Ground, Track, and Flight Test

PUBLICATIONS

NAVAIR 11-85-1	Rocket Catapults for Aircraft Ejection Seats: Description, Operation and Handling
NAVAIR 13-1-6.2	Survival Equipment Manual

(When requesting any of the applicable documents, refer to both title and number. All requests should be made via the cognizant Government quality control representative. Copies of this specification and other unclassified specifications and drawings required by contractors in connection with specific procurement

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functions should be obtained upon application to the Commanding Officer, Naval Supply Depot (Code 1051), 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120. All other documents should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 General requirements -

3. 1.1 Charts and descriptions - The charts and descriptions required herein shall be prepared in accordance with the instructions and shall conform to the requirements of MIL-M-005474, MIL-M-38784, specifications referenced in each section herein, and the sample formats herein enclosed. The applicable aircraft model designation shall be marked clearly on all charts and descriptions in the locations shown on the enclosed samples.

3. 1.2 Negatives - Negatives required for reproduction of the specified charts and descriptions shall conform to MIL-N-17792.

3.2 Specific requirements -

3. 2.1 Descriptive and performance data presentation types - The descriptive and performance data presentations described herein shall be of the following types:

(a) Aircrew escape system performance data charts and description (3. 2. 2) suitable for inclusion in pilot's manuals.

(b) Aircrew escape system general description (3. 2. 3), including illustrations, suitable for inclusion in Maintenance Instruction Manuals and pilot's handbooks.

(c) Aircrew escape system fire and crash rescue information (3. 2. 4), including illustrations, suitable for inclusion in fire and crash rescue team publications and posters.

(d) Description and illustrations of rocket motors and rocket catapults suitable for inclusion in NAVAIR 11-85-1 (3.2.5).

(e) Aircrew escape system maintenance instructions (3. 2. 6).

(f) Stabilization and recovery parachute configuration description and packing instructions (3. 2. 7) suitable for inclusion in NAVAIR 13-1-6.2.

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3.2.2 Aircrew escape system performance data presentations - The aircrew escape system performance data presentation shall consist of the following charts and descriptions:

(a) Pull Up and Escape Capabilities (Power Off) Land. (Figure 1)

(b) Pull Up and Escape Capabilities (Power Off) Carrier. (Figure 2)

(c) Pull Up Discussion. (Figure 3)

(d) Minimum Ejection Altitude (Terrain Clearance) vs. Velocity & Flight Path. (Figure 4)

(e) Minimum Ejection Altitude (Terrain Clearance) vs. Velocity and Aircraft Attitude. (Figure 5)

(f) Landing and Take-off Escape Capability. (Figure 6)

3.2.2.1 Pull Up and Escape Capabilities (Power Off) Land - The chart (illustrated in Figure 1) shall depict for normal take-offs and landing patterns, including final approach for aircraft operations from airports those areas in which pull-up is effective in improving escape capability, in which pull-up is ineffective, and in which ejection is not recommended.

3. 2.2.2 Pull Up and Escape Capabilities (Power Off) Carrier - The chart (illustrated in Figure 2) shall depict for normal take-offs and landings, including final approach, for aircraft operating from carriers those areas in which pull-up is effective in improving escape capability, in which pull-up is ineffective, and in which ejection is not recommended.

3. 2.2.3 Pull Up Discussion - Pull up discussions, based upon aircraft flight characteristics shall discuss, as shown in Figure 3, advantages and dis - advantages/problems associated with pull -up attempts to gain altitude to improve inflight aircrew escape capability under various flight conditions.

3. 2.2.4 Minimum Ejection Altitude (Terrain Clearance) vs. Velocity & Flight Path - The chart, illustrated in Figure 4, shall present curves depicting minimum safe terrain clearance vs. aircraft velocity at time of escape initiation for constant aircraft dive angles of O, 15, 30, 45, 60, and 90 degrees each.

3.2. 2.5 Minimum Ejection Altitude (Terrain Clearance) vs. Velocity & Aircraft Attitude - The chart, illustrated in Figure 5, shall present curves depitting minimum safe terrain clearance vs. aircraft velocity at the time of escape

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initiation for constant aircraft bank angles of 0, 30, 60, 90, 120, 150, and 180 degrees each. It shall not be necessary to show curves for both right and left bank attitudes unless performance characteristics of the aircrew escape system will produce significant differences between the terrain clearance requirements associated with equal magnitudes of right and left bank. The curves shall be based on the worst results obtained from either right or left bank attitudes.

3.2.2.6 Landing and Take-off Escape Capability- As shown in Figure 6, this chart shall depict the normal climb out and approach, as well as the no thrust approach curves for the aircraft. Superimposed upon these curves shall be shown the safe and unsafe regions based upon aircrew inflight escape system performance characteristics. Separate charts shall be prepared for (a) wings level and 30 degrees bank, and (b) 45 and 60 degrees bank.

3.2.2.7 Data -

3.2.2.7.1 Data sources - The data required for developing the aircrew escape system performance data presentations specified herein shall be derived from, or extrapolated from, data obtained during escape system tests specified by MIL-E-9426, MIL-S-18471, MIL-A-23121, and MIL-STD-846, as applicable. The use of computer simulations based upon, or verified by, data generated during the escape system tests to develop these presentations is encouraged.

3.2.2.7.2 Escape system weight - In developing the herein specified aircrew escape system performance data presentations, the weight of the escape system shall represent the total for fully-equipped 98 percentile aircrewman(men) and the portion of the aircrew escape system boosted from the aircraft.

3.2.2.7.3 Escape system center of gravity - The escape system center of gravity used in developing the aircrew escape system performance data presentation herein specified shall represent worst extreme conditions as determined during test and evaluation of the escape system.

3.2.2.7.4 Aircrew reaction time - The aircrew escape system performance data presentations shall include both pure data (showing performance measured from time of escape system firing control actuation) and data allowing for a 2 second aircrew reaction time between realizing the need for escape and actuating escape system firing controls.

3.2.2.7.5 Completion of aircrew egress - Aircrew egress shall be considered complete when the last aircrewman or escape system has cleared the adjacent aircraft structure.

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3. 2.2.8 Aircrew escape system performance data presentation format - The format of the aircrew escape system performance data presentations shall conform to Figures 1 through 6 and to MIL-M-7700.

3. 2.3 Aircrew escape system general description - The aircrew escape system description is intended to furnish aircrewmen and ground crewmen a brief description of the aircrew escape system configuration and of the aircrew escape system operation.

3. 2.3.1 Aircrew escape system configuration description - A brief, illustrated narrative shall be provided describing the configuration, location, purpose, and mode of functioning of the aircrew escape system and each of its major components, subassemblies, assemblies, and subsystems.

3.2.3. 1.1 Configuration illustrations - Illustrations showing the configuration and location of the aircrew escape system and each of its major components, subassemblies, assemblies, and subsystems shall be provided. The illustrations used shall show clearly the details described in the narrative to aid aircrewmen and ground crewmen in learning the location and visual characteristics of the aircrew escape system and each described item. At least one picture shall show the aircrew escape system in the safetied condition and shall emphasize the location of all of the escape system safety devices.

3.2.3.2 Aircrew escape system operation description - A brief description of the aircrew escape system operation shall be prepared enumerating the pre-escape, egress, post-escape, and post-landing events in the escape sequence. Where applicable, event occurrence times, measured from a common base time point (i. e.: escape system initiation) shall be listed using nominal times.

3.2.3.2.1 Operation illustrations - Illustrations depicting the operation of the aircrew escape system shall be provided. The illustrations shall include a typical escape system - aircrew trajectory curve on which are superimposed, as shown in Figure 7, major escape system operation events.

3. 2.3.3 Aircrew escape system general description format - The description shall be suitable for inclusion in flight and maintenance manuals and, therefore, shall conform to the requirements of MIL-M-7700, MIL-M-81260 and MIL-M-81273/5.

3.2.4 Aircrew escape system fire and crash rescue information - Information shall be prepared concerning aircrew rescue procedures and safety precautions. The information shall be presented in both a wall chart and in a brochure.

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3.2.4.1 Aircrew rescue information chart - A chart, at least 24 inches x 30 inches but no greater than 30 inches x 36 inches, shall be prepared depicting the location and operation of cockpit ingress controls, the location and safetying of escape system firing controls, means for safetying the escape system, and means for releasing aircrewmen from their seats. The chart shall include measures to be taken to prevent aircrewman suffocation. In addition, the chart shall include rescue crew warnings depicting the danger areas in and around the aircraft. Figure 8 illustrates an acceptable wall chart embodying these requirements.

3.2.4.2 Aircrew rescue procedures brochure - An illustrated brochure, containing a detailed description of the aircrew escape system with emphasis on methods of safetying the system, means for obtaining ingress to crew station areas, aircrew rescue methods, and safety precautions to be observed, shall be prepared to supplement the aircrew rescue information chart. Appropriate warnings concerning danger areas in and around the aircraft and information concerning safety procedures to be observed shall be provided. The approximate page size for the brochure shall be 8-1/2 inches x 11 inches. A sample brochure illustrating these requirements is provided as Figure 9 for guidance in preparing the aircrew rescue procedures brochure.

3.2.5 Rocket motor/catapult description - An illustrated description of the aircrew escape system propulsion rocket motor/catapult shall be prepared for inclusion in NAVAIR 11-85-1. The description prepared by the contractor shall provide the following sections:

(a) -1 PURPOSE.

(b) -2 DESCRIPTION AND LOCATION.

(c) -3 OPERATION.

(d) -4 IDENTIFICATION.

A typical rocket motor/catapult description is provided as Figure 10 for contractor guidance in preparing the description.

3.2.5.1 Rocket motor/catapult description illustrations - The following illustrations shall be provided with the rocket motor/catapult description:

(a) Assembled unit.

(b) Sectional or cut-away view of the assembled unit.

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(c) View of the installed unit's firing mechanism connected to the aircrew escape system initiation subsystem.

(d) View of the installed unit.

(e) Unit as shipped in shipping container.

(f) Aircrew escape system major sequence events diagram.

Except where line drawings are necessary to show more clearly important detail, the illustrations (a) through (e) shall be photographs. Examples of the types of illustrations desired, although in line form, are shown in Figure 10.

3.2.6 Aircrew escape system maintenance instructions - The contractor shall prepare (a) aircrew escape system maintenance instructions conforming to MIL-M-81260 and MIL-M-81273/5, and suitable for inclusion in the NAVAIR 13 Series manuals and in Maintenance Instruction Manuals, (b) aircrew escape system periodic maintenance requirements conforming to MIL-M-23618, and(c) aircrew escape system illustrated parts breakdown conforming to MIL-M-8910.

3.2.7 Stabilization and recovery parachute configuration description and packing instructions - The contractor shall prepare, in a format suitable for inclusion in NAVAIR 13-1-6.2, (a) illustrated descriptions of both the stabilization (if used in the aircrew escape system) and recovery parachute subsystems, and (b) illustrated detailed packing and installation instructions for each parachute subsystem. The preparation of the description and instructions shall be coordinated with the Naval Aerospace Recovery Facility, El Centro, California, to ensure their completeness and adequacy for service use.

3.2.7.1 Parachute configuration description - Each parachute configuration description shall describe and illustrate the type parachute canopy, pack and equipments included in the parachute subsystem. Particular care shall be exercised to warn personnel in the event similar components (i. e. : similar in size, shape or appearance) are capable of being installed readily in a manner likely to cause system malfunctions.

3. 2.7.2 Parachute detailed packing and installation instructions - For each parachute, illustrated packing and installation instructions shall be prepared in sufficient detail that qualified, trained personnel following the instructions can pack and install the parachute subsystem satisfactorily.

3. 2.7.3 Parachute configuration, packing and installation illustrations - Detail photographs, occasionally buttressed by detail line drawings, shall be provided to complement the narrative configuration description and packing and installation instructions. All critical phases of the packing and installation process shall be illustrated.

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4. QUALITY ASSURANCE PROVISIONS (See MIL-M-8910)

5. PREPARATION FOR DELIVERY (See MIL-M-8910)

6. NOTES

6.1 Intended use - The intended use of this document is to provide the general guide lines and requirements for the style and format and required information to be included in technical manuals and data associated with aircrew escape systems.

6.2 Ordering data - Procurement documents should specify:

(a) Title, number, and date of this specification.

(b) Whether a manual plan, manual outline, manuscript copy only, manuscript copy for review, reproducible copy, original artwork, negatives, printed copies, are to be furnished.

(c) Whether approved manuscript copy will be used as interim preliminary issues; whether copy shall be single spaced; how copies shall be reproduced and bound; whether a commercial manual may be submitted in lieu of manuscript copy.

(d) Type of equipment publications required.

(e) Page size of the manual.

(f) Whether the manual shall have a cover in lieu of, or in addition to, a title page.

(g) The cover/title page transmittal notice.

(h) Authority for a cover/title page on manuals.

(i) Requirement for a copyright release.

(j) When original drawings shall be furnished.

(k) Quality assurance requirements.

(l) If packaging and packing shall be other than specified in MIL-M-8910.

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(m) Whether the decimal system for numbering shall be used in changes.

6.3 Detailed information for revision consideration - In considering a revision, the following detailed information would expedite a decision by the procuring activity:

(a) Number of pages in the new change: percentage of pages affected in existing manual by all changes which would include the new change, and all previous changes.

(b) If the new change merely adds pages to a section, or to the back of the manual, affecting no pages in the existing manual, it should be so stated.

(c) Time required to prepare the new change. Time required to prepare a revision.

(d) Cost of preparing the new change. Cost of preparing a revision.

(e) If the basic manual was prepared to a specification presently obsolete, will the revision be prepared to the same specification or to the current specification? If proposal is to prepare the revision to the original specification, what are the time and cost factors for preparing it to the current specification?

6.4 Definitions -

6.4.1 Technical manual - A technical manual is a publication containing a description of equipment, systems, with instructions for effective use, including one or more of the following sections, as required: instructions covering initial preparation for use; operational instructions; maintenance instructions: overhaul instructions; related technical information or procedures, exclusive of those of an administrative nature; and parts lists or parts breakdown.

6.4.1.1 A standard technical manual is any technical manual that does not require a new concept or special presentation of data that can not, or should not, be constrained by the size and format requirements of this specification.

6.4.2 Change - A change means a modification of information in an existing manual.

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6.4.3 Revision - A revision is a second or subsequent edition of a manual which supersedes the preceding edition.

6.4.4 Supplenent - A supplement is a subsidiary document which complements information in a manual.

6.4.5 Reprint - A reprint is a second or subsequent printing of a manual including all changes. Normally, all changes are merged with the basic manual and a note to that effect is added to the cover/title page.

6.4.6 Preliminary issue - A preliminary manual is normally intended for interim use to make the technical information available for test, verification or training purposes.

6.4.7 Copy freeze date - The copy freeze date is the date that the contractor or procuring activity decides no more additions, deletions, and changes will be accepted to the publication material. Additions, deletions, and changes after that date will be accumulated for preparation of a subsequent change or revision of the publication.

6.4.8 Multi-volume publications - Multi-volume publications are assigned individual publication numbers. If a volume, because of its bulk, warrants being further divided, the procuring activity will decide how these divisions shall be identified.

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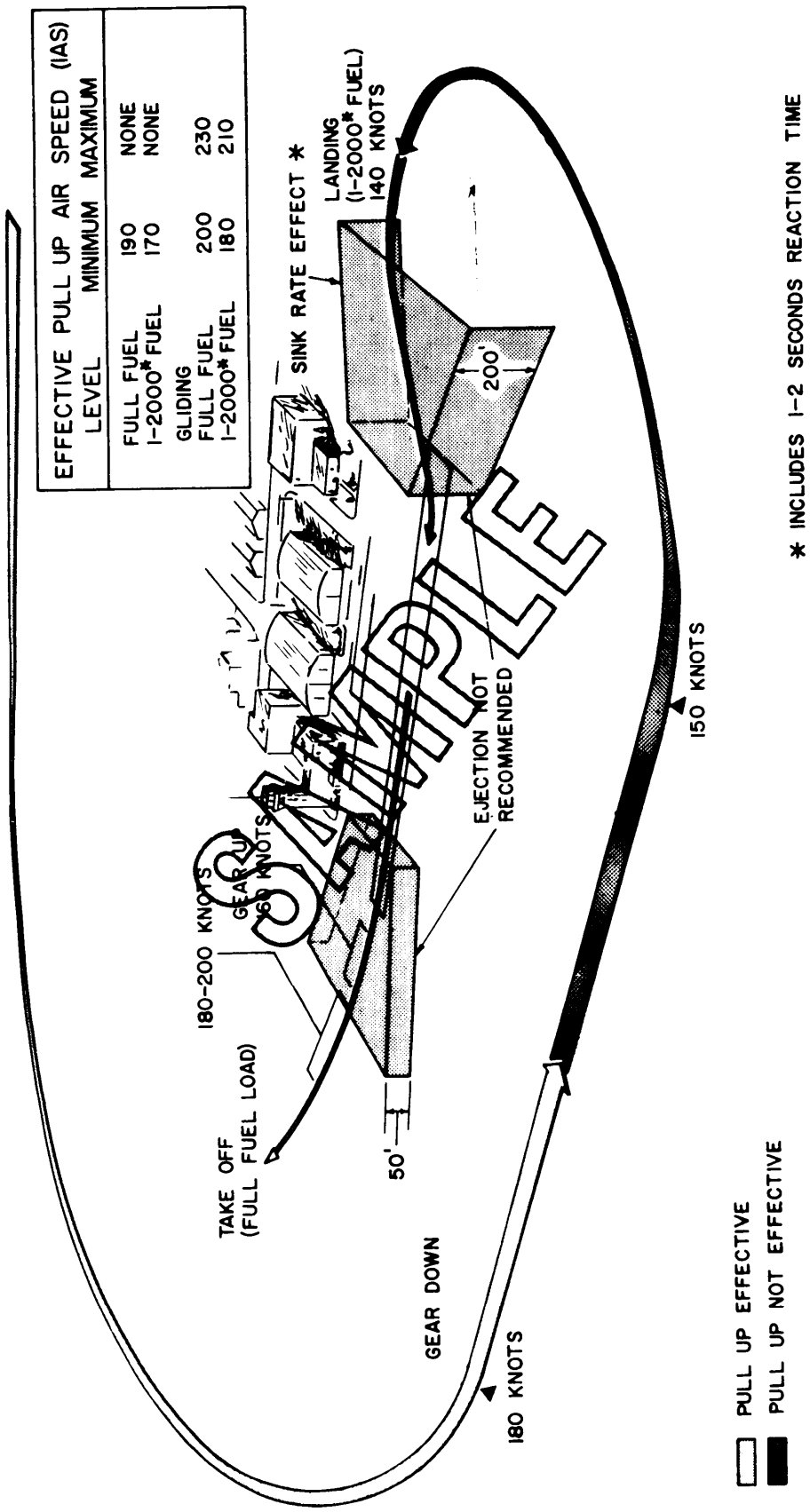

Figure 1. PULL UP AND ESCAPE CAPABILITIES (POWER OFF) LAND

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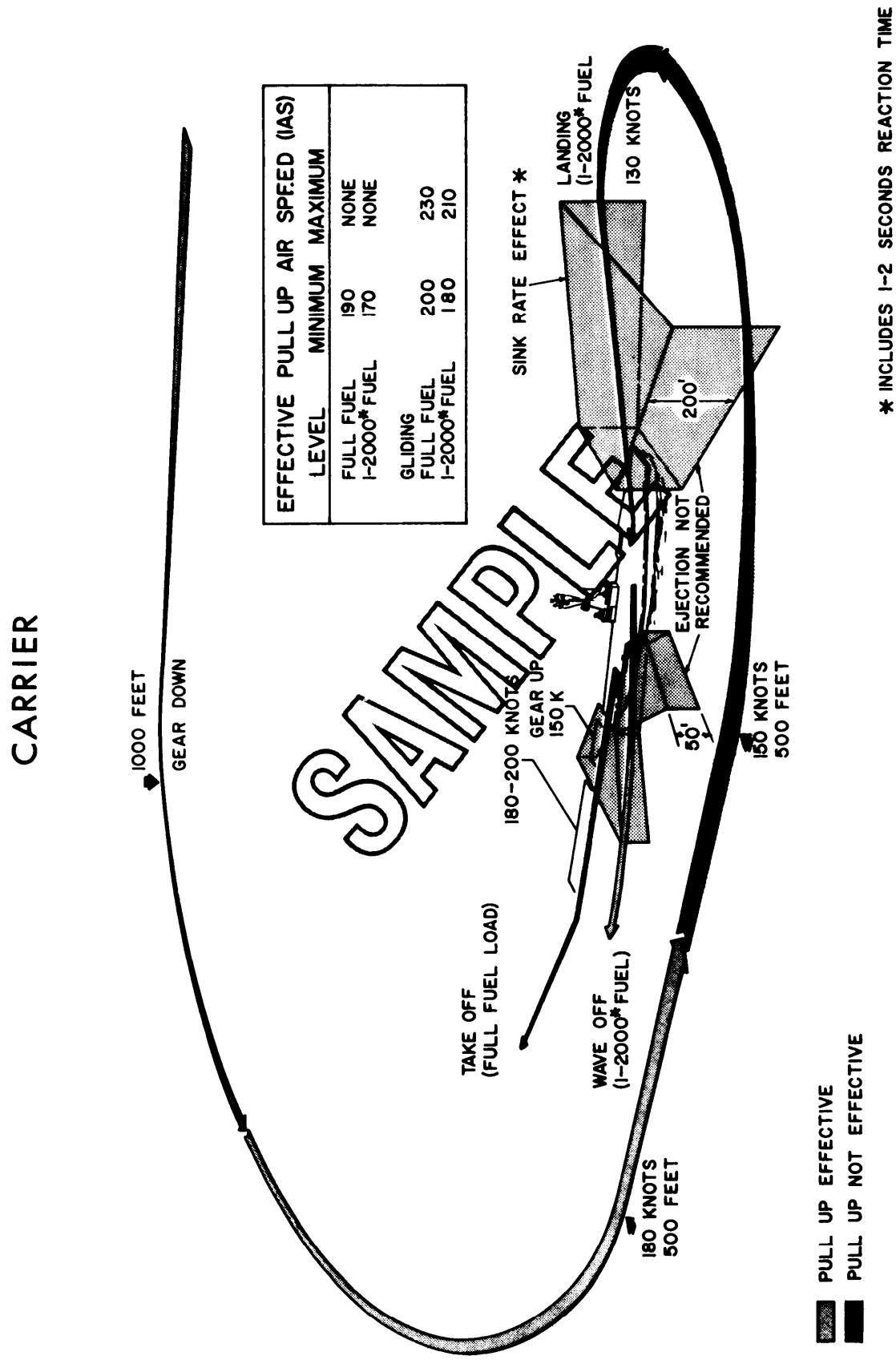

Figure 2. PULL UP AND ESCAPE CAPABILITIES (POWER OFF) CARRIER

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PULL-UP.

A "pull-up" maneuver may be performed as an aid to successful ejection at low altitudes. Flight test demonstrations have shown that attempting a power off "pull-up" outside of certain airspeed limits will result in a loss of altitude rather than a gain. Variations in flight path, weight, and wing position can vary the minimum airspeed required for an effective pull-up from 160 knots to 190 knots. In gliding flight, the maximum effective airspeed can vary from 210 to 230 knots. When above this airspeed in a glide, more altitude is lost during the flare than can be regained during pull-up.

Upon loss of power following takeoff with full fuel load, 180 knots airspeed is required with the wing up and 190 knots with the wing down in order to convert airspeed into altitude. This assumes no rate of descent at the time of pull-up. If a descent has begun after power loss, a minimum of 210 knots and a maximum of 230 knots, wing up or down, is required.

During landing approach, airspeed will normally be approximately 150 knots at the 180° position decreasing to 135 knots on final. If power is lost anywhere during the approach, rate of descent will increase rapidly, and a pull-up will not be effective.

Pilot technique for performing a power off pull-up is to apply light to moderate aft stick force, increasing the pitch attitude steadily until the ejection point is reached 10 to 20 knots above stall speed.

WARNING

Do not pull excessive g's. Accelerations above 1.2g will decrease possible altitude gains by causing stall at higher airspeed.

Note

Aircraft pitch attitude and flight path can reach as high as 25°. Time for effective completion of a pull-up maneuver will be at least 6 seconds at minimum airspeed and can exceed 15 seconds when starting above 220 knots.

Figure 3. PULL UP DISCUSSION

SAMPLE

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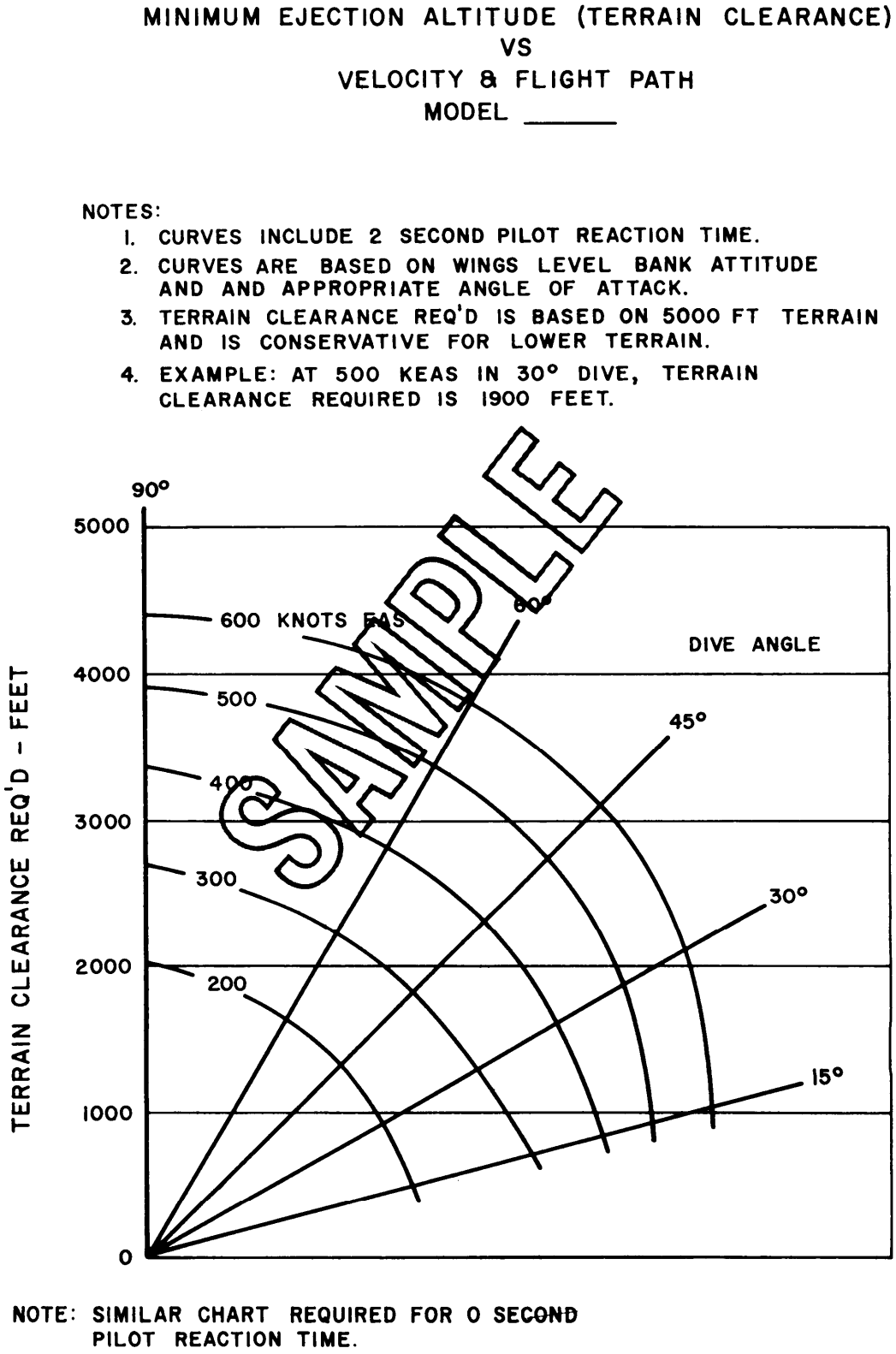

Figure 4. MINIMUM EJECTION ALTITUDE (TERRAIN CLEARANCE) VS. VELOCITY AND FLIGHT PATH

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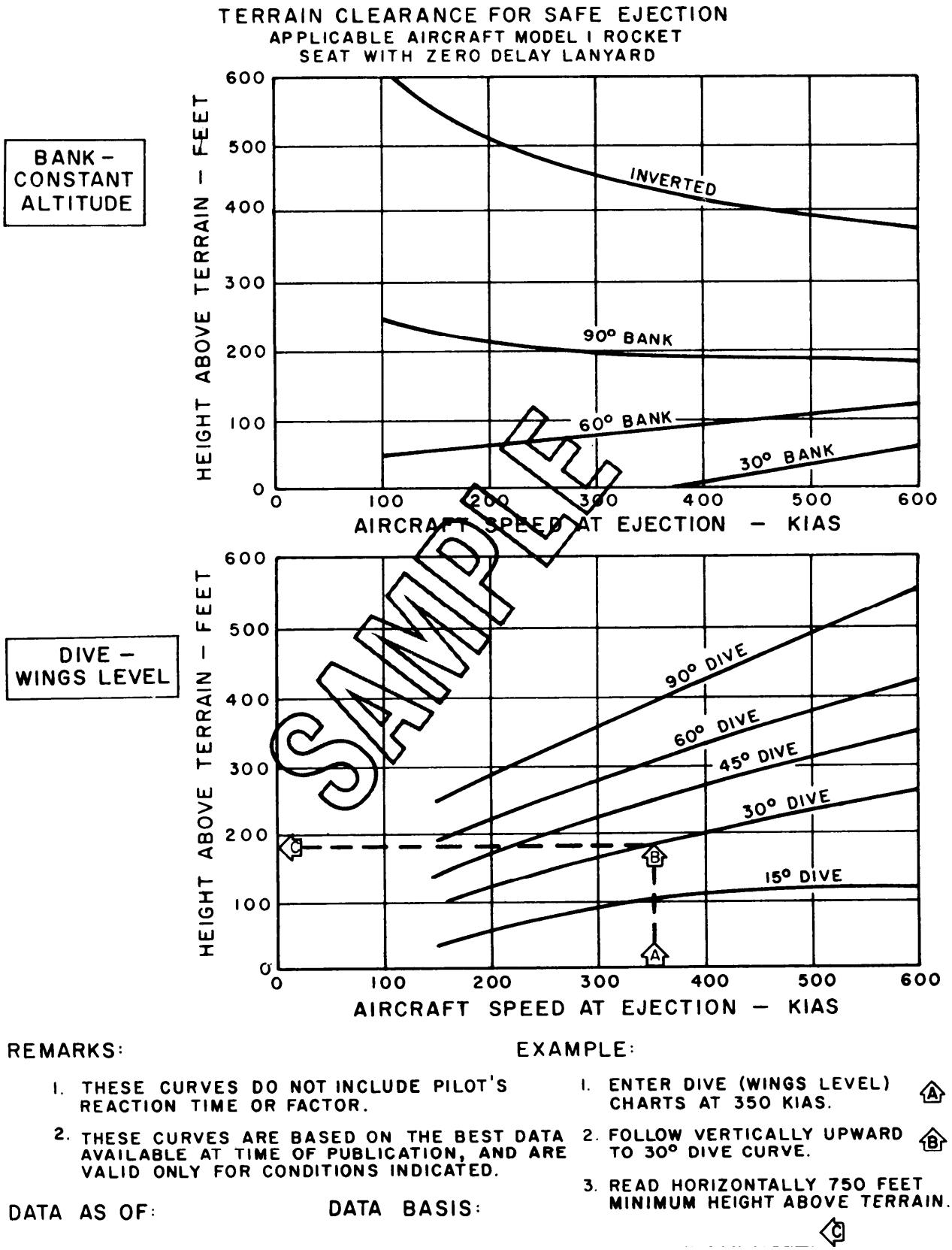

Figure 5. MINIMUM EJECTION ALTITUDE (TERRAIN CLEARANCE) VS. VELOCITY AND AIRCRAFT ATTITUDE

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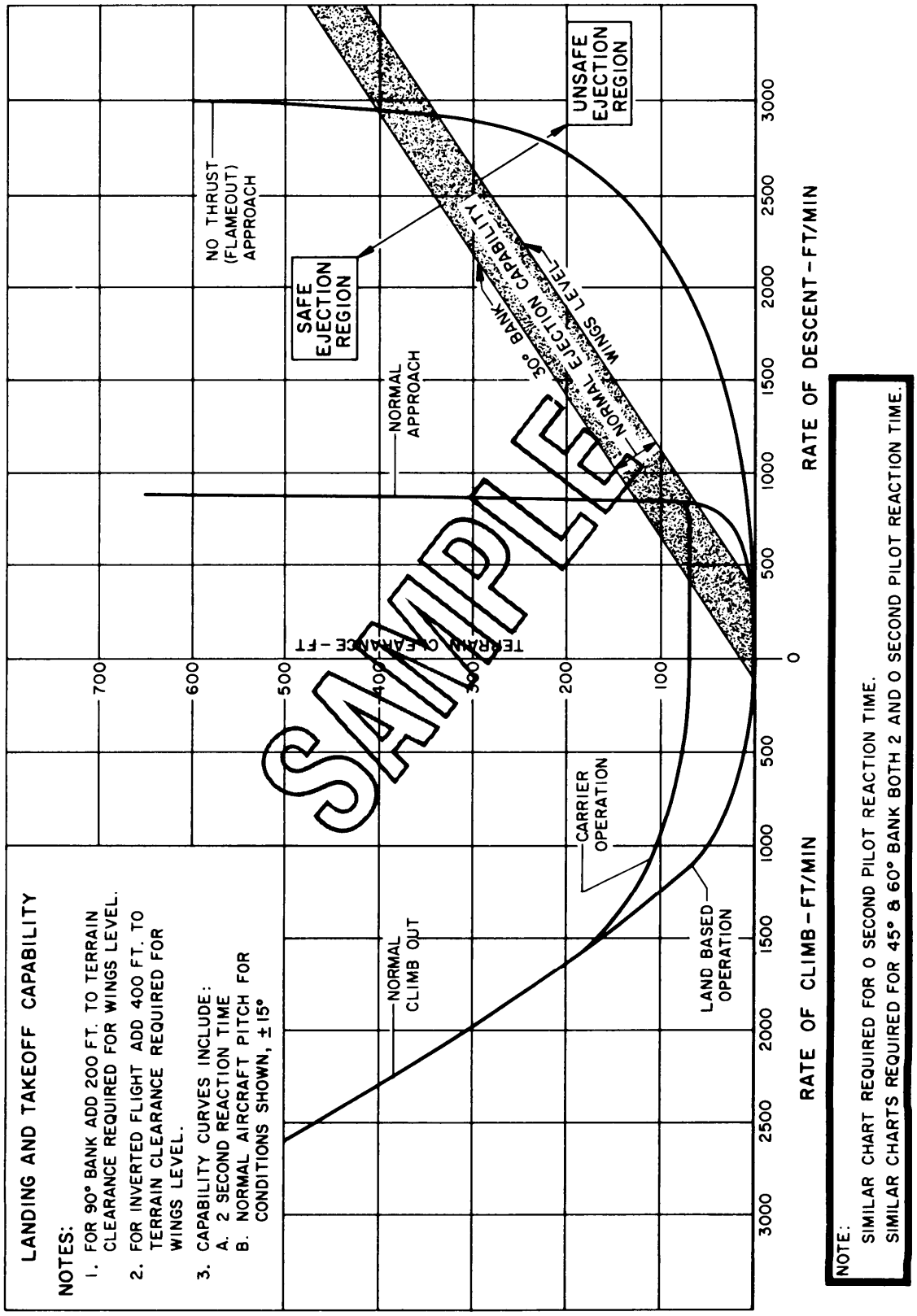

SAMPLE

Figure 6. LANDING AND TAKE-OFF ESCAPE CAPABILITY

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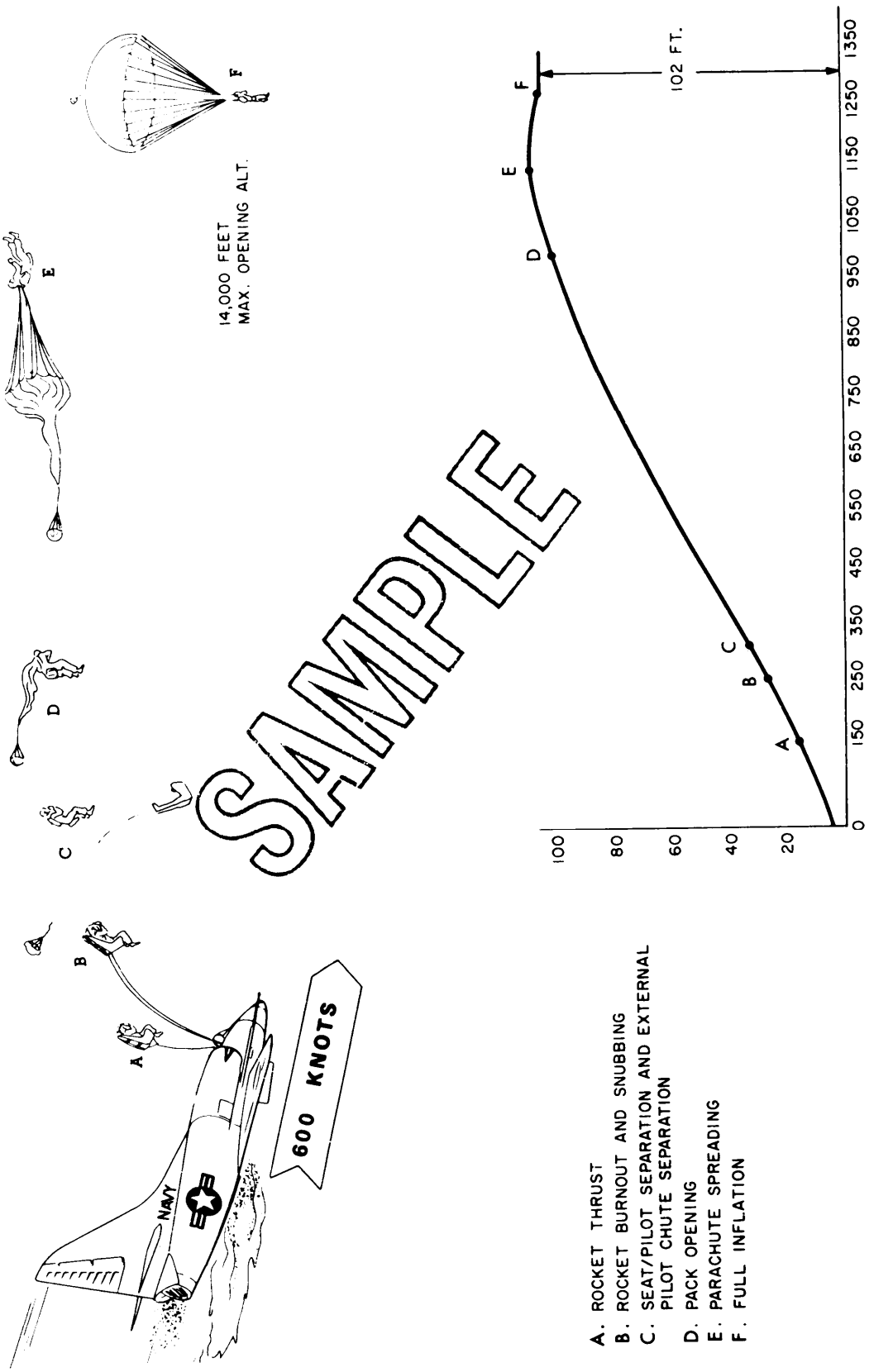

SAMPLE

Figure 7. AIRBORNE EJECTION SEQUENCE (Sheet 1 of 2)

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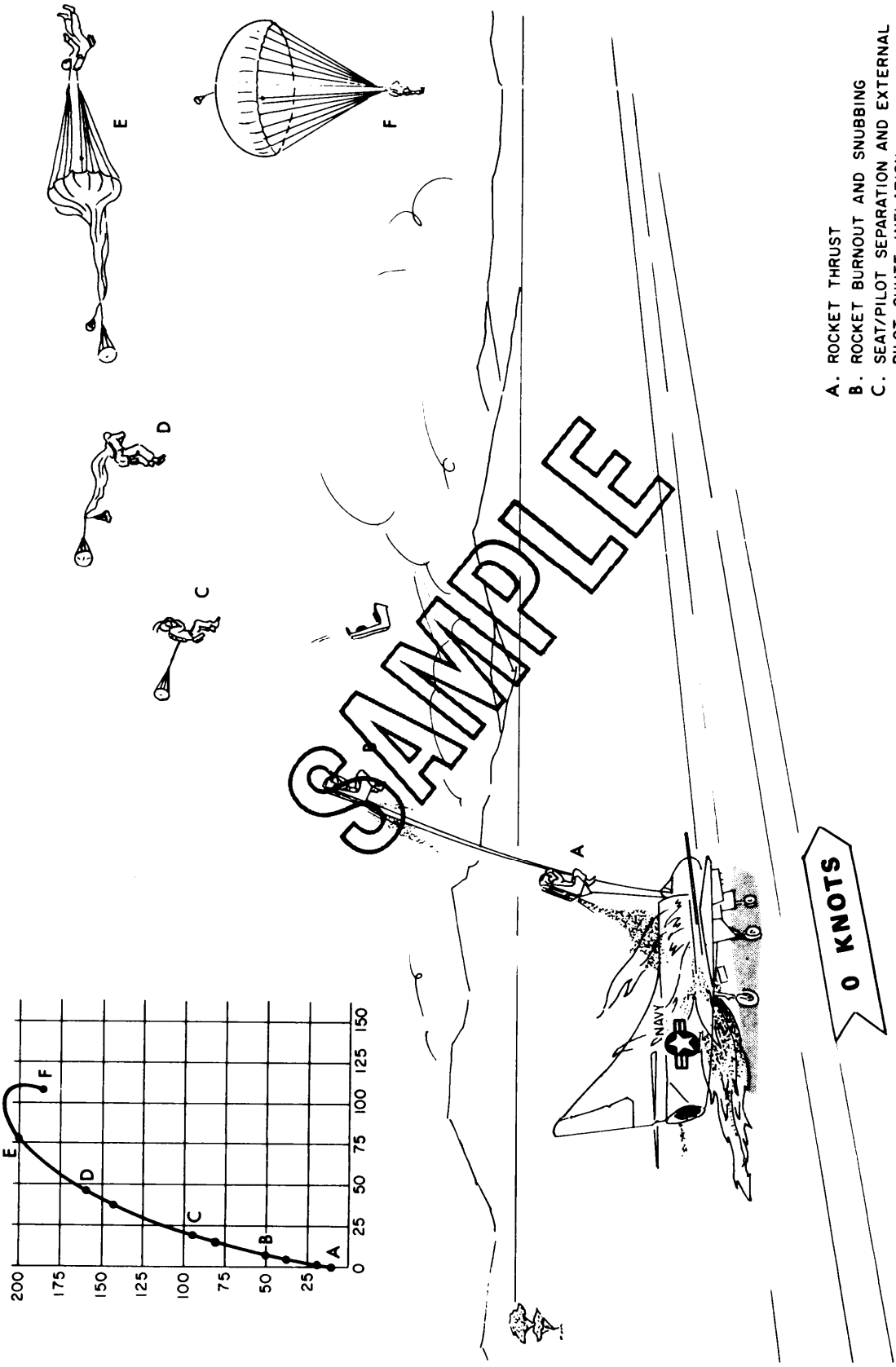

Figure 7. GROUND LEVEL EJECTION SEQUENCE (Sheet 2 of 2)

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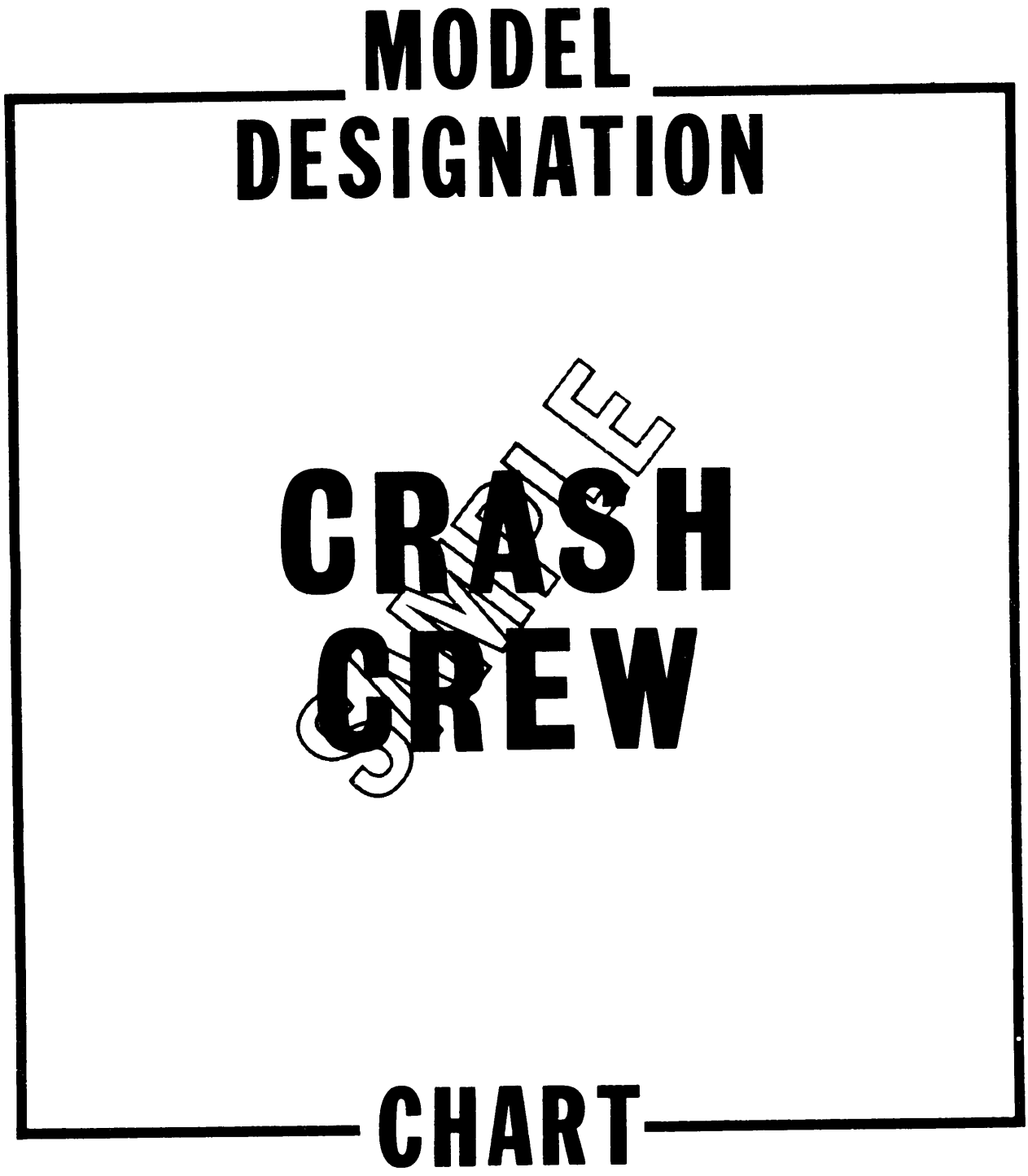

Figure 8. AIRCREW RESCUE INFORMATION CHART (Sheet 1 of 2)

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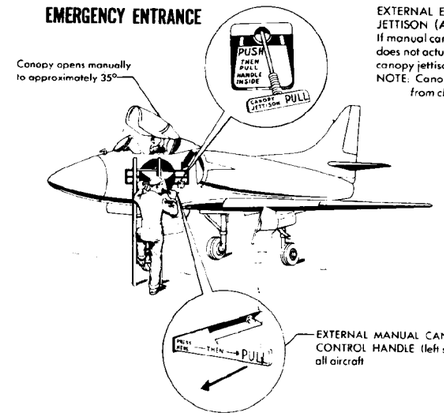
CRASH CREW CHART

EMERGENCY ENTRANCE

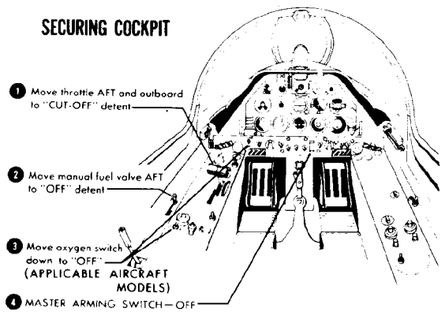


Canopy opens manually to approximately 35°

EXTERNAL EMERGENCY CANOPY JETTISON (APPLICABLE AIRCRAFT MODELS)
If manual canopy control handle does not actuate canopy, pull canopy jettison handle (either side)
NOTE: Canopy will jettison only *from closed position*

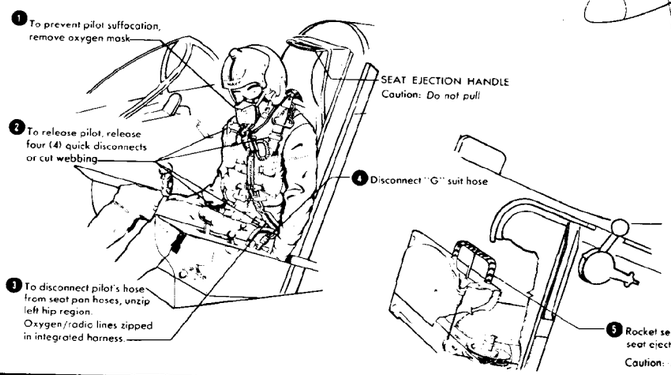
EXTERNAL MANUAL CANOPY CONTROL HANDLE (left side only) all aircraft

SECURING COCKPIT



1. Move throttle AFT and outboard to "CUT-OFF" detent
2. Move manual fuel valve AFT to "OFF" detent
3. Move oxygen switch down to "OFF" (APPLICABLE AIRCRAFT MODELS)
4. MASTER ARMING SWITCH—OFF

PILOT REMOVAL SEQUENCE

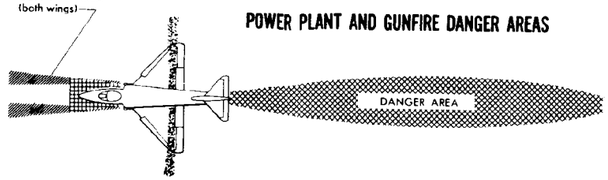


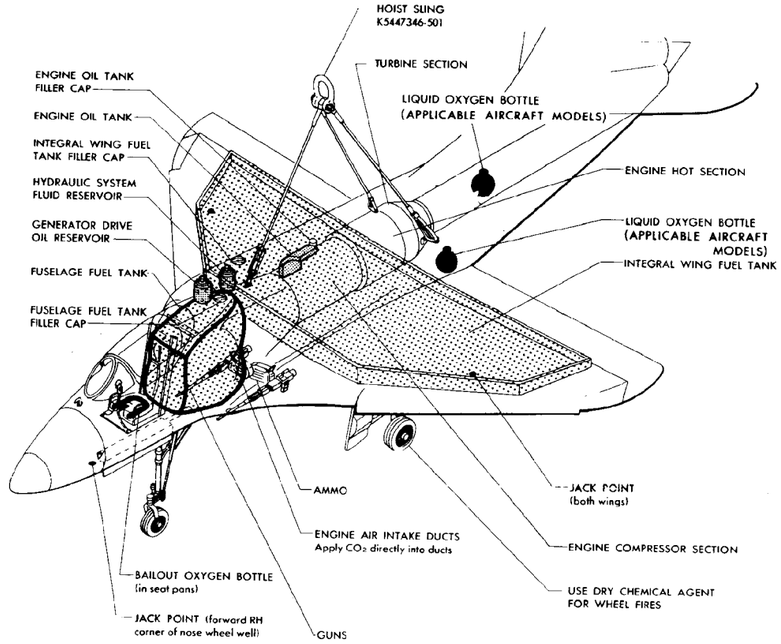
1. To prevent pilot suffocation, remove oxygen mask
2. To release pilot, release four (4) quick disconnects or cut webbing
3. To disconnect pilot's hose from seat pan hoses, unzip left hip region. Oxygen/radio lines zipped in integrated harness
4. Disconnect "G" suit hose
5. Rocket seats have secondary seat ejection handle
   Caution: *Do not pull*

SEAT EJECTION HANDLE
Caution: *Do not pull*

GUN FIRE AREA (both wings)

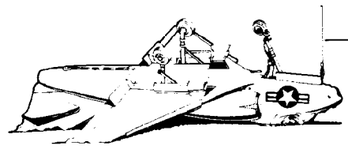
POWER PLANT AND GUNFIRE DANGER AREAS





- OIL
- OXYGEN, GAS OR LIQUID
- FUEL—MIL-F-5624A JPA
  CO_2 is the effective extinguishing agent
- FRAGMENT DISPERSAL AREAS
- INTAKE AREA
- BLAST AREA

PILOT RESCUE FROM INVERTED AIRCRAFT

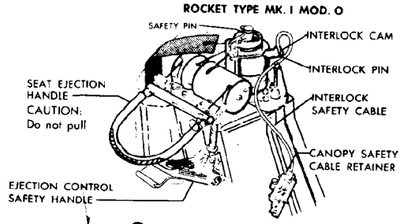


Insert hook point in forward jack pad location and raise aircraft to free pilot

NOTE: Chop through forward end of nose gear door if closed

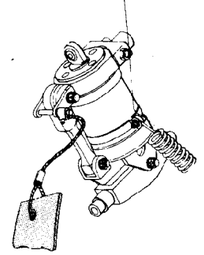
EJECTION SEAT SAFETY PROCEDURE

ROCKET TYPE MK. 1 MOD. 0

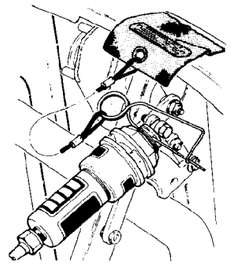


1. Install safety pins
2. Pull head-rest ground ejection control safety handle into down position

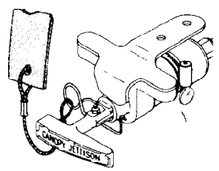
CANOPY BUNGEE AND INITIATOR SAFETY PROCEDURES



BUNGEE SAFETY PIN (Bungee End)

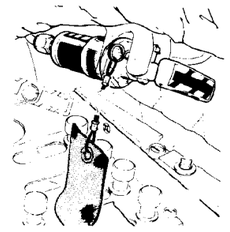


BUNGEE SAFETY PIN (System Initiator End)



BUNGEE SAFETY PIN (Initiator End)

Install bungee safety pin and initiator safety pin



BUNGEE SAFETY PIN (Cockpit Initiator End)

Install canopy bungee initiator safety pins forward and aft

Figure 8. AIRCREW RESCUE INFORMATION CHART (Sheet 2 of 2)

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CRASH RESCUE AND FIRE FIGHTING INFORMATION

Figure 9. AIRCREW RESCUE PROCEDURES BROCHURE

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TABLE OF CONTENTS

DESCRIPTION	PAGE
AIRCRAFT DESCRIPTION	24
AIRCRAFT INTERIOR ARRANGEMENT	25
DANGER AREAS (Sheet 1 of 2)	26
COCKPIT ENTRY (Sheet 1 of 2)	28
ENGINE SHUTDOWN	30
DISARMING SEATS AND CANOPY	31
BATTERY DISCONNECT	32
FACE MASK REMOVAL AND SUFFOCATION (Sheet 1 of 2)	33
CREW RELEASE FROM SEAT (Sheet 1 of 2)	35

SAMPLE

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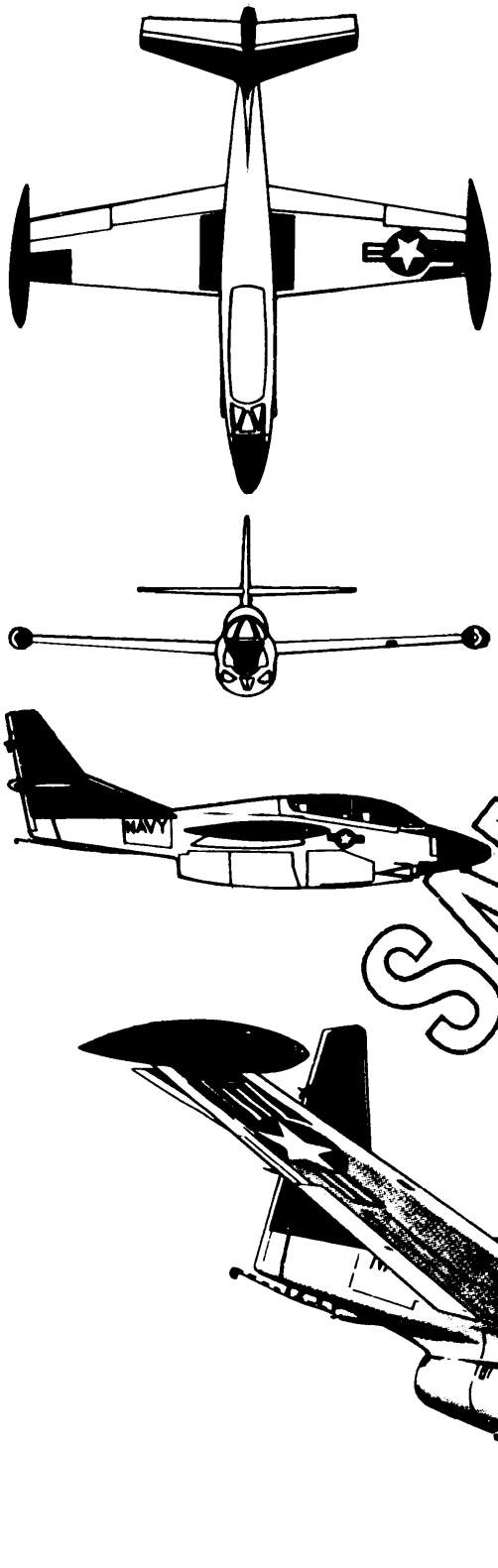

Figure 1. AIRCRAFT DESCRIPTION

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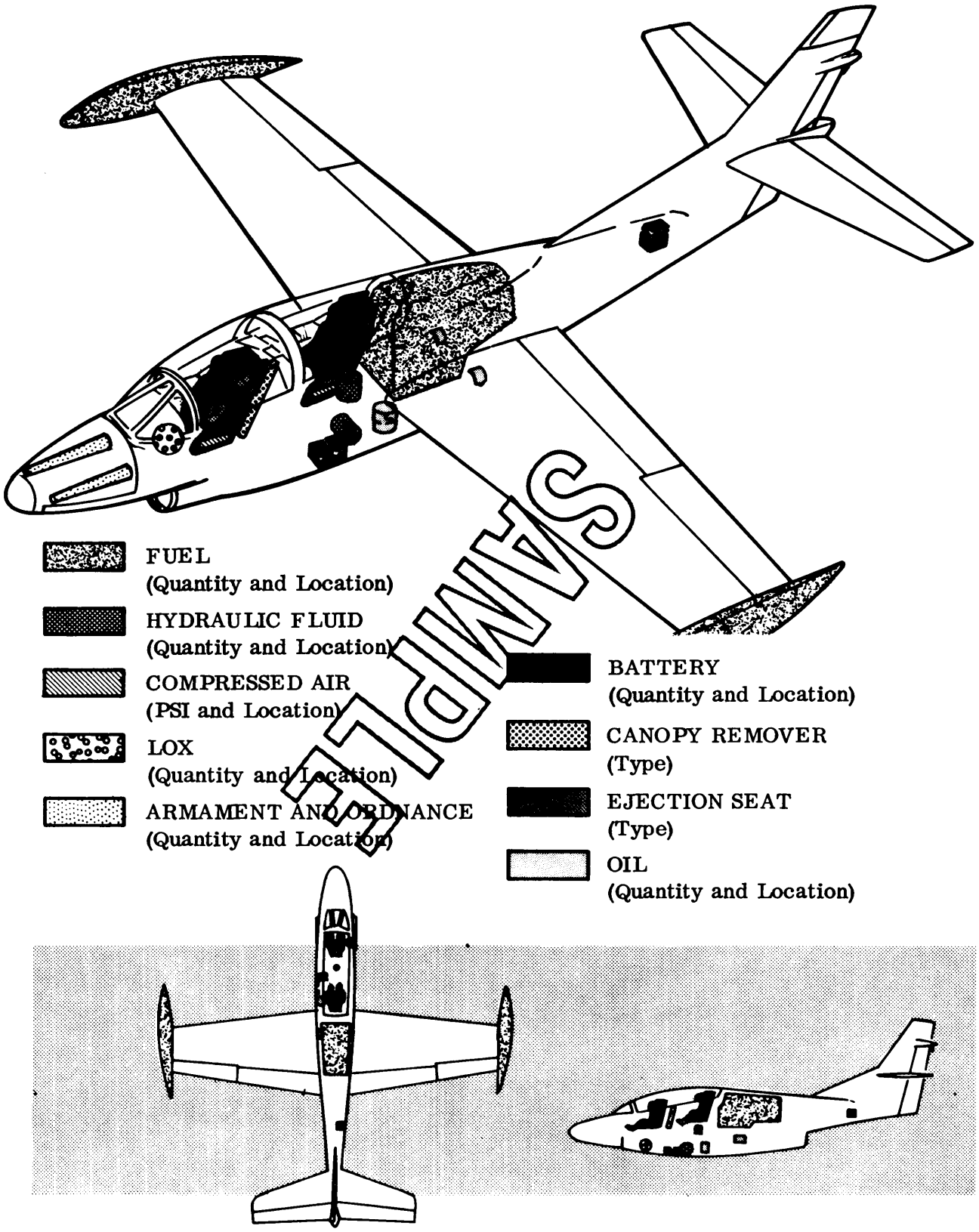

SAMPLE

Figure 2. AIRCRAFT INTERIOR ARRANGEMENT

INTAKES Avoid area ___ feet in front of intakes.

EXHAUST Exhaust temperatures can range as high as ____° F at nozzle exit to ____° F at ___ feet.

CANOPY Canopy is jettisoned directly aft to a distance approximately ___ feet behind aircraft.

TURBINE Avoid engine turbine plane of rotation — a potential path of flying pieces if rotor disintegrates.

WEAPONS Avoid standing or working in an area which is in direct line of fire of aircraft mounted weapons.

SAMPLE

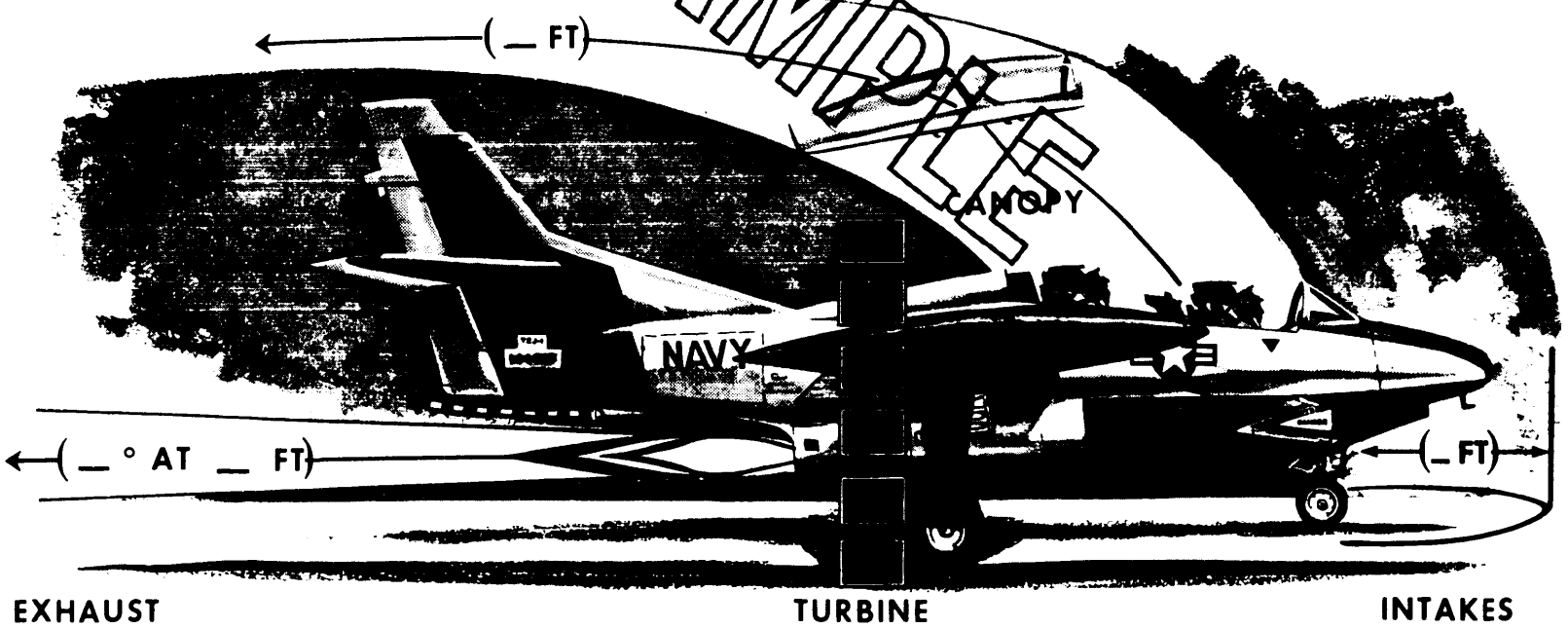

Figure 3. DANGER AREAS (Sheet 1 of 2)

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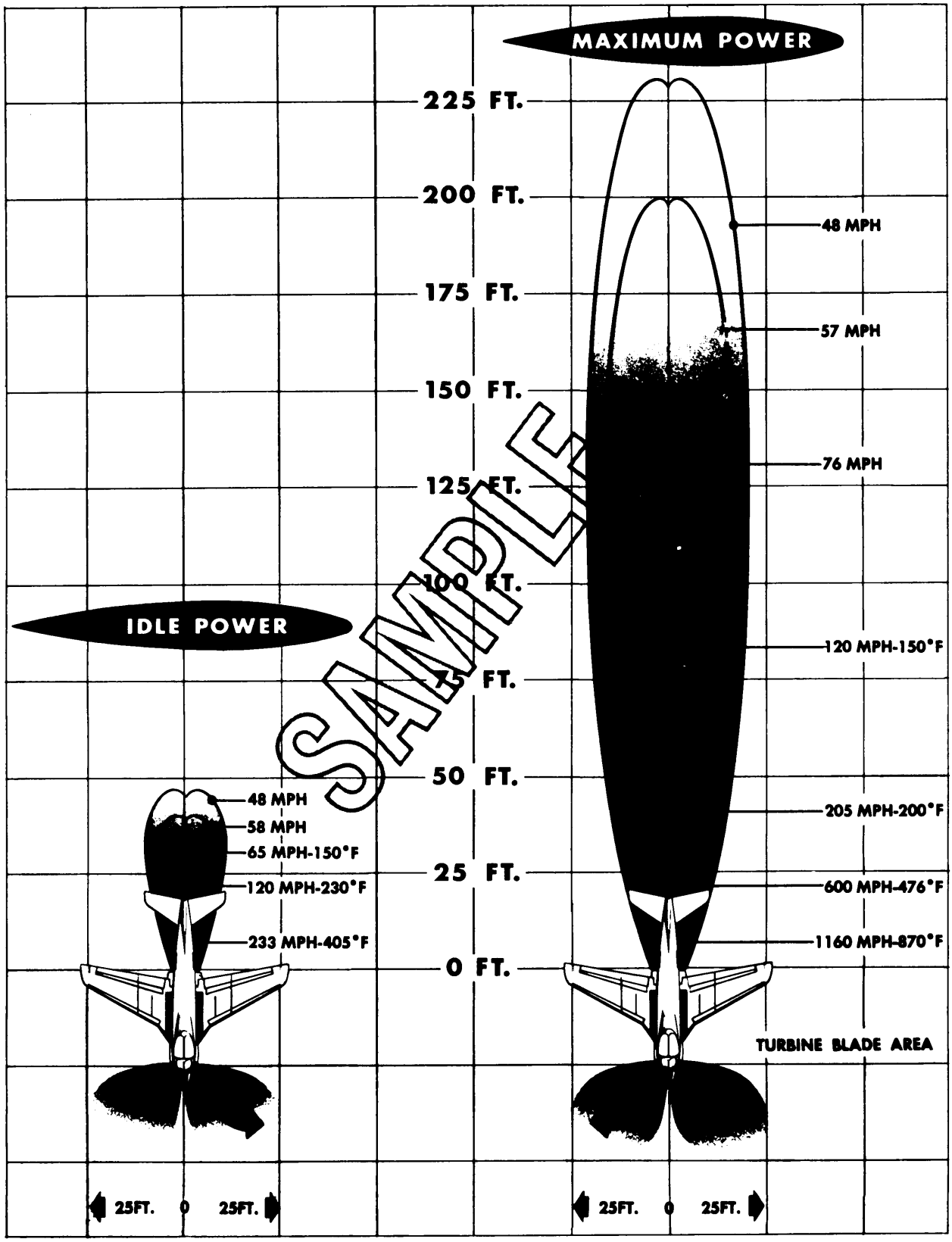

Figure 3. DANGER AREAS (Sheet 2 of 2)

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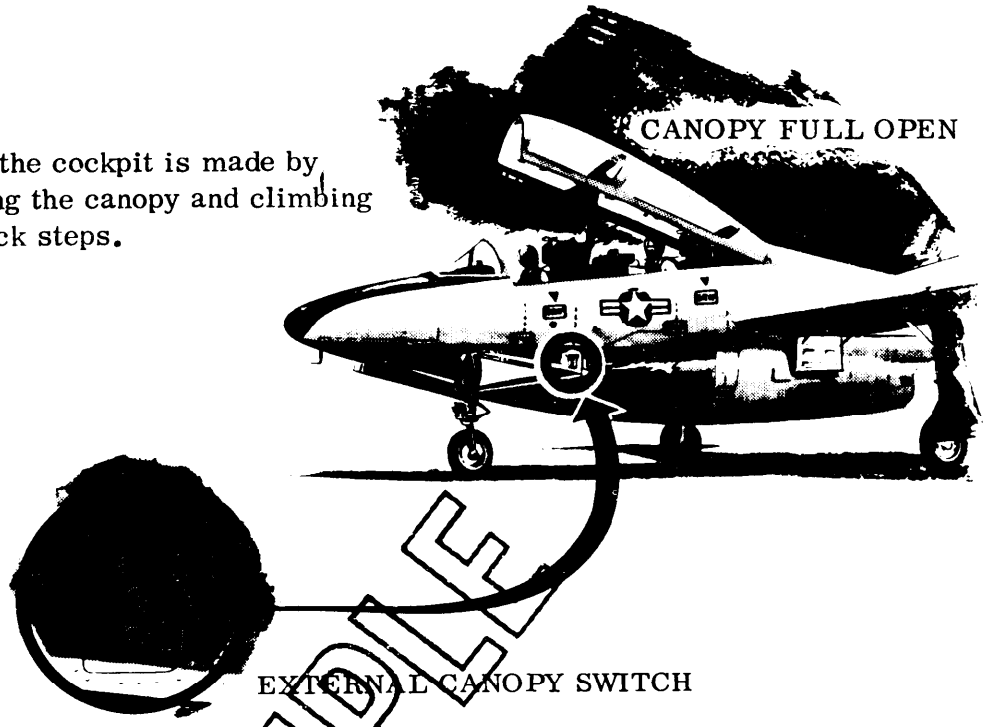
NORMAL

Normal access to the cockpit is made by electrically opening the canopy and climbing in by use of the kick steps.

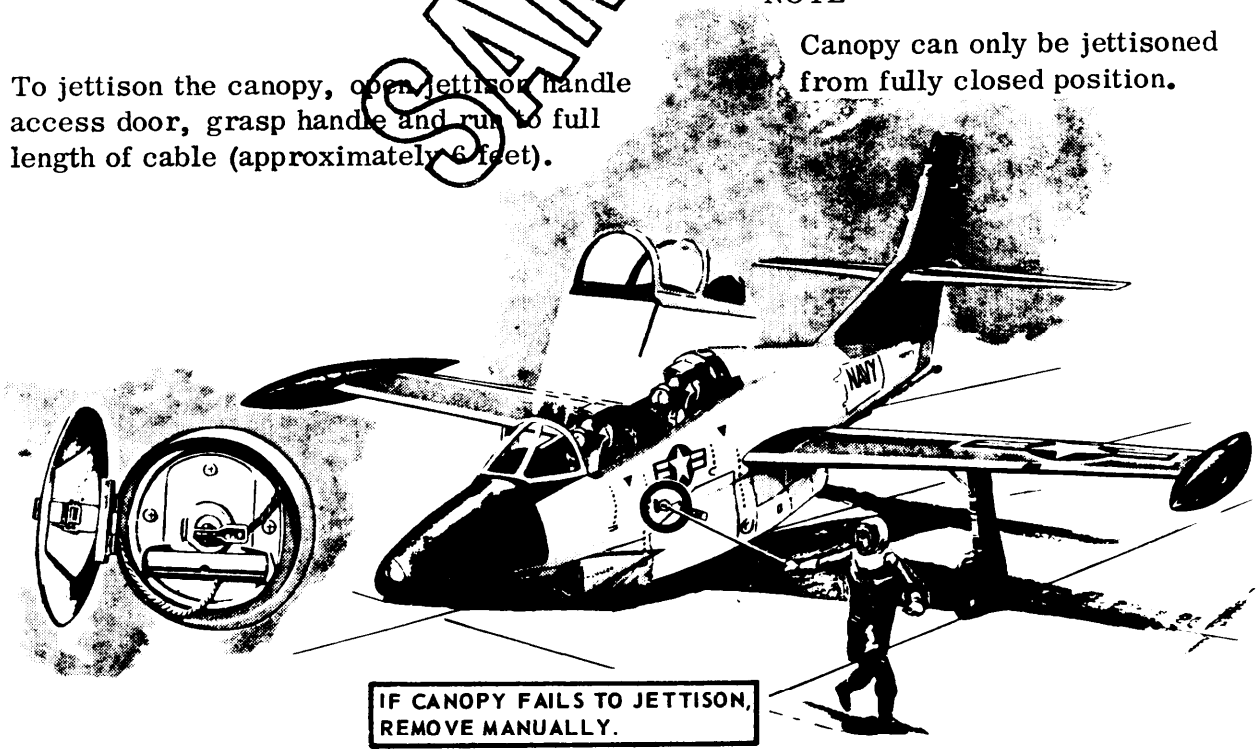


EMERGENCY

To jettison the canopy, open jettison handle access door, grasp handle and run to full length of cable (approximately 6 feet).

NOTE

Canopy can only be jettisoned from fully closed position.



SAMPLE

Figure 4. COCKPIT ENTRY (Sheet 1 of 2)

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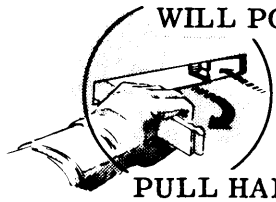
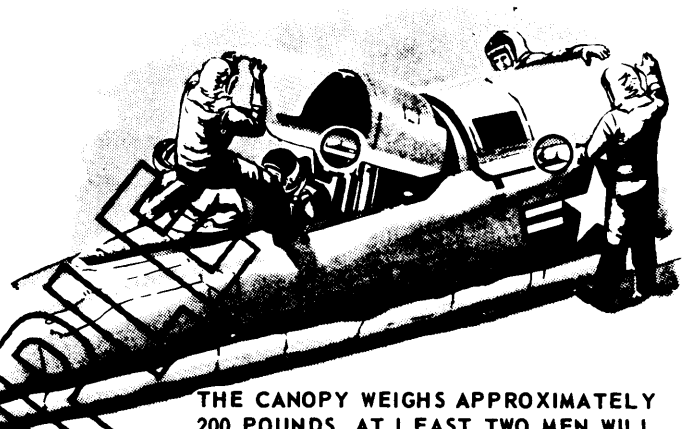
MANUAL

To open the canopy manually, use the CANOPY MANUAL UNLOCK. A similar handle on the right-hand side does not unlock the canopy but may be used as a handhold to assist in raising it.



TO REMOVE CANOPY:

1. Depress latch and pull handle full out (90 degrees).
2. Slide canopy aft about 1 inch to disengage side hooks.
3. Push canopy up and prop in position or continue pushing until it falls from airplane.



THE CANOPY WEIGHS APPROXIMATELY 200 POUNDS. AT LEAST TWO MEN WILL BE REQUIRED TO OPEN IT MANUALLY.

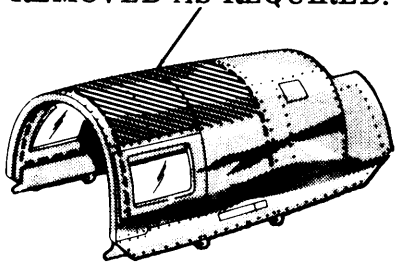
SAMPLE

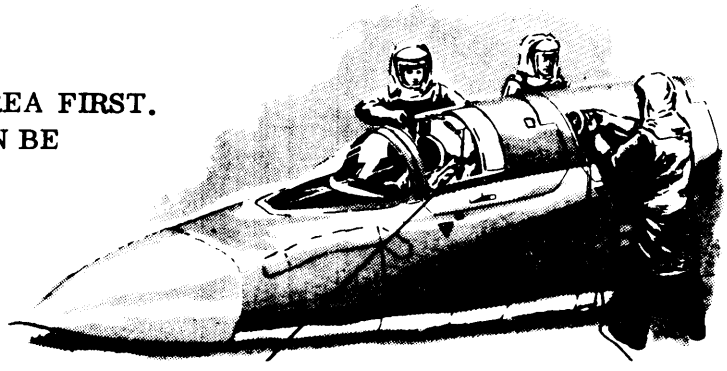
FORCIBLE

Using the standard hatchet-size fire axe, direct the pointed end of the axe on the canopy near the center of the bow. One heavy blow will put a hole in the glass. Chop from the hole, down to the sill, then along the frame.

TAKE CARE NOT TO SNAG THE BLACK AND YELLOW STRIPED FACE CURTAIN HANDLE ON TOP OF THE CREWMAN'S SEAT, OR THE CANOPY JETTISON HANDLES LOCATED IN LEFT-HAND FORWARD CORNER OF EACH COCKPIT.

CUT OR CHOP THROUGH THIS AREA FIRST. REMAINING PORTIONS CAN THEN BE REMOVED AS REQUIRED.





IF AIRPLANE IS ON FIRE AND CANOPY IS SOFT, APPLY CO_2 TO MAKE IT BRITTLE BEFORE CHOPPING

Figure 4. COCKPIT ENTRY (Sheet 2 of 2)

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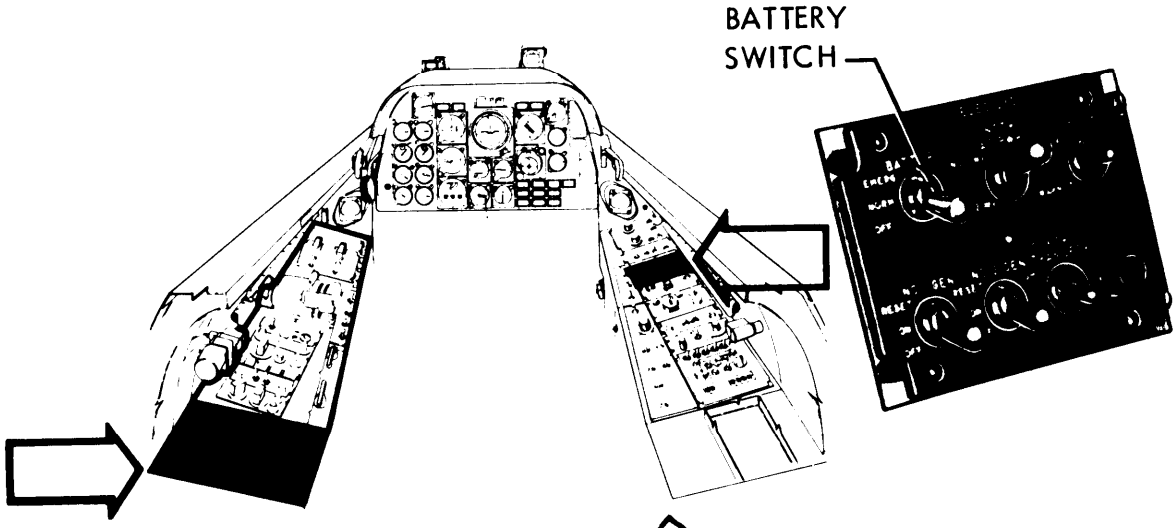

- MASTER SWITCH (BATTERY)
- THROTTLE
- AUXILARY POWER PLANT (APP)
- IGNITION SWITCHES
- FUEL SHUTDOWN HANDLES
- POWER CONTROL LEVER

Provide information pertinent to location and quickest operation of the following shutdown controls as applicable to various aircraft:

SAMPLE

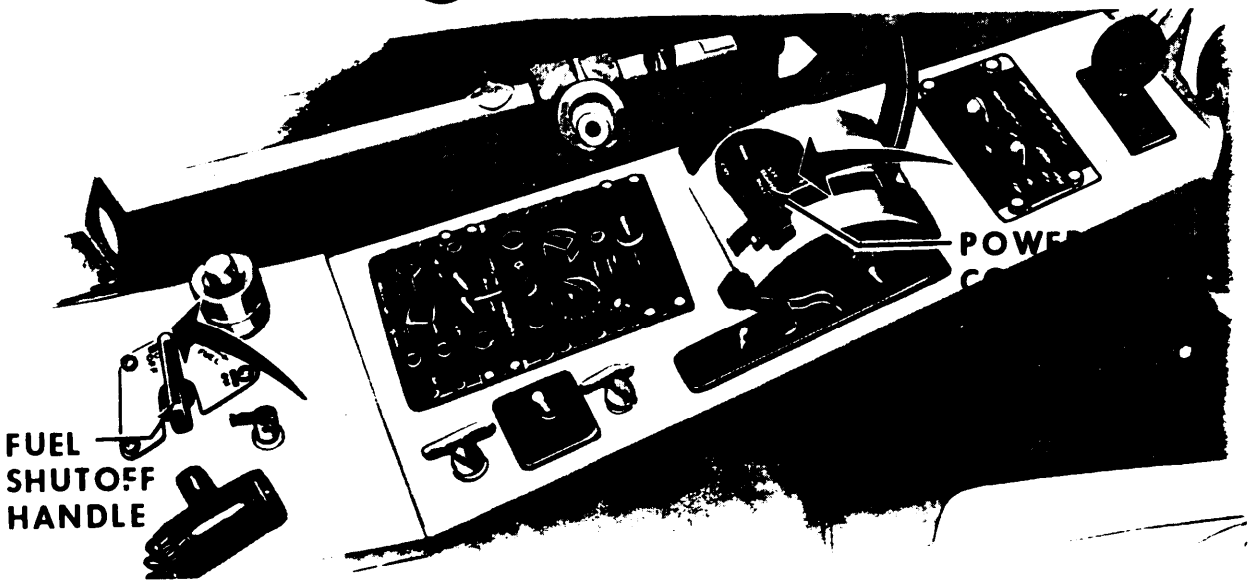

Figure 5. ENGINE SHUTDOWN

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DO NOT EJECT PILOTS – ALTHOUGH SEATS HAVE GROUND LEVEL RECOVERY CAPABILITIES, AIRPLANE MUST HAVE AIRSPEED OF 75 KNOTS FOR SAFE EJECTION.

CANOPY

The cockpit has an emergency canopy jettison handle. A pin is provided to safety each handle. If the pins are not available, use .080 inch diameter wire.

SEATS

For emergency situations, the quickest way to disarm seats is to uncouple the four initiator quick-disconnects (one on each side of each seat). The couplings are safetied with copper shear wire.

SAMPLE

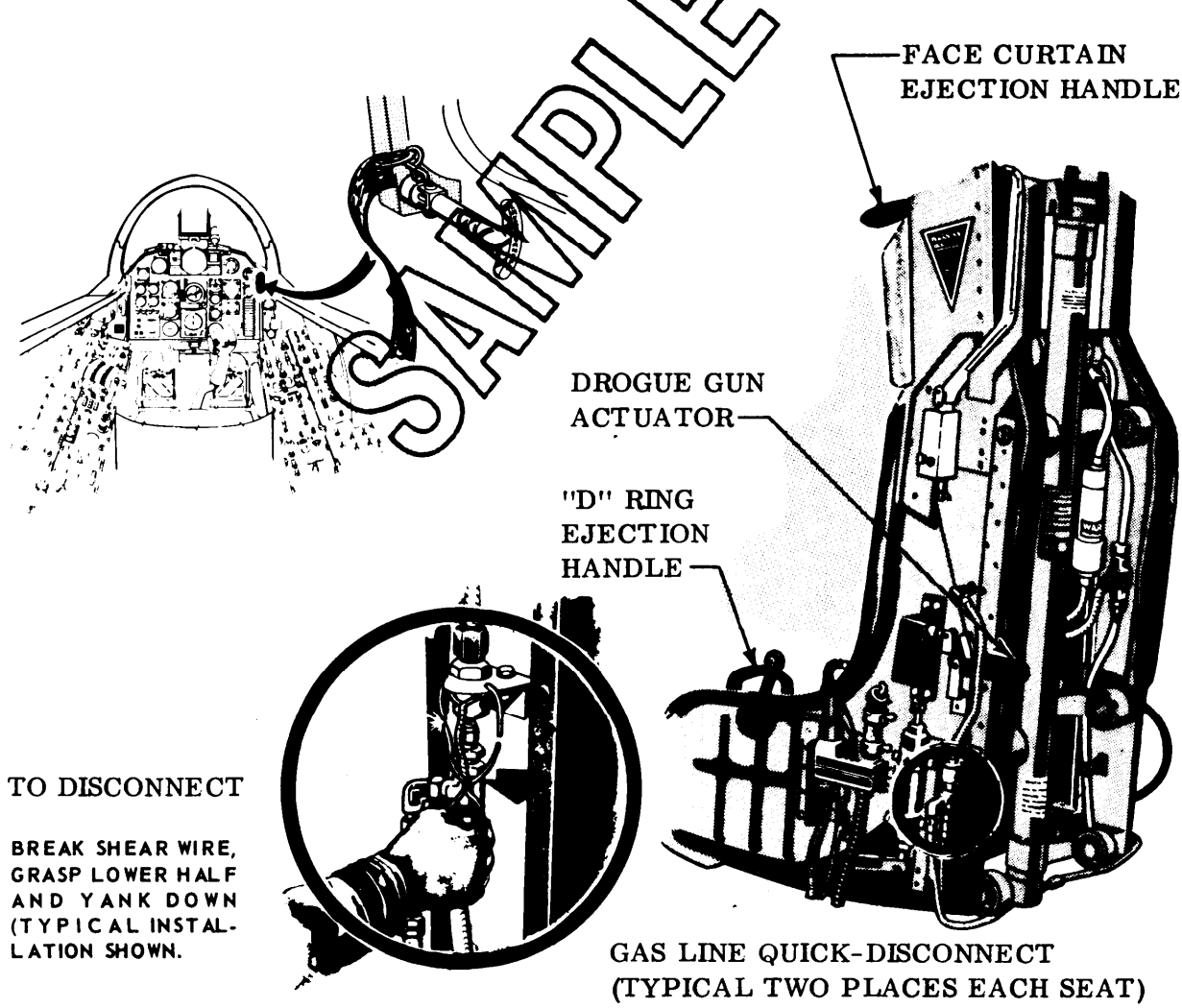

Figure 6. DISARMING SEATS AND CANOPY

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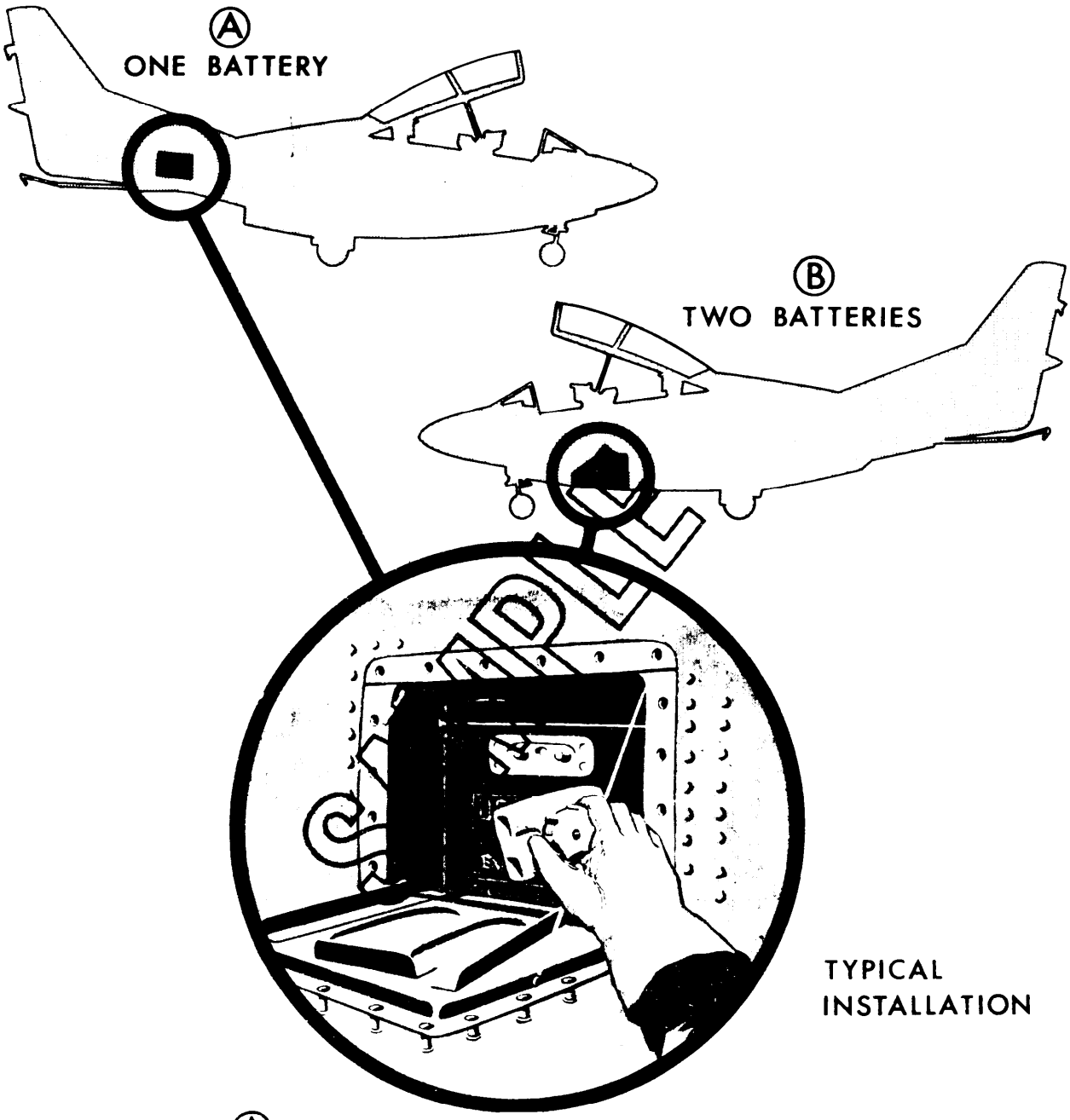

Access to the Ⓐ battery is through a door located just aft of the right-hand speed brake on the fuselage. Fourteen Phillips head, quick-acting fasteners secure the door.

Access to the Ⓑ batteries is through the large door on the left side below the aft cockpit. Four hand-operated latches secure the door.

To disconnect the battery, turn the handwheel counterclockwise and pull the disconnect fitting from the battery.

Figure 7. BATTERY DISCONNECT

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I M P O R T A N T

DO NOT CUT OR DISCONNECT
OXYGEN HOSE BEFORE LOOSENING
PILOT'S FACE MASK

OXYGEN FACE MASK

TO UNHOOK MASK:

1 Press release

2 Pull mask fitting free

3 If fire hazard exists turn oxygen system supply valve to "off".

SAMPLE

NOTE:
THREE TYPES OF FACE MASK CONNECTIONS ARE CURRENTLY IN USE

SUFFOCATION

As soon as crewmen are reached, open their pressure suit helmet faceplate or unhook their oxygen mask, depending on what type of flight gear they are wearing. This eliminates the possibility of the crew suffocating from lack of oxygen due to a damaged system or disconnected hoses.

Figure 8. FACE MASK REMOVAL AND SUFFOCATION (Sheet 1 of 2)

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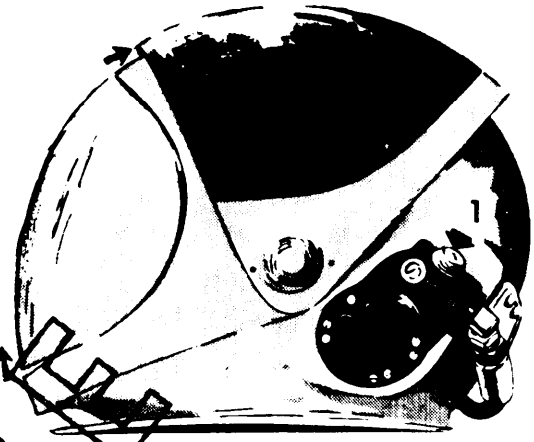
I M P O R T A N T

DO NOT CUT OR DISCONNECT OXYGEN HOSE BEFORE LOOSENING PILOT'S FACE MASK

RAISE SUN VISOR (DEPRESS BUTTON AT RH SIDE HINGE POINT)



SAMPLE

FULL PRESSURE SUIT HELMET

TO OPEN FACEPLATE:

1 Slide oxygen switch aft to "off" face seal will deflate when oxygen is shut off.

2 Push faceplate up

SUFFOCATION

As soon as crewmen are reached, open their pressure suit helmet faceplate or unhook their oxygen mask, depending on what type of flight gear they are wearing. This eliminates the possibility of the crew suffocating from lack of oxygen due to a damaged system or disconnected hoses.

Figure 8. FACE MASK REMOVAL AND SUFFOCATION (Sheet 2 of 2)

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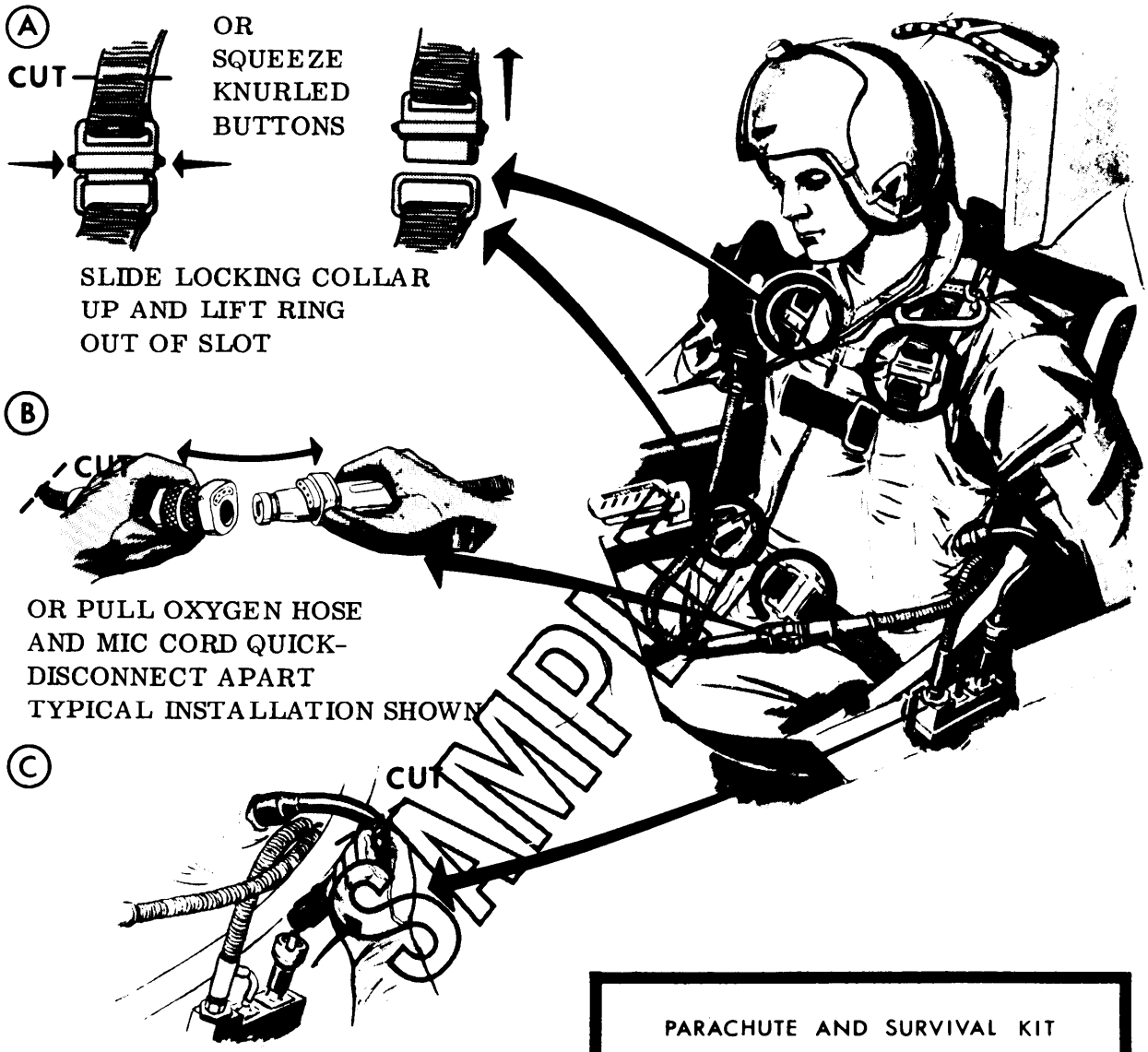

G-SUIT HOSE DISCONNECT

(A) Disengage the four parachute-to-torso suit "rocket-jet" fittings.

(B) Uncouple the oxygen hose and mic cord personnel disconnect.

(C) Uncouple the anti-G suit hose disconnect (if G-suit is worn).

OR CUT

at indicated locations

Figure 9. CREW RELEASE FROM SEAT (Sheet 1 of 2)

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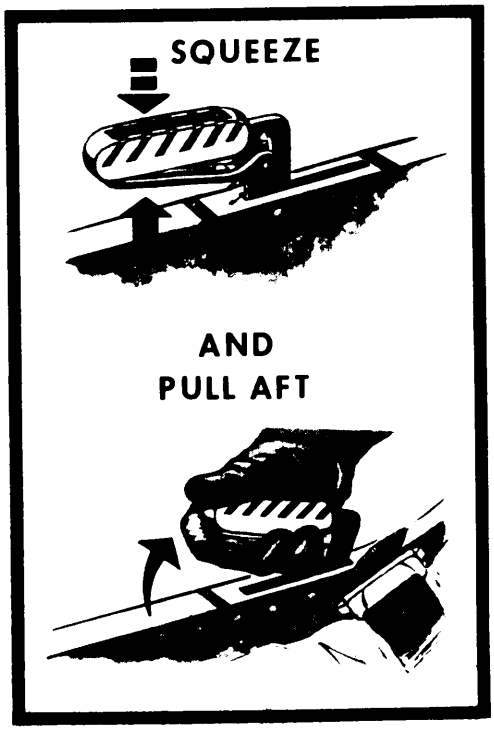

HARNESS RELEASE HANDLE

SAMPLE

Each seat has a harness release handle on the right arm rest. The single action of pulling the handle aft releases the crew member from all attachment to the seat and is the fastest method for removing crew member from cockpit. When the man is released in this manner, the parachute and survival kit remain attached to him. If circumstances dictate, the straps and hoses can be disconnected or cut as shown on next page.

Figure 9. CREW RELEASE FROM SEAT (Sheet 2 of 2)

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CHAPTER

CATAPULT, ROCKET, AIRCRAFT EJECTION SEAT, MARK 1 MOD 1 (M326)

-1 PURPOSE

Rocket Catapult, Aircraft Ejection Seat, Mark 1 Mod 1, figure 1-1, is a self-contained, mechanically-initiated, two-phase, solid propellant booster and rocket used, in an emergency, to eject the pilot and pilot's seat from A-4 series aircraft.

-2 DESCRIPTION AND LOCATION

Rocket Catapult Mark 1 Mod 1, figure 1-1 and 1-2, consists of an outer launcher tube and breech assembly into which is telescoped and locked a dual-phase, booster-sustainer rocket motor. At the top of the rocket motor a coil-spring-loaded firing mechanism is mounted above a percussion-type Rocket Motor Igniter Mark 250 Mod 0. The booster propellant charge is contained within a seamless steel booster tube. The forward end of the tube is welded to a steel valve cylinder assembly, and the booster tube after end is fitted into an elbow attached to one of the seven ports of the motor nozzle. The valve cylinder has six gas ports that are sealed by the valve piston until the proper time for opening during operation. Attached to the valve piston is a strip of steel that extends almost to the after end of the booster tube. On one side of this strip the booster propellant charge is bonded, and on the other side the cable guide is welded.

Within the rocket motor, surrounding the booster tube, is contained the sustainer propellant grain. A ring-shaped auxiliary igniter is located at the forward end of this grain. A steel nozzle fits into the after end of the motor tube, and is canted at an angle of 47.5 degrees to the axis of the rocket catapult so that, during ejection, the sustainer thrust is directed through the center of gravity of the man-seat combination. Welded around the outer periphery of the nozzle is a retainer sleeve having 22 tangs that are spread below the lower lip of the launcher tube by the spring-loaded breech can. This device holds the rocket motor securely within the launcher tube until the ejection sequence is initiated.

Dimensions of the catapult are: length, 45.623 inches; major diameter, 6 inches; maximum width at trunnion ring, 4.625 inches; diameter of firing mechanism body, 3 inches. The catapult weighs 27.15 lbs.

SAMPLE

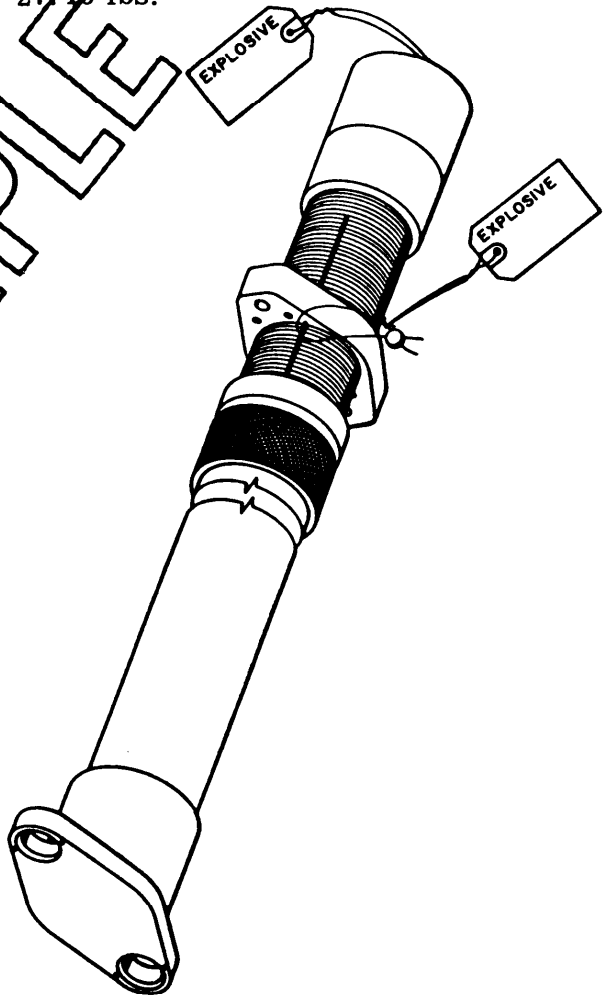

Figure 1-1. Rocket Catapult, Aircraft Ejection Seat, Mark 1 Mod 1

Figure 10. ROCKET MOTOR/CATAPULT DESCRIPTION (Sheet 1 of 3)

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The catapult is installed behind the ejection seat. The trunnion ring around the threaded portion of the motor tube is attached by two bolts near the top of the seat framework, figure 1-3. The breech at the base of the launcher tube is attached to the twin barrel seat actuator which is mounted on the cockpit floor.

-3 OPERATION

When the pilot pulls the face curtain handle, the canopy is automatically jettisoned and the sear on the rocket catapult firing mechanism is withdrawn. The spring-loaded firing pin strikes the primer which ignites the Rocket Motor Igniter Mark 250 Mod 0. The gas evolved from the burning pellets ruptures the igniter case, and hot gases enter the booster tube and ignite the booster propellant charge. Gas from the booster charge is released through the nozzle at the after end of the booster tube into the launcher breech. The pressure created in the launcher breech forces the breech can from the nozzle-sleeve tangs, freeing the rocket motor and man-seat mass and allowing it to move up the launcher tube. The cable, one end attached to the booster propellant strip holder and the other to the can in the launcher breech, is payed out.

When the motor tube has traveled 34 inches the cable becomes taut and exerts a pull on the booster propellant strip holder, pulling the valve piston down. This opens the ports in the valve cylinder and hot gases from the booster pass throug onto the auxiliary stage rocket igniter. The continuing strain on the cable causes the cable to fail, freeing the rocket motor from the launcher.

The auxiliary stage rocket ignition charge is ignited by the hot booster gases and, in turn, ignites the rocket propellant grain as the motor clears the launcher tube. The rocket motor imparts a sustained thrust sufficient to propel the man-seat mass to an altitude which permits safe descent by parachute, figure 1-4.

The operating temperature range of the

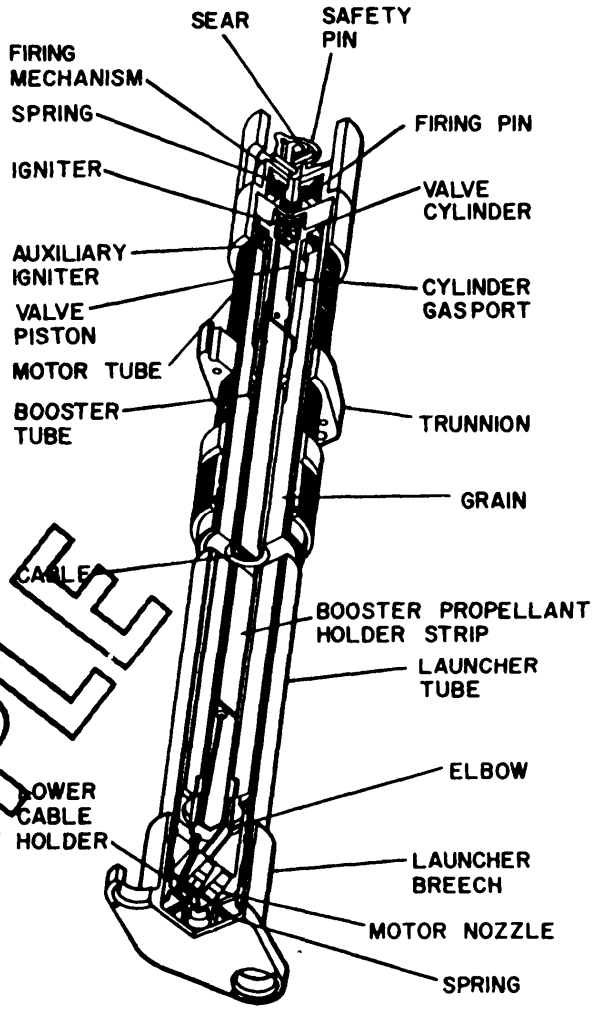

Figure 1-2. Rocket Catapult, Aircraft Ejection Seat, Mark 1 Mod 1, Sectioned

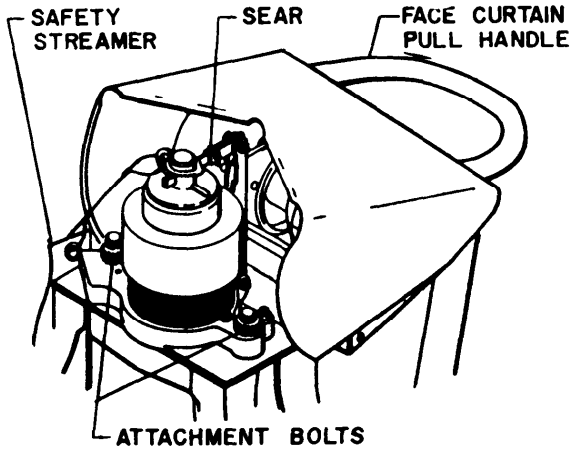

Figure 1-3. Rocket Catapult, Aircraft Ejection Seat, Mark 1 Mod 1, Attached to Top of Ejection Seat

SAMPLE

Figure 10. ROCKET MOTOR/CATAPULT DESCRIPTION (Sheet 2 of 3)

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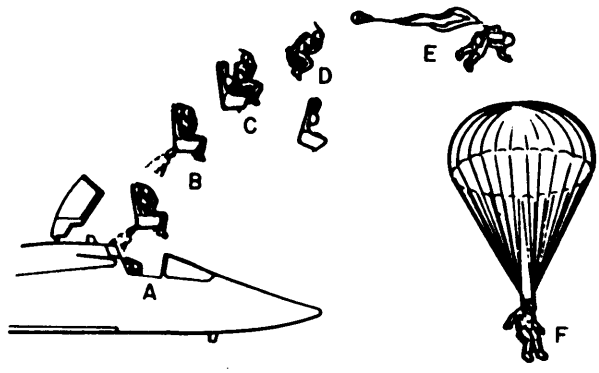
rocket catapult is from -65° F to +165° F. Ideal storage temperature range is from +60° F to 90° F.

-4 IDENTIFICATION

On the shipping container, figure 1-5, the following data is stenciled in ink or paint: Explosive Power Device; Class B - Handle Carefully; Keep Fire Away; Contr. (number); Serial No. ; Lot (number); FSN (stock number).



A. EJECTION POINT
B. ROCKET BURNOUT
C. HARNESS RELEASE ACTUATED
D. SEAT AND PILOT SEPARATED
E. PARACHUTE ACTUATED
F. PARACHUTE FULLY OPENED

Figure 1-4. Rocket Catapult, Aircraft Ejection Seat, Mark 1 Mod 1; Diagram showing Sequence of Operation

SAMPLE

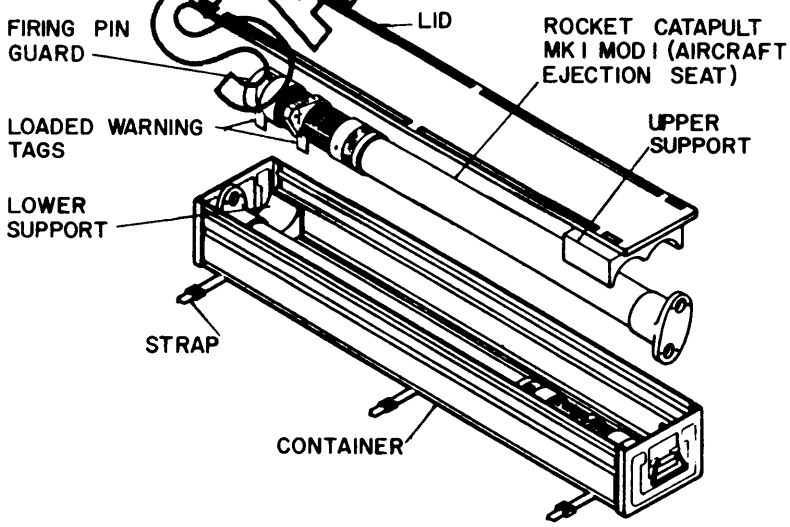


Figure 1-5. Rocket Catapult, Aircraft Ejection Seat, Mark 1 Mod 1, Shipping Container

Figure 10. ROCKET MOTOR/CATAPULT DESCRIPTION (Sheet 3 of 3)

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INDEX

CONTENTS	PARAGRAPH	PAGE
APPLICABLE DOCUMENTS	2.	1
DEFINITIONS	6.4	10
Change	6.4.2	10
Copy freeze date	6.4.7	11
Multi-volume publications	6.4.8	11
Preliminary issue	6.4.6	11
Reprint	6.4.5	11
Revision	6.4.3	11
Supplement	6.4.4	11
Technical manual	6.4.1	10
DETAILED INFORMATION FOR REVISION CONSIDERATION	6.3	10
GENERAL REQUIREMENTS	3.1	3
Charts and descriptions	3.1.1	3
Negatives	3.1.2	3
INTENDED USE	6.1	9
NOTES	6.	9
ORDERING DATA	6.2	9
PREPARATION FOR DE LIVERY	5.	9
QUALITY ASSURANCE PROVISIONS	4.	9
REQUIREMENTS	3.	3
SCOPE	1.	1
SPECIFIC REQUIREMENTS	3.2	3
Aircrew escape system fire and crash rescue information	3.2.4	6
Aircrew rescue information chart	3.2.4.1	7
Aircrew rescue procedures brochure	3.2.4.2	7
Aircrew escape system general description	3.2.3	6
Aircrew escape system configuration description	3.2.3.1	6

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INDEX (Continued)

CONTENTS	PARAGRAPH	PAGE
Configuration illustrations	3.2.3.1.1	6
Operation illustrations	3.2.3.2.1	6
Aircrew escape system general description format	3.2.3.3	6
Aircrew escape system operation description	3.2.3.2	6
Aircrew escape system maintenance instructions	3.2.6	8
Aircrew escape system performance data presentations	3.2.2	4
Aircrew escape system performance data presentation format	3.2.2.8	6
Data	3.2.2.7	5
Aircrew reaction time	3.2.2.7.4	5
Completion of aircrew egress	3.2.2.7.5	5
Data sources	3.2.2.7.1	5
Escape system center of gravity	3.2.2.7.3	5
Escape system weight	3.2.2.7.2	5
Landing and Take-Off Escape Capability	3.2.2.6	5
Minimum Ejection Altitude Terrain Clearance vs. Velocity and Aircraft Attitude	3.2.2.5	4
Minimum Ejection Altitude (Terrain Clearance) vs. Velocity and “Flight Path	3.2.2.4	4
Pull Up and Escape Capabilities (Power Off) Carrier	3.2.2.2	4
Pull Up and Escape Capabilities (Power Off) Land	3.2.2.1	4
Pull Up Discussion	3.2.2.3	4
Descriptive and performance data presentation types	3.2.1	3
Rocket motor/catapult description	3.2.5	7
Rocket motor/catapult description illustrations	3.2.5.1	7
Stabilization and recovery parachute configuration description and packing instructions	3.2.7	8
Parachute configuration description	3.2.7.1	8
Parachute configuration, packing and installation illustrations	3.2.7.3	8
Parachute detailed packing and installation instructions	3.2.7.2	8

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