United States
Department of the Interior

ALSE

Aviation Life Support Equipment

Handbook

October 2008

FOREWORD

This handbook is a supplement for the Departmental Manual, Part 351 DM 1 and establishes standards for approval and use of aviation life support equipment when conducting Department of the Interior (DOI) aviation activities.

Questions regarding the content or guidance referenced in this handbook may be directed to the National Business Center, Aviation Management Directorate (NBC-AMD), Aviation Safety and Evaluations Division, 300 E. Mallard Drive, Suite 200, Boise, ID 83706-3991. The Handbook is available on the AMD website at http://amd.nbc.gov/library/handbooks.htm.

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Chapter 1 General Information

1.1 Purpose. This handbook outlines policies, procedures, and responsibilities for using aviation life support equipment (ALSE) during Department of the Interior (DOI) aviation activities. It is designed to supplement the Departmental Manual, providing detailed information as well as specific requirements.

1.2 Policy.

A. Departmental Policy. It is DOI policy to provide employees with a safe and healthy work environment free from recognized safety and health hazards.

B. Responsibilities. Bureaus are responsible for implementing their personal protective equipment (PPE) program. Supervisors are responsible for evaluating aviation activities and providing employees with appropriate ALSE equipment. Supervisors are also required to provide employee training on the proper use of ALSE equipment. Bureaus and individuals are encouraged to supplement these requirements to better meet the needs of the mission and environment.

1.3 Scope. ALSE covers a broad spectrum of equipment and procedures for protecting aircrews, passengers, and support personnel engaged in aviation activities, including mishap or survival situations. While the emphasis is on special use activities, other mission-specific equipment such as fire extinguishers, first aid kits, restraint systems, and additional equipment required for flights beyond gliding distance to shore are also included.

Note: ALSE listed in this handbook may require fitting, periodic inspections, testing, and scheduled replacement. Users must ensure that equipment is maintained in serviceable condition and in accordance with the manufacturer's guidance.

1.4 Definitions.

A. Extended Overwater Operations. Airplanes: Operations over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline. Helicopters: An operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline and more than 50 nautical miles from an offshore heliport structure.

B. Offshore Operations. These are operations beyond a point where navigation by visual reference to landmarks can be made.

C. Point-to-Point Flight. Flights between airports (excluding operations defined in 351 DM 1 as special use) for which the route of flight is determined only by the pilot(s) based on navigational requirements.

D. Shore. That area of the land adjacent to the water, which is above the high water mark and excludes land areas that are intermittently under water.

E. Special Use Activity. Operations involving the utilization of airplanes and helicopters in support of DOI programs which are not point-to-point flight activities and which require special considerations due to their functional use. This may require deviation from normal operating practices where authorized by AMD. Special pilot qualifications and techniques, special aircraft equipment, and personal protective equipment are required to enhance the safe transportation of personnel and property.

Chapter 1 General Information

1.5 Exceptions and Waivers.

A. Exceptions.

1. Fire-resistant clothing, gloves, and leather boots are not required for flights beyond gliding distance to shore, or for offshore vessel and platform landings.

2. Wildland firefighters assigned to wildland fire incidents may wear approved hardhats with chinstrap in lieu of flight helmets when being transported as a qualified non-crew member during fire operations from an established and managed helibase/helispot to another managed helibase/helispot. A managed helibase/helispot is established when there is a helicopter crewmember or helibase/helispot manager on the ground at the helibase or helispot before passengers are transported to these locations.

3. Personal protective equipment (PPE) is not required, but is recommended, for flights conducted entirely (less takeoff and landing) above 500 feet above ground level (AGL) in airplanes, such as resource recon, fire recon, and air tactical use.

4. Flight helmets are not required in multiengine airplanes.

Note: The above exceptions do not authorize the wearing of outerwear or undergarments made of materials with low temperature melting characteristics, such as synthetics (nylon, dacron, polyester, and so on) and synthetic blends, as provided by paragraphs 2.3C (Outerwear Garments) and 2.3D (Undergarments) of this handbook.

B. Waivers. If a bureau identifies an ALSE requirement that presents a concern affecting employee safety or security, then bureau directors have discretionary authorization to grant a waiver. This authority may be exercised by the bureau director or by written delegation at a lower authority. Exercising this authority requires that the NBC-AMD Aviation Safety and Evaluations Division and the appropriate AMD Regional Director be provided a copy of the waiver and any written delegation.

C. Other. All other waivers must be approved by the Associate Director, NBC-AMD in accordance with 350 DM 1.9, "Exceptions".

Chapter 2 Personal Protective Equipment (PPE)

2.1 General. Personal protective equipment (PPE) provides head protection and flash fire protection. The Occupational Safety and Health Administration (OSHA) has established requirements for hearing conservation and eye protection.

Flight crewmembers and aircrew members engaged in special use activities, except airplane operations above 500 feet AGL, such as fire recon, resource recon, air tactical use, etc., are required to wear the following ALSE unless exempted by paragraph 1.5B:

- Flight helmet
- Fire-resistant clothing
- All-leather, or leather and NOMEX® gloves
- Leather or approved nonleather boots

Note: Extreme environmental work conditions may dictate that a waiver be obtained, as provided by paragraph 1.5B, in lieu of an ALSE requirement.

2.2 Head, Hearing, and Eye Protection. Flight helmets provide head, hearing, and eye protection in most environments.

A Flight Helmets. This chapter identifies the types of approved flight helmets, but it does not address how the user should take care of the helmet. It is imperative that employees using a flight helmet ensure that the helmet is serviceable before flight. The *DOI Flight Helmet User's Guide* provides detailed information on what to look for to determine whether the helmet is serviceable, and what to do if the helmet needs repair. The guide can be downloaded at http://amd.nbc.gov/safety/library/helmetguide.pdf.

Flight helmets incorporating a one-piece hard shell made of polycarbonate, Kevlar®, carbon fiber, or fiberglass, must cover the top, sides (including the temple area and to below the ears), and the rear of the head and be compatible with required avionics. The helmet must be equipped with a chinstrap, appropriately adjusted for proper fit. "Shorty" (David Clark-style) helmets are not approved for either helicopter or airplane flight operations.

1. Helicopter flight helmets. Flight helmets conforming to a U.S. military standard or otherwise approved for use in helicopters by a branch of the U.S. Military, or flight helmets conforming to American National Standard Institute (ANSI) Z90.1B-1992 (American National Standard for Protective Head Gear - for Motor Vehicle Users - Specifications) are approved for DOI use in helicopters. Flight helmets currently known to meet this requirement include: SPH-5, HGU-84P, SPH-4B, and HGU-56P manufactured by Gentex; Alpha 200, Alpha 400, and Alpha Eagle (900) manufactured by Interactive Safety Products; and MSA Gallet LH050 (single inner visor), LH150 (single outer visor) and LH250 (dual visor – one inner and one outer). Helmets designed specifically for use in airplanes, such as HGU-33P, HGU-34/P, and HGU-55P, do not provide adequate protection for helicopter occupants and are not approved for helicopter use.

2. Airplane flight helmets. Flight helmets conforming to a U.S. military standard (Mil-H-87174) or otherwise approved for use in nonejection seat airplanes by a branch of the U.S. Military, or flight helmets conforming to American National Standard Institute (ANSI) Z90.1B-1992 (American National Standard for Protective Head Gear - for Motor Vehicle Users - Specifications) are approved for DOI use in airplanes. Flight helmets currently known to meet this requirement include: HGU-33/P, HGU-34/P, HGU-55/P, SPH-5, HGU-84P, SPH-4B, and HGU-56P manufactured by Gentex; Alpha 200, Alpha 400, and Alpha Eagle (900) manufactured by Interactive Safety Products; and MSA Gallet LH050 (single inner visor), LH150 (single outer visor) and LH250 (dual visor – one inner and one outer).

1. Hearing Protection. Most operating aircraft generate noise levels above 85 dBA. A hearing conservation program is required whenever employees are exposed to noise equal to, or exceeding, an 8-hour time-weighted average of 85 decibels (dBA).

When not conducting special use activities, earmuffs and earplugs may be substituted for the flight helmet. Earplugs generally provide the best noise reduction. Earmuffs provide warmth, relieve pressure in ear canals, and reduce noise. Earplugs can be worn with earmuffs or flight helmets for added protection.

C. Eye Protection. DOI requires eye protection in work environments where air particle contaminants are present. Working in a dusty environment can cause eye injuries and presents additional hazards to contact lens wearers. Safety goggles are the only effective type of eye protection from nuisance dust because they provide a protective seal around the eyes. Either safety-type glasses with side protectors, eyecup or cover-type goggles should be worn when dust is present.

2.3 Fire-Resistant Clothing. Fire-resistant clothing protects the wearer from flash fire burns. The preferred material is commonly known as " NOMEX®." The actual material may be NOMEX®, NOMEX® fleece, polyamide, aramide, polybenzimidazole, Kevlar®, or blends thereof (clothing not containing labels identifying the material either by brand name or U.S. military standards is not acceptable). These materials, while not fireproof, will char rather than burn at about 700 to 800 degrees Fahrenheit. Cotton materials chemically altered and marketed as fire-resistant are acceptable. Materials treated with fire-resistant chemicals which launder out and materials with low temperature melting characteristics, such as synthetics (nylon, dacron, polyester, and so on) and synthetic blends, are not approved.

Fire resistant clothing used by wildland firefighters is approved for DOI aviation operations. Shirtsleeves must be long enough to overlap gloves with the cuffs fastened. The shirttail must be tucked into the trousers and the trousers must cover the boot tops.

A. Flight Suits. For optimum protection, NOMEX® coveralls must fit loosely, providing trapped air for insulation. Sleeves must be long enough to reach the first knuckle on the thumb before securing snugly over the flight gloves at the wrist. Pant legs must reach the floor while standing and secure snugly over approved boots at the ankle while seated. Fabrics are available in 4.5- and 6.0-ounce material.

B. Flight Gloves. Gloves (type GS/FRP-2) constructed of a soft leather palm and stretchable NOMEX® fabric for the back are preferred. These gloves have a long cuff extending several inches above the wrist providing total coverage when the flight suit sleeve is properly worn. Gloves should fit snugly to provide maximum finger dexterity for the wearer. All-leather gloves (without synthetic liners) are acceptable if they provide the wearer with wrist coverage and finger dexterity.

C. Outerwear Garments. Garments worn over the NOMEX® flight suit, such as coats, bib pants, and coveralls, should also be made of NOMEX®. Outerwear garments made from natural fibers, such as leather, cotton, wool, or wool/cotton blends, as well as from fire-resistant cotton and cotton blends, are acceptable substitutes. Materials with low temperature melting characteristics, such as synthetics (nylon, Dacron, polyester, and so on) and synthetic blends, are not approved.

D. Undergarments. Underwear, socks, and clothing worn under the flight suit and next to the skin will provide the best protection if made of NOMEX®. Natural fibers, such as cotton, wool, or wool/cotton blend, as well as fire-resistant cotton and cotton blends, are acceptable substitutes. Materials with low temperature melting characteristics, such as synthetics (nylon, dacron, polyester, and so on) and synthetic blends, are not approved.

Caution: In cold climates, cotton undergarments and socks will absorb perspiration and water, subjecting the wearer to chill, hypothermia, and frostbite.

E. Boots. Boot tops must extend above the ankle and must be constructed so that metal parts, such as shoestring eyes or zippers, do not contact the wearer's skin. Nonleather boots must be flight approved in accordance with U.S. Military standards for aviation use. Boots made of fire-resistant rubber are also an acceptable substitute.

The following nonleather boots are authorized for footwear:

Weather Conditions	Manufacturer	Model	Internet Address
Cold	Belleville	770 (Black)	http://www.bellevilleshoe.com/product.php
Temperate	Bates Belleville Wellco	E01500 700 (Black) 790 (Tan) ACBBTW (Black) ACBTTW (Tan)	http://www.batesfootwear.com/ http://www.bellevilleshoe.com/product.php http://www.wellco.com/
Hot	Belleville	340 DES	http://www.bellevilleshoe.com/product.php

2.4 Aircrew Member Secondary Restraint System. In addition to the normal seat belt, an adjustable full-body harness or a rappeller gunner strap and tether (lanyard, or safety strap) is intended to provide an aircrew member a secondary restraint when performing certain duties from an aircraft when the doors are removed. This restraint is required when the aircrew member is functioning as an aerial ignition device operator, aerial photographer, infrared sensor operator, ACETA gunner, spotter during rappel, cargo letdown, or short-haul operations. A properly adjusted secondary restraint tether shall ensure that the aircrew member is restrained inside the aircraft in case the seat belt is inadvertently unbuckled. This does not preclude the required use of the aircraft's seat belt and shoulder harness during all takeoffs and landings. The full-body harness must be commercially made. The tether must be attached to one or more aircraft hard points or seat belt rings (hardware) using locking carabiners or snaphooks. A knife is required to be worn by the aircrew member for emergency use that is suitable for rapid cutting of the tether. The knife must be worn where it is accessible and easily removed.

Full body harnesses and carabiners are commercially available. The Rappeller Gunner Strap, Harness Tether and Harness Tether Attachment can be obtained from:

John Day Air Base
730 Airport Rd
John Day, OR 97845
(541) 575-1322

For additional information on the rappeller gunner strap, tether, hardware or full body harnesses refer to the appropriate agency directive, guide and/or handbook (i.e. Interagency Aerial Ignition Guide, Interagency Helicopter Rappel Guide, Short-Haul Handbook).

2.5 Hypothermic Exposure and Drowning Protection. Many aircraft fatalities are attributed to hypothermia or drowning. The United States Search and Rescue Task Force published data shows survival time in 37 °F. water ranges from 30 to 90 minutes. People immersed in water below 59 °F. (15 °C.) will immediately experience breathing difficulties, beginning with a large aspiratory (cold) gasp, increasing the potential of drowning. Disorientation, unfamiliarity with underwater escape procedures, and the lack of personal floatation devices also contribute to these statistics.

A. Anti-Exposure Garments. A garment's thermal protection aids in reducing cold shock by preventing cold water from touching the skin, or creating a thermal barrier warming cold water trapped between the garment and the body. The table in appendix 1 provides an estimate of the effectiveness of several survival garments at various water temperatures. There are several types of anti-exposure garments available, to include survival suits and anti-exposure flight suits.

1. A Survival (dry) suit or more specifically an immersion suit is a special type of waterproof dry suit that protects the wearer from hypothermia when immersed in cold water. A survival suit will provide additional protection against hypothermia (Refer to Appendix 1). Thermal performance is dependent on the thickness of the undergarment worn. Survival suits will typically be of a one-piece design made of a fire resistant neoprene and usually not intended to be worn all the time. Quick-donning survival suits are acceptable when readily available to occupants of multiengine aircraft. (Examples of available products: Mustang Survival Products, http://www.mustangsurvival.com/products/product.php?id=314 or GORE-TEX® military fabrics, http://www.goremilitary.com.

2. An anti-exposure flight suit is comprised of a one-piece coverall constructed of a NOMEX® outer shell and foam lining providing fire resistance, hypothermia protection, and buoyancy. The user has the ability to seal the ankle and wrist cuffs so flushing of water through the suit is minimized. The body will heat entrapped water (along with the foam in the suit) to become a thermal barrier. An additional benefit of buoyancy results from the foam liner, which keeps the wearer horizontal (on top of the water). Hood and hand protection must be carried in a specific pocket provided for that purpose. (Examples of available products: Mustang Survival Products, http://www.mustangsurvival.com/products/product.php?id=280.

An anti-exposure garment must be worn in single engine aircraft and readily available to occupants of multiengine aircraft when conducting extended overwater flights and when the water temperature is colder than 50 °F.

Caution: Aircraft occupants wearing anti-exposure garments may experience difficulty exiting from an overturned or submerged aircraft.

B. Personal Flotation Devices (PFDs). It is virtually impossible to survive immersion in cold water without thermal protection and additional flotation, especially if you're injured. Departmental policy now requires that a PFD will be an inflatable-type (compressed gas inflation) flotation vest. Inflation must be accomplished by release of a compressed gas contained in a cartridge into the inflation chamber. The cartridge must be activated by a means readily accessible and clearly marked for its intended purpose. The flotation chamber must also be capable of oral inflation in the event of failure of the gas cartridge. For the sake of redundancy, it is recommended that the PFD have two separate inflation cells. (Examples of available products: Switlik Parachute Company, http://www.switlik.com/, Mustang Survival Products, http://www.mustangsurvival.com/products/category.php?t=1, Life Saving Systems Corporation, http://www.lifesavingsystems.com/general/frame_lsc.htm.

Note: Inflatable PFDs are specifically required because they do not restrict the occupant's movement or egress.

An inflatable PFD must be worn by all occupants in single engine aircraft and made immediately available to all occupants in multiengine aircraft that are operating off of or to water, or that operate beyond gliding distance from shore including water bucket dipping and snorkeling operations.

Aircraft occupants must wear inflatable PFDs aboard DOI flights when performing water takeoffs or landings (including float and boat-hulled aircraft).

Caution: PFDs equipped with an automatic (water-activated) inflation mechanism must not be worn in the aircraft. Aircraft occupants must not inflate PFDs in the aircraft. An occupant wearing an inflated PFD may experience difficulty exiting if the aircraft is overturned or submerged.

Chapter 3 Survival Equipment

Survival following an aircraft mishap requires (1) the desire to survive, (2) training, (3) survival items carried with you or available from the aircraft, and (4) use of environmental resources. When constructing a personal "survival kit" consider what would be practical, comfortable, and of the highest priority (fire and signal) during an unexpected survival situation.

Note: Aircraft accident experience has shown that survival equipment carried on your person is often the only equipment available to the survivors.

3.1 General. The equipment listed in this section is the recommended minimum to enhance your chances for survival. Weather, terrain, and environment should be considered when developing your personal survival kit.

3.2 Personal Survival Equipment (Recommended).

A. Personal Survival Items. Survival items carried in a personal survival vest, clothing, or flight suit pockets are:

- Fire starter (can be two boxes of matches in waterproof containers, "metal match" etc.)
- Laser rescue light or key chain LED light
- Signal mirror
- Whistle
- Knife or tool containing a knife blade
- Water purification tablets
- Sealing clear plastic bag(s)
- Personal locator beacon (PLB)
- 360/720/760-channel VHF-AM radio transceiver or satellite telephone

B. Personal First Aid Items (Recommended). In addition to personal survival items, consider the following medical items to be personally carried:

- Adhesive bandages – elastic knit – 1" x 3"
- Alcohol towelettes, individual foil pouches
- Handkerchief or bandanna
- Adhesive tape, waterproof
- Aspirin or acetaminophen
- Compress bandage, 4" (4)

3.3 Aircraft Survival Kit (Required). Survival kits are required for all DOI flight activities other than point-to-point flights, and airplane operations above 500 feet AGL, and are recommended for all missions. A detailed list of requirements and recommendations is located in appendix 2. Appendix 3, page 1, provides the Alaska Survival Kit Regulations and identifies those items that are required for every airman operating within the State. Appendix 3, page 2, provides the Canadian Survival Regulations and identifies those items that are required when conducting aviation operations in Canada.

3.4 Aircraft First Aid Kits (Required). First aid kits are required for all DOI flight activities other than point-to-point flights, and airplane operations above 500 feet AGL, and are recommended for all missions. Specific requirements are listed in appendix 4.

Caution: Avoid storing survival or first aid kits in seaplane float compartments. Kits stored in these compartments are often damaged or inaccessible after an aircraft mishap.

Chapter 4 Aircraft-Installed ALSE

4.1 General. This chapter covers the ALSE required to be installed in aircraft owned or under the control of DOI. It is the responsibility of the operator to ensure the appropriate equipment is provided. The pilot-in-command must ensure the correct installation, quantity, and serviceability of the equipment. The pilot-in-command is also responsible for briefing occupants on ALSE location and use.

4.2 Restraint Systems. Aircraft must be equipped, as a minimum, to the FAA certification standards for the specific aircraft. Restraint systems must be FAA approved and meet the installation guidance referenced in FAA Advisory Circular (AC 21-34), or its current revision. All installations must secure the occupant with a metal-to-metal buckle or latching mechanism. Occupants must wear lap belts and installed shoulder harnesses during all phases of flight unless there is a valid operational or safety requirement, which would cause the pilot-in-command to direct otherwise. Additional requirements are as follows:

All occupied seats must have a lap belt as a minimum (two-point system).

TWO-POINT SYSTEM

DOI minimum requirement.

Front seats must be equipped with a lap belt and shoulder harness as a minimum (three-point system). FAR 91.205 defines a front seat as a seat located at a flight crewmember's station or any seat located alongside such a seat.

Single-strap shoulder harnesses are acceptable provided they cross the chest diagonally when fastened and do not remain across the chest when the buckle is released. Lap belt and shoulder harness installations must not restrict crewmembers from performing their duties.

Lap belts must fit low and snug across the lap. If the belt is loose, or high around the waist, it can cause injury. Shoulder harnesses must be snug, but not tight, across the chest.

THREE-POINT SYSTEM
Front seat occupants of airplanes.
Rear seat occupants of helicopters.

FOUR-POINT SYSTEM

Front seat occupants of helicopters.

Front and tandem seat occupants of airplanes performing water takeoffs and landings.

FIVE-POINT SYSTEM

Front and tandem seat occupants of airplanes performing water takeoffs and landings.

A. Helicopter. A double-strap shoulder harness with automatic or manual locking inertia reel for each front seat occupant is required. Shoulder straps and lap belts must fasten with one single-point metal-to-metal, quick-release mechanism. Heavy duty (military-style) harnesses with a fabric loop connecting the shoulder harness to the male portion of the lap belt buckle, are acceptable in transport category helicopters. Shoulder harnesses (either single-strap or double-strap) are required for each aft cabin occupant. Shoulder harness straps and lap belts must fasten with a single-point metal-to-metal, quick-release mechanism.

B. Airplane. Shoulder harness and lap belt for front seat occupants and both occupants in tandem seat airplanes are required. The shoulder strap and lap belt must fasten with a single-point metal-to-metal, quick-release mechanism, which does not leave the shoulder strap across the chest when released. Airplanes with a factory-installed military-type shoulder harness also meet this requirement. Some tandem aircraft are also equipped with a five-point system with an additional crotch strap.

Note: Four-point systems with shoulder harnesses permanently attached to the lap belt are prohibited when performing water takeoffs and landings in airplanes.

4.3 Fire Extinguishers. The fire extinguisher must be a hand held bottle, minimum 2-B:C rating, mounted and accessible to the flight crew when seated. The fire extinguisher must be maintained in accordance with *NFPA 10: Standards for Portable Fire Extinguishers* or the Contractor's Part 135 operations specifications. Aircraft with 10 to 30 passenger seats must be equipped with an additional extinguisher mounted in the passenger compartment.

4.4 Life Rafts. Life rafts are required for extended overwater operations in accordance with 14 CFR 135.167.

4.5 Emergency Locator Transmitter (ELT). An ELT meeting the requirements of 14 CFR 91.207 must be installed in all nonturbojet airplanes owned or operated by DOI. DOI also requires ELTs (meeting the same requirement specified above for airplanes) in all helicopters. The ELT must be installed in a conspicuous or marked location and feature an antenna that is external to the aircraft. The ELT installation must be in accordance with the manufacturer's instructions and applicable TSOs as follows:

Aircraft performing "fire-related" missions - TSO-C91a or TSO-C126
All other aircraft – TSO-C91, TSO-C91a, or TSO-C126

Aircraft performing "extended overwater" missions are additionally required to have a survival-type ELT (ELT/S) attached to their life raft, meeting the requirement of 14 CFR 135.167.

Appendix 1

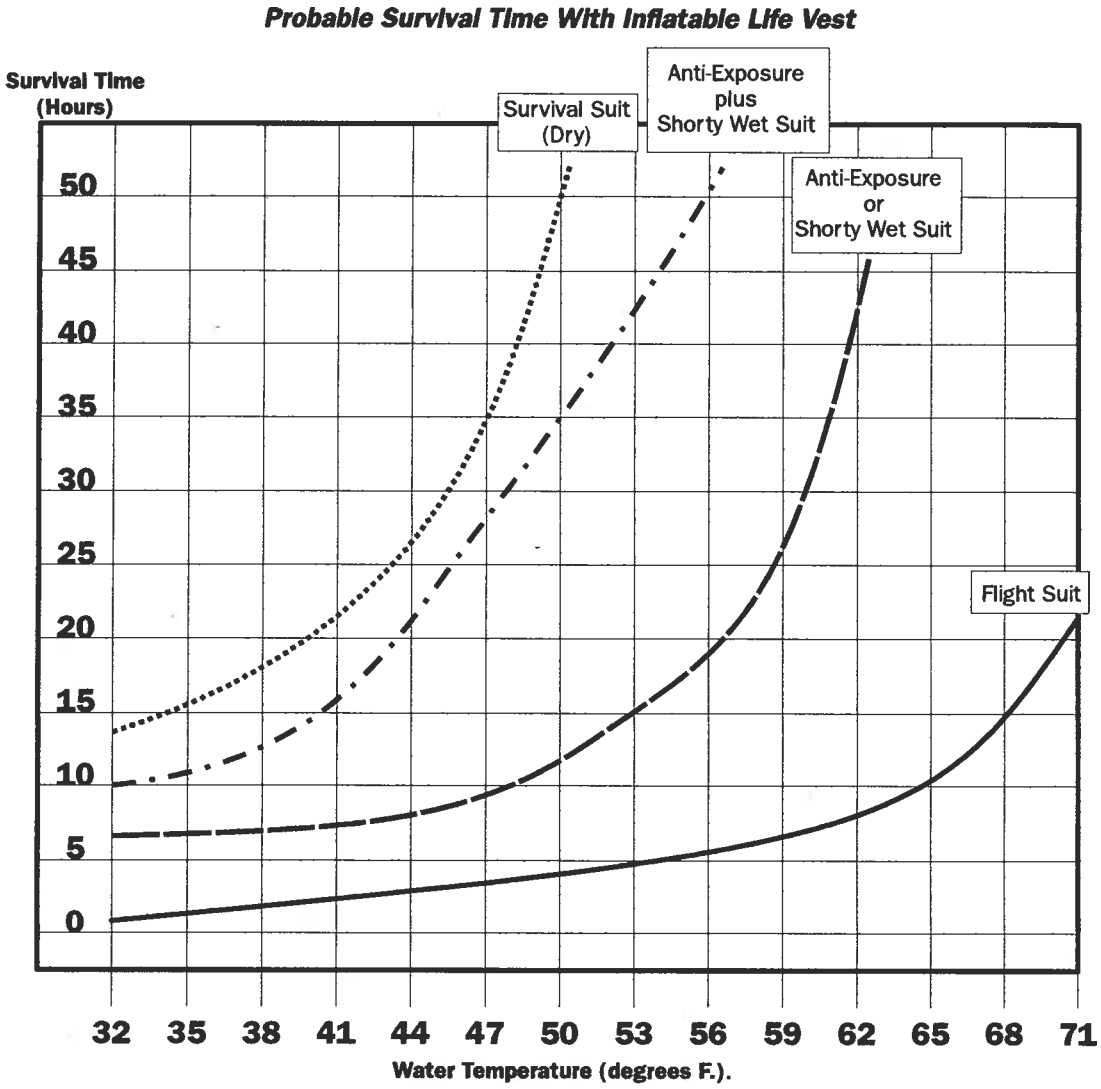

Table 3-1

This table is based on U.S. Coast Guard data for the following conditions:

- Rough Seas (4' to 6' Swells)
- Approx. 18% Body Fat
- Inflatable Life Vest with Self-Righting Characteristics

NOTE: Survival time in a covered life raft will be significantly longer in all water temperatures.

Appendix 2

Aircraft Survival Equipment Items

These are the minimum required items for all DOI flight activities, other than point-to-point and airplane operations above 500 feet AGL, in the United States and U.S. possessions. Additional requirements for flight activities conducted in Alaska and Canada are listed in Appendix 3.

Minimum Aircraft Survival Kit Items:

- Fire starter (can be two boxes of matches in waterproof containers, "metal match" etc.)
- Magnesium fire starter
- Laser rescue light
- Signal mirror
- Whistle
- One knife (includes "multi-tools" with knives)
- Wire saw, axe, hatchet, or machete
- Nylon rope or parachute cord (50 feet, minimum 1/8 inch [3mm] thick)
- Collapsible water container (Sealing clear plastic bag(s))
- Water purification tablets
- Water (one quart per occupant required except when operating over areas without adequate drinking water)
- Food (2 days emergency rations per occupant, with a caloric value of 1,000 calories per day
- At least one of the following shall be in the aircraft:
    - Automated flight following system
    - Satellite phone
    - 406 MHz personal locator beacon (PLB) with GPS or aircraft-mounted 406 MHz ELT
    - Handheld UHF or VHF radio

In addition, recommended items to consider depending on environmental factors:

- Flashlight with spare batteries, chemical light sticks, or LED light
- Signal flares (consider fusees and road flares for starting fires in any weather condition)
- Signal panels
- Large plastic trash bags
- Collapsible shovel
- Insect repellant (can be used for fire starter)
- Sunblock
- Sleeping bag (one bag per two people)
- Snowshoes
- Survival manual or guide

Appendix 3

Alaska Survival Regulations

Alaska Survival Kit Regulations

Alaska Statute 02.35.110 Emergency Rations and Equipment.

Alaska law requires that no airman may make a flight inside the State with an aircraft unless emergency equipment is carried as follows:

The following minimum equipment must be carried during summer months:

- Rations for each occupant to sustain life for one week
- One axe or hatchet
- One first aid kit
- An assortment of tackle such as hooks, flies, lines, and sinkers
- One knife
- Fire starter
- One mosquito headnet for each occupant
- Two small signaling devices such as colored smoke bombs, railroad fusees or Very pistol shells in sealed metal containers

In addition to the above, the following must be carried as minimum equipment from October 15 to April 1 of each year:

- One pair of snowshoes
- One sleeping bag
- One wool blanket or equivalent for each occupant over 4 years of age

Note: Operators of multiengine aircraft licensed to carry more than 15 passengers need carry only the food, mosquito nets, and signaling equipment at all times other than the period from October 15 to April 1 of each year, when two sleeping bags and one blanket for every two passengers must also be carried. All of the above requirements as to emergency rations and equipment are considered to be minimum requirements that are to remain in full force and effect, except as further safety measures may be from time to time imposed by the State of Alaska.

Appendix 4

Canadian Survival Regulations

Canadian Aviation Regulations, VI, subpart 2, 602.61 Survival Equipment - Flights Over Land

(1) Subject to subsection (2), no person shall operate an aircraft over land unless there is carried on board survival equipment, sufficient for the survival on the ground of each person on board, given the geographical area, the season of the year and anticipated seasonal climatic variations, that provides the means for

(a) starting a fire;

(b) providing shelter;

(c) providing or purifying water; and

(d) visually signaling distress.

(2) Subsection (1) does not apply in respect of

(a) a balloon, a glider, a hang glider, a gyroplane or an ultra-light aeroplane;

(b) an aircraft that is operated within 25 nautical miles of the aerodrome of departure and that has the capability of radio communication with surface-based radio station for the duration of the flight;

(c) a multi-engined aircraft that is operated south of 66° 30' north latitude

(i) in IFR flight within controlled airspace, or

(ii) along designated air routes;

(d) an aircraft that is operated by an air operator, where the aircraft is equipped with equipment specified in the air operator's company operations manual, but not with the equipment required by subsection (1); or

(e) an aircraft that is operated in a geographical area where and at a time of year when the survival of the persons on board is not jeopardized.

If you plan to carry firearms in an aircraft, included as part of your survival equipment, you must be aware that hand guns and fully automatic weapons are not legal to be carried or worn in Canada. As for any long guns, when entering Canada you must register each firearm with Canadian Customs or face severe penalties if caught.

On a related issue, the "flare gun" found in many life rafts and survival kits is not a "firearm," so do not refer to it as such when asked by Canadian Customs if you have any firearms on board. If the subject comes up, and only if it comes up, you must always refer to it as a "pyrotechnic signaling device" as in "There is a pyrotechnic signaling device in the life raft survival kit in accordance with Canadian, U.S., and international regulations."

Appendix 5

Aircraft First Aid Kit Requirements

The kit items must be stored in a dust-proof and moisture-proof container. It must be readily accessible to the aircraft occupants. Kits are available through commercial sources. The kit's contents must include the items listed below plus additional equipment appropriate to the route and number of occupants aboard the aircraft.

Item	Passenger Seats 0-9	Passenger Seats 10-50
Adhesive bandage strips, (3" long)	8	16
Antiseptic or alcohol wipes (pkts)	10	20
Bandage compresses, 4" (aka "field dressing")	2	4
Triangular bandage, 40" (sling)	2	4
Roller bandage, 4"x 5 yd (gauze)	2	4
Adhesive tape, 1"x 5 yd (std roll)	1	2
Bandage scissors	1	1
Body fluids barrier kit: 2 - pair nitrile or nonlatex surgical gloves 1 - face shield 1 - mouth-to-mouth barrier 1 – protective gown 2 – antiseptic towelettes 1 – biohazard disposable bag	1	1
NOTE: Splints are recommended if space permits.		