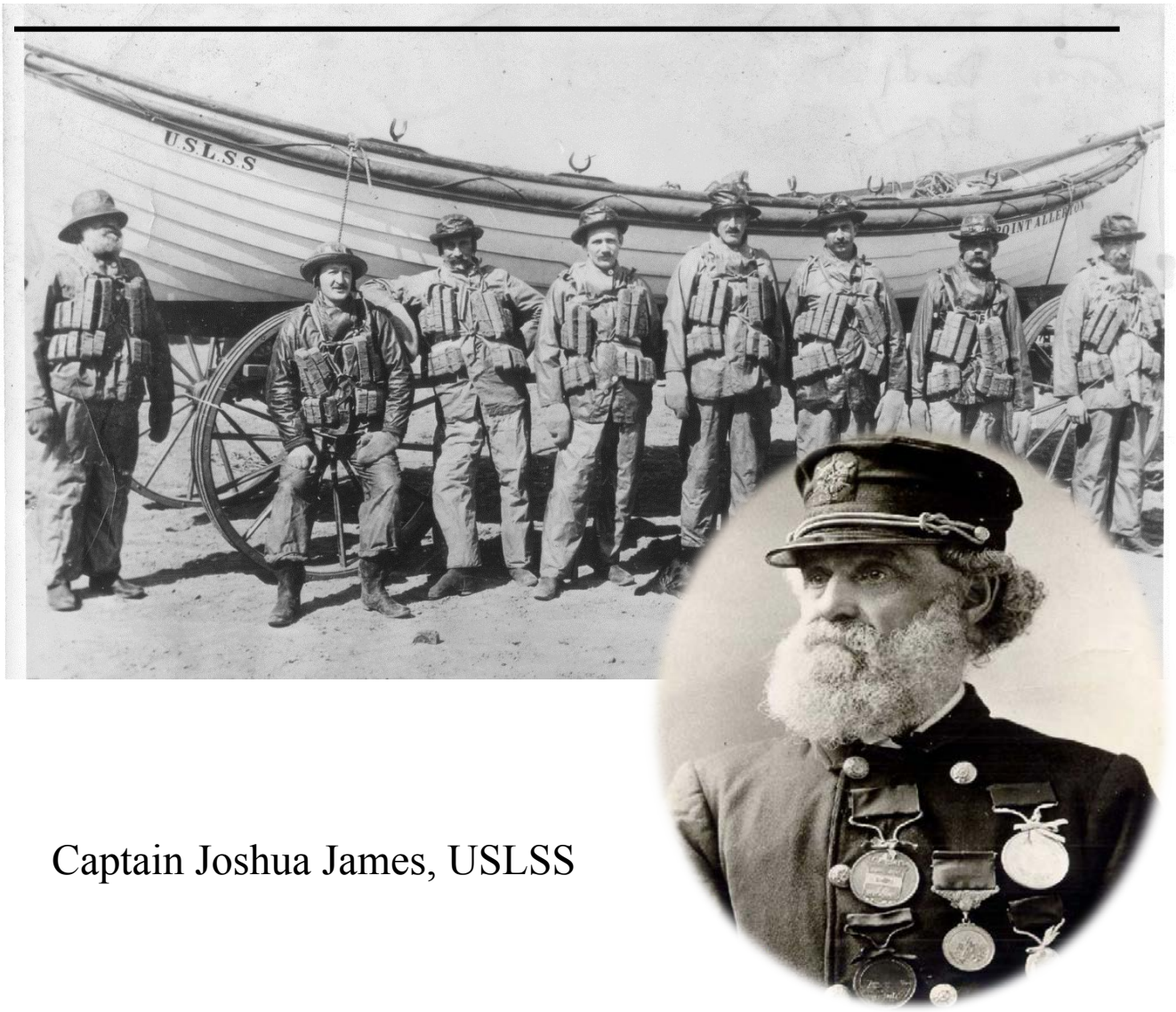
U.S. Department of Homeland Security

United States Coast Guard

BOAT CREW HANDBOOK – Rescue and Survival Procedures



Captain Joshua James, USLSS

BCH16114.2
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rapid heat loss.

(05) The body position assumed in the water is very important in conserving heat. Float as still as possible with legs together, elbows close to your side and arms folded across the front of the PFD. This is called the Heat Escape Lessening Position (HELP) and minimizes exposure of the body surface to the cold water. Try to keep head and neck out of the water (see **Figure 3-2**). However, if wearing a Type III PFD, or if the HELP position turns the body face down, bring legs together tight and arms tight to sides and head back.

(06) Another heat conserving position is to huddle closely to others in the water making as much body contact as possible. A PFD must be worn to be able to maintain these positions in the water (see **Figure 3-3**).

(07) Keep a positive attitude about survival and rescue. This will extend survival time until rescue comes. **A will to live does make a difference.**

Figure 3-2
Single PIW

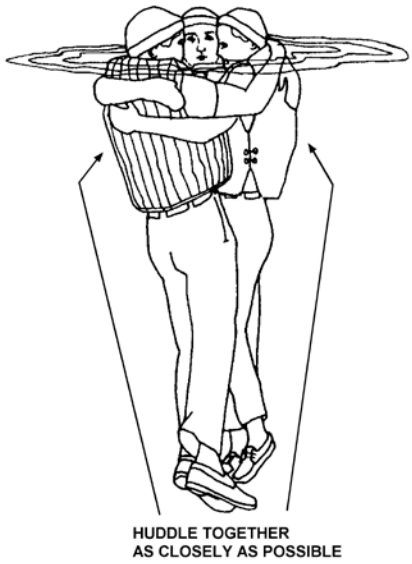

Figure 3-3
Multiple PIW Huddling

C.5. Climbing onto an Overturned Boat Hull

Regardless of what factors or condition contributed to the capsizing of your vessel, after you safely egress, you are now faced with an open water survival situation. The ability to think clearly and proficiently can make the difference between life and death. Climbing onboard an overturned vessel will provide greater protection from the elements and hypothermia. Once onboard, your chances of being spotted by rescuers (Coast Guard or good Samaritans) greatly increases because it is a larger object that can be seen from greater distances.

The majority of capsized vessels will inherently float and not sink for some time. The hull will float bow-up with the stern lying just beneath the surface of the water due to the vessel hull design and weight of the engines (see **Figure 2-2**). Although there is no standard procedure for climbing onto an overturned vessel, general procedures are listed below.

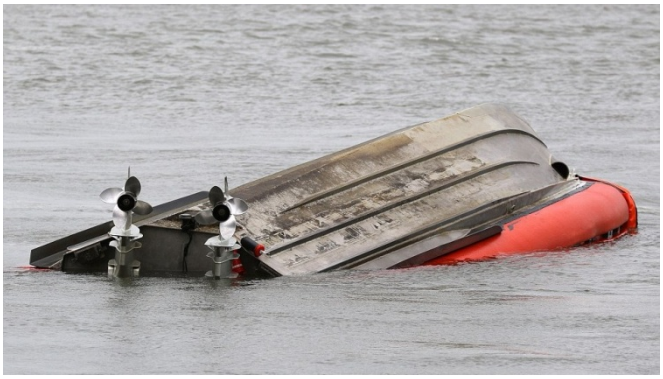

Figure 2-2
Capsized Vessel

Use the following procedures when climbing onto an overturned boat hull:

(01) Look for the easiest access point to climb aboard, this is often found towards the stern of the vessel since it will be lower in the water than the bow.

(02) Use the natural design of the boats hull for hand holds eg. keel, chine, through hull drains.

CAUTION!

Be careful of sharp edges, burs, and protruding objects that may cause injury or tear PPE when climbing on board the overturned boat hull.

(03) Be aware that some leverage points may be slightly below the surface, e.g. Rub rails, swim platforms, life lines.

(04) Assist other survivors in climbing aboard.

Once on board the overturned vessel, get as much as your body out of the water as possible to reduce your exposure to hypothermia. Apply training principles learned in the **Open Water Survival Skills** section and **Post Capsize Procedures** paragraph.

A.2. Storage

PFDs should be stored in a cool, dry place out of direct sunlight. A "dry" area is considered any suitable area where water will not condense on a PFD. All PFDs should be kept away from oil, paint, and greasy substances. The Coast Guard does not consider any PFD "readily accessible" if it is kept in its original wrapper. Persons under stress may be unable to get them out promptly. Also, the wrapper can trap moisture leading to mildew and rot.

NOTE Remember, even more important than PFD storage condition is that PFDs be readily accessible.

A.3. Care

If a PFD requires cleaning, it should be washed in fresh, warm water with a mild detergent, then rinsed in clean, fresh water. Additional maintenance requirements for all styles of PFDs used in the Coast Guard can be found in Reference (a).

Sterns Model 1600 (Type I) PFD

A.4. Description

The Sterns Model 1600, also known as a Type I (**Figure 3-1**), is a one-piece, PFD intended primarily for use by survivors, passengers on towed vessels, or prisoners aboard vessels. Sterns model 1600 PFD provides an unconscious person the greatest chance of survival in the water. It is universally sized for adults (90 pounds and over) which provides at least 22 pounds of buoyancy. The PFD must be international orange in color.

Figure 3-1
Sterns Model 1600

A.5. Advantages

Sterns model 1600 PFD is effective for all waters, especially open, rough, or remote waters where rescue may be delayed. It is designed to turn most unconscious wearers in the water from a face-down position to a vertical or slightly backward position, allowing the wearer to maintain that position. It provides at least 22 pounds of buoyancy. This buoyancy will allow the wearer to relax and save energy while in the water, thus extending survival time.

A.6. Disadvantages

There are three major disadvantages to this type of PFD:

(01) It is bulky and restricts movement.

(02) Its buoyancy restricts the underwater swimming ability needed to escape from a capsized boat or to avoid burning oil or other hazards on the surface of the water.

(03) It provides minimal protection against hypothermia.

A.7. Donning

Before entering the water, don and adjust Sterns model 1600 PFD using the following procedures:

WARNING For safety, always tuck all loose straps into your pockets, shirt, or belt. Adjust straps on injured people before they are lowered into the water.

Step	Procedure
1	Don PFD as you would a vest.
2	Buckle upper chest strap and pull tight.
3	Secure lower chest strap snap hook to the ring on the left and pull strap tight.

A.8. Entering the Water

Use the following procedures to enter the water:

NOTE

Follow these steps before entering the water wearing any type of PFD or combination of cold weather protective device (e.g., dry suit) and PFD.

Step	Procedure
1	Ensure all straps on the PFD are securely fastened, tightened to a snug fit, and tucked in to prevent them from snagging.
2	Stand on the boat's gunwale, on the windward side, at a point closest to the water.
3	Check surrounding area for debris and depth.
4	Hold elbows close to your sides and cover your face with one hand.
5	Grip PFD or area between wrist and elbow with the other hand.
6	Looking straight ahead, keep the body erect and legs held together and crossed when entering the water. It is better to gently slip in, if possible, rather than jumping.
7	Minize initial immersion by spreading arms and applying a scissor kick upon entry.

NOTE

If jumping into water is necessary with chemicals, oil, or burning oil on the surface, place one hand over mouth with palm under chin and split fingers tightly squeezing nostrils shut. Place other hand on the PFD collar to keep it in place.

Survivors (Type I) PFD

A.9. Description

The Survivors – PFD, is a Type I (**Figure 3-2**) PFD. A wearable device that will keep most unconscious wearers face-up in the water. It is intended for use by passengers, prisoners, and non-mission essential personnel. It comes in international orange with SOLAS reflective panels:

(01) Adult (more than 90 pounds) which provides at least 22 pounds of buoyancy.

(02) Child (less than 90 pounds) which provides at least 18 pounds of buoyancy.

Figure 3-2
Survivors Type I

A.10. Advantages

Lightweight and easy to don. Easily stacked for storage.

A.11. Disadvantages

There are three major disadvantages to this type of PFD:

(01) It restricts movement.

(02) Its buoyancy restricts the underwater swimming ability needed to escape from a capsized boat or to avoid burning oil or other hazards on the surface of the water.

(03) It provides minimal protection against hypothermia.

A.12. Donning

Before entering the water, don and adjust a near-shore buoyant vest PFD using the following procedures:

Step	Procedure
1	Grasp the PFD at the lower part of head opening and pull outward to expand opening.
2	Slip head through opening.
3	Pass the body strap around the back and fasten at the front of the PFD, then adjust the strap for a snug fit.

Type III PFD

A.13. Description

Type III PFD is routinely worn aboard boats when freedom of movement is required and the risk of falling over the side is minimal. It is not designed to turn an unconscious wearer to a face-up position; the design is such that conscious wearers can place themselves in a vertical or slightly backward position. It has a minimum of 15.5 pounds of buoyancy and comes in many sizes and colors. (**Figure 3-3)** shows one style of Type III PFD that boat crews are authorized to wear. Most approved flotation jackets ("float coats") are also Type III devices.

Figure 3-3
Type III Device PFD

A.14. Advantages Type III PFDs offer boat crewmembers greater comfort and freedom of movement. The Type III PFD is designed so wearers can place themselves in a face-up position in the water. Type III PFD allows greater wearing comfort and is particularly useful when water-skiing, sailing, hunting from a boat, or engaging in other water activities.

NOTE

The Type III PFD provides adequate flotation when wearing a full complement of law enforcement gear. If unable to remain afloat, jettison easily accessible equipment.

A.15. Disadvantages

The following are some disadvantages to the Type III PFD:

(01) Flotation characteristics are marginal and not suitable for wear in heavy seas,

(02) Tendency to ride-up on the wearer in the water,

(03) Wearer may have to tilt head back to avoid a face-down posture in the water,

(04) The distribution of the flotation material reduces or eliminates the turning ability when compared to the Survivors Type I PFD.

A.16. Donning

Before entering the water, don and adjust a Type III PFD using the following procedures:

Step	Procedure
1	Place your arms through the openings in the vest.
2	Close zipper, if provided. Close front slide fasteners.
3	Adjust waist straps for a snug fit.

A.17. Non-Coast Guard Approved Type III PFDs

Non-Coast Guard Approved Type III PFDs (**Figure 3-4**) are intended for specific activities and may be carried instead of a Coast Guard-approved Type III PFD only if used according to the approval condition on the label. Examples of Non-Coast Guard Approved Type III PFDs are:

(01) Mustang Survival MD-3183 v22 with survival equipment pockets,

(02) Lifesaving Systems Life Preserver Survival Vest.

NOTE Non-Coast Guard Approved PFDs are not Coast Guard approved because they have beaded handles vice t-handles (which have been deemed a snag hazard).

Figure 3-4
Non-Coast Guard Approved Type III PFD

A.18. Advantages

The Non-Coast Guard Approved Type III PFD offers boat crewmembers greater comfort and maneuverability compared to the typical Type III vest. Lightweight and not as bulky, the inflatable Non-Coast Guard Approved Type III device is especially beneficial to units in warmer climates. When fully inflated, the inflatable Non-Coast Guard Approved Type III provides more buoyancy. Some Non-Coast Guard Approved Type III inflatables provide storage pockets/pouches which, when properly outfitted, eliminate the need for wearing the Boat Crew Survival Vest mentioned later in this chapter.

A.19. Disadvantages

The initial purchase price and preventive maintenance costs of Non-Coast Guard Approved Type III inflatable PFDs are greater than most Type III vests. It also requires more frequent and complicated preventive maintenance. As with any other automated feature, if the auto-inflate mechanism were inoperative, the PFD would have to be manually inflated. This could be a problem if the crewmember is knocked unconscious while falling overboard. Automatically inflatable PFDs are also know to hinder egress from an enclosed cabin environment.

A.20. Donning

There are several different styles of Non-Coast Guard Approved Type III PFDs. Each has a specific method of donning, equipment storage, and activation. Prior to use, each crewmember must complete the performance qualification standards for that specific style of Non-Coast Guard Approved Type III. PFD PQS can be found on the Office of Boat Forces Portal site.

Ring Buoys/Throwable Devices

A.21. Description

Ring Buoys/Throwable Devices are Coast Guard-approved devices that are easily deployed to a person-in-the-water and are grasped by the user until rescued. Buoyant cushions come in many different colors. Ring buoys (see **Figure 3-5**) are usually international orange.

Figure 3-5
Ring Buoy/Throwable Device

A.22. Advantages

An advantage of Ring Buoys/Throwable Devices is that since they are not worn like other PFDs, there are no size restrictions. This type of device is designed to be stored on deck for easy deployment should someone fall overboard. If quickly deployed following a person in the water, Ring Buoys/Throwable Devices also act as markers assisting in returning to the area where the person originally fell overboard. See Reference (c) for more information on Person-in-the-Water Recovery.

A.23. Disadvantages

A disadvantage of Ring Buoys/Throwable Devices is that they are not worn, although some can be secured to the body once reached in the water.

Section B. Hypothermia Protective Clothing

Introduction

Accidentally falling into cold water has two potentially lethal consequences: drowning and hypothermia. Previously, the protection provided by PFDs against drowning was discussed. All Coast Guard and Auxiliary crews including passengers will be outfitted with the appropriate hypothermia protective clothing per Reference (a).

Hypothermia protective clothing is designed to permit functioning in cold weather and water conditions. There are two primary types used by the Coast Guard:

(01) Anti-exposure coverall,

(02) Dry suit (or approved replacement).

NOTE A special type float coat, with a Type V-approval label, meets the same flotation requirements as the anti-exposure coverall, but provides only partial covering and less thermal protection.

In this Section

This Section contains the following information:

Title	See Page
Cold Weather Principles	3-13
Anti-Exposure Coverall	3-14
Dry Suit	3-15

Cold Weather Principles

B.1. Layered Clothing

The best way to avoid cold-related injuries is to wear proper clothing. When choosing clothing combinations, the best advice is to layer clothing.

B.2. Maintaining Body Heat

Wet clothing robs the body of heat by breaking down the thermal protection of insulated clothing. It is extremely important to replace wet clothing as soon as possible to prevent cold-related injuries, particularly if the person is idle after a period of heavy perspiring.

Many cold weather medical problems involve wet hands, feet and head. These areas should receive special care.

Anti-Exposure Coverall

B.3. Description

Anti-exposure coveralls are Type III PFDs. The anti-exposure coverall is the standard garment for moderate weather operations (**Figure 3-6**). It provides good durability and out-of-water protection from the elements, but limited protection from hypothermia in the water.

Figure 3-6
Anti-Exposure Coverall

B.4. Donning

Anti-exposure coveralls are designed to be worn over the uniform in the same manner as standard coveralls. Also, hoods, balaclava, goggles and gloves should be used to protect against the elements.

B.5. Entering the Water

Before entering the water with anti-exposure coveralls, perform the following procedures:

Step	Procedure
1	Ensure the zipper is completely closed.
2	Tighten straps at the waist, thigh, and ankle to reduce transfer of cold water inside the suit. This increases the degree of hypothermia protection.
3	Orally inflate the pillow behind the collar. This will provide support for the head.

Dry Suit

B.6. Description The dry suit, one part of a multilayered maritime cold-weather suit system (MCWSS), provides protection in areas where exposure to wind, spray, cold water, and hypothermia is likely (see **Figure 3-7**). The dry suit, with proper undergarments, provides the best protection for crewmembers in adverse weather and cold-water immersion.

When the mission performed by the member is more likely to cause excess damage to a dry suit (AtoN maintenance, fisheries boardings), other Coast Guard authorized hypothermia protective clothing may be worn. Details on all authorized PFDs can be found in Reference (a).

Figure 3-7
Dry Suit

WARNING Dry suits provide no inherent buoyancy. A PFD must be worn over a dry suit at all times while underway.

B.7. Use When worn with a PFD and proper undergarments, a dry suit offers mobility and superior protection against the effects of wind, spray and cold-water immersion.

B.8. Donning

Use the following procedure to put on the MCWSS. Follow the steps closely to ensure proper sealing of neck and wrist seals:

Step	Procedure
1	Lubricate inside of the neck and wrist seals with unscented talc.
2	Don Layer I moisture wicking followed by Layer II fleece insulating undergarments.
3	Don the MCWSS in the same fashion as donning coveralls, entering it one leg at a time.
4	Pull the bottom section of the suit up to the waist and place arms into the sleeves.
5	Gently push one hand through the wrist seal at a time using the index finger of the opposite hand to stretch the seal as you push your hand through. Repeat for opposite hand. Make sure insulating undergarments are not sandwiched between seal and skin and flatten any folds or rolls of the seal flat against the skin.
6	Bring the upper portion of the suit over the head, aligning the neck opening with the top of the head. Reach inside the top of the neck seal with the fingers and gently pull the seal outward and down as you push your head through. Ensure insulating undergarments are not sandwiched between seal and skin, and flatten any folds or rolls of the seal flat against the skin.
7	Close the entry and relief slide fasteners. Have a fellow crewmember double check all fasteners to ensure it is closed completely against the sealing plug.
8	Remove excess air from the suit by sliding fingers under the neck seal and squatting down, pull arms tight against the chest and release seal.

WARNING

Use of comfort devices to stretch the neck or wrist seals away from the skin such as neck rings or O-ring comfort devices are not authorized and shall not be used.

CAUTION!

Use extreme caution when donning the MCWSS. Prior to donning the MCWSS, remove all rings, watches, earrings, necklaces and eyeglasses that will cause damage to wrist and neck seals.

B.9. Entering the Water

Before entering the water, perform the following procedures:

Step	Procedure
1	Slip on a neoprene hood.
2	Close all zippers and fasten Velcro wrist and ankle straps.
3	Put on gloves.

12	Grasp the end of the waterproof zipper on your right side and the zipper pull with the opposite hand. 
13	Pull the zipper closed completely around the waist circumference, ensuring the zipper is tight against the sealing plug.

WARNING Failure to completely close the waterproof entrance and relief zippers to the sealing plug will allow water to leak into the suit resulting in drastic loss of survival time.

14	Pull relief zipper closed completely ensuring the zipper is tight against the sealing plug.
15	Fold the waterproof zipper cover closed over the zipper.
16	Buckle the waist belt and adjust to a comfortable fit.
17	Adjust and close the ankle and thigh adjustment straps.
18	Grasp and pull the neck seal drawstring to **ensure a watertight and comfortable fit**. 
19	Secure the end of the neck seal drawstring to the tab under the outer collar.
20	Buddy-check all fasteners and zippers.

WARNING

Use of comfort devices to stretch the neck or wrist seals away from the skin such as neck rings or O-ring comfort devices are not authorized and shall not be used.

WARNING

The MSD901 shall be worn with all three modules completely assembled.

CAUTION!

Use extreme caution when donning the MSD901. Prior to donning the MSD901, remove all rings, watches, earrings, necklaces and eyeglasses that will cause damage to wrist and neck seals.

A.11.b. Doffing Procedure

Use the following procedure to take off the MSD901:

Step	Procedure
1	Remove all other equipment donned over the MSD901 before proceeding.
2	Wash down the MSD901 while wearing it paying particular attention to entry and relief slide fasteners. Remove all traces of salt.
3	Unbuckle the waist belt and release the ankle, wrist and thigh adjustment straps.

CAUTION!

Failure to completely open slide fastener will damage the suit when it is removed.

4	Fold the waterproof zipper cover out of the way. Completely open the waterproof zipper.
5	Completely loosen the neck seal drawstring and open the chest zipper.
6	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling head from seal and shoulders and head out of the suit.
7	Insert two fingers under wrist seal and gently pull seal outward. Cup the hand, fingertips and thumb together, and gently pull hand from seal. Repeat for other hand.
8	Remove legs from suit. Hang the suit by the hanging loop, close waterproof zipper half way and hang until dry.

B.12. Ice Rescue Dry Suit

Two dry suits are approved specially for ice rescue operations only:

(01) The MSD 640 dry suit, and

(02) The MSD 630 dry suit.

The MSD 900, MSD585 and Kokatat™ dry suits in current inventory may be utilized for ice rescue until unserviceable see reference (a) for additional information.

Figure 3-8
MSD640 Dry Suit

B.12.a. MSD640 Donning Procedure

Before donning the MSD-640, ensure appropriate polypropylene undergarments are worn.

CAUTION!

Always don the dry suit on a clean surface such as a towel or tarp to avoid attracting debris. Pebbles, sand, dirt and other debris on the ground can cause damage to dry suit sock and compromise the suit's integrity.

CAUTION!

Use extreme care when donning the dry suit. Prior to donning, remove all rings, watches, earrings, necklaces and eyeglasses that will cause damage to the wrist and neck seals. Footwear other than thermal socks must not be worn inside the drysuit.

Use the following procedures to put on the MSD640. Follow the steps closely to ensure proper sealing of the neck and wrist seals:

Step	Procedure
1	Ensure that Velcro® wrist covers and ankle covers are unfastened.
2	Ensure waist adjusters are loosened.
3	Ensure that both the outer shell entry zipper and waterproof entry zipper are fully opened.

4	Ensure the suspenders are pulled out of the suit legs.
5	Slide your legs into the suit until your toes reach the ends of the socks.
6	Don the suspenders. Ensure they are crossed in the back but not twisted.
7	Apply unscented talcum powder to the inside of the wrist seals.
8	Place right arm into right sleeve.
9	Carefully place the right hand into the right cuff by pointing the fingers straight, tucking the thumb underneath and inserting the hand through the seal. Do not make a fist when putting your wrist through the seal.
10	Roll the Velcro® wrist covers back and refasten to a snug fit.
11	Repeat steps 7-10 for the left arm.
12	Bring the upper portion of the suit over your head, aligning the neck opening with the top of the head. Reach inside the top of the neck seal with fingers and gently pull the seal outward and down as you push your head through. Flatten any folds or rolls of the seal against the skin.
13	Close the waterproof entry zipper. Reach over your left shoulder with your right hand and grasp the zipper toggle. While holding the top of the zipper, pull the toggle down until the zipper is completely fastened.
14	Ensure the waterproof relief zipper is completely closed and the slider is fully engaged with the zipper stop. Stow the zipper toggle in the yellow loop located under the zipper cover
CAUTION!	Dry suits alone provide inadequate insulation for hypothermia protection. Personnel shall wear thermal underwear beneath the dry suit to provide protection from cold temperature, wind, sea spray and rain. Dry suits are not inherently buoyant. The harness flotation vest shall be worn over the dry suit for all cutter swimmer deployments.
15	Close the outer shell entry zipper. Reach over your left shoulder with your right hand and grasp the zipper toggle. While holding the top of the zipper, pull the zipper down until the zipper is completely fastened.
16	Tighten the ankle Velcro® covers to a snug fit.
17	Prior to water entry, cross arms in front and gently slide finger between neck seal and your neck, squat down and force excess air through the neck opening.

B.12.b. Doffing Procedure

Use the following procedure to take off the MSD640:

Step	Procedure
1	Remove all equipment worn over the suit.
2	Thoroughly rinse down the exterior of the suit while wearing it, paying special attention to the seals and zippers. Remove all dirt, salt and debris.
3	Loosen Velcro® waist and ankle adjustment tabs.
4	Completely open the outer shell entry zipper and the inner immersion layer waterproof zipper.
CAUTION!	Placing undue force on the zipper may damage the seal and harm the integrity of the suit. Never forcefully yank on the zipper.
5	Insert fingers between neck seal and neck. Gently stretch the seal outward and upward while pulling neck seal over your head.
6	With an unclenched fist, slowly pull each hand through the wrist seals while holding the rubber seal open
CAUTION!	Pulling on the wrist seal may damage the seal.
NOTE	If wearing suspenders, remove suspenders prior to proceeding.
7	Pull suit down past hips and slide legs from the suit.

B.13. Cutter Surface Swimmer Dry Suit

The cutter surface swimmer dry suit is worn by cutter surface swimmer personnel when deployed into water that is 50 degrees Fahrenheit and below.

Figure 3-9
Cutter Surface Swimmer Dry Suit

Section C. Boat Crew Survival Vest

Introduction

The equipment in the boat crew survival vest provides crewmembers a means to signal their position on the surface of the water, day or night. The vest is worn over all PFDs with the exception of Type V inflatables. The vest does not interfere with wearing a PFD or hypothermia protective clothing. If using a Type V inflatable, the equipment normally stored in the boat crew survival vest will be tethered to the PFD's storage pocket/pouch.

The components of the boat crew survival vest shall not be removed to other devices/individual PFDs. Auxiliary survival equipment requirements are outlined in the Reference (b).

In this Section

This Section contains the following information:

Title	See Page
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Strobe Light	3-30
Illumination Signal Kit, MK-79 MOD 0	3-31
Signal Whistle	3-34
Smoke and Illumination Signal, MK-124 MOD 0	3-35
Survival Knife	3-38
Personal Locator Beacon	3-38

Boat Crew Survival Vest

C.1. Description

Boat crew survival vests contain the equipment listed in **Table 3-1** Boat Crew Survival Vest Contents, with their use, characteristics, and operation described later in this Section.

Figure 3-10 shows the boat crew survival vest and the proper storage location for each item.

WARNING

In addition to the PFD, each crewmember must also be outfitted with either a boat crew survival vest, or if wearing a Type III inflatable PFD, the same contents found in the survival vest stored in the PFD's pocket/pouch. Reference applicable maintenance procedure cards.

Figure 3-10
Boat Crew Survival Vest

C.2. Contents

Item	Equipment	Quantity
1	Emergency Signaling Mirror	1
2	Strobe Light	1
3	MK 79 Personal Distress Signal Kit	1
4	Whistle	1
5	MK-124 Mod 0/1 Marine Smoke and Illumination Signal	1
6	Survival Knife	1
7	Personal Locator Beacon (PLB)	1

Table 3-1
Boat Crew Survival Vest Contents

Emergency Signaling Mirror

C.3. Description

The emergency signaling mirror is a pocket-sized mirror with a sighting hole in the center and a lanyard attached (see **Figure 3-11**). However, any common mirror is useful as an emergency signaling device.

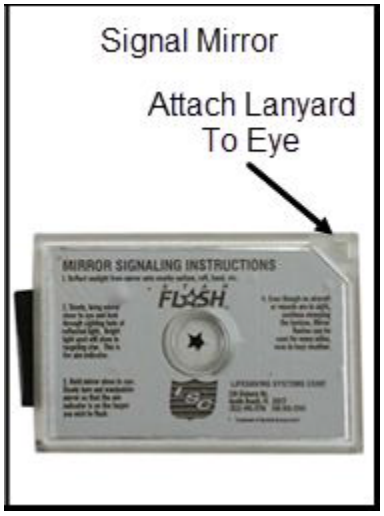


Figure 3-11
Emergency Signaling Mirror

C.4. Use

The mirror is used to attract the attention of passing aircraft, boats, or ground rescue teams by reflecting light at them. Instructions for using the mirror are printed on its backside.

C.5. Characteristics

Light reflected in this manner can be seen at a great distance from the point of origin. Practice is the key to effective use of a signal mirror.

C.6. Operation

The following procedures describe how to properly use this accessory:

Step	Procedure
1	Face a point about halfway between the sun and an object you wish to signal.
2	Reflect sunlight from the mirror onto a nearby surface such as the raft, your hand, etc.
3	Slowly bring the mirror up to eye-level and look through the sighting hole. You will see a bright light spot, this is the aim indicator.
4	Hold the mirror near your eye and slowly turn and manipulate it so the bright light spot is on target.

Strobe Light

C.7. **Description** The strobe light is a lightweight, compact, battery-operated strobe light that emits a high intensity white LED visual distress signal (**Figure 3-12**).

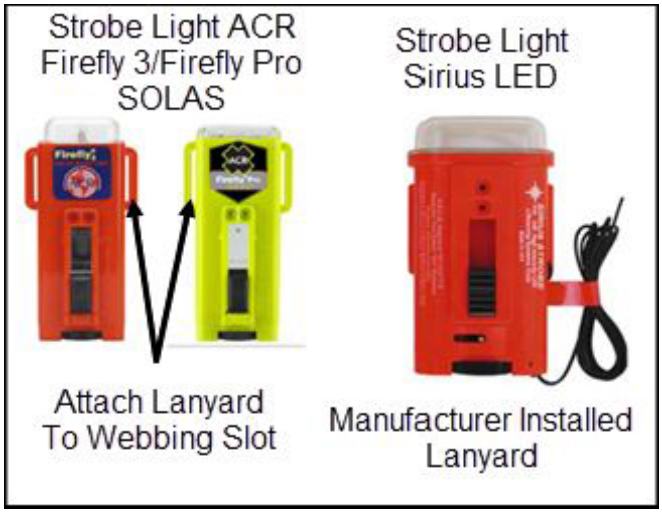


Figure 3-12
Strobe light

C.8. Use

The strobe light is used to attract the attention of aircraft, ships, or ground parties. One side is equipped with hook fasner tape so that it can be attached to the boat crew safety helmet, inflatable PFD, or survival vest. This eliminates the need to hold the strobe light, freeing up hands to operate other signaling equipment.

C.9. Characteristics

The strobe lights emit approximately 50 to 70 flashes per minute. It will operate for a minimum of 8 hours continuous, but typically 18+ hours. Depending on atmospheric conditions, the strobe light has a visual range of 2 – 5 miles.

C.10. Operation

The following are the procedures to operate the strobe light:

Step	Procedure
1	Turn *on*: Slide the switch into the *on* position. Light should begin flashing within seconds.
2	Turn *off*: Slide the switch back into the *off* position. The light should stop flashing.
NOTE	Coast Guard Deployable Specialized Forces units utilizing MILTAC stroble light will have different operating procedures.

Illumination Signal Kit, MK-79 MOD 0

C.11. Description

The MK-79 MOD 0 is a pyrotechnic illumination signal kit that contains seven screw-in cartridge flares (MK-80) and one pencil-type projector (MK-31). The projector in this kit is used to aim and fire a signal cartridge (**Figure 3-13**). Additional information can be found in Reference (e).

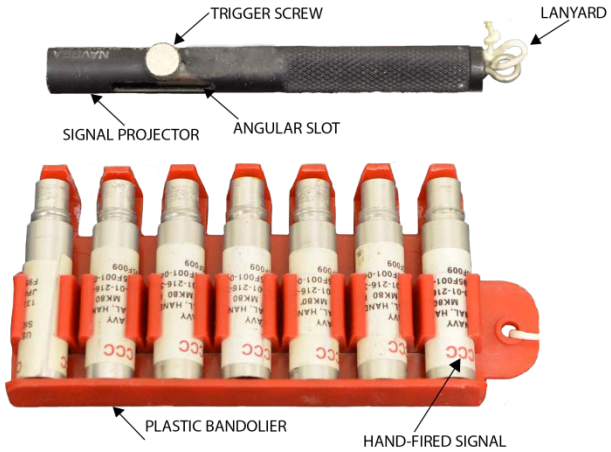


Figure 3-13
Illumination Signal Kit, MK-79 MOD 0

C.12. Use

The MK-79 MOD 0 is used to attract vessels, aircraft, and ground rescue teams.

C.13. Characteristics

These signals produce a red star display at an altitude of 250-650 feet for a minimum time of 4.5 seconds. Their luminous intensity is about 12,000 candle power.

C.14. Operation

The following are procedures for operating the MK-79 MOD 0:

Step	Procedure
1	Remove the bandolier and projector from the plastic envelope.
2	Cock the firing pin of the projector by moving the trigger screw to the bottom of the vertical slot and slipping it to the right so that it catches at the top of the angular (safety) slot. 
WARNING	Failing to cock the firing pin back may result in the cartridge firing prematurely when attaching to the projector.
3	Bend protective plastic tab away from signal in bandolier to allow attachment to projector. 
WARNING	The plastic tabs over signals in the bandolier protect percussion primers on the cartridges from being struck accidentally. They should be kept intact until just before loading into the projector.

WARNING	Keep the projectile-end of the flare pointed in a safe direction while loading the flare in the projector. Ensure Step 2 is completed prior to "loading." Accidental firing may occur if projector is not cocked.
4	Attach a signal flare to the projector and rotate clockwise until the signal is seated. 
5	Hold projector overhead with arm fully extended. The projector should be pointed at a slight angle away from the body. 

6	While firmly gripping the projector, fire the signal by slipping the trigger screw to the left out of the safety slot and into the firing slot.
NOTE	This action should be one continuous movement so that the thumb does not interfere with the upward motion of the trigger screw when it is brought into the firing slot. The trigger screw must "snap" upward.
7	If the signal fails to fire, try again twice by depressing the trigger screw to the bottom of the firing slot with the thumb and releasing it quickly. If it still fails to fire, wait 30 seconds before unscrewing, to reduce the possibility of hang fire.
WARNING	Do not aim at personnel, aircraft, or other objects.
8	Unscrew (counterclockwise) the spent signal case or signal that has failed to fire. Discard by throwing overboard.
9	To fire another signal, repeat the procedures above.

Signal Whistle

C.15. Description

The whistle is a small, hand-held device (see **Figure 3-14**) that produces a loud sound when it is blown. The standard whistle is constructed of plastic and resembles a police officer's whistle.

Figure 3-14
Signal Whistle

C.16. Use

The sound produced by a whistle will attract the attention of rescuers and guide them to the whistle's origination. During periods of restricted visibility, fog, and darkness, rescuers may hear the sound it produces before they sight the strobe light.

C.17. Characteristics

Depending on weather conditions, a whistle's audible sound may be heard at a distance of up to 1,000 yards. Any wind has the effect of carrying the sound downwind.

Smoke and Illumination Signal, MK-124 MOD 0/1

C.18. Description

The MK-124 Mod 0/1 is a pyrotechnic smoke and illumination signal used day or night as a distress signal at sea or on land (**Figure 3-15**). One end produces orange smoke as the day signal and the other end produces a red flare as the night signal. Additional information can be found in Reference (e).

NOTE

Auxiliary crewmembers may use commercially available Coast Guard approved survival equipment while operating an Auxiliary facility. See reference (b) for specific requirements.

Figure 3-15
Smoke and Illumination Signal, MK-124 MOD 0/1

C.19. Use

These signals are used to attract vessels, aircraft, and ground rescue teams day or night. The signal may also be used to indicate wind direction for helicopter hoists. It is labeled with the following operating instructions:

(01) Do not dispose of the signal until both ends have been used.

(02) Only when signals misfire should it be disposed of over the side. Misfires are a safety hazard if kept onboard a vessel.

(03) When both ends of the signal have been discharged, properly dispose of it. In an actual distress situation, spent signals may be tossed over the side.

WARNING

Under no circumstances shall personnel ignite both ends simultaneously.

C.20. Characteristics

As mentioned above, both ends of the device produce a signal and each end burns for about 20 seconds. The night end produces a red flare (similar to a road flare) and the day end produces orange smoke.

C.21. Operation

The device has two raised bands around its circumference on its night end (flare). These bands positively identify the night end by sense of touch. Also, a label on the case identifies the day (smoke) and night (flare) ends and provides instructions for use.

After choosing which end to use, perform the following procedures:

Step	Procedure
WARNING	After ignition, the outer case may overheat and burn the hand. Dropping the signal on land will not decrease its effectiveness.
WARNING	Do not look directly at the light of a night flare close up. The intensity of the lights could burn the eyes.
WARNING	Do not direct either end of a signal toward another person.
1	Remove the protective cap from the end to be ignited. 
2	Slide the plastic lever in the direction of the arrow until fully extended. 

3	Hold the signal downwind and overhead at a 45° angle from the horizon over the side of the raft or away from dry debris to prevent burns from hot drippings. 
WARNING	Prior to pulling lever downward, position all fingers below top of signal.
4	Using the thumb, pull down on the extended tab to ignite signal. 
5	If the smoke signal end flames up, briefly immerse it in water or hold it against a solid object.
6	After using one end, douse in water to cool it, or if on land, place it on the ground to cool. Save the signal to use the other end when needed.

Survival Knife

C.22. Description

The survival knife (**Figure 3-16**) is a basic tool used to free the crewmember from entangling lines. It is also used to cut material blocking a path in escaping a capsized or sinking boat. It should be a fixed blade design with a blunt tip made of corrosion-resistant material. The blade should be checked periodically for sharpness.

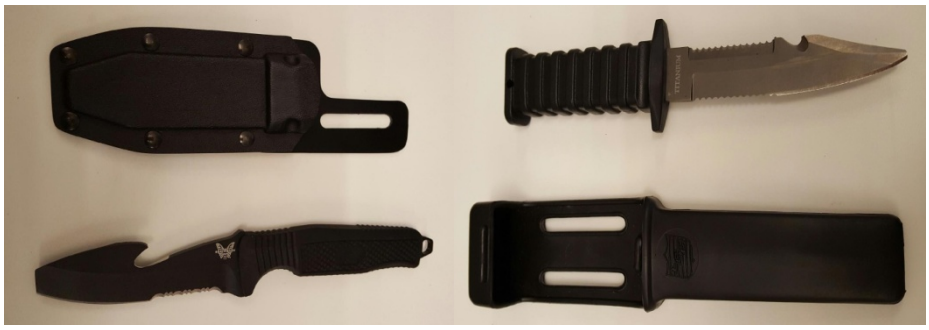


Figure 3-16
Survival Knife

Personal Locator Beacon (PLB)

C.23. Description

The PLB (**Figure 3-17**) is a smaller version of the common ship mounted 406 MHz EPIRB that is used on military, commercial, and recreational vessels. This personal transmitter is capable of broadcasting a distress signal that can be received and tracked world-wide guiding emergency response resources to the transmitting position for rescue.

C.24. Use

The PLB is for emergency use only. This device is the primary distress signal and should be activated immediately to signal for help. Once activated, do not turn it off. Once search vessels or aircraft have reached the transmitting position area, use other signaling equipment (radio, signal mirror, flares, etc.) to vector them to the position.

C.25. Characteristics

The PLB is a personal transmitter capable of broadcasting on both 406 MHz and 121.5 MHz. The international satellite based search and rescue system (COSPAS SARSAT) monitors 406 MHz and is able to provide a position accurate to within three nautical miles within 90 minutes. Once the rescue platform is in the vicinity, the 121.5 MHz transmitter provides a signal allowing the resource to home in on the vessel or individual in distress particularly if the individual is equipped with flares and a strobe light.

C.26. Operation

Since PLB's may vary in style and operation, as new models are produced, each crewmember shall read and understand the PLB owner's handbook. Prior to getting underway with the PLB the first time, each crewmember shall demonstrate the test sequence and explain the activation procedure to a qualified member.

Figure 3-17
Personal Locator Beacon (PLB)

Section D. Parachute Illumination Signal, M127A1

Introduction

This signal is used for appropriate nightime illumination purposes when situations require additional visibility while engaged in search and rescue, crossing a bar/inlet, or security operations. Additional information can be found in Reference (e).

In this Section

This Section contains the following information:

Title	See Page
Parachute Illumination Signal, M127A1	3-40

D.1. Parachute Illumination Signal, M127A1

The parachute illumination signal, M127A1 is a night time illumination-signaling device. When fired, it climbs to an altitude of 650 to 700 feet before igniting. Upon ignition, it produces a parachute-suspended white star flare that burns for about 36 seconds with 125,000 candlepower. The signal descends at a rate of 10 to 15 feet per second (**Figure 3-18**).

Figure 3-18
Parachute Illumination Signal, M127A1

E.3.a. Safety Precautions

The following safety precautions shall be strictly observed when firing the parachute illumination signal:

(01) Do not remove a signal from its sealed container until just before use.

(02) Do not attempt to use dented, cracked, or otherwise damaged or deteriorated signals.

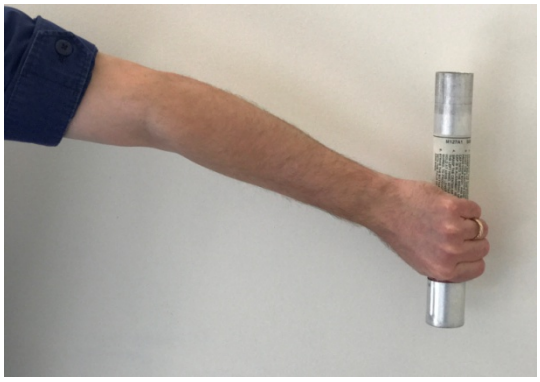
(03) While handling the illumination signal outside of its canister, be sure to avoid striking the primer.

E.3.b. Firing Procedures

The following are procedures for firing the parachute illumination signal M127A1:

Step	Procedure
1	Remove a signal from its container.
2	Hold the signal in left hand with the RED knurled band of the signal FACING UP. Align left thumb and forefinger along the red band. 

3	Withdraw the firing cap from the lower end of the signal. 
4	Point the ejection end of the signal (the end opposite the red knurled band) away from personnel, equipment, and materials. Slowly push the cap onto the primer (red band) end until the cap meets the edge of the knurled band. DO NOT PERMIT THE CAP TO GO BEYOND THE RED BAND. 
CAUTION!	Exercise due care to prevent the expended rocket body from falling on people, watercraft, and structures.

5	Hold the signal FIRMLY at arm's length with the left hand, with the ejection end facing straight up. The signal should be held in a vertical position (90° elevation) when firing. 
6	Strike the firing cap bottom sharply with the palm of the right hand, keeping the left arm rigid and pointing straight up. 
7	If a misfire occurs while underway, toss it overboard. **Or** If a signal misfires while on land, place it in a secure position to prevent people from being hurt should the signal fire. The signal must not be approached for at least 30 minutes.

WARNING

When conducting SAR operations with a helicopter, extreme caution and coordination must be used by surface units using pyrotechnics. Do not fire pyrotechnics without permission and instructions from the Aircraft Commander.

E.3.c. Firing Angles

Firing a signal at angles other than a vertical position may be necessary under the following circumstances:

(01) To compensate for high wind velocities.

(02) To gain maximum illumination of the area.

NOTE

If a signal is fired at an angle less than 90° elevation (directly overhead), the altitude reached is reduced and the altitude of candle burnout is lessened. If the firing angle is 60° or less, the candle will, in almost all cases, still be burning when it strikes the surface.