MARITIME SAFETY STANDARD ON LIFE-SAVING APPLIANCES AND AIDS FOR WORK NEAR OR OVER WATER

1.0. PURPOSE

Establish uniform safety requirements when performing work or activities near or over water, with the objective of preventing death by drowning.

2.0. BACKGROUND

Operations near or over water are carried out daily in the Panama Canal Authority (ACP). However, a reference standard for consultation is nonexistent; therefore, several divisions have independently developed safety procedures for such work.

3.0. SCOPE

This Standard applies to ACP employees, contractors, third parties, or visitors performing work or activities near or over water in areas under the responsibility of ACP.

4.0. LEGAL FOUNDATION

This Standard is established pursuant to Agreement No. 12 of the Board of Directors of the Panama Canal Authority, Occupational Safety and Health Regulation, Chapter I, Article 3, numeral 3.

5.0. DEFINITIONS

For purposes of this Standard, the following definitions shall apply:

5.1 PFD: Personal Flotation Device or life preserver. Shall be of the type specified by the Maritime Safety Unit of the Board of Inspectors.

5.2 OPXI-S: Maritime Safety Unit of the Board of Inspectors.

5.3 SOLAS: International Convention for the **Safety of Human Life at Sea**. Adopted in November, 1974, and entered into force on May 25, 1980.

5.4 Inflatable device: A device used for floating that requires cameras that are not rigid; gas lines, and is normally stored deflated until used.

5.5 IMO: International Maritime Organization.

5.6 USCG: United States Coast Guard.

5.7 MSC: Maritime Safety Committee, superior technical body on safety matters.

5.8 FEDERAL STANDARD 595B: A color-comparison chart of five-digit numbers used for all United States Federal Government activities.

5.9 Work near water: Work or activity (including inspection) that is:

5.9.1 Performed **3 feet or less** from the edge of Locks walls, the main deck of any ship, pier, floating equipment, working floaters, pontoon, or any other structure near water, **where the railing does not offer sufficient protection, or is inadequate for preventing falls into the water**.

5.9.2 Performed on scaffolds, elevated platforms, and the like, where there is an existing risk of falling into the water.

5.10 Work over water: Work or activity performed while being suspended above the water.

5.11 Fording: To cross a river or deep stream at a ford, or any other place where it is shallow enough to cross by wading.

5.12 Ford: A place in a river that has a firm bottom is shallow and of little depth, which can be crossed by wading, on horseback, or inside a vehicle.

5.13 International Life-Saving Appliance Code (LSA): A code approved by the Maritime Safety Committee (MSC) of the Organization through Resolution MSC 48(66), by which the standards for on board life-saving appliances and arrangements are regulated.

5.14 Candles power (Cp): A unit of measurement of the luminous intensity.

5.15 Detection: Determination of the point in which survivors or survivor craft is located.

5.16 Pantone: A color-control system for graphic arts. The system is based on a color-range palette that often makes it possible to obtain other premixes of predetermined hues.

5.17 Munsell: Colorimetry. A color control based on the space of the color that specifies it in three dimensions: Chroma, value, and hue.

5.18 RAL: A color identification system developed in 1927, based on the space of the colors.

5.19 Far from the coastline: Located at more than one nautical mile from the closest land.

6.0 GENERAL

6.1 Unless otherwise expressly stipulated, or if in the opinion of OPXI-S, other determinations are appropriate, **use of PFDs is mandatory when work or activity is being performed at 3 feet or less** from locks walls, the main deck of any ship, a pier, floating equipment, working surface floats, pontoons or any other structure that is near water, where sufficient protection is not offered.

6.2 Sufficient protection is that which complies with the established minimum height of one (1) meter; otherwise, PFDs shall be used at all times.

6.3 All life-saving appliances required in this Standard shall comply with the following provisions:

6.3.1 They shall be manufactured with adequate materials that are rot-proof and corrosion-resistant, and not affected by seawater, oil, or fungal attack. They shall not deteriorate in the parts exposed to sunlight.

6.3.2 Their color shall be highly visible in all parts that can contribute to color-detection, such as FEDERAL International Orange FS 12197.

STANDARD 595B, as well as Indian Orange and Scarlet Munsell Red are acceptable, with the exception of the inflatable PFD type V for use as type II or type III in yellow, which shall also be accepted. They shall also have reflective material where it can contribute to its detection; utilization

and placement of retro-reflective materials on PFDs shall be in accordance with IMO recommendations as set forth in Resolution A. 658 (16).

6.3.3 OPXI-S shall determine the period of acceptability of the life-saving appliances that deteriorate with the passing of time. Whenever possible, the preferred method of determining the period of acceptability shall be through PANTONE color. PFDs shall be kept in good operating condition and shall be ready for immediate use at any time.

6.3.4 Prior to purchasing PFDs described in this Standard, they require the approval from OPXI-S, who will ensure their compliance with IMO recommendations on testing of life-saving appliances, as set forth in Resolution A.689 (17).

6.3.5 Each time a particular PFD type is specified for any application in this Standard, another type of appliance may be used, as long as it is subjected to an evaluation, and is considered acceptable by OPXI-S.

6.3.6 For individuals whose working area is more than one nautical mile, but less than 12 nautical miles from the coastline, PFDs shall have a SOLAS/USCG-approved whistle, and a white light that complies with the following characteristics:

6.3.6.1 A white light with an intensity of 0.75 candles power (Cp) in all directions which shall be kept on for at least 8 hours.

6.3.6.2 Shall be located at the highest level possible of the PFD.

6.3.6.3 If it is scintillating, there shall be a minimum of 50 scintillations, but no more than 70 in a one-minute period, with an intensity of 0.75 candles power (Cd).

6.3.6.4 Can be activated manually or upon contact with water.

6.3.7 For individuals whose working area is more than twelve nautical miles from the coastline, PFDs shall be equipped with a SOLAS-approved whistle, a white light that complies with the characteristics detailed in points 6.3.6.1 through 6.3.6.4, minimum buoyancy of 150 newtons or 15.3 kilograms (34 pounds), SOLAS Class. Retro-reflective tape and International Orange color.

6.4 Control measures shall be set to prevent employees from falling into the water while working near or over it. If, after taking such measures the unsafe conditions persist, exposed personnel shall be provided with PFDs, in accordance with those indicated in Appendix No. 2 of this Standard.

6.5 Use of a faulty PFD that could alter its resistance, safety and buoyancy is strictly prohibited.

6.6 In crafts carrying children, lifejackets shall be provided for them that comply with the provisions in paragraph 6.3.7, and with a minimum buoyancy of 150 newtons or 15.3 kilograms (34 pounds), SOLAS Class. Retro-reflective tape and International Orange color.

6.7 Avoid walking, fording or swimming in waters suspected of having dangerous animals. All work carried out in fords shall be sufficiently protected to avoid attack by dangerous animals.

6.8 All PFDs shall be fitted properly, and firmly secured to the body, so that it is comfortable. PFDs shall allow individuals wearing them to swim a short distance and climb into crafts or up ladders.

6.8.1 When transporting children on floating equipment, a sufficient number of PFDs shall be provided, and these shall be properly identified as being for children.

6.9 Examination and Maintenance

6.9.1 PFDs permanently on board ACP floating equipment shall be subjected to an annual examination by OPXI-S inspectors.

6.9.2 Managers and/or supervisors of the units whose employees utilize PFDs, and are not the ones permanently on board, shall ensure that they be examined regularly for integrity and availability, and that a record be kept of such examinations.

6.9.3 A monthly control shall be maintained by managers and/or supervisors of the condition of PFDs that, because of the nature of the work, are exposed to premature wear and tear.

6.9.4 PFDs which are faulty, torn, faded or incomplete shall be immediately replaced and disposed of as goods in disuse.

6.9.5 The cylinder and automatic mechanism of Type V inflatable life preservers shall be examined before each use for verification of expiration dates, whistles and lights. Activators of the automatic mechanism shall be replaced in accordance with the manufacturer's recommendations, or yearly. Cylinders shall be replaced if discharged, when showing signs of deterioration, in accordance with the manufacturer's recommendations, or, every three years.

6.10 Storage

6.10.1 Floating equipment shall have in storage a sufficient number of PFDs, according to the number of passengers and crew, as stated in the (OPXI-S) Maritime Safety Inspection Form 2531.

6.10.2 PFDs shall be stored in floating equipment in such manner that they are accessible at all time, and their integrity and appearance are not affected.

6.10.3 PFDs shall not be stored in a manner that, in order to reach them, it would be necessary to break wooden shelves, open padlocks, etc.; they shall be easily accessible.

6.10.4 The location in which the PFDs are stored shall be clearly identified and protected from humidity, direct sunlight, and damages of any type.

6.10.5 PFDs of different types shall not be stored in the same location (for example, Type I with Type V, for children or adults, etc.)

6.11 Utilization

6.11.1 In Appendix No. 1 there is a description of the different types of PFDs.

6.11.2 In Appendix No. 2 PFDs are presented according to the user and conditions under which they are utilized.

6.12 Lifebuoys

6.12.1 Lifebuoys shall be installed for emergency rescue cases in piers, pools, norias or basins, aboard ships or other floating equipment, and in working areas near or over water.

6.12.2 The distance between the lifebuoys shall not exceed 61 m (200 feet).

6.12.3 Lifebuoys shall be at least 600mm (24 inches) in overall diameter for crafts of between 7 m (23 feet) and 20 m (65 feet) in length, and 800mm (30 inches) in overall diameter for crafts greater than 20 m (65 feet) in length.

6.12.4 Lifebuoys shall be equipped with retro-reflective tape having a minimum width of 50 mm (2 inches), as set forth in SOLAS, and shall be provided with a lanyard of at least 8 mm in diameter, and no less than 20 m (65 feet) in length for crafts between 7 m (23 feet) to 20 m (65 feet) in length, and of 30 m (100 feet) for crafts having a length greater than 20 m (65 feet).

6.12.5 Lifebuoys equipped with a luminous device shall be provided with a line of at least 8 mm in diameter, and 1 to 2 m (3 to 6 feet) in length, which will connect the luminous device to the lifebuoy. Lifebuoys equipped with a luminous device shall not be provided with the lanyard specified in paragraph 6.12.4.

6.12.6 Lifebuoys shall be maintained in good condition, protected from the action of the environment, and accessible at all times.

6.12.7 They shall be marked with the name of the vessel and the port of registration.

6.13 Lifeboats

6.13.1 At least one lifeboat or one rescue boat (panga) shall be available in places where workers are exposed to the danger of death by drowning.

6.13.2 This lifeboat is required on non-propelled craft or on those with a length more than 40 meters.

6.13.3 Such lifeboats or rescue boats shall have the capacity to transport three seated individuals, and one lying on a stretcher. **The Capacity formula is (LxM)/15**

6.14 Emergency ladders

6.14.1 A ladder, folding or permanent, shall be maintained where work is being performed near or over water.

6.14.2 These ladders shall be of sufficient length to assist the employee in reaching a safe place in the event of a fall into the water.

6.14.3 These ladders shall be on piers, pontoons, working floats or structures near or over water, and shall be permanent and/or removable.

6.14.4 On fixed structures such as piers, the ladders shall have a minimum spacing between them of 60 meters (200 feet).

MARITIME SAFETY STANDARD ON LIFE-SAVING APPLIANCES AND AIDS FOR WORK NEAR OR OVER WATER

6.15 Embarkation and disembarkation operations and work on floating equipment.

6.15.1 When embarking or disembarking in open sea anchorages, Type V Inflatable PFDs shall be used, as well as Type II or Type III.

6.15.2 When embarking or disembarking from ships in which rails do not offer sufficient protection, or when such rails are inadequate to prevent falls into the water (not complying with maritime regulations), a PFD shall be used.

6.15.3 When the height of the rails on floating equipment does not offer sufficient protection, or when such height is inadequate for preventing falls into the water, a PFD shall be used near or over the water.

6.16 Procurement

6.16.1 OPXI-S shall determine the PFD types and models authorized for use.

6.16.2 OPXI-S shall grant approvals for PFD procurements not under inventory in the main warehouse.

7.0 RESPONSIBILITIES

7.1 Of the Maritime Safety Unit:

7.1.1 Responsible for the examination of life-saving devices and appliances annually, and compliance with their correct utilization by those on board floating equipment.

7.1.2 Responsible for prohibiting the use of any PFD or life-saving appliance that is deteriorated, faded, broken or incomplete, or which does not comply with the provisions set forth in this Standard.

7.2 Of the Shipfitter or Operator:

7.2.1 Responsible for ensuring compliance with this Standard.

7.2.2 It is the responsibility of each ACP unit, contractor and third party carrying out activities in areas under ACP responsibility, to be informed regarding the PFD models authorized and approved through this Standard.

7.2.3 A person working near or over water shall confirm and comply with the swimming requirement set forth by ACP.

7.2.4 The employee is responsible for the care, inspection, maintenance, integrity and proper use of the PFD assigned, and shall follow the manufacturer's and supervisor's instructions.

7.2.5 Other ACP units and contractors shall evaluate the activities, workplace and risks, and take the necessary actions to control the dangers of death by drowning. If necessary, they shall provide and require their employees with PFDs, and require that they be used in accordance with this Standard.

7.2.6 Whenever ACP guests and visitors are exposed to a danger of death by drowning, the host shall ensure that they be provided with the same level of protection utilized for personnel assigned to the area visited.

8.0 CONSULTATIONS

All information or clarification regarding the contents or application of this Standard shall be requested in writing to OPXI-S.

Certain work requires different PFDs. The supervisor shall consult with OPXI-S for the selection of the proper type. To effect the selection, the supervisor shall evaluate the activities, the workplace and the risks.

9.0 EXCEPTIONS

Deviations or temporary exceptions in complying with this Standard shall be requested in writing to OPXI-S.

10.0 DURATION

This Standard is effective until modified or revised.

11.0 REFERENCES

11.1 SOLAS. International Convention for the Safety of Life at Sea.

11.2 LSA. International Life-Saving Appliance Code.

MARITIME SAFETY STANDARD ON LIFE-SAVING APPLIANCES AND AIDS FOR WORK NEAR OR OVER WATER

APPENDIX NO. 1

Types of Individual Personal Flotation Devices (PFDs)

Type I: Lifejacket for use in open waters of up to 12 nautical miles from the coastline.

- Stamped with Type I as their designation, they are designed to provide prolonged buoyancy and be able to turn an unconscious person in the water, from an upside-down position to a vertical one that is slightly inclined towards the back in 10 seconds. In doing so, the survival possibility is greatly increased by preventing water from entering into the respiratory tract.
- They are designed to provide a minimum buoyancy force of between 22 to 25 lbs.
- They shall have retro-reflective tape that conforms to SOLAS, adhered to both the inner- and outer-facing sides to reflect the light, thus helping to locate victims in the water, especially at night.
- They shall have approval certification from the United States Coast Guard Office.
- Of a color that is highly visible in all parts so that it can contribute to its detection, such as International Orange FS 12197 of FEDERAL STANDARD 595B.
- For individuals whose work area is far from the coastline at a distance of more than one nautical mile, but less than twelve nautical miles, the lifejacket shall comply with what is set forth in paragraph 6.3.6 of this Standard.
- For individuals whose work area is far from the coastline at more than twelve nautical miles, the lifejacket shall comply with what is set forth in paragraph 6.3.6 and 6.3.7 of this Standard.

Type I: Lifejacket for use in open water more than 12 nautical miles from the coastline.

- Stamped with Type I as their designation, they are designed to provide prolonged buoyancy and be able to turn an unconscious person in the water, from an upside-down position to a vertical one that is slightly inclined towards the back in 5 seconds. In doing so, the survival possibility is greatly increased by preventing water from entering into the respiratory tract.
- They are designed to provide a minimum buoyancy force of 34 pounds that conforms to SOLAS.
- They shall have retro-reflective tape that conforms to SOLAS, adhered to both the inner- and outer-facing sides to reflect the light, thus helping to locate victims in the water, especially at night.
- They shall have approval certification from SOLAS.
- Of a color that is highly visible in all parts that can contribute to its detection, such as International Orange FS 12197 of FEDERAL STANDARD 595B.
- This lifejacket shall comply with what is set forth in paragraph 6.3.6 and 6.3.7 of this Standard.

Type I: Lifejacket for children of less than 90 pounds **(only for children)**

- Stamped with Type I as their designation, they are designed to provide prolonged buoyancy and be able to turn an unconscious person in the water, from an upside-down position to a vertical one that is slightly inclined towards the back in 5 seconds. In doing so, the survival possibility is greatly increased by preventing water from entering into the respiratory tract.
- They are designed to provide a minimum buoyancy force of 18 pounds.
- They shall have retro-reflective tape that conforms to SOLAS, adhered to both the inner- and outer-facing sides to reflect the light, thus helping to locate victims in the water, especially at night.
- They shall have approval certification from the United States Coast Guard Office or SOLAS.
- Of a color that is highly visible in all parts that can contribute to its detection, such as International Orange FS 12197 of FEDERAL STANDARD 595B.
- This lifejacket shall comply with what is set forth in paragraph 6.3.6 and 6.3.7 of this Standard.

Type II: Lifejacket for use near the coast and in calm waters.

- They are designed to provide a minimum buoyancy force of 15.5 pounds.
- They shall have retro-reflective tape that conforms to SOLAS, adhered to both the inner- and outer-facing sides to reflect the light, thus helping to locate victims in the water, especially at night.
- Stamped with Type II as their designation, they are designed to provide a buoyancy that is not so prolonged where there is a great possibility of being rescued quickly and shall be able to turn an unconscious person in the water, from an upside-down position to a vertical one that is slightly inclined towards the back.
- They shall have approval certification from the United States Coast Guard Office.

Type III: Lifejacket (WELDER VEST ONLY)

- Designed only for welders where they are to be immediately rescued; not capable of turning an unconscious person in the water.
- Designed with special material to prevent damage with welding produced sparks.
- They are designed to provide a minimum buoyancy force of 15.5 pounds, and have retro-reflective tape adhered that conforms to SOLAS, both to the inner- and outer-facing sides to reflect the light, thus helping to locate victims in the water, especially at night.
- They shall have approval certification from the United States Coast Guard Office.

Typo IV: Throw lifebuoy.

- These lifebuoys are designed to be thrown to a person *in the water* who is having problems. They do not serve the purpose if they remain in turbulent waters for too many hours, or for individuals who cannot swim, or are unconscious.
- They must have retro-reflective tape that conforms to SOLAS adhered to four opposite areas of both the inner- and outer-facing sides to reflect the light and, thus, help to locate victims in the water, especially at night.

- They shall have approval certification from the United States Coast Guard Office.

Typo V: Lifejacket (*WORK VEST ONLY*)

- A lifejacket that could be worn by personnel requiring greater freedom of movement in their activities, while working on board floating equipment near or over water, and in jobs on the hull of a vessel or over a float.
- They are designed to provide buoyancy for a short time; are not capable of turning an unconscious person in the water who is in an upside-down position; designed to provide a minimum buoyancy force of 16.5 pounds; and, have retro-reflective tape conforming to SOLAS adhered to both front and back.
- The manufacturer's instructions for this type life-preserver require that the user **knows how to swim**.
- Shall have certification approval from the United States Coast Guard Office.

Typo V, Inflatable, for use as Type II or Type III: INFLATABLE personal flotation device.

- Used in maritime operations for embarking and disembarking on vessel decks.
- With an automatic, by mouth, and manual inflation mechanism, once immersed in water, the flotation mechanism should activate itself; has retro-reflexive tape adhered that conforms to SOLAS, whistle, and an incorporated scintillating lamp, providing a buoyancy force of 34 pounds.
- Shall have certification approval from the United States Coast Guard Office. The cylinder and automatic mechanism of the Type V inflatable life preservers that are used as Type II or Type III shall be inspected before each use.
- These life preservers use a small CO_2 cylinder as their primary means of inflation; however, they may be inflated by mouth by blowing into a tube, or may be activated by pulling a tag. After each inspection, and before putting this type of life preserver on, it is important to ensure that the tag is available and at hand for manual activation.
- Shall not be used with restrictive clothing that may worsen when the automatic inflation mechanism is activated.
- The light shall be white, with an intensity of 0.75 candles power, and have a minimum service life of 8 hours, of manual or automatic method upon contact with water. Such light, if scintillating, shall execute no less than 50 scintillations in one minute, and shall be SOLAS Class.
- Whistle shall have SOLAS/USCG approval.
- To maintain these buoys in condition for use, the automatic mechanism activators shall be replaced yearly, or in accordance with the manufacturer's recommendations. CO_2 cylinders shall be replaced if they are discharged, if they show signs of deterioration, according to the manufacturer's recommendations, or every three (3) years, whichever occurs first.
- Adequate training is required for all users of this type of life preservers.

MARITIME SAFETY STANDARD ON LIFE-SAVING APPLIANCES AND AIDS FOR WORK NEAR OR OVER WATER

APPENDIX NO. 2

Personal Flotation Devices (PFDs) in accordance with the unit, user and activity to be performed

TYPES	USERS	ACTIVITIES
I **I (Children)**	ON BOARD ALL FLOATING EQUIPMENT	ONLY FOR EMERGENCIES ON BOARD CRAFTS
	CONTRACTOR	
II	ON BOARD ALL FLOATING EQUIPMENT	EMERGENCIES, FOR CERTAIN WORK ON DECK.
	CONTRACTOR	
III **(Welder vest only)**	OPM	ONLY FOR SPECIAL USE BY WELDERS
	OPD	
	OPE	
	CONTRACTOR	
IV	ON BOARD ALL FLOATING EQUIPMENT GREATER THAN 7 METERS AND ON PIERS	MANDATORY USE ON ALL CRAFTS OVER 7 M (23 FEET) IN LENGTH AND ON PIERS
	CONTRACTOR	
V **(Work Vest Only)**	OPD	ON BOARD OPERATIONS, WORK NEAR OR OVER WATER
	OPM	
	OPE	
	IAI	
	OPP	
	EAC	
	OPT	
	CONTRACTOR	
V **(Inflatable, for use as Type II or Type III)**	OPT	EMBARKING AND DISEMBARKING OPERATIONS
	OPXI	
	OPP	
	IAP OPD HRHS	
	CONTRACTOR	