UL 1123

STANDARD FOR SAFETY

Marine Buoyant Devices

UL Standard for Safety for Marine Buoyant Devices, UL 1123

Seventh Edition, Dated October 1, 2008

Summary of Topics

This revision of ANSI/UL 1123 dated November 23, 2020 includes the following changes in requirements:

Hinging Requirements; 4.5, 16.1.5, and 16.1.7

Marking and Labeling; 36A.1.1, 36A.1.5, Figure 36A.1.6a, Figure 36A.1.6b, 36A.2.1, 36A.2.2, 36A.3.1.1, Table 36A.3.1, Figure 36A.3.1a, Figure 36A.3.1b, Figure 36A.3.2, Figure 36A.3.2a, Figure 36A.3.2b, Table 36A.3.2, 36A.3.2.1, 36A.3.3.1, Section 37, and Appendix C

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated July 31, 2020.

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OCTOBER 1, 2008
(Title Page Reprinted: November 23, 2020)

ANSI/UL 1123-2020

UL 1123

Standard for Marine Buoyant Devices

Previous numbered and unnumbered editions of standards covering marine buoyant devices have been published since April, 1971.

The first through third editions were titled "Marine Special Purpose Water Safety Buoyant Devices."

First Edition – April, 1971
Second Edition – June, 1972
Third Edition – April, 1973
Fourth Edition – August, 1978
Fifth Edition – April, 1986
Sixth Edition – March, 1996

Seventh Edition

October 1, 2008

This ANSI/UL Standard for Safety consists of the Seventh Edition including revisions through November 23, 2020.

The most recent designation of ANSI/UL 1123 as an American National Standard (ANSI) occurred on November 23, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements cover Type II, Type III, and Type IV marine buoyant devices, including vests, jackets, horseshoe buoys and ring buoys, with or without lifelines, intended for recreational use, and those Type V devices described in the Supplements, in accordance with the applicable regulations of the United States Coast Guard (USCG).

1.2 The buoyant devices covered by these requirements are intended for USCG approval under 46 CFR 160.064.

2 General

2.1 The buoyancy of devices covered by these requirements is provided by inherently buoyant material and is not dependent upon loose or granulated materials, gas compartments, or inflation.

2.2 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.3 Devices for which the intended use is indicated as "General Purpose Vest," "Boating Vest," or the like, shall be considered to include "Skiing" unless this is specifically excluded in the marking provided with the device. Statements such as "Hiking" are not considered general use statements.

3 Glossary

3.1 For the purpose of this standard, the following definitions apply.

3.2 ADULT DEVICE – A device intended for use by persons weighing more than 90 pounds (41 kg).

3.3 BUOYANT DEVICES – The following defines the device types covered by these requirements:

a) Type II – A device intended to turn some unconscious persons from a face down position in the water to a position where the wearer's respiration is not impeded.

b) Type III – A device intended to support a conscious person in the water in an upright position. This type of device is not required to turn an unconscious person in the water from a face-down position to a position where the wearer's respiration is not impeded.

c) Type IV – A device intended to be thrown to and grasped by a person in the water. This device does not provide means for adjustment or close fitting to the body.

3.3.1 BUNCHING – The curling or folding of internal buoyant material upon itself, from its original position, within the envelope.

3.4 CANDIDATE DEVICE – The device being investigated.

3.5 CHILD DEVICE – A device intended for use by persons weighing not less than 30 pounds (14 kg) but not more than 50 pounds (23 kg).

3.6 CLOSURE SYSTEM– A combination of a closure and a corresponding means of adjustment.

a) Primary – A component or group of components in series that provide a single circumferential path around the wearer to support the prescribed body tensile load when adjusted to any position.

b) Secondary – A closure provided in addition to a primary closure that is intended to be closed to provide proper fit and performance of the device but when used on the device by itself, does not make the device appear to be donned as intended.

3.7 DEVICE – Any marine buoyant device.

3.8 DOGBONE – A piece of loop-shaped metal designed for attachment to a hiking harness.

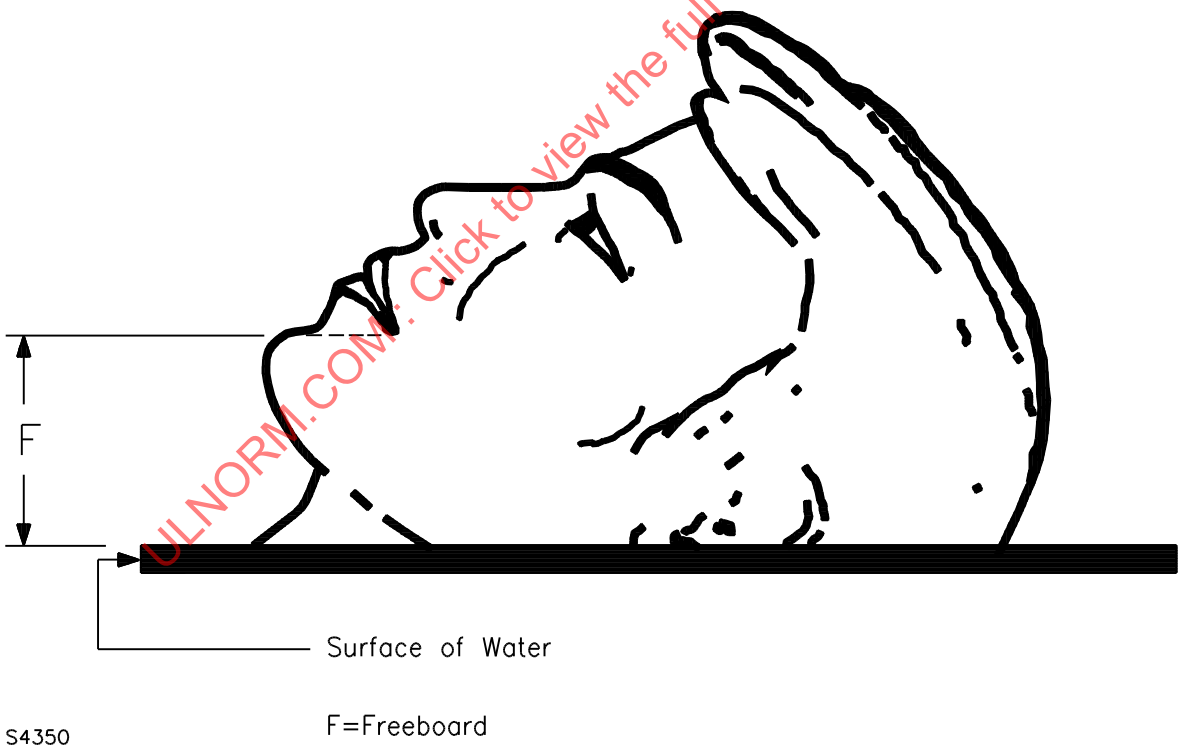
3.9 FACE PLANE ANGLE – The angle, relative to the surface of the water, of the plane formed by the most forward part of the forehead and chin of a wearer floating in the attitude of static balance in which respiration is least likely to be impeded.

3.10 FOAM – Closed-cell foamed polymeric material.

3.11 FREEBOARD – A distance measured perpendicularly from the surface of the water to the lowest point where the wearer's respiration is able to be impeded, typically to the corner of the mouth. See Figure 3.1.

Figure 3.1

Freeboard



3.12 INFANT DEVICE – A device intended for use by persons weighing less than 30 pounds (14 kg).

3.13 INFANT/CHILD DEVICE – A device intended for use by persons weighing less than 50 pounds (23 kg).

3.14 INSERT – A quantity of buoyant material that has been cut or formed for insertion into a buoyant device.

3.15 JACKET – A buoyant device having sleeves.

3.16 LOCK TYPE STITCH – A stitch that will not unravel when a force is applied in the direction of the seam on any of the threads forming the stitch.

3.17 OVERSIZE DEVICE – An adult device intended for specified chest ranges of not less than 38 inches (0.97 m) at the minimum to at least 60 inches (1.52 m) at the maximum.

3.17.1 PLAIN SURFACE TEXTILE FABRIC – Any textile fabric which does not have an intentionally raised fiber or yarn surface such as pile, nap, or tuft, but shall include those fabrics that have fancy woven, knitted or flock-printed surfaces (See 16 CFR 1610).

3.17.2 RAISED SURFACE TEXTILE FABRIC – Any textile fabric with an intentionally raised fiber or yarn surface, such as a pile, including flocked pile, nap, or tufting (See 16 CFR 1610).

3.18 REFERENCE VESTS – The standard USCG vests: Model AK-1 (Adult), Model CKM-1 (Youth), and Model CKS-2 (Child Small and Infant).

3.19 SEAM – A joint consisting of a sequence of series of stitches uniting two or more pieces of material.

3.20 SERVICEABLE – Acceptable for continued intended use. Exhibits no signs of functional deterioration.

3.21 SPECIAL PURPOSE – A buoyant device intended for one or more specific purposes, such as sailing, skiing, or similar activities in addition to general use.

3.22 STRUCTURAL SEAM – A seam that serves a functional purpose in the end product as distinguished from a decorative function.

3.23 *Deleted*

3.24 TURNING TIME – The time required for a device to turn a face-down wearer to a position in which the wearer's respiration is not impeded.

3.25 UNIVERSAL SIZE DEVICE – An adult device intended for use by persons in the 30 – 52 inch (0.8 – 1.3 m) chest sizes.

3.26 VEST – A sleeveless buoyant device.

3.27 YOUTH-ADULT DEVICE – A device intended for use by persons weighing more than 75 pounds (34 kg) and that meets the performance and minimum requirements of both youth and adult devices within the size range specified on the device.

3.28 YOUTH DEVICE – A device intended for use by persons weighing not less than 50 pounds (23 kg) but not more than 90 pounds (41 kg).

3.29 YOUTH LARGE – / ADULT XXS DEVICE– A device intended for use by persons weighing at least 75 pounds (34 kg) but not more than 125 pounds (57 kg). It shall be designed for chest sizes no larger than 33 inches(914 mm) and shall meet the minimum performance requirements for both youth and adult devices within the size specified on the device.

CONSTRUCTION

4 General

4.1 The construction and assembly of a device shall be judged according to its intended application and use as well as according to these requirements.

4.2 A component of a device covered by this standard shall:

a) Comply with the applicable requirements for the component in the Standard for Components for Personal Flotation Devices, UL 1191 (see Table 4.1); or

b) If not covered by specific requirements in UL 1191, be acceptable when investigated with respect to the application. In addition, if the United States Coast Guard has specific requirements for the component, it shall comply with those requirements.

Table 4.1
Component requirements

Component	Application	Applicable Sections in UL 1191[a] or USCG Requirements
Body Straps	Primary closure	Webbing
	Secondary closure	Tie Tape and Reinforcing Tape
Drawstrings	Secondary closure	Tie Tape and Reinforcing Tape
Fabric	Wearable device	Fabrics for Wearable Devices
	Throwable device	Fabrics for Buoyant Cushions
Foam	Buoyant material[b]	Closed-Cell Foamed Polymeric Material
Hardware	Primary closure	Hardware
Kapok	Buoyant material	46 CFR 164.003
Lacing	Any	Lacing
Polymeric film	Kapok or fibrous glass enclosure	Plastic Film for Kapok or Fibrous Glass Enclosures
Retroreflective fabric or tape	Any	46 CFR 164.018
Survivor locating light	Any	46 CFR 161.012
Thread	Structural seam	Thread
Tie Tape	Secondary closure	Tie Tape and Reinforcing Tape
Polymeric coating	Any	Vinyl-Dip Coatings
Zipper	Primary closure	Zippers

NOTE – Not applicable to nonfunctional (decorative) components.

[a] The Standard for Components for Personal Flotation Devices, UL 1191.

[b] Material relied upon for compliance with the requirements of the Buoyancy Test, Section 20.

4.3 Adhesive shall be an all-purpose, waterproof type, acceptable for use with the materials being bonded. See requirements for glued joints in 32.5.

4.4 Metals shall be used in combinations that are galvanically compatible.

4.5 A device intended to be worn shall:

a) Be as comfortable, nonrestrictive of motion and vision, and as nonbulky for the wearer as practicable, consistent with intended use;

b) Be such that the intended method of donning the device is obvious to an untrained person;

c) Incorporate strapping or other means of adjustment that provides a snug fit (as tight as possible without causing discomfort). See Donning Test, Section 15, Flotation Stability Test, Section 16, and Water Entry Test, Section 17;

d) *Deleted*

e) Incorporate at least one primary closure.

4.6 Unless a PFD is reversible, under reduced lighting conditions a candidate device shall be obvious to the wearer as to which is the inside and outside of the device. This may be accomplished by pockets, belts, distinctively different (tactile) fabrics, logos and the like. Logos as a sole means are not acceptable.

4.7 A device shall not incorporate means obviously intended for fastening or securing the device to a boat, nor shall instructions accompanying the device indicate such intent.

Exception No. 1: A Type V device for which the intended use includes fastening or securing the device to the boat, such as in hiking, need not comply with this requirement.

Exception No. 2: A device incorporating a D-ring, tab, or other construction feature that is not intended to secure the device to the boat need not comply with this requirement, if:

a) The feature is rendered inoperative when subjected to the Pull Test, Section 26, or

b) The marking label information complies with the requirements of the Optional Texts, Section 39.

Exception No. 3: A Type IV buoyant cushion may be provided with hook and loop touch fasteners, or the equivalent, on the cushion's bottom surface only provided the cushion complies with the requirements specified in the Release Test, Section 28.

4.8 Drawstrings shall comply with at least one of the following:

a) Be at least 1 inch (25.4 mm) wide;

b) Have a positive closing mechanism; or

c) When tied into a square knot, be able to be untied within 1 minute by the number of test subjects selected as specified in Table 16.1.

Drawstrings shall be positively secured to the device using means other than a knot alone.

4.9 An infant device shall:

a) Have a means of closure that is constructed to reduce the risk of the wearer's undoing the closure; and

b) Incorporate means for removing the wearer from the water without the necessity of grasping the wearer.

4.10 An infant device shall be a Type II device.

4.11 A child and an infant device shall be provided with crotch straps; however, equivalent means will be investigated.

4.12 An infant, child, or youth device shall not be constructed with single point release buckles.

4.13 A youth device shall be constructed for chest sizes no larger than 32 inches (813 mm). If a device is marked with the chest size, the chest size marking shall not exceed 29 inches (737 mm). The maximum chest size shall be measured using 12.2 (a) or (b) in that specific order.

4.14 A child device shall be constructed for chest sizes no larger than 25 inches (625 mm).

4.15 A device shall have provision for drainage of entrapped water including water entrapped between the device and the wearer. See Water Retention Test, Section 21, and Water Emergence Test, Section 18.

4.16 If chest size marking is required, the chest size shall be expressed as a range and each range shall encompass a minimum of 2 inches (50.8 mm), for example, 30 – 32 inches (762 – 813 mm).

4.17 Uncoated 70 denier fabric shall:

a) Have 3/4 inch (19.1 mm) seams; or

b) Incorporate two rows of lockstitch, or the equivalent.

4.18 The ratio of the weight of a cushion to its total volume, as determined from the finished product, shall be not less than 4.0 pounds per cubic foot (65 kg/m^3).

4.19 The spacing between parallel grab strap inner edges of a cushion shall be 4-1/4 ±1/2 inches (108 ±12.7 mm) from the centerline of the cushion to the inside edge of the grab strap.

4.20 The cut ends of woven or braided components and construction features shall be turned under and stitched, or the equivalent, so as not to ravel. With the exception of fabric, synthetic materials such as webbing and lacing may be heat-sealed in lieu of being turned under.

4.21 A wearable device having side adjustments shall be provided with at least one positive means to maintain the front flotation pads in their intended positions.

4.22 A zipper used to close the envelope of a horseshoe buoy shall be disabled (in the closed position) by one of the methods below:

a) Detachment of zipper tab from zipper crown or bail with the zipper slider and/or zipper chain either heat or chemical welded. If zipper chain is welded, the weld should be directly behind the zipper slide;

b) Detachment of zipper tab from zipper crown or bail with the zipper slider placed inside a pocket that fully covers the body of the zipper slide such that the pocket is tight fitting around the zipper body and extends beyond the body by at least 1/4 inch; or

c) Complete removal of the zipper slider and securement of the zipper chain/stops as defined in (a) or (b).

5 Material

5.1 Material used in the manufacture of a device shall be new.

5.2 A fibrous buoyant material shall be completely encased in polymeric film.

5.3 Only inherently buoyant materials shall be used as the prime buoyant means in a device.

5.4 A device shall be constructed to reduce the likelihood of bunching of internal buoyant materials.

5.5 Foam used as buoyant material in a device intended to be worn shall have a V factor of 85 or more as determined in accordance with the Standard for Components for Personal Flotation Devices, UL 1191. Also, see 20.2.

Exception No. 1: Foam used in a jacket or suit to comply with the requirement of 20.2 may have a V factor of 80 or more provided that at least 85 percent of the regulatory minimum buoyancy for the device as specified in Table 20.1 is supplied by foam having a V factor of 85 or more and when the foam is not layered.

Exception No. 2: This requirement does not apply to foam that is not relied upon for compliance with the requirement of 20.2, provided that the device complies with the requirements of the Flotation Stability Test, Section 16, both with and without the foam in place.

5.6 For a wearable device, the V factor (as determined in accordance with the Standard for Components for Personal Flotation Devices, UL 1191) of foam forward of the body axis (see Figure 16.1) shall be not more than 2 points less than the V factor of foam aft of the body axis.

Exception: A device that complies with the requirement of 19.2.1 need not comply with this requirement.

5.7 Foam used as buoyant material in a buoyant cushion shall have a C factor of 94 or more as determined in accordance with the Standard for Components for Personal Flotation Devices, UL 1191.

6 Hardware

6.1 The width of the opening in the hardware through which webbing is routed, provided with a device, such as buckles, dee rings, and the like, shall not exceed the width of the associated webbing by more than 1/8 inch (3.2 mm) as measured at the line of contact.

6.2 The hardware used shall be so attached to the device that it will be retained in its intended position yet not to be so tight that the operation of the hardware is restricted.

6.3 Hardware used to secure a wearable device to the body shall have a quick and positive lock mechanism.

6.4 All buckles provided on a device with multiple buckle closures shall be operated in a similar manner, i.e., all buckles shall have center release mechanisms, or all buckles shall have side release mechanisms.

6.5 An exposed edge or projection of a component shall not be sufficiently sharp to damage material, body straps, etc., or constitute a risk of injury to persons during intended use. Referee measurements necessary to determine compliance with this requirement are to be those described in the Standard Test for Sharpness of Edges on Equipment, UL 1439.

7 Body Straps

7.1 General

7.1.1 The free end of a body strap shall be provided with a t-tab or an equivalent means, such that the strap does not disengage from the hardware. See the Body Strap Hardware Secureness Test, Section 25.

7.1.2 A tab shall be formed by turning under 1-1/2 inches (40 mm) of material twice and stitching 3/4 inch (19 mm) from the end of the folds with bar tack stitching, rivets, or other equivalent means. Other constructions will be subjected to an investigation to determine acceptability which will include the Body Strap Hardware Secureness Test, Section 25.

7.1.3 Body straps shall be prevented from becoming disengaged from the device either by means of belt loop constructions intended for that purpose or by an equivalent means that will attach at least one end of the body strap to the device.

7.2 Devices for personal water craft, water skiing, or similar towed uses

7.2.1 At least three front closures (at least two of which shall be primary encircling body straps) shall be provided on all devices which are marked "Water Skiing Vest," or the equivalent, as indicated by the intended use statement. See PFD Markings, Section 36.

Exception No. 1: A device with features, such as integral legs, that prevent dislodging of the device during water drops is not required to comply with this requirement.

Exception No. 2: A device with 2 encircling body straps that does not separate in front, such as a pullover vest with a centered front flotation pad, shall meet the intent of the requirement of having the third non-encircling body strap.

7.2.2 Devices which do not meet the construction requirements in 7.2.1 shall be marked to indicate that the devices are not approved for the corresponding uses as specified in PFD Markings, Section 36.

7.3 Buddy line

7.3.1 A buddy line installed on a PFD shall comply with the requirements specified in 7.3.2, 26.2, 26.3, and 36.2.6.

7.3.2 The buddy line shall be a minimum of 600 mm (24 inches) long. Means for stowage shall be provided to secure the free end of the buddy line to the PFD, so that it is not a snag hazard.

8 Belt Loops

8.1 The belt loops shall be constructed so that the primary closure does not come out of the loop if the belt loops are being used to prevent the body strap from becoming disengaged from the device.

9 Tie Tapes

9.1 Tie tapes shall remain in the original tied position during the Flotation Stability Test, Section 16; and Water Entry Test, Section 17.

10 Thread

10.1 Monofilament and non-synthetic thread shall not be used for structural applications.

10.2 Thread and fabric combinations shall be compatible. Cotton threads shall be used only with cotton fabrics; synthetic threads may be used with all fabrics.

11 Seams and Stitching

11.1 A lock-type stitch, such as type 301, Federal Standard 751a, shall be used for joining structural seams. The stitch density shall be 7 – 12 stitches per inch.

Exception: Except for closing seams, an overedge stitch constructed in accordance with 500 series requirements in Federal Standard 751a may be used in lieu of the lock stitch type 301 if the 500 series stitch complies with the requirements described in 31.3.1.1 – 31.3.3.1.

12 Primary Closures

12.1 For adult devices the extended finished length of each body strap shall not allow an excess strap length of more than 3 inches (76 mm)) for a device with separable front flotation pads; and 10 inches (254 mm) for a device with non-separable front flotation pad(s), when measured using the method in 12.2.

12.2 The excess strap length is measured from the end of the buckle to the stop on the T-tab when using one of the methods in the following order:

a) With the device placed over a cylinder having an outer circumference equal to the maximum chest size for which the device is intended and adjusted to a snug fit; or

b) On the largest test participant successfully tested in accordance with the Performance Tests specified in Sections 15 – 18.

13 Coatings

13.1 Polymeric coatings shall be applied smoothly and evenly and shall be free of visible blemishes. This shall not preclude the stressed areas from having a greater thickness than unstressed areas.

13.2 A pocket comparator with a minimum magnifying power of 6X shall be used to determine the thickness of the dipped coating. One slash shall be made at each of the following locations for vests, or at seven high stress locations for other type devices:

a) At the top of one armhole;

b) At the bottom of one armhole;

c) On the left side of the neck edge;

d) On the right side of the neck edge;

e) On the left front panel near the lower center front;

f) On the right front panel near the lower center front; and

g) On the lower edge at the center back.

Three readings shall be taken at each location and the average of the three readings shall be considered the minimum thickness for that location.

PERFORMANCE

14 General

14.1 Except as otherwise indicated, fully representative sample(s) of a device shall be subjected to the applicable tests specified in Sections 15 – 34.

14.2 A device having optional features shall be tested both during use and not during use of the optional feature.

14.3 Where human test subjects are employed in the testing of a device, adequate precautions shall be taken to reduce the risk of injury to the subjects at all times.

15 Donning Test

15.1 Donning and complete adjustment to a fit , for each subject [see 4.5(c)] shall be accomplished by at least one of the following:

a) Donning and complete adjustment of the device within 60 seconds;

b) If donning and complete adjustment is not accomplished within 60 seconds, the subject shall be instructed to “stop” at 60 seconds. The donned device shall then comply with the applicable requirements of Sections 16 – 18. In addition, the device donned to a complete fit, not timed, shall comply with the applicable requirements of 16 – 18; or

c) Donning and complete adjustment of the device, with the donning instructions provided on the device, within 60 seconds.

15.2 Human test subjects as specified in Table 16.1 are to be used for this test. All size adjustments are to be at the halfway point when the device is given to a subject for donning.

Exception: When the device is donned and no additional size adjustments are required, the test subject shall remove the device, loosen the side adjustments beyond the halfway point, and restart the donning test.

15.3 For subjects ages 12 or younger, the donning and adjustment attempts specified in 15.1 may be performed with the assistance of an adult.

15.4 For youth devices, at least 2 subjects are required to successfully don the device in accordance with 15.1 without adult assistance.

15.5 The candidate device is to be given to the subject, or assisting adult, where applicable, at pool side with the instruction "Please don as quickly as possible and adjust to fit snugly, and say "finished" once donning is complete." The donning attempt then is to be timed.

15.6 *Deleted*

15.7 If donning and adjustment of the candidate device on a subject is not achieved within 1 minute after the instruction specified in 15.5 has been given, the test is to be repeated by the subject with the reference vest. If the reference vest also is not donned and adjusted within 1 minute, the subject is to be disqualified and replaced.

16 Flotation Stability Test

16.1 General

16.1.1 Human test subjects as specified in Table 16.1 are to be used for these tests.

Table 16.1
Test subject selection

Chest size adjustment range[a] of device, inches (mm)	Number of test participants[b]
6 (150) or less	6
More than 6 but not more than 12 (300)	12
More than 12 (300)	18

NOTE –

1. Test participants selected are to be of varying height and weight so as to represent endomorphic, mesomorphic, and ectomorphic anatomic builds. For an adult device, the chest sizes of the subjects are to be within the intended chest size range of the device; except that one subject shall have a chest size 1 ±0.5 inch (25 ±13 mm) larger than the marked maximum size, and one subject shall have a chest size 1 ±0.5 inch (25 ±13 mm) smaller than the marked minimum size.

2. Should an adult test participant having a chest size 1 ±0.5 inch (25 ±13 mm) smaller than the marked minimum size be unavailable, a test participant having the required chest size and a weight of 80 lbs. (36.4 kg) or more may be used to demonstrate acceptable performance of the device. However, should the candidate device perform unacceptably on such a participant, it shall not constitute failure of the device to comply with the requirements of this Standard, and another participant shall be selected.

3. For a youth, child, or infant device, the weights of the subjects are to be within the intended weight range ±1 lb (0.5 kg) of the device and, for a device that indicates a chest size, the chest sizes are to be within the intended chest size range ±1 in (25 mm).

4. A youth test participant may be used to satisfy specific anthropomorphic characteristics for weight, chest size, or girth of an adult-size device. When testing an adult-size device, when the youth is less than 13 years of age, his or her test results may be excluded for Donning, Sections 15, SA4, or SB7; or In-Water Removal Sections SB9, or SC9 due to the participant's inherent limitations in dexterity, strength, and maturity. For an adult-size device, where the results for a youth test participant are excluded, a substitute test participant shall be used for the excluded tests. The substitute participant shall have anthropomorphic characteristics within the candidate device's specified range, that are similar to, but not necessarily identical to the excluded participant.

[a] For a youth, child, or infant device, six subjects are to be used. For a combined infant/child device (less than 50 pounds), nine subjects are to be used. For a combined child/youth device (30 – 90 pounds), twelve subjects are to be used.

[b] May be any combination of males and females, provided that at least one male and one female are used.

16.1.2 For these tests, the device is to be donned over a swimsuit; except that, if the attire customary to the designated purpose of the device may have an adverse effect on the test results, the tests are to be repeated with at least one subject wearing such attire.

16.1.3 The tests for Type II devices are to be conducted with the test subject wearing the reference vest, and then repeated wearing the candidate device.

16.1.4 The pads of a candidate Type II device shall not dislodge, the internal buoyant materials shall not bunch, and tie tapes shall remain in the original tied position during the tests specified in 16.2.1 – 16.3.7.

16.1.5 During the conduct of the Flotation Stability Test (16.4.1 – 16.4.9) and the Water Entry Test, Section 17, a Type III shall comply with the following:

a) The internal buoyant material shall not become dislodged to the extent that prevents the device to comply.

b) The internal buoyant material shall remain in a position which produces a body list angle of less than 30 degrees. If an angle of 30 degrees or more is measured and the internal buoyant material has noticeably shifted, the subject is to be instructed to remain in the water and attempt to correct the position of the internal buoyant material by adjusting the device. The in-water correction shall

be such that the internal buoyant material is secured in place without the need for repeated adjustment or physical restraint by the subject. The body list angle following such correction shall be less than 30 degrees.

c) *Deleted*

d) The internal buoyant materials shall not bunch.

16.1.6 A youth or adult Type II or Type III candidate device is to be tested in accordance with the Water Emergence Test, Section 18, if subjects have difficulty emerging from the pool during the in-water flotation stability tests due to excess water retained by the device. A device need not comply with the Water Retention Test, Section 21, if it complies with the Water Emergence Test, Section 18, for all subjects specified in Table 16.1.

16.1.7 *Deleted*

16.2 Type II turning test

16.2.1 A youth and an adult Type II candidate device are to be tested as specified in 16.2.4. The device shall comply with the following:

a) The corrected average turning time (see 16.2.2) for the group of test subjects shall not exceed that for the reference vest by more than 2 seconds; and

b) The total number of turns for the group of test subjects shall not be less than the number of turns obtained by using the reference vest.

16.2.2 The corrected average turning time (see 16.2.1 and 16.2.3) is to be computed based on the following:

$$A_C = \frac{A_t}{T_t / T_{total}}$$

in which:

A_c *is the corrected average turning time;*

A_t *is the average turning time for tests resulting in a turn;*

T_t *is the number of tests resulting in a turn; and*

T_{total} *is total number of tests performed.*

16.2.3 A child and an infant Type II candidate device are to be tested as specified in 16.2.4. The device shall comply with the following:

a) The corrected average turning time (see 16.2.2) for the group of test subjects shall not exceed that for the reference vest by more than 1 second;

b) The total number of turns for the group of test subjects shall be not less than the number of turns obtained by using the reference vest; and

c) Water shall not funnel or be cupped into the face of a test subject as a result of the turning moment.

16.2.4 The following are the test methods for conducting the Type II turning test specified in 16.2.1 and 16.2.3:

a) For a youth and adult Type II candidate device the subject is to don the device and enter the water[a]. The subject then is to take at least three breast strokes and then, face down in the water, relax completely while exhaling slowly. The subject is to remain limp in this position long enough so that the final stabilized attitude of static balance can be determined. The turning time is to be recorded. The subject then is to repeat the test two additional times.

b) For a child Type II candidate device, the device is to be fastened in the intended manner on the subject. The subject is to gently push-off from the side of the pool, take a single breast stroke, and then face down in the water relax and exhale slowly. The turning time is to be recorded. The test then is to be repeated two additional times. As an alternative, the device is to be fastened in the intended manner on the subject, who then is to be placed in a face down (mouth above the water) position in the water and released. The turning time is to be recorded. The subject then is to repeat the test two additional times.

c) For an infant Type II candidate device, the device is to be fastened in the intended manner on the subject, who then is to be placed in a face down (mouth above the water) position in the water and released. To prevent the test subject from inhaling water during the test it is permissible to gently blow air into the child's face immediately prior to the release. The turning time is to be recorded. The test is to be repeated two additional times.

[a] The Donning Test, Section 15, and Water Entry Test, Section 17, may be conducted at this point. In addition, if an examination of the candidate device indicates that it may have a tendency to permit movement of the buoyant material from the position it was in when the device was donned to a position toward the sides or back of a subject, at least one test subject is to enter the water by diving so that the subject strikes the water in a prone position.

16.3 Type II freeboard, head support, face plane angle, and chin support test

16.3.1 A youth and adult Type II candidate device shall comply with the following when tested as specified in 16.3.3 – 16.3.7:

a) The average freeboard of the group of test subjects shall be not less than that of the reference vest by more than 1/4 inch (6.4 mm);

b) Each individual freeboard measurement of the group of test subjects shall be no less than 1 inch (25.4 mm);

c) The average value of the lowest marks that can be viewed on a vertical scale (see 16.3.3) by the group of test subjects shall be not greater than that for the reference vest by more than 3 inches (76 mm), or the average face plane angle for the group of test subjects shall be not less than that for the reference vest by more than 5 degrees, providing vision to the scale is not obscured by the candidate device to a degree greater than by the reference vest; and

d) The number of test subjects provided with chin support (see 16.3.7) shall be not less than that for the reference vest.

16.3.2 An infant and child Type II candidate device shall comply with the following when tested as specified in 16.3.3 – 16.3.7:

a) The average freeboard of the group of test subjects shall be not less than that of the reference vest by more than 1/4 inch (6.4 mm);

b) Each individual freeboard measurement of the group of test subjects shall be no less than 1 inch (25.4 mm);

c) The average distance of the ear canal above the surface of the water for the group of test subjects shall be not less than that for the reference vest by more than 1/4 inch (6.4 mm);

d) The average face plane angle for the group of test subjects shall be not less than that for the reference vest by more than 5 degrees and vision to the scale shall not be obscured by the candidate device to a degree greater than by the reference vest;

e) The head support shall cradle the subject's head in a stable manner to limit lateral rotation and tilting from side to side of the head; and

f) The number of test subjects provided with chin support (see 16.3.7) shall be not less than that for the reference vest.

16.3.3 The subjects used during the test specified in 16.2.1 – 16.2.4 are to be used for this test while still in the water. Starting from a vertical upright position (see 16.3.7), each subject is to attain a relaxed, face-up position of static balance. The subject then is to be positioned in line with a vertical scale mounted at the side of the pool, so that the subject's feet are closest to the scale and eyes are 20 feet (6.1 m) from the scale. The vertical scale is to be not less than 12 feet (3.6 m) high and is to be marked in 3-inch (75-mm) increments so that the increment at the level of the surface of the water is equal to zero and the increment 12 feet above the level of the surface of the water is equal to 144.

16.3.4 While in the position of static balance specified in 16.3.3, the subject is to be instructed to "relax and breathe normally." The freeboard, face plane angle, and distance of the ear canal from the surface of the water is to be measured (see 16.3.5) while the subject is at the lowest level attained during the normal breathing cycle. The lowest mark on the scale that can be seen by the subject without movement of the head from the relaxed position then is to be identified (see 16.3.6). The subject then is to attempt to touch the chin to the chest (see 16.3.7).

16.3.5 For the purpose of calculating the average ear-canal distance above the water, if the ear canal is below the surface of the water, the distance is to be measured and recorded as a negative value.

16.3.6 For the purpose of calculating the average lowest-viewable-mark height, the value for a subject that can see below the zero mark is to be zero and the value for a subject that cannot view below the 12-foot (3.6-m) mark is to be 144.

16.3.7 A subject is to be considered as having chin support if:

a) The device is in direct contact with the jawline while the subject is in either the vertical upright or relaxed face-up position, or

b) The device prevents the subject from touching the chin to the chest while the subject is in the relaxed face-up position of static balance.

16.4 Type III device test

16.4.1 A Type III Device:

a) Shall maintain each subject in an attitude of relaxed static balance (such as an upright or backward position) so that the subject's respiration is not impeded at any time, and

b) Shall not have a tendency to turn a subject face-down from the position of relaxed static balance in the water.

See 16.4.4 and 16.4.9. In addition, a youth and adult device shall not have a shoulder gap of more than 6 inches (152.4 mm), following 3 self-induced bobbing actions in the water (see 16.4.5) when any part of the front buoyant material, including the portion of the shoulders forward of the ears constructed of foam

and/or fabric laminated foam, is shifted upward on the wearer above the lowest corner of the mouth or when vision of the wearer is obstructed by the ridden up device. The gap shall be measured at the shoulder with the greatest apparent gap. Also, the device in the ridden-up condition shall not have a tendency to turn a subject face-down from the position of relaxed static balance in the water and shall comply with the requirements specified in 16.4.2 and 16.4.3 following the bobbing actions. The use of crotch straps is not acceptable to achieve compliance with the ride-up requirements.

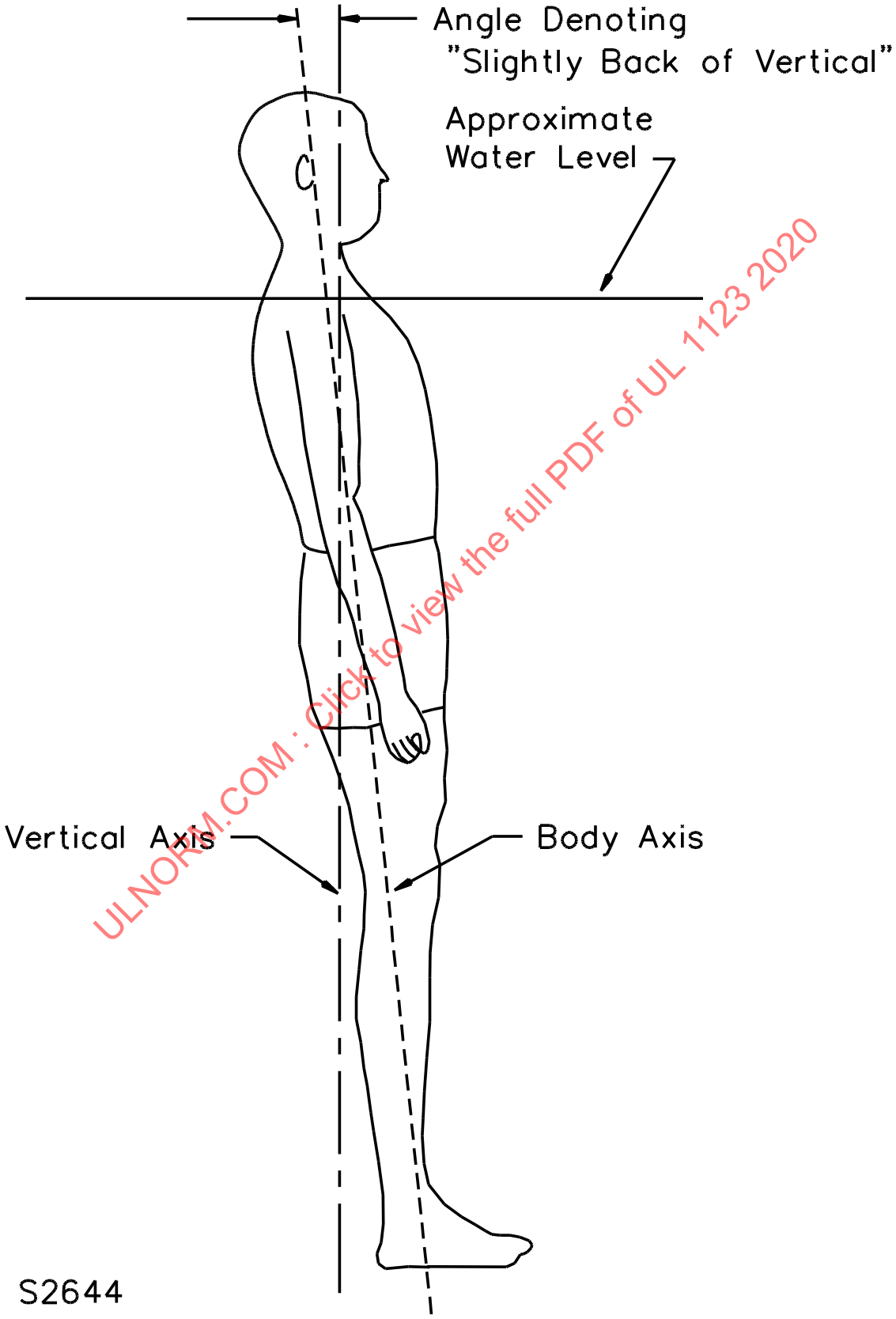
Exception No. 1: The shoulder gap requirements do not apply to float coat or wetsuit style PFDs.

Exception No. 2: For pear-shaped individuals only (i.e., stomach is larger than chest), a device need not comply with the shoulder gap requirements. See THINK SAFE PFD PAMPHLET. For the purposes of this exception, a compressed chest size measurement is taken, similar to a snug fitting PFD.

16.4.2 A Type III device shall permit each subject to attain at least a slightly backward of vertical position, see Figure 16.1, when starting from a face-down position in the water.

Figure 16.1

Starting position – Type III flotation test



16.4.3 The average freeboard of a Type III device at static balance for the group of test subjects shall be not less than 2 inches (50.8 mm). In no case shall the freeboard measured on an individual test subject be less than 1 inch (25.4 mm). The subject is to be instructed to "relax and breathe normally" during measurement of the freeboard.

16.4.4 Each subject is to don the device and enter the water[a]. The subject then is to assume an upright, slightly back of vertical position in the water, keeping the head and torso in the same plane, while holding the arms at the sides. Refer to Figure 16.1 for an illustration of the starting position. A straight rod with an inclinometer attached may be used to establish the starting position. The subject is to maintain this position until motion (forward or backward of vertical) is induced by the device. Then, the subject is to allow the arms, legs, torso, and head to assume their naturally relaxed positions so that the head falls in the direction of induced motion. If motion is not induced, the subject is to allow the head to fall backwards and then the subject is to allow the arms, legs, and torso to assume their naturally relaxed positions. After the subject attains an attitude of relaxed static balance, the freeboard of the subject is to be measured while the subject is at the lowest level attained during the normal breathing cycle.

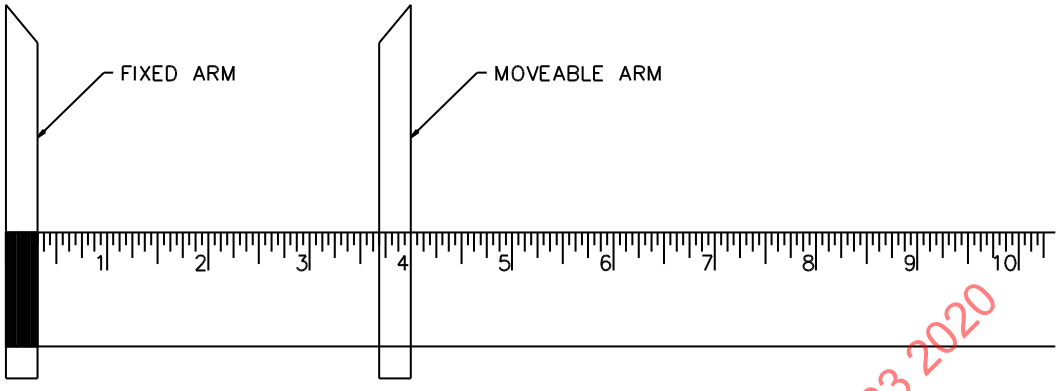
[a] The Donning Test, Section 15, and Water Entry Test, Section 17, may be conducted at this point. In addition, if an examination of the candidate device indicates that it may have a tendency to permit movement of the buoyant material from the position it was in when the device was donned to a position toward the sides or back of a subject, at least one test subject is to enter the water by diving so that the subject strikes the water in a prone position.

16.4.5 For an adult and youth Type III device, the subjects are to perform 3 bobbing motions in the water while in a vertical position to induce ride-up. See 16.4.1. Prior to the bobbing actions and while in the water, the subjects are to be instructed to "readjust the device to a comfortably snug fit." Immature, young subjects with limited manual dexterity may be assisted when readjusting the device to a comfortably snug fit. The bobbing motions are then to be generated by stretching the arms straight out from the sides at the water's surface with the palms facing downward. While in this position, the subjects are to push down on the water with their hands in an open, flat orientation. While pushing down on top of the water, the subjects are to fully inhale and rise above the water's surface. After reaching the upward peak, the subjects are to bring their hands together over the head and fully exhale while sinking into the water. The head must go under the water's surface to be counted. This motion is to be repeated three total times. Subjects weighing 50 – 90 pounds (22 – 41 kg) may be assisted in performing the bobs.

16.4.6 Immediately following the last bobbing motion specified in 16.4.5, the shoulder with the greatest apparent gap is to be measured by inserting the measuring device illustrated in Figure 16.2 between the top of the shoulder and the inside uppermost portion of the PFD above the right shoulder and applying only enough pressure to take up existing slack. The test subject is to be oriented vertically in the water during this measurement. The hands are to be held together and located at approximately the mid-abdomen during the measurement. Following the shoulder gap measurement, the candidate device is to be tested in accordance with 16.4.2 and 16.4.3. See 16.4.1.

Figure 16.2

Shoulder gap measuring instrument



16.4.7 The subject then is to attain a face-down position in the water. The device shall permit the subject to turn in not more than 5 seconds from the face-down position to a position in which respiration is not impeded.

16.4.8 If, during these tests, a subject is not maintained in an upright or backward face-up position, the subject is to repeat the test using a reference vest. If the reference vest does not maintain the subject in an upright or backward face-up position, the test is to be repeated with another subject of the same anatomic build.

16.4.9 If during the tests described in 16.4.4 and 16.4.8 the candidate device does not comply with these requirements with one subject from the group, an additional 18 subjects as specified in Table 16.1 may be used. If the device performs acceptably (see 16.4.1 – 16.4.3) while being worn by each of the 18 subjects, the device is acceptable.

16.5 Pocket flotation stability test

16.5.1 When a device employs more than 150 square inches (967 cm^2) of total pocket area on the front when measured in accordance with 16.5.6, pockets of the device are to be filled with the nonbuoyant material (i.e., weights) determined in accordance with 16.5.4. Pockets on the rear of the device are to be filled once with buoyant material (i.e. closed cell foam flotation material) determined in accordance with 16.5.5 and once with nonbuoyant material.

16.5.2 For Type II devices, the device with the front pockets filled with nonbuoyant material shall comply with the requirements:

a) In Section 16.2, with rear pockets filled with buoyant material; and

b) In Section 16.3, with the rear pockets filled once with nonbuoyant material and once with buoyant material.

16.5.3 For Type III devices, with the pockets filled, the device shall comply with one of the following:

a) For front and rear pockets, the subject's freeboard shall not be reduced to below water's surface when measured at the bottom of the subject's normal breathing cycle with the subject in the starting

position and in the achieved position of static balance. Also, the device shall maintain the subject in an upright or back of vertical position.

b) For front pockets, when the use of the nonbuoyant items no longer permits the device to provide adequate freeboard or does not maintain the subject in an upright or back of vertical position in the water, the test is to be repeated as follows. The backward tilting of the head described as follows shall maintain the subject in an upright or back of vertical position and the average freeboard at static balance shall not be less than 1 inch (25.4 mm). The subject is to be instructed to breathe normally during measurement of the freeboard.

1) The subject is to assume an upright, slightly back of vertical position in the water, while holding the arms at the sides. The subject is to relax the neck to allow the head to tilt backward so that it is behind the plane of the body axis. The subject then is to allow the arms, legs, and torso to assume a natural relaxed position, until motion is induced by the device.

2) After the subject attains an attitude of static balance, the freeboard of the subject is to be measured while the subject is at the lowest level attained during the normal breathing cycle.

c) For front pockets, when, even with the head tilted backward, the device does not maintain the subject with a freeboard of 1 inch (25.4 mm) or more in an upright or back of vertical position, the test is to be repeated as follows. The freeboard at static balance shall not be less than 1 inch (25.4 mm).

1) The subject is to assume an upright slightly back of vertical position and then is to assume a posture in the water where breathing is not impaired. This posture may be attained by arching of the back and tilting of the head, or the like.

2) After the subject attains an attitude of static balance, the freeboard of the subject is to be measured while the subject is at the lowest level attained during the normal breathing cycle. The subject is to be instructed to breathe normally during measurement of the freeboard.

The device does not comply with the requirement when any action other than the posturing specified in (a) – (c) is needed to maintain the specified minimum freeboard.

16.5.4 To determine the maximum capacity of each front pocket, rigid rectangular prisms (to represent ammunition boxes) are to be placed in the pockets and each pocket is to be filled with as many prisms as it is able to hold. Nonbuoyant items with in-water weight equivalent to the ammunition boxes are then to be used for the swim test specified in 16.5.1. The dimensions for the prisms and the weight for the nonbuoyant items are to be as follows:

a) For lower or middle pockets on the front of a device the prism is to measure 4-1/4 by 3 by 1 inches (114 mm by 76 mm by 25 mm). Each nonbuoyant item, representing 1 box of ammunition, is to have an in-water weight (i.e. weight under two inches of fresh water) of 250 ±5 grams (7.7 ±0.1 ounces).

b) For upper pockets the prism is to measure 1-1/4 by 1-1/2 by 2-1/2 inches (32 mm by 38 mm by 64 mm). Each nonbuoyant item, representing 1 box of ammunition, is to have an in-water weight (i.e. weight under two inches of fresh water) of 140 ±5 grams (4.5 ±0.1 ounces).

16.5.5 To determine the maximum capacity of each back pocket, rigid rectangular prisms are to be placed in the pockets. The prisms are to measure 4-1/4 by 3 by 1 inches (114 by 76 by 25 mm), and each pocket is to be filled with as many prisms as it is able to hold. Closed cell foam buoyant material with a density of no more than 4 lb/ft^3 (64.1 kg/m^3) and a volume equal to the rigid prisms are then to be used for the swim test specified in 16.5.1.

16.5.6 The area (A) of each pocket is to be determined by the following equations:

a) For flat pockets:

$$A = h \times w$$

where:

h is the height of the pocket, and

w is the width of the pocket. See Figure 16.3.

b) For pouch type pockets or pockets with gussets:

$$A = \left(h + g_b\right) \times \left(w + g_m\right)$$

in which:

h is the height of the outer surface of the pocket,

w is the width of the outer surface of the pocket,

g_b is the depth at the bottom gusset, and

g_m is the depth at the middle side gusset. See Figure 16.4.

c) The total area (AT) is the sum of all pocket areas:

$$AT = A1 + A2 + ...An$$

Figure 16.3

Area flat pocket

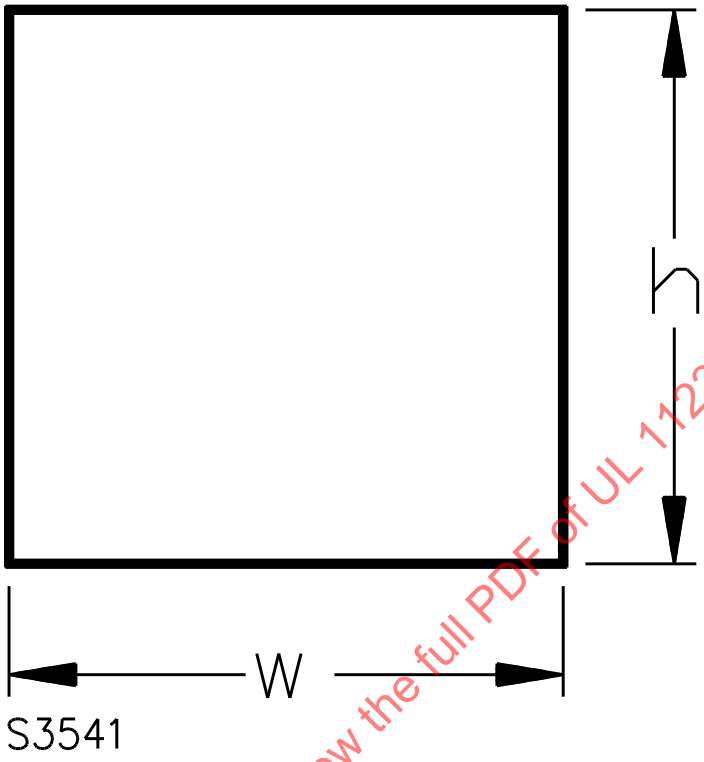
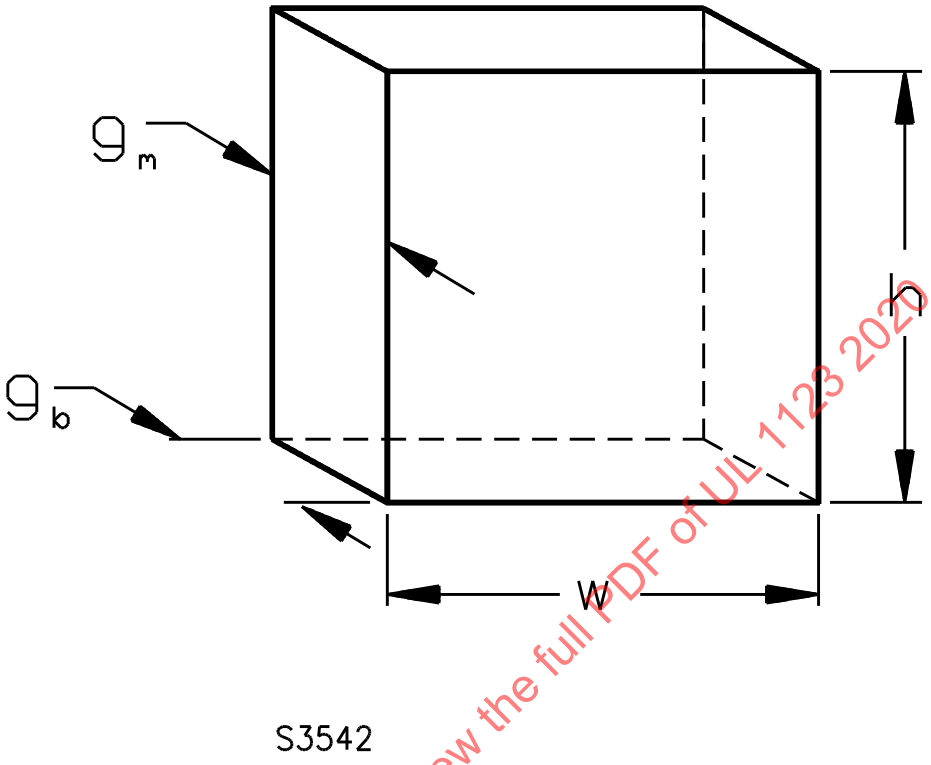


Figure 16.4

Area of pouch type or gusseted pocket



16.5.7 The in-water weight of the test subject is to be approximately 12-1/2 ±1/4 pounds (5.6 ±0.1 kg) and is to be determined in accordance with the Standard for Hybrid Personal Flotation Devices, UL 1517. A subject of higher in-water weight may be used if agreeable to all concerned.

16.5.8 If a device is available in a range of sizes, the device with the minimum amount of designed up-front buoyancy distribution and the device with the minimum designed overall buoyancy are to be tested.

17 Water Entry Test

17.1 A device shall maintain its intended position on each subject and the pads shall not dislodge when tested as described in 17.2 – 17.4.

Exception: Infant devices are not required to be tested.

17.2 For this test, subjects as specified in Table 16.1 are to be used. Prior to this test, each subject is to don and adjust the device prior to water entry as specified in the Donning Test, Section 15. After donning, secondary closure fabric belts and drawstrings that the subject has adjusted to obtain a fit are to be loosened and all elastic is to be defeated.

17.3 Each subject is to enter the water as specified in Table 17.1. Before jumping, each subject is to be instructed that after surfacing, the device may be pulled down and tightened in order to see or breathe more easily.

Table 17.1
Water entry test specifications

PFD type	Test number	Platform height	Subject configuration
Type II[a] Type III	1	3 feet (0.91 m)[c]	Feet first, hands above head with arms extended.
Type II[b]	1	9.9 feet (3 m)	Feet first, hands above head with arms extended.
	2	3 feet (0.91 m)	Head first dive, hands above head with arms extended.

[a] Youth and Child devices. Adult devices which utilize a chest strap or tie tapes.

[b] Adult devices which do not utilize a chest strap or tie tapes.

[c] For child devices, at least 50 percent of the test subjects specified in Table 16.1, shall perform the test from the platform or the side of the pool.

17.4 The device is to be considered in the intended use position if:

a) The subject's arms are not trapped in the overhead position;

b) The device remains in a usable position on the subject; and

c) The subject's breathing is not impeded.

If the subject elects to make any adjustments in accordance with the instructions specified in 17.3, the determination of compliance with (c) is to be made after the subject has made the adjustments and then has relaxed.

18 Water Emergence Test

18.1 If it is determined that a Water Emergence Test is required (see 16.1.6), the candidate youth or adult Type III device shall permit at least as many subjects to emerge from the water to the top of the platform specified in 18.2 as are capable of emerging in the reference vest.

18.2 A rigid wood platform mounted 6 inches (150 mm) above the water at the side of the pool is to be used for this test. The top of the platform is to have a smooth painted or varnished surface.

18.3 Each subject is to don the candidate device, enter the water, and swim or tread water for at least 30 seconds. The subject is then to attempt to emerge from the pool onto the top of the platform within 30 seconds without grasping any edge of the platform, or contacting the side or bottom of the pool; only the top surface of the platform may be used to emerge from the water. The test is then to be repeated using the reference vest.

19 Buoyancy Distribution Tests

19.1 Distribution test

19.1.1 At least 50 percent of the total buoyancy of a wearable device for which the buoyancy is provided by foam shall be forward of the body axis (see Figure 16.1) when tested in accordance with 19.1.2 or 19.1.3, as applicable.

Exception: A device that complies with the requirement of 19.2.1 need not comply with this requirement.

19.1.2 If the Flotation Stability Test, Section 16, indicates that the performance of a wearable device is due to an angular stability (Type III) or an angular change (Type II) in the position of the body axis, as

opposed to its rotation about the body axis, buoyancy of the material aft of the body axis and the buoyancy of the material forward of the body axis is to be determined individually in accordance with 20.4 – 20.8. For this purpose, the sample need only be submerged long enough to provide a stabilized reading.

19.1.3 If the Flotation Stability Test, Section 16, indicates that the performance of the wearable device is due to the rotation around the body axis, the buoyancy of the material is to be divided as necessary into three or more polar segments and tested individually in accordance with 20.4 – 20.8, following submersion to the point of stabilization.

19.2 Loss distribution test

19.2.1 In lieu of compliance with the requirements of 5.6 or 19.1.1, or both, a sample of the device may be altered in accordance with 19.2.2 and tested in accordance with Flotation Stability Test, Section 16. The sample shall comply with the applicable requirements in Section 16.

19.2.2 Each foam insert of the sample is to have an amount of the foam removed by skiving the surface of greatest area, or the equivalent, so that the buoyancy of each insert is as follows:

$$B = B_o \frac{3V}{100} - 2$$

in which:

B is the buoyancy of the altered insert (for front inserts: plus 0, minus 15 percent; and for back inserts: plus 15, minus 0 percent);

B_o is the buoyancy of the insert as provided in the as-received device; and

V is the V factor of the foam from which the insert is formed, determined in accordance with the Standard for Components for Personal Flotation Devices, UL 1191.

The sample then is to be reassembled in a manner that represents the construction of the complete device, to account for buoyancy loss from sewing and the like.

20 Buoyancy Test

20.1 The total buoyancy of a horseshoe or ring buoy, or a kapok device shall be not less than the applicable minimum value specified in Table 20.1.

Table 20.1
Minimum buoyancies

Device	Weight range	Minimum buoyancy[a]	
		pounds-force	(N)
Adult	Persons weighing over 90 pounds-mass (40.8 kg)	15-1/2	(68.9)
Youth-Adult	Persons weighing over 75 pounds-mass (34 kg)	15-1/2	(68.9)
Youth Large /Adult XXS	Persons weighing 75 to 125 pounds-mass (34 – 57 kg)	13-1/2	(60)
Youth	Persons weighing 50 to 90 pounds-mass (22.7 – 40.8 kg)	11	(48.9)

Table 20.1 Continued on Next Page

Table 20.1 Continued

Device	Weight range	Minimum buoyancy[a] pounds-force	(N)
Child	Persons weighing 30 to 50 pounds-mass (13.6 – 22.7 kg)	7	(31.1)
Infant /Child	Persons weighing less than 50 pounds (22.7 kg)	7	(31.1)
Infant	Persons weighing under 30 pounds-mass (13.6 kg)	7	(31.1)
Kapok buoyant cushions		20	(89.0)
Foam buoyant cushions		18	(80.1)
Horseshoe buoys		20	(89.0)
Ring buoys		16-1/2	(73.4)

[a] Minimum values either measured at, or corrected to, atmospheric pressure of 29.92 inches (760 mm) mercury and water temperature of 68°F (20°C).

20.2 The total buoyancy of a cushion or wearable device for which the buoyancy is provided by foam shall be not less than the applicable regulatory minimum buoyancy specified in Table 20.1 or the value determined according to the following equation, whichever is greater:

a) For a cushion:

$$B_t = (0.91)(F)\sum_{i=1}^{N}\frac{P_i}{3R_i - 2}$$

b) For a vest:

$$B_t = (0.82)(F)\sum_{i=1}^{N}\frac{P_i}{3R_i - 2}$$

c) For a jacket:

$$B_t = (0.70)(F)\sum_{i=1}^{N}\frac{Q_i}{3R_i - 2}$$

where:

B_t is the total buoyancy required for the device, in pounds-force;

F is the applicable regulatory minimum buoyancy for the device specified in Table 20.1, in pounds-force;

P_i is the fraction of Buoyancy provided by the i^{th} material to the total buoyancy of the device;

Q_i is the fraction of buoyancy provided by the i^{th} material to the applicable regulatory minimum buoyancy of the device as specified in Table 20.1;

R_i is the applicable value specified in Table 20.2; and

N is the number of materials used in the device.

Table 20.2
Values of R_i

Application	Applicable factor	Factor for material[a]	R_i[b]
Buoyant cushion	C	97 or more	0.97
		Less than 97	C factor/100
Wearable device	V	94 or more	0.94
		Less than 94	V factor/100

[a] The applicable factor (V or C) as determined in accordance with the Standard for Components for Personal Flotation Devices, UL 1191.

[b] Also, see 5.5 – 5.7.

20.3 The total buoyancies mentioned in 20.1 and 20.2 are to be determined:

a) Immediately after the device is completely submerged and all entrapped air removed, and

b) After complete submergence for 24 hours for devices for which buoyancy is provided by foam and 48 hours for devices for which buoyancy is provided by kapok.

20.4 Tests for buoyancy are to be conducted on a complete device in a test tank of water that can be secured against change of water level or disturbance of the device being tested. Entrapped air, air enclosed in folds of the cloth, and the like, is to be removed from the device immediately following immersion. If the device utilizes fibrous buoyant material enclosed in a plastic envelope, the test is to be conducted twice; first with the device in the as-received condition, and then with the envelope slit at each corner and on each side. Each slit is to be at least 2 inches (50.8 mm) long and not more than 2 inches (50.8 mm) apart so that the envelope will not entrap air.

20.5 A test basket made of wire mesh or equivalent material and of sufficient size to hold the sample without unduly compressing the material is to be ballasted with sufficient weight to permit the complete submergence of the basket and sample.

20.6 The ballasted basket is to be suspended from a scale calibrated to an accuracy of at least ±1 ounce (±28.3 g), and the weight of the submerged apparatus determined.

20.7 The complete device is to be placed in the basket so that its upper surface is approximately 2 inches (50.8 mm) below the water surface and is to remain submerged for a 24-hour period. For tests in which the envelope of a device utilizing fibrous buoyant material has been slit, the device is to be submerged for a 48-hour period.

20.8 The buoyancy of the complete device is computed by subtracting the submerged weight of the ballasted basket and test sample from the submerged weight of the ballasted basket alone.

21 Water Retention Test

21.1 Following total immersion in water, a candidate device shall not entrap more than:

a) Five pounds-mass (2.3 kg) of water if the device is intended for use by persons weighing more than 90 pounds-mass (40.8 kg),

b) Four pounds-mass (1.8 kg) of water if the device is intended for use by persons weighing 50 – 90 pounds-mass (22.7 – 40.8 kg),

c) Three pounds-mass (1.4 kg) of water if the device is intended for use by persons weighing 30 – 50 pounds-mass (13.6 – 22.7 kg), or

d) Two pounds-mass (0.9 kg) of water if the device is for use by persons weighing under 30 pounds-mass (13.6 kg).

21.2 Prior to starting this test, any pocket flaps on the candidate device are to be tucked into the pockets. The candidate device is to be submerged in a substantially upright position for not less than 2 minutes. The device is to be removed in a vertical, upright position and immediately hung on a clothes hanger from a scale with an accuracy of ±1 ounce (28.4 g). Ten seconds after removal from the water, the total weight indicated on the scale is to be recorded. The device is then to be removed, inverted, or otherwise manipulated to remove all entrapped water and reweighed. The difference in weight between the two readings shall not exceed the values shown in 21.1.

22 Throw Test

22.1 Each throw of the candidate device shall be closer to the target than the reference device as specified in 46 CFR 160.048 or 160.049, as applicable, or the average distance of all the throws (measured from the target to the point of impact) of the candidate device shall not be more than 12 inches (305 mm) greater than the corresponding average distance of all the throws of the reference device from the target. In addition, a candidate device intended to be grasped shall be such that within 1 minute a swimmer can orient himself to the device in such a manner that his face is out of the water without the necessity for constant use of either hand.

Exception: Candidate devices using USCG approved designs in accordance with 46 CFR 160.048 or 160.049, as applicable, and utilizing foam buoyant material with a minimum 4-pounds per cubic foot (0.06 grams per cubic centimeter) density construction need not be tested.

22.2 To determine compliance with 22.1, so that within 1 minute a swimmer can properly orient himself to the device, the device is to be thrown to a swimmer who is then to be able to support himself by the device so that his face is out of the water without grasping the device constantly.

22.3 The candidate device is to be compared to a standard reference device (see 22.1), when each is thrown, in turn, in three alternating sequences by six test subjects. At least one of the six test subjects is to be experienced and at least one test subject is to be inexperienced. The inexperienced test subject is to be allowed one unrecorded practice throw for the candidate device and the reference device.

22.4 Prior to the test, each subject is to be qualified by throwing the applicable reference device 5 feet (1.5 m) from the center of the center of the target in any direction (i.e., 10 feet (3.0 m) diameter). Each subject then is to separately throw both the candidate device and the reference device toward a specified target 40 feet (12 m) away. The target is to be circular and measure 36 inches (914 mm) in outside diameter. Each test subject is to be instructed "Stand behind this line and throw each device, separately, toward the center of the circle." The subjects are not to be given instructions on the method of throwing; except, each subject is to use the same throwing motion for each throw. The throwing method is to be recorded. The distance of the device from the center of the target is to be measured on each throw.

23 Dynamic Strength Test

23.1 *Deleted*

23.2 *Deleted*

Figure 23.1

Dynamic strength test form

Figure deleted

Table 23.1
Test form dimensions
Table deleted

23.3 *Deleted*

23.4 *Deleted*

23.5 *Deleted*

23.6 *Deleted*

23.7 *Deleted*

23.8 *Deleted*

24 Tensile Test

24.1 There shall be no evidence of broken zippers, buckles, seams, webbing, and/or lacing on the device when tested in accordance with Table 24.1 and 24.2 – 24.10. Each primary closure shall be tensile tested independently. A zippered device with side adjustments shall have each zipper/side adjustment combination(s) tested as a primary closure, independent from any other primary closure.

Table 24.1
Tensile test

Device	Test load, Pounds-mass	(kg)	Test duration minutes
A. Devices intended to be Grasped			
1. Ring buoy body, horseshoe buoy body	200	(90.7)	30
2. Ring buoy and horseshoe buoy grablines and attachments	200	(90.7)	30
3. Cushion grabstrap and grab strap to body	150	(68.0)	10
B. Devices intended to be Worn			
1. Body test[a]			
Adult	300	(136.0)	5
Youth or child	230	(104.3)	5
Infant	115	(52.2)	5
2. Shoulder section, collar, collar strap, crotch strap, and exposed hanging loop test			
Adult	150	(68.0)	2
Youth or child	115	(52.2)	2
Infant	60	(27.2)	2
3. Secondary closures that do not encircle body			
Adult	70	(31.7)[b]	2
Other than adult	60	(27.2)[b]	2

Table 24.1 Continued on Next Page

Table 24.1 Continued

Device	Test load, Pounds-mass	(kg)	Test duration minutes
4. Secondary closures that encircle body			
Other than infant	140	(63.5)	5
Infant	120	(54.4)	5

[a] Webbing and friction type closure assemblies are to be tested both wet and dry.

[b] Unlooped, straight application of load.

24.2 A device intended to be grasped, such as a ring buoy, is to be suspended by means of a strap passed about the body of the device. The test load as specified in Table 24.1 is to be applied by means of a second identical size strap passed about the body directly opposite the point of suspension. For a horseshoe buoy, the means of closure is to be secured during this test. The straps are to be 2 (-0, +1/4) inches [51 (-0, +8) mm] wide and are to be covered with 1/4-inch (6.4-mm) thick closed-cell PVC or PE foam.

24.3 In addition, a ring buoy or cushion is to be suspended by means of a strap passed about the grabline or grabstrap. The test load specified in Table 24.1 is to be applied by means of a second identical size strap passed about the grabline or grabstrap, directly opposite the point of suspension. The straps used to apply tension to the grabline or grabstrap are to be 2 (-0, +1/4) inches [51 (-0, +8) mm] wide and are to be covered with 1/4-inch (6.4-mm) thick foam.

24.4 If a device incorporates a zipper and side adjustment(s), the test load specified in Table 24.1 is only applied to the zipper and corresponding side adjustments being tested (no load shall be transferred through any fabric located between the attachment points of the side adjustment). For devices utilizing more than one side adjustment per side, the test is conducted on opposing pairs of side adjustments independently (with only the lower side adjustments tightened, with only the upper side adjustments tightened, and the like).

24.5 If a device incorporates multiple body straps with different closures, each strap shall be tested independently.

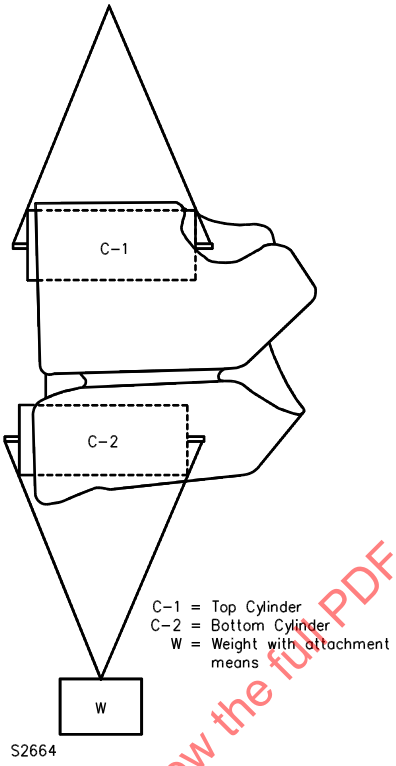
24.6 For a wearable device, a means of adjustment that depends on friction for the necessary force shall not slip in excess of 1 inch (25.4 mm). For a device incorporating a zipper and side adjustments, the corresponding side adjustments are to be set to a point between their minimum and maximum adjustment lengths such that a side panel, if present, bears none of the load (typically adjusted halfway).

24.7 To determine compliance with 24.6, the wearable device is to be immersed in water for a minimum of 2 minutes prior to applying the required test load. Body straps and their closures, which completely encircle the device, may be tested independently of the device. The test apparatus and procedure described in 24.8 – 24.10 shall be used.

24.8 In this test, two cylinders, each having a diameter of 5 inches (127 mm) for adult size devices, 3-1/2 inches (89 mm) for child size devices, or 2 inches (50.8 mm) for infant size devices and having a length sufficient to freely support the test device, are to be used. See Figure 24.1. With the test device supported by the top cylinder (C-1) and the primary closure adjusted to a point halfway between its minimum and maximum adjustment lengths, a weight (W) is to be attached to the bottom cylinder (C-2) so that the required test load is applied to the device. The total test load is to include the weight (W), its attachment means, and the bottom cylinder (C-2).

Figure 24.1

Tensile test – Closure(s)



24.9 While testing the shoulder section, or collar or crotch strap, of a device, the tension specified in Table 24.1 is to be applied to only one shoulder section, or directly to the collar or crotch strap.

24.10 The device is to be secured to a test form of appropriate size as specified in Figure 24.2 and Table 24.2, and secured to maintain an upright position. A tension equivalent to that specified in Table 24.1 is to be applied to one shoulder section, or to the collar or crotch strap, by means of a 2 inch (50.8 mm) wide strap having a 1/4-inch (6.4-mm) thick foam covering. The strap is passed through the shoulder section or around the collar or crotch strap.

Figure 24.2

Tensile strength test form

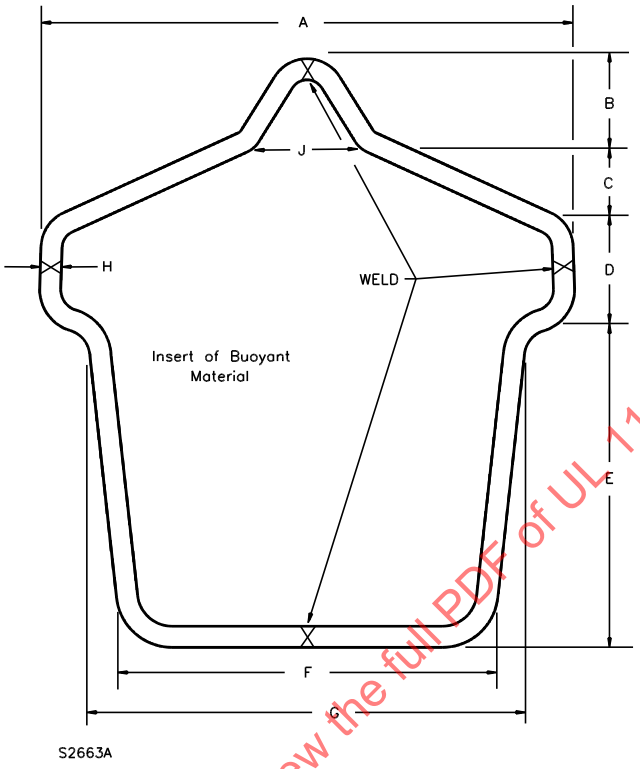


Table 24.2
Tensile strength test form dimensions

Size	Dimensions – Inches (mm)								
	A	B	C	D	E	F	G	H	J
Extra Large Adult	32 (813)	6 (152)	3-1/2 (86)	6 (152)	18 (457)	21 (533)	26 (660)	1 (25)	8 (203)
Adult	24 (610)	4-1/2 (114)	3 (76.2)	5 (127)	15 (381)	17 (432)	20 (508)	1 (25.4)	7 (178)
Youth	20 (508)	4 (102)	3 (76.2)	4 (102)	11 (279)	13 (330)	16 (406)	7/8 (22.2)	6 (152)
Child	13 (330)	3 (76.2)	2 (50.8)	3 (76.2)	9 (229)	10 (254)	11-1/2 (292)	3/4 (19.1)	4 (102)
Infant	12 (305)	2-1/2 (63.5)	1-1/2 (38.1)	2-1/2 (63.5)	7-1/2 (191)	8 (203)	9-1/2 (241)	3/4 (19.1)	3 (76.2)

Notes:

1 – Fabricated from mild-steel rod. (Diameter – Dimension H).

2 – Grind welds and burrs smooth.

3 – Prime and paint thoroughly.

24.11 For a PFD with a collar, not having a collar strap, that extends more than 4 inches (101.6 mm) from the body of the PFD, the collar is to be grasped with a clamp that measures 1 by 3 inches (25.4 by 76.2 mm). With the back of a PFD placed flat on a table (i.e., PFD oriented face-up) the clamp is to be attached

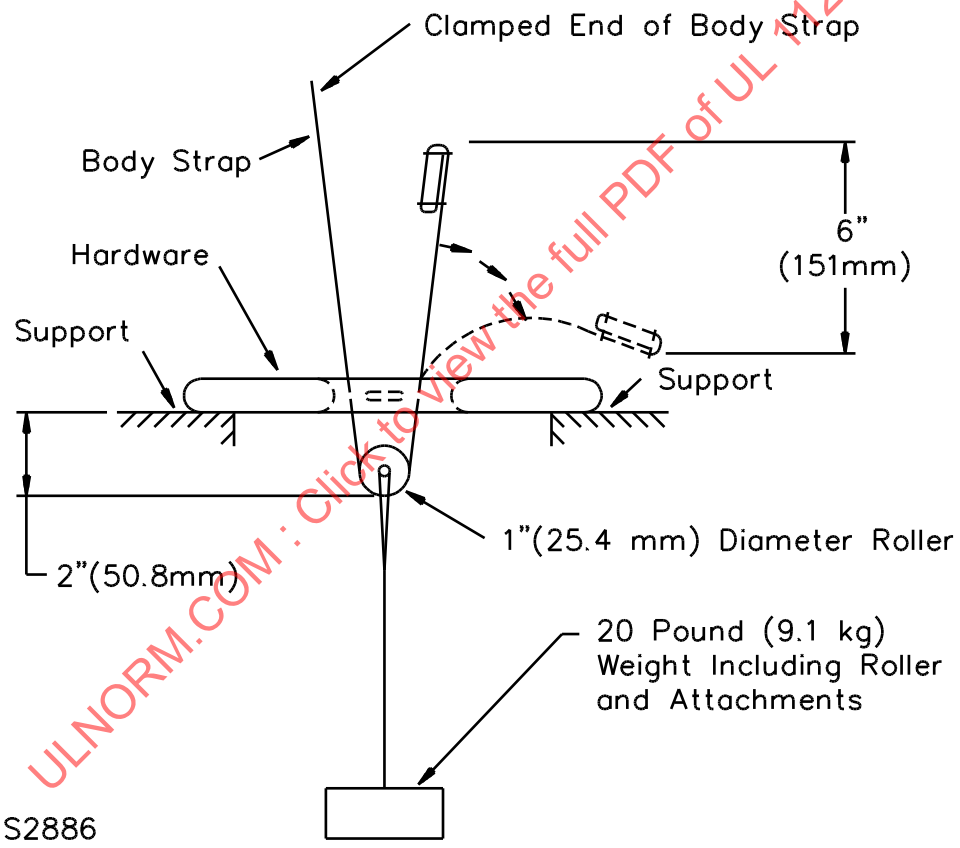
to the top of the collar at a location starting 3 ±1/2 inches (76 ±12 mm) from the outer most edge of the collar. The device is to be secured to a test form of appropriate size as specified in Figure 24.2 and Table 24.2, and secured to maintain an upright position. A tension equivalent to that specified in Table 24.1 is to be applied to the collar for the specified duration.

25 Body Strap Hardware Secureness Test

25.1 The body strap is to be loosened to provide a 2-inch (50.8-mm) loop at the center of the buckle with a 6-inch (151-mm) free end as illustrated in Figure 25.1. The buckle is to be held firmly in the horizontal plane. A 20-pound (9.1-kg) weight is to be released instantaneously and left hanging for 30 seconds. The body strap shall remain firmly engaged in the hardware.

Figure 25.1

Body strap hardware secureness test



26 Pull Test

26.1 To determine compliance with Exception No. 2(a) of 4.7, the candidate device is to be placed on the torso form illustrated in Figure 24.2, and a dead-weight force of 50 pounds (222 N) is to be applied to the decorative dee ring or tab. The dee ring or tab shall become inoperative within 10 seconds.

26.2 The buddy line shall be tested by being pulled by a 90 pound-force (400 N) test load for 10 seconds in any direction without damage to the buddy line or PFD. The buddy line is required to remain completely attached to the PFD. In order to ensure that the worst case direction of pull is evaluated, the test is to be repeated as required.

26.3 Immediately following the pull test specified in 26.2, the buddy line is to be pulled until torn from the device. The force required to accomplish the separation of the buddy line from the device is to be recorded and shall be greater than 90 pound-force (400 N) and less than 300 pound-force (1340 N). The separation of the buddy line from the device shall not adversely affect the integrity of the device.

27 Secondary Closure Attachment-Strength Test

27.1 For a device that employs a secondary closure (tie tape, chest strap, or the like) that is attached directly to the cover fabric, the average breaking strength of samples of the closure/fabric combination shall be not less than 70 pounds-force (311 N) when they are subjected to the test specified in 27.2 and 27.3. The breaking strength of any individual sample shall be not less than 60 pounds-force (267 N).

27.2 Ten samples of the weakest closure/fabric combination, five with the closure material sewn parallel to the direction of greater thread count and five with the closure material sewn parallel to the direction of lesser thread count, are to be prepared using the intended securing means, such as a box-X or bar tack stitch. Alternatively, ten samples may be cut from candidate devices. The cover fabric shall be 4 ±0.125 in (101.6 ±3 mm) by 4 ±0.125 in (101.6 ±3 mm by 101.6 ±3 mm) long with sufficient closure material length to be fully grasped by the jaws specified in 27.3.

27.3 The samples are to be placed, in turn, in a constant-rate-of-traverse or constant-rate-of-extension tensile test machine by clamping the closure perpendicularly in the fixed jaws, aligning the threads (in the direction of greater thread count or of lesser thread count) of the cover fabric portion of the sample parallel to the closure length, and then securing the cover fabric portion in the moving jaws. The jaws are to be separated at a rate of 12 ±0.5 inches (305 ±13 mm) per minute. The lower jaws are to be located 1-1/2 ±0.125 in (38 ±3 mm) below the means of securement as specified in 27.2.

28 Release Test

28.1 To determine compliance with Exception No. 3 of 4.7, a cushion provided with hook and loop fastener tapes or the equivalent shall release from the dead weight and float free when subjected to the test specified in 28.2.

28.2 Either the hook or loop fastener tape is to be permanently attached to the cushion. The mating fastener tape is to be attached by adhesive, or similar means, to a flat surface of a dead weight that has a hydrostatic weight greater than the buoyant force of the cushion. The flat surface area of the dead weight is to be greater than the surface area of the attachment surface of the cushion. With the assembly in a horizontal attitude and with the cushion topside, the assembly is to be gently lowered into a pool of water until fully submerged. The test is to be repeated in the vertical attitude.

29 Temperature Test

29.1 General

29.1.1 A candidate device shall remain serviceable and the donning characteristics of a wearable device shall not be impaired following exposure to high temperature and low temperature conditioning. If, following either test, the serviceability of a wearable device is doubtful, the device shall comply with the requirements of the Flotation Stability Test, Section 16; Buoyancy Test, Section 20; and Tensile Test, Section 24; in that sequence.

29.1.2 For a range of sizes of devices made of identical material, the following tests may be conducted on the smallest representative size.

29.2 High temperature test

29.2.1 The device is to be placed in a chamber maintained at a temperature of 60 ±2.8°C (140 ±5°F) for 24 hours. The device is then to be removed from the heat chamber.

29.3 Low temperature test

29.3.1 The device is to be placed in a chamber and maintained at a temperature of minus 17.78 ±2.8°C (0 ±5°F) for 24 hours. The device is then to be removed from the cold chamber.

29.3.2 Within 30 seconds after conditioning at each temperature, a wearable device is to be opened by placing the back side down on a plane surface, fully opening the device until the leading edge of the front surface is in contact with the plane and then fully closing the device. (See 29.1.1.)

29.3.3 Within 30 seconds after conditioning at each temperature, a Throwable Device – Type IV PFD is to be dropped 3 separate times, using three different orientations, from a height of 6 feet (1.8 m) onto a concrete floor. Then, the same Type IV PFD is to be subjected to the applicable test load specified in the Tensile Test, Table 24.1; except the duration is to be 2 minutes.

30 Flame Exposure Test

30.1 A device intended to be worn shall not flame more than 6 seconds following a 2-second exposure to flames produced by burning n-heptane when tested in accordance with 30.2 – 30.5.

Exception: Fabrics which would be exposed to flame that have uncoated faces of either:

a) Plain surface fabrics, regardless of fiber content, weighing 2.6 oz (74 g)or more per square yard; or

b) Plain and raised surface fabrics made of acrylic, modacrylic, nylon, olefin, polyester, wool, or any combination of these fibers, regardless of weight

are not required to comply with this requirement.

30.2 The test pan is to be 12 by 18 by 2-1/2 inches (305 by 457 by 63.5 mm).

30.3 The test is to be conducted in an essentially draft-free area.

30.4 One-half inch (12.7 mm) of water is to be put in the bottom of the test pan, followed by enough n-heptane to make a minimum total depth of 1-1/2 inches (38.1 mm). The n-heptane is to be ignited and allowed to burn freely for 30 seconds before the device is inserted.

30.5 The upright device is to enter and pass through the flames in a forward, vertical, freehanging position, with the bottom of the device 9 inches (229 mm) above the top edge of the test pan. The 2-second timing is to start as soon as the leading edge of the sample is touched by the flames and stopped as the trailing edge leaves the flames.

30.6 *Deleted*

30.7 *Deleted*

30.8 *Deleted*

31 Strength Tests – Seams

31.1 Insert envelope seam

31.1.1 If a device utilizes fibrous buoyant material encased in an envelope, the seam strength of the envelope shall withstand an 8 pound-force per inch (1.40 N/mm) tension for a 2-minute period without separation.

31.1.2 A sample consisting of a 1-inch (25.4-mm) wide strip, cut across and perpendicular to the seam, is to be cut from a complete envelope and secured at each end by a clamping device, having jaws 1 inch (25.4 mm) wide minimum, and subjected to a pull of 8 pounds-force (35.6 N) for 2 minutes.

31.2 Seam breaking strength test– lock stitch

31.2.1 The average breaking strength of a lock stitch type 301 (see 11.1), when tested in accordance with the Standard Test Method for Failure in Sewn Seams of Woven Fabric, ASTM D1683-90 for existing seams or for seams prepared in accordance with 31.2.2, shall be:

a) For a wearable device, not less than 70 pounds-force (311 N) in both the direction of greater thread count (warp) and lesser thread count (fill).

b) For a throwable device, not less than 50 pounds-force (222 N) in both the direction of greater thread count (warp) and lesser thread count (fill).

31.2.2 Each type of lock stitched or multichain stitch (double locked stitch) seam used in a device is to be subjected to this test. For prepared seams, five 4 x 6 inch (102 x 152 mm) samples are to be tested in each of the directions of greater thread count (warp) and lesser thread count (fill) of the fabric. See 31.3.1.3 and 31.3.1.4.

31.2.3 The test sample is to be opened with the sewn seam in a horizontal position and the top and bottom edges are to be secured in 1 inch (25.4 mm) wide clamps. The initial separation of the clamps is to be 3 inches (76.2 mm). Tension is to be applied at a constant rate of separation of 12 inches (305 mm) per minute.

31.3 Seam breaking strength test – overedge stitch

31.3.1 General

31.3.1.1 The average breaking strength of an overedge stitch, when tested in accordance with the Standard Test Method for Failure in Sewn Seams of Woven Fabrics, ASTM D1683-90 for either direction (i.e., warp to warp or fill to fill), both prior to and after the sample conditioning specified in 31.3.2.1 and 31.3.2.2, shall be:

a) Greater than or equal to that determined for a comparable lock stitched type 301 seam, or

b) In compliance with 31.2.1 (a) or (b), as applicable, for those samples specified in 31.3.1.5.

In addition, stitch ravelling measured in accordance with 31.3.3.1 shall not exceed 1 inch (25.4 mm).

31.3.1.2 Seam samples used for the tests including fabric, thread, stitch type, seam width, and stitch density shall be representative of those used in production. No selvage or back stitched edge is to be used. The overedge stitch type seams are to be compared to the lock stitch type 301 seams as follows (see 31.3.1.5):

a) Group 4 vs. Group 1

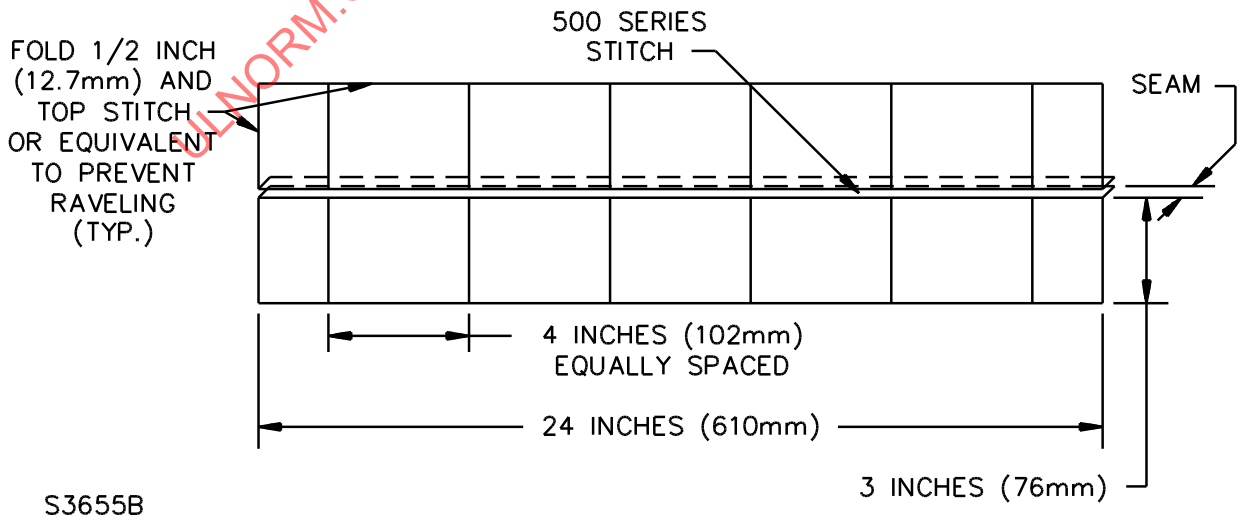
b) Groups 5 and 6 vs. Group 2

c) Group 7 vs. Group 3

31.3.1.3 Each piece of fabric from which the samples are to be made (sewn together with a lock stitch type 301; sewn together with an overedge stitch) is to measure at least 4 x 24 inches (102 x 609 mm). Two pieces of fabric are to be sewn together (fill to fill and warp to warp) along the longest unsewn edge. The outer edge of the sewn sample is to be folded 1/2 inch (12.7 mm) and top stitched, or equivalent, to prevent ravelling. See Figure 31.1.

Figure 31.1

Samples



31.3.1.4 Lines with indelible ink, drill holes, or equivalent, 4-inches (102 mm) apart along the long dimension are to be made on each sample (see Figure 31.1) so that at least five 4-inch segments are available for use in the breaking strength tests.

31.3.1.5 Four separate samples for each of the following groups are to be used. The samples are to consist of:

a) Two control samples (one sewn fill to fill and one sewn warp to warp) conditioned in accordance with 31.3.2.1, and

b) Two laundered samples (one sewn fill to fill and one sewn warp to warp) conditioned in accordance with 31.3.2.2:

Group 1 – Lock stitch type 301 intact with no cut.

Group 2 – Lock stitch type 301; except one thread on one side of the fabric in each of the 4-inch (102 mm) marked segments is to be cut at approximately the midpoint between each 4-inch mark.

Group 3 – Same as group 2; except one thread on each side of the fabric in each of the 4-inch marked segments is to be cut at approximately the midpoint between each 4-inch mark.

Group 4 – Overedge stitch intact (the stitch representative of that used in production) with no cut.

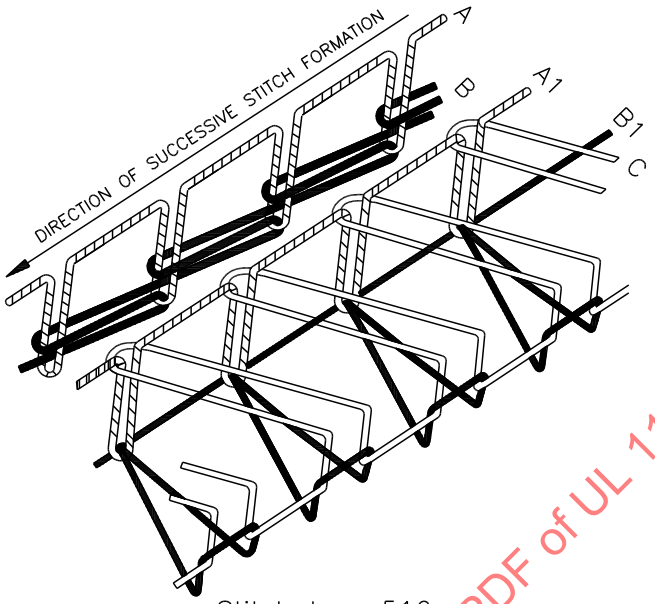
Group 5 – Overedge stitch; except the threads on one side of the fabric in each of the 4-inch marked segments are to be cut at approximately the midpoint between each 4-inch mark. For example, for stitch type 516, the A, A_1, and C threads are to be cut (see Figure 31.2).

Group 6 – Overedge stitch; except the threads on one side of the fabric are to be cut as specified for group 5. For example, for stitch type 516, the B and B_1 threads are to be cut.

Group 7 – Same as group 5; except the threads on each side of the fabric are to be cut as specified for groups 5 and 6.

Figure 31.2

516 Stitch



Stitch type 516

This type of stitch shall be formed by simultaneously sewing one row of stitch type 401 a specified distance from the edge of the material, and one row of stitch type 504 on the edge of the material.

S3656

31.3.2 Conditionings

31.3.2.1 Prior to the breaking strength test of the control samples and prior to the stitch ravelling check and breaking strength test after the samples have been laundered, all samples are to be conditioned at 21 ±2°C (70 ±4°F) and 65 ±5 percent relative humidity for not less than 40 hours.

31.3.2.2 Prior to the check for stitch ravelling and prior to the breaking strength tests, two samples from each of the groups specified in 31.3.1.5 are to be subjected to 5 complete washing and drying laundering cycles. The laundering cycles are to be conducted in accordance with the Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics, AATCC Test Method 135-92, with the following considerations:

a) Dummy wash load Type 1 is to be used to achieve proper loading of the washing machine [i.e., 1.8 kg (4.0 pounds)].

b) The washing machine setting is to be permanent press and the water temperature is to be 27 ±2°C (80 ±5°F). Water level is to be full.

c) Detergent is not to be used.

d) The drying is to be tumble dried and the drying cycle is to be delicate.

Exception: If the fabric used is a fabric laminated foam flotation material, a front loading washer is to be used.

31.3.3 Stitch ravelling measurement

31.3.3.1 Stitch ravelling for the laundered samples is to be checked with calipers and shall comply with the requirement in 31.3.1.1. Stitch ravelling is to be measured by inserting the caliper between the fabric pieces inside the seam and administrating a 1-pound force (4.4 N) between the ravelled ends of stitching. For example, the 401 stitching ends for the overedge stitch type 516 seamed samples.

32 Foam Flotation Material Secured Joints

32.1 Samples

32.1.1 If a device is provided with one or more buoyant inserts constructed from multiple pieces of foam flotation material secured together, representative samples of the secured joints shall comply with the requirements in 32.1.2 – 32.3.3.

Exception No. 1: Secured joints that comply with the requirements in 32.4.1.2 – 32.4.3.2 need not comply with the requirements in 32.1.5 – 32.2.2.2.

Exception No. 2: Glued joints that comply with the requirements in 32.5.1.1 – 32.5.3.2 need not comply with the requirements in 32.1.2 – 32.3.3.

32.1.2 Testing is to be conducted on 33 specimens cut from six samples of foam flotation material measuring 12 inches x 12 inches (305 mm x 305 mm) and of the thickness of the foam flotation material being investigated. The 12 inch x 12 inch samples are to consist of two 6 inch x 12 inch (153 mm x 305 mm) pieces of foam flotation material secured together using the materials and methods intended for use in the construction of the end-product, and may consist of inserts taken from a complete personal flotation device.

32.1.3 The condition of the samples is to be representative of that intended for use in the end-product (for example, with or without skin). For the purposes of these requirements, skin is considered to be a relatively dense outer layer of the foam flotation material. Tests conducted on foam flotation material without skin are representative of the same foam flotation material with skin.

32.1.4 Five of the 12 inch x 12 inch samples are to be cut into six specimens each using Die A as specified in Standard Test Methods for Rubber Properties in Tension, ASTM D412-83, yielding 30 dumbbell-shaped specimens. The remaining 12 inch x 12 inch sample is to be cut into three 1 inch x 9 inch (25 mm x 203 mm) specimens. Each of the 33 resulting specimens (referred to as Candidate Specimens) is to be the same thickness as the original sample, with the secured joint located perpendicular to, and at the midpoint of, the long dimension of the specimen.

32.1.5 In addition to the specimens specified in 32.1.4, control testing is to be conducted on 30 specimens (referred to as Control Specimens) cut from five samples of foam flotation material measuring 12 inches x 12 inches (305 mm x 305 mm) and of the thickness of the foam flotation material being investigated, using Die A as specified in Standard Test Methods for Rubber Properties in Tension, ASTM D412-83. Each of the 30 resulting specimens is to be the same thickness as the original sample.

32.1.6 Prior to testing, the 33 Candidate Specimens specified in 32.1.4 and the 30 Control Specimens specified in 32.1.5 are to be conditioned in air at 23 ±2°C (73 ±4°F) and 50 ±5 percent relative humidity for 40 hours (Standard Conditioning).

32.2 Breaking strength test

32.2.1 Exposures

32.2.1.1 Testing shall be conducted on specimens subjected to the exposures specified in 32.2.1.2 – 32.2.1.7.No specimen is to be subjected to more than one exposure.

32.2.1.2 Six Candidate and six Control Specimens are to be placed in a basket of sufficient size to hold them without undue compression, constructed of wire mesh or equivalent material and ballasted with sufficient weight to permit the complete submergence of the basket and specimens. The basket is to remain submerged for 24 hours in a position such that the upper surface of the specimens is approximately 2 inches (51 mm) below the surface of the water.

32.2.1.3 Six Candidate and six Control Specimens are to be placed in a chamber maintained at a temperature of 60 ±2°C (140 ±4°F) for 24 hours.

32.2.1.4 Six Candidate and six Control Specimens are to be completely submerged in ASTM Reference Oil Number 2 for 70 hours.

32.2.1.5 Six Candidate and six Control Specimens are to be completely submerged in ASTM Reference Fuel B for three separate 5-minute periods with a 30-minute drying time between submersions.

32.2.1.6 Six Candidate and six Control Specimens are to be completely submerged in perchloroethylene for 70 hours.

Exception: A device marked "Do not dry clean," or the equivalent, need not comply with this requirement.

32.2.1.7 Six Candidate and six Control Specimens are to be completely submerged in a mixture of 0.5 percent phosphate-free detergent and zero-hardness water for 70 hours.

32.2.2 Test method

32.2.2.1 Each Candidate and Control Specimen specified in 32.2.1.2 – 32.2.1.7 is to be individually clamped with a force of 20 ±2 lbf (89 ±9 N) in the jaws of a tension machine. The jaws are to measure 1 inch x 1 inch (25 mm x 25 mm) or wider, and the initial jaw separation is to be 3 inches (76 mm). The rate of jaw separation is to be 20 inches (0.5 m) per minute. The specimens are to be tested until failure and the breaking strength is to be determined.

32.2.2.2 The average breaking strength of the six Candidate Specimens for each group specified in 32.2.1.2 – 32.2.1.7 shall be greater than or equal to the average breaking strength of the corresponding six Control Specimens within a given exposure group.

32.3 Flexibility test

32.3.1 There shall be no evidence of cracking when the three 1 inch x 9 inch specimens specified in 32.1.4 are tested in accordance with 32.3.2 and 32.3.3.

32.3.2 The three 1 inch x 9 inch Candidate Specimens and a steel mandrel having a diameter of approximately twice the thickness of the foam flotation material being investigated are to be placed in a chamber and maintained at a temperature of minus 18 ±2°C (0 ±4°F) for 24 hours.

32.3.3 Within five seconds of removal from the cold chamber, the longest dimension of each specimen specified in 32.3.2 is to be wrapped approximately 180 degrees around a steel mandrel. If skin is provided

on only one side of the foam flotation material, the specimen is to be wrapped around the mandrel with skin on the outside.

32.4 Elongation test

32.4.1 General

32.4.1.1 In lieu of compliance with the requirements in 32.1.5 – 32.2.2.2, secured joints shall comply with the requirements in 32.4.1.2 – 32.4.3.2.

32.4.1.2 In addition to the specimens specified in 32.1.4, reference testing is to be conducted on 30 specimens (referred to as Reference Specimens) measuring 4 inches x 6 inches (102 mm x 152 mm) each, cut from material representative of material intended for use in the construction of the outer envelope of the end-product. Half of these specimens (referred to as Reference 1 Specimens) are to be cut with the warp threads traversing the long dimension, while the other half (referred to as Reference 2 Specimens) are to be cut with the fill threads traversing the long dimension.

32.4.1.3 Prior to testing, the 30 Candidate Specimens specified in 32.1.4 and the 30 Control Specimens specified in 32.4.1.2 are to be conditioned in air at 23 ±2°C (73 ±4°F) and 50 ±5 percent relative humidity for 40 hours (Standard Conditioning).

32.4.2 Exposures

32.4.2.1 Testing shall be conducted on specimens subjected to the exposures specified in 32.4.2.2 – 32.4.2.7. No specimen is to be subjected to more than one exposure.

32.4.2.2 Six Candidate, three Reference 1, and three Reference 2 Specimens are to be placed in a basket of sufficient size to hold them without undue compression, constructed of wire mesh or equivalent material and ballasted with sufficient weight to permit the complete submergence of the basket and specimens. The basket is to remain submerged for 24 hours in a position such that the upper surface of the specimens is approximately 2 inches (51 mm) below the surface of the water.

32.4.2.3 Six Candidate, three Reference 1, and three Reference 2 Specimens are to be placed in a chamber maintained at a temperature of 60 ±2°C (140 ±4°F) for 24 hours.

32.4.2.4 Six Candidate, three Reference 1, and three Reference 2 Specimens are to be completely submerged in ASTM Reference Oil Number 2 for 70 hours.

32.4.2.5 Six Candidate, three Reference 1, and three Reference 2 Specimens are to be completely submerged in ASTM Reference Fuel B for three separate 5-minute periods with a 30-minute drying time between submersions.

32.4.2.6 Six Candidate, three Reference 1, and three Reference 2 Specimens are to be completely submerged in perchloroethylene for 70 hours.

Exception: A device marked "Do not dry clean," or the equivalent, need not comply with this requirement.

32.4.2.7 Six Candidate, three Reference 1, and three Reference 2 Specimens are to be completely submerged in a mixture of 0.5 percent phosphate-free detergent and zero-hardness water for 70 hours.

32.4.3 Test method

32.4.3.1 Each Candidate Specimen specified in 32.4.2.2 – 32.4.2.7 is to be individually clamped with a force of 20 ±2 lbf (89 ±9 N) in the jaws of a tension machine. The jaws are to measure 1 inch x 1 inch (25 mm x 25 mm) or wider, and the initial jaw separation is to be 3 inches (72 mm). The rate of jaw separation is to be 20 inches (0.5 m) per minute. Each Reference Specimen specified in 32.4.2.2 – 32.4.2.7 is to be tested in accordance with ASTM D1682 G-E or G-T. All specimens are to be tested until failure, and the percent elongation is to be calculated as follows:

$$Percent\ \ Elongation\ \ = (\frac{Final\ \ Jaw\ \ Separation - Initial\ \ Jaw\ \ Separation}{Initial\ \ Jaw\ \ Separation}) \times 100$$

32.4.3.2 For all groups specified in 32.4.2.2 – 32.4.2.7, the average percent elongation of the six Candidate Specimens shall be at least twice the average percent elongation of the corresponding six Reference Specimens within a given exposure group.

32.5 Glued joints

32.5.1 General

32.5.1.1 Where foam buoyant material is bonded with adhesive to form an insert, the foam buoyant material in bonded specimens cut from the insert shall break before the adhesive separates when tested in accordance with 32.5.2.1 – 32.5.3.2.

Exception: Glued joints that comply with the requirements in 32.1.2 – 32.2.2.2 or 32.4.1.1 – 32.4.3.2, and 32.3.1 – 32.4.1.1 need not comply with the requirements in 32.5.2.1 – 32.5.3.2.

32.5.2 Exposures

32.5.2.1 The sample is to consist of a glued insert which has been subjected to the following conditioning test series in the order specified:

a) Low Temperature Test (see Section 29).

b) High Temperature Test (see Section 29).

c) Buoyancy Test (see Section 20).

The insert may be subjected to the above conditioning test series while assembled as part of a complete personal flotation device.

32.5.3 Test method

32.5.3.1 Upon removal from the water following the conditioning test series specified in 32.5.2.1, the sample insert is to be cut into five specimens. Each specimen is to measure 5 inches x 0.25 inches (127 mm x 6 mm), and be of the thickness of the foam insert. The glued joint is to be perpendicular to, and at the midpoint of, the 5 inch (127 mm) dimension of the specimen.

32.5.3.2 Each specimen is to be clamped individually in 1 inch x 1 inch (25 mm x 25 mm) or wider jaws of a tension machine with a force of 20 ±2 lbf (89 ±9 N). The initial jaw separation is to be 3 inches (76 mm), and the rate of jaw separation is to be 20 inches (0.5 m) per minute.

33 Solvent Exposure Test

33.1 A ring buoy using a buoyant material likely to be affected by oil products shall not incur a buoyancy loss greater than 5 percent of the original buoyancy and at no time shall the buoyancy be reduced under the minimum buoyancy requirement of Table 20.1 when tested in accordance with 33.2 – 33.4.

33.2 The ring buoy shall be subjected to the buoyancy test as described in 20.1 – 20.8 before and after exposure to the reference fuel specified in 33.3.

33.3 The complete device is to be subjected to a series of three separate 5-minute periods of total submergence in ASTM reference fuel B to a depth of 2 inches (51 mm). A 30-minute drying period is to be allotted between submersions. The device is to be horizontally oriented during the submergence period. After the last submergence period, the sample is to be removed from the liquid and the excess liquids allowed to run off. The device is then to be visually examined for evidence of deterioration which may impair its performance.

33.4 If the performance of the ring buoy is in question, the ring buoy shall be subjected to the tensile test as detailed in 24.1 – 24.3.

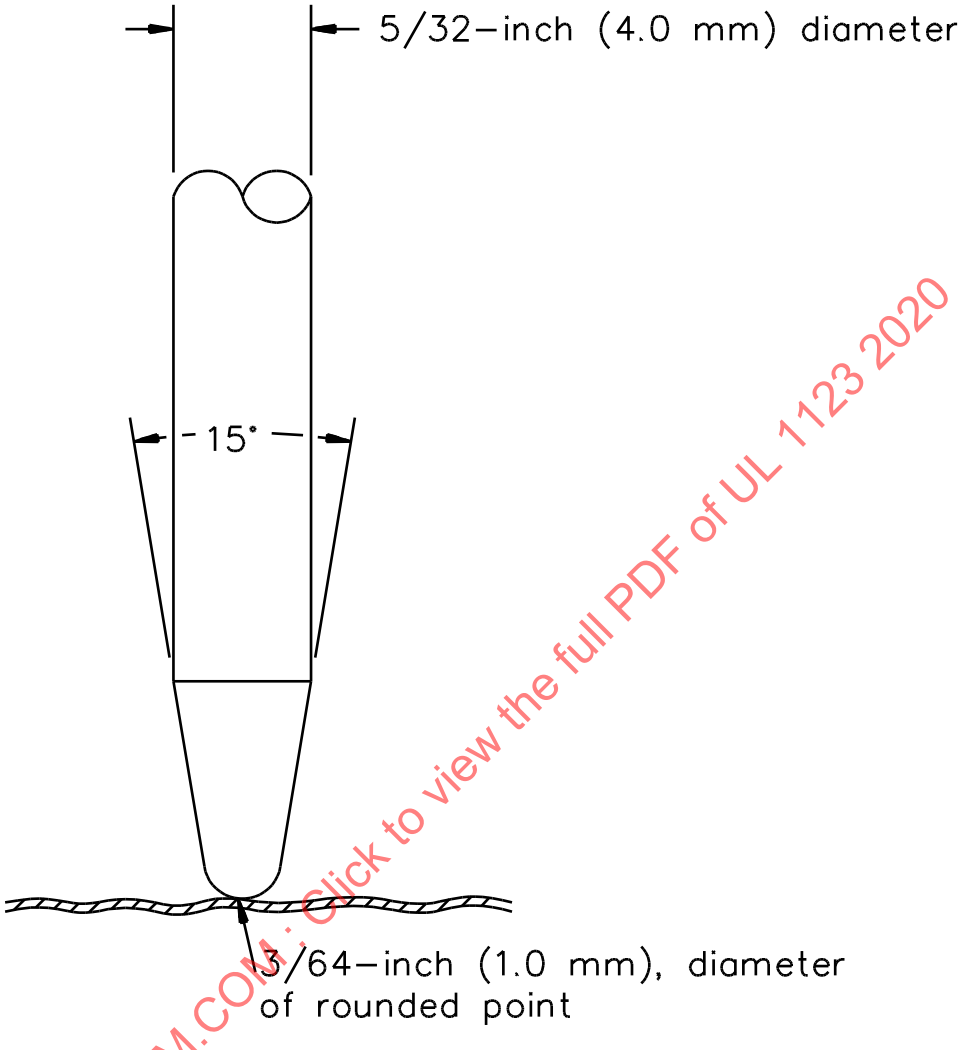
34 Penetration Test – Ring Buoys

34.1 A ring buoy having a coating used as a hydrocarbon barrier, or to increase the strength of the basic foam body of the ring buoy shall withstand, without puncture, the application of a test point with a force of 7 pounds (31.1 N) applied as specified in 34.2.

34.2 The test point illustrated in Figure 34.1 is to be pressed onto the coating at three spots equidistant from one another, and is to move perpendicularly to the coating at a rate so that a force of 7 pounds (31.1 N) is applied to the material surface within not less than 10 seconds.

Figure 34.1

Test point



35 Pamphlet Strength of Attachment Test

35.1 One complete sample of a pamphlet and its attachment means shall not break or separate from a PFD to which it is attached following the test specified in 35.2. Each different attachment means and method of attaching the pamphlet to a PFD is to be tested.

35.2 A complete PFD is to be suspended above the floor by any convenient fixed means. The fastener used to attach the pamphlet is to be attached to a PFD by its intended method. A total weight of 4 pounds (1.80 kg) is to be attached by a clamping mechanism approximately 1 inch (25.4 mm) from the bottom middle portion of the pamphlet. The complete assembly, consisting of the PFD, the pamphlet, the attachment means, and the weight, is to be suspended for 1 minute so that the complete assembly does not touch the floor for the duration of the test.

MARKING

36 PFD Markings

36.1 General

36.1.1 *Deleted*

36.1.2 *Deleted*

36.1.3 *Deleted*

36.1.4 *Deleted*

36.2 Product labels

36.2.1 *Deleted*

Table 36.1
Device-specific required markings for PFD label
Table deleted

Figure 36.1

Type II PFD label – printed on spun-bonded paper
Figure deleted

Figure 36.2

Type II PFD label – silk-screened, ink-stamped, or similar
Figure deleted

36.2.2 *Deleted*

Figure 36.3

TYPE III PFD label – printed on spun-bonded paper

Figure deleted

Figure 36.4

TYPE III PFD label – silk-screened, ink-stamped, or similar

Figure deleted

36.2.3 *Deleted*

Figure 36.5

Type IV PFD label – printed on spun-bonded paper

(gusset or other application)

Figure deleted

Figure 36.6

Type IV PFD label – silk-screened, ink-stamped, or similar

(gusset or other application)

Figure deleted

Figure 36.7

Type IV PFD label – printed on spun-bonded paper

(top or bottom cover application)

Figure deleted

Figure 36.8

Type IV PFD label – silk-screened, ink-stamped, or similar

(top or bottom cover application)

Figure deleted

36.2.4 *Deleted*

36.2.5 *Deleted*

36.2.6 *Deleted*

36.3 Use and care instructions or care instructions

36.3.1 *Deleted*

36.4 Sewn Labels

36.4.1 *Deleted*

36.4.2 *Deleted*

36.4.3 *Deleted*

36.4.4 *Deleted*

36.5 Children's information placard

36.5.1 *Deleted*

36.5.2 *Deleted*

36.5.3 *Deleted*

36.5.4 *Deleted*

36.5.5 *Deleted*

Figure 36.9

Important information about children's PFDs

Figure deleted

Figure 36.10

Teach your children how to float with a PFD!

Figure deleted

36.5.6 *Deleted*

36.5.7 *Deleted*

36A Markings for Type II and Type III PFDs

36A.1 General

36A.1.1 All markings that are provided shall be in English. If Spanish is provided, English shall be listed first. Each language may be provided together on each panel as described in 36A.3.

36A.1.2 All required markings shall be clearly reproduced in permanent, waterproof lettering that contrasts with the color of the surface on which it is applied.

36A.1.3 A device shall not be provided with any marking or literature which modifies or contradicts the intent of the required markings, specified in Section 36A.

36A.1.4 A device shall not have any literature or markings that imply personal protection from impact.

36A.1.5 A marking shall be included on both sides of a buddy line or the outside of a pocket in which a buddy line is stowed, in letters at least 12 mm (1/2 inch) high, with the following words:

English	Spanish
NOT FOR LIFTING	NO PARA ELEVACIÓN

Figure 36A.1.6a

Performance Label Sample

su2084c

Figure 36A.1.6b

Performance Label Sample

ADULT UNIVERSAL

User Weight: >41 kg (>90 lbs)
Chest Size: 76-132 cm (30-52 in.)

- Drowning hazard if not worn.
- Must be fastened and properly adjusted to float the wearer.

Choose and wear the device which fits you and your activity, visit www.XXXXX.com.
Read and keep the owner's manual and tags for info on wear, and care.

Company Name
Company Address
Company website if available
Indication of Country of Origin

USCG Approved 160.064/XXXX/X
UL 1123 TYPE XX

Lab Certification Mark

Certifying Lab Identification and address

Model: XXXX
Lot No. XXXX

Approval conditions state that this device must be worn to be counted as equipment required by vessels meeting Transport Canada or USCG regulations.

Use:
Fasten all closures and adjust for a snug fit.

Inspection:
Inspect your life vest before each outing. Do not use if your life vest shows signs of weathering, damage, or rot.

Care and Storage:
Dry thoroughly after each outing.
Store in a dry, cool place out of direct sunlight.

su2083c

36A.2 Label location and format

36A.2.1 All lettering on the PFD label shall have a similar typeface and layout. Unless otherwise specified, all lettering shall have a height of no less than 1.5 mm (0.06 in), or the size of the lettering shall be legible by a person with 20/20 vision, or vision corrected to 20/20, at a nominal distance of 864 – 965 mm (34 – 38 in) in a well-illuminated area.

Note: Label legibility may differ based on the material upon which it is printed (e.g. knit, woven, etc.).

Note: When font height is less than 1.5 mm (0.06 in), each material type (e.g. knit, woven, etc.) shall be evaluated as label legibility may differ based on the material upon which it is printed.

36A.2.2 The PFD label shall have similar information grouped together into 3 panels: Selection and Warnings, Certification and Approval, Care and Maintenance, as described in this section. Each Panel shall be fully bordered by a distinct solid line. The 3 panels may be grouped together as a single label or separated as individual labels as follows:

a) Selection and Warnings – The Selection and Warnings panel of the PFD label shall lay entirely on one continuous surface of the device and be visible immediately prior to donning. When the selection and warnings are not printed directly to the PFD, the label shall comply with the requirements in 36A.4.1 – 36A.4.5. Unless a separate or additional "neck" label with the device size information is provided, the Selection and Warning panel shall be oriented such that, after donning, the sizing information is located as near as practicable to the back of the wearer's neck. If provided, the separate or additional "neck" label shall include no less than the device size, chest size range, and mass range with a size of the lettering according to 36A.2.1.

b) Certification and Approval – When not adjacent to the Selection and Warnings Panel, the Certification and Approval Panel shall be provided on an interior or exterior surface or tag. When the Certification and Approval Panel is not printed directly to the PFD, it shall comply with the requirements in Section 36A.3.2.

c) Care and Maintenance – When not adjacent to the Selection and Warnings Panel, the Care and Maintenance information shall be provided on an interior or exterior surface or tag. When the Care and Maintenance panel is not printed directly to the PFD, it shall comply with the requirements in Section 36A.3.3.

36A.3 Label content

36A.3.1 Selection and warnings panel

36A.3.1.1 The Selection and Warnings Panel shall include the following information arranged in the order listed:

a) Sizing information, to include a size class, weight range, and chest and waist size (if applicable), according to Table 36A.3.1.

b) Graphics indicating the appropriate performance level according to Figure 36A.3.1a and Figure 36A.3.1b. The graphics shall be located within the same region of the label. The order in which the graphics shall be located on the panel shall be Figure 36A.3.1a and Figure 36A.3.1b, respectively.

c) Graphics to warn the user that the PFD is not designed for use on a personal watercraft, or when water skiing, or participating in similar towed uses, according to Figure 36A.3.2b. The warning symbol, Figure 36A.3.2b, shall be displayed with these graphics. These graphics may be included on the same line as the warning symbol or below the warning symbol.

d) Any applicable warnings and limitations, as determined elsewhere in this standard. Examples include, but are not limited to those shown in Table 36A.3.2. When the warnings in Figure 36A.3.2b are not applicable, the warning symbol shown in Figure 36A.3.2a shall be included with the content from Table 36A.3.2.

e) The following statement:

English	Spanish
Choose and wear the device which fits you and your activity, visit www.wearitlifejacket.org. Read and keep the owner's manual and tags for info on wear and care.	Elija y utilice el chaleco salvavidas que le ajuste a su medida y actividad, visite www.wearitlifejacket.org. Lea y conserve el manual de usuario y etiquetas para consultar la información forma correcta de utilizarlo y recomendaciones para su cuidado.

Table 36A.3.1
Sizing Information for PFD Labels

Size Class English[1, 2]	Size Class Spanish[1,2]	Weight Range	Chest Size[1, 4]	Waist Size[1, 4, 5]
"ADULT"[3]	ADULTO	"> 41 kg (>90 lbs.)"	Mandatory	Mandatory
"YOUTH-ADULT"[3]	JOVEN/ADULTO	"> 34 kg (>75 lbs.)"	Mandatory	Mandatory
"YOUTH LARGE/ADULT XXS"	JOVEN GRANDE / ADULTO XXS	"34 – 57 kg (75 – 125 lbs.)"	Mandatory	Mandatory
"YOUTH"	JOVEN	"23 – 41 kg (50 – 90 lbs.)"	Optional	Mandatory
"CHILD"	NIÑO	"14 – 23 kg (30 – 50 lbs.)"	Optional	Mandatory
"INFANT / CHILD"	BEBÉ / NIÑO	"<23 kg (<50 lbs.)"	Optional	Mandatory
"INFANT"	BEBÉ	"<14 kg (< 30 lbs.)"	Optional	Mandatory

[1] If this marking is not visible when the device is packaged, it shall also appear on the package.

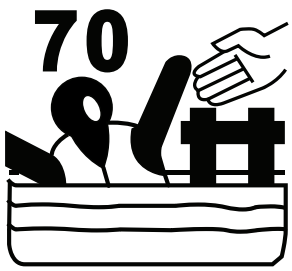
[2] Notwithstanding 36A.2.1, the size class on the device shall have a letter height of no less than 9 mm (0.35 in).

[3] The size class may be followed by a size description, such as but not limited to: "S", "M", "L", "UNIVERSAL", or "OVERSIZE".

[4] Shall be expressed in inches and centimeters over a range of not less than 2 inches; for example, "76 to 81 cm (30 to 32 in)".

[5] Required only when the primary closure is around the waist.

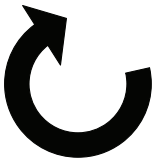
Figure 36A.3.1a
Performance Information for PFD Labels – Environment

Graphic	Definition of graphic
	Meets all requirements for Type II and Type III

su2078b

Figure 36 A.3.1b

Performance Information for PFD Labels – Turning

Graphic	Definition of Graphic
	No turn
	Device turns most wearers from a face down position.

su2742d

Figure 36A.3.2

Water Skiing and Towed Uses Icons for PFD Labels

Figure deleted

Figure 36A.3.2a

Warning Symbol

Graphic	Definition of graphic
	Warning symbol

su3469

Figure 36A.3.2b

Water Skiing, Towed Sports, or Personal Watercraft (PWC) Icons for PFD Labels

Graphic	Definition of graphic
	Not designed for water skiing, towed sports or for use on personal watercraft (PWC).

su3470

Table 36A.3.2
Warnings for PFD Labels

Foam	Kapok	English	Spanish
X [1]	X[1]	Approval conditions state that this device must be worn to be counted as equipment required by vessels meeting USCG regulations.	Las condiciones de aprobación establecen que este dispositivo debe usarse para contar como el equipo requerido por los buques que cumplen con las regulaciones de USCG.
	X	Do not puncture inner plastic cover. Replace PFD if pads become waterlogged.	No perfore la cubierta interior de plástico . Reemplace PFD si almohadillas se inundan.
X	X	Drowning hazard if not worn.	Peligro de ahogamiento si no se usa.
X	X	Must be fastened and properly adjusted to float the wearer.	Debe abrocharse y ajustarse apropiadamente para flotar al usuario.
X [1]	X [1]	Attach accessories at your own risk; they can reduce PFD performance.	Agregue accesorios bajo su propio riesgo; pueden reducir el rendimiento del PFD.
Note [1]: If required by the certification.			

36A.3.2 Certification and approval panel

36A.3.2.1 The Certification and Approval Panel shall include the following information, arranged as indicated:

a) Company trademark and/or name and physical address or web address of the Applicant, in the upper left corner of the Panel;

b) “USCG Approved” and the U.S. Coast Guard Approval Number in the format “160.###/####/#” in the lower left corner of the Panel;

c) Model Number and Style (if applicable), manufacturer may include a catalog number;

d) The standard to which the device was certified;

e) Lot Number, directly below the Model Number and Style. The lot number shall:

1. Incorporate a means of identifying the year and quarter of manufacture of the device;

2. Be numbered serially; and

3. Provide a means of identifying the device as the product of a particular factory (if a manufacturer produces PFDs at more than one factory);

f) The Mark or Name of the Certification Organization, in the lower right corner of the Panel; and

g) The following statement, if applicable, in the bottom left of the panel:

English	Spanish
Approval conditions state that this device must be worn to be counted as equipment required by vessels meeting USCG regulations	Las condiciones de aprobación establecen que este dispositivo debe usarse para contar como el equipo requerido por los buques que cumplen con las regulaciones de USCG.

36A.3.3 Care and maintenance panel

36A.3.3.1 The Care and Maintenance Panel shall include the following for all PFDs:

a) The manufacturer's recommended cleaning, drying, and storage instructions, which shall comply with the Federal Trade Commission Rule (16 CFR 423). The care instructions shall use International Care Labeling Symbols, ASTM D5489, and at a minimum shall indicate "Do not dry clean", unless all critical components of the device have been evaluated to the Standard for Components for Personal Flotation Devices, UL 1191, following perchloroethylene exposure.

English	Spanish
Use: • Fasten all closures and adjust for a snug fit. Inspection: • Inspect your life vest before each outing. Do not use if your life vest shows signs of weathering, damage, or rot. Care and Storage: • Dry thoroughly after each outing. • Store in a dry, cool place out of direct sunlight.	Uso: • Fije todos los enganches y ajuste para que estén bien apretados. Inspección: • Revise su chaleco salvavidas antes de cada salida. No lo use si su chaleco salvavidas muestra signos de intemperie, daños o mal estado. Cuidado y almacenamiento: • Séquelo completamente después de cada salida. • Guárdelo en un lugar seco y fresco, alejado de la luz directa del sol.

36A.4 Alternate attachment means for PFD markings

36A.4.1 If required markings are not printed directly on the outer shell or lining of a device as specified in 36A.2, the material on which the markings are printed and the means of attachment shall comply with the requirements in this section.

36A.4.2 The material on which the markings are printed shall be spun-bonded, high-density polyethylene sheeting, woven poly label fabric, or the equivalent.

36A.4.3 The material shall be fastened to the outer shell or lining of the PFD using either a type 301 stitch constructed in accordance with Federal Standard 751a, at 7 – 12 stitches per inch (3 – 5 stitches per cm) or an equivalent means of attachment.

36A.4.4 Stitching of the label must not obscure any of the text and must be at least 1.6 mm (1/16 in) away from any text.

36A.4.5 Stitching shall lie at least 1.6 mm (1/16 in) from the outer edges of the material along the entire perimeter of the label, or equivalent alternate means of attachment shall secure the entire perimeter of the label to the PFD.

36A.4.6 For all other markings, the label shall be attached as specified in 36A.4, or stitched or attached by an equivalent means on at least one edge of a single or multi-page or stacked or folded flag-style arrangement which allows either an exposed or stowed arrangement. Exposed labels shall not present a potential for snagging any greater than other construction features of the PFD.

36A.4.7 Flag-style arrangements shall be prominently marked on the bottom of the label with the words "Do Not Remove".

36B Markings for Type IV PFDs

36B.1 General

36B.1.1 All required markings shall be clearly reproduced in permanent, waterproof lettering of a single color that contrasts with the color of the surface on which it is applied.

36B.1.2 A device shall not be provided with any marking or literature which modifies or contradicts the intent of the required markings as specified in Section 36B.

36B.1.3 A device shall not have any literature or markings that imply personal protection from impact.

36B.2 Label content and format

36B.2.1 A Type IV device shall be marked in accordance with Device-Specific Required Markings for PFD Label, Table 36.1 , and one of the following, as appropriate:

a) Type IV PFD Label – Printed on Spun-Bonded Paper (Gusset or other Application), Figure 36B.1;

b) Type IV PFD Label – Silk-Screened, Ink-Stamped, or Similar (Gusset or other Application), Figure 36B.2.

c) Type IV PFD Label – Printed on Spun-Bonded Paper (Top or Bottom Cover Application), Figure 36B.3.

b) Type IV PFD Label – Silk-Screened, Ink-Stamped, or Similar (Top or Bottom Cover Application), Figure 36B.4.

Figure 36B.1

Type IV PFD label – printed on spun-bonded paper

(gusset or other application)

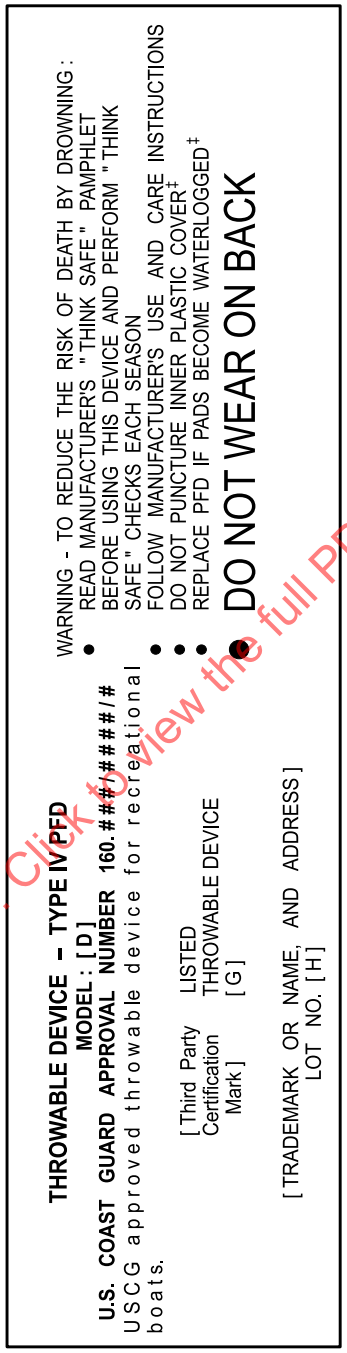


Figure 36B.2

Type IV PFD label – silk-screened, ink-stamped, or similar

(gusset or other application)

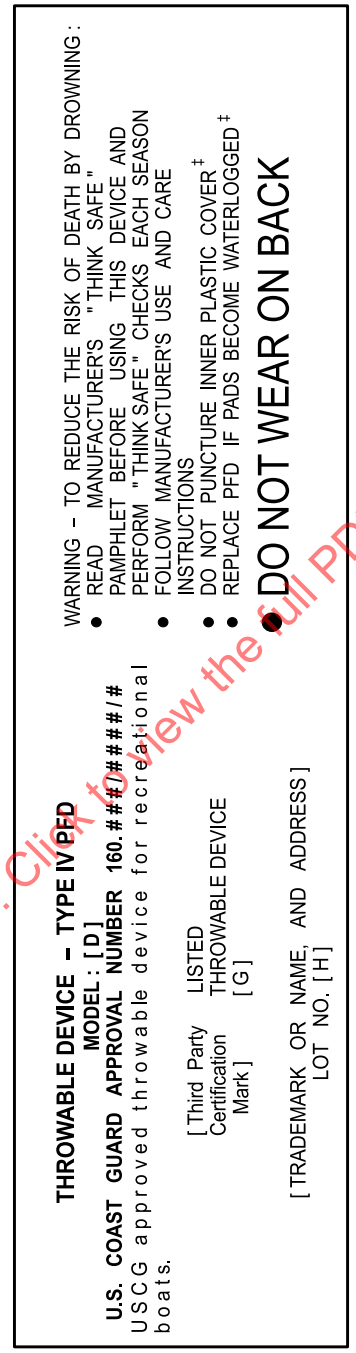


Figure 36B.3

Type IV PFD label – printed on spun-bonded paper

(top or bottom cover application)

THROWABLE DEVICE – TYPE IV PFD

MODEL : [D]

U.S. COAST GUARD APPROVAL NUMBER 160.###/#####/#

USCG approved throwable device for recreational boats.

WARNING – TO REDUCE THE RISK OF DEATH BY DROWNING:

- READ MANUFACTURER'S "THINK SAFE" PAMPHLET BEFORE USING THIS DEVICE AND PERFORM "THINK SAFE" CHECKS EACH SEASON
- FOLLOW MANUFACTURER'S USE AND CARE INSTRUCTIONS
- DO NOT PUNCTURE INNER PLASTIC COVER‡
- REPLACE PFD IF PADS BECOME WATERLOGGED‡
- **DO NOT WEAR ON BACK**

[Third Party Certification Mark]

LISTED THROWABLE DEVICE [G]

[TRADEMARK OR NAME, AND ADDRESS]

LOT NO. [H]

su0148

Figure 36B.4

Type IV PFD label – silk-screened, ink-stamped, or similar

(top or bottom cover application)

THROWABLE DEVICE – TYPE IV PFD

MODEL : [D]

U.S. COAST GUARD APPROVAL NUMBER 160.###/#####/#

USCG approved throwable device for recreational boats.

WARNING – TO REDUCE THE RISK OF DEATH BY DROWNING:

- READ MANUFACTURER'S " THINK SAFE " PAMPHLET BEFORE USING THIS DEVICE AND PERFORM " THINK SAFE " CHECKS EACH SEASON
- FOLLOW MANUFACTURER'S USE AND CARE INSTRUCTIONS
- DO NOT PUNCTURE INNER PLASTIC COVER‡
- REPLACE PFD IF PADS BECOME WATERLOGGED‡
- **DO NOT WEAR ON BACK**

[Third Party Certification Mark]

LISTED THROWABLE DEVICE [G]

[TRADEMARK OR NAME, AND ADDRESS]

LOT NO. [H]

su0149

CONSUMER INFORMATION

37 Consumer Information at Point of Sale

A pamphlet explaining the different performance levels available to the user and any unique features of the particular buoyancy aid offered shall be provided with the buoyancy aid for consumer information. All markings that are provided shall be in English. If Spanish is provided, English shall be first.

37.1 Safe choice placard

All PFDs shall be provided with a Placard as shown in Figure 37.1a and Figure 37.1b, Choose the Device You Will Want to Wear.

Figure 37.1a

Choose the Device You Will Want to Wear (front)

su2085c

Figure 37.1b

Choose the Device You Will Want to Wear (back)

DESIGN TYPES

- INHERENT – built-in flotation (always buoyant).
- INFLATABLE – activated gas canister inflates chamber(s) (no buoyancy until time of inflation, requires canister replacement, may be manual, may require secondary action to don).
- HYBRID – combination of flotation and inflation (some immediate buoyancy and supplemental when inflated, may require canister replacement).
- SPECIAL PURPOSE – your activity may require special features (safety color, harness, straps, etc.) and accessories (whistle, lights, reflectors, etc.) for certain conditions.

YOUR DEVICE ONLY WORKS WHEN WORN

MAINTENANCE

- Over time, exposure to sun, salt, fuel, and mildew can damage device.
- Allow to air dry. Inspect and test regularly.
- Inflatables require replacement rearming, repacking and regular servicing.

READ, SAVE AND FOLLOW INSTRUCTIONS

WARNINGS

- Children should have adult supervision when on or near the water.
- Devices must be fastened correctly and securely.
- Some devices were not designed for certain activities or conditions such as water skiing, towed sports, personal watercraft (PWC), or whitewater paddling.

CHECK LABEL FOR LIMITATIONS OF USE

APPROVAL

- Some devices are approved only when worn.
- Check federal, state/provincial and local requirements for carriage, use and wear.

☑ US Coast Guard ☐ Transport Canada

WEAR IT

For more info on the right choices for yourself, your family and friends.

Visit www.wearitlifejacket.org

su2086e

Spanish Translation for Figures 37.1a and 37.1b

Figure 37.1a (front)	
English	Spanish
CHOOSE THE DEVICE YOU WILL WANT TO WEAR	ESCOJA EL DISPOSITIVO QUE QUIERA USAR
SIZE & FIT • Check label for user weight and chest size. • Different body types float differently. • Try your device on in the water to ensure your airway is clear. • A good fit is secure, comfortable, and adjustable.	TAMAÑO Y AJUSTE • Revisar el peso del usuario y tamaño de pecho de la etiqueta. • Cada tipo de cuerpo flota de manera diferente. • Pruebe su dispositivo en el agua para asegurar que pueda respirar sin problema. • Un buen tamaño es seguro, cómodo y ajustable.
TRY IT ON	PROBÁRSELO
PERFORMANCE •Lower level number generally offers greater mobility, comfort, and style with good flotation for most people. • Higher level number generally offers greater flotation, turning, and stability in the water.	DESEMPEÑO • Un número de nivel más bajo generalmente ofrece gran movilidad, confort y estilo con buena flotación para la mayoría de la gente. • Un número de alto nivel generalmente ofrece gran flotación, viraje, y estabilidad en el agua.
Near Shore (Calm) (Waves) Offshore Increasing time to rescue	Cerca de Costa (Calmado) (Olas) en alta mar. Incremento del tiempo de rescate
No Turn Turns Most	Sin giro, Muchos giros
CONSIDER YOUR ACTIVITY & ENVIRONMENT	CONSIDERAR LA ACTIVIDAD Y EL AMBIENTE
WATER SAFETY INFO * • In over 80% of boating fatalities the person was not wearing flotation. • Most of these are sudden falls overboard or capsize of a small boat. • The first moments in the water are critical, even for experienced swimmers. • Cold water shock causes involuntary gasping, loss of muscle control and swim failure. • Long term immersion in cold water causes hypothermia and requires thermal protection and flotation in the HELP position to conserve energy.	INFORMACIÓN DE SEGURIDAD EN EL AGUA* • En más del 80% de fatalidades navegando la persona no usaba flotador. • La mayoría de estos repentinamente caen de la borda o vuelcan de botes pequeños. • Los primeros momentos en el agua son críticos, incluso para nadadores experimentados. • El choque de agua helada causa jadeo involuntario, pérdida del control muscular y fallas al nadar. • La inmersión de largo plazo en agua helada causa hipotermia y requiere protección térmica y flotación en la posición HELP para conservar energía.
FLOTATION DEVICES SAVE LIVES	LOS EQUIPOS DE FLOTACIÓN SALVAN VIDAS
Figure 37.1b (back)	
DESIGN TYPES • INHERENT – built-in flotation (always buoyant). • INFLATABLE – activated gas canister inflates chamber(s) (no buoyancy until time of inflation, requires canister replacement, may be manual, may require secondary action to don). • HYBRID – combination of flotation and inflation (some immediate buoyancy and supplemental when inflated, may require canister replacement). • SPECIAL PURPOSE – your activity may require special features (safety color, harness, straps, etc.) and accessories (whistle, lights, reflectors, etc.) for certain conditions.	TIPOS DE DISEÑO • INHERENTE - flotación interior (siempre flotan). • INFLABLE - una lata de gas activada infla la(s) cámara(s) (no flota hasta que s einfla, requiere reemplaz o de la lata, puede ser manual, puede requerir acción secundar ia para usarse) • HIBRIDO - combina ción de flotación e inflación (algo de flotabilida d inmediat a y supleme nta cuando se infla, puede requerir un cambio de repuesto) • PROPÓSITO ESPECIAL - su actividad puede requerir características especiales (color de seguridad, arnés, cordones, etc.) y accesorios (silbato, luces, reflectores, etc.) para ciertas condiciones.
YOUR DEVICE ONLY WORKS WHEN WORN	SU DISPOSITIVO SOL FUNCIONA SI ESTA PUESTO
MAINTENANCE • Over time, exposure to sun, salt, fuel, and mildew can damage device. • Allow to air dry. Inspect and test regularly. • Inflatables require replacement rearming, repacking and regular servicing.	MANTENIMIENTO • Pasado el tiempo, la exposición al sol, a la sal, al combustible y al moho puede dañar el dispositivo. • Se permite secar con aire. Inspeccionar y probar regularmente. • Los inflables requieren rearmado, reempaquetado y mantenimiento regular.

Spanish Translation for Figures 37.1a and 37.1b Continued on Next Page

Spanish Translation for Figures 37.1a and 37.1b Continued

READ, SAVE AND FOLLOW INSTRUCTIONS	LEER, GUARDAR Y SEGUIR INSTRUCCIONES
WARNINGS • Children should have adult supervision when on or near the water. • Devices must be fastened correctly and securely. • Some devices were not designed for certain activity or conditions such as water skiing, towed sports personal watercraft (PWC), or whitewater paddling.	ADVERTENCIAS • Los niños deben estar bajo la supervisión de un adulto cuando estén en o cerca del agua. • Los dispositivos deben abrocharse correctamente y con seguridad. • Algunos dispositivos no fueron diseñados para ciertas actividades o condiciones como esquí en agua, deportes de remolque o uso en embarcaciones personales.
CHECK LABEL FOR LIMITATIONS OF USE	REVISAR LAS LIMITACIONES DE USO EN LA ETIQUETA
APPROVAL • Some devices are approved only when worn. • Check federal, state/provincial and local requirements for carriage, use and wear.	APROBACIÓN • Algunos dispositivos son aprobados solo cuando se usan. • Revisar requisitos federales, estatales/provinciales y locales para el transporte, uso y vestimenta.
US Coast Guard	Guardia Costera de los E.U.
WEAR IT	ÚSELO
For more info on the right choices for yourself, your family and friends visit www.wearitlifejacket.org	Para más Información en las decisiones correctas para usted, su familia y amigos, viste www.wearitlifejacket.org

37.2 Child placard

37.2.1 In addition to 37.1 all PFDs for users under 25 kg (55 lbs.) shall be provided with a Placard as shown in Figure 37.2.1, Child Placard, Choosing the Right Lifejacket.

37.2.2 The length and width of the Placard shall be no less than 21.5 cm x 13.9 cm, respectively.

Figure 37.2.1

Child Placard, Choosing the Right Lifejacket

IMPORTANT INFORMATION ABOUT CHILDREN'S PFDs

⚠WARNING *To reduce the risk of drowning, read and follow the information* **1** in this tag, **2** in the label on your Personal Flotation Device (PFD), **3** in the "Safe Choice" placard.

Select the Right PFD for your Child!

When choosing a PFD for your child, understand that different types of PFDs have various strengths and limitations, see www.uscgboating or www.tc.gc.ca/ for the different types of PFDs.

Make sure your child's PFD fits properly!

Select a PFD that fits your child based on his/her weight, and other sizing on the PFD, such as chest size. Make sure your child's weight is within the range marked on the PFD. The PFD should fit snugly, but not too tightly. Do not buy a PFD that your child will "grow into".

Have your child try on the PFD and test its fit by lifting the child up by the shoulders of the PFD - the PFD is too large if it slips up over the child's chin or ears. Always use leg straps, if provided, to keep PFD securely in place.

Teach your child how to float with a PFD!

Floating in a calm, "face-up" position is not something that comes naturally to children. Before going boating, teach your child how to float safely in a pool or shallow water where the child cannot touch bottom. Specifically, you should:

1. **Teach your child to be calm in the water. Children sometimes panic when they enter the water. This causes them to move their arms and legs frantically, making it difficult for them to float safely with a PFD.**
2. **Teach your child to float on his/her back with arms and legs in the water and head back, face out of the water (see the figure below). The height and weight distribution of some young children makes them "top-heavy," causing them to tip in the water until they learn to float in a calm, "face-up" position.**
3. **Teach your child to turn to a "face-up" position from a "face-down" position. Have your child practice turning himself/herself until you are certain that he/she can turn to a "face-up" position consistently and reliably.**

Floating "face-up"

Floating "face-up" using a device with head support.

If your child cannot turn to maintain a relaxed, "face-up" floating position after getting used to wearing a PFD, try another style or type of PFD.

MAKE SURE YOUR CHILD WEARS A PFD AT ALL TIMES!

su2113a

Spanish Translation for Figure 37.2.1

English	Spanish
IMPORTANT INFORMATION ABOUT CHILDREN'S PFDs	INFORMACIÓN IMPORTANTE ACERCA DE LOS DFP PARA NIÑOS
WARNING To reduce the risk of drowning, read and follow the information 1 in this tag, 2 in the label on your Personal Flotation Device (PFD), 3 in the "Safe Choice" placard.	ADVERTENCIA Para reducir el riesgo de ahogamiento, leer y seguir la Información de 1 en esta pancarta, 2 en la etiqueta de su dispositivo de flotación personal (DFP), 3 en el panfleto 'Elección Segura'.
Select the Right PFD for your Child! When choosing a PFD for your child, understand that different types of PFDs have various strengths and limitations, see www.uscgboating.org for the different types of PFDs.	¡Seleccione el DFP correcto para su niño! Cuando se escoge un DFP para su niño, entienda que los diferentes tipos de DFP tienen varias resistencias y limitaciones. Visite www.uscgboating.org.
Make sure your child's PFD fits properly! Select a PFD that fits your child based on his/her weight, and any other sizing on the PFD, such as chest size. Make sure your child's weight is within the range marked on the PFD. The PFD should fit snugly, but not too tightly. Do not buy a PFD that your Child will "grow into". Have your child try on the PFD and test its fit by lifting the child up by the shoulders of the PFD – the PFD is too large if it slips up over the child's chin or ears. Always use leg straps, if provided, to keep PFD securely in place.	¡Asegúrese que el DFP de su niño se ajuste apropiadamente! Seleccione el DFP que se ajuste a su niño basándose en su peso, y otras medidas del DFP, tales como el contorno de pecho. Asegúrese que el peso de su niño este dentro del rango marcado en el DFP. El DFP debe ajustarse perfectamente, pero no muy ajustado. No comprar un DFP de talla mayor a la que su niño necesita. Haga que sus niños se prueben el DFP y pruebe su ajuste levantando al niño de los hombros del DFP - el DFP es demasiado largo si se resbala sobre la barbilla u orejas del niño. Siempre usar correas de pierna, si se proporcionan, para mantener el DFP asegurado en un lugar.
Teach your child how to float with a PFD! Floating in a calm, "face-up" position is not something that comes naturally to children. Before going boating, teach your child how to float safely in a pool or shallow water where the child cannot touch bottom. Specifically, you should: 1 Teach your child to be calm in the water. Children sometimes panic when they enter the water. This causes them to move their arms and legs frantically, making it difficult for them to float safely with a PFD. 2 Teach your child to float on his/her back with arms and legs in the water and head back, face out of the water (see the figure below). The height and weight distribution of some young children makes them "top-heavy," causing them to tip in the water until they learn to float in a calm, "face-up" position. 3 Teach your child to turn to a "face-up" position from a "face-down" position. Have your child practice turning himself/herself until you are certain that he/she can turn to a "face-up" position consistently and reliably.	¡Enseñe a su niño como flotar con un DFP! Flotar en una posición tranquila "cara-arriba" no es algo que los niños conozcan por instinto. Antes de ir a navegar, enseñe a su niño como flotar con seguridad en una alberca o agua poco profunda donde el niño pueda tocar el fondo. Especialmente, usted debe: 1 Enseñe a su niño a estar calmado en el agua. Los niños algunas veces entran en pánico cuando están en el agua. Esto causa que muevan los brazos y piernas frenéticamente, haciendo difícil para ellos flotar con seguridad en un DFP. 2 Enseñe a sus niños a flotar en su espalda con brazos y piernas en el agua y la cabeza hacia atrás, (ver la figura debajo). La distribución de altura y peso de algunos niños jóvenes los hace "muy pesados," causándoles tocar el agua hasta aprender a flotar con calma, en posición "cara arriba". 3 Enseñe a sus hijos a colocarse "cara arriba" partiendo de una posición "cara abajo". Ayude a su niño a practicar el viraje hasta que usted esté seguro de que él/ella pueden volver a la posición "cara arriba" de manera constante y fiable.
Floating "face-up" Floating "face-up" using a device with head support.	Flotando « cara arriba » Flotando « cara arriva » usando un dispotivo de apoyo en su cabeza.
If your child cannot turn to and maintain a relaxed, "face-up" floating position after getting used to wearing a PFD, try another style or type of PFD.	Si su niño no puede voltearse para mantenerse relajado, en posición de flotación "cara arriba" después de usar un DFP, pruebe otro estilo o tipo de DFP.
MAKE SURE YOUR CHILD WEARS A PFD AT ALL TIMES!	¡ASEGÚRESE QUE SU NIÑO USE EL DFP TODO EL TIEMPO!

37.3 *Deleted*

37.4 *Deleted*

37.5 *Deleted*

37.6 *Deleted*

38 Required PFD Pamphlet Text

38.1 *Deleted*

38.2 *Deleted*

38.3 *Deleted*

38.4 *Deleted*

39 Optional Text

39.1 *Deleted*

39.2 *Deleted*

39.3 *Deleted*

No Text on This Page

SUPPLEMENT SA – TYPE V BUOYANT SUITS

GENERAL

SA1 Scope

SA1.1 The requirements in this supplement cover buoyant suits.

SA1.2 The suits covered by the requirements in this supplement are:

a) Intended for USCG approval as a Type V device under 46 CFR 160.053 or 160.064, or both; and

b) Required by the USCG to provide thermal-protection properties acceptable to the USCG.

SA1.3 These requirements do not cover immersion suits intended for USCG approval under 46 CFR 160.171.

SA2 Glossary

SA2.1 For the purposes of this supplement, the following definitions apply.

SA2.2 DESIGN PRESSURE RANGE – The range of pressures, as specified by the manufacturer, to which a compartment may be inflated to provide the intended in-water performance.

SA2.3 SUIT – A device that is intended for extended wear and provides buoyancy at the lower portion of the body (such as the legs) in addition to buoyancy at the upper portion. Such a device usually covers most or all of the body.

SA3 General

SA3.1 A suit shall comply with the requirements specified in Sections 4 – 39 (as applicable to jackets), except as modified or superseded by the requirements in this supplement.

SA3.2 Unless otherwise specified, if a suit consists of a coat and pants, these requirements apply only to:

a) Coat and pants; and

b) Coat only, and not to pants only.

SA3.3 A suit intended for USCG approval under 46 CFR 160.053 shall comply with the requirements specified in:

a) Sections SB4 – SB5, SB13 – SB15, SB16.1.2, and SB17 in Supplement SB; and

b) Section SB11 in Supplement SB in lieu of the requirements in Section SA8 of this supplement.

Exception: The suit need not be universal size.

SA3.4 Materials for inflatable compartments, if provided, shall comply with the requirements specified for one of the following:

a) RF Welded, Urethane Coated Nylon Compartment Materials for Hybrid and Fully Inflatable Recreational PFDs in the Standard for Components for Personal Flotation Devices, UL 1191;

b) Coated Fabric in section 3.1.1 of FAA Technical Standard Order-C13f;

c) Unsupported Film in section 3.2.6 of MIL-L-2411(SH) and shall be encased in fabric complying with UL 1191 for Use Code 3; or

d) Knitted Fabric Laminated to Foam Flotation Material of at least a nominal 5-mm (3/16-inch) thickness meeting the requirements of the Standard for Components for Personal Flotation Devices, UL 1191.

SA3.5 An inflation system for an inflatable compartment, if provided, shall comply with the applicable requirements for Inflation Systems for Hybrid PFDs in the Standard for Components for Personal Flotation Devices, UL 1191.

SA3.6 For a compartment supplied by an oral inflation system:

a) The minimum value of the design pressure range shall be not greater than 0.6 psig (4 kPa), and

b) The maximum value of the design pressure range shall be not less than 2 psig (14 kPa) or the maximum final pressure permitted by an overpressure-relief valve, whichever is less.

PERFORMANCE

SA4 Donning Test

SA4.1 A suit shall be tested as specified in 15.2 – 15.5, SA4.2, and SA4.3. The donning time for each test subject shall be 2 minutes or less.

SA4.2 For this test, each subject is to wear athletic shoes, or the equivalent, having traction soles. The suit is to be wet for at least one donning attempt by one subject.

SA4.3 If donning and adjustment of the candidate suit on a subject is not achieved within 2 minutes after the subject has received the instruction specified in 15.5, the test is to be repeated by the subject with the reference vest (see 3.18). If the reference vest is not donned and adjusted within 1 minute, the subject is to be disqualified and replaced.

SA5 Flotation Stability Test

SA5.1 A suit shall be tested as specified in 16.3.3 and 16.3.4. The suit with any inflatable compartment orally inflated, shall comply with the requirements in 16.3.1, and the average freeboard for the group of test subjects shall be not less than 2 inches (see SA5.3). When an inflatable compartment is provided, the freeboard is to be measured in both the inflated and deflated condition. The average value obtained in the deflated condition shall be not less than 2 inches.

SA5.2 A suit shall comply with the requirements specified in 16.4.1 and 16.4.2 when tested as specified in 16.4.4 – 16.4.9 and under each of the following conditions:

a) The suit is to be tested with all closures secured. Also, see 14.2.

b) The suit is to be tested with the subject jumping feet-first in accordance with SA6.2 and then diving head-first into the water from a 3-foot (0.9-m) height.

c) If a suit consists of a coat and pants, the suit is to be tested in the following configurations:

1) Coat and pants;

2) Coat only; and

3) Pants only (in the pants-only configuration, the suit need comply only with the requirement specified in 16.4.2).

SA5.3 When tested as specified in SA5.2, the average freeboard of a suit at static balance shall be at least 2 inches (50 mm) but in no case less than 1 inch (25 mm) on an individual test subject, and respiration shall not be impaired. Test subjects are to be selected as specified in 16.1.1. If the suit consists of a coat and pants, these requirements apply only in the configurations of:

a) Coat and pants; and

b) Coat only, and not in the pants only configuration.

SA6 Jump and Air Entrapment Test

SA6.1 A suit shall sustain no structural damage and shall maintain its intended position on each subject as defined by 17.4 when tested as specified in SA6.2. In addition, the suit shall not:

a) Restrict the wearer from attaining a face-up position within 5 seconds (such as by excessive air entrapment) after the wearer enters the water;

b) Stretch to the extent that the mouth, nose, or eyes are obstructed; and

c) Exhibit signs of leakage as evidenced by a continuous stream of bubbles from any inflatable compartment.

SA6.2 The number of test subjects to be used is to be determined as specified in Table 16.1. Each test subject is to jump feet-first three times from a 10-foot (3-m) height into the water. The inflatable compartment, when provided, is to be inflated orally for at least one of the three jumps. At least one subject from the group of subjects is to jump with the compartment inflated to at least 0.6 psig (4 kPa). Each jump is to be performed with the subject's arms extended vertically overhead.

SA7 Water Emergence Test

SA7.1 While wearing the candidate suit at least two thirds of the test subjects (i.e., 4 test subjects; see SA7.4) shall be capable of emerging within 30 seconds from the water to the top of the 1-foot (305-mm) platform specified in SA7.3. Subjects are to be qualified using the reference vest. The test is to be conducted with the test subject wearing the reference vest and then repeated wearing the candidate suit. Successful emergence attempts in the candidate suit by subjects unable to qualify in the reference vest are acceptable. The subjects are to be selected as specified in SA7.4.

Exception: Due to physical limitations of the subject group, fewer than two thirds of the subjects may be used to qualify in the extreme sizes (e.g., extra-large), provided it is demonstrated that the construction does not hamper the subject's emergence attempts to an extent greater than the reference vest and the dimensional progression relative to the other sizes is consistent.

SA7.2 A subject unable to emerge successfully in the candidate suit is to be instructed to open any wrist, ankle, thigh, or the like, closures fully and try again. If opening of these closures is necessary to emerge successfully, the suit shall be marked in accordance with SA16.7.

SA7.3 A platform, measuring approximately 4 by 8 feet (1.2 by 2.4 m) and constructed of at least 3/4-inch (20-mm) marine grade wood with a smooth sealed surface is to be located at the edge of the pool so that its top is 1 foot (305 mm) above the water. Neither the bottom nor side of the pool, nor edges of the platform are to be used by subjects emerging from the pool onto the platform.

SA7.4 Six subjects wearing the reference vest (Type I Adult, Model 3 constructed in accordance with 46 CFR 160.002) are to enter the water and station themselves within 3 feet (0.9 m) of the platform, and then are to attempt to climb onto the platform within 30 seconds. The time period is to start when the subject's hands touch the platform. The subjects are to repeat the procedure while wearing the candidate suit, as specified in SA7.5.

SA7.5 After donning the candidate suit, each subject is to enter the water feet-first with all the closures open. While the subject swims or treads water for at least 1 minute the suit is to be allowed to flood completely. Prior to emerging from the water on the top of the platform, the subject is to fasten all closures.

SA7.6 If the required number of subjects are unable to emerge in the candidate suit and less than two thirds of the subjects have qualified in the reference vest, then additional subjects shall be substituted for subjects who couldn't emerge in either device until the required number of subjects emerges in either the candidate suit or the reference vest.

SA8 Buoyancy Test

SA8.1 A suit is to be tested as specified in 20.3 – 20.8. The suit shall comply with the requirement for jackets specified in 20.2, using the applicable minimum buoyancy specified in Table SA8.1 in lieu of the value specified in Table 20.1. If an inflatable compartment is provided, it shall be in the deflated condition for this portion of the test.

Table SA8.1
Minimum buoyancy

Device	Minimum buoyancy[a], pounds-force (N)
For persons weighing more than 90 pounds-mass (40.8 kg)	15-1/2 (68.9)
[a] Minimum value either measured at, or corrected to, atmospheric pressure of 29.92 inches (760 mm) mercury and water temperature of 68°F (20°C).	

SA8.2 The buoyancy of an inflatable compartment shall be measured when inflated to 0.6 psi (4 kPa) after 15 minutes and after 24 hours of submergence. After 24 hours of submergence, the buoyancy of the inflatable compartment shall be not less than 95 percent of the buoyancy after 15 minutes of submergence.

SA9 Water Retention Test

SA9.1 A suit need not comply with the requirements for water retention specified in Water Retention Test, Section 21.

SA10 Dynamic Strength Test

SA10.1 *Deleted*

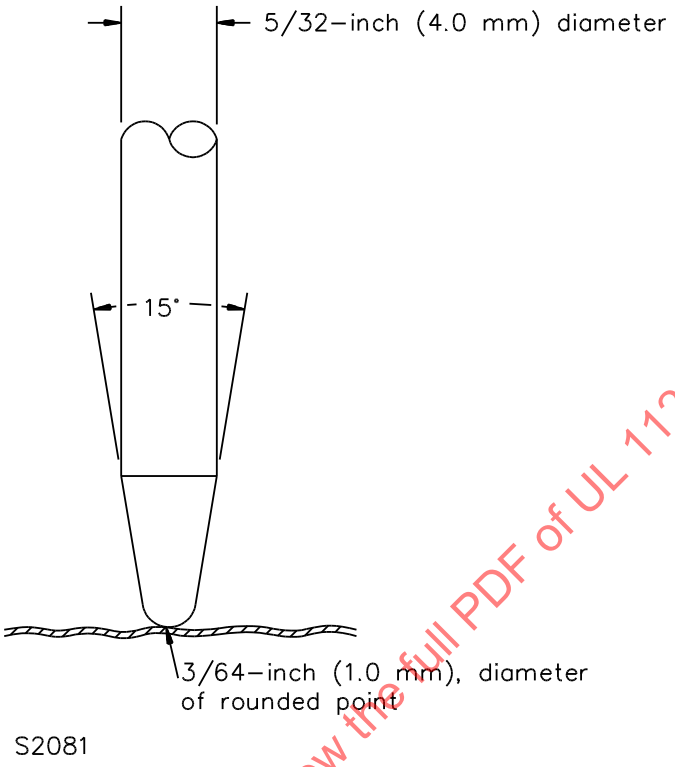
SA11 Puncture Resistance Test

SA11.1 Each inflatable compartment, if provided, of a suit shall withstand without puncture, the test described in SA11.2.

SA11.2 The compartment is to be inflated to the maximum value of the design pressure range and placed on a rigid, smooth, flat plywood surface. The steel test point illustrated in Figure SA11.1 is to be pressed against each chamber at three different locations (such as each front side and the collar), at a point of maximum wall separation for each compartment, perpendicular to the wall, and with a uniform speed of 6 – 12 inches per minute (2.5 – 5.0 mm/s) until a force of 7 pounds (31 N) is attained.

Figure SA11.1

Test point



SA12 Strength of Attachment Tests

SA12.1 An inflatable compartment, if provided, shall comply with the applicable Strength of Attachment Tests in the Standard for Hybrid Personal Flotation Devices, UL 1517.

SA13 Overpressure Tests

SA13.1 An inflatable compartment constructed of material described in SA3.4 (a), (b), or (c), when provided, shall comply with the Overpressure Tests specified in the Standard for Hybrid Personal Flotation Devices, UL 1517; except the test pressure is to be 2 times the maximum design pressure range or 4 psig (28 kPa), whichever is greater.

SA13.2 An inflatable compartment constructed of material described in SA3.4(d), when provided, shall not leak when inflated with air to twice the buoyance provided at the maximum design pressure, but not to exceed 4 psig.

SA14 Temperature Test

SA14.1 A suit shall comply with the requirements specified in 29.1.1 – 29.3.2 and SA15.1.

SA14.2 During the test specified in 29.1.1, donning of a suit is to be started within 30 seconds after removal from the exposures specified in 29.2.1 and 29.3.1.

SA15 Seam Strength Test

SA15.1 When tested in accordance with 31.2.2 and 31.2.3, the average strength of samples for a material such as neoprene that has no directions of greater thread count and of lesser thread count shall be not less than 50 pounds-force (222 N) in any direction.

MARKING

SA16 General

SA16.1 The required formatting and markings as described in Figure 36.1 – Figure 36.4 and Table 36.1 shall be utilized in conjunction with SA16.2 – SA16.7 and the following:

a) An intended use statement, such as "deck suit" or "antiexposure coverall."

b) "TYPE V PFD."

c) The generic name of the buoyant material and the minimum buoyancy for the device as specified in SA8.1 or SB11.1, as applicable, in the form "_____ buoyant material provides a minimum buoyant force of ____ pounds." The words "at time of manufacture" may be added to the end of the statement.

d) "Inspected and tested in accordance with U.S. Coast Guard regulations."

e) The USCG approval number(s) in the form "U. S. Coast Guard approval no. * /XXX/X," where * is 160.053 or 160.064, or both." See SA16.4.

f) "For persons weighing more than 90 pounds."

g) Chest size. If the chest size marking is not located as specified in Figures 36A.1 – 36A.4 and Table 36A.1, the marking shall be located on the inside back of the neck or other prominent place with the chest size for which it is intended.

h) "This device is not an approved replacement for an immersion (exposure) suit."

i) "As this device cannot be donned as quickly as a conventional PFD, it must be worn at all times to be counted as an approved device."

j) "When this suit is worn with a Type I device, it is recommended that the Type I device be placed over the suit, not under."

k) "The wearer should realize that the turning moment of the Type I device may be decreased when worn over a Type V device."

l) "ATTENTION – This device may increase the difficulty of emerging from the water."

SA16.2 A suit intended for USCG approval under 46 CFR 160.064 shall be marked, immediately alongside of or below the marking specified in SA16.1(b): "This device is a Type V thermal PFD with RESTRICTED APPROVAL under USCG Subpart 160.064 and is an approved replacement for a Type III PFD ONLY WHEN WORN. Wear it. This device has been shown to significantly increase an individual's chances for survival in cold water when properly donned."

SA16.3 A suit intended for USCG approval under 46 CFR 160.053 shall be marked, immediately alongside of or below the marking specified in SA16.1(b): "This device is a Type V work suit. It is a work PFD approved for the same uses and under the same limitations as work vests under USCG Subpart 160.053. Wear it. This device has been shown to significantly increase an individual's chances for survival in cold water when properly donned."

SA16.4 If marked "160.053" in accordance with SA16.1(e), each device shall be marked on the front panel "WORK PFD ONLY" in letters not less than 1 inch (25 mm) high.

SA16.5 If a suit consists of a coat and pants, the pants shall be marked with the word "CAUTION" and the following or the equivalent: "DO NOT WEAR PANTS ONLY, BECAUSE THEY MAY FLOAT YOU IN AN UNSAFE POSITION IN THE WATER."

SA16.6 A suit shall not be marked with a test speed.

SA16.7 If it is necessary to open any closures for compliance with the Water Emergence Test, Section SA7, a suit shall be marked "CAUTION:" and the following, or equivalent wording," It may be necessary to open closures (wrist, ankle, thigh and the like) to emerge from the water." See SA7.2.

INFORMATION PAMPHLET

SA17 General

SA17.1 A pamphlet shall be provided with a recreational Type V buoyant suit and shall address the special features and restrictions which place the device in the Type V category. Additional pages may be used to convey this information. See Appendix A for the front cover information and Appendix B for the text of inside pages for a buoyant suit.

No Text on This Page

SUPPLEMENT SB – TYPE V WORK VESTS

GENERAL

SB1 Scope

SB1.1 The requirements in this supplement cover personal flotation devices intended for use on merchant vessels as work vests.

SB1.2 The devices covered by the requirements in this supplement are intended for USCG approval as Type V work vests under 46 CFR 160.053.

SB1.3 The requirements in this supplement also cover personal flotation devices intended for use both in recreational boating activities and as work vests. See SB2.2.

SB2 Glossary

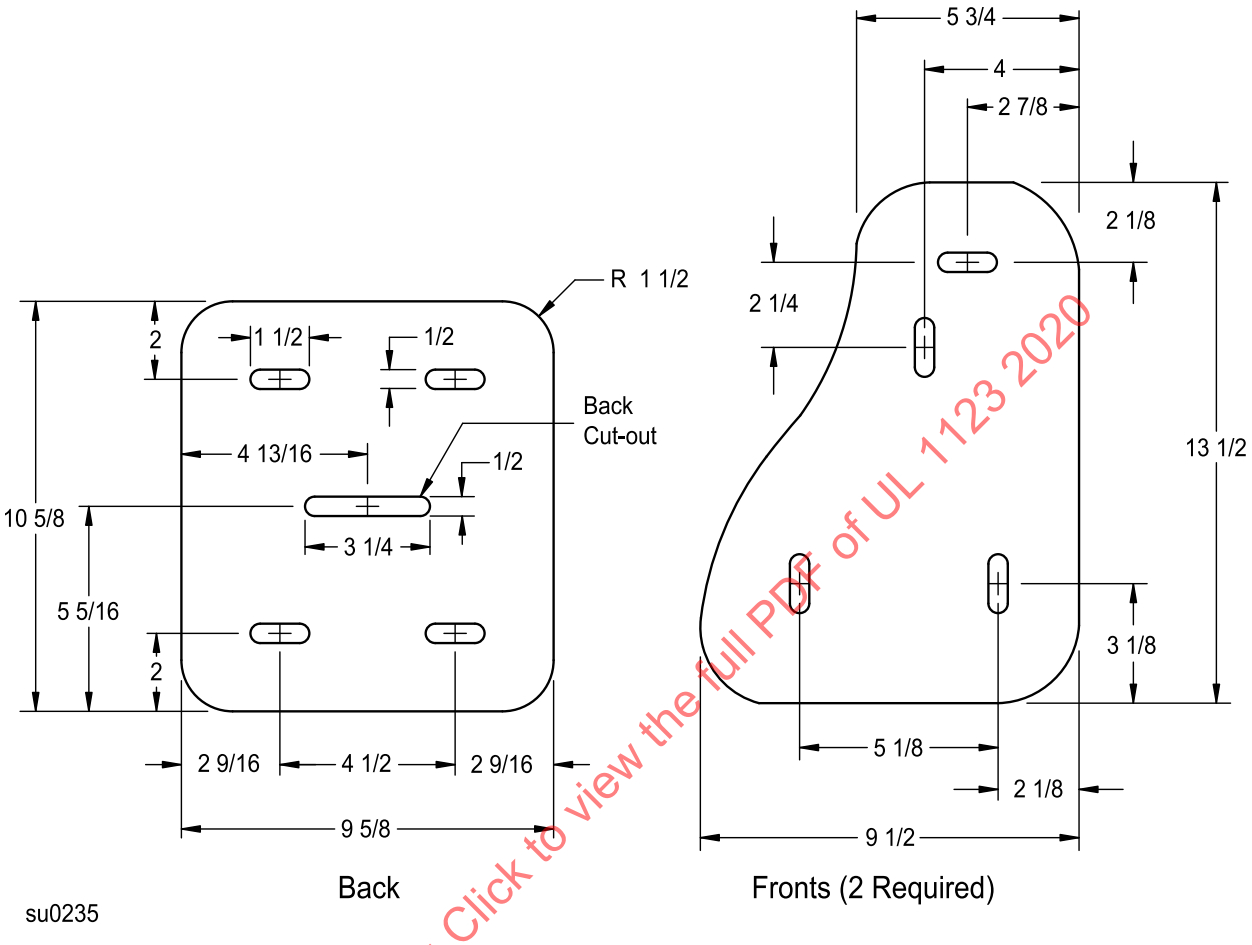
SB2.1 For the purposes of this supplement, the following definitions apply.

SB2.2 COMBINATION LABEL DEVICE – A device intended for USCG approval as a Type II or III device under 46 CFR 160.064 in combination with approval as a Type V device under 46 CFR 160.053.

SB2.3 REFERENCE VEST – The standard USCG Type V work vest constructed in accordance with 46 CFR 160.053 and Military Specification MIL-L-17653A for single body strap devices, or a vinyl coated reference vest in accordance with USCG Model WV-RTD-TBS as described in Figure SB2.1, Figure SB2.2, and Figure SB2.3 for twin body strap devices.

Figure SB2.1

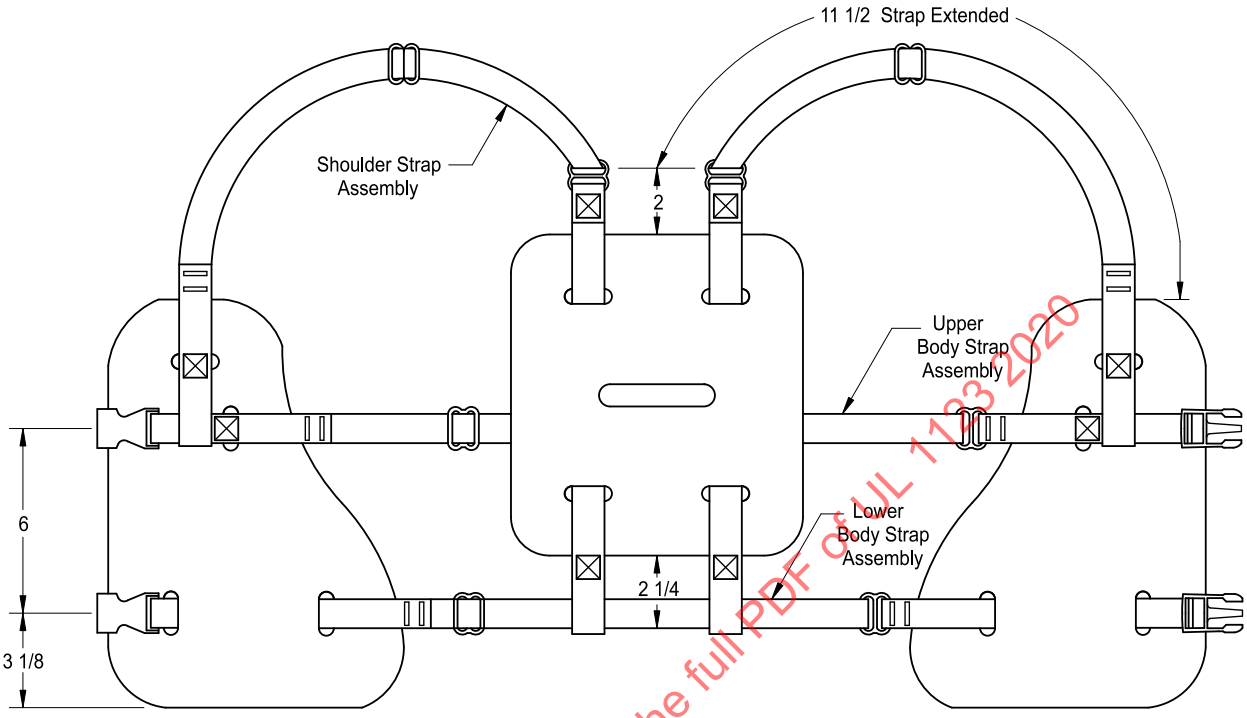
Model WV-RTD-TBS vinyl coated buoyant foam pads



1. Drawing not to scale.
2. Dimensions are in inches and after vinyl coating. Linear Tolerance: ±1/4; Thickness: 1-3/4; Thickness Tolerance: ±1/8.
3. Vinyl coating shall be any UL Recognized Polymeric Coating of 0.010 inches minimum thickness, color Indian Orange or International Orange.
4. Holes shall be reinforced with vinyl film extending a minimum of 1/2 inch beyond hole perimeter adhered on either side of foam prior to dipping.
5. Foam buoyant material shall be any use code 5WV, UL Recognized PVC foam.
6. Fronts and/or back may be made up of a single layer or two layers glued together to achieve required thickness.
7. Buoyancy of complete device shall be 18-1/4 pounds, ±3/4 pound.
8. Buoyancy distribution shall be 67%, ±1%.
9. Markings shall be in accordance with UL 1123, SB16.

Figure SB2.2

Model WV-RTD-TBS Vinyl Coated Work Vest Assembly



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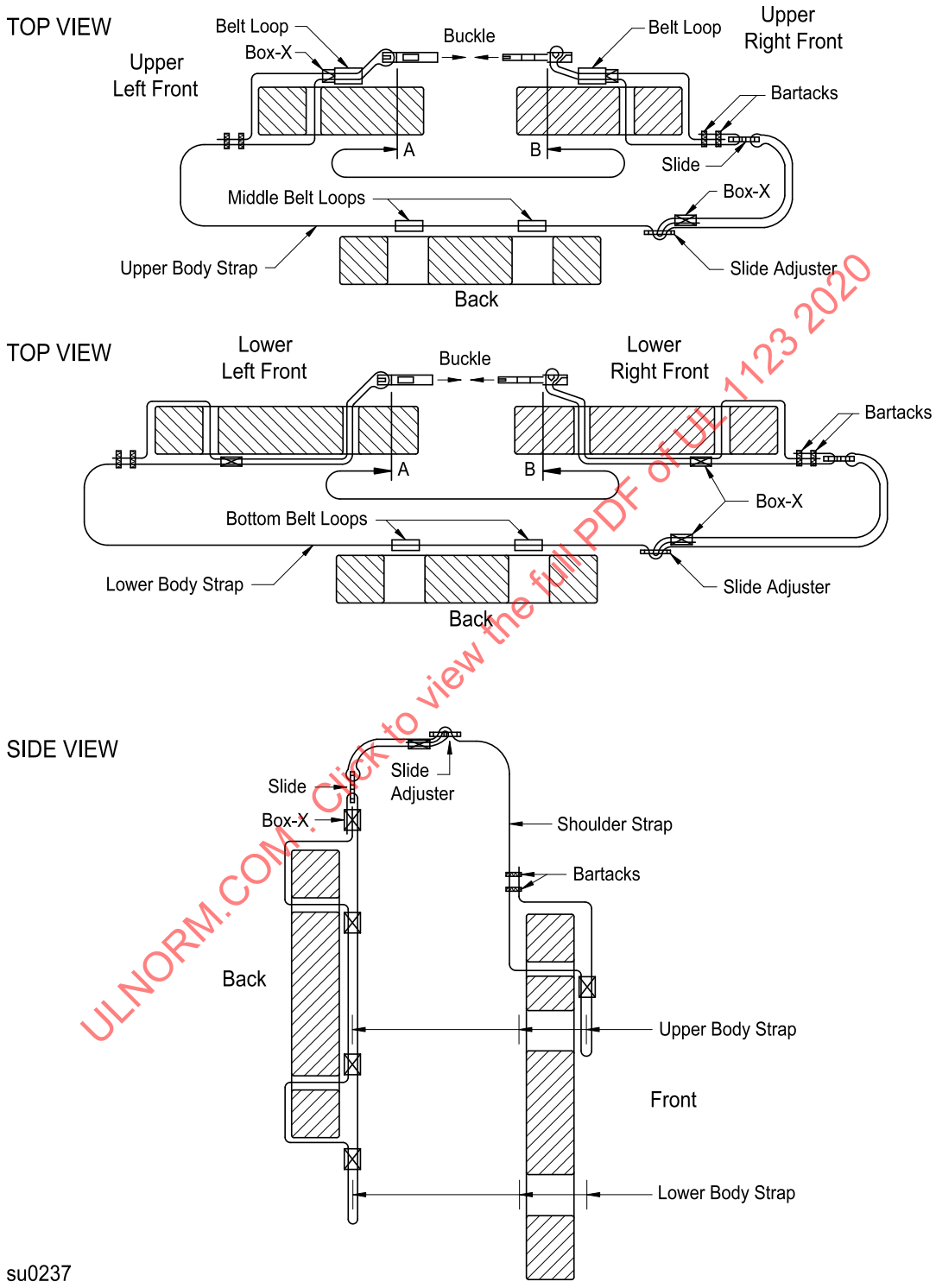
1. Drawing not to scale.
2. Dimensions are in inches. Linear Tolerance: ±1/4.
3. Buckles shall be one inch UL Recognized YKK, Model LBV-1.
4. Webbing shall be one inch UL Recognized Tape Craft, Style P0001-webbing.
5. Slide Adjusters shall be Aluminum, Style 10053-51-50042 by ITW Waterbury Buckle.
6. Thread shall be any UL recognized use code 1 or 5WV thread.

Figure SB2.3

Model WV-RTD-TBS Body Strap, Shoulder Strap, and Belt Loop Assemblies



1. Drawing not to scale.

2. Dimensions are in inches. Linear Tolerance: ±1/4.

Note for Top View: Body Strap finished length from A to B shall be 49-1/2, ±1/2, when fully extended measured from mating edge to mating edge of buckle.

SB3 General

SB3.1 A candidate device shall comply with the requirements in Sections 4 – 39, as applicable, except as modified or superseded by the requirements in this supplement.

SB4 Components

SB4.1 A component covered in Table SB4.1 shall have at least the minimum properties specified in Table SB4.1 when tested in accordance with the applicable specifications in the Standard for Components for Personal Flotation Devices, UL 1191.

Table SB4.1
Components

Component	Applicable UL 1191 test	Conditioning	Minimum required values
Fabric	Breaking Strength	As-received and after accelerated weathering	Either 105 pounds-force (470 N) average in direction of greater thread count and 70 pounds-force (310 N) average in direction of lesser thread count, or 90 pounds-force (400 N) average in each direction
Webbing	Breaking Strength	As-received and after accelerated weathering	360 pounds-force (1600 N) average
Hardware	Strength	After salt spray exposure (metal), as-received and after accelerated weathering and high and low temperatures (plastic)	225 pounds-force (1000 N)

SB4.2 Webbing shall be at least 1 inch (25.4 mm) wide.

SB4.3 A polymeric coating shall be no less than 0.010 inch (0.25 mm) thick.

SB4.4 The buoyant material of a device shall be foam flotation material.

CONSTRUCTION

SB5 General

SB5.1 The construction of a device shall acceptably reduce the likelihood of snagging, such as by providing means to secure the free ends of body straps and the like. Tie tapes, decorative "D" rings, and the like shall not be provided.

SB5.2 The external surfaces (the surfaces facing away from the body) of a device shall be a highly visible color such as:

a) Indian Orange;

b) Scarlet Munsel 7.5, Red 6/10; or

c) International Orange.

SB5.3 The primary means of closure of a device shall consist of one or more body straps.

SB5.4 The excess webbing length shall be less than 4 inches (101.6 mm) when measured from the body of the device at the last point of securement (e.g. plastic belt keeper, belt loop, stitch, hardware, etc.) to the furthest endpoint of the webbing per the manufacturer's donning instructions.

SB6 Sizing

SB6.1 A device shall be constructed for use by persons weighing more than 90 pounds (41 kg) and shall be sized to fit chest sizes 32 to 50 inches (81 – 127 cm).

Exception: A device may be designed to fit other chest size ranges provided the chest size range that the device was tested for is marked on the approval label. The size shall be marked in letters not less than 0.5 inch (12.5 mm) on the front panel of the work vest with the marking required by SB16.1.2. Other size devices of the same construction shall include the full chest size range of 32 – 50 inches (81 – 127 cm).

PERFORMANCE

SB7 Donning Test

SB7.1 For a candidate device intended for use only as a work vest (not a combination label device), the average donning time for the group of test subjects shall be not more than 1 minute when the device is tested as specified in 15.2 – 15.5 and SB7.2. A combination label device shall comply with the requirements in 15.1 when tested as specified in 15.2 – 15.7.

SB7.2 If donning and adjustment of the candidate work vest on a subject is not achieved within 1 minute after the subject has received the instruction specified in 15.5, the test is to be repeated by the subject with the reference vest (see SB2.3). If the reference vest is not donned and adjusted within 2 minutes, the subject is to be disqualified and replaced.

SB7.3 The test participant is then to be given the instructions, "This vest will be used around machinery. The loose ends of the webbing straps need to be secured to prevent becoming entangled in machinery. Read the manufacturer's donning instructions to secure loose straps. "The test participant is not timed. A candidate device shall comply with the requirements in SB5.4 with no more than 10 percent of the test participants being unsuccessful. When more than 10 percent of the test participants are unsuccessful, one of the following shall apply:

a) Increase the number of test participants until the candidate device achieves a 90 percent success rate; or

b) A revised set of manufacturer's donning instructions is provided with all tests repeated.

SB8 Flotation Stability Test

SB8.1 A candidate device shall comply with the requirements in 16.2.1 and 16.3.1 when subjected to the tests specified in 16.1.1 – 16.3.4 (see SB2.3 for the reference vest to be used).

SB8.2 A candidate device shall comply with the requirements in SB5.4 following the tests specified in SB8. When the test participant is unsuccessful, a revised set of manufacturer's donning instructions is required and the test shall be repeated using a new test participant.

SB9 In-Water Removal Test

SB9.1 The time required by each subject to remove the candidate device shall be:

a) Less than 15 seconds; or

b) If more than 15 seconds not more than the time required to remove the reference vest,

when the device is tested as specified in SB9.2 – SB9.4.

SB9.2 The test subjects used for the test specified in Section SB8 are to be used for this test. Each subject is to repeat the test twice; first with the reference vest, then with the candidate device.

SB9.3 The subject is to be positioned in a pool at a point:

a) Where there is sufficient depth for the subject to float freely; and

b) That is at least 2 feet (0.6 m) from the edge of the pool.

The subject then is to be given the instructions: "At the command of 'go,' remove the device as quickly as possible... ready.... go." The time from the command "go" until complete removal of the device is to be recorded. To simulate an emergency situation, the subject may be given additional instructions during the removal attempt indicating that quick removal is imperative.

SB9.4 If a subject is unable to remove the reference vest within 60 seconds, the subject is to be disqualified and a new subject used for the test.

SB10 Water Entry Test

SB10.1 A candidate device shall comply with the requirement in Water Entry Test, Section 17 (abandon ship instructions are not to be utilized).

SB11 Buoyancy Test

SB11.1 A candidate device shall comply with the requirements in 20.2 using a minimum buoyancy value of 17-1/2 pounds-force (78 N) in lieu of the values specified in Table 20.1 when subjected to the buoyancy test specified in 20.3 – 20.8.

SB12 Dynamic Strength Test

SB12.1 *Deleted*

SB13 Tensile Test

SB13.1 A candidate device shall comply with the requirements in 24.1 and 24.6 when tested as specified in 24.7 – 24.10 using the loads and durations specified in Table SB13.1.

Table SB13.1
Work vest tensile test loads and durations

Component or area under test	Load, pounds-mass	Load, (kg)	Duration, minutes
Primary closure body strap (body test)[a,b]	450	(202)	10
Secondary closures[c]	120	(54)	5
Shoulder section, collar, collar strap, or crotch strap	200	(90.7)	2

[a] Includes any body encircling strap, which may be tested independent of the device.

[b] A device as specified in note a of Table SB4.1 may be tested with any combination of two adjacent body straps secured, provided that each strap alone complies with the requirements in SB13.1 when subjected to a load of 450 pounds-mass (204 kg).

[c] Includes chest straps. Does not include collar or crotch straps.

SB14 Secondary Closure Attachment-Strength Test

SB14.1 For a candidate device provided with a chest strap that is attached directly to the cover fabric, the average breaking strength of the chest strap/fabric combination shall be not less than 120 pounds-force (530 N), when subjected to the test specified in 27.2 and 27.3.

SB15 Flame Exposure Test

SB15.1 A candidate device shall comply with the requirements in SB13.1 when subjected to 75 percent of the applicable tensile load specified in Table SB13.1 applied for the applicable duration specified in Table SB13.1, following the Flame Exposure Test specified in Section 30.

MARKING

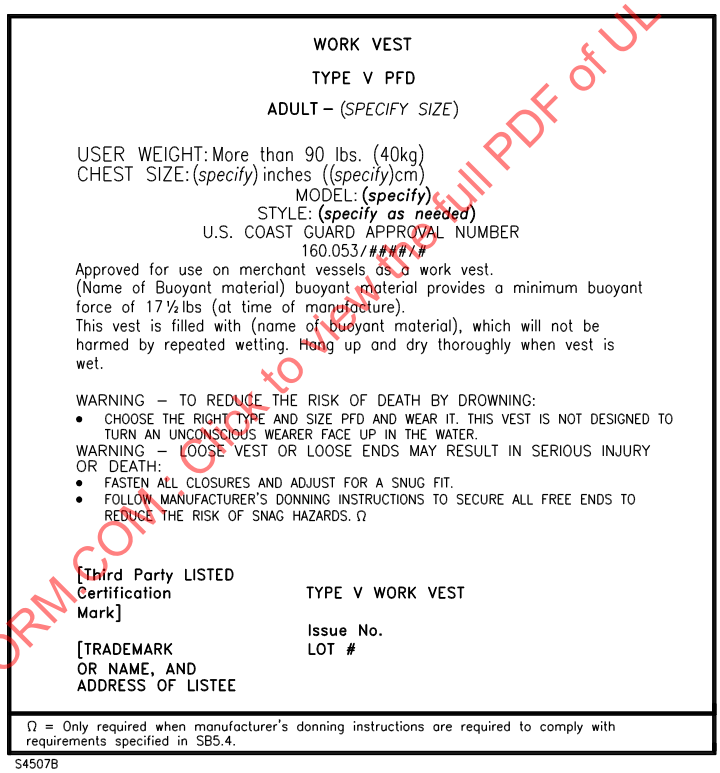
SB16 General

SB16.1 USCG Type V work vest approval

SB16.1.1 Each Type V work vest shall be marked as shown in Figure SB16.1.

Figure SB16.1

Type V work vest



SB16.1.2 Each device shall be marked, on a front panel, with "WORK VEST ONLY" in letters not less than 1 inch (25 mm) high.

Exception: A device that is dual labeled as a Type III/V PFD may additionally be marked, on a front panel "ON MERCHANT VESSELS" in letters not less than 0.5 inch (12.5 mm).

SB16.1.3 Each type III/V work vest shall be marked as shown in Figure SB16.2.

SB16.2 USCG recreational use approval

SB16.2.3 Each Type III/V work vest shall be marked as shown in Figure SB16.2.

Figure SB16.2

Type III/V work vest

WORK VEST-TYPE V PFD
FLOTATION AID-TYPE III PFD
ADULT - (*SPECIFY SIZE*)

USER WEIGHT: More than 90 lbs. (40kg)
CHEST SIZE: (*specify*) inches ((*specify*)cm)
MODEL: (*specify*)
STYLE: (*specify as needed*)

U.S. COAST GUARD APPROVAL NUMBERS
160.053/#####/# 160.064/#####/#

Approved for use on merchant vessels as a work vest.
USCG approved as a Type III for use an unispected commercial vessels less than 40 feet (12m) in length not carrying passengers for hire and for recreational boats. Not approved for use in personal water craft, for water skiing, or similar towed uses.
This PFD performs to Type V Work Vest an to Type III PFD standards.
(Name of Buoyant material) buoyant material provides a minimum buoyant force of 17 ½ lbs. This vest is filled with (name of buoyant material), which will not be harmed by repeated wetting. Hang up and dry thoroughly when vest is wet.

WARNING - TO REDUCE THE RISK OF DEATH BY DROWNING:

- READ MANUFACTURER'S "THINK SAFE" PAMPHLET BEFORE USING THIS DEVICE AND PERFORM "THINK SAFE" CHECKS EACH SEASON
- FOLLOW MANUFACTURER'S USE AND CARE INSTRUCTIONS
- DO NOT CARRY HEAVY OBJECTS - HEAVY OBJECTS IMPAIR FLOTATION
- CHOOSE THE RIGHT TYPE AND SIZE PFD AND WEAR IT, THIS VEST IS NOT DESIGNED TO TURN AN UNCONSCIOUS WEARER FACE UP IN THE WATER.

WARNING - LOOSE VEST OR LOOSE ENDS MAY RESULT IN SERIOUS INJURY OR DEATH:

- FASTEN ALL CLOSURES AND ADJUST FOR A SNUG FIT.
- FOLLOW MANUFACTURER'S DONNING INSTRUCTIONS TO SECURE ALL FREE ENDS TO REDUCE THE RISK OF SNAG HAZARDS. Ω

[Third Party LISTED Certification Mark]

TYPE V WORK VEST

Issue No.
LOT #

[TRADEMARK OR NAME, AND ADDRESS OF LISTEE

Ω = Only require when manufacturer's donning instructions are required to comply with requirements specified in SB5.4

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SB16.3 Identification and information

SB16.3.1 Each Type V and Type III/V work vest shall be marked as shown in Figure SB16.3 when manufacturer's donning instructions are necessary to comply with SB5.4.

Figure SB16.3
Donning instructions

DONNING INSTRUCTIONS

WARNING – LOOSE VEST OR LOOSE ENDS CAN KILL OR MAIM YOU:

TO SECURE LOOSE ENDS:

[Manufacturer to identify how to secure loose ends.]

RECHECK LOOSE ENDS AND READJUST AS NEEDED.

SUPPLEMENTARY INFORMATION

SB17 General

SB17.1 A device intended for use only as a work vest need not be provided with the supplementary information specified in Sections 37 – 39.

No Text on This Page

SUPPLEMENT SC – TYPE V WHITE WATER PFD'S

GENERAL

SC1 Scope

SC1.1 The requirements in this supplement cover personal flotation devices intended for use in commercial white-water activities.

SC1.2 The devices covered by the requirements in this supplement are intended for USCG approval as Type V white-water devices under 46 CFR 160.055.

SC1.3 The requirements in this supplement also cover personal flotation devices intended for use in both recreational and commercial white-water activities. See SC2.2.

SC2 Glossary

SC2.1 For the purposes of this supplement, the following definitions apply.

SC2.2 COMBINATION LABEL DEVICE – A device intended for USCG approval as a Type II or III device under 46 CFR 160.064 in combination with approval as a Type V device under 46 CFR 160.055.

SC2.3 REFERENCE VEST – The standard USCG Type I vest as specified in 46 CFR 160.002; Model 3 (adult) or Model 5 (child).

SC3 General

SC3.1 A candidate device shall comply with the requirements in Sections 4 – 39, as applicable, except as modified or superseded by the requirements in this supplement.

SC4 Components

SC4.1 A component covered in Table SC4.1 shall have at least the minimum properties specified in Table SC4.1 when tested in accordance with the applicable specifications in the Standard for Components for Personal Flotation Devices, UL 1191 for Use Code V.

Table SC4.1
Components

Component	Applicable UL 1191 test	Conditioning	Minimum required values
Fabric	Breaking Strength	As-received and after accelerated weathering	Either 105 pounds-force (470 N) average in direction of greater thread count and 70 pounds-force (310 N) average in direction of lesser thread count or 90 pounds-force (400 N) average in each direction
Webbing	Breaking Strength	As-received and after accelerated weathering	360 pounds-force (1600 N) average
Hardware	Strength	After salt spray exposure (metal), as-received and after accelerated weathering and high and low temperatures (plastic)	360 pounds-force (1600 N)[a]

Table SC4.1 Continued on Next Page

Table SC4.1 Continued

Component	Applicable UL 1191 test	Conditioning	Minimum required values
Tie Tape	Breaking Strength	As-received and after accelerated weathering	200 pounds-force (880 N) average

[a] Minimum value is 225 pounds (1000 N) if:

1) Two or more body straps are provided on the device,

2) The intended method of securement of the straps is obvious, and

3) The construction of the device is such that it is apparent that all straps are likely to be secured.

SC4.2 Webbing shall be at least 1 inch (25.4 mm) wide. Tie tape shall be 1 inch or 1-1/4 inches (31.8 mm) wide.

SC4.3 A polymeric coating shall be no less than 0.010 inch (0.25 mm) thick.

SC4.4 The buoyant material of a device shall be foam flotation material.

CONSTRUCTION

SC5 General

SC5.1 The construction of a device shall acceptably reduce the likelihood of snagging, such as by providing means to secure the free ends of body straps and the like. Decorative "D" rings and the like shall not be provided.

SC5.2 A device shall have a:

a) Back pad constructed to provide back protection; and

b) Collar constructed to provide head protection and support.

Foam provided in the back pad or collar shall be at least 1/2 inch (13 mm) thick (nominal). Also, see Flotation Stability Test, Section SC8.

SC5.3 Devices shall be made highly visible using one of the following means:

a) A minimum of the upper 50 percent of the external surfaces (the surfaces facing away from the body) of the device shall be a highly visible color; or

b) At least two contrasting colors shall be used with each color covering a minimum of 25 percent of the upper front and back external surfaces of the device. Contrasting colors that comply include combinations such as white and black, yellow and bright/dark blue, pale blue and orange, yellow and dark green, and white and dark blue.

SC5.4 The primary means of closure of a device shall consist of one or more body straps.

SC6 Sizing

SC6.1 A device shall not be constructed for use by persons weighing less than 50 pounds (23 kg).

SC6.2 For adult devices, the chest range of 30 to 52 inches (760 to 1320 mm) shall be covered by no more than two different sizes of devices. One additional adult size for larger persons may be provided.

SC6.3 A youth device shall be constructed to fit the 24- to 29-inch (610- to 740-mm) chest sizes.

PERFORMANCE

SC7 Donning Test

SC7.1 For a candidate device intended for use only in commercial white-water activities (not a combination label device), the average donning time for the group of test subjects shall be not more than 1 minute when the device is tested as specified in SC7.2 – SC7.4. A combination label device shall comply with the requirements in Donning Test, Section 15.

SC7.2 Human test subjects as specified in Table 16.1 are to be used. The candidate device is to be given to each test subject, who then is to be given the instructions "Please don the device as quickly as possible, adjusting it as necessary to fit snugly." The time from the initiation of the donning attempt to complete donning of the device then is to be recorded. All adjustments for size are to be at the halfway point when the device is given to the subject.

SC7.3 If a subject cannot don the device after receiving the verbal instructions described in SC7.2, the subject is to be instructed in accordance with any donning instructions marked on the device (see SC17.3.3) and then is to repeat the test.

SC7.4 If donning and adjustment of the candidate white-water device on a subject is not achieved within 1 minute after having received the instruction specified in SC7.3, the test is to be repeated by the subject with the reference vest (see SC2.3). If the reference vest also is not donned and adjusted within 1 minute, the subject is to be disqualified and replaced.

SC8 Flotation Stability Test

SC8.1 Flotation stability, freeboard, head support, face plane angle, and chin support tests

SC8.1.1 An adult candidate device shall comply with the following (see SC8.1.3):

a) When tested as specified in 16.4.1 the back pad shall extend at least from the top of the shoulders to the bottom of the rib cage on each test subject (determined prior to entry into the water).

b) When tested as specified in 16.3.3 and 16.3.4:

1) The average freeboard of the group of test subjects shall not be less than 85 percent of that of the reference vest.

2) The average distance of the ear canal from the surface of the water of the group of test subjects shall not be less than 40 percent of that for the reference vest.

3) The average value of the lowest marks that can be viewed on the vertical scale by the group of test subjects shall not be greater than 200 percent of that value for the reference vest, or the average face plane angle for the group of test subjects shall not be less than 50 percent of that value for the reference vest, providing vision to the scale is not obscured by the candidate device to a degree greater than the reference vest.

4) The number of test subjects provided with chin support shall be at least 60 percent of that number for the reference vest.

5) The collar shall extend beyond each side of the head of each test subject.

6) The collar shall extend at least 6 inches (150 mm) above the shoulders of each test subject.

SC8.1.2 A youth candidate device shall comply with the following (see SC8.1.3):

a) When tested as specified in 16.4.1:

1) The device shall comply with the requirements in 16.4.1, 16.4.2, and 16.4.3.

2) The back pad shall extend at least from the top of the shoulders to the bottom of the rib cage on each test subject (determined prior to entry into the water).

b) When tested as specified in 16.3.3 and 16.3.4:

1) The average freeboard for the group of test subjects shall not be less than that of the reference vest by more than 1/4 inch (6.4 mm).

2) The average distance of the ear canal from the surface of the water of the group of test subjects shall not be less than that of the reference vest by more than 1/4 inch.

3) The average value of the lowest marks that can be viewed on the vertical scale by the group of test subjects shall not be greater than 135 percent of that value for the reference vest, or the average face plane angle for the group of test subjects shall not be less than 67.5 percent of that value for the reference vest providing vision to the scale is not obscured by the candidate device to the degree greater than the reference vest.

4) The number of test subjects provided with chin support shall be at least 60 percent of that number for the reference vest.

5) The collar shall extend beyond each side of the head of each test subject.

6) The collar shall extend at least 4-1/2 inches (114 mm) above the shoulders of each test subject.

SC8.1.3 Test subjects as specified in Table 16.1 are to be used. The tests are to be repeated twice on each test subject; first with each subject wearing the reference vest (see SC2.3) and then with each subject wearing the candidate device.

SC8.2 Maneuverability test

SC8.2.1 A youth candidate device shall not restrict a test subject from attaining and maintaining an upright position in the water.

SC8.2.2 Each subject is to attain a static balance position in the water. The subject then is to be instructed to attempt to attain and maintain an upright vertical position by moving and repositioning the head and torso only. The device shall permit the maneuver to be performed.

SC9 In-Water Removal Test

SC9.1 When tested as specified in SC9.2 – SC9.4:

a) For an adult candidate device, the average time required to remove the device by the group of test subjects shall be less than 10 seconds, and no test subject shall require more than 30 seconds to remove the device.

b) For a youth candidate device, the average time required to remove the device by the group of test subjects shall be less than 15 seconds, and no subject shall require more than 30 seconds to remove the device.

SC9.2 The test subjects used for the Flotation Stability Test, Section SC8, are to be used for this test. Each subject is to repeat the test twice; first with the reference vest, then with the candidate device.

SC9.3 The subject is to be positioned in a pool at a point:

a) Where there is sufficient depth for the subject to float freely; and

b) That is at least 2 feet (0.6 m) from the edge of the pool.

The subject then is to be given the instructions: "At the command of "go" remove the device as quickly as possible... ready.... go." The time from the command "go" until complete removal of the device is to be recorded. To simulate an emergency situation, the subject may be given additional instructions during the removal attempt indicating that quick removal is imperative.

SC9.4 A subject is to be disqualified and a new subject used for the test, if:

a) For tests on an adult device, the subject is unable to remove the reference vest within 30 seconds; or

b) For tests on a youth device, the subject is unable to remove the reference vest within 45 seconds.

SC10 Water Entry Test

SC10.1 A candidate device shall comply with the requirement in Water Entry Test, Section 17 (abandon ship instructions are not to be utilized).

SC11 Buoyancy Distribution Test

SC11.1 The buoyancy of material forward of the body axis (see Figure 16.1) shall be:

a) At least 57 percent of the total buoyancy of an adult candidate device; and

b) At least 60 percent of the total buoyancy of a youth candidate device,

when the device is tested in accordance with 19.1.2 or 19.1.3, as applicable.

SC12 Buoyancy Test

SC12.1 A candidate device shall comply with the requirements in 20.2 using the applicable minimum buoyancy value specified in Table SC12.1 in lieu of the values specified in Table 20.1 when subjected to the buoyancy test specified in 20.3 – 20.8.

Table SC12.1
Minimum buoyancies for white water PFD's

Device	Minimum buoyancy, pounds-force	(N)
Adult	22	(97)
Youth	15-1/2	(69)

SC13 Dynamic Strength Test

SC13.1 *Deleted*

SC14 Tensile Test

SC14.1 A candidate device shall comply with the requirements in 24.1 and 24.6 when tested as specified in 24.7 – 24.10 using the loads and durations specified in Table SC14.1.

Table SC14.1
White water device tensile test loads and durations

Component or area under test	Device	Load, Pounds-mass	Load, (kg)	Duration, Minutes
Primary closure body strap (body test)[a,b]	Any	720	(324)	10
Secondary closures[c]	Any	120	(54)	5
Shoulder section, collar, collar strap, or crotch strap	Adult	200	(90.7)	5
	Youth	115	(52)	5

[a] Includes any body encircling strap, which may be tested independent of the device.

[b] A device as specified in note a of Table SC4.1 may be tested with any combination to two adjacent body straps secured, provided that each strap alone complies with the requirement in SC14.1 when subjected to a load of 450 pounds-mass (204 kg).

[c] Includes tie tapes and chest straps. Does not include collar or crotch straps.

SC15 Secondary Closure Attachment-Strength Test

SC15.1 For a candidate device provided with a secondary closure attached directly to the cover fabric, the average breaking strength of the closure/fabric combination shall be not less than 120 pounds-force (528 N), when subjected to the test specified in 27.2 and 27.3.

SC16 Flame Exposure Test

SC16.1 A candidate device shall comply with the requirements in SC14.1 when subjected to 75 percent of the applicable tensile load specified in Table SC14.1 applied for the applicable duration specified in Table SC14.1, following the Flame Exposure Test specified in Section 30.

MARKING

SC17 General

SC17.1 USCG Type V white-water device approval

SC17.1.1 Each device shall be marked with the following and formatted as shown in Figure 36.1 – Figure 36.4 :

a) Intended Use Statement

b) Size Class – "ADULT" if a universal size device; "ADULT S/M" or "ADULT L/XL" as applicable, if an adult device that is not universal size; or "CHILD," or "YOUTH," or if a youth device. The letters shall be at least 3/4 inch (19.1 mm) high.

c) Chest Size – Shall be expressed in inches and centimeters over a range of not less than 2 inches. If this marking is not visible when the device is packaged, it shall also appear on the package.

d) Model Number

e) Weight Range – "For persons weighing more than 90 pounds" if an adult device or "For persons weighing 50 to 90 pounds" if a youth device, immediately alongside of or below the marking provided in accordance with (a).

f) "TYPE V PFD."

g) "APPROVED ONLY FOR USE BY PERSONS ENGAGED IN COMMERCIAL WHITE WATER SERVICE WITHIN THE USA."

h) "This is a Type V PFD because it has restricted USCG approval allowing it to be used in place of a Type I PFD only in commercial white water activities. When worn, it offers special protection to those participating in these activities and, therefore, must be worn at all times to be accepted for meeting the U. S. Coast Guard regulations requiring PFD's to be carried."

i) "NOTICE: BEFORE BOARDING, PUT THIS JACKET ON AND ADJUST TO FIT PROPERLY" in letters at least 3/16 inch (4.8 mm) high.

j) "Inspected and tested in accordance with U. S. Coast Guard regulations."

k) The generic name of the buoyant material and the required minimum buoyancy for the device as specified in Table SC12.1 in the form " _____ buoyant material provides a minimum buoyant force of ____ pounds." The words "at time of manufacture" may be added to the end of the statement.

l) The USCG approval number in the form "U. S. Coast Guard approval no. 160.055/XXX/X."

m) Third Party Certification Mark.

n) Companies Trademark or name, and address.

o) Lot Number.

SC17.2 USCG recreational use approval

SC17.2.1 A combination label device markings shall be made distinct from the markings provided in accordance with SC17.1.1 by the use of bordering, a separating line, or the like.

SC17.3 Identification and information

SC17.3.1 For a combination label device, the markings may be repeated (once in each subgroup formed by the markings provided in accordance with SC17.1.1 and SC17.2.1) or may be stated only once in a distinct subgroup.

SC17.3.2 A device intended for use only in commercial white water activities need not be marked with Dynamic Strength Test Speed.

SC17.3.3 If necessary to comply with the requirement in Donning Test, Section SC7, a device intended for use only in commercial white water activities shall be marked with donning instructions either in words or pictorially.

SC18 Supplementary Information

SC18.1 A device intended only for use in commercial white-water activities need not be provided with the supplementary information specified in Sections 37 – 39.

No Text on This Page

SUPPLEMENT SD – TYPE V SAILBOARD-HARNESS PFD'S

GENERAL

SD1 Scope

SD1.1 The requirements in this supplement cover personal flotation devices provided with a harness assembly for use only in boardsailing activities.

SD1.2 The devices covered by the requirements in this supplement are intended for USCG approval as Type V sailboard devices under 46 CFR 160.064.

SD2 Glossary

SD2.1 For the purposes of this supplement, the following definitions apply.

SD2.2 REMOVABLE HARNESS – A harness that can be completely removed from the device without impairing the in-water performance characteristics of the device.

SD2.3 SAILBOARD HARNESS – Various webbings, fabric, and hardware (including a sailboard harness hook) combined into a construction that provides the wearer with a means of attachment to the harness line of a sailboard.

SD3 General

SD3.1 A device shall comply with the requirements in Sections 4 – 39, as applicable, except as modified or superseded by the requirements in this supplement.

SD4 Components

SD4.1 Webbing provided as part of the harness shall have a breaking strength of not less than 200 pounds-force (880 N) both in the as-received condition and after accelerated weathering when tested in accordance with the specifications for webbing in the Standard for Components for Personal Flotation Devices, UL 1191.

CONSTRUCTION

SD5 Sizing

SD5.1 A device shall be constructed for use by persons weighing more than 90 pounds (41 kg).

PERFORMANCE

SD6 Flotation Stability Test

SD6.1 A device shall comply with the requirements for a Type II or III device when tested in accordance with the applicable requirements in Flotation Stability Test, Section 16. For a device employing a removable harness assembly, the device is to be tested both with and without the harness attached.

SD7 Water Entry Test

SD7.1 A candidate device shall comply with the requirement in Water Entry Test Section 17 (abandon ship instructions are not to be utilized).

SD8 Dynamic Strength Test

SD8.1 *Deleted*

SD9 Flame Exposure Test

SD9.1 A sailboard-harness PFD need not be subjected to the Flame Exposure Test specified in Section 30.

SD10 Harness Tensile Test

SD10.1 A candidate device, including the harness, shall comply with the requirements in 24.1 and 24.6 when tested as specified in SD10.2 and SD10.3.

SD10.2 The device is to be secured on the test form for adult devices specified in Figure 24.2 and Table 24.2 by all primary means of closure. The harness then is to be adjusted to approximate the intended "in-use" position while applying no pressure to the test form or device. If the harness has more than one "in-use" arrangement, each arrangement is to be tested.

SD10.3 A weight sufficient to provide a total load (test form and weights) of 400 pounds (181 kg) is to be attached to the test form. The assembly (device, test form, and weights) then is to be slowly raised by means of a 2-inch (51-mm) wide strap run underneath the base of the harness hook until the total load (test form and weights) is completely supported. The force of the load is to be applied perpendicular to the base of the hook. The assembly is to be maintained in this position for 5 minutes.

SD11 Entrapment Test

SD11.1 A candidate device shall permit each test subject to free the harness hook from the rope and surface within 10 seconds on each attempt, when tested as specified in SD11.2 – SD11.4.

SD11.2 Three subjects wearing swimsuits are to be used for this test. The subjects are to be of varying heights and weights as to represent endomorphic, mesomorphic, and ectomorphic builds. Each subject is to be able to withhold from breathing for at least 30 seconds. The subjects are to be informed of the details of the test prior to testing. The test is to be conducted three times with each subject.

SD11.3 The test is to be conducted in a pool that is:

a) Of such size that there will be sufficient space at any side of the rig illustrated in Figure SD11.1 for a subject to surface when the rig is draped over the water and expanded to full size; and

b) Of sufficient depth to prevent a subject from touching bottom while attached to the rope on the rig.

SD11.4 Each subject is to:

a) Don the device with the harness adjusted so that the harness hook opening faces upward and then

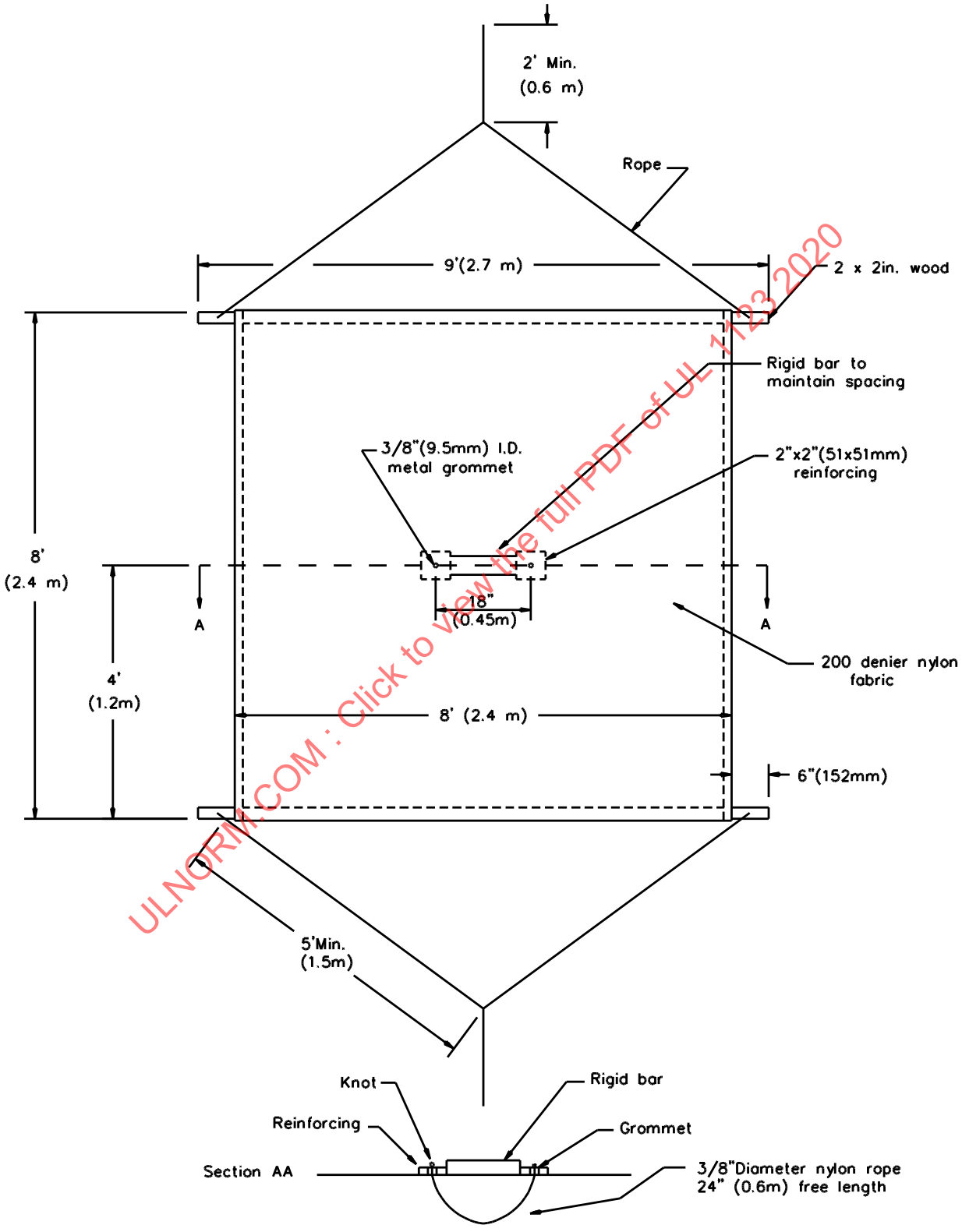
b) Enter the water.

The two rigid sides of the rig illustrated in Figure SD11.1 are to be placed at the side of the pool and the center of the rig is to be stretched over the surface of the water and extended to its maximum extent so as to expose the 24-inch (610-mm) long rope. With the subject upright in the water and facing the rig, the rope is to be twisted to form a single loop and the loop inserted into the harness hook on the device. The subject then is to be instructed "At the command of 'go,' you are to free yourself by disengaging the harness hook from the rope and surface outside the rig as quickly as possible." Following the instructions, the rig is to be rapidly draped over and across the subject and stretched taut. Concurrent with the subject

being covered with the rig, the subject is to be commanded "Ready, go." The time from the command "go" to the subject's surfacing outside of the rig is to be recorded.

Figure SD11.1

Entrapment test rig



MARKING

SD12 General

SD12.1 USCG Type V sailboard device approval

SD12.1.1 The required formatting and markings as described in Figure 36.1 – Figure 36.4 and Table 36.1 shall be utilized in conjunction with SD12.2 and the following:

a) An intended use statement, such as "sailboard vest."

b) Size of device; for example, "adult small."

c) "TYPE V PFD – Approved for boardsailing activities only."

d) "This is a Type V PFD because it has restricted U. S. Coast Guard approval. When worn, it offers flotation characteristics similar to those of approved Type * PFD's. The device has been investigated for boardsailing only and, therefore, this device is not approved for any other application."; where * is II or III, as applicable.

e) "WARNING – THIS DEVICE IS DESIGNED FOR BOARDSAILING ONLY. DO NOT USE IN ANY OTHER APPLICATIONS."

f) "Inspected and tested in accordance with U. S. Coast Guard Regulations."

g) " * buoyant material provides a minimum buoyant force of 15-1/2 pounds", where * is the generic name of the buoyant material. The words "at time of manufacture" may be added to the end of the statement.

h) The USCG approval number in the form "U. S. Coast Guard approval no. 160.064/XXX/X."

SD12.2 Identification and information

SD12.2.1 A sailboard-harness PFD shall not be marked with the test speed.

SD12.2.2 Unless investigated for use with other size harness lines, a device shall be marked "Use harness only with 1/4 to 3/8 inch diameter harness line."

SD12.2.3 A device incorporating a removable harness assembly shall be marked to identify the specific models and sizes of the harness assemblies for which it is approved and with the following: "This device is designed to function as a Type * PFD, both with and without the harness. USE ONLY WITH THE HARNESS ASSEMBLY DESIGNED FOR THIS VEST. THE HARNESS ALONE CARRIES NO APPROVAL.", where * is II or III, as applicable.

SD12.2.4 A removable harness assembly shall be marked to identify the model and size and the specific model and size of device with which it is approved.

No Text on This Page

SUPPLEMENT SE – TYPE V HIKING-HARNESS PFD'S

GENERAL

SE1 Scope

SE1.1 The requirements in this supplement cover personal flotation devices provided with a harness assembly for use in hiking out on a sailboat.

SE1.2 The devices covered by the requirements in this supplement are intended for USCG approval as Type V hiking-harness devices under 46 CFR 160.064.

SE2 Glossary

SE2.1 For the purposes of this supplement, the following definitions apply:

SE2.2 DOGBONE – A piece of loop-shaped metal intended for attachment to a hiking harness.

SE2.3 HIKING HARNESS – Various webbings, fabric, and hardware combined into a construction that provides the wearer with a means of attachment to the boat while hiking out.

SE3 General

SE3.1 A device shall comply with the requirements in Sections 4 – 39, as applicable, except as modified or superseded by the requirements in this supplement.

CONSTRUCTION

SE4 General

SE4.1 The construction of a device shall acceptably reduce the likelihood of snagging.

SE5 Sizing

SE5.1 A device shall be constructed for use by persons weighing more than 90 pounds (41 kg).

SE6 Harness Assembly

SE6.1 The harness of a device shall employ a hook of an open-type construction. See Harness Release Test, Section SE10.

PERFORMANCE

SE7 Flotation Stability Test

SE7.1 A device shall comply with the requirements for a Type II or III device when tested in accordance with the applicable specifications in Flotation Stability Test, Section 16, both with and without the harness in its intended use position. In addition, the harness assembly shall not extend below the knees of any test subject when not in the "in-use" position (determined prior to the subject entering the water).

SE8 Dynamic Strength Test

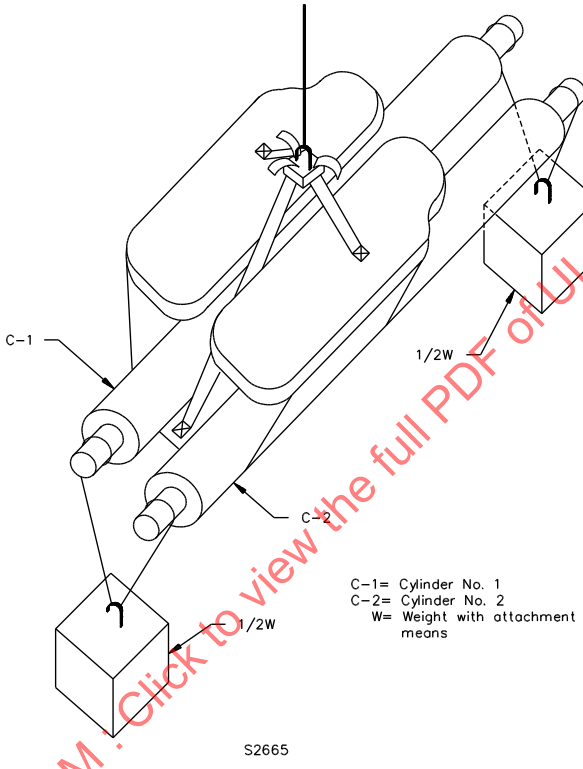
SE8.1 *Deleted*

SE9 Harness Tensile Test

SE9.1 A device, including the harness, shall comply with the requirements in 24.1 and 24.6 when tested as specified in 24.8 [except that both rollers are to be positioned such that a load of 800 pounds (363 kg) is applied to the harness]. See Figure SE9.1.

Figure SE9.1

Tensile test – hiking harness



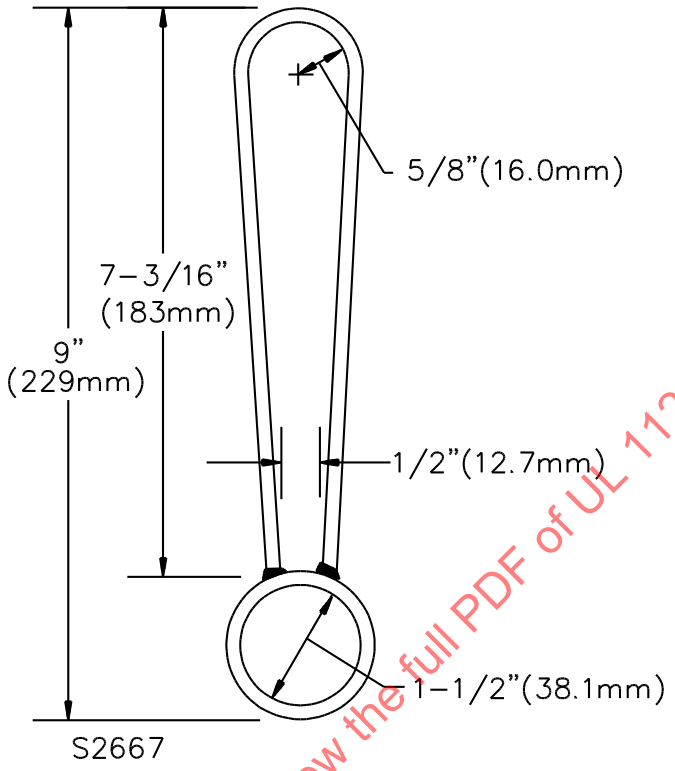
SE10 Harness Release Test

SE10.1 Each test subject shall be able to release the harness assembly from the dogbone within 20 seconds, when the device is tested as described in SE10.2.

SE10.2 Each of three test subjects, each wearing shoes, is to don the device with the harness in the "in use" position. The harness is to be secured to a boat by means of a line using a standard dogbone (see Figure SE10.1) at the point of attachment to the harness. The subject then is to enter the water, and with the boat proceeding at a speed of 9 ±1 miles per hour (4.07±0.5 m/s) through calm water, the test subject is to assume a head-forward, face-down position and attempt to release from the tow line. Each subject is to repeat this test three times.

Figure SE10.1

"Dogbone"



MARKING

SE11 General

SE11.1 USCG Type V hiking-harness device approval

SE11.1.1 The required formatting and markings as described in Figure 36.1 – Figure 36.4 and Table 36.1 shall be utilized in conjunction with SE11.2 and the following:

a) An intended use statement, such as "hiking flotation harness."

b) Size of the device; for example, "adult small."

c) "TYPE V PFD – Approved for hiking activities only."

d) "This is a Type V PFD because it has restricted U. S. Coast Guard approval. When worn, it offers flotation characteristics similar to those of approved Type * PFD's. The hook has been investigated for hiking only and, therefore, this device is not approved for any other application."; where * is II or III, as applicable.

e) "WARNING – THIS DEVICE IS DESIGNED FOR HIKING ONLY. DO NOT USE IN OTHER APPLICATIONS."

f) "Inspected and tested in accordance with U. S. Coast Guard regulations."

g) " * buoyant material provides a minimum buoyant force of 15-1/2 pounds", where * is the generic name of the buoyant material. The words "at time of manufacture" may be added to the end of the statement.

h) The USCG approval number in the form "U. S. Coast Guard approval no. 160.064/XXX/X."

SE11.2 Identification and information

SE11.2.1 A hiking harness PFD shall not be marked with the test speed.

SE11.2.2 Each device shall be marked: "This device is designed to function as a Type * PFD, both with and without the harness portion secured to the body. In an emergency, the vest portion only may be donned and secured to the body as a normal vest – the device will still perform as a Type * PFD."; where * is II or III, as applicable.

SUPPLEMENT SF – TYPE V PULL-OVER PFD's

GENERAL

SF1 Scope

SF1.1 The requirements in this supplement cover adult Type V pull-over personal flotation devices for recreational use.

SF1.2 The devices covered by the requirements in this supplement are intended for USCG approval as Type V devices under 46 CFR 160.064.

SF2 Glossary

SF2.1 For the purposes of this supplement, the following definitions apply:

SF2.2 PULL-OVER PFD – A PFD that is donned by being pulled over the head and arms, having no opening and corresponding closure system for donning and closing the device (e.g., donned as a tee-shirt or sweatshirt).

SF3 General

SF3.1 Pull-over devices shall comply with the applicable requirements in Sections 4 – 35.

Exception No. 1: With regard to compliance with 4.5(b), Pull-over PFDs are able to have their front-to-back orientation communicated solely through labeling in compliance with SF5.1.

Exception No. 2: With regard to compliance with 4.6, Pull-over PFDs are able to have their correct donning orientation communicated solely through labeling in compliance with SF5.1.

Exception No. 3: With regard to compliance with the Donning Test, Section 15, Pull-over PFD test samples are able to be marked as specified in SF5.1.

CONSTRUCTION

SF4 Sizing

SF4.1 A device shall be constructed for use by persons weighing more than 90 pounds (41 kg).

MARKING

SF5 General

SF5.1 Pull-over PFDs shall be marked in letters at least 1 inch (25.4 mm) in height, on the inside upper back with the word: "**BACK**".

SF5.2 Pull-over PFDs shall comply with the marking requirements in Section 36, PFD Markings.

Exception: The label heading "PULL OVER DEVICE – TYPE V PFD" shall be used.

SF5.3 The following supplementary information shall be included as part of the USCG Approval statements on the label:

a) "NOTICE: BEFORE BOARDING, PUT THIS DEVICE ON AND ADJUST TO FIT PROPERLY."

b) "This is a Type V PFD because it has restricted approval allowing it to be used in place of a Type III PFD **ONLY** when worn."

c) "THIS DEVICE MUST BE WORN AT ALL TIMES IN ORDER TO MEET THE U. S. COAST GUARD REGULATIONS REQUIRING PFDS TO BE CARRIED."

INFORMATION PAMPHLET

SF6 General

SF6.1 Pullover PFDs must be provided with a Type V PFD information pamphlet meeting the United States Coast Guard Guidelines for Preparing Special Pamphlets for Type V PFDs.

SUPPLEMENT SG – TYPE V RESCUER'S HARNESS PFD's

GENERAL

SG1 Scope

SG1.1 The requirements in this supplement cover adult Type V Rescuer's Harness personal flotation devices for use in rescue and retrieval of personnel and equipment in moving water.

SG1.2 The devices covered by the requirements in this supplement are intended for USCG approval as Adult Type V, Rescuer's Harness devices under 46 CFR 160.064.

SG2 Glossary

SG2.1 For the purpose of this supplement, the following definitions apply:

SG2.2 RESCUER'S HARNESS – Various webbing, fabric, and hardware combined into a construction that provides the wearer with a means of attachment and quick release of a rescue line, but is not intended as a primary closure system.

SG2.3 HARNESS BUCKLE – The buckle that secures the rescuer's harness belt.

SG2.4 RESCUE LINE ATTACHMENT RING – The ring used to attach the rescuer's harness to a rescue line.

SG2.5 REMOVABLE RESCUER'S HARNESS ASSEMBLY – A rescuer's harness, as described in SG2.2, that is designed to be removable from the PFD.

SG3 General

SG3.1 A PFD covered by this supplement shall comply with the requirements in Sections 4 – 39, as applicable, except as modified or superseded by the requirements in this supplement. The rescuer's harness assembly, including a removable assembly, shall comply with the requirements in this supplement. Sections 6.4, 7.1.1, and 7.1.2 do not apply to the rescuer's harness hardware. Section 6.1 does not apply for the rescue line attachment ring. For a removable rescuer's harness, Section 7.1.3 does not apply. When conducting the donning test per Section 15, the time to fasten and secure the rescuer's harness is not included.

SG4 Components

SG4.1 All components shall comply with the requirements in the Standard for Components for Personal Flotation Devices, UL 1191.

SG4.2 Webbing provided as part of the rescuer's harness belt shall be strength tested with 730 lbf (3250 N) (looped) according to SG9.4 as received and according to SG9.4 on a separate sample after weathering as described in SG9.3.

SG4.3 Hardware provided as part of the rescuer's harness belt shall be strength tested with 730 lbf (3250 N) as installed within the rescuer's harness according to SG9.4 as received and according to SG9.4 on a separate sample after weathering as described in SG9.3.

CONSTRUCTION

SG5 Sizing

SG5.1 A device shall be constructed for use by persons weighing more than 90 pounds (41 kg).

SG6 Closures

SG6.1 The rescuer's harness cannot be a primary closure.

PERFORMANCE

SG7 55 Pound Release Test

SG7.1 The rescue line attachment ring shall completely disengage from the webbing belt when tested per SG7.2 to SG7.5 and the force required to open the buckle and release the belt shall not be greater than 25 lbf (110 N) when tested per SG7.5. There shall be no evidence of deterioration on the device.

SG7.2 This test is to be conducted on an "as received" sample of the rescuer's harness used in conjunction with the smallest and the largest PFD sizes for which the harness is intended after a two minute complete immersion of the device and rescuer's harness in water (i.e., wet).

SG7.3 A sample of the complete device is to be secured to a simulated torso frame, as shown in Figure 24.2 and Table 24.2, and all closure systems on the device shall be secured. Any means of adjustment on the rescuer's harness are fully tightened. The frame is secured in a face up position to a hoist by routing webbing through the waist, neck and arm stubs of the frame. The rescue line attachment ring is to be placed at the back of the device and the rescuer's harness webbing passed through it. The webbing is properly threaded through the buckle and secured in accordance with the manufacturer's instructions. The deadweight is then attached by appropriate means to the rescue line attachment ring.

SG7.4 The total load to be applied to the device is to be 55 lbf (250 N) and is to include the weight of the deadweight and the attachment means. The assembly is to be raised until the deadweight is clear of the floor and is to be held in this position until the buckle is released in accordance with SG7.5.

SG7.5 The force required to open the buckle and allow release of the webbing from its closure is to be determined. This is to be achieved by attaching a peak reading force indicator to a length of small diameter line that in turn is attached to the free end of the rescuer's harness webbing. The free end of the webbing is to be pulled back across the buckle at a rate of approximately 20 inches per minute and at an angle of approximately 30 degrees relative to the base of the buckle to open the buckle and allow the webbing and load to be released.

SG7A Pull-Toggle Security of Attachment Test

SG7A.1 For a rescuer's harness that employs a pull toggle that is attached to the harness buckle and is intended to be used to open the buckle, the pull toggle shall support a total load of 50 lbf (220 N), and is to include the weight of the deadweight and the attachment means. The assembly shall support the load for 1 minute when tested in accordance with SG7A.2.

SG7A.2 The buckle or harness with buckle attached shall be supported in such a manner that will allow the load to be applied to the portion of the pull toggle that is intended to be grasped by the user, located furthest from the buckle. The force is to be applied in the intended direction of operation.

SG8 220 Pound Strength Test

SG8.1 When tested per SG8.2 and SG8.3 slippage shall not exceed 1 inch (25 mm) and the device shall support 220 lbf (1000 N) for 10 minutes. The force required to open the buckle cannot exceed 25 lbf (110 N) when tested per SG8.4. There shall be no evidence of deterioration on the device.

SG8.2 This test is to be conducted on a complete device with rescuer's harness after a two minute complete immersion of the device under water (i. e., wet), and the rescuer's harness shall be in "as received" condition.

SG8.3 The device is to be rigged as described in SG7.3. The total load applied to the device is 220 lbf (1000 N) and includes the weight of the deadweight and the attachment means. The assembly is to be raised until the deadweight is clear of the floor and is held in this position for 10 minutes.

SG8.4 Immediately after SG8.3, and with the deadweight still suspended clear of the floor, the force required to open the buckle and allow release of the webbing from its closure is to be determined by repeating SG7.5.

SG9 730 Pound Rescuer's Harness Strength Test

SG9.1 When tested per SG9.4, slippage shall not exceed 3 inches (76 mm) and the device shall support 730 lbf (3250 N) for 2 minutes. Evidence of deterioration does not constitute a failure.

SG9.2 Samples of complete devices with "as received" rescuer's harnesses are to be used. A "dry" sample is to be tested in accordance with SG9.4 and then the test is to be repeated with a new "wet" "as received" rescuer's harness sample (with wetting achieved by immersing the device and rescuer's harness in water for two minutes).

SG9.3 One sample of the rescuer's harness is to be weathered by being exposed either to CA_{100} or Xe_{500} as specified in the Sample Conditioning Table in UL 1191. The weathered sample is then tested in accordance with SG9.4.

SG9.4 The device is to be rigged as described in SG7.3. The rescuer's harness is closed, leaving at least 3 inches (76 mm) of excess strap. The webbing is marked at the harness buckle so that slippage of the webbing through the harness buckle can be measured. The total load applied to the device is 730 lbf (3250 N) and includes the weight of the deadweight and the attachment means. The assembly is raised until the deadweight is clear of the floor and held in this position for 2 minutes.

SG10 730 Pound Shoulder Strength Test

SG10.1 The device is to be rigged as described in SG10.2. The device must support a load of 730 lbf (3250 N) for 2 minutes.

SG10.2 A sample of the complete device is to be secured to a simulated torso frame, as shown in Figure 24.2 and Figure 24.2, and all closure systems on the device shall be secured. Any means of adjustment on the harness are fully tightened. A 2-inch (51 mm) wide strap is looped through a shoulder and attached to a hoist. A 2-inch (51 mm) strap is looped through the bottom of the frame and attached to the deadweight. The total load applied to the device is 730 lbf (3250 N) and includes the weight of the deadweight, the frame and the attachment means. The assembly is raised until the deadweight is clear of the floor and held in this position for 2 minutes. If the device incorporates adjustable shoulders then the test is to be repeated on a new, "wet" sample.

MARKING

SG11 General

SG11.1 USCG Type V Rescuer's Harness Approval, Identification, and Information Label

SG11.1.1 A PFD covered by this supplement shall be marked as shown in Figure SG11.1.

SG11.1.1.1 In addition to Figure SG11.1, a Type V Rescuer's Harness PFD label may be marked, "APPROVED ONLY WHEN WORN" to comply with Section 15, Donning Test.

Figure SG11.1

Rescuer's Harness Type V PFD Label - printed on spun-bonded paper, silk-screened, ink-stamped, or similar

RESCUER'S PERSONAL FLOTATION DEVICE-TYPE V PFD
INTENDED USE: RECREATIONAL RESCUE
[SIZE]

USER WEIGHT: [B] CHEST SIZE: [C]
MODEL: [D] STYLE: [E]

U.S. COAST GUARD APPROVAL NUMBER 160.064/####/#

This is a Type V PFD because it has restricted U.S. Coast Guard approval. It is approved for use only by persons knowledgeable in proper use and release of the chest harness and only as a substitute for a Type *PFD. USCG approved wearable device intended for use by persons engaged in recreational rescue services of personnel. Any user of this device must be knowledgeable of the many assumed and uncontrollable risks and hazards associated with their activities and the unpredictable nature of them.

WARNING - TO REDUCE THE RISK OF INJURY OR DEATH WHILE USING HARNESS:

- **OBTAIN TRAINING FROM QUALIFIED SOURCE**
- **DO NOT DEFEAT QUICK RELEASE CAPABILITY**
- **USE ONLY WITH LOCKING CARIBINERS**

WARNING - TO REDUCE THE RISK OF DEATH BY DROWNING:

- **READ MANUFACTURER'S "THINK SAFE" PAMPHLET BEFORE USING THIS DEVICE AND PERFORM "THINK SAFE" CHECKS EACH SEASON**
- **CHOOSE THE RIGHT TYPE AND SIZE PFD AND WEAR IT - FASTEN ALL CLOSURES AND ADJUST FOR SNUG FIT**
- **FOLLOW MANUFACTURER'S USE AND CARE INSTRUCTIONS**
- **USE ONLY WITH THE HARNESS ASSEMBLY DESIGNED FOR THIS VEST. HARNESS ALONE CARRIES NO APPROVAL.[1]**
- **DO NOT USE IN HIGH-SPEED WATER SPORTS**
- **DO NOT CARRY HEAVY OBJECTS - HEAVY OBJECTS IMPAIR FLOTATION**

[Third Party LISTED Certification Mark] LISTED FLOTATION AID

[TRADEMARK OR NAME, AND ADDRESS]
LOT NO. [H]

Refer to Table 36.1 for all [ ].

* - is either II or III, as applicable.

[1] - Only required when device utilizes a removable harness.

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SG11.1.2 A label with the following markings shall be applied to the device or, for removable harness assemblies, to the belt.

1. "ATTENTION! DO NOT USE THIS DEVICE IF THE BELT IS NOT PROPERLY THREADED AS SHOWN HERE. THIS IS THE ONLY PROPER METHOD TO THREAD THE BELT THROUGH THE HARDWARE.";

2. A drawing or illustration shall be provided which clearly and accurately represents the proper threading of the belt.

3. "Failure to thread the belt as shown can result in serious injury or death.";

4. "Obtain training from a certified instructor on the use and dangers involved in the use of this device."

SG11.1.3 A PFD incorporating a removable harness assembly shall be marked to identify the manufacturer, specific models and sizes of the harness assemblies approved for use with the PFD.

SG11.1.4 A removable harness assembly shall be marked to identify the manufacturer, model, size, and the specific model and size of the PFD with which it is approved.

APPENDIX A – PAMPHLET COVER

A PFD pamphlet front cover shall be composed of one of the following appropriate layouts and the back cover shall be provided with the PFD checklist. The following is the front cover for an Off-Shore Lifejacket (Type I PFD). The color of the illustrated PFD shall be orange:

Think Safe

Choose the Right
Personal Flotation Device (PFD)

This package contains an Off-Shore Lifejacket (Type I PFD). Other available types are described within.

An Off-Shore Lifejacket (Type I PFD) —

- ☐ Turns most unconscious wearers face-up in water.
- ☐ Most effective type in rough water.
- ☐ Reversible; can be put on inside out.
- ☐ Two sizes to fit most children and adults.

Intended Uses

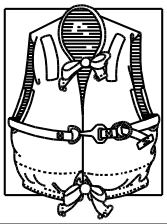
- ☐ Best for all waters; open ocean, rough seas, or remote water; where rescue may be slow coming.
- ☐ Abandon-ship lifejacket for commercial vessels and all vessels carrying passengers for hire.

Advantages

- ☐ Best performing PFD of all types in both rough and calm waters.
- ☐ Provides best chance of survival for unconscious wearer.
- ☐ Best device for non-swimmers if they wear it.

Disadvantages

- ☐ Bulky.
- ☐ May be too uncomfortable to wear for extended periods.
- ☐ May not fit extremes of some sizes well (especially children).



NOTE: Do not remove this booklet. No person may sell or offer for sale a PFD unless this booklet is provided with it.

S3437

The following is the front cover for a Near-Shore Buoyant Vest (Type II PFD). The color of the illustrated PFD shall be red.

Think Safe

Choose the Right
Personal Flotation Device (PFD)

This package contains a Near-Shore Buoyant Vest (Type II PFD). Other available types are described within.

A Near-Shore Buoyant Vest (Type II PFD) —

- ☐ Will turn some unconscious wearers face-up in water.
- ☐ Sizes: Infant, child-small, child-medium, and adult.
- ☐ Compromise between Type I PFD performance and wearer comfort.

Intended Uses

- ☐ General boating activities.
- ☐ Good for calm, inland waters, or where there is a good chance for fast rescue.

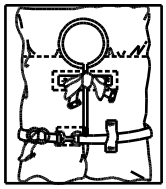
Advantages

- ☐ More comfortable to wear than a Type I PFD.
- ☐ Keeps most unconscious wearers face-up in water.

Disadvantages

- ☐ May be uncomfortable after wearing for extended periods.
- ☐ Will not turn as many people face-up as a Type I PFD will.
- ☐ In rough water, a wearer's face may often be covered by waves.
- ☐ Not for extended survival in rough water.

PLEASE READ IMPORTANT MESSAGE ON BACK COVER FOR INFANT DEVICES.



NOTE: Do not remove this booklet. No person may sell or offer for sale a PFD unless this booklet is provided with it.

S3438A

The following is the front cover for a Flotation Aid (Type III PFD).

Think Safe

Choose the Right Personal Flotation Device (PFD)

This package contains a Flotation Aid (Type III PFD). Other available types are described within.

A Flotation Aid (Type III PFD) is:

- ☐ Designed to provide a stable face–up position in calm water for a wearer floating with head tilted back.
- ☐ Available in a wide variety of styles.
- ☐ Available in many sizes for good fit.

Intended Uses

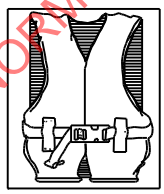
- ☐ General boating or the activity that is marked on the device such as skiing, hunting, fishing, canoeing, kayaking, and others.
- ☐ Good for calm, inland waters, or where there is a good chance for fast rescue.
- ☐ Designed so that wearing it will complement your boating activities.

Advantages

- ☐ Should be comfortable enough to wear for extended periods.
- ☐ A wide variety of designs for specialized boating activities.
- ☐ Available in bright colors so you can be easily spotted in the water.

Disadvantages

- ☐ Wearer may have to tilt head back to avoid going face–down.
- ☐ Will not hold the face of an unconcscious wearer clear of the water.
- ☐ In rough water, a wearer's face may often be covered by waves.
- ☐ Not for extended survival in rough water.



NOTE: Do not remove this booklet. No person may sell or offer for sale a PFD unless this booklet is provided with it.

S3955

The following is the front cover for a Throwable Device (Type IV PFD):

Think Safe

Choose the Right Personal Flotation Device (PFD)

This package contains a Throwable Device (Type IV PFD). Other available types are described within.

A Throwable Device (Type IV PFD) is:

- ☐ Designed to be grasped and held by the user until rescued.
- ☐ Provides enough buoyancy for users to hold their heads out of the water.

Intended Uses

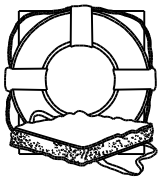
- ☐ For use on small boats in calm, inland water with heavy boat traffic, where help is always nearby.
- ☐ For use on larger boats as an extra device to aid persons who have fallen overboard. May be used with a lanyard, "man-overboard" pole, locator light, or smoke signal.

Advantages

- ☐ Can be thrown to someone within 40 feet.
- ☐ Can be used as a seat cushion, or some types can be placed in a bracket mounted above deck, where they are immediately available.
- ☐ Good back-up buoyancy for use with a wearable PFD.

Disadvantages

- ☐ Not for an unconscious or exhausted person.
- ☐ Not for non-swimmers or children.
- ☐ Not for rough water survival.



NOTE: Do not remove this booklet. No person may sell or offer for sale a PFD unless this booklet is provided with it.

S3440

The following is the front cover for a Buoyant Suit (Type V PFD):

Think Safe

Choose the Right Personal Flotation Device (PFD)

This package contains a Buoyant Suit (Type V PFD). Other available types are described within.

A Buoyant Suit (Type V PFD) is :

- ☐ Required to be worn to be recognized as an approved PFD.
- ☐ Designed to provide a stable face-up position in calm water for a conscious wearer.
- ☐ Available in many adult sizes for good fit and comfortable wear.

Intended Uses

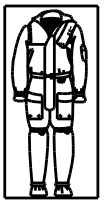
- ☐ Good for calm, cold waters, where rescue may be slow coming.
- ☐ General boating or the specialized activity that is marked on the device such as hunting, fishing, sailing, or others.

Advantages

- ☐ Comfortable to wear for extended periods in a cool environment.
- ☐ Inflatable head support lifts head from water.
- ☐ Significantly increases chances of survival in cold water when properly worn.

Disadvantages

- ☐ May increase difficulty in getting out of water.
- ☐ Cannot be put on as quickly as a conventional PFD; therefore, must be worn to be counted as an approved PFD.
- ☐ May not hold the face of an unconscious wearer clear of the waves.



NOTE: Do not remove this booklet. No person may sell or offer for sale a PFD unless this booklet is provided with it.

S3607