

**Subject:** Report to UL STP from  
Task Group on Consolidated Standard for Wearable PFDs  
**Date:** February 6, 2008  
**Submitted by** S.E. Wehr on behalf of the Task Group

Task Group: Dr. Bilal Ayyub, Marty Jackson, Chris James, Paul Potter, Ralph Steger, David Toshack, Wayne Walters, and Sam Wehr (Chair) (also participating: Mike Cunningham)

Goal: Per Dan Ryan's message of 10/25/07, the initial objective of the task group is to develop the framework (i.e., a draft outline) of a new standard on wearable PFDs.

Introduction / Background:

1. As one of the results of the joint USCG/PFD industry/UL risk based compliance project, a task group was requested and subsequently appointed by the STP chair with the above stated goal. At about the same time, the USCG and Transport Canada agreed to the PFDMA resolution calling for a single North American Standard for wearable PFDs.
2. The Task Group (TG) met for the first time on November 26<sup>th</sup> at the offices of BMA Engineering, Bethesda, MD with the meeting goal of establishing working guidelines for the task group and starting work on the consolidated standard outline. Subsequently the group met by teleconference four times from January 9<sup>th</sup> to January 25<sup>th</sup>.

Mission statement - Objectives:

3. In addition to the goal stated above the TG generally agreed to use risk-based methods in the proposed standard as follows: The proposed draft standard should offer provisions on minimum component and device performance requirements, and a minimum aggregate for the device performance for the compliance determination to the standard to enable risk-informed tradeoffs where appropriate.

Initial Proposal:

4. The group considered a proposal that the ISO standard (ISO 12402) be adopted with any needed national differences documented to make them acceptable as national North American standards.
5. The rationale for this approach was: 1) Awareness of global market competition necessitates this effort to move toward the eventual goal of having acceptable international standards. 2) We need to start using the documents and identifying the essential differences to document what keeps us from presently adopting them "as is". 3) We should do the most we can to reduce drownings as we move forward with the consolidated standard development process. To do this, adoption of the concept of ISO level 50 devices was proposed with the provision that they be approved only when worn. This would provide an opportunity to increase wear rate with the incentive of lower buoyancy and therefore more comfortable devices.

Discussion:

6. The ISO PFD standard (12402) is structured with ten parts; five parts for the various levels of performance; a part for special purpose devices; and various parts for components, test methods, accessories, etc. More details on the structure of the standard are provided in Attachment (1).
7. By accepting the ISO structure, we do not intend to be locked into the Level 50, 100, etc. approach to classification. We intend that the results of our reclassification project will guide the needed differences to be adopted for the classification labeling and marking requirements.

8. The group contacted Sonya Bird, the UL expert on harmonization with international standards, regarding the procedures for developing a harmonized ISO with national differences, and concluded this approach may be feasible. There are a number of steps that need to be accomplished, and the national differences need to be significantly less than the base ISO document. To get an estimate of the potential volume of differences, which may be needed, the group compared parts of the ISO standard contents and corresponding North American requirements and noted whether significant differences exist that are believed to require an addition, deletion, or modification to ISO requirements. After doing this for Parts 5 and 6, and some sections of Part 9 of the ISO standard, it appears that about 25% of Part 5 would require national differences, which should keep the documented differences within acceptable proportions. For Part 6 a similar percentage of sections would likely require documented differences when the current supplements to 1123 are not considered. It was suggested that if the kinds of requirements that are in the UL 1123 supplements are needed for the new standard(s) that they could be handled in separate parts from the current ISO Parts and therefore would not prevent the harmonization effort from going forward.
9. The TG has not yet collectively reviewed the UL requirements that have no corresponding section in the ISO standards. With a limited review of those requirements, it is apparent that there will be additional issues to consider as national differences. Continued review of those additional requirements will be needed. It is unknown at this time as to whether the volume of additional requirements needed as a result of that review would make the documented differences too great. However, there are likely several options available to deal with needed additions while still using the basic ISO requirements. To prevent just transferring old requirements into a new (ISO) format at least some of any needed additional clarifications could potentially be included in a UL Practical Application Guide. Additional requirements that are not suitable for such a guide may be appropriate for an additional part to ISO series depending on how important or critical they are.

Position with ISO – Advantages/Disadvantages:

10. Whereas the US has participated in the ISO PFD development effort for more than 10 years, and influenced some positive improvements in the transition from the European (CEN) standards to ISO standards, our comments are often not seriously considered partly because we don't currently use the standards. North American adoption of the ISO standards could improve the ISO members' perception of the North American commitment to applying the proposals we advance for making the ISO usable in North America. It will also make it easier for the foreign suppliers to discern that differences must be addressed to have their products approved for use in North America.
11. Another possibility is that, our use of national differences to the basic ISO requirements will be perceived as cementing the fact that this exercise will not lead to a world standard. It may lead to the Europeans ignoring the North American view even more in the base standard, because they know we will just make national deviations to fix anything we don't like. One of our tasks will be to determine the overall perception of the ISO members as we proceed and emphasize our desire to reach a common worldwide standard. The intention is to sell the Europeans on the new research and the more cost effective and wearable initiatives we are attempting to achieve.

"Clean Sheet of Paper" Approach:

12. In developing this consolidated standard, the concept of starting with a "clean sheet of paper" was proposed in order to avoid just transferring existing requirements into the consolidated standards without considering the lifesaving value added or other benefit(s) achieved that justifies the cost for compliance. A holistic approach should be taken where the aggregate effect of all the requirements are considered in determining whether a requirement merits being included in the standard.

13. By proposing the adoption of the ISO standard with national differences, the Task Group is not proposing to abandon a "clean sheet of paper" perspective. Rather, the Group notes that the ISO standards are considerably leaner on requirements than the current UL standards, and national differences can delete unnecessary requirements as well as modify or add requirements. In any case, the process of weighing the merits of any particular requirement should be continued in the preparation of the consolidated standard.

Conclusion:

14. The group's conclusion is that adoption of the ISO PFD standards with needed national differences should be pursued.

Recommendations:

15. During the process of deciding what sections of the ISO standards should be modified, deleted, and added to by national differences, any new classification system coming out of the Reclassification and Risk-Based Compliance Assessment project should be used along with the PFD models coming out of that project to guide the process.

16. A comprehensive, integrated approach, as discussed in the above section "Clean Sheet of Paper" Approach, should be used to ensure that the resultant consolidated standard optimizes lifesaving potential in a cost effective manner.

17. If, during the process of developing the national differences which are needed for adoption of the ISO PFD standards, the differences become too voluminous to allow adoption, the format of the ISO standards should be used as a template to develop a consolidated North American standard for wearable PFDs.

Schedule:

18. To meet a 2012 implementation schedule, the target date for submittal of PFDs for evaluation to the consolidated standard is 31 March 2012. As shown in the attached draft schedule for consolidated standard development, the new standard (or national differences) should be ready to begin the UL ballot process at the end of March 2010. (See Attachment (2).)

Method of completing the work:

18. Since the Task Group proposes a "clean sheet of paper" approach to development of the new standard, which requires considering the requirements as whole, an oversight or steering group is suggested to coordinate the efforts of several task groups in preparing the new standard. In addition to the oversight group, we suggest the work be broken down into the following groups: Device Requirements Task Group, Special PFD Task Group, Component and Accessories Task Group, Test Methods Task Group, and perhaps Applications Task Group.

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References:

- a. PFDMA & CMAC resolutions supporting consolidated standard

Attachments:

- 1. Structure of the ISO 12402 PFD Standard
- 2. Draft Schedule for Consolidated PFD Standard Development

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## Structure of the ISO 12402 PFD Standard

The ISO PFD standard (12402) is a ten part standard as described in the following extracts from the forward and introduction of one of the parts.

### **“Foreword**

...

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

...

ISO 12402-6 was prepared by European Committee for Standardization (CEN) Technical Committee CEN/TC 162, Protective clothing including hand and arm protection and lifejackets, in collaboration with Technical Committee ISO/TC 188, Small craft, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 12402 consists of the following parts, under the general title Personal flotation devices:

- *Part 1: Lifejackets for seagoing ships — Safety requirements*
- *Part 2: Lifejackets, performance level 275 — Safety requirements*
- *Part 3: Lifejackets, performance level 150 — Safety requirements*
- *Part 4: Lifejackets, performance level 100 — Safety requirements*
- *Part 5: Buoyancy aids (level 50) — Safety requirements*
- *Part 6: Special purpose lifejackets and buoyancy aids — Safety requirements and additional test methods*
- *Part 7: Materials and components — Safety requirements and test methods*
- *Part 8: Accessories — Safety requirements and test methods*
- *Part 9: Test methods*
- *Part 10: Selection and application of personal flotation devices and other relevant devices*

...

### **Introduction**

ISO 12402 has been prepared to give guidance on the design and application of personal flotation devices (hereafter referred to as PFDs) for persons engaged in activities, whether in relation to their work or their leisure, in or near water. PFDs manufactured, selected, and maintained to this standard should give a reasonable assurance of safety from drowning to a person who is immersed in water.

...

(February 6, 2008 ) Attachment (1)

ISO 12402 allows for the buoyancy of a PFD to be provided by a wide variety of materials or designs, some of which may require preparation before entering the water (e.g. inflation of chambers by gas from a cylinder or blown in orally). However, PFDs can be divided into the following two main classes:

- those which provide face-up in-water support to the user regardless of physical conditions (lifejackets), and
- those which require the user to make swimming and other postural movements to position the user with the face out of the water (buoyancy aids).

Within these main two classes there are a number of levels of support, types of buoyancy, activation methods for inflatable devices, and auxiliary items (such as location aids), all of which will affect the user's probability of survival. Within the different types of buoyancy allowed, inflatable PFDs either provide full buoyancy without any user intervention other than arming (i.e. PFDs inflated by a fully automatic method) or require the user to initiate the inflation. Hybrid PFDs always provide some buoyancy but rely on the same methods as inflatable PFDs to achieve full buoyancy. With inherently buoyant PFDs, the user only needs to put the PFD on to achieve the performance of its class.

... The primary function of a PFD is to support the user in reasonable safety in the water. Within the two classes, alternative attributes make some PFDs better suited to some circumstances than others or make them easier to use and care for than others. Important alternatives allowed by ISO 12402 are the following:

- to provide higher levels of support (levels 100, 150, or 275) that generally float the user with greater water clearance, enabling the user's efforts to be expended in recovery rather than avoiding waves; or to provide lighter or less bulky PFDs (levels 50 to 100)
- to provide the kinds of flotation (inherently buoyant foam, hybrid, and inflatable) that will accommodate the sometimes conflicting needs of reliability and durability, in-water performance, and continuous wear;
- to provide automatically operating (inherently buoyant or automatically inflated) PFDs that float users without any intervention on their part, except in initially donning the PFD (and regular inspection and rearming of inflatable types), or to provide user control of the inflatable PFD's buoyancy by manual and oral operation;
- to assist in detection (location aids) and recovery of the user.

...

In compiling the attributes required of a PFD, consideration has also been given to the potential length of service that the user might expect. Whilst a PFD needs to be of substantial construction and material, its potential length of service often depends on the conditions of use and storage which are the responsibility of the owner, user and/or employer. Furthermore, whilst the performance tests included are believed to assess relevant aspects of performance in real-life use, they do not accurately simulate all conditions of this. For example, the fact that a device passes the self-righting tests in swimming attire, as described herein, does not guarantee that it will self-right an unconscious user wearing waterproof clothing, neither can it be expected to completely protect the airway of an unconscious person in rough water. Waterproof clothing can trap air and further impede the self-righting action of a lifejacket.

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(February 6, 2008 ) Attachment (1)

Draft Schedule for Consolidated PFD Standard Development

Proposed Schedule:

1.	Task Group for consolidated standard established	(25 October 2007)
1a	Milestone – Correspondence of Sections in ISO & UL Stds	(19 December 2007)
	Submit written report to STP	1 February 2008
2.	Present consolidated standard outline to STP and establish task group(s) to complete standard development.	March 2008
3.	Establish task group(s) to complete standard development	” ”
4.	10 or 12 Task Group meetings/conference calls to complete drafting consolidated standard	April 2008 thru March 2010
4a	Milestone – Draft deviations/differences complete	(April 2009)
4x	Task Group meetings/conference calls	
x.	. . .	March 2010
5.	Beginning ballot process	31 March 2010
x.		
6.	Milestone – Consolidation complete/published	31 March 2012
6a	PFD submittals to new consolidated standard	31 March 2012

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(February 6, 2008 ) Attachment (2)