NATO STANDARD

AAMedP-1.17

MINIMUM PHYSIOLOGICAL REQUIREMENTS FOR IMMERSION PROTECTION ASSEMBLIES FOR AIRCREW

Edition A Version 1

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NORTH ATLANTIC TREATY ORGANIZATION

ALLIED AEROMEDICAL PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

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NATO LETTER OF PROMULGATION

26 November 2018

1. The enclosed Allied Aeromedical Publication AAMedP-1.17, Edition A, Version 1 - MINIMUM PHYSIOLOGICAL REQUIREMENTS FOR IMMERSION PROTECTION ASSEMBLIES FOR AIRCREW, which has been approved by the nations in the MCASB, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 3981.

2. AAMedP-1.17, Edition A, Version 1, is effective upon receipt.

3.

4. This publication shall be handled in accordance with C-M(2002)60.

Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

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RESERVED FOR NATIONAL LETTER OF PROMULGATION

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
SVN	SVN does not use appropriate assemblies specified in this STANAG.
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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CHAPTER 1 INTRODUCTION

1.1 AIM

The aim of this standard is to establish the minimum requirements for immersion protection assemblies for aircrew.

1.2 AGREEMENT

Participating nations agree that immersion protection assemblies for aircrew shall meet the minimum requirements detailed in this NATO standard.

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CHAPTER 2 IMMERSION PROTECTION

2.1 GENERAL

1. Hypothermia is a major threat to the survival of aircrew who find themselves in water. Immersion protection assemblies reduce this risk by reducing heat loss from the body and enhancing the victim's thermoregulatory defenses to maintain a deep body or core temperature compatible with survival. In addition, the assemblies reduce the risk of ‘cold shock’ and swimming failure secondary to the cold water.

2. Other survival aids such as life-rafts may also help protect against cold by allowing the victim to remove themselves from the water but, as these may not be available, the performance of immersion protection garments should be specified on the assumption that the survivor will have to remain immersed to the neck until rescued.

3. Immersion protection assemblies may need to be worn for long periods without interfering with the general comfort and operating capability of the wearer. In particular, there is a balance to be struck between protection from cold immersion and the thermal load imposed by such assemblies prior to immersion. They must also be compatible with other items of equipment including life-preservers. These and other subsidiary requirements are not considered here.

2.2 SPECIFYING THE INSULATION OF THE IMMERSION PROTECTION ASSEMBLY

1. The level of protection against hypothermia provided by an immersion protection assembly is determined by its overall insulation measured in water over a period at least as long as the required survival time. It is important that the assembly does not allow inward leak of water since this produces marked loss of insulation.

2. An immersion protection assembly is required to protect the survivor only until they are rescued. Estimation of the rescue time therefore forms the first step in the determination of the degree of insulation required. While many factors can influence development of hypothermia in cold water, two important factors are time in the water and temperature of that water. From these a basic estimate of required immersion protection can be calculated (Figure 1).

3. Rescue times depend on local circumstances such as the location and range of search and rescue facilities, their capability at night and in adverse weather, and the performance of location aids. While most rescues tend to occur relatively quickly a small proportion will take an inordinately long time. The estimate required is that of the maximum likely rescue time and not the longest possible time. The reason for this is that taking the longest figures would demand a performance from the immersion protection assembly that would be difficult to achieve yet rarely required. It follows that the goal of an immersion protection assembly is not to prolong survival indefinitely but to prolong survival until such time that the great majority of victims will have been rescued.

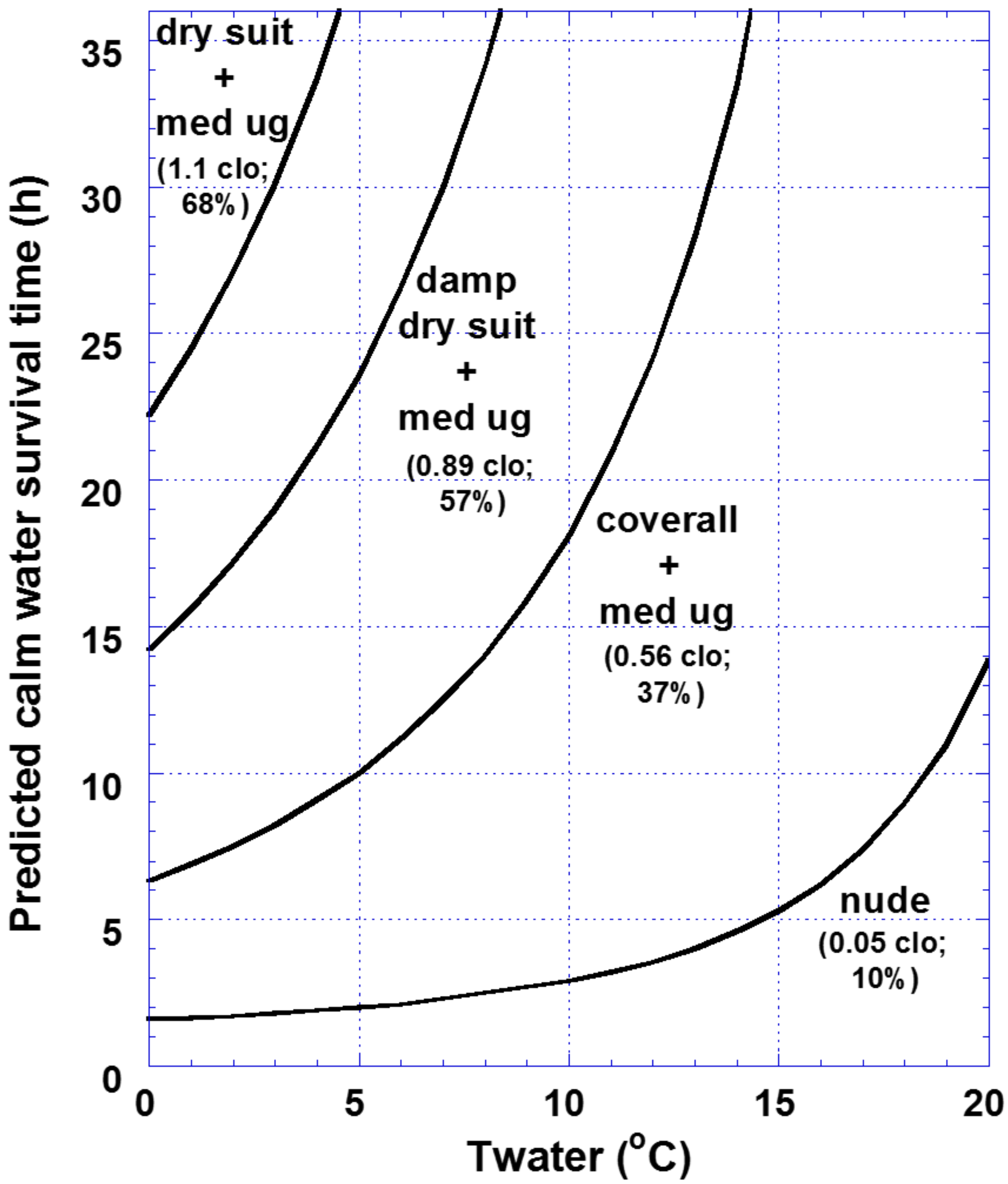

Figure 1: Predicted calm water survival time plotted against water temperature for lean males (approximate 10th percentile of the ASIC flying population) for four levels of body/clothing insulation ('med ug' refers to medium weight undergarment). Values within the parenthesis refer to the in-water insulation on the body and the probability of dying due to causes other than hypothermia (e.g., drowning, injury, etc.) at the predicted survival time.

4. The next step is to obtain an estimate of the water temperatures for the locality and season, and then determine the level of insulation required to ensure a survival time at least as long as the maximum likely rescue time.

5. Once the level of insulation necessary for the required survival time has been read from the graph, an appropriate assembly with an equal or greater immersed insulation can be selected.

6. In certain adverse circumstances, particularly likely at times of war, rescue times may be so prolonged that no immersion protection assembly alone could ensure a sufficient duration of survival. Difficulties may also arise if the maximum likely rescue time dictates a level of insulation that in the aircraft would cause heat stress sufficient to interfere with the operational performance of the aircrew. In both these situations the aircrew should wear the maximum insulation compatible with reasonable thermal comfort in the aircraft; the survival curves can then be used to determine the required rescue time.

7. Hypothermia is related to many factors: individual parameters including age, gender, weight, height, percent body fat, and fatigue; environmental conditions such as air temperature, humidity, wind speed and sea state; and, insulation from clothing worn under the immersion suit. There are computer-based survival time prediction models that account for variables other that simply time and water temperature currently being used in support of rescue operations in many NATO nations. Two such models are the Cold Exposure Survival Model (CESM) and the Probability of Survival Decision Aid (PSDA) model. The PSDA has been specifically mandated for use by the US Coast Guard since 2010 and has undergone refinements since. The survival time predictions shown in Fig. 1 were obtained using CESM. When available these more sophisticated tools will provide much more accurate survival time estimates.

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