

31 The establishment of 137N as the Canadian General Standards Board maximum acceptable inherent buoyancy limit for passenger helicopter immersion suits

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When a helicopter ditches into water it usually inverts and rapidly sinks. Aircrew and passengers have to overcome inherent buoyancy to make their escape from a flooded compartment through cargo doors, access doors, windows or the windshield. Even if the crew and passengers are uninjured, escape is difficult due to the loss of vision, disorientation, the requirement to hold their breath underwater and the extreme terror imparted by the catastrophe.

The buoyancy of trapped air in between each layer of clothing and of deliberately trapped air in foam rubber type immersion suits for hypothermia protection are added to the inherent buoyancy of each individual. The total buoyancy may indeed be of such a high value that it decreases or could even prevent the ability to make an escape from an inverted cabin.

In 1984, to establish a preliminary standard, Brooks and Provencher conducted two sets of experiments simulating a helicopter escape, first in a closed flooded diving chamber and secondly in an open pool, using clearance divers and later naive swimmers. The conclusions were that the shell of the suit alone should not contain more than **89N** of buoyancy; furthermore this figure should be confirmed in the dynamic situation of the Helicopter Underwater Escape Trainer.

This paper will review the latter work and report on the problems encountered with the development of a practical method of measuring the buoyancy of an immersion suit worn by a human, to confirm that the levels were representative of the conditions expected during underwater escape by dynamic measurement of subjects and suits in the Helicopter Underwater Escape Trainer; and finally, describe the recent experiment using four subjects (3 males, 1 female) which lead up to the establishment of the maximum inherent suit buoyancy figure conducive with safe escape, the figure of 137N being finally recommended to the Canadian General Standards Board.