

D2.3 NAMIRG GUIDELINES FOR MATERIALS AND DEVICES

After careful study and in-depth research, taking into consideration what has already been done by the existing European MIRC teams, the study group dedicated to the drafting of guidelines for materials and equipment necessary for the NAMIRG team has come to the following conclusions:

In the meantime, there are 2 different operative situations:

1. Helicopter transfer
2. Fire Fighting

Both require specific apparatus, equipment and PPE to ensure operator safety and, at the same time, effectiveness of operations

To this end, all supplies must comply with international regulations concerning both the maritime and air sectors

After a careful discussion, we have decided to use the normal equipment available, as far as possible, for various reasons, the main one being to ensure that the material is kept in an efficient condition, which is only done by being used on a daily basis, while maintaining the habit for operators to wear and use them in all types of conditions

Obviously this decision means that we try to limit as much as possible the amount of equipment and materials dedicated exclusively to the NAMIRG team that has very limited operational use and therefore requiring a high number of routine checks

It is evident that the helicopter transfer will require a greater quantity of specifically dedicated material compared to that for firefighting, given that this operation currently does not provide any operating standard or specific equipment

For operator safety, in an operator's rescue event, the following 5 phases (ELIFE) must be ensured:

- Evacuation
- Flotation
- Insulation
- Location
- Extraction

Not to guarantee the effectiveness of any one of the previous phases significantly reduces the possibility of operator survival

To ensure the effectiveness of the operations, check-lists will be drawn up to check the equipment to be loaded on board the helicopter. Although carrying out this procedure each time the helicopter is boarded may seem to be a waste of time, it does give us the absolute certainty of having all the necessary equipment in an efficient condition

Moreover, we also decided to search for products that combine multiple devices so as to simplify dressing, at the same time ensuring that regulatory requirements and effectiveness of use are met

Helicopter transfer

Watertight immersion suit (3rd layer)

The watertight immersion suit must ensure sufficient freedom of movement to allow operations to be carried out while it is being worn, including escaping from a sinking helicopter, at the same time guaranteeing thermal insulation as required by international regulations

Given the climatic conditions in the area of operations, with temperatures that can drop below -10°C in winter and soar well over 40°C in summer, the temperatures of use of the suit must be provided, and, where appropriate, any indications on the temperatures above which use of the suit is not recommended for the health and safety of the operator

Therefore, padding should be provided with the immersion suit to guarantee thermal protection in winter, while allowing the suit to be used during the warmer months

It must be ETSO and SOLAS-approved

The colour must guarantee high visibility

It must be supplied in several sizes to ensure a sufficient fit for operators with different anthropometric measurements

Footwear must guarantee operations at the helicopter embarkation and disembarkation points without wear

The type of maintenance and frequency thereof must be provided in compliance with the requirements of international standards

The suit must be equipped with reflective tapes as per SOLAS standards

It should be possible to use the suit together with a SOLAS-approved life jacket, otherwise the suit on its own must ensure the same performance as the life jacket, suitably equipped with a device that ensures the buoyancy of the operator, with a minimum buoyancy of 275 Newton, SOLAS-approved. As previously mentioned, this solution is preferred as it guarantees operator safety with the least amount of equipment being worn

Following the same philosophy, special pockets or hooks must be provided for MOLLE (modular lightweight load-carrying equipment) for the emergency breathing apparatus (PSTASS - passenger short-term air supply system), the personal locating device (PLB - personal locator beacon) and for any other accessory

It should also be possible to easily select automatic or manual inflation of the life jacket/equivalent device, to avoid inflation of the jacket/device before leaving the helicopter in the event of splashdown/sinking

If the use of the immersion suit above certain temperatures is not recommended, a separate life jacket also equipped with special pockets/MOLLE hooks for PSTASS and PLB must be foreseen so that it can always be used as a buoyancy aid

The working group has taken another product offered on the market into consideration, i.e. an immersion suit with fire-resistant properties such as to allow use also as PPE for firefighting operations and has found, in addition to the obvious comfort of completely eliminating PPE and the time it takes to change from one set to another, a series of negative sides that have discouraged its use:

The first is the excessive increase in body temperature

There are studies in literature on the increase in a firefighter's body temperature when fighting fires in confined rooms; temperatures, which in these cases can already reach 40°C just by using normal PPE

The second problem to be considered is the possibility of tearing or even piercing the suit during rescue operations, making it unusable to abandon ship

Another problem, which is starting to be taken into consideration, thanks to recent Swedish studies on the contamination of unburnt particulate matter during fires, also through the skin, has led to the introduction of decontamination procedures for this type of intervention as well, with related procedures for undressing, packaging the contaminated clothing and replacing it, thus avoiding the subsequent contamination of truck/helicopter/support vessel. In our case, the possibility of putting the immersion suit back on to leave the ship at the end of the operations, performs the same task. To be able to change in a protected area of the ship when boarding also makes it possible to avoid wetting the fire-resistant PPE, decreasing/preventing greater heat permeability due to wet clothing

Life jacket

A life jacket must be provided to ensure buoyancy of the operator who was forced to enter the water, in compliance with SOLAS requirements, i.e. double chamber, gas-inflatable, fire-resistant, a buoyancy of at least 275 Newton and compatible with the rest of the equipment required by the regulations

Once inflated it must be able to position and maintain the operator with his/her face out of the water

The deflated life jacket must allow operations on board the helicopter, even in emergency conditions, wearing all the equipment provided

It should also be possible to easily select automatic or manual inflation of the life jacket device to avoid inflation before leaving the helicopter in the event of splashdown/sinking

The life jacket should be provided special pockets or MOLLE hooks (modular lightweight load carrying equipment) for the emergency breathing system (PSTASS - passenger short term air supply system), the personal locating device (PLB - personal locator beacon) and for any other accessory

The positioning of these accessories must be such as to reduce the possibility of injury in the event of splashdown and avoid obstruction from exiting the helicopter in an emergency

Personal locator beacon

If necessary, the PLB is the device that allows locating operators at sea, in case of abandon ship/helicopter

Given the possibility that the NAMIRG team will have to intervene on ships with a potentially hazardous atmosphere, all the electronic devices must comply with the ATEX European directives. The PLB is manually or automatically activated once immersed; therefore there is a lower risk from this point of view

It should operate on the digital satellite frequency of 406 MHz and on the analogue frequency of 121.5 MHz, be equipped with strobe light, ensure a transmission duration of more than 12 hours and a battery life of at least 5 years, it must float and be equipped with GPS to allow greater precision in the search and rescue operations

It should be noted that, although registration with the COSPAS-SARSAT centre is not mandatory, each PLB has the code of the respective country

Emergency breathing system (EBS)

The EBS (PSTASS) (Emergency Breathing System) (Passenger Short Term Air Supply System) is a compact compressed air breathing apparatus designed to provide the operator with air during an emergency escape from a helicopter, in the event of splashdown/sinking, increasing the time available for this operation

The air will be compressed to 200 bar in a small cylinder (about 0.5 l), fitted with pressure gauge for pressure control and a special nozzle on request equipped with nose clip, to simplify its use during immersion

It must be compatible with the immersion suit/life jacket so as to guarantee its immediate use in case of need, using only one hand

Positioning on the immersion suit/lifejacket must be such as to reduce the possibility of injury to the wearer on impact of the helicopter ditching and also to limit snagging when passing through helicopter emergency exits.

Complete harness

It must allow safe hoisting of the operator without interfering with the rest of the equipment worn. An immersion suit or a life jacket with integrated harness is preferred

Bags for personal protective equipment

The bags must be soft, watertight, no larger than 70 x 50 x 45, red and must bear the NAMIRG team logo and the name of the operator

Firefighting PPE must be placed inside it as well as everything else necessary to ensure sufficient operational autonomy on board the distress vessel, such as energy bars, drinks with saline supplements, change of clothing, etc. (welfare pack), which every operator, based on their experiences, preferences and needs, will take to the intervention, remaining in any case within a precise weight limit

Technical underwear (thermal undergarments) (1st layer)

The underwear should guarantee high breathability and high perspiration dispersion, in order to protect the operator from the effects of cold, loss of body heat and hypothermia, while maintaining comfort in case of body overheating

It will consist of a long-sleeved shirt and long johns

The operation planned for the NAMIRG team is defensive and not offensive, so with a lower theoretical heat exposure, opting for protection from the cold was preferred, to provide the necessary level of thermal protection required should the wearer enter the water.

Eye and ear protection

Eye and ear protection must be guaranteed during helicopter operations

Neoprene hood

It must provide thermal protection of the operator's head at sea

Winter hat

It must provide thermal protection of the operator's head

Survival knife

It should have a fixed blade with a length between 10-12 cm, thickness 4-6 mm, smooth sharpening, the handle must be made of synthetic material to ensure a good grip even when using wet gloves
The sheath must have the MOLLE attachment

Firefighting

Waterproof and ATEX satellite telephone

Priority will be given to the sustainability of the SIM tariff plan in the context of the possible use for the NAMIRG team

Waterproof container for transporting equipment (HLB Helicopter loading bag)

The containers will be used to hold several PPE bags and for the remaining material, self-contained breathing apparatus, spare cylinders, etc.

The following items have already been the subject of previous supplies

PPE:

- Fire coat
- Fire trousers
- Helmet
- Fireproof balaclava
- Fire gloves

Lightweight working coveralls (2nd layer)

Self-contained breathing apparatus with a buddy breather (EBSS emergency breathing supply system) for third-party rescue

Spare composite cylinders

Thin work gloves

Fog nozzle

Hose holder hook

Lifeline

Watertight and explosion-proof (ATEX) marine VHF radio (Tri-Watch)

Watertight and explosion-proof (ATEX) FRS team radio (Puma-type)

Explosion-proof flashlight (ATEX)

Man down detection device

Thermal image camera

Explosimeter

UDR-13 electronic dosimeter

Plasticised MIRG SOP

Pencil

Triage marker

Memo paper