

Interagency Security Committee (ISC)
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Escape Hoods

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BACKGROUND:

A number of Federal agencies are in the process of considering whether to provide escape hoods to employees for use in the event of chemical, biological or other emergency events. The Interagency Security Committee, has developed the following guidance to assist managers in the decision making process of determining when to purchase and distribute such protection devices to their employees.

PURPOSE:

The escape hood is designed and used as a quick, simple means of providing users with a source of filtered or supplied air to safely exit an environment in which the air may be contaminated. As such, the escape hood is designed for a one-time use of short duration.

The decision to procure escape hoods is influenced by a number of factors which include threat and risk assessments, an evaluation of other available protective options such as shelter-in-place, and an understanding of the capabilities, features, and limitations of escape masks on the market. Equally important are a number of additional issues such as training capability, logistics and funding which need to be carefully considered prior to a large scale purchase and distribution of hoods.

It should be noted at the outset that based on current technology no single escape hood is capable of protecting an individual from all types of potential respiratory hazards. For example, some hoods provide no protection in the event of smoke or toxic chemicals, such as carbon monoxide, resulting from a fire. Decision makers should carefully research information provided by equipment manufacturers to understand the types of respiratory agents that may be covered by a given product.

RISK ASSESSMENT:

The single most important determination for facility and security managers to make in determining the need for acquiring escape hoods for general employee use is a comprehensive risk assessment for the facility. Risk assessments may be conducted by on-site security personnel, or qualified security consultants. In some cases the local office of the Federal Protective Service may also be able to provide assistance and guidance. Multi-tenant facilities should have all assessments coordinated by their respective Building Security Committee. The Local Emergency Planning Committee (LEPC), which is comprised of representatives of local emergency services, may also be

a source of risk assessment assistance in some locations. The Headquarters of the local fire department should be able to provide information regarding the LEPC in your area.

The following is a list of risk/threat considerations, which may be used by building and security managers in deciding whether escape hoods may be advisable for the general employee population of a facility:

Determine the threat and risk potential of events that could create an environment where respiratory protection would be required, such as the release of chemical, biological or radiological respiratory hazards.

Consider Agency mission. Does your agency's mission or the missions of other shared tenant agencies make your facility a prime target? Is there a prime target nearby which could put your facility at risk if such an attack against their facility occurred?

What is your facility's proximity to chemical plants, industrial complexes or rail yards that manufacture, use, transport, store or dispose of large amounts of hazardous materials? Is your facility closer than one mile to a road, rail, or water transportation artery on which hazardous materials are transported?

If so, how secure are these neighboring facilities?

What level of security or force protection is available at your facility? Is the security force capable of identifying and responding to a Chemical, Biological, Radiological, or Nuclear (CBRN) attack?

What is the location and response time of the nearest hazardous materials (HAZMAT) team for your facility?

What are the rescue and decontamination capabilities of the nearest HAZMAT team (number that can be rescued and decontaminated per hour)?

Does the HAZMAT team have detection and/or identification capabilities for chemical/biological/radiological agents? Will you have detection in time to alert employees and take countermeasures?

Are visitors entering your facility screened? Are employees screened?

Can you effectively shut down your facility?

Do you have the ability to control all pedestrian and vehicle flow in and out of your facility?

Is there an effective and tested shelter-in-place plan for your facility?

Where are your air intakes located? Are they under surveillance? Are there protections on the intake and re-circulation ducts of the heating, ventilation and air conditioning (HVAC) system?

How long does it take to stop the intake of air into your facility?

Does your HVAC system shut off in one central location or are multiple shutoffs required? Do you have emergency shutdown capability?

Once facility management/security determines that escape hoods are advisable or necessary, additional training and logistical issues need to be considered. The following is a list of considerations and issues that should be resolved, prior to making a final determination:

TRAINING:

Training your workforce to respond to a chemical or respiratory threat is impacted greatly by many factors that are unique to your environment. The size of the population, the facility characteristics, emergency operation(s) procedures, and current safety and security practices are but a few of these factors. When considering escape hoods, there are four general topics that must be addressed: When do I put on my hood, how do I put it on, what do I do after I have donned the hood, and when should I remove the hood? Panic and anxiety can defeat the best CBRN equipment available. Training is critical and all employees **must** be trained on the equipment issued.

Consider these:

Absent reasonable threat predication, can CBRN training sufficiently improve employee morale and mitigate their sense of vulnerability?

What is the ability of your agency to provide the initial and follow on training required for use of the hoods? Is training available from the manufacturer?

Consider that in addition to initial training, recurring training must occur, as this is a perishable skill. Training for new hires will also be required. Consult with your local training office to determine how often training should occur and adhere to that schedule.

What training methods are most appropriate/effective for your facility:

- Group training sessions?
- Instructional tapes at centralized locations (i.e. kiosks)?
- Use of in-house training resources?
- Use of training consultants/contractors?

Do you need a trainer hood for each employee or can one trainer serve many without compromising good safety and hygiene practices?

NOTE: Ensure that a plan is in place to guarantee that training hoods are not inadvertently used in emergency situations.

How will new employees be trained? Will it be part of orientation?

Will visitors be trained? How?

Do security officers need specialized training?

Do floor wardens and hall monitors need specialized training?

What credentials should the instructors possess?

Is there a need for bilingual training or American Sign Language training?

Are resources available to manage the stockpile of hoods and handle stock rotation for shelf life and maintenance? This normally requires additional training.

How often should CBRN drills be conducted?

Consider coordinating training with possible decontamination response (HAZMAT) personnel, ensuring that these responders are familiar with decontamination of personnel wearing the escape hoods.

Ensure that ALL PERSONNEL realize that SOME escape hoods provide no protection in the event of smoke or toxic chemicals, such as carbon monoxide, resulting from a fire.

LOGISTICS:

Consider whether to issue the escape hoods individually or have them contained in centralized locations. If they are issued individually, how do you ensure that they are accessible quickly for both employees and visitors (i.e. not buried in a distant file drawer or locker)?

If opened, hoods must be replaced. Unopened hoods also have a fixed shelf life. Replacement schedules and costs must be considered.

Are resources available to manage the stockpile of hoods and handle stock rotation for shelf life and maintenance?

Be cognizant of the physical bulk and weight of the equipment; this will drive delivery and storage.

Will personnel moving from one facility to another be permitted to carry their hood with them?

How will accountability be established?

Will an inventory be conducted? How often and whose responsibility is it?

How do you store excess hoods and hoods turned in from out-processing personnel?

Who ensures hoods are turned in before personnel are allowed to out process?

HUMAN RESOURCE ISSUES:

Do some jobs place certain employees at higher risk than others?

What responsibility does the issuing agency want to accept for the well being of persons visiting the facility?

If escape hoods will be made available to visitors consider the following:

How many escape hoods are sufficient to meet the potential demand?

If not enough escape hoods are available, what criteria will be used to issue those that are available?

NOTE: Hoods with appropriate seals may not be available for children.

MEDICAL:

The agency should consider an effective alternative for the small percentage of personnel incapable of using escape hoods due to medical conditions, such as strong gag reflex, allergies to rubber products, respiratory difficulties, as well as small children who may not be able to obtain an effective seal with their hoods.

Other potential medical/physical problems include claustrophobia, limited visibility, and hearing problems. These issues may be mitigated with effective training.

LEGAL:

Are there union issues, labor law ramifications or issues particular to your agency that must be considered?

The agency should consider the legal ramifications of misuse of equipment, both by “well wishers” and “evil doers”.

FUNDING:

The Agency must have the ability to replace used and/or damaged hoods, including storage facilities and money for the equipment.

The agency should budget for the extra hours per employee for initial and follow on training.

Will training require a separate contract from purchasing?

Will sustainment training require an additional contract?

Will new personnel arriving after initial training be trained under an additional contract?

What is the shelf life of the hood? Do the hoods need maintenance? Do they come with a warranty?

PLANNING:

Is your agency emergency evacuation/reaction plan flexible enough to incorporate the use of these hoods or will changes have to be made?

OTHER ISSUES:

The agency should consider the possibility that not all HVAC systems have central shut off capability and may take a period of time before stopping the intake of air. Shutting down an intake fan depends on some means of advanced detection and warning to the personnel responsible for shutting the system. Detection capabilities are often limited to chemical warfare agents and may not alert, respond or detect some toxic industrial chemicals. Depending on a variety of issues, such as the release point of toxic chemicals, the means of delivery, and volume and type of chemical used, the notification time required to don an escape hood as well as the amount of protection afforded by the building itself will vary widely.

EXTERNAL IMPACT:

Consider the impact of escape hood issuance on public perception.

Consider the impact of the issuance of escape hoods on other parts of the organization or other organizations within the building. These issues should be discussed in detail within the organization and within the Building Security Committee.

Consider the potential impact of significant expenditure of appropriated funds for escape hoods from the base operating funds if reviewed by internal budget personnel, OMB and/or Congress.

PRODUCT FEATURES:

Many escape hood products are available on the market today with a wide variety of features that may or may not make them suitable for your needs. Basically there are three options for escape respirators: supplied air or oxygen, negative pressure filtered respirators, and positive pressure filtered respirators. Some come in half masks, some cover the full face and some cover the entire head. Supplied air or oxygen systems use bottled air and therefore provide protection in nearly all threat environments, including

smoke, but are usually limited in duration. Negative pressure filtered masks are good choices for most (not all) potential threat chemicals and will typically last longer than supplied air systems but will not be effective in an oxygen depleted environment (smoke). Powered air filtration systems have the same benefits and vulnerabilities as other filtered systems with the exception that the wearer has a positive pressure air feed into the mask. This positive pressure greatly reduces the breathing resistance experienced with negative pressure masks and also typically can be expected to provide an additional safety factor whereby if the seal between the skin and mask is violated there is less chance of infiltration of the chemical into the mask (many of the supplied air systems are also positive pressure systems). A drawback to the powered systems is their reliance on battery power. Should the power supply be lost, the ability of the mask (especially hood type masks) to provide protection will be diminished or lost.

It is important to remember that the ability of an escape mask to provide protection is also driven by the concentration of chemical agent, how rapidly the mask can be donned, the materials and craftsmanship of the mask, where it is stored, and the breathing rate of the individual wearing the mask. High volumes of chemicals can overwhelm a filter and chemicals or smoke that displaces the oxygen in the air will render filters useless. Some materials used in the construction of escape masks may provide a good seal but may be penetrable in short periods of time by some toxic chemicals. Additionally some masks may have a much shorter shelf life if stored in high heat areas like the trunk of a car. High breathing rates can severely limit the effectiveness of any respiratory protection system and should be considered in the selection process and be a major part of training.

While there is no perfect escape mask for all applications, one must consider the likelihood of events (intentional release of chemicals, HAZMAT accident, etc.), the concept of use, the cost of such a measure and the benefits to be gained with issuing escape masks. Remember that for nearly all of the different escape masks, once you open the package and remove the mask, it cannot be used again at some future date. False alarms can be very costly. In this regard, consideration should also be given to developing filtered collective protection areas within your facility as a potential cost effective means to provide a safe environment for employees in case of a respiratory threat.

The Technical Services Working Group (TSWG) has completed the evaluation of the SURVIVAIR® Quick2000® Escape Hood and the MSA Response™ Escape Hood. These two escape hoods were tested at the U.S. Army Edgewood Chemical Biological Center (ECBC) and have met the ECBC performance criteria for chemical-biological (CB) escape hood respirators. A brief description of these products is provided below.

Note: (Description information provided has been obtained from the product manufacturers – not from official government sources).

SURVIVAIR® Quick2000® Escape Hood www.survivairquick2000.com

Features of the Quick2000® are as follows:

- An oversized hood, which covers the whole head to allow for a full head of hair, facial hair and eyeglasses.
- An extra – large visor to reduce chance of claustrophobia. Visor features a permanent anti-fog coating.
- A unique mouthpiece design which delivers protection factors significantly higher than traditional half masks / neck seal designs.
- A higher capacity filter packed with ASZM-TEDA carbon. A HEPA filter is sealed to the front of the cartridge. Will provide protection from most biological and chemical warfare agents.
- A nose clip to prevent nasal breathing during use.
- A neck dam made of an “Elastomeric” rubber to seal off the external environment from inside the hood. Adapts to neck sizes from 10” to 22”.
- Releasable mouthpiece to facilitate communication.

The Quick2000® also features a soft carry pouch that can be snapped to any belt and, a compact design for easy storage. Training units and training videos are recommended and are sold separately.

MSA Response™ Escape Hood

<http://www.westpacmarine.com/preparedness/response.htm>

Features are as follows:

- Made of high-performance laminate material.
- A soft, high-stretch rubberneck seal conforms to irregular neck contours and allows a secure fit on a wide variety of users.
- A unique nose cup to reduce lens fogging and carbon dioxide buildup by directing airflow inside the hood. Also allows for enhanced communication.
- A high efficiency particulate filter and activated carbon to combat aerosols, gasses and vapors. (The canister claims to contain 50% more carbon than similar U.S. military canisters).
- A large lens and translucent chemical-resistant hood for better visibility, face recognition and reduced claustrophobia.
- Cradle-type head straps to allow for quick, no assistance donning.

- Claims extensive testing against a variety of chemical agents. Contains a pleated high-efficiency (P-100) filter to remove aerosols, radionuclides, and solid particulates and a impregnated activated carbon bed to adsorb (filter out) gasses and vapors. Teargas agents are removed by the P-100 filter and carbon bed. Mustard (HD), Sarin (GB), DMMP (Sarin simulant), HCN and CK are also effectively adsorbed by the carbon bed.

CONCLUSION:

The escape hood issue is very complex. There are too many variables to establish a uniform benchmark to guide agencies in this area. Many of the factors that must be considered are agency, even office, specific and preclude the issuance of blanket recommendations. Each agency or component must carefully evaluate its own situation and objectively weigh the criteria in order to render a prudent decision. This guide is intended to provide some focus in this area, but the decision and commitment rest solely with the agency or component managers.

For additional information on selecting escape hoods/respirators for both home and business use, please consult the National Institute of Occupational Safety and Health website at www.cdc.gov/niosh/respinfo.html and click on “Fact Sheet” (dated 4/14/03).