

ESCAPE DEVICES: RESPIRATORY PROTECTION FOR THE EVOLVING THREAT LANDSCAPE

WHY WOULD I REQUIRE A RESPIRATORY ESCAPE DEVICE?

The images and reports that followed the events of the January 2021 Capitol riots in the United States shocked audiences globally as an iconic democratic institution came under attack and threatened the safety of the lawmakers inside. Few could foresee such an event taking place, however, it demonstrated the importance of being prepared for any eventuality. With rioters close to breaching the doors to the Senate, escape hoods were distributed and deployed to law makers and politicians housed inside to protect against any airborne threat such as tear gas or any unknown substance that may be released by rioters. These events showed the importance of preparation and having such a device on hand that could be quickly and easily donned, even by untrained or civilian personnel.

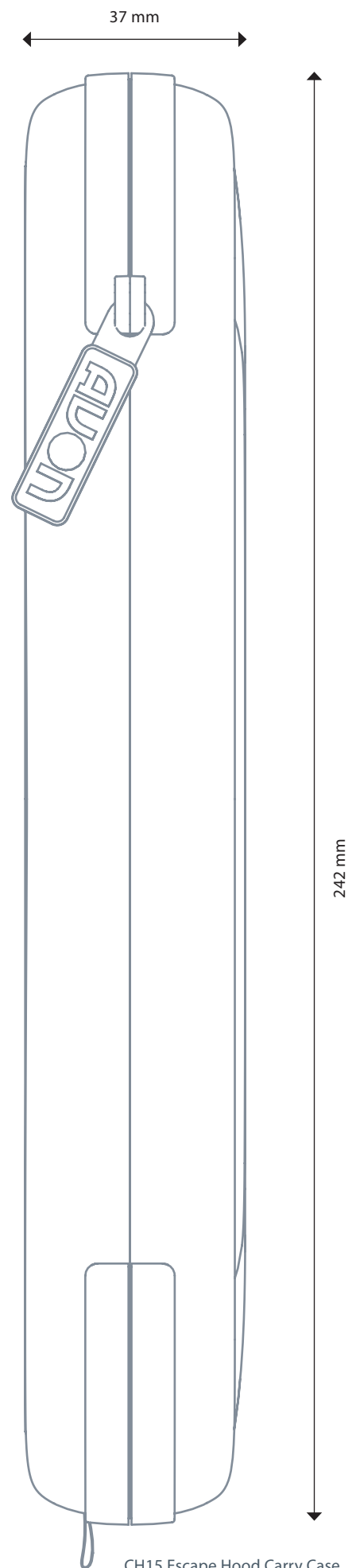
Individuals who are routinely subjected to particulates, gases or vapours which are harmful to the respiratory tract due to their occupation will deploy suitable Respiratory Protective Equipment (RPE) and other Personal Protective Equipment (PPE) to ensure they are protected from the threat at hand. The presence of harmful substances occurs in a range of workplace professions, for example in paint shops which therefore require the selection of appropriate RPE to meet the given threat substance. Often in these cases, the threat substance is known and protective equipment can be selected to allow work to be conducted safely.

However, in certain situations, the potential for a release of materials hazardous to health means organisations and agencies typically develop an Emergency Response Plan, consisting of a means to protect and safely evacuate all affected individuals, such as that which was followed in the Capitol riots.

Increasingly, respiratory protection is at the forefront of people's minds due to the ever-changing threat profile. In the last decade, there has been an increased concern about the potential for a terror attack releasing a chemical or radiological agent. However, these threats are not confined to only deliberate releases. Economic development has meant the presence and transportation of hazardous materials have become more widespread globally due to increasing numbers of industrial facilities and the associated waste being produced and subsequently transported cross-country. The increasing volumes and geographic spread of Toxic Industrial Chemicals and Materials (TICs/TIMs), leads to a greater potential for an accidental release of these materials in both rural and urban communities.

Large-scale incidents of a Chemical Biological Radiological and Nuclear (CBRN) nature generally occur without warning meaning initial first on scene response is likely to be conducted by front-line emergency services personnel rather than specialized units, particularly in cases where the threat is unknown. Consequently, emergency services have expressed a desire to be prepared for any potential threat and investigate and action the procurement of CBRN protection to all emergency personnel. For this kind of respiratory protection to be successful, it needs to be low-profile, simple to use with a quick don time as well as cause no interference with both the existing ensemble of equipment used by the operator or with their job role.

A respiratory escape device is designed to provide a period of protection to enable a safe escape from the threat at hand. A key differentiator of an escape device, such as an escape hood, is that it is designed and approved by certifying bodies only for escape. Whereas typical Air Purifying Respirators (APRs) are approved by certifying bodies to be used



in the workplace for the completion of tasks and job roles, Air Purifying Escape Respirators (APERs) are approved only for the evacuation of a hazardous environment. APERs, like the CH15 occupy a small footprint allowing them to be carried at all times, with no maintenance, minimal training and no annual fit testing meaning they offer a compact, potentially life-saving device which they can use to escape the incident area and subsequently regroup at a safe zone.

There are a variety of respiratory escape devices available, which have a range of different potential applications, and fit into two major groups; Air Purifying Escape Respirators (APERs) including Escape mouth-bits and Escape Hoods as well as Supplied Air Escape Devices such as Self Contained Breathing Apparatus (SCBA). The use scenarios of these differing respiratory escape devices depend on the environment and user groups in question.

AIR PURIFYING ESCAPE RESPIRATORS

Air Purifying Escape Respirators (APERs) use a filtration system to filter and remove hazardous substances from the air to ensure that the user is afforded a minimum protection time to safely evacuate the area. There are two main types of APER, Escape Hoods such as the Avon Protection CH15 and escape mouth bits. Escape mouth bits cover only the mouth, with a nose clip to prevent inhalation through the nose and typically offer minimum protection durations of 5-15 minutes. Escape Hoods offer higher levels of protection, as they cover the entire head, typically sealing at the neck, and offer protection for 15-30 minutes. Key advantages of APERs are their compact size allowing them to be carried at all times. Furthermore, they typically require no servicing for the duration of their shelf life and have a lower purchase price than SCBA offerings, reducing the total cost of ownership.

SUPPLIED AIR ESCAPE DEVICES

In contrast to APERs which filter atmospheric air to remove harmful contaminants, supplied air escape devices utilize a cylinder containing pressurized air to aid safe escape of the user. These systems are independent of ambient air, meaning they have the key advantage over APERs in that they can be deployed in an oxygen deficient environment. The disadvantages of these devices compared to APERs is the elevated total cost of ownership due to higher purchase price and the increased maintenance required. They are also generally larger and heavier, meaning they cannot easily be carried on a person at all times in the same way low profile APERs can be.

EXAMPLE USE – CASE 1

A large metropolitan Police Department may issue an Air Purifying Escape Respirator such as the Avon Protection CH15 to each of its patrol officers. This means in the event of a chemical release either following an accidental industrial release or a deliberate terrorist attack, officers will be protected and are able to leave the scene safely and hand over to specialist teams. The low profile of an escape hood like the Avon Protection CH15 means it can easily be transported via a belt mount or carried inside a patrol vehicle with no maintenance during the product lifecycle.

EXAMPLE USE – CASE 2

With military's deploying their troops globally to potentially hostile areas, the threats are constantly evolving and with it the type of equipment troops are issued is also changing. Chemical Warfare Agents (CWAs) are extremely toxic synthetic chemicals which can be dispersed in a range of forms such as a gas, liquid or aerosol and have been used in warfare as well as stockpiled as recently as the twentieth and twenty-first century. The release of CWAs is often unexpected, and due to APRs and canisters being generally larger and therefore more cumbersome to carry, there is a trend towards a form of respiratory protection that can be worn on the body at all times. This enables safe withdrawal from the area and allows personnel to regroup in a safe area where specialist equipment can then be deployed. The Avon Protection CH15's low profile means it can be easily be carried on the body at all times and donned in under 10 seconds by a trained user. The CH15 has been tested against live agents and provides a minimum of 15 minutes protection against a range of threats including CWAs.