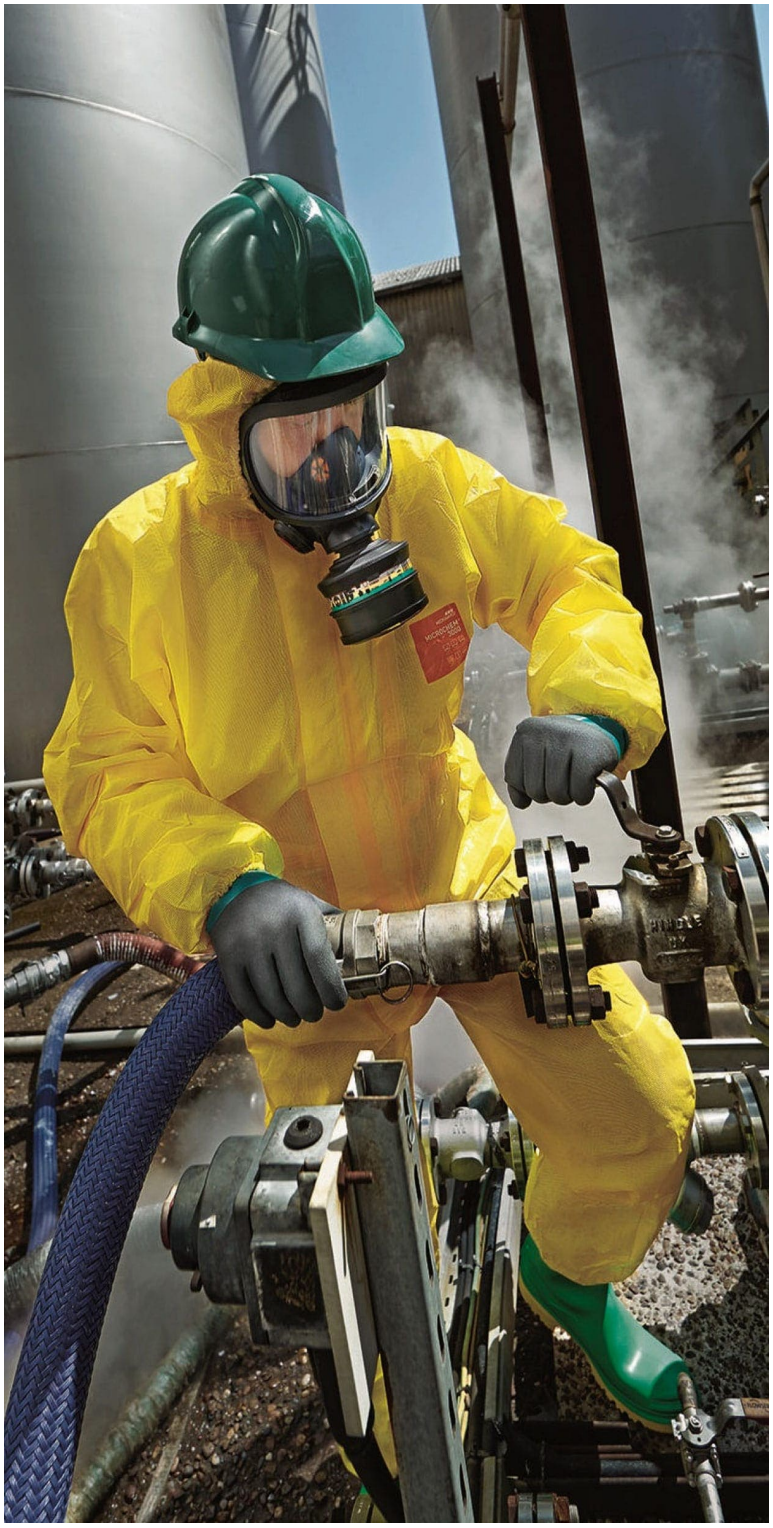
DANISH MINISTRY OF DEFENCE
ACQUISITION AND LOGISTICS ORGANISATION

DALO

# AnsellGUARDIAN® Chemical Report

april 11, 2024



Ansell

## Ansvarsfriskrivning

I den här rapporten hittar du information om barriärprestandan hos viss personlig skyddsutrustning (personal protective equipment, PPE) mot de kemikalier du har valt. Denna information är avsedd att göra det möjligt för din organisations hälso- och säkerhetspersonal att fatta mer välgrundade beslut om vilken av Ansells personliga skyddsutrustning som kan erbjuda det bästa skyddet under de avsedda omständigheterna och hjälpa till med att utföra en riskbedömning för din organisation.

Vi vill betona att permeationstiderna inte motsvarar en säker användningstid. Den säkra användningstiden kan variera beroende på om den personliga skyddsutrustningen har satts på korrekt, den omgivande temperaturen, kemikaliernas toxicitet och andra faktorer. Den permeationsinformation som erbjuds här är begränsad till det huvudsakliga skyddsmaterialet. Permeationstiderna kan variera runt sömmar, dragkedjor, visir eller andra sammanfogningar eller delar av den personliga skyddsutrustningen. Det åligger din organisations hälso- och säkerhetspersonal att göra en riskbedömning innan de väljer lämplig personlig skyddsutrustning för uppgiften. Om du vill diskutera någon aspekt i detalj kan du kontakta oss.

*Uppskattningarna av skyddsutrustningens barriäregenskaper baseras på aktuellt tillgängliga data och extrapoleringar från laboratorietestresultat och information om kemikaliernas sammansättning. Synergistiska effekter vid blandning av kemikalier har inte redovisats. Uppskattningarna kan komma att ändras om nya tester utförs eller om ny information som utgör en bättre grund till extrapolering blir tillgänglig. Av dessa skäl tillhandahålls alla uppgifter i denna rapport endast i informationssyfte och Ansell frånsäger sig helt allt ansvar, inklusive garantier, relaterade till samtliga påståenden som finns häri.*

# Teckenförklaring för kroppsskydd

| Barriärens permeationsprestanda |
| --- |
| Ingen barriär |
| Stänkbarriär/begränsad barriär |
| Medelgod barriär |
| Bra barriär |

PS = Fysiskt tillstånd: A = aerosol, G = Gas, L = Flytande , P = klistra, S = Fast

## Genombrottstider för genomträngning - $BT_{1.0}$

$BT_{1,0}$ är tiden (i minuter) det tar för kemikalien i fråga att tränga igenom materialet vid en hastighet av 1,0 µg/$cm^2$/min.

Detta kan bestämmas med ett antal olika standardprovningsmetoder, däribland EN 374-3 och ISO 6529. Detta används främst i regioner som berörs av EN- och ISO-standarderna.

# Genombrottstider för genomträngning - BT

## 1.0

De färgade cellerna med siffror och symbolen C motsvarar experimentellt fastställda data som genererats av ett externt ackrediterat laboratorium. De färgade cellerna med siffror och symbolen V motsvarar experimentellt fastställda data som genererats av ett internt ackrediterat laboratorium. Färgade celler utan siffror motsvarar uppskattningar

| Varumärke | | | | AlphaTec® | AlphaTec® | AlphaTec® |
|---|---|---|---|---|---|---|
| Produktgrupp | | | | 3000 | 4000 | 5000 |
| CAS | Kemikalienamn | % | PS |  |  |  |
| 57-12-5 | Cyanide anion | 100 | g | See Note | See Note | See Note |
| 74-90-8 | HCN | 100 | l | <3' C | >480' C | >480' C |

# Liquefied gasses

Version 2
31/10/2018

The aggregation of a chemical (its physical state i.e. solid, liquid or gas) is needed because some chemicals are gasses at room temperature e.g. oxygen, Nitrogen, Hydrogen, ammonia etc. however they are commonly handled as liquids. This can be done by:

1. Storing the chemicals under a large amount of pressure e.g. in gas cylinders or storage tanks.
2. Or cooling these chemicals to very low temperatures e.g. oxygen becomes a liquid below -219 °C (-362 °F), often known as LOX and is a pale blue; ammonia liquefies below -33 °C (-28 °F) and is used as a common industrial coolant.


When a Liquefied gas comes into direct contact with living tissue it has the potential to cause cold burns in addition to any chemical hazards that may or may not be present. When selecting PPE we would suggest considering both the physical hazards (e.g. the cold) as well as any chemical hazards that may be present (e.g. for ammonia). Some gasses are non-harmful and don't pose a chemical hazard e.g. Oxygen, Nitrogen, Hydrogen etc. and so a permeation barrier may not be needed however if they are cold then this may pose a physical hazard.

Currently we don't offer any permeation and body protective materials designed to offer cold protection although several of our materials have undergone permeation tests against liquefied gasses. The AlphaTec® Flash and EVO have also been additionally certified in the optional liquefied gas and chemical flash fire protection according to NFPA 1991: 2016.

Due to the rapid rate at which many liquefied gasses evaporate, splashes are usually only a hazard for a couple of seconds before it heats up and becomes a gas (this will depend upon the chemical). Protection from this may only require a barrier to stop direct contact with the skin for a few seconds before the chemical evaporates, in which case a microporous material such as the AlphaTec® 2000 material and up may be considered e.g. for liquid nitrogen. However our materials are not designed to offer any thermal protection from chemicals, if contact for any longer than a couple of seconds is expected our materials may not be suitable.

When selecting PPE for liquefied gasses we suggest making a few decisions:

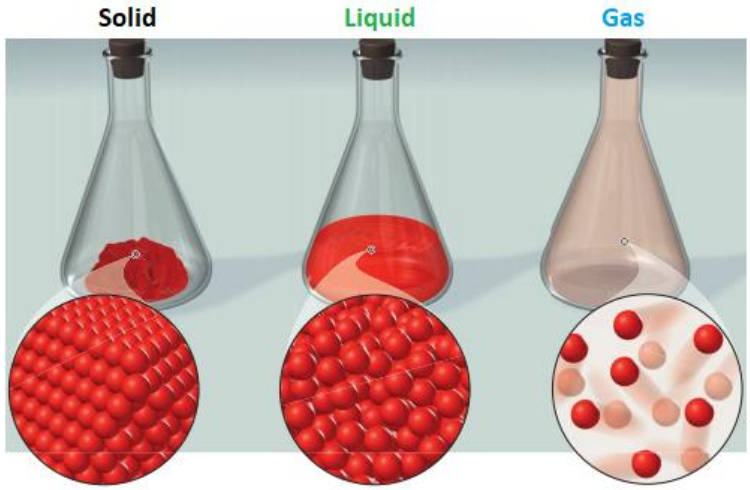
1. Consider whether a permeation barrier is required or not. For example Nitrogen is not a permeation hazard as it is a non-harmful chemical (nearly 80% of the air we breathe is made of it) so only cold protection may be needed. However if the chemical is Ammonia a permeation barrier may be required as this does offer chemical hazards.
2. Is a gastight material required? These liquids can usually rapidly warm in ambient conditions to form a gas where they may pose an inhalation hazard or be an asphyxiant along with any chemical hazards.
3. Are other hazards present? Other hazards may also need to be considered as many liquefied gasses can form an explosive or flammable atmosphere e.g. Oxygen or LPG (liquefied petroleum gas).

# Chemical gases

## What are gases and their characteristics ?

Gasses are one of the three fundamental states of matter, at regular room temperature and atmospheric pressure, the others being liquids and solids. The biggest and most noticeable difference between these states of matter is *the shape and volume*.

1. Gasses have ***no fixed shape or volume***, so they will completely fill whatever container they are in. This is because the atoms are spaced much further apart in gasses than liquids or solids, as shown in the picture.




2. Gasses are ***compressible.*** They are commonly stored in compressed cylinders until needed.
3. Gasses can be ***colourless***
4. Some gasses are ***odourless***, and others have ***distinctive odours*** though the odour limit can be above or below the toxic limit.
5. Gases ***form mixtures.*** They can be mixed with other matters like solid or liquid forming aerosols.

Information on the physical state of a chemical can be found in **Section 9** of **(M)SDS** (Material) Safety Data Sheet. Also, note the boiling point (b.p.) which is the temperature at which a chemical can change its state from a liquid to a gas. For example, hydrogen fluoride (HF) has a b.p of 19.5 °C (67.1 °F).

## Where are gases used?

Gases are used in many kinds of applications such as medical, industrial and/or transport.

## What are the associated health risks of exposure to gases?

There are very few common hazards associated with gasses because they will all chemically behave differently. However, there are some key factors to consider:

1. Is the gas toxic or not? Even if a gas is not toxic, a gastight material may still need to be considered depending on how it is handled. If it is toxic or corrosive on skin contact, a gastight material must always be considered.
2. Is the gas under standard conditions, or is it pressurized, or liquified? Then, an appropriate thermal protecting glove must be considered.
3. Is it diluted in water or a solution? Then, a material that can protect against such solution must be used.

## Chemical gases

Further examples to elaborate:

1) **Air** is composed of different gases: oxygen, nitrogen, carbon dioxide, etc. Air is not toxic for human beings (they absolutely need oxygen to live), meaning that **no PPE** should be used in this case.

2) **Mustard gas** is classified as a chemical warfare agent and used in military applications. It is a blistering agent and toxic by inhalation. In this precise case, a glove does not provide an appropriate mean of protection when it is used alone. Instead, a full body protection suit with an isolating breathing device on it should be used to protect the user from this chemical.

3) **Hydrogen fluoride (HF)** is a very toxic chemical (see Hydrofluoric acid/Hydrogen fluoride FAQ). It can induce gangrene and even death. When pure (100% concentration), HF is a gas. If gaseous HF is used, then a whole suit of protection with an isolating breathing device on it should be used to completely avoid any contact and inhalation of this toxic chemical.

4) **Propane** corresponds to a gaseous compound often stored in pressurized bottles. This condition of storage, which increases the pressure, transforms propane into a liquid, which is called "liquefied gas". When this liquefied gas comes out of the pressurized bottles, the main risk will be the possible ***cold burns*** produced to the end-user's hands.

5) **Chlorine** is a gas in under normal use conditions – therefore, a glove doesn't represent a relevant way of protection against it when used alone. However, in the day-to-day life, many people use the term "chlorine" as a very generic word to describe the liquid solution usually used to disinfect swimming-pools.

### What kind of hand protection is needed for gases?

Gloves alone do not provide appropriate protection against a pure gaseous compound. A glove can't prevent complete contact with the gas or protect against gas inhalation.

### What kind of body protection is needed using gases?

For body protection materials, Ansell offers permeation data and estimates against gasses. AlphaTec® 4000 and up as well as AlphaTec® Light are usually tested against gasses. Although, AlphaTec® 3000 material and below or AlphaTec® Splash materials are not tested typically against gasses, there are instances when limited amounts of data are included when appropriate.
Our data is based on the fabric and not the model selected, therefore a fabric that may have excellent permeation times may not be suitable for a certain application. The decision for what PPE is required should be done by the onsite Health and Safety team with a good knowledge of conditions and a full health and safety report.

Only **Type 1** gastight suits are pressure tested to ensure they do not let gasses pass through the suit and we would always suggest considering one where protection from gasses is needed. Our gastight suits include the **AlphaTec® 6000**, **Light**, **Super**, **VPS**, **VPS Flash** and **EVO**.

Other models such as **PAPR** and **AIRline** may limit the amount of gas reaching the user. These models use positive pressure inside the suit which may stop gasses entering. Another model, namely **APOLLO**, which is an encapsulating designed model looking like a gastight, may also limit the amount of gasses

## Chemical gases

reaching the user. However, it may not prevent all gasses reaching the user as this model is not designed as gastight suit, does not undergo pressure testing and is not certified as gastight.

**Traditional** model **coveralls** may **not be suitable** for protection from gasses. This is because gasses can enter the suit through neck, hand and foot openings and through the non-gastight zipper. They may be considered for small amounts of (non-hazardous) vapors as this may reduce the amounts of gas reaching the user but not sufficiently for large amounts of vapors and gasses. The decision to use a non-gastight suit for protection against gasses and vapors must be thoroughly considered.