Ansell

CHEMICAL+ Protection

UNDERSTANDING CHEMICAL PROTECTIVE GLOVE SELECTION

Addressing multiple safety hazards with advanced hand protection solutions

SAFETY BRIEFING

UNDERSTANDING CHEMICAL PROTECTIVE GLOVE SELECTION

By focusing on the primary risk of protection from hazardous chemicals alone, many safety and operations managers fail to consider additional hazards when identifying suitable personal protective equipment (PPE). As industrial settings can present a range of safety threats, the ideal choice not only addresses the primary risk, but provides defence against multiple hazards, thanks to increasingly advanced design, material fabrication and production techniques.

In the case of chemical protection, the requirements may seem reasonably straightforward, with choice dictated by a protective glove's ability to defend against a specific chemical type (or types). However, where choice fails to factor in additional hazards, or where workers are required to apply a 'one-glove-fits-every-application' methodology, safety is inherently compromised and new risks are introduced.

This is because the chosen option may not be fit for purpose and usually presents limitations in comfort, dexterity or grip. Ill-chosen PPE – particularly hand protection – that prevents workers from effectively carrying out required tasks, is always at risk of being removed entirely, further endangering the wearer.

Advances in technology have delivered material improvements and enhanced construction techniques that have allowed development of superior glove solutions and render these 'shortcuts' a thing of the past. Workers no longer need to choose between protection or comfort and are not limited to defence against a single hazard in their working environment. Today's chemical gloves have developed to the point where defence against multiple threats is available in a single convenient solution.

CHEMICAL+
Protection

HANDLING MULTIPLE CHEMICAL HAZARDS


AlphaTec® 53-001 (Nitrile + Neoprene)


AlphaTec® 58-001 (Nitrile)

Many workplace environments feature the threat of exposure to multiple chemical types, a situation that presents obvious risk, which is often exacerbated by confusion around hand protection suitability for specific chemicals.

In the past, the conventional approach of protection when dealing with multiple chemical hazards was to utilise multiple gloves made from a single polymer such as nitrile, neoprene, or PVC.

The advancement of technology has made it possible to produce a single glove that combines multiple layers of polymers, essentially providing broader chemical protection to wearers.

The **protective performance** of gloves intended to protect against chemicals, is defined through permeation and degradation testing set out within the standard EN ISO 374:2016. Permeation being the duration it takes for a chemical to pass through the glove at a set speed as defined within the standard. Gloves are identified as Type A, B or C depending on the number of chemicals the glove can resist permeation for 30 minutes or more.

Type A

Offers greater than or equal to 30 minutes against minimum 6 chemical types

Type B

Offers greater than or equal to 30 minutes against minimum 3 chemical types

Type C

Greater than or equal to 10 minutes against minimum 1 chemical types

Degradation performance is the ability of the glove to resist physical changes when interacting with a chemical such as swelling, elongation or hardening. Whilst degradation may seem secondary to permeation, it can occur earlier than the reported breakthrough time. Hence, degradation of the glove from chemical exposure poses the risk of reduced grip and wearer contamination, via the penetration of chemical through any holes or other defects caused by degradation.

The suitability of protective gloves when working with chemicals should therefore be determined having carefully considered both permeation breakthrough and degradation test data.

CHEMICAL+ CUT RESISTANCE AND PROTECTION


AlphaTec® 58-735 (Cut Protection)


AlphaTec® 58-735 (Chemical)

EN 388

4X32C

EN ISO 374-1 Type A

AJKLMNOPT

The mechanical strength of chemical gloves are determined through testing to EN ISO 388:2016 which covers abrasion, cut, tear and puncture

Many applications – such as manufacturing steel – leave workers exposed to the threat of both chemical and cut injury, a situation which was commonly addressed through the practice of 'double-gloving'. This endangers the wearer, as dexterity is generally compromised due to the thickness and inflexibility of two protective layers. Removal of hand protection in this scenario is a distinct threat.

A far better solution is to utilise a glove that offers protection against both hazards thanks to a design that addresses the dynamic nature of industrial worker environments and likely present hazards.

CHEMICAL+ ELECTROSTATIC DISSIPATIVE PROPERTIES

The use of chemically protective, electrostatic dissipative PPE is vital in many working environment, including in the presence of sensitive electronic components or in flammable atmospheres where static discharge can cause a fire. Sparks, through static discharge are easily formed when workers are in contact with a range of items and equipment including tools and metal parts on fittings including insulating pipes and hoses, nozzles, platform trucks or any other piece of plant machinery.

EN 1149

EN 1149 is a suit of 3 test methods used to assess the different electrostatic properties of materials which was used in the absence of an appropriate standard for assessing gloves. EN 1149 part 2 was used as the basis for EN 16350.

EN 16350

The test defines how well an electrical charge moves through the glove and how much of that charge build-up is held within the glove material, which could be subsequently released upon contact with another object or item. Standard mechanical or chemical protective gloves are unable to meet the requirements under EN 16350 as they are not dissipative enough and contain too much resistance for the charge to flow sufficiently.

Only gloves designed to incorporate specialist conductive fibres within the textile yarns and feature conductive active fillers inside the glove's polymer layers are able to pass this standard, meaning that standard chemical protective solutions may not offer sufficient defence against all hazards in this specific environment.

CHEMICAL+ ERGONOMICS

Performing manual tasks makes the hands and arms particularly susceptible to a range of conditions including; muscle, ligament or tendon sprains and strains; joint and bone injury or degeneration in the shoulder, elbow or wrist; nerve injuries and compression; muscular or vascular disorders. Most of these can additionally present as acute or enduring chronic conditions that continue to threaten productivity in the longer term.

Performing those activities while wearing gloves that are thick, rigid, ill-fitting, slippery or otherwise uncomfortable will exacerbate the problem. To address these issues, safety and operations managers should opt for a protective glove style designed for the specific hazard types present and for the functions being performed. This means considering multiple factors;

FIT
When gloves are too small, movement is compromised. When they are too large, dexterity and tactility is restricted.

CONSTRUCTION
Material construction and comfort will dictate overall wearability

GRIP
The amount of grip a glove delivers plays a major role in the amount of muscle effort required to securely handle, hold or manipulate objects.

APPLICATION-SPECIFIC ISSUES
Wet conditions, contact with abrasive materials or the use of vibrating machinery, for example, all present differing needs. Each application is unique and should be assessed in its own context to determine the optimal glove choice.

ASSESS EVERY APPLICATION

There are many hand protection solutions available to safety managers. Determining the most appropriate choice for each staff member and the tasks they undertake is shaped by a range of influences including potential risks, productivity impact and budget.

It is important to understand that root cause of injury is not always the most obvious one – cut injury can occur when a worker uses gloves that deliver poor grip or increase fatigue. Selection of the most appropriate hand protection solution requires a thorough analysis of the specific conditions of each workplace application.

Selecting the optimum chemical protection choice is complex – even more so in the presence of additional workplace safety risks. To simplify the process, ensure you work with a vendor that offers an industry leading portfolio of chemical protection products and can offer the advice and expertise required to deliver the smartest choice.

AnsellGUARDIAN®

Performed by our safety experts, AnsellGUARDIAN® is a service that helps our customers to improve their safety, productivity, combining 45 years of safety assessment experience with a data-driven methodology, delivering unique personalised assessments.

Safety & Compliance
We provide a personalised risk management solution that leads to improved worker safety, injury reduction and increased regulatory compliance.

Cost Performance
We advise on business performance improvements that result in lower overall costs for your company.

Productivity
We deliver best practice recommendations to optimise your PPE dispensing, improve your company's output and eliminate waste, leading to an increase in productivity.

AnsellGUARDIAN® Chemical

AnsellGUARDIAN® Chemical simplifies the glove and suit selection for your unique set of chemicals. Self-service tool to search our extensive chemical permeation and degradation data to identify the appropriate hand and body protection for the chemicals they use.

Search by CAS number or chemical name:
ansellguardianpartner.com

How does it works:

1 Search for chemicals by CAS or Name

CAS	CHEMICAL NAME
110-82-7	CYCLOHEXANE

2 Search for products or materials

CHEMICAL PERMEATION DATA

3 View permeation and degradation charts and identify optimal solutions

For more information, visit ansell.com/services

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