



Personal Protective Equipment

PPE Safety: How to Better Understand Chemical Resistant Gloves

Julie Sullivan | Nov 02, 2017

What You Need to Know:

Despite the need for protection when workers come in contact with chemicals, oftentimes the wrong PPE (specifically in regard to gloves) is used—and that can be extremely dangerous.

In 2016, the Standard EN ISO 374-1 was updated to ISO 374-1:2016 and subsequently separated into three different tests (EN ISO 374-2, EN ISO 374-3 and EN ISO 374-4).

When selecting the proper chemical-resistant gloves, a number of application factors must be considered.

When cleaning gloves, washing and rinsing with water or a solution should be chosen over high-heat and chemical-laden laundering.

Protecting your employees is paramount. But with so much gray area surrounding hand chemical protection, understanding what chemicals you're working with exactly—and how they come in contact with your staff—is crucial.

Glove Selection Tool

Need help selecting the right gloves for chemical protection? Have no fear: Use our handy *interactive glove selector* to sort through all of the options and conditions, including nonchemical applications.

From high falls to dangerous equipment, there are any number of dangers your associates come face-to-face with each day on the shop floor. But of all the potentially lethal workplace dangers, chemical hand protection might have the most prominently blurred line.

OSHA requires that employers “select appropriate hand protection when employees’ hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe

abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.” And, of course, that statement begs the question: When it comes to hand protection, what is *appropriate*?

Unfortunately, the answer isn't so finite. As a recent **webinar** on chemical hand protection from Ansell highlighted, if you asked your associates, they'd probably reach for mechanical- or disposable-style gloves—which often provide the most dexterity and comfort, meaning they will get the job done faster and more comfortably.

“Most times, workers are wearing the wrong PPE because of a lack of education and understanding,” explains Chancellor Wyatt, chemical protection product portfolio manager for Ansell. “Oftentimes, they're wearing a mechanical glove that's quarter-dipped or fully dipped where they think they're protected but actually aren't.”

But with over **100 million** chemical types in existence (and many of them that become toxic when in contact), comfort and expedience on the job should probably be secondary considerations. According to Ansell's research, it found that 89 percent of associates in automotive, metal, machinery and chemical industries encounter some level of oil and grease on the job—while 65 percent of those same workers also encounter chemicals. As a result, many of those associates suffer from Irritant Contact Dermatitis (ICD) burns, cancer and other deadly or debilitating side effects. Making matters worse, as Wyatt states, chemical permeation isn't generally visible to the human eye, and occurs without notice or warning.

With guidance from Ansell on chemical hand protection, we outline ways you can better protect your employees from harmful contact.

Making Sense of PPE Regulatory Requirements

Before selecting the appropriate glove for your application, as Wyatt stresses, you need to ensure you're meeting all regulatory requirements in regard to chemical PPE.

“Within the world of chemical PPE, there are various regulatory requirements that must be met in terms of body protective gear and hand protection. But especially in regard to hand protection specifically, you have EN ISO 374-1.”

In 2016, the Standard EN ISO 374-1 was updated and subsequently separated into three different tests (EN ISO 374-2, EN ISO 374-3 and EN ISO 374-4). The tests are designed to accurately measure permeation, degradation and penetration, respectively, as Wyatt conveys.

“When it comes to testing and understanding chemical solutions and compatibility, permeation is the most common,” he explains. “It's the process by which chemicals move through a protective glove material on a molecular or microscopic level.”

The tests for glove permeation (separated into Type C, Type B and Type A) incorporate the **16 most common chemicals** found in manufacturing, Wyatt explains.

“The glove is categorized as Type C if no permeation occurs after 10 minutes. For Type B, however, you're considering three chemicals that don't permeate within 30 minutes. Finally, if a glove is a Type A, any six chemicals off the list will not permeate the glove within 30 minutes.”

And while degradation and penetration aren't as commonly referenced or tested for glove protection from chemicals, according to Wyatt, they're equally as important.

“Degradation oftentimes gets overlooked because most data available is surrounding permeation,” he explains. “Permeation is great to use, but degradation tells a much different story. If a chemical causes a physical change to the product (like stretching, thinning, elongation or bubbling), the glove is not good. This information should be provided by the manufacturer.”

Penetration is another critical aspect to glove safety, Wyatt points out. The tests are conducted via a water-leak test or an air-leak test, which helps to certify that the glove can protect against microorganisms, fungi, bacteria or viruses.

"If you don't see a glove with a label of Type C, Type B or Type A, don't use the glove—it's not chemical-resistant," urges Wyatt.

Selecting and Disposing of the Appropriate Gloves

Although a glove can technically be acceptable based on government and manufacturing specifications, that doesn't necessarily mean it's the right one.

1. Identify primary hazards
2. Determine the type of exposure and length of exposure
3. Determine the "In Use Conditions" (including working temperature)
4. Consider the secondary hazard(s) (including thermal, static discharge and cut)
5. Review technical data of products

"You need to identify your primary hazard first, which is the chemical," explains Wyatt. "Is it a particulate or a biological agent? If an agent, you need to consider whether the glove has virus and biological protection."

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Exposure relates to the length that you'll be exposing the glove to the chemical, in addition to the amount of immersion and splash. For "In Use Conditions," temperature should be accounted for, in addition to how much the glove will expand or contract in hot, humid weather or frigid temperatures, Wyatt explains.

Want to learn more about how to select gloves beyond chemical resistance? Read the article in our PPE series: [How to Choose the Right PPE: Safety Gloves](#)

As far as cleaning and disposing of gloves, Wyatt recommends a straightforward approach:

"The best practice is to wash the glove down with cold water and rinse with some type of solution," he says. "When you put a glove in a laundering system, you're exposing it to high heat and detergent that could change the glove itself."

And as for shelf life, three years is the standard for natural rubber latex and polyisoprene. For nitrile rubber, PVC, polyurethane, polyvinyl alcohol, polyethylene and butyl/Viton, five years is the longest duration of time you'll want to keep them on your shelf, Wyatt says.

What type of glove protection does your shop use when handling chemicals? Do you run into any challenges or frustrations in choosing a particular glove? Let us know.