



**PROTECT YOURSELF  
FROM TYPE I AND  
TYPE IV ALLERGIES**



## **PROTECT YOURSELF FROM TYPE I AND TYPE IV ALLERGIES.**

Occasionally wearing glove products can cause issues with the health of our skin. This predominantly manifests itself in the form of skin allergies of a variety of different types and severity. This paper reviews these various allergies, their causes and what glove solutions are available to help prevent these reactions from occurring. Skin allergies from adverse reactions to glove products are generally classified into three distinct types, immediate hypersensitivity or Type I, delayed hypersensitivity or Type IV, and irritant contact dermatitis.

## REPEATED EXPOSURE TO NRL MAY LEAD TO TYPE I ALLERGIES

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Adverse reactions to natural rubber latex (NRL) gloves can range from irritant contact dermatitis to serious allergic response such as anaphylaxis. **Latex allergy also known as Type I Allergy** is a reaction to the residual allergenic proteins present in NRL products. NRL comes from the sap of the rubber tree, *Hevea brasiliensis*, found in South Africa and Southeast Asia. While there are more than 250 different types of latex proteins, approximately 20% are allergenic. After repeated exposure to NRL products, the immune system of some susceptible individuals produces antibodies that react immunologically with these allergenic proteins. There is an immediate adverse reaction occurring within minutes after initial contact with NRL. The symptoms may include some or all of the following: swelling, redness on the site of exposure, itching and burning sensation. Symptoms can spread to areas near the site of glove contact and can be accompanied by: urticarial, conjunctivitis, rhinitis, and bronchial obstruction. Symptoms of anaphylaxis is rare but can occur.

**Over 80% of reported hand dermatitis is due to chemical accelerators in disposable gloves. Protect yourself.**

## CHEMICAL ACCELERATORS INDUCE THE MAJORITY OF CHEMICAL ALLERGIES

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Allergic reactions to chemical residues from the glove manufacturing process may produce what is known as a **Type IV Allergy (Chemical Allergy) or ACD**. This type of allergy is not life threatening, but it is a major concern for healthcare workers and those employed in the Life Science industry. Glove manufacturers use a variety of chemicals to produce both NRL and synthetic rubber gloves. Different manufacturers use different chemical combinations and nearly all manufacturers leach and wash their gloves to minimize residual chemicals in the final product. A chemical allergy is due to an immunological reaction to a residual chemical leached from finished glove products into the skin of the wearer.

### **The chemicals used in the glove manufacturing process fall into the following broad classifications:**

- Accelerators;
- Accelerator activators;
- Stabilizers;
- Antidegradants;
- Retarders;
- Fillers; and
- Extenders.

The chemical accelerators induce the majority of chemical allergies. The residues from these accelerators have become a major concern because of their ability to sensitize users and elicit chemical allergic reactions. Over 80% of reported glove associated allergic contact dermatitis is attributable to chemical accelerators.

The response is delayed, typically producing symptoms between 6-48 hours after initial contact with the glove, and symptoms may persist for up to 4 days. The symptoms may include: redness and swelling, dry skin to patch eczema, and chronic sores that weep or bleed. A Type IV response begins when residual chemicals leached from the glove penetrate the skin and trigger the formation of T cells sensitized to the specific antigens.

## HAND IRRITATION AND REACTION TRIGGERS

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Many glove users experience what is known as **irritant contact dermatitis**, a non-immune reaction that occurs within minutes to hours of glove contact. It is not an allergy rather a condition as a result of many factors combined with glove use (for example: reactions to detergents/fragrance soap, frequent hand washing, inadequate rinsing/drying). Symptoms are limited to where there is direct glove exposure and include redness, chafing, dryness, and scaling or cracking. To reduce the risk of irritation: minimize contact with the causative agent, commit to a regular skin care regimen, avoid oil/fat based hand creams, and wear powder free gloves.

## TYPE I LATEX ALLERGY SOLUTIONS

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In all cases of repeat or persistent dermatitis or allergic reaction associated with glove use it is recommended to consult a medical practitioner. Since skin allergies vary in possible severity, solutions to these problems also vary. First and foremost a Type I or true natural rubber latex allergy can be a very serious condition. In this case, a synthetic product is appropriate and must be worn as an alternative to a natural rubber latex glove. As the donning powder on NRL powdered gloves is a possible carrier of allergenic NRL proteins which may become airborne and inhaled, coworkers practicing in the same environment as someone allergic to NRL, should wear either a synthetic glove or a powder-free NRL glove.

## SYNTHETIC MATERIAL OPTIONS

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### **Polyisoprene**

Most similar performance to natural rubber latex with a high level of comfort, excellent elasticity and moderate strength.

### **Neoprene**

Characteristic performance falls between polyisoprene and nitrile with a good balance of comfort, strength and elasticity.

### **Nitrile**

Higher strength, durability and puncture resistance than natural rubber latex but does sacrifice some elasticity.

**To reduce the risk of irritation: minimize contact with the causative agent, commit to a regular skin care regimen, avoid oil/fat based hand creams, and wear powder free gloves.**

## TYPE IV CONTACT DERMATITIS SOLUTIONS

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For individuals who are experiencing a Type IV reaction product recommendations are a little more complex as you will first need to identify and then eliminated the causative chemical agent. Since there are several classes of chemicals that tend to cause adverse skin reactions a better understanding of what chemicals are used and why they are required is needed.

*Accelerators are used to chemically speed up the vulcanization process during the manufacturing of natural and synthetic latex gloves.*

## ARE ACCELERATORS NECESSARY?

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In order to manufacture a glove from a rubber material effectively, some type of chemical accelerator is generally used. Accelerators are used to chemically speed up the vulcanization process during the manufacturing of natural and synthetic latex gloves. Vulcanization is one step in the process by which crude latex is transformed into a finished product. This is normally accomplished by subjecting the crude latex to heat and sulfur to cross-link the rubber molecules rendering a solid film with desired strength and elastic properties dependent upon the design features and material type. These chemical accelerators speed the vulcanization process by reducing the temperature at which vulcanization occurs producing a much more consistent and reliable film from which the final gloves are formed. Examples of accelerator classes commonly used in glove manufacturing are thiurams, mercaptobenzothiazols (MBT) and carbamates. Of these classes of accelerators the least likely to produce a skin reaction are carbamates.

## ARE ACCELERATORS SAFE?

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For personal protective gloves, manufacturers are required to ensure the product is safe for use. This is typically done by conducting two skin irritation tests, one long term and one short term, on the finished glove product. In fact, current regulations in most geographic regions require this of medical grade gloves. In the United States for example, the Food and Drug Administration (FDA) requires that all medical grade gloves pass both the skin irritation test and the skin sensitization test prior to being marketed in the US. These battery of tests ensure that the vast majority of glove users will not experience any sort of irritating response from the glove itself. Other regions such as the European Union under the Medical Device Directive (93/42/EEC) require similar types of testing and product assessment before those products can be placed on the market.

## PRODUCT QUALITY AFFECTS THE POTENTIAL FOR REACTIONS

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When it comes to allergic contact dermatitis caused by chemicals used in disposable gloves, the manufacturing process and how well a glove is produced can significantly reduce the potential for reactions. On a well manufactured glove product residual chemicals are leached out of the glove prior to packaging. For products that are poorly manufactured this leaching process is not always as effective as it should be and as such the potential for an increased number of people experiencing a skin reaction exists.

## CAN A GLOVE BE MADE WITHOUT ACCELERATORS?

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The short answer is yes! Ansell provides products that are specifically engineered for our customers who may have extremely sensitive skin. These products are produced without the use of the chemical accelerators listed above or any other chemical accelerators. Proper vulcanization without the use of any chemical accelerators is done through a proprietary process that strengthens the material without using chemical accelerators. This process results in a cleaner, more skin-friendly product and provides the best possible solution when you need the barrier protection of a glove and healthy skin for your sensitive hands.

## THE ANSELL SOLUTION

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For those wearers with Type I or Type IV allergies, Ansell has a wide variety of options in the synthetic category and several different synthetic materials to choose from including nitrile, neoprene and polyisoprene. These materials vary in performance characteristics as well as cost. Products may also have special design features for specific applications which should factor in to any glove decision.

And for those wearers with Type IV allergies or sensitivities, Ansell has products that are produced without the use of any chemical accelerators. The **TouchNTuff® 73-500, TouchNTuff 73-701** as well as **Microflex® 93-823** are several Ansell gloves that are perfect solutions for anyone who has extremely sensitive skin or who is having trouble finding a glove that is the least irritating to their skin. Not only have these products been specifically engineered to solve this particular problem it's been proven scientifically to be less likely to cause the types of reactions listed above.

**Information on Ansell and its products can be found at [www.ansell.com](http://www.ansell.com)**

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Reference: 2014. Ansell Cares: Understanding Latex Allergy in The Healthcare Setting, A Self Study Guide.

Reference: 2004 Ansell Cares: Chemical Allergy Masquerade, A Self Study



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