

Hand Protection

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Kyorene® Pro Food Safe Gloves

Armor Guys is proud to introduce an entirely new range of gloves in our Kyorene® Pro family of products. *Kyorene® Pro Food Safe* gloves are the latest innovation to utilize Armor Guys' patented Kyorene® Pro yarns, specifically designed for workers in a variety of food handling applications. Kyorene® Pro Food Safe gloves utilize the same proprietary and patented technologies that have made Kyorene® Pro the success that it is. These gloves were developed to address the needs of workers in food handling applications who are seeking greater safety, comfort, performance and durability.

This new offering will be available in 15 gauge uncoated liners in ANSI cut levels A4, A5, A6, A8 and A9. Kyorene® Pro Food Safe gloves are inclusive of the inherent properties that make Kyorene® Pro gloves unique. The three key features in all 5 styles

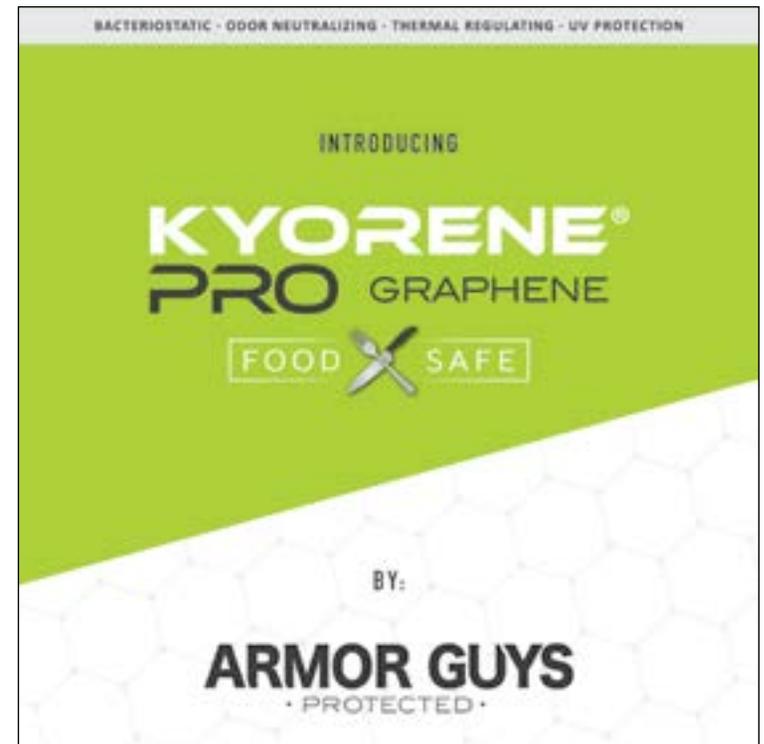
of these gloves are bacteriostatic, thermal regulating and odor neutralizing capabilities. These features provide for gloves that actively regulate bacteria on the hands, which should prove very useful in food handling applications where contamination is of concern. In addition, they allow heat to dissipate from the hands and combat the foul odor that is associated with sweaty gloves.

Kyorene® Pro gloves solve the long-standing issue of hot, sweaty and smelly gloves being discarded prematurely.

Kyorene® Pro Food Safe gloves: 20-049, 20-059, 20-069, 20-089 and 20-099 will benefit the wearer like nothing before! The only gloves on the market verified by *The Graphene Council* as a *Verified Graphene Product*® and made by

a *Verified Graphene Producer*®. Kyorene® Pro Food Safe gloves rise above all other food handling gloves on the market. When functionality and safety matters most in food handling applications, chose Kyorene® Pro Food Safe gloves! ■

Learn more at www.armorguys.com.





Tools that emit vibrations can cause debilitating effects on workers' fingers and hands.
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Good Vibrations? Not for Hands

By: **Maureen Paraventi**

Jackhammers, chain saws, rivet guns, angle grinders, sanders, impact wrenches and power drills are just *some* of the tools and equipment that can transmit strong vibrations to the hands of workers and do-it-yourselfers and result in a condition known as *hand-arm vibration syndrome* (HAVS). While they're cutting through concrete or grinding metal, these powerful tools are also sending tremors through the nerves and soft tissues of the hands. Employees in the manufacturing, construction, automotive, carpentry, quarrying, agriculture and forestry industries are among who may develop HAVS. In the U.S. alone, approximately 2.5 million workers are exposed to it, despite the fact that many tool manufacturers have incorporated anti-vibration (A/V) designs into their product lineups.

How serious is this condition (which is also known as *vibration white finger* and *Raynaud's phenomenon of occupational origin*)? The consequences can range from fingers that are numb, painful and unnaturally pale to long-range circulatory and neural effects, like loss of dexterity and sensation and chronic pain. Muscles, tendons, nerves and bones may all be affected. HAVS is

irreversible; there is no cure for it, just treatment intended to alleviate the pain. Thus, it is important to watch for symptoms and take action to avoid permanent problems. Workers may notice the following in their fingers and hands:

- A "pins and needles" feeling
- A loss of sensation
- Pain at night that is severe enough to awaken them
- Fingers turning white in painful attacks that can last up to 15 minutes

Symptoms can be more severe in cold temperatures or in a worker who smokes.

Workers whose hands are regularly exposed to vibrations, shift after shift, should be made aware of these signs. According to the National Institute for Occupational Safety and Health (NIOSH), HAVS can present serious symptoms after only a year's exposure. Home hobbyists who use vibration-emitting tools often should also pay attention.

In the workplace, anti-vibration gloves can be used, along with engineering controls and modified work practices, to protect workers from harmful vibrations. This type of hand protection includes special features designed to

absorb vibrations, such as air-filled spaces between the glove's exterior and its palm and extra layers of vibration-dampening materials.

FACTORS TO CONSIDER WHEN SELECTING ANTI-VIBRATION GLOVES

- How important is dexterity? Will the user be required to grasp small objects to accomplish tasks?
- Do the tools being used generate high-frequency vibrations? Grinders, sanders and saws call for different models of anti-vibration gloves than pavement breakers, which emit low frequency vibrations.
- Should the gloves have additional features, like impact resistance or cut resistance? Do wearers have to be protected from impact and shock hazards, in addition to vibrations?
- Will the gloves be worn in extreme temperatures and humidity levels – whether indoors or outdoors?
- Do they need to be oil and water-resistant?
- Should they be high visibility?
- Is touchscreen compatibility a priority?

Those, of course, are in addition to the usual concerns that come into play when choosing any kind of personal protective equipment. It should be comfortable to wear, designed with ergonomics in mind and durable enough to justify its cost.

Anti-vibration gloves are available in both natural and synthetic materials – everything from nylon, a nylon/cotton knit, leather, neoprene and even terry cloth, which wicks away sweat. Knitting mesh or a similar fabric on sections like the back of the hand can make the gloves lighter and more “breathable.” Neoprene is able to stand up to harsh sunshine and other environmental elements.

The optimal coating should be based on expected usage and the variables of the work environment, such as temperature. Nitrile palms give gloves a good grip with oily or wet objects or surfaces. Coatings like polyurethane, PVC and latex are also available, and provide different levels of flexibility and insulating properties.

Padding on the palms and knuckle and finger guards may consist of EVA (ethylene-vinyl acetate), a closed-cell copolymer foam with form and impact absorption properties; thermal plastic rubber, chloroprene rubber and memory gel.

There are varying levels and types of padding available in anti-vibration gloves, and deciding on which models are right for specific workers is no easy task. Comfort and dexterity must be balanced with protection. Bulky padding or padding that is too stiff may prove cumbersome and force the wearer to exert more effort while performing tasks. This

can contribute to cramping and hand fatigue. Lesser amounts of padding, constructed of more flexible materials, may not effectively tamp down vibrations.

A few other features to be aware of:

- Adjustable elastic cuffs wrist straps and velcro closures will help gloves fit comfortably and securely.
- Leather protects the wearer from abrasive surfaces, sparks and heat. Synthetic, rubber or plastic gloves can provide barriers against grease, oil, biohazards and chemicals.
- A thermal lining will help keep hands warm in cold conditions.
- Anti-vibration gloves with lots of flex points tend to be more comfortable to wear.
- Fingerless gloves are not recommended, nor are they tested for efficacy, since HAVS always begins at the fingertips and moves toward the palm.
- A worker using different tools to perform a variety of tasks may need to use different models of anti-vibration gloves, to get the dexterity level and vibration protection needed for each tool.

Taking steps to reduce the likelihood of HAVS through the use of anti-vibration gloves and other means can keep your workforce healthy and productive, and prevent lost time and, potentially, long-term disability among employees. ■

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Allergies and Hand Protection: What You Need to Know

By: **Shana McGuinn**, Contributor

Protective gloves are a necessity for many workers, who must perform tasks that bring their hands into proximity or actual contact with harsh chemicals, bloodborne pathogens, sharp tools, heat, cold temperatures and other hazards. While most forms of hand protection can be worn regularly with no ill effects, there are a few that can have unintended effects, for people who have allergies or sensitivities to some of their components.

Fortunately, glove manufacturers have made great strides in leaching proteins used to stabilize latex from gloves. Even though there are fewer workers experiencing allergic reactions to hand protection these days, it is still important to be aware of glove types that may be harmful to some workers.

ALLERGY: LATEX

Cause: Certain proteins that are in natural rubber latex derived from rubber trees trigger a reaction in your body, which releases antibodies and histamine to combat it. In addition to skin problems, a latex allergy can affect the respiratory system when an individual with a latex allergy breathes in latex particles that become airborne when they or someone near them removes latex gloves. A skin test conducted by a physician can confirm the existence of a latex allergy.

Symptoms: Mild to severe, depending upon exposure and sensitivity levels. Hives, itching, red patches on skin, runny nose, water or itchy eyes, wheezing, sneezing, coughing, even anaphylaxis, a potentially

life-threatening condition that can cause throat swelling and severe difficulty breathing as well as nausea and vomiting, loss of consciousness, low blood pressure and a weak or rapid pulse. As with some other types of allergies, symptoms can become worse over successive exposures – a process known as sensitization. Fortunately, anaphylaxis does not usually occur after the first exposure.

Who’s at risk:

- **Healthcare workers:** An estimated 8-12 % of healthcare workers who are regularly exposed to latex become sensitized to it, compared with 1-6 % of the general population.¹
- Likewise, patients who’ve had repeated exposure to latex gloves because they’ve undergone a number of medical procedures are also at risk.
- People with a family history of allergies – including food allergies and hay fever – make people more susceptible to latex allergies. If you’ve had allergic reactions to avocados, bananas, passion fruit, chestnuts and kiwi, you may have a latex allergy, because those fruits contain some of the same allergens found in latex.
- People who work in the rubber industry are prone to latex allergies, as are those with spina bifida.

What to do: Workers with a latex allergy should use nitrile, neoprene or vinyl gloves. In mild cases, antihistamines or corticosteroids prescribed by a health care provider can lessen symptoms and relieve discomfort.

If there’s been an anaphylactic reaction, immediately seek emergency medical care, which will likely be an injection of adrenaline (epinephrine).

ALLERGIES: NITRILE AND NEOPRENE

Causes: Exposure to accelerators that help solidify liquid synthetic rubber.

Symptoms: Reactions to nitrile and neoprene gloves are generally confined to the skin under the gloves. Sufferers may experience a rash, itching, hives, white raised bumps, a burning sensation, blisters, cracked skin and sensitivity to the sun.

Who’s at risk: Workers who opt for latex-free gloves and those who have to wash their hands frequently. Allergic reactions to nitrile and neoprene are much less common than allergies to latex.

What to do: Wash hands with soap or apply hydrocortisone to the affected area. Rashes and cracked skin may require medical treatment if they fail to resolve.

ALLERGY: VINYL

Cause: Lack of ventilation, perspiration from wearing chemical-resistant gloves, leakage that occurs over time, resulting in hands being exposed to substances being handled.

Symptoms: Urticaria, an itchy, swollen, red rash.

¹ www.cdc.gov/niosh/updates/latexpr.html

Who's at risk: Allergic reactions to vinyl gloves are rare.

What to do: Switch to natural or synthetic gloves. Wear gloves with sweat-absorbing fabric liners.

ALLERGY: ALLERGIC CONTACT DERMATITIS

Cause: *Allergic* contact dermatitis is caused by exposure to chemicals like thiurams, dithiocarbamates, and mercaptobenzothiazole that are added to gloves during the manufacturing process. It is often confused with irritant contact dermatitis, which is *not* caused by an allergen but is linked to frequent hand washing, repeated exposure to an irritant or wearing rubber gloves for long periods of time.

Symptoms: Skin ulcers or a skin rash with lesions and blisters that look like poison ivy and appears 24 to 48 hours after exposure. Ulcers may also form. (Irritated, itchy skin is the primary symptom of irritant contact dermatitis.)

Who's at risk: Workers who may experience allergic contact dermatitis symptoms include those who are exposed to textile chemicals, nickel, preservatives, hair dyes and photo allergent.

What to do: Consult a dermatologist or an allergist to determine if symptoms are caused by allergic contact dermatitis or irritant contact dermatitis. Treatment may be necessary to avoid an infection. Discuss prevention measures with your doctor and manager.

Understanding the effects that certain types of gloves can have on some workers can help companies avoid health problems, related medical expenses, lost time and the downturn in productivity that may go with it. ■

Shana McGuinn is a freelance writer specializing in topics surrounding PPE, workplace safety and chemical safety.



Skin problems caused by allergies can range from uncomfortable to severe. © chomplearn_2001 - stock.adobe.com

ANSI/ISEA 105-2016 Hand Protection Classification

Hand injuries are not only more common than other types of workplace injuries; on average, they require a longer average recovery time than all other injury types combined. According to the Bureau of Labor Statistics¹, there were 102,350 occupational hand injuries across all injuries that resulted in days away from work in 2021. Manufacturing accounted for 36,660 of those, followed by 3,300 in natural resources and mining, and 2,790 in agriculture, forestry, fishing and hunting.

About the Standard

The tremendous number of hazard-specific work gloves available today can make selection challenging. Technological developments have produced high-performance materials and composite yarns that - together with improved manufacturing processes - create ultra-tough, highly specialized hand protection. ANSI/ISEA 105-2016 is a voluntary global standard that manufacturers can use as a basis for testing and classifying their products. Those classifications, in turn, enable managers to sort through the options and choose the gloves best suited to the applications, environments and hazards to which their workforce will be exposed. Note: hand protection covered under this standard includes gloves, mittens, partial gloves or other items covering the hand (or a portion of the hand) that are intended to provide protection against, or resistance to, a specific hazard.

The standard addresses the classification and testing of hand protection for specific performance properties. Gloves are classified to a performance level ranging

from 0 to 6 based upon their performance when evaluated against defined industry test methods for:

- Mechanical protection (cut-resistance, puncture resistance and abrasion resistance).
- Chemical protection (permeation resistance, degradation)
- Other performance characteristics such as ignition resistance and vibration reductions

A revised version of this standard was issued in 2016. One of the major changes: an expanded 9-Level Classification for cut-resistance, including the use of a single test method for testing in an effort to provide consistent meaning of the ratings from the end-user perspective (and to embrace the approach used in international standards). ANSI also increased the range of cut resistant protection levels. Other updates include the incorporation of a needlestick puncture test, recognizing that this is a common potential exposure for the medical, sanitation and recycling industries.

Testing Protocols

- **Cut resistance** to glass, knives, sheet metal, bladed tools and other sharp objects is tested using the ASTM F2992-15 test method and TDM (Tomodynamometer) cut test machine. A straight-edge blade is run over the material used in protective clothing until it cuts through. Multiple iterations are performed, using new blades and different loads. The resulting resistance ratings range from A1 (very minor cuts) to A9 (highest cut danger).

- **Abrasion resistance** is tested using the Taber Abrasion equipment following the ASTM D3389-10 and D3884-09 test methods.
- **Puncture resistance** tests material with a hypodermic needle under pressure, following the ASTM F2878 test method.
- **Chemical protection** testing is in accordance with the ASTM F 739 method, in which a piece of the exterior side of glove material is exposed for a period of time to a certain chemical, and the interior side is examined at intervals to determine if the material has been permeated.
- **Flame resistance** testing is performed per the methodology provided in ASTM F1358-16.
- **Heat resistance** is tested in accordance with ISO 17493:2016.
- **Conductive heat resistance** of cut resistant gloves are tested per ASTM 1060-08.
- **Vibration reduction** testing is done according to ANSI S2.73-2002 / ISO 10819:2013 and results in only pass or fail classifications. ■

For More Information

- » Get the standard at: <https://isea.wpengine.com/resources/shop/>
- » The International Safety Equipment Association (ISEA) has developed an on-line tool to help manufacturers, material suppliers and test labs accurately calculate the glove's cut-resistance classification outlined in the standard. Access it at: <https://selectsafety.net/cut-resistant-glove-levels/>

¹ <https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables/case-and-demographic-characteristics-table-r2-2020.htm>

OSHA 1910.138 Hand Protection

The human hand is an extraordinarily complex extremity, capable of performing a broad range of movements. Thanks to its array of muscles, tendons and ligaments, the hand can perform fine motor tasks and big movements by extending fingers, flexing, turning the palm upward or downward, gripping and grasping items. Because of the vital role that hands play in the workplace – and elsewhere – they are often exposed to hazards, and thus susceptible to injuries. These include cuts and lacerations, finger and hand amputations, fractures, burns, punctures, crush injuries and nerve damage.

Key Provisions

OSHA 1910.138 Hand Protection is one of the agency's more succinct regulations:

1910.138(a)

General requirements. Employers shall select and require employees to use 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.

1910.138(b)

Selection. Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection

relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

Hand Injuries

According to the U.S. Bureau of Labor Statistics¹ (BLS) there were 102,350 nonfatal hand injuries in private industry involving days away from work in 2020, along with 37,300 arm injuries and 28,410 wrist injuries. The BLS days-away-from-work data is also available for specific industries. The following figures reflect the numbers of hand injuries in 2020 per 10,000 full-time workers:

- All industries - 10.5
- Greenhouse, nursery and floriculture production - 28.5
- Manufacturing - 17.9
- Natural resources and mining - 20.2
- Animal production and aquaculture - 44.4
- Forestry and logging - 7.8
- Construction - 14.2 (residential building construction was 25.3)
- Specialty trade contractors - 14.7
- Building equipment contractors - 11.3
- Manufacturing - 19.7

Employers are responsible for providing their workers with all the personal protective equipment (PPE) required to carry out their jobs safely – including gloves. There are glove types to address virtually every kind of workplace hazard that employees' hands may be exposed

The Numbers

Citations regarding this standard by Federal OSHA for inspections during the period October 2021 through September 2022:

Citations	Inspections	Penalty	Industry Classification
87	85	\$195,536	<i>Total for All Industries</i>
24	23	\$57,625	33 / Manufacturing (part 3 of 3)
16	16	\$17,986	32 / Manufacturing (part 2 of 3)
8	7	\$3,480	42 / Wholesale Trade
7	7	\$13,363	72 / Accommodation and Food Services
6	6	\$23,488	31 / Manufacturing (part 1 of 3)
5	5	\$20,986	44 / Retail Trade (part 1 of 2)
4	4	\$3,546	81 / Other Services (except Public Administration)
3	3	\$6,324	23 / Construction
3	3	\$3,575	56 / Administrative and Support and Waste Management and Remediation Services
2	2	\$16,235	62 / Health Care and Social Assistance

to: fabric gloves coated with latex, nitrile, polyurethane and PVC; latex and nitrile gloves that protect against oils, solvents, chemicals, grease and biohazards; leather gloves that shield hands from sharp objects, abrasive surfaces and heat; and gloves designed specifically to resist punctures, impact and vibrations. A thorough hazard assessment will identify the particular hazards present in the workplace. A successful hand protection program will take into account:

- Protection levels
- Dexterity requirements, so that the wearer is able to perform the necessary tasks

- Size and fit

Gloves that have sustained significant wear and tear should be discarded. ■

For More Information

» OSHA offers an overview of PPE at: www.osha.gov/personal-protective-equipment. Click here to learn about who pays for PPE: www.osha.gov/personal-protective-equipment/payments

¹ www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables/case-and-demographic-characteristics-table-r2-2020.htm

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