

## **Are Your Hands Being Protected?**

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### **Introduction to Hand Safety**

Keeping your employees safe is on top of employers' minds as they work on improving their employees' work environment. Hands are the second most frequent injury involving days away from work, according to the U.S. Bureau of Labor Statistics. More than a quarter of all injuries on the job are related to the hands or wrists, so are you doing the right thing to keep yourself and your employees protected?

Hands are one of the most critical parts of our body as they are directly related to movement, work and giving us a sense of touch. Hands are the necessary component to perform a variety of jobs and tasks. Hands are made up of a wrist, palm, four fingers, and a thumb, as well as over 25 bones, including the bones found in the wrist. Ultimately, the bones in the hands and wrists make up about 10% of the total number of bones in the entire human body. Hands are important and, no matter how complex they are, they must be protected. All the different parts of hands should be protected when they are hard at work. Every day our hands are at risk. Making sure you are protecting your hands, and wearing the correct type of protection, is critical in safety no matter what the job or application might be.

Examples of injuries that can occur with our hands are cuts, punctures, skin abrasion, allergic reactions, skin irritation, broken bones, fractures, and sprains. We categorize our hand protection into different categories, including cut resistant, leather, mechanics, heat resistant, and palm coated. Each of these categories can provide protection to all the different types of hand injuries that can occur in your workplace. They can also be recommended for different types of applications and environments. This paper will better explain the different types of hand protection available in today's market, in addition to which types of hand protection should be used in a variety of different applications and industries. All companies should develop a hand protection program specific to their needs. By creating a hand protection program and identifying which gloves should be worn in specific applications, you are ensuring your employees are being both productive and kept safe from the different hazards in your work environment.

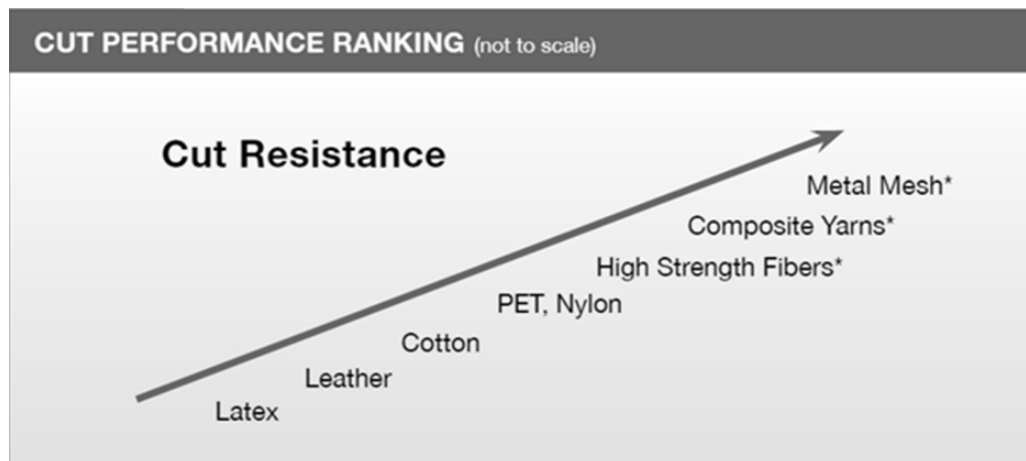
## Cut Resistance

Cut-resistant gloves are one of the most important hand protection categories as it protects employees from any type of cut to the skin, blood vessels or nerves. Employees need to use cut-resistant gloves whenever they come in contact with environments that contain sharp edges, knives, and blades, for example.

Cut resistance is a function of a glove's material composition and thickness. Increased cut protection can be achieved with: increased material weight (ounces per square yard), use of high performance fibers (Spectra®, Kevlar®, Vectran®), and use of composite yarns made with varying combinations of stainless steel, fiberglass and high performance materials.

Cut-resistant gloves come in various fabrics, offering different levels of cut resistance. Cut-performance tests indicate that metal mesh offers the highest level of cut resistance, followed by composite yarns and high-strength fibers. In Exhibit 1, the cut resistance of different materials used in gloves is displayed. Cut resistance is a function of a glove's material composition and thickness. Increased cut protection can be achieved with:

- Increased material weight; for example, ounces per square yard
- Use of high performance materials such as Spectra®, Kevlar®, Vectran™, etc.
- Use of composite yarns made from varying combinations of stainless steel, fiberglass, synthetic yarns and high performance yarns



\*Cut Resistant Materials

### Exhibit 1. Cut Performance Ranking for Glove Materials

The glove industry tests cut-resistant gloves according to standards established by the American Society for Testing Materials (ASTM). The ASTM testing procedures for fabric cut-resistant gloves (F-1790) compare the cut resistance of a material by measuring the force (load) required to cut fabric with one inch of sharp blade travel. Gloves can fall between ANSI cut level 0 and ANSI cut level 5. The higher the load, the more cut resistant the material (or the higher the ANSI cut level). The table in Exhibit 2 is used by ASTM to identify the correct ANSI cut level, based on the number of pounds or grams it will take to cut through the fabric. The testing protocol established by ASTM is widely accepted in the industry and is used by companies like

Wells Lamont Industrial when testing our products. In addition, we test cut-resistant gloves under actual field conditions to ensure that our products meet the full range of requirements.

CLASSIFICATION FOR CUT RESISTANCE		
ANSI Cut Levels	Gram Range	LBS Range
Level 0	<200	<0.44
Level 1	200–500	0.44–1.10
Level 2	500–1,000	1.10–2.20
Level 3	1,000–1,500	2.20–3.30
Level 4	1,500–3,500	3.30–7.70
Level 5	>3,500	>7.70

**Exhibit 2. 5.1.1 Cut Resistance Standard**

It is important to consider each application’s specific requirements when choosing a glove. When it comes to cut-resistant gloves, there are a variety of applications and industries where these types of gloves are almost always used. The most prominent industries include automotive, manufacturing, metal fabrication, metalworking, food processing and food service. From these industries, applications typically include final assembly areas, general material handling, handling sharp surfaces, meat and poultry processing, and food preparation.

Leather

Leather gloves are considered one of the glove categories that have been around the longest. Leather is result of tanning the skin and hides of an animal. Through the tanning process, the animal’s skin is transformed into a strong, long-lasting, and flexible natural material.

Leather is considered a commodity item. The leather glove category includes different styles such as drivers, leather palms, insulated gloves, welders, and mining gloves. Leather gloves are typically made from cowhide, pigskin, deerskin or goatskin. There are specific benefits that are dependent on the specific leather that is being used in a glove. Exhibit 3 describes properties and characteristics of the specific types of leathers.

				
<p><b>COWHIDE</b></p> <ul style="list-style-type: none"> <li>• Good abrasion resistance</li> <li>• Attractive appearance</li> <li>• Good thermal protection</li> </ul>	<p><b>PIGSKIN</b></p> <ul style="list-style-type: none"> <li>• Highest resistance to heat</li> <li>• Highest abrasion resistance</li> <li>• Good tensile strength</li> <li>• Flexible even after repeated wettings</li> </ul>	<p><b>GOATSKIN</b></p> <ul style="list-style-type: none"> <li>• Highest natural lanolin content</li> <li>• Excellent wear and abrasion resistance</li> <li>• Soft and pliable</li> <li>• Perfect for medium duty jobs</li> <li>• High tensile strength</li> </ul>	<p><b>DEERSKIN</b></p> <ul style="list-style-type: none"> <li>• Naturally soft</li> <li>• Highest tensile strength</li> <li>• Warm and long wearing</li> <li>• Excellent dexterity</li> </ul>	<p><b>SHEEPSKIN</b></p> <ul style="list-style-type: none"> <li>• Excellent dexterity</li> <li>• Soft and supple</li> <li>• Superior sensitivity</li> </ul>

**Exhibit 3. Benefits of Specific Leathers**

When it comes to cut-resistant gloves, there are a variety of applications and industries where these types of gloves are almost always used. You are most likely going to see leather gloves in manufacturing and industrial-type environments, for applications such as machine operation, building materials, mining, utilities, and most general purpose applications. Because different leather materials have different characteristics, some types of leather may work better in some applications than others. Exhibit 4 lists more applications, along with how they match up to the different leather materials.

Applications	Grain Pigskin	Grain Cowhide	Split Cowhide	Grain Deer/Elkskin	Grain Goatskin	Synthetic Leathers	Coated Knits
Framing, carpentry, roofing	Good	Best	Fair	Good	Good	Good	Fair
Maintenance, dry surface cleaning	Better	Good	Good	Best	Better	Good	Fair
Demolition, rough labor	Good	Better	Best	Fair	Fair	Fair	Good
Equipment operation	Good	Good	Fair	Best	Better	Better	Fair
Heavy machine operation	Good	Better	Best	Good	Good	Fair	Fair
Landscaping	Best	Good	Better	Fair	Good	Good	Good
Hand tools, pistol grips, assembly	Good	Good	Fair	Better	Better	Best	Fair
Parcel delivery, warehouse work	Good	Better	Good	Good	Better	Good	Best
Transportation	Good	Good	Fair	Best	Good	Better	Fair
Low abrasion operations	Good	Fair	Fair	Good	Better	Best	Fair
High abrasion operations	Better	Good	Best	Fair	Better	Good	Good
Rigging	Better	Good	Good	Good	Best	Better	Fair
Materials handling	Better	Better	Better	Fair	Good	Good	Best

**Exhibit 4. Material Recommendations for Common Leather Glove Applications**

## Mechanics

Mechanics gloves offer exceptional dexterity and general hand protection. Mechanics gloves may serve the same purpose as leather gloves or may even contain some leather in their construction. However, with mechanics gloves you will also get additional features such as Velcro® wrist closures, spandex backs, knuckle straps, additional protection on fingertips, lining for warmth, waterproof membranes, and heavy-duty leather or synthetic patches on palms and fingertips, which offer employees longer life gloves with additional comfort and protection.

Mechanics gloves are specially designed and created specifically for the trades. Common users for this type of glove are fleet mechanics, maintenance mechanics, pipe fitters, electricians, millwrights and other professions requiring protection from nicks and abrasions. Typically, mechanics gloves offer superior grip and excellent dexterity for handling tools and parts.

## Heat Resistance

According to the National Safety Council (NSC), burns cost an average of more than \$21,350 per claim. Heat-resistant gloves can help your company protect its employees from the second most costly injury.

### Terry Cloth

Terry cloth is a common heat-resistant material that will offer heat protection to your employees. The terry cloth glove design creates an insulating layer of air between each loop, allowing heat to

rapidly dissipate, keeping your hands comfortable. This looping structure causes sharp edges to roll from one surface to the next without incision, protecting the hand from cuts and abrasions. This material is naturally cut- and abrasion-resistant and also absorbs oils for better gripping capabilities. In addition, it also absorbs perspiration for increased comfort and slip resistance. This heat-resistant material stands up to repeated launderings with minimal shrinkage, while remaining soft and flexible.

There are different weights of terry cloth that can affect the heat resistance of the product. The larger the ounces of terry cloth, the higher the heat range of the product that can be used. Exhibit 5 shows the different weights of terry cloth products, along with their respective heat ranges.

TERRY CLOTH HEAT RANGES		
OZ RANGE	HEAT RANGE*	DESCRIPTION
18oz - 21oz	200° F - 250° F	Medium Weight Terry
22oz - 25oz	250° F - 325° F	Standard Weight Terry
26oz - 29oz	325° F - 350° F	Heavy Weight Terry
30oz - 40oz	350° F - 460° F	Extra Heavy Weight Terry

**Exhibit 5. Heat Ranges of Terry Cloth Products**

### Kevlar

Kevlar is another material found in heat-resistant gloves that has tremendous heat properties. Heat-resistant gloves made with Kevlar provide the highest degree of protection from heat. They are flame resistant so they will not burn or melt, and can protect against temperatures up to 700°F.\* If a glove is made out of 100% Kevlar, it won't melt, burn or lose flexibility at temperatures as high as 700°F.\* Kevlar gloves can also be insulated with cotton, wool and double wool linings for maximum protection and comfort.

(\*Note: Please consult your glove manufacturer for the correct heat ranges of their specific products.)

Heat-resistant gloves are found in industries, such as automotive plants, foundries, and manufacturing facilities. Applications for heat-resistant gloves include environments where there are ovens and handling objects over 200 degrees.

## **Palm-Coated Gloves**

Palm-coated gloves allow you to have greater dexterity and provide a heightened level of tactile sensation. It also improves gripping capabilities, while the glove's shell, with an open back, creates a breathable surface for the back of the hand. This increases the circulation of air, ensuring greater comfort while wearing the product.

Palm-coated gloves are usually used for cut resistance and general purpose. For cut resistance palm-coated gloves, the shell of the gloves typically includes high-performance polyethylene fibers (HPPE), Kevlar®, and a combination of high-performance materials. For general-purpose gloves, the shell of the gloves typically includes polyester/cotton combinations, along with synthetic fiber shells, which are typically made up of nylon or polyester.

The unique feature of palm-coated gloves is actually the coating that can be found on the palm and finger tips of the glove. Common coatings found on these gloves include nitrile, latex (natural rubber), polyurethane, and PVC. Nitrile is a coating that offers great resistance and grips when it comes to oils. Latex is flexible, durable, and offers an outstanding grip. Polyurethane is considered a lightweight coating that provides good abrasion resistance and tensile strength. PVC offers excellent abrasion resistance and durability, while being very cost effective.

Applicable industries that use palm-coated gloves include glass and sheet metal handling, construction, canning, recycling, lumber, general manufacturing, small parts handling, and electronics and precision assembly. Over the past decade, palm-coated gloves are increasing in popularity. A palm-coated glove can be effective to use in most applications.

## **Ensuring Long-Term Safety**

To help avoid hand injuries at the workplace, actions should begin at the corporate level by creating a hand protection program. By creating such a program, companies will be able to standardize the gloves used and follow a more cost-effective strategy. Employees should be trained on how, where, and when hand protection is required on their job. Implementing a program and ensuring your employees are educated on hand protection is important in keeping your employees safe and away from injuries.

One of the most difficult challenges in implementing a glove program will be in the process of determining which glove should be used in each of your applications. Because there are such a variety of gloves out in the market place already, there is a lot from which to choose. Organizing a safety survey is a great first step to assess the current working conditions at your facility. Companies should pick a hand protection expert to go through their work environments, and make evaluations and recommendations on which products should be used.

After a hand protection survey is completed, a glove trial should be performed. Glove trials allow your employees to use the glove in their applications under supervision of a hand protection expert. Results will then be gathered on important aspects of the specific applications, such as performance, employee preference, longevity, etc. After data is collected, the results should be presented to your corporate team, along with the specific glove recommendations for each department that performed a trial test on a glove. Your company will then be on its way to developing a corporate program for all their hand protection needs.

It is very important your employees know and understand that your company is taking the proper steps to make sure their hands are being protected. If your employees feeling confident they are being protected, you will see an increase in their overall job performance. Ultimately, their confidence and success will positively influence your overall work environment. Your employees are your most important assets, so make sure they are protected to the potential maximum.