Hand safety handbook

HexArmor®
protecting people

Hand safety **standards**

Workplace hand injuries are a leading cause of lost workdays and emergency room visits around the globe. From minor to life-threatening and everything in between, these injuries can be costly to employers and life-changing for employees. In this booklet you will find:

- An overview of the current state of industrial hand safety, including facts and statistics about hand injuries in the work place
- Considerations for implementing or revitalizing a hand safety program in your workplace
- Resources for gaining further insight on hand safety, including websites, forms, checklists, etc.


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Hand injuries in the workplace

Prevalent and preventable

Injuries to the hand and fingers are extremely common in the workplace, accounting for more than 23% of all injuries reported in a recent U.S. Department of Labor study. That amounts to over 143,000 hand-related workplace injuries in 2015 (second only to back injuries at 191,450) where workers lost a median of five work days, not including rehabilitation. Not only does this harm the worker, but medical costs and disability claims can escalate rapidly when an injury is incurred.

Most hand injuries are preventable – and that's where proper glove use comes in. Of injuries reported, a large majority of workers who suffered hand injuries at work were not wearing gloves at the time – and many of those injured who were wearing gloves were wearing the wrong type of glove protection for the application and hazard.

Proper glove use has been proven to reduce the risk of injury by over 70%, according to the Occupational Safety and Health Administration (OSHA), and when coupled with a hand personal protection equipment (PPE) program, gloves can go a long way toward creating a safer, compliant, and more productive work environment – helping you to avoid statistics like this:

- **1,080,000:** Number of emergency room visits per year from workers with hand injuries
- **70%:** Percentage of workers who sustained hand injuries in the workplace not wearing gloves
- **30%:** Percentage of injured workers who wore gloves,but they were inadequate, damaged, or wrong for the type of hazard present
- **2.5:** Number of times hand injuries have increased due to non-compliance (as in more than double)

Proper hand protection in the workplace helps to prevent numbers like the above, as well as the damaging physical, emotional and financial costs of an injury.

Costs of hand injuries

To break it down, the cost of just one disabling hand or finger injury varies from $540 to $26,000, with more serious extremity trauma averaging $730,000 per incident, according to a National Safety Council study.

OSHA provides a breakdown of various occupational injuries and estimates of what they cost per year, per incident:

- **Lacerations:** $40,023
- **Punctures:** $47,703
- **Fractures:** $101,833
- **Crushing:** $118,769

These numbers are only the beginning. The indirect cost of an injury can be as much as 20 times more than these direct costs, according to the American Society of Safety Professionals. Costs such as the accident's investigation expense, lost worker productivity, hiring and training replacement employees, low worker morale, and a negative impact on the company's reputation are virtually immeasurable – and can place irreparable damage on your company.

Think about this: when combining the cost of a hand injury, including treatment, worker's compensation claims, and lost time, the cost of this one preventable incident could conceivably surpass *the cost of an entire comprehensive hand safety program*.

Causes of hand injuries

Every workplace has hazards; some being more present than others. A workplace hazard is any aspect of work that can cause safety and health risks and have potential to harm, the majority of which can be divided into four categories:

- **Mechanical:** Includes cutting surfaces, sharp points, pinch points, moving parts, and vibrating equipment
- **Personal:** Includes worn items such as jewelry, loose-fitting clothing, and improper or defective personal protective equipment
- **Contact:** Includes contact with hot or cold surfaces, chemicals, solvents or liquids, and electrical currents
- **Housekeeping:** Includes the improper storage of equipment and materials or slippery conditions

Among these categories are the causes of individual hand injuries, divided into direct or indirect causes. Direct causes result from a worker's actions, such as using a sharp tool or operating machinery. Indirect, and sometimes more common, causes include carelessness, boredom, or disregard of safety procedures.

Causes of hand injuries in the U.S.

44% Cuts, lacerations, and punctures
These account for the highest number of reported hand injuries, according to the U.S. Bureau of Labor Statistics.

- **Cuts and lacerations** can result from handling materials such as glass, metal, or wood. They can occur using box cutters, knives, punch presses, and other machinery. Lacerations come from diverse sources such as handling, knives, nails, staples, scrap metal, sharp tools, steel shims, and metal burrs. Lacerations often start as punctures with the hazard dragging and then tearing the skin.

- **Punctures** can be large wounds caused by wood slivers or metal burrs, smaller scale such as from cable wire or shards of glass, or tiny "needle sticks" from 25- to 31-gauge needles found in medical recycle waste. Sometimes leaving little visual evidence, punctures often are under-treated or neglected, which can lead to infection.

21% Fractures, sprains, and tears
Fractures, sprains, and tears affect the bones and tendons of the hand's inner workings. Fractures are breaks in the bone and can be caused by trips, falls, and crushes. They can require much longer recovery times than other injuries.

13% Bruises, contusions, and soreness

13% Other

- **Thermal injuries:** Cold environments take their toll in multiple ways, including air temperature, wind speed, and wetness. The hands have a higher surface area to volume ratio than other parts of the body, so they lose heat more rapidly, resulting in freeze injuries.

- **Chemical exposure:** Chemicals can cause burns and other long-term health effects when they enter the body through the skin These substances can be in the form of liquids, dusts, vapors, gases, or even fibers produced in a process.

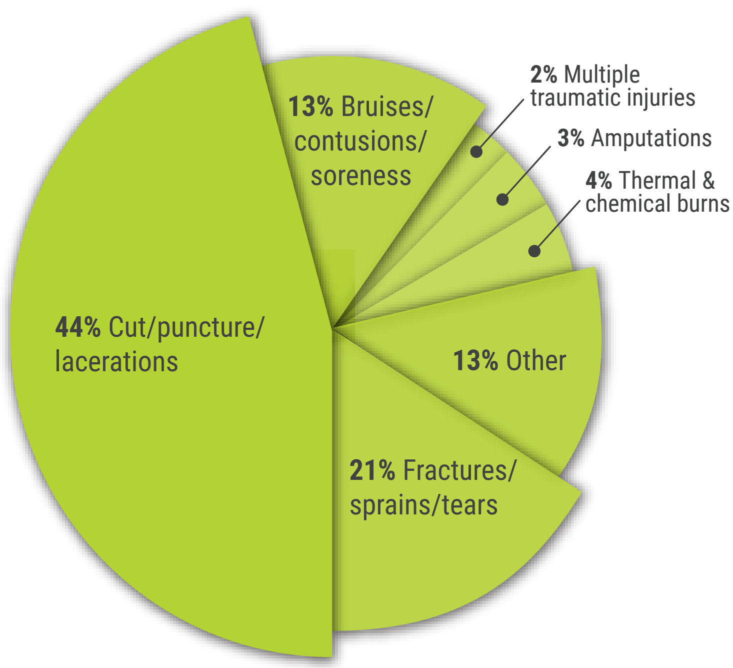
OSHA regulations

OSHA has specific regulations for hand protection: 29 CFR 1910.132. They require employers to assess the workplace to determine if hazards are present, or are likely to be present, to make necessary the use of PPE. This helps to protect workers from workplace hazards such as machines, work procedures, and hazardous substances that can cause injury.

Specifically, the OSHA hand protection standard mandates that employers select and require employees to use appropriate hand protection when employees' hands are exposed to the following hazards:

- Skin absorption of harmful substances
- Severe cuts or lacerations
- Severe abrasions or punctures
- Chemical burns or thermal burns
- Harmful temperature extremes

Going a step further, employers must institute all possible engineering and work-practice controls to reduce or eliminate hazards before using PPE to protect against them.



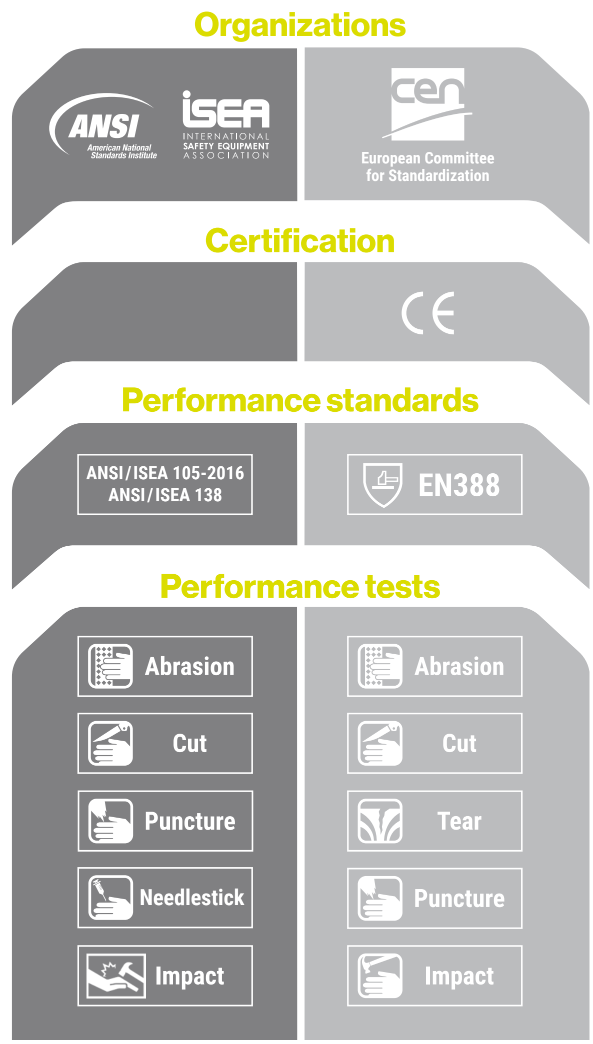
Hand protection standards

There are two main governing bodies when it comes to hand protection standards: 1. ANSI/ISEA – American National Standards Institute & International Safety Equipment Association, and 2. CEN – European Committee for Sanitization. Each use their own testing method organizations to test performance levels of gloves in the various standards that exist. Once tested and rated, corresponding performance levels may either be recommended or required to be displayed directly onto each industrial glove to give safety professionals a simple, visual indication of the performance standard, thereby increasing the credibility of glove performance claims.

ANSI/ISEA 105

ANSI/ISEA developed the first American national standard for glove selection criteria, ANSI/ISEA 105. It specifies test methods to be used with results reported on a numeric scale for manufacturers to rate their products against certain contaminants and exposures.

ANSI/ISEA 105 addresses specific performance properties related to mechanical protection (cut-resistance, puncture resistance, and abrasion resistance), chemical protection (permeation resistance and degradation), and other performance characteristics such as ignition resistance and vibration reductions. The performance properties covered in this handbook are mechanical protection. ANSI/ISEA 105 is a voluntary standard that is recommended to be labeled on the glove, but all reputable glove manufacturers adhere to the criteria.



ANSI/ISEA 138

Finalized in 2019, ANSI/ISEA 138 was developed to establish testing, classification, and labeling requirements that offer back-of-the-hand impact protection and is recommended to be labeled on the glove.

EN 388

The European Union developed a standardized system of laws that require anyone wanting to sell products in Europe to attain CE compliance/marking. A CE compliance/marking requires testing at an accredited lab, with official lab results, by a certifying body. For protective clothing, the EN 388 is the standard used to test these mechanical properties: abrasion, cut, tear, puncture, and impact resistance.

The EN 388 requires the use of specific test methods, reporting results on a 1-5 scale and in levels A-F (for cut only). PPE tested using the EN 388 standard are required to be marked with a "Conformité Européenne" (CE) label, the corresponding four numbers and two letter scores for mechanical and the corresponding newton score received in each of the mechanical tests received in each of the mechanical tests.

Test method organizations

ASTM

The American Society for Testing and Materials (ASTM) was founded in 1898 to address the issue of manufacturers encountering numerous quality problems due to inferior materials provided by suppliers. In its bylaws, the ASTM is dedicated to “the development and unification of standard methods of testing.”

ISO

The International Organization for Standardization was founded in 1947. To date it has developed over 19,000 standards covering a wide range of topics, including food safety, manufacturing, health services, production process, and computing.

Cut resistance

Cut resistance is often the number-one characteristic considered in selecting hand PPE, as cuts, abrasions, and punctures are the most common types of hand injuries sustained in the workplace. There are two testing and classification standards that exist to measure cut resistance: ANSI/ISEA 105- 2016 and EN 388.

Cut resistance: ANSI/ISEA

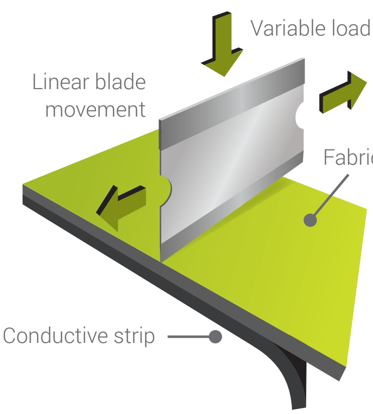
105-2016 standard for glove selection criteria

The ANSI/ISEA 105-2016 standard has established ASTM F2992-15 as the test method for measuring cut resistance and offers a 9-level scale (called out as A1-A9) based on the gram score. This scale spans from 200 grams to 6,000 grams of cut resistance. Prior to 2016, this standard (called ANSI/ISEA 105-2011) used a 1-5 scale but was updated to allow for more accurate identification of protection in PPE.

The standard references the Tomodynamometer (TDM-100) Test Method, which tests the amount of weight (in grams) necessary for a blade to achieve cut-through of PPE material at the reference distance of 20mm of blade travel.

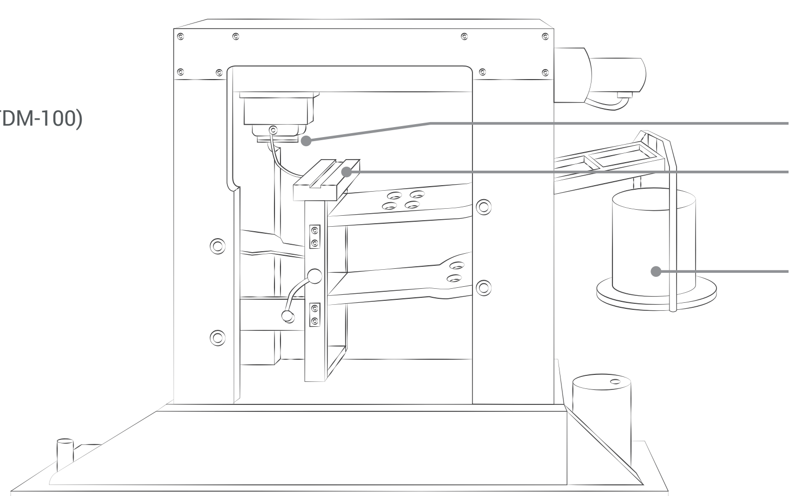
How the test works: With the TDM-100, the test fabric receives several cuts, all in a uniform direction and length that may range in distance from 5mm to 50mm, but 20mm is the target distance for cut-through. After each cut, a new blade is positioned in the tester and weight (in grams) is added until cut-through is achieved. Once cut-through occurs, a test range is established with several other cuts conducted using different weights. These test cuts are spaced 6mm apart on the test specimen and repeated until a total of 15 cuts are measured; five cuts at both extremes of the range and five in the middle. A calculation of the load or weight, and the distance required to cut through the fabric, illustrated on a curved line, is then conducted to determine the gram score or the weight required to achieve cut-through of the fabric at 20mm.

Scoring: The standard employs a 9-level scale (expressed as A1-A9) that spans 200 grams to 6,000 grams of cut resistance. The very granular rating system allows end users to precisely identify a level of cut resistance that meets a specific need.



	Low cut							High cut
Level	A1	A2	A3	A4	A5	A6	A7	A8	A9
Weight (G) needed to cut with 1" (20mm) blade travel	≥ 200 G	≥ 500G	≥ 1000G	≥ 1500 G	≥ 2200 G	≥ 3000 G	≥ 4000 G	≥ 5000 G	≥ 6000 G

Tomodynamometer (TDM-100) **testing instrument**



Comparing ANSI/ISEA 105-2016 and ANSI/ISEA 105-2011 standards

As mentioned, ANSI/ISEA 105 was updated in 2016 to better reflect the varying degrees of cut resistance available. There are two major differences between ANSI/ISEA 105-2016 and ANSI/ISEA 105-2011, and they lie in how cut-resistance classifications are determined.

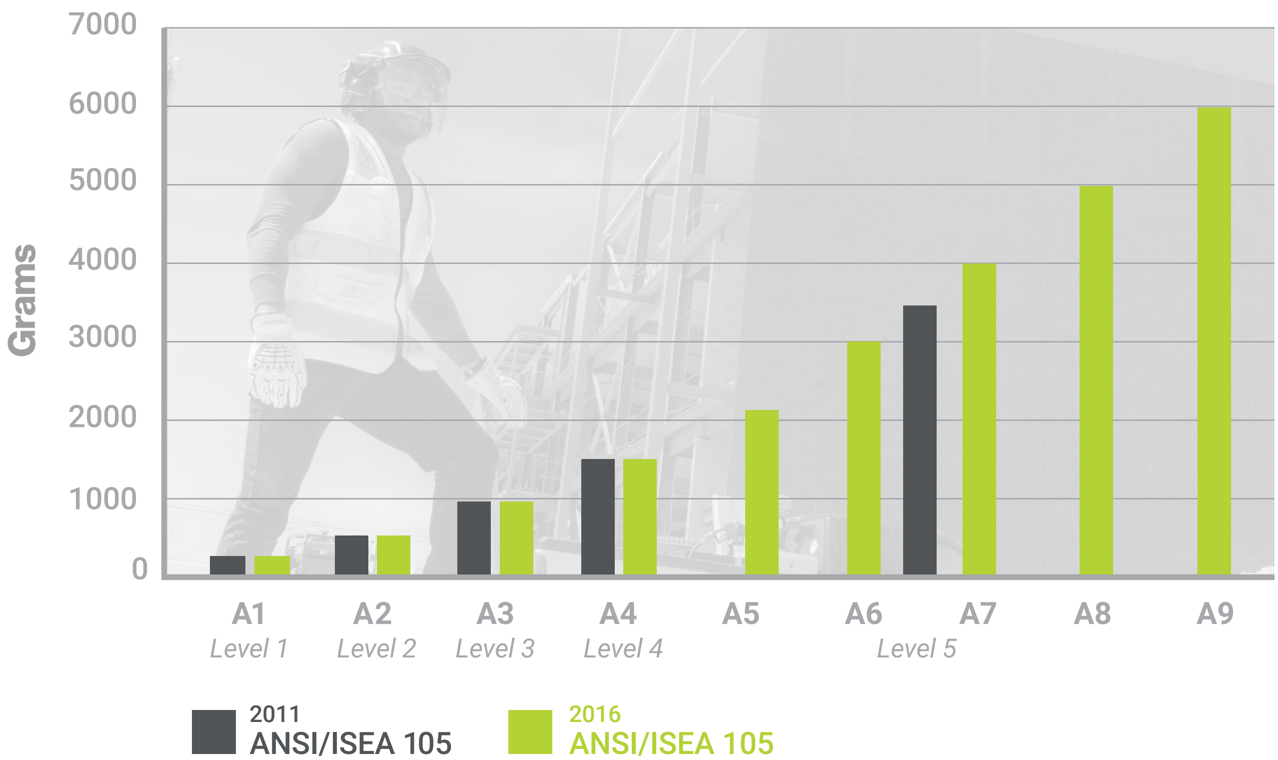
1. **Two tests vs one test:** ANSI/ISEA 105-2011 accepted the ASTM F1790 method along with its two additions: ASTM F1790-97 and ASTM F1790-05 which allowed data from either of two different testing instruments: the Cut Protection Performance Tester (CPPT) or the TDM-100.

   For consistent ratings, ANSI/ISEA 105-2016 selected ASTM F2992-15 as the only accepted test method for measuring cut resistance, which uses the TDM-100. The TDM-100 was chosen to address issues of the blade dulling on the CPPT tests, which skewed results.

2. **Difference scales:** ANSI/ISEA 105-2011 measured cut resistance on a 1 to 5 point rating scale spanning from 200 grams to 3,500 grams of cut resistance, whereas ANSI/ISEA 105-2016 provides an expanded 9-level cut resistance scale (A1-A9) that spans 200 grams to 6,000 grams of cut resistance.

The 2016 version addresses the gaps between cut levels, provides more accurate identification of the protection offered, and allows end users to more precisely identify a level of cut resistance that meets a specific need. Graph shows the expanded cut resistance levels adopted by ANSI/ISEA 105-2016.

Cut resistance rating system: 2011 vs. 2016



Cut resistance

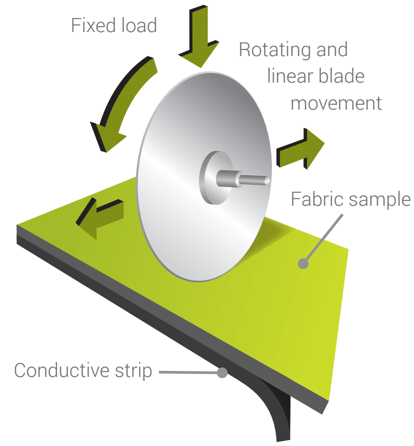
EN 388 european regulatory standard for protective gloves

The EN388 (CE) standard reports two cut levels, using two different testing standards and methods: the Coup Test and the ISO 13977 cut resistant method, also commonly known as the "TDM-100 Test." The second (and more recommended) test, TDM-100 was added in 2016 to address result inconsistencies and the dulling blade with the Coup Test while testing high cut materials. TDM-100 closely relates to the North American standard test.

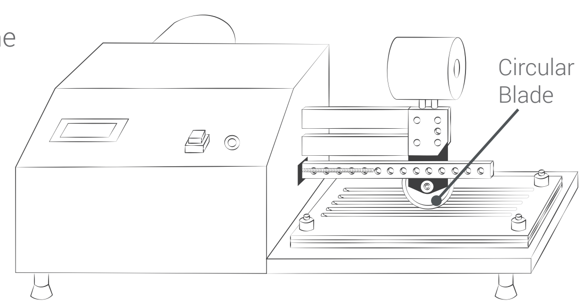
How the test works: For the Coup Test, testing is done in accredited labs where test fabric samples are cut by a counter-rotating circular blade that tracks back and forth on a singular point of contact under a specified load of 5n (509g). This test is limited to a maximum number of 60 rotations, whether the blade has cut through the material sample or not. If the test reaches 60 rotations, the material is required to be tested using the TDM-100 test, which assesses how much force is needed to cut material over a 20mm stroke using a straight blade. After each cut is made, the blade is changed, and weight is added.

Scoring: The Coup Test cut level index ranges from 1-5 (1.2-20 Newtons of the Index Value) based on the ratio of rotations it takes to cut through the sample vs. the control sample. The TDM-100 Test results are measured in newtons and reported in levels A-F (2-30 Newtons), helping end users to precisely identify higher cut-resistant materials.

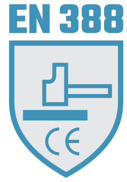
EN 388 cut testing



The Coup Test

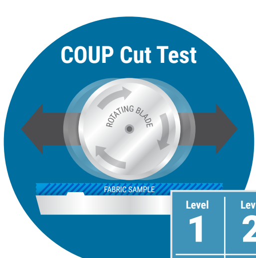


EN 388



Abrasion	COUP Cut Test	Tear	Puncture	TDM Cut Test	Impact
4	5	4	3	C	X
1-4	1-5	1-4	1-4	A-F	P, F, X

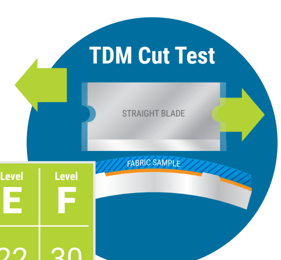
COUP Cut Test



	Level 1	Level 2	Level 3	Level 4	Level 5
EN Coup Cut Resistance in Index Value	1.2	2.5	5	10	20

* This is the traditional cut standard in use

TDM Cut Test



	Level A	Level B	Level C	Level D	Level E	Level F
EN ISO Cut Resistance in Newtons	2	5	10	15	22	30
Gram Conversion	204	509	1020	1530	2243	3059

Cut resistance: Comparison between EN 388-2016 and ANSI/ISEA 105-2016

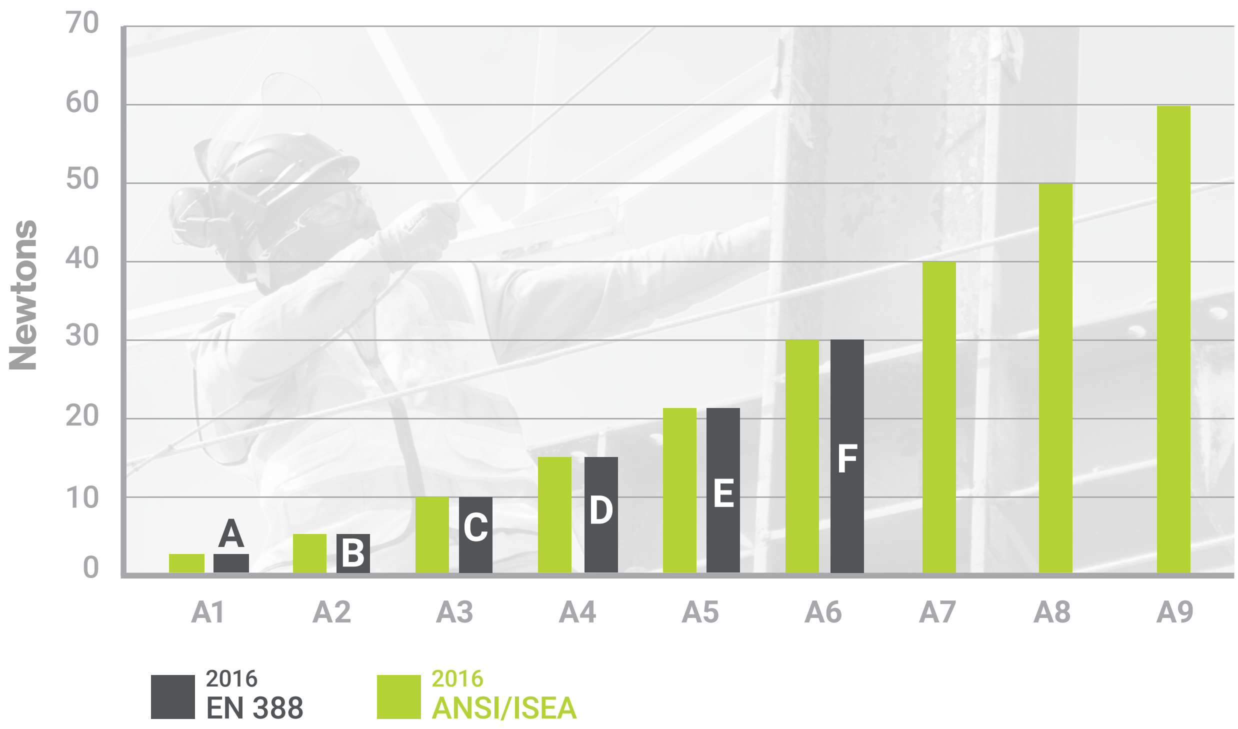
Standards: Since CE is the only certification-requiring body, safety glove manufacturers in North America can, in theory, produce gloves without testing for cut resistance. If they do test for cut resistance, they are able to use any of the methods discussed here. When comparing the cut resistance of two or more fabrics, it is important to make sure that for all materials:

- **The same test method was used**
- **The same type of cut tester was used**

Unless these points are met, you cannot accurately compare the results.

Cut resistance levels: The use of the TDM-100 test method is required by both ANSI/ISEA 105 and by EN 388 (for high-cut materials). However, the ANSI/ISEA standard reports results in grams on an A1-A9 scale (200-6000 grams/2-60 Newtons). While the A1-A9 scale is comparable to the EN 388 A-F levels which reports up to 30 Newtons (200-3000 grams/2-30 Newtons), ANSI/ISEA extends their scale by three levels to 6000 grams/60 Newtons to report high cut materials more accurately.

ANSI/ISEA & EN 388 cut test standards



Puncture resistance

Puncture resistance is among the major mechanical properties required of protective clothing or material. It's defined as the maximum force required for a puncture probe to penetrate a specimen clamped between two plates in a sample holder. The probe is meant to simulate a tear or burst hazard. The EN 388 puncture standard test is the only test currently recognized by both EN 388 and ANSI/ISEA 105-2016 standards.

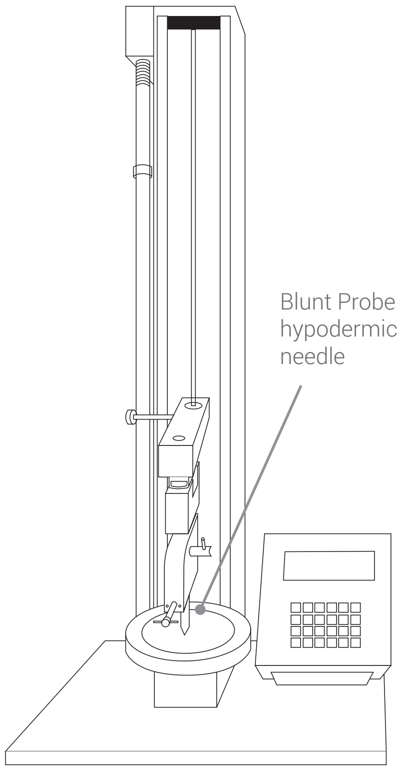
How the test works: EN 388 and ANSI/ISEA 105 Blunt Puncture Testing method uses a probe to simulate a tear or burst hazard to measure the amount of force needed to pierce through PPE material. ANSI/ISEA recognizes both the testing instrument and probe used in the EN 388 puncture standard.

- Test fabric is held firmly between two plates in a sample holder
- A probe penetrates the test fabric at a 90° angle at 100mm/min
- Results are reported in Newtons

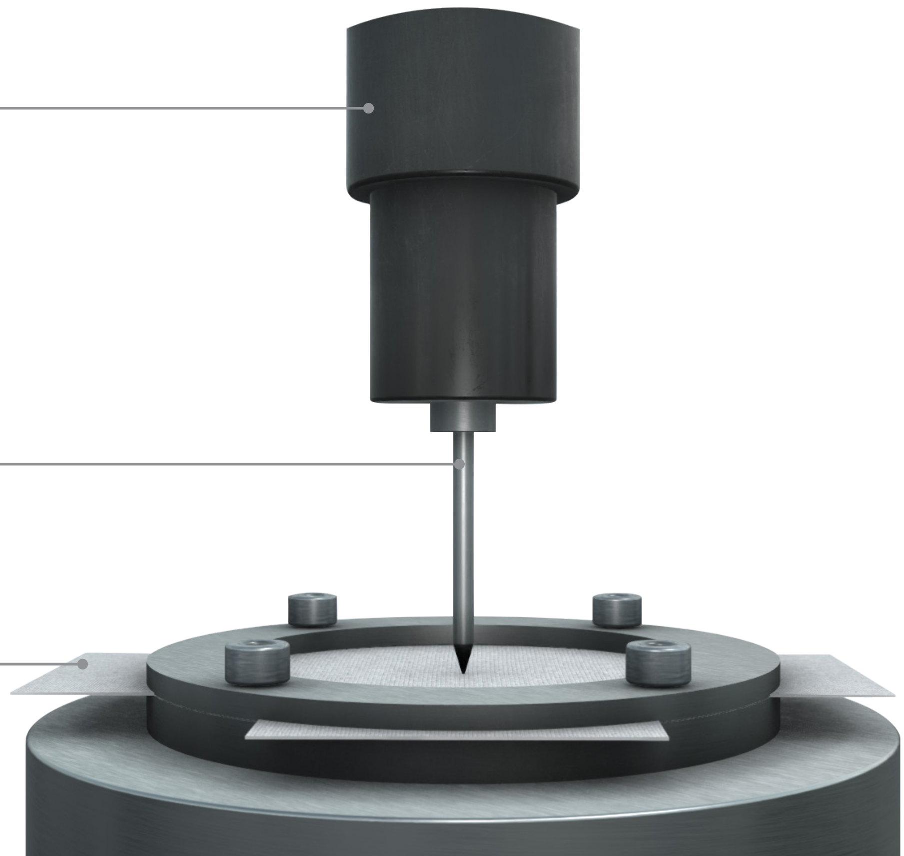
Scoring: Results are converted into a 1-4 scale for EN 388, and a 1-5 scale for ANSI/ISEA 105. This scale spans from 10 Newtons to 150 newtons of puncture resistance.

	Low cut				High cut
Level	1	2	3	4	5
ANSI/ISEA (Newtons)	10-19 N	20-59 N	60-99 N	100-149 N	150+ N
EN (Newtons)	20-59 N	6099 N	100-149 N	150+ N	-

ASTM F2878-10 hypodermic needle puncture test



EN 388 Blunt Puncture Test



Needlestick resistance

The ANSI/ISEA 105 hand protection standard was updated to include the ASTM F2878-10 needlestick puncture test in February 2016. Before this standard became effective, the only tests available were the ANSI/ISEA 105 and EN 388 puncture tests which were inadequate for determining needlestick specific resistance and in no way represented the danger of a hypodermic needle.

The ASTM F2878-10 recognizes needlestick incidents as a common potential exposure risk for the law enforcement, medical, sanitation, and recycling industries. Protective clothing or material must be tested under this standard to determine the proper rating that it takes to stop and/or mitigate needlestick punctures.

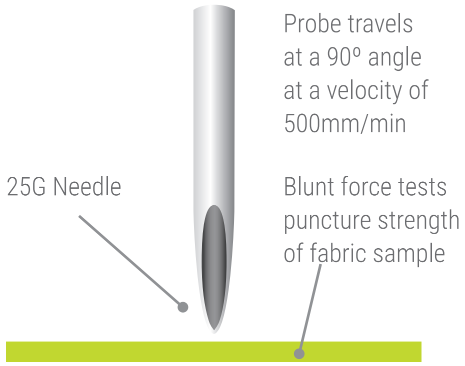
How the test works: The ASTM F2878 hypodermic needle test calls for a 21-gauge or 28-gauge needle (HexArmor® uses a 25-gauge needle) to measure the amount of force it takes to puncture through the testing material.

- Test fabric is held firmly between two plates in a sample holder
- A probe penetrates the test fabric at a 90° angle at an 500mm/min
- Results are reported in Newtons

Scoring: Results are reported in Newtons and classified based on the average of 12 samples. ANSI/ISEA uses a 1-5 rating scale for these test results, measuring from 2-10 Newtons, with a level 5 measuring at 10 Newtons or higher.

	Low				High
Level	0	1	2	3	4	5
Force (N) needed to puncture specimen at 500mm/min	< 2 N	≥ 2 N	≥ 4 N	≥ 6 N	≥ 8 N	≥ 10 N

ASTM F2878 needle resistance



Abrasion and tear resistance

Abrasion resistance

Abrasion resistance is also a critical factor in preventing hand injuries. If a glove fails too early due to wearing through from an abrasive hazard, the skin is quickly exposed to cut hazards. The higher the abrasion level, the higher the level of protection from not just abrasions but from cuts and punctures as well.

ASTM D3384 Taber abrasion test method
This test method determines the resistance to abrasion, or wear resistance, of fabrics coated with rubber or plastics.

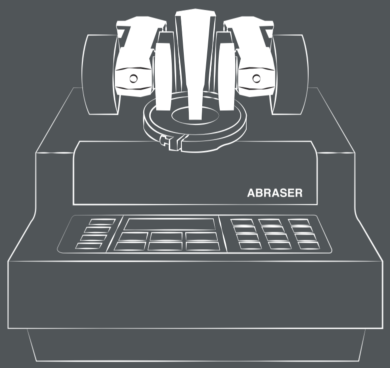
How the test works: A four-inch circular test specimen is mounted on a horizontal-axis platform while being abraded to failure under a specified vertical weight load (of 500 or 1,000 grams) by the sliding rotation of two vertically oriented abrading wheels. The abrading wheels are composed of vitrified clay and silicon carbide abrasive particles.

Scoring: The abrasion is measured in revolutions. The results are recorded as abrasion Levels 1–6.

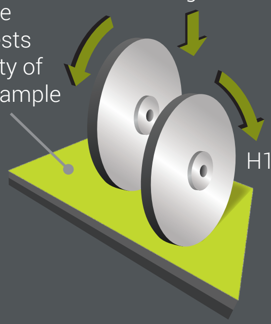
EN 388 Martindale abrasion test method
The EN 388 Martindale Abrasion Test tests fabric by continually rubbing small discs of worsted wool or wire mesh (the abradant) against the test specimens in a figure eight.

How the test works: The fabric is continually inspected for wear and tear, and the test ends when two yarns break or when there is a noticeable change in appearance.

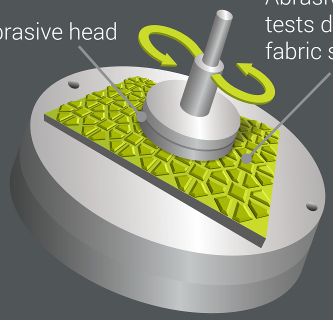
Scoring: Rated on a 1-4 scale; the greater the number, the greater the resistance.

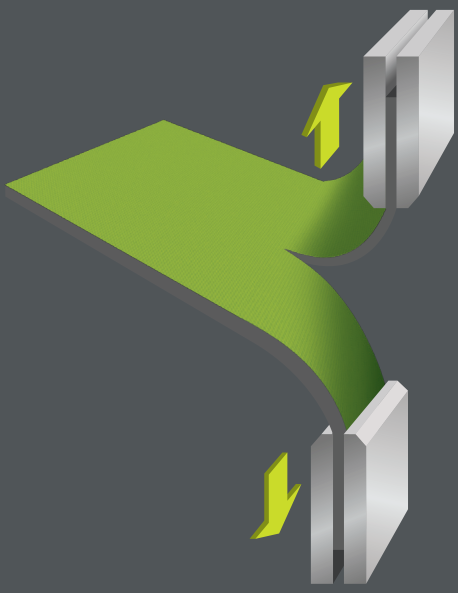


ASTM D3884 Taber



EN 388 Martindale





Tear resistance

The EN 388 tear resistance testing method is measured by testing a glove material's tinsel strength by applying the force necessary to propagate a tear in a rectangular specimen slit half way along its length.

How the test works: A rectangular sample of material is partially slit in its center, lengthwise and torn axially by simultaneously pulling on each "let" under tension. Force is increased until the integrity of the material is torn. The tear resistance corresponds to the maximum force recorded over the distance torn in the material. The amount of force used to tear the material is recorded and categorized.

Scoring: Rated on a 1-4 scale, the tear score is recorded using Newtons. The greater the force measured, the greater the tear resistance of the material.

Impact protection

Back-of-hand bones and soft tissues are extremely vulnerable to impact-related hand injuries among a wide range of job sites. This U.S.-based impact performance standard will help safety professionals make better-informed decisions about glove selection – ultimately keeping more people safe on the job.

Impact protection: ANSI/ISEA 138
The ISEA 138 standard establishes the minimum performance, classification, and labeling requirements for gloves that are designed to protect the knuckles and fingers from impacts based on three performance levels. ISEA 138 requires testing in a lab that meets the laboratory conformity assessment standard IOS/IEC 17205. Strict guidelines for the testing device, including weight and velocity specifications for the anvil, must be followed and measured consistently to help increase the credibility of glove performance level claims.

How the test works: To score gloves into their appropriate level, impact protection testing under ISEA 138 requires consistent, regulated tests on each kind of glove on two areas for impact performance: knuckles and fingers/thumb. On both gloves, knuckles are tested four times and fingers/thumb are tested five times.

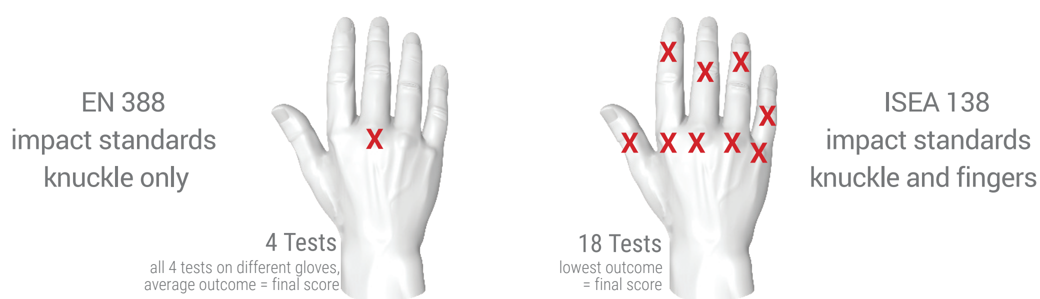
To start, one pair of gloves is required per test. The gloves are cut in half and the back-of-hand (where the impact protection is located) is placed on an anvil. A striker with a force of 5 Joules is dropped on the required back-of-hand locations, and the amount of force transferred through the glove back-of-hand is recorded with a force gauge that is connected below the anvil and measured in kiloNewtons (kN).

Scoring: The average of eight knuckle tests are compared to the average of the ten finger tests. The highest average of the two is the impact testing score.

- **Performance Level 1** – Results in an average peak transmitted force of greater than or equal to 9 kN.
  - 55% of force absorbed
- **Performance Level 2** – Results in an average peak transmitted force of 6.5 to 8.1 kN.
  - 67.5% of force absorbed
- **Performance Level 3** – Results in an average peak transmitted force of 4 to 5 kN.
  - 80% of force absorbed

The chart showcases the ISEA 138 performance levels, with "Performance Level 3" being the highest. Any impact-resistant PPE that scores higher than a 9 kN force transfer will not qualify for a ranking and will fail. With no impact material, the machine registers around 20kN, so in order to pass the test, the impact material must register less than 9kN, reducing the force or energy transferred by 55%. The anvil will drop roughly around 5 ½ pounds from 8 inches.

Impact protection: EN 388
The European industrial glove market includes impact testing performance ratings in EN 388, which tests the impact on just the knuckles, and the tests are given a basic score of pass or fail. To pass the test, the transmitted force needs to be less than or equal to 7 kN with no single results greater than 9 kN.



	EN	ISEA
Levels	Pass/fail ≤ 7kN EN reference digit 4244XP	1 ≤ 9kN Level 1 55% of force absorbed 2 ≤ 6.5kN Level 2 67.5% of force absorbed 3 ≤ 4kN Level 3 80% of force absorbed

Other properties of hand PPE

When evaluating hand PPE for your safety program, you need to consider more than just cut and impact protection. Consider the additional factors that can affect the success of your program below. It cannot be emphasized enough the importance of conducting glove trials and collecting feedback from workers to ensure the gloves being considered offer the properties needed for safe and efficient work.

Grip
Confidence in grip can play a major role in the successful and safe completion of projects. Oils, liquids, dust, and mud all affect the grip quality of different materials in different ways. Poor grip can lead to hand strain and fatigue. Gloves that enable a good grip help lower the incidence of dropped tools (which can result in an impact injury) and reduce the number of fatigue- and strain-related conditions reported by workers. Because grip is largely a subjective issue, look for gloves with a wide range of grip options with standard levels of cut and impact protection.

Dexterity
Dexterity is crucial to workers dealing with small parts or handling jobs that require repetitive motions. Gloves that are bulky or restrictive can complicate a worker's ability to effectively complete a task. If workers don't have the dexterity and tactile sensitivity they need to do a job effectively, there's chance they'll remove gloves in order to work, leaving hands susceptible in injury.

Comfort
Comfort must be considered for those wearing gloves for long periods of time, since uncomfortable gloves can lead to lower compliance, and lower compliance can lead to a higher rate of hand injuries. An ill-fitting glove can be as dangerous as not wearing hand protection. Gloves that retain body heat and sweat can lead to skin problems and circulation issues. Ideally, gloves should contour to the shape and form of the individual's hand.

Weather
Extreme weather conditions introduce a host of potential hazards that can result in hand injury. Workers dealing with extremely cold weather can suffer from numbness, loss of grip and feeling, and other cold-related issues, including the frostbite. Extreme variance in temperature can even exist in plants and warehouses when employees are near furnaces, hot water, or cold storage. Look for warm- and cold-weather versions of many gloves to address the range of climates found in the field.

Developing a safety program

One of the most effective ways to avoid injuries and costs is to develop and implement a hand safety program. Hand injuries are the second leading cause of a work-related injury – but they are also the most preventable.

Do you have a hand safety program in place?

- *If you do not* – Use this guide to help you build and establish a plan that works best for your organization.
- *If you do* – Use this guide to evaluate your program for intended effectiveness. It should be periodically (and at least annually) evaluated for what is working and what is not, and whether it's on track to achieve its goals.

When opportunities are identified to improve the program, employers, managers, and supervisors – in coordination with workers – should make adjustments and monitor performance results. Sharing the results and celebrating successes can help drive further improvement. Program evaluation and improvement includes:

- Establishing, reporting, and tracking goals and targets that indicate whether the program is making progress
- Evaluating the program initially and periodically thereafter to identify shortcomings and opportunities for improvement
- Providing ways for workers to participate in program evaluation and improvement

Program benefits

In addition to ensuring a safer workplace, an effective hand safety program can decrease workplace injuries, reduce lost time, increase compliance with the law, and lower insurance costs, as well as other potential benefits:

- Helps build employee morale, loyalty, and trust
- Ensures your company is meeting its responsibilities toward its workers
- Raises awareness and enhances company image
- Shows good citizenship in the local community

An excellent safety record can also be an effective recruiting tool, helping attract the most highly skilled talent to your company. In today's competitive business environment, it's easy to see how safety becomes a fundamental driver for many companies' long-term business successes.

Getting started

A hand safety program is more than just gloves; OSHA considers personal protective equipment to be the last line of defense when it comes to preventing injuries. Training, hazard controls, and an overall culture of safety are equally important aspects of your hand safety program.

Get started using this simple framework:

Program purpose: Develop a short statement about why the hand safety program exists. Use clear, concise language everyone will understand.

Policy: Write a statement of company policy that conveys management's support for the safety program and what is intended by the company in establishing the program.

Responsibilities: Define who is responsible for which parts of the program: management, supervisors, and workers.

Record-keeping: Identify the specific forms and documents required for your safety program, including audits, inspections, and training documentation.

Training: Educate your workforce on program guidelines and why they're needed to help employees properly learn their jobs, reinforce safety policies and procedures, and provide an opportunity to communicate safety principles and management's commitment to a safe workplace. Going beyond OSHA requirements, assign what training is required for managers, supervisors, and workers. Training should list what each group should know and what action they can take to meet program goals. For example, if the program includes a mandate to use protective gloves, workers need to know when and where they should wear them. Also include:

- Type of training, such as classroom, field, on-the-job, or a combination of training session types
- How often the training is to be conducted and for whom
- Special qualifications required for trainers
- Specific source materials to be used for each session, such as OSHA, ANSI, or other industry standard

Audits and inspections of hazards

Do a walk-through to determine and list areas where hazards exist in your facility by conducting a job safety analysis (JSA) on each operation. This can help identify potential hazards and promote safety awareness on the job, which can then be covered in your hand safety program. Your safety program should require, at minimum, an annual review of effectiveness and hazard coverage.

There are four basic steps to conducting a JSA:

1. Analyze the steps to perform a task or job function
2. Look for the obvious and hidden hazards
3. Look for potential direct and indirect exposure:
   a. Caught in or between
   b. Contact with chemicals, electricity, heat/cold, caustics, toxics, sharp edges, heavy tools
   c. Bodily reaction from voluntary or involuntary motion
   d. Struck against or by
   e. Rubbed or abraded by friction, pressure, and/or vibration
4. Determine preventive measures to address these hazards

Developing a safety program (cont.)

How to control hazards

Here you will outline any engineering, administrative, work-practice, and training controls that will mitigate your above listed hazards. First, assess the risk of serious hand injury at the activity and/or task level, including the operation of powered and non-powered hand tools. Then, establish specific preventive controls that reduce the likelihood of a serious hand injury. Types of controls include:

Engineering controls: Safeguards put in place by designers, erectors, installers, manufacturers, and suppliers that work to rectify hazards where there is risk of serious hand injury.

- Machine guards
- Safety controls
- Ventilation
- Substitution with less harmful material
- Enclosure or isolation of a process
- Monitoring devices
- Changing a process

Administrative controls: Procedures, assessments, inspection, and records to monitor and ensure that safe practices and environments are maintained.

- Periodic inspections
- Equipment operating and maintenance procedures
- Hazard analysis
- Selection and assignment of personal protective equipment

Work-practice controls: Changing the way workers do their jobs to eliminate potential hazards.

- Worker job rotation
- Personal hygiene
- Housekeeping and maintenance

Training controls: Ensure that workers are fully trained to safely perform all assigned tasks. No employee should attempt any task without proper training in the equipment used, required personal protective equipment, specific hazards, and their control and emergency procedures.

- Initial new hire safety orientation
- Job-specific safety training
- Periodic refresher training

Other safety rules and guidelines

More complex programs may lend themselves to developing standard operating procedures (SOPs), while other programs may need only general guidelines to help eliminate any doubt about what is required for safe performance on the job. Guidelines may include such considerations as:

- Rules for wedding bands, rings, and other jewelry
- Rules and signage for loose sleeves and gloves near rotating equipment
- Rules for isolation and lockout systems
- Safe work instructions for hand positions, weight of parts, etc.
- Distinguishing "safe handholds" on plant equipment
- Identification and signage of hand hazards on machinery
- Rules regarding what PPE must be worn for specific tasks

Communication

No safety program can be effective if employees don't know about it, which makes launching an awareness campaign to reinforce the changes and requirements not just a good idea but a necessary one. The best awareness campaigns are integrated throughout all company communications. Here are some ideas:

Visual media: Post posters, fliers, banners, etc. around your workplace. For example, place images of specific gloves by specific machines or in specific areas where hazards are present. If your budget allows, consider a short video promotion.

Internal communications: Your intranet site is a great platform for messaging. Plus, email signatures, web banners, and internal chat protocols can all incorporate safety messaging.

Monthly safety meetings: Meeting formats should be relaxed, open, helpful, and informational; engagement and two-way communication are key. Workers who have been on the job a long time have heard safety "lectures" so many times they may just tune out, so make it your goal to spark conversation to get people involved. Better yet, have them help lead the meeting.

Safety incentive programs: Companies have found these can help increase compliance and lower the incidence of hand injuries. Such programs can be developed and implemented as a component of your overall communications campaign.

Monitoring

Monitoring results is important to be able to understand the effectiveness of your hand safety program. To help, have managers, supervisors, and/or hourly workers observe others on the job and then complete a short "focused safety" audit checklist. This will help raise awareness of mandated compliance or improvement areas. Where there are gaps, your program, training, and communications can be changed accordingly.

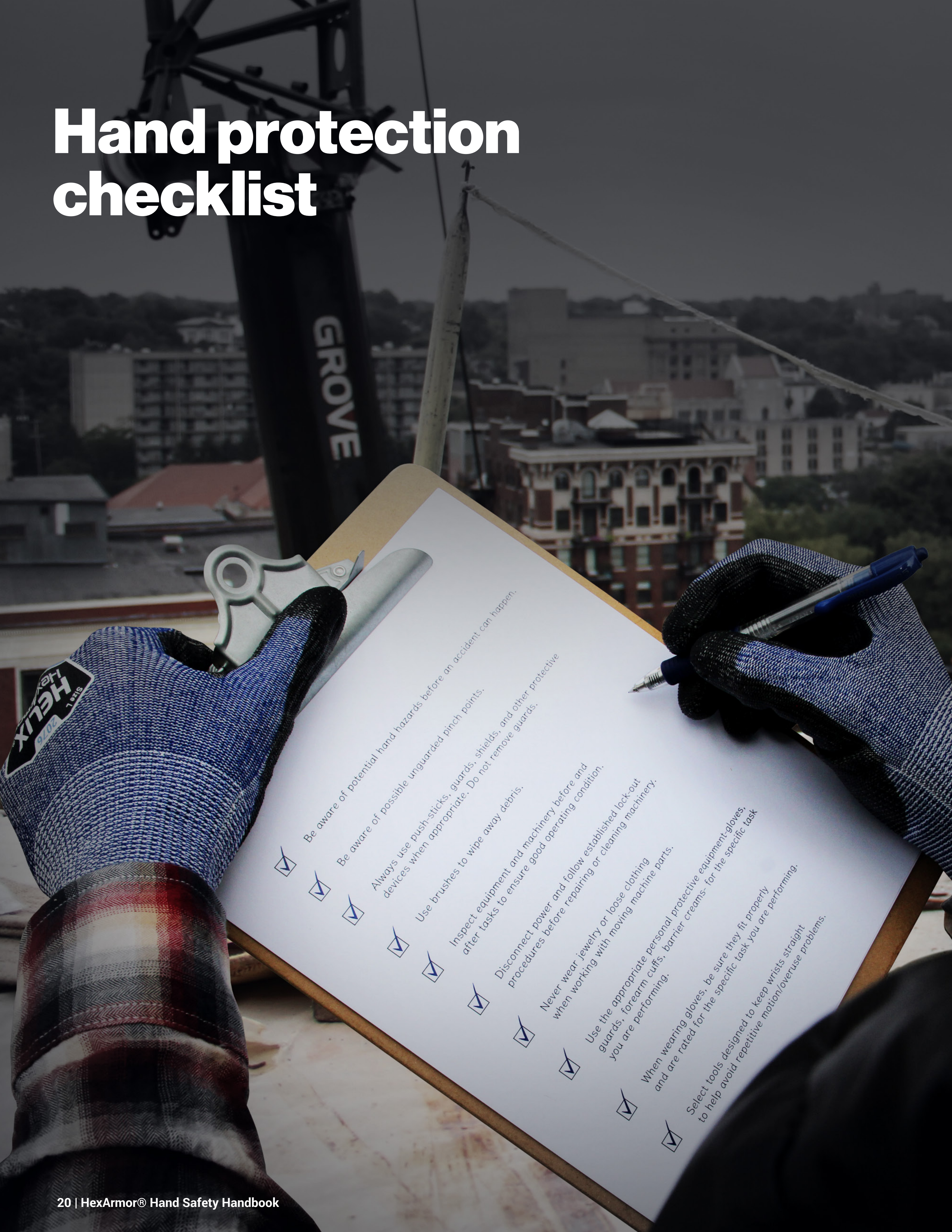
Checklist for developing a safety program:

- Identify steps taken to assess potential hazards in every employee's workspace and in workplace operating procedures
- Identify appropriate PPE selection criteria
- Identify how you will train employees on PPE use, including:
  - What PPE is necessary
  - When PPE is necessary
  - How to properly inspect for wear or damage
  - How to properly put on and adjust the fit
  - How to properly take off PPE
  - The limitations of the PPE
  - How to properly care for and store PPE
  - How you will assess employee understanding of PPE training
- Identify how you will enforce proper PPE use
- Identify how you will provide for any
- Required medical examinations
- Identify how and when to evaluate the PPE program

Train workers to know:

- Importance of hand and arm protection
- How gloves and sleeves will protect them
- Protective equipment limitations
- When gloves and sleeves must be worn
- Proper donning of gloves and sleeves
- How to ensure a comfortable and effective fit
- How to identify signs of wear, such as:
  - Cracks, scrapes, or lacerations
  - Thinning or discoloration
  - Break-through to the skin
- How to clean and disinfect non-disposable gloves/sleeves

Hand protection checklist



Operational questionnaire

1. Is there a hazard assessment procedure used to determine if hazards that require the use of personal protective equipment (head, eye, face, hand, or foot protection) are present or are likely to be present?

2. If hazards or the likelihood of hazards are found, is PPE selected and are employees properly fitted?

3. Have employees been trained on PPE procedures: What PPE is necessary for a job task, when they need it, and how to properly adjust it?

4. Are protective goggles or face shields provided and worn where there is any danger of flying particles or corrosive materials?

5. Are approved safety glasses required to be worn at all times in areas where there is a risk of eye injuries such as punctures, abrasions, etc.?

6. Are employees who need glasses/contacts required to wear only approved safety glasses, protective goggles or use other medically approved precautionary procedures?

7. Are protective gloves, aprons, shields, or other means provided and required where employees could be cut or where there is reasonably anticipate exposure to corrosive liquids, chemicals, blood, or other potentially infectious materials?

8. Are safety helmets provided and worn where danger of falling objects exists?

9. Are safety helmets inspected periodically for damage to the shell and suspension system?

10. Is appropriate foot protection required where there is the risk of foot injuries from hot, corrosive, or poisonous substances, falling objects, crushing, or penetrating actions?

11. Are approved respirators provided for regular or emergency use where needed?

12. Is all protective equipment maintained in a sanitary condition and ready for use?

13. Are there eye wash facilities and a quick-drench shower within the work area where employees are exposed to injurious corrosive materials?

14. Is special equipment available where needed?

15. Where food or beverages are consumed on the premises, are they consumed in areas where there is no exposure to toxic material, blood, or other potentially infectious materials?

16. Is protection against the effects of occupational noise exposure provided when sound levels exceed those of the OSHA noise standard?

17. Are adequate work procedures and protective clothing and equipment provided and used when cleaning up spilled toxic or otherwise hazardous materials or liquids?

18. Are there appropriate procedures in place for disposing of, or decontaminating, personal protective equipment contaminated with, or reasonably anticipated to be contaminated with, blood or other potentially infectious materials?

Types of protective gloves

Selecting protective gloves for the workplace

Glove selection is an important process in your hand safety program, especially with so many types of gloves available to protect against a wide variety of hazards. When choosing a glove, look at the nature of the hazard and the operation involved; note that gloves designed for one function may not protect well against another. Additionally, gloves are made from a wide variety of materials and are designed for many types of workplace hazards. Factors that may influence the selection of protective gloves for a workplace are:

- Risk of cuts, lacerations, punctures, and abrasions
- Risk of smashes or pinches
- Type of chemicals handled; nature and duration of contact
- Area requiring protection (hand only, forearm, arm)
- Grip requirements (dry, wet, oily)
- Thermal protection
- Size and comfort

In general, gloves fall into three groups:

1 **Leather gloves**
Sturdy gloves made from leather provide some protection against cuts and burns, and help protect against sustained and moderate heat, sparks, blows, chips, and rough objects. Various synthetic leathers offer protection against heat and cold, are cut- and abrasion-resistant, and may withstand some diluted acids but do not stand up against alkalis and solvents.

2 **Mechanic's style gloves**
Mechanic's style gloves are made from several kinds of fabric, cotton, or synthetic fabric to provide varying degrees of protection against dirt, chafing, and abrasions for use with rough, sharp, or heavy materials. Always changing and improving, mechanic's style gloves deliver a full range of protection, such as cut, puncture, and impact, for a wide scope of industries and applications.

3 **Knit gloves**
Made with high-performance yarns, knit gloves are available in any number of thread combinations for all levels of cut protection, dexterity, and comfort. A coating can be added to the fingers, palm, and back of hand, to offer slip-resistant qualities and extra protection from cuts or liquids. These gloves are used for tasks ranging from handling bricks, wire, chemicals, and everything in between.

Protective materials

Types of fibers and protective fabrics on the market today

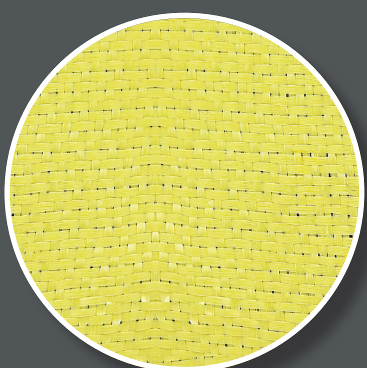
Using cotton or leather gloves to protect workers from cuts, punctures, and abrasions is a thing of the past. And for good reason – for years, better protection would require thicker materials or layers, resulting in less dexterity, comfort, and grip. As a result, manufacturers began developing other materials to increase protection without compromising worker hand function.

Today, advanced technology brings us hand protection that meets specific protection needs while enhancing worker comfort, dexterity, and productivity. Most hand injuries are preventable with the proper selection and use of gloves, which are designed and manufactured with many different types of materials to provide some level of cut resistance. The majority of cut-resistant fabrics on the market consist of leather, Kevlar®, Dyneema, composite yarns, and SuperFabric® brand materials.

Leather

Leather is one of the oldest fabrics used to make gloves. A durable, flexible material created by tanning the hides of animals, the unique properties of leather allow for both a comfortable fit and useful grip.

Due to its resistance to abrasion and wind, leather is used in rugged occupations. However, the natural fibers of leather will break down with the passage of time and exposure to environmental factors. It is also difficult to wash and, depending on the type of leather, does not have great cut resistance.



Kevlar®

Kevlar® is the registered trademark for a synthetic fiber. Developed by DuPont in 1965, this high-strength material was first commercially used in the early 1970s as a replacement for steel in racing tires. Typically, it is spun into ropes or fabric sheets that can be used as such or as an ingredient in other materials.

The high tensile strength-to-weight ratio allow Kevlar® to be used in a variety of products ranging from bicycle tires to racing sails to body armor because of its, making it five times stronger than steel on an equal weight basis. Perhaps best known for its use in bulletproof body armor and protective gear, it is created by overlapping multiple layers into sheets and then laminating several sheets together to form a “super web” of fiber that is difficult to break and even halts bullets. Additionally, it is very light compared to other products.

However, because it is an open-weave knit material, Kevlar® is susceptible to small punctures through the knit penetrating the skin, which can result in severe injury. Ultraviolet exposure and temperature extremes also degrade the fibers, resulting in declining performance over time.

Dyneema®

Dyneema®, or high-performance polyethylene (HPPE), is an ultrahigh molecular weight polyethylene fiber that offers high cut resistance, even when wet, and is 10 times stronger than steel per unit weight. Because of its unique properties, gloves made with Dyneema® are lightweight, flexible, and cool to the hands. They may be used in a variety of applications, such as glass handling, sheet metal assembly, and handling small, sharp parts.

Chemically inert, Dyneema® does well in environments where chemicals are involved. And unlike Kevlar®, it resists degradation and maintains its performance when exposed to UV light over time. However, Dyneema/HPPE is very slippery, and the glove either needs to be dipped or worn with an outer glove in order to maintain grip. Additionally, some puncture/tear issues occur with the woven glove.

Protective materials (cont.)

Protective tile technology – SuperFabric®* brand material
SuperFabric®, fabrics created with protective tiles designed specifically to address PPE requirements, was introduced in 1996 and works to meet almost every conceivable performance need through a variety of protective fabric functions, such as industry-leading cut, puncture, and needle resistance.

Performance is enhanced through the configuration of tiny protective tiles, which come in a variety of geometries, thicknesses, composites, and base materials, that provide higher levels of resistance to lacerations and slashes like no other material on the market. Because of the physics behind the materials, SuperFabric® exceeds both ANSI/ISEA Level A9 and CE/EN 388 Level 5 cut resistance. For example, HexArmor® gloves with SuperFabric® brand materials offer 10 times more cut and abrasion resistance than standard leather gloves.

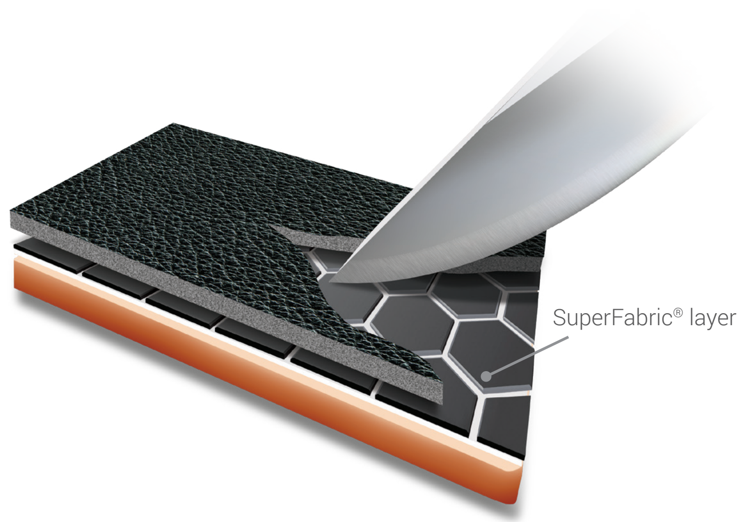
Additionally, a combination in the number of layers will also offer needlestick resistance. Like all fabrics, the thickness, substrates, and surface coatings supplement varying levels of cut, puncture, and abrasion resistance, as well as grip and flexibility.

Composite yarns
Composite yarns or knit gloves are the latest development for hand safety protection materials. Made of a core thread wrapped in a complementary thread, the core thread is generally a tougher material like stainless steel or fiberglass, with the complementary thread typically being a softer fiber such as Kevlar® or HPPE that is wound around the core at roughly 5 to 60 turns per meter of the thin metal wire.

These fibers have allowed glove manufacturers to make 360-degree hand protection with higher levels of cut resistance, all while maintaining the same dexterity offered by Kevlar® or Dyneema®. Cut resistance in gloves made with composite yarns is influenced by four factors:

- **Material strength:** Determined by the strength of the winding yarn
- **Toughness:** A hard yarn/core, such as stainless steel, dulls sharp edges
- **Slickness:** Yarns like Dyneema® are slippery, allowing a blade to glide over the surface without cutting through
- **Rolling action:** Individual yarns roll as a sharp edge slides over them, producing a "ball bearing effect", keeping sharp edges from cutting through in some instances

By maximizing the rolling action, slickness, and strength of each of the materials within the composite, knit gloves are able to capitalize on the strength of each material for a dexterous, second-hand feel. Coupled with this lightweight strength, composite yarns also have the ability to be 'dipped' to include a coating that adds extra protection and grip options. The possibilities of yarn and coating combinations are nearly endless, providing the majority of cut, grip, and comfort levels for all kinds of applications.



* SuperFabric® is a registered trademark of HDM, Inc.

Field-testing PPE

How to conduct a PPE trial

A glove trial is the process of field-testing different models of safety gloves, either from a single source or from several manufacturers, in order to identify the best glove for a particular job. When done correctly, the benefits of a glove trial include:

- √ Improved hand safety program and equipment; reduced rate of injuries
- √ Increased awareness of hand safety issues among workers
- √ Higher rates of compliance with hand safety PPE requirements
- √ Reduction in costs related to hand protection through increased efficiency and durability of work gloves, or reduced insurance rates, medical costs, and workers' compensation claims

1 Assess the hazards and work environment

When you begin a glove trial, it is important to consider as many application-specific issues as possible. Answer these questions in detail:

What hazards are present?
Conduct a thorough assessment and list all existing and potential hazards. These may include metal, glass, wood, sawing or cutting tools, blades or knives, wire, needles, hammers, scaffolding joints, pipes, insulation, connections, etc. Are there cut hazards in the form of long, sharp edges? What about possible pinch and smash injuries from dropped tools, rocks, pipes, etc.?

How much protection is needed?
The type of glove and protection levels will depend on the application. Check for cut, abrasion, and puncture risk to determine your glove's cut level, as well as impact hazards in case your glove needs back-of hand impact protection. Some applications require heat resistance, anti-vibration padding, or chemical-exposure protection as well.

What kind of dexterity is required?
Glove dexterity on the job must be considered, especially if workers are removing their gloves to complete high-dexterity tasks. Ask yourself: Do your workers require a high level of tactile sensitivity in order to do their jobs? Will they be picking up small parts or handling sheets of plywood or steel beams?

Where is the job being performed?
The location where your employees are doing the majority of their work will have an impact on glove selection. Are they indoors or outdoors? Is it an excessively hot or cold environment? Are there other factors pertinent to the job that may cause issue, such as working around oil pipes or handling lumber, steel, or glass?

Are there potential grip issues?
A glove's palm material must be designed to offer appropriate grip characteristics per application, as poor grip can lead to increased hazards from dropped tools and knives, in addition to increased fatigue and strain. Pay attention to tasks that could affect worker grip, such as applications involving mud, oils, cleaning fluids, and other workplace substances.

What is the temperature of materials being handled?
Do workers regularly handle tools or parts that are extremely hot or cold? This can affect glove properties such as grip, protection, and durability.

Are there any corrosive materials? Consider whether there are fluids like solvent or acids present that could break down the glove fibers or coating.

2 Identify the common applications

The key to finding the right glove for the job is to look at the applications and tasks that are representative of most of the work being done. Select a glove that of offers the necessary levels of comfort, protection, and dexterity for the most common, day-to-day tasks.

Although it is tempting to look for a one-glove solution, the reality is that a single glove can almost never meet all needs. If you outfit your entire workforce with a glove that is suited only to the easiest job, the most hazardous task, or the application that only occurs once a week or once a month, it may provide too little protection – or too much – for the work they're doing every day.

This will have a negative impact on glove compliance, safety outcomes, and the overall effectiveness of your hand safety program. If necessary, offer a different glove for use with an extreme or unusual task. Most of the time it is best for workers, and for hand safety programs, to use a glove that offers the right level of protection for the work performed most often.

3 Audit your current glove program

An audit of your existing glove solution will help you understand what is working, what isn't, and where improvement is needed. Learn what your employees like about the gloves they use now. Find out where the glove isn't meeting their needs. Identify any trade-offs between a new glove and the old.

By collecting this information, you can work to ensure that the trade-offs are minimized and that any new gloves used in the trial offer the same features that your work crews have become accustomed to. You can address any objections that may come up during the trial, selection, and implementation process. Knowing what your team likes and dislikes will help you find something better and explain how it is an improvement upon your old glove.

4 Select your trial crew

Having the right trial crew will help you find the right gloves and also help get buy-in from the rest of the employees once a glove has been chosen and the new program is rolled out. Choose people for the trial crew who are serious about safety on the job and will provide honest and constructive feedback. Encourage them to share their experiences, personal preferences, and anything else that might be relevant to glove selection. Be clear that this feedback will help determine which gloves are ultimately provided to the entire team. Let them know that their feedback will be shared with the glove manufacturer and could result in product improvements.

Get an agreement from the crew stating that they will provide written feedback as well as the glove samples at the end of the trial, since both are needed to make the best decision. Provide feedback forms that are easy to use.

5 Collect and review the data

When you've reached the end of your field-testing period, collect all of the feedback forms and the gloves used in the trial. Give the trial crew a chance to offer verbal feedback, and record what is said. Record anecdotes and stories of any "saves" from accident or injury that occurred during the glove trial. Collect and review written feedback forms. Examine the trial glove samples and note their condition with regard to cut resistance and durability of fabric. Include all relevant information in your report. Also, it is important to realize that the first glove or round of gloves tested may not fit your needs.

As you continue to try gloves, it might pay to revisit the specifics of various applications. For example, is there a fluid present that was not accounted for in your initial hazard and work environment assessment that could be causing premature failure or excessive wear? One goal of the glove-trial process is to uncover this type of information and address it with your glove selection. Add the new data to the application profile and hazards assessment as you select and field test the next glove solution.

6 Develop final glove specifications

Based on all the data collected after a successful trial, you can specify your gloves.
Specifications include:

- Fiber type (e.g.,protective tiles, nylon, etc.)
- Base weight (oz/yd²)
- Glove construction
- String knit, terry, etc.
- Coatings, dots, leather palms
- Ambidextrous (offers extended wear)
- Reinforced thumb saddle
- Cuff length
- Yarn size
- Glove sizing
- Cut resistance
- Reinforced thumb saddle (rating force and test method)
- Puncture resistance
- Abrasion resistance
- Needlestick resistance
- Other performance values required for the job (thermal testing, abrasion testing, etc.)

Use the following worksheets as a guide to evaluating hand protection at your workplace. For a more in-depth look on how to improve your hand safety, contact us. resistance that meets a specific need.

Glove care
Why does it matter?

Glove care

Improper glove care can shorten the life of your PPE. It can also lead to dermatitis, decreased dexterity, loss of protective abilities, and odor. Glove care refers not only to laundering but also proper storage, routine glove checks, and knowledge of materials and their particular strengths and weaknesses.

Because there are so many different work gloves on the market, experienced safety managers should be aware of what workers' gloves are made of and how they will stand up to the applications they're being used for. Common glove materials include nylon, spandex, leather, cotton, SuperFabric®*, Kevlar®, and knit fibers. Each of these materials has a certain way it needs to be cared for. Often there is a blending of the materials, making proper care even more crucial.

Proper storage
Gloves should be stored in clean, dry conditions, away from direct sunlight and extreme temperatures.

Routine glove checks
Glove life varies depending on the application, environment, and amount of use. It is vital that you perform routine glove checks before beginning work every day. Take note of areas that have begun to wear down, such as loose Velcro® or a worn-down name tag. If you see holes in the synthetic leather or TP-X® material on the palm of your glove, this is an indication that its protective qualities may be compromised, putting you at risk of injury. Lingering moisture or a strong odor are also signs that your gloves may need to be replaced.

Keeping an eye out for these issues (and others) takes you one step further from a worksite hand injury, which is the ultimate goal of hand protection.

Cleaning + care
Most gloves and arm and body PPE are machine washable. Please see hexarmor.com for product specific washing instructions.

Increase your glove lifespan
Laundering removes harmful chemicals, perspiration, and everyday grit and grime that can weaken protective fibers and seams. Our team of HexArmor® solutions specialists are here to help you with this process, and they are more than happy to provide you with all the information you need.

Increase your PPE lifespan through proper care

Job safety analysis form

Job to be performed: ____________________ Department: ____________________
JSA written by: ____________________ Date: ____________________
Supervisor: ____________________ Supervisor signature: ____________________

Task performed by (names):

Personal protective equipment, special tools, and other equipment required: ____________________

Step	Description	Potential hazard	Recommended safe job procedure
1			

PPE audit

Facility: ______________________ Area: ______________________

Auditor: ______________________ Date: ______________________

Area	Satisfactory	Action required	Corrective action (date)
Employee knowledge			
Date of last PPE training			
When to use PPE			
Limitations			
Selection and inspection			
Cleaning and storage			
Donning and removal			
Program administration			
Hazard assessment completed			
Hazard control survey completed			
PPE hazard certification completed			
High-hazard areas identified			
PPE disposal procedures			
Safeguards			
Engineering safeguards			
Administration safeguards			
Training safeguards			
Area inspection			
Signs and warnings posted			
Adequate PPE stock available			
Electricians wear electrically rated safety shoes/hard hats			
PPE clean and properly stored			
PPE used properly			

Annual Safety Audit Form

Facility: ______________________ Area: ______________________

Auditor: ______________________ Date: ______________________

Area	Satisfactory	Action required	Corrective action (date)
Safety officer			
Person assigned			
Written job description			
Written program			
Safety policy statement			
Written programs			
Responsibilities defined			
Safety plan of action			
Safety rules			
Operating procedures posted			
Administrative procedures			
Written fire-prevention plan			
Written emergency plan			
Management responsibility			
Sufficient staff and resources			
Management commitment			
Communication with employees			
Program enforcement			
Written enforcement policy			
Records of disciplinary action			
Managers held accountable			
Hazard identification			
Department inspections			
Hazard analysis for each task			
Purpose inspections			
Safety reviews for changes			
Hygiene inspections			
Hazard-control procedures			

Area	Satisfactory	Action required	Corrective action (date)
Hazard control			
All hazards classified			
No employees in hazard areas			
Correction documentation			
Corrective actions taken			
PPE program			
Hazard analysis completed			
PPE assessment completed			
Replacement as required			
Adequate stocks available			
Training completed			
Communication			
Periodic safety communication			
Means for communication			
Employee participation			
Training			
Safety orientation program			
Pre-assignment task tracking			
Annual retraining			
Training records maintained			
Supervisor training			
Specialized training			
Accident investigation and corrective action			
Written records			
Trends evaluated			
First-aid responders trained			

Source: Safetyinfo.com

Glove trial feedback form

Your name: ______________________ Date: ______________________

Company: ______________________ Position: ______________________

HexArmor® product: ______________________ Location: ______________________

Previous products used: ______________________

Protection and performance

1 Below average 2 Average 3 Fair 4 Good 5 Excellent

1 Back-of-hand protection	1	2	3	4	5	n/a
2 Cut protection in palm area	1	2	3	4	5	n/a
3 Puncture protection	1	2	3	4	5	n/a
4 HexArmor® PPE allows me to perform my job better than other gloves	1	2	3	4	5	n/a
5 I feel better protected in this product than in others	1	2	3	4	5	n/a
6 Product is appropriate for my application	1	2	3	4	5	n/a
7 Durability	1	2	3	4	5	n/a
8 Lasted _____ days of 8-hour work shifts	1	2	3	4	5	n/a

Grip (if applicable)

1 Grip when dry	1	2	3	4	5	n/a
2 Grip when wet or coated with chemicals	1	2	3	4	5	n/a
3 Grip consistency	1	2	3	4	5	n/a
4 The grip/coating used is appropriate for my application	1	2	3	4	5	n/a
5 Grip/coating lasted _____ days of 8-hour work shifts	1	2	3	4	5	n/a

Comfort/fit

1 Overall comfort	1	2	3	4	5	n/a
2 Overall fit	1	2	3	4	5	n/a
3 Dexterity	1	2	3	4	5	n/a
4 Product is comparable in comfort to previous products worn	1	2	3	4	5	n/a
5 If applicable: gloves are correct length in the fingertips	1	2	3	4	5	n/a
6 If applicable: gloves are correct width across the palm	1	2	3	4	5	n/a
7 If applicable: product kept me cooler/warmer than previous products	1	2	3	4	5	n/a

Overall satisfaction

1 2 3 4 5 n/a

Activities performed while wearing PPE:

Types of fluid gloves were exposed to (such as hydraulic oil, grease, mud, etc.):

Did you wash the PPE during the trial period? If so, how were they washed and how many times?

How many days/weeks/months would you estimate HexArmor® PPE would last in your profession before replacement?

Please describe any potential injury HexArmor® PPE may have prevented:

Are there any changes or improvements you would suggest for this product(s)?

Additional comments:

Glove sizing guide

Industrial gloves fit differently than most gloves because of the materials used to provide protection. We recommend using our size charts and reviewing glove descriptions and materials.

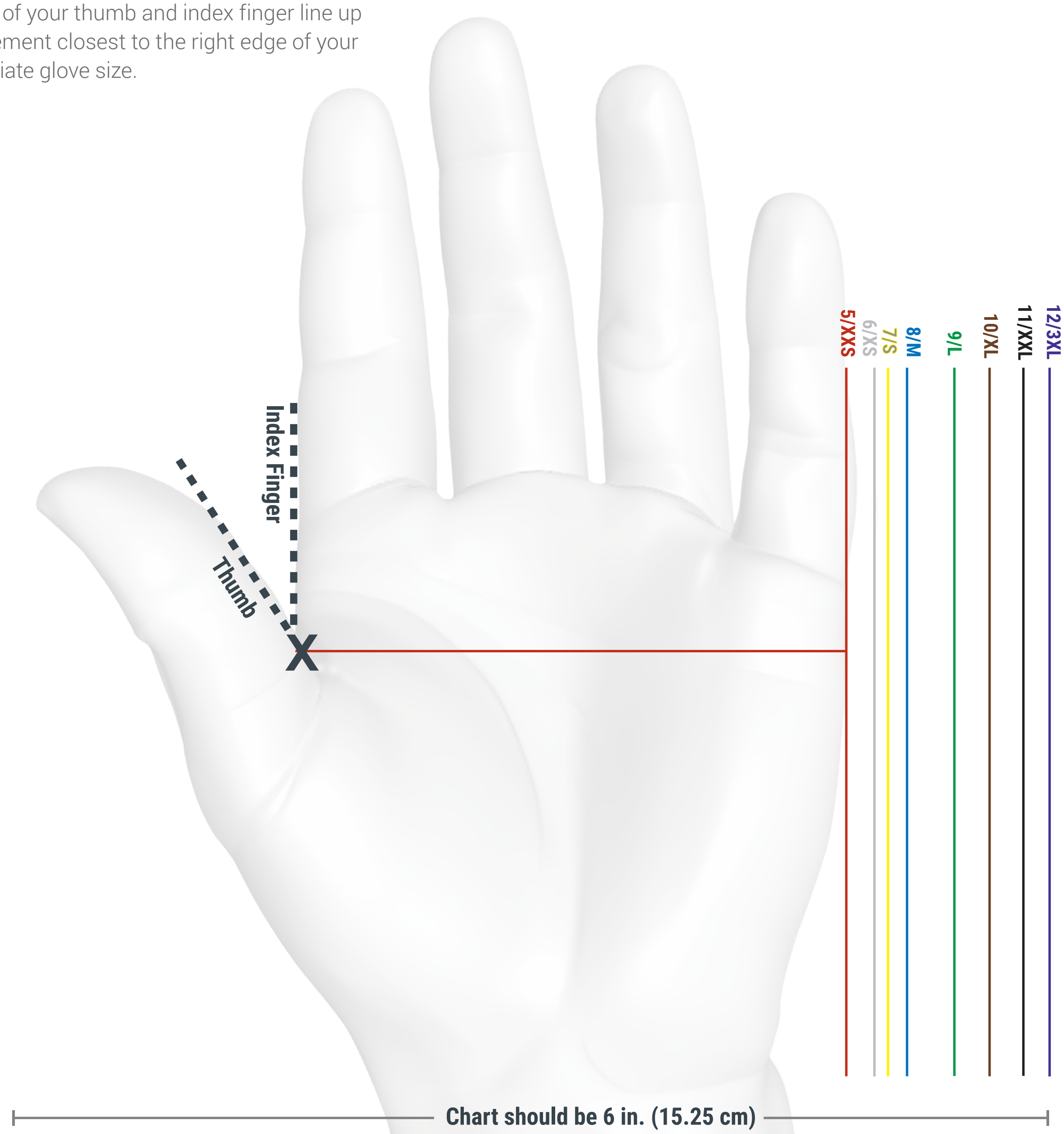
Palm width x hand height	HexArmor® size
3.18 in. (8.1 cm) x 8.85 in. (22.5 cm)	5/XXS
3.3 in. (8.5 cm) x 9.25 in. (23.5 cm)	6/XS
3.4 in. (8.7 cm) x 9.6 in. (24.5 cm)	7/S
3.5 in. (9 cm) x 10 in. (25.5 cm)	8/M
3.8 in. (9.7 cm) x 10.2 in. (26 cm)	9/L
4 in. (10.2 cm) x 10.4 in. (26.5 cm)	10/XL
4.2 in. (10.7 cm) x 10.8 in. (27.5 cm)	11/XXL
4.4 in. (11.1 cm) x 11.2 in. (28.5 cm)	12/3XL

Measure your hand (recommended)

Using a string or measuring tape, measure the circumference around the knuckles, excluding the thumb. Your hand should be open with the fingers together. Compare this measurement to the chart on the right to determine your glove size.

Or, print the chart below to help measure

Print the below glove chart at 100% size to assist with accurate measurement. Reducing or enlarging the printout will result in inaccurate measurements. Place your right hand on the glove chart so that the saddle of your thumb and index finger line up with the X. The measurement closest to the right edge of your hand will be the appropriate glove size.



Hand safety resources

Get started improving hand safety; it's up to you to make it work!

Hand safety starts at the top, with the highest levels of management actively promoting and modeling safe behavior. This sends a message that the company is serious about safety and helps establish a culture of safety throughout the ranks. A first step to take is to partner with a respectable glove manufacturer in developing your hand safety program. A good partner can help you analyze your operations, the hazards specific to your workplace, your past injury rates, and your PPE budget.

They can also help you:

- Assess risks. Are the risks in your operation purely cut-related? Or are there puncture risks too? If so, your distributor partner can help you assess your overall protection needs.
- Collect data. Get the data in the form of outside lab results for cut tests that help you focus on true comparisons among gloves tested with different standards (ASTM/ISO vs. EN).
- Test, test, test. Conducting safe and scientific tests with typical hazards is important. A hunting knife in the conference room does not qualify! A trusted distributor/manufacturer can help you set up a safe test for a true work hazard in the real world.
- Keep good records. If you don't already, begin collecting injury data with pictures and an assessment of what happened so you can track successes over time with your program. This will also help you evaluate new products in future testing.

Resources and links

Environmental Health & Safety Today Magazine:
http://ehstoday.com/

HexArmor:
http://www.hexarmor.com/

ISHN Magazine (Safety, Health, Industrial Hygiene Issues):
http://www.ishn.com

National Safety Council:
http://www.nsc.org/pages/home.aspx

Occupational Safety and Health Administration:
https://www.osha.gov/

HexArmor®
protecting people

Call **1-877-MY ARMOR** or visit **hexarmor.com**

HexArmor® products are cut and puncture resistant, NOT CUT AND PUNCTURE PROOF. Do not use with moving or serrated blades or tools. User shall be exclusively responsible to assess the suitability of the product as specified for any individual application or use. Protection zones are to be used as a general guide. Actual product protection zones may differ.

Protected by patents and patents pending.

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All products, product descriptions, and performance scored are current as of June 2020.
For current product information, please visit hexarmor.com, or call 1-877-MY ARMOR