Gloves that Fit the Worker and the Job

It's a powerful fact, reinforced by Bureau of Labor Statistics data: hand injuries trail only back problems in terms of frequency in the workplace. Further, OSHA records show that 70 percent of hand injuries were suffered by workers who were not wearing gloves, while the hand protection worn by the remaining 30 percent was inadequate.

Accordingly, the two main goals of workplace hand protection are ensuring that the cut resistance of work gloves matches the level of the cut hazards present, and then, even more importantly, assuring that workers do in fact wear the gloves on the job.

Standards of Resistance

To enable worthwhile comparisons of glove performance, safety and health organizations have established standards for hand wear cut resistance. The ANSI/ISEA standard generally used in the U.S. sets cut levels from 1 to 5, representing how resistant a certain material is to a cutting edge applied under specific loads. Higher levels provide more protection. For example, gloves with a cut resistance level of 5 might be used in high-risk applications such as food processing and plate glass handling; gloves with level 2 resistance may be appropriate for less hazardous work in construction and packaging. However, the practical application of the standards is not that simple. The true level of risk is influenced by variables in the work environment and the actual hazards involved, such as differences between slicing, abrasive, and impact cuts, or puncture resistance as opposed to linear cuts. Safety audits, internal safety directors, or industry personal protective equipment (PPE) experts can help determine the level of risk in a specific situation and determine which level of protection is most appropriate and cost effective. On-site testing and worker input is essential as well.

Those responsible for glove selection should be aware that the standard EN388, used in Europe, Asia, South America, Mexico and parts of Canada and the U.S. is not interchangeable with the ANSI system and can muddle the selection process. If differences in the standards appear to play a role in the choice of gloves, buyers should familiarize themselves with the properties the standards represent and determine how to apply them to their specific situations.

Material Performance

A glove's basic cut resistance depends on the material(s) from which it is made and the material thickness or weight per square inch. Heavier thickness and advanced materials improve cut protection, while lighter-weight gloves can offer more flexibility and be less tiring to wear, resulting in less hand fatigue. Additional features such as coatings can improve grip but may not be appropriate for applications such as food processing.

Regarding the relative performance of glove materials, a simplified ranking of cut resistance capability from least to most begins with leather, cotton and synthetics such as nylon and polyester, and progresses through high-performance materials to engineered composite yarns made with varying combinations of synthetic materials, fiberglass, and stainless steel.

Manufacturers offer a wide and growing selection of high-performance cut-resistant glove materials with differing performance characteristics. They include para-aramid synthetic polymer (plastic) fibers such as Kevlar, ultra-high molecular weight polyethylene (UHMW PE) material such as Dyneema, and advanced technology aramid (ATA) fibers. Kevlar is well known for its strength and use in body armor and sports equipment. Dyneema is a lightweight and extremely strong polyethylene fiber that is stronger than steel and resistant to chemicals, moisture and UV rays. Advanced technology aramid (ATA) yarn is a high-performance fiber with a softer feel, greater breathability and higher cut resistance compared to other materials.

To handle specific cut hazards, glove makers combine different glove material properties such as hardness, lubricity and the ability to roll away from sharp cutting edges. Blended yarns, such as those incorporating high-strength fibers and steel, allow manufacturers to produce gloves with higher levels of cut resistance than achievable with one kind of high-strength fiber alone.

The cut-resistant materials are utilized in various glove constructions, including metal mesh, cut and sewn, and seamless knitted gloves. Metal mesh gloves are made of rings of stainless steel and are typically used in more hazardous applications. Their interlocked construction is extremely abrasion, cut, corrosion and puncture resistant. Cut and sewn gloves can consist entirely of a high-performance cut-resistant material or be assembled from less costly materials with cut-resistant material comprising a full or palm lining.

Beyond cut resistance, the selection of gloves can depend on other issues such as the ability to clean them. The cut resistance of Kevlar, for example, is not affected by typical laundering or dry cleaning processes, while its performance can be affected by chlorine bleach.

If the Glove Fits...

Considering that 70 percent of hand injuries are sustained by gloveless workers, it's obvious that getting workers to wear protective gloves is a key issue. Gaining end user acceptance is at least equal to and in many cases may be more critical than cost issues. No matter how low a glove's cost, if the worker won't wear it the investment is 100 percent wasted. On the other hand, a slightly-higher-priced glove that the end user does wear multiplies the added investment when it prevents a single time-lost accident. In any case, even the best-performing glove is of little worth if the end user puts it aside because it is uncomfortable or if it makes his or her work more difficult. Unfortunately, it's not uncommon for a buyer to choose a certain style of cut-protection glove based largely on price, and then find that function, fit, or other considerations force a re-evaluation and another purchase of a style that is more expensive but works better. It is essential to acquire end user testing input on fit, comfort and flexibility as well as issues such as cuff style and even color. Comfort and ease of use as well as a sense of ownership can motivate workers to use the gloves faithfully.

As in many other circumstances, advanced technology provides great benefits in terms of increased performance while it simultaneously complicates the selection process. When decades ago the choice might have been limited to either rubber or leather, today the wide variety of glove materials, performance properties and styles enables the end user to essentially custom-tailor glove construction to maximize safety, comfort, and cost-effectiveness for a particular application. Careful research of the comprehensive offerings of gloves from suppliers such as MSC, understanding of cut-resistance standards, and full use of safety-related resources will enable end users to choose gloves that maximize the return on this important investment in worker safety.

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OSHA

Please consult your safety professional to determine the right glove for your particular application. Always ensure your selected glove complies with the mandated safety standard recommended for your particular application.