



CUT RESISTANT GLOVES



SAFETY, STANDARDS & STRATEGIES



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CUT RESISTANT GLOVES:

Safety, Standards and Strategies

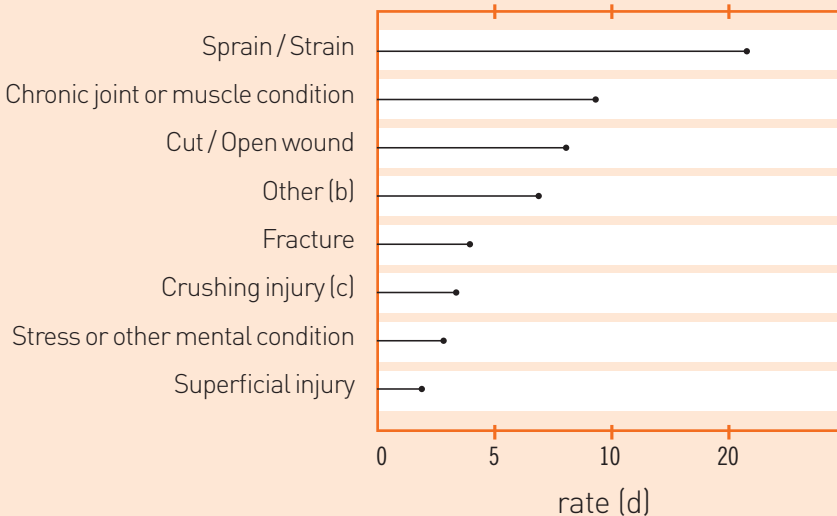
Cuts and open wounds are the leading cause of work-related hand and wrist injury requiring emergency department presentation in Australia and the third most common workplace injury overall.

A 2008 Safe Work Australia report found that about 55% of the 8400 workplace hand injuries that require hospital admission each year are from open wounds and that these injuries accounted for 35% of workers' compensation claims for work-related hand and wrist injuries. Sprains or strains were only prominent in workers' compensation cases, not hospitals (Safe Work Australia, 2008).

Further, a 2009/10 Australian Bureau of Statistics (ABS) Work-Related Injury report found that 16% of the 640,700 people who sustained a work-related injury had suffered either cuts or open wounds. Industrial and construction industries were the most common. 90.9% were males (Australian Bureau of Statistics, 2010).

Clearly the prevention or reduction of cuts and open wounds in the workplace is of significant importance and a critical consideration for an HSE officer or others considering PPE purchases.

Workplace Injuries 2009/10



(d) is the number of injuries /thousand workers

Source : ABS Australian Social Trends 2011

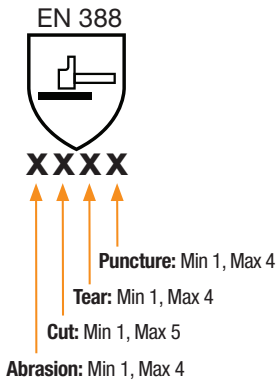
CUT RESISTANT STANDARDS

There are three main standards of cut resistance, European (EN 388:2003) which Australia has adopted in its entirety as AS/NZS 2161.3, American (ANSI/ISEA 105-2011) and International (ISO 13997). Further complicating matters is the use by both European and American systems of a 1-5 rating scale of resistance which is not interchangeable or comparable because they use different test methods. The ANSI scale ratings offers higher levels of resistance than the equivalent EN388 ratings, which is also prone to inaccuracies at levels four and five.

EN 388:2003 Coup Test

Testing under the European Standard EN 388 (adopted in Australia as AS/NZS2161.3) is conducted using a "coup test". A 40mm diameter circular blade rotates back and forth on the material being tested under a fixed load (5N) until a cut is made. Cut resistance is indexed against a cotton canvas control material and rated between 1 and 5, with 5 being the most resistant.

TEST	Level 1	Level 2	Level 3	Level 4	Level 5
6.2 Blade cut resistance (index)	1.2	2.5	5.0	10.0	20.0



This test and subsequent results enable a cut resistant certification from CEN (European Committee for Standardisation) to be applied with the relevant level number its "CE Score" which forms part of a "CE Mark" declaring that the product has been tested and conforms to applicable European legislation.



As Standards Australia has adopted the EN 388 coup test for cut resistance, the CE Mark and score/index rating can be found on many Australian products, however EN 388 compliance in Australia is not a requirement for cut resistant gloves - only a recommendation - and the use of the CE mark and standards adherence is self-regulated. Certification is not mandatory and testing often lacks independence or currency. Resultantly, importers and distributors can freely sell products with un-substantiated self-declarations of cut resistance.

Moreover the coup test is widely regarded as having limitations given it was developed when cut resistant materials were limited to cotton, leather and nylons. These limitations are most evident when testing products of high cut resistance that blunt the circular blade and provide inconsistent and inaccurate results.

In fact, the EN 388 standard allows for the use of the ISO 13997 test method on materials with a CE cut index of 4 or 5 – a method that is similar to the test used by ANSI/ISEA (below). However ISO 13997 is optional (and more expensive) and EN 388 certification can be obtained without it.

The result is a Level 5 rating that may not actually be accurate, meaning users and HSE officers will have trouble determining the best cut resistant products for their requirements.

ANSI/ISEA 105:2011



The American National Standards Institute for Hand Protection Selection Criteria uses testing method ASTM 1790 from the American Society for Testing and Materials - an international body.

This test method sees a range of predetermined loads applied to a straight edge razorblade which moves in 20mm or 25mm movements (20mm was introduced in 2004 for testing machine compatibility) in one direction across the fabric being tested. The weight applied to the razorblade is gradually increased to set weights until a cut is made.

Like EN 388, the results lead to a cut resistance rating of 1 to 5 (there is a 0 rating also) with a rating of 5 again being the most resistant. However a rating of 5 on the ANSI scale offers significantly more cut resistance than a rating of 5 on EN 388 and is also more accurate, unless the ISO 13997 (Determination of resistance to cutting by sharp objects) test method was used as part of the EN 388 coup test, which is usually impossible for the end user to determine.

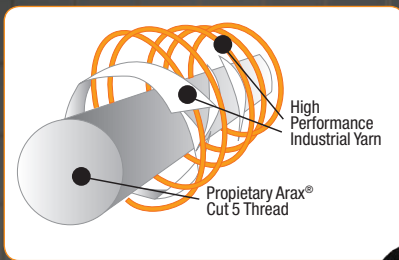
Level	Weight (grams) needed to cut through material
	(25 mm of blade travel - ASTM F1790-97) (20 mm of blade travel - ASTM F1790-05)
0	< 200
1	≥ 200
2	≥ 500
3	≥ 1000
4	≥ 1500
5	≥ 3500

Best of Both Worlds

Even though the EN 388 coup test has been adopted by Standards Australia as the benchmark for cut resistance in this country, some PPE brands will also use the ANSI ASTM 1790 test method to enable them to rate their product under both systems and deliver cut resistance that has been tested by the more respected ASTM 1790 method and thus providing HSE officers and workplaces better access to glove's fit for a specific use.

Generally, because those brands are going the extra mile in ensuring their products are fit for purpose they will also regularly batch test their gloves to ensure ongoing adherence to EN 388 ratings.

What contributes to cut resistance?



Cut resistance in gloves is influenced primarily by the material composition; however its weave and thickness as well as any coatings applied also contribute.

Fibres such as Dyneema®, Kevlar®, glass and steel fibres all contribute to cut resistance and can be used as a single thread or a mix of fibres. The addition of coatings such as rubber dips and leather also increases cut resistance.

For example the ProChoice Arax® Platinum glove is a steel fibre yarn blended with Arax® proprietary thread that is tightly woven and finished with a nitrile sand dip for extra grip.

The result is exceptional cut performance meeting ANSI ASTM Rating 5 along with EN 388 Rating 5 while retaining impressive dexterity and grip.



CUT PROTECTION STRATEGIES:

Understanding the ratings showing the type and level of cut resistance offered by a glove is only one component of reducing workplace injuries. Matching that glove to an application is equally important as no glove can provide the best of everything.

If a worker is wearing an incorrect glove type for an application it may actually serve to increase the dangers due to a lack of control, or a lack of comfort leading them to not wear gloves at all.

Hierarchy of Control

- 1 Eliminate the hazard** altogether, e.g. get rid of the dangerous machine.
- 2 Substitute the hazard** with a safer alternative, e.g. replace the machine with a safer version.
- 3 Isolate the hazard** from anyone who could be harmed, e.g. keep the machine in a closed room and operate it remotely.
- 4 Use engineering controls** to reduce the risk, e.g. attach guards to the machine to protect users.
- 5 Use administrative controls** to reduce the risk, e.g. train workers how to use the machine safely.
- 6 Use PPE**, e.g. wear gloves and goggles when using the machine

More Effective



Less Effective

Source: Workcover NSW

However it is important to note that PPE and administrative controls are lowest on the “hierarchy of control” measures. PPE does not control the hazard at the source and should not be relied on as the main control measure unless it is a temporary or interim measure or when options higher on the list of controls have been exhausted.

CUT PROTECTION STRATEGIES:

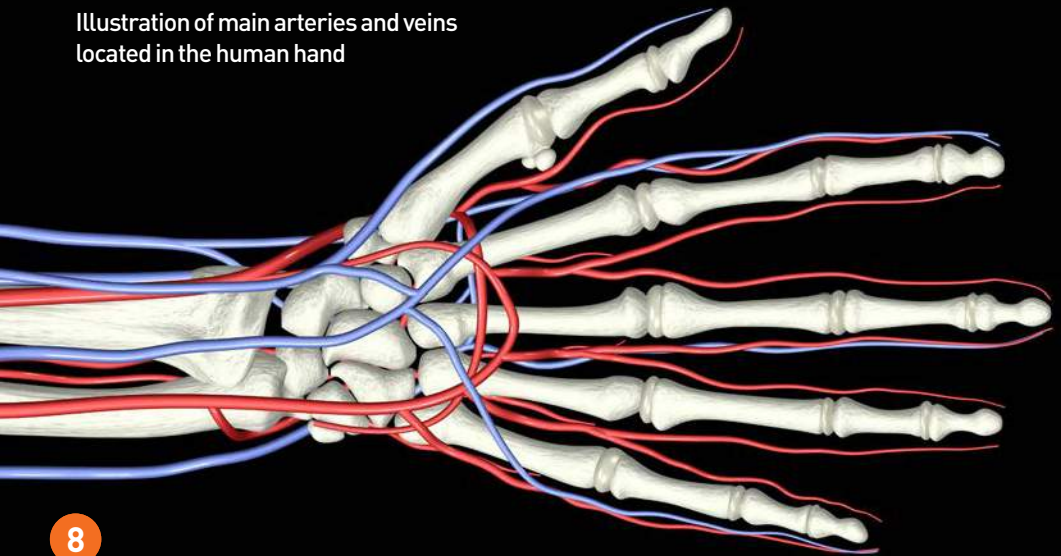
When determining the cut resistance required from a glove, the level and type of cut risk and the nature of the working environment are key considerations. Factors such as the force, direction and sharpness of the blade along with the length of the cut and the flexibility required should be assessed.

Other recommended measures to prevent workplace hand injuries should include using high quality tools and machinery with guarding and braking as well as ensuring staff are properly trained in the correct procedures and use of equipment and suitable PPE.

A lot of hand injuries occur because these have not been correctly assessed and could have been avoided with the appropriate training, procedures and PPE.



Illustration of main arteries and veins located in the human hand



GLOVE CHOICE

Choosing the right glove for an application means understanding exactly what features and benefits different gloves have. Some gloves will focus on the highest level of cut resistance while others will focus on dexterity, feeling or grip in certain conditions – the correct combination of which is required for adequate control and to safely perform specific tasks.

While high levels of cut resistance have traditionally come at the expense of sensitivity and dexterity, recent advances in technology have enabled glove development to retain feeling without compromising cut resistance. These advances can be found in ProChoice Safety Gear's Arax® Range of gloves marked as containing Bare Hand Technology (BHT).

Given the limitations of the EN 388 coup test on high cut resistant fabrics many ProChoice products are rated above and beyond the maximum EN 388 Rating 5.

This has led them to also voluntarily and independently test their Arax® range to the more realistic and relevant American ANSI/ISEA standard with the ASTM 1790 testing method – with their Arax® Platinum glove achieving a Rating 5 on both tests. On such products both the EN 388 rating and the ANSI rating is shown – something currently unique in the Australian market.

The superior cut resistance in the Arax® range is a result of the proprietary Arax® fabric and the weave that fuses a high performance industrial yarn with the Arax® thread on a 13 gauge machine for a tighter knit and so greater cut resistance.

Each glove in the range has been developed for the specific environments workers face when working with sharp objects and mechanical hazards.

Features include a variety of coating options for enhanced grip in wet or dry conditions, snag resistance, or sensitivity, all while performing exceptionally well in EN 388 and ANSI/ISEA performance rating standards.



Selection of PPE

To ensure PPE provides the level of protection it is designed to it should:

- be appropriate for the type of work and provide appropriate protection for the risk
- not create additional health or safety risks
- be compatible with other PPE being used (e.g. ear muffs with a hard hat)
- fit properly
- not interfere with any medical conditions of the user
- be easy to use
- be comfortable
- comply with relevant Australian Standards





Manufacturer /Distributor Assistance

Some manufacturers and distributors of PPE and cut protective gloves will offer advice and assistance to health and safety officers looking for further information and guidance.

ProChoice Safety Gear representatives regularly meet with HSE staff to assist in the correct product choice based on the employer's risk assessments.

They also regularly attend worksites and deliver "toolbox talks" and education to assist workers understand the risks associated with their work and in the navigation of the often complex nature of PPE.

COMPLIANCE IN AUSTRALIA

Unlike hearing and respiratory PPE, to date there has been no requirement for cut protective products sold in Australia to comply with Australian Standards AS/NZS2161.3 through independent certification, with the law leaving the industry largely to self-regulation.



Other protective products sold in Australia such as earmuffs and eyewear must be tested by an independent NATA-accredited testing body. Then the products and manufacturing processes are independently audited by companies such as SAI Global with certified compliance is displayed on packaging with the “Five Ticks” logo giving the consumer the assurance this product will give the advertised level of protection.

The independent NATA-accredited testing is not a requirement of cut resistant gloves however ProChoice Safety Gear still invests in the independent testing of many of their gloves.

While the EN 388 coup test must be conducted prior to using the CE mark and its associated cut resistant ratings there are no controls in Australia as to the independence or recency of that testing, meaning industrial hand resistance in Australia is essentially left to self-regulation.

Resultantly, protective gloves can be imported that have been self-tested by manufacturers or distributors and not by an EU approved independent NATA certified testing laboratory.

While some distributors and manufacturers such as ProChoice Safety Gear do have many of their gloves independently tested by a NATA certified testing laboratory, there are manufacturers and distributors that do not. The lack of controls in Australia over the correct use of the CE mark or ratings combined with an absence of product compliance inspections means there might be gloves or other PPE on the market that do not meet the standards that are stated on the packaging and so are of inferior quality.

This white paper was produced by ProChoice Safety Gear, an Australian safety products manufacturer. ProChoice boast an unblemished safety record when it comes to providing personal protective products and site safety equipment spanning Head, Hearing, Eye, Respiratory and Hand Protection as well as Protective Apparel, Sunscreen, Site Safety, and Safety Signs and Labels.



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ProChoice Safety Gear

For more information about Cut resistant gloves Contact your nearest branch to find your local ProChoice stockist.

The extensive ProChoice range of high quality Personal Protective Equipment is produced for Australian conditions and is available from leading safety stockists.

ProChoice Safety Gear is distributed throughout Australia by Paramount Safety Products.

To see our full range, please visit our website prosafetygear.com

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