

Showa Best Glove

April 2011



## the best anti-cut Weapon Comfort included

Good cut protection is no unnecessary luxury. That is why we test our gloves further to the European EN388 test method, the American ASTM F1790-05 test method and the international ISO 13997-1999 test method. This way we can better recommend the right cut protection against your risk assessments.

Eurostat reported that 7 million workers (3,2%) in Europe experienced a work accident in 2009. Many national statistics like RIDDOR, HSE, DGUV and FAO/FAT show that in 1 out of 3 accidents the hand, fingers or wrist get injured. Moreover, further to TNO 10,4% and further to Assurances Maladie 15,3% of all work accidents are cuts.

Showa Best Glove product manager Mike Carducci points out that the hand injury problem goes far beyond accidents that make it to the official statistics. "In the US for instance it is generally agreed that 29 minor accidents and 300 near misses occur for every major accident reported," he said. "The right cut-resistant hand protection does make a difference. That is why so many work applications specify cut-resistant gloves rather than general purpose gloves." Showa Best Glove currently has a wide range of cut-resistant hand protection models. At the same time, Showa Best Glove's research team, the world's largest hand protection R&D team, continues to innovate with new glove models combining cut-resistant fibers and surface features such as sponge nitrile for oily slippery applications. Showa Best Glove has just expanded its already comprehensive line with new models to meet specific task needs in the near future. A look at today's choices Showa Best Glove cut-resistant glove options protect and provide comfort while wearing and laundering well. Choices include a number of DuPont Kevlar glove models with a variety of coatings for special purposes as well as gloves with stainless steel fibers and gloves woven from the High Performance Polyethelene (HPPE). Each glove model serves specific purposes. Ideal for critical environments where cut/laceration hazards are present, electronics, circuit boards, semiconductor, small parts assembly the high performance Showa 540, 541 and 545 are HPPE gloves. By combining HPPE fibers with Showa Best's innovative liner technology the wearer experiences maximum comfort and dexterity while being protected from cuts. Both the white 540 glove and the black 541 glove have a polyurethane coated palm, while the seamless grey 545 model has a blue nitrile coated palm. Specific glove models from the company's D-Flex (with stainless steel fibers) and T-Flex glove lines provide comfort plus cut resistance for applications such as food processing, cutting, glass handling, sheet metal handling, meat and poultry industry, commercial fishing, and restaurants. Models go from the ultra-lightweight, 15-gauge T-Flex 8115 to the heavier and more protecting 10-gauge D-Flex.

### For more information

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## "CUT COSTS"

Every company can insure itself against work accidents but every accident will increase the insurance premium. Apart from the insurance cost, every accident will result into uninsured costs to be paid by the company like lost time, sick pay, repairs, loss of contracts, loss of business reputation and other negative effects. These uninsured costs might rise to 36 times the insurance premium. (Source: EU-OSHA)

## DIFFERENT LINERS IN CUT TESTS

Cutting costs is only possible when the workplaces invest in suitable hand protection. In order to help in making an informed decision, Showa Best Glove organised in-house cut tests on a selection of gloves having different types of yarns in the base liner.

Thanks to our tests, you will learn more about the cut protection of different liners. These in-house tests have been executed further to the European EN388 cut test method, the American ASTM F1790-05 test method and the international ISO13997-1999. Eliminate doubt, become an anti-cut expert too! Visit [www.showabestglove.eu](http://www.showabestglove.eu).

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# Press release

## ARAMID

Aramid is lightweight, supple, comfortable and washable. It provides effective protection from cuts (above level 5, with stainless steel reinforcing) and from convective heat and offers durability and performance that far exceed that of leather and cotton. Gloves made from aramid only, mostly achieve cut levels in EN388:2003 of 3. Kevlar is the aramid fiber developed and commercialized by DuPont.

## HPPE

High performance polyethylene is flexible, tactile, light and durable. It is almost as resistant to cuts as a para-aramid but with more resistance to abrasion, it remains resistant to chemicals, in particular solvents. Gloves made from HPPE only, mostly achieve cut levels in EN388:2003 of 2/3 unless blended with other yarns such as steel or glass. Dyneema is the HPPE fiber developed and commercialized by DSM.

## STAINLESS STEEL vs GLASS FIBER

Stainless steel and Fiber glass can be combined with another fiber in order to significantly improve the cut resistance. When adding these reinforcements to another fiber, EN 388:2003 cut levels of 4/5 become possible.

Stainless steel adds significant cut resistance to gloves however the testing procedures (both EN388:2003, ISO 13997-1999 and ASTM F1790) have difficulties showing the true protection level as the tests are both based on the cutting blade contacting a metal surface to stop the test. The steel yarn gives the machine a "false" read and ends the test.

The glass fiber provides a different result. The surface becomes so slippery that the blade "slides" over the yarn and dulls the microscopic edge. It is recommended looking at both test scores when evaluating high cut level gloves (EN cut level 4 & 5).

*Kevlar aramid reinforced with Stainless steel: 250 – AEGIS KV54*



*HPPE for maximum tactility: 542*



*Stainless steel & polyester (Hagane Coil): S-TEX GP-1 / S-TEX GP-2*



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## NEVER IMITATE

At Showa Best, innovation has always been a tradition. GP-KV1 (aramid grip glove) and 540 (HPPE with maximum tactility) were the original cut protection gloves.

Ever since, Showa Best focused its efforts even more at developing gloves with high cut protection and comfort. The result today is a complete range of anti-cut gloves, with improved grip, tactility and chemical protection, appropriate to almost every application and industry.

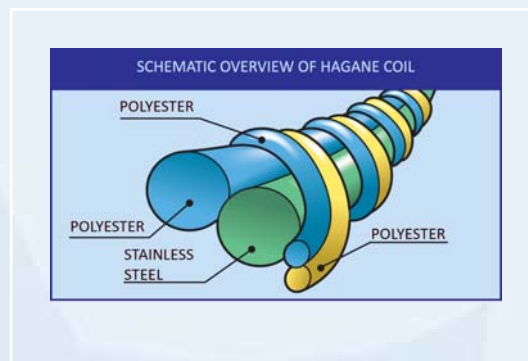
Did you know that HAGANE Steel is also used for making the Samurai sword?

## HAGANE COIL

HAGANE Coil has been developed by Showa and is applied to all S-TEX gloves: S-TEX KV3, S-TEX GP-1 and S-TEX GP-2. HAGANE Coil is a technology that combines HAGANE Stainless steel with another fiber in order to provide the very high cut protection. In addition, HAGANE coil shell adheres to the latex and nitrile coating well and HAGANE coil is not affected by UV light.

S-TEX KV3 combines Stainless steel with Kevlar aramid resulting into a very high cut level 5 into EN388:2003. S-TEX GP-1 and S-TEX GP-2 combine Stainless steel with polyester resulting into an EN388:2003 cut level 4 and greater comfort. See schematic overview of the HAGANE Coil for S-TEX GP-1 and S-TEX GP-2.

HAGANE steel is used for making the Japanese SAMURAI sword. HAGANE Coil is the patented way Showa combines this Hagane steel with another yarn.



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## OVERVIEW OF ANTI-CUT WEAPONS BY SHOWA BEST GLOVE

At Showa Best Glove, we developed a wide range of cut protection combining the aforementioned cut resistant materials like aramid, HPPE, Stainless steel and Fiber glass.

Product	Brand	Liner material	Cut index	Cut application	Feature
S-TEX KV3	Showa	HAGANE Coil (Stainless steel & Kevlar)	5	Metal sheet Glass Knives	Highest cut level Wet & dry grip
S-TEX GP-1	Showa	HAGANE Coil (Stainless steel & Polyester)	4	Metal sheet Glass Metal wire	High visibility Wet & dry grip
S-TEX GP-2	Showa	HAGANE Coil (Stainless steel & Polyester)	4	Metal sheet Glass Metal wire	High visibility Wet & oil grip
KV660	Showa	Kevlar aramid	3	Metal sheet Chemical hazards Oils	High chemical protection
250	Best	Kevlar aramid & Stainless steel	4	Metal sheet Glass Oils	Wet & oil Grip Comfort
4560	Best	Kevlar aramid	3	Metal sheet Glass Oils	Wet & oil Grip Breathability
4565	Best	Kevlar aramid	3	Metal sheet Glass Oils	Wet & oil Grip Knuckle protection
542	Showa	HPPE	3	Metal sheet Glass Electronics	Durability Tactility
541	Showa	HPPE	3	Metal sheet Glass Electronics	Tactility
8110	Best	HPPE	5	Glass Knives Food	Highest cut level Breathability

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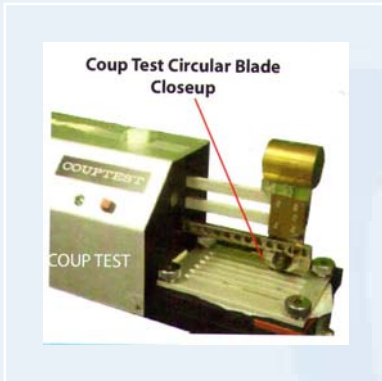


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# Press release

## EUROPEAN CUT TEST EXPLAINED

EN388:2003 uses the Coup test machine.



A circular blade rotates as it is dragged back and forth by the test machine across the sample of the glove under a constant 500 gram weight at a constant speed. The test is stopped when the rotating blade cuts through the glove material. The number of cycles (# back and forth) required to cut the material is noted. Then a control fabric (cotton fabric) is tested in order to establish a reference. The number of cycles (# back and forth) is again noted. This test is repeated as follows: cotton - sample - cotton - sample - cotton - sample - cotton - sample - cotton.

After these repeated tests, the cut index can be calculated. This is the ratio of the number of cycles required to cause cutting of the test material to the number of cycles required to cut the known standard material (cotton canvas). This Cut Index can be found on the marking of the glove itself. The second number under the pictogram for mechanical protection indicates the cut protection level between 0 and 5. The higher the Cut Index, the higher the cut protection level.

### EN388:2003 Cut Index

Cut index	Ratio	Examples of liners (further to in-house tests and excluding the effect of coating and thickness)
0	0	Unsupported gloves
1	1,2	Nylon Cotton Leather
2	2,5	HPPE
3	5	HPPE 13-gauge Aramid
4 (ISO 13997)	10	10-gauge Aramid Aramid reinforced with Stainless steel Stainless steel with polyester
5 (ISO 13997)	20	Aramid reinforced with Stainless steel HPPE reinforced with Glass fiber Stainless steel



The disadvantage of this Coup Test is the dulling of the microscopic edge of the blade when testing highly cut protective gloves. Round robin tests indicate many differences between different test labs. The Coup Test tends to give more favourable results with ceramic than steel based engineered yarns. Steel-based engineered yarns will stop the machine due to metal to metal contact and do not necessarily cut through the material while glass fiber makes the material slippery. That is why manufacturers are recommended to also indicate the results of the TDM test further to ISO 13997-1999 for gloves with a Cut Index 4 or 5.

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## AMERICAN CUT TEST EXPLAINED

ASTM F1790-05 uses the TDM 100 cut test machine.



The 2005 version ASTM F-1790-05 test method uses the Tomodynamometer (TDM) test machine to measure the distance traversed by a sharp blade over a test material before it penetrates. The 100 mm straight-edged blade is used only once and it is calibrated before every test. After adding weight to the blade, it is dragged back and forth by the test machine across the sample of the glove at a constant speed. The moment it cuts through the glove sample, it makes contact with the copper strip under the glove sample. This metal-to-metal contact stops the machine. The machine measures the distance the blade traveled to produce a 20mm cut in the material. Then the machine measures the load in grams that a material can withstand a 20 mm cut.

Five test cycles are completed with 3 different loads (weights) and the distance/weight data are entered into an exponential regression program. This program determines the weight (in grams) that would be required to cause a cut of a distance of 20 mm. The higher the gram weight the higher the cut protection level.

The 1997 version of this test method is called the ASTM F1790-97 and used the Cut Protection Performance tester (CPPT). Other key differences: the glove sample is adhered to the machine using a mounting tape, the reference distance of the cut is 25 mm and the calibration is lower (500 g in 2005 method). The 1997 results cannot be compared with the results before 2005. Many companies still use the ASTM 1790-97 and the CPPT machine. Beware that results can vary based on the microscopic sharpness of the new blade.

ANSI/ISEA 105 is the standard that assigns levels according to the gram weights from the ASTM Testing. The ANSI Cut Level is the most common reference for cut protection levels in the USA. Important: it only applies to ASTM F1797-97 and not to ASTM F1790-05. The 2005 standard is not recognized by ANSI/ISEA as it gives lower results than the 1997 method.

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## INTERNATIONAL CUT TEST EXPLAINED



ISO 13997-1999 only uses the TDM 100 cut test machine.

This method is very similar to the ASTM F1790-05 test method with slight changes to the range of lengths achieved from the 3 different weights. The ISO method requires a validation of the calculated weight to be within specification limits. Results are quoted in newton (N).

The use of the ISO 13997-1999 test method is already mandatory in Europe for gloves with a high cut protection of level 4 or 5.

The ASTM F1790-05 uses the same machine and many same test features.

## RECOMMENDATIONS BY SHOWA BEST GLOVE



All cut test methods can show important differences in results, related to variability in test machines, in glove samples, placement and stress exerted on the samples, the microscopic sharpness of the edge of the blade, etc. That is why you should never just compare the EN388:2003 cut Indexes without organizing a test run before ordering.

Gloves can contaminate the handled products, or worse, they can put the life of workers at danger. It is our duty to inform about possible contaminations, allergies, storage conditions, washing instructions, chemical protection, grip features, etc.

An important note: It is also recommended not to use high cut resistant engineered fiber gloves when exposed to moving and serrated blades. The tensile strength of these fibers is very high and can pull the worker's hands into the machinery!

Showa Best Glove developed a dedicated pack of information. Brochures and the website [www.showabestglove.eu](http://www.showabestglove.eu) will instruct the Health and safety Manager how to make a more informed decision about hand protection against cut hazards.

There is a lot of information available about the cut protection of gloves. You can rely on the technical knowledge of glove manufacturers. They are at your disposal to give you advice when for instance to use a specific glove in a very specific application. For Showa Best Glove products you can always contact [info@showabestglove.eu](mailto:info@showabestglove.eu).

**Be sure that all gloves made by Showa Best Glove are the highest in comfort and dexterity!**

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## About Showa Best Glove

*The Japanese group Showa is a world leader in the professional protective glove market.*

*As the inventor of the seamless PVC glove and the grip style glove, Showa's industrial approach and development strategy revolve around innovation and operational excellence. This pursuit of innovation takes the form of ongoing research into new fibres and materials offering unrivalled comfort and improved safety.*

*Established over 50 years in this market, Showa Best Glove has a strong presence in all continents. Its research centres in Japan, Malaysia and USA are recognized as among the most advanced in the world.*

*It exercises full and unique control, from design, manufacturing through to marketing, giving it an expertise that is particularly recognized by its customers. Through their contribution to increased productivity, Showa Best gloves represent a profitable investment while making a significant contribution to improving working conditions.*

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