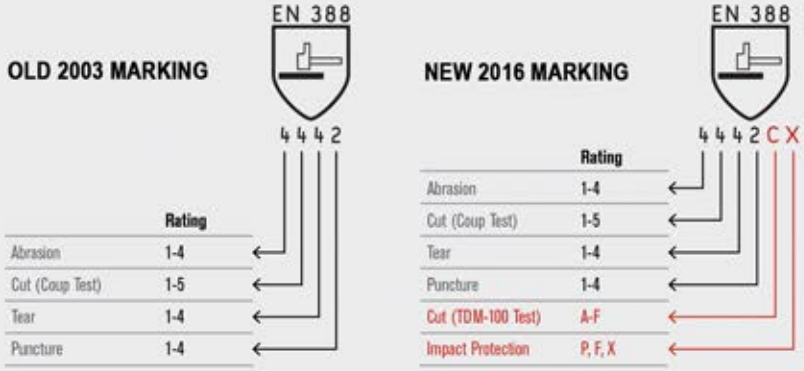
NEW CUT STANDARD

PROTECTIVE GLOVES AGAINST MECHANICAL RISKS

EN 388 2016 Standard

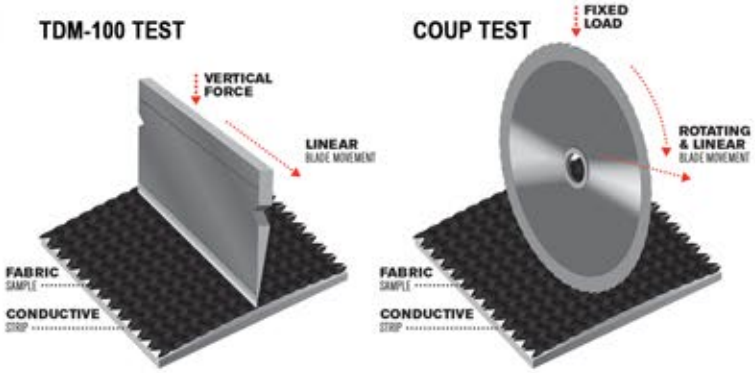
The EN 388 marking can be found on cut resistant gloves, similar to ANSI/ISEA 105, it is the European standard used to evaluate mechanical risks for hand protection. Gloves with a EN 388 rating are third party tested and rated for abrasion, cut, tear and puncture resistance. Cut resistance is rated 1 - 5 (2003) and A - F (2016), while all other physical performance factors are rated 1 - 4 (the higher the number, the better the performance).

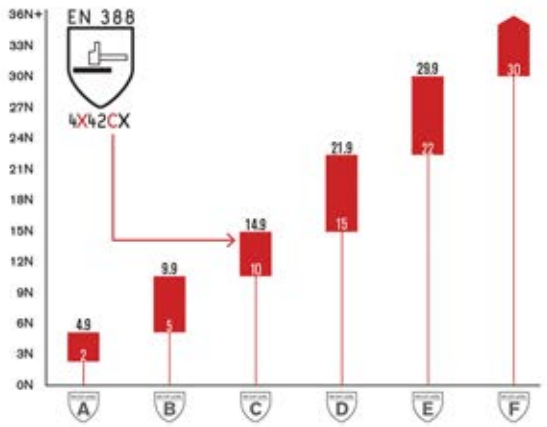


Two Testing Methods for Cut Protection

The most significant change to the EN 388 2016 standard was the formal inclusion of the ISO 13997 cut test method. Also known as the TDM-100 Test, it is similar to the ASTM F2992-15 test method used in the ANSI 105 standard. Both standards now make use of the TDM machine with the sliding blade and weights.

TDM-100 Tests for higher cut resistant fibres. It was found that the blade used in the Coup Test would dull quickly when testing yarns with high levels of glass and steel fibers. This resulted in unreliable cut scores, so the need for including the TDM-100 Test to the new EN 388 2016 standard was globally supported.





Understanding the ISO 13997 Test Method (TDM-100 Test)

To differentiate between the two cut scores generated under the new EN 388 2016 standard, the cut score achieved using the ISO 13997 test method will have a letter added to the end of the first four digits. The letter assigned will depend on the result of the test, which will be given in Newtons.

The table to the left outlines the new alpha scale used to calculate the results from the ISO 13997 test method. When a glove material is tested to ISO 13997, there is no need to conduct the Coup Test, so an X is placed in the second numeral space.

EN 388 RATING	RANGE (NEWTONS)	CONVERTED RANGE (GRAMS)	ANSI/ISEA 105 LEVEL	RANGE (GRAMS)
A	2 - 4.9	204 - 508	A1	200 - 499
B	5 - 9.9	509 - 1,019	A2	500 - 999
C	10 - 14.9	1,020 - 1,529	A3	1,000 - 1,499
D	15 - 21.9	1,530 - 2,242	A4	1,500 - 2,199
E	22 - 29.9	2,243 - 3,058	A5	2,200 - 2,999
F	30+	3,059+	A6	3,000 - 3,999
---	---	---	A7	4,000 - 4,999
---	---	---	A8	5,000 - 5,999
---	---	---	A9	6,000+

EN 388 vs ANSI/ISEA 108

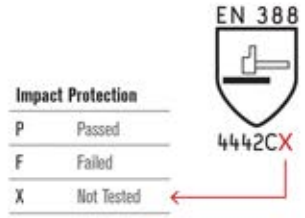
PIP has been testing all of its cut resistant gloves with the TDM-100 machine since 2005. The EN 388 2016 tests cut resistance to 30+ Newtons or Level F. This converts to a rating of A6 under the ANSI/ISEA 105 standard. This standard tests higher cut resistance right up to A9 which is 2 times higher at 6000+ Grams.

The table to the left illustrates how the new EN 388 2016 standard is now in-line with the ANSI/ISEA 105 standard for cut resistance when converting Newtons to grams.

Please Note: Direct comparisons for Cut Performance can not be made between the old EN 388 2003 standard and the new EN 388 2016 standard.

NEW IMPACT STANDARD

PROTECTIVE GLOVES AGAINST MECHANICAL RISKS



New Impact Protection Test

The updated EN 388 2016 standard also includes an impact protection test. This test is intended for gloves designed for protection against impact. Gloves that do not offer impact protection will not be subjected to this test. For that reason, there are three potential ratings that will be given, based on this test.

EN 388 vs ANSI/ISEA 138

Previously, the EN 388 Standard was the only measurement of impact protection recorded to date that could be referenced. The European standard impact test is based on the EN13594 2015 Standard for Protective gloves for motorcycle riders. The test method is similar, but only test the knuckle impact (excluding the fingers). The EN 388 Standard classifies impact protection with a letter representation: **P** represents Pass, **F** represents Fail and **X** represents Not Tested. If the average transmitted force is less than or equal to 7kN, then the gloves will receive a Level 1 P, Pass rating. If the average transmitted force is higher than 9kN, then the gloves will receive a Level 0 F, Fail rating.

The new **ANSI/ISEA 138-2019 standard** breaks down this letter representation into a numerical range of mean transmitted forces. This allows different impact resistant applications to precisely match up to the correct numerical value, or protection level needed for the job. This new ANSI/ISEA 138 standard measures higher protection values than the EN388 2016 testing.

Understanding ANSI/ISEA 138-2019 Testing

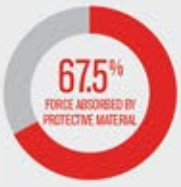
ANSI/ISEA 138-2019 outlines three levels of impact protection. Each level is determined on how effectively each glove can disperse impactful force applied during testing. The way this impactful force is created is by dropping a 2.5-kilogram mass onto each glove with an impact energy of 5 joules. This process is repeated ten times on the fingers and eight times on the knuckles. The glove's impact level will then be determined based on the Mean Transmitted Force (MTF) recorded.

It is important to note that the MTF of the finger region is treated separately from that of the knuckle region, so the lower mean transmitted force of the two regions will be used to classify the glove as a whole.

ANSI/ISEA 138 1

LOW
PERFORMANCE LEVEL

≤ 9.0 (kN)
MTF



ANSI/ISEA 138 2

MEDIUM
PERFORMANCE LEVEL

≤ 6.5 (kN)
MTF

ANSI/ISEA 138 3

HIGH
PERFORMANCE LEVEL

≤ 4.0 (kN)
MTF

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