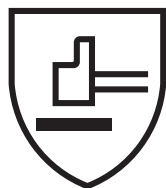
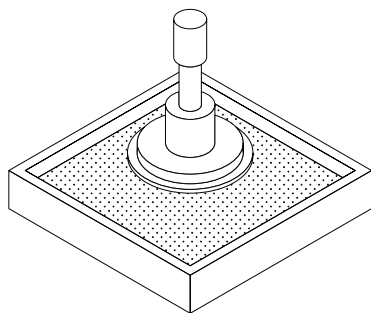


# What is the difference between EN 388 and ANSI/ISEA?



EN 388:2016  
3 X 4 2 DP

- ABRASION RESISTANCE (0-4)
- COUP TEST/CUT RESISTANCE (0-5 OR X)
- TEAR RESISTANCE (0-4)
- PUNCTURE RESISTANCE (0-4)
- ISO CUT TEST/CUT RESISTANCE (A-F OR X)
- IMPACT PROTECTION (MARKING IF PASSED REQUIREMENTS)



Material from the palm of the glove is put into a machine with standardized abrasive paper that rubs the material until a hole appears. There is a large difference between the levels where 1 stands for 100 rubs and 4 for 8000 rubs.

## ABRASION RESISTANCE

The American standard ANSI/ISEA 105-2016 abrasion testing method measures the number of cycles required for an abrasion wheel to break down the glove material. Levels 0 to 3 are measured with a 500-gram load on the abrasion wheel while levels 4 to 6 are measured with a 1,000-gram load. The glove material is then mounted and abraded by the spinning wheel until the material is worn through, creating a hole, under the corresponding weight. The greater the number of cycles it takes to break the material down, the higher the abrasion rating. The average of a minimum of 5 specimens shall be used to report the classification level. The results are shown in the ANSI abrasion standard rating chart below:

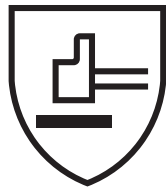
ABRASION LEVEL RATING	0	1	2	3	4	5	6
Gram load	500	500	500	500	1000	1000	1000
Abrasion cycles to fail	<100	≥100	≥500	≥1000	≥3000	≥10000	≥20000



In the EN388 abrasion resistance test, circular specimens of material are abraded under the constant pressure of  $(9,0 \pm 0,2)$  kPa approximately 435 g weight load. The resistance to abrasion is measured by the number of rubs required for breakthrough to occur. Four test specimens shall be taken from four individual gloves of the same glove series. The performance level is defined as the lowest of the 4 values.

The results are shown in the EN388 abrasion standard rating chart below:

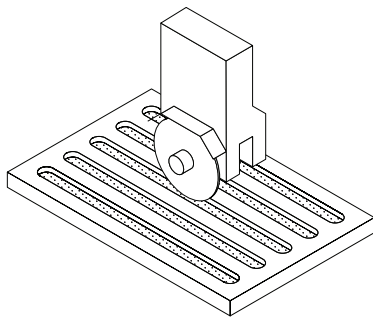
ABRASION LEVEL RATING	1	2	3	4
Abrasion cycles to fail	100	500	2000	8000



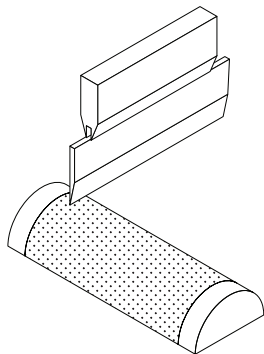
EN 388:2016

3 X 4 2 DP

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The resistance to circular blade cuts based on the cope test. A circular blade rotates on the glove material while moving back and forth with a constant speed and pressure until the blade cuts through. The result is compared with the reference material an index is calculated.



The straight blade cut resistance as determined by the TDM-100 Test according to the EN ISO 13997 cut method. This straight blade test is used when the circular blade cube test is not applicable. The straight blade test measures the applied vertical force and distance that is needed to cut through the glove with the standardized blade. After each cut on the sample a new blade is used and the force increases the level of performance is rated from A to F. With F being the highest level of cut resistance.

## CUT RESISTANCE

When assessing cut resistance in gloves it can be good to understand both European and American cut resistance classification systems as many gloves will show both markings.

In US, the ANSI/ISEA 105 standard include a cut resistance test with a scale with 9 levels of cut protection, A1-A9. The levels indicate how many grams required to cut through a sample using a rectangular blade in the specified cut test machine.

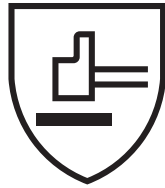


The EU standard includes two different cut resistance tests: the TDM-100 Test, (the same machine that ANSI uses), where the levels (A-F) indicate the force in newtons (N) required to cut through a sample using a rectangular blade in the specified cut test machine. This test is optional unless the blade in Coup test becomes dull, whereupon it becomes the reference for cut resistance. The coup test is more complicated. A glove is assigned a cut level of 0 to 5 (with 5 being the most cut resistant) based on the material's "cut index." The cut index is a ratio that compares the material's cut resistance to the cut resistance of a reference cotton fabric.

Important to remember, due to different testing methods, ANSI and EN 388 cut results don't always match up based on the cutting load.

ANSI LEVEL	A1	A2	A3	A4	A5	A6	A7	A8	A9
Weight needed to cut through (gram)	≥ 200	≥ 500	≥ 1000	≥ 1500	≥ 2200	≥ 3000	≥ 4000	≥ 5000	≥ 6000
TDM LEVEL (EN 388)	A	B	C	D	E	F			
Weight needed to cut through (newton)	≥ 2	≥ 5	≥ 10	≥ 15	≥ 22	≥ 30			

COUP LEVEL (EN388)	1	2	3	4	5
Cut index	1,2	2,5	5	10	20



EN 388:2016  
3 X 4 2 D P

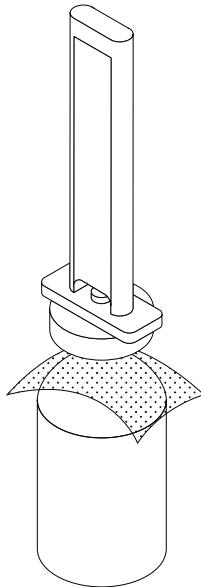
- ABRASION RESISTANCE (0-4)
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  - ISO CUT TEST/CUT RESISTANCE (A-F OR X)
- IMPACT PROTECTION  
(MARKING IF PASSED REQUIREMENTS)**

## IMPACT RESISTANCE

There are two global standards when selecting an impact glove: EN 388 and ANSI/ISEA 138. Both standards have similar test methods where a weight is dropped on the impact areas with an energy of 5 Joule. What differs is the scoring and rating system.

The American standard sets requirements of gloves designed to protect the knuckles and fingers from impact forces. The impact resistance is classified in 3 levels (1-3) where level 1 has the lowest protection and level 3 has the highest protection. Areas tested are knuckles at back of hand, fingers, and the thumb. The lowest performance value sets the overall protection level.

PERFORMANCE LEVEL	MEAN (KN)	ALL IMPACTS (KN)
1	< 9,0	< 11,3
2	< 6,5	< 8,1
3	< 4,0	< 5,0



The material is secured over a domed anvil a weight with an energy impact of 5 joules is dropped onto it and transmitted force is measured. If the glove has sufficient impact protection letter P will appear. This test is only used on gloves that have impact resistant properties.

### ANSI / ISEA 138



### ANSI / ISEA 138



### ANSI / ISEA 138



EN 388 only tests impact on the knuckles, backhand or palm where 4 different gloves are tested. Fingers are not tested. The EN 388 test is given a simple Pass (P) or fail. A glove that failed or was not tested will show no marking. In order to pass, the transmitted mean force is calculated from the 4 tested gloves. This needs to be less than or equal to 7 kN with no single results greater than 9 kN.

MEAN(KN)	SINGLE RESULT (KN)
≤7,0	≤9,0