



UNDERSTANDING THE STANDARDS: ANSI/ISEA 105-2016 VS EN 388:2016

There are two standards used worldwide to evaluate the protection levels of work gloves: **ANSI/ISEA 105-2016**, the US Standard developed in tandem by the American National Safety Institute (ANSI) and International Safety Equipment Association (ISEA) and **EN 388:2016**, the European Standard. Each standard has established testing methods for cut, abrasion, puncture, and tear resistance. Although both standards ensure that the wearer is protected against the same mechanical risks, they are not equivalent and cannot be compared as such.

Glove Markings and Classification Systems

When assessing the protection levels of gloves, it is important to note both the US and European classification systems, as many gloves will show both markings.

ANSI/ISEA 105-2016

The ANSI/ISEA 105-2016 standard has separate markings for cut, abrasion, and puncture resistance as each protection classification is tested separately. Unlike EN 388:2016, tear resistance is not covered, and impact resistance is tested under a different standard, ANSI/ISEA 138-2019.

The ANSI/ISEA standard features nine cut levels and five abrasion and puncture levels that can be characterized by a unique shield with the protection level noted in number form.



EN 388:2016

Currently on many cut-resistant and non-cut resistant gloves sold in North America, you will find the EN 388 marking. Gloves with an EN 388 rating are third party tested and the marking notes that they are rated for cut, abrasion, puncture, tear and as of 2016, impact resistance.

You will notice that this standard includes two cut ratings – the first determined by the Coup Test that features five numerical cut levels, and the second, which was added in 2016 to achieve a more accurate score, is determined by the TDM-100 Test and features a letter scale A-F. The impact resistance test is optional and only applies to gloves claiming back-of-the-hand impact protection. There are three potential ratings that will be given: P for Pass, F for Fail, or X if it has not been tested.



Comparing the Testing Methods

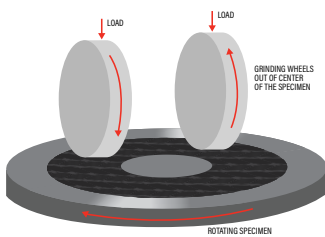
Although there are many similarities between the testing methods and instruments used for both ANSI/ISEA 105-2016 and EN 388:2016, there are also many differences that are important to note in order to fully understand each testing process. The graphics below contain a breakdown of the components of each standard that can be used as a guide to better understand each performance outcome.

ANSI/ISEA 105-2016 TESTING METHOD

Abrasion

ANSI/ISEA 105-2016

Taber Test



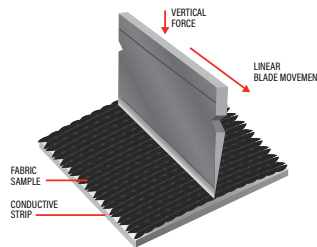
The Taber Test involves securing the test fabric on a rotating disc while two wheels with a 180 grit abrasant such as emery board or sandpaper, rub the fabric in a circular motion. The number of cycles that the fabric can endure before is shows noticeable wear determines the abrasion rating on a 1-6 scale. This method is the most favored due to the wide range of materials it can test.

Test Method:
ASTM D3884-09 (uncoated)
ASTM D3884-10 (coated and unsupported)

Cut

ANSI/ISEA 105-2023

TDM-100 Test



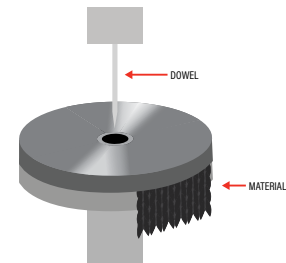
The sample is cut by a straight-edge blade, under a specific weight load that moves along a straight path. The sample is cut five times at three different weight loads, referred to as a cutting force, with a new size blade -- short, medium, and long -- for each load, providing 15 data-points. The cutting force is then used to determine the appropriate cut level.

Test Method:
ASTM F2992-15

Puncture

ANSI/ISEA 105-2016

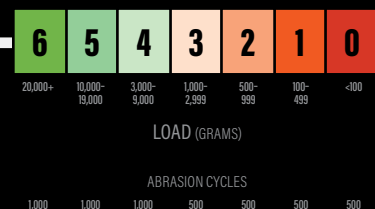
Blunt Puncture Test



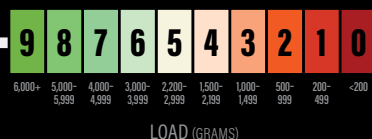
The Blunt Force Puncture Testing uses a 4.5mm probe, resembling a ballpoint pen, at a 90-degree angle to simulate a tear or burst hazard. The test measures the amount of force needed for a blunt probe to pierce through PPE material at a rate of 100mm per minute.

Test Method:
ASTM F1342-2022

ABRASION LEVEL



CUT LEVEL



PUNCTURE LEVEL



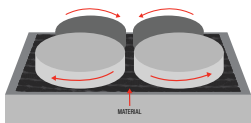
EN 388:2016 TESTING METHOD

EN 388



X X X X X X

Abrasion



Martindale Test

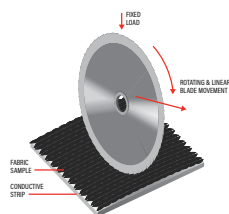
The Martindale Test uses a similar rotating disc to the Taber Test but rubs the fabric in a figure eight motion. The number of cycles that the fabric can endure before it shows noticeable wear determines the abrasion rating.

Test Method: EN ISO 13997

ABRASION LEVEL

| | | | | |
|--------------|-------------|-----------|---------|------|
| 4 | 3 | 2 | 1 | 0 |
| 8,000+ | 2,000-7,999 | 500-1,999 | 100-499 | >100 |
| LOAD (GRAMS) | | | | |

Cut (Coup)



Coup Test

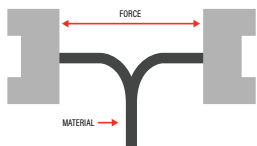
The Coup Test is conducted using a circular blade that rotates in cycles and moves back and forth along the same piece of material until the material is cut through. The test uses the same amount of force on all samples. Materials that achieve a higher cut score will contribute to the dulling of the blade.

Test Method: EN 388:2016

CUT LEVEL

| | | | | | |
|----------------------|-------------|-------------|-------------|-----------|---------|
| 5 | 4 | 3 | 2 | 1 | 0 |
| 3,059+ | 2,243-3,058 | 1,530-2,242 | 1,020-1,529 | 509-1,019 | 204-508 |
| FORCE TO CUT (GRAMS) | | | | | |

Tear



Tear Resistance Test

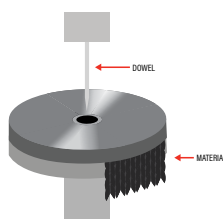
The EN388 Tear Resistance Test is measured by testing the tensile strength of a glove by applying force to four separate tear points on the fabric. The force is increased until the material is torn. The amount of force used to tear the material is recorded and categorized on a 1-4 scale.

Test Method: EN ISO 13997

TEAR LEVEL

| | | | | |
|-------------------------|-------|-------|-------|-----|
| 4 | 3 | 2 | 1 | 0 |
| 75+ | 50-74 | 25-49 | 10-24 | >10 |
| FORCE TO TEAR (NEWTONS) | | | | |

Puncture



Blunt Puncture Test

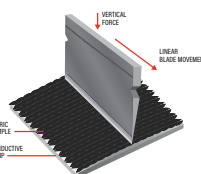
The Blunt Force Puncture Testing uses a 4.5mm probe, resembling a ballpoint pen, at a 90-degree angle to simulate a tear or burst hazard. The test measures the amount of force needed for a blunt probe to pierce through PPE material at a rate of 100mm per minute.

Test Method: EN 388:2016

PUNCTURE LEVEL

| | | | | |
|-----------------------------|---------|-------|-------|-----|
| 4 | 3 | 2 | 1 | 0 |
| 150+ | 100-149 | 60-99 | 20-59 | >20 |
| FORCE TO PUNCTURE (NEWTONS) | | | | |

Cut (TDM-100)



TDM-100 Test

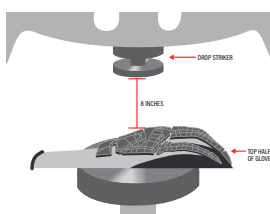
The sample is cut by a straight-edge blade, under a specific weight load that moves along a straight path. The sample is cut five times at three different weight loads, referred to as a cutting force, with a new size blade — short, medium, and long — for each load, providing 15 data-points. The cutting force is then used to determine the appropriate cut level.

Test Method: EN ISO 13997

CUT LEVEL

| | | | | | |
|------------------------|---------|---------|---------|-------|-------|
| F | E | D | C | B | A |
| 30+ | 22-29.9 | 15-21.9 | 10-14.9 | 5-9.9 | 2-4.9 |
| FORCE TO CUT (NEWTONS) | | | | | |

Impact



Impact Protection Test

The sample is cut open and laid out flat over a raised anvil. A 2.5kg striker force is dropped on the knuckles at an impact force of 5 joules. If the average transmitted force is less than or equal to 7kN, the gloves will be marked P for Pass. If the average transmitted force is higher than 9kN, the gloves will be marked F for Fail. Gloves that have not been tested will be marked X.

Test Method: EN 13594

IMPACT LEVEL

| | | |
|------------------------------|-----------------|---------------|
| P | F | X |
| PASS (≤ 7kN) | FAIL (> 9kN) | NOT TESTED |
| FORCE TO GLOVE (KILONEWTONS) | | |



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