

Introduction

Two standards are used to evaluate the cut protection levels of gloves. The American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) 105 "American National Standard for Hand Protection" is the U.S. standard for glove testing. The European standard – EN388 "Protective Gloves against Mechanical Risks" – is the European Union (EU) standard for glove testing and it also is referenced globally. Both ANSI/ISEA 105 and EN388 are used to test gloves for mechanical risks such as abrasion, cut, tear and puncture, with cut ratings generating the most interest amongst glove users..

ANSI/ISEA 105-2016

| ANSI/ISEA 105 Pre-2016 | | ANSI/ISEA 105-2016 | |
|------------------------|-----------------|--------------------|-----------------|
| Rating | Weight In Grams | Rating | Weight In Grams |
| 1 | 200 - 499 | A1 | 200 - 499 |
| 2 | 500 - 599 | A2 | 500 - 999 |
| 3 | 1000 - 1499 | A3 | 1000 - 1499 |
| 4 | 1500 - 3499 | A4 | 1500 - 2199 |
| 5 | 3500+ | A5 | 2200 - 2999 |
| | | A6 | 3000 - 3999 |
| | | A7 | 4000 - 4999 |
| | | A8 | 5000 - 5999 |
| | | A9 | 6000+ |

ANSI/ISEA 105-2016 is the fourth revision of the voluntary consensus standard that first was published in 1999. Significant changes to the cut-resistance classification determinations have been made through the years.

ANSI/ISEA 105-2016 Continued

With the 2016 revision, a single test method has been selected for classification purposes (ASTM F2992-15), and the number of classification levels has been expanded to nine levels to address the gap among certain levels seen in earlier versions of the standard. Previous editions of ANSI/ISEA referred to two test methods and five levels of cut resistance. ASTM F2292-15 uses a tomodynamometer (TDM) machine to pull a blade in 20 millimeter (mms) paths across a glove's surface under varied loads and measures the weight needed to cut through in grams..

EN 388-2016

| EN 388 – 2016 Cut Index Performance Levels (Coupe Test) | | | | | |
|---|-----------|-----------|-----------|-------------|------|
| Performance Level | 1 | 2 | 3 | 4 | 5 |
| Cut Index | 1.2 - 2.4 | 2.5 - 4.9 | 5.0 - 9.9 | 10.0 - 19.9 | ≥ 20 |

| EN 388- 2016 / ISO 13997 Cut Resistant Levels in Newtons and Grams (TDM Test) | | | | | | |
|---|--------|--------|---------|---------|---------|---------|
| | A | B | C | D | E | F |
| Newtons | ≥ 2 | ≥ 5 | ≥ 10 | ≥ 15 | ≥ 22 | ≥ 30 |
| Grams | 203.94 | 509.86 | 1019.72 | 1519.57 | 2243.38 | 3039.15 |

| ASTM F2292-15 and ISO 13997 now allow for a more accurate comparison of a glove's cut resistance level. | | | | |
|---|-----------------|-------------|------------------|--------------------|
| ANSI/ISEA 105-2016 | | EN 388-2016 | | |
| Rating | Weight In Grams | Rating | Force in Newtons | Converted to Grams |
| A1 | 200 - 499 | A | ≥ 2 | 203.94 |
| A2 | 500 - 999 | B | ≥ 5 | 509.86 |
| A3 | 1000 - 1499 | C | ≥ 10 | 1019.72 |
| A4 | 1500 - 2199 | D | ≥ 15 | 1529.57 |
| A5 | 2200 - 2999 | E | ≥ 22 | 2243.38 |
| A6 | 3000 - 3999 | F | ≥ 30 | 3059.15 |
| A7 | 4000 - 4999 | | | |
| A8 | 5000 - 5999 | | | |
| A9 | 6000+ | | | |

EN 388-2016 uses different level groupings and references two different cut test methods in the revised standard. The use of the second test is dependent upon the results of the first. The first test uses the coupe test and a rotating blade under a fixed weight is moved back and forth on the surface of the glove until cut-through. The results are then compared to a reference fabric.

EN 388-2016 Continued

If the glove material dulls the coupe tester blade, then the second cut test – ISO 13997 – is performed. Like ASTM F2292-15, the ISO 13997 test also uses a TDM machine and pulls a blade in 20 mm paths across the glove's surface under varied gram loads. But the cut through is measured in newtons – a unit of force. One newton is equivalent to 101.97 grams.

You must know the grams of cut resistance required to avoid confusion between the old and new ANSI/ISEA and EN 388 standards. Manufacturers are being given a transition period to change product labeling and content to reflect the ANSI/ISEA 2016 levels. All pre-existing EN 388 certifications will remain valid until a new certification is needed (5 year maximum).