MAKING SENSE OF CUT LEVELS

Laceration injuries can be costly. Not only is time lost, but also the actual cost of a laceration can be anywhere from $3,000–$16,000 per incident. This makes the selection of PPE a critical decision, one that can have great impact on a company and its employees. The chart on the right illustrates the performance characteristics of common 'cut-resistant' technologies taken from the ASTMF1790 method for testing cut-resistance. As you can see, HexArmor® products perform above the industry standard, and blow away the competition.

HOW CAN WE PROTECT EMPLOYEES WITH THE BEST PPE?

In our field studies of injuries and the corresponding hand protection worn, we see that many injuries can happen with PPE rated in the range below ASTM/ISEA level 5 of 3569 grams (35 Newtons). This can be demonstrated easily with a razor blade (simulating sharp metal or glass) and how easily typical CE 5 gloves, for example, will cut. As a result, many of our customers have adopted standards in their own organization, specifying a minimum cut at a certain number such as 3000 or 3500 grams- level 4 or 5 ASTM. Keep in mind the standard is just a guide, the profile of the hazard and actual use conditions are paramount. We always encourage conducting a safe test in actual situations; new gloves, used gloves, saturation with oils and fluids, etc.

CPPT-ASTM-F1790 TEST

- Various weights are applied to a standardized razor blade
- Blade travels at constant speed until material is cut through and a conductive strip is contacted
- Bade travel distance is recorded and index is used to calculate grams of cut resistance

100% VARIABILITY IN CE 5 SCORES?

When normalized, we see that the scores of gloves claiming to be CE Level 5 gloves vary quite a bit. Why is this? There are several reasons for the variability; testing consistency, operator variability, material variability, etc. However, the single largest factor is this: While the EN388 standard suggests that the Coup test is not appropriate for materials that abrade the cutting wheel, the standard doesn't require the alternative ISO be used. Section 6.2 of the standard merely states that the test is not appropriate for hard materials like chain mail, but doesn't contemplate other hard materials like fiberglass, SuperFabric®, etc. So, some manufacturers, while knowing the test is not appropriate, use it anyway to get the higher score (and sell more gloves). This is very common in gloves that are blended with fiberglass, as the fiberglass "fools" the Coup test by dulling the blade The range of performance that gloves can score and still qualify for a level 5 is so varied, that the CEN body is going to require gloves to not only list their Cut Level, but to note their average Newton force. Why would they do this? Because they recognize that worker safety requires a better understanding of the real cut protection a glove is providing. We can now conclude that all Level Five's are not created equal. There is significant confusion in global markets because many glove manufacturers misrepresent how they test their gloves, and the standard doesn't provide clear direction.

EN388-COUP TEST

- Constant weight applied to a counter-rotating circular blade
- Blade travels at constant speed until material is cut through and a conductive strip is contacted
- Number of rotations is recorded and indexed

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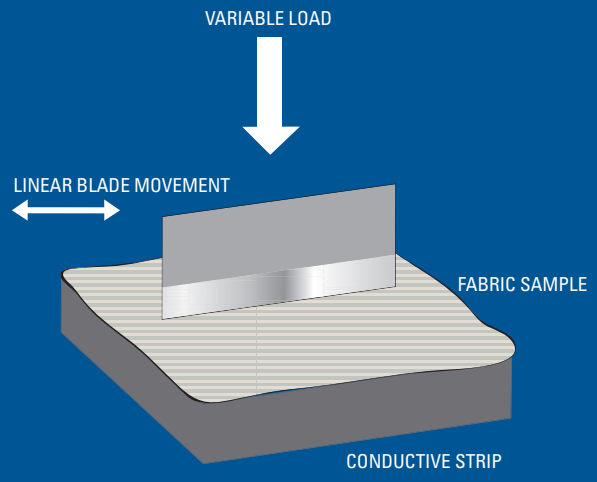
ANSI/ISEA LEVELS

CUT LEVEL	WEIGHT (G) NEEDED TO CUT WITH 1" (25MM) BLADE TRAVEL
0	< 199
1	200 – 499
2	500 – 999
3	1000 – 1499
4	1500 – 3499
5	> 3500

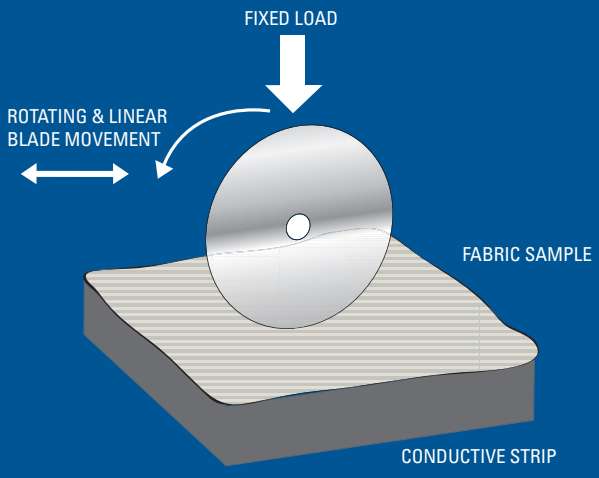
EN388 LEVELS*

CUT LEVEL	WEIGHT (G) NEEDED TO CUT WITH 1" (25MM) BLADE TRAVEL	AVERAGE CUT INDEX (10 MEASUREMENTS)
0	< 119	< 1.2
1	120 – 249	1.2 – 2.4
2	250 – 499	2.5 – 4.9
3	500 – 999	5.0 – 9.9
4	1000 – 1999	10.0 – 19.9
5	> 2000	> 20

*N/F required and converted to Grams to determine approximate correlation. 101.97gF. Based on calculation G/F= .00980665N



CPPT-ASTM-F1790 TEST
U.S. STANDARD



EN388-COUP TEST
EUROPEAN STANDARD

ISEA: Industrial Safety Equipment Association
ASTM: Internationally developed & approved test method to measure cut resistance in standard format
EN 388: Test method used for CE Scores, generally required outside the USA.
Scores listed in the following order: Abrasion-Cut-Tear-Puncture (example CE 4521)

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