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Understanding **EN 388 vs ANSI/ISEA** test standards

The differences between EN 388 and ANSI/ISEA standards for abrasion, cut, puncture, and impact resistance in gloves.

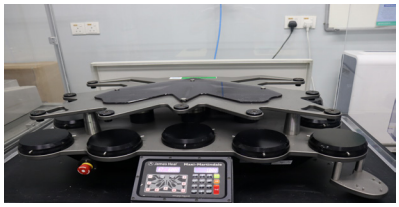
CONTENT

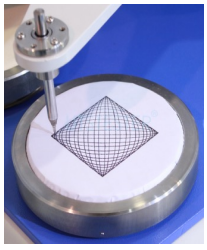
ABRASION RESISTANCE

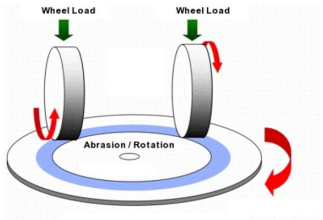
	EN 388 ABRASION *(Level classification based upon minimum value)*	ANSI ABRASION *(Level classification based upon average)*
Method	EN 388	ASTM D3389
Instrumentation	Martindale Pilling Machine	Taber Abraser
Number of Test Samples	4 Minimum	5 Minimum
Abrading Media	100 grit Sandpaper (specified supplier)	Wheels made of vitrified clay and silicon particles
Vertical Weight Load	9Mpa	500g or 1000 g
Failure Point	1st evidence of hole through coating & lining	1st evidence of hole through coating & lining
Unit of Measure	Cycles	Revolution
Pattern of Movement	Elliptical (Lissajous figure)	Rotational
Performance Levels	0 - 4	0-6

Performance Level	Abrasion (cycles)
0	< 100
1	100 – 500
2	500 – 2000
3	2000 – 8000
4	> 8000

Performance Level	Abrasion (revolutions)
(tested at 500 g vertical force)	
0	< 100
1	≥ 100
2	≥ 500
3	≥ 1000
(tested at 1000 g vertical force)	
4	≥ 3000
5	≥ 10000
6	≥ 20000



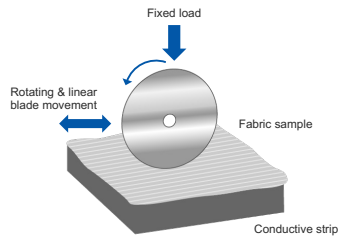


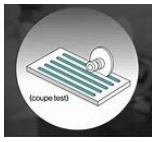


CUT RESISTANCE

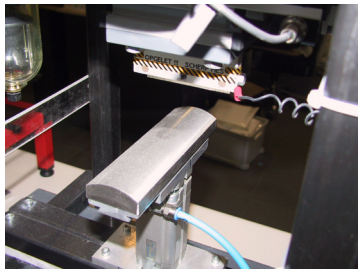
	EN 388 (COUP) TEST	EN 388/ISO 13997 CUT	ANSI CUT
Instrumentation	Blade cut test *(or other approved)*	TDM-100 *(Tomodynamometer)*	TDM-100 *(Tomodynamometer)*
Blade Type	Circular *(specified supplier)*	Razor *(specified supplier)*	Razor *(specified supplier)*
Cutting Motion	Rapid – Back & Forth Cycling	Slow – One Pass *(Gather 5 data points in three weight loads)*	Slow – One Pass *(Gather at least 15 data points using three weight loads)*
Number of Test Samples	4	2	3
Results	Mathematical Calculation	Mathematical Calculation	Mathematical Calculation
Unit of Measure	Index	Newtons	Grams
Performance Levels	0 - 5 Based upon minimum value	A - F Based upon minimum value	A1 - A9 Based upon average

Performance Level	Cut (index)
0	< 1.2
1	1.2 – 2.5
2	2.5 – 5.0
3	5.0 – 10.0
4	10.0 – 20.0
5	> 20.0

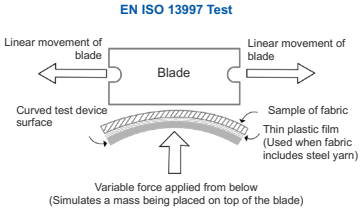




EUROPE: EN 388-2016	
ISO 13997 (TDM)	
TDM ONLY	
LEVEL	NEWTONS*
A	2
B	5
C	10
D	15
E	22
F	30



NEW: ANSI/ISEA 2016	
ASTM F2992-15 (TDM)	
TDM ONLY	
LEVEL	GRAMS
A1	≥ 200
A2	≥ 500
A3	≥ 1000
A4	≥ 1500
A5	≥ 2200
A6	≥ 3000
A7	≥ 4000
A8	≥ 5000
A9	≥ 6000



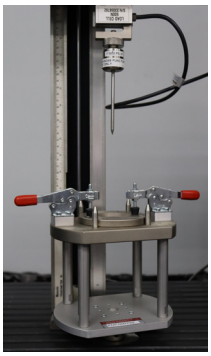
PUNCTURE RESISTANCE

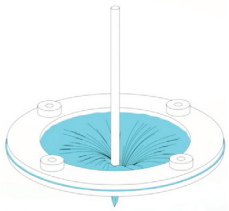
EN 388 PUNCTURE AND ANSI PUNCTURE TESTS APPLY THE SAME EN 388 TEST METHOD

A circular test specimen is mounted into a holder and punctured with a stylus of specified sharpness that is attached to a tensile tester. The force in newtons required to puncture the specimen to failure is measured.
EN Puncture requires 4 test samples and ANSI Puncture requires 12 test samples.
EN 388 Puncture is classified into five levels of performance (0-4) and ANSI Puncture into into six (0-5).
EN Puncture classifications are based upon the minimum value and ANSI Puncture upon the average value.

EN 388 PERFORMANCE LEVELS	
Level	**Puncture (newtons)**
0	< 20
1	20 – 60
2	60 – 100
3	100 – 150
4	> 150

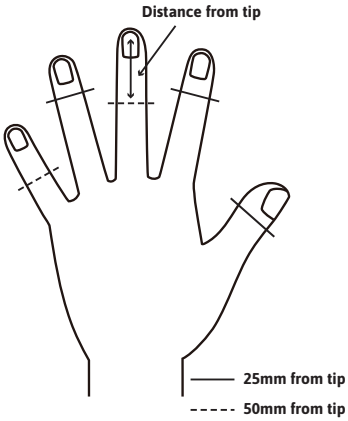
ANSI PERFORMANCE LEVELS	
Level	**Puncture (newtons)**
0	< 10
1	10 – 20
2	20 – 60
3	60 – 100
4	100 – 150
5	> 150

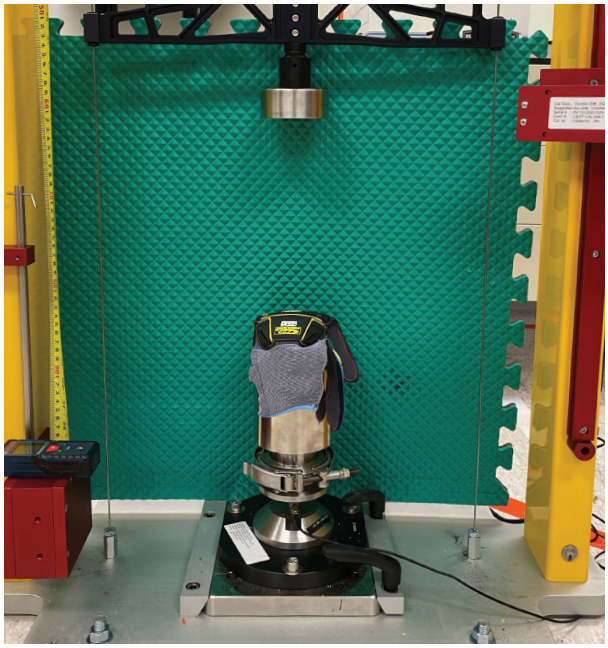




IMPACT RESISTANCE

ANSI/ISEA 138 IMPACT TESTING VS EN 388 IMPACT TESTING





- The glove is worn so the knuckles and fingers can be marked for impact sites (EN 388 is knuckles only)
- The glove being tested has dorsal half cut off and laid out over a domed anvil with force sensors underneath
- The glove surface is struck with a 2.5 kg striker at a distance sufficient enough to provide an impact energy of 5 J

ANSI/ISEA 138 Impact

(Level classification based upon average value and worst value)

Table 1. Classification for ANSI/ISEA 138 Impact Resistance		
Level	**Mean (kN)**	**All impacts (kN)**
1	≤ 9	< 11.3
2	≤ 6.5	≤ 8.1
3	≤ 4	≤ 5

EN 388 Impact

(Level classification based upon average and worst value)

Table 2. Classification for EN 388 Impact Resistance	
Level	**Force Reading (kN)**
Pass (P) Avg	≤ 7
Fail (F) Worst	> 9

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