

expert guide /

# **A summary of the update to standard EN 388 Protective Gloves Against Mechanical Risks**



Published on 2nd November 2016 the revised standard: EN 388: 2016 Protective gloves against mechanical risks supersedes the EN 388: 2003 revision.

EN 388 is the standard that determines a glove's performance against mechanical hazards. The standard specifies the testing and marking required for protective gloves. It also states the performance levels for gloves protecting against mechanical risks such as abrasion, blade cut, tear, puncture and where relevant, impact.

### Why Change is Needed

In the new version of the standard some tests remain unchanged, other test procedures have been improved. The most notable change is in relation to a glove's cut protection where a new category of protection has been introduced.

To achieve high levels of cut protection base materials are blended with additional materials such as fibreglass or steel. These blends are designed to protect against sharps that can damage the hand but due to their robust nature, they can also blunt the blades of the test machine used to test for protection ratings. The standards committee felt that because blunting of the blade can occur in the test known as the 'coupe test', that this particular method is no longer representative of the actual degree of protection provided by the glove, once the blade has been proven to blunt.

Therefore, in instances where blunting of the coupe test blade occurs an additional test is being introduced, the EN ISO 13997:1999 cut test, this will provide a further cut performance indicator.

The changes to the standard will affect new products being certified after the publishing date of the new revision. Gloves can continue to be sold against both versions of the standard until the effects of the new PPE regulation make recertification against the latest standard mandatory.

### Overview of Main Changes to EN 388

#### 6.1 Abrasion Testing

New abrasive test paper will be used. It is possible some abrasion scores may change when a product is recertified under the new test conditions.

#### 6.2 Cut Protection Testing

The existing cut test i.e. the 'coupe test' will be supplemented with the additional EN ISO 13997:1999 test method if blunting of the coupe test blade occurs. Additional marking will be required for the ISO EN 13997:1999 rating.

#### 6.6 Impact Protection Testing (where relevant)

Where impact protection is claimed there has been an introduction of the EN 13594:2015 test method, gloves which meet the test criteria will be marked with a 'P'.

#### 7 Marking

Gloves marking will include two new elements relating to the ISO cut method and the optional impact protection test.

### Our Service

If you would like to discuss your individual hand protection needs we have a Technical Specialist who will visit your site to discuss your requirements including a site survey, an application audit or a range review. To arrange an appointment please call your local sales office.



# EN 388 - Clause 6.1

## Resistance to Abrasion

There have been some changes to the testing of the abrasion resistance of gloves.

### Testing

The abrasion resistance of all types of material used for protective gloves are tested in accordance with EN 388. A Martindale Abrasion Tester is the internationally-accepted test equipment for wear of fabrics, and it is also used for determining the susceptibility of fabrics to pilling. Samples are cut from the palms of gloves and are subjected to rubbing against glass paper until a sample wears and a hole appears.

### Changes to the Test Method

The specification of the abradant paper used in the abrasion resistance method has been changed.

This revision, along with a number of additional minor changes to test materials means that it is possible some abrasion scores may change when a product is recertified under the new test conditions.

### Performance and Marking

The performance of the sample is measured as the number of abrasion rubs before sample breakthrough and the lowest value from four samples is used for classification. Four levels of performance are defined ranging from Level 1, through to Level 4.

The four levels of performance are shown as a number on the glove.

Test	Level 1	Level 2	Level 3	Level 4
6.1 Abrasion Resistance (number of rubs)	100	500	2000	8000

For more information on testing for resistance to abrasion visit [www.arco.co.uk/productassurance](http://www.arco.co.uk/productassurance)



# EN 388 - Clause 6.2

## Determination of blade cut resistance

### Testing

#### EN 388 6.2 – the ‘coupe’ test

The **Circular Blade Cut Resistance Tester** measures the cut resistance of a material, and is known as the ‘coupe test’. A test sample is cut from a glove and is clamped in a holder, which is placed onto the machine. A circular blade is gently lowered so that it touches the sample. The blade counter rotates whilst moving back and forth across the fabric, and when it penetrates the sample, the machine automatically stops.

### Changes to the Test Method

The coupe test method has been revised to include limiting the number of test cycles of the blade to a maximum of 60 cycles, whether the blade has cut through the fabric or not. This mitigates the effects of the dulling of the blade.

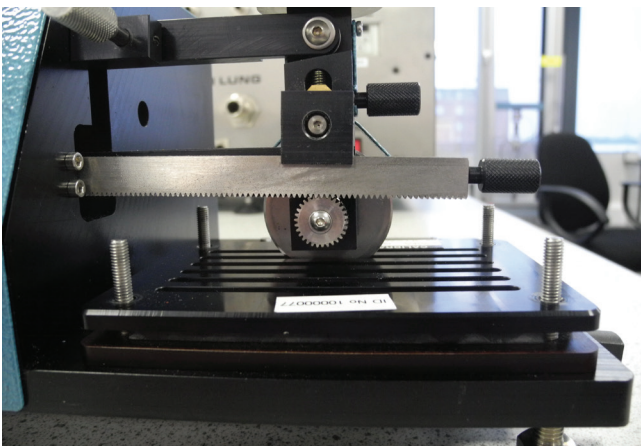
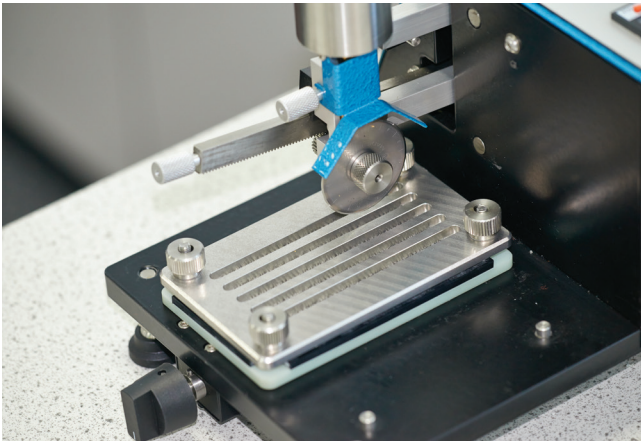
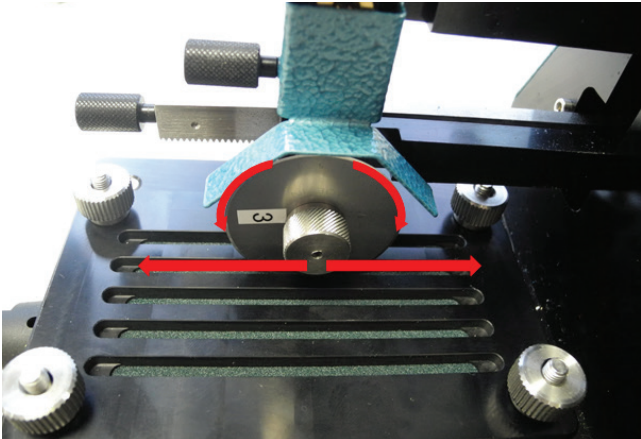
As a result, it is expected that when gloves utilising materials prone to blunting the blade are recertified, they are likely to produce a lower cut resistance index and reported performance level.

When a sample is tested using this new coupe test method, if the sample has proven to blunt the blade by more than a factor of 3 during the 60 cycle test it then becomes mandatory to test the sample using the ISO 13997 cut resistance method.

The ISO 13997 result then becomes the reference to be used when assessing the glove’s performance against cut hazards.

### Performance and Marking

The number of cycles of the rotating blade is used to determine the cut index. The performance is shown on the glove as a number.



Test	Level 1	Level 2	Level 3	Level 4	Level 5
6.2 Blade Cut Resistance (index)	1,2	2,5	5,0	10,0	20,0

For more information on testing for resistance to abrasion visit [www.arco.co.uk/productassurance](http://www.arco.co.uk/productassurance)

# EN 388 - Clause 6.3

## Cut resistance method (EN ISO 13997:1999)

The EN ISO 13997:1999 cut resistance test has been introduced in addition to the coupe test method (as defined in 6.2) and aims to better demonstrate how more complex yarns which may have blunted the coupe test blade can be effectively assessed.

### Testing

The Cut Resistance Evaluator is used to measure performance of materials to cuts from very sharp blades and is suitable for the testing of highly cut resistant materials. A straight edged blade is drawn across a sample until break through takes place. This test measures the average load required to achieve the moment of cut-through, after the blade has travelled 20mm. It does not suffer from blunting as the blade only passes once over the surface of the sample and for each cut a new blade is used.

### Performance and Marking

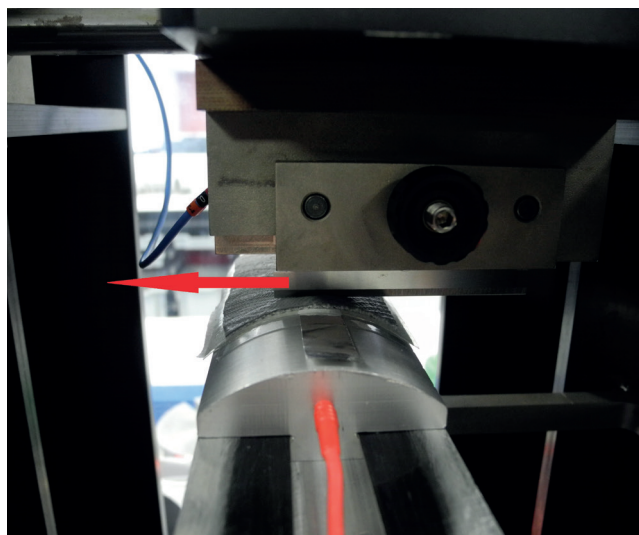
The cut level achieved is defined using the letters A to F, denoting increasing levels of protection.

**Levels A, B, C and D** are new values

**Level E** offers a level of protection, previously indicated in EN388:2003 to be similar to a level 5.

**Level F** value is a new designation offering a higher measured level of protection than previously indicated in EN388:2003

**It should be noted however that the new revision states there is no correlation between the coupe test and ISO test levels of protection.**



Test	Level A	Level B	Level C	Level D	Level E	Level F
6.3 EN ISO Cut Resistance (N)	2	5	10	15	22	30

**Note:** Manufacturers can choose to use the coupe test or the ISO cut test when measuring cut resistance during certification or use both methods. The ISO cut test is only mandatory when blunting of the blade occurs during the coupe test. When blunting occurs the manufacturer still has an option to display a coupe test result but these results are indicative only, whilst the displayed ISO cut result is the reference performance result – a statement to this effect must be included in the user information notice.

# EN 388 - Clause 6.6

## Impact Protection

A protective glove can be designed to offer protection against impacts as an optional characteristic.

### Current Testing

The old EN 388:2003 standard does not include a test to assess impact protection.

### Revised Testing

The 2016 version of the standard contains an additional test for impact resistance, this test is optional and is used only for gloves that claim specific impact resistant properties, usually added to the back of the hand and / or the knuckles. Testing is carried out in accordance with EN 13594:2015 6.9 Protective Gloves for Motorcycle Riders.

To test the glove, the area of protection is secured over a domed anvil and is impacted at an impact energy of 5J.

### Marking

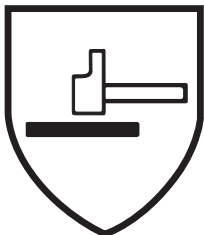
When the requirements in the test are fulfilled by the gloves, the marking code 'P' will be displayed on the glove marking after all other protective characteristics.

# EN 388 - Clause 7

## Marking

### Marking Changes

Gloves satisfying the requirements of EN 388 will feature a pictogram as shown below:

 <b>EN388</b> Example 1 : 3 4 4 3 E P Example 2 : 3 X 0 3 E Example 3 : 3 2 0 3 X	Example	No. 1	No. 2	No. 3
	Abrasion (6.1)	Level 3	Level 3	Level 3
	Cut (6.2)	Level 4	Test not performed or not applicable	Level 2
	Tear (6.4)	Level 4	Level 1 not achieved	Level 1 not achieved
	Puncture (6.5)	Level 3	Level 3	Level 3
	Cut (6.3)	Level E	Level E	Test not performed
	Impact Protection	Achieved	Test not performed	Test not performed

The pictogram shows the mechanical properties of the glove plus the respective performance levels of each mechanical test. The pictogram will now include two new characters relating to two new elements relating to the ISO straight cut test and the optional impact protection test.

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