

## **APPENDIX 5**

### **EUROPEAN STANDARDS AND MARKINGS FOR HAND AND ARM PROTECTION**

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#### **INTRODUCTION**

Harmonised European Standards for Personal Protective Equipment (PPE) have been developed as the preferred means of demonstrating equipment conformity with the basic health and safety requirements (BHSRs) of the EC Personal Protective Equipment Directive (89/686/EEC). Only equipment which meets these BHSRs is entitled to carry the CE mark and to be sold for use in the EC.

The alternative route to obtaining the CE mark involves the manufacturer producing a 'technical file' for the equipment which also demonstrates that it satisfies the BHSRs. In such cases, the equipment will carry the CE mark but may not display any Standard number. The manufacturer's information will contain the performance specification.

For Category III PPE (for use against "mortal danger"), the CE mark will be accompanied by a four-digit code number identifying the responsible Notified Body appointed to ensure that the manufactured product continues to satisfy the BHSRs.

Increasingly, European Standards (prefixed EN – European Norm) are being superseded or subsumed by International Standards (prefixed ISO). Where these are adopted in the UK, they will also be issued as British Standards and be prefixed BS. The British versions of standards (BS EN, BS ISO or BS EN ISO) may have minor differences from the original versions of the standard, usually in the form of a National Foreword or National Annex, to account for legislative or technical variations specific to the UK. If such a UK variation exists, this is flagged up in the attached listings below for the individual standards. BS versions may also differ slightly in the stated year of issue from the EN or ISO versions; the original EN or ISO issue dates are quoted here.

The Standards may contain design, performance and marking requirements for the different types of equipment. This document lists the Standards, and gives a brief explanation of the markings which they define.

#### **ORGANISATION OF THE INFORMATION**

PPE Standards are separated into broad categories, depending on the type of protection intended, eg head protection, foot protection. Separate documents have been produced for each category.

Within a category, where possible, Standards have been further subdivided according to

the hazard (eg mechanical hazards, heat and flame) or component type (eg filters; facepieces) as appropriate. Both current and recently superseded versions are listed, as equipment marked according to either version may be encountered in the field.

Standard number and date are given, with the title (sometimes abridged).

If a UK National variation applies to this standard, the nature of this variation is described.

Markings and classifications defined in the Standard for that class of equipment are listed and briefly described.

Related Standards, eg specific test methods which will not usually appear in the markings on equipment are listed separately at the end of each document.

Pictograms and symbols for each type of equipment are included at the rear of the relevant document.

## STANDARDS FOR HAND / ARM PROTECTION

### General requirements

EN 420:2003- General requirements for gloves. Corrected 2007, Amended 2009.	
	mark identifying the manufacturer product identifying mark # - size designation (normally in range <b>6 to 11</b> ) - date of obsolescence (if appropriate) # - dexterity performance in range <b>1</b> (lowest) to <b>5</b> (highest), if required markings specific to individual risks, including pictograms (Figs 1 to 15) where appropriate

### Mechanical risks

EN 381-7:1999 - Requirements for chainsaw protective gloves	
	<i>Note: Unless otherwise marked, only the <u>left</u> hand glove will incorporate chainsaw protection and the following markings.</i> as for EN 420, plus: <b>pictogram</b> - for chainsaw use (Fig 10) - <b>A</b> (5 finger glove without protection in the fingers), <b>or</b> - <b>B</b> (glove or mitt also having protection on the back of the fingers, but not the thumb) # - chain speed class <b>0</b> to <b>4</b> (16 to 28 m/s in 4 m/s increments) below the pictogram - <b>EN 381-7</b>

<b>EN 388:2003 - Protective gloves against mechanical risks</b>	
<b>Mechanical properties</b>	as for EN 420, plus: <b>pictogram</b> - for mechanical risk (Fig 1), with four digits in a horizontal line, in the order: # - abrasion resistance ( <b>0 to 4</b> ) # - blade cut resistance ( <b>0 to 5</b> ) # - tear resistance ( <b>0 to 4</b> ) # - puncture resistance ( <b>0 to 4</b> ) (highest number = greatest resistance)
Plus, if appropriate:	
<b>Impact cut resistance</b>	<b>pictogram</b> - for impact cut resistance (Fig 2)
<b>Anti static</b>	<b>pictogram</b> - for antistatic properties (Fig 3)
<b>EN 1082-1:1997- Protective clothing - Gloves and arm guards protecting against cuts and stabs by hand knives: Chain mail gloves and arm guards</b>	
	<b>pictogram</b> - for impact cut resistance (Fig 2) mark identifying the manufacturer product identifying mark # - size designation (normally in range <b>6 to 11</b> ) maximum cleaning temperature if <82°C
<b>EN 1082-2:2000 - Gloves and arm guards made of material other than chain mail</b>	
	- size - maximum cleaning temperature if <82°C
<b>EN 14328:2005 - Gloves and armguards protecting against cuts by powered knives.</b>	
	- size - maximum cleaning temperature if below 82°C - intended and forbidden applications - constituent materials

## Physical risks

<b>EN 407:2004 - Protective gloves against thermal risks (heat and/or fire)</b>	
	as for EN 420, plus: <b>pictogram</b> - for thermal resistance (Fig 4), with six digits in a horizontal line, in the order: # - burning resistance # - contact heat resistance # - convective heat resistance # - radiant heat resistance # - resistance to small splashes of molten metal # - resistance to large splashes of molten metal each graded <b>X, or 1 to 4</b> . X denotes that this property has not been tested. Higher numbers indicate higher resistance.
<b>EN 421:1994 - Protective gloves against ionizing radiation and radioactive contamination</b>	
<b>Superseded by EN 421:2010</b>	
	as for EN 420, plus where appropriate:

	<p><b>pictogram</b> - for radioactive risk (Fig 8)</p> <p># - 'lead equivalence' in mm</p> <p># - water vapour permeability (1[most] to 5[least])</p> <p># - ozone cracking resistance (1[least] to 4[most])</p> <p>- any mechanical resistance as for EN 388</p> <p>- any chemical resistance tested by EN 374-3</p>
<b>EN 421:2010</b> - Protective gloves against ionizing radiation and radioactive contamination	
	Number and date of standard, plus as for EN 420, plus:
Gloves against ionizing radiation	<p><b>pictogram</b> - for ionizing radiation risk (Fig 15)</p> <p># - 'lead equivalence' in mm, plus test conditions (kV and filtration).</p> <p>Gloves with different levels of protection in different parts, each part labeled accordingly.</p>
Gloves against radioactive contamination	<b>pictogram</b> – for radioactive contamination risk (Fig 14)
If applicable	<p>- any mechanical resistance as for EN 388, pictogram (Fig 1) and performance levels</p> <p>- any chemical resistance tested by EN 374-3, pictogram (Fig 4) and chemical codes</p>
<b>EN 511:1994</b> - Protective gloves against cold	
<b>Superseded by EN 511:2006</b>	
	<p>as for EN 420, plus</p> <p><b>pictogram</b> - for cold risk (Fig 6) with two or three digits in a horizontal line in the order:</p> <p># - convective cold resistance (1[least] to 4[most])</p> <p># - contact cold resistance (1[least] to 4[most])</p> <p>1 - water impermeability (if required)</p>
<b>EN 511:2006</b> – Protective gloves against cold	
	<p>as for EN 420, plus</p> <p><b>pictogram</b> - for cold risk (Fig 6) with two or three digits in a horizontal line in the order:</p> <p># - convective cold resistance (1[least] to 4[most])</p> <p># - contact cold resistance (1[least] to 4[most])</p> <p>1 - water impermeability (if required)</p>
<b>EN 659:2003</b> - Protective gloves for firefighters Amended 2008, Corrected 2009	
	<p>as for EN 420, plus <b>pictogram</b> (Fig.11):</p> <p><b>EN 659</b> - implies the following performance levels</p>
<b>Mechanical properties</b>	<p># - abrasion resistance <math>\geq 3</math></p> <p># - cut resistance <math>\geq 2</math></p> <p># - tear resistance <math>\geq 3</math></p> <p># - puncture resistance <math>\geq 3</math></p>
<b>Thermal properties</b>	<p>4 - burning resistance</p> <p># - convective heat resistance <math>\geq 3</math></p> <p># - radiant heat resistance (RHTI<sub>24</sub> time of <math>\geq 18</math> s when</p>

	tested according to EN ISO 6942) <b>#</b> - contact heat resistance ( $t_t$ time of $\geq 10$ s when tested according to EN 702, wet and dry) - heat shrinkage $\leq 5\%$ - heat resistant lining
<b>Other properties</b>	<b>#</b> - dexterity $\geq 1$ - defined water permeability for waterproof layer - water penetration resistance <b>1 – 4</b> optional - integrity to water immersion optional - liquid chemical penetration resistance optional
<b>EN 12477:2001</b> – Protective gloves for welders Amended 2006. National foreword clarifies application of requirement to material assemblages	
	As for EN 420, <b>pictograms</b> for mechanical and thermal resistance (Figs 1 and 7), plus: <b>A</b> – Higher protection but lower dexterity <b>B</b> – Lower protection but higher dexterity
<b>BS ISO 16073:2011</b> – Wildland firefighting personal protective equipment – Requirements and test methods Corrected 2011	
This standard is for complete ensembles of PPE for wildland firefighting, but contains requirements and markings for gloves.	
	- manufacturer identification - model - size - <b>pictogram</b> and standard number (Fig 11)
<b>EN 50237:2000</b> - Gloves and mitts with mechanical protection for electrical purposes	
<b>Superseded by EN 60903:2003</b>	
	<b>symbol</b> - for insulating protective equipment (Fig 9) <b>symbol</b> - for mechanical protection (Fig 1) - mark identifying the manufacturer - category (see below) <b>#</b> - size designation (normally in the range <b>6 to 11</b> ) - class (see below) - month and year of manufacture
<b>Category</b>	<b>A</b> - acid resistance <b>H</b> - oil resistance <b>Z</b> - ozone resistance <b>P</b> - acid, oil and ozone resistance <b>C</b> - extreme low temperature
<b>Class</b>	- marking / symbol colour code for material thickness: <b>00</b> (beige) (thinnest) <b>0</b> (red) <b>1</b> (white)
<b>Service history</b>	Panel on which date of first use, and dates of subsequent inspection and test, can be marked

<b>EN 60903:2003</b> - Gloves and mitts of insulating material for live working Corrected 2004 and 2006	
	<p><b>symbol</b> - for insulating protective equipment (Figs 1 &amp; 9)</p> <ul style="list-style-type: none"> <li>- standard number and year</li> <li>- mark identifying the manufacturer</li> <li>- category</li> </ul> <p><b>#</b> - size designation (normally in the range <b>6 to 11</b>)</p> <ul style="list-style-type: none"> <li>- Class</li> <li>- serial / batch number</li> <li>- month and year of manufacture</li> </ul>
<b>Category</b>	<p><b>A</b> - acid resistance</p> <p><b>H</b> - oil resistance</p> <p><b>Z</b> - ozone resistance</p> <p><b>R</b> - all the above</p> <p><b>C</b> - resistance to low temperature</p>
<b>Class</b>	- marking and/or symbol colour code:
	<p><b>00</b> (beige)</p> <p><b>0</b> (red)</p> <p><b>1</b> (white)</p> <p><b>2</b> (yellow)</p> <p><b>3</b> (green)</p> <p><b>4</b> (orange) - depending on length of glove and thickness of material (00 is shortest and thinnest)</p>
<b>Service history</b>	panel on which date of first use, and dates of subsequent inspection and test, can be marked
<b>EN 60984:1993</b> - Sleeves of insulating material for live working Amended 1998 and 2002	
	<p><b>symbol</b> - for insulating protective equipment (Fig 9)</p> <ul style="list-style-type: none"> <li>- standard number</li> <li>- mark identifying the manufacturer</li> </ul> <p><b>#</b> - size designation (<b>S, M, LG</b> or <b>XLG</b>)</p> <p><b>Right</b> or <b>Left</b> - sleeve orientation</p> <ul style="list-style-type: none"> <li>- month and year of manufacture</li> </ul>
<b>Category</b>	<p><b>A</b> - acid resistance</p> <p><b>H</b> - oil resistance</p> <p><b>Z</b> - ozone resistance</p> <p><b>S</b> - both oil and ozone resistance</p> <p><b>C</b> - resistance to low temperature</p>
<b>Style</b>	<p><b>Style A</b> - straight taper sleeve</p> <p><b>Style B</b> - curved elbow sleeve</p>
<b>Class</b>	<p>marking and/or symbol colour code:</p> <p><b>0</b> (red)</p> <p><b>1</b> (white)</p> <p><b>2</b> (yellow)</p> <p><b>3</b> (green)</p> <p><b>4</b> (orange) - depending on thickness of material (0 is thinnest)</p>

<b>Service history</b>	panel on which date of first use, and dates of subsequent inspection and test, can be marked
<b>BS IEC 61942:1997 - Live working – gloves and mitts with mechanical protection</b>	
	<b>symbol</b> - for insulating protective equipment (Fig 9) - pictogram for mechanical protection - mark identifying the manufacturer - category <b>#</b> - size designation - class <b>Right or Left</b> - sleeve orientation - month and year of manufacture
<b>Category</b>	<b>A</b> - acid resistance <b>H</b> - oil resistance <b>Z</b> - ozone resistance <b>P</b> - acid, oil and ozone resistance <b>C</b> - resistance to low temperature
<b>Class</b>	- marking and/or symbol colour code:
	<b>00</b> (beige) <b>0</b> (red) <b>1</b> (white) - depending on length of glove and thickness of material (00 is shortest and thinnest)
<b>Service history</b>	panel on which date of first use, and dates of subsequent inspection and test, can be marked or punched

### Chemical / Biological risks

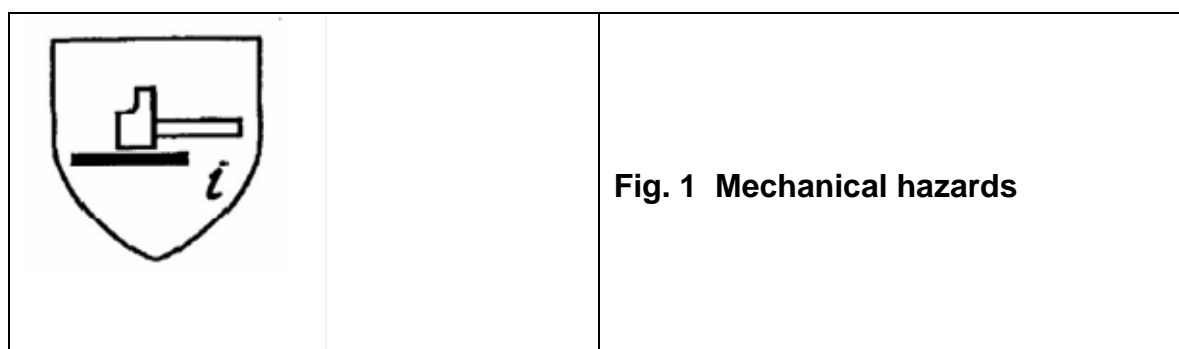
<b>EN 374-1:2003 - Protective gloves against chemicals and micro-organisms</b>	
Revision expected ~2014, after publication of EN 374-4	
	As for EN 420 and EN 388, plus:
	- standard number <b>EN 374</b>
Gloves resisting penetration and permeation:	- <b>Pictogram</b> (Fig 4) with a minimum of 3 letters <b>A</b> to <b>L</b> denoting which chemicals have been tested
Gloves resisting micro-organisms:	- must achieve performance level 2 in penetration <b>Note: does not infer protection against virus</b>
Gloves resisting penetration only (low chemical hazards):	- <b>Pictogram</b> (Fig 12)
<b>EN 455-1:2000 – Medical gloves for single use – Part 1: Requirements and testing for freedom from holes</b>	
	No specific marking requirement
<b>EN 455-2:2009 – Medical gloves for single use – Part 2: Requirements and testing for physical properties</b> Amended 2011	
	No specific marking requirement
<b>EN 455-3:2006 – Medical gloves for single use – Part 3: Requirements and testing for biological evaluation</b>	
	If glove contains latex, Fig 13 plus warning wording (may

	be on packaging only)
<b>EN 455-4:2009</b> – Medical gloves for single use – Part 4: Requirements and testing for service life determination	
	No specific marking requirement

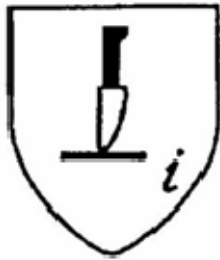
#### OTHER STANDARDS RELEVANT TO HAND AND ARM PROTECTION

Occupational equipment is unlikely to be marked with these Standard numbers, but they may contain useful information on equipment performance or test methods.

<b>EN 374-2:2003</b>	Protective gloves against chemicals and micro-organisms: Determination of resistance to penetration
<b>EN 374-3:2003</b>	Protective gloves against chemicals and micro-organisms: Resistance to permeation by chemicals
<b>EN 374-4:201X</b>	Protective gloves against chemicals and micro-organisms: Resistance to degradation by chemicals ( <b>expected by 2014</b> )
<b>EN 381-4:1999</b>	Test methods for chainsaw protective gloves
<b>EN 1082-3:2000</b>	Gloves impact cut test for fabric, leather and other materials
<b>EN ISO 10819:1997</b>	Hand-arm vibration: Method for the measurement of the vibration transmissibility of gloves at the palm of the hand
<b>BS 6526:1998</b>	Domestic oven gloves - Requirements and test methods
<b>BS 7971</b>	Protective clothing and equipment for use in violent situations and in training. Part 4:2002 – Limb protectors Part 6: 2003 - Gloves against mechanical thermal and chemical hazards Part 7: 2003 – Slash resistant gloves







**Fig. 2 Impact cut**



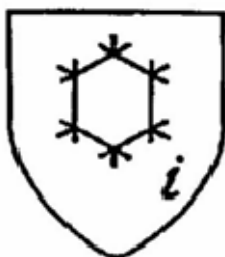
**Fig. 3 Static electricity**









**Fig. 4 Chemical hazards**






**Fig. 5 Micro-organism hazards**



**Fig. 6 Cold hazard**

	<p><b>Fig. 7 Heat and fire</b></p>
	<p><b>Fig. 8 Ionizing radiations and radioactive contamination</b> (Now superseded by Figs 14 and 15)</p>
	<p><b>Fig. 9 Live working symbol</b></p>
	<p><b>Fig. 10 Chainsaw protection</b></p>
	<p><b>Fig. 11 Firefighters protection</b></p>
	<p><b>Fig. 12 Low chemical protection</b></p>

 A black and white warning symbol consisting of a downward-pointing triangle with a rounded top. Inside the triangle, the word 'LATEX' is written in a bold, sans-serif font.	<p><b>Fig 13. Warning of latex content</b></p>
 A black and white warning symbol consisting of a shield shape. Inside the shield, there is a central atomic symbol (a circle with a cross) surrounded by a cloud of small dots, representing radioactive contamination.	<p><b>Fig 14. Particulate radioactive contamination</b></p>
 A black and white warning symbol consisting of a shield shape. Inside the shield, there is a central circle with three curved lines radiating outwards, representing ionizing radiation.	<p><b>Fig 15. Ionizing radiation</b></p>