



A revised guide to **EN STANDARDS** for gloves

A greater commitment to health and safety

The Single European Act does not stop at removing barriers to trade: it also seeks to upgrade social and welfare policy throughout Europe. It includes a specific pledge to improve health and safety at work for all European workers.

The commitment to 'level up' to the best practice currently employed within the Union has been enshrined in a legally binding **Framework Directive (89/391/EEC)**, which not only lays down broad guidelines for health and safety but also places upon the employer an absolute duty 'to ensure the safety and health of employees in their workplace'. This directive is amplified by five daughter directives, of which one directly governs the use of protective gloves.

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The use of Personal Protective Equipment Directive 89/656/EEC

Four articles in the Directive merit particular attention, as they place substantial responsibilities on employers:

ARTICLE 3

Article 3 states that before selecting any PPE a basic assessment must be made to identify and evaluate the risk. **Where possible, the risk must be reduced or eliminated by a modification of workplace practice.** This option is always to be preferred to the use of PPE.

ARTICLE 4

Under article 4, **the employer must inform his workers of the risks in the workplace, supply appropriate and correctly fitting PPE which complies with EU standards, and give adequate instruction in its use.**

He should further ensure that the PPE is used only for the purpose intended by the manufacturer, and in accordance with the manufacturer's instructions.

ARTICLE 5

Article 5 requires the employer to:

1. **Audit** workplace hazards and assess the level of risk to employees.
2. **Define** the properties necessary in the gloves to protect the employees.
3. **Ensure** that all gloves used in the workplace conform to the PPE Directive.
4. **Compare** the merits of the various types of protection available.
5. **Keep full records** of assessments and reasons for selecting a particular type of glove.

If the risk should alter in any way, for instance by the introduction of a new chemical or industrial process, the assessment must be repeated.

ARTICLE 6

Finally, Article 6 requires Member States to introduce written rules for workplace situations in which the use of PPE shall be considered compulsory.

Naturally, employers will have to be aware of and comply with these rules.

To comply with the new regulations, you must select gloves which not only adhere to the above Directive and relevant safety standards, but also are demonstrably of good quality and fittest for the intended task.

All Ansell Healthcare industrial products satisfy these requirements, and our experts will be glad to assist you in making the safest choice.

Complying with the PPE Directive: 89/686/EEC

The Directive specifies two classes of glove meeting two **levels of risk**:

'**minimal**', and '**mortal**' or '**irreversible**' risk. A risk which falls between these two levels may be described as '**intermediate**'.

To comply with the 89/656/EEC Directive, you must establish the level of risk and select gloves of the appropriate class.

A system of marking has been developed to help you in that selection.



Category I: Gloves of simple design - For **minimal** risk only

For gloves of simple design offering protection from low level risks, e.g. janitorial gloves, manufacturers are permitted to test and certify gloves themselves.



Category II: Gloves of intermediate design - For **intermediate** risk

Gloves designed to protect against intermediate risk (e.g. general handling gloves requiring good cut, puncture and abrasion performance) must be subjected to independent testing and certification by a notified body. Only these approved bodies may issue a CE mark, without which the gloves may not be sold. Each notified body has its own identification number. The name and address of the notified body that certifies the product has to appear on the instructions for use that will accompany the gloves.



Category III: Gloves of complex design - For **irreversible or mortal** risk

Gloves designed to protect against the highest levels of risk, e.g. chemicals, must also be tested and certified by a notified body. In addition, the quality assurance system used by the manufacturer to guarantee homogeneity of production or the quality consistency testing of the final product must be independently checked. The body carrying out this evaluation will be identified by a number which must appear alongside the CE mark (in this case, 0493).

Please note that the original PPE Directive 89/686/EEC has been amended by both the 93/95/EEC Directive and the CE marking Directives 93/68/EEC and 95/58 EEC.

STANDARD EN 420: 2003

General requirements for protective gloves

SCOPE

This standard defines the general requirements for glove design and construction, innocuousness, comfort and efficiency, marking and information applicable to all protective gloves. This standard can also apply to arm guards.

The key points are given below. Some gloves designed for very specialist applications, such as electrician's or surgical gloves are, governed by other stringent job-specific standards (details are available on request).

DEFINITION

A glove is an item of personal protective equipment which protects the hand or any part of the hand from hazards. It may also cover part of the forearm and arm.

A performance level is a number (between 0 and 4) which shows how a glove has performed in a specific test, and by which the results of that testing may be graded. Level 0 indicates that the glove is either untested or falls below the minimum performance level. A performance level X means that the test method is not suitable for the glove sample. Higher numbers indicate higher levels of performance.

REQUIREMENTS

GLOVE CONSTRUCTION AND DESIGN

- Gloves have to offer the greatest possible degree of protection in the foreseeable conditions of end use.
- When seams are included, the strength of these seams should not reduce the overall performance of the glove.

INNOCUOUSNESS

- The gloves themselves shouldn't cause any harm to the user.
- pH of the glove should be between 3.5 and 9.5.
- Chromium (VI) content should be below detection (< 3 ppm).
- Natural rubber gloves shall be tested on extractable proteins as per EN 455-3.

CLEANING INSTRUCTIONS

- If care instructions are provided, the levels of performance should not be reduced after the maximum recommended number of cleaning cycles.

ELECTROSTATIC PROPERTIES

- Anti-static gloves that are designed to reduce the risk of electrostatic discharges shall be tested as per EN 1149.
- Obtained test values are to be reported on the instructions for use.
- An electrostatic pictogram shall NOT be used.

SIZING (SEE TABLE BELOW)

- Gloves that are below the minimum length are to be called 'Fit for Special Purpose'.

DEXTERITY

- If required, performance to be graded as per table below.

WATER VAPOUR TRANSMISSION AND ABSORPTION

- If required, gloves shall allow water vapour transmission ($5\text{mg}/\text{cm}^2\cdot\text{h}$).
- If gloves exclude water vapour transmission, it should be at least $8\text{ mg}/\text{cm}^2$ for 8 hours.

MARKING & INFORMATION

Marking of the glove

- Each glove should be marked with:
 - Name of manufacturer
 - Glove and size designation
 - CE mark
 - Appropriate pictograms accompanied by the relevant performance levels and the reference of the EN standard
- The marking should be legible throughout the life of the glove. Where marking of the glove is not possible in view of the characteristics of the glove, it should be mentioned on the first packaging enclosure.

Marking of the packaging immediately containing the gloves

- Name and address of the manufacturer or representative
- Glove and size designation
- CE mark
- Usage info
 - simple design: 'For minimal risks only' or,
 - intermediate design or complex design: relevant pictograms
- When protection is limited to part of the hand, this shall be mentioned (e.g. 'Palm protection style only').
- Reference to where information can be obtained

INSTRUCTIONS FOR USE

(to be supplied when the glove is placed on the market)

- Name and address of the manufacturer or representative
- Glove designation
- Size range available
- CE mark
- Care & storage instruction
- Instructions and limitations of use
- A list of substances used in the glove which are known to cause allergies
- A list of all substances in the glove shall be made available upon request
- Name and address of notified body that certified the product



SIZING OF GLOVES

GLOVE SIZE	FITS HAND SIZE	HAND CIRCUMFERENCE/LENGTH (MM)	MINIMUM LENGTH OF THE GLOVE (MM)
6	6	152/160	220
7	7	178/171	230
8	8	203/182	240
9	9	229/192	250
10	10	254/204	260
11	11	279/215	270

GLOVE DEXTERITY

PERFORMANCE LEVEL	SMALLEST DIAMETER*
1	11.0
2	9.5
3	8.0
4	6.5
5	5.0

*pin that can be picked up with gloved hand 3 times / 30 seconds (mm)

GLOVE SIZING CHART

Ordering the right size is the best way to assure that gloves are comfortable. One way to determine the size needed is to use a dressmaker's cloth tape to measure around the hand. Measure above the thumb and below the fingers. The circumference of the hand (rounded to the nearest half inch; 1 inch = 2.54 cm) is numerically equal to the worker's average glove size.

Measuring the hands in this way will not account for all possible variations in hand size. Some workers, for example, may have long fingers, while others will have short fingers. Workers may find gloves that are one-half or even a full size larger or smaller than the measured hand size fit more comfortably.

SIZE #	XS	S	M	L	XL	XXL
Size	6	7	8	9	10	11

ALL GLOVES WITH A CUFF ARE COLOUR CODED FOR SIZE IDENTIFICATION AS BELOW.

SIZE	6	7	8	9	10	11
Overedge Colour*	Purple	Red	Yellow	Brown	Black	Light Blue
* Except for Vantage® proFood®	Brown	Green	White	Red	Blue	



Ansell

STANDARD EN 374: 2003

Gloves giving protection from chemicals and micro-organisms

SCOPE

This standard specifies the capability of gloves to protect the user against chemicals and/or micro-organisms.

DEFINITIONS

Penetration

Penetration is the movement of a chemical and/or micro-organism through porous materials, seams, pinholes or other imperfections in a protective glove material at a non-molecular level.

Permeation

The rubber and plastic films in gloves do not always act as barriers to liquids. Sometimes they can act as sponges, soaking up the liquids and holding them against the skin. It is therefore necessary to measure breakthrough times, or the time taken for the hazardous liquid to come in contact with the skin.

REQUIREMENTS

■ The minimum liquid-proof section of the glove shall be at least equal to the minimum length of the gloves specified in EN 420.

■ **Penetration:** A glove shall not leak when tested with an air and water leak test, and shall be tested and inspected in compliance with the acceptable quality level.

PERFORMANCE LEVEL	ACCEPTABLE QUALITY LEVEL UNIT	INSPECTION LEVELS
Level 3	< 0.65	G1
Level 2	< 1.5	G1
Level 1	< 4.0	S4

WARNING:

The chemical data information does not necessarily reflect the actual duration in the workplace.



■ The 'chemical resistant' glove pictogram must be accompanied by a minimum 3-digit code. This code refers to the code letters of the chemicals (from a list of 12 standard defined chemicals), for which a breakthrough time of at least 30 minutes has been obtained.

CODE LETTER	CHEMICAL	CAS NUMBER	CLASS
A	Methanol	67-56-1	Primary alcohol
B	Acetone	67-64-1	Ketone
C	Acetonitrile	75-05-8	Nitrile compound
D	Dichloromethane	75-09-2	Chlorinated paraffin
E	Carbone disulphide	75-15-0	Sulphur containing organic compound
F	Toluene	108-88-3	Aromatic hydrocarbon
G	Diethylamine	109-89-7	Amine
H	Tetrahydrofurane	109-99-9	Heterocyclic and ether compound
I	Ethyl acetate	141-78-6	Ester
J	n-Heptane	142-85-5	Saturated hydrocarbon
K	Sodium hydroxide 40%	1310-73-2	Inorganic base
L	Sulphuric acid 96%	7664-93-9	Inorganic mineral acid

■ **Permeation:** Each chemical tested is classified in terms of breakthrough time (performance level 0 to 6).

MEASURED BREAKTHROUGH TIME

> 10 minutes
> 30 minutes
> 60 minutes

PROTECTION INDEX

class 1
class 2
class 3

MEASURED BREAKTHROUGH TIME

> 120 minutes
> 240 minutes
> 480 minutes

PROTECTION INDEX

class 4
class 5
class 6



■ The 'low chemical resistant' or 'waterproof' glove pictogram is to be used for those gloves that do not achieve a breakthrough time of at least 30 minutes against at least three chemicals from the defined list, but which comply with the penetration test.



■ The 'micro-organism' pictogram is to be used when the glove conforms to at least a performance level 2 for the penetration test.

CHECK THE CHEMICAL TOOL

on Ansell's website at <http://industrialcatalogue.ansell.eu/en/chemicalagents>

STANDARD EN 388: 2003

Gloves giving protection from mechanical risks

SCOPE

This standard applies to all kinds of protective gloves in respect of physical and mechanical aggressions caused by abrasion, blade cut, puncture and tearing.

DEFINITION AND REQUIREMENTS

Protection against mechanical hazards is expressed by a pictogram followed by four numbers (performance levels), each representing test performance against a specific hazard.



a b c d

The 'mechanical risks' pictogram is accompanied by a 4-digit code.

a. RESISTANCE TO ABRASION

Based on the number of cycles required to abrade through the sample glove.

b. BLADE CUT RESISTANCE

Based on the number of cycles required to cut through the sample at a constant speed.

c. TEAR RESISTANCE

Based on the amount of force required to tear the sample.

d. PUNCTURE RESISTANCE

Based on the amount of force required to pierce the sample with a standard-sized point.

In all cases, [0] indicates the lowest level of performance, as follows:

TEST	PERFORMANCE LEVEL RATING					
	0	1	2	3	4	5
a. Abrasion resistance (cycles)	<100	100	500	2,000	8,000	
b. Blade cut resistance (factor)	<1.2	1.2	2.5	5.0	10.0	20.0
c. Tear resistance (newton)	<10	10	25	50	75	
d. Puncture resistance (newton)	<20	20	60	100	150	

These performance levels must be prominently displayed alongside the pictogram on the gloves and on the packaging which immediately contains the gloves.

STANDARD EN 407: 2004

Gloves giving protection from thermal hazards

SCOPE

This standard specifies thermal performance for protective gloves against heat and/or fire.

DEFINITION AND REQUIREMENTS

The nature and degree of protection is shown by a pictogram followed by a series of six performance levels, relating to specific protective qualities.



abcdef

The 'heat and flame' pictogram is accompanied by a 6-digit number:

a. RESISTANCE TO FLAMMABILITY (performance level 0 - 4)

Based on the length of time the material continues to burn and glow after the source of ignition is removed. The seams of the glove shall not come apart after an ignition time of 15 seconds.

b. CONTACT HEAT RESISTANCE (performance level 0 - 4)

Based on the temperature range (100-500 °C) at which the user will feel no pain for at least 15 seconds. If an EN level 3 or higher is obtained, the product shall record at least EN level 3 in the flammability test. Otherwise, the maximum contact heat level shall be reported as level 2.

c. CONVECTIVE HEAT RESISTANCE (performance level 0 - 4)

Based on the length of time the glove is able to delay the transfer of heat from a flame. A level of performance shall only be mentioned if a performance level 3 or 4 is obtained in the flammability test.

d. RADIANT HEAT RESISTANCE (performance level 0 - 4)

Based on the length of time the glove is able to delay the transfer of heat when exposed to a radiant heat source. A performance level shall only be mentioned if a performance level 3 or 4 is obtained in the flammability test.

e. RESISTANCE TO SMALL SPLASHES OF MOLTEN METAL
(performance level 0 - 4)

The number of molten metal drops required to heat the glove sample to a given level. A performance level shall only be mentioned if a performance level 3 or 4 is obtained in the flammability test.

f. RESISTANCE TO LARGE QUANTITIES OF MOLTEN METAL
(performance level 0 - 4)

The weight of molten metal required to cause smoothing or pinholing across a simulated skin placed directly behind the glove sample. The test is failed if metal droplets remain stuck to the glove material or if the specimen ignites.

Gloves must achieve at least performance level 1 for abrasion and tear.

STANDARD EN 511 : 2006

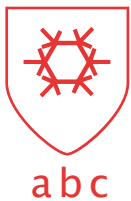
Gloves giving protection from cold

SCOPE

This standard applies to any gloves to protect the hands against convective and contact cold down to -50 °C.

DEFINITION AND REQUIREMENTS

Protection against cold is expressed by a pictogram followed by a series of 3 performance levels, relating to specific protective qualities.



The 'cold hazard' pictogram is accompanied by a 3-digit number :

a. RESISTANCE TO CONVECTIVE COLD (performance level 0 - 4)

Based on the thermal insulation properties of the glove which are obtained by measuring the transfer of cold via convection.

b. RESISTANCE TO CONTACT COLD (performance level 0 - 4)

Based on the thermal resistance of the glove material when exposed to contact with a cold object.

c. PENETRATION BY WATER (0 or 1)

0 = water penetration

1 = no water penetration.

All gloves must achieve at least performance level 1 for abrasion and tear.

STANDARD EN 421 : 2010

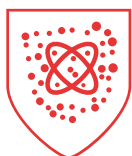
Gloves giving protection from radioactive contamination and ionising radiation

SCOPE

This standard applies to gloves to protect from ionising radiation and radioactive contamination

DEFINITION AND REQUIREMENTS

The nature of protection is shown by a pictogram relating to the specific protective qualities.



- To protect from **RADIOACTIVE CONTAMINATION**, the glove has to be **LIQUID PROOF** and needs to pass the penetration test defined in EN 374.

- For gloves used in containment enclosures, the glove shall pass in addition a specific air pressure leak test.

- Materials may be modelled by their behaviour to ozone cracking. This test is optional and can be used as an aid to selecting gloves.



- To protect from **IONISING RADIATION**, the glove has to contain a certain **AMOUNT OF LEAD OR EQUIVALENT METAL**, quoted as lead equivalence. This lead equivalence must be marked on each glove.

STANDARD EN 1149

Electrostatic properties

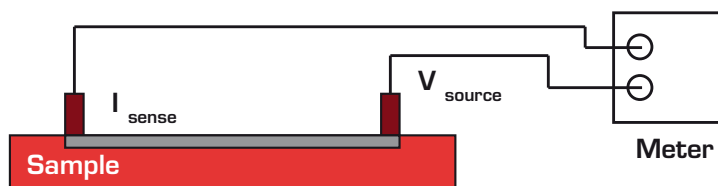
SCOPE

This standard specifies the requirements and test methods for materials used in the manufacturing of electrostatic dissipative protective clothing (gloves) to avoid electrostatic discharges.

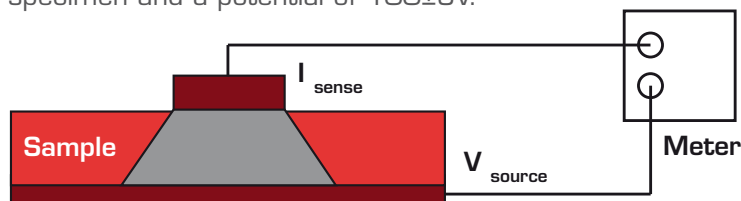
DEFINITION AND REQUIREMENTS

As per EN 420:2003, it is defined that the electrostatic properties shall be tested as per the test methods described in EN 1149.

- 1. EN 1149 – Part 1 defines the test to measure surface resistivity/resistance (Ω) = resistance in ohm along the surface of the material, between two specified electrodes (resting on the test specimen) and a potential of $100 \pm 5V$.



- 2. EN 1149 – Part 2 defines the test to measure vertical resistance (Ω) = resistance in ohm through a material, between two electrodes placed on opposite surfaces of the test specimen and a potential of $100 \pm 5V$.



- 3. EN 1149 – Part 3 defines the test to measure the half decay time T_{50} (s) = the time it takes for a material to achieve a 50% decay of a charge induced on the material via an electrode.
- 4. EN 1149 – Part 5 defines the criteria to claim antistaticity for gloves:
 - Surface resistance $< 2.5 \times 10^9 \Omega$ (or Surface resistivity $< 5 \times 10^{10} \Omega$) **OR**
 - Charge decay time $T_{50} < 4s$
 - For vertical resistance (Ω), there are no set criteria defined.

As per the EN 420 standard, no anti-static pictogram shall be used.

STANDARD EN 12477: 2001

Gloves giving protection from manual metal welding

SCOPE

This standard applies to protective gloves for use in manual metal welding, cutting and allied processes.

REQUIREMENTS

EN 12477: Protection gloves for welders

Standard for manual metal welding

Compliance to EN 420 except for lengths:

Size 6:	300 mm
Size 7:	310 mm
Size 8:	320 mm
Size 9:	330 mm
Size 10:	340 mm
Size 11:	350 mm

REQUIREMENTS (EN LEVELS)	TYPE A	TYPE B (HIGH DEXTERITY, TIG WELDING)
Abrasion	2	1
Cut	1	1
Tear	2	1
Puncture	2	1
Burning behaviour	3	2
Contact heat	1	1
Convective heat	2	–
Small splashes	3	2
Dexterity	1	4

Type B gloves are recommended when high dexterity is required as for TIG welding, while Type A gloves are recommended for other welding processes.

Type A or B to be marked on the product, its packaging and in the instructions for use.

REACH

Registration, Evaluation, Authorisation and Restrictions of Chemicals

WHAT IS REACH?

European firms that make or import more than one tonne of a chemical substance per year had to pre-register that chemical substance if it is within a release agent on an article or within a preparation (mixture of chemical substances).

Companies who failed to pre-register can no longer manufacture or import their chemicals unless they make immediate formal registrations.

A second pillar of the REACH legislation is the notification of substances of very high concern (SVHC), i.e. chemicals with indications of impact on the environment and/or health. In October 2008, REACH published its first Candidate List with such SVHC chemicals which has been amended in January 2010 and June 2010 and December 2010. Companies now have the obligation to inform everyone involved in their supply chain if they use any of the Candidate List substances in concentrations over 0.1% w/w within their articles (e.g. gloves) or within preparations. Companies can continue to use these SVHCs up to a certain date that 'still need to be defined by the European Commission and then, only if application is made to the ECHA for 'Authorization for continued use of the SVHC', companies can continue to use them after that date.

ANSELL & REACH

All Ansell products fully comply with the legal requirements as per REACH regulation 1907/2006.

Pre-registrations of all required substances have been completed and substances that have been (or will be in the future) defined as substances of very high concern and which are currently used in any Ansell products will be removed and replaced before authorisation is required.

The Ansell REACH statement can be obtained via the Ansell website and more detailed info is available through the Ansell regulatory department.

Working with Ansell



ALL THE SUPPORT YOU NEED TO MAKE THE SAFEST CHOICE

Ansell Healthcare have not only adopted all the above procedures, but frequently operate quality controls more stringent than those required by law. (In particular, each step of the manufacturing process is carefully monitored to produce the most consistent quality of production in the industry.)

Our documentation contains a more detailed description of each glove, together with recommendations for use, but if you feel you would like any further help in making your choice, we will be glad to send an expert adviser to observe your gloves in action, and recommend the optimum specification.

Remember, under Article 5 of the PPE Directive, you will be required to prove that you are providing your workforce with the safest and fittest protection available: so if you do have any special needs, we strongly recommend that you take advantage of Ansell's unique 'hands-on' advisory service.

THE ANSELL HEALTHCARE GUARANTEE

Any glove you buy from us has been certified as per the PPE 89/686/EEC Directive and relevant EN standards, and is CE marked.

You may be confident that any safety product you buy from Ansell will be manufactured, tested, packaged and documented strictly in accordance with current European legislation.

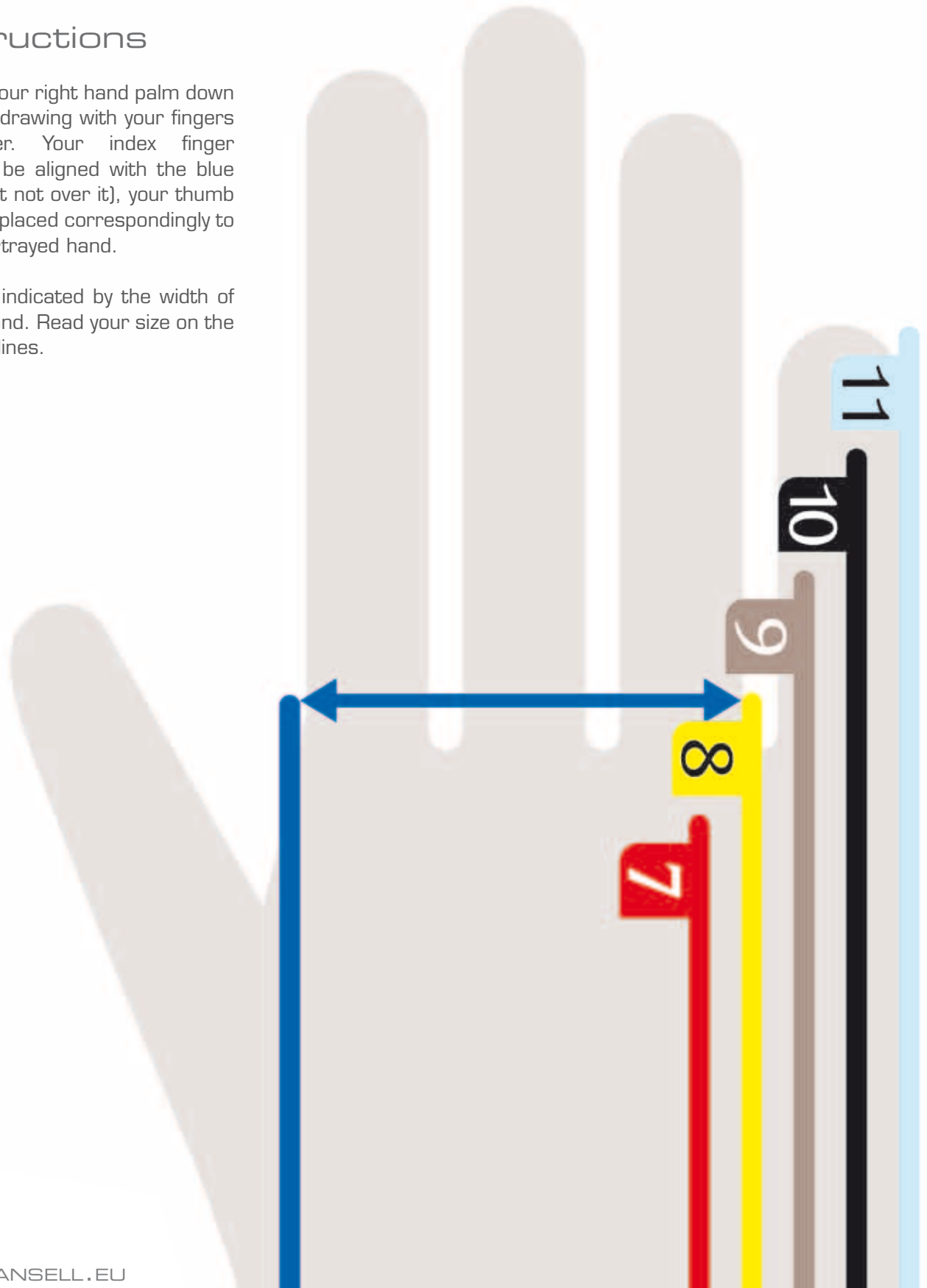
No one knows more about protective gloves than Ansell.

By choosing protective products you know to be of the highest quality, you will not only be making the best decision for your workforce, but will clearly be fulfilling your obligation under the law.

Glove Sizing Chart

Instructions

- Place your right hand palm down on the drawing with your fingers together. Your index finger should be aligned with the blue line (but not over it), your thumb crotch placed correspondingly to the portrayed hand.
- Size is indicated by the width of your hand. Read your size on the colour lines.





Ansell is a world leader in providing superior health and safety protection solutions that enhance human well being. With operations in North America, Latin America, EMEA and Asia, Ansell employs more than 10,000 people worldwide and holds leading positions in the natural latex and synthetic polymer glove and condom markets. Ansell operates in four main business segments: Medical Solutions, Industrial Solutions, New Verticals, and Sexual Health & Well Being. Information on Ansell and its products can be found at <http://www.ansell.eu>.

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