



Special Hazard Clothing

Under Regulation 4 of the Personal Protective Equipment at Work Regulations 1992, employers are required by law to provide suitable PPE for employees whose health and safety is at risk in the workplace.

Should an employee be exposed to risk of harm from contact with chemicals or health threatening particulates then they should be provided with appropriate clothing and other items of PPE.

Chemical and hazardous particulate protective clothing is available in a number of styles and fabrics, including re-usable and limited life. Whatever the style and fabric used in the manufacture of special hazard protective clothing it should conform to appropriate EN Standards.

Chemical Protective Fabrics

Any fabric used in the manufacture of chemical protective clothing should be tested to standards EN369 and EN368. EN369 measures the permeation of chemicals, through a fabric and EN368 measures liquid repellency of a fabric.

Additional EN standards, which may be considered

when selecting chemical protective clothing, might include EN1149-1 Antistatic Properties, EN533 Limited Flame Spread and EN531 Flame Heat Protection of the fabric.

Chemical Protective Clothing Types

According to European Standards, chemical protective clothing is subdivided into several levels or 'Types' of protection. In order to be certified as offering a particular 'Type' of protection the fabric's physical and barrier properties must meet minimum performance requirements. Additionally, for protection levels of Types 3, 4 & 6, the whole suit itself must be tested for liquid barrier to a minimum of one of the whole suit 'Type' tests and pass a dynamic movement test.

The table (table 1) below provides a summarized description of the whole suit 'Type' tests (Types 3, 4 and 6 only)

For Type 3, EN463 for limited life fabric suits and EN466 for re-usable fabric suits and for Type 4, EN468 for limited life fabric suits and EN465 for re-usable fabric suits and for Type 6, EN468(prEN13034) for limited life fabric suits.

TABLE 1 – Chemical Protective Clothing Pictogram's and Standards



Chemical Protective Clothing

Type 3

EN 463

Liquid Test Method

This test involves exposing a whole suit to a series of short jets of a water based liquid (with a low surface tension of 30-35 m N/m) aimed at various critical parts of the suit. The pressure of the jet when leaving the nozzle is situated at a distance of 1m away from the garment.

The liquid is coloured, so that any inward leakage will visibly stain the undergarment. A suit has passed the test when the total stained area on the undergarment is smaller than three times the calibration stain. (The calibration stain is the stain area produced by 0.02ml of the test liquid.)



Type 4

EN 468

Spray Test

This test involves exposing a whole suit to an intense spray of a water based liquid (with a low surface tension of 30-35 m N/m). A total quantity of 4.5 litres is sprayed as an aerosol for one minute. There is no pressure exerted by the fine spray on the suit. While being sprayed, the wearer of the suit will perform gentle movements while rotating.

The liquid is coloured, so that any inward leakage will visibly stain the undergarment. A suit has passed the test when the total stained area on the undergarment is smaller than three times the calibration stain. (The calibration stain is the stain area produced by 0.02 ml of the test liquid.)



Type 6

EN 468 modified by prEN 13034

Low Level Spray Test

This test is essentially the same as the Type 4 spray test however the liquid now has a slightly higher surface tension of 57 m N/m and the quantity sprayed is reduced to 1.9 litres.





Your Eurosafe supply partner offers the full range of both Limited Life and PVC Chemical Protective suits and can help you with your product selection.

Limited Life Chemical Protective Clothing

Safe and reliable Tychem C and F Type 3 protective clothing available from Dupont and Prime Guard Xtra from Shiloh offers you a combination of chemical and biological protection as well as lightweight in a single garment.

Re-Usable Chemical Protective Clothing

PVC chemical protective suits manufactured by Alpha Solway are included in the range and offer excellent splash protection from a wide range of chemicals and are specified by many of the largest chemical and petro-chemical companies in the country.

The following table (table 2) will help in your decision about which chemical suit to select when making the choice between permeation times and suit life. It should not be considered as absolute and you should contact your Eurosafe supply partner who will help you access the technical information provided by our manufacturers.



TABLE 2 – Permeation Times

Chemical	Cas#	Tychem C	Tychem F	Prime Guard Xtra WS	PVC
Tolulene	108-88-3	imm.	>480	3	4
Hexane	110-54-3	imm.	>480	1	6
Methanol	67-56-1	imm.	>480	>480	14
Methyl Vinyl Ketone	78-94-4	n.t.	>480	n.t.	10
Methyl Isocyanate	624-83-9	n.t.	>480	n.t.	5
Chlorobenzene	108-90-7	n.t.	>480	n.t.	10
PCB in Transformer Oil	11097-69-1	n.t.	>480	n.t.	n.t.
Acetonitrile	75-05-8	imm.	>480	5	10
Hydrochloric Acid (37%)	7647-01-0	235	>480	>480	480
Hydroflouric Acid (70%)	7664-39-3	>480	>480	n.t.	360
Hydroflouric Acid (48%)	7664-39-3	n.t.	390	n.t.	n.t.
Nitric Acid (70%)	7697-37-2	>480	>480	>480	30
Sulphuric Acid (98%)	7664-93-9	>480	>480	>480	25
Sodium Hydroxide (42%)	1310-73-2	>480	>480	>480	480
Sulphuric Acid, Chromium Salt (80%)	65272-70-0	>480	>480	n.t.	n.t.
Sodium Hypochlorite (13%)	7681-52-9	>480	>480	>480	360
Potassium Chromate (saturated salt solution)	7789-00-6	>480	>480	n.t.	360

Key

n.t. = not tested, imm = immediate

For further guidance please contact your **EURSAFE** Member who will be pleased to assist with product selection



Particulate Protective Clothing

When employees are exposed to risk to their health from the effects of hazardous particulates then they should be provided with clothing manufactured from appropriate fabric offering suitable particle barrier.

Particle barrier is measured by exposing a fabric to a particle challenge and then determining the penetration of particles through the fabric by means of a particle counter. The particle counter determines the number of particles, which have penetrated through the fabric per defined size range.

In the absence of a European test method for particle barrier of breathable fabrics many manufacturers measure the particle barrier to Aloxite dust according to a proposed European test method, CEN/TC 162 WG3 and to Chrysolite asbestos fibres according to a Haskell laboratory test method. Additionally there may be a requirement for the garment to be anti static, when the fabric is tested to EN 1149-1.

Whilst there is no test method for fabric particle barrier, particle protective clothing is tested to 'Types' and as a minimum your selection should be to 'Type' 5/6. The table (table 3) summarises the test methods of whole suit 'Types 5 and 6.



TABLE 3 – Particle Protective Clothing

<p>Type 5</p> 	<p>Draft Test Method A</p>	<p>Particle Test</p>	<p>This test involves exposing a whole suit to coloured epoxy resin particles. The particle Size distribution ranges from 5 to 100 microns, with an average of 25 microns. The particles are electrostatically charged and are attracted to the wet undergarment worn by the grounded wearer. 45g of test dust are sprayed over the suit during one minute while the wearer gently moves.</p>	<p>Any inward leakage will visibly stain the undergarment. A suit has passed the test the total stained area on the garment is smaller than 3 times the calibration stain area generated by 20 mg of the test dust.</p>
	<p>Draft Test Method B</p>	<p>Particle Test</p>	<p>This test involves exposing a whole suit to a dry aerosol of sodium chloride. The particle size is 0.6µm. While being exposed to the dry aerosol, the wearer of the suit performs the following sequence of movements: 9 minutes standing, 9 minutes walking, 9 minutes squatting.</p>	<p>The total inward leakage is expressed as a percentage of the concentration of sodium chloride outside the suit. In order to pass the test the proposed inward leakage must be less than 30%.</p>
<p>Type 6</p> 	<p>EN 468 modified by prEN 13034</p>	<p>Low Level Spray Test</p>	<p>This test is essentially the same as the Type 4 spray test however the liquid now has a slightly higher surface tension of 57 m N/m and the quantity sprayed is reduced to 1.9 litres.</p>	