

Guide to European Norms and Selection Guide

To assist you with the selection of chemical protective clothing the EU has developed six “types” of chemical protective clothing.

Certification to a particular type offers an indication of your suits protection against a particular hazard (gas, liquid or dust). As a manufacturer it is our responsibility to ensure that MICROGARD® and MICROCHEM® products meet the requirements of these type standards, where applicable.

Please be aware that conformance to these types standards does not mean that your suit is 100% impervious to your hazard. Under this testing, suits are only required to meet the minimum performance requirements specified. In the case of the Type 5 particulate test, suits are allowed individual leakages of up to 30%, providing the average for the suits tested is less than 15%.

Microgard Limited manufacture products according to ISO 9001, thus ensuring as far as is reasonably possible they consistently achieve the desired protection level. For more information visit www.microgard.com

Current European “Types” of Chemical Protective Clothing

EN “Types”	Definition	Symbol*
EN 943-1 & 2 “Type 1”	Gas Tight Chemical Protective Clothing Protective clothing against liquid and gaseous chemicals, aerosols and solid particulates	 TYPE 1
EN 943-1 “Type 2”	Non Gas Tight Chemical Protective Clothing Suits which retain positive pressure to prevent ingress of dusts, liquids and vapours	 TYPE 2
EN 14605 “Type 3”	Liquid Tight Suits Suits which can protect against strong and directional jets of liquid chemical	 TYPE 3
EN 14605 “Type 4”	Spray Tight Suits Suits which offer protection against saturation of liquid chemicals	 TYPE 4
EN ISO 13982-1 “Type 5”	Dry Particulate Protection Suits which provide protection to the full body against airborne solid particulates	 TYPE 5
EN 13034 “Type 6”	Reduced Spray Suits Suits which offer limited protection against a light spray of liquid chemicals	 TYPE 6

Disclaimer
MICROGARD®/MICROCHEM® garments are available for most applications. However please note that a detailed assessment of the nature of the hazard and the working environment should be undertaken prior to the selection of appropriate PPE. Microgard Ltd provides the information in this product catalogue to assist you with selecting the correct product, but responsibility for the correct choice of PPE remains with the user.

Additional Standards achieved by the MICROGARD® product range

Standard	Definition	Symbol*
EN 1073-2**	Protective clothing against radioactive particulate contamination	 EN 1073-2
EN 14126	Protective clothing against infective agents [“Type” prefixed with “-B” [i.e. Type 3-B] indicates approval to this European Norm]	 EN 14126
EN 1149-1 EN 1149-5	Protective Clothing with electrostatic properties***	 EN 1149
DIN 32781	Protective Clothing. Protective suits against pesticides	 DIN 32781
EN ISO 14116	Protective Clothing Limited flame spread materials, material assemblies and clothing	 EN ISO 14116 INDEX 1000
EN 12941	Respiratory protective devices. Powered filtering devices incorporating a helmet or a hood	 EN 12941

* Type approvals do not necessarily apply to accessories. Always refer to the garment label and instructions for use document which will indicate the protection level offered.

** Gives no protection against radioactive radiation

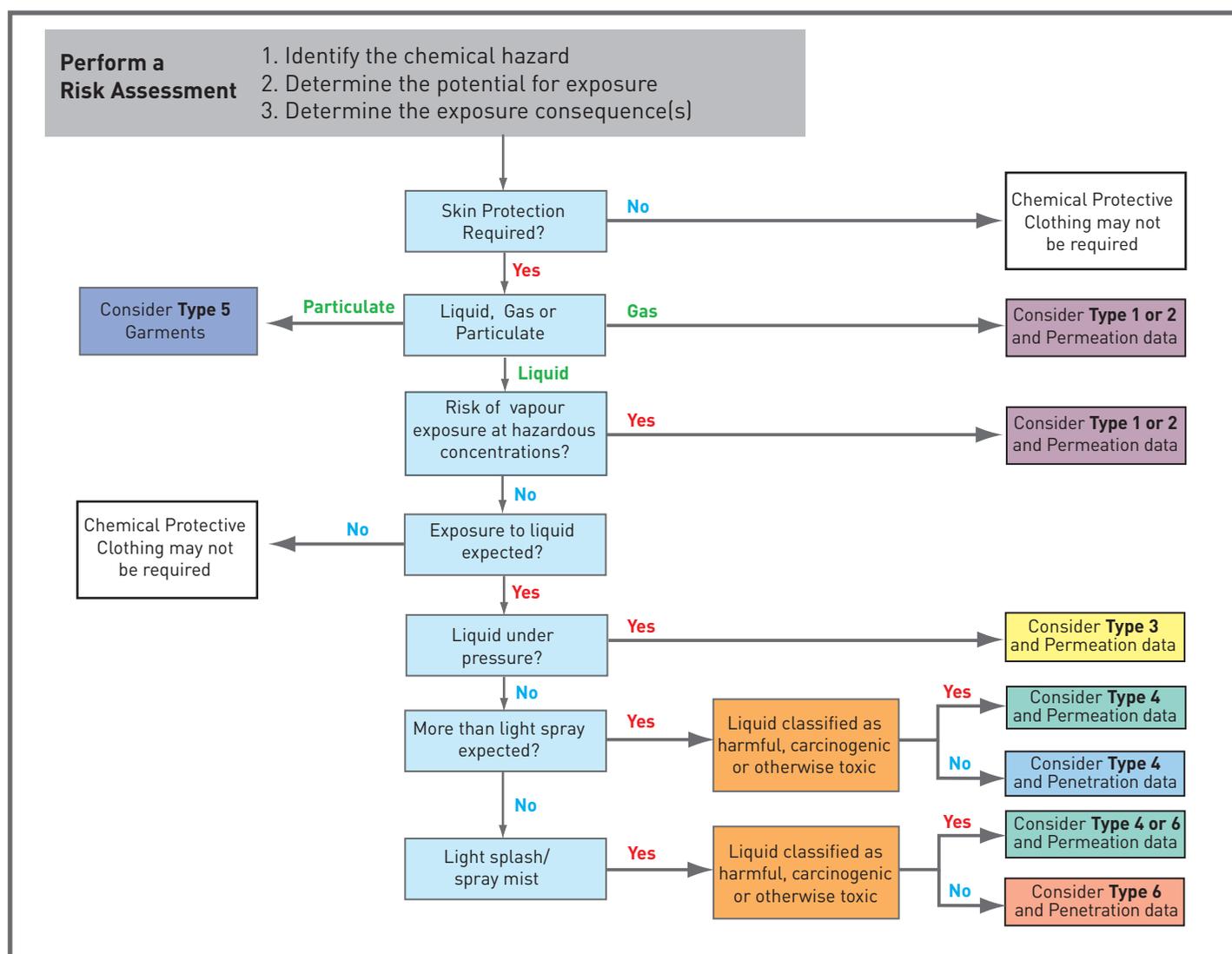
*** Always ensure the garment and wearer are properly grounded

Selecting the Correct Chemical Protective Clothing



Microgard Limited has devised this simple flowchart as a basic tool to assist users and specifiers in selecting the correct “type” of chemical protective clothing.

It is important that protective clothing’s suitability for a particular use is determined by a trained expert in occupational health & safety. Many chemicals can cause serious and permanent injury to an unprotected or improperly protected user. Therefore special emphasis has to be placed on the careful selection of chemical protective clothing when the potential for exposure to such chemicals has been identified.



Factors to Consider

Advice on the suitability of chemical protective clothing for a task is very often based on reported permeation breakthrough times. The standard test methods used for measuring breakthrough time (i.e. EN 374-3, ISO 6529, ASTM F 739) are often regarded as representing the “worst case scenario”, since the chemical is held in direct contact with the barrier material. Intermittent contact or splashes of chemical, in real-life, may in fact lengthen the breakthrough time. Also, laboratory generated chemical permeation data may not always reflect conditions in the workplace. Temperature, pressure, flexing etc. could all potentially have an impact on the breakthrough time. When choosing chemical protective clothing consideration has to be given to permeation and penetration, and the physical performance attributes of the product (abrasion, tear, tensile, strength etc.) Other physical properties to consider are the strength of seams and closures (i.e. zips) the flexibility, weight and comfort factors (i.e. thermal insulation, breathability etc.) The best chemically resistant material will be ineffective if torn, cut, punctured or otherwise damaged.

The Microgard Technical Team can assist in the selection of chemical protective clothing. Visit www.microgard.com for more details or e-mail technical@microgard.com

Important note: This guide is simplified and as such chemical protective clothing’s suitability for a particular use should only be determined by a trained expert in occupational health & safety. It is the responsibility of the user to assess the types of hazards and the risks associated with exposure and to verify the information provided for the product to make a final decision on the appropriate personal protective equipment needed for their specific circumstance.



Protective Clothing according to EN 14126:2003 - Protection from Infective Agents



Protective Clothing against infective agents has two main functions...

- to prevent infective agents from reaching the (possibly injured) skin
- to prevent the spreading of infective agents to other people and other situations, e.g. eating or drinking, when the person has taken his protective clothing off

In many work situations i.e. microbiological laboratories; the infective agents can be contained and the risk of exposure limited to the occurrence of an accident.

However, in other types of work i.e. sewage & waste water treatment, caring for infected animals, emergency clean-up; the organisms cannot be contained, exposing the worker continuously to the risk of infection by biological agents. In these situations the biological agents the worker is exposed to may not be known.

Applications where workers can be exposed to biological agents

- Waste water treatment works, sewage systems work
- Agriculture
- Food Industry
- Healthcare, hospitals, emergency services
- Clinical, veterinary laboratories
- Refuse disposal plants
- Activities where there is contact with animals and/or products of animal origin

Micro-organisms are a very heterogeneous group in that they come in all shapes and sizes, and their living conditions, survival abilities etc. vary widely. A distinction is made between four risk groups according to the risk of infection for humans. Details of these risk groups, along with their containment measures are found in European Directive 2000/54/EEC (on the protection of workers from the risk related exposure to biological agents at work).

EN14126:2003

Due to the heterogeneity of micro-organisms, it is not possible to define performance criteria of protective clothing on the basis of risk groups, nor on the type of micro-organism. Also it may not be possible to define exactly the organisms the worker is exposed to. Hence the test methods in EN14126:2003 focus on the medium containing the micro-organism, such as liquid, aerosol or a solid dust particle.

In accordance with the requirements of EN14126:2003 protective clothing should be certified as Category III and subjected to 5 test methods specified in the standard. The corresponding protective clothing "Type" is then prefixed with the letter "B" (e.g. Type 3-B) and the biohazard symbol is displayed.

For a copy of the Microgard Guide to EN14126:2003 please visit www.microgard.com

Microgard suggested garments for protection against infective agents					
Microgard Product	Protection against biologically contaminated dust	Protection against biologically contaminated liquids	Tasks*	Risk Groups	
				✓ Risk Groups 1, 2	✗ Risk Groups 1, 2, 3, 4
MICROGARD® 2000 STANDARD	✓	-	A/B	1. Biological agent unlikely to cause sickness in humans 2. Biological agent that could cause sickness in humans and represent a danger to employees; substance dispersal amongst the population is unlikely; effective preventive measures or treatment is normally possible	
MICROGARD® 2000 Ts PLUS	✓	✓	A/B		
MICROGARD® 2500 PLUS	✓	✓	B		
MICROCHEM® 3000	✓	✓	B/C	3. Biological agent, that can cause severe illness in humans and represent a serious risk for employees; a risk of dispersal amongst the population may occur; but effective preventive measures or treatment are normally possible 4. Biological agent, that causes severe illness in humans and represents a serious risk for employees; the risk of dispersal amongst the population is high under some circumstances; effective preventive measures or treatment are not normally possible.	
MICROCHEM® 4000	✓	✓	B/C		
MICROCHEM® 5000	✓	✓	B/C		

*Tasks - A. Routine inspection = no contact with contaminated material or objects B. Handling and disposal of possibly contaminated material, objects or animals C. Performed tasks require application of cleaning and disinfecting chemicals



Use of MICROGARD® and MICROCHEM® Chemical Protective Clothing in Ex-Zones



MICROGARD®
High Performance Protection in Comfort

Ex-Zones

The purpose of 'Zoning' is to provide the basis for correct selection of a protection concept. Areas are classified depending on the properties of the flammable vapours, liquids, mists, gases or combustible fibres/dusts that may be present in the environment and the likelihood that a combustible concentration of that gas or dust is present.

Where ignition sources cannot be eliminated and a flammable gas or dust area may be present, it is important to assess the extent and duration of the risk to select the correct equipment. This is normally referred to as 'Zoning' (Ex-Zones).

Gas Explosion Groups

Group I: Concerned with underground mining where coal dust and methane are present.

Group II: Concerned with surface industries gases & dust. They are sub-grouped according to volatility - IIA being the least volatile and IIC the most volatile.

Having conducted tests at the Swiss Safety Institute, Basel, the table below shows in which situation MICROGARD® and MICROCHEM® protective clothing may be safely worn*. Ex-Zone definitions as specified by CENELEC/IEC†.

		MICROGARD® 2000	MICROCHEM® 3000	MICROCHEM® 4000	MICROCHEM® 5000
Zone 0	An area in which a potentially explosive atmosphere, consisting of air and flammable substances – in the form of gas, vapour or mist – is continuously present or present for a long period.	✓	✓	✓	✓
Zone 1	An area in which a potentially explosive atmosphere, consisting of a mixture of air and flammable substances – in the form of gas, vapour or mist – is likely to occur in normal operation	✓	✓	✓	✓
Zone 2	An area in which a potentially explosive atmosphere, consisting of a mixture of air and flammable substances – in the form of gas, vapour or mist – is not likely to occur in normal operation	✓	✓	✓	✓
Zone 20	An area in which a potentially explosive atmosphere, in the form of a cloud of combustible dust in the air, is continuously present or present for long period.	✓	✓	✓	✓
Zone 21	An area in which a potentially explosive atmosphere, in the form of a cloud of combustible dust in the air, is likely to occur in normal operation	✓	✓	✓	✓
Zone 22	An area in which a potentially explosive atmosphere, in the form of a cloud of combustible dust in the air, is not likely to occur in normal operation	✓	✓	✓	✓

MICROGARD® and MICROCHEM® protective clothing meet the requirements of EN1149-1. For more information please visit www.microgard.com

*Ex-Zone testing conducted by the Swiss Safety Institute at 23°C and 30% relative humidity. The anti-static properties of MICROGARD® and MICROCHEM® protective clothing depends on the take up of moisture from the air. The anti-static treatment is therefore only effective when the relative humidity is above 25%. Please note that only the clothing material is dissipative. In order to prevent the creation of a spark, the garment and the wearer should be properly grounded. According to requirements in relevant standards (i.e. BGR 132), clothes and protective suits must not be changed in Ex-Zones if the minimum ignition energy is <3mJ. MICROGARD® and MICROCHEM® protective clothing should not be donned or removed in Ex-Zones.

† Sources: European (Cenelec) Standards www.cenelec.org, International (IEC) Standards www.iec.ch