



Technical information on biological hazards

Protection from contact with biological agents.

Whether in agriculture, the food industry, waste separation and recycling facilities, sewer systems or in the emergency services sectors, if workers come into contact with biological substances, safe and reliable protective clothing is essential to prevent, for example, infections and the spread of germs.



What are biological agents?

The term “biological agents” refers primarily to microorganisms such as bacteria, viruses and fungi. It also includes cell cultures and parasites that can cause infections or allergies in the human body.

What are the biological agents risk groups?

A distinction is made between four risk groups according to the risk of infection for humans. More detailed information on this can be found in the EU directive 2000/54EC.

How do we come into contact with biological agents?

A wide variety of activities can bring you into contact with bacteria, viruses or fungi, for example:

1. Manufacture and use of biological agents
(this includes for example: isolation, production, propagation, use, processing, filling, transferring, mixing, supply and disposal).
2. Occupational contact with people, animals, plants, biological products, objects and materials
(if this involves the release of biological agents and contact with them).

Where do biological substances occur, what are they, and what diseases can they trigger?

Sector	Biological substances	Possible diseases
Agriculture	Moulds	Allergies
	Bacteria (actinomycetes)	Farmer's lung (EAA)
	Microorganisms (e.g. Erwinia herbicola)	Organic dust toxic syndrome (<i>humidifier fever</i>)
	Bacteria (e.g. <i>Listeria monocytogenes</i>) Pathogens (e.g. <i>Coxiella burnetii</i>) Fungi (e.g. <i>Dermatophytes</i>)	Zoonotic diseases (<i>sickness transmitted from animals to humans</i>), e.g. Q fever, listeriosis or skin mycoses
Handling of veterinary waste (e.g. waste separation/recycling facilities, composting facilities)	See agriculture	Zoonotic diseases
	Moulds (e.g. <i>Aspergillus fumigatus</i>)	Allergies Aspergillosis, aspergilloma
	Bacteria (<i>Actinomycetes</i>)	Extrinsic allergic alveolitis (EAA)
	Gram-negative bacteria Enteric viruses, enteric bacteria	Organic dust toxic syndrome (<i>humidifier fever</i>) Infections (e.g. <i>gastroenteritis</i>)
Wastewater treatment plants, sewer system work	HAV virus	Hepatitis A
	Salmonella	Salmonellosis
	Echo, rota virus	Enterovirus (<i>virus infection</i>)
	Bacteria (e.g. <i>Leptospirosis</i>)	<i>Leptospira interrogans</i>
Hospitals, healthcare, laboratories, police, emergency services	Ebola, Lassa	Fevers
	HIV virus	AIDS
	Bordetella pertussis	Whooping cough
	Mycobacterium tuberculosis	Tuberculosis
	HBV virus	Hepatitis B
Food industry	Moulds/yeast	Allergies, skin irritations
	Bacteria	
	Endotoxins	Organic dust toxic syndrome (ODTS)

What protective measures must employers put into place?

According to the EU directive 2000/54EC, the employer is under obligation to make suitable protective clothing available to his employees. What clothing will give protection against biological agents? According to EN 14126, special requirements are defined for protective clothing against infectious agents in order to protect against bacteria, viruses and other microorganisms. It is their function to protect the skin against possible contact with biological substances and to prevent the spread of germs.

Classification of protective clothing according to EN 14126 type (including ending "B")	Standard reference suit test
1B, 2B	EN943-1, EN943-2
3B	EN466*
4B	EN465*
5B	prEN ISO 13982-1**
6B	prEN13034***
Partial body protection	EN467*

*466, EN465, EN467 have been superseded by EN14605 **Now EN ISO 13982-1 ***Now EN13034

Tyvek® and Tychem® bio barriers: For safe protection against biological agents.

In addition to the tests for chemical protective clothing, Tyvek® and Tychem® protective clothing materials from DuPont are tested using special procedures for determining the effectiveness of the barrier against infectious agents. Direct contact with bacteria, biologically contaminated liquid aerosols and solid particles is determined in this way and so is the bio barrier tested. Simply wearing protective clothing will not guarantee protection. The protective effect of the suits can only be ensured if the clothing is put on and taken off in the correct way and if correct working procedures are followed. For example, a suit being taken off incorrectly may result in the wearer becoming contaminated. DuPont Personal Protection can provide a training video on this subject entitled "Correct Handling of Protective Clothing". When selecting and using personal protective equipment, the compatibility of the equipment must be ensured e.g. protective suits, gloves or breathing apparatus.

DuPont recommended garments for protection against biological substances				
Garment model	Protection against biologically contaminated dust	Protection against biologically contaminated liquids	Risk groups	
			<input checked="" type="checkbox"/> Risk groups 1, 2 <input checked="" type="checkbox"/> Risk groups 1, 2, 3, 4	
TYVEK®				
TYVEK® Classic Plus Model CHA5 (4B, 5B, 6B)	✓		1. Biological agents unlikely to cause sickness in humans. 2. Biological agent that could cause sickness in humans and represent a danger to employees; substance dispersal among the population is unlikely; effective preventive measures or treatment is normally possible. 3. Biological agent, that can cause severe illness in humans and represent a serious risk for employees; a risk of dispersal among 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 among the population is high under some circumstances; effective preventive measures or treatment are not normally possible.	
TYVEK® Classic Plus with socks Model CHA6 (4B, 5B, 6B)	✓			
TYCHEM®				
TYCHEM® C Standard Model CHA5 (3B, 4B, 5B, 6B)	✓	✓		
TYCHEM® C Standard with socks Model CHA6 (3B, 4B, 5B, 6B)	✓	✓		
TYCHEM® C2 Model CHZ5 (3B, 4B, 5B, 6B)	✓	✓		
TYCHEM® F Standard Model CHA5 (3B, 4B, 5B, 6B)	✓	✓		
TYCHEM® F Standard with socks Model CHA6 (3B, 4B, 5B, 6B)	✓	✓		
TYCHEM® F2 Model CHZ5 (3B, 4B, 5B, 6B)	✓	✓		

Guidelines and orders for contact with biological agents	Directive/order	Bio substances order (bioStoffV) (see also EU directive 2000/54EC) http://de.osha.eu.int/
	Contents	Requirements for the protection of employees against hazards caused by biological agents

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