Introduction

This technical bulletin provides general guidance on skin hazards in the workplace. It considers the legislation that governs the control of skin hazards, provides some advice on how to identify them, lists some of the health effects associated with exposure to skin hazards and provides some guidance on control measures with particular emphasis on how to select suitable protective clothing.

1. Legislation

Employers have a legal duty to assess the health risks from skin exposure to hazardous substances at work. They are required to prevent, or where this is not reasonably practicable, control exposure by using and maintaining suitable controls. The Health and Safety at Work Act, the Control of Substances Hazardous to Health Regulations and the Personal Protective Equipment at Work Regulations are all relevant to the control of skin hazards at work.

1.1 The Health and Safety at Work Act

The Health and Safety at Work Act is concerned with protecting people at work and protecting others from any risks associated with work activities. An employer’s main duties with respect to skin hazards are to:

- prevent or adequately control exposure to substances that cause damage to the health of employees or others
- ensure that hazardous substances are used safely
- ensure that safe systems of work are in place and followed
- ensure equipment and tools are safe and maintained
- provide free personal protective clothing or equipment where it is necessary
- provide adequate welfare facilities including a number of skin care products
- provide health surveillance wherever it is appropriate
- give employees information, instruction, training and supervision
- appoint a competent person(s) to assist with health and safety responsibilities
- consult employees or their safety representative
- set up emergency procedures
- provide adequate first-aid facilities
- ensure appropriate safety signs are provided and maintained
- report diseases to the Health and Safety Executive (HSE) where appropriate.

1.2 The Control of Substances Hazardous to Health (COSHH) Regulations

COSHH applies whenever there is a risk at work of health effects from hazardous substances. In the case of skin hazards COSHH requires employers to:

- assess the risk from hazardous substances and wet work
- prevent or adequately control the risk with control measures
- if there are 5 or more employees, record the findings of the assessment
- maintain and monitor the effectiveness of controls
- in some situations carry out air monitoring and health surveillance
- inform, instruct and train the workforce about the risks of exposure to substances hazardous to health and the precautions that should be taken.

1.3 The Personal Protective Equipment at Work Regulations

The Personal Protective Equipment at Work Regulations consider the design, construction, testing and certification of Personal Protective Equipment (PPE). They require, where appropriate, that PPE is cleaned, maintained, used and stored correctly.
2. Identifying Skin Hazards

Skin hazards can be substances used in, or substances generated by, work processes and both should be considered. These might be naturally occurring, biological or man-made and various information sources are available to help identify them. These include; the Health and Safety Executive’s (HSE) Skin at Work website, EH40/2005 Workplace Exposure Limits (where substances which may cause damage to skin are marked with an “Sk” notation), product labels and trade associations and their journals and websites. The risk of exposure should be considered by assessing who might be harmed and how. This will include considering how much of a substance is used, how long it is used for, what parts of the body it is in contact with and for how long it is in contact with them. It is important to understand the health effects associated with exposure to help identify the risk, inform workers and ensure that any symptoms are recognised at an early stage.

3. Health Effects

The skin is the largest organ in the human body, covering 1.5 – 2m² in most adults. It provides a protective barrier, restricts the loss of moisture from the body, acts as a sensory organ, regulates temperature and produces vitamin D. There are two main layers in skin; the dermis and the epidermis, with the epidermis providing the skin’s barrier function. It is not a perfect barrier, however, and some substances can pass through the skin and into the body, whilst others can damage its surface. There are five main groups of skin hazards and each is summarised below:

3.1 Burns

Severe skin damage, which may lead to skin scarring, can occur after brief contact with a corrosive substance. Examples include; wet cement, strong acids and strong alkalis.

3.2 Irritant contact dermatitis (ICD)

Irritant contact dermatitis is a skin reaction leading to inflammation at the site of contact. Symptoms include; dry, red or itchy skin, swelling, flaking, blistering, cracking and pain. Repeated contact can lead to hyper-irritability, where inflammation occurs more readily than normal. ICD can develop after regular contact with mild irritants (e.g. detergents, weak acids, weak alkalis and some solvents) or it can develop through prolonged or frequent contact with water, known as “wet work”.

3.3 Allergic contact dermatitis (ACD)

ACD is also known as skin sensitisation and is an immunological response to a sensitising substance (e.g. latex). The symptoms are similar to ICD but once a person has developed an allergy just a tiny amount of that substance will trigger a reaction and the only remedy is to prevent further exposure.

3.4 Other skin diseases

These include urticaria (a wheal or mark that appears quickly after skin contact and disappears again within hours), skin cancer (one of the most common forms of cancer, identifiable by scaly skin, a red lump or spot, an ulcer, a new/changed mole, or a patch of skin that bleeds, oozes or has a crust) and acne (inflammation in the form of pimples and pustules).

3.5 Systemic diseases

Systemic diseases occur when harmful substances pass through the skin and cause diseases in other parts of the body. These can include; cancer, diseases of the kidneys, heart, circulatory and nervous systems and poisoning.

4. Control Measures

If a skin hazard has been identified in the workplace it may be necessary to implement one or more control measures to eliminate exposure or reduce it to non-hazardous levels. The below describes the hierarchy of control which should always be followed:

4.1 Elimination or substitution

Careful consideration should be given to whether exposure to a skin hazard can be eliminated completely by altering the process used or if the substance can be substituted for something which is less harmful. If this is not possible, or if the risk is not sufficiently reduced (i.e. in the case of substituting for a less harmful substance) engineering controls, the next step in the hierarchy of control, should be considered.

4.2 Engineering controls

Engineering controls help to prevent an employee from coming into contact with skin hazards. Examples of engineering controls include; spray booths, automated handling equipment and tools with longer handles which increase the distance from the hazard.

4.3 Personal Protection Equipment (PPE)

If it is still not possible to control exposure to a safe level after following the upper levels of the hierarchy of control, PPE should be used as a last resort. PPE may also be used as an interim measure whilst other controls are being implemented. Gloves and protective coveralls are examples of PPE used to control exposure to skin hazards.

5. Personal Protective Equipment (PPE) Selection

PPE must be both adequate and suitable. Adequate PPE is capable of eliminating or reducing the wearer’s exposure to a skin hazard to a safe level. Suitable PPE is appropriate for the task, the wearer and the environment in which it is used. Considerations when selecting PPE for skin hazards include; the parts of the body exposed to the hazard (e.g. hands or whole body), the nature of exposure (e.g. immersion, splash or spray), the task, the size of the wearer and the ability of the PPE material to exclude the hazard.
5.1 Selection of Protective Coveralls

There are a number of different tests and standards that relate to protective coveralls and it is important to understand what these mean in practice in order to select a suitable product.

5.1.1 EN 340 Protective Clothing: General Requirements

EN 340 is the high level standard for protective clothing which is not applied on its own, but in combination with other relevant standards. It specifies general requirements such as the innocuousness of the material, labelling, sizing and weight which apply to many different types of clothing including those designed for adverse weather, mechanical risks and heat protection. In respect to protective coveralls, it requires that products comply with certain “type” standards.

5.1.2 Type Standards

Each “type” of protective clothing has its own standard and/or test method but products can be approved to more than one standard and therefore type. A common example of this would be a type 5/6 coverall which is designed to protect the wearer against particles (type 5, EN ISO 13982-1+A1) and limited liquid splash (type 6, EN 13034+A1). The table below lists the six types, their symbols and the relevant EN standards.

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<thead>
<tr>
<th>PPE Category</th>
<th>Protection Type</th>
<th>Symbol</th>
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<tr>
<td></td>
<td>5. Particle Protection</td>
<td>![Particle Symbol]</td>
<td>EN ISO 13982-1+A1 (EN ISO 13982-2 test method)</td>
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5.1.3 Materials Tests

Within each type standard there is also a number of material requirements such as, abrasion resistance, tensile strength and puncture resistance. The test method for each of these is detailed in EN 14325 and materials are given a class (generally up to class 6) for each test, with a higher class indicating a higher test result. This information may be of use when comparing products and judging their relative suitability for a workplace and 3M publishes the class results for each of our products on the relevant datasheets.

5.1.4 Additional Standards

In addition to the type standards and materials tests, there are also a number of optional standards to which protective coveralls can be approved. These include; EN 1149-5 Electrostatic properties, EN 1073-2 Protection against nuclear particles and EN 14126 Protection against micro-organisms.

5.1.5 Chemical Data – Permeation, Penetration and Repellency

Different materials offer varying levels of protection against different substances and it is important to take this into account when selecting protective coveralls. Protective coverall manufacturers often test their materials against a number of commonly used substances and can supply information on a material’s performance against specific hazards. Performance is generally tested in three ways; penetration, permeation and repellency. Penetration is how much of a substance travels through any minute pores in the fabric, whereas repellency is the opposite - how much of a substance rolls off the fabric and does not penetrate through. Permeation is how long it takes for molecules of a substance to travel through the fabric, this is occurs on a chemical level so is not necessarily easily detectable by the naked eye.

5.1.6 CE Simple Products

Some protective coveralls are not intended for use in hazardous environments and are classified as CE Category I Personal Protective Equipment (PPE) and are CE marked but do not undergo any independent, third party testing. They are suitable for use in general dirty applications but should not be used for more hazardous applications.

5.1.7 Selecting Suitable Protective Coveralls

Some protective coveralls incorporate features which can help make them more suitable for a particular wearer, task or environment. For instance, products with breathable back panels may be more comfortable in hot environments or where the work is more physical, and 3-piece hoods may be more appropriate for users who are also required to wear other PPE as these can offer a better fit with equipment worn on the head/face.

6. Training

It is important that employees receive information, instruction and training on any Personal Protective Equipment (PPE) that is supplied (as well as other control measures). Good training should include:

- the need for protection
- limitations of use
- donning and doffing
- storage
7. **3M Protective Coveralls**

3M is able to offer a broad range of comfortable protective coveralls and accessories suitable for a variety of industrial applications.

**3M™ 4500 Protective Coverall**
- Light duty, non-hazardous applications
- Elasticated hood, ankles, cuffs and waist
- 2 way zip with storm flap
- Available in white or blue

**3M™ 4505 Protective Coverall**
- Light duty, non-hazardous applications
- Elasticated hood, ankles, cuffs and waist
- 2 way zip with storm flap
- Water and oil resistant

**3M™ 4510 Protective Coverall**
- Approvals:
  - Type 5: EN ISO 13982-1+A1,
  - Type 6: EN 13034+A1,
  - EN 1149-5 Electrostatic properties and EN 1073-2
  - Protection against nuclear particles
- Elasticated hood, ankles, cuffs and waist
- 2 way zip with storm flap
- Low linting

**3M™ 4515 Protective Coverall**
- Approvals:
  - Type 5: EN ISO 13982-1+A1,
  - Type 6: EN 13034+A1, EN 1073-2
  - Protection against nuclear particles
- Elasticated hood, ankles, cuffs and waist
- 2 way zip with sealable tabs on storm flap
- Available in white, blue, red and orange.
3M™ 4520 Protective Coverall
- Approvals: Type 5: EN ISO 13982-1+A1, Type 6: EN 13034+A1, EN 1149-5 Electrostatic properties and EN 1073-2 Protection against nuclear particles
- Elasticated hood, ankles and waist
- 2 way zip with sealable tab on storm flap
- Knitted cuffs
- 3-panel hood

3M™ 4530+ Protective Coverall
- Approvals: Type 5: EN ISO 13982 1+A1, Type 6: EN 13034+A1, EN 1149-5 Electrostatic properties, EN 1073-2 Protection against nuclear particles
- Elasticated hood, ankles and waist
- Alcohol and oil resistance coatings
- 2 way zip with sealable storm flap
- Knitted cuffs
- Available in white and blue
- 3-panel hood

3M™ 4535 Protective Coverall
- Approvals: Type 5: EN ISO 13982-1+A1, Type 6: EN 13034+A1, EN 1149-5 Electrostatic properties and EN 1073-2 Protection against nuclear particles
- Breathable back panel
- Elasticated hood, ankles, cuffs and waist
- 2 way zip with storm flap
- 3-panel hood

3M™ 4540+ Protective Coverall
- Approvals: Type 5: EN ISO 13982-1+A1. Type 6: EN 13034+A1, EN 1149-5 Electrostatic properties and EN 1073-2 Protection against nuclear particles
- Breathable back panel
- Elasticated hood, ankles and waist
- Knitted cuffs
- 2 way zip with fully sealable storm flap
- 3-panel hood
- Low linting
**3M™ 4545 Protective Coverall**
- Approvals: Type 5: EN ISO 13982 1+A1, Type 6: EN 13034+A1, EN 1073-2 Protection against nuclear particles and EN 14126 Protection against micro-organisms
- Elasticated hood, ankles and waist
- Knitted cuffs
- 2 way zip with fully sealable storm flap
- 3-panel hood
- Ultra low linting

**3M™ 4565 Protective Coverall**
- Approvals: Type 4: EN 14605+A1, Type 5: EN ISO 13982-1+A1, Type 6: EN 13034+A1, EN 1149-5 Electrostatic properties, EN 1073-2 Protection against nuclear particles and EN 14126 Protection against micro-organisms
- Elasticated hood, ankles and waist
- Knitted cuffs
- 2 way zip with fully sealable storm flap
- 3-panel hood
- Low linting

**3M™ 4570 Protective Coverall**
- Approvals: Type 3: EN14605+A1, Type 4: EN 14605+A1, Type 5: EN ISO 13982-1+A1, Type 6: EN 13034+A1, EN 1149-5 Electrostatic properties, EN 1073-2 Protection against nuclear particles and EN 14126 Protection against micro-organisms
- Elasticated hood and ankles
- Elasticated cuffs with thumb loops
- Double front closing system with large zip
- 3-panel hood
- Low linting

**3M Accessories**
- 3M™ 440/450 Overboots
- 3M™ 402/442 Overshoes
- 3M™ 444/445 Oversleeves
- 3M™ 4400/4430/4440 Lab coats
- 3M™ 446 Over hood
- 3M™ 407 Mob cap
- 3M™ 408 Boxer short and vest set
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In all cases, a risk assessment should be carried out. Always read product user information. Use limitations and performance data should be considered by a competent person to ascertain the protection required. If in doubt, contact a safety professional.

** See user instructions or technical datasheets for full details.
8. **3M Safety Services**

3M is able to offer a range of services to help you meet your PPE needs. These include:

- ✔ Care & Maintenance Packs
- ✔ Noise Level Check Service
- ✔ Hearing Conservation Programme
- ✔ Respiratory Service Life Software
- ✔ Fit Testing (Quantitative and Qualitative)
- ✔ Fit Testing Workshops
- ✔ EarFit Validation System (Hearing Protective Equipment)
- ✔ Air Quality Testing
- ✔ Product Selection Tools

9. **More information from 3M**

For more information on 3M products or services please visit the 3M Occupational Health & Environmental Safety website, [www.3m.co.uk/ohes](http://www.3m.co.uk/ohes) or call our helpline on **0870 60 800 60**.

10. **Further reading**

- Health and Safety Executive, Managing skin exposure risks at work, HSG 262
- The Health and Safety at Work Act
- The Control of Substances Hazardous to Health Regulations
- The Personal Protective Equipment at Work Regulations

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