



# Reactive dyes: Safe handling in textile finishing

## Introduction

This Information Sheet is part of a series. You will need to read it with Sheet No 1 *Dyes and Chemicals in textile finishing: An introduction* which gives background information on hazards, risk assessment and relevant law; and Sheet No 3 *Dyestuffs: Safe handling in textile finishing* which gives advice on methods of minimising exposure to all dyes.

This guidance was written with the assistance of the Textiles Industry Advisory Committee (TEXIAC). The aim of TEXIAC is to help protect employees and others from hazards to their health and safety arising from work activity. It brings together representatives from employers' associations and trade unions under the chairmanship of HSE to produce sound, practical advice to meet the industry's specific needs.

## Hazards

Reactive dyes have a high degree of wet fastness because the reactive dye molecule fixes itself to natural materials such as cotton, silk, wool or leather by a strong chemical bond. If reactive dyes are inhaled or ingested they can react in the same way within the body. Sometimes this can affect the body's immune system. Changes to the immune system may mean that the next time a person is exposed to the same reactive dye, their body reacts very dramatically, even if the amount of dye involved is very small. If this happens, the person is said to have become **sensitised** to that dye.

If the symptoms affect the lungs (often affecting the nose and eyes too) this is called **respiratory sensitisation**. If the symptoms affect the skin, this is called **skin sensitisation**. Reactive dyes may be respiratory and/or skin sensitisers, although skin sensitisation seems to be rare.

Evidence has shown that a number of reactive dyes have definitely caused respiratory sensitisation in the past. However, there is no validated test procedure for assessing the potential of any individual reactive dye to cause respiratory sensitisation. It is therefore prudent to handle all reactives as if they are respiratory sensitisers. This includes reactives used for dyeing wool.

The hazard to health from reactive dyes is only a concern before their application to the yarn or fabric. There is no known risk to anyone handling or wearing the dyed materials.

## Dyeing and Finishing Information Sheet No 5

### Symptoms of sensitisation

#### *Respiratory sensitisation*

**Eyes** Itching, watering eyes or swelling of the eyelids.

**Nose** Sneezing, itching, running nose or blocking of the airways.

**Chest** Symptoms of asthma such as unusual breathlessness on running or playing sport; coughing, wheezing and tightness of the chest.

#### *Skin sensitisation*

**Skin** Redness or an irritating rash anywhere on the body but commonly between the fingers or on the back of the hands and wrists.

If someone exposed to reactive dyes displays one or more of these symptoms, you should investigate the possibility of sensitisation. Be aware, however, that the symptoms could be caused by other agents such as exposure to irritant substances commonly used in dyehouses.

The symptoms may occur immediately on exposure to the particular dye, in which case it will be relatively easy to identify the connection. However, a common pattern is that symptoms are delayed for several hours and are most severe in the evening or during the night. When symptoms are delayed, the affected person might not realise that the ill health is linked with their work. Their first indication might come when they have a holiday away from the workplace and realise that the symptoms they have been suffering from have improved or even disappeared.

#### *Four facts to remember about sensitisation*

- Sensitisation is unpredictable. A number of colourweighers may work with reactive dyes under exactly the same conditions. Some may become sensitised - others may suffer no adverse health effects at all.
- Most people who become sensitised to reactive dyes do so during the first two years of exposure but sometimes sensitisation occurs years or even decades after starting to work with the dyes.
- Sensitisation is all or nothing. You are either sensitised to a reactive dye or you are not. It is also irreversible - you remain sensitised for life.

- People become sensitised to a particular substance. Symptoms will occur only in response to that substance. While there is no exposure, there will be no symptoms. However, a person who has become sensitised to one reactive dye may then be more likely to suffer adverse reactions to other dyes in the same chemical class.

***What happens if exposure continues after a person becomes sensitised?***

If a person sensitised to a reactive dye continues to be exposed to it, their symptoms are likely to worsen. People who start off by reacting to the dye with a stuffy nose may go on to develop asthma. Asthma attacks are likely to become progressively more severe. Once asthma is established, an attack may be triggered by things other than the reactive dye, such as tobacco smoke or cold air. If this happens, the person may be left with occupational asthma for years after they stop working with the dye.

Some people who develop occupational asthma become so disabled that they cannot work again - not only with dyestuffs but in any occupation. For some, a slow deterioration in their health caused by the occupational asthma means a shortened life expectancy. In an extreme case a sudden, severe asthma attack could result in death.

So, it is very important that:

- you take all practicable steps to reduce the exposure of your employees to reactive dyes, thereby reducing the risk of anyone becoming sensitised;
- if someone does become sensitised, this is recognised as quickly as possible, so that you can take steps to prevent their symptoms from becoming worse.

The rest of this sheet outlines the steps you can take to achieve these two aims.

**Reducing exposure**

In general, you should handle reactives in the same way as other dyestuffs. The safe handling procedures you should adopt are given in Dyeing and Finishing Sheet No 3 *Dyestuffs: Safe handling in textile finishing*. In addition, you will need to consider the following:

***Substitution***

Where technical demands require the use of a reactive dye, choose the least hazardous form of the dyestuff available to you. The choice of low-dusting dyes such as those in granular, dust-suppressed or liquid form, can be a very important factor in reducing exposure. Remember,

however, that dust will be released if liquid spills are allowed to dry or granules become ground down.

***Dispensing***

The whole process of dispensing powdered and granular forms of reactive dye, not just the weighing stage, should be carried out under local exhaust ventilation. If the existing ventilation arrangements in your colourstore will not accommodate the dispensing of dyes, you will need to provide a facility which does. In the interim, people working within the colourstore should wear suitable respiratory protective equipment.

***Respiratory protective equipment (RPE)***

RPE will need to be worn in a variety of situations where adequate control of airborne dust cannot otherwise be achieved. Examples include cleaning-up spillages and changing filters in ventilation plant.

Train employees in how to wear their RPE. Badly fitted, poorly maintained RPE offers nothing to the employee except a false sense of security.

Make arrangements for regular cleaning and maintenance along with proper storage away from harmful contamination, excess moisture, heat, cold and sunlight. The RPE will be supplied with instructions on how to tell when the filter needs changing. Always follow these instructions carefully. Employees cleaning and maintaining RPE should avoid or be protected from exposure from any contamination of the RPE.

**Recognising early symptoms**

You need to pick up any cases of sensitisation in your workforce as quickly as possible so that you can take action to prevent the problem getting worse.

***Making people aware of the risks***

Individuals are in the best position to recognise any deterioration to their own health. However, unless they are informed and regularly reminded of the risks of sensitisation, they may not attach any significance to the early symptoms.

**Do** tell employees who work with reactive dyes about:

- what sensitisation is and what can cause it;
- what the early symptoms are;
- the importance of reporting seemingly minor symptoms at an early stage;
- who they should report symptoms to;
- the risk of long-term breathing difficulties if exposure

to a reactive dye continues after they are sensitised to it.

Do make sure your training programme provides:

- guidance on how to handle the dyes safely;
- information on the arrangements for health surveillance and for reporting suspected symptoms;
- the opportunity to ask questions;
- opportunities for refresher training.

Don't just rely on giving your employees a copy of this sheet.

This training should be given to everyone who may be exposed to reactive dyes. Most obviously this will be the colourweighers but it may include other dyehouse workers, and laboratory and maintenance staff. Line managers and first aiders also need to appreciate the risks.

### **Health surveillance**

Even when people have been made aware of the risks, they may still not report symptoms of sensitisation. They may forget the advice they have been given, overlook symptoms, or be reluctant to come forward for fear of effects on their job. You need to arrange a system of making positive checks on health. This is known as health surveillance. The legal requirements relating to health surveillance are contained in regulation 11 of the Control of Substances Hazardous to Health (COSHH) Regulations 2002.<sup>1</sup>

In addition to checking the health status of your employees, health surveillance can play an important role in monitoring the effectiveness of the control measures you have in place.

#### ***Who needs to be covered?***

Health surveillance is appropriate for anyone at risk of being sensitised to reactive dyes. In practice, this will mean all colourweighers and any maintenance staff involved in filter changing etc. However, there may be more workers at risk of sensitisation. This will depend on who dissolves the dye and how this is done. Remember that it is always better to change work methods to prevent or reduce the number of people exposed rather than extend the numbers covered by health surveillance.

#### ***Who should carry out the health surveillance procedures?***

Provided good working practices are followed, the risks arising from the use of reactive dyes can be kept small. Nevertheless, the consequences for the health of an

individual whose symptoms of respiratory sensitisation are not recognised or acted upon can be very high. It is therefore appropriate that a person with relevant medical experience is involved in health checks. This gives a greater degree of assurance that relevant symptoms will be recognised and allows for an objective test of peoples' lung function to be carried out.

The ultimate responsibility for overseeing the health surveillance programme should rest with a doctor but an occupational health nurse may carry out the checks. Any doctor or nurse carrying out checks should preferably have received training in occupational health or at least have relevant knowledge of respiratory sensitisers and their effects.

#### ***What should health surveillance entail?***

A pre-exposure assessment should be carried out of anyone beginning work with reactive dyes. This is to provide a base line against which their future health status can be judged. They should be asked whether they suffer, or have ever suffered, the symptoms of sensitisation mentioned earlier, and whether their chest has suffered as a result of any previous employment. A measurement of their lung function should be made.

Since many people who become sensitised do so after a relatively short period of exposure, further interviews should take place after approximately six weeks and six months of work with reactive dyes. Interviews and lung function testing by the nurse or doctor should take place annually after this.

Repeat interviews should also be considered on return to work after a chest infection or respiratory illness. Isolated colds, sore throats and flu can be discounted.

It is good practice to nominate a responsible person inside the company to receive reports from anyone believing themselves to be showing early symptoms of sensitisation. The responsible person should never be expected to make judgements about the cause of these symptoms but should make referral to the occupational health nurse or a doctor. The responsible person may also review sickness absence records for evidence of repeated absences which might have relevance.

#### ***Health records***

Employers should keep a health record for each relevant employee to show what surveillance has been carried out and its results in terms of the employee's fitness for work or otherwise. Employees should be given access to their own health record. The record should not include information which is medical-in-confidence, which will be kept in the medical record by the doctor or nurse concerned.

### **What if sensitisation is confirmed?**

If a case of sensitisation is confirmed by a doctor, you will need to make a thorough examination of the circumstances. You may need to introduce further control measures to prevent other employees from becoming sensitised. You will need to consult the doctor about the best course of action for the sensitised employee, but this will probably mean relocating them in a job which avoids all contact with reactive dyes.

Occupational asthma resulting from exposure to reactive dyes is a reportable disease under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995.

### **Is health surveillance always necessary?**

The method of health surveillance described above will be appropriate in virtually all parts of the textile finishing industry where reactive dyes are handled. However, you may operate under circumstances which mean that the level of your employees' exposure to reactive dyes, and hence their risk of becoming sensitised, is particularly low. If this is the case, it is open to you to justify choice of a lower level of health surveillance through the assessment of health risks required of you under the COSHH Regulations.<sup>1</sup>

### **Other Information Sheets in the Dyeing and Finishing Series**

- No 1 *Dyes and chemicals in textile finishing: An introduction*
- No 2 *Non-dyestuff chemicals: Safe handling in textile finishing*
- No 3 *Dyestuffs: Safe handling in textile finishing*
- No 4 *Hazards from dyes and chemicals in textile finishing: A brief guide for employees*
- No 6 *Dust control in dyestuff handling*

### **References**

- 1 *Control of substances hazardous to health. The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance L5* (Fourth edition) HSE Books 2002 ISBN 0 7176 2534 6

### **Further information**

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