


## ETAD'S REFERENCE FOR THE SAFE HANDLING OF DYES (2023)

### Material Safety Data Sheets (SDS) and labels

All specific hazards of a chemical product must be clearly identified by the manufacturer with appropriate information to warn the workers in the dye mill/tannery and ink factory/colour kitchen. Following information related to hazardous properties can be found in the dye product documentation, particularly in **Section 2 of the SDS**:

- Hazard codes (**H-phrases**) with their corresponding **statements**, which describe the hazard(s)
- In the EU, additionally codes (starting with **"EUH"**) will also appear on **mixtures** when classified substances are present above a specific concentration of concern.
- **Pictograms** related to the described hazard(s)
- **Signal word(s)**
- A series of precautionary statements (**P-phrases**) covering prevention, response, storage, and disposal of the chemical.

In the figure below is an example of such information:

SECTION 2: HAZARDS IDENTIFICATION	
<b>GHS Classification</b>	Serious Eye Damage/Eye Irritation      Category 2A      H319
<b>Signal Word</b>	<b>WARNING</b>
<b>Symbol</b>	
<b>Hazard Statements</b>	H319 Causes serious eye irritation.
<b>Precautionary Statements</b>	P264 Wash hands, forearms, and exposed areas thoroughly after handling. P280 Wear protective gloves/ eye protection/ face protection P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 If eye irritation persists: Get medical advice/attention.

Additionally, **Section 4 to 8** of the SDS will provide information about:

- First aid measures
- Accidental release measures
- Handling and storage
- Exposure control and personal protection

### Possible exposure to dyes

The major routes of personal exposure, depending on the dye form, are **skin contact** to dyes and **inhalation of dye dust**. This can happen at many stages in the handling process, e.g., when opening dyestuff containers or cleaning spillages. These two routes of exposure are the most relevant for all hazardous properties of the dyes, followed by (involuntary) **ingestion**.

As regards skin contact, usually, if a dye just colors the skin, it may not be deemed to be really affecting your health. However, dyes classified as skin sensitizers can cause serious allergic reactions.

### If skin contact with dyes occurs:

- Wash hands immediately whenever skin contact occurs. This will minimize staining, prevent absorption of the dyes through the skin and avoid transfer of the dyes to other parts of the body.
- Use soap and water or commercial cleaners designed for removing dyes. Inappropriate products can react with dyes to produce harmful chemicals.
- Do not use strong abrasives or harsh detergents. They may irritate your skin.
- **Follow any further specific instruction in the SDS/dye documentation.**

In case dyes are classified as respiratory sensitizers, it is particularly important to implement and use properly **local exhaust ventilation and respiratory protective equipment** (see next section). In case of inhalation, check **Section 4 of the SDS** for first aid measures.

In case of **other classifications** of the dyes, especially when they indicate the **possibility of more severe effects on human health**, a **strict implementation of the described good practices** is essential, together with any further specific indication from the SDS/dye documentation. In case of exposure, check **Section 4 of the SDS** for specific first aid measures.

## Exposure to dyes dust

Prolonged exposure to dust of any kind should be always avoided: under repeated exposure conditions even dust particles of natural materials can be dangerous, both through **skin contact** and **inhalation**.

Therefore, it is highly recommended that tasks which might expose personnel to products in powder form take place under **local exhaust ventilation**. Additionally, consider substituting the dye powder with one prepared as less hazardous forms of dyestuffs, which are often available. Choosing **low-dusting dyes** such as those in granular, dust-suppressed or liquid form can be a very important factor in reducing exposure.

Remember that **even liquid dyes can cause dust problems** if spills or even splashes are allowed to dry out.

In addition to general improvements in the dyes management system (see Annex 1), the following practices will also decrease worker exposure to sensitizing dyes:

### Transfer of the weighed dyestuff to the next process stage

- Different methods are possible:
  - o Weigh the dyestuff in an area with LEV and then charge it to a vessel which is covered through a charge port fitted with LEV
  - o Use a screw feeder for powder if available.
  - o Weigh into a water-soluble bag - the closed bag can be dropped into the mixing vessel and will then dissolve.
  - o Try to use automated dispensing to avoid operator contact.
- Manually mix the weighed dyestuff to a slurry or paste with water before transfer. This process could be done safely using the same LEV extraction provided for the weigh scale. Take account of the fact that large containers of dye slurry will be heavy and difficult to handle.
- Keep transit containers covered.

TREAT ANY  
SKIN  
CONTACT  
IMMEDIATELY

BE AWARE  
OF OTHER  
SPECIFIC  
HAZARDS

WORK UNDER  
LOCAL EXHAUST  
VENTILATION

PREPARE  
THE DYE  
FOR SAFE  
TRANSFER

**WORK SAFELY AT THE MIXING VESSEL**

## Mixing /dissolving the dye in a mix vessel

- Additions at chest height are preferred if automatic charging is not possible: there is less chance of a dust cloud being formed in the operator's breathing zone. Also, manual handling problems will be reduced.
- Charge the dye powders whilst the mixer is slowly turning. When charging large volumes of dry powders to low volumes of liquids, most of the "let down" carrier liquid should be already in the vessel, with the dye being one of the final materials added.
- Do not start up high-speed mixers until all dry dye is wetted out and the stirrer blades are covered.
- To prevent the emission of an aerosol of fine droplets during high-speed mixing, fit vessels with lids.
- The lids should preferably have local exhaust ventilation.
- Do not begin any steam heating until the dye solution has been diluted.

## General workplace good practices

**KEEP YOURSELF CLEAN**

- Wash hands regularly during the workday.
- Use skin conditioners to keep skin healthy (barrier creams or hand moisturisers).
- Also wash hands before eating, drinking, smoking, or applying cosmetics. This will help prevent getting dyes in your food, drinks, smoking materials or on your skin.
- Shower at the end of the work shift to remove any dye contamination.
- Wear clean work clothes. A daily change of work clothing is recommended when handling dyes.
- It is good practice to have a proper changing area with a "clean" side and a "dirty" side.
- Work clothing and personal clothing should be separated.
- Work clothing should not be brought home.

**KEEP YOUR WORK AREA CLEAN**

- Avoid spillage of dyes or other chemicals.
- Keep transfer containers clean and free of loose dust.
- Keep equipment clean, particularly in weighing and charging areas.
- Use dye transfer techniques which minimize spillage.
- Use covered or closed containers for transporting powdered dyes.
- Place container as close to weighing station as possible when transferring or weighing out dyes.
- Clean the charging scoop and weighing pan with Glauber salt or other methods which minimize exposure and contamination.

**DEAL CAREFULLY WITH SPILLAGE**

### If spillage occurs:

- Consult your supervisor before starting any cleanup.
- Follow all warnings on labels and SDSs when cleaning up spills.
- Clean up dye spills promptly. This prevents spreading and contamination of people and equipment. Specific recommendations include:
  - o Pick up dry-spills carefully to avoid dust generation and, if possible, return for reuse.
  - o Absorb liquid spills with an absorbent material, then pick up for disposal.
  - o Wash or clean areas where dyes have been spilled to prevent tracking.
- Properly dispose of spilled material and wash water in accordance with the environmental requirements for your facility.
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## USE PROTECTIVE EQUIPMENT PROPERLY

- Use gloves made of impervious materials, such as rubber, latex (take care for any allergies), polyethylene, polyvinyl chloride or neoprene when hand contact with dye material is expected.
- Avoid contamination of your hands and body while removing protective equipment such as gloves, aprons, and boots.
- Use an approved dust respirator when dust exposures are expected.
- Disposable clothing should be used only once and discarded when contaminated or changed regularly as appropriate.
- Contaminated aprons, arm covers, and boots should be cleaned and rinsed with water before being put away.
- Long sleeved shirts and trousers or preferably overalls are recommended when mixing and/or charging dyes.
- Safety glasses with side shields are the minimum eye protection required for handling dyes; however, additional precautions such as goggles or a face shield may be required for certain dyes as noted on the label or SDS.

## TAKE GOOD CARE OF YOUR RESPIRATORS

- Keep reusable respirators clean and sanitary.
- Respirators should be stored so that their shape is not distorted.
- If stored in work area, respirators should be in a plastic bag or closed container to keep it clean.
- Ensure the respirator bag is marked with the operators name and date it was first used – respirators should not be shared by different people.
- Disposable respirators must be put on properly and worn with two straps. Paper dust masks are not recommended.
- Facial hair interferes with the seal between the respirator and the face.
- Talking while wearing a respirator may break the seal between the respirator and the face.
- Approved respiratory protection program procedures should be followed whenever respirators are used. Your employer must provide training, fit testing, and maintenance as part of this program.

## USE THE RIGHT TOOL

- Use a long handled scoop to recover dye from bottom 1/3 of a large drum.
- Use a drum caddy to bring drums to the weighing scale to minimize manual handling during dye transport.
- Use an inert powder (e.g., Glauber salt) or vacuum rather than brush to clean scoop and weighing pan.

- Prevent dusting by cleaning dye room floors with:
  - o Vacuum
  - o Sweeping compound
  - o Water

- **Do not dry sweep!**

## USE VENTILATION APPROPRIATELY

- Be sure ventilation and LEV is switched on at the beginning of the shift.
- Position yourself so that ventilation system takes dust away from your breathing zone.
- Do not use cooling fans as they will create dust.
- Ensure dyes are not placed close to air recirculation or cooling system fans.
- Position dusty work close to local exhaust hoods because they are effective only within a few inches of the hood face.
- Report problems with the ventilation system immediately to your supervisor or maintenance group.

## Symptoms of skin sensitization / respiratory sensitization

A common **symptom of skin sensitisation** is **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 dyes classified as skin sensitizers displays one or more of these symptoms, you should investigate the possibility of sensitisation. Be aware, though, that the symptoms could also be caused by, e.g., exposure to irritant substances commonly used in dyehouses.

The symptoms may happen 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.

By **respiratory sensitization**, typical symptoms will affect:

- **Eyes:** itching, watering eyes or swelling of the eyelids
- **Nose:** sneezing, itching, running nose or blocked airways
- **Chest:** symptoms of asthma, such as unusual breathlessness when running or playing sport; coughing, wheezing and chest.

## ANNEX 1

### Recommendations on the factory management of dyes

#### General recommendations

- **Make workers aware of the risks:**
  - Individuals are in the best position to recognise any deterioration in 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 onset or recognition of symptoms.
  - In particular, everyone who may be exposed to sensitising dyes should be given training. Most obviously, this will be the colour-weighers but it may include other dyehouse workers as well as the laboratory and maintenance staff. Line managers and first aiders/first responders also need to understand the risks.
- **Restrict access** to the colour store to essential trained personnel. It is better to have a limited number of people do all the weighing, with proper training and precautions
- Local exhaust ventilation (LEV) should be present by any operations which might expose operators to products in powder form
- **Personal Protective Equipment (PPE) should always be considered as a last resort:**
  - a number of factors can seriously affect its performance, so the protection afforded to the employee decreases dramatically, e.g., if a respirator is badly maintained, contaminated with dyestuff, not properly adjusted to the wearer or removed for even short periods while dust is airborne.
  - PPE does not protect against skin irritation.
  - wearing PPE all day may cause undue stress and discomfort to the wearer – regular breaks are encouraged

#### Specific recommendations for improving worker safety during different steps of the dyestuff handling

##### a) Opening and resealing containers and scooping powder

Dispensing should take place under local exhaust ventilation - this usually means in the weighing booth. To make this easier:

- **Provide wheeled trolleys or mount large dye drums on castors**, so containers can be easily pushed to the booth. Do not forget to assess any risks created by manual handling.
- Organise your store so that 'fast-moving' products, particularly dusty dyes and dyes with recognised hazards to health, are nearest the booth. Some items may be kept permanently in the booth if it is large enough and it is safe to do so.
- Use **ventilated carousels** which can be rotated to present the appropriate drum to the weighing station.
- When refurbishing or planning a new facility, consider **different options to the traditional method of storage:**
  - These might include paternosters - rotary stores in which the shelves holding the dye drums are brought round to the weighing station.
  - The ventilated weighing station itself may be made mobile, guided on rails by the operator to the appropriate place on the shelf.
  - Robotic handling can also be an option, and is already employed in some dyehouses.

**In some colour stores, dispensing all dyestuffs in the ventilated weighing room may not be practicable.** An example might include a commission dyehouse with a very large inventory of dyes, only a few grams of which are often needed at any one time.

Under these circumstances:

- While it may not be practicable to transfer all dyes to the weigh station, the colour weigher should still take as many there as possible. Organise your store as above.
- **Reactive, disperse and basic dyes and those classified with a CLP/GHS pictogram (e.g. skulls and crossbones, exclamation mark or health hazard, (<https://echa.europa.eu/regulations/clp/clp-pictograms>))** should always be dispensed under local exhaust ventilation, regardless of the quantity involved.
- Scoops should be of adequate size to prevent spillages. Provide trays to carry scoops or to hold under scoops in transit. Vacuum or clean the trays regularly.
- Watch for any inappropriate working methods that may generate dust, for instance banging the scoop vigorously against the container wall when returning unused dye.
- Personnel will need to pay particular attention to issues such as cleaning and ventilating the colour store and clearing spillages if dyes are to be carried around in scoops.

#### **b) Emptying dye containers and preparing for final disposal**

The design of dye containers and liners can make removing residues and bagging waste difficult to do without creating a dust cloud.

- Ideally, provide local exhaust ventilation for these tasks and contact your dye suppliers for their advice.

#### **c) Dispensing liquids**

If spills of liquid dye or ink are allowed to dry out, they may release very fine particles of dust.

- Reduce the likelihood of spillage by using **automatic dispensers** or carefully choosing **transfer containers**.

#### **d) Weighing out**

Weighing out should always take place under local exhaust ventilation.

#### **e) Changing filters in the extraction equipment**

If this work is carried out in-house, it should proceed according to a **written system of work covering the method of removing, handling and disposing of the contaminated filter and the standard of personal protective equipment to be worn**. Respiratory protective equipment will be needed. The suppliers of the extraction system should be able to advise you on the method of work. Contaminated dust filters should be disposed of according to local waste regulations.