



## WHAT IS THIS BROCHURE ABOUT?

This guideline is designed to help people who use epoxy resin systems. Epoxy resin systems provide many unique technical advantages, which are not equalled by any other materials. Therefore, they are used widely in various applications including in the composite, building and construction industries. The components of epoxy resin systems may possess hazardous properties, the main risk being via skin contact. However, they are perfectly safe to handle, provided that basic precautions are taken. Epoxy resins are typically mixed with a hardener component before application. After application, a

chemical reaction takes place producing an inert final material. The finished, hardened epoxy resin does not pose any health risk and offers superior performance.

This guideline describes the main situations where there is a risk of contact with epoxy systems, and offers information for the safe handling of these products. The information is designed to support craftsmen, business managers, safety and education managers in the selection and provision of suitable organisational, technical and personal safety tools and procedures. The brochure also provides helpful information for workers using the products. However, the guideline cannot replace the specific safety instructions given for each product, which must always be respected in full.

This brochure is provided by the Epoxy Resins Committee of PlasticsEurope. Institutes for safety at work, professional craft associations, the construction industry, regional and national authorities and experts from the chemical industry have been consulted in its development. The common goal is to prevent incidents of health problems and to support the continued safe use of epoxy systems in all applications.



Epoxy resin systems are perfectly safe to handle, provided that basic precautions are taken.

## CHARACTERISTICS OF EPOXY RESINS



Modern two-component systems provide the correct ratio of components and enable easy use.

### Which products are used?

This brochure mainly covers situations where the materials are handled at ambient temperature. This includes applications in the construction industry where two-component systems are used. Most products consist of an epoxy resin and a hardener. Before use, both components have to be mixed in a defined ratio. Both the individual components, as well as the uncured mixture, may possess hazardous properties and can produce irritating or sensitising effects. However, taking the right precautions they can be handled safely and easily.

### What are their properties?

Cured epoxy resins are not a health risk and provide outstanding properties. They show excellent adhesion and mechanical properties, as well as corrosion and chemical resistance.

### Where are they used?

The main areas for application of epoxy resins in the construction industry are coatings, adhesives, flooring (e.g. industrial floors and multi-storey car parks), concrete restoration, crack repair and as joint material for tiles. In addition, they are widely used in electrical, electronics, aerospace, automotive, sports goods and other high performance applications.

### How are the containers labelled?

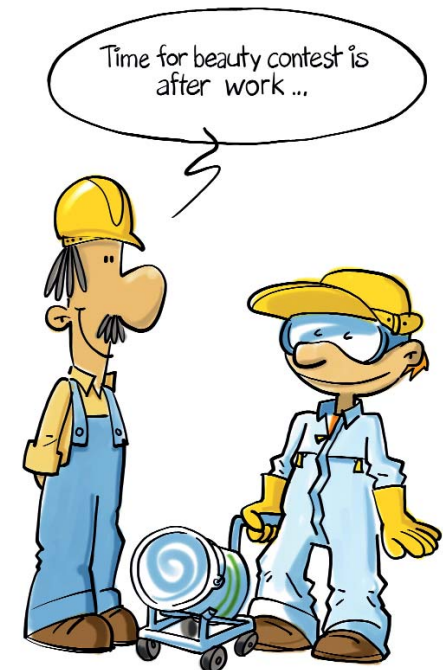
- In general, the resin component is classified as follows:
  - Symbol Xi – Irritant
  - Classification R 36/38  
Irritating to eyes and skin
  - Classification R 43  
May cause sensitisation by skin contact
  - Contains epoxy constituents. See information supplied by the manufacturer.

Note: the risk phrase R 43 – may cause sensitisation by skin contact – means that skin contact with such products may lead to allergic reactions.

- The hardener is in most cases classified as follows:
  - Symbol C – Corrosive
  - Classification R 20/21/22  
Harmful by inhalation, in contact with skin and if swallowed
  - Classification R 34  
Causes burns
  - Classification R 43  
May cause sensitisation by skin contact

In addition, many products are classified with the symbol "Dangerous for the environment."

The classification and labelling points out to the user that the product contains substances which may have irritating or sensitising effects, especially in direct contact with skin or mucous membranes. The components of epoxy resins must therefore be mixed and applied according to safe handling instructions.



## POTENTIAL CONTACT SITUATIONS

### Which contact situations can occur?

Potentially hazardous everyday situations in the use of epoxy resins include transport and storage of containers, metering and mixing of components, spreading, scraping, rolling, spraying and injecting the epoxy resin system, cleaning the tools and disposal of empty containers and waste materials. Unintended contact situations with epoxy resin components occur mainly when the user is inappropriately protected, when he is not attentive or works with unsuitable tools. The following situations should be avoided:

- skin or eye contact through spray or spillage
- dirty/soaked clothes, shoes, gloves
- contaminated handles of tools
- unintended chemical reaction through wrong metering or using the wrong components
- inhaling fumes



### Which kinds of effects can appear?

People don't react equally. Some users are less susceptible to the sensitising properties of the components, for others a few short contacts are sufficient to produce an allergic reaction. Typical symptoms for such an allergic reaction include reddened or swollen skin areas or eyes, skin damage or allergic contact eczemas. Direct contact with the individual components or uncured mixtures must therefore be avoided. This guideline and the safety instructions provided with each product explain how to avoid exposure.



When taking off used gloves, the skin must not come into contact with the dirty glove: with this "inside-out technique" the dirty side remains inside and the gloves can be safely disposed of.





## SAFE HANDLING OF EPOXY SYSTEMS

### Manager's responsibilities

When potentially hazardous chemicals such as epoxy systems are used, one of the tasks of management is to inform and train its employees regarding the safe handling of these products. Appropriate personal protective equipment must be used. Regular participation of employees in education and safety training is an essential element. The potential hazards, as outlined in the Material Safety Data Sheets, must be communicated and understood by all workers who may come into contact with the materials. Management's responsibilities include e.g.:

- the development and display of appropriate operating instructions
- the provision of First-Aid-Kits
- the installation of safety equipment such as eye showers
- ensuring the availability of adequate washing and changing facilities

### Metering

Optimal dosages of the components are provided by ready-to-use combi-packages, where the correct resin/hardener ratio is already delivered. Where the application of such systems is not possible, the use of technical metering and mixing systems is advisable, e.g. the use of drum pumps with flow meters, large containers with taps and flow meters or a drum tipper.



Legs and feet should always be covered properly to prevent any potential splashes getting onto the skin.

### Mixing

Specially designed equipment can substantially reduce the potential exposure to unintended splashing or spilling. The main goal is to prevent such splash or spillage from spreading to the surrounding areas. The following equipment should be used to minimise any risk:

- mixers with variable speed control
- suitable mixing tools (according to the information of the manufacturers)
- protective lid with a hole for the mixer
- mixing stations (for larger amounts of material)
- forced action mixer
- static mixer especially for crack injection



Hey – you're not making a cake!



## SAFE HANDLING OF EPOXY SYSTEMS

### Spreading the material

In all areas of application, suitable pail carriers should be used to pour the uncured liquid epoxy system onto the floor and spread it safely.

### Scraping, rolling, brushing, spraying

The processing of epoxy systems can be made safer by following a few simple measures. For example, using a scraper instead of a palette knife substantially increases the safety distance against splashes. When using a roller, it should be equipped with a splash protector. For spray applications good air circulation must be provided.

### Injection

Careful and exact handling and management of the equipment is of particular importance with this application. This means e.g.:

- preferably, use of two-component metering and mixing equipment
- use of suitable high pressure joints and connections
- permeability check with compressed air
- careful placement of the injection head
- vent placement at the sealer
- do not squeeze, bend or drive over hoses



When applying the liquid system, always protect arms and legs, work calmly, use a splash protector...



### Cleaning of the tools

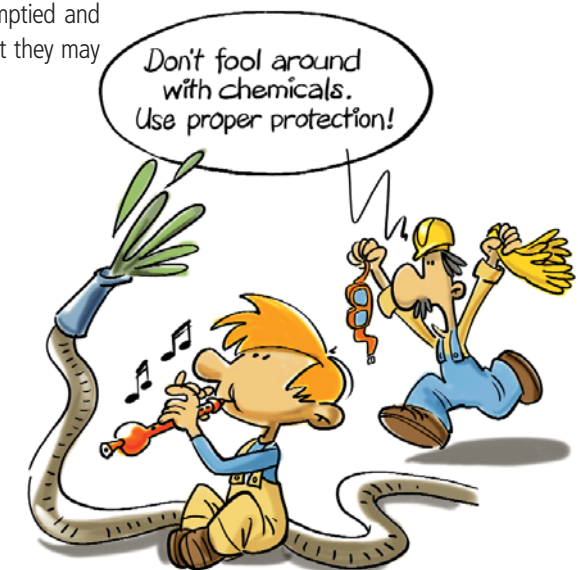
For one's own safety and for the safety of colleagues, tools, and especially their handles, must be cleaned after use. The cleaning can be carried out by scraping off residual material and/or by using cleaning detergents that are recommended by the producer. Cleaning detergents for tools must never be used on the skin.

### Transport, storage and disposal

Guidelines for the transport of epoxy system components are provided by the supplier and must be followed. The components should be stored in sealed containers in a cool and dry place, which is designated as a material storage area. The containers must not be stored in unsuitable places, such as restrooms, or temporary accommodation on the building site. Cured epoxy resins can usually be disposed of as normal building waste, but expert advice should always be sought to ensure compliance with local regulations. Single-use containers should be emptied and disposed of properly, bearing in mind that they may still contain residue.



...and have ample distance between the liquid and the skin.



## SAFE HANDLING OF EPOXY SYSTEMS



### Personal safety protection

In addition to all appropriate organisational and technical measures, the use of personal protective equipment, which must be cleaned and replaced regularly, is essential. Shoes and gloves must be suitable and in good condition. All parts of the body potentially exposed to epoxy systems must be protected with adequate clothing or safety equipment. A comprehensive personal safety protection kit for working with epoxy systems contains:

- suitable protective gloves made from nitrile or butyl rubber with fully coated back; note: leather and latex gloves are generally not suitable as they are permeable for the substances and become easily soaked
- eye and face protection, e.g. safety glasses, protective goggles, face visor
- single-use disposable safety overall/trousers/spats
- protective apron, e.g. for mixing
- knee protection
- breathing protection where necessary, e.g. when spraying in enclosed areas

If products containing solvents are used, a mask with an appropriate filter, e.g. A-type filter, should be used. With spray applications a combination filter, e.g. an A1-P2 type, is required.

### Skin protection, skin care

Before starting work with epoxy systems, exposed areas of the skin, which are not covered by other protective means, e.g. gloves, should be protected with a protective skin cream. Such areas include e.g. face, lower arms and legs. Products without any abrasive ingredients or solvents should be used to clean the skin. After work, the skin should be treated with a cream to support moisturising and regeneration.



Suitable creams provide skin protection and skin care.



The personal safety protection equipment is the most important basis for safe work with epoxy resin systems.



## FIRST AID

Please refer to the manufacturer's safety data sheets. General recommendations normally include:

**In case of eye contact:** turn the head to the side of the contaminated eye and wash immediately for some time with clean running water (eye shower, 10-15 min), seek medical attention.

**In case of skin contact:** immediately remove contaminated clothes, wash the affected areas carefully under running water, possibly use a suitable skin cleanser; cover potential lesions with sterile material (First Aid Kit), in case of severe contamination seek medical attention.

**Inhalation:** move the person immediately into fresh air, provide air circulation, seek medical attention.

**Ingestion:** drink plenty of water, do not induce vomiting, seek medical attention.

Basically in all cases, in addition to the first aid measures inform your safety advisor and/or a doctor.

### Useful links

[www.plasticsindustry.org/about/epoxy/](http://www.plasticsindustry.org/about/epoxy/)  
[www.plasticseurope.org/epoxyresins](http://www.plasticseurope.org/epoxyresins)

### Legal disclaimer

The information contained in this publication is intended to provide practical and sound advice to the user and is, to the best of our knowledge, true and accurate. However, the actual conditions of use of the products in question are beyond our control and the responsibility for their proper handling lies with the end user. No liability for such is accepted or implied by the authors.

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# SAFE HANDLING OF EPOXY SYSTEMS

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**PlasticsEurope**  
Association of Plastics Manufacturers

Guideline for the safe handling  
of epoxy resin systems in the construction  
and related industries