

## EPOXY, URETHANE AND POLYASPARTIC 2K SAFETY GUIDE

As a 2K coatings installer, you should be concerned about health and safety and be well informed of the materials and products you use. This guide addresses health hazards associated with working with ACE epoxy, urethane and polyaspartics. More importantly, it suggests common sense safety best practices and techniques that may help prevent health problems and assure your long and productive use of 2K coatings.

Please read this entire guide in addition to reading and following all product install guides, safety data sheets (SDS), and label warnings posted on containers.

### Understand that you are working with Industrial Chemicals-Not House Paint

ACE's 2K coatings are industrial chemicals, not house paint. These coatings are formulated with high performance materials designed to provide finished floor coatings that withstand harsh environments. Epoxy, Urethane, Polyaspartic, Resins, Hardeners, Additives and Fillers are comprised of several chemical ingredients, of varying proportion and toxicity. Overall, they contain only a very small proportion of the more hazardous ingredients and most are formulated to help prevent ozone damage and allow for a lower VOC (Volatile Organic Compound) product.

There is a safe exposure level for most substances. The more toxic the substance, the lower that level will be. Overexposure occurs when the safe exposure level is exceeded. When this happens, the substance can cause health problems. Your immune system and overall health can influence your tolerance to a substance.

Most hazardous substances can enter the body through skin absorption (most common method), inhalation or ingestion (route of entries). The route of entries for a particular substance depends on its physical characteristics and how it is normally used. This guide will focus on squeegee, roller and brushed uses since ACE's 2K products are not designed to be spray applied.

### Resins, Hardeners, Additives and Curing Agents

The risk of exposure to resin, hardener, additives, curing agents and mixed 2 component products (2K) are higher when they are liquid. As the 2K product cures, the chemical ingredients react to form a non-hazardous cured film.

Once it solidifies, the 2K products are less likely to enter the body. Skin contact from the liquid source is the most common type of exposure to the 2K products. Even minor skin contact, if repeated often can cause chronic health problems. In rare cases, with prolonged or repeated contact, the skin can absorb harmful 2K ingredients.

Exposure by inhaling vapors is another route of entry. ACE's 2K products may contain solvents, resins, amines, isocyanates or other additives that may cause sensitivity over time with over exposure. Use of proper ventilation and disposable particulate respirators similar to 3M® #8247 for nuisance level organic vapor relief ([www.cdc.gov/niosh/pel88/8052-41.html](http://www.cdc.gov/niosh/pel88/8052-41.html)) or 3M® #6001 chemical type of respirator for areas that don't have good ventilation is the best practice to use when working with 2K products. Additionally, areas in confined spaces should use mechanical devices similar to products offered by [www.airsystems.com](http://www.airsystems.com). Detailed Stoddard Solvent information can be found here: [www.cdc.gov/niosh/pel88/8052-41.html](http://www.cdc.gov/niosh/pel88/8052-41.html).

### Health Effects from Overexposure

The following are the most common health conditions related to use of 2K products. Using common sense, best practices, and personal protective equipment (PPE) can help prevent these conditions.

### **Dermatitis**

The most common reaction from contact with 2K products is contact dermatitis, or skin inflammation. 2K products can cause acute contact dermatitis. Working in hot or high humidity climates can exaggerate these reactions, most likely when the user is not using proper PPE and also because of the higher temperatures.

Discomfort can be severe, but usually disappears after some time without being in contact with the product. Repeated skin contact with 2K products may also cause chronic contact dermatitis, which is usually milder but longer lasting. If left untreated for long periods, this condition can progress to eczema, a form of dermatitis that can include swelling, blisters and itching.

### **Allergic Dermatitis (Sensitization)**

Allergic dermatitis is a more serious problem, but less common. Allergic dermatitis is caused by hyper reaction to an allergen. Sensitization is the condition of being allergic to a substance and it may increase with repeated exposure. The body's immune system and the degree and frequency of exposure to 2K products affects the chances of becoming sensitized. Persons who have been overexposed to epoxy, isocyanate or are inherently sensitized or allergic to a component of the 2K coating are most susceptible. Persons with fair skin are more susceptible to sensitization, as well as persons previously exposed to other sensitizing substances or with other allergies.

Sensitization to 2K products may occur after many exposures or just one. It is best to avoid all exposure because individual tolerances vary and cannot be known ahead of time.

### **Skin Irritation**

Allergic reactions to 2K products can result in irritated skin or respiratory issues (see below). Irritated skin is by far the more common of the two. Usually, it appears much like a reaction to poison ivy and may include swelling, itching and red eyes. Just as with poison ivy, the irritation can be mild or severe, acute or chronic. Exposing sensitive skin areas, like the eye lids, to highly concentrated epoxy vapors may cause itching and swelling.

See a physician if irritation persists or worsens after avoiding 2K products for several days. There is no specific antidote for 2K sensitization, but symptoms can sometimes be treated with medicine.

Once sensitized, additional (and sometimes increasingly severe) reactions become likely, upon future exposures, even to tiny amounts of 2K products. It is difficult, but not impossible to prevent recurrences. Resume 2K use only after symptoms disappear, and strictly follow the recommended handling procedures, best practice and use of PPE to prevent exposure.

### **Severe irritation (chemical burns)**

Chemical burns are always possible when appropriate PPE is not worn, and recommended procedures are not followed. Mixed 2K are unlikely to cause burns. Some of ACE's curing agents and hardeners are moderately corrosive but pay close attention to the labeling and SDS of all products to be aware of the risks before handling. If left in contact with the skin, severe irritation and moderate chemical burns can occur. Chemical burns develop gradually, and first cause irritation and

slight pain. The burn may discolor and slightly scar the skin. The time it takes for a hardener to cause a chemical burn depends on the area of contact and hardener concentration. When resin and hardener are mixed, the hardener is diluted and therefore less corrosive. Although mixed epoxy is less corrosive, never leave it on the skin because it cures rapidly and is difficult to remove. Always wash away any chemicals that get on the skin with soap and water. Do not use solvent as that will cause the chemical to penetrate the skin.

### Respiratory irritation

Breathing highly concentrated 2K vapor can irritate the respiratory system and cause sensitization. At room temperature, 2K vapors are unlikely to be highly concentrated. However, persons already sensitized to epoxy, urethane or isocyanate, may have an allergic reaction exposure to low concentrations of vapors. Warmer temperatures and high humidity, cause 2K vapor levels to increase and be attracted to moisture (typically the case with isocyanate ) on the users skin due to increased perspiration and lack of air circulation. Use a fan when working in areas with poor air circulation. Additionally, using proper ventilation and disposable particulate respirators similar to 3M® #8247 for nuisance level organic vapor relief ([www.cdc.gov/niosh/pel88/8052-41.html](http://www.cdc.gov/niosh/pel88/8052-41.html)) or 3M® #6001 chemical type of respirator for areas that don't have good ventilation is the best practice to use when working with 2K products. Areas in confined spaces should also use mechanical devices similar to products offered by [www.airsystems.com](http://www.airsystems.com) .

### General guidelines

While the following guidelines are meant for an industrial setting, they can be an important guide for casual 2K users. Consider the following steps to protect yourself from 2K products.

**Step 1**—Make informed decisions about the products to be used. Read and follow all SDS and use PPE when working with the products.

**Step 2**—Set up a safe work area. Use equipment and procedures that prevent or reduce exposure. Effective ventilation is critical and range from high-tech air-filtration and exhaust systems to the basic floor fans.

**Step 3**—Wear protective equipment (goggles, safety glasses, gloves, respirators, protective clothing, etc.) appropriate for the job at hand. The recommended minimum for most 2K users is gloves, eye protection and protective clothing. Protect from 2K vapors by using a respirator with an organic vapor cartridge.

### Limiting exposure to 2K products

1. Avoid contact with resin, hardeners, isocyanate mixed epoxy and sanding dust from partially cured 2K materials. Wear protective gloves and clothing whenever handling epoxies. Barrier skin creams provide added protection. Using a cotton glove with a disposable latex glove over it, allows the latex glove to be easily thrown away and replaced if materials get on it. If the event of skin contact with resin, hardener, isocyanate or mixed epoxy, remove it as soon as possible. Most 2K products are not water soluble—use a waterless skin cleanser to remove 2K products from the skin. Never use solvents to remove 2K products from the skin. Always wash skin thoroughly with soap and warm water after using 2K products. Change clothes immediately if 2K products are spilled on them. Use skin cleanser to remove any 2K products from you and your clothes. Clothing with mixed and cured 2K product may be worn again. Stop using any product which causes a reaction and resume work only after the symptoms disappear, usually after several days. When resuming work, use enhanced safety precautions to prevent exposure to 2K products, its vapors and sanding dust. If problems persist, discontinue use and consult a physician.

2. Eyes must be protected from contact with resin, hardeners, isocyanate, mixed 2K products, and sanding dust by wearing appropriate eye protection. If 2K products gets in the eyes, obtain assistance to flush the eye with plenty of warm water under low pressure for 20 minutes. In all cases, seek immediate medical attention.
3. Avoid breathing concentrated vapors and sanding dust. Most of ACE 2K products have a low concentration of volatile organic content (VOC), but vapors can build up in unvented spaces. Provide ample ventilation when working with 2K products in confined spaces and see best practices above for use of fans or other ventilation equipment.
4. Avoid ingesting 2K products. Wash thoroughly after handling 2K products, especially before eating or smoking. If any quantity of 2K product is swallowed or ingested, —DO NOT induce vomiting and drink large quantities of water. Some 2K products are corrosive and can cause additional harm if vomited. Contact or see a physician immediately. Refer to First Aid procedures on the Safety Data Sheet.
5. Keep your work area clean to avoid incidental contact. Avoid touching door handles, light switches and containers when 2K residue is on your gloves. Clean up spills with a scraper, collecting as much material as possible. Follow up with absorbent towels. Use sand, clay or other inert absorbent material to contain large spills. Clean 2K product residue with acetone, lacquer thinner or alcohol. Follow all safety warnings on solvent containers. Do not dispose of 2K products in trash containing saw dust or other fine cellulose materials due to risk of fire hazard or explosion.
6. Safely dispose of 2K products and empty containers. Puncture a corner of the can and drain residue into the appropriate new container of resin or hardener. Do not dispose of 2K products as liquids. Mix and cure waste 2K products into a hard cured clump which will be considered a non-hazardous solid.
7. CAUTION! Pots of curing epoxy can ignite surrounding combustible materials and give off hazardous fumes. Place pots of mixed epoxy in a safe and ventilated area, away from people and animals and combustible materials. Dispose of the solid mass only after it has completely cured and cooled. Follow federal, state or local disposal regulations.

### Other Related Hazards

#### Uncontrolled curing and burning of 2K Products

The chemical reaction that cures mixed epoxy is exothermic and generates heat. If left to cure in a large contained mass, such as in a mixing pot, it can generate enough heat to melt plastic, burn the skin or ignite surrounding combustible materials. The larger or thicker the epoxy mass, the more heat generated.

To prevent heat buildup, transfer epoxy from the mixing pot to a roller pan or pour directly to the floor.

#### Spraying 2K Materials

Do not spray ACE's 2K products.

### Best Practices When Working with ACE's 2K Products

#### 1. PPE (personal protective equipment)

- a. DO NOT WEAR shorts, flip flops, short sleeve shirts when working with the chemicals.

- b. DO WEAR, pants, protective glasses, hat, long sleeve shirts, socks, steel toed boots, gloves and use a rubber band to synch the pants and sleeves over socks and gloves. It is okay to wear cooler clothing when prepping, scraping and working in the area after the materials have cured. Disposable Tyvek style sleeves and legs may be a good option when used with shorts if there are no other options.
- c. Wear a solvent respirator when working with products that contain solvent.
- d. Do not touch the facial area when installing chemicals, have dry clean towels nearby during the installation portion.
- e. Wash hands, arms and face when done working with chemical and after grinding concrete. Avoid using solvents whenever possible.
- f. Consider using a uniform service to provide installers with a standard uniform that can be worn and then turned in for laundering.
- g. If long sleeve shirts are not in use, consider use of a disposable Tyvek style suit or disposable arms if wearing a tee shirt when working with the chemicals.
- h. Train all installers to be aware of all possible hazards when working with them and the importance of wearing PPE. Use of a tennis type of head band to address the sweating may be helpful.

## 2. Temperature and Humidity

Hot and humid weather increases the chances of skin irritation when working with chemicals. The B component for the Urethanes and Polyaspartic are more hazardous when in contact with moisture.

- a. Increase air circulation in the-working area during installation of the Polyaspartic or Urethane by using a fan to circulate the air while mixing and installing.
- b. Use of air circulation does not replace PPE; PPE must be properly worn.
- c. When wearing PPE in hot and humid conditions take necessary precautions to be observant, avoid and as necessary treat for, heat exhaustion and heat stroke.

## 3. General House Keeping

- a. All installers and staff must familiarize themselves with all product Safety Data Sheets.
- b. Do not leave open containers of uncured materials in vans, trailers or enclosed spaces. Place lids on them and clean edges of uncured materials and dispose.
- c. All ACE 2-component floor coatings are designed for rolling and brushing. DO NOT spray apply any of the coatings.
- d. Have clothing to wear for non-chemical activities that can be used when driving, etc. Only wear clothing used for chemical application when working with chemicals. A disposable Tyvek style suit may be a good option.
- e. **Glove Tip:** Many contractors shy away from using disposable latex gloves because they can be hard to change when hands become sweaty. An effective way around this is to put on a thin pair of cotton gloves underneath the latex

gloves as the cotton absorbs the sweat and makes it easy to change. Double gloving is also an easy way to keep clean - if the top gloves get dirty, just rip them off, replace them and keep going. Always buy powder-free gloves as users can develop sensitization to the powder/sweat combination produced while they work.

- f. Work as cleanly as possible and wipe dirty items on rags, not shirts or pants.
- g. Keep the PPE on until the trash is bagged and keep clean towels or rag available for wiping faces.
- h. With proper PPE and handling, there is no reason to get the chemicals on any area of skin.
- i. Wash skin immediately with soap and water if contact occurs.
- j. DO NOT use a solvent to remove chemicals from the skin! The solvent breaks down the chemicals and makes it much easier to remove, but it also makes it much easier to penetrate through the skin and enter the body. This fact should be kept in mind for solvent-borne chemicals, as these products already have solvents in them that make skin contact even more dangerous in this context.
- k. Ingestion – Do not induce vomiting. Have the person drink 1-2 cups or milk or water. Nothing should be given to an unconscious or convulsing person. Immediately consult a physician.
- l. Eye – Seek immediate medical attention! Immediately flush with large amounts of lukewarm water under low pressure for at least 20 minutes, holding eyelids open all the time. Refer individual to an ophthalmologist or other physician for an immediate follow-up.

***If you want to work in the Epoxy, Urethane and Polyaspartic Floor Coating Industry over a long period then you need to develop the right habits from day one: work clean, protect your body, clean up without solvents and read the Safety Data Sheets to understand what the potential dangers are.***

**Useful online resources for more detailed information on some of the different raw materials used in our 2 component floor coating products:**

[Epoxy sensitization article from CoatingsPro Magazine](#)

[Epoxy sensitization article](#)

[CDC overview of Isocyanates](#)

[Article on spike in rashes in the floor coating industry reaffirms best practices listed here](#)

<https://www.cdc.gov/niosh/pel88/8052-41.html> for measurements allowed that the disposable mask below will withstand:

<https://multimedia.3m.com/mws/media/14244280/3m-particulate-respirator-8247-r95-technical-specification.pdf>

## **SUMMARY OF SAFETY FOR ALIPHATIC POLYISOCYANATES AND AMINES FOR BRUSHING AND ROLLING APPLICATIONS**

Overexposure to aliphatic polyisocyanates and amines can cause skin, eye, nose, throat, and lung irritation, as well as skin and respiratory sensitization. Sensitization is the body's hyper-reactive (allergy-like) response to a substance that has been touched or inhaled by a hyper-sensitive individual. Sensitization may develop as a result of a large single

overexposure, such as from a spill or accident, or from repeated overexposure at lower levels. A sensitized individual may then respond with asthma-like symptoms or skin reactions upon subsequent exposure to the same or even lower levels. Symptoms of sensitization include wheezing, tightness in the chest, shortness of breath, and coughing. Skin sensitization reaction may include itching, rash, hives, redness, and swelling of hands, arms, and legs as well as other parts of the body.

### **ALIPHATIC POLYISOCYANATES:**

Depending on the individual, sensitization can be permanent or non-permanent. Those who show symptoms of being sensitized should avoid contact with aliphatic polyisocyanates. There is no simple test to identify individuals who are most susceptible to sensitization. Overexposure to polyisocyanates can cause sensitization that produce symptoms of asthma. Some sensitized persons who develop asthma-like symptoms resulting from exposure to polyisocyanates may then develop the same reactions when exposed to agents other than polyisocyanates. In the workplace, exposure to polyisocyanates should be consistently below the prescribed exposure limits (TLV, PEL, or manufacturers guidelines).

Exposure to aliphatic isocyanates can be limited by good engineering controls such as exhaust ventilation. However, wearing of personal protective equipment (PPE) is important and necessary when exposed to aliphatic polyisocyanates. Clothing and gloves (e.g., nitrile, neoprene, or butyl rubber with thickness greater than 10 mils) are recommended in addition to engineering controls, the very minimal hand protection is a double-layer gloves (cotton gloves with latex gloves over). Vapors and/or aerosols of polyisocyanates should be avoided.

If an individual is exposed to aliphatic polyisocyanates, the following measures should be taken:

.Eye – Seek immediate medical attention. Flush with large amounts of lukewarm water under low pressure for at least 20 minutes, holding eyelids open all the time. Refer individual to an ophthalmologist or other physician for an immediate follow-up;

.Skin – Remove any contaminated clothing immediately and wash affected areas thoroughly with soap and water for at least 15 minutes. The affected individual should get under a safety shower, using the flushing action of the water to remove the bulk of the chemical followed by soap and water. Seek medical attention.

Inhalation – Remove individual to an area free from risk of additional exposure. Administer oxygen or artificial respiration if needed. If the person develops asthmatic-like symptoms, consult a physician. Symptoms may develop immediately or may be delayed up to several hours.

Ingestion – Do not induce vomiting. Have the person drink 1-2 cups or milk or water. Nothing should be given to an unconscious or convulsing person. Immediately consult a physician.

In the event of a spill, identify the spilled material and consult the Safety Data Sheet (SDS). Evacuate the area, notify others as necessary, and put on personal protective equipment depending on the scope of the spill. If possible, control the source of the spill and dike the spill with oil-dry or similar absorbent. Decontaminate the spill area with the following mixture: 20% Tergitol TMN-10 (Dow) or other nonionic surfactant + 80% water. Remove absorbent/decontaminated material into steel container and place outside covered loosely for 72 hours to allow time for the polyisocyanates to react with water. The material may be a hazardous waste if it contains a solvent or other material with a flash point less than 140°F.

### **AMINES:**

Amines are typically used in two-component epoxy coatings, usually referred to as the B-Component. As with the aliphatic polyisocyanates, depending on the individual, sensitization can be permanent (less likely) or non-permanent. Those who show symptoms of being sensitized should avoid contact with amines. There is no simple test to identify individuals who are most susceptible to sensitization. Skin sensitization reaction may include itching, rash, hives, redness, and swelling of hands, arms, and legs as well as other parts of the body. Some sensitized persons may then develop the same reactions when exposed to agents other than amines. In the workplace, exposure to amines should be consistently below the recommend exposure limits (TLV, PEL, or manufacturers guidelines).

Exposure to amines can be limited by wearing personal protective equipment (PPE). **This is strongly recommended.** Clothing and gloves (e.g., nitrile, neoprene, or butyl rubber with thickness greater than 10 mils) are recommended in addition to engineering controls. The very minimal hand protection is a double-layer gloves (cotton gloves with latex gloves over).

If an individual is accidentally splashed with amines, the following measures should be taken:

**Eye** – Get immediate medical attention. Immediately flush with large amounts of lukewarm water under low pressure for at least 20 minutes, holding eyelids open all the time. Refer individual to an ophthalmologist or other physician for an immediate follow-up.

**Skin** – Remove any contaminated clothing immediately and wash affected areas thoroughly with soap and water for at least 15 minutes. The affected individual should get under a safety shower, sing the flushing action of the water to remove the bulk of the chemical followed by soap and water. Seek medical attention.

**Ingestion** – Do not induce vomiting. Have the person drink 1-2 cups or milk or water. Nothing should be given to an unconscious or convulsing person. Immediately consult a physician.

As with aliphatic polyisocyanates, in the event of a spill, identify the spilled material and consult the Safety Data Sheet (SDS). Evacuate the area, notify others as necessary, and put on personal protective equipment depending on the scope of the spill. If possible, control the source of the spill and dike the spill with oil-dry or similar absorbent. Remove material into steel container and cover. The material may be a hazardous waste if it contains a solvent, is uncured and will need proper disposal according to the laws of the local jurisdiction.