FIBERGLASS LAYUP AND SPRAYUP

GOOD PRACTICES FOR EMPLOYEES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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Your health and your job are pretty important to you, as they are to most of us. Generally, your job can be a safe one but it is important that you understand the hazards that you might encounter while at work.

This booklet was prepared by the National Institute for Occupational Safety and Health (NIOSH) to help workers in the fiberglass reinforced plastics layup and sprayup industry avoid hazards that could endanger their health. It identifies common problems and suggests work practices you can follow to help you stay safe, healthy, and on the job.

The first section will define terms you may already know, but they are listed here for your ready reference in reading the rest of this booklet. The other sections will give you information about some of the materials you work with and good work practices for handling them.

Important Terms

Accelerators Compounds added to speed up the action of the catalyst in a resin mix. Polyester acclerators are usually cobalt compounds.

Catalyst A material used to activate the basic resins, causing them to harden. Polyester systems mainly use organic peroxides, and epoxy systems use amines and anhydrids.

Contaminant Any impurity in air or liquids. May or may not be harmful.

Crosslinking The linking together of the long resin molecules by a monomer. Also called polymerization.

Dermatitis An allergic skin condition resulting from direct contact with an irritating chemical.

Epoxy Resin A resin family used to manufacture fiberglass reinforced plastic products, which is made by combining certain thick liquid or solid epoxy chemicals along with a hardener.

Exhaust Ventilation (local) Ventilation systems that draw the dust, vapors, or contaminated air out of an area, usually with hoods.

Gel The state of the resin during the early stages of hardening prior to becoming a solid. Similar to gelatin.

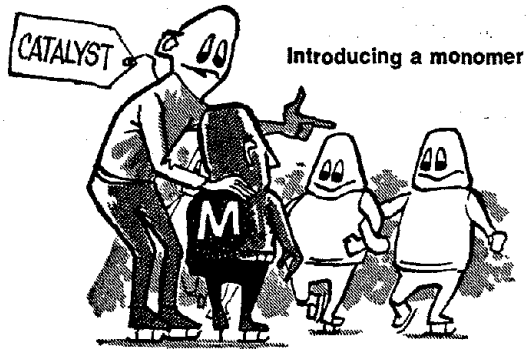
Gel Coat A specially formulated resin containing color and filler materials to provide a smooth, pore-free surface for the fabricated part.

General Dilution Ventilation Ventilation systems that draw or blow fresh air into an area, thus diluting contamination in that area.

Hardener	A material which is added to the resin to aid in the curing process.
Inhibitors	Chemicals added to prevent too-soon polymerization of resin blends.
Mold Release Agents	Waxes or stearates applied to a mold to aid in the separation of the mold and finished product.
Monomer	A compound of simple structure that converts into a polymer by combining with itself or other similar compounds.
Organic Peroxides	Group of catalysts most frequently used with polyester resins. MEK peroxide is the most common type used; benzoyl peroxide and lauroyl peroxide are also used.
Polyester Resin	The family of resins most commonly used in the manufacture of fiberglass products. The monomer units are crosslinked together to form a chain structure.
Reactive Diluent	A material used in an epoxy system, first to act as a solvent, thinning and dissolving resins, and secondly to enter into the hardening reaction by crosslinking with the epoxy resins.
Resin	Highly reactive chemical building blocks which are transformed into a solid plastic upon activation by hardeners (epoxies) or catalysts (polyesters).
Sensitization	An allergic reaction caused from exposure to a particular material. Onset of such reactions can be sudden and may occur after as short a period as one week or after a person has safely handled a material for years.

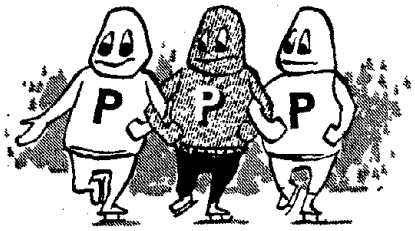
POLYESTER AND EPOXY RESINS

Polyester resins are used in about 80 percent of all layup and sprayup applications. Most of the other resins used are epoxies. Polyester resins come into the plant as liquids containing both large polyester molecules and smaller monomer molecules. The raw resin under a powerful microscope looks like a pile of chain links. Some are joined together and others are individual links. The joined links are polyester molecules while the individuals are monomers.



Introducing a monomer to molecular chains . . .

. . . results in polymerization



When a catalyst is added, the monomer links join and crosslink between the polyester molecules. This crosslinking is called polymerization and results in the liquid resins gelling into a solid, rigid plastic.

To keep the two types of resin molecules from joining accidentally the supplier adds an inhibitor. Styrene is often added to make the resin easier to handle. Promoters, activators, or accelerators may be added to help the catalyst and reduce the gel time. Pigments, fillers, and fire retardants may also be added, depending on the product being made.

Epoxy resins, because of their great strength, have replaced polyesters in some layup and sprayup applications. Epoxies are more hazardous to work with than the polyester resins because they use chemicals which are powerful skin irritants and sensitizers.

WORKING WITH EPOXIES

Special precautions and work practices are required when working with epoxies.

- Read the labels on all containers for information on health or fire hazards. If you have any questions about the kinds of chemicals you use, ask your supervisor.
- Always mix components in hoods that draw the vapors away from you.
- Protect your skin and eyes from any contact with epoxies during hand layup. Wear proper gloves, face shields, chemical goggles, and coveralls. You may have to wear special rubber clothing when working with some epoxies.
- Remove any splashed epoxy from your skin immediately. Use mild soap or waterless cleaners but do not use solvents since they can cause skin rash.
- Remove contaminated clothing immediately and do not reuse it until it has been cleaned. Epoxies can be removed from rubber clothing and gloves with a solvent, followed by a soap and water washing.
- Keep work areas clean. Use disposable cloth rags or paper towels to clean up any spills. In many plants, heavy paper is used to cover work areas and floors at the beginning of each shift. During cleanup, or after a spill, the covering is replaced.
- Keep tools free of epoxy. Disposable tools like wooden stirrers, plastic or paper containers, and throwaway rollers are best because you avoid additional contact with the chemicals when cleaning. Unless effective incineration is available, do not burn throwaway items to dispose of them because the vapors can be hazardous.
- Shower after each shift to remove any traces of the chemicals from your body.

SOLVENTS AND STYRENE

You probably use styrene and many different kinds of solvents. Accidents and health problems may occur from misuse or improper handling of these solvents as well as from exposure to styrene. If you're handling styrene or solvents and experience any eye discomfort, breathing difficulty, or other type of discomfort, tell your supervisor.

Styrene monomer and most of the commonly used solvents such as acetone and MEK (methyl ethyl ketone) can form flammable or explosive vapor concentrations under normal room temperatures.

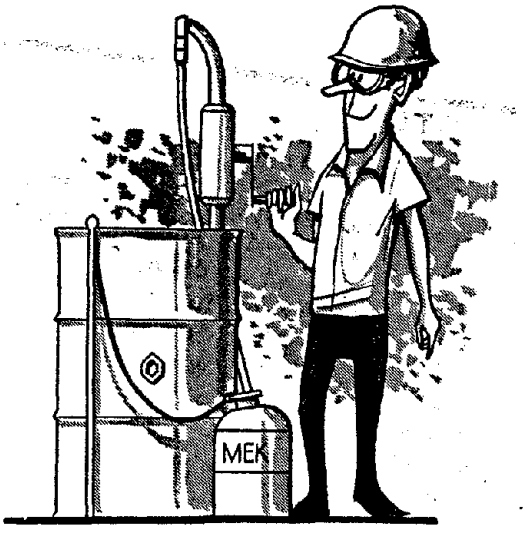
Good work practices to follow when working with solvents and styrene are:

Ventilation: Always work with adequate ventilation.

Fire Protection: Exclude all possible sources of ignition from areas where solvents are used or stored. This means there must be no smoking, open flame, welding, burning, hot machinery, or electrical equipment not designed for this special use in any area where flammables are used or stored.

Report any skin irritation or erruption or breathing problems to your supervisor immediately

Use a ground and bond when transferring flammable liquids



Dispensing: Prevent static electricity build-up when transferring solvent from a drum to a container by grounding the drum and the container to form an electrical bond. (Just as static builds up when you run a comb through your hair, a similar charge can build up when the particles of a solvent rub together as the fluid is being poured. This is why the drum must be grounded and the receiving container bonded to the drum.) A metallic cable is usually used for grounding. It is bolted or clamped to a ground conductor on one end and has a screw clamp or clip to attach to the drum on the other end. Be sure to scrape any paint, dirt, or rust from the part of the drum where you are going to attach the ground. The receiving container must also be attached to the drum with a bonding wire.

Handling: Carry in, and use from safety cans. No more solvent than will be used during a shift must be taken into the work area. Unused solvent must be returned to storage at the end of the shift.

Cleanup: Clean up a solvent or styrene spill immediately. There are special compounds such as vermiculite, perlite, clay, and dry sand which will absorb spilled solvents.

CASE HISTORY

The Not-So-Empty Drum

The supervisor wanted an old drum to use as a garbage can at home. He went to the shipping and receiving man who let him pick out an empty 20-gallon solvent drum despite a company rule that no drums be reused without decontamination. The supervisor asked a welder to cut the top off. The welder removed the bung and was adjusting his torch to begin the cut when the drum blew apart. A fragment partially severed the welder's jugular vein but prompt first aid by a coworker saved his life.

What went wrong? The drum apparently contained a small amount of solvent that the heat from the torch caused to explode. Many companies have a rule that any drums to be cut must first be filled with water and then cut with non-sparking tools (special alloy chisels).

CASE HISTORY

Static Charge Triggers Fire

Two workers were using a hand pump to empty a small amount of solvent remaining in one drum into a second drum. While one worker was turning the hand crank on the pump, the second was aiming the pump spout into the bung but the spout was not touching the drum. The drums exploded. Both men and a fellow employee were severely burned in the fire that followed.

What went wrong? A static charge built up as the free falling solvent was being transferred and ignited the flammable vapors. Bonding straps were not used to prevent building up charges.

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BLAST MYSTERY

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Damage Put at $5 Million by Firemen

Fire and explosion

Many solvents and some catalysts are fire and explosion hazards. How great a hazard this can be is shown here. This blast involved a catalyst of a type used in layup.

ORGANIC PEROXIDES

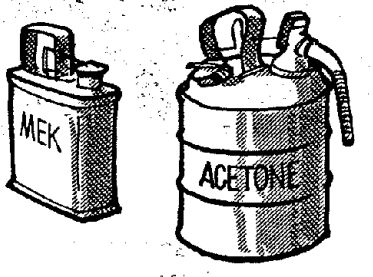
The basic rule for handling peroxides is follow the manufacturer's directions carefully!

Organic peroxides are used as catalysts and can be dangerous. **HANDLE WITH CARE.** The various peroxides differ considerably in their chemical properties, but all can be unstable and require special handling, storage, and mixing procedures. They may explode from friction, static electricity charges, contamination with other materials, improper mixing procedures, or from changes brought about by freezing, evaporation, or aging.

In addition to the dangers of fire and explosion, skin or eye contact can produce severe irritation or chemical burns.

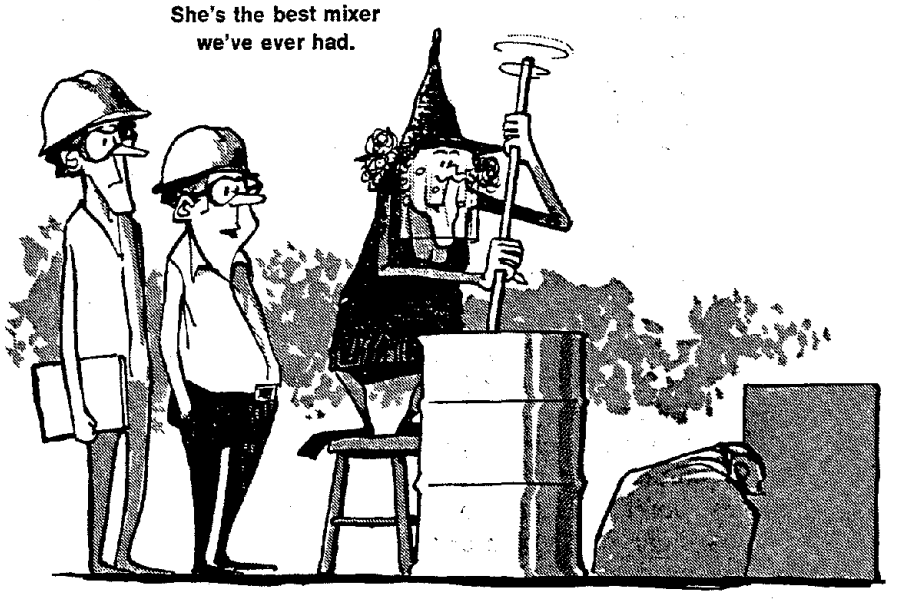
There are special guidelines to follow for mixing and dispensing, spraying, storing and disposing of organic peroxides.

REMEMBER: FOLLOW ALL of the manufacturer's directions.



MIXING AND DISPENSING ORGANIC PEROXIDES

- You should have special training in mixing and dispensing.
- Wear a face shield or chemical goggles and protective gloves. A good practice is to work behind safety shields or in hoods with safety glass fronts. Ventilated hoods or respirators approved for organic vapors are necessary for some formulations because of the solvents they contain.



Mixing and compounding require special training

Organic peroxides

- Never mix peroxides directly with accelerators or promoters. A violent explosion can result.
- Keep all work areas, tools, and containers clean. Avoid mixing contaminated peroxides with any other substance.
- Weigh and mix in a special room or area apart from other plant operations. *Never* use a storage area containing other peroxides. The mix area should be well-ventilated and have sprinklers.
- Know the location of the nearest emergency shower and eye wash in the mix areas.
- Adding peroxides to hot resins is dangerous. Be extremely careful during this operation.
- Never dilute peroxide solutions. Using the wrong solvent or a contaminated solvent can cause a violent reaction.
- Mixing and dispensing containers should be polyethylene, Teflon, glass, or stainless steel (304 or 316). (Brass, copper, zinc, galvanized finishes, and some steels and aluminum alloys are corroded by peroxides, and this corrosion can trigger a peroxide fire or explosion. Paper containers and wooden stirrers are good for one-time use.)
- Never return excess peroxides to storage containers. Don't use glass for storage as any pressure buildup can shatter the container.
- Keep all containers tightly closed to prevent contamination.
- Use an electrical ground and bonding strap with any processing equipment.
- Don't use acetone to dilute peroxide solutions or to clean containers or tools. Acetone reacts with some peroxides to form explosive compounds.

SPRAYING WITH ORGANIC PEROXIDES

- Keep your equipment clean and properly maintained with covers in place.
- Avoid contaminating the organic peroxide when filling dispensing containers. Sanding dust and resin overspray are serious sources of contamination.
- NEVER smoke in a spray area.
- Keep dispensing containers away from any sources of fire or heat.
- Be sure that the vents of all pressure pots are free of overspray. Vents that are too small or closed because of overspray buildup cannot work properly.
- Wear eye protection.
- Avoid breathing overspray — always use the ventilation system and/or wear your respirator.
- Never test-spray peroxide solutions into the air or onto resin overspray. Make all test shots into water.
- Be sure that all spray gun parts that come in contact with peroxides are stainless steel (316).
- Use only original replacement parts. Replacing screens or other parts with copper or other metals that are corroded by peroxide can result in fires or explosions.
- Never point a spray gun at yourself or anyone else.

STORAGE OF ORGANIC PEROXIDES

- Store in the manufacturer's shipping containers. Repackaging is dangerous.
- Be sure containers are completely emptied and cleaned before disposal.
- Destroy empty containers. DO NOT reuse.
- Keep only the quantity that will be used during the shift in the plant.
- Store organic peroxides apart from all other materials.
- Keep all containers labeled and tightly closed to avoid contamination.

DISPOSAL OF ORGANIC PEROXIDES

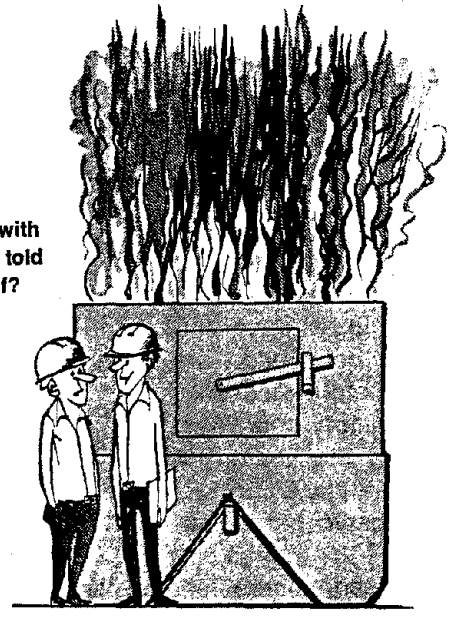
Destroy waste, spilled, or out-dated peroxides. Do not discard. (Discarded peroxides can catch fire or explode. Dumping in sewers or drains can cause distant explosions.)

Soak up spilled liquid or paste peroxides with sand, clay, perlite, or vermiculite and then wet with water. Next, sweep up with tools that do not spark. (After being wet with water, spilled solid peroxides may be very carefully swept up with non-sparking tools.) Place wet waste in double polyethylene bags and dispose of *immediately* as follows:

(a) Peroxides can be safely destroyed by burning small amounts in an open trench, by burying, or by slowly adding them to a 5% caustic (lye) solution. (Air pollution laws in many places forbid burning. Always follow your plant's disposal procedure carefully.)

(b) Use only clean, white rags for cleanup. The dyes used in colored rags can react with peroxides.

(c) Dispose of contaminated rags and single-use mixing containers and tools by burning in a proper incinerator or by soaking them in water.



What did you do with that old catalyst I told you to get rid of?

Case History – Sprayup Man Loses Leg

A sprayup plant was diluting MEK peroxide catalyst using reclaimed acetone. A two-gallon pressure pot exploded and the operator lost a leg.

What went wrong? Here three different safe handling rules were violated. First, manufacturers strongly warn against plants doing their own dilution. Secondly, acetone must never be used with MEK peroxide, and lastly, use of a reclaimed solvent, which could have contained contaminants, increased the hazard. All pressure pots must be equipped with a good vent and kept clean.

Case History – Fire Sweeps Plant

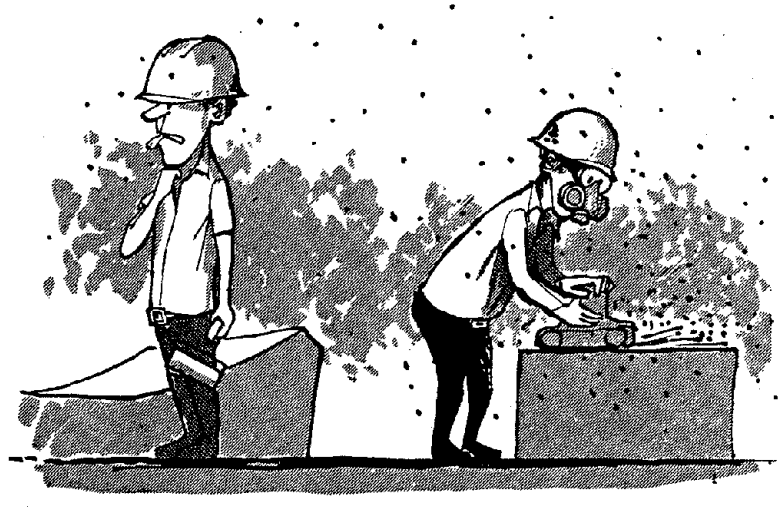
At a plant manufacturing fiberglass reinforced plastic products, a special room was used for all mixing. Mixing was done at a long bench with a liquid peroxide catalyst station at one end and the accelerator dispenser located at the other end of the bench. The man in charge of the mixing was usually careful about his housekeeping but one summer's day, he used the same cotton rag to clean up spilled catalyst and accelerator. The rag caught fire, the flames spread rapidly, and the plant was destroyed.

What went wrong? The mix man knew the danger of mixing organic peroxides and promoters or accelerators but carelessly combined them on his cleanup rag. Never mix peroxides directly with accelerators or promoters because fire or explosion can result.

DUSTS

Dust from flashing removal, finishing operations, sanding joints, or repairing defects can irritate your skin, nose, throat, and lungs. Workers in finishing areas should work in exhaust booths, or use tools that collect the dust. If this is not feasible, they should wear dust respirators. Wearing long-sleeved shirts is also a good idea for keeping the dust off.

Even when heat-treated, epoxy resins are often not completely cured when you start finishing operations. These uncured resin dusts can give you allergic reactions and asthma-like problems. Some people may develop skin reactions.

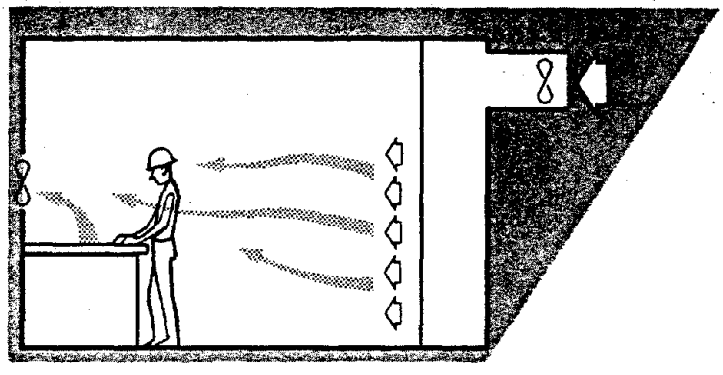


Finishers aren't the only people who need dust respirators — workers in adjacent areas may need them too

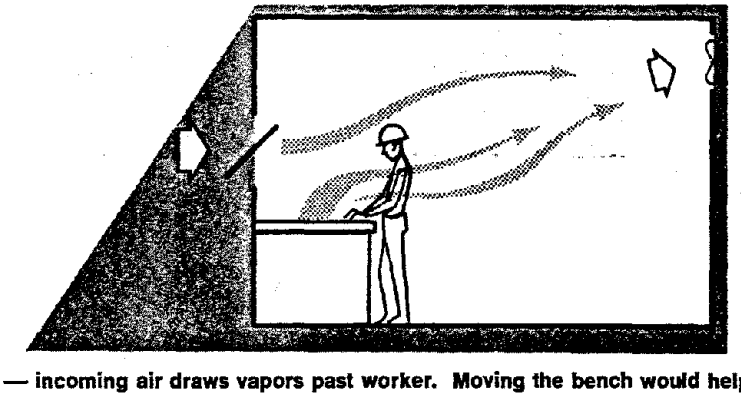
VENTILATION

Proper ventilation is the most important key to preventing airborne hazards from reaching you. There are some standard variations of the two basic types of ventilation — general dilution and local exhaust systems.

GENERAL DILUTION VENTILATION uses fans to exhaust air from a room or a building and to keep air contaminants at a low level.



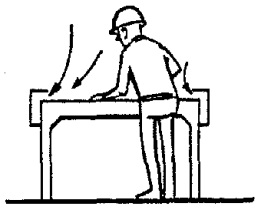
Good system — fresh air carries fumes away from worker



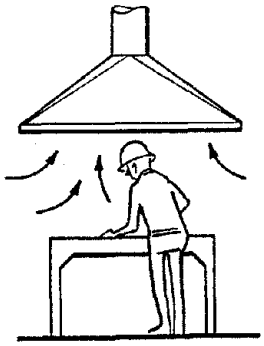
Bad system — incoming air draws vapors past worker. Moving the bench would help.

LOCAL EXHAUST SYSTEMS are the most effective. They move the air toward a hood, pulling contaminants along. But the effectiveness of local exhaust systems are greatly reduced as you move the work away from the hood. A hood 12 inches from the source of the contaminant is only about one-fourth as effective as a hood 6 inches away.

Effective local exhaust systems
should pull contaminants away
from the worker's breathing zone.
Here are some examples of local exhaust ventilation systems:

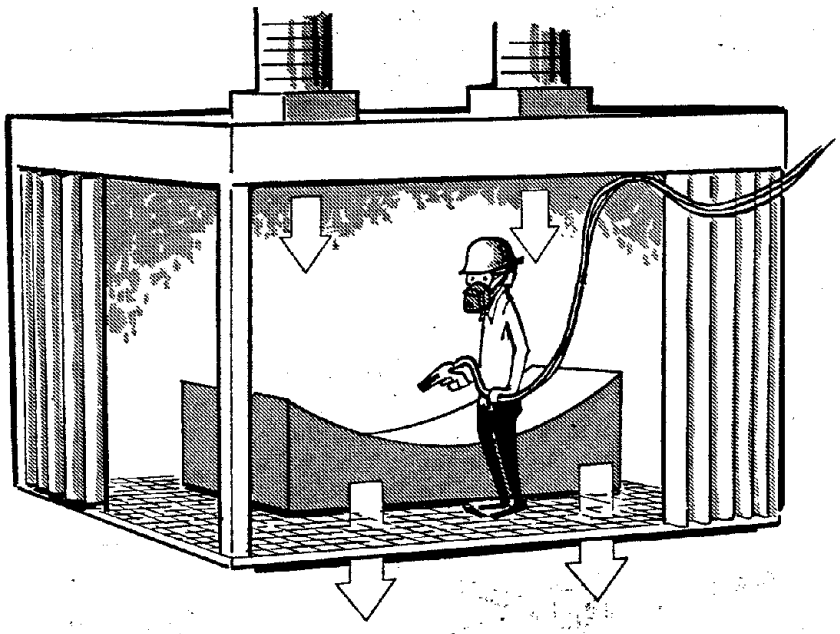


Good



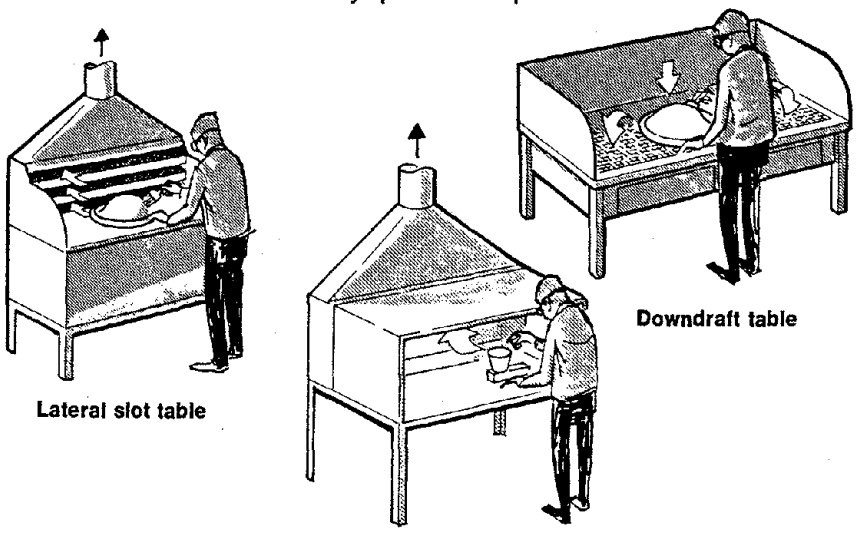
Poor

SPRAY BOOTHS are recommended for sprayup, gun wetting, and rollout operations. The spray booth exhaust system operates to draw vapors away from your breathing zone.



Good system — downdraft booth for sprayup

AN EXHAUST BOOTH is recommended for mixing and compounding. These operations should be done in an exhaust booth, on a side-draft or down-draft table, or at a lateral slot exhaust table. If you must use an overhead canopy hood, don't lean over your work — the exhaust may draw vapors through your breathing zone. The systems sketched below are also excellent for the layup of small parts.

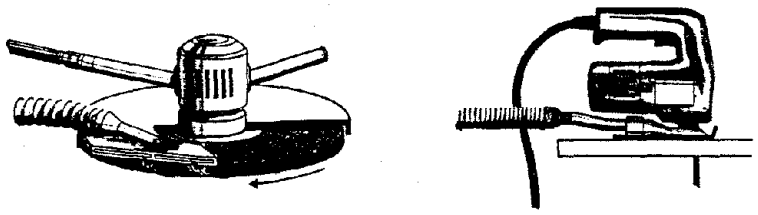


Lateral slot table

Booth

Downdraft table

Shaping and finishing after parts have hardened are best done in an exhaust booth. Grinding or cutting tools (portable sanders, grinders, and saber saws) can also be equipped with low-volume, high-velocity exhaust systems. These small exhaust systems are mounted on the tool and connected to an exhaust duct with a hose.

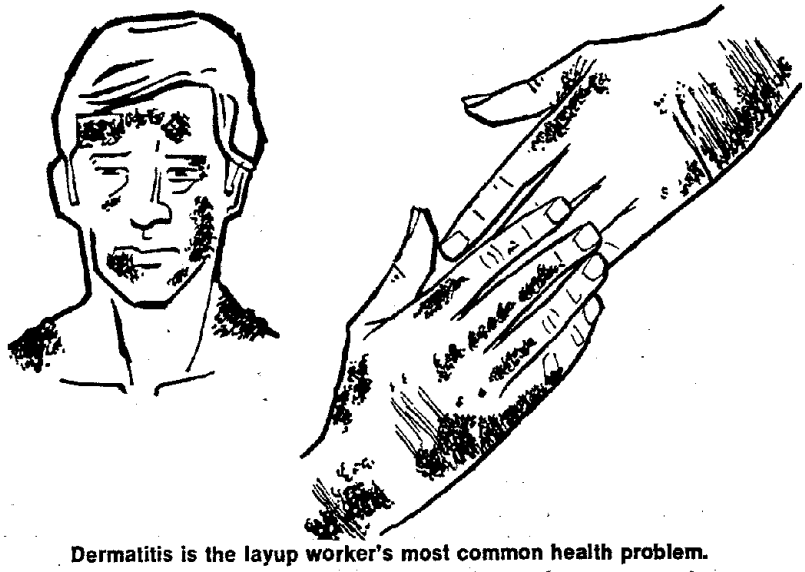


POSSIBLE HEALTH EFFECTS

DERMATITIS

The most common health problem of layup workers is a skin condition called dermatitis. Poison ivy, for example, is a dermatitis reaction with which you are familiar. Dermatitis can range from a slight reddening of the skin and a mild itch to rashes, open, oozing sores, and intense pain. In advanced cases, it becomes almost impossible not to scratch open the inflamed blisters, causing the skin to become infected, scaly, and deeply cracked. Prompt medical attention is the best way to keep a slight irritation from becoming severe.

The only sure way to prevent dermatitis is to avoid contact with chemical irritants. People vary in their reaction to these chemicals, depending on several factors including skin color or the amount of oil in their skin. The reaction always breaks out where you touched the irritant and does not spread beyond the irritated area. It usually will go away with time when contact stops.



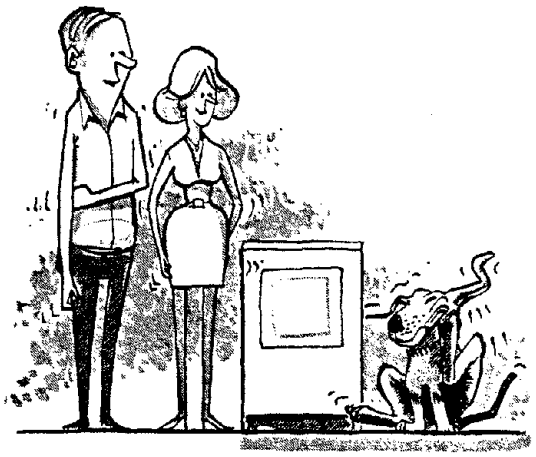
Dermatitis is the layup worker's most common health problem. It is easy to avoid if you use good work practices to prevent contact with chemicals.

SENSITIZATION

Sensitization is an allergic reaction that some layup workers can develop suddenly after years of handling a material without any reaction. Once you are sensitized, contact with even a small amount of the same material can cause a severe outbreak that may spread widely over the body. Some sensitization reactions can also affect the lungs, resulting in asthma-like problems or coughing spells. You seldom lose this sensitivity, and sensitized workers frequently must leave their jobs or be transferred to other areas.

Avoid contact with all resins, hardeners, catalysts, and additives used in layup and sprayup; they are all possible sensitizers. The uncured resin dust from finishing operations also can cause these allergic reactions. Because sensitization starts so suddenly, it is extremely important that you limit contact with all chemicals even though they may not bother you now.

Wash work clothing separately or glass itch can be passed on



GLASS ITCH

Another skin problem, glass itch, is caused by fibers from glass reinforcing products rubbing on the skin and irritating it. Glass fibers can also be so fine as to enter the lungs and do damage there. Most new workers stop itching after a week or so on the job. However, the itch may temporarily return after your vacation or if you miss work for long periods.

RESPIRATORS

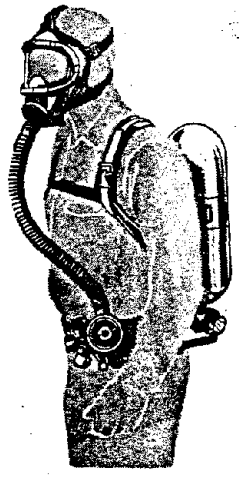
Approved respirators must be worn where ventilation is not adequate. They must fit properly, must be chosen for the particular job, and must be properly worn and maintained.

If your job requires that you need to wear a respirator, your employer must train you in how to wear and care for the respirator. Respirators must be cleaned and checked after each use. The facepiece of your respirator must be cleaned each day, or before each use. Use mild soap and warm water. Do not use solvents, hot water, or harsh cleaning compounds.

Replacement filters and cartridges and other parts must be those designed by the manufacturer for that particular purpose — do not attempt to substitute parts.

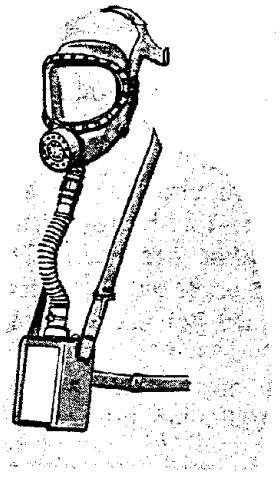
Filters and cartridges should be changed as often as necessary: if it becomes hard to breathe through them; if you detect the odor of solvent while wearing the respirator; or if they have been used for their specified lifetime.

Store all respirators in a clean, dry place, in a carton or a plastic bag, and preferably in a cabinet or locker designated for this purpose.

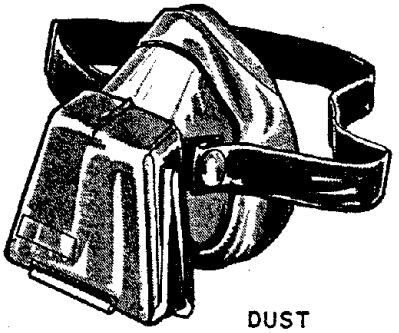


SELF-CONTAINED RESPIRATOR

AIRLINE RESPIRATOR

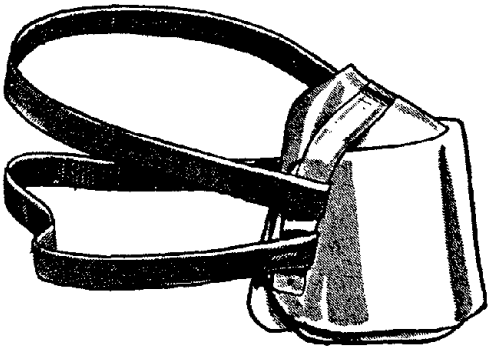


GAS MASK

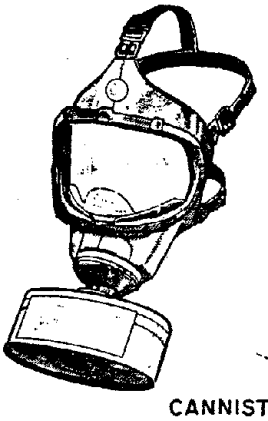


DUST

CHEMICAL
CARTRIDGE



DUST



CANNISTER

RESPIRATOR FIT

Make sure your respirator fits properly.

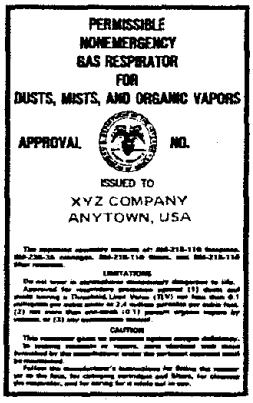
- Facial hair can cause your respirator to fit poorly. You cannot have a beard; mustaches should not extend beyond the corners of your mouth. Bushy or long sideburns (below the bottom of your ears) also will cause a poor fit.

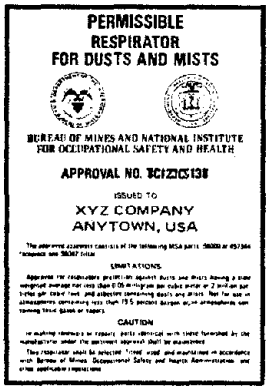
Too much facial hair will cause your respirator to fit improperly

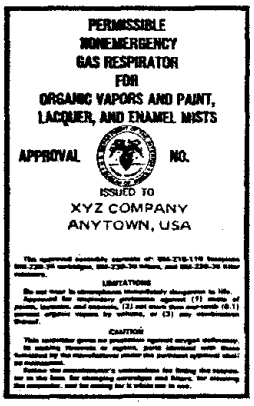
- Do not wear regular glasses when you are wearing a full facepiece respirator. The stems will break the seal.
- Adjust the respirator so that it doesn't dig into your face and you don't feel a lot of pressure. It should fit snugly, but still be comfortable. Check to see if any air leaks around the edges while you breathe. You should not be able to detect any styrene or solvent odor or dust. If the respirator has a full facepiece, pinch off the hose leading into the facepiece and inhale. The facepiece will collapse if you have a good seal.
- Always inspect any respirator before you wear it. Be sure it is in good condition and is working properly.
- Do not borrow another worker's respirator, and do not lend yours to anyone.

Government Approval

The government tests and evaluates respirators to be sure they provide adequate protection for you. Use only approved respirators under the conditions intended. Approval labels may be on either the respirator or the container it comes in.







PROTECT YOURSELF

Most of the job-related health problems of layup workers can be prevented by taking a few simple precautions:

- Change your work clothing daily. If compounds or solvent splash on your clothes, change immediately! Workers sometimes get considerable amounts of fiberglass trapped in their clothing. This clothing should be laundered separately from the family wash to prevent other people from getting glass itch.
- Use waterless hand cleaners to remove resin from your skin, followed by soap and water washup. If the resin won't come off, dab with a cloth or towel dampened in rubbing alcohol and then use soap and water. Never use shop solvents to clean yourself because they remove the oil from your skin and can, by themselves, cause painful dermatitis.
- Keep your fingernails short, and don't wear rings or watches on the job. Chemicals can build up under them and lead to dermatitis.
- Always shower at the end of a shift. Shower at work if possible, or immediately after arriving home. After a thorough soap and water washup, use a cream or lotion containing lanolin to protect your skin against drying out.
- Never eat or smoke in areas where chemicals are used or stored.
- Use the right type of protective skin cream and lotions for the work you are doing. These are furnished by many plants or can be purchased. To get the most benefit from these creams wash before you apply them. Always wash away the creams from your hands before eating or smoking. Reapply them before returning to your work station.
- Do not use protective creams as a substitute for gloves. The creams can often rub off as you work. They do work well for face and neck areas which are hard to protect with other coverings.

FIRST AID

First aid for the compounds you handle in fiberglass layup and sprayup has two basic principles. Both principles hold true for all the compounds you handle whether they are solvents, styrene, epoxies, hardeners, catalysts, organic peroxides, or polyester resins.

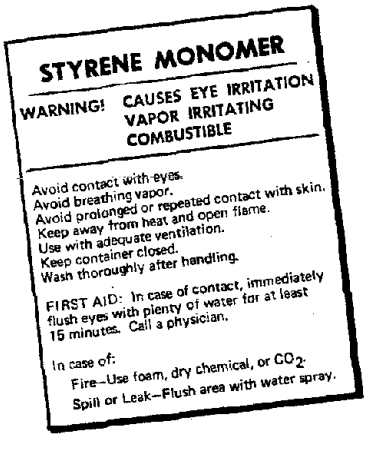
For skin and eye contact, get under running water immediately. Prompt action will prevent after-effects in many cases. You should know the location of the nearest eye wash fountain, emergency shower, or other source of running water.

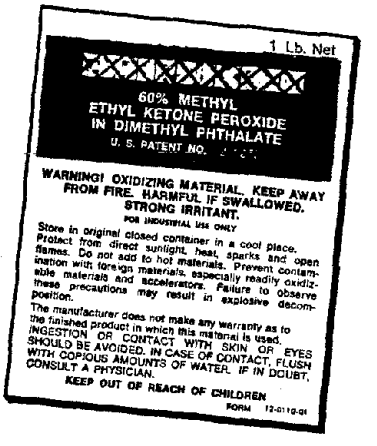
The other basic principle concerns lung overexposure and calls for you to get into fresh air immediately.

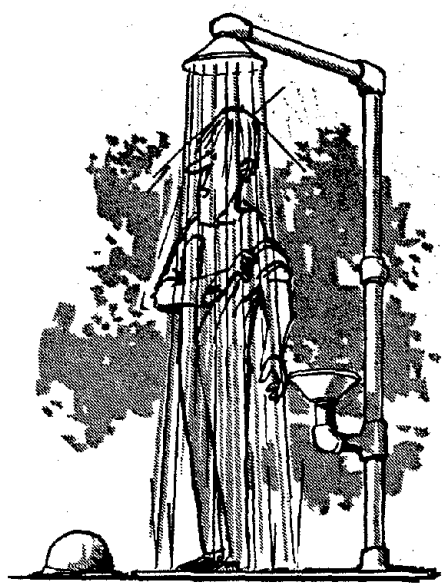
Emergency phone numbers should be posted at every phone. The last page of this booklet has a place for you to jot down these numbers.

First aid

All plants should keep a complete list of the exact chemicals being used so that emergency medical personnel will know how to treat the patient. All storage containers should be clearly marked as to contents. Many manufacturers of hazardous chemicals use labels like those shown. These labels identify the chemical, explain the hazard and first aid procedures.







Remove your clothing after you're under the shower

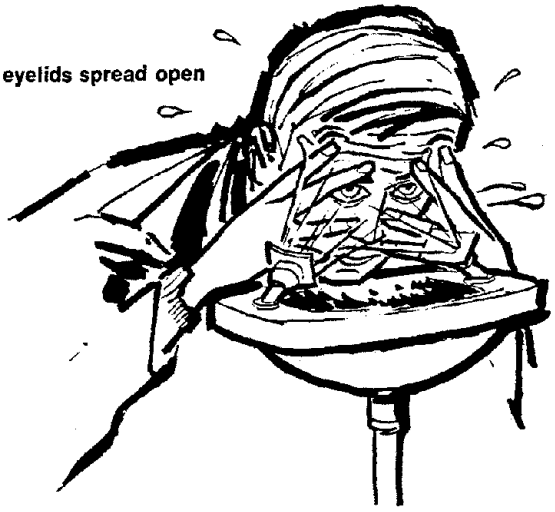
Skin Exposure, Small Areas. Remove contaminated clothing and immediately flush the area with water. Scrub gently with soap or detergent.

Skin Exposure, Large Areas. Rush to the safety shower; remove clothing while you are in the shower. Then scrub gently with mild soap or detergent and remain in the shower for 10 minutes. Always get medical aid if the skin is damaged or remains red, if you feel like vomiting, or have balance, vision, or breathing problems. Never put on clothing that has been contaminated until it has been laundered or cleaned.

First aid

Eye Contact. Flush your eyes immediately at the nearest eye wash fountain, sink, or other source of clean water. Spread your lids open with your fingers and roll your eyes around in their sockets. Continue for 15 minutes. Meanwhile, send for medical help.

Keep eyelids spread open

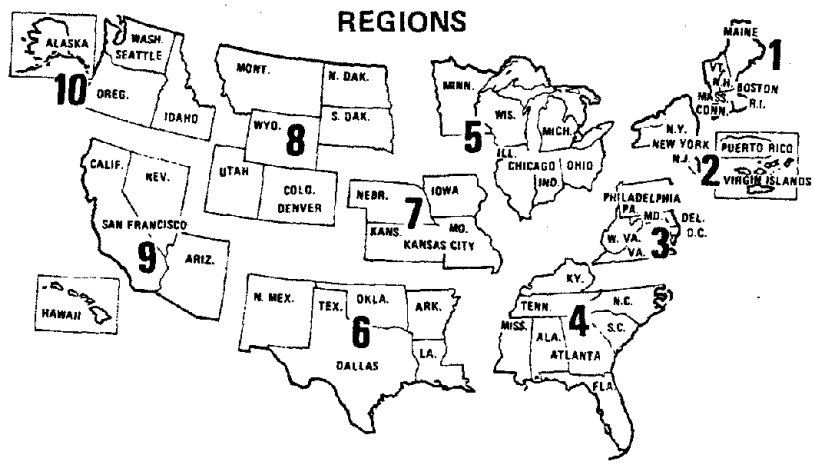


Inhalation Exposure. Immediately move the victim to fresh air and call for medical aid. Keep him warm and if he is unconscious remove any objects from his mouth. Keep victim's head low. If he is not breathing, immediately begin mouth-to-mouth resuscitation.

If victim isn't breathing, start resuscitation

Compounds used for polyester-filled, fiberglass-reinforced products present these hazards:

Catalysts	_____Compounds called organic peroxides are the most common catalysts. These are skin irritants and sensitizers and require careful handling because they are also fire or explosion hazards.
Cleanup solvents	_____Washing yourself with solvents can lead to dermatitis. Solvents are fire hazards and high vapor concentration of some can cause you to pass out or can affect your nervous system or lungs.
Epoxy resins	_____Uncured, the liquid resins are mildly irritating to the skin and some can cause sensitization, dermatitis, and lung problems. When fully cured they are not irritating.
Fiberglass reinforcement	_____Can cause glass itch; a temporary skin irritation. The fine dusts from finishing may be damaging to the lungs.
Hardening agents	_____Many are potent irritants and skin and lung sensitizers. Hazards vary depending on the type. The types used for room temperature curing are the strongest irritants; some can burn the skin and eye tissue. In addition, sensitization can result in asthma or rashes. Usually, the hardeners used for oven curing are less hazardous.
Polyester resins	_____Harmless but are usually mixed with monomers that are skin irritants and skin sensitizers.
Promoters, activators, accelerators and inhibitors	_____Potential skin irritants and sensitizers.
Reactive diluents	_____Moderately to severely irritating to skin. Some are sensitizers.
Solvents	_____Continued skin contact can lead to dermatitis. Excessive breathing of vapors can affect the nervous system and other parts of the body.
Styrene monomer	_____Irritating to skin, eyes, nose and lungs. High vapor concentrations cause nausea, headache, dizziness or drowsiness.



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EMERGENCY INFORMATION

FIRE

Telephone Fire Department _____

Nearest Alarm Box at _____

CRIME

Telephone Police _____

INJURY/ILLNESSES

Avoid infection of minor injuries; always get medical attention or skilled first aid.

Doctor _____

Office _____ Tel. _____

Residence _____ Tel. _____

_____

_____

Hospital _____

Address _____ Tel. _____

Ambulance _____

Address _____ Tel. _____

(In emergencies, get medical attention and transportation elsewhere if necessary.)

In all cases of Fire, Crime, Accident, or Sickness, promptly notify:

1. Name _____ Office Tel. _____

Address _____ Res. Tel. _____

or

2. Name _____ Office Tel. _____

Address _____ Res. Tel. _____