

PB-266404



EPOXY WISE IS HEALTH WISE

PB 266 404



REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

BIBLIOGRAPHIC DATA SHEET	1. Report No. NIOSH-76-152	2.	3. Recipient's Accession No.
4. Title and Subtitle Epoxy Wise is Health Wise		5. Report Date April 1976	
7. Author(s)		6.	
9. Performing Organization Name and Address National Institute for Occupational Safety and Health. 4676 Columbia Pkwy. Cincinnati, Ohio 45226		8. Performing Organization Rept. No.	
12. Sponsoring Organization Name and Address Same		10. Project/Task/Work Unit No.	
		11. Contract/Grant No.	
15. Supplementary Notes		13. Type of Report & Period Covered	
		14.	
16. Abstracts This pamphlet provides health and safety information for epoxy workers. Epoxy resins, hardeners, and curing agents are described. Possible hazards of working with epoxy resins, including sensitization, illness, eye injury, unconsciousness, fire or explosion and skin rash, are described, and preventive measures are given. The importance of cleanliness is emphasized.			
17. Key Words and Document Analysis. 17a. Descriptors Chemical industry Dermatitis Measures Synthetic resins Epoxy compounds Epoxy resins Hardeners Curing agents 17b. Identifiers/Open-Ended Terms Epoxy workers Toxic substances 17c. COSATI Field Group 6J			
18. Availability Statement Release Unlimited		19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 23
		20. Security Class (This Page) UNCLASSIFIED	22. Price PC A62-A01

HEW Publication No. (NIOSH) 75-152

Copies of this publication are available from
Division of Technical Services
National Institute for Occupational Safety and Health

1015 Co. Street, N.W.
Cincinnati, Ohio 45226

Epoxy Wise Is Health Wise

**U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health
Division of Technical Services
Cincinnati, Ohio 45226
April 1976**

**For sale by the Superintendent of Documents, U.S. Government
Printing Office, Washington, D.C. 20402**



ATTENTION!

You're working with "EPOXIES". That means you're working with special chemical formulations needed and used by industry, commerce, and the home.



Those "EPOXIES" and their related chemicals are:

- very adhesive
- very chemical resistant
- very heat resistant
- very dimensionally stable
- very unaffected by moisture
- very unaffected by heat or cold
- very dangerous to you, unless you follow easy, simple, but very important procedures in their handling and use.

Be smart! Know the hazards of working with these materials. Be smarter! Do it the right way. No one has more at stake in your well-being and health than you. Remember the "do's" and "don'ts" in this pamphlet . . . and you can work with these valuable chemicals safely and in good health.

WHAT'S "EPOXY"?

To help you work safely with these chemicals, we must agree on exactly what products are "EPOXY".

1. "EPOXY" isn't a thing. It's a chemist's short-hand way of describing a certain way that molecules are linked together.
2. "EPOXY RESINS" can be a whole lot of different molecules of different materials.
3. The "EPOXY" resins you work with are in several different forms, each with many variations.
 - a. There are liquid "EPOXY" resins.
 - b. There are solid "EPOXY" resins.
 - c. There are solution "EPOXY" resins.The last mentioned, the solution "EPOXY" resins, are usually the solid resins supplied in one or a combination of different solvents or diluents.
4. There are different "do's" and "don'ts" for each of the types and forms of "EPOXY".
5. Epoxy resins alone are useless! Those good properties listed on page 1 don't happen until the resin is "cured" or "hardened" by other kinds of chemicals called, naturally enough, curing agents and/or hardeners.

WHAT ARE CURING AGENTS/HARDENERS?

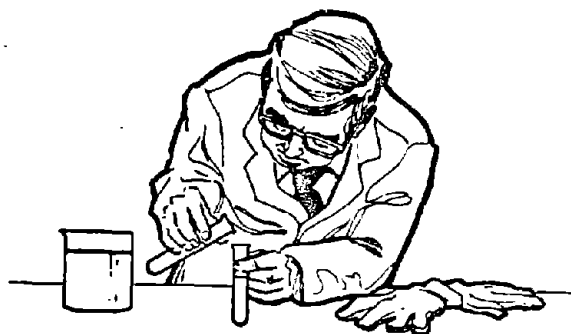
Think of it this way. You don't have fudge if you only have cocoa. And you don't have a useful epoxy product if you only have an epoxy resin.

1. The curing agent-hardener molecules react with the epoxy resin molecules and cause, for example, a liquid resin and liquid hardener to become a commercially useful solid epoxy casting ... or laminate ... or coating film ... or adhesive ... or ...
2. Not considered curing agents, but working in the same way, are many kinds of esters, solvents, diluents, and resin modifiers. They either put the resin into a solution or react with it, resulting in a useful product for further processing.
3. There are different "do's" and "don'ts" for each of the curing agents, solvents, diluents ...
4. When you're **working** with "EPOXY" resins, and curing agents-hardeners, and the other related materials, you can't spend your time studying them. Know about them ahead of time.
5. You can work with these materials in safety and continued good health if you treat them all with respect, if you don't try to short cut, and if you give yourself a margin for natural error.

WHAT CAN HAPPEN TO YOU

Thousands of people have worked with these materials for over twenty years with very few problems. Because they've always used proper equipment and have adequate ventilation, and have followed simple, careful procedures. However, ignore those procedures and "EPOXY" and related materials can be hazardous.

Case 1* . . . Sensitization. CHARLEY was a chemist working with epoxy resins and hardeners . . . only sometimes he got the curing agents on his fingers and skin . . . no problem for several years. Then he swelled up like a balloon. Skin erupted in blisters and pustules. Looked like he'd slept in poison ivy. Now he's working away from these materials and if he walks into a lab where there are open containers of curing agent, it happens all over again! Charley is allergic to hardeners; he's "sensitized."

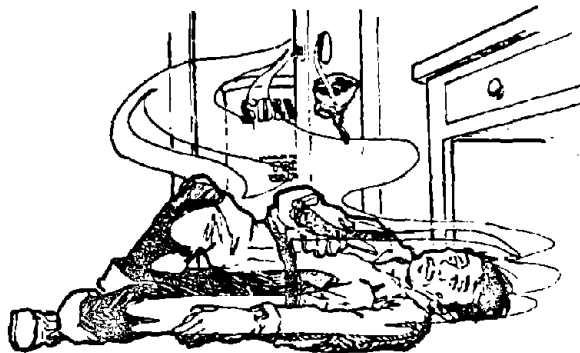


*The names and cases are changed to protect the careless.

Case 2 . . . Illness. LOIS, a lab worker, had to pour small amounts of liquid resin and/or liquid hardener into paper cups for sample formulations. Poured herself some coffee in a used cup and drank it. Lucky she had a smart co-worker who got her to the medical department right away. Lois does not eat or drink in her work area anymore.

Case 3 . . . Eye Injury. JACK was in a hurry. Had a beaker of liquid hardener up on a shelf. Reached for it and it tipped, spilling over his unprotected face and eyes. His partner had him at an eye shower in 30 seconds. Today he's OK. Jack *could* be blind.

Case 4 . . . Unconscious. MANUEL was working in a small enclosed area, without proper ventilation, and open supplies of resin and solvent. Keeled over cold. Fortunately, his buddy walked by right after, put on breathing protection, and pulled him out. Only injury to Manuel was a bump on the head from a bench. Manuel *could* be dead.



Case 5 . . . Burned. EARTHA forgot herself on a Friday afternoon. Thinking of a Friday night date. Lit a cigarette with open solvent handy. Boom!



Case 6 . . . Bad skin rash. FRED had six years in and had no trouble. Familiarity bred contempt. Often got the stuff on his skin or clothes and then didn't wash up until after the shift. Then the formulation changed and no one told Fred to change his ways. He soon had blisters all over and an uncomfortable itch. At that, he was lucky. He could have been *permanently injured*.

There's more. But you get the idea.

What *can* happen if you don't work with care is . . . sensitization, skin rash, dizziness, unconsciousness, poisoning, eye damage, fire or explosion burn . . . sickness, hurt, or even death!!!

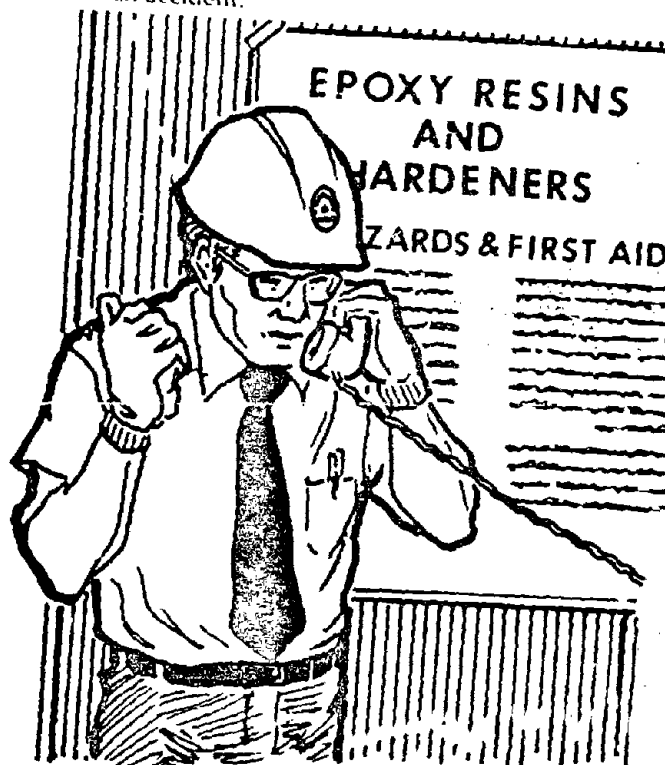
HOW TO KEEP IT FROM HAPPENING TO YOU

1. **DO** treat every product or raw material with respect, and know how to protect yourself.
DON'T be careless.
2. **DO** be clean and stay clean in your person and your clothes.
DON'T let any of the products get or stay on your clothes.
3. **DO** protect your eyes. Wear safety glasses with side shields or chemical goggles. Contact lenses can be a hazard when working with chemicals.
DON'T take a chance on any material or spray getting into your eyes.
4. **DO** use the ventilation provided. Use approved respirators or other approved masks as provided.
DON'T inhale vapors of any solvents, resins, hardeners, diluents. Beware of dusts and powders from grinding or polishing operations.
5. **DO** keep all possible sources of ignition (cigarettes, lighters, open electrical heaters or motors, bunsen burners, . . . all sources) away from the area of open solvents, diluents, resins, curing agents.
DON'T gamble with fire or explosion hazards.

6. **DO** keep contaminated hands, gloves, cloths away from eyes and mouth.
DON'T assume anything is clean enough.
7. **DO** use disposable dippers, stirrers, bench covers; discard them regularly or when contaminated.
Keep clean!
DON'T let your tools, etc., turn on you and your health.
8. **DO** check your co-workers as well as yourself on these safety procedures. Your mistakes can hurt them; their carelessness can hurt you.
DON'T guess about safety. Know!
9. **DO** read and follow safety-warning-hazard statements on product package labels.
DON'T assume this booklet says it all.
10. **DO** keep all containers of flammable liquids covered.
DON'T take a chance on fire.

WHAT TO DO... FIRST AID

KNOW where the nearest eye bath, shower, sink with water, and fire extinguishing equipment are located.
NOW is the time to find out, not when there is an accident.



Eye contact . . . Wash/flush the eyes immediately with low pressure flowing water for at least 15 minutes. Be sure the entire eye surface is flushed. **GET MEDICAL ATTENTION AT ONCE.**

Skin contact . . . Remove contaminated clothing at once. Use disposable wipes to take syrupy or thick liquids off the skin before cleaning. Clean skin *immediately* with soap and water or waterless hand cleaner. **DO NOT USE SHOP SOLVENTS TO CLEAN THE SKIN.** If there is any sign of redness, itching, or a burn, **GET MEDICAL ATTENTION PROMPTLY.** Discard, do not reuse, contaminated leather articles (belts, shoes, watch straps . . .).

Dizziness, nausea, blackout . . . from breathing of vapors. Get yourself or the affected person into fresh air immediately. Know how and be ready to use artificial respiration if breathing should stop. **GET MEDICAL ATTENTION IMMEDIATELY.**

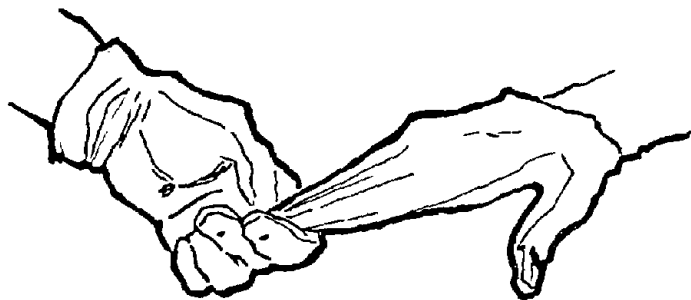
Illness, nausea . . . from swallowing. **GET MEDICAL ATTENTION IMMEDIATELY.**



NOW is the time for you and your co-workers to **KNOW** how to help each other, should the need arise.

BE CLEAN

One person's dirt is another person's clean!
We mean *clean*.



GEORGE thinks he's clean. Wears cotton gloves. Washes his hands. Puts the gloves sopped with resin/hardener/solvent in his hip pocket. Puts 'em back on. George wastes his time. YOU use rubber or plastic gloves to protect you and wash them with soap and water before taking them off. Keep the gloves stored where they won't become contaminated or be a source of contamination.

HELEN is a doll. Looks and smells like springtime *all* the time. Very seldom gets resin or hardener on her. If she does, promptly washes it off thoroughly with a shop solvent (which itself can cause skin problems). Helen may not be a "doll" for long. YOU use soap or detergent to get yourself clean.

DOUG tries to do everything right. Wears all the needed equipment and washes up thoroughly. Has a pail of "safe" shop solvent he cleans his tools in. But Doug forgets that after a while his "safe" shop solvent is full of harmful diluents, curing agents, and resins and isn't so safe anymore. Trouble ahead! YOU replenish your clean-up solvent regularly, and keep your hands out and your nose away.



LOUISA works with solvents and diluents and liquid hardeners and resins a lot. She is very careful and her work area is well-ventilated. Only trouble is, Louisa has moved to the other end of the bench to be closer to a friend. And the exhaust fan now pulls the vapors over and around her. Her friend could be friendless soon. YOU breathe the freshest air available and don't ignore the equipment that can help you keep safe.

FRANK is a fanatic. Uses rubber gloves, works in a properly ventilated area, washes past his elbows (and behind his ears). Uses safety glasses. Uses disposable wipes and utensils and tosses them in the waste basket. Great guy ... a real safety pro ... except to the clean-up man who empties the waste basket twice a day ... by hand. YOU throw wastes into a polyethylene bag and close it tight for cart-away. DIEGO takes a shower every day. He also earns a good living grinding and sawing and cutting cured epoxy surfaces. It's hot and tiring work. Too hot and sweaty for a respirator, he thinks. His lungs may be the dirtiest part of him. And they may injure his clean self. YOU use a face mask or a respirator or ventilation, and use them properly, rather than breathe in dusts. Wearing dirty gloves isn't clean. Using a respirator with a two-week old filter isn't clean. Using disposables over and over again isn't clean.



JUST BE CLEAN. That means don't get chemicals on you ... don't get them in you ... and don't breathe them, either. **DO** those simple things, be careful, and there should be no problems.

BE AWARE

If you are doing these kinds of things with "EPOXIES" . . . formulating, screeding, grinding or cutting, stirring, applying adhesives . . . you can be vulnerable!

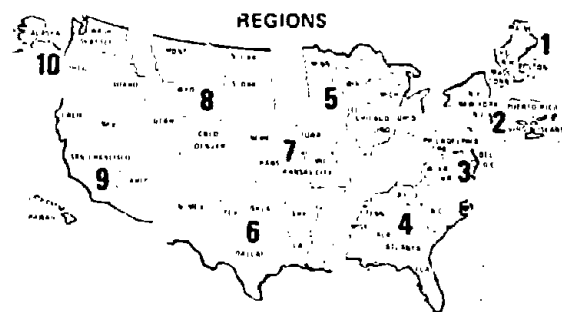
As we have said: treat *all* the "EPOXY" kinds of products like they are the worst ones around. That'll give you a margin of safety.

It's also true that some things do require special care and caution. A few:

- Applying room temperature cure epoxy systems over hot pipes or metal parts vaporizes solvents or catalysts. And it is much more critical for you to have good ventilation.
- The thinner and more liquid an epoxy system is, the more chance of it's being dangerous to you from splashes, skin absorption, breathing . . .
- If the epoxy system you're using cures at room temperature (instead of needing oven or other heat cure), chances are that the resin, hardener, and solvent-diluent used are more hazardous.
- Solvents, diluents, resins, all can burn. Some can explode. You can be the cleanest angel in heaven if you're not especially careful of *all* ignition sources from cigarettes and matches to electric motors and bunsen burners.
- Clean-up time can be a hazard! Don't use solvents carelessly. Do take proper care of the waste clean-up. Remember, the janitor, the guy in the next department, or the fellow from city pick-up isn't as aware as you and your co-workers about what to do and what not to do with these "EPOXY" materials.

NIOSH AND OSHA REGIONAL OFFICES

The following pages list NIOSH and OSHA regional offices. Either of these facilities serving the state can provide information on the OCCUPATIONAL SAFETY AND HEALTH ACT including questions on standards interpretations, voluntary compliance information, copies of the *OSHA Standards*, *OSHA Act*, *Employee Rights Posting Notice* and other OSHA publications.



NIOSH REGIONAL OFFICES

DHEW, Region I
Government Center (JFK Fed. Bldg.)
Boston, Massachusetts 02203
Tel.: 617/223 6668/9

DHEW, Region II - Federal Building
26 Federal Plaza
New York, New York 10007
Tel.: 212/264 2485/8

DHEW, Region III
3525 Market Street P.O. Box 13716
Philadelphia, Pennsylvania 19101
Tel.: 215 596 6716

DHEW, Region IV
50 Seventh Street, N.E.
Atlanta, Georgia 30323
Tel.: 404/526 5474

DHEW, Region V
300 South Wacker Drive
Chicago, Illinois 60607
Tel.: 312/353-1710

DHEW, Region VI
1200 Main Tower Building
Dallas, Texas 75202
Tel.: 214/655-3081

DHEW, Region VII
601 East 12th Street
Kansas City, Missouri 64106
Tel.: 816/374-5332

DHEW, Region VIII
19th & Stout Streets
9017 Federal Building
Denver, Colorado 80202
Tel.: 303/837-3979

DHEW, Region IX
50 Fulton Street (723 FDB)
San Francisco, California 94102
Tel.: 415/556 3781

DHEW, Region X
1321 Second Avenue (Arcade Bldg.)
Seattle, Washington 98101
Tel.: 206/442-0530

OSHA REGIONAL OFFICES

Region I

U.S. Department of Labor
Occupational Safety and Health Administration
18 Oliver Street, Fifth Floor
Boston, Massachusetts 02110 Telephone: 617/223-6112/3

Region II

U.S. Department of Labor
Occupational Safety and Health Administration
1515 Broadway (11 Avon Plaza)
New York, New York 10036 Telephone: 212/971-5941/2

Region III

U.S. Department of Labor
Occupational Safety and Health Administration
15220 Gateway Center, 3035 Market Street
Philadelphia, Pennsylvania 19104 Telephone: 215/596-1201

Region IV

U.S. Department of Labor
Occupational Safety and Health Administration
1375 Peachtree Street, N.E., Suite 587
Atlanta, Georgia 30309 Telephone: 404/576-3573/4 or 2281/2

Region V

U.S. Department of Labor
Occupational Safety and Health Administration
300 South Wacker Drive, Room 1201
Chicago, Illinois 60606 Telephone: 312/353-4716/7

Region VI

U.S. Department of Labor
Occupational Safety and Health Administration
7th Floor, Texas Building, 1512 Commerce Street
Dallas, Texas 75210 Telephone: 214/749-2477/8/9 or 2567

Region VII

U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 3000, 911 Walnut Street
Kansas City, Missouri 64106 Telephone: 816/374-5861

Region VIII

U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 15010, 1961 Stout Street
Denver, Colorado 80202 Telephone: 303/837-3883

Region IX

U.S. Department of Labor
Occupational Safety and Health Administration
9470 Federal Building, 450 Golden Gate Avenue
Post Office Box 36017
San Francisco, California 94102 Telephone: 415/556-0584

Region X

U.S. Department of Labor
Occupational Safety and Health Administration
1808 Smith Tower Building, 506 Second Avenue
Seattle, Washington 98104 Telephone: 206/442-5930

U.S. GOVERNMENT PRINTING OFFICE: 1976-657-692/1517

EMERGENCY INFORMATION

FIRE

Nearest Fire Department

Address: _____

CRIME

Nearest Police Station

Address: _____

