

ACTS FACTS

THE MONTHLY NEWSLETTER FROM
ARTS, CRAFTS AND THEATER SAFETY (ACTS)

181 THOMPSON ST., # 23,

NEW YORK, NY 10012-2586

PHONE 212/777-0062

January 2001

Vol. 15, No. 01

ACTS wishes you a healthy, happy 2001

BOARD of DIRECTORS: Monona Rossol, Susan Shaw, Eric Gertner,
Nina Yahr, Elizabeth Northrop, Diana Bryan, Tobi Zausner;
STAFF: John Fairlie.

PHTHALATES: STILL IN THE NEWS

Sci. News, 9/2/00, p. 152 & 156; *Envir. Health Persp.*, 9/00.

Last year, the first article in our January issue was about phthalate plasticizers. This year we are doing the same in order to cover more data about phthalates and reproductive hazards.

A phthalate data review was commissioned by the National Toxicology Program's Center for the Evaluation of Risks to Human Reproduction. The panel expressed concern about the most widely used phthalate, diethylhexyl phthalate (DEHP). They concluded that exposure to DEHP in the womb or from chewing on vinyl toys during early childhood can potentially disrupt boys' reproductive development.

A study of premature breast development (thelarche) in 6 to 24 month old girls was reported in *Environmental Health Perspectives* (September). For over 2 decades, Puerto Rico had an inexplicable epidemic of thelarche affecting 7 or 8 girls per 1000. Researchers studied the levels of pesticides and phthalates in the blood of 41 girls with thelarche and 35 normally developing girls. The pesticides were not at higher levels in the girls with thelarche. But 24 girls (68%) with thelarche had detectable phthalates in their blood compared with just 6 (17%) of the normal girls.

Phthalates are found in some solvents, colognes, dyes, fingernail polish, fumes from hot glue guns, and plastics such as food wrap. Artists should be concerned about phthalates in brightly colored, oven-cured, vinyl plastic clays. These popular modeling materials contain about 15% phthalates. They transfer greasy phthalate residue to the hands of children and adult users and release airborne phthalates when the clays are fired in kitchen ovens!

PESTICIDE MAY BE TIED TO PARKINSON'S DISEASE

Sci. News, Vol 158, 12/2/00

Animal tests on rotenone, a plant-derived pesticide used in organic gardening, causes symptoms comparable with Parkinson's disease, kills the same subgroup of cells, and produces the same abnormal masses of proteins seen in the brains of Parkinson's patients.

ERGONOMICS STANDARD PUBLISHED

65 FR 68261-68870, Nov. 14, 2000

The Occupational Safety and Health Administration (OSHA) published their new Ergonomics Program Standard (29 CFR 1910.900). The rule is designed to prevent job-related ergonomic injuries, that is, injuries to the muscles, ligaments and/or bones (musculoskeletal system). The rule requires employers to inform workers about common musculoskeletal disorders (MSDs), MSD signs and symptoms and the importance of early reporting by October 15, 2001. Other provisions of the law are effective November 15, 2004:

If a worker develops a work-related MSD, the employer must check the job to determine whether it exposes the worker to risk factors described by the "Basic Screening Tool." This tool is a two-page form that breaks down job hazards into categories. Included are: repetition; force (lifting, pushing/pulling, pinching, gripping), awkward postures, contact stress, and vibration.

Employers also must develop a formal program and response system, provide training, keep complete records, and more. Tasks that may trigger this program include working too long at the keyboard, using vibrating tools like chain saws and power sanders, and lifting. Unnecessary hazardous tasks should be eliminated when possible. For example, purchasing ceramic supplies in small bags rather than 100 pound sacks can eliminate this lifting risk which triggers program requirements. This saves money in the long run.

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LIMONENE PRODUCTS POLLUTE INDOOR AIR

Sci. News., Vol 158, 12/9/00, p.375; *Envir. Health Persp.*, 12/00.

A chemical mystery was solved by Charles J. Weschler, a chemist at Telcordia Technologies in Red Bank, New Jersey. He noticed a white message board in his lab turning dingy. Weschler found that a thin coat of submicron particles of d-limonene, a chemical he was using in experiments, was building up on the board.

Weschler teamed up with chemists at Rutgers University in Piscataway, New Jersey, to determine how limonene could deposit this way. The New Jersey team sprayed a wooden coffee table for 15 seconds with a lemon scented wax and measured limonene's release into the air for the next 3 hours. Then, they loaded a test chamber with concentrations of limonene similar to those recorded and of ozone typical of indoor air on a smoggy, summer day.

Within 30 minutes, particulates began forming in the air. The particulates were less than 2.5 micrometers in diameter which permits them to deposit deep in the lung (alveoli). The concentrations of these particulates, in some cases, reached one-third of the new limit for particulates in outdoor air proposed by the Environmental Protection Agency (ACTS FACTS Aug., 2000) to prevent aggravation of heart and lung problems.

Scientists have long known that much of the haze shrouding eastern U.S. forests is from toxic particulates created in reactions of ozone with terpenes, such as the pinene emitted by evergreens. But it was not known that this could happen indoors and with limonene.

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EPA AMENDS ASBESTOS RULE TO PROTECT SCHOOL WORKERS

65 FR 69209-69217, Nov. 15, 2000

The Environmental Protection Agency (EPA) amended both the Asbestos Worker Protection Rule (WPR) and the Asbestos-in-Schools Rule. This was done to bring governmental workers in the 27 States that do not have approved OSHA State Plans under the same rules as private sector workers.

EPA has amended the WPR to provide the same level of protection to State and local government employees by incorporating OSHA's Asbestos Standards for Construction (29 CFR 1926.1101) and for General Industry (29 CFR 1910.1001). EPA amended the Asbestos-in-Schools Rule to provide coverage under the WPR for employees of public local education agencies who perform operations, maintenance and repair activities.

When EPA proposed the rule in April, they received 12 comments from interested parties including industrial hygiene organizations, unions, an asbestos trade group, and one university. Eleven of the comments were generally supportive and encouraged EPA to be as consistent as possible with the OSHA Asbestos Standards to avoid confusion. The single negative comment came from Texas A & M. According to OSHA, Texas A & M said that

... The University believes that it might have to survey all of its buildings for asbestos in order to comply with the requirements to determine the presence, location, and quantity of asbestos-containing material (ACM) and presumed asbestos-containing material (PACM) in custodial work sites, post signs at the entrances to mechanical rooms containing asbestos, and provide information and training to custodians who work in areas that contain asbestos. 65 FR 69212

DUH! Of course they have to do these things. These common sense precautions have been required in OSHA-covered schools since 1994. And EPA has recommended all schools do the same for years.

Further, Texas A & M said it considers annual training for custodians and the associated recordkeeping "excessive" and "cumbersome" for employers with large numbers of custodial employees. Actually, EPA's annual educational requirements for custodians are minimal, consisting of 2 hours or more of awareness training on topics such as the health effects of asbestos, how to work around asbestos-containing materials safely, and where asbestos-containing materials are located in the building.

ACTS FACTS reprints Texas A & M's comments because they are consistent with our experience that many schools, especially those in states that exempt their own employees from OSHA rules, do not provide proper protection and training for their workers. But this is first time we have seen this fact stated so clearly and openly.

The new EPA rule was effective on December 15, 2000. Schools newly covered by the law need to get busy.

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BEWARE OF WOLVES IN OSHA CLOTHING

BNA-OSHR, 30(44), 11-9-00, p. 1009

IN CALIFORNIA, a man posed as a workplace safety inspector and threatened to impose fines and penalties on small businesses for nonexistent violations unless the owners paid him in cash. He is now facing three years in prison for the swindle, Senior investigator Randall Mikuriya of the Los Angeles County District Attorney's Major Crimes Unit, said (*People v. Jackson*, Calif. Super. Ct., BA207401, 10/31/00).

Using a fake Cal-OSHA inspector's badge complete with a color photo, Mark Dwayne Jackson threatened to levy penalties on business owners unless they paid him in cash for "pre-inspections," the investigation found. He approached minority-owned small businesses such as auto repair shops run by recent immigrants and pointed out supposed safety violations. He would tell the owners, "I won't write you up right now. I'll tell you what's wrong, but you have to pay me and then I'll come back and reinspect," Mikuriya said.

Jackson was trapped in a sting operation and pled guilty to burglary--defined as entering a building with the intent to commit larceny. He will serve three years in prison.

IN COLORADO, two men posing as OSHA compliance officers, stole a laptop computer from a University of Colorado, Boulder, research laboratory. The thieves were well dressed and had two-way radios to stay in touch as they went through the building. Apparently they had done some research and learned that the local fire marshal had complained about equipment being stored in the building's hallways. The men told staff members that OSHA was concerned about "congestion" in the building. No arrests have been made.

IN MICHIGAN, OSHA's name was used in a boiler room operation targeting medical facilities. An organization calling itself the "OSHA Hotline," was selling a manual for \$150 that purported to help the medical offices comply with "significant changes dealing with infectious control."

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ACTS FACTS sources: the *Federal Register* (FR), the *Bureau of National Affairs Occupational Safety & Health Reporter* (BNA-OSHR), the *Mortality and Morbidity Weekly Report* (MMWR), and many technical, health, art, and theater publications. Call for information about sources.

Editor: Monona Rossol; Research: Tobi Zausner, Nina Yahr, Diana Bryan, Sharon Campbell; Staff: John Fairlie, OES.

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February 2001

Vol. 15, No. 02

PRUSSIAN BLUE PIGMENT IS "CYANIDE", SAYS EPA

66 FR 7759-7760, Jan 25, 2001 & Preliminary Administrative Determination that ferric ferrocyanide is a "cyanide" under 40 CFR 401.15, 302.4 & Table 302.4.

The Environmental Protection Agency (EPA) determined that ferric ferrocyanide, better known as "Prussian Blue," qualifies as a "cyanide" under the Clean Water Act. All other hexacyanoferrates ($\text{Fe}(\text{CN})_6$), that is, ferro- and ferricyanides, also are covered by EPA's decision. This includes potassium ferricyanide which is used in non-silver photoprocesses such as cyanotype.

EPA says that as early as 1948 fish kills have been documented to have been caused by waterborne ferrocyanides releasing cyanide under ultraviolet light from the sun. A 1980 study in midsummer in Minnesota showed the half life of various hexacyanoferrate radicals in water ranged from 18-160 minutes indicating that substantial releases of cyanide will occur in minutes or hours. EPA also cited studies showing ferricyanides release cyanide in time under neutral and alkaline conditions like those found in the environment.

The EPA's statement was in response to a legal action in a District Court in Massachusetts (*Commonwealth of Mass. v. Blackstone Valley Electric Co.*, No. 94-2286). Blackstone disposed of ferric ferrocyanide as unregulated waste. Blackstone defended its position by citing a 1985 action in which EPA delisted pigment waste from a company called Mearl (50 FR 48886) in Peekskill, NY. But EPA said this exemption applied to Mearl's waste only and that Mearl's waste was a mixture of chemicals in which ferric ferrocyanide had to be below 590 milligrams per kilogram in order to be land-disposed.

Blackstone also noted that the Food and Drug Administration approves ferric ferrocyanide for use in cosmetics, but EPA said this fact is not related to disposal either. Instead, disposal of significant amounts of these "cyanide" chemicals will require the services of a toxic waste disposal company. A copy of EPA's administrative determination can be obtained from Dr. Maria Gomez-Taylor, USEPA, 202/260-1639; or e-mail gomez-taylor.maria@epa.gov.

NEW THEATER SAFETY BOOK OUT

Monona Rossol

My latest book, "The Health & Safety Guide for Film, TV & Theater" has been released. It is a greatly expanded version of an earlier book called *Stage Fright: Health & Safety in the Theater*. The new book is double the size of the old one and costs \$19.95 plus \$3.50 postage. The table of contents and ordering information are at www.allworth.com. Credit card orders can be placed at 800/491/2808.

ACTS CHANGES MOTHBALL RECOMMENDATION

Press Release, NIEHS PR#01-03, TR-410: Toxicology & Carcinogenesis Studies of Naphthalene in B6C3F₁ Mice (Inhalation Studies) NTP, 1992, and TR-500: Toxicology and Carcinogenesis Studies of Naphthalene in F344/N Rats (Inhalation Studies) NTP, 2000.

Two chemicals, naphthalene (1,4-dichlorobenzene) and PDB (para dichlorobenzene) are used as mothballs or as deodorizers for rooms and toilet bowls. Museums and costume storage facilities in particular depend these chemicals as fumigants and insecticides to protect their collections. In the past, ACTS has recommended people use naphthalene instead of PDB based on toxicity and cancer data.

TOXICITY. Both naphthalene and PDB are irritating to the respiratory system and eyes and can cause allergies. At high doses both are can cause serious health effects including death. Both chemicals have identical Threshold Limit Values (TLVs--workplace air quality standards) which are very low (10 parts per million-ppm) because both chemicals are highly toxic. Both chemicals have odors that warn people they are being exposed before the concentrations reach the TLV. Naphthalene has slightly better odor warning properties (0.084 ppm) than PDB (0.18 ppm).

Naphthalene is especially hazardous to people with an inherited erythrocyte (G6PD or glucose-6-phosphate dehydrogenase) deficiency. Although all people may experience acute hemolysis (intervascular bleeding) if exposed to high levels of naphthalene, people with this enzyme deficiency are unusually sensitive. The incidence of G6PD deficiency is low in people of European origin while it is higher in certain groups of Asians and Middle Eastern populations and about 16% of African American males are G6PD deficient.¹

CANCER DATA. There have been enough studies of PDB for several agencies to consider it a suspect cancer agent. These agencies assigned PDB the following cancer ratings: IARC=2B, NIOSH=X, NTP=R, TLV=A3² (see below).

Naphthalene, on the other hand, was not well-studied for cancer effects. However, the American Conference of Governmental Industrial Hygienists (ACGIH) listed it as "not suspected to be a carcinogen" (A4)². And in March, 1992, a National Toxicology Program (NTP) peer review panel concluded from their first two year inhalation study of naphthalene and ruled that it produced no evidence³ of carcinogenic activity in male mice, but showed some evidence³ of carcinogenic activity in female mice. Based on this data, ACTS recommended naphthalene rather than PDB be used.

NEW CANCER STUDY. The procedure for determining whether a substance causes cancer involves testing at least two animal species. The first study was on mice. A second study on rats was proposed after some German workers exposed to naphthalene developed excessive amounts of a variety of cancers including laryngeal and nasal cancers. Released December, 2000, the second two-year inhalation study of naphthalene concluded that there was clear evidence³ of carcinogenic activity in both male and female rats based on increased incidences of respiratory cancers (epithelial adenoma and olfactory epithelial neuroblastoma of the nose). This study tips the scale in favor of naphthalene being a carcinogen.

CONCLUSION. ACTS no longer recommends that naphthalene be used rather than PDB. Both chemicals are in the same range of toxicity and both are likely to be listed as suspected cancer agents. Workers in museums and costume storage areas should be provided with ventilation and/or respiratory protection sufficient to keep exposure to either of these chemicals as low as possible. People also may want to consider alternative ways of protecting the contents of their closets and attics.

1. Calabrese, E.J., 1986 Ecogenetics: Historical foundation and current status. *J Occup Med* 28:1096-1102

2. Cancer Rating systems (abbreviated definitions)

NTP: K Known to be a human carcinogen.

R Reasonably anticipated to be a carcinogen.

IARC: 1 Carcinogenic to humans: sufficient evidence of carcinogenicity

2A Probably carcinogenic to humans; limited human evidence; sufficient evidence in experimental animals

2B Possibly carcinogenic to humans; limited human evidence in humans in the absence of sufficient evidence in experimental animals

3 Not classifiable as to carcinogenicity to humans

4 Probably not carcinogenic to humans

NIOSH:X carcinogen defined with no further categorization

ACGIH:A1 Confirmed Human Carcinogen.

A2 Suspected Human Carcinogen.

A3 Confirmed Animal Carcinogen with Unknown Relevance to Humans.

A4 Not Classifiable as a Human Carcinogen.

A5 Not Suspected as a Human Carcinogen

3. The NTP uses five categories of evidence of carcinogenic activity to summarize the evidence observed in each animal study: Two categories for positive results (clear evidence and some evidence); one category for uncertain findings (equivocal evidence); one category for no observable effects (no evidence); and one category for studies that cannot be evaluated because of major flaws (inadequate study).

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EXPLOSION IN HOME KILLS ONE

NFPA Journal, Jan/Feb 2001, p. 21

A 41-year-old man died when ingredients used to manufacture fireworks exploded in the basement of his single-family house. The man conducted fireworks displays and illegally manufactured and stored fireworks in his dwelling. After the fire was put out, firefighters discovered many items that were either explosive or could form explosive mixtures with other ingredients in the basement. Included were flash powder, antimony sulfides, barium and calcium carbonates, potassium nitrate, red gum, sulfur powder, and metallic chlorates including potassium chlorate.

This accident is not only relevant to people who make their own fireworks, but to special effects and theatrical pyrotechnicians, to metal-working artists who use antimony sulfide to darken metal, and to etchers who use potassium chlorate to make Dutch Mordant.

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MAGIC BIOCIDES

C&EN, Oct, 2000, p. 88

Two *Chemical & Engineering News* readers told editors about an insert found in a brand of FDA-approved eye drops called GenTeal (made in Canada for CIBA Vision Corp., Duluth, GA). The insert says GenTeal provides "multidose convenience without preservative irritation" because it has a "unique disappearing preservative: sodium perborate. Upon contact with the eye, sodium perborate turns into pure water and oxygen, thereby minimizing the irritation that may be caused by preservatives." Apparently, miracles still occur.

EPA FINAL RULE ON LEAD LEVELS IN HOUSING

66 FR 1205-1240, Jan 5, 2001

The Environmental Protection Agency has set new lead levels for house dust. Effective March 6, 2001, pre-1978 housing and child-occupied facilities which have been abated for lead paint must meet these standards. A certified inspector must take dust samples after an abatement for lead paint and have them analyzed. Lead in these samples be below 40 $\mu\text{g}/\text{ft}^2$ for floor dust, and 250 $\mu\text{g}/\text{ft}^2$ for dusts taken from interior window sills. The rule also sets a 400 part per million level for soil around housing where children may play.

ACTS FACTS covered EPA's initial proposal to lower these levels in the July 1998 issue and their subsequent decision to enforce these levels in Housing and Urban Development (HUD) Authority housing in the November, 2000 ACTS FACTS. This new rule makes the standard applicable to most pre-1978 housing and child-occupied facilities.

LEAD LEVELS MAY PREDICT HIGH BLOOD PRESSURE

Reuters Health, Jan 12, 2001 & *Am J Epidemiol*, 2001;153:164-171

A new study strengthens the hypothesis that chronic exposure to lead is associated with an increased risk of hypertension. Dr. Howard Hu of Brigham and Women's Hospital in Boston and colleagues conducted a substudy of the Normative Aging Study to determine the relationship between lead exposure and hypertension. Both blood lead and bone lead tests were conducted on a cohort of 337 men with normal blood pressure, 182 with borderline hypertension, and 314 with definite hypertension.

"In the present study, bone lead, but not blood lead, was associated with an increased incidence of hypertension, suggesting that the hypertensive effect of lead is more likely to be a chronic than an acute phenomenon," the researchers speculate. This makes sense because blood lead levels fluctuate and are useful only in determining relatively recent lead exposures.

ACTS FACTS sources: the *Federal Register* (FR), the *Bureau of National Affairs Occupational Safety & Health Reporter* (BNA-OSHR), the *Mortality and Morbidity Weekly Report* (MMWR), and many technical, health, art, and theater publications. Call for information about sources.

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March 2001

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ACGIH SETS CERAMIC FIBER TLV: MANUFACTURERS SUE

www.acgih.org/Members/CaseStudies.htm

In December, the American Conference of Governmental Industrial Hygienists (ACGIH) was served with three lawsuits all relating to the group's recommended chemical substance threshold limit values (TLVs). One of the suits involves standards for refractory ceramic fibers (RCFs)--a substance used by potters, glassblowers and many other artists for kiln insulation and other high heat applications.

The plaintiffs in the suit are the Refractory Ceramic Fibers Coalition, Thermal Ceramics, Inc., Unifrax Corporation, and Vesuvius U.S.A. Corporation. They assert: 1) that ACGIH's research regarding the TLVs for RCFs is flawed; and 2) that ACGIH has a conflict of interest, because many of its members are federal and labor union employees. Lets look at these two arguments.

TLV RESEARCH FLAWED? The ACGIH proposed setting a TLV of 0.2 fibers/cubic centimeter (f/cc) for RCF.* The Refractory Ceramic Fibers Coalition's recommended exposure guideline (REG) is 0.5 f/cc. The research can't be greatly flawed by simply considering the similarity in the two guidelines.

ACGIH IS BIASED? By filing a brief charging bias, the Refractory Ceramic Fibers Coalition has called attention to the fact that their own REG standard was set by their members, all of whom are RCF manufacturers with obvious conflicts of interest! Actually, bias should be looked at by the courts because it is all too common for industry to be over-represented on standard setting bodies. ACTS would like to see safety standards accompanied by the names and affiliations of the voters. Artists should know how many art material manufacturers and certifiers vote on the art material labeling standard (ASTM D 4236). Theatrical artists should know that voters on safety standards (ESTA) for theatrical fog are almost all theatrical fog manufacturers and their paid consultants.

CURRENT STATUS. On January 12, 2001, the United States District Court in Atlanta held a hearing on the Refractory Ceramic Fibers Coalition's request for a Temporary Restraining Order enjoining ACGIH from publishing the new TLV. After reviewing the legal briefs filed by both parties and listening to both counsels, the Court denied the Coalition's request, finding that it does not appear that the Coalition is likely to win. ACGIH is free to publish the TLV for RCF. The case will now proceed to a hearing.

* The TLV for asbestos is 0.1 f/cc which makes it clear that ACGIH considers the hazards of RCF to be similar to those of asbestos.

LEAD REPORTING THRESHOLDS LOWERED: DEADLINE CHANGED

64 FR 42222-42243, 8/3/99, 66 FR 4499-4547, 1/17/01, 66 FR 7701, 1/24/01 & 66 FR 10585-10586, 2/16/01

Our October, 1999, ACTS FACTS reported that the EPA proposed lowering the amount of lead that businesses would have to report to 10 pounds. EPA said lead is a "persistent, bioaccumulative toxic chemical" and requires special reporting under section 313 of the Emergency Planning and Community Right-to-Know Act of 1986.

Then on January 17, EPA published the final rule which raised the reporting requirement to 100 pounds. This level of reporting is required for highly persistent toxic chemicals. EPA has deferred the decision on whether lead and lead compounds are appropriately classified in that subset of toxic chemicals that are both highly persistent and highly bioaccumulative. If and when more data is obtained, lead could be reclassified into this second category and the threshold could be reset to 10 pounds or even to one pound.

EPA lists the types of companies required to report that they either use during manufacture or release to the air, water, or soil 100 pounds of lead or more per year. Included are "facilities that manufacture, process, or use inorganic pigments," and "small arms ammunition." An additional list of business using lead compiled from commenters included:

...metalworkers; glaziers; lead crystal glassware manufacturers; animal feed producers*; metal platers; brass and copper fabricators; stained glass manufacturers*; organ makers* and manufacturers of other musical instruments; dyemakers and manufacturers of dye-containing products including businesses in the leather, garment, and textile industries; pigments and coatings companies; metal finishers*; makers of sporting and recreational equipment; precision metal components, mirrors, stabilizers, fertilizer; and numerous ceramic decorative art manufacturers and studios; art pottery and art pottery supply firms; ink formulators; print shops; product painting/coating/refinishing businesses; and packaging or packaging coating firms.... (66 FR 4534)*

* Commenters from these industries already have provided enough data for EPA to determine that they qualify and must report. (66 FR 4535)

Even lead-contaminated materials are covered. EPA eliminated the 0.1% de minimis concentration for release reporting since a large release of material containing only very small amounts of lead still could exceed the 100 pound threshold.

A request to exempt lead soldering was considered, but EPA said it did "not believe that the commenter's allegation that lead may not be released during these processes ... provides an adequate basis for excluding that activity...."

Two commenters requested that lead compounds contained in glass, ceramic enamels, and ceramic ware be excluded from reporting on the same basis that the lead in stainless steel, brass, and bronze are exempt. The EPA replied that "The commenter has provided no data to support expanding its alloys review to these materials so the basis for the deferral for lead in certain alloys does not apply.... In addition, under certain conditions, glass and ceramic products may be eligible for the article exemption...." (66 FR 4532) which applies to finished ceramic and glassware pieces.

EFFECTIVE DATES. President Bush's Regulatory Review Plan in which all actions are delayed for 60 days has changed the effective date of this rule from February 16, 2001 to April 17, 2001. The first reports from industries holding 100 pounds of lead are due on or before July 1, 2002, for the 2001 calendar year. Some Art businesses may want to use this month to dispose of lead materials. Others can contact Daniel R. Bushman, Petitions Coordinator, 202/260-3882 or e-mail:bushman.daniel@epa.gov for more information.
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CPSC PROPOSES LEAD-WICK CANDLE BAN

CPSC Press Release #01-083, 2/14/01, CONTACT: Jane Francis or Scott Wolfson 301/504-0580
Fine lead wires traditionally have been used to hold candle wicks upright. When they burn, the wicks release lead into the air. ACTS FACTS has reported on this problem before (June 1999, March 2000). Now the U.S. Consumer Product Safety Commission (CPSC) voted to begin working on a proposal to ban candles with lead-core wicks. The long CPSC press release contained the following information:

- * CPSC studies showed that lead-wicked candles could present a lead poisoning hazard to young children. Some candles emitted lead levels in excess of 2,200 micrograms/hour (µg/hr)--about five times the rate of 430 µg/hr that could lead to elevated levels of lead in a child. Burning lead-wicked candles four hours/day for 15-30 days, could result in blood lead levels over the 10 µg/deciliter health concern level for young children.
- * The emitted lead presents a risk to children from exposure through inhalation and from ingestion of lead that may settle on surfaces in the room. This deposited lead can remain accessible for extended periods of time and allow exposure through mouthing of surfaces or objects or by hand-to-mouth contact.
- * Despite a 1974 voluntary industry agreement not to use lead wicks in the U.S., CPSC found that a small percentage of candles sold today still contains lead in their wicks. CPSC staff investigation has shown that importers of candles have not followed this voluntary agreement, nor has it been followed universally by manufacturers within the United States.
- * It is not possible for consumers to tell if the wicks of candles they use contain lead. There is no accurate "home test."
- * The hazard cannot be avoided by labeling. The only way to avoid the hazard is to forego burning--the candle's intended use.
- * Sophisticated laboratory tests conducted by CPSC staff showed that there is no correlation between the amount of lead in the candlewick and the quantity of lead emitted during burning.
- * CPSC analysis shows that metal wicks, some of which could contain lead, are most likely to be used in container, pillar, votive and tealight candles.

The CPSC adviser consumers not to burn or to throw away all candles which have a metal wire in their wicks. Clearly, the only answer is a ban on candles with lead wicks. ACTS would like to see the ban extended to candlemaking kits and wicks sold to home hobbyists.
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ERROR IN LAST MONTH'S ISSUE

Editor

The first line in last month's story on Naphthalene on page 2 contained an error. It began: "Two chemicals, naphthalene (1,4-dichlorobenzene) and PDB (para dichlorobenzene)...." The word order here is wrong. Naphthalene is not 1,4-dichlorobenzene. Instead, 1,4-dichlorobenzene is yet another name for PDB.

The sentence should have read: "Two chemicals, naphthalene and PDB (paradichlorobenzene or 1,4-dichlorobenzene).... I'm embarrassed that I must have looked at this dozens of times and didn't see it. Does anyone out there want to volunteer to proofread?"

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ARSENIC DRINKING WATER STANDARD CHANGES

66 FR 6975-7066, Jan 22, 2001

The Environmental Protection Agency (EPA) has lowered the Maximum Contaminant Level (MCL) for arsenic from 0.05 milligrams per liter (mg/L) to 0.01 mg/L. They also reduced the maximum contaminant level goal (MCLG) for arsenic to zero. The new MCL will not be effective until 2006 because some communities will need time to develop systems for purifying their water.

OTHER ARSENIC SOURCES. Artists also should avoid additional arsenic exposure from art materials. Grinding, polishing, acid etching, or heating of glass may expose artists to arsenic since it is used in glass as both a pigment (off white) and fining agent (removes bubbles). Painters and art conservators should be aware that arsenic pigments were used historically and still are available from specialty suppliers. Metal-workers should check material safety data sheets for arsenic contamination in all ingots, solders, and other alloys. Some old patina formulas also used arsenic. Last year, this editor found a pound jar of arsenic trioxide during an inspection of a university art department.

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ACTS FACTS sources: the *Federal Register* (FR), the *Bureau of National Affairs Occupational Safety & Health Reporter* (BNA-OSHR), the *Mortality and Morbidity Weekly Report* (MMWR), and many technical, health, art, and theater publications. Call for information about sources.

Editor: Monona Rossol; Research: Tobi Zausner, Nina Yahr, Diana Bryan, Sharon Campbell; Staff: John Fairlie, OES.

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ARTS, CRAFTS AND THEATER SAFETY (ACTS)

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May 2001

Vol. 15, No. 05

SPECIAL EFFECTS BUBBLES INJURE DOZENS

Calgary Herald, 4/14/02, Page 1 <<http://calgary.cbc.ca/cgi-bin/templates/view.cgi?news/2001/04/17/foam010417>>; & National Post, Toronto, 4/16/01

A night out at the Back Alley Nightclub turned out badly for many patrons. Three dozen were sent to hospital with varying degrees of burns to their eyes as a result of contact with chemicals in special effects "bubbles" that were spilled from above onto the dance floor. Calgary Herald reporter Daryl Slade quoted one patron as saying "They must have known the bubbles would do something to your eyes because they were tossing out goggles to people."

Dr. Howard Gimble opened his clinic on Good Friday to treat the influx of victims. He noted there was "a spectrum of the severity of chemical burns." Most of the injuries appeared to be superficial with some victims only requiring medication. Others needed contact lenses to be placed temporarily in their eyes to protect the epithelial or surface layer over the cornea from further damage. "We'll have to do followup, because we can't say at this point if there will be any permanent damage or not," Gimbel said.

According to a document from Lakeside Bubbles, the manufacturer, the bubbles contained monoethanolamine and diethanolamine. Both chemicals are severe eye irritants. ACTS will be watching for further information about this incident.

DIOXIN-CONTAINING CLAYS SOLD TO POTTERS

Cleverly.David@epamail.epa.gov, 4/30/2001, Env Sci & Tech, 34(21), pp. 4524-4532

FROM THE EDITOR: I try to keep readers informed about the dioxin-contaminated ball clays, but I did not reprint a letter in the January *Ceramics Monthly* in which potters were assured by EPA's David Cleverly that "once the ball clay has been commercially processed in a kiln before it is sold to potters, all the dioxin is removed." Although I did not have proof, I was sure this was untrue because ball clays are not pre-fired.

My proof came in a conversation with a teacher whose new bags of OM4 and XX Saggar clays carried dioxin warnings. I e-mailed David Cleverly about this and he replied: "You are correct. The ball clay used in ceramics is not 'pre-fired'. I stand corrected on this. To date no Agency of the U.S. Government has studied potential dioxin exposures to persons using ball clay to make clay pottery and other artifacts. For example, pottery workers may be exposed to dioxin-contaminated dust."

David Cleverly also attached an impressive article he wrote which presents laboratory data confirming that dioxins are present in both raw and processed ball clays. (See reference under headline.) We also alerted *Ceramics Monthly* to this new information.

UPDATES ON REGULATORY UPS & DOWNS

66 FR 20403, 4/23/01, Final Rule; removal

ERGONOMICS OFFICIALLY DEAD. Under the Congressional Review Act, Congress has passed, and the President has signed, Public Law 107-5, a resolution of disapproval of OSHA's final Ergonomics Program Standard. Now OSHA has officially removed it from the Code of Federal Regulations. (66 FR 20403, 4/23/01, Final Rule; removal)

OLD ARSENIC STANDARD DEAD, NEW ONE COMING? Promising to set new arsenic levels for water, EPA says it will request the National Academy of Sciences (NAS) to convene a panel of scientific experts to review the EPA's interpretation and application of arsenic research in NAS's own study of arsenic performed in 1999. Hello! NAS did that review already when it made it's 1999 arsenic report! (66 FR 20579-20584, April 23, 2001)

LEAD LEVEL LIVES. The 100 pound EPA reporting level for lead is expected to become final without challenge. Politicians probably felt this would be a bad time to announce that they decided to let businesses go back to dumping 25,000 pounds of lead in the environment each year without even reporting.

OTHER ISSUES. And then there are actions on carbon dioxide, global warming, Arctic oil drilling, etc. A line in a song on PBS radio's Prairie Home Companion summed up the Bush policies this way: "To hell with you and the caribou, shut up and drink your arsenic."

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LEAD HOT SPOTS IN URBAN AREAS

Am. Journal of Public Health, 91(4), April, 2001, pp. 621-631

More than 400 urban sites that may be highly contaminated with lead have remained unknown to local authorities for decades, a preliminary study suggests. As part of his doctoral thesis at George Mason University in Fairfax, VA, William P. Eckel used old directories of factories and fire-insurance maps to locate the sites of 640 factories that smelted lead from car batteries and other sources between 1931 and 1964. Eckel, now with the EPA, then cross-checked his list with records from state, regional, and federal environmental agencies. The agencies were unaware of 430 of the sites, Eckel and his colleagues reported in the April *American Journal of Public Health*.

Eckel took one soil sample at each of eight of these smelting sites in Philadelphia and Baltimore neighborhoods and found that seven had concentration of lead higher than 400 parts per million (ppm), the standard specified by the EPA for soil in residential areas. The soil from one site just two blocks from homes in North Philadelphia had a lead level of 2,550 ppm, more than 2 1/2 times the EPA's accepted 1,000-ppm amount for industrial areas.

COMMENT: This study demonstrates the need for the new EPA lead reporting requirement. At least from this point on, businesses using more than 100 pounds of lead per year will be on a registry so that potentially contaminated areas can be easily identified.

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LEAD POISONING FROM RESTORING STRIPPED FURNITURE

MMWR, 50(13), 4/6/01, 246-248

The Occupational Lead Poisoning Prevention Program (OLPPP) of the California Department of Health Services investigated cases of lead poisoning in six furniture workers and their families in 1998. The investigation was initiated after a blood test of a worker's child revealed an elevated blood lead level (BLL).

During a routine medical examination, an 18-month-old child of a worker received a BLL test at his mother's request. The result, 26 µg/dL, met the CDC-recommended criterion for a lead poisoning case. Follow up tests revealed that the father, who worked for a company that refinished antique furniture, had a BLL of 46 µg/dL and his 4 month-old daughter a BLL of 24 µg/dL.

Investigators looked at the process for repairing and restoring wood furniture. The employer said that before arriving at the shop, the furniture was chemically stripped of all paint or coatings and was believed to be free of lead. Four carpenters made necessary repairs using power tools such as saws and planers. In an adjacent outdoor courtyard, two refinishers smoothed the wood using manual and power sanders, washed the furniture, and applied wax. Workers routinely ate and drank in the work areas, wore no protective equipment and returned home in work clothes and shoes.

BLL tests for six workers showed that all six workers had elevated BLLs: the two refinishers has BLLs of 29 and 54 µg/dL, and the four carpenters had BLLs of 46, 46, 47, and 56 µg/dL. The OSHA lead regulation requires employees with BLLs $\geq$ 40 µg/dL to receive a medical examination, additional laboratory testing, and follow-up. Five of the six family members, aged 7-12 years, did not have elevated BLLs, however a 7 month-old infant, whose father's BLL was >40 µg/dL, had a BLL of 16 µg/dL.

This investigation revealed that wood chemically stripped of lead-containing coatings can retain harmful amounts of lead., The process of alkaline stripping can cause lead to migrate from the paint layer into the pores of the wood substrate. Although the wood appears uncoated, sufficient airborne lead dust is released while using power and hand tools to cause surface contamination and elevated BLLs in workers. Lead in the dust was carried from the workplace on clothes and shoes and was found to be the source of the child's lead exposure and subsequent poisoning.

COMMENT: ACTS asks craftspeople to consider the following points made evident by this investigation:

- * Paint-stripped wood that looks clean may still contain significant amounts of lead.
- * Sanding the wood outdoors did not protect the two refinishers.
- * Family members, especially children, can be put at risk from dust brought home on clothes and shoes.

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MINERAL OIL-BASED PRODUCT CAUSED DEATHS OF CHILDREN

66 FR 18738-18740, April 11, 2001

The Consumer Product Safety Commissions (CPSC) proposes to include products containing more viscous (thicker) solvents than previously covered under a proposed child-resistant packaging rule. Last January, the CPSC proposed child-resistant packaging for products containing 10 percent or more of solvents and some lower viscosity (<100 Saybolt Universal Seconds-SUS) hydrocarbons such as those found in certain finger nail products, sunscreen and suntan preparations, bath oils, and cosmetics. It is known that when these less viscous items are ingested by children, some may be aspirated into the lungs causing serious health effects and/or death.

A review of the supporting data for the regulation found five additional deaths that were not reported in the previous notice. Three of these deaths were caused by products listed in the proposed rule making. The children died following ingestion and aspiration of 1) a homemade cleaning product, 2) motor oil, and 3) hair oil. These deaths support the need for the regulation.

However, the two other deaths were caused by products that were more viscous than the original regulation would cover. These were 1) death of a 9 month old female six days following the ingestion of an oil-containing hair moisturizer, and 2) death of a 12-month old female 45 days following ingestion of baby oil (mineral oil).

ACTS is especially concerned about the death from baby oil ingestion. We recommend baby oil as a brush cleaner to replace more toxic solvents such as turpentine. Clearly, we need to reemphasize our recommendation that artists keep young children out of all painting studios--even those in which safer materials are used.

It is also important to note that death followed 45 days after the child ingested the mineral oil from hemothorax (a rupture of blood vessels from the pneumonia which was caused by the mineral oil). This supports previous findings that inert substances like mineral oil are not removed from the lungs by natural metabolic processes. The long term fate of even small amounts of mineral oil in the lungs has been questioned by ACTS previously in the context of their use in theatrical fogs.

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ACTS FACTS sources: the *Federal Register* (F), the *Bureau of National Affairs Occupational Safety & Health Reporter* (BA-ACHIER), the *Mortality and Morbidity Weekly Report* (MMWR), and many technical, health, art, and theater publications. Call for information about sources.

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SCHOOLS SHOULD CONTROL SILICA & WOOD DUST

NIOSH Health Hazard Evaluation Report (HETA 99-0084-2807), Haverhill High School, MA, David C. Sylvain, CIH, released 4/01

High schools should control silica and wood dusts in classrooms even when they are below recommended limits, a National Institute for Occupational Safety and Health (NIOSH) report recommends. The recommendations resulted from a NIOSH study at Haverhill High School in Haverhill, MA. The study was conducted in response to a confidential request from school staff members.

CERAMICS. At the school, six ceramics courses were conducted a day. Potters wheels and wedging tables were used. The ceramic ware was glazed and kiln fired. The clay was purchased premixed, but glazes were mixed from powdered materials. The teachers estimated that two to three hours each month were spent preparing glazes from powders that included flint (silica), kaolin, and metal colorants such as manganese dioxide, nickel, and cobalt compounds.

Respirable crystalline silica measurements were below NIOSH's recommended exposure level, however, air sampling was not done during glaze mixing and "this potentially significant source of silica exposure was not evaluated," the report said. It also seemed likely to the investigator "that higher airborne levels would be generated during periods of greater use of the wedging table."

The researcher also warned that: "The relatively low silica concentrations measured ... should not be interpreted as an indication of the absence of airborne silica exposure: the settled dust sample, which consisted of 25% quartz, revealed the presence of crystalline silica in the classroom."

WOODWORKING. Typical woodworking machines (table saw, radial arm, band saw, etc.) were used in the school's shop. Some machines had no dust collection and the others were connected either to a Haradee fabric collector or stand-alone collectors, both of which discharged air back into the shop. Air sampling showed that the collectors emitted wood dust. A homemade downdraft table consisting of a Wood-Tek dust collector that pulled air from beneath a peg board table top was ineffective. Noise levels greater than NIOSH's standard (85 dBA) were measured at several workstations.

NIOSH RECOMMENDATIONS

1. Control exposure to airborne silica and metal compounds during glaze mixing by substituting premixed glazes. If substitution is not feasible, install a properly designed local exhaust system.

2. Install a local exhaust system at the wedging table and clean the table with wet methods and/or a HEPA vacuum.
 3. Visible dust on the floor and other horizontal surfaces in the ceramics classroom should be addressed by thorough and regular cleaning using wet-methods and/or a HEPA vacuum cleaner.
 4. Launder student aprons frequently to remove dry clay, which is a likely source of airborne crystalline silica.
 5. Implement an effective Hazard Communication Program "to ensure that teachers and students are aware of the hazards of materials they are using and appropriate methods for reducing these hazards." MSDSS should be obtained on materials. (Editor: The underline is mine. Hazard communication laws apply only to teachers. This means that NIOSH, like ACTS, thinks hazard training should be extended to high school students.)
 6. Provide an effective local exhaust ventilation system in the woodworking shop.
 7. Wear hearing protection when woodworking machines are used.
 8. Inspect art classrooms and the woodworking shop at least weekly to ensure that guards are installed on all equipment, machinery, moving mechanical parts, and drive belts where there is any chance that a student or teacher could inadvertently contact moving mechanical parts. Equipment with unguarded components should be taken out of service until effective guards are installed.
- =====

A MUSICIAN SPEAKS ABOUT SPECIAL EFFECT FOGS

Entertainment Design, March, and Letters to the Editor, May, 2001; "Voices Fading in the Fog," Sabin Russell, *San Francisco Chronicle*, 1/2/2001, p.1; & "Stage Fog Blamed for Vocal Problems," Kelly Yamanouchi, APWire Services (reprinted nationwide)

In his column in the March issue of *Entertainment Design*, David Johnson implied that reactions to the fog are psychological and said that "study after study has not found any evidence that fog, when used correctly, is directly linked to any respiratory problems." He is wrong. While no study has been definitive about fogs being able to cause asthma, exacerbation of existing asthma is so well accepted that most fog manufacturers have asthma warnings on their product's labels. And all the studies agree that the fog chemicals are capable of causing respiratory irritation--a condition which can result in vocal problems for performers.

These points and others were made by violinist Evan Johnson in a letter replying to David Johnson's column. Evan Johnson's letter refers to Pamela Dale, a chorister at the San Francisco Opera, who has been fighting to eliminate the theatrical fog effects that she and her doctors blame for her vocal and health problems. In fact, quotes from Pamela Dale in articles about her in the *San Francisco Chronicle* and by the AP Wire Service were the impetus for David Johnson's column (see the references under the heading).

Evan Johnson's letter appeared in the May issue of *Entertainment Design* and it is reprinted in full on the next page.

You note that performers are complaining again about theatrical fog in the March 2001 Entertainment Design. Has it occurred to lighting designers who shrug it off with the kind of anecdotal hypotheses you mention that there might really be a problem? People suffering with tuberculosis in the 19th century had to endure similar smug pronouncements that the disease was psychologically caused. There may not yet be a definitive study of the health hazards of breathing theatrical fog and smoke, but there is plenty of evidence that it can seriously damage some people:

1) Any doctor will tell you that breathing oil mists can aggravate pre-existing respiratory conditions. The New York Musicians Union has a file of doctors' statements such as: "Exposures to the smoke are a health hazard to this musician and to other members of the orchestra, and every effort should be made to correct this situation."

2) Seven of the musicians in the pit orchestra for the New York production of Beauty and the Beast developed respiratory conditions (including asthma) which they didn't have before.

3) One Broadway musician, now partially disabled, won a Workers Compensation suit in which a serious lung condition caused by theatrical smoke was determined to be an occupational disease by the doctor for management's insurance company.

4) There are lawsuits pending in New Jersey and California in which the plaintiffs allege serious damage from theatrical fog exposure--one person is now in a wheel chair and on oxygen most of each day.

5) Labels on fog chemicals warn: "Not to be used in the presence of known asthmatics."

6) The Materials Safety Data Sheet for mineral oil used in fog states that medical conditions aggravated by exposure to this fog include "lipoid granuloma/asthma/pneumonia when respiratory protective devices are not worn."

7) The safety claim for "food grade" oils used in fog is ludicrous since we don't inhale our food. (If we did, we'd have a health problem.)

8) Major manufacturers of oil [sic glycol] based products caution against their use for theatrical fog. For example, Texaco says, "We have consistently described this application as an inappropriate, and potentially harmful, use of our product, and have discouraged the use of these glycols to produce theatrical fogs."

In view of this evidence, theatrical producers are taking an irresponsible risk with the health of their audiences, which often include children, the elderly, and people susceptible to respiratory diseases. Daily variations in temperature, humidity, and air flow in theatres makes it impossible to use fog "correctly" even if everyone is fully informed and follows the rules (and how often does that happen!). The biggest shame is that there are alternatives which are readily available to scenic and lighting designers who use their imaginations. Scenic designer John Conklin of New York City Opera says that a ban on smoke "becomes an element in the design thinking. You can always find another solution... Management is beginning to understand that there may be a problem [with smoke and fog] and consider that they might have a moral responsibility not to endanger singers and crew." (quoted in Opera America Newsline)

Please help your scenic and lighting designer colleagues understand that problems really develop for performers who have to work in fog and smoke. Some suffer severe health consequences, to the point of permanent health and career damage. Many are unwilling to make a fuss or to go public (like Pamela Dale) because of the possible professional stigma. The "here we go again" attitude helps no one, and contributes to many individuals' misery.

Evan Johnson, theatre violinist

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DISNEY COSTUME RECALLED

CPSC Press Release # 01-129, April 19, 2001

In cooperation with the U.S. Consumer Product Safety Commission, a Disney Store in Glendale, CA, is voluntarily recalling about 54,000 Princess Aerial (Little Mermaid) costumes sold from July 2000 to October 2000. Fabric in these costumes ignites readily in violation of the Federal Flammable Fabrics Act. There have been two reports of costumes igniting, resulting in one burn injury to a 4-year-old girl. E-mail: Disneystore.costume@disneyonline.com or call 800/328-5902 (8am and 5pm CT Monday-Friday) for more information.

ACTS thinks that all costumes made for children on stage should also be flameproof. And all costumes for adults and children alike should be fire retardant if fire or pyrotechnics are used on stage.

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RECYCLER FACES \$221,000 IN FINES AFTER EXPLOSION

BNA-OSHR, 31(18), 5/3/01, p. 411

A Richmond, California recycling company faces \$221,000 in proposed penalties for 19 alleged safety and health violations as the result of an explosion and fire that killed a worker on October 26, 2000. A forklift operator was killed at MBA Polymers when a grinding machine used for recycling toner cartridges--such as those used in computer printers--exploded at the facility. Explosive toner cartridge dust may have been ignited by an electrostatic discharge in the grinder used by the recycler.

MBA Polymers in Northern California recycles plastic items such as computer cases, telephones, and toner cartridges. Alleged serious violations include failure to prevent toner dust from accumulating, not training workers regarding the fire hazards to which they were exposed, and failure to properly ground machinery.

RELEVANCE FOR ARTISTS. We are aware that artists, especially printmakers, are using copy toner powders in very unorthodox ways. Some are shaking and pouring toners onto works in progress. ACTS already provides warnings about the explosive nature of rosin dust (aquatint) and metal powders such as bronze and aluminum. We now will include copy toner powders in these warnings.

=====

ACTS FACTS sources: the *Federal Register (FR)*, the *Bureau of National Affairs Occupational Safety & Health Reporter (BNA-OSHR)*, the *Mortality and Morbidity Weekly Report (MMWR)*, and many technical, health, art, and theater publications. Call for information about sources.
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NINTH REPORT ON CARCINOGENS PUBLISHED

66 FR 29340-1, May 30, 2001

Every two years or so a new edition of the National Toxicology Program's Report on Carcinogens is released after much wrangling among cancer experts, unions, and industry. It is interesting to see which substances survive the battle. The most important new listing in this 9th Edition is for benzidine dyes (see page 2). Other listed substances to which artists may be exposed include:

CADMIUM AND CADMIUM COMPOUNDS have been upgraded to a "known to be a human carcinogen."* This includes the cadmium pigments.

DIESEL EXHAUST PARTICULATES from engine exhaust are now listed as reasonably anticipated to be human carcinogens.* ACTS sees high exposure to diesel exhaust in film and TV workers where diesel-powered equipment is used indoors in movie locations and stadiums.

ETHYLENE OXIDE is upgraded to a known human carcinogen.* It is a fumigant used in hospitals and by some museums and archives to fumigate collections of artifacts and books.

PHENOLPHTHALEIN is listed as reasonably anticipated to be a human carcinogen.* This laboratory dye and laxative ingredient is being phased out of laxatives. One company tells consumers that they have switched to "natural senna" because it is gentler. It wouldn't do to tell consumers that the old laxative chemical can cause cancer in animals at same doses people have taken for 40 years!

SILICA, CRYSTALLINE (Respirable Size) has been upgraded to a "known to be a human carcinogen."* Artists can expect tighter regulations on clay and other silica-containing dusts. (See also page 4.)

TOBACCO SMOKE is finally listed as a known human carcinogen.* Hello! **SMOKELESS TOBACCO** also is listed.

2,3,7,8-TETRACHLORODIBENZO-p-DIOXIN, better known as "the" dioxin of greatest toxicity in the dioxin class of chemicals, is now upgraded to a known human carcinogen.* This is no surprise, but it intensifies ACTS' concern about dioxin-containing ceramic clays.

SOLAR UV RADIATION AND EXPOSURE TO SUNLAMPS AND SUNBEDS have been listed as "known to be a human carcinogen." Remember when advertisers told us there was "good UV" and "bad UV?"

* NTP has two ratings for carcinogens, K & R. K stands for "Known To Be A Human Carcinogen." R stands for "Reasonably Anticipated To Be A Human Carcinogen" based on limited human evidence or sufficient evidence from animal studies.
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BENZIDINE DYE CLASS LISTED AS CANCER-CAUSER

66 FR 29340-1, May 30, 2001

The National Toxicology Program's (NTP) 9th edition of the Report on Carcinogens now lists "DYES METABOLIZED TO BENZIDINE (Benzidine dyes As A Class)" as known to be human carcinogens. Benzidine itself, the chemical on which these dyes are based, has been listed as a known carcinogen since NTP's first report in 1980. But only benzidine dyes that were actually tested and shown to cause cancer in animals such as Direct Black 38 and Direct Blue 6 were listed as reasonably anticipated to cause cancer. This meant that over 250 untested benzidine dyes¹ could be legally sold without warnings.

Listing dyes by a class means that dyes which have not been tested individually may be listed. It is only necessary to know that the dye releases benzidine during metabolism in significant amounts. Obviously, substances that metabolize to release carcinogens are carcinogens.

GERMANS AHEAD OF US. The German government did something similar in 1995. They regulated 120 dyes that are known to metabolize to release any of 12 known carcinogens including benzidine (see table). These dyes were banned for use in contact with the skin such as on clothing, bed clothes, or in plastic eyeglass frames. ACTS hopes NTP will take a lesson from the Germans.

CHEMICALS LISTED AS CARCINOGENS IN THE GERMAN DYE RULES²

o-Aminoazotoluene
p-Aminoazobenzene
2-Methoxyaniline
2-Amino-4-nitrotoluene
Benzidine
4-Chlor-o-toluidine
3,3'-Dimethoxybenzidine*
Dichlorobenzidine*
2-Naphthylamine
o-Toluidine
3,3'-Dimethylbenzidine*
4-Methyl-1,3-phenylenediamine

ACTS believes NTP should list all dyes that release known or suspect human carcinogens such as those listed in the German rules. And, since NTP already lists anthraquinone and five of its derivatives, the anthraquinone dye class should be included. Once all these dyes are listed and properly labeled, users will know what many experts have known for decades: large numbers of dyes are carcinogens.

BENZIDINE-RELATED PIGMENTS. ACTS is concerned about benzidine pigments as well. These pigments are often extremely closely related in chemical structure to the dyes or they are metal salts of the same exact dye chemical. It is highly likely that these pigments also metabolize to benzidine or its derivatives.

For example, a common art pigment, Diarylide yellow 83 (C.I. 21108), is known to release 3,3-dichlorobenzidine on heating to 200 ° C or higher.³ It probably releases this chemical on metabolism as well. ACTS' publications describe such pigments as "untested, but chemically related to cancer-causing dyes." We think art materials manufacturers should provide similar warnings.

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1. The Colour Index, 3rd Edition, 1985, lists 258 benzidine dyes.
 2. Institute Items, ACMI, 38(1), Jan/Feb 1996, p. 5 & Consumer Information, Verband der Druckfarbenindustrie, September, 1995
 3. 63 FR 5740, February 4, 1998.
- =====

CHELATION FOR LEAD DOES NOT PREVENT BRAIN DAMAGE

The New England Journal Of Medicine, 344(19), May 10, 2001, pp. 1421-1426 &
Science News, Vol 159, May 12, 2001, p. 292.

Chelation is a treatment that removes lead from a person's blood. This therapy saves lives in cases of acute lead exposure, but a major study now finds that for children who have had moderate exposure to lead, chelation does not prevent brain impairments.

The study enrolled 780 children with blood lead levels of 20 to 44 micrograms per deciliter ($\mu\text{g}/\text{dL}$) in a randomized, placebo-controlled, double-blind trial of up to three 26-day courses of treatment with succimer, a lead chelator that is administered orally. The children lived in deteriorating inner-city housing and were 12 to 33 months of age at enrollment; 77 percent were black, and 5 percent were Hispanic.

The study concluded that while treatment with succimer lowered blood lead levels, it did not improve scores on tests of cognition, behavior, or neuropsychological function in children with blood lead levels below 45 $\mu\text{g}/\text{dL}$. Chelation therapy is no longer recommended for children with these blood levels.

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CANDLE FIRES ON THE RISE

CPSC Press Release # 01-176, June 21, 2001

The 1998 figures on fires countryside have now been tabulated. The figures show that while deaths from residential fires have been nearly cut in half from 4,500 in 1980 to 2,660 in 1998, those caused by candles have increased dramatically. Candle deaths also increased by 750% from 1980 (20 deaths) to 1998 (170 deaths).

The report also showed that the number of house fires dropped from 655,000 in 1980 to 332,300 in 1998. In contrast, house fires caused by candles have increased, from 8,500 in 1980 to 12,900 in 1998. This also means that in 1998, 4% of all house fires were caused by candles!

In most cases, candles caused house fires when they were left unattended and tipped over, igniting nearby combustibles. Almost half of home candle fires start in the bedroom. Mattresses or bedding are the most common items that ignite, followed by furniture (dressers, desks, and tables) and then curtains. Tealights and tapers are common culprits in candle fires. CPSC suggests that consumers:

- * Keep matches, lighters and candles away from children.
- * Never leave burning candles unattended.
- * Keep combustible materials away from candles.
- * Don't put candles in locations where children or pets could knock them down.
- * Use only non-flammable candle holders
- * Always trim the wicks before lighting.

=====

QUARTZ IS AS TOXIC AS OTHER CRYSTALLINE SILICAS

Guide to Occupational Exposure Values, 2001, ACGIH, p. 110-112.

ACTS is publishing this article to answer the questions of a number of callers who have expressed confusion about the toxicity of quartz. Quartz is found in almost all clays, minerals, stones, metal casting mold materials, and more.

For many years, it was thought that quartz was less toxic than two other forms of silica: tridymite and cristobalite. Then in 1999, the American Conference of Governmental Industrial Hygienists (ACGIH) published a notice that they intended to change the threshold limit values (TLVs) for various forms of silica. In 2000, they were changed. The new TLVs are applied to respirable² silica and they are the same for all three crystalline forms. The only variant is for the type of quartz found in Tripoli polishing compounds used in jewelry and metal work. (See Table.)

TLVs FOR AMORPHOUS & CRYSTALLINE SILICA

AMORPHOUS

diatomaceous earth (uncalcined)	10	inhalable ¹
	3	respirable ²
precipitated silica ³	10	total dust ⁴
silica gel (sodium silicate) ³	10	total dust
silica, fume	2	respirable
silica, fused	0.1	respirable

CRYSTALLINE⁵

cristobalite	0.05	respirable
quartz	0.05	respirable
tridymite	0.05	respirable
tripoli (as quartz)	0.1	respirable

-
1. Inhalable: that portion of dust which can deposit anywhere in the respiratory system.
 2. Respirable dust: that portion of dust which deposits deep in the lungs in the gas exchange area (alveoli).
 3. A synthetic product.
 4. Total dust: all sizes of particles.
 5. All crystalline forms are also listed as carcinogens.

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ACTS FACTS sources: the *Federal Register (FR)*, the *Bureau of National Affairs Occupational Safety & Health Reporter (BNA-OSHR)*, the *Mortality and Morbidity Weekly Report (MMWR)*, and many technical, health, art, and theater publications. Call for information about sources.

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August 2001

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Vol. 15, No. 08

CERAMIC FIBER: POLITICAL HISTORY & A LAWSUIT LOST

www.acgih.org & ACTS FACTS, March 2001.

Refractory ceramic fiber (RCF) insulation is used by potters, glassblowers, stained glass artists, art foundry workers, and other artists for high heat applications. RCFs also have an interesting history for which another chapter was closed this month.

HISTORY: Artists began using RCF in the 1960's believing that they were a safe substitute for asbestos. But beginning in 1984, animal test data began to show that RCF could cause health effects similar to those of asbestos including mesothelioma, a rare cancer typically caused by asbestos exposure. In time, RCF were formally listed as carcinogens by all the major agencies including the Environmental Protection Agency, the International Agency for Research in Cancer, and the National Toxicology Program.

IN THE YEAR 2000, the American Conference of Governmental Industrial Hygienists (ACGIH) determined that workers needed more protection from RCF and decided to set their air quality standard (threshold limit value) for refractory ceramic fiber at 0.2 fiber/cubic centimeter (f/cc). This level is nearly as restrictive as the one they set for asbestos (0.1 f/cc). Then in December, ACGIH was served with a Temporary Restraining Order preventing them from publishing the new standard.

The Restraining Order was part of a lawsuit filed by the Refractory Ceramic Fibers Coalition (RCFC). The RCFC alleged that: 1) ACGIH's research regarding the TLVs for RCFs was flawed; and 2) ACGIH had a conflict of interest because many of its members are federal and labor union employees. The conflict of interest argument was ironic since RCFC's members are fiber manufacturers that clearly have a financial stake in standards set for their product. Yet, the RCFC didn't see a conflict of interest when they set their own less protective limit of 0.5 fibers/cubic centimeter!

ON JANUARY 12, 2001, the United States District Court in Atlanta held a hearing on the RCFC's request for the Temporary Restraining Order. After reviewing the legal briefs filed by both parties and listening to both counsels, the Court denied the Coalition's request, finding that it does not appear that they are likely to win. Then ACGIH published their standard for RCF.

ON JULY 2, 2001, a press release announced that the parties settled the suit and that ACGIH agreed to "clarify" the meaning of the their threshold limit value (TLV) standard.

EDITOR'S COMMENT. Readers can expect that Ceramic Fibers manufacturers will be distributing the TLV "clarification" and trying to make it look like ACGIH made concessions. However, if you go to the ACGIH's website and read the full the press release you will see how completely ACGIH refuted any attempts to discredit them. You will see:

* The sentences "clarifying" the TLV in the statement are identical to those in ACGIH's regular definition which has been essentially unchanged for years. This definition is in all their TLV booklets.

* ACGIH says other standards can be as credible as TLVs if they are subject to rigorous, independent peer review. This could be seen as a question RCFC should answer regarding RCFC's own standard.

* ACGIH agreed to review RCFC's new data which ACGIH would have done anyway.

ACGIH currently is defending themselves against other equally unfounded lawsuits brought by industries emboldened by the current pro-industry climate in Washington. The suits are diverting funds and time from the ACGIH's important work. The ACGIH is one of the world's most reliable and respected safety standards organizations. Readers can contribute to ACGIH's defense fund at www.acgih.org.

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SPARKLERS GENERATE OZONE

C&EN, 7/2/01, p.23 citing: *Nature*, 411, 1015 (2000) & Per Alenfelt, "Chemical Analysis of Consumer Fireworks," *Journal of Pyrotechnics*, Issue 11, Summer 2000, pp. 11-15

Handheld sparkler fireworks lit by millions of revelers celebrating the Diwali festival in India create a temporary rise in atmospheric ozone. Arun K. Attri and colleagues at Jawaharlal Nehru University in New Delhi were measuring concentrations of nitrogen oxides and ozone in the local environment during the festival month of November 1999 in Delhi. They noted that on the sparkler-drenched night of Diwali (November 7), the ozone levels rose. The authors took their hypothesis into the lab and measured ozone next to burning sparklers and found a spike in the levels.

Nitrogen oxides (NO_x)--which normally produce ozone (O_3) in the presence of sunlight--appear not to be involved in the sparkler reaction, the authors say. Instead, a significant portion of the light generated from the sparklers contains wavelengths shorter than 240 nanometers. These wavelengths contain just the right amount of energy to split molecular oxygen ($\text{O}_2 \rightarrow \text{O}^\cdot + \text{O}^\cdot$), allowing the reaction $\text{O}_2 + \text{O}^\cdot \rightarrow \text{O}_3$ to take place.

COMMENT: While the researchers were concerned with atmospheric ozone, ACTS is just as concerned about exposure of the revelers to much higher amounts while they are near the sparklers. The sparklers also illustrate how little we know about chemical emissions from consumer fireworks. Emissions are not only dependant on ingredients of the fireworks, but on the wavelengths of the light they produce, the amount of oxidation and reduction of the ingredients, and other factors.

One recent study of fireworks emissions was done in Sweden. It only looked at release of metals from consumer fireworks based on chemical analysis of the unignited products. The author estimates that 3000 kilograms (kg) of lead, 5 kg of arsenic, 2 kg of cadmium, and 0.1 kilogram of mercury were released from consumer fireworks in 1998--and double that in 1999 due to increased sales. If consumer firecrackers in Sweden produce this much, we should certainly be concerned about emissions from Macy's 4th of July celebration in New York when roughly 200,000 pounds of explosives were converted to dust, metal fumes, gases and vapors.

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BATHTUB WINE

"Lead Poisoning from Homemade Wine: A Case Study" Sam Mangas, Renuka Visvanathan, & Mike van Alphen, (Adelaide, South Australia), Environmental Health Perspectives, 109(4), April 2001, pp. 433-435.

A 66-year-old man was being considered for nursing home placement because he could no longer care for himself. He was fit and healthy in 1997, but had undergone personality changes becoming irritable, aggressive, and paranoid. He also had severe short term memory loss, abdominal pain, and constipation. Over a two-year period, he was treated for abdominal symptoms with CT scans, ultrasounds, endoscopies, colonoscopies, and barium enemas, with no improvement.

A routine blood test on hospital admission showed normal amounts of iron and hemoglobin, but a preponderance of smaller than normal red blood cells. Examination of these cells showed they were the type associated with lead poisoning.* Only then was a blood lead test ordered. The test found a blood lead level of 98 micrograms per deciliter (µg/dL). (Normal is considered 1-10 µg/dL.)

An investigation of the patient's home found none of the usual lead sources such as paint, hobby activities, or water contamination. Instead, the lead source was homemade wine made by the patient. As part of the process, grape crushings and juice were stored for a week prior to bottling in a bathtub. Lead enamel glaze on the tub was found to leach very high amounts of lead into the juice.

After time and treatments, most of the man's symptoms resolved, he was less confused and his memory improved. He returned home and cared for himself. A lead test 8 months later registered 31 µg/dL.

LESSONS to be learned from this story are: 1) there are so many potential environmental sources of lead that doctors should consider lead poisoning as a diagnosis even in adults who are not working with lead in their jobs or hobbies; and 2) if you are going to make wine or any other kind of food product for home use, invest in food-grade equipment for preparation and storage.

OTHER SOURCES OF LEAD IN WINE. Both homemade and commercial wines in the past have been contaminated by lead solder used to repair wine cases, passing wine through lead-containing outlet tubes on storage casks, various types of fermentation bats that contained lead, storage of spirits in lead crystal decanters, and from lead foil on wine bottle closures. Add bathtubs to this list.

* The small cells, microcytes, are stained with a basic dye. If the cell's surface stains in a speckled fashion, it is called basophilic stippling and usually indicates lead poisoning.
=====

BATHTUB & LEAD POISONING OF CHILDREN

<http://www.paintstore.com/archives/reglazingk+b/kitc0196.html>, LEADCHECK
SWABS@<http://www.leadcheck.com> <http://businesses.msn.com/refinishingpros/Articles.htm> &
Toxicological Profile for Lead, US DHHS, ASTDR, July 1999

On April 19, 1995, a Special Report on Good Morning America declared that porcelain bathtubs were an unexpected source of lead exposure for children. The report focused on the Thomas family from a small town in Massachusetts. Despite efforts to identify and eliminate lead in their home, their two children continued to have high blood lead levels (47 and 20 micrograms/deciliter ($\mu\text{g/dL}$)).

The family removed all lead paint and other common lead sources. Nevertheless, when the children lived elsewhere, their lead levels dropped; when they returned home, their lead levels rose. Then the parents checked their bathtub with a home lead test kit called LeadCheck®. The swab turned pink, indicating the tub leached lead. When the children ceased using the tub, their blood lead levels returned to nearly normal in a few months. The theory is that when children bathe and play with their toys, they ingest lead by touching the tub and putting wet fingers and toys in their mouths.

COMMENT. The fact that many bathroom fixtures, especially older ones, are coated with lead frit enamel is well-known. Making wine in bathtubs obviously can be hazardous as seen in the story above. But how hazardous is bathing? In curiosity, I swab-tested my own ancient fixtures and the tests were negative. If I left vinegar soak in my tub and sinks for 24 hours, I'll bet some tests on that vinegar would fail. And surfaces like those in the story that instantly turn swabs pink are worse. But just how much worse?

The bathtub poisoning story appeared on Good Morning American and can be seen on the websites of companies promoting LeadCheck® swabs and bathtub refinishing products (most of these coating products are very hazardous!). But I couldn't find mention of porcelain fixtures in the Agency for Toxic Substance and Disease Registry's massive profile on lead or in any of my other standard references. If any reader knows of a good peer reviewed study on this problem for our files, please let us know.

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ACTS FACTS sources: the *Federal Register (FR)*, the *Bureau of National Affairs Occupational Safety & Health Reporter (BNA-OSHR)*, the *Mortality and Morbidity Weekly Report (MMWR)*, and many technical, health, art, and theater publications. Call for information about sources.

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September 2001

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Vol. 15, No. 09

VENTILATION SYSTEMS FOR PASTEL WORK

The Pastel Journal, July/August, advertisement, p. 51

Last month, an artist called ACTS about a ventilation system that was advertised in *The Pastel Journal*. I called David Gordon who is a Certified Industrial Hygienist and Professional Engineer with Gordon Air Quality Consultants. David agreed to write comments on the system. But to understand David's points, we first must understand the two major hazards of pastels: the toxicity of the pigments; and the particle size of pastel dusts.

1. TOXIC PIGMENTS. There are only a few hundred pigments which are lightfast (fade-resistant) enough for art pastels. These pigments fall into two groups: **INORGANIC** pigments which contain metals some of which are toxic such as cadmium, chrome, cobalt, manganese, and nickel; and **ORGANIC** pigments which are complex chemicals most of which have never been studied for long term hazards but many of which are members of chemical classes suspected to cause cancer. Examples are anthraquinone pigments (e.g. alizarin crimson) and benzidine-derived pigments (e.g. diarylide yellow).

2. PARTICLE SIZE. Pigments are very small particles often in the range of 1-0.1 microns in diameter. In pastels, the pigments are mixed with binders such as chalk, talc, barytes (barium sulfate), and/or other minerals. The binders also often contain very fine particles. As a result, pastels are composed of a high percentage of particles under 5 microns in diameter and when they are used, two sizes of dust particles are created.

a) LARGE DUST PARTICLES. A portion of the pastel dust is composed of particles that seem large but which actually are agglomerated (stuck together) small particles. This dust is visible as it slides down the easel and catches in the tray. When inhaled, these larger particles deposit in the upper part of the respiratory system. Some are caught in the nose and are blown or coughed out. Other large particles are trapped in the throat or mucous linings in the tubes (e.g. bronchi) in the lung. These are raised with the mucous by little hair-like structures (cilia) and usually swallowed.

b) FINE DUST PARTICLES. At the same time that large particles are being created, another dust, composed of extremely small particles is generated. This dust forms a sort of invisible cloud around the easel as the artist works. When inhaled, these particles can get deep into the lung's little air sacs (alveoli). Once there, some particles can irritate or damage the air sacs, some will dissolve and pass through the air sacs' walls to enter the blood stream, and some particles can remain trapped there indefinitely.

DAVID GORDON'S COMMENTS. The ad for the pastel ventilation system shows a slot hood placed below the easel tray. There is a hose at one side of the tray which can be connected to a shop vacuum. David Gordon has the following concerns about the system.

1. A standard shop vacuum cleaner filter (bag) efficiently collects particles greater than 5 microns in diameter, but its efficiency drops off markedly as the size decreases to 1 micron (1/40,000 of an inch) and is very poor when the size drops below 1 micron. Much of the dust generated by the pastel process is below 5 microns.

2. The particles that fall onto the tray will be drawn into the shop vacuum where the largest ones ... will be trapped by the shop vac filter, but the smaller particles pass through the filter and will be blown into the room air where the occupants will inhale them. ...By using a shop vac with a standard filter, it's quite possible that more respirable particles may enter the breathing air than if the dust were simply allowed to drop to the floor. I strongly advise against the use of a shop vac for this purpose.

3. Another problem is that the device only collects dust that falls from the easel. It is too far away from the easel (from the point of dust generation) to collect dust generated at the point of work.

4. Another issue is the high frequency noise that a shop vac creates which could cause hearing problems if the person uses it over a long period of time and sits close to it. As a minimum, sitting in the same room with a running shop vacuum cleaner could easily interfere with the artist's creativity and productivity.

A QUICK FIX. David suggested improving the system by fitting the shop vac with a HEPA filter that can capture fine particles. But he warns artists to be sure that the "shop vac motor has the capacity to handle the extra resistance to air flow caused by the more efficient filter." In addition, he says that a standard shop vacuum draws about 120 cubic feet per minute of air. This already makes it highly unlikely that the hood as pictured in the advertisement can generate the 1000 feet per minute minimum linear air flow speed needed to "capture" particles at a distance. Adding a more resistant HEPA filter will reduce this air flow even further.

THE RIGHT SYSTEM. David says that "to efficiently capture the dust generated by the pastel process, ... the hood should be easily moved from place to place across the easel so that the artist can have a continuous source of suction close to the point of dust generation without [the hood] getting in the way of the artist. ... The exhaust vac should be located outside [the studio] to minimize noise and the discharge should be such that it doesn't impact on people nor get recirculated back into the building. A second exhaust hood, which can be connected to the same exhaust fan as the moveable hood, should be used to collect tray dust...."

David Gordon has designed systems like this for specific artists. Pastel artists interested in contacting David about ventilation systems can reach him at davidgordon@mediaone.net.

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THE LIMONENE LABEL GAME

Editorial

Since 1988, ACTS FACTS has warned readers about the toxicity of products based on citrus oil and d-limonene. Recently, we found that artists were unable to identify products containing these chemicals because their labels listed the chemicals by other names.

For example, one manufacture lists "terpenes and terpenoids" and "sweet orange-oil" on its label. The material safety data sheet (MSDS) on this product, however, says that "d-Limonene is a major fraction of the sweet orange oil terpenes/terpenoids." Unless the consumer reads the MSDS, they will not know d-limonene is present.

Some manufacturers list individual chemicals that comprise citrus oil by their confusing long names. Others use unfamiliar synonyms for the chemicals. For example, three synonyms for d-limonene are 1-methyl-4(1-methylethyenyl) cyclohexene, 4-isopropyl-1-methyl cyclohexene, and p-mentha-1,8-diene. These names or variations of them without the numbers can be used on labels.

D-limonene can also be called cinene or cajeputene, or it may be identified only by its class which is terpene or dipentene. D-limonene can also be derived from other sources such as oils of bergamot or caraway and these oils may be listed on the label. All these names can legally be used to identify d-limonene and citrus oil, but, in our opinion, it is unethical when the names are used to confuse consumers.

Any reader who is unsure of the contents of a product with a citrus odor may send a copy of the label to ACTS for our interpretation. This will also help ACTS keep abreast of these labeling practices.

=====

PHOTODERMATITIS FROM PLANTS

Chemical Health & Safety, July/Aug 2001, citing: Solis, R.R.; Dotson, D.A.; Trizna, Z., Arch. Family Med., 2001, 9(10), 1195-6.

Phytophotodermatitis is a long word meaning an allergy or skin reaction caused by the interaction of sunlight and toxic chemicals in plant substances. An article in the *Archives of Family Medicine* discusses a case of phytophotodermatitis from a reaction to plant chromophores (chemicals which are colored) called furocoumarins.

In the study, a young man who squeezed limes to make margaritas at an all-day beach party presented with bright-red fingers which two days later formed blisters. Lime juice turned out to be the cause. The furocoumarins like those in limes can cause skin redness followed by formation of blisters, conditions similar to chemical burns, poison ivy, or nonspecific dermatitis.

Researchers at Texas Tech University Health Science Center of Lubbock advise doctors to pay attention to the plant products to which patients may have been exposed. The condition can also be caused by other citrus fruits, carrots, dill, figs, parsnips, celery, and some perfumes. The treatment is a topical steroid.

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TURPENOID v. TERPENOID

Editorial

Many readers have expressed confusion about the words "turpenoid" and "terpenoid." To explain, we have to look back about 20 years when it became commonly known that turpentine was highly toxic. Safer chemicals were found for diluting oil paints. The name "turpenoid" was coined by one of the art material manufacturers who developed one of these first substitutes. The name was soon appropriated, improperly in my opinion, and applied to other manufacturer's turpentine substitutes.

Today, the name "turpenoid," through usage, has become a common name for any solvent or combination of solvents that can be used in place of turpentine. For this reason, it is important to get an MSDS on turpenoids whether "natural" or "synthetic" since they can consist of many different solvents.

Terpenoid, on the other hand, is a chemical synonym for some types of terpenes. Terpenes are a class of chemicals found in many plant oils and extracts. They are based on an "isoprene" unit which contains 5 carbon and 8 hydrogen molecules. These molecules can be arranged in a chain or in a cyclic order. They are classified by their structures as monocyclic (dipentene), dicyclic (pinene), or acyclic (myrcene). For example, turpentine, contains pinene which is one of the terpenoids. Turpentine's other main constituent is diterpene which is a terpene but not a terpenoid.

Clearly, consumers can't be expected to keep all this straight. The confusion in the names and chemical classes is one more reason that artists should request material safety data sheets (MSDSs) on all solvent products to aid in the identification of the chemical ingredients. These ingredients, then, can be looked up to see what is known and what is not known about their toxicity. This is especially true of natural chemicals like the terpenoids because most of them have never been tested for long term hazards.

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Vol. 15, No. 10

OPERA COMPANY CITED FOR FALL PROTECTION VIOLATION

CalOSHA District Office, P.O. Box 42063, San Francisco, CA 94142, Inspection
#:300889458, Inspection date: 05/16/2001, CSHO ID:F4610

Responding to a complaint from an employee, the State of California, Division of Occupational Safety and Health (CalOSHA) inspected and subsequently cited the San Francisco Opera for having a fall hazard. The citation read:

Citation I Item I Type of Violation: **Willful General**

T8CCR 3210(a): Elevated Locations. Guardrails shall be provided on all open sides of unenclosed roof openings, open and glazed sides of landings, balconies or porches, platforms, runways, ramps, or working levels more than 30 inches above the floor, ground, or other working areas. Where overhead clearance prohibits installation of a 42-inch guardrail, a lower rail shall be installed. The railing shall be provided with a toeboard where the platform, runway, or ramp is 6 feet or more above places where employees normally work or pass and the lack of a toeboard could create a hazard from falling tools, material, or equipment.

The employer failed to provide guardrails on the elevated platform located in the Zellerbach Auditorium used by chorus employees during rehearsals of "Aida". The height of this platform varied from 9 inches to 8.4 feet. The employer had been made aware of this requirement through an Information Memorandum through another citation of this section that was issued prior to this inspection.

Date By Which Violation Must be Abated: 10/11/2001
Proposed Penalty: \$ 7500.00

This CalOSHA rule is similar to federal OSHA fall protection rules. Most theaters in the US come under fall protection laws like this. Yet the rules are often violated. One reason is that many people think theaters are exempt from these laws.

ENTERTAINMENT INDUSTRY EXEMPTION. OSHA regulates theaters and other entertainment venues under the general industry standards (29 CFR 1910). The only artistic exemption from fall protection rules that OSHA acknowledges is at the front edge of a stage. A 1997 letter of interpretation entitled "Fall protection for the entertainment industry under the OSHA Act of 1970" says in part:

OSHA is concerned with the safety and health of all workers in the entertainment industry. Although OSHA recognizes it is not appropriate to put guardrails at the edge of stages, theatrical employees need to be protected from all occupational safety and

health hazards. The fall protection standards for general industry (found in Subpart D of 29 CFR at 1910.21 through 1910.32) as well as the personal protective equipment standards (found in Subpart I of 29 CFR at 1910.132 through 138) are the appropriate standards for your situation.*

* http://www.osha-slc.gov/OshDoc/Interp_data/119970128.html

This means that all other areas of theaters must be free of places from which people can fall more than four feet. The CalOSHA citation demonstrates that temporary rehearsal stages and risers are included under these rules.

LIABILITY. OSHA rules apply to theater "employees" only. The rules do not apply to children, students, volunteers, amateurs, and other non-employees. If these uncovered individuals fall--even from stages--theater managers or owners may be held liable for damages related to their injuries. Theaters that allow non-employees, or even untrained workers, on their stages should provide temporary guard rails for the front of the stage.

Other ways to reduce liability and accidents is to provide training and written materials on stage protocol, provide professional supervision, assign safe stage crossover pathways, and direct stage actions to occur at safe distances from the edge of the stage.

=====

DOLLHOUSE FURNITURE RECALL

Press Release # 01-219, CPSC, 8/22/2001

In cooperation with the U.S. Consumer Product Safety Commission (CPSC), XL Machine Ltd., of Eden Prairie, Minnesota, is voluntarily recalling about 10,000 sets of dollhouse bathroom furniture. The yellow paint on the furniture contains lead, which can present a risk of lead poisoning to young children. There have been no reports of injuries from the dollhouse furniture. The recall is being conducted to prevent injuries.

The Little Tree natural wood/dollhouse bathroom furniture sets contain a tub, sink with mirror, toilet, shower, bench, towel rack and a wooden doll. The fixtures on the bathroom furniture are painted yellow. The packaging for the set reads "Little Tree," "Distributed by Target Corporation," and "MADE IN CHINA."

Consumers should immediately take these dollhouse furniture sets away from children, and return the sets to the Target store where purchased for a refund. For more information, call XL Machine Ltd. at (866) 746-8097 between 9 a.m. and 5 p.m. CT Monday through Friday, or visit Target's web site at www.target.com.

COMMENT. This recall is presented as a reminder to artists that art paints also are not suitable for children's toys or furniture unless they are specifically labeled for this purpose. Art paints are exempt from the CPSC's consumer paint lead laws and may contain lead and highly toxic pigments. Artists who make children's items should use paints whose labels clearly state that they are safe for use on toys and furniture. Even if no one is harmed, a product recall is very expensive for the toy maker.

=====

RIGGING COURSE MAKES 4 DAYS FLY

Editorial

In August I took a four-day, 32-hour professional course on stage and arena rigging sponsored by Local 52 of the International Alliance of Theatrical and Stage Employees (IATSE). Like many other unions, Local 52 is not waiting for schools or employers to train workers as the OSHA regulations require. They train their own. Bravo Local 52!

The first two days were taught by Jay O. Glerum and concentrated on stage rigging. The last two days covered arena rigging and were taught by Harry Donovan. Both men are renowned in their fields and their gift for teaching made days seem short. Jay Glerum is the author of the *Stage Rigging Handbook* and Harry Donovan wrote a massive manual on *Arena Rigging*. Both books were provided to participants along with a hand calculator, rulers, rope, and other needed paraphernalia.

Especially gratifying to me was the course's coverage of the laws applicable to rigging and the liability generated by failure to comply. In addition to OSHA regulations that apply directly to rigging and its hardware and equipment, the course addressed OSHA rules for fall protection, standard rails and other guard systems, scaffold erection and use, hard hats and other protective equipment, powered lifts, ladders, first aid, and accidents.

If you take this course, you will learn amazing new things about hardware, even common items you have used for years. As examples, you will learn to identify the grade of bolts and nuts, interpret the markings on shackles and chains, understand the use of different types of pulleys, decode the interior configuration of 1900 types of wire rope, appreciate the varying properties of fiber rope (hemp, polypropylene, polyester, nylon and cotton), and calculate how weight is distributed on beams, pipes and trusses.

As the result, you will never look at a theater, an arena, an outdoor concert location, or even a building construction site, in the same way ever again. And before you finish, you should be able to tie a bowline with your eyes closed and estimate the angle and select the hardware to make a bridle dropline land on a mark. And you'll know what that means!

Some college theater programs cover this material, but it should be required in all of them. And the course should be easier to take in college because, presumably, students will not need a refresher on their algebra. Readers can get information on rigging seminars and courses from:

Rigging Seminars	Jay O. Glerum & Assoc.	Sapsis Rigging	Harry Donovan
P.O. Box 486	18434 47th Place N.E.	233 N. Lansdowne Av.	Donovan Rigging
Bedford IN 47421	Seattle WA 98155	Lansdowne PA 19050	2416 3rd Ave, W
812/278-3123	206/362-9293	800/292-3851	Seattle WA 98119

rigging@riggingseminars.com

Bsapsis@aol.com

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FALL OUT FROM THE WORLD TRADE CENTER ATTACK

Editorial

OUR THANKS, and deep appreciation go to all the **ACTS FACTS** readers who wrote and e-mailed their concern and good wishes. Our main office is near the corner of Thompson and Houston Streets which is well into the area that was secured after the attack.

CONTACTING US. We had no mail delivery for almost a week and now it appears that some mail has gone astray. If you wrote to us during this period and have not received a reply, please try again. We still do not have reliable long distance service. Callers may have to try several times to reach us, especially during business hours. E-mail is still the best way for us to communicate because it involves only local phone lines.

DUST HAZARDS. ACTS and the New York Environmental Law & Justice Project (315 Broadway Suite 200, New York NY 10007-1121) became concerned about the health of the rescue and security workers and the people who live and work in lower Manhattan. We conducted dust sampling in and around the World Trade Center Disaster site and sent them to ATC Associates of NY for independent analysis.

Analysis of our samples and reports from EPA and other independent groups indicate that some dust samples contain up to 5% asbestos and others up to 80% fiberglass. Silica, dioxins and PCBs also may be present and further analyses are being done.

ACTS and the NYELJP believe that proper advice about cleaning up homes and businesses can only be provided when the composition of the dust in that particular location is known. We are providing referrals to laboratories that will test samples and then, based on this information, we are recommending clean up procedures.

ACTS and the NYELJP sent out a joint press release about the problem. Monona Rossol from ACTS spoke on public radio station WNYC. Joel R. Kupferman, NYELJP's Executive Director spoke on WBAI and on Channel 2. *The Daily News* and *The Village Voice* covered our point of view. There will be more information in the next issue.

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ACTS FACTS sources: the *Federal Register (FR)*, the *Bureau of National Affairs Occupational Safety & Health Reporter (BNA-OSHR)*, the *Mortality and Morbidity Weekly Report (MMWR)*, and many technical, health, art, and theater publications. Call for information about sources.

Editor: Monona Rossol; Research: Tobi Zausner, Nina Yahr, Diana Bryan, Sharon Campbell; Staff: John Fairlie, OES.

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ACTS FACTS

THE MONTHLY NEWSLETTER FROM **ARTS, CRAFTS AND THEATER SAFETY (ACTS)**

181 THOMPSON ST., # 23,

NEW YORK, NY 10012-2586

PHONE 212/777-0062

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November 2001

Vol. 15, No. 11

OFFICIALS GIVE BAD GUIDANCE: FAIL TO FULLY TEST DUST IN TRADE CENTER DISASTER

Editorial with apologies for covering this important non-art subject

I am shocked and angered by the advice given by the US Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the New York State and New York City Departments of Health (NYC & NYS DOH), and the New York City Department of Environmental Protection (NYC DEP) regarding the dusts from the Trade Center attack. At a November 1 hearing held by the City Council, I testified that their advice is flawed and should not be followed by lower Manhattan workers and residents.

The two major areas about which I expressed most concern were related to 1) the lack of data on the contents of the dust, and in particular the fiberglass content, and 2) advice on the cleanup of this dust from apartments, businesses, and schools.

1. DUST DATA. The tests performed by federal, state, and city agencies on the dusts lying on the ground and other surfaces are incomplete and thus cannot be used to determine the hazards to anyone involved in cleaning up these dusts. The primary substance tested by these agencies was asbestos. But there are other important contaminants, such as fiberglass, fine particulates (e.g. those under 10 microns called PM₁₀), PCB's, and dioxins.

Regarding asbestos, the agencies reported levels in the dusts on the ground and other surfaces ranging from a trace to as high as 4.49% asbestos. These dusts were found over a large area, and not just confined to Ground Zero. There were over 30 locations in lower Manhattan where concentrations were 1% or higher, including at locations five to seven blocks away from Ground Zero.* Dust that contains 1% or more asbestos is regulated as hazardous under both EPA and OSHA regulations.

The agency's tests did not find hazardous airborne asbestos in street air monitoring locations in lower Manhattan. But these air monitoring results are misleading because they do not indicate what the air levels are inside buildings, schools, and homes in the area. The dust in outdoor air samples is diluted with wind from non-contaminated areas. Indoors, the dust is contained. Disturbing indoor dust during cleaning and other activities can result in higher levels. And the amounts of dust in buildings can be expected to rise when dust from the air and streets enters through open windows or doors, is tracked in by people, and enters through air-conditioning units (which do not filter out fine particles).

This relationship between indoor and outdoor dust was demonstrated at Stuyvesant High School after it was professionally abated and reopened. Parents hired an independent industrial hygienist, Howard Bader of H.A. Bader Consultants, to monitor the air during classes on 12 school days between October 9 and 24. Bader found that dust levels indoors rose when dust were visible on streets and the winds were high. On five of these days, most of the air samples contained PM₁₀ levels above the 65 micrograms/cubic meter level that EPA lists as "unhealthy for sensitive groups."

Bader states: "The dust levels in the school are unacceptable and represent a potential health concern. This is of particular concern because the composition of the dust and potential health effects is not completely known." This echoes my concern that the agencies have failed to characterize the dust's composition with respect to asbestos, fiberglass, dioxins, PCBs, and other contaminants.

FIBERGLASS. I am most distressed about the lack of reporting of fiberglass. No agency sampled for fiberglass in the air or surface dust. Yet they knew it was there. Under the Freedom of Information Act, the Environmental Law and Justice Project obtained EPA's data from September 16 to October 16. In this material we found an October 9 analysis of 25 bulk samples of debris (insulation) from structural steel. While two samples contained asbestos at 24% and 31%, the remaining 23 samples showed fiberglass and/or glass wool ranging from 10 to 75% with most in the range of 65 to 70%.

This is consistent with our data. ACTS in conjunction with the New York Environmental Law & Justice Project took dust samples in and around Ground Zero. We also directed a number of apartment dwellers to take dust samples and share their data. These samples were analyzed by ATC Associates of NY. We saw asbestos levels in these samples ranging from a trace to 5% and fiberglass concentrations ranging from 10% to 90%, with most in the 40% to 50% range.

These needle-like fiberglass particles may be causing much of the reported eye and respiratory irritation and the widely reported "WTC cough". The National Institute for Occupational Safety and Health has found that fiberglass causes respiratory irritation in humans and fibrosis in animal studies. And the National Toxicology Program lists respirable glass fibers as "reasonably anticipated" to cause cancer. The International Agency for Research on Cancer lists certain glass fibers as "possibly carcinogenic to humans."

OSHA has proposed a 1 fiber/cubic centimeter permissible exposure limit for fiberglass. While the OSHA limit is not yet instituted, the American Conference of Governmental Industrial Hygienist set the same standard. Clearly, fiberglass dust is a "recognized hazard" and workers should have been told about these hazards and OSHA should have enforced the wearing of respirators. Instead, OSHA stood by and watched ad barefaced workers toiled in the dust.²

2. CLEANING UP. The New York State Department of Health's website (www.ci.nyc.ny.us/html/doh/html/alerts/wtc3.html) provides advice that is typical of the major agencies. The NYS DOH says:

As expected, some asbestos was found in a few of the dust and debris samples taken from the blast site and individuals working in this area have been advised to take precautions. However, most of the air samples taken have been below levels of concern. Based on the asbestos test results received thus far, there are no significant health risks to occupants in the affected area or to the general public.

This statement is false. As I stated above: there were over 30 locations in lower Manhattan where asbestos levels were 1% or above, including at locations 5 to 7 blocks away from Ground Zero.¹ However, the NYS DOH then advises:

If you were evacuated from a residence or workplace south of Warren Street, west of Broadway, and north of Exchange Street, and have been approved to resume tenancy by your building manager, you are advised to wear a dust mask upon entering this area to decrease the possibility of dust inhalation and throat irritation. Outside these boundaries, masks are not necessary, but may be worn for your own comfort.

Yet an independent test showed that inside an apartment on Pine Street which is East of Broadway the dust contained 2.2% asbestos.

LAWS BROKEN. There are laws regulating the handling and disposal of materials containing 1% or more asbestos. The Clean Air Act in Title 40 of the Code of Federal Regulations at Parts 61.145 and 61.150 applies to the demolition of buildings (the WTC disaster falls in this category), schools, business, and dwellings of 4 or more units, and surface areas of more than 160 square feet (about the size of a small kitchen). These regulations require that OSHA's regulations used to select the type of respirator, and to medically certify, fit test, and train workers before they wear them. In addition, the EPA rules require other protective equipment, HEPA vacuums, sealing of asbestos wastes prior to disposal, regulated transport and disposal in certain approved landsites, asbestos abatement plans prior to starting work, analyses of samples to ensure proper cleaning, etc.

Apparently, the NYC DOH and the NYS DOH have decided to waive these regulations in their guidance for the cleanup of dusts. And the federal US EPA, in delegating the cleanup authority to the health departments, also waived its own regulations. EPA even refers people at its web site to the less stringent NYS DOH guidance.

The NYS DOH's website also advises people to wear masks when cleaning up their dust. Yet only certain types of masks and respirators provide protection against asbestos. In addition, people should not wear these respirators unless they are first medically certified, fit tested and trained as OSHA rules require.

It is unconscionable that health departments suggest that anyone can wear a respirator without even warning that the masks do not fit all people and that certain heart and respiratory problems can be exacerbated by the breathing stress caused by wearing a mask.

RECOMMENDATIONS. Based on the data we have seen, we believe:

- Any dust containing asbestos at 1% or greater should be cleaned up in accordance with the stringent federal EPA regulations.
- Unless independent tests are performed, all the dusts in lower Manhattan apartments, schools, and businesses should be assumed to contain 1% or more asbestos--and many other toxic substances.
- Samples of indoor dust accumulations (not air samples) should be tested and proper and legal cleanup planned in accordance with the findings of these tests.

Obviously, testing of the dust should be done before a householder attempts to clean their home. However, Joel Kupferman, Attorney with the Environmental Law and Justice Project, testified at City Hall that two laboratories doing tests for individual householders have been threatened with loss of accreditation if they continue!!

It is clear that there is a rush to get people back into the area, paying their rents, and giving the impression to the world that all has returned to normal. We need to slow down and put people first. New York has had enough casualties.

1. Examples of locations at which more than 1% asbestos was found in the dust include City Hall at Broadway and Murray Street, 22 River Terrace, Battery Park and 2nd Place, and Chambers Street and North End Ave.

2. National Institute for Environmental Health Services, National Clearinghouse for Worker Safety and Health Training - press release, 10/23/01. See also www.wetp.org
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EPA ENDORSES CLINTON ARSENIC WATER STANDARD

<http://www.epa.gov/>

The EPA's home page announces that the new arsenic standard for drinking water will be 10 parts per billion (ppb). This is the same level set by a Clinton Administration rule last January. The rule was set aside when the Bush administration charged that Clinton rushed the rule through without scientific evidence.

US EPA Administrator Christie Whitman's concurrence with the Clinton 10 ppb limit was dated October 31. Trick or treat?

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ACTS FACTS sources: the *Federal Register (FR)*, the *Bureau of National Affairs Occupational Safety & Health Reporter (BNA-OSHR)*, the *Mortality and Morbidity Weekly Report (MMWR)*, and many technical, health, art, and theater publications. Call for information about sources
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December 2001

Vol. 15, No. 12

EPA SCIENTIST RESPONDS TO ACTS FACTS

Editorial

Last month's *ACTS FACTS* editorial criticizing City, State and federal governmental agencies' handling of the World Trade Center disaster cleanup engendered a response from a scientist at the US Environmental Protection Agency. In a Memorandum to Monona Rossol at ACTS, Cate Jenkins, a veteran 22-year EPA employee, charged that her agency and the New York City Health Department are ignoring federal asbestos-abatement laws in buildings near the World Trade Center disaster site. The memo lists the specific parts of the regulations which are being effectively waived and replaced with the "extremely lenient (and arguably illegal) asbestos guidelines of the New York City Department of Health."

The scathing memo circulated within the Agency was reported by the press and was brought up at a New York State Assembly public hearing on air quality in lower Manhattan. In response to some of the criticisms of her opinions, Cate Jenkins has sent additional memos to EPA's Region 2 legal counsel and the Office of Homeland Security and Senate Oversight Committee. Readers can see these Memos on the web site of the Environmental Law and Justice Project: www.nyenvirolaw.org.

ACTS is proud to have sparked this response from a respected EPA scientist and hopes Cate Jenkins' efforts will be rewarded with the institution of safer clean up procedures in lower Manhattan.

ART CONSERVATORS DEAL WITH WTC DUST

Notice

The American Institute for Conservation is engaged in developing procedures for decontaminating art works and artifacts from the World Trade Center disaster area. Conservators working on jobs that cannot wait for this material to appear in a final form may call ACTS for interim advice and referrals.

SMOG REJECTED AS PROTECTION AGAINST UV RADIATION

C&EN, 11/19/01, p. 56

In 1997, industry challenged EPA's 0.08 part per million air quality standard for ozone in court. One of industry's claims was that ozone pollution could be beneficial because it would help shield the public from ultraviolet rays. In 1999, an appeals court ordered EPA to analyze this claim. EPA has now concluded that any increased protection from UV radiation resulting from the new smog standard's decrease in ground level ozone are "too uncertain at this time to warrant any relaxation" of the standard.

METALLIC PAINT MAY HAVE CAUSED HINDENBURG CRASH

C&EN, 9/24/01, p. 64; 11/19/01, p.64, & 11/26/02, p. 56

An article in an August issue of *Chemical & Engineering News* about the Hindenburg sparked an interesting debate. The writer of the first article assumed that hydrogen in the massive airship was the cause of the fire when it docked in New Jersey in 1937. However, other experts had different opinions.

Carolyn Elam of the National Renewable Energy Laboratory, Golden, Colorado, said that "[e]ven at the time of the accident, it was recognized by the investigators that the coating on the airship was to blame." Elam then quotes an excerpt from a column which appeared shortly after the 1937 disaster written by Roy McAlister, who was called "The Philosopher Mechanic."

Careful investigation of the Hindenburg disaster verified the opinion of the engineers on the Hindenburg and proved that it was the flammable aluminum-powder-filled paint varnish that coated the infamous airship, not the hydrogen, that started the fateful fire. The Hindenburg repeated the famous experiment of Ben Franklin regarding collection of electrical charge on an object in the sky. Franklin flew a kite in a storm to learn about lightening. The captain of the Hindenburg provided the 800-foot-long, 236-ton, aluminum-powder-varnish-covered airship as a much larger electric charge collector. As the Hindenburg was grounded by dropping landing lines, the experiment was complete and electrical discharge in the Hindenburg skin started the fire. The Hindenburg would have burned and crashed if it had been filled with helium or simply held in the air by some other force. ... The hydrogen fire started considerably after the Hindenburg surface skin started to burn and was over in less than one minute. The diesel fuel and other heavier-than-air components of the Hindenburg continued to burn many hours on the ground.

C&EN now has reported other expert opinions. There seem to be three schools of thought: 1) the hydrogen is the sole cause; 2) the flammable varnish containing aluminum powder and ferric oxide initiated the fire and was the major contributor to the rapid burning with hydrogen burning as a result, and 3) that the varnish may have been a significant contributor, but that the hydrogen was the major cause and fuel for the fire.

A source at the Smithsonian Institution's National Air and Space Museum reports that the cause of combustion in the Hindenburg incident was never determined.

RELEVANCE. This question is not merely an academic exercise for theatrical scene designers and artists, or creators of large museum or public building art works or exhibits. Most professional artists are aware that they need to use fire-retardant paints for such installations. However, adding aluminum or other metallic pigments to these paints may alter their flammability characteristics. This could be especially hazardous in the case of stage sets and props that may come in contact with certain special effects (lasers, fire or pyrotechnics), electrical equipment, or hot lights.

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ROSIN v. RESIN

The article in the September *ACTS FACTS* called "Turpenoid v. Terpenoid" generated so much mail that we decided to do a similar article on two other commonly confused terms: rosin and resin.

ROSIN is an amber colored solid material consisting of a mixture of natural chemicals derived from the gum of pine trees. When ground fine, it appears as a white powder. It is used by dancers and athletes to dry their hands and feet or to provide traction. Violinists use it on their bow. And printmakers use rosin in a process called "aquatint."

AQUATINT. In the aquatint process, a metal plate is placed in a box with finely divided rosin powder.* The powder is stirred up by some method such as wooden paddles or bursts of compressed air. Then the rosin dust is allowed to settle on the plate.

The plate is taken out and heated so that the powder melts and adheres to the plate. However, there are many little spaces which were not covered by a particle of powder and these spaces are left bare. The bare spots will be etched (dissolved) when the plate is placed in acid.

Next, the plate is wiped clean of the rosin and ink is rubbed into the many little etched depressions in the place. When the plate is pressed against damp paper (printed) an overall appearance of a shaded area or "aquatint" is created.

ROSIN HAZARDS. Like many natural organic chemicals, some people are allergic to rosin. And like all organic chemicals, rosin dust is flammable. When confined in aquatint boxes, a spark, flame, or static discharge can cause the dust to explode (similar to grain elevator explosions). The boxes should be not be placed near electrical outlets, plumbing pipes which could act as a ground, hot plates, or other electrical and heat sources. Ventilation should also be provided to control the dust that escapes when the plate is removed from the box.

RESIN. The word "resin" refers to any organic chemical liquid that can be converted to a solid. Synthetic resins are the result of a chemical reaction between small chemical compounds called monomers, such as styrene and vinyl acetate, that produces solid plastic materials (polymers) called "polystyrene", "polyvinylacetate," etc. Natural resins include shellac, copal, dammar, and linseed oil. These natural liquids harden to form hard surface coatings.

When natural pine gum rosin is melted to form a liquid and cooled again to become a solid material on an etching plate, it is being used as a resin. No wonder we are confused. In the aquatint process, rosin is a resin!

* Asphaltum can also be used for aquatint. Asphaltum is a black or brown solid consisting of a mixture of organic chemicals (bitumens) which occur either in natural deposits in the earth or as residue from petroleum refining. Since it is also a carbon-based material, it has the same flammable hazards as rosin.

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