

Why Wait?

Sprinklers Save Lives and Property

Automatic sprinkler systems dramatically increase the probability of survival in dormitory fires, according to a report issued by the National Institute of Standards and Technology. The report was based, in part, on three fire experiments conducted by the U.S. Fire Administration with and without sprinkler systems. Based on reports from FM Global and the NFPA, sprinklers are 86 percent to 96 percent successful. An automatic sprinkler system is the safest, most effective method for containing and suppressing most building fires. They are cost effective,

typically costing only a few dollars per square foot. Insurance premiums are usually less for property that is protected by an automatic sprinkler system, which helps defray the cost of the system.

**More than 80
students have died
in on- and off-campus fires
since January 2000.**



“We have never seen multiple fatalities in a sprinklered building in which the system was not otherwise impaired,” noted Gregory Harrington, principal fire protection engineer for the National Fire Protection Association. The NFPA claims that, where sprinklers are present, the chance of dying in a fire and the average property loss per fire are

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Mercury Remains a Hazard

SENDS TWO TO HOSPITAL

Mercury-related incidents have been rising in schools around the country, according to the federal government. Locally a Boston middle school nurse and a student were taken to hospitals in February after they were exposed to mercury that escaped when a blood pressure machine burst.

Attention to the dangers of mercury poisoning was elevated when, in 1997, a Dartmouth University professor and experienced researcher died after she spilled a few drops of dimethylmercury, an organic



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Happenings!

**Gerry Davis, Director of Training,
Massamont Loss Control Division announces:**

“Disaster Recovery; Be Prepared”

July 26th at Gillette Stadium in Foxboro Massachusetts

The topics of water damage, fire, smoke, odor and mold have become a major concern to our program members and to the insurance industry in general. Every day we are hearing reports of another school or town hall facing large costs and/or opening delays to deal with these problems.



This Metrogard Seminar will shed light on being prepared for recovery from disaster. This is a value-added seminar and is free of charge to all current Metrogard policy holders. Risk Managers, School Business Officials, Superintendents of Public Works and Facility Managers should attend this seminar.

Register at: www.metrogard.com/Seminars/Disaster/Disaster.htm or call Laurie Shaw, Massamont's Loss Control Coordinator at 800.444.3916 x 639 for more information.

Would you like to be on our mailing list?

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Mercury Remains a Hazard, cont'd from page 1

form of mercury, on her latex gloves. She was an expert on the toxicology of heavy metals, which should be a warning to all persons who use mercury, expert or novice. With the present rise in the incident rate, attention must again be called to this useful but harmful elemental material.

Mercury is contained in many devices, instruments and chemicals. The presence of mercury is not limited to laboratories. It is commonly found in thermometers, as a component of some electrical switches, and in a variety of specialized devices and consumer goods. The liquid metal is hazardous to humans. It also reacts with certain metal alloys, causing metal failure.

The Human Factor

Inhalation of mercury fumes is the most common human route of entry leading to severe cases of mercury poisoning. High levels of exposure to the odorless fumes of mercury can cause brain damage, kidney failure, and death. It is very insidious for fetuses. In lower concentrations, the fumes can cause short-term medical problems, such as diarrhea, nausea, and vomiting. Short-term exposures, even at low concentrations, can cause lung damage, skin and eye irritations, elevated blood pressure, and increased heart rate. Other health effects include damage to the central nervous system, heart, and immune system; memory loss; tremors; fatigue; insomnia; learning difficulty; gingivitis; sweating; weight loss; blindness; birth defects; personality changes; and, some researchers think, Alzheimer's disease and autism in some individuals.

A Useful Substance in Instruments and Laboratories

Mercury is the only metal that is a liquid at room temperatures. It can easily evaporate, making it extremely dangerous. The liquid is 13.5 times as

dense as water, weighing 13.546 grams/cm³. This makes mercury very useful for some medical procedures. It is also a good conductor of electricity, hence its prevalent use in relays and tilt switches. Because it expands and contracts uniformly, it is a very good substance to use in instruments that measure temperature and pressure. In its various molecular forms, it is useful in a variety of chemicals.

Mercury may be found in fluorescent and neon lamps, barometers, manometers, thermometers, thermostats, thermostat probes, gas-regulators, light switches, sump pump relays, button batteries, automobiles (anti-lock brake relays, light switches, etc.), laboratory bubblers, diffusion pumps, and medical equipment (e.g., home blood pressure gauges, which may contain up to 1.5 lbs of mercury). Mercury was once used in



Mercury, which can cause many medical conditions, is widely used in laboratories, instruments, vaccines, appliances, lamps, and for other purposes.

microwave oven light bulbs; current models do not use mercury. Mercury-containing temperature devices and electrical switches have been used in common appliances such as clothes irons, washing machines, and top loading freezers.

The metal is used in a variety of substances that benefit from its ability to kill bacteria and fungi. It has been used in paints, medicines, and pesticides. As an amalgamate with other metals, it was useful for many years as a dental substance to fill cavities in teeth. It is added as a preservative in vaccines

Sprinklers Save Lives and Property, cont'd from page 1

both cut by 50 to 67 percent, compared to fires where sprinklers are not present.

temperature of a dormitory room can quickly exceed 1,000°F, and everything not burning will soon ignite spontaneously – a very dangerous process called “flashover” and much feared by firefighters.

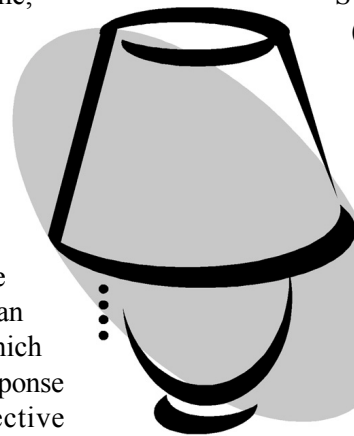
Sprinkler systems have an established record of preventing catastrophic fires. Quick response sprinklers can keep an incipient fire from causing major damage and injuries or death while limiting water damage. A typical sprinkler discharges 25 to 35 gallons of water per minute (cf. fire department attack hoses, which discharge 100 to 300 gallons per minute). Most fires activate 1 to 4 sprinkler heads before the fire is suppressed and the fire department arrives to “overhaul” the facility, i.e., to find and put out smoldering fires and evacuate smoke and toxic gases.

Many communities have mandated sprinklers for certain types of occupancy. Installing sprinklers during new construction is less costly than having to retrofit a facility. In the past, campuses often retrofitted buildings only after there had been loss of life or after state or local laws were enacted that mandate sprinkler systems. The trend today is to be pro-active and install sprinkler systems as soon as possible. Retrofitting often gets down to judgment and

balancing life and property against cost, time, and disruption.

Recent advances in residential sprinklers allow for much quicker response than older style sprinkler heads. The sprinkler system can be interconnected with a master fire alarm at a campus dispatch facility, which can summon the fire department and rescue teams immediately. A computerized system can identify the room, stairway, or hall from which the alarm was initiated, thereby shortening response time considerably and allowing for selective evacuation. Advanced systems can detect tampering or deactivation of sprinklers and alarm systems and send a tamper signal to the response center.

Automatic sprinkler systems are very important for student safety because other safety measures do not always work as intended, or are ignored. Dormitory fires can completely engulf a room within 3 minutes, faster if an accelerant is used. The



Students at the Hindsdale (Illinois) South High School were spared injury when

sprinklers there extinguished a fire in the science area of the facility. At Drew University in Madison, NJ, a February 2005 fire in a student’s room at Tolley Hall was

Students should be warned that draping clothes over lamps is an unsafe practice.

Each year in the U.S. there are an estimated 1,700 fires in high school, private and prep school, and university dormitories according to the U.S. Fire Administration.

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Loss Prevention *and* Fire Safety

The Princeton Review, in cooperation with the Center for Campus Fire Safety, has a rating system for fire safety at colleges and universities, a useful tool for parents. The scoring system, which runs from 60-100, includes such factors as sprinkler systems, fire alarms, and fire drills.

Although many campus buildings are equipped with smoke and heat detectors and fire alarms, students often sleep through them or ignore them because there are so many false alarms in student dormitories. For example, in a 2000 interview, the Rutgers University fire department chief said his department had chased down 107 malicious false alarms in the previous year.

According to FEMA and the US Fire Administration, the leading cause of school fires that result in fatalities is arson – 27%. The second leading cause of fatal fires is smoking – 18%. Most fatal fires occur between 1 a.m. and 4 a.m.

Cooking is the leading cause of fire-related injuries on college campuses; careless smoking and arson vie for the number two spot.

The Center for Campus Fire Safety lists four common factors in (serious) campus fires:

- lack of automatic fire sprinklers,
- disabled smoke alarms,
- careless disposal of smoking materials, and
- alcohol consumption (alcohol was a factor in more than 50% of fire fatalities).

Candles, cooking, and faulty electrical systems could be added to this list. Lack of education on fire safety, apathy, careless disregard for fire alarms, and the misuse of fire alarms all contribute to the loss of life and property on- and off-campus.

Fire prevention is a major effort on just about ev-

It is a common practice for residents to disable smoke detectors during cooking or parties and to forget to re-enable them. Today anyone can purchase an inexpensive detector that can be silenced by the resident with the simple touch of a button. The detector automatically resets itself in about fifteen minutes.

ery campus. Educating students and practicing fire drills are routine at most schools. Fire inspections and evacuation drills are often done several times during a school year.

Fire inspectors look for a variety of items and situations, such as extension cords more than six feet long, candles, incense, fireworks, flammable liquids, volatile liquids, non-UL approved halogen lamps, space heaters, cooking appliances (including hot plates and microwave ovens), ceiling fans, posters affixed to ceilings, dimmer switches, overloaded electrical outlets, obstructed smoke and heat detection devices, disconnected smoke or heat detectors or those with weak or missing batteries (flame and smoke detectors are usually hard wired, but may contain a backup battery), impaired fire doors, and blocked ways of egress. Fire retardant items are required in many residential buildings, including carpeting, wall coverings, dormitory furniture, and mattresses.

In some residential halls limited cooking is permitted in designated areas, such as kitchens. Smoking might and we think should be prohibited in most if not all areas of student housing. Controlling cooking and smoking would go a long way towards reducing fire injuries, fatalities, and property loss. Education and responsive action to alarms are crucial to life safety, and automatic sprinkler systems are most effective at limiting fire spread and smoke, thereby saving lives and property. //

Mercury Remains a Hazard, cont'd from page 3

for influenza. It readily combines with carbon and organic compounds; one such combination is methylmercury, which is found naturally in soils. This form of organic mercury embeds in the tissues of most fish and other animals. Fish consumption is the principal exposure route for methylmercury poisoning in humans.

Mercury was used as an anti-fungal additive in latex paints until 1992, in Mercurochrome as an antiseptic for cuts (now treated mostly with Neosporin and Mycin), and in pesticides and biocides until 1994; it is still used in some disinfectants, antiseptics, diuretics, and preservatives. It is the principal ingredient in Thimerosal, which is a preservative in some vaccines.

The industrial safety threshold for mercury vapor is 0.05 milligrams of mercury per cubic meter of air, the level considered safe for 40 hours per week of exposure. Left alone in a room and exposed to air, mercury has a saturation concentration of 20 milligrams/M³ of air, much greater than the safety threshold, so it must be contained and controlled.

The metal, also known as “quicksilver,” is commonly found in school and commercial laboratories. Mercury may be found in chemistry, physics, bioscience, pharmacological, and medical laboratories. If properly handled in a well-ventilated laboratory, it is relatively safe.

It is often stored in glass jars or plastic or steel

containers. Aluminum and copper are not good choices because they will form an amalgamate with mercury. If mercury is stored in a glass or plastic container, which can break, the container should be placed in a secondary container, preferably one of steel.

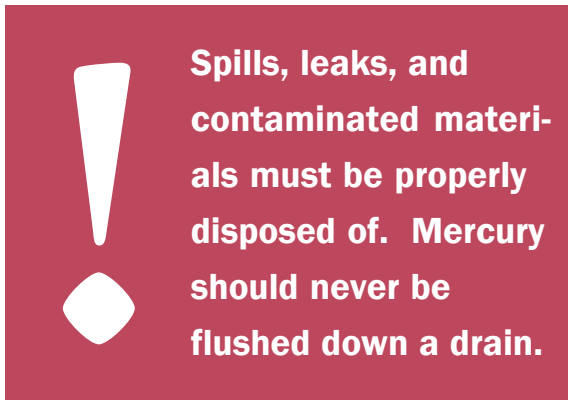
Accidental Spills and Disposal

The biggest danger in handling mercury comes from accidental spills. If mercury is spilled, it can disperse over a wide area thereby contaminating many square feet of surface and enabling it to evaporate quickly. Droplets of as little as 10 microns can be formed on a floor if the spill is stepped on. One milliliter of the metal can spread

over 6.4 sq. feet of floor. A spill of as little as 2½ tablespoons of mercury must be reported to the EPA.

Cleaning up mercury usually involves collecting as much of the liquid as possible, including all droplets. A steel, glass, or plastic tray may be used to collect spilled mercury. After most of the mercury is cleaned up manually, zinc dust can be sprinkled over the area to absorb the tiny beads that remain; sulfur is useless for this task.

If carpeting is contaminated, it must be removed. Furniture and wood surfaces, e.g., a wood floor, may have to be ripped-out and replaced. Decontamination experts will typically complete the decontamination of indoor facilities by heating the affected rooms to 80° F for at least two hours while venting the rooms to evaporate and evacuate



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residual mercury. Monitoring for air-borne contamination is conducted during the heating and venting process to ensure complete removal of the mercury. If the spill is outdoors, the contaminated soil must be removed.

Routine mercury residue on laboratory equipment can be cleaned up using nitric acid, syringes, or filter papers. The residue and cleanup materials should be disposed of in a waste container reserved for mercury products.

Mercury-filled thermometers are sometimes used in laboratory ovens, though they should not be. Digital temperature devices with fail-safe components are available for laboratory ovens. If the temperature is raised above the manufacturer's

specifications, the mercury instrument could break spilling the metal.

Mercury evaporates faster as the temperature increases, so this is a particularly dangerous release. Should this happen, the oven will have to be disposed of as hazardous waste. The laboratory is likely to be shut down for several days until it is established by a HazMat team that the room is safe.

Mercury is also dangerous when used in high-pressure systems because the release of the element will cause it to atomize and spread over large areas. To prevent this, all high-pressure connections should be thoroughly checked before mercury is presented.



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quickly extinguished by an automatic sprinkler system. In January 2006, a fire in a dormitory at the University of Hartford was suppressed by sprinklers after spreading the length of the attic. The fire started in a clothes dryer duct in the laundry room. Sprinklers extinguished a fourth floor fire at Birnkrant Residential College, a dormitory at the University of Southern California, in April 2005. Clothing draped over a lamp was determined to be the cause of that fire. Draping clothing over lamps is a common but dangerous practice in student dormitories and apartments.

Once installed, sprinkler systems require periodic maintenance, flushing, and testing (alarms, flow tests, etc.), especially in dormitories where system abuse is widespread. Proper design can minimize abuse and tampering; this is commonly done through concealment and employing tamper-

resistant sprinklers and tamper alarms. Damaged or impaired systems need immediate attention, and such work should not be put off until the next scheduled maintenance. In one study conducted in the mid 1990s of more than 5,000 fires, 40 percent of the sprinklers failed primarily because of poor or no maintenance.

A good maintenance system will include flushing the system periodically to reduce microbial contamination within the pipes. If there is a discharge of water from a sprinkler head, accidental or otherwise, the area will have to be wet-vacuumed and dried. It should be assumed that the water holds microbes, such as fungi or mold, and that disinfecting the effected areas is necessary unless testing indicates otherwise. //



Mercury Remains a Hazard, cont'd from page 7

Although once a common practice, laboratory persons should not dump mercury into drains. The EPA prohibits the disposal of mercury in this way. Disposal in drains causes environmental damage. Plumbers are at risk when they have to use a torch to free pipe joints in drains that are leaking, not knowing that the trap contains mercury. The heating vaporizes the trapped mercury and exposes the plumber to dangerous mercury fumes.

Other Criteria

If possible, substitutes for mercury should be used. This is usually feasible for thermometers (alcohol-filled or digital thermometers are good alternatives), laboratory bubblers (use oil instead of mercury), and reducing agents (safe agents can be used in

place of mercury amalgams). Mercury bubblers should only be used with a vertical exhaust tube to prevent splashing and always under a vented fume hood.

Mercury is incompatible with many substances, including ammonia, ethylene oxide, halogens, nitrates, sulfur, oxygen, chlorates, acetylene, calcium, metal oxides, and many other substances, as well as some metals such as aluminum, iron, lead, lithium, and copper. Mercury will destroy jewelry, so keep it away from gold and silver – remove such jewelry before working with mercury. Material safety data sheets (MSDS), available from suppliers, provide a more comprehensive list of incompatible elements and substances. //

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