

Labor Occupational Health Program  
Institute of Industrial Relations  
University of California  
Berkeley, CA 94720

8 2



# Cleaning Up: Health and Safety for Drycleaners

Non-Profit Org.  
U.S. Postage  
**PAID**  
Berkeley, CA  
Permit No. 1

## HEAT

Drycleaning plants are often very hot and humid. The constant heat causes certain changes in exposed workers. Heartbeat rate, blood pressure, and perspiration rate increase. These changes are signs that the body is being stressed, and may lead to fatigue, lowered alertness, dehydration, and a decline in physical strength. Excessive heat can also cause heat rash, cramps, heat exhaustion, and in extreme cases, heat stroke.

A study performed by S.H. Snook in 1974 showed that workers were slowed down due to increased fatigue by up to 20% their usual rate by heat in their workplace. A.K. Mortagy performed another study of 108 people working under 3 different temperatures for 6 different lengths of time. They found that fatigue was highest and performance lowest when workers went for a long time without a break in the hottest temperatures. This was especially true for young workers.

## HOW TO BEAT THE HEAT

Engineering methods are the best way to control temperature. Ideal temperatures for doing light but active industrial work are 60° to 67°F. Drycleaners have successfully used air conditioning, ventilation, dehumidifiers, and insulation of machinery to beat the heat. Some have placed exhaust hoods directly over sources of moisture to lower humidity.

Administrative controls and good work practices are also important in hot workplaces. Drycleaning workers should have a cool place to take breaks and water fountains should be available. In very hot environments, workers may have to consult their doctor about replacement of body salts lost through perspiration. And if work clothing is provided, it should be comfortable in high temperatures.

## NOISE

Working 8 hours a day in a noisy plant can be annoying and frustrating. Noise interferes with the ability to communicate with other workers. Noise that is loud enough to drown out a co-worker's warning can contribute to accidents. Like heat, noise is also a stressor and has been linked to diseases of the circulatory and digestive systems.

OSHA has set 90 decibels (db) as the maximum amount of noise workers can be exposed to in an 8 hour day. But government research has shown that 85 db would be much healthier, because one out of every five workers suffers hearing loss at 90 db.

## HOW MUCH IS TOO MUCH?

You've been exposed to too much noise if:

- you can't hear a co-worker shouting an arm's length away
- your ears ring after work
- you have to turn the TV or radio up much louder than usual after work
- family and friends notice you've started to have trouble hearing
- you notice other workers at your plant seem hard of hearing

## WHAT TO DO IF THERE'S TOO MUCH RACKET

To adequately protect your hearing, workplace noise levels should be checked regularly, and your hearing checked annually.

If you think noise levels in your plant may be over the legal limit, an OSHA industrial hygienist can be called in to measure decibel levels with special instruments. Workers can also measure noise levels if equipped with the proper instruments. You or a co-worker have a legal right to accompany the OSHA Compliance Officer during inspections, and can make him or her aware of other hazards at this time.

Employers can bring down the noise level with engineering and administrative controls. Noise dampening acoustical materials can be installed in the noisiest areas. Enclosures can quiet down the noisiest of machines. Equipment should be maintained regularly, and moveable parts lubricated and replaced when necessary.

Workers can be rotated in and out of noisy areas, and should work as far away from loud machines as possible. Frequent rest breaks in quiet areas can relieve some of the stressful effects of noise. If these are impossible, workers may have to wear ear plugs or muffs as a last resort.

## HERE'S TO YOUR HEALTH

Drycleaning workers provide an important service to consumers. But it has been shown in this pamphlet that this work can be hazardous to your health. It needn't be. Comprehensive medical exams can help you monitor your health. And you can take an active part in making sure your workplace stays safe and healthy:

1. Workers in many industries have had great success by forming health and safety committees. You can join together with co-workers in your plant or union to watchdog these hazards and get them corrected.
2. If a health and safety inspection seems necessary in your plant, call or write to your local OSHA office. Inspection requests are kept confidential under the law. In Northern California OSHA headquarters is at 455 Golden Gate Ave., SF, CA 94102, (415) 557-1946. In other areas check the phone book under U.S. government or state government listings.
3. For a free detailed safety checklist for drycleaning plants, send for the HEALTH AND SAFETY GUIDE FOR LAUNDRIES AND DRYCLEANERS published by the Office of Technical Publications, National Institute for Occupational Safety and Health, Post Office Building, Cincinnati, Ohio, 45202. Ask for publication #75-151.
4. If fire seems to be a hazard at your workplace, write for a special fire prevention booklet for drycleaners put out by the National Fire Protection Association, 470 Atlantic Ave., Boston, MA 02210. It costs \$2.50.

## — written by Jo Molloy

"This material has been funded in whole or in part with Federal funds from the U.S. Department of Labor under grant number EMFOD305. Individuals undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement. Therefore, these materials do not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government."

---

## ALL ABOUT TRICHLOROETHYLENE:

---

**Also Known As:**  
Trichloroethane,  
ethinyl trichlor-  
ide, Trilene, Tri-  
chloran, Treth-  
ylene, TCE

### Health Effects:

Trichloroethylene is usually used as a heavy-duty spot remover after other solvents have failed. But it also has more severe health effects than other solvents.

Skin contact can cause irritation.

Inhalation causes mild irritation to the nose, throat and sinuses.

Inhalation over a long period of time can cause cramps, loss of coordination, and intolerance to alcohol. It can cause blindness.

Trichloroethylene has been shown to cause damage to the kidneys, and liver, and to the digestive and the cardiovascular system.\*

Trichloroethylene can be absorbed right through the skin with the same harmful effects.

Exposure to very high levels can cause intoxication, vomiting, and even death.

When heated, it releases gases which can cause lung damage.

ERRATA: Note typographical error. Trichloroethane should read trichloroethene.

### What Do The Studies Show?

Trichloroethylene has been found to cause liver cancer in mice.

In an NCI study of 330 drycleaners exposed to trichloroethylene, perchloroethylene, and carbon tetrachloride for an average of 13 years, they were found to have an increased rate of deaths due to cancer of the lung, cervix, uteri, skin, blood and liver.

Trichloroethylene has also been connected with birth defects in children whose mothers were exposed during pregnancy.

\*The cardiovascular system includes the heart and the blood vessels.

---

## ALL ABOUT FREON 113: 1977 TLV 1000 ppm

---

**Also Known As:**  
Refrigerant 113,  
fluorocarbon 113,  
TCTFE

### Health Effects:

Skin contact can cause a rash due to drying out of the skin.

Inhalation can cause mild irritation of the nose, throat and sinus passages. Inhalation also affects the central nervous system, causing drowsiness, dizziness, nausea, and loss of coordination.

### What Do The Studies Show?

Freon 113 is considered to be safer than most solvents. Its TLV was set at a level considered to be good hygiene for substances of low toxicity.

---

## ALL ABOUT STODDARD SOLVENT: 1977 TLV 100 ppm

---

**Also Known As:**  
white spirits,  
safety solvent,  
varnoline

### Health Effects:

Stoddard solvent has effects similar to "perc."

Skin contact can cause drying and cracking of skin.

Inhalation can irritate the nose and throat.

Inhalation can also cause damage to the central nervous system.

Extremely high levels of Stoddard solvent can cause unconsciousness and even death.

### What Do The Studies Show?

A study of drycleaners exposed to Stoddard solvent over a number of years found them to have a higher incidence of nerve disorders than drycleaners who had never used the solvent.

---

## HOW TO SOLVE THE SOLVENT PROBLEM:

The best way to keep solvent vapors down is to recycle them with engineering devices, called "sniffers." Installed on old or new tumblers, "sniffers" can promote health while doubling solvent mileage. Drycleaners who have installed them find they pay for themselves.

Employers should install proper ventilation that supplies and exhausts air at frequent intervals so solvent vapors don't build up. If this is not possible and levels are high, respirators may have to be worn. But since wearing a respirator in a hot environment can be uncomfortable, engineering controls are recommended. And workers should always remember to keep their heads out of the cleaning machines while removing clothes.

Annual medical exams are also an important safeguard against long-term illness. It's important to make your doctor aware of the type of work you do and the substances to which you're exposed, so special blood and urine tests can be included in your check-up.

In case of emergencies such as solvent spills, the plant should be evacuated immediately. Those workers who clean up the spill should wait to re-enter the plant until it has been properly ventilated and tested to insure solvent levels are low. Wearing respirators would be an added precaution.

## OTHER HAZARDS OF DRYCLEANING

Solvents are not the only health hazard faced by drycleaners. Excessive heat and noise present in many shops can also have serious effects on the health of exposed workers.

To many people, the drycleaner is a magician. The spot that could ruin a dress or suit has somehow disappeared by the time we get back the familiar plastic-enclosed clothing. But it's solvents, not a magic wand, that provide the cleaning action. Most solvents can pose a serious hazard to drycleaners' health. And the work environment is often hot, noisy and badly ventilated. But by taking a few simple precautions, drycleaners can make their plant a healthy and safe place in which to work.

## HISTORY UNFOLDS

Drycleaning first began in France in the mid-1800's, where it was all done in small plants by hand. After the invention of special machinery, the industry grew. Today, 225,000 workers are employed in some 26,000 drycleaning establishments. Most of these workers are women and minorities. Mom-and-Pop shops are common, but some wholesale processing plants employ up to 80-100 people. The Laundry and Drycleaners International Union of the AFL-CIO has locals in 29 cities. Many work as pressers, and those that work directly with the cleaning process must be licensed.

Drycleaning is literally a process of cleaning fabrics without water. The fabrics are placed in a revolving washer where they are cleaned with special soaps and cleansing solvents. They are then rinsed with pure solvent, spun to remove most of the fluid, and dried in a warm air tumbler. If stubborn stains remain, a heavy-duty spot-removing solvent is applied directly onto the material by hand. Delicate fabrics are processed by hand from start-to-finish.

During the industry's early days, cleaners often went out on strike over oppressively hot, noisy, and dangerous conditions. At that time use of flammable solvents made fire a constant threat. Today, heat and noise are still present, although the problem of fire has been reduced through use of nonflammable solvents. But in replacing the more flammable solvents such as petroleum naphtha with others such as tetrachloroethylene, other hazards were created.

## THE HAZARDS OF DRYCLEANING

Solvents are the most serious danger in the drycleaning operation. Their vapors can be absorbed into the air at a rapid rate. A spill or machine leak can release dangerous concentrations into the work atmosphere. Solvent vapors are irritating to the eyes and sinus passages. When inhaled they can cause dizziness, slowed reflexes, and feelings of drunkenness. Prolonged skin contact can cause drying, cracking, and reddening. And if a person is exposed long enough, solvents can have toxic effects on the liver and kidneys.

The most commonly used solvent in drycleaning is tetrachloroethylene, also known as perchloroethylene or "perc." Stoddard solvent and Freon 113 are also used, and trichloroethylene is often used as a spot remover. These go by different brand names but the chemical names are often listed on the label.

The Occupational Safety and Health Administration (OSHA) has set maximum air exposure levels or "threshold limit values" (TLVs), for these solvents. Workers should not be exposed to higher than 100 ppm\* of perc, Stoddard solvent, or trichloroethylene, or to more than 1000 ppm of Freon 113. Yet OSHA inspectors have often found air concentrations in drycleaning plants to be much higher than these

levels. And scientists have found that even at these legal limits, long-term exposure can cause serious health problems for drycleaning workers. (See chart below)

\* Just what is a "ppm"? It stands for "parts per million." If you had a haystack with exactly one million pieces of hay in it, and one of those pieces was green, you'd have one green part per million. So 100 ppm of Stoddard solvent means out of a million parts of air, 100 of them are Stoddard solvent vapor. These limits are averaged over an 8-hour workday. You can be exposed to the limit for 8 hours. Or you can be exposed to even higher concentrations so long as the 8-hour average stays within the limit.

---

## ALL ABOUT TETRACHLOROETHYLENE: 1977 TLV 100 ppm

---

### Also Known As:

Perchloroethylene, Perc, Nema, Tetracap, Tetropil, Perclene, Akilos-tin, Didakene

### Health Effects:

Skin contact can cause burning, drying and cracking.

Inhalation can cause irritation of the eyes, nose and throat. The face and neck may get flushed.

Workers have also experienced headaches, drowsiness, slurred speech, and dizziness from inhalation of perc. These are signs that the central nervous system\* is being effected. Long-term exposure to perc can cause permanent damage to the central nervous system. Signs of this damage include problems with vision and memory, numbness of the hands and feet, and loss of coordination.

Perc can also cause permanent liver damage.

### What Do The Studies Show?

Despite the fact that 70% of drycleaning establishments use perc, it is one of the most hazardous solvents.

In human experiments, exposure to the legal limit of 100 ppm for 7 hours resulted in mild irritation of the eyes, nose and throat. Flushing of the face and neck, headache, drowsiness, and slurred speech also occurred.

A European study of workers exposed to just 35 ppm of perc for an average of 12 years showed a 68% higher rate of kidney disorders.

The National Cancer Institute (NCI) found in animal tests that perc vapors caused high rates of liver cancer and central nervous system damage. In an NCI study of 330 drycleaners exposed to perchloroethylene, trichloroethylene, and carbon tetrachloride for an average of 13 years, they were found to have an increased rate of deaths due to cancer of the lung, cervix, uteri, skin, blood and liver.

Perc has been shown in one case study to cause liver damage in an infant whose nursing mother was exposed to perc for 1 hour a day.

\*The central nervous system includes the brain and the spinal cord.