CAUSATIVE AGENT: CLEANING AGENTS
LUNG IRRITANT, LUNG SENSITIZER, SKIN IRRITANT, SKIN ALLERGEN

DEFINITION
Chemicals used for cleaning, degreasing and disinfection; workers may be exposed by inhalation or skin absorption; exposure may lead to lung irritation or sensitization (i.e. allergy) as well as skin irritation or allergy.

HEALTH EFFECTS
- Allergic contact dermatitis: an allergic reaction of the skin triggered by exposure to a chemical allergen
- Irritant contact dermatitis: a skin rash triggered by over-exposure to water, solvents, friction or contact with irritating substances (e.g. soaps, detergents)
- Occupational asthma: asthma (i.e. airway obstruction) or the exacerbation of pre-existing asthma resulting from an exposure in the workplace
- Cancer resulting from exposure to carcinogenic compounds
- Other health effects (e.g. dizziness, headaches, nosebleeds)

EXAMPLES
- Degreasers (i.e. used to remove grease and dirt from parts, equipment, tools, surfaces and materials)
- Detergent
- Wax
- All-purpose cleaner
- Bathroom cleaner
- Bleach
- Optical brightener
- Disinfectant
- Carpet cleaner
- Floor cleaner
- Glass cleaner
- Oven cleaner
- Tile cleaner
- Sanitizer
- Air freshener
- Antiseptic
- Bactericide

KEY COMPOUNDS
Review cleaning products’ Safety Data Sheets to identify the presence of these compounds. Follow the appropriate precautionary measures.

- Acids (e.g. acetic, citric, decanoic, hydrochloric, octanoic, oxalic, peracetic, phosphoric, sulfuric)
  - Strong inorganic acid mists such as sulfuric acid, are classified by the International Agency for Research on Cancer (IARC) as Group 1 carcinogens
- Aldehydes (e.g. formaldehyde, glutaraldehyde)
  - Formaldehyde is classified as an IARC Group 1 carcinogen
- Alkaline agents (e.g. ammonium hydroxide, sodium hydroxide, carbonates, ethanolamine compounds, monoethanolamine, silicates)
  - Diethanolamine is classified as an IARC Group 1 carcinogen
- Ammonia
- Amyl acetate
- Bleach (e.g. sodium hypochlorite)
- Chlorine-releasing compounds (e.g. chloramine)
- Diazolidinyl urea
- Complexing agents [e.g. ethylene diamine triethylene tetramine (EDTA), nitrilotriacetic (NTA) acid]
  - Nitrilotriacetic acid and its salts are classified as IARC Group 2B carcinogens
- Aldehydes (e.g. formaldehyde, glutaraldehyde)
- Ammonia
- Ammonium hydroxide
- Carbonates
- Ethanolamine compounds
- Monoethanolamine
- Silicates
- Acids (e.g. acetic, citric, decanoic, hydrochloric, octanoic, oxalic, peracetic, phosphoric, sulfuric)
- Aldehydes (e.g. formaldehyde, glutaraldehyde)
- Formaldehyde is classified as an IARC Group 1 carcinogen
- Alkaline agents (e.g. ammonium hydroxide, sodium hydroxide, carbonates, ethanolamine compounds, monoethanolamine, silicates)
- Diethanolamine is classified as an IARC Group 1 carcinogen
- Fragrance
- Hydrogen peroxide
- Isothiazolinones [e.g. benzisothiazolinone (BIT)]
- Quaternary ammonium compounds (e.g. benzalkonium chloride)
- Toluene
- Trichloroethylene
  - Classified as an IARC Group 1 carcinogen

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SECTORS
Agriculture, industrial manufacturing, service.

JOBS
Agriculture
Abattoir worker, animal handler, barn worker, cleaner/custodian, dairy farmer, greenhouse worker, grounds keeper, nursery worker, poultry farm worker

Industrial Manufacturing
Cleaner/custodian, cleaning product formulator, food/beverage processor, galvanizer, leather/animal hides and skin processors, metal workers, pesticide production

Service
aesthetician, animal groomer, artist, automobile mechanic, baker, barber, bartender, butcher, carpet cleaner, caterer, cleaner/custodian, cook, dishwasher, dry cleaner, embalmer, fish monger, fitness centre worker (e.g. personal trainer), floor polisher, garage worker, hairdresser, homemaker, hotel housekeeper, kitchen porter, launderer, massage therapist, nail salon technician, painter, pet groomer, pool cleaner/service technician, swimming instructor, retail associate

OTHER CONSIDERATIONS
Even workers with little or no exposure to irritants can develop hand dermatitis as a result of prolonged friction associated with manual work.

HOW COMMON ARE THE HEALTH EFFECTS?
15% of dermatitis cases reported by food manufacturers in the UK are attributed to detergents and solvents. Antiseptics and disinfectants account for 26.3% of allergens affecting food processing workers.

KEY PREVENTION STRATEGIES

Substitution
• Use products with fewer sensitizers and irritants such as certified “green cleaners” (i.e. products that are nontoxic in their undiluted form, non-corrosive, non-carcinogenic, and do not contain heavy metals or ingredients that can cause lung or skin effects)
• Use products that can be poured and wiped, rather than sprayed

Engineering Controls
• Increase ventilation (i.e. open windows and/or doors after cleaning products have been used for approx. 1 hour; improve local or general ventilation systems)
• Use tools to prevent direct contact with cleaning agents or surfaces that have been treated

Administrative Controls
• Follow manufacturers’ directions (i.e. dilution ratio of cleaning solution to water)
• Avoid mixing products
• Use the lowest needed concentration or amount
• Clean work areas when they are least occupied (i.e. after regular working hours)
• Train employees on good housekeeping practices (i.e. wet sweeping or vacuuming)

Personal Protective Equipment
• Use appropriate respirator and gloves (consult manufacturer)
• Avoid gloves made from natural rubber latex (if necessary, use low-protein and powder-free styles)
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SOURCES

Bauer, A., 2013. Contact dermatitis in the cleaning industry. Current Opinion in Allergy and Clinical Immunology 13, 521–524.


