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# Fire Safety and Emergency Response to Fires and Explosions

## 4.1 Introduction

Research laboratories differ from other work environments in that they usually contain a variety of fire hazards. In addition to the ‘ordinary’ (Class A) fires, those fueled by wood, paper and textiles; hazards include the presence of flammable and volatile solvents such as petroleum distillates that are not miscible with water; reactive metals such as sodium and potassium; flammable metal powders such as magnesium, titanium, and zirconium; metal hydrides such as lithium hydride, lithium aluminum hydride and sodium borohydride; as well as many kinds of electrical equipment.

Complications arise when fighting these fires because each type of fire must be fought with the extinguishing agent and procedure appropriate for it; the use of the wrong technique or extinguisher can be catastrophic. EH&S has simplified fire-fighting in the laboratories by recommending laboratories be equipped with multi-purpose (ABC) dry chemical fire or CO<sub>2</sub> type extinguishers, which can be used on all types of fires with the exception of reactive flammable metals (which must use extinguishers suitable for the particular metal). Laboratory workers must be trained in the RACE and PASS procedures outlined below. Annual fire drills reinforce this training. Fire extinguishers are inspected monthly and tested annually. If a fire extinguisher in any laboratory, chemical storeroom, or nearby location requires inspection or recharging, call Facilities Operations at CUMC (212)305-7367 or EH&S at Morningside (212)854-8749 to replace. A monthly inspection of the fire extinguisher pressure gauge by laboratory personnel is strongly recommended as a further safeguard to ensure the extinguisher is properly charged.

Before attempting to extinguish, the fire must first be judged as being controllable by laboratory personnel. This depends on the judgment of the person making the decision and the factors involved: the size, intensity of the fire, the nature of the burning material, proximity of other flammable or explosive materials, availability of escape routes, availability of proper fire-fighting equipment, and the safety of personnel in the area.

## 4.2 Classification of Fires

Should the nature and size of the fire make it controllable, use the appropriate available extinguisher and proceed with the methods described below. Should the fire be judged “uncontrollable”, follow the “Evacuation Procedures for Uncontrollable Fires”. In all cases, call Public Safety at (212)854-5555 (Morningside) or (212)305-7979 (CUMC) to report the incident. Public Safety can, along with notifying emergency responders, direct emergency responders quickly to your location.

**CLASS A.** (Wood, paper, textiles, rubber). The ABC extinguisher can extinguish this type of fire.

**CLASS B.** (Flammable or combustible liquids, greases, petroleum products, solvents) Carbon dioxide or dry chemical ABC extinguishers should be used. Carbon dioxide extinguishers do not leave any residue, whereas dry chemical devices do. Pressurized water units should not be used since the immiscibility of solvents and water may result in spreading of the fire.

**CLASS C.** (Live electrical equipment involved in a fire). If possible, turn off the electrical power to the devices, and then use either the dry chemical extinguisher or a carbon dioxide or halon extinguisher, if available.

**CLASS D.** (Sodium, potassium, magnesium, titanium, zirconium and other metals) If sodium, potassium, magnesium, or any other flammable metal powders are to be used in a laboratory, call EH&S for guidance on the appropriate dry powder-extinguishing agent. A specific "Class D" (dry powder) extinguishing agent such as graphite, limestone, sand or sodium carbonate must be made available for fire emergency before work is started.

DO NOT USE pressurized water, carbon dioxide, dry chemical or halon extinguishers on metal or organometallic fires. The use of these extinguishers may introduce substances that are very reactive with the burning metal that may either make the fire grow or trigger an explosion. For more details recommendations on safely handling or fighting fires with pyrophoric materials, see the EH&S bulletin [Safe Use of Pyrophoric Reagents](#).

### **4.3 Race and Pass**

**IF YOU DISCOVER A FIRE – REMEMBER:**

**RACE and PASS**

**R** - RESCUE /REMOVE anyone in immediate danger  
**A** - Activate the Manual Fire ALARM  
**C** - CONFINE the fire (close the door)  
**E** - EXTINGUISH small controllable fires/or EVACUATE

**P** - PULL the pin  
**A** - AIM the nozzle at the base of the fire  
**S** - SQUEEZE handle  
**S** – SWEEP from side to side

### **4.4 Fire Emergency Procedures**

4.4.1 – Extinguishing a person engulfed in flames:

- If a person's clothing is on fire, he/she must not be allowed to run, as this will fan the flames and cause a more serious burn. **Remember! STOP, DROP and ROLL.** Clothing fires must be extinguished immediately, before anything else is done, in order to minimize skin burns. Try not to use your hands for they will also burn
- Roll the person on the floor if necessary.
- Wrap him/her in a fire blanket, coat or whatever is available to smother the flames. Put the person under a shower or use an extinguisher, or whatever is available to smother the flames.

- After calling the emergency numbers, place clean, wet, ice-packed cloths on small burned areas. Wrap the person warmly to avoid shock, and secure medical assistance.

#### 4.4.2 - Evacuation Procedures for Uncontrollable Fires

- Leave the area of danger. **DO NOT** stay to fight a large fire. Rescue anyone in immediate danger. On your way out, if it can be done safely, turn off equipment and move any explosive or flammable materials away from possible contact with hot surfaces or other sources of ignition. Using the laboratory circuit breaker or Emergency Power Off switch (EPO) is often the quickest and most effective way to turn off all laboratory electrical equipment simultaneously. For this reason, the circuit breaker or EPO must always be readily accessible. Your safe exit, however, must be given the highest priority.
- Transmit the fire alarm by pulling the alarm box in the hallway, notify personnel on the floor and call the Public Safety Office ((212)854-5555 at MS or (212)305-7979 at CUMC).
- Leave by means of one of the predetermined evacuation routes for your laboratory area. If possible, confine the fire by closing doors as you leave. Evacuate promptly and meet outside the building away from the entrance at a pre-determined place. Conduct an attendance/person count of workers and make sure all are accounted for. If not, notify the Fire Department immediately.

#### **Remember! RACE**

**Rescue**

**Alarm**

**Confine**

**Evacuate/Extinguish**

#### 4.4.3 - Fire-fighting Procedures for Controllable Fires

- For all fires, the fire alarm must be transmitted immediately to ensure Fire Department response.
- The decision of whether to fight the fire oneself or to wait for fire-fighting help must be made according to the type and size of the fire, its location and the circumstances of the fire. A small fire in a container may be easily snuffed out by the placement of a nonflammable cover across the container opening. A small fire in an area free of other fuels can be extinguished with appropriate available extinguishers before calling for help. When extinguishing a burning solid, direct the extinguisher discharge at the base of the flame; in the case of burning liquids, direct it at the leading edge. Larger or rapidly growing fires are best left to the Fire Department.
- To extinguish a minor fire with an extinguisher:

#### **Remember! PASS**

**Pull Pin**

**Aim nozzle at base of fire**

**Squeeze handle**

**Sweep from side to side**

- In the case of an occurrence of any fire, the fire must be reported to the Public Safety Office ((212)854-5555 at MS or (212)305-7979 at CUMC).
- If your extinguisher needs to be replaced, call Facilities Operations at CUMC (212)305-7367 or EHS at Morningside (212)854-8749.

**Remember! – If you *pull the pin, call it in!***

#### 4.4.4 – Emergency Procedures for Fires Caused by Explosions

- Immediately transmit the building alarm.
- Alert and evacuate all personnel in the immediate area.
- Close all doors leading to the affected area and secure area until Public Safety or other personnel arrive to evaluate the situation. Do not attempt to re-enter the space.
- Call Public Safety ((212)854-5555 at MS or (212)305-7979 at CUMC) and EH&S ((212)854-8749 at MS and (212)305-6780 at CUMC) for instructions. Be prepared to give the chemical name, location (building and room), and any other pertinent information.
- Attend to any persons contaminated by chemicals by removing contaminated clothing, and when feasible, flush the affected body area with water. A [University Accident Form](#) should be completed.
- At CUMC refer the employee to Workforce Health and Safety located on Harkness Pavilion One South (212)305-7580 during working hours, and at all other times, to the NYPH Emergency Room. Affected students are to report to Student Health Services located on 60 Haven Avenue (telephone (212)795-4181).
- At Morningside refer the employee to Student Health Service located at John Jay Hall during working hours, and at all other times, to the Saint Luke's Hospital Emergency Room.
- Have a person knowledgeable of the incident and laboratory available to provide information to emergency personnel, including the SDS.