



Property Risk Consulting Guidelines

XL Risk Consulting

A Publication of AXA XL Risk Consulting

PRC.9.11.1

FIRE PROTECTION FOR LABORATORIES USING CHEMICALS

INTRODUCTION

National Fire Protection Association (NFPA) documents describe a level of fire protection agreed on by persons representing a variety of interests. The guidance in these documents does not reflect unique conditions or special considerations, such as system performance under adverse or unusual conditions. Nor does NFPA guidance reflect the increased system reliability that AXA XL Risk Consulting recommends for high valued properties.

This AXA XL Risk Consulting Guideline states AXA XL Risk Consulting's position on provisions of NFPA 45 because AXA XL Risk Consulting believes they require clarification or changes. To understand AXA XL Risk Consulting's position, this AXA XL Risk Consulting Guideline must be read with a copy of NFPA 45. The provisions of the NFPA document are not repeated.

POSITION

General

Apply NFPA 45 as modified by guidance in this AXA XL Risk Consulting Guideline to any laboratory containing more than ½ gal of flammable or combustible liquids per 100 ft² (2 L per 10 m²) or more than a total of 74 standard ft³ (2.1 m³) of flammable gas. In addition:

- Apply NFPA 30 to pilot plants and laboratories that are primarily manufacturing plants.
- Apply NFPA 801 to laboratories handling radioactive materials.
- Apply NFPA 495 to laboratories handling explosives.
- Apply NFPA 318 to laboratories handling pyrophoric gases.

Properly label all storage cabinets, storage spaces or other storage locations in the laboratory.

Fire Protection

Install automatic fire protection throughout all laboratory hoods and duct systems. See also [PRC.2.3.2](#). Provide sprinkler systems designed per NFPA 13 in all laboratory as follows:

- For Class A laboratory units, Extra Hazard Group 1
- For Class B laboratory units, Ordinary Hazard Group 2
- For Class C laboratory units, Ordinary Hazard Group 2
- For Class D laboratory units, Ordinary Hazard Group 1

Since the interiors of hoods and ducts are shielded from the extinguishing systems provided for the rest of the lab, an independent means of handling duct or hood fires is needed.

Provide a UL certificated central station signaling system, proprietary signaling system, or a combination of the two, installed in accordance with NFPA 72 and PRC.11.1.1.0 to monitor the following in the laboratory units.

- Sprinkler system waterflow
- Extinguishing system discharge
- Manual fire alarm stations
- Automatic fire alarms (smoke, heat, or optical flame detectors)
- All fire protection valves of 2½ in. (65 mm) or larger
- Low building temperature
- Intrusion detection

Contract in writing for monthly testing and routine and emergency maintenance of the system.

Building Construction

Use explosion-resistant construction when used in conjunction with explosion-relieving construction

Flexible exhaust ducts shall not be used. They have little resistance to fire or heat. Failure of these ducts will cut off exhaust allowing chemical fumes to collect. This may create a fire or explosion hazard. Plastic ducts should be constructed and protected per PRC.2.3.2.

Avoid the use of dampers in ductwork which would cause the accumulation of chemical vapors if shut.

DISCUSSION

The amounts of flammable and combustible liquids allowed in Class A laboratories exceed the limits of what should be considered ordinary hazard by NFPA 13.