Ducting

Systems and ductwork shall be designed to maintain negative pressure within all portions of the ductwork inside the building when the system is in operation.


Laboratory exhaust system ductwork shall comply with the appropriate sections of Sheet Metal and Air Conditioning Contractors’ National Association (SMACNA, 1985) standards.

Exhaust ductwork shall be fire- and corrosion-resistant and selected based on its resistance to the primary corrosive present. Exhaust system materials shall be noncombustible if perchloric acid or similar oxidizing agents that pose a fire or explosion hazard are used.

Refer to the campus architect’s and engineer’s design criteria for specific fume hood fan and motor requirements. Welded Type 316L stainless steel is often used, but may be attacked by some corrosive materials. Stainless steel is particularly inappropriate where vapors of hydrochloric acid will be present due to a chloride attack, or where vapors of nitric acid may be present. Galvanized steel coated inside and out with a 4 mL thick coating of polyvinyl chloride, or a corrosion-resistant epoxy coating, may be an acceptable material for fume exhaust ductwork; under certain circumstances, fiberglass-reinforced plastic (UL rated) may be used as an alternative. The campus ES&H organization can be consulted for advice on compatible materials.

ANSI Z9.5 5.3.1.2
8 CCR, 5154.1 (e)(7)
24 CCR, Part 4, 609.1
NFPA 45, Chapter 6-5.1
ASHRAE Handbook of Fundamentals, Ch. 32
ACGIH Industrial Ventilation: A Manual of Recommended Practice, Ch. 5
Exhaust ductwork joints shall be sealed to protect against a chemical attack.

Slope all horizontal ducting down towards the fume hood (recommended guideline: slope equals 1 inch to 10 feet).

Liquid pools and residue buildup that can result from condensation may create a hazardous condition if allowed to collect. In cases where dust or high concentrations of solids might accumulate, such accumulation within the duct system may be prevented by providing water spray nozzles in the duct at frequent intervals and sloping the duct down to an appropriate receptor (e.g., a wet dust collector).

UC Practice
ANSI Z9.5 5.3.1.

The exhaust ducting shall be grounded to dissipate any static electricity. Lengths of electrically conductive ductwork on both sides of a flex connection or other insulating section in the airflow path shall be electrically bonded and grounded.

UC Practice

Laboratory supply ventilation system ductwork shall not be internally insulated. Sound baffles or external acoustical insulation at the source should be used for noise control.

Fiberglass duct liner deteriorates with aging and sheds into the space resulting in indoor air quality (IAQ) complaints, adverse health effects, maintenance problems, and significant economic impact. Glass wool and refractory ceramic fibers are classified as possible carcinogens by the National Toxicology Program.

UC Practice
Occupational Exposure, Toxic Properties, and Work Practices Guidelines for Fiberglass
AIHA

Exhaust airflow volume shall be sufficient to keep the temperature in the duct below 400°F (205°C) under all foreseeable circumstances.
This includes the ignition of a flammable liquid spill that in turn requires an estimate of the maximum credible accident that would generate heat.

If variable air volume (VAV) laboratory chemical hoods are used, satisfying these criteria might require a heat sensor arrangement to signal the VAV controls system to increase the exhaust airflow. An alternative solution would be to provide a higher-temperature exhaust system design or a high-temperature combustion flue design for the portions of the exhaust system in which temperatures might exceed 400°F (205°C) in conjunction with NFPA 86?1999.

ANSI Z9.5 5.3.1.1