

**GENERAL:**

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This section provides the minimum standards for specification, design and installation of fume hoods in University Buildings. In University buildings fume hoods are used for one of three basic purposes: Teaching, Research, and Clinical Laboratories.

**DESIGN GUIDELINES:**

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1. Types of Fume Hoods
  - 1.1 Classroom Laboratories – Classroom Laboratories are limited to spaces with regularly scheduled classes where no research is taking place. These classroom spaces should be supervised by qualified instructors who are familiar with the hood operation and limitations.
  - 1.2 Research and Clinical Laboratories – All hoods other than classroom fall into this category. Within these laboratories there are at least the following sub categories:
    - 1.2.1 Standard Fume Hood
    - 1.2.2 Perchloric Acid Hood
    - 1.2.3 Acid Digestion Hoods
    - 1.2.4 Radiological Hoods
2. Ductless fume hoods are not allowed.
3. All fume hood systems will be designed according to ANSI Z9.5 and NFPA 45.
4. Fume Hoods shall be placed out of the direct traffic pattern and shall be located away from supply and exhaust diffusers. Fume hood shall be located at least one foot from the perpendicular wall.
5. Perchloric and radioactive systems will be completely separate from other exhaust systems.
6. Fume Hoods are to be certified and tested in accordance with ASHRAE Standard 110 latest version.
7. Variable Volume Hoods
  - 7.1 Variable Volume Hoods are the default design criteria for new and replacement applications for energy conservation purposes. No hood may be used in a variable air volume application unless specifically certified by the manufacturer for that use.
  - 7.2 All variable volume hoods shall be equipped with sash locks with alarms at 18” above the closed position. The sash lock may be released to raise the sash for

loading and cleaning the hood. Alarms may have a user override, but if the override is used, the alarm will sound again after 4 minutes.

- 7.3 All fume hoods shall have flow indicators with low flow alarms.
- 7.4 All fume hoods shall have presence sensor mounted on the front of the hood to reduce airflow from 100 fpm to 60 fpm when no one is standing within 2 feet of the hood.
- 7.5 Fume hood alarms, sensors, and controls shall be integral to the lab HVAC control system. Laboratory Controls shall be Phoenix. Antec has been approved on the UMKC campus.
- 7.6 VAV fume hood setup shall be as follows:
  - 7.6.1 The maintained face velocity shall be 100 FPM whenever the sash is at or between closed to 18" open (at sash lock).
  - 7.6.2 Where the hood requires a restricted bypass the restriction will be selected to allow bypass from full closed to the position where the minimum flow divided by the face area equals 100 FPM. This is usually somewhere around 4" open. From that point to the sash locks the flow rate shall vary to maintain 100 FPM face velocity. The maximum flow rate is the flow rate required to maintain 100 FPM at a sash height of 18". If the sash locks are released and the sash is raised further, the face velocity will decrease.
- 7.7 Constant Volume Hoods
  - 7.7.1 Constant Volume Hoods, where used, shall be of the low flow (60FPM face velocity or less) design or standard bypass fume hoods.
  - 7.7.2 Constant Volume Hoods shall have the hood flow rate for 100 FPM at all positions from closed to 18" open. A sash restriction is to be installed at a sash height of 18" and the face velocity will be allowed to decrease above the 18" sash height.
  - 7.7.3 Constant Volume Hoods are only allowed in the following circumstances:
    - 7.7.3.1 Where no more than three hoods are to be installed in a building and sufficient diversity cannot be obtained to justify variable volume for the building. If the building is of sufficient size or use that additional hoods may be added in the future, then the building system shall be VAV.
    - 7.7.3.2 In existing buildings where spaces are converted to laboratory use from another use and there is an expectation of additional changes in the building, hoods shall be specified such that they can be converted to VAV when enough labs are completed to accommodate VAV systems. Generally, this will require a bypass type hood that can be converted to a restricted bypass type in the future. The designer shall verify the specified hood(s) can perform under both design conditions.

**REFERENCES**

- 230002 Bio-Containment Labs General
- 230003 General Chemistry Laboratories