

APPENDIX 4

DESIGN GUIDELINES FOR LABORATORY CONSTRUCTION AND RENOVATION PROJECTS

The following items are often overlooked in project documents submitted to EH&S for review. It is critical that the project design team assures that these issues are properly addressed in plan submittals and field inspections.

If deficiencies are discovered after projects are completed, the responsibility for correcting those problems will fall back on the design team, most likely at a higher cost for re-designing modifications.

Projects desiring variances from these guidelines will require advanced review and approval from EH&S.

If a project involves any laboratory or shop space, hazardous exhausts or fume hood ventilation (or associated HVAC impacts on other areas), storm sewer drains, chemical storage issues or the presence of any hazardous materials, asbestos, lead paint, radioactive materials, chemicals, gases, lasers, x-ray machines, petroleum tanks or generators, or other potential environmental or occupational hazards, the project design team or other parties responsible for the project must: a) solicit from the client and submit to the EH&S Environmental Compliance group (303-492-6025), a comprehensive hazardous materials inventory, using the template provided by EH&S (see *General Issues* and *Chemical and Gas Inventories*, below), which will be used to determine special design requirements; b) make sure the plan conforms with all applicable fire and building codes, and UCCS Construction Standards and Appendices including, but not limited to the following:

UCCS Standards:

Make sure the following UCCS Standard Sections and Appendices are incorporated into the Project Documents:

General Issues:

Review Project Documents and Drawings to make sure that all of the applicable UCCS Standards and items listed in this document are included.

Determine when "Special" Ventilation is needed, and if so, what type.

Occupied areas that have hazardous materials, chemicals and/or gases may require pre-project site

preparation for safe storage. Hazardous materials/waste must be properly managed and/or disposed

before site work begins. Furthermore, any hazardous waste generated by the project must be safely

managed and properly disposed by the contractors, with documentation, e.g., shipping manifests, provided to EH&S.

Project "Clients" must provide complete chemical/gas inventories for EH&S review using EH&S template; project designs must incorporate hazardous material requirements -

refer to *EH&S Guidelines for Chemical Use Areas*.

Building/Room Ventilation –

If a project's scope includes or will affect either supply or exhaust ventilation, the design team shall

verify if there are fume hoods or other special exhaust systems that could be affected. Notify EH&S of

any affected hoods, canopies, slot exhausts, etc. so that equipment can be re-certified for safe operation

prior to being placed back into service.

Project documents shall include UCCS Standard, Section 15240 – Mechanical Sound and Vibration Control to determine acoustical criteria for equipment and ductwork.

Chemical and Gas Inventories – UCCS Standard, Appendix #11

Contact the EH&S Environmental Compliance Group at 303-492-6025 for information concerning Inventory submittals and evaluations.

All Inventories require chemical and gas names, quantities, and locations of storage and use.

Fume Hoods – UCCS Standard, Sections 11610 and 15852

Hoods should be visually inspected prior to mechanical, electrical, or plumbing work to make sure they

meet UCCS design standards.

Include UCCS standard face velocity requirements in project documents and drawings.

Existing Fume Hoods:

Relocation -

- Hood owners/users shall complete a “Hazardous Work Area/Equipment Repair Form”, return the original to EH&S with a copy to the party responsible for the project, and post a copy on the fume hood for the Contractor.
- Hoods shall not contain any chemicals or chemical waste during relocation.
- Hoods shall meet current UCCS Standards or be brought up to current UCCS Standards prior to being placed back into service and certified for safe operation by EH&S.
- Hoods shall not be relocated less than 10 feet from any doorway.
- Projects are responsible for ensuring that hoods meet UCCS Standards for face velocity. Air supplies and exhausts for effected areas may require balancing.
- Balancing dampers at hood exhausts should be reviewed per Mechanical.

Disposal –

- Hood owners/users shall complete an “Equipment Disposal Form”, return the original to EH&S with a copy to the Party responsible for the project, and post a copy on the fume hood for the Contractor.
- Hoods shall not contain any chemicals or chemical waste at time of disposal.
- Interior room duct(s) that serviced disposed fume hood(s) should be removed and capped at the wall so lab /room occupants cannot access the ducts for unauthorized use.
- Projects are responsible for verifying if there are any other devices/equipment/hoods that are serviced by the same fan that serviced the disposed hood.
- Projects are responsible for notifying EH&S, so that remaining devices/equipment/hoods can be certified for safe operation at completion of the Project.

New Fume Hoods:

Cup Sinks - UCCS Standard, Sections 11610, 12348 and 15852

- If a User requests that a hood have a cup sink, the sink must have a minimum 3/8” raised edge around cup sink cut out, i.e., provide a 3/8” lip above work surface.

Hood Alarms - UCCS Standard, Sections 11610 and 15852

- Include Low Airflow Alarm and mount on front of hood.
- One 2-gang duplex, 20A, 125V receptacle shall be located on top of fume hood to accommodate air

flow alarm. A cover or strap should be secured over the receptacle so the alarm cannot be easily unplugged.

Hood Base Cabinets - UCCS Standard, Sections 11610, 12345, 12346 and 15852

- Include corrosive and/or flammable base cabinets below fume hoods based on submitted chemical/gas inventories. Additional chemical storage cabinets may be necessary to ensure proper chemical storage and segregation.
- Vent base cabinets separately using hard duct connections. Flex connectors or flexible duct materials are NOT acceptable.
- All materials used to vent flammable cabinets must have a flame spread rating of 25 or less.
- Flammable and corrosive cabinet exhausts must have maximum separation before mixing.
- Corrosive base cabinets should be vented through the hood work surface. Use manufacturer vent kits when available. If two corrosive base cabinets are used, vent both separately through hood work surface.
- All flammable cabinets must have self-closing door(s) unless a variance is granted by the Campus Fire Marshall. Flammable storage cabinets must meet all applicable NFPA standards.

Sash Stops -

- Include sash stop so that sash stops at approximately 18" above work surface. UCCS Standard, Sections 11610 and 15852

Open Bypass Hoods - UCCS Standard, Sections 11610 and 15852

- Depending on Manufacturer (i.e. Kewaunee), fume hood bypass may not be closed when sash is open to 14" above work surface.

Emergency Showers - UCCS Standard, Sections 12349 and 15440

- Units are required to meet current ANSI Z358.1 Standards.
- Water sources must be "potable". Verify sources using Cross Connection & Back Flow Prevention data.
- Activation levers for showers require a wall clip to hold handle against wall.
- Shower heads should be stainless or other material that will not break on impact.
- Showers shall be in accessible locations that require no more than 10 seconds to reach.
- Floor drains are required. Drain shall be plumbed to sanitary sewer drain.
- Be sure to address ADA issues.

Combination Emergency Shower & Eye/Face Wash - UCCS Standard, Sections 12349 and 15440

- Units are required to meet current ANSI Z358.1 Standards.
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- Water sources must be “potable”. Verify source using Cross Connection & Back Flow Prevention data.
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- Activation levers for shower require a wall clip to hold handles against wall or stand pipe of unit.
- Shower heads should be stainless or other material that will not break on impact.
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- Combination shower and eye/face wash unit shall be in accessible location that requires no more than 10 seconds to reach.
- Eye/Face wash units must be plumbed to drains using “hard connections” to drain pipes.
- Floor drains are required for showers. Drain shall be plumbed to sanitary sewer drain.
- Be sure to address ADA issues.

Emergency Eye/Face Wash - UCCS Standard, Sections 12349 and 15440

- Units are required to meet current ANSI Z358.1 Standards.
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- Water sources must be “potable”. Verify sources using Cross Connection & Back Flow Prevention data.
- Devices must be listed as an eye **and** face wash unit.
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- Hand held drench hoses or any unit that requires hand held operation to allow unit to continuously operate is **NOT permitted**.
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- Eye/Face wash units must be plumbed to drains using “hard connections” to drain pipes, unless they are faucet mount units.
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- Eye/Face wash units shall be located no more than 10 seconds to reach and must be in the same room where hazardous chemicals are used. For a strong acid or caustic, the eye/face wash unit shall be immediately adjacent or within 10 feet to the hazard.
- Be sure to address ADA issues.

New Laboratory Casework - UCCS Standard, Section 12348

- Laboratory tops – provide a minimum of 3/8” raised edge around cup sink cut outs, i.e. provide a 3/8” lip above work surface.

Hazardous Equipment –

- Lasers – contact EH&S Radiation Safety @ 303-492-2622

- X-Ray Machines contact EH&S Radiation Safety @303-492-2622

Storm Sewer Drains - There shall be no discharges to storm sewer drains without approval from EH&S. Basement floor drains are assumed to be connected to storm sewers unless specifically verified to the contrary.

Projects may be responsible for correcting or plugging illicit connections associated with their scope of work.

Storm drains and inlets must be protected from work activities to prevent accidental releases to the environment.