HVAC LAB

SPACE DESCRIPTION

The HVAC Lab is a dedicated space used to train students in the primary discipline of Heating, Ventilation and Air Conditioning technology. The HVAC Lab is a large industrial space with high ceilings, and flexible utilities to accommodate various machinery and systems. Lab space is typically arranged as a series of training equipment in rows. The variety of equipment varies widely in size, so a basic planning module does not exist. Classrooms, CAD Labs, and Storage rooms adjoin the HVAC Lab for ease of movement and agile instruction. The HVAC Lab requires direct access to a Mock House, which is frequently used in conjunction with the Building Construction Technology program. The layout shown is illustrative of basic concepts and spatial needs, but should be adjusted according to each campus' specific requirements. Typical student count in the lab is 12, with a maximum of 18 students, and space should be adjusted according to each campus' needs. The lab is illustrated as part of a larger "construction trades" lab – co-located with the Building Construction Technology Lab.

Depending on Service Area needs, the following programs may be served by the HVAC Lab:

- HVAC Technology
- Applied Sciences
- OSHA

As all programs in the AMEAS field quickly evolve and expand, so too, must the space they occupy. The Lab, the site, and all infrastructure shall be planned with flexibility and reconfiguration in mind. Buildings housing HVAC Labs are most successful when located at the rear of campus property, outside the common path of travel, and with area for future building additions.

Outdoor facilities should include an overhead door for movement of large equipment and a fenced service yard. The yard must provide space for Chillers, Fuel Oil Tanks and a 100lb LP Tank.

SUCCESS FACTORS

Safety: Due to the hazardous nature of this work, HVAC Labs must be designed with safety as a top priority. The Labs must be outfitted with safety equipment and must comply with all relevant safety regulations and standards. Walkways through the space should be clearly marked, and equipment should be properly located to prevent harm. Removeable guardrails may be considered to separate circulation and work areas.

Flexibility: The Lab shall be designed to allow movement of trainers and job boxes between the Lab and adjacent classrooms. Garage doors, open floor space, overhead utilities, and equipment on rollers all lend to a flexible space. Equipment will regularly be moved, changed, rearranged, and upgraded as technology and the type of teaching evolves.

Noise Control: HVAC Labs shall be designed to reduce noise levels, as they are loud spaces by nature and the sound quality is poor for instruction. Sound absorption shall be provided on wall and ceiling surfaces, and walls shall be constructed to reduce sound transmission to adjacent spaces. These spaces should be located away from acoustically sensitive spaces.

Utility Loads: When running, these labs create a significant load on the building utilities. The additional electrical, gas, water, exhaust, heating, and cooling needs should be considered early in the design process.

GENERAL

All perimeter walls shall be full height to deck.

ADJACENCIES

Separate but adjacent space is required for the following: **Mock House, HVAC Classrooms, Tool Crib, and HVAC Storage.**

Ideally, the HVAC Lab adjoins a Building Construction Technology Lab for shared use of the Mock House and cross-training between programs.

ACOUSTICS

HVAC Labs are naturally very loud spaces due to the activities in the space. Provide absorbent panels on walls and ceilings for noise reduction and to decrease sound transmission to adjacent spaces.

Where HVAC labs border acoustically sensitive spaces, exterior walls should have a minimum STC rating of 50.

MECHANICAL

Many HVAC labs use a large amount of functioning HVAC equipment for training. The training equipment thus creates a significant demands on the mechanical systems and infrastructure serving this area. A proper exhaust strategy should be coordinated with a utility distribution strategy as design driver to successfully arrange the space. Compressed Air, Gas, and Water are likely to be best distributed overhead to allow for reconfiguration. Distilled/ Reverse Osmosis water supply may be required. Verify specific needs on a project-by-project basis while planning for flexibility in the future.

- Provide plumbed natural gas to outside tanks. No tanks inside the Lab. Verify gases with the program.
- Provide a sink and emergency shower with eye wash in each Lab.
- Provide floor drains/ trench drains in locations as required for certain equipment.
- Provide a grease interceptor for the building.

ELECTRICAL & DATA

- Electrical power shall be provided in overhead bus bars to allow for future flexibility.
- High voltage service is required. Provide flexibility for 120/208V 3-Phase and 480/277V 3-Phase, standard. Verify required voltages with planned and future equipment.
- Provide twist-lock plugs for trainers, similar to Hubbell HBL2511 and HBL2513.
- Emergency shut-off switches are required.

Provide power and data at 6’ intervals along perimeter walls at locations which may be used for desktop computer workstations and/or lab equipment.

LIGHTING

- In high-bay areas, provide LED lighting in warm, soft white color.
- Task lighting is required at individual workstations.

TECHNOLOGY

All utilities shall be provided overhead, including Internet.

- Provide Wireless capability throughout FLEX Labs with Wireless Access device.
- Provide telephone service.
- Provide high-speed internet throughout, with each machine connected via CAT-6 cable from bus bar overhead (min. 13’ clear below). Depending on program, each machine may require its own IP address and tablet. Verify specific requirements.
- PSEP cameras are required at high security locations.
- Provide card reader/ key fob at entry doors.

ACCESSORIES AND EQUIPMENT

Equipment needs should be determined on a project-by-project basis while planning for flexibility in the future. The hands-on nature of this training requires specific machinery as a minimum:

- Provide guardrails with removable sections to define walkways. Removable sections allow for movement between spaces.
- 80-90% Furnaces w/ AC
- Trane units with dedicated electric supply
- 8’ x 20’ Walk-in Cooler with Condensers
- Ice machine with potable water supply and floor drain
- Sheet metal rollers
- Equipment on rollers for flexibility (trainers, job boxes)
- Dust recovery collector
- Air compressors
- Fire extinguishers
- Wall-mounted tack boards and marker boards

FURNITURE

Provide the following standard furnishings for FLEX Labs:

- Work benches and job boxes on rollers for flexibility and mobility.
- Stationary computer workstations with integral power and data connections.
- Wall shelving and storage racks on perimeter walls.

FINISHES

Ceilings

Recommended Height: 20’ clear with exposed structure for future reconfiguration of unistrut systems to support utilities. Provide acoustic panels for sound absorption.

Floors

Polished or sealed concrete slab (6” min. thickness). Verify specific needs on a project-by-project basis while planning for flexibility in the future.

DOORS AND WINDOWS

Overhead coiling doors for access and movement of equipment between HVAC Lab and HVAC Classrooms.

Overhead coiling doors for access to the Loading Dock. 10’W x 12’H, min.

FLEX Lab doors shall be minimum STC 30 with 6” x 30” Window Lite preferred.

Clerestory windows with E/W exposure, preferred. Place windows above 6’-0” high to reduce damage; or provide reinforced glazing/ window film.

HVAC STORAGE

SPACE DESCRIPTION

HVAC Storage is a separate space, adjacent to the HVAC Lab, for trainers and equipment storage. For flexibility and ease of movement, equipment shall be on rollers for transfer between spaces. Consider the path of travel of equipment as it moves in and out of this space.

Provide overhead coiling doors for direct access to the HVAC Lab.

TOOL CRIB

SPACE DESCRIPTION

Directly adjacent to the HVAC Lab, the Tool Crib provides a secure location for the storage of tools and supplies. The crib should be secured by walls, or guardrail with locked gate, and PSEP camera coverage.

Additional equipment includes tool chests, shelves and cabinets as determined by the program.

Provide double doors with key fob access or locked gate.