



This is an internal document developed by the Department of Environmental Health and Safety (EHS) to facilitate review, by EHS and Facilities Planning staff, of renovation and new laboratory facility at KSU. We believe this checklist is consistent with BOR policies, current standards, best practices, and government regulations. This checklist was developed to provide guidance and facilitate dialogue during the design phase, rather than prescribe requirements. The checklist is not exhaustive and can be augmented as necessary, based on project-specific conditions and needs.

FACILITY INFORMATION

Project Name			
Project Description			
Project Type	<input type="checkbox"/> New Construction	<input type="checkbox"/> Renovation	<input type="checkbox"/> Demolition
Review Phase	<input type="checkbox"/> Schematic	<input type="checkbox"/> Preliminary	<input type="checkbox"/> Working Drawings
	<input type="checkbox"/> Pre-Construction	<input type="checkbox"/> Final	
Project Manager		Tel:	
Project Start Date		Project End Date	

EHS

Name		Title	
Signature		Date	

Description	Reference	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	Notes
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LABORATORY VENTILATION & FUME HOODS

- | | | | |
|--|---|--|--|
| All laboratory spaces are mechanically ventilated with all lab rooms exhausting 100% to the outside – no recirculation of fume hood exhaust | <i>Prudent Practices</i> | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA | |
| No installation of ductless fume hood without prior review and approval by EHS on a case-by-case basis. | <i>ANSI Z9.5</i>
<i>Prudent Practice</i> | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA | |
| Fume hoods are UL certified and installing contractor has demonstrated proper operation of the fume hoods using ANSI/ASHRAE 110 test method before closeout. | BOR | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA | |
| Flexible local exhaust devices (“snorkels” or “elephant trunks”) designed to adequately control exposures to hazardous chemicals from lab equipment such as gas chromatographs, vacuum pumps, atomic absorption, or other equipment that can produce potentially hazardous air pollutants. | <i>ACGIH, Ventilation Manual</i> | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA | |
| Necessary acoustic treatment is provided to avoid excessive noise | <i>ANSI Z9.5 5.1.3</i> | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA | |



Renovation & New Project Review Checklist - Laboratory Building

levels in laboratories. Fume hood sound level at the sash does not exceed **63 dB**.

Prudent Practices

Fume hoods, and other laboratory exhaust ventilation are designed in accordance with ANSI/AIHA Z9.5, and ACGIH's *Industrial Ventilation: A Manual of Recommended Practice*.

ANSI/AIHA Z9.5
ACGIH's Ventilation
Manual

Yes No NA

Hoods are located away from doors or activities that may produce air currents or turbulence.

BOR
Prudent Practices

Yes No NA

Fume hoods are not be located adjacent to an emergency exit unless a second exit is provided.

BOR
NFPA 45,

Yes No NA

Fume hood superstructures are secured to countertop cabinet.

BOR

Yes No NA

Controls for the fume hood utilities - electrical, air, water, etc. are located external to the hood and easily accessible to users.

ANSI Z9.5
NFPA 45

Yes No NA

Fume hoods 5 feet or wider have service fixtures one on each side.

BOR

Yes No NA

Fume hood service fixtures are on a common vertical center line.

BOR

Yes No NA

Fume hood water service fixtures are located directly over cup sinks.

BOR

Yes No NA

Fume hood light fixture has twin lamps and is properly installed and secured.

BOR

Yes No NA

Fume hood light fixture has a switch on the hood face and works properly.

BOR

Yes No NA

Fume hood work surface is recessed at least 3/8 inch below the front edge, sides and back to contain spill.

ANSI Z9.5
BOR

Yes No NA

Fume hood airfoil is secured to hood structure.

BOR

Yes No NA

Fume hood baffles (if supplied) open and close from the hood exterior.

BOR

Yes No NA

Fume hood sash stops are installed and set at 18 inches from the work surface.

BOR

Yes No NA

Fume hood sashes move up and down easily and stay where stopped.

BOR

Yes No NA

Fume hood nameplate is provided, meeting criteria for perchloric acid hoods.

BOR

Yes No NA

Sufficient exhaust air is provided to assure the removal of hazardous airborne materials.

Prudent Practices

Yes No NA

Fume hoods are designed to provide average face velocity of **100 fpm** during normal operations, with sash open at 18" above work surface".

BOR

Yes No NA

Sufficient airflow velocity provided in each duct to prevent settlement of liquid, condensates and solids in the ducts.

ACGIH, Ventilation Manual

Yes No NA



Fume hoods are equipped with a both audible and visual flow alarms to alert users to high - and low exhaust flow.

BOR
ANSI Z9. 5
NFPA 45,

Yes No NA checkboxes

Fume hood low airflow alarm/indicators are working and properly calibrated.

BOR

Yes No NA checkboxes

The hood's low airflow alarm activates if exhaust airflow falls below 80 fpm.

BOR

Yes No NA checkboxes

Fume hood low airflow alarm activates when sash opening exceeds 18 inches.

BOR

Yes No NA checkboxes

Fume hood low airflow alarm audible signal is mutable during alarm sequence.

BOR

Yes No NA checkboxes

Laboratory hoods DO NOT have a user-controlled on/off switch. Exhaust fans shall run continuously without direct local control from laboratories.

ANSI Z9. 5
Prudent Practices.

Yes No NA checkboxes

Hoods are provided with user accessible emergency switch that allows the hood exhaust volume to be switched to a maximum exhaust airflow when necessary, e.g. in the event of a spill.

ANSI Z9.5
NFPA 45

Yes No NA checkboxes

Fume hoods have operating instructions/low airflow alarm instructions.

BOR
Prudent Practices

Yes No NA checkboxes

Fire dampers or fire sprinklers are not installed in chemical hood exhaust system manifolds.

ANSI Z9.5
NFPA 45

Yes No NA checkboxes

Fume hood exhaust fans will not be shut down automatically when a smoke-alert signal is detected in the supply air system.

NFPA 45

Yes No NA checkboxes

Provision(s) to initiate emergency notification and initiate the fume hoods emergency operation mode are in place.

NFPA 45

Yes No NA checkboxes

Losses of power will not change or affect any of the control system's set points, calibration settings, or emergency status - no need for manual intervention.

ANSI/Z9.5

Yes No NA checkboxes

Laboratories have fully integrated control system for temperature, ventilation rate and room pressurization.

Prudent Practices

Yes No NA checkboxes

Laboratories areas are negatively pressurized relative to the adjacent spaces.

BOR

Yes No NA checkboxes

Fume hood exhaust duct connections meet installation criteria and are secured.

BOR

Yes No NA checkboxes

Exhaust ductwork are fire and corrosion-resistant and selected based on resistance to the primary corrosive present.

ANSI Z9.5
NFPA 45,

Yes No NA checkboxes



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Exhaust from hoods used for teaching are routed to blowers different from those used to exhaust air from research labs.	<i>Prudent Practices</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Exhaust system ductwork IS NOT internally lined with fiberglass, mineral wool, foam or such material that can accumulate chemical deposits. Sound baffles or external acoustical insulation should be used for noise control.	<i>NFPA 45 Prudent Practices</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Hoods with exhaust streams that may contain flammable or explosive vapors at concentrations above the Lower Explosion Limit as well as those that might form explosive compounds (i.e., perchloric acid hood exhaust) are not connected to a centralized exhaust system.	<i>ANSI Z9.5</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Perchloric acid hoods have a connected, identified, working wash-down system.	<i>BOR</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Hoods are labeled to show the fan or ventilation system to which they are connected to.	<i>NFPA 45 Best Practice</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Hood duct connectors are labeled to identify the hood they serve.	<i>BOR NFPA 45</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Exhaust from lab does not pass un-ducted through other areas	<i>NFPA</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Fume hood ducting is properly connected to an exhaust fan (if not manifold).	<i>BOR</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Fume hood fan drive and motor units are properly guarded.	<i>BOR</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Fume hood exhaust fans are permanently identified as to the hoods they serve.	<i>BOR</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Fume hood exhaust stacks are oriented vertically and terminate at least 10 feet above the adjacent roof lines and air intakes.	<i>BOR ANSI Z9.5 5.3.5</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Each exhaust stack has a minimum discharge velocity of 3,000 fpm unless it's demonstrated that a specific design achieves the necessary dilution.	<i>BOR ANSI Z9.5 ASHRAE</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Exhaust duct dampers and valves are accessible for adjustment or service work. Exhaust fans are located and arranged so as to allow for periodic cleaning, inspection, repairs and maintenance.	<i>BOR ANSI Z9.5 NFPA 45</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Exhaust discharges are located away from supply air intakes and designed so as to prevent contaminated exhausts from being re-entrained into the building.	<i>ASHRAE ANSI Z9.5</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Wind engineering evaluations have been conducted to ensure that re-entrainment of exhaust will not occur, or that potentially hazardous exhaust will not impact nearby buildings.	<i>Prudent Practices</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA



Test and balance work has been completed, verifying proper installation before closeout. BOR Yes No NA

BIOLOGICAL SAFETY CABINETS

All biological safety cabinets (BSCs) meet the specifications of the most recent edition of the National Sanitation Standard 49 – Class II (Laminar Flow) Biological Cabinets. Best Practice Yes No NA

At a minimum, Class II A1 or Class II A2 BSCs are provided for biohazard work. CDC-NIH Yes No NA

Type II A BSCs are not "hard-ducted" into the building exhaust system. CDC-NIH BMBL Yes No NA

BSCs provided have at least 6 inches side and 18 inches top clearance. BOR Yes No NA

The BSCs located away from doors and high-traffic areas, and such that air supply diffusers do not affect airflow at the BSC face. BOR CDC-NIH BMBL Yes No NA

BSC wrappings are essentially left in place until dusty area work is completed. BOR Yes No NA

Required BSC service fixtures are installed and work properly. BOR Yes No NA

BSCs are certified by an accredited certifier. BOR Yes No NA

EMERGENCY EYEWASH & SAFETY SHOWERS

An emergency Eye-wash and Safety-shower is provided at all work areas where, during normal operations or emergencies situations, the body may come into contact with a hazardous substance. CFR 1910.151(c) Yes No NA

Emergency eyewash and safety shower comply with the requirements of ANSI/ISEA Z358.1-2009 "Emergency Eye Wash and Shower Equipment" ANSI/ISEA Z358.1 Yes No NA

Emergency eyewash facilities and safety showers are in unobstructed and accessible locations that require no more than 10 seconds for the injured person to reach along an unobstructed pathway. BOR ANSIZ358.1 Prudent Practices Yes No NA

Emergency eyewash/shower install to meet ADA accommodation - disabled person can access it within 10 seconds of an ADA fume hood BOR Yes No NA

Safety showers are located at least 4 feet from walls (preferably near a sink). BOR Yes No NA

No electrical apparatus, telephones, thermostats, or power outlets are NFPA 70 (NEC) Yes No NA



to be located within 18 inches of either side of the emergency shower or emergency eyewash facility.	<i>Prudent Practices</i>	
Safety shower heads are installed 4 inches below ceiling.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Safety shower valve rods or handles are within easy reach of deluge area.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Safety showers have an identified in-line shut-off valve	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Screen filters in water supply line (if installed by manufacturer) are removed.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Safety shower water flow is at least 20 gpm.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Safety shower water flow stops dripping within 1 minute of shut-off.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Safety shower signage is installed, visible from any direction.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewashes are plumbed into the cold water line at or near a major sink.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewashes have twin-stream nozzles, properly anchored to maintain position.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewash nozzle filters are not installed until water supply lines are flushed out.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewash water flow is at least 3 gpm.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewash water pressure is gentle (adjusted to criteria guideline).	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewash water stream is not blocked by cabinetry or other equipment.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewash valve handle remains on when activated.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Eyewash signage is installed, visible from any direction.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA

CHEMICAL STORAGE (STOCKROOMS)

Dedicated space(s) for storage of chemical with the appropriate ventilation and fire suppression is provided for?	BOR <i>Prudent practices</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Chemical storage rooms have an independent air supply.	BOR	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Storage rooms are located adjacent to the laboratories they support. with storage cabinet for flammable materials and vented cabinet for toxic and odorous materials.	<i>Prudent practices</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
Storage cabinets of flammable, corrosive, and toxic materials are provided and labeled	<i>Prudent practices</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA



- Flammables cabinets provided are UL or FM certified. BOR Yes No NA
- Flammables cabinets provided have positive latching, self-closing doors. BOR Yes No NA
- Flammables cabinets provided are not vented. Vent caps are in place. BOR Yes No NA
- Flammables cabinets provided have a retention basin for leak containment. BOR Yes No NA
- Corrosives cabinets provided are non-corroding and have spill containment. BOR Yes No NA

HAZARDOUS WASTE AND POLLUTION PREVENTION

- A dedicated central space for storage of hazardous waste (180/90 days accumulation) with the appropriate ventilation and fire protection is provided for? KSU Yes No NA
- Liquid effluent from labs is discharged through a central acid neutralization tank with monitoring system Best practice Yes No NA
- Lab sinks, drains and equivalent discharge points are connected to wastewater system and not storm water system CC-ordinance Yes No NA
- Lab countertops or lab sinks are separated with a ridge or lip to prevent hazardous or other regulated materials spilled on the countertops from draining into the sink. Best practice Yes No NA
- No unpolluted cooling water discharge, groundwater, roof or basement drainage is connected to the wastewater system. CC-Ordinance Yes No NA
- Appropriate spill containment is ensured for outdoor oil-filled electrical equipment (transformers). Transformer pad should be surrounded by gravel or other containment measures to prevent the lateral migration of oil from reaching a drainage inlet. CC-Ordinance Yes No NA

FIRE AND LIFE SAFETY

- Standpipes are provided for laboratory buildings with two or more stories above or below the grade level. NFPA 45 Yes No NA
- Automatic sprinkler system is provides per NFPA 13 NFPA 45 Yes No NA
- Portable fire extinguishers are provided for and appropriately distributed in accordance with NFPA 10. NFPA 10; NFPA 45 Yes No NA
- Cabinets and shelving are not located to impede sprinkler head water flow BOR Yes No NA



Emergency power back-up provided to fume hood for sensitive chemical and biological experiments.

Prudent practices

Yes No NA

Back-up exhaust fan power kicks in within 3 seconds of a manifold fan failure.

BOR

Yes No NA

All fire detection, alarm and communication systems are designed in accordance with appropriate NFPA and NEC requirements?

NFPA 45

Yes No NA

Panic hardware are installed on exit doors

NFPA 45;
NFPA 101

Yes No NA

Adequate illumination of "means of egress" and emergency lighting is provided. Use of tritium (or other radioactive material) emergency lighting is not allowed.

NFPA 45
NFPA 101

Yes No NA

Laboratory aisles are at least 4 feet in width.

BOR

Corridors/halls are wide enough to accommodate occupant traffic and potential art displays/exhibits, where necessary.

NFPA 101
Prudent practices

A dedicated space (at least 5ft x 5ft) for storage of emergency equipment is located on each lab floor (lab zone)

KSU
Prudent practices

Yes No NA

ELECTRICAL SAFETY

Adequate electrical receptors provided at an appropriate distribution in order to preclude future need for use of extension cords

Prudent Practices

Yes No NA

Receptacles of appropriate voltage and current ratings are provided for known equipment in order to avoid overloading.

NFPA 70
Prudent Practices

Yes No NA

Electrical receptacles, switches, and controls are located so as not to be subject to liquid spills.

NFPA 45

Yes No NA

Ground Fault Circuit Interrupter (GFCI) protection provided for convenience receptacles located within 6 feet of a sink or other wet location.

NFPA 70
BOR

Yes No NA

Panel circuits, including GFCI, are properly identified.

BOR

Yes No NA

Adequate clear space provided in front and to the sides of each electrical circuit breaker panel and equipment disconnect.

NFPA 70
Prudent Practices

Yes No NA

Circuit-breaker panels located outside the laboratory whenever possible.

Prudent Practices

Yes No NA

Each circuit-breaker panels has built-in lockout devices.

NFPA 70

Yes No NA



Prudent practices

Electrical power lines are not commingled in a cable tray with other utilities (e.g., electrical, gas, water, etc.). NFPA 70 Yes No NA

Electrical service fixtures of required types have proper covers. BOR Yes No NA

COMPRESSED GAS CYLINDERS & PRESSURE VESSEL

Compressed gas cylinder storage area is provided. BOR Yes No NA

Compressed gas storage area is provided with racks to adequately secure gas cylinders by chains, metal straps, or other approved materials, to prevent cylinders from falling or being knocked over. BOR NFPA 45 Yes No NA

Cylinder restraints sufficient to prevent the cylinder from tipping over. Prudent Practices NFPA 45 Yes No NA

Compressed gas cylinder closets have required venting. BOR Yes No NA

Vented gas cylinder closets have gas sensing devices and an alarm. BOR Yes No NA

Compressed gas supply lines are properly identified. BOR Yes No NA

SHIPPING RECEIVING AREAS (LOADING DOCKS)

The shipping/receiving area has proper vehicle clearance and access. KSU Yes No NA

Utility lines and pipes are appropriately protected from vehicular impact KSU Yes No NA

A telephone is installed in the receiving area KSU Yes No NA

The receiving area has adequate lighting? KSU NFPA 101 Yes No NA

Guard rails have been provided where necessary KSU Yes No NA

Shipping/receiving areas handling hazardous materials is equipped with fire extinguishers and an emergency eyewash and shower. Prudent Practices Yes No NA

Loading docks is designed to prevent the run-on of storm water and runoff of spills. - inward sloping, covered or use of berms/dikes KSU Prudent Practices Yes No NA

Plumbing

Water supply and drain connections are tested as correctly installed and working. BOR Yes No NA

Any plumbing leaks (water, drains, and gases) are repaired (all BOR Yes No NA



fixtures).

Water service fixtures have vacuum breakers and cut-off valves. BOR Yes No NA

Water service fixture valves turn on/off in required direction. BOR Yes No NA

Special water service installations have self-closing valves. BOR Yes No NA

Cup sinks have strainers secured in place. BOR Yes No NA

General

Laboratory wall, corner, and surface moldings are in place and secured. BOR Yes No NA

Laboratory aisles are at least 4 feet in width. BOR Yes No NA

Clear wall space at doors is at least 2 feet. BOR Yes No NA

Cabinets and shelving are not located to impede sprinkler head water flow. BOR Yes No NA

Air supply vents are not close to fume hoods and biosafety cabinets. BOR Yes No NA

Disability (ADA) design considerations are taken into account. BOR Yes No NA

Cabinet, countertop, and fume hood materials are appropriate for uses. BOR Yes No NA

Cabinetry meets the size criteria. BOR Yes No NA

Sliding doors have required stops. BOR Yes No NA

Reagent shelving is 5 feet from the floor. BOR Yes No NA

Reagent shelving has 1/2 -inch retaining lips. BOR Yes No NA

Doors and drawers do not stick when opened and closed. BOR Yes No NA

Panels are all in place and properly secured. BOR Yes No NA

Service fixtures are properly positioned and secured in place. BOR Yes No NA

Service fixtures, lab and fume hoods, are properly identified and color-coded. BOR Yes No NA

Comments:



Department of Environmental Health & Safety

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EOSMS-307-1

Date: 01/14/2014

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