

1.0 **GENERAL**

1.1 **Related UBC Guidelines & Documents**

- .1 All other Tech Guidelines as may be applicable to a given project.

1.2 **Related Documents External to UBC**

- .1 BC Fire Code and all references contained there within
- .2 BC Building Code and all references contained there within
- .3 Work Safe BC Occupational Health and Safety Regulation
- .4 Where the applicable regulatory codes do not reference applicable standards. The most relevant version of NFPA or other applicable standards shall be used as determined by the engineer. For example:
 - .1 NFPA 12 - Carbon Dioxide Fire Extinguishing Systems
 - .2 NFPA 45 - Design of Laboratories
 - .3 NFPA 2001 - Clean Agent Fire Extinguishing Systems

1.3 **Description**

- .1 The Guidelines apply to all work completed within buildings on both UBC Vancouver and UBC Okanagan campuses unless stated otherwise.
- .2 In instances where conflicts are found between these guidelines and provincial regulations or codes, please notify UBC Mechanical Engineer.
- .3 These guidelines are intended to be read by designers and their content integrated into construction drawings and specifications. Construction documents are not to reference the technical guidelines directly.
- .4 It is the requirement of the mechanical designer to coordinate these requirements with other disciplines.

1.4 **Design Review**

- .1 All projects are expected to submit their designs for review through the UBC Design Review Portal. The milestones that are expected to be submitted will vary by project and discipline. Please coordinate with your UBC Project Manager for specific instructions.
 - .1 The review process does not relieve the designers of the requirement to follow the technical guidelines as well as other pertinent codes, standards and best engineering practice.

2.0 **MATERIAL AND DESIGN REQUIREMENTS**

These are requirements specific to UBC that may not exist in code or other jurisdictions. Any deviation from these guidelines requires a variance be granted. Please see the variance application process at <https://www.technicalguidelines.ubc.ca/>.

2.1 **Design Requirements**

- .1 New and renovated facilities at UBC are to be fully sprinkler protected regardless of code requirements. UBC is largely self-insured and has adopted this policy to manage risk and

enhance the safety of its facilities to the benefit of faculty, staff, students, and visitors. Fire sprinkler protection at the University is consistent to standard industry practice. Deviations are intended to increase system longevity and provide flexibility for subsequent renovation.

- .2 For water supply information:
 - .1 This bullet and all sub-bullets for UBC-Vancouver, only: Contact UBC Energy and Water Services for water supply information.
- .3 All flows shall be designed with a 10% safety factor to provide capacity for future renovations including the possibility that some light hazard spaces may be re-classified to ordinary hazard in the future.
- .4 Fire pumps:
 - .1 This bullet and all sub-bullets for UBC-Vancouver, only: UBC Vancouver has higher water pressure than most parts of the city. As a result, fire pumps are often not required. Review all required pressures and avoid booster pumps when possible.
 - .2 Size fire pumps with 10% safety factor for future expansion.
- .5 Each building shall have a separate water service. No building shall be fed from another building.
- .6 For systems subject to freezing, UBC order of preference is:
 - .1 Dry heads
 - .2 Dry systems
 - .3 Anti-freeze systems. (only if the above can be demonstrated to be impractical – variance required)
- .7 Deluge systems & fire curtains
 - .1 UBC has had false release events of deluge systems in performance theaters which has caused significant damage.
 - .2 Fire curtains are preferred, but there is a recognition that they are not appropriate for all applications. Please engage UBC Fire and Life Safety Maintenance group when specifying either deluge or fire curtain systems.
- .8 Oxygen displacement systems
 - .1 Shall be avoided and only considered when required by the specific application.
 - .2 Where oxygen displacement systems are used, gases with low global warming potential (GWP) and zero ozone depleting potential (ODP) shall be utilized. For example:
 - .1 FM200 is not acceptable
 - .2 Novec1230, Intergen, CO2 are acceptable
- .9 Wet chemical systems
 - .1 Provide one manual control ULC listed operating station to NFPA17A.
- .10 *Fire Shutters*
 - .1 *Fire shutters require motor operators in both directions. Manual only fire shutters are not acceptable.*

2.2 Construction & Material Requirements

- .1 Access Requirements
 - .1 Installing valves such that they cannot be reached through an access panel is not acceptable.
 - .2 Access panels shall be installed wherever required to access valves, equipment, sensors, etc.
 - .3 Any equipment that requires regular access for maintenance shall not be located in a confined space.
 - .4 Access to piping chases shall be granted
 - .5 All manufacturer recommended clearances and service requirements shall be met.
 - .6 Where ladders exceed 16 feet in height or where there is a danger of a worker falling from the ladder to the ground level, roof or floor including an elevated access from a platform having less than 1.2 meters (48 inches) clearance between the ladder and any adjacent guardrail. The cage shall commence not more than 2.2 meters (7 ft.) above grade and continuing at least 90 centimeters (36 inches) above the top landing with openings to permit access by a worker to rest platforms or to the top landing.
- .2 All equipment shall be installed such that it is readily accessible. This includes but is not limited to:
 - .1 Piping installed above drop ceilings shall be within reach of an access panel located on the ceiling. Installing piping out of reach of any access panel shall be avoided. Installing valves such that they cannot be reached through an access panel is not acceptable.
 - .2 Appropriate access panels shall be installed.
 - .3 Any equipment that requires regular access for maintenance shall not be located in a confined space wherever avoidable.
 - .4 Access to piping chases shall be granted
 - .5 Consideration shall be given to accessing, servicing and replacing plumbing fixtures – particularly when they're mounted against tile.
 - .6 All manufacturer recommended clearances and service requirements shall be met.
 - .7 The designer shall include general notes pertaining to equipment access. If access is not adequate then projects will be responsible for granting adequate service access.
- .3 Whenever fire protection may be temporarily suspended, in buildings/facilities with Occupancy Permit, a Fire Watch must be called for which conforms to the requirements of UBC Building Operations. For details click on the following link:
 - .1 Vancouver Fire & Rescue Services. https://buildingoperations.ubc.ca/files/2017/05/I-B-41_AW_and_MF_Fire_Watch.pdf
- .4 Building fire alarm panels shall provide one set of form C contacts for monitoring of fire alarm system status by the BMS System.
- .5 Drains
 - .1 System drains shall be piped to floor drains, minimum size of 4"
 - .2 All low point drain valves shall be mounted at maximum 2m AFF and the associated piping shall allow for discharge into a floor drain.

- .3 The inspector's test valves and drum drip shall be readily accessible and secured to prevent tampering.
- .6 Standpipes
 - .1 Where standpipes are required and provided in the stair enclosure, the control valves and drains shall be secured from tampering/vandalism.
- .7 Compressors
 - .1 All Pre-Action System and Dry System compressors shall be dedicated to Life Safety and shall not serve any other purpose.
 - .2 All Pre-Action System and Dry System compressors shall be mounted using suitable vibration isolation, using flexible air line that is rated to a minimum of 1.5 times the maximum psi rating of the compressor and with at least 1m clear space above and on one side to allow for maintenance.
- .8 All control, test and drain valves shall have tags / labelling:
 - .1 Shall identify the type of valve and the area (floor or portion of the building) affected by the valve
 - .2 Shall indicate normally open / normally closed position
- .9 Pressure gauges;
 - .1 Provide a 3 ½" diameter pressure gauge with the appropriate scale at the main incoming water. Also, at each valve station, base of every riser, above and below alarm valves, before and after check valves, at any compressors or pumps, and at any pressure switches.
- .10 Sprinkler heads
 - .1 In the following areas, exposed sprinkler heads are prone to damage and require guards:
 - .1 Mechanical rooms
 - .2 Electrical rooms
 - .3 Storage rooms
 - .4 Stairways
 - .2 The contractor shall work with UBC to assure a stock of spare sprinklers is available in conformance with code requirements.
- .11 Fire department connections
 - .1 Plastic caps on fire department connections are not acceptable due to concerns of durability.
- .12 Use Teflon pipe tape, pipe dope is not acceptable.
- .13 Manufacturer of all equipment and materials shall have local technical personnel available for testing, maintenance and repair,
- .14 All dry pipe valves must have an external reset feature actuated by a reset knob.

- .15 *Exterior Fire Alarm Devices installation requirements:*
 - .1 *Bottom Entry.*
 - .2 *Weather Rated.*
 - .3 *Metal Shroud: Required to be mounted such that it does not interfere with operation or maintenance of FA device or adjacent equipment. Minimum of 6" vertical clearance from device and sized with a minimum 6" extension from the outermost edges of the FA device.*

2.3 Testing & Commissioning Requirements

- .1 Operate all test connections to verify water flow switch operation per NFPA standards.
 - .1 For wet systems, it should exceed NFPA standards and operate in 30 seconds.
 - .2 For dry systems, it should meet NFPA standards.
- .2 UBC Facilities – Fire and Life Safety Crew shall be invited to witness and participate in the Integrated System Testing whenever it is required per BCBC and CAN/ULC S1001.

2.4 Demolition Requirements

- .1 Decommissioned equipment shall be demolished and disposed of in accordance with applicable codes and standards. No equipment shall be abandoned.
- .2 Decommissioned piping located within mechanical rooms shall be demolished and cut back to the edge of the mechanical space, capped and clearly tagged. No piping shall be abandoned within mechanical rooms.
- .3 Decommissioned piping may be abandoned outside of mechanical rooms to the designer's judgement. Pipes which are likely to be obtrusive to future use of the space or maintenance should be demolished. Abandoned pipes are to be clearly labelled as such – at least once per room and more regularly as required.
- .4 All dead legs shall be capped and disconnected as close as possible to the active pipe. Valves shall not be considered acceptable isolation from a dead leg. The dead leg piping/equipment shall be demolished as per the requirements above.

3.0 LESSONS LEARNED & COMMON MISSES ON UBC PROJECTS

Items in this section are not specific requirements of UBC but are code or industry best practices which have been missed on past jobs. These items should be considered in mechanical designs at UBC. However, if they're not applicable then a variance is not required.

- .1 Space holder

END OF SECTION