1.0 **GENERAL**

1.1 **Related UBC Technical Guidelines**

- 1 00 01 Special Room Requirements
- 20 00 05 Mechanical - General Requirements
- 20 00 06 Meters
- 22 00 00 Plumbing (and all subsections)
- 23 21 05 District Hot Water Heating System
- 33 10 00 Water Utilities
- All other Tech Guidelines as may be applicable to a given project.

1.2 **Related Documents External to UBC**

- BC Plumbing Code and all references contained there within
- BC Building Code and all references contained there within
- Work Safe BC Occupational Health and Safety Regulation

1.3 **Description**

- The Guidelines apply to all work completed within UBC Vancouver Campus Buildings.
- In instances where conflicts are found between these guidelines and provincial regulations or codes, please notify UBC Mechanical Engineer.
- 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.
- It is the requirement of the mechanical designer to coordinate these requirements with other disciplines.

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.

2.1 **Design Requirements**

- Water entry station shall include, in this order:
  - 1 Wye-Strainer c/w blow off valve
  - 2 Neptune Water meter c/w turbine strainer as per 33 10 00 Water Utilities
  - 3 Backflow Preventers each sized at 50% flow for the building. Refer to 22 11 18 Backflow / Cross Connection Control for more details.
  - 4 Pressure reducing station complete with a normally closed by-pass, a low flow and where necessary a high flow pressure regulator. For many buildings, high pressure range regulators may need to be specified.
    - 1 Low flow shall be direct acting type with high pressure range.
    - 2 High Flow shall be an externally piloted type.

- All new and renewed buildings are to be connected to the district energy system. This system is to be the primary source of heat for hot water systems. Refer to section 23 21 05 for more details including energy transfer station piping arrangement.

- Bronze drain valves c/w cap and chain shall be specified at all low system low points.
.4 All janitor rooms shall have detergent dispensing systems installed. These require ¾” RPBP’s on DCW and DHW. Refer to 10 00 01 – Special Room Requirements for more information on janitor room requirements.

.5 For DHW recirculation systems, on all branches specify, ¼ turn ball valves, check valves and balancing valves (or auto flow valves) (lead free for all).

.6 In no situation is it acceptable to use a balancing valve as an isolation point (even if it has a memory stop). The reason for this is that when they’re used for isolation, they are frequently not returned to the same point and over time, system balancing is thrown off.

.7 Potable hot water tanks shall be maintained at no less than 50°C and no more than 60°C. Where potable water is stored in tanks, it cannot be stored at Legionella growth temperatures (25-45°C).

.8 The use of waste heat to preheat domestic hot water is encouraged where building mechanical designs are well suited to this. However, it’s not acceptable to have a pre-heat storage tank due to legionella concerns so this must be done using instantaneous heat on the DCW supply line, using a double wall heat exchanger.

.9 “Alternate water source system” means a system to collect, treat, and use non-potable water from alternate water sources in lieu of potable water.

.1 Experience at UBC indicates that a robust maintenance plan with dedicated funding source be in place to operate and maintain these systems effectively to achieve the benefits and address performance outcomes.

.2 UBC is committed to water conservation and alternative water source systems however these will only be permitted at UBC through variance application to ensure that the necessary stakeholder engagement is in place.

.1 Acceptable alternate water sources and collection systems:

.1 Rainwater collected from roofs or similar above-grade surfaces free from use and storage of vehicles, hazardous materials, fuels and fertilizers.

.2 Clear-water waste such as cooling water or condensate drainage from refrigeration, not including wastewater (greywater or blackwater) or storm water.

.2 Acceptable uses (subject to meeting applicable health and safety requirements and/or Canadian Water Quality Guidelines applicable to the specific use):

.1 Flushing of water closets, urinals and trap primers.

.2 Irrigation (non-food plants) using drip rather than spray systems.

.3 Equipment cooling water such as boiler make-up water or open-loop cooling of equipment.

.3 Systems that are in line with the CSA-B128.1 – Design and Installation of Non-Potable Water Systems, ARCSA Rainwater Harvesting Manual, CoV Building By-law 10908 (note that this is elective compliance as CoV Building Bylaws do not apply at UBC)

.4 As part of the variance process, additional conditions on design, regulatory requirements, testing and commissioning will be developed.
2.2 Construction and Material Requirements

.1 Acceptable piping systems (this section is a work in progress, please email andrew.porritt@ubc.ca to request updates – most industry standard, non-proprietary systems will be accepted)
   .1 Domestic Cold Water
      .1 Type K Copper (solder, grooved, pro-press or flanged)
      .2 Uponor (up to 2”)
      .3 Aquatherm
      .4 Stainless Steel (for express mains)
   .2 Domestic Hot Water
      .1 Type K Copper (solder, grooved, pro-press or flanged)
      .2 Uponor (up to 2”)
      .3 Aquatherm
   .3 Domestic Hot Water Recirc
      .1 Type K Copper (solder, grooved, pro-press or flanged)
      .2 Uponor (up to 2”)
      .3 Aquatherm

.2 Insulation:
   .1 Chilled water and condenser water piping shall have continuous vapour barrier complete with oversized hangers and ‘h-block’
   .2 Indoor piping
      .1 Insulation shall have paper wrap (even in existing mech rooms which have canvas)
      .2 Pre-formed PVC elbows
   .3 Outdoor piping
      .1 Insulation shall have continuous pvc wrap which is UV stable and sealed to prevent water ingress into the insulation.
      .2 Pre-formed, PVC elbows
      .4 Chilled and condenser water pump bodies shall be insulated with pre-formed foam (preferred) or closed cell adhesive foam.
      .5 Thickness and additional specifications by consulting engineer
   .3 Wafer style valves are not acceptable. All valves shall be capable of end of line isolation.

2.3 Testing and Commissioning Requirements

.1 UBC Building Official shall be invited to witness all tests that are required by code or the tech guidelines.

.2 BCPC 2.3.7.2 requires water pressure tests at the maximum in service pressure. At UBC this shall be deemed to be 125PSI (worst case if PRV fails). The system must maintain pressure without leaking for a minimum of 2 hours.

.3 For renovation projects, all new lines shall be flushed and pressure tested prior to connecting to the base building system.

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 Non-potable water system requirements as per CSA B128.1-06 (referenced in BCBC)
.1 All piping shall be marked with warning labels and shall be purple in colour or have a continuous purple stripe.

.2 All water outlets on non-potable systems shall have signage as described in the standard

.3 This may include lab sinks where zone protection is being used

***END OF SECTION***