1.0 GENERAL

1.1 Related UBC Guidelines & Documents

.1 Section 23 00 00 HVAC (and all subsections)
.2 Section 20 00 00 Mechanical - General Requirements
.3 Section 01 91 00 Commissioning Requirements
.4 Section 25 05 00 Building Management Systems (BMS) Design Guidelines
.5 All other Tech Guidelines as may be applicable to a given project.

1.2 Related Documents External to UBC

.1 BC Plumbing 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

1.3 Description

.1 The Guidelines apply to all work completed within UBC Vancouver Campus Buildings.
.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.

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

.1 Designs shall incorporate strategies for maximizing the delta-t of heating water across the building's mechanical systems. The maximum acceptable supply water temperature to the building heating system shall be 55°C with a preference for lower temperatures whenever possible. Refer to section 33 61 00 for maximum supply and return water temperatures to the district energy system on the primary side of the HEX. Select heat exchangers and system designs that can meet these requirements. Design strategies that may be employed to achieve the low return water temperature requirement include:
   .1 Selecting heating coils for large delta-t or using switchover coils.
   .2 Cascading perimeter heat in series with heating coils.
   .3 Heating water temperature reset.

.2 Controls design and specification shall comply with TG Section 25 05 00 – Building Management Systems Design Guidelines
Any system that utilizes large central air handlers to serve multiple zones shall include re-heat coils for all zones.

1. VAV box's shall have re-heat coils
2. Zones within displacement ventilation systems shall have re-heat coils

All perimeter air terminal units shall have heating coils (or re-heat coils)

Freezer farms, rooms that are specifically designated to hold multiple freezers have special design requirements.

1. Freezer farms shall have dedicated cooling equipment (such as fancoils or water to air heatpumps), it's not acceptable to have freezer farms drive the supply air temperature of large air systems (which would then require excessive re-heat in other zones).
2. Due to the amount of equipment located in freezer farms, accessing equipment above the ceiling can be challenging. Special care needs to be employed to ensure reliable equipment access.
3. Ensure that freezer farms are designed for future capacity. At the engineer’s discretion, it may be reasonable to assume that all available floor space is filled with freezers comparable to the units being installed at the time of design.
4. Depending on the quantity and nature of the equipment, consider installing parallel cooling equipment.
5. If the room cannot be sufficiently cooled (to prevent equipment trip) by jamming the door open then make sure that the ac equipment (and all associated central infrastructure) is on emergency power.
6. Freezers associated with research should be on emergency power
7. Floor mounted cooling units should be considered for these space for the ease of service access.

Window mounted air conditioners and exhaust fans are not acceptable.

Open ceilings generally make maintenance easier than drywall or t-bar. Work with the architect to install open ceilings in spaces such as communication closets, freezer farms, back of house prep areas, hallways, research labs.

1. Many of UBC’s clientele (especially in the Science departments) prefer utility and flexibility over aesthetics. Consider the wide use of open ceilings when it has service or future flexibility benefits.

All mechanical equipment that is related to temperature control, equipment that that requires scheduling, or any item that requires remote monitoring shall be connected to BMS.

Refer to Section 20 00 30 Indoor Thermal Environment and I-B-53 Energy Policy for Classrooms for thermal design criteria. Some key points are:

1. 2.5% summer design condition at UBC shall be 30°C DB/ 23°C WB based on projected 2050s hourly weather files.
2. Many spaces including learning spaces shall be designed for indoor temperatures of 25°C.
3. Where possible use natural ventilation and passive principles to cool offices and transient spaces.
4. Refer to the following for detailed design guidance:
UBC's Climate Action Plan (CAP) has set a target of 100% reduction in GHG emissions below 2007 levels by 2050. In support of this plan, natural gas shall not be used as the primary heating source in new and replacement air handling and space heating equipment, including but not limited to rooftop units, unit heaters, space heaters, etc. Natural gas may be used as a backup heating source at the unit where required to ensure heating requirements can be met.

2.2 Testing and Commissioning Requirements

.1 Any project which is modifying the central building system or installing new central infrastructure that will affect multiple spaces shall hire a Commissioning Authority (CxP). Refer to section 01 91 00 for more information. Some examples where this would apply are:
   .1 Chiller replacement
   .2 Boiler replacement where the piping has significant modifications
   .3 Installation of manifolded fumehood exhaust system
   .4 Full floor renovations
   .5 Any project with a moderate mechanical scope or controls scope. If unsure, ask UBC Building Operations Mechanical Engineer

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 Displacement ventilation systems are not suitable in many office environments where they may blow under desks or be affected by moving furniture. Displacement ventilation systems also provide limited options for modifications (ie increasing/decreasing supply air temp) if comfort requirements aren’t being met.

***END OF SECTION***