1.1 **GENERAL**

1.2 Related SFU Technical Requirements

   .1 *Section 20 00 05 Mechanical - General Requirements*
   .2 *Section 22 05 00 Plumbing - General Requirements*
   .3 *Section 25 05 00 Building Management Systems (BMS) Design Guidelines*

1.3 Coordination Requirements

   .1 SFU Facilities
   .2 SFU IT

1.4 Description

   .1 SFU Owners’ Technical Requirements for HVAC design specification details.

1.5 HVAC System Shutdown

   .1 All system shutdowns have to be coordinated with SFU Facilities. Refer to SFU Standards and Procedures Manual – HVAC System Shutdown Scheduling.

2.1 **MATERIALS AND DESIGN STANDARDS**

2.2 Submission of Design Philosophy

   .1 The Mechanical Consultant shall submit to SFU Facilities a design philosophy for the proposed building mechanical and plumbing systems.

   .2 Submit to SFU Facilities a design philosophy for the proposed building HVAC systems. Major components of the philosophy must be accepted in principle by SFU Facilities before the project can proceed to Construction. Consultants are expected to produce designs that meet user needs and allow SFU Facilities to continue to meet those needs in the future in a safe efficient manner.

2.3 Performance Standards

   .1 The HVAC design shall comply with the following:
       .1 BC Building Code and its latest bulletin / addendums.
       .2 SFU Owners’ Technical Requirements.

2.4 General Requirements

   .1 For all equipment design safe access for servicing and replacement including anchor points for lifting.

   .2 Use air systems in combination with perimeter radiation. Perimeter radiation shall be capable of being operated independent of the air system (see *Section 25 05 00*). Perimeter radiation must be capable of supplying building skin loss.

   .3 Avoid use of ceiling radiant panels unless approved by SFU Facilities Mechanical Department.

   .4 Avoid all air systems.
.5 See Section 25 05 00 Building Management Systems (BMS) Design Guidelines for additional control system requirements.

.6 Zone mechanical systems by intended occupancy, separate interior and exterior zones.

.7 Provided reheat coils in each interior zone.

.8 All air handling units shall have heating or preheat coils even if building load indicate that one is not required.

.9 Proposed fan volume control schemes based on building static pressure must have prior approval from SFU Facilities.

.10 Do not specify variable pitch in motion fans.

.11 Design all air handling units with minimum 15% spare volumetric and static pressure capacity.

.12 Refer to Division 27, Section 27 05 05 Communication Rooms Design Guidelines environmental/ventilation requirements.

.13 Filters must meet project requirements and where applicable, conform to SFU standard filter sizes (coordinate with SFU Facilities).

.14 Specialty requirements will be needed for lab environments as needed.

.15 Air filters provided for use in Fan Coil Units adhere to the following:
   
   .1 Filters for use in Fan Coil Units shall be a nominal trade size such as 12” x 24” x 1” and have an efficiency rating of MERV 8 or better.

.16 Buildings with no air conditioning shall have circulation air increased by minimum of 25% or have sufficient air volume and temperature to meet BC Safety Authority requirements for continuous occupancy with respect to maximum space temperature.

.17 Radiant heating panels shall not face windows. Design installation of radiant heating panels so that heater radiates energy to the intended target.

.18 Ensure sufficient air mixing within the occupied space on VAV systems under all operating conditions.

.19 VAV systems shall have reheat coils at all VAV boxes.

.20 Window mounted air conditioners and exhaust fans are not acceptable, except for temporary buildings.

.21 All exhaust ductwork within the building occupied floors/areas shall be under negative pressure.

.22 Specify separate ventilation systems for Mechanical Rooms.

.23 Do not specify sidewall supply registers for classroom applications.

.24 Controls specifications shall meet SFU Owners’ Technical Requirements. Overall responsibility of Mechanical system design and necessary controls shall be
Mechanical Consultants responsibility.

.25 Provide minimum of 8 air changes per hour (ACH) for all laboratories during occupied hours and, where possible, an unoccupied nighttime setback to 4 ACH. Laboratories designed with 4 ACH unoccupied nighttime setback must have adequate motion detection to override nighttime setback conditions when occupied, as well as adequate VAV supply and exhaust control. Alternate proposals to be reviewed with SFU Facilities and approved by SFU Safety & Risk Services – Environmental Health and Research Safety.

.26 Return and supply fans requiring volumetric tracking shall have same type devices for volume control and measurement, i.e. inlet dampers must be only used with inlet dampers, VFD’s with VFD’s etc.

.27 If fume hood exhaust systems are located in mechanical penthouses they shall be located in separate self-contained area within the Mechanical Penthouse.

.28 Specify lockable isolation valves (lug style) on all equipment and all branches of heating and chilled water distribution systems.

.29 Design installation of all equipment that may have to be removed from service for repairs while remainder of system remains in service.

2.5 Air Outlets and Inlets

.1 Do not specify balancing dampers at the face of air outlets and inlets. Locate balancing dampers sufficient distance into the ductwork to maintain acceptable sound level within the conditioned space. (NC 30 or less)

.2 Co-ordinate with architectural discipline.

2.6 Outside Air Intake Louvers

.1 Locate outside air intake louvers as far away as practical from all sources of contamination; avoid locating intakes at loading docks, fume hood exhausts, generator exhausts. Outside air intake louvers are not to be located on roof tops where fume hood exhausts are located.

.2 Locate outside air intake louvers as high as possible above grade.

.3 Where below grade intakes are unavoidable install bird/debris screen on outside of the louvers.

2.7 Tests

.1 Insulate or conceal work only after testing.

.2 Piping

.1 General: maintain test pressure without loss for 48hr unless otherwise specified.

.2 Hydraulically test steam and hydronic piping systems at 1-1/2 times system operating pressure.

.3 Test natural gas systems to latest edition of CAN-B149.1 and requirements of authorities having jurisdiction.
.4 Test fuel oil systems to latest edition of CSA B139, CSA B139S1 and authorities having jurisdiction.

.5 Test drainage, waste and vent piping to B.C. Building Code.

.6 Test domestic hot, cold and recirculation water piping at 1-1/2 times system operating pressure.

.7 Provide x-ray testing of 3% of the welds in steam piping 2 ½ Dia. or larger.

2.8 Painting

.1 Refer to Section 09 90 00 Painting and Coating.

.2 Specify at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.

***END OF SECTION***