1.1 GENERAL

1.2 Related Technical Requirements

.1 Division 11, Section 11 53 13 Fume Hoods, especially regarding the restriction concerning operable windows in labs to maintain negative pressure at the fume hood.

.2 Division 20, Section 20 00 08 Mechanical Identification for the details for fume hood labelling requirements.

1.3 Coordination Requirements

.1 Coordinate with SFU Facilities and SFU Environmental Health & Safety of Safety and Risk Services.

.2 Coordinate with other design disciplines, architectural and structural.

.3 Division 11, Section 11 53 13 Fume Hoods, for design and commissioning requirements for fume hood systems.

2.1 MATERIALS AND DESIGN REQUIREMENTS

2.2 General

.1 Where the fume hood exhaust duct static pressure may exceed 4” of WC, provide passive make up air openings in building structure or design all elements of building envelope (including roofs and skylights) for an additional structural load that may be imposed on the building due high negative pressure created by fume hood exhaust fans and a coincident combination of wind and snow loads.

.2 Proposals for fume hood supply and exhaust air systems must meet Worksafe BC standard, and be approved by both SFU Facilities and SFU Environmental Health and Research Safety; prior to commencement of detailed design.

.3 Ducts from fume hoods shall proceed to the roof of the building in as direct a route as possible for discharge above the re-circulation cavity boundary of the structure.

.4 Where multiple fume hoods are manifolded together; an induction type fan system with direct drive is required.

.5 System shall be Engineered in such a way that no leakage of fume hood exhaust occurs in the Mechanical Room or other interior spaces.

.6 See Section 11 53 13 Fume Hoods, for design and face velocity requirements for fume hoods.

.7 Radio isotope cabinets to be on separate fans, not connected to other systems or other RI cabinets.

.8 Where fume hood fans are contained within mechanical penthouses, pressurize the penthouse with supply air from the building rather than from outside to avoid the possibility of drawing exhaust air into the service space and to provide flushing of contaminants if a minor duct leak occurs.

.9 Induction type fans are generally required otherwise a separate isolated fan room dedicated only to fume hoods shall be designed.
.10 Supply and install hasps and padlocks on all fume hood cabinet sashes to allow for locking out.

.11 Fume hood cabinet numbering shall be coordinated with exhaust fan serving it, exhaust fan motor control center or starter and room number. Provide cross labeling at fume hood, motor control center and exhaust fan.

2.3 Design Requirements

.1 All fume hoods and exhaust systems shall conform to Part 30 Laboratories, of the Occupational Health and Safety (OHS) Regulation under the inspection jurisdiction of WorkSafeBC and the latest edition for CSA-Z-316.5 Fume Hoods and Associated Exhaust Systems and show evidence of being performance tested in accordance with ASHRAE 110, Method of Testing Performance of Laboratory Fume Hoods.

.2 Fume hoods should be specified with face velocities within the range of 100 - 120 fpm.

.3 Fume hood cross draft shall be less than 50% of the face velocity of the hood as per ANSI Z9.5 Section 6.1.2.3.

.4 Horizontal ducts shall be kept to a minimum and shall be graded up in direction of air flow.

.5 Duct work shall be resistant to the types of chemicals to be used or generated in the fume hood. Stainless steel is not to be used for Perchloric acid or hydrochloric acid, fume hood systems. A more resistant material such as CPVC must be used instead.

.6 The need for installing scrubbers for Perchloric acid or similar use fume hood systems is to be reviewed with SFU Environmental Health and Safety.

.7 Exhaust stacks shall be made from material that is resistant to the chemicals that are being handled inside the fume hoods. Stainless steel exhaust stacks to be schedule 5 type 316 stainless steel butt welded pipe with 2B finish in accordance with A.S.T.M. A.240. (See 2.2.3 above).

.8 Stainless steel ductwork shall be type 316 with 2B finish, minimum thickness’ suction side 24 ga. and discharge side 18 ga.

.9 Transverse joints in ductwork on suction side of fan shall be slip joints made in reverse direction of flow screwed or riveted. Longitudinal joints shall be double lock seams with the joints on top for horizontal sections.

.10 Vertical ducts shall be supported at every floor using 14 ga. stainless steel bands welded to the duct. Horizontal ducts shall be supported by stainless steel strap hangers 2’ x 14 ga. at 8’ centers and every change in direction.

.11 Power supply feeding fan should be the same source feeding the alarm.

.12 Exhaust fans shall be mounted on a housekeeping pad. Roof mounted fans shall be installed in accordance with standard detail.

.13 Exhaust fans shall have interior surfaces in contact with the air stream coated with a chemical resistant coating, scroll shall have access door, drain with plug and shaft seal. Axial or in-line centrifugal fans shall not be used.
.14 Canvas or any other flexible connections are not acceptable on the discharge side of the fan.
(i.e. Only solid connections on the discharge side of the side of the fan are acceptable).

.15 Fume discharge shall be through free standing stacks minimum height 20’ above roof level,
terminated with a 2’ long discharge cone.

.16 In new buildings, stacks shall be grouped together to provide an aesthetic appearance when
viewed from street level.

.17 In existing buildings, stack locations shall be coordinated through SFU Facilities in order to
select locations which will help facilitate the future upgrading of existing fume exhausts,
again to provide an aesthetic appearance.

.18 Stacks may be braced from adjoining structures, but bracing and bases for free standing
stacks shall be designed by a structural engineer.

.19 Maximum Duct Velocities
   .1 Suction side of fan 1500 f.p.m.
   .2 Discharge side of fan 2000 f.p.m.

.20 Minimum stack exit velocity
   .1 Point of exit from stack 3000 fpm, as per ANSI/AIHA Standard for Laboratory
   Ventilation, Z9.5-2003.

.21 Where multiple fume hoods are manifolded together and feed to a high plume exhaust fan
system, the plume height must be sufficient to achieve adequate dilution to meet allowable
concentration levels.

.22 All ductwork and stacks on discharge side of fan shall have welded joints.

.23 All welding shall be done using the TIG process with stainless steel filler rods and stainless
steel wire brushes. After fabricating, stacks shall be washed with “vecom” pickling paste in
the shop.

.24 Fume hoods need not be connected to emergency power.

***END OF SECTION***