

1.0 **GENERAL**

1.1 **Related UBC Guidelines**

- .1 Division 26

1.2 **Coordination Requirements**

- .1 UBC Energy & Water Services (Vancouver)
- .2 UBC Facilities Electrical (Vancouver)
- .3 UBC Facility Management (Okanagan)

1.3 **Description**

- .1 UBC requirements for Secondary Power Distribution.

2.0 **MATERIALS AND DESIGN REQUIREMENTS**

2.1 **General Requirements:**

- .1 Two secondary voltage levels are acceptable at the University:
 - .1 120/208 Volt, 3-Phase 4-Wire Wye System
 - .2 347/600 Volt, 3-Phase 4-Wire Wye System.
 - .3 (Vancouver) 600 Volt 3-Phase 3-Wire Wye System. 3 wire supply from EWS can be utilized as long as a solidly grounded system is maintained and tied back to the utility neutral point.
- .2 All secondary distribution equipment shall be installed inside conditioned rooms.
- .3 The selection of distribution voltage shall be based on building layout. Conditions such as large distribution loads, high building and large footprint shall be used to determine the preferred secondary distribution.
- .4 If a 600V secondary distribution is selected, all motors 3/4 hp and over shall be supplied at this level. ECM motors 2HP and below shall be except.
- .5 Life Safety, Stand-by, Emergency Power distribution shall not contain any switches between the generator distribution overcurrent device and each transfer switch. All CBs upstream of Life Safety transfer switches shall have auxiliary contacts monitored by the transfer switch or generator or fire alarm system that will notify building maintenance personnel of a “not normal” situation. The monitoring wiring diagram shall form a separate section of the generator submittals.
- .6 The electrical distribution shall be designed to limit incident energy to maximum 8 cal/cm² at all switches, circuit breakers and MCCs while retaining acceptable coordination selectivity. Incorporate LSI Circuit Breakers, not fuses, where necessary to achieve the desired results.
- .7 Secondary power distribution equipment shall have NEMA ratings dependent on the following type of locations:
 - .1 General purpose areas: NEMA 1
 - .2 Locations where water ingress will occur: NEMA 3R
 - .3 Locations where pressurized water ingress will occur: NEMA 4

- .4 Wood processing locations and locations subjected to circulating dusts/lints/fibers: NEMA 12
- .8 Used or Refurbished distribution equipment is not permitted to be utilized.
- .9 Mixing of manufacturers within distribution equipment is not permitted.
- .10 The entire electrical system must be fully rated. Series rated systems are not acceptable.
- .11 Any new single load added to an existing distribution 36kW or greater requires approval from UBC Facilities Electrical prior to proceeding with design.

2.2 Service Entrance Requirements:

- .1 Service Entrance disconnects shall only be circuit breaker type with the ability to be lockable in the open position.
- .2 Any building or addition supplied by 208 or 600 Volts shall have entrance switchgear designed and labelled as "Suitable for Service Entrance".
- .3 Minimum requirements for breakers at service entrance distributions (unless determined otherwise by coordination study):
 - .1 LSI trip units:
 - .1 Any breaker 600A and larger.
 - .2 Any breaker 400A and larger that feeds a mechanical distribution.
 - .3 Any breaker 400A or larger feeding a distribution that contains 2 or more sub distributions/panelboards.
 - .4 Any breaker feeding a separate building.
 - .5 Any breaker feeding a bus duct system.
 - .6 Life safety distributions shall not have LSI trip units.
 - .2 LSI trip units are required for other breakers not mentioned in .1.

2.3 Switchboard Requirements:

- .1 When a switchboard is fed from a 150kVA transformer or larger the following is required:
 - .1 The transformer primary breaker shall be LSI complete with arc flash reduction/maintenance mode functionality.
 - .2 A remote selector switch shall be installed at the same location as the switchboard that can activate the maintenance mode/arc flash reduction. The remote selector switch shall have indicator lights to confirm the status of arc flash reduction/maintenance mode.
- .2 Lockout hasps are required on all distribution boards and for all circuit breakers feeding panelboards.
- .3 Surge Protective Devices (SPD/TVSS) are required for switchboards feeding laboratory, research and elevator loads.

2.4 Panelboard Requirements:

- .1 New Panelboards shall utilize bolt-on molded case circuit breakers. Panelboards shall contain copper buswork. All panelboards shall have phases balanced to within 15% and shall contain a typewritten directory on cardstock. The directory shall include the circuit

number, room(s) number and load description. All new panelboards shall be located on the same floors as the loads they serve.

- .2 Panelboards serving laboratory or research spaces where final equipment lists are unknown or the space is designed to have a rotation of researchers shall have a minimum of 50% spare circuit capacity. All other panelboards shall have a minimum of 30% spare circuit capacity.
- .3 Tandem/skinny/piggyback circuit breakers shall not be utilized.
- .4 All panelboards and loadcentres shall have main lugs only. Panelboards servicing CRUs are exempt and will require a main breaker. Panelboards and loadcentres shall not be back-fed through a circuit breaker.
- .5 Where possible every load shall be supplied by a panelboard on the same floor.
- .6 Daisy-chaining of electrical panels shall not be permitted. All panelboards shall be fed from separate overcurrent devices.
- .7 Panelboards shall not be used as splice boxes.
- .8 CTs shall not be installed inside panelboards and shall be located in a separate enclosure.
- .9 Surge Protective Devices (SPD/TVSS) are required for panelboards feeding laboratory, research and elevator loads.
- .10 The minimum panelboard ampacity shall be 100A. The only acceptable panelboard sizes are the following: 42, 66 and 82 CCT.

2.5 Disconnect Requirements:

- .1 Disconnect switches shall not be used as junction boxes.
- .2 Fused disconnect switches shall be utilized for single loads of 30kW and greater.
- .3 Refer to Section 11 60 00 Cranes and Hoists for disconnect requirements for Cranes and Hoists.
- .4 UPS Disconnect Requirements:
 - .1 30A or smaller shall be cord connected with twist lock receptacles.
 - .2 For all other scenarios a separate disconnect is required for the UPS line side connection.
- .5 Fused disconnects with fast acting fuses are required for boilers and other types of loads involving an immersed element in liquid.

3.0 SECONDARY DISTRIBUTION EQUIPMENT IDENTIFICATION AND LABELING

- .1 Refer to Section 26 05 53 – Labeling for secondary distribution labeling requirements.

END OF SECTION