Cold Storage Room - Design Standards

Self-contained Fridge and Freezer Cabinets (+4˚C to -80˚C)

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Preamble:

The intent of this document is to provide minimum standard requirements for utilities and environmental layout for self-contained refrigerated sample cabinets within designated “cold storage / freezer rooms”. Many of the standards can also be applied to stand-alone cabinets within open design laboratories.

The recommendations are primarily written around new structures however can be adapted in critical areas for existing infrastructure.

Design Standards:

Utility	Comments
Project Management	• Freezer room design standards are to be imbedded into UNSW Building Design and HVAC guidelines.
Power Supply and Building Management and Control System. (BMCS)	• A backed-up power supply is required, i.e. mains plus generator (supplied from the “Essential” power supply), or two mains supplies from independent source. • Cabinets and rooms are to be monitored by Building Management and Control System (BMCS) and Independent Data Logging Alarm System (IDLAS). IDLAS data will be available to stakeholders via, handheld devices, smart phones, tablets, laptops etc. • Separate 15Amp or 10Amp circuits for each cabinet where applicable, all power outlets to have captive plug capability. Individual power circuits are to be BMCS monitored. Essential 10Amp circuits (red) within lab areas for refrigerated cabinets to be BMCS monitored. • All power outlets are to be fitted with power indicating LED’S. • Power outlets and BMCS connection points are to be accessible without moving the refrigerated cabinets, or power and BMSC connection points to be wired to a central location, or access aisles provided behind cabinets.

	• Easily Accessible BMCS test panels within the room common areas are required for BMS alarm testing without the need to move cabinets or remove BMCS cables. • Install power, BMCS and Ethernet outlets to match maximum room, cabinet capacity. Stakeholders to inform of intended usage. • A Centrally located (spare)double GPO is to be provided for technicians, auxiliary equipment i.e. fans, vacuum cleaners etc.
Climate Control	• Maintain freezer room temperature to match surrounding labs or 23°C maximum. • Use outside air ventilation in cooler ambient temperatures where possible, analyse climate data to determine viability. • Provide a minimum of two conditioned air solutions for up to 43°C ambient conditions i.e. chilled water from building recirculation and back-up, stand-alone variable speed DX A/C system. If the back-up AC is auto changeover via the BMCS, manual operation must also be available via the wall mounted room controller. • Room air flow for the central ducted option is to be of cold aisle / hot aisle design for single or dual row freezer rooms. Double row rooms will have supply air longitudinally in the centre of the room and return air longitudinally along each side at ceiling level. Supply and return air ducts are to be longitudinally dimensioned to match room dimensions. • Room heat load to be based on 100% room capacity of -80°C cabinets at 2.4kW heat rejection each. • A/C systems to be BMCS monitored and IDLAS may be utilised to monitor room temperature independently.
Environmental	• Windows are not required, however if present should be heavily shaded and tinted to reduce solar load and false temperature recording from room thermostats. • Combining self-contained cabinets and cryogenics within the same room is prohibited. The ventilation requirements are juxtaposed. • Provide for a storage area in each room for spare freezer racks, step ladder, sample transport trolleys etc.

	• Minimum room width to be: Dual row room = Max cabinet dimension with door open at 90°+ minimum ventilation requirement behind + 600mm, to centre of room. Add 1200mm to width, if power and BSCM connections are inaccessible without moving cabinets or locate services to a central accessible location. • Minimum room length: combine cabinets widths + (cabinet number +1) x 250mm) + 600mm walk around at one end if power and BMS are inaccessible.
Risk Assessment	• Carry out Risk assessment for each room, for utilities and available freezer bank back-up. •