Basis of Design

This section applies to the design and installation of refrigerated walk-in coolers, walk-in freezers, environmental rooms and cold rooms.

Programming

- How will the cold/environmental room be used? The future users of the cold/environmental room must explain, in detail, how the room will be utilized. Include current and future expectations. Consider long-range goals during design.
- What is the required size of the cold/environmental room? When determining room dimensions, consider the wall thickness required to maintain cold room temperatures. Do not locate mechanical and electrical systems above the cold/environmental room.
- If a cold/environmental floor height is 4 to 6 inches higher than the building floor, provide a ramp or depressed slab.
- What are the cold/environmental room temperature requirements? What are the maximum and minimum temperatures required? How quickly must operating temperatures be achieved? What is the temperature control range? For instance, a ± 2º F control range requires the installation of a specific type of control system.
- What are the cold/environmental room humidity requirements? If cold/environmental room operating temperature is approximately 32º F, humidity is difficult to control.
- What will the refrigeration loading be? If refrigeration load is constant, the refrigeration equipment is sized for wall and infiltration losses. If large objects are to be cooled or frozen, will a larger-capacity refrigeration system be required? Consider the frequency of door opening/closure as part of the system design.
- How important is cold/environmental room reliability? Refrigeration equipment will eventually fail and leave the cold/environmental room without temperature control. Can this be tolerated or is standby equipment required? If reliability is extremely important, provide standby power.
- Is constant monitoring of cold/environmental room required? Is a contract with ADT or Sonatrol necessary? Who is the contact when the unit does fail?
- Where will the compressor be located? Do not locate compressors on top of pre-fabricated cold/environmental rooms. Provide an equipment space immediately adjacent to the cold/environmental room. The compressor may then be mounted on the wall, providing usable floor area. Consider sound level requirement with the compressor location.
- Will people be working in the cold room? Must the cold/environmental room be ventilated? Will air need to be exhausted from the room? Contact Campus Engineering and EH&S.
- What are the limitations on air velocities?
- Is the evaporator positioned to direct air at the door (Reduces incoming air)?
- What utilities are required inside the cold room? Interior water and waste utilities may require freeze protection.
- How is the access to equipment/piping /ductwork above the cold room/environmental room ceiling provided?

Design Criteria

- See Refrigeration section for design criteria.
• Provide environmental control chambers/refrigerated rooms with frost/fog-free viewing windows, an internally actuated panic alarm system for personnel protection, a temperature limit alarm (automatic) with audible and visual signals, and two contacts for remote monitoring.

• Provide positive pressure ventilation for environmental rooms to avoid condensation. If exhaust is required, provide neutral pressure.

Design Evaluation

The following information is required to evaluate the design:

• **Schematic Design Phase:** Provide equipment locations; system definition and design criteria developed by the users, names of responsible Mechanical Design Engineer, Refrigeration Shop Supervisor, and Campus Engineering representative.

• **Design Development Phase:** Provide design calculations, equipment sizing criteria, room dimensions, insulation type and thickness, equipment lists, operation sequence, control diagram and piping plans.

• **Construction Document Phase:** Provide one-line diagrams, pipe sizing, descriptive literature with capacities for each piece of equipment and appropriate selections marked. Capacity balance curves shall be included to show operating balance conditions for matching components.

Construction Submittals

• Provide equipment product data.

• Provide control schematics, sequence of operation, and location of controls.

• Provide standard industry submittal requirements.

Installation, Fabrication and Construction

• See Refrigeration section for installation, fabrication and construction.

END OF DESIGN GUIDE SECTION