

DESIGN CRITERIA

1. Related Sections: See Division 03 Section Insulated Freezer Floors, Division 23 Section Product Refrigeration Systems, and Division 23 Section Refrigeration Monitoring and Control Systems (RMCS).
2. Summary: Provide cold storage rooms per Concept Floor Plan: Shop fabricated, site assembled, walk-in room type, complete with doors and frames. Erect freezers over insulated cast-in-place concrete floors and provide heated stainless steel threshold across door openings.
3. Doors for cold storage rooms are included in this section. Provide sliding and/or swinging cold storage room doors as well as 1G11 Dairy Reach-in doors. Provide cart corrals and milk and egg carts aligned with the 1G11 reach in doors in Dairy cold storage rooms. See Division 08 Section Traffic Doors for double action and flexible vertical strip doors used in cold storage rooms.
4. Windows for cold storage rooms are included in this Specification Section.
5. General Description:
 - A. Prefabricated Insulated Panels: Interior and exterior aluminum panels uniformly formed with metal dies, insulation, and panel fasteners. Maximum length: 12'-0". Maximum width: 48". Minimum thickness: Low temperature panels shall be 5" thickness with minimum "R" factor of 36. Medium temperature panels shall be 4" thickness with minimum "R" factor of 28. Panel joints: Interlocking design. Wood frame panels not acceptable. Provide panel fasteners to secure panels to each other. Provide vapor seal at panel joints when joints are assembled. Form seal by compressing closed cell gaskets or silicon sealant at the joint. Panel gaskets: Synthetic rubber or other manufacturer approved material. Panel skins: Minimum 0.032" thick stucco embossed aluminum. Provide factory applied USDA accepted white baked or acrylic enamel finish on exposed surfaces. Panels shall be UL approved, or shall be provided with an independent testing laboratory's test certificate certifying fire retardant properties of the insulation. Panel skins shall adhere to the insulation.
 - B. Insulation:
 1. Insulation shall be foamed-in-place polyurethane, 2 pcf minimum density, bonded to inner and outer metal panels.
 2. Thermal conductivity (K) shall not exceed 0.14 (BTU) (IN) / (HR.) (FT²) (DEGREE F).
 3. Insulation shall be Factory Mutual System classified Class I (per ASTM E-84) having a flame spread of no more than 25, fuel contributed of 0, and smoke developed rating not greater than 400 when tested in a 4" cross section.
 - C. Walls: Cold storage room walls shall be constructed using 10'-0" high panels.
 - D. Ceilings: Prefabricated insulated panels spanning width of cold storage room. Underside of ceiling panels shall have sufficient strength to support conduit and light fixtures affixed directly to the skin.
 - E. Ceiling Panel Suspension System: Provide suspension system for support of ceiling panels from roof structural members. Do not use ceiling support columns within the cold storage rooms. Suspension system shall consist of all members, including fasteners and attachments, required to support ceiling panels. Provide manufacturer's standard hangers conforming to panel joint configuration. Suspension system shall be of sufficient strength to support ceiling panels, workmen during construction, light fixtures, and equipment supported from panels.
 - F. Penetrations: Provide PVC conduit sleeves and resilient gaskets for all penetrations. Seal penetrations vapor tight with silicone sealant. Seal electrical conduits internally and externally to prevent moisture migration through electrical conduit.
 - G. Temperature Monitoring: Monitor temperatures within each cold storage room with the Refrigeration Monitoring and Control System (RMCS). Provide temperature probes to measure

temperature of return air to unit coolers and general room temperature. Do not mount temperature probes in unit cooler discharge air or near doors.

- H. Thermometers: At each cold storage room, provide a 4" flanged dial thermometer with a remote reading capillary tube. Range of thermometer shall be within operating temperature of the cold storage room. Locate thermometer adjacent to entrance door with capillary tube located remote from door opening.
- I. Pressure Relief Ports: Provide a pressure relief port for cold storage rooms operating at temperatures below 20 deg F. Design port so that air can move into and out of refrigerated space. The relief port shall be electrically heated.
- J. Floors:
 - 1. Medium temperature cold storage rooms shall be constructed directly on top of concrete floor slabs as required by Section 03 30 00 Cast-In-Place Concrete. Provide perimeter wood thermal break (preservative treated or redwood) around medium temperature cold storage room floor slabs to isolate them from adjacent non-refrigerated floor slab areas. Discontinue wood thermal break at door openings and provide isolation membrane across door openings. Cold storage rooms shall have concrete floors sloped to drains.
 - 2. Low temperature cold storage rooms 200 SF in size, and larger, shall have insulating concrete freezer floors with positive underfloor ventilation for prevention of frost heave. Construct insulating concrete freezer floor systems consisting of:
 - a. 36" deep drainage fill layer containing PVC ventilation piping.
 - b. 10 mil vapor retarder directly on top of drainage fill.
 - c. Concrete sub-slab.
 - d. Three 2" layers of polystyrene insulation.
 - e. Perimeter wood thermal break (preservative treated or redwood) around freezer slab recess.
 - f. 10 mil vapor retarder set directly on top of insulation and wrapping-up and over exposed face of perimeter wood thermal break (note that purpose of this is to minimize possibility of excess concrete mix water from seeping down between joints in insulation).
 - g. Concrete top slab.
 - 3. On new construction projects, low temperature cold storage rooms (less than 200 SF in size) shall be constructed similarly, except that an underfloor ventilation system is not required.
 - 4. On alteration projects with existing concrete floor slabs, low temperature cold storage rooms (less than 200 SF in size) shall be constructed using 4" thick prefabricated insulated aluminum floor panels with 1/4" thick aluminum diamond tread plate wearing surface. Provide removable 1/4" thick aluminum diamond tread plate exterior ramp.
- K. Curbs:
 - 1. Provide concrete curbs (secured to concrete floor slab with steel dowels) for protection of prefabricated wall panels. Construct curbs with sloped tops for drainage, and isolated from face of wall panels with pre-molded expansion joint filler. Seal joint between back of curb and face of wall panel, water tight.
 - 2. At cold storage rooms with resinous floor finish, cover exposed surfaces of curb with resinous material to match floor. (Note that curb is installed after wall panels are complete, using pre-molded joint filler as form against wall panel).

3. Provide heater cable within concrete curb on outside of frozen food storage. Refer to Division 3 Design Criteria and Design Standard Plates 13 21 26-04 and 13 21 26-08 for additional information.

L. Sealing Existing Cooler and Freezer Panels Seams:

1. Seal cooler and freezer panel seams found to have air leaks with sealant tape described in specification section 13 21 26 Cold Storage Rooms. Panels must be sealed on outside (warm side) of seam to prevent warm moist air from entering the gap between panels. Before applying tape, surface must be clean and dry to ensure proper bond. Tape must be applied with roller to ensure permanent repair.

M. Signage:

1. Doors must have a means for a person inadvertently trapped inside a locked room to disable the lock and exit the room. Provide instructions for releasing the interior locking mechanism adjacent to lock. Instructions should be in English and host nation language as applicable.

END OF SECTION