

## Basis of Design

- This section applies to thermal insulation, safig insulation and moisture protection systems. Systems are used vertically and horizontally.
  - Building insulation selection shall be made in consideration of location and exposure to water. Some insulation loses its thermal properties when wet and the appropriate type of insulation system must be chosen to retain its properties under specific circumstances.
  - Fluid applied membrane waterproofing systems are acceptable on horizontal surfaces such as plazas, decks and walkways over occupied spaces. Fluid applied systems have better performance at the UW.
    - 1) These systems require protection if foot traffic is allowed.
    - 2) Protection includes but is not limited to pavers, concrete, fired clay tile or similar durable components.
    - 3) Any drains installed shall have two level inlets, at the finish surface and at the membrane level.
  - Provide membrane waterproofing systems adhered with adhesive on vertical surfaces with occupied or service spaces on the other side. A protection system is required when the proposed system is vulnerable to damage from backfill or other related construction.
  - Provide waterstops at all joints in concrete slabs on grade and foundation joints.
  - A subgrade perimeter (footing) drainage system is required. If the soil report indicates water above the lowest slab level, an underslab drainage system is required.
  - Slope the structure under plazas, decks or walkways and any below-grade space ¼ inch per 1' 0" minimum towards drains or over the edge of foundation walls. The design of the structure shall enhance slope as building creep relaxes.
  - Conduit and piping shall not penetrate any horizontal waterproofing membrane.
  - Extend the waterproof membrane up walls and curbs a minimum of 1 foot, and a minimum of 4 inches above pavers, sidewalks or planting soils. Terminate the membrane with a termination bar, sealant and flashing in a reglet.
  - Vertical joints, i.e. seismic and expansion, shall have continuous interior and exterior waterproof gaskets/membranes. At transitions (floors, roofs, etc.) install gaskets in a manner that will shed water. Joint system shall be designed to be easily replaced when system fails due to age and use. System shall have a cover designed for the specific use and location. Sealant is unacceptable as the primary barrier.
  - Manufactured system transitions, i.e. vertical to horizontal, shall be shop fabricated. All system transitions shall be integral and continuous.
  - Horizontal joints shall have a cover designed for the specific use and location, waterproof gaskets/membranes and an interior gutter drain system. Vehicular traffic areas shall be fully supported and designed for H-20 loads. The joint shall be at the high point or a curb at the adjacent building. The structure shall slope away from the joint. Avoid joint systems in planter areas over building spaces. Joint system shall be designed to be easily replaced when gaskets/membranes fail due to age and use. Sealant is unacceptable as the primary barrier.

- Sealants shall not be used for the primary weather barrier. Research material compatibility with proposed sealant. Prime all joints. Provide for adhesion tests for all materials and sealants. Provide sand textured finish on all masonry sealant joints.
- Consider salvaged or recycled content insulation where possible.

## **Design Evaluation**

**The following information is required by the University to evaluate the design.**

- Schematic Design Phase: Indicate overall design concept for thermal and moisture protection systems at all vertical and horizontal components. Provide a conceptual description of all materials and systems to be used and their location.
- Design Development Phase: Provide complete information about all thermal and moisture protection systems. Provide information on the drainage system that indicates how it will function at all locations. Provide detailed information that clearly indicates how the various components relate to other building components and one another, including but not limited to edge conditions, drainage systems, flashing and penetrations. Outline specifications.
- Construction Documents Phase: Complete design and final specifications.

## **Submittals**

**The following submittals are required as a minimum by the University from the Contractor:**

- Shop drawings indicating the complete design of all systems
- Complete list of the materials and items proposed for complete system installation including product data, samples and Material Safety Data Sheets (MSDS)
- Letter from manufacturer(s) confirming compatibility of all proposed materials
- Manufacturer's installation instructions and modifications required to meet manufacturer's warranties
- Application schedule
- Certificate stating that all components of waterproofing, damp-proofing and insulation systems are asbestos free.

## **Related Sections**

- Facilities Services Design Guide - Masonry Walls
- Facilities Services Design Guide - Metal Walls
- Facilities Services Design Guide - Structural - Foundations
- Facilities Services Design Guide - Structural - Slab on Grade
- Facilities Services Design Guide - Structural - Below Grade Walls
- Facilities Services Design Guide - Structural - Exterior Walls

## Products, Materials and Equipment

### Waterproofing

- Membrane system for vertical and horizontal applications: The acceptable membrane waterproofing systems used on campus on vertical walls below grade and at plaza decks is a hot fluid-applied rubberized asphalt membrane.
  - 1) The acceptable system used is “Monolithic Membrane 6125” by American Hydrotech, CCW-500R by Carlisle, American Permaquik 6100 and Hot Ruberized Asphalt Waterproofing by Monsey - Bakor. No other membrane systems are acceptable substitutions unless they meet or exceed the technical performance criteria of the above systems and are acceptable to Campus Engineering.
  - 2) The acceptable flexible flashing compatible with the waterproof membrane system used is uncured neoprene sheet, “Flex Flash UN” by American Hydrotech. Other flexible flashing systems are acceptable if they meet or exceed the technical performance criteria of the above system.
  - 3) The acceptable drainage course used is a three dimensional, crush-proof drainage core with a non-woven needle punched filter fabric system, “Hydrodrain 300” by American Hydrotech. Other drainage course systems are acceptable if they meet or exceed the technical performance criteria of the above system.
- Sheet system for vertical and horizontal applications: For sheet system waterproofing on below-grade walls, slabs below grade, and around utility tunnel construction, the acceptable system used on campus is an expandable, resealable mineral composition sheet system.
  - 1) The acceptable system used is “Paraseal Membrane” by Mameco. Other systems are acceptable if they meet or exceed the technical performance criteria of the above system.
  - 2) The acceptable drainage course system used is “Hydrodrain 300” by American Hydrotech. Other systems are acceptable if they meet or exceed the technical performance criteria of the above system.
  - 3) The acceptable protection board used is extruded polystyrene that complies with ASTM C 578, Type IV, with compressive strength of 25psi and R-value of 10. Other systems are acceptable if they meet or exceed the technical performance criteria of the above system.

### Damp-proofing

- For damp-proofing of below grade walls enclosing unoccupied spaces and of concrete and concrete masonry walls behind face brick in cavity wall construction, the acceptable system used on campus is a bituminous damp-proofing system.
  - 1) This system shall be a cold applied, semi-mastic asphalt and solvent compound containing non-asbestos inorganic fibrous reinforcement.
  - 2) Acceptable systems used are “Sealmastic Asphalt Emulsion, Type 2” by W. R. Meadows, Inc. or “Karnak 220AF” by Karnak. Other systems are acceptable if they meet or exceed the technical performance criteria of the above system.

### **Building Insulation**

- All insulation types and manufacturers are acceptable. Insulation must be appropriate for the use and location.
- Vapor barriers are required to prevent water from condensing with the insulation and reducing the insulating properties.
- Any vapor barrier that meets design requirements and has a maximum permanence rating of 0.13 perms is acceptable.
- Safing insulation must meet the fire rating of the assembly of which it is part.

### **Sealers**

- The purpose of sealers is to protect the exterior masonry and concrete walls from water.
- The acceptable water based water repellent sealer system used on campus is “Weather Seal Siloxane WB Concentrate” by ProSoCo. Other systems are acceptable if they meet or exceed the technical performance criteria of the above system.

### **Warranties**

- **Waterproofing:** Warrant by waterproofing material system manufacturer, installer and general Contractor, entire waterproofing system against defects in materials and workmanship for a period of 5 years from date of substantial completion.
  - 1) The warranty shall warrant against failure of the waterproofing membrane to remain waterproof, including abnormal deterioration of materials.
  - 2) Warranty shall include all components of the waterproofing system specified.
  - 3) Warranty shall also include the responsibility for removal and replacement of all work concealing the waterproof system. Upon completion, work which was removed and replaced must be approved by the University.
- **Sealer:** Provide manufacturer’s standard warranty.

### **Installation, Fabrication and Construction**

- Install all systems according to manufacturer's instructions and modifications required to meet warranty.
- At plaza deck and similar construction over occupied spaces, provide for a flood test of the installation. Test areas by flooding to a depth of 2 inches for a period of 48 hours. If leaks occur, the water must be drained and the membrane repaired. Contractor must verify that the supporting structure can support the deadload weight of the water.

END OF DESIGN GUIDE SECTION