

A

Substructure

This Element includes all work below the lowest floor construction (usually concrete slab-on-grade) and the enclosing horizontal and vertical elements required to form a basement, together with the necessary mass excavation and backfill.

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A10 FOUN- DATIONS

A1010 Standard Foundations

1. General:

- a. Foundation systems are to be recommended by a geotechnical engineer in consultation with a structural engineer. Caltech will retain and pay expenses of a Geotechnical Engineer.

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A20 SUBGRADE ENCLOSURE

The following types of waterproofing are preferable: hot fluid-applied waterproofing, crystalline waterproofing, and bentonite waterproofing.

A2010.90 Subgrade Enclosure Wall Supplementary Components

1. Basement Wall Vertical Waterproofing: Select waterproofing membrane based on soil and installation conditions. The following types of waterproofing are preferable: hot fluid-applied waterproofing, crystalline waterproofing, and bentonite waterproofing.

a. Hot Fluid-Applied Waterproofing System: Single component, 100 percent solids hot fluid-applied, rubberized asphalt; including elastomeric sheet flashing, primer, metal termination bars, sealants, reinforcing fabric if required, and protection course or molded-sheet drainage panels; minimum total thickness of 215 mils.

- 1) Manufacturer's representative to inspect completed waterproofing installation before covering with other construction and provide written report that installation complies with manufacturer's written instructions.
- 2) Contractor shall submit joint and several waterproofing warranty, signed by Manufacturer and Installer, covering Work of waterproofing system, including all components of waterproofing system such as membrane, flashings, protection board or drainage panels, fasteners, and primers for 10 years from date of Substantial Completion.

b. Crystalline Waterproofing: Prepackaged, gray or white-colored proprietary blend of portland cement, specially treated sand, and active chemicals that, when mixed with water and applied, penetrates into concrete and concrete unit masonry and reacts chemically with the byproducts of cement hydration in the presence of water to develop crystalline growth within substrate capillaries to produce an impervious, dense, waterproof substrate; that has VOC content complying with limits of authorities having jurisdiction. Maximum water permeability shall be zero for water at 30 feet when tested according to CE CRD-C 48. Minimum compressive strength shall be 4000 psi at 28 days when tested according to ASTM C 109/C 109M. Include patching and plugging compounds as necessary for complete installation.

- 1) Manufacturer's representative to inspect completed application and provide a written report that application complies with manufacturer's written instructions.
- 2) Install minimum two coats with smooth final finish.

c. Bentonite Waterproofing: Bentonite clay granules with geotextile or high-density polyethylene (HDPE) faces. Include mastic, termination bar, patching material, fasteners, sealants, tapes, adhesives, protection course or drainage panel, and other accessories as required for complete installation.

- 1) Manufacturer's representative to inspect completed application and provide a written report that application complies with manufacturer's written instructions.
- 2) Contractor shall submit joint and several waterproofing warranty, signed by Manufacturer and Installer, covering Work of waterproofing

system, including all components of waterproofing system such as membrane, flashings, protection board or drainage panels, fasteners, and primers for 10 years from date of Substantial Completion.

2. Basement Footprint: Basement footprints should not exceed the footprint of the first floor above. Consult Caltech PM for special circumstances.

A40 SLABS- ON-GRADE

A4090 Slab-on-Grade Supplementary Components

1. Vapor Retarder: Provide minimum 15-mil-thick vapor retarder, complying with ASTM E 1745, minimum Class B, directly under all concrete slabs on grade. Vapor retarder should connect to air barrier and/or waterproofing membrane(s) to form a continuous seal around the building. Do not place granular fill between vapor retarder and concrete slab.

*Provide minimum
15-mil-thick vapor
retarder*

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A90 SUB- STRUCTURE RELATED ACTIVITIES

A9010 Substructure Excavation

1. General:

- a.** Comply with current California Law, Government Code 4216. See www.digalert.org.
- b.** Excavations are not permitted which undermine the integrity of adjacent structures, paving, or utilities.

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fornia Law,
Government
Code 4216.***

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**END OF
ELEMENT A**



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