

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 07 • THERMAL & MOISTURE PROTECTION

07 10 00 • WATERPROOFING & DAMPPROOFING

SECTION INCLUDES

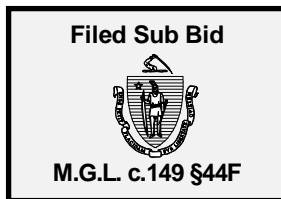
Dampproofing
Bituminous Waterproofing
Water Repellents

RELATED GUIDELINE SECTIONS

03 30 00 Concrete
04 20 00 Unit Masonry
07 20 00 Insulation and Moisture Protection
07 90 00 Sealants
31 00 00 Earthwork

REFERENCES

**IBC Section 406 and Mass amendment 406.2 Residential Code
IBC Section 1805 Building Code Mass Amendments 1805.1.1.2,
1805.4.2 & 1805.5**



Waterproofing, dampproofing and caulking is a stipulated filed sub-bid category under M.G.L. Chapter 149, §44F. While these types of work are typically specified in different sections if the cumulative estimated value of the work in this section exceeds \$25,000 and the projects total cost is over \$150,000, it triggers the filed sub-bid requirement. If this is the case, specify it all in a single section to avoid confusion

Note that a wide range of waterproofing products and assemblies would be considered part of this file sub-bid. Only materials typically used for public housing are discussed herein. Care should be taken when atypical waterproofing products, such as traffic coatings, and deck and plaza waterproofing systems are included as part of the filed sub bid.

CLIMATE RESILIENCE DESIGN CONSIDERATIONS

Waterproofing is a climate resilience best practice for protecting the building structure and equipment from flooding associated with extreme precipitation, sea level rise and extreme tidal conditions. It is particularly critical for elevator systems and to keep electrical, heating, cooling, and domestic hot water systems from flooding. It can have the added benefit of reducing pest infestation, such as from termites, which is likely to become worse over time as the climate zone in Massachusetts becomes warmer and more humid.



Waterproofing may only be of value for a limited time in buildings that already experience frequent and severe flooding. Few of the original plans for housing authority buildings have information about the elevation of each building in a development that could be compared to the future flood elevation projections that are or will soon be available for most Massachusetts communities (2030, 2050, and 2070). For some buildings,

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relocating electrical and mechanical equipment from basements to upper floors, diverting coastal or stormwater flood waters away from a building with piped stormwater infrastructure or external permanent or temporary barriers, or pumping water out of below-grade spaces with sump pumps should be compared to the efficacy of a major waterproofing project.

Waterproofing should be continuous from the lowest point in the building up to the Design Flood Elevation (DFE), if known.

TECHNICAL STANDARDS

FOUNDATION & WALL DAMPROOFING & WATERPROOFING

MATERIALS

There is a distinct difference between damproofing and waterproofing. Damproofing is intended to keep out soil moisture while waterproofing is intended to keep out both moisture and water. Waterproofing is intended to create a barrier that large quantities of water under pressure (such as standing water) cannot penetrate. Damproofing is intended to prevent the penetration of small quantities of water not under pressure. As waterproofing is a more rigorous and usually a more expensive treatment than damproofing, waterproofing should only be used when damproofing will not provide sufficient protection. In general, the designer should avoid construction below the water table.

DAMPROOFING

The intent is to protect interior surfaces from water vapor diffusion, and moisture wicked in by capillary action.

Products available include:

- Crystallization products or cementitious coatings are often used in elevator or sump pits on the “Negative” or interior side only.
- Cementitious coatings to exterior of foundation wall, “Parging” used for CMU walls conforming to ASTM C887
- Asphaltic or Bituminous Coatings applied to exterior of foundation wall. Spray on or trowel-on applications. General Installation: Apply damproofing to exterior below grade concrete walls in contact with earth or other backfill, and where the space is enclosed on the opposite side. Apply to back side of concrete or masonry retaining walls to prevent the percolating of water through the wall. Requires the installation of a protection board.

WATERPROOFING

Applied to exterior (positive) side. Products should meet ASTM C-836

- Asphaltic based products applied to exterior of foundation wall. Built up with 2 or 3 coats combined with membranes. Most economical
- Rubberized asphalt coating applied to exterior of foundation wall or slab surface. High performance and more flexible. Spray applied or sheet membranes. Requires a protection layer.
- Clay based waterproofing system applied to exterior of foundation wall, products such as Bentonite, or Volclay panels are typical. This

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is a traditional and effective solution for difficult waterproofing situations, but it is costly and requires careful application.

- ❑ Thermoplastic Sheet Waterproofing: Typically a multi-layered PVC membrane system combined with drainage blanket and reinforcing fabrics. An effective system. Typically used for below grade habitable spaces.

In wet areas, a rigid insulation board drain system with channels is used in conjunction with a perimeter drain in order to direct water away from the foundation.

All of the above the systems rely on a properly designed drainage system. Civil engineering services should be used.

Design

Dampproof basement, foundation walls and provide waterproofing as dictated by site conditions. A full range of test pits or borings should be used to identify subsurface soil and water table issues.

Testing of waterproofing (ponding, spray tests) assemblies is recommended prior to covering. The need for perimeter drains and sumps will also need to be assessed.

AIR/VAPOR BARRIERS

Materials

For midrise residential buildings, the Massachusetts Energy Code requires a continuous air barrier assembly at opaque exterior walls or soffits, including joints and junctions to abutting constructions to control air movement through the wall. The air barrier also serves as a liquid-water drainage plane flashed to discharge water or condensation to the exterior.

Recommended product is:

Modified Bituminous Sheet: Recommend 40-mil thick, peel and stick membranes. Care must be taken in selecting compatible accessory transition strips to adjacent spray applied materials. Compatibility of material issues may require the use of a primer prior to attachment. At opaque exterior walls use vapor open air barriers.

UNIT MASONRY & VENEER BRICK WATER REPELLENTS

Materials

Protective Coatings: The resolution of water infiltration problems at above ground masonry should be accomplished by other means than masonry sealants or coatings. If circumstances demand the use of these products, a penetrating “breathable” system containing silane or siloxanes should be used rather than a film coating.

Protective masonry coatings are acceptable as long as they allow moisture to escape. Coatings should have a 10 year minimum guarantee.

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Design

Specify water repellants in accordance with manufacturer's recommendations.

CLIMATE RESILIENCE RESOURCES

Project teams can learn more about best practices for moisture control from this resources and others:

- EPA's guide "Moisture Control Guidance for Building Design, Construction and Maintenance" has strategies for using appropriate paint types and photos of example challenging conditions: <https://www.epa.gov/sites/production/files/2014-08/documents/moisture-control.pdf>
- FEMA's publication "Reducing Flood Risk to Residential Buildings That Cannot Be Elevated" (FEMA P-1037) has strategies and graphics explaining how to reduce water intrusion as well as some of the details to consider when doing so. https://www.fema.gov/media-library-data/1443014398612-a4dfc0f86711bc72434b82c4b100a677/revFEMA_HMA_Grants_4_pg_2015_508.pdf
- FEMA's "Flood Damage-Resistant Materials Requirements" (FEMA Technical Bulletin 2) should be used for materials selection in waterproofed spaces: https://www.fema.gov/media-library-data/20130726-1502-20490-4764/fema_tb_2_rev1.pdf