

Basis of Design

This section applies to the design and installation of reinforced CMU and reinforced multi-wythe brick walls.

Design Criteria

- Use most recent version of the International Building Code (IBC) with local municipality amendments. Referenced standards include American Society of Civil Engineers (ASCE) 5 and ASCE 6.
- Refer to the following industry guidelines; Brick Institute of America (BIA), National Concrete Masonry Association (NCMA).
- Do not use masonry below grade.
- Detail non-bearing walls to allow for vertical deflection of members above. Provide positive connection at top of wall at 4'-0" on center maximum spacing.
- Detail non-bearing/shear walls to allow for seismic inter-story drift at both top and each end of walls where adjacent to structural members.
- Provide footing under all masonry walls. Interior non-bearing walls may utilize a thickened slab which is a minimum of 12" thick by 1'-6" wide.
- Specify the use of low lift masonry practices. Grout vertically reinforced cells in no more than four foot high lifts. Grout pours over 12" in height shall be mechanically vibrated.
- Provide control joints in CMU walls and expansion joints in multi-wythe brick walls at a spacing not to exceed $1\frac{1}{2}$ x the wall height or 25'-0" whichever is less. Follow recommendations in NCMA TEK Manual 10-2B.
- Provide vertical and horizontal reinforcing in CMU walls. Wall reinforcing shall not be less than #5 at 32" oc vertical and 2 #4 in horizontal bond beam at 4'-0" oc.
- Use of stack bond is discouraged. If used, for architectural reasons, provide a minimum of one vertical reinforcing bar in each piece of block.
- Extend vertical reinforcing up to top of parapet walls. Provide horizontal reinforcing at the top of the wall.
- Provide a table on the drawings that indicates required lap lengths of the various bars used.

Design Evaluation

The following information is required to evaluate the design:

- Schematic Design Phase: Provide schematic plan indicating location and type of reinforced masonry. Outline specifications.
- Design Development Phase: Provide framing plans, typical masonry details, control joint locations. Draft specifications.
- Construction Document Phase: Complete design and specifications.

Construction Submittals

- Shop drawings for reinforcing steel.
- Material certificates for masonry units.
- Mix design for mortar and grout.

Quality Assurance

- Provide inspection of all masonry by independent testing lab.
- Mock-up is required for large projects; shall not be part of the work. Work must be approved prior to working on the building.

Related Sections

- General Requirements
- Below Grade Walls
- Architectural – Masonry Walls
- Architectural – Thermal and Moisture Protection

Products, Material and Equipment

- Concrete masonry units (CMU) minimum net compressive strength 1900 psi, normal or medium weight block.
- Brick minimum net compressive strength 3000 psi.
- Grout minimum compressive strength 2500 psi.
- Type-S mortar.
- No calcium chloride allowed in mortar or grout.
- At exterior walls, all metal accessories shall be stainless steel.
- Consider specifying reinforcing steel with a high recycled content.

Installation, Fabrication and Construction

- Store masonry units in dry location. If units are not stored in an enclosed location, cover top and sides of stacks with waterproof sheeting, securely tied.
- Follow cold and hot weather construction practices per ASCE 6.

END OF DESIGN GUIDE SECTION