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flow, will meet the required compressive strength, air content, and retentivity (ability

to retain water) requirements and (2) verify

in the field that volume proportions meet

proportion limits.

• Two kinds of grout:

plant - batched grout.



Design of Masonry Struc

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Grout

Grout for unit masonry is specified by ASTM C 476

- Coarse grout (cement, sand, pea gravel, water)

ASTM C 476 permits a small amount of hydrated lime,

but does not require any. Lime is usually not used in

- Fine grout (cement, sand, water)

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Masonry Mortar

- The proportion specification is the default. Unless the property specification is used, no mortar testing is necessary.
- The proportion of water is not specified. It is determined by the mason to achieve good productivity and workmanship.
- Masonry units absorb water from the mortar decreasing its water-cement ratio and increasing its compressive strength. Mortar need not have high compressive strength.

Grout

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- Under ASTM C476, grout can be specified by proportion or by compressive strength:
 - Proportion specification is simpler. It requires only that volume proportions of ingredients be verified.
 - Specification by compressive strength is more complex. It requires compression testing of grout in a permeable mold (ASTM C 1019).

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SW Type	Minimum Reinforcement	SDC
Empirically Designed	none	A
Ordinary Plain	none	A, B
Detailed Plain	Vertical reinforcement = 0.2 in. ² at corners, within 16 in. of openings, within 8 in. of movement joints, maximum spacing 10 ft; horizontal reinforcement W1.7 @ 16 in. or #4 in bond beams @ 10 ft	A, B
Ordinary Reinforced	same as above	А, В,
Intermediate Reinforced	same as above, but vertical reinforcement @ 4 ft	A, B, (
Special Reinforced	same as above, but horizontal reinforcement @ 4 ft, and $\rho = 0.002$	any





















Action	Reinforced Masonry	Unreinforced Masonry
Combinations of lexure and axial load	0.90	0.60
Shear	0.80	0.80
Anchorage and splices of Reinforcement	0.80	
Bearing	0.60	0.60























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Code 3.3.2, Design Assumptions

- Continuity between reinforcement and groutEquilibrium
- $\mathcal{E}_{mu} = 0.0035$ for clay masonry, 0.0025 for concrete masonry
- Plane sections remain plane
- Elasto-plastic stress-strain curve for reinforcement
- Tensile strength of masonry is neglected
- Equivalent rectangular compressive stress block in masonry, with a height of 0.80 f_m 'and a depth of 0.80 c

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