# Check-Your-Spec

A change in Building Code is a great time to Check-Your-Spec.

## SPECIFYING CONCRETE MASONRY UNITS (CMUs):

- Only specify that the CMUs meet all the requirements of ASTM C90, along with color and texture. Leave the weight and method of verifying compliance with the design strength ( $f_m'$)(Unit Strength of Prism method) to the S-1 Sheet.

| Density Classification | Oven-Dry Density of Concrete, lb/ft$^3$ (kg/m$^3$) |
|---|---|
| | Average of 3 Units |
| Light Weight | Less than 105 (1,680) |
| Medium Weight | 105 to less than 125 (1,680-2,000) |
| Normal Weight | 125 (2,000) or more |

ASTM C90-16a Weight Table (Density Classification Requirements Table from ASTM C90-16a)

- When Unit Strength method is used to verify $f_m'$ suggest that the structural engineer use a "standard" composite masonry strength (i.e. 2,000psi, 2,250psi, 2,500psi, 2,750psi or 3,000psi) listed in the Unit Strength Table.

- Make sure that your specification does not require a "Grade" or "Type". These designations have not been found in the ASTM or Building Code for many cycles. Producers will not be able to certify that CMUs meet the requirements of a specification requiring "Grade" or "Type".

| Net Area Compressive Strength of Concrete Masonry ($f_m'$), psi | Net Area Compressive Strength of ASTM C90 Concrete Masonry Units, psi | |
|---|---|---|
| | Type M os S Mortar | Type N Mortar |
| 1,700 | N/A | 1,900 |
| 1,900 | 1,900 | 2,350 |
| 2,000 | 2,000 | 2,650 |
| 2,250 | 2,600 | 3,400 |
| 2,500 | 3,250 | 4,350 |
| 2,750 | 3,900 | N/A |
| 3,000 | 4,500 | N/A |

TMS 602-13 Compressive Strengths for Concrete Masonry (Unit Strength Table from TMS 602-13)

## SPECIFYING MASONRY MORTAR:

- Only specify that the masonry mortar meets the requirements of ASTM C270 and any color that may be required. Leave the mortar Type (M or S) to the S-1 Sheet.

- Do not specify a mortar strength. Mortar meeting the requirements of ASTM C270 may be either proportioned as shown in the C270 Proportion Table, or meet the physical properties required for the Type specified (i.e. compressive strength). Mortar should never be specified to meet both the proportion and property requirements.

- Do not specify field testing in an effort to verify compressive strength of mortar used in the field. Field testing may be used to establish consistency in mortar used in the field. When field mortar testing is required, mortar must be sampled and tested prior to start of construction in accordance with ASTM C780 to establish a baseline for comparison of field-tested mortar. There are no ASTM requirements that field sampled mortar meet the strength requirements.

- Testing of approved, pre-blended mortar is no longer required on essential services projects (including K-12 and Community Colleges). CBC 2105A.3 Exception 2.

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## SPECIFYING MASONRY GROUT

- Specify that the masonry grout must meet the requirements of ASTM C476. Leave the strength requirements to the S-1 Sheet. Insist that the mix design submitted indicate compliance with ASTM C476.
- Masonry grout should have a slump between 8 and 11 inches and should contain no water reducers or plasticizers (approved grout-aid should only be specified when required by some agencies for high-lift grouting).
- Total weight of cementitious materials in the mix should not exceed 610 pounds, and Portland Cement may be replaced with up to 40% fly ash or a combination of 70% fly ash and ground granulated blast-furnace slag (see www.cmacn.org for details).
- Masonry grout mixes developed by ready-mix suppliers are not required to have a $^1/_3$ increase in strength when statistical test data is not available.
- Masonry grout should not contain integral water repellants.

## MORTAR JOINTS

- Specify that mortar joints should be tooled to form a waterproof joint and a tight bond with the CMUs. A concave tooled joint is most commonly used.
- Any mortar joints that are cracked or not bonded with the face shells of the CMUs should be removed and joints repointed prior to grout placement.

## CONSTRUCTION TOLERANCES

- Construction tolerances should be specified to meet the requirements of TMS 602 Article 3.3 F. Note that construction tolerances are intentionally compatible with material manufacturing tolerances.

## QUALITY CONTROL AND TESTING PROGRAM

- A quality control and testing program should be specified to meet the requirements of TMS 602 Article 1.6.
- Inspection and testing frequency should be outlined on the S-1 Sheet. Incorporate Tables 3 and 4 from TMS 602 Article 1.6. We suggest creating a table similar to Tables 3 and 4 and indicate project specific tests and inspections and their frequency.

## MOVEMENT AND CONTROL JOINTS

- Movement and control joints should be specified and located on the project documents by the design team. Movement and control joint locations should never be left to the discretion of the contractor.

For more help with your masonry specification, please contact: Kurt Siggard, Concrete Masonry Association of California and Nevada, 916-722-1700; or John Chrysler, Masonry Institute of America, 310-257-9000.

*4. CMACN 2017 July Awards Issue of "CMU Profiles in Architecture"*