

strength. This verification may be provided in one of two ways—the unit strength method or the prism test method. The unit strength method is very conservative, and is based on the empirical assumption that the combination of certain mortar types with units of a certain compressive strength will produce masonry of a given strength. If the manufacturer submits certification of the unit compressive strength and the mortar is specified by the ASTM C270 proportion method, compressive strength verification can be provided by a table in the code without any preconstruction or construction testing of any kind. If the mortar was specified by the ASTM C270 property method, the mortar test discussed above, along with the manufacturer's certification of unit strength, is sufficient to verify compressive strength compliance. If  $f'_m$  must be verified by the prism test method, an assemblage of the selected units and mortar must be constructed and tested in accordance with ASTM C1314. This test may be used both for preconstruction and construction evaluation of the masonry. Although the ASTM C1314 test method is similar to other compressive strength test methods, ASTM C1314 does not require any extraneous information other than that required for verification of the specified compressive strength.

## 17.6 MASONRY SUBMITTALS

Submittals are a time-consuming, but important, part of construction projects. Submittals are used to help assure that the work meets the requirements of the contract documents and that the contractor achieves the standard of quality established by the specifications. For each project, the architect or engineer must decide what submittals are needed for each portion of the work. Submittals require time and money to prepare and process (for both the A/E and the contractor), so it is important that only those submittals that are appropriate and necessary to the work be required.

The types of submittals that are appropriate or necessary will vary from project to project according to the nature of the construction, both aesthetic and structural. For masonry projects designed under the Masonry Standards Joint Committee (MSJC) *Building Code Requirements for Masonry Structures (ACI 530/ASCE 5/TMS 402)*, some submittals are mandatory. Projects that are non-structural, but aesthetically important, may lean more toward submittal of unit and mortar samples than test reports. Each project is unique in its requirements.

### 17.6.1 Specifying Submittals

According to the *CSI Manual of Practice*, administrative and procedural requirements for submittals should be specified in Division 1—General Requirements, because they apply to all project submittals. CSI's MasterFormat™ designates Section 01300 as the proper location for these requirements, which would include information such as the number of copies required, how much time should be allowed for review, and to whom reviewed submittals should be distributed.

Specific submittals required for a masonry project should be specified in the appropriate technical section in Division 4. Each of the technical sections should include in Part 1 a complete list of the submittals required for that portion of the work. Submittals may include shop drawings, product data, samples, and quality assurance/quality control submittals. Each type of submittal has a different function, and is applicable to different types of materials, products, or systems. *Figure 17-3* lists all of the types of submittals and

<p><b>SHOP DRAWINGS</b></p> <ul style="list-style-type: none"> <li>• fabrication dimensions and placement locations for reinforcing steel and accessories</li> <li>• sheet metal flashing details</li> <li>• stone fabrication and setting drawings</li> </ul> <p><b>PRODUCT DATA</b></p> <ul style="list-style-type: none"> <li>• proprietary mortar ingredients               <ul style="list-style-type: none"> <li>• portland cement</li> <li>• masonry cement</li> <li>• mortar cement</li> <li>• lime</li> <li>• admixtures (including pigments)</li> </ul> </li> <li>• connectors</li> <li>• joint reinforcement</li> <li>• flashing materials</li> <li>• weephole and drainage accessories</li> <li>• cleaning agents</li> </ul> <p><b>SAMPLES</b></p> <ul style="list-style-type: none"> <li>• masonry units</li> <li>• stone</li> <li>• mortar colors</li> <li>• connectors</li> <li>• flashing materials</li> <li>• accessories</li> </ul> <p><b>QUALITY ASSURANCE / QUALITY CONTROL SUBMITTALS</b></p> <ul style="list-style-type: none"> <li>• design data               <ul style="list-style-type: none"> <li>• mortar mix designs (property specification only)</li> <li>• grout mix designs (for required compressive strength only)</li> </ul> </li> <li>• test reports               <ul style="list-style-type: none"> <li>• prism test (alternate method of verifying <math>f'_m</math>)</li> <li>• preconstruction testing</li> <li>• field testing</li> </ul> </li> <li>• certifications               <ul style="list-style-type: none"> <li>• compliance with specified ASTM standards</li> <li>• brick IRA</li> </ul> </li> <li>• inspection reports               <ul style="list-style-type: none"> <li>• materials</li> <li>• construction procedures</li> <li>• reinforcement</li> <li>• grouting</li> <li>• protection measures</li> </ul> </li> <li>• manufacturer's instructions               <ul style="list-style-type: none"> <li>• mortar admixtures</li> <li>• mortar pigments</li> <li>• cleaning agents</li> </ul> </li> <li>• manufacturer's field reports               <ul style="list-style-type: none"> <li>• cleaning operations</li> </ul> </li> <li>• proposed hot and/or cold weather construction procedures</li> </ul>
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**Figure 17-3** Masonry submittals checklist.