

PROPERTY vs. PROPORTION MIXES

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The American Society for Testing and Materials (ASTM) maintains the national standards for mortars and the materials commonly used within mortars. Four mortar types are included in these mortar standards: Types M, S, N, and O.

The method in which these mixes are designed is determined by **ASTM C270 The Standard Specification for Mortar for Unit Masonry**. This standard covers mortars for use in the construction of non-reinforced and reinforced unit masonry structures.

ASTM C270 outlines two distinctive options for the specification of masonry mortars: **property specifications** and **proportion specifications**.

Proportion Specification

When the proportion requirements of ASTM C270 are specified, **the manufacturer is required to produce the mortar to have specific proportions as stated in this standard**. Because this recipe is prescriptive, there are no performance criteria within ASTM C270 for test data since the manufacturer doesn't have direct control of the design. This means test data should not be required for submittal purposes. Submittal information should include the proportions of the mortar materials and certificates of compliance for each raw material used, and should be evaluated for acceptance accordingly.

TCC Materials blends proportion mortars to meet those specific proportions by volume.

PROPORTION				
Mortar	Type	Cement	Hydrated Lime or Lime Putty	Aggregate Ratio (Measured in Damp, Loose Conditions)
Cement-Lime	M	1	¼	Not less than 2¼ and not more than 3 times the sum of the separate volumes of cementitious materials
	S	1	Over ¼ to ½	
	N	1	Over ½ to 1¼	
	O	1	Over 1¼ to 2½	

Property Specification

When the property requirements of ASTM C270 are specified, **the manufacturer is responsible for the design of the mix, including the amount of sand, lime, and cement**. When property mortars are

specified, submittal information should include test data from a qualified laboratory that indicates the compressive strength and flow, the water retention, the air content, and the aggregate ratio of the mortar tested, as well as certificates of compliance for each raw material used. This data can then be compared to the performance criteria within ASTM C270 in order to evaluate whether the mortar complies with the specification.

TCC Materials blends property mortars to meet specific design criteria for the mortar required in the specification, including minimum compressive strength at a specific flow, a minimum amount of water retention, a maximum air content, and a minimum and maximum aggregate ratio. The actual mix design of the mortar is proprietary to the mortar manufacturer and will not be disclosed.

PROPERTY					
Mortar	Type	Average Compressive Strength at 28 Days, min, psi (MPa)	Water retention, min, %	Air content, max, %	Aggregate Ratio (Measured in Damp, Loose Conditions)
Cement-Lime	M	2500 (17.2)	75	12	Not less than 2¼ and not more than 3½ times the sum of the separate volumes of cementitious materials
	S	1800 (12.4)	75	12	
	N	750 (5.2)	75	14	
	O	350 (2.4)	75	14	

Specification of Property vs. Proportion

In no case should both test data and mix proportions be required in order to demonstrate compliance with the specification.

This would create a situation where a manufacturer would be required to comply with both alternates of the specification. The specifier should select either property or proportion per ASTM C270, but never both.

TCC Materials manufactures masonry mortars that are designed to comply with ASTM C270. Either the proportion specifications or property specifications shall govern as specified. Specifications must be clear on the design intent (property or proportion) so the contractor knows what the acceptance criteria for the proposed mortar will be.

(continued)

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TCC Materials prepares submittal information in order to expedite evaluation of our mortar mixtures on jobs that have specifications. These submittal packages are put together to demonstrate that our masonry mortars meet the requirement of ASTM C270. Submittals are updated annually or more frequently, as needed. Please contact your sales rep for the most current product submittal. For more information please refer to the latest version of ASTM C270.

For product information visit www.tccmaterials.com.

References

- American Society for Testing and Materials (ASTM)

