

TYPE N, S, M MASONRY CEMENT



Building the future™

PRODUCT DESCRIPTION

Basic Use

CEMEX's Masonry Cement is specially formulated and manufactured to produce masonry mortar for use in brick, block and stone masonry construction; also used to produce stone plaster.

Composition and Materials

CEMEX's Masonry Cement consists of a mixture of Portland or blended hydraulic cement and plasticizing materials (such as limestone, hydrated or hydraulic lime) together with other materials introduced to enhance one or more properties. These components are proportioned at the cement plant under controlled conditions to assure product consistency.

Types

CEMEX's Masonry Cements are produced in Type N, Type S and Type M strength levels for use in preparation of ASTM Specification C-270 Type N, S or M mortar,

respectively without any further additions.

Table 1 is a general guide for selection of mortar type. Other factors, such as type and absorption of masonry unit, climate and exposure, applicable building codes, and engineering requirements should also be considered.

TABLE 1
Recommended Guide for Selection
of Mortar Type

Building Segment	Mortar Type
Exterior, above grade, load-bearing	N or S or M
non load-bearing parapet wall	N N or S
Exterior, at or below grade	S or M
Interior load-bearing	N or S
non load-bearing	N

Limitations

CEMEX's Masonry Cements are designed to be mixed with sand and water. The addition of hydrated lime or any other materials to a masonry cement mortar at the job site is not required or recommended.

TECHNICAL DATA

Applicable Standards

The following standards apply to the use of CEMEX's Masonry Cements:

ASTM C-91 (Standard Specification for Masonry Cements)

ASTM C-144 (Standard Specification for Aggregates for Masonry Mortar)

ASTM C-270 (Standard Specification for Mortar)

ASTM C-780 (Standard Specification for Pre-construction and Construction Evaluation of Mortar for Plain and Reinforced Unit Masonry)

Water

All water should be clean and free from organic material and deleterious amounts of dissolved acids, alkalies and salts.

Physical Properties

CEMEX's Masonry Cement conforms to physical properties of ASTM C-91 (See Table 2).

TABLE 2
Physical Properties of Masonry Cements (ASTM C-91)

Masonry Cement Type	N	S	M
Fineness, residue on a 45-um (No. 325) sieve max., %	24	24	24
Autoclave expansion max., %	1.0	1.0	1.0
Time of setting			
Initial set, min., hr.	2	1-1/2	1-1/2
Final set, max., hr.	24	24	24
Compressive strength (avg. of 3 cubes), min.			
7 days, psi (MPa)	500 (3.4)	1300 (9.0)	1800 (12.4)
28 days, psi (MPa)	900 (6.2)	2100 (14.5)	2900 (20.0)
Air content, volume %			
Min.	8	8	8
Max.	21	19	19
Water retention, flow after suction as % of original flow, min.	70	70	70

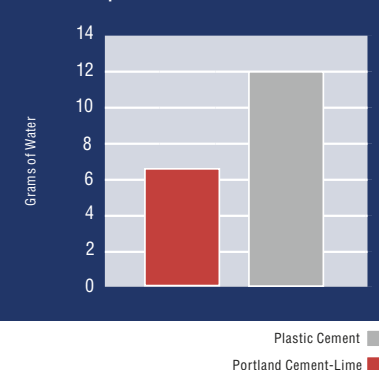
- Water permeance. The properties of Masonry Cement Mortars assure that the designer's and masons' needs are met in achieving watertight masonry construction. Laboratory research⁴ has confirmed the excellent performance of Masonry Cement Mortars in water permeance tests (See Figure III).

Appearance

Since Masonry Cement color is laboratory controlled and Masonry Cement offers the simplicity of the one bag system of batching, it is easier to achieve a consistent appearance in the finished job.

INSTALLATION

Figure III
Water Absorption of Mortars



Durability

Properties of masonry mortar related to its durability include:

- Resistance to freeze-thaw deterioration. Research^{1,2,3} shows that air-entrainment levels of at least 10 to 12 percent are needed to provide effective resistance to freeze-thaw deterioration.
- Drying shrinkage characteristics. Results of laboratory test shown in Figure I indicate that the drying shrinkage of Masonry Cement Mortars is about half that of Portland Cement-Lime Mortars (See Figure I).
- Resistance to sulfate attack. Masonry Cement Mortars also demonstrate significantly greater sulfate resistance than Portland Cement-Lime Mortars (See Figure II).

range of 1:2¼ to 1:3½, and the mortar must be pre-tested in the laboratory before the job begins.

Machine mixing should be used whenever possible. First, with mixer running, add most of the water and half the sand. Next, add the Masonry Cement and the rest of the sand. After one minute of continuous mixing, slowly add the rest of the water. Mixing should continue for at least three minutes; extending mixing up to five minutes improves mortar.

APPLICATION

Good workmanship principles are required for successful application, including proper filling of head and bed joints, careful placement of units, appropriate tooling of the joint, modification of construction procedures and/or schedules to adapt to extreme weather conditions^{5,6} and proper cleaning procedures.

Figure I
Drying Shrinkage of Masonry Mortars at 28 days

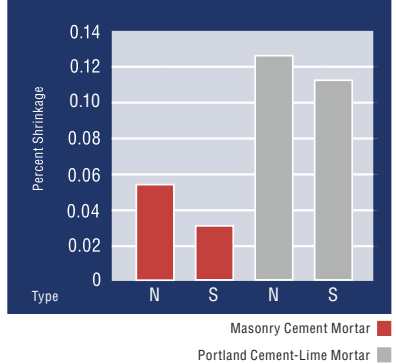
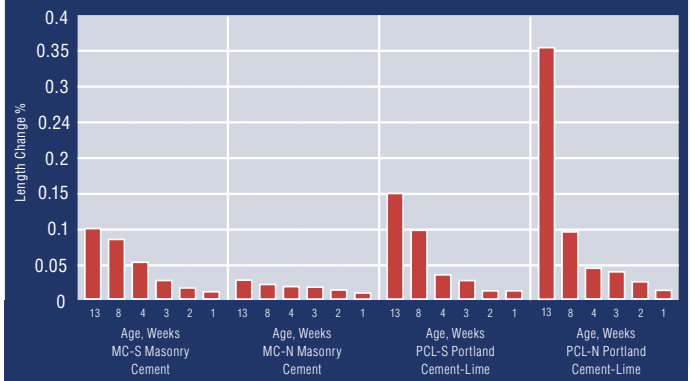


Figure II
Sulfate Expansion of Masonry Mortars



Masonry joints should be tooled at the same degree of stiffness and moisture. If joints are tooled too early, excess water will be drawn to the surface, producing lighter joints. The joints will appear dark and discolored if tooling is done after stiffening has started.

Hot Weather and Retempering

Mortars exposed to hot winds and full sun will tend to lose workability due to the evaporation of water. Common sense precautions should be taken to protect the mortar such as shading the mixer, wetting mortar boards, covering wheelbarrows and tubs, and balancing mortar production to meet demand.

If it is necessary to restore workability, mortar may be retempered by adding water and remixing. No mortar should be used or retempered beyond 2½ hours after the initial mixing.

Preparation

CEMEX's Masonry Cement proportioned with sand meeting ASTM C-144, according to Table 4, will produce mortar meeting the requirements of ASTM C-270 under the proportion specifications. Under the property requirements of ASTM C-270, however, cement-to-sand proportions for the job mixed mortar are to be in the

Cold Weather Precautions

Mortar should be maintained at a minimum temperature of 40° F as prescribed by standard cold weather masonry specifications. Cold weather admixtures should be approved by the architect.

AVAILABILITY

CEMEX's Type N, S, and M Masonry Cement can be ordered by contacting any of the following CEMEX offices:

Alabama	(800) 854-2872
Arizona	(602) 416-2600
California	(909) 974-5478
Colorado	(800) 848-5871
Florida	(800) 727-6261
Georgia	(800) 367-1668
Kentucky	(800) 626-6117
Ohio	(800) 848-3498
Pennsylvania	(800) 245-1705
Tennessee	(800) 352-7582
Texas-Balcones	(800) 492-9004
Texas-Odessa	(800) 927-4838

GUARANTEES

CEMEX, Inc. guarantees Broco Stucco Cement when shipped from our mill or terminals to meet the current requirements of ASTM C-1328, "Standard Specification for Plastic (Stucco) Cement" and ASTM C-91, "Standard Specification for Masonry."

MAINTENANCE

Avoid use of harsh chemical cleaners or strong acid solutions in cleaning masonry.

TECHNICAL SERVICES

CEMEX personnel are available to provide technical assistance by contacting any of the offices previously listed.

- 1 Dubovoy, V.S., and Ribar, J.W., "Masonry Cement Mortars – A Laboratory Investigation", Research and Development Bulletin RD0095, PCA Skokie, IL, 1990, 26pp.
- 2 Davison, J.I., "Effect of Air-Entrainment on Durability of Cement-Lime Mortars", Durability of Building Materials, Elsevier Publishing Co., Amsterdam, 1981.
- 3 Zematis, W.L., "Factors Affecting Performance of Unit Masonry Mortar", ACI Journal, Proc. Vol. 56, No. 6, American Concrete Institute, Detroit, MI 1959.
- 4 Ribar, J.W., "Water Permeance of Masonry, a Laboratory Study", ASTM STP 778, ASTM 1982, pp 200-220.
- 5 "Cold Weather Construction" and "Hot Weather Construction", ACI 530.1/95, Section 1.8, pp. 5-12, ACI, 38800 Country Club Drive, Farmington Hills, MI 48331.
- 6 "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction", International Masonry All Weather Council.

WARRANTY

CEMEX warrants that the products identified are in accordance with the appropriate current ASTM and Federal Specifications. No one is authorized to make any modifications or addition to this warranty. **CEMEX makes no warranty or representation, either expressed or implied with respect to this product and disclaims any implied warranty of merchantability or fitness for a particular purpose.**

As CEMEX has no control over the other ingredients mixed with this product or the final application, CEMEX does not and cannot warrant the finished work.

In no event shall CEMEX be liable for direct, indirect, special, incidental or consequential damages arising out of the use of this product, even if advised of the possibility of such damages. In no case shall CEMEX's liability exceed the purchase price of this product.

TABLE 3
Physical Properties of Masonry Cement Mortars (ASTM C-270)

Mortar Type	Compressive Strength 2" Cubes at 28 days Min., psi (MPa)	Water Retention Minimum %
N	750 (5.2)	75
S	1800 (12.4)	75
M	2500 (17.2)	75

TABLE 4
Masonry Cement Mortar - Proportions by Volume (ASTM C-270)

Mortar Type	Portland Cement	Masonry N	Cement S	Type M	Sand
N	–	1	–	–	2¼ – 3
S	½	1	–	–	3¾ – 4½
S	–	–	1	–	2¼ – 3
M	1	1	–	–	4½ – 6
M	–	–	–	1	2¼ – 3



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