



Standard Practice for Use of Chemically Setting Chemical-Resistant Silicate and Silica Mortars¹

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1. Scope

1.1 This practice provides information for the proper storage, mixing, and use of chemically setting silicate and silica mortars for bonding chemical-resistant brick or tile in order to obtain the optimum chemical resistance and physical strength of the mortar.

1.2 This practice does not apply to the air-setting type of silicate and silica chemical-resistant mortars.

1.3 Chemical-resistant brick or tile conforming to Specifications C 279, C 410, or C 980 are considered satisfactory for use with these mortars.

NOTE 1—For specifications for mortars covered by this practice, see Specification C 466.

1.4 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

C 267 Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing²

C 279 Specification for Chemical-Resistant Masonry Units²

C 410 Specification for Industrial Floor Brick²

C 414 Test Method for Working, Setting, and Service Strength Setting Times of Chemically Setting Chemical-Resistant Silicate and Silica Mortars²

C 466 Specification For Chemically Setting Silicate and Silica Chemical-Resistant Mortars²

C 904 Terminology Relating to Chemical Resistant Nonmetallic Materials²

C 980 Specification for Industrial Chimney Lining Brick²

¹ This practice is under the jurisdiction of ASTM Committee C-3 on Chemical-Resistant Nonmetallic Materials and is the direct responsibility of Subcommittee C03.02 on Mortar and Monolithics.

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² *Annual Book of ASTM Standards*, Vol 04.05.

3. Terminology

3.1 For definitions of terms used in this practice, see Terminology C 904.

4. Shipment and Storage

4.1 The powder shall be protected from water during shipment and storage. Powder that has become wet shall be discarded.

4.2 The liquid binder shall be protected from freezing during shipment and storage. In the event that any containers of liquid have ruptured, they shall be discarded.

4.3 In the event that silica sols freeze, they must be discarded. In the event that silicates freeze, they may be restored by warming and thorough stirring until a uniform solution results. Consult the manufacturer for recommendations.

5. Installation Conditions

5.1 Silicate and silica mortars shall be applied when the powder, binder or water, brick or tile, substrate and ambient air temperatures are all between 50°F (10°C) and 90°F (32°C). For temperatures outside this range, consult the manufacturer for recommendations.

5.2 The brick or tile and substrate shall be clean and dry during installation.

6. Mixing and Application

6.1 Use the proportions of powder to binder or potable water recommended by the manufacturer. Weigh the powder and binder or potable water into separate containers according to the recommended ratio. Liquid and powder levels may then be marked so that future measurements may be made by volume.

6.1.1 The optimum properties may vary due to temperature. The mortar should be sufficiently stiff for the brick or tile to retain its position without slipping or sliding or without sagging out of the joint.

6.2 Using a clean mortar pan or other suitable container, add approximately three fourths of the powder to the liquid and mix with hoe, trowel, or power mixer until all of the powder has been wetted. Add the remainder of the powder to the mix and continue mixing to a proper mortar consistency.

6.3 Mix only as much mortar as can be used during its working time. Since the working time depends on the temperature, the batch size shall be determined on the job site if data are not available from the manufacturer.

6.4 Mortar that has begun to set shall not be altered by adding binder or water. Remove mortar that has begun to set from the mortar pan, and discard it before preparing fresh batches.

6.5 No additives, such as portland cement shall be added to the mortar. Silica sand or other materials shall not be added unless recommended by the manufacturer, and then only in a quantity and quality specified by the manufacturer.

6.6 Apply the mortar to the brick or tile in a manner consistent with good workmanship. Butter the surface to fully cover, leaving a slight mound of mortar in the center of the brick face. Strike the mounded mortar toward each edge to ensure full contact. Tap the brick or tile firmly into position so that the joints are of the width recommended by the design engineer or the manufacturer and mortar is extruded from all joints. Strike extruded mortar off the faces of the brick or tile with a trowel. Chemical-resistant brickwork joints should be as narrow as good workmanship and uniformity of the brick or tile will permit (preferably less than $\frac{1}{8}$ in. (3 mm)).

7. Acid Washing

7.1 If acid washing is recommended by the manufacturer, it shall be carried out in accordance with his directions.

8. Curing

8.1 The time interval between the bonding of the brick or tile and the time the structure can be put into service shall be

that recommended by the manufacturer. Test Method C 414 is recommended for use in the determination of time to put into service.

8.2 The installation shall be protected from moisture in all forms, and mechanical damage, for the period of time recommended by the manufacturer.

9. Chemical Resistance

9.1 Sodium and potassium silicate, and silica mortars are resistant to most acids (except those containing fluorine).

9.1.1 Exposure of silicate and silica mortars to water, boiling water, or neutral salt solutions may be detrimental. Consult the manufacturer for recommendations.

9.1.2 Silicate and silica mortars are generally not resistant to alkalis.

9.2 Under certain conditions crystal formation can occur in silicate mortars. If the crystals are growth salts, they can damage the joints.

9.3 Chemical resistance to specific chemical media may be determined in accordance with Test Method C 267.

9.4 Consult the manufacturer regarding service conditions and selection of either sodium or potassium silicate, or silica mortars.

10. Temperature Resistance

10.1 Consult the manufacturer regarding the temperature resistance of a specific mortar.

11. Keywords

11.1 chemical-resistant; masonry units; mortars; silica; silicate

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