



Standard Practice for Use of Chemical-Resistant Resin Mortars¹

This standard is issued under the fixed designation C399; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice provides information on the handling and proper use of chemical-resistant resin mortars such as those covered in Specification C395.

NOTE 1—Resin mortars and grouts are differentiated as follows: resin grouts are applied to the joints, generally ¼ in. (6 mm) wide, after the brick or tile are set in place (grouting or tile setter's method). Resin mortars are troweled onto the brick or tile, generally in a ⅛ in. (3 mm) thickness, before the brick are laid in place (buttering or bricklayer's method). Refer to Practice C723.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *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.* Specific precautions are given in Sections 5 and 5.2.

2. Referenced Documents

2.1 ASTM Standards:²

- C279 Specification for Chemical-Resistant Masonry Units
- C305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency
- C386 Practice for Use of Chemical-Resistant Sulfur Mortar
- C395 Specification for Chemical-Resistant Resin Mortars
- C410 Specification for Industrial Floor Brick
- C723 Practice for Chemical-Resistant Resin Grouts for Brick or Tile
- C904 Terminology Relating to Chemical-Resistant Nonmetallic Materials
- C980 Specification for Industrial Chimney Lining Brick

¹ This practice is under the jurisdiction of ASTM Committee C03 on Chemical-Resistant Nonmetallic Materials and is the direct responsibility of Subcommittee C03.02 on Monolithics, Grouts and Polymer Concretes.

Current edition approved Aug. 1, 2012. Published September 2012. Originally approved in 1957. Last previous edition approved in 2008 as C399 – 98 (2008)^{ε1}. DOI: 10.1520/C0399-98R12.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, see Terminology C904.

4. Storage

4.1 When stated on the package, the manufacturer's recommendations shall be followed. In all cases, storage shall be in a dry place with containers tightly closed and away from open flames. Some resins should be stored in a cool place at temperatures as low as 40 to 50°F (5 to 10°C) to extend their shelf life. Powder or resin that has become wet or otherwise contaminated shall not be used.

5. Hazards

5.1 Consult manufacturer's Material Safety Data Sheet for precautions to be taken when using chemical-resistant resin mortars.

5.2 Solvents used for cleaning tools are generally flammable. (**Warning**—Open flames must be kept from the area. "No Smoking" signs should be posted.)

6. Equipment

6.1 For hand mixing, a shallow mortar box should be provided. A suggested size is 2 ft² by 4 in. (600 mm² by 100 mm) deep.

6.2 Equipment for power-mixing ranges from small mixers, such as described in Practice C305, to simple beaters used on low-speed motors. A suitable container is a round-bottom pan or a 5-gal (20-L) pail, which is commonly available.

6.3 Equipment may be required for heating or cooling materials as conditions dictate.

6.4 All mixing equipment should be clean and dry.

7. Mixing

7.1 For hand mixing, measure the liquid into the mortar box, then stir the powder in gradually, working out all lumps and air bubbles. Mix with a mason's trowel or other suitable tool.

7.2 For power mixing, measure the liquid into the container and mix in the powder gradually and uniformly.

7.3 Mortars shall be mixed in accordance with the manufacturer's specifications. It is recommended that some means

of measuring be devised so that the batches are uniform. Simple volume measurements may be used, but weighing is preferred. Consult the manufacturer if variations in proportions are being considered.

7.4 Batch size should be varied according to temperature. In hot weather, batches may be as small as 10 lb (5 kg), and in cold weather they may be increased to as much as 50 lb (23 kg).

7.5 No additives such as sand, portland cement, or water should be added.

7.6 Containers of resins and powders should be closed when not being used.

8. Handling

8.1 Resin mortars cure very slowly at low temperatures. If work must be carried on at temperatures below 60°F (16°C), chemical-resistant construction units should be heated and the area enclosed and heated to obtain proper cure. However, certain resin mortars can be used satisfactorily at lower temperatures.

8.2 Mortar should be transferred immediately from the mixing vessel and spread in a thin layer on the mortar pan, as mortar heats up during setting and thick layers or large masses retain this heat. Retained heat shortens the working time.

8.3 Mixed mortar that has become unworkable shall not be retempered with resin liquid but shall be discarded.

8.4 When resin mortars are to be exposed to temperatures below 60°F (16°C) or above 90°F (32°C) during mixing, application, or setting, special precautions are required. The manufacturer should be consulted for recommendations.

9. Laying Chemical-Resistant Brick or Tile

9.1 Brick and tile are covered by Specifications **C279**, **C410**, and **C980**.

9.2 The brick or tile shall be dry. Minimum and maximum temperature of the brick or tile at the time of use shall be 50 to 90°F (10 to 32°C). Sufficient time is required to establish temperature equilibrium within the brick or tile.

9.3 *Walls with No Sulfur Back-Joint*—Spread a bed-joint of mortar the width of the brick or tile and $\frac{1}{4}$ to $\frac{3}{8}$ in. (6 to 10 mm) thick. Butter one end and the back side of each brick or tile with approximately $\frac{1}{4}$ in. (6 mm) thickness of mortar. Press the brick or tile into the bed and against the wall and adjacent unit until the joint in each is as near to $\frac{1}{8}$ in. (3 mm)

thick as good workmanship will permit. Trim off excess mortar and return it to the mortar board.

9.4 *Walls with Sulfur Back-Joint*—Spread a bed-joint as described in 9.3. Butter one end of each brick or tile and lay it $\frac{1}{4}$ in. (6 mm) away from the wall. After each course has been laid, pour the back-joint with molten sulfur cement in accordance with the Practice **C386**.

9.5 *Floors With Bed-Joint*—Spread the mortar on the floor to approximately $\frac{1}{8}$ -in. (3-mm) thickness. Spread approximately $\frac{1}{4}$ in. (6 mm) thickness of mortar on two adjacent edges of the brick or tile. Press into the bed and against the starting curb or brick until the joint is as near to $\frac{1}{8}$ in. (3 mm) thick as good workmanship will permit. Trim off the excess mortar and return it to the mortar board.

10. Cleaning Mortar From Chemical-Resistant Brick or Tile

10.1 Various compounds and application methods are available from mortar manufacturers for masking brick or tile to keep mortar from adhering to them. Such compounds may be removed by steam or water after the joints have hardened.

10.2 The manufacturer of the mortar should be consulted for the method of cleaning mortar from the face of the brick or tile before hardening, since the cure of certain mortars is affected by contact with water.

11. Cleaning the Equipment

11.1 Clean equipment according to manufacturer's recommendations. Remove hardened mortars from metal equipment by sandblasting. Most solvents used for cleaning are flammable, and therefore precautions should be taken. (**Warning**, see 1.3 and 5.2.)

12. Curing

12.1 Resin mortars are generally formulated to cure ready for use in 24 to 48 h at normal temperatures. The manufacturer should be consulted for details.

12.2 Methods are available for speeding the cure of resin mortars. Consult the manufacturer for details.

12.3 The construction should be protected from weather and water, and from mechanical damage until the mortar is cured.

13. Keywords

13.1 chemical-resistant resin mortar; mortar application

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).