



Atlas Minerals & Chemicals, Inc.



# DATA SHEET

5-43PI (8-98)  
Supersedes 5-43PI (1-98)

## CARBO-CHEMESTER MORTAR

### DESCRIPTION

CARBO-CHEMESTER MORTAR is a high performance, acid and solvent resistant mortar for chemical resistant brick construction.

### TYPICAL USES

CARBO-CHEMESTER MORTAR is recommended for process vessels, storage tanks, scrubber towers and dryers requiring the chemical, physical or thermal resistance of chemical resistant brick construction. CARBO-CHEMESTER MORTAR is an excellent mortar for carbon brick lined structures designed to contain nitric and hydrofluoric acid solutions. It is also recommended for trenches, sumps and containment dikes exposed to hydrofluoric acid in combination with strong caustics, organic acids, chlorine, and nitric, chromic or sulfuric acids.

### CHEMICAL RESISTANCE

CARBO-CHEMESTER MORTAR is resistant to sodium hydroxide and hydrofluoric, phosphoric, nitric, sulfuric and chromic acids. It's also resistant to solutions of organic acids, such as acetic, lactic and citric acids. Refer to the chemical resistance chart for specific information. CARBO-CHEMESTER MORTAR complies with the specifications of ASTM C395 for chemical resistant resin mortars.

### AVAILABLE COLORS

CARBO-CHEMESTER MORTAR is available in black only.

### PACKAGING AND COVERAGE

#### AMPVAR PRIMER Base

1-gallon (6 lb. [2.7 kg.]) can  
Coverage: 300 sq. ft. (27.9 m<sup>2</sup>) per can

5-gallon (29 lb. 10 oz. [13.4 kg.]) pail  
Coverage: 1,480 sq. ft. (137 m<sup>2</sup>) per pail

#### CARBO-CHEMESTER MORTAR

##### 21 lb. 11 oz. (9.8 kg.) Unit Consisting of:

- One - 1-gal. can of Resin (8 lb. [3.6 kg.])
- One - bottle of Hardener (36 g.)
- One - bag of Powder (13 lb. 10 oz. [6.2 kg.])

## PHYSICAL PROPERTIES

| PROPERTY  | TEST METHOD | TYPICAL VALUE                                       |
|---|-------------|---|
| Density   | ASTM C905   | 94 lb./cu. ft.<br>(1.51 g./cc.)                     |
| Bond Strength,<br>7 days @ 77°F (25°C)                  | ASTM C321   | Brick fails   |
| Tensile Strength,<br>7 days @ 77°F (25°C)               | ASTM C307   | 1,500 psi.<br>(10.3 MPa)                            |
| Compressive Strength,<br>7 days @ 77°F (25°C)           | ASTM C579   | 12,000 psi.<br>(82.7 MPa)                           |
| Flexural Strength,<br>7 days @ 77°F (25°C)              | ASTM C580   | 3,300 psi.<br>(22.7 MPa)                            |
| Coefficient of Thermal Exp.,<br>in./in./°F (cm./cm./°C) | ASTM C531   | 1.8 x 10 <sup>-5</sup><br>(3.2 x 10 <sup>-5</sup> ) |
| Water Absorption  | ASTM C413   | 0.25%   |
| Temperature Resistance<br>Immersion                     |             | 220°F (104°C)                                       |
| Linear Shrinkage  | ASTM C531   | 0.53%   |

### 108 lb. 8 oz. (49.2 kg.) Unit Consisting of:

- One - 5-gal. pail of Resin (40 lb. [18.1 kg.])
- One - bottle of Hardener (182 g.)
- Five - bags of Powder (13 lb. 10 oz. [6.2 kg.]) ea.

### APPLICATION OF THE CARBO-CHEMESTER MORTAR

CARBO-CHEMESTER MORTAR can be used as a mortar for chemical resistant brick construction, as a bed joint over an impervious membrane or with RED FURNANE SETTING BED, Data Sheet 5-55PI.

**BRICK JOINTS:** Install the mortar using conventional bricklaying techniques. Apply the mortar to two sides of the brick forming a "V" profile. Place the brick on the setting bed and slide it into place to attain a 1/8" (3.2 mm.) wide joint. Strike excess mortar before the mortar begins to set.

**BED JOINT:** When using CARBO-CHEMESTER MORTAR as a bed joint over an asphalt membrane, apply a coat of AMPVAR PRIMER Base (without accelerator) over the membrane and allow it to dry. Typical drying times of AMPVAR PRIMER Base are 2-1/2 hours at 65°F (18°C) or 1 hour at 85°F (29°C). Apply the mortar with a 3/16" V-notched trowel held at a 45 degree angle. Place a sufficient amount of mortar to provide a continuous bond coat to the specified thickness. Do not apply more mortar than can be covered in 10 to 15 minutes at 75°F (24°C).

## ESTIMATING TABLES - CARBO-CHEMESTER MORTAR

## FLOOR AREA

| Brick Size            | Brick Depth | 1/8" Wide x Full Depth Joint<br>Square Feet per Unit |                    | 1/8" Setting Bed &<br>1/8" Wide x Full Depth Joint<br>Square Feet per Unit |                    |
|-----------------------|-------------|--|--------------------|--|--------------------|
|                       |             | 21 lb. 11 oz. Unit                                   | 108 lb. 8 oz. Unit | 21 lb. 11 oz. Unit   | 108 lb. 8 oz. Unit |
| 8" x 3-3/4" x 2-1/4"  | 2-1/4"      | 26 sq. ft.   | 130 sq. ft.        | 12 sq. ft.   | 60 sq. ft.         |
| 8" x 3-3/4" x 2-1/4"  | 3-3/4"      | 11 sq. ft.   | 55 sq. ft.         | 7 sq. ft.  | 35 sq. ft.         |
| 8" x 3-3/4" x 4-1/2"  | 3-3/4"      | 17 sq. ft.   | 85 sq. ft.         | 9 sq. ft.  | 45 sq. ft.         |
| 8" x 3-3/4" x 4-1/2"  | 4-1/2"      | 13 sq. ft.   | 65 sq. ft.         | 8 sq. ft.  | 40 sq. ft.         |
| 9" x 4-1/2" x 1-1/16" | 1-1/16"     | 64 sq. ft.   | 320 sq. ft.        | 16 sq. ft.   | 80 sq. ft.         |
| 9" x 4-1/2" x 2-1/2"  | 2-1/2"      | 27 sq. ft.   | 135 sq. ft.        | 12 sq. ft.   | 60 sq. ft.         |
| 9" x 4-1/2" x 2-1/2"  | 4-1/2"      | 10 sq. ft.   | 50 sq. ft.         | 7 sq. ft.  | 35 sq. ft.         |
| 9" x 4-1/2" x 3"      | 3"          | 22 sq. ft.   | 110 sq. ft.        | 11 sq. ft.   | 55 sq. ft.         |
| 9" x 4-1/2" x 3"      | 4 1/2       | 11 sq. ft.   | 55 sq. ft.         | 7 sq. ft.  | 35 sq. ft.         |
| 9" x 6" x 1-1/16"     | 1-1/16"     | 77 sq. ft.   | 385 sq. ft.        | 17 sq. ft.   | 85 sq. ft.         |
| 9" x 6" x 2-1/2"      | 2-1/2"      | 32 sq. ft.   | 160 sq. ft.        | 13 sq. ft.   | 65 sq. ft.         |

Bed Joint at nominal 1/8": 22 sq. ft. per 21 lb. 11 oz. unit; 110 sq. ft. per 108 lb. 8 oz. unit

**WAXING OF THE BRICK FOR FLOORS**

CARBO-CHEMESTER MORTAR can stain red shale brick during installation. Paraffin wax can be applied to the surface face of the brick to eliminate staining. The wax coating and excess mortar are removed from the surface of the brick by steam cleaning. Use a minimum 60 psi. nozzle pressure for cleaning. Allow 24 hours at 65°F (18°C) or 12 hours at 85°F (29°C) minimum cure time before steam cleaning.

**TEMPERATURE DURING APPLICATION**

Store CARBO-CHEMESTER MORTAR at 70°F (21°C) to 80°F (27°C) for 24 hours prior to use. The best working characteristics of the materials will be attained when the temperature of the substrate, air and CARBO-CHEMESTER MORTAR are between 65°F (18°C) and 85°F (29°C). Minimum temperature for installation is 60°F (16°C).

**MIXING OF THE CARBO-CHEMESTER MORTAR**

Mixing of the components should be with a KOL type mixer with a 5-gallon capacity. The mixing speed should be between 60 and 75 RPM.

**21 lb. 11 oz. (9.8 kg.) Unit**

- Place the contents of the 1-gallon can (8 lb. [3.6 kg.]) of CARBO-CHEMESTER MORTAR Resin in the 5-gallon capacity mechanical mixer.
- Add approximately 1/2 of the 13 lb. 10 oz. (6.2 kg.) bag of CARBO-CHEMESTER MORTAR Powder. Mix thoroughly for approximately two minutes.
- Add the contents of the 36 gram bottle of CARBO-CHEMESTER MORTAR Hardener to the resin/powder slurry. Mix thoroughly for approximately two minutes.

- Add the balance of the CARBO-CHEMESTER MORTAR Powder from the 13 lb. 10 oz. (6.2 kg.) bag. Mix the combined components for approximately two minutes or until all the powder is thoroughly dispersed.

**108 lb. 8 oz. (49.2 kg.) Unit**

- Place 119 fluid ounces (3.5 liters) of CARBO-CHEMESTER MORTAR Resin in the 5-gallon capacity mechanical mixer.
- Add approximately 1/2 of one of the 13 lb. 10 oz. (6.2 kg.) bags of CARBO-CHEMESTER MORTAR Powder. Mix thoroughly for approximately two minutes.
- Add 1.1 fluid ounces (30 ml.) CARBO-CHEMESTER MORTAR Hardener to the resin/powder slurry. Mix thoroughly for approximately two minutes.
- Add the balance of the CARBO-CHEMESTER MORTAR Powder from the 13 lb. 10 oz. (6.2 kg.) bag. Mix the combined components for approximately two minutes or until all the powder is thoroughly dispersed.

**Note:** The amount of the powder may be varied slightly to obtain the desired consistency. Please note that decreasing the powder component will decrease the estimated unit coverage.

**TYPICAL WORKING & SETTING TIMES OF THE CARBO-CHEMESTER MORTAR**

| Temperature | Working Time | Setting Time     |
|-------------|--------------|------------------|
| 65°F (18°C) | 20-25 min.   | 2 to 3 hours     |
| 75°F (24°C) | 15-20 min.   | 1 to 1-1/2 hours |
| 85°F (29°C) | 10-15 min.   | 3/4 to 1 hour    |

**MIX RATIO CHART - CARBO-CHEMESTER MORTAR**

| <b>CARBO-CHEMESTER MORTAR</b>   | <b>Weight</b>           | <b>Volume</b>               |
|---------------------------------|-------------------------|-----------------------------|
| CARBO-CHEMESTER MORTAR Resin    | 8 lb. (3.6 kg.)         | 119 fl. oz. (3.5 liters)    |
| CARBO-CHEMESTER MORTAR Hardener | 1.2 oz. (36 g.)         | 1.1 fl. oz. (30 ml.)        |
| CARBO-CHEMESTER MORTAR Powder   | 13 lb. 10 oz. (6.2 kg.) | 13 lb. 10 oz. (6.2 kg.) bag |
| <b>Batch Size</b>               | 21 lb. 11 oz. (8.2 kg.) | 0.23 cu. ft. (6.5 liters)   |

**CLEANING OF TOOLS AND EQUIPMENT**

Solvents, such as methyl ethyl ketone, toluene or xylene will remove the materials referred to in this Data Sheet from mixing tools and equipment if cleaning is done immediately after use. Fully hardened material will have to be removed by mechanical means.

Dispose of residues and wastes in accordance with the directions in the Material Safety Data Sheets and government regulations.

**STORAGE AND SHELF LIFE**

Store all materials in a cool, dry environment. Keep all materials out of direct sunlight. CARBO-CHEMESTER MORTAR Resin and Hardener must be stored between 40°F (4°C) and 60°F (15°C). Protect from freezing. In unopened original containers, CARBO-CHEMESTER MORTAR Resin and Hardener have a shelf life of approximately four months. CARBO-CHEMESTER MORTAR Powder has a shelf life of approximately one year.

**PRODUCT SPECIFICATION**

The mortar shall be CARBO-CHEMESTER MORTAR as manufactured by Atlas Minerals & Chemicals, Inc. The manufacturer shall be ISO 9001 registered for the manufacture and sale of corrosion resistant products. The mortar shall comply with the requirements of ASTM C395. The mortar shall consist of a vinyl ester resin with a 100% carbon filler and be resistant to sodium hydroxide and hydrofluoric, nitric, sulfuric and chromic acids.

**PRECAUTIONS**

The materials referred to in this Data Sheet are for Industrial Use Only. They contain materials that present handling and potential health hazards. Consult Material Safety Data Sheets and the container labels for complete precautionary information.

**TECHNICAL SERVICES**

ATLAS maintains a staff of Technical Service Representatives who are available to assist you with the use of ATLAS products. In the event of difficulties with the application of ATLAS materials, the installation should be stopped immediately and ATLAS' Technical Service Department consulted for assistance.

**WARRANTY**

ATLAS warrants that its products will be free from defects in workmanship and materials under normal use for a period of one (1) year from the date of shipment by ATLAS (provided the products are installed before the expiration of the shelf life). THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR THE PURPOSE FOR THIS PRODUCT WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. ATLAS' LIABILITY FOR ALLEGED BREACH OF THIS WARRANTY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT (BUT NOT INCLUDING REMOVAL OF THE DEFECTIVE PRODUCT OR INSTALLATION OF REPLACEMENT PRODUCTS). ATLAS SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES DURING THE WARRANTY PERIOD OR THEREAFTER. **ATLAS' WARRANTY IS VOIDED IF PAYMENT FOR PRODUCT IS NOT RECEIVED IN FULL.**

## CHEMICAL RESISTANCE OF CARBO-CHEMESTER MORTAR (5-43PI)

|  | 80°F | 140°F |                                      | 80°F | 140°F |                                      | 80°F | 140°F |
|--|------|-------|--------------------------------------|------|-------|--------------------------------------|------|-------|
| Acetaldehyde                               | N    | N     | Ethylene Glycol                      | R    | R     | Potassium Chloride, Nitrate, Sulfate | R    | R     |
| Acetic Acid, to 10%                        | R    | R     | Fluoboric Acid, to 15%               | R    | R     | Potassium Cyanide                    | R    | C     |
| Acetic Acid, 10% to 20%                    | C    | C     | Fluosilicic Acid, 30%                | R    | R     | Potassium Ferricyanide, Ferrocyanide | R    | R     |
| Acetic Acid, above 20%                     | N    | N     | Formaldehyde                         | R    | R     | Potassium Hydroxide, to 25%          | R    | R     |
| Acetic Acid, Glacial                       | N    | N     | Formic Acid                          | R    | C     | Potassium Hydroxide, above 25%       | R    | C     |
| Alum or Aluminum Sulfate                   | R    | R     | Gasoline                             | R    | R     | Pyridine                             | N    | N     |
| Aluminum Chloride, Nitrate, Sulfate        | R    | R     | Glycerine                            | R    | R     | Rochelle Salt                        | R    | R     |
| Ammonium Chloride, Nitrate, Sulfate        | R    | R     | Gold Cyanide                         | R    | R     | Salicylic Acid                       | R    | R     |
| Ammonium Hydroxide, to 25%                 | R    | C     | Hexane                               | R    | R     | Silver Nitrate                       | R    | R     |
| Amyl Acetate                               | N    | N     | Hydrobromic Acid                     | R    | R     | Sodium Acetate                       | R    | R     |
| Amyl Alcohol                               | R    | C     | Hydrochloric Acid                    | R    | R     | Sodium Bicarbonate, Carbonate        | R    | R     |
| Aniline                                    | N    | N     | Hydrocyanic Acid                     | R    | R     | Sodium Chloride, Nitrate, Sulfate    | R    | R     |
| Aqua Regia                                 | N    | N     | Hydrofluoric Acid, to 20%            | R    | C     | Sodium Cyanide, 10%                  | R    | R     |
| Barium Chloride, Nitrate, Sulfate, Sulfide | R    | R     | Hydrofluosilicic Acid, to 10%        | R    | R     | Sodium Hydroxide, to 50%             | R    | R     |
| Barium Hydroxide                           | R    | C     | Hydrofluosilicic Acid, 10% to 35%    | R    | C     | Sodium Hypochlorite, to 15%          | R    | C     |
| Benzene                                    | R    | N     | Hydrogen Peroxide, to 30%            | R    | C     | Sodium Sulfide, Sulfite, Thiosulfate | R    | R     |
| Benzene Sulfonic Acid, 30%                 | R    | R     | Hydrogen Sulfide Gas, Dry or Wet     | R    | R     | Soya Oil                             | R    | R     |
| Benzoic Acid                               | R    | R     | Iron Chloride, Nitrate, Sulfate      | R    | R     | Stearic Acid                         | R    | R     |
| Boric Acid                                 | R    | R     | Kerosene                             | R    | -     | Sulfur Dioxide Gas, Dry or Wet       | R    | R     |
| Bromine Water                              | N    | N     | Lactic Acid                          | R    | R     | Sulfur Trioxide Gas, Dry             | R    | N     |
| Butyl Acetate                              | N    | N     | Lead Acetate, Nitrate                | R    | R     | Sulfur Trioxide Gas, Wet             | N    | N     |
| Butyl Alcohol, normal                      | R    | C     | Linseed Oil                          | R    | R     | Sulfuric Acid, to 50%                | R    | R     |
| Butyric Acid                               | R    | C     | Magnesium Chloride, Nitrate, Sulfate | R    | R     | Sulfuric Acid, 50% to 75%            | R    | C     |
| Cadmium Chloride, Nitrate, Sulfate         | R    | R     | Magnesium Hydroxide                  | R    | R     | Sulfuric Acid, above 75%             | N    | N     |
| Calcium Bisulfite                          | R    | R     | Maleic Acid                          | R    | R     | Sulfurous Acid, to 10%               | R    | R     |
| Calcium Chloride, Nitrate, Sulfate         | R    | R     | Mercuric Acetate                     | R    | R     | Tannic Acid                          | R    | R     |
| Calcium Hydroxide                          | R    | R     | Methyl Acetate                       | N    | N     | Tartaric Acid                        | R    | R     |
| Carbon Disulfide                           | N    | N     | Methyl Alcohol                       | R    | C     | Tin Chloride, Sulfate                | R    | R     |
| Carbon Tetrachloride                       | C    | N     | Methyl Ethyl Ketone                  | N    | N     | Toluene                              | C    | N     |
| Chlorine Dioxide, Water Solution           | R    | R     | Methyl Sulfate                       | C    | N     | Trichloroethylene                    | N    | N     |
| Chlorine, Dry or Wet                       | R    | R     | Mineral Oil                          | R    | R     | Trisodium Phosphate                  | R    | R     |
| Chlorine Water                             | R    | -     | Mineral Spirits                      | R    | R     | Tung Oil                             | R    | R     |
| Chloroacetic Acid, to 10%                  | R    | C     | Muriatic Acid                        | R    | R     | Urea                                 | R    | R     |
| Chlorobenzene                              | N    | N     | Nickel Chloride, Nitrate, Sulfate    | R    | R     | Xylene                               | C    | N     |
| Chloroform                                 | N    | N     | Nitric Acid, to 20%                  | R    | R     | Zinc Chloride, Nitrate, Sulfate      | R    | R     |
| Chromic Acid, to 5%                        | R    | C     | Nitric Acid, 20% to 50%              | R    | C     |                                      |      |       |
| Chromic Acid, 5% to 20%                    | R    | N     | Nitric Acid, above 50%               | C    | C     |                                      |      |       |
| Chromic Acid, 20% to 50%                   | C    | N     | Nitrobenzene                         | N    | N     |                                      |      |       |
| Chromic Acid, above 50%                    | N    | N     | Oleic Acid                           | R    | R     |                                      |      |       |
| Citric Acid                                | R    | R     | Oxalic Acid                          | R    | R     |                                      |      |       |
| Copper Chloride, Nitrate, Sulfate          | R    | R     | Perchloric Acid, to 30%              | R    | N     |                                      |      |       |
| Dichloroacetic Acid, 10%                   | R    | N     | Phenol, to 5%                        | R    | R     |                                      |      |       |
| Dichlorobenzene                            | N    | N     | Phosphoric Acid, to 80%              | R    | R     |                                      |      |       |
| Diethyl Ether                              | N    | N     | Phosphorous Acid                     | R    | R     |                                      |      |       |
| Ethyl Acetate                              | N    | N     | Phosphorous Trichloride              | N    | N     |                                      |      |       |
| Ethyl Alcohol                              | R    | C     | Phthalic Acid                        | R    | R     |                                      |      |       |
| Ethyl Sulfate                              | C    | N     | Picric Acid, to 10%                  | R    | R     |                                      |      |       |
| Ethylene Dichloride                        | N    | N     | Potassium Bicarbonate, Carbonate     | R    | R     |                                      |      |       |

(8-98)

**KEY**  
R - Recommended  
N - Not Recommended  
C - Conditional; May be serviceable if the contaminant is immediately removed or washed off the surface.

**Note** - The information presented in the chemical resistance tables is based on judgments derived from laboratory testing and field service performance. The tables have been prepared as a guide to performance. No guarantee of results is made or implied and no liability in connection with this information is assumed. The information presented herein should be supplemented by in-service testing. The data furnished in the tables may be revised on the basis of further testing.