



Atlas Minerals & Chemicals, Inc.



# DATA SHEET

5-43PI (6-03<sup>2</sup>)  
Supersedes 5-43PI (8-98)

## CARBO-CHEMESTER® MORTAR

### DESCRIPTION

CARBO-CHEMESTER MORTAR is a carbon filled, 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

##### 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.

## PHYSICAL PROPERTIES

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

## 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).

## 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.

## ESTIMATING TABLES - CARBO-CHEMESTER MORTAR

## FLOOR AREA

Brick Size	Brick Depth	1/8" Wide x Full Depth Joint Square Feet per Unit	1/8" Setting Bed & 1/8" Wide x Full Depth Joint Square Feet per Unit
		108 lb. 8 oz. Unit	108 lb. 8 oz. Unit
8" x 3-3/4" x 2-1/4"	2-1/4"	130 sq. ft.	60 sq. ft.
8" x 3-3/4" x 2-1/4"	3-3/4"	55 sq. ft.	35 sq. ft.
8" x 3-3/4" x 4-1/2"	3-3/4"	85 sq. ft.	45 sq. ft.
8" x 3-3/4" x 4-1/2"	4-1/2"	65 sq. ft.	40 sq. ft.
9" x 4-1/2" x 1-1/16"	1-1/16"	320 sq. ft.	80 sq. ft.
9" x 4-1/2" x 2-1/2"	2-1/2"	135 sq. ft.	60 sq. ft.
9" x 4-1/2" x 2-1/2"	4-1/2"	50 sq. ft.	35 sq. ft.
9" x 4-1/2" x 3"	3"	110 sq. ft.	55 sq. ft.
9" x 4-1/2" x 3"	4 1/2"	55 sq. ft.	35 sq. ft.
9" x 6" x 1-1/16"	1-1/16"	385 sq. ft.	85 sq. ft.
9" x 6" x 2-1/2"	2-1/2"	160 sq. ft.	65 sq. ft.

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

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.

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

- Place 128 fluid ounces (3.8 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 1.4 fluid ounces (41 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

**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

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

CARBO-CHEMESTER MORTAR	Weight	Volume
CARBO-CHEMESTER MORTAR Resin	8 lb. (3.6 kg.)	128 fl. oz. (3.8 liters)
CARBO-CHEMESTER MORTAR Hardener	1.3 oz. (37 g.)	1.4 fl. oz. (41 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)

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 mortar shall comply with the requirements of ASTM C395. The mortar shall consist of an epoxy novolac 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
Acetaldehyde	N	N
Acetic Acid, to 10%	R	R
Acetic Acid, 10% to 20%	C	C
Acetic Acid, above 20%	N	N
Acetic Acid, Glacial	N	N
Alum or Aluminum Sulfate	R	R
Aluminum Chloride, Nitrate, Sulfate	R	R
Ammonium Chloride, Nitrate, Sulfate	R	R
Ammonium Hydroxide, to 25%	R	C
Amyl Acetate	R	C
Amyl Alcohol	R	C
Aniline	C	N
Aqua Regia	N	N
Barium Chloride, Nitrate, Sulfate	R	R
Barium Hydroxide	R	C
Benzene	R	N
Benzene Sulfonic Acid, 30%	R	R
Benzoic Acid	R	R
Boric Acid	R	R
Bromine Water	N	N
Butyl Acetate	C	N
Butyl Alcohol, normal	R	C
Butyric Acid	R	C
Cadmium Chloride, Nitrate, Sulfate	R	R
Calcium Bisulfite	R	R
Calcium Chloride, Nitrate, Sulfate	R	R
Calcium Hydroxide	R	R
Carbon Disulfide	N	N
Carbon Tetrachloride	R	R
Chlorine Dioxide, Water Solution	R	R
Chlorine, Dry or Wet	R	R
Chlorine Water	R	R
Chloroacetic Acid, to 10%	R	C
Chlorobenzene	R	C
Chloroform	N	N
Chromic Acid, to 5%	R	R
Chromic Acid, 5% to 20%	R	R
Chromic Acid, 20% to 50%	R	C
Chromic Acid, above 50%	N	N
Citric Acid	R	R
Copper Chloride, Nitrate, Sulfate	R	R
Dichloroacetic Acid, 10%	R	C
Dichlorobenzene	R	C
Diethyl Ether	N	N
Ethyl Acetate	N	N
Ethyl Alcohol	R	C
Ethyl Sulfate	R	C
Ethylene Dichloride	N	N

	80°F	140°F
Ethylene Glycol	R	R
Fluoboric Acid, to 15%	R	R
Fluosilicic Acid, 30%	R	R
Formaldehyde	R	R
Formic Acid	R	C
Gasoline	R	R
Glycerine	R	R
Gold Cyanide	R	R
Hexane	R	R
Hydrobromic Acid	R	R
Hydrochloric Acid	R	R
Hydrocyanic Acid	R	R
Hydrofluoric Acid, to 20%	R	C
Hydrofluosilicic Acid, to 10%	R	R
Hydrofluosilicic Acid, 10% to 35%	R	C
Hydrogen Peroxide, to 30%	R	C
Hydrogen Sulfide Gas, Dry or Wet	R	R
Iron Chloride, Nitrate, Sulfate	R	R
Kerosene	R	R
Lactic Acid	R	R
Lead Acetate, Nitrate	R	R
Linseed Oil	R	R
Magnesium Chloride, Nitrate, Sulfate	R	R
Magnesium Hydroxide	R	R
Maleic Acid	R	R
Mercuric Acetate	R	R
Methyl Acetate	R	C
Methyl Alcohol	R	C
Methyl Ethyl Ketone	C	N
Methyl Sulfate	C	N
Mineral Oil	R	R
Mineral Spirits	R	R
Muriatic Acid	R	R
Nickel Chloride, Nitrate, Sulfate	R	R
Nitric Acid, to 20%	R	R
Nitric Acid, 20% to 50%	R	C
Nitric Acid, above 50%	C	C
Nitrobenzene	R	C
Oleic Acid	R	R
Oxalic Acid	R	R
Perchloric Acid, to 30%	R	C
Phenol, to 5%	R	R
Phosphoric Acid, to 80%	R	R
Phosphorous Acid	R	R
Phosphorous Trichloride	N	N
Phthalic Acid	R	R
Picric Acid, to 10%	R	R
Potassium Bicarbonate, Carbonate	R	R

	80°F	140°F
Potassium Chloride, Nitrate, Sulfate	R	R
Potassium Cyanide	R	R
Potassium Ferricyanide, Ferrocyanide	R	R
Potassium Hydroxide, to 25%	R	R
Potassium Hydroxide, above 25%	R	C
Pyridine	N	N
Rochelle Salt	R	R
Salicylic Acid	R	R
Silver Nitrate	R	R
Sodium Acetate	R	R
Sodium Bicarbonate, Carbonate	R	R
Sodium Chloride, Nitrate, Sulfate	R	R
Sodium Cyanide, 10%	R	R
Sodium Hydroxide, to 50%	R	R
Sodium Hypochlorite, to 15%	R	C
Sodium Sulfide, Sulfite, Thiosulfate	R	R
Soya Oil	R	R
Stearic Acid	R	R
Sulfur Dioxide Gas, Dry or Wet	R	R
Sulfur Trioxide Gas, Dry	R	R
Sulfur Trioxide Gas, Wet	R	R
Sulfuric Acid, to 50%	R	R
Sulfuric Acid, 50% to 75%	R	C
Sulfuric Acid, above 75%	N	N
Sulfurous Acid, to 10%	R	R
Tannic Acid	R	R
Tartaric Acid	R	R
Tin Chloride, Sulfate	R	R
Toluene	C	N
Trichloroethylene	N	N
Trisodium Phosphate	R	R
Tung Oil	R	R
Urea	R	R
Xylene	C	N
Zinc Chloride, Nitrate, Sulfate	R	R

**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.

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