Corrosion Engineering	
AN ERGONARMOR COMPANY	TECHNICAL INFORMATION

CES-336
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CORROSION ENGINEERING SPECIFICATION FOR INSTALLATION

ACID-RESISTANT GUNITE AND MEMBRANE LININGS FOR INDUSTRIAL STEEL STACKS

1. SCOPE OF WORK

1.1 This specification will outline the materials, reinforcement, surface preparation, application of membrane and application of gunite for the lining of industrial steel stacks serving industrial boilers burning high sulfur oil, coal, wood waste, agricultural waste, municipal solid waste or the waste from a chemical processing facility.

2. MATERIALS

2.1 Potassium silicate cements are resistant to a broad variety of corrodants found in industrial gases from various fuel-fired boilers. These cements, when suitably reinforced, have been found to be a cost-effective, acid-resistant lining for such stacks.

2.2. Potassium silicate cements, installed by the dry gunite method, may either be a single component Gunite Mix SDX® or a 2-component TUFCHEM® Silicate Gunite. The gunned density of the products shall range between 120-135 lbs./cu.ft. wet.

2.3 Chemical-Resistant Membrane. Elastomeric membranes, TUFCHEM II Membrane Spray Grade, are used in combination with potassium silicate cements in industrial stacks off wet or dry scrubbers. Where flue gas temperatures are higher, namely off particulate control devices such as electrostatic precipitators, the substitution of a higher temperature mastic, namely PACMASTIC® 325 Coating, is recommended.

3. SURFACE PREPARATION

3.1 Unless specified to the contrary, A36 or A242 carbon steel shall be blasted to a near-white metal finish conforming to SSPC-SP#10 or NACE #2. No mil profile is required.

3.2 All welds shall be continuous. Intermittent or spot welding is not acceptable.

3.3 Weld splatter, slag, old anchor welds shall be removed and the area ground flush with the substrate. Chipping is acceptable if followed by grinding for finish.

3.4 Pinholes, pits, blind spots, porosity, under-cutting or similar depressions shall not exist in the finished surface of the weld before or after blast cleaning.

3.5 All edges, fillets, and similar abrupt contours shall be rounded off smoothly by grinding or machining to a 1/8" or 3mm minimum radius. Smooth ripple-finished welds are acceptable.

3.6 Steel surface should be from oil, grease, mill scale, rust or other contaminants.

4. REINFORCEMENT OF GUNITE LINING

4.1 The acid-resistant potassium silicate gunite must be anchored. Anchorage shall be a minimum of 304 stainless steel V-Type metal anchors, or material suitable to the corrosive environment typically 1/8" thick x 5/8" wide, crimped 2-tine anchors. See CES-329 for more information on retaining anchors.

4.2 The stud anchors shall be welded in accordance with the anchor manufacturer's specifications.

4.3 Anchors shall be placed in a standard square pattern on the floors, walls and overheads. Anchor spacing shall be as recommended on CES-329 "Corrosion Engineering Specifications for Sizing and Spacing of V-Type Metal Anchors for Castable Gunite Lining Installation".

5. STEEL SURFACE PRIMING

5.1 To prevent flash rust bloom and maintain a uniform surface, the steel surface shall be primed with PENNGUARD® Block Primer after abrasive blasting.

5.2 Refer to CE-227 for product information, application and curing instructions on PENNGUARD Block Primer.

6. BENDING OF ANCHORS

6.1 After priming is completed, each anchor shall be bent with a hammer or heavy wall tubing bending tool so that the angle is greater than 90°F between the tines, but less than 180°F. They shall be bent in such a manner that there is a minimum 3/4" gunite coverage over the tips of the tines.

6.2 Any anchor welds that fail during bending the anchors shall be completely removed and replaced.

7. APPLICATION OF CHEMICAL-RESISTANT MEMBRANE

7.1 If the hot face of the steel is below 200°F, it is suggested that TUFCHEM® II Membrane be installed by the airless spray method. Typically, these stacks are off wet or dry scrubbers.

7.2 TUFCHEM II Membrane Spray Grade shall be applied via the airless spray method to a minimum dry film thickness of 1/8". It may require a minimum of two coats to achieve the dry film thickness. See Product Data Sheet CE-228 for further instructions on application, equipment and curing.

7.3 The installation Quality Assurance method of TUFCHEM II Membrane is governed by CES-326 and should be followed. This specification covers the dry film thickness measurement as well as spark testing for holiday detection of the resulting cured membrane.

7.4 If the hot face of the steel is over 200°F, which is typical of industrial flues downstream of electrostatic precipitators or baghouses, it is recommended that PACMASTIC® 325 Coating be used.

7.5 Please see the data sheet on PACMASTIC 325 Coatings for application and curing information. The dry film thickness of PACMASTIC 325 Coating shall be 1/8".

8. APPLICATION OF POTASSIUM GUNITE LININGS

8.1 The potassium silicate gunite lining shall be installed by the dry gun method as outlined in CES-329. A nominal 2" thickness of gunite shall be applied with a minimum thickness of 1.5". The tips of the reinforcing tines must be covered by 3/4" of gunite minimum.

8.2. Prior to installation, gunite powders and solutions must be stored as close to 70°F as possible.

8.3 If a single component potassium silicate gunite is desired, Gunite Mix SDX® shall be specified. Product Data Sheet CE-221 lists the application and curing information on Gunite Mix SDX.

8.4 Should a 2-component potassium silicate gunite cement be desired, TUFCHEM Silicate Gunite, Product Data Sheet CE-238, application and curing procedures shall be followed.

9. SAFETY PRECAUTIONS AND DISCLAIMER

9.1 TUFCHEM® Silicate Gunite, SDX®, PACMASTIC® 325, and PENNGUARD® Primer, components, and mixes of them present a number of hazards. Read before using and follow the hazard information, precautions, and first aid directions on the individual product labels and Material Safety Data Sheets.

9.2 The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, Corrosion Engineering expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information; NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable when such product is used in combination with other materials or in any process. The user should thoroughly test any application before installation. Nothing contained herein should be taken as an inducement to infringe any patent and the user is advised to take appropriate steps to be assured that any proposed use of the product will not result in patent infringement.

9.3 Please contact Corrosion Engineering for specific recommendations at +1-610-833-4000 or fax +1-610-833-3040.