

SECTION 321316.15-2
LITHOCRETE® SEDIMENTARY WALL SYSTEM SPECIFICATION
SYSTEM 2

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- A. Requirements of "General Conditions of the Contract" and of Division 1, "General Requirements," apply to work in this Section with same force and effect as though repeated in full herein.

1.2 SCOPE OF WORK

- A. Furnish materials, labor, transportation, services, and equipment necessary to furnish and install Lithocrete® sedimentary wall system as indicated on Drawings and as specified herein.
- B. Work included in this Section:
1. Installation of architectural concrete walls called Lithocrete® Sedimentary walls under U.S. Patents (# 5,887,399- # 5,950,394 - # 6,082,074)(TM# 646,052, TM # 1,879,329, TM # 2,358,183, TM # 2,358,054 Reg # 75/646,052)
 2. Lithocrete® Installers:
 - a) Orange County and Los Angeles: Contact Ron Shaw, Paul Taylor, Damon Toth or Ryan Rood at Shaw & Sons @ 949-642-0660.
 - b) San Diego: Contact Frank Klemaske at T.B. Penick & Sons @ 858-558-1800
 - c) Arizona: Contact Lucas Wennersten or Mike Riggs at Progressive Concrete Works @ 623-582-2274
 - d) Colorado & Wyoming: Contact Colorado Hardscapes @ 303-750-8200
 - e) Washington and Oregon: Contact John Belarde at Belarde Company @ 425-376-2500
- C. Work related in other Sections:
1. Section 02750 - Portland Cement Concrete Paving: Adjacent concrete paving.
 2. Section 02810 - Irrigation System: Coordination of irrigation sleeve installation.
 3. Section 02900 - Landscape Planting: Coordination of plant material placement.
 4. Section 07900 – Joint Sealers: Installation of caulking.

1.3 REQUIREMENTS OF REGULATORY AGENCIES

- A. Federal, state and local laws and regulations governing this work are hereby incorporated into and made part of this section. When this section calls for certain materials, workmanship, or a level of construction that exceeds the level of Federal, State, or local requirements, provisions of this section take precedence.

1.4 APPLICABLE STANDARDS

- A. Specifications and recommended practices of American Concrete Institute (ACI), American Society for Testing and Materials (ASTM), The Uniform Building Code, and U.S. Patents

(# 5,887,399- # 5,950,394 - # 6,082,074)(TM# 646,052, TM # 1,879,329, TM # 2,358,183, TM # 2,358,054 Reg # 75/646,052) referred to in this Specification with their individual designations are to be considered part of this Specification.

B. Design and Control of Concrete Mixtures – Thirteenth Edition; Portland Cement Association.

1.5 QUALITY CONTROL

- A. Quality control to be maintained by licensed installers of Lithocrete® throughout duration of project.
- B. Subcontractor Qualifications: Provide evidence to indicate successful experience in providing Lithocrete® similar to that specified herein and demonstrate successful experience.
- C. Demonstration of experience: Provide a minimum of 1 local projects within a 100 mile radius of project site of installed Lithocrete® sedimentary wall system totaling at least 250 L.F. with a reference list of each containing contact person and phone # of project's architect and owner rep.
- D. Supervision: On site superintendent must have a minimum of 5 years experience installing Lithocrete®.

1.6 SITE INSPECTION

- A. Verify conditions at site that affect work of this Section.
- B. Take field measurements as required.
- C. Report major discrepancies between drawings and field dimensions to Owner's Authorized Representative prior to commencing work.

1.7 SUBMITTALS

- A. Product Data: Submit no later than 10 days after contract award a typed list of products specified in this Section.
- B. Shop Drawings:
 - 1. Submit shop drawings for reinforcing steel and accessories in accordance with ACI standards.
 - 2. Paving Jointing and Pour Sequence Plan: Submit six blueprints indicating the following:
 - a. Proposed sedimentary layers and vertical dimensions of each layer.
 - b. List of each material to be used and clearly indicated on elevation shop drawing.
 - c. Concrete pour sequence: Indicated sequence of pour installation.
- C. Statement of Mix Design: Submit (1) copy of Statement of Mix Design prepared by batch plant servicing Project for each load delivered to Project. Statement of Mix Design to contain following information:
 - 1. Name, address, and telephone number of batch plant preparing statement of mix design.
 - 2. Date of mix design.
 - 3. Project location.
 - 4. Contractor requesting load delivery.
 - 5. Mix design number.
 - 6. Integral color used.

7. Gradations for sand and aggregate.
 8. Material weights, specific gravity, and absolute volumes.
 9. Basis of testing, i.e. UBC 2605 D4 and Title 24 2604 D4.
 10. Water/cement ratio.
 11. PSI rating.
 12. Signature of testing laboratory manager.
 13. Signed stamp from registered Project structural engineer or architect.
- D. Lithocrete® Surface-Seeded Aggregate (extra stock):
1. One 1-pound sample of each Lithocrete® aggregate specified.
 2. One 5-pound sealed bag of each Lithocrete® aggregate specified for use by Owner in future repairs of damaged Lithocrete® concrete paving.
- E. Washed Concrete Sand (extra stock):
1. One 50-pound sealed bag of washed concrete sand similar to type used during installation of Lithocrete®.
- 1.8 SUBSTITUTIONS
- A. None allowed unless approved in writing by Owner's Authorized Representative.
- 1.9 TESTING
- A. A testing agency may be designated by Owner or Owner's Authorized Representative. Testing personnel to meet ASTM E329 requirements.
- 1.10 MOCK-UPS
- A. Prior to construction, provide (1) 4-foot long x required height x 12-inch wide sample of Lithocrete® sedimentary wall system specified on Drawings.
- B. Locate mock-ups in a conveniently accessible and protected place. Approved mock-ups will be standard for future Lithocrete® installation review.
- C. Remove mock-ups from site upon completion of work and approval by Owner's Authorized Representative.
- 1.11 PROJECT CONDITIONS
- A. Keep work area clean, and in a safe and workman-like condition so that rubbish, waste and debris do not interfere with work of other trades.
- 1.12 PRODUCT HANDLING
- A. Store materials in a dry and protected location. Protect reinforcing steel and dowels from rusting, deformation, staining, and moisture damage.
- B. Keep Lithocrete® aggregate dry at all times prior to installation.
- 1.13 COORDINATION

- A. Notify Owner's Authorized Representative and contractors performing work related to installation of Contractor's Work in ample time, so as to allow sufficient time for them to perform their portion of work.

PART 2 PRODUCTS

2.1 PORTLAND CEMENT

- A. Type I, IA, II, IIA, III, IIIA, IV, and V cements, to conform to ASTM C150.
- B. Use same brand of cement from single source throughout entire project.
- C. Refer to Drawings for cement type specified.
- D. Sedimentary wall colors to be formulated by installer per Lithocrete® wall systems.
- E. Special colors and textures are achieved per Lithocrete® sedimentary wall systems with consent of the design intent of the project.

2.2 WASHED CONCRETE SAND

- A. Clean, hard, and durable washed concrete sand, conforming to ASTM C33.
- B. Use same sand from single source throughout entire project.

2.3 COARSE AGGREGATE

- A. Clean, hard, and durable coarse aggregate, conforming to ASTM C33.
- B. Use same aggregate from single source throughout entire project.

2.4 LITHOCRETE® AGGREGATE

- A. Refer to Drawings for specified Lithocrete® aggregate type, size, color, and distribution percentage.
- B. Lithocrete® aggregate may vary, however must be consistent with shop drawings.

2.5 WATER

- A. Free from deleterious materials such as oils, acids, and organic matter.

2.6 ADMIXTURES

- A. Integral Concrete Coloring Admixture: Refer to project Shop Drawings for color type. All Lithocrete sedimentary wall system's incorporate project specific color systems and shall be referenced in the project submittal package after contract and verified in the close out package to ownership.
- B. Air Entrainment Admixtures: Conforming to ASTM C260.
 - 1. Acceptable Manufacturers:

- a. Grace Construction Products; Daravair[®], (800) 433-0020 or www.graceconstruction.com/concrete/air_entraining.html#daravair.
 - b. Master Builders, Inc.; Micro-Air[®], (800) 628-9990 or www.masterbuilders.com/MB/pub/Product.asp?TypeCat=2&ParentID=78&ProductID=22.
- C. Water Reducing Admixtures: Conforming to ASTM C494, Type A.
- 1. Acceptable Manufacturers:
 - a. Grace Construction Products; WRDA[®] (800) 433-0020 www.graceconstruction.com/concrete/water_reducers.html#wrda.
 - b. Master Builders, Inc.; Micro-Air[®] (800) 628-9990 or www.masterbuilders.com.
- D. Shrinkage Reducing Admixtures: Conforming to ASTM C157.
- 1. Acceptable Manufacturers:
 - a. Grace Construction Products; Eclipse[®] (800) 433-0020 or www.graceconstruction.com/concrete/shrinkage_reducers.html#eclipse.
 - b. Eclipse[®] Shrinkage Reducing Admixture is a liquid admixture which dramatically reduces concrete shrinkage and curling due to drying.

2.7 READY MIXED CONCRETE

- A. Batched mixed and transported in accordance with ASTM C94 - "Specifications for Ready Mixed Concrete."

2.8 REINFORCING

- A. Reinforcing Steel: Conforming to ASTM A615, clean and free of rust, dirt, grease or oils.
- B. Tie Wire: 16-gauge plain cold-drawn steel conforming to ASTM A82, clean, and free of rust, dirt, grease or oils.
- C. Supports for Reinforcement:
 - 1. Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place.
- D. Polypropylene Fiber Reinforcement: 100% virgin multifilament polypropylene fibers, complying with ASTM C 1116 - Type III.
 - 1. Acceptable Manufacturers:
 - a. Fibermesh; Fibermix Stealth[®] – 1/4" long (423) 892-8080 or www.fibermesh.com/family/stealth.htm.
 - b. Grace Construction Products; MicroFiberTM (800) 433-0020 or www.graceconstruction.com/concrete/fibers.html
 - 2. Application Rate: 1/2 lb. /cy of mix.

PART 3 EXECUTIONS

3.2 FORMING: FORM MATERIALS FOR STRUCTURAL COMPONENTS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork with plywood, panel type materials to provide continuous, straight, smooth, exposed surfaces.

1. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Contract Drawings.
 2. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
 3. Provide forms that comply with US Product Standard PS 1 and the following:
 - a. $\frac{3}{4}$ " Medium Density Overlaid exterior Class I mill oiled and edge sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Provide forms of plywood. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.
- C. Forms for Textured Finish Concrete: Provide forms with face design, size, arrangement and configuration as shown on Contract Drawings, or as required to match control sample. Provide solid backing and form supports to ensure stability of textured form liners.
- D. Use 1.5 lb foam for course effect and shape with sureform planes.
- E. Laminate all radius forms with 2 layers of $\frac{3}{8}$ " A.C.X and 1 finish layer of M.D.O. fully gun nailed at 6" o.c. to studs and wallers at 18" O.C.E.W.

3.3 DESIGN OF MIXES AND PROPORTIONING

- A. Proportion and mix of cement, aggregate, admixture and water to attain required plasticity and strength in accordance with current edition of ACI Manual of Concrete Practice and PCA "Design and Control of Concrete Mixtures."
- B. Concrete mixtures to be designed by an approved commercial testing laboratory, using approved materials to obtain specified minimum compressive strength, by owner.
- C. Concrete Mix Criteria:
1. Slump: 5-inch, with a 1/2-inch slump differential between successive batches. Obtain approval from Owner's Authorized Representative if slump is outside these parameters.
 2. Minimum PSI Rating at 28 days: 2,500.
 3. Cement quantity per yard of mix:
 - a. Minimum: 6 sacks.
 - b. Maximum: 7 sacks.
 4. Water/cement ratio: 0.65 – 0.67.
 5. Sand: 70% of total mix.
 6. Pea gravel: 30% of total mix.
 7. Admixtures:
 - a. Air entrainment: Do not exceed 2%.
 - b. Shrinkage Reducing: Do not exceed 2% by weight of cement.
 8. Fly ash: Use only when seeding reactive Lithocrete® aggregates such as glass and seashells.
 9. Non-Chloride Accelerators: Do not use corrosive accelerators such as calcium chloride.
 10. Concrete Delivery: Use of concrete loads exceeding 90 minutes from time of batch plant must be approved by Owner's Authorized Representative.
 11. Ensure that batch plant guarantees single source supply for cement, sand, and aggregate for the entire project.

3.4 LITHOCRETE® AGGREGATE INSTALLTION

1. Lithocrete® Sedimentary walls are a patented wall process. Installation of Lithocrete® walls must be performed by a licensed Lithocrete® installer only.
2. Contact Lithocrete® at (949) 642 0660 for a licensed Lithocrete® installer in project area.
3. Lithocrete® is installed in accordance with U.S. Patents: U.S. Patents (# 5,887,399- # 5,950,394 - # 6,082,074)(TM# 646,052, TM # 1,879,329, TM # 2,358,183, TM # 2,358,054 Reg # 75/646,052)
4. Lithocrete® process incorporates use of following patented products:
 - a. Eurotard by Grace form retarder
 - b. Lithocrete® Etch Retarder®.
 - c. Lithoseal™ sealer.

3.5 JOINTING

- A. Refer to ACI 302 “Guide for Concrete Floor and Slab Construction” for work under this section.
- B. Construction and Contraction Joints:
 1. Sawcut construction and contraction joints in locations indicated on Drawings.
 2. Perform jointing with a new diamond tip circular saw.
 3. Joint Width: Per Drawings. Do not exceed 3/16-inch in width.
 4. Depth of sawcuts: 1/4th depth of slab.
 - a. Decorative Sawcut Joints: Per Drawings.
 5. Sawcut joints in a straight line with no overcutting.
 6. Use a hand tool to sawcut up to vertical edges such as walls, steps, curbs and columns. No cutting into vertical surfaces will be allowed.

3.6 CURING

- A. After initial Lithocrete® installation, sprinkle or fog with water for minimum 7 days.

3.7 SEALING

- A. Seal surface of wall surface using Lithocrete® Sealer.
- B. Follow Lithocrete® Sealer directions when applying this product (sealer must be applied in 3 to 6 coats).

4.0 Acceptance of work

- A. Lithocrete® Sedimentary walls contain natural materials and acceptance is at the sole discretion of Shaw & Son’s should lack of owner acceptance become an Issue.

END OF SECTION