SECTION 03316 (03 31 16)

LIGHTWEIGHT STRUCTURAL CONCRETE - MOISTURE VAPOR EMISSION WARRANTED (ASSURANCE LWC)

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\*\* NOTE TO SPECIFIER \*\* ISE Logik Industries; moisture vapor emission control.

This section is based on the products of ISE Logik Industries, which is located at:

5635 Iron Works Road

Theodore, AL 36581

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[[Click Here](https://www.arcat.com/arcatcos/cos49/arc49683.html)] for additional information.

ISE Logik Industries is strategically located in Theodore, AL, allowing for a geographical central hub for our clients throughout the Americas. From our state-of-the-art chemical manufacturing facility and distribution logistics center in Theodore, to our distribution logistics centers in Kansas City, KS, we are well positioned to supply each region in a timely manner.

ISE Logik Industries combines top individuals from the concrete moisture vapor reduction (MVRA) and floorcovering technical consulting markets, and chemical, civil, concrete engineers under one umbrella, bringing unequalled full-spectrum expertise to each and every project.

1. GENERAL
	1. SECTION INCLUDES
		1. Assurance LWC moisture vapor emission warranted concrete slab system for new structural lightweight slabs to receive flooring, coatings, or roofing systems.
	2. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 09561 (09 05 61) - Common Work Results for Flooring Preparation.
		2. Section 03060 (03 60 00) - Schedules for Concrete.
		3. Section 03300 (03 30 00) - Cast-in-Place Concrete.
		4. Section 07279 (07 27 19) - Plastic Sheet Air Barriers .
		5. Division 9 Sections for floor coverings applied to concrete substrates.
	1. REFERENCES
		1. American Concrete Institute (ACI):
			1. ACI 301 - Specifications for Structural Concrete.
			2. ACI 304.2 - Guide to Placing Concrete by Pumping Methods.
			3. ACI 305 - Guide to Hot Weather Concreting.
			4. ACI 306 - Guide to Cold Weather Concreting.
			5. ACI 308 - Guide to External Curing of Concrete.
			6. ACI 318 - Building Code Requirements for Structural Concrete.
		2. ASTM International (ASTM):
			1. ASTM C31 - Practice for Making and Curing Concrete Test Specimens in the Field.
			2. ASTM C33 - Specification for Concrete Aggregates.
			3. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
			4. ASTM C94 - Specification for Ready-Mix Concrete.
			5. ASTM C138 - Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
			6. ASTM C143 - Test Method for Slump of Hydraulic Cement Concrete.
			7. ASTM C150 - Specification for Portland Cement.
			8. ASTM C172 - Practice for Sampling Freshly Mixed Concrete.
			9. ASTM C173 - Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
			10. ASTM C260 - Specification for Air-Entraining Admixtures for Concrete.
			11. ASTM C330 - Specification for Lightweight Aggregates for Structural Concrete.
			12. ASTM C494 - Specification for Chemical Admixtures for Concrete.
			13. ASTM C567 - Test Method for Density of Structural Lightweight Concrete.
			14. ASTM C595 - Specification for Blended Hydraulic Cements.
			15. ASTM C618 - Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
			16. ASTM C845 - Specification for Expansive Hydraulic Cement.
			17. ASTM C989 - Specification for Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars.
			18. ASTM C1240 - Specification for Use of Silica Fume as A Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout.
			19. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
			20. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
			21. ASTM D5084 - Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
			22. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
			23. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
			24. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
			25. ASTM F3191 - Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
			26. ASTM F3311 - Standard Practice for Mat Bond Evaluation of Performance and Compatibility for Resilient Flooring System Components Prior to Installation.
		3. National Ready Mix Concrete Association (NRMCA):
			1. Certification of Ready Mixed Concrete Production Facilities.
		4. U.S. Green Building Council (USGBC):
			1. Leadership in Energy and Environmental Design (LEED).
	2. DEFINITIONS
		1. Cementitious Materials - Portland cement alone or in combination with one or more of following:
			1. Blended hydraulic cement.
			2. Fly ash and other pozzolans.
			3. Ground granulated blast-furnace slag.
			4. Silica fume.
	3. SUBMITTALS
		1. Submit under provisions of Section 01300 - Administrative Requirements.
		2. Product Data: Manufacturer’s descriptive data for admixture.
		3. Warranties:
			1. Sample lifetime warranty against flooring/coating failure due to concrete moisture vapor emission (MVE).
			2. Sample adhesive bond performance warranty from moisture vapor reduction admixture (MVRA) manufacturer.

\*\* NOTE TO SPECIFIER \*\* Delete one of the two following paragraphs. Delete both if not required.

* + - 1. Sample adhesive bond performance warranty from flooring adhesive manufacturer.
			2. Sample lifetime adhesive bond performance warranty from flooring adhesive manufacturer and certified flooring installer.

\*\* NOTE TO SPECIFIER \*\* Delete paragraph if not required.

* + 1. Sustainable Design Submittals:
			1. Regional materials.
			2. Low-emitting materials.
			3. MVRA Health Product Declaration (HPD).
			4. MVRA NSF/ANSI 61: Drinking Water System Components – Health Effects Compliant.
			5. MVRA NSF/ANSI 372: Drinking Water System Components – Lead Content Compliant.
		2. Quality Assurance Submittals:
			1. Qualification Data: For Applicator.
			2. Product Test Reports: For MVE-control system, indicating compliance with requirements.
			3. Field quality-control reports.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section and employs technical-support personnel who are available for product training.
			1. Ready Mixed Concrete Manufacturer Qualifications:
				1. Comply with ASTM C94/C94M requirements for production facilities and equipment.
				2. Manufacturer certified according to NRMCA certification procedures.
			2. Obtain concrete moisture vapor reduction admixtures from same manufacturer.
		2. Installer Qualifications: Company specializing in performing Work of this section and trained and approved by the manufacturer.
		3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
			1. Aggregates: Each grading and type shall be stockpiled separately. Storage shall minimize segregation and prevent contamination.
			2. Cement: Store in accordance with ACI 318.
			3. Moisture Vapor Reduction Admixture: Store in temperature-controlled area above 40 degrees Fahrenheit, protected from exposure to harmful weather and out of direct sunlight. Do not allow to freeze.
	3. Pre-Installation Conference:
		+ 1. Convene at Project site minimum 2 weeks prior to beginning work of this Section.
			2. Attendance: Architect, Design/Builder, Contractor, Construction Manager, Testing Laboratory, lightweight aggregate manufacturer, MVRA manufacturer, and concrete supplier, either in person or via teleconference.
			3. Review and Discuss:
				1. Concrete mix designs.
				2. Procedures for ensuring quality of concrete materials.
				3. Procedures for ensuring conveyance of specified warranties.
	4. WARRANTIES
		1. Provide MVRA manufacturer’s lifetime warranty against concrete induced moisture vapor failure, providing coverage for:
			1. Repair or removal of failed flooring, coating, or roofing.
			2. Placement of topically applied moisture remediation system.
			3. Replacement of flooring, coating, or roofing materials to match original, if available, including material and labor.
		2. Provide MVRA manufacturer’s adhesion warranty, matching terms of adhesive or primer manufacturer's material adhesion warranty.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: ISE Logik Industries, which is located at: 5635 Iron Works Road, Theodore, AL 36581; Toll Free Tel: 877-549-5159; Email: request info (decraft@iselogik.com); Web: http://www.iselogik.com.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01600 - Product Requirements.
	1. PERFORMANCE REQUIREMENTS
		1. Except as modified or exceeded by these specifications, all cast-in-place structural lightweight concrete work shall conform to ACI 301.
	2. MATERIALS
		1. Moisture Vapor Reduction Admixture (MVRA): By ISE Logik Industries. Non-toxic, volatile organic compound (VOC) free, liquid admixture formulated to react with hydroxide ions produced by cement hydration process, creating additional hydration products within capillary pores, blocking moisture vapor movement through concrete.
			1. Meets requirements of ASTM C494.
			2. Hydraulic Conductivity Performance per ASTM D5084. No greater than 6.0 x 10-8 cm/sec.
		2. Cement: Meets ASTM C150, ASTM C595, or ASTM C845.

\*\* NOTE TO SPECIFIER \*\* Arcosa Lightweight Website: (<https://arcosalightweight.com/>)

* + 1. Aggregate: Expanded shale or clay lightweight aggregate supplied by Arcosa Lightweight using the rotary kiln method shall meet the requirements of ASTM C330.

\*\* NOTE TO SPECIFIER \*\* Delete substitution options not required.

* + - 1. Substitutions: Per Section 01600 - Product Requirements.
			2. Substitutions: Not permitted.
		1. Normal Weight Aggregate: Meet requirements of ASTM C33.
		2. Water: Meet requirements of ASTM C94.
		3. Air-Entraining Admixtures: Shall meet the requirements of ASTM C260.
		4. Chemical Admixtures: Set-controlling and water reducing admixtures, are to meet requirements of ASTM C494 and manufacturer’s recommendations.
		5. Fly Ash: Meet requirements of ASTM C618.
		6. Ground Granulated Blast-Furnace Slag: Meet requirements of ASTM C989.
		7. Silica Fume: Meet requirements of ASTM C1240.
	1. ACCESSORIES

\*\* NOTE TO SPECIFIER \*\* Ensure related sections include a sheet vapor retarder complying with ASTM E1745, having maximum permeance of 0.1 US perms and minimum thickness of 0.01 inch. Include manufacturer's recommended seam adhesive or pressure-sensitive seam tape. Ensure related sections include adhesives and installation that convey the specified warranties.

* + 1. Flooring Adhesive:
			1. Specified in Section 090561.
			2. Specified in Section 096200.
			3. Specified in Section 096400.
			4. Specified in Section 096500.
			5. Specified in Section 096800.
			6. Specified in Section \_\_\_\_\_\_.
			7. Adhesive manufacturer’s lifetime performance bond warranty against installation failure due to defective product providing coverage for:

Equivalent floor covering.

Replacement adhesive.

Reasonable labor costs to repair or replace the failed portion of installation.

\*\* NOTE TO SPECIFIER \*\* Taylor Adhesives website is https://www.tayloradhesives.com/

Certified Flooring Installers Association website is <https://cfiinstallers.org/>. Delete Contract documents paragraph not required.

* + - 1. Contract Documents: Based on Taylor Adhesives.
			2. Contract Documents: Are based on Taylor Adhesives utilizing a certified installer from International Certified Flooring Installers Association (CFI).

\*\* NOTE TO SPECIFIER \*\* Delete substitution options not required.

* + - * 1. Substitutions: Per Section 01600 - Product Requirements.
				2. Substitutions: Not permitted.
	1. CONCRETE PROPERTIES
		1. Compressive Strength: Materials proportioned to produce concrete with a minimum compressive strength of \_\_\_ psi (\_\_\_ MPa) at 28 days.
		2. Density: Materials proportioned to produce concrete with a calculated equilibrium density of \_\_\_ lbs per cu ft (\_\_\_ kg per cu m) plus or minus 3 lbs per cut ft (\_\_\_ kg per cu m) as determined by ASTM C567, Section 9.
		3. Slump: Concrete to be delivered at minimum slump necessary for efficient mixing, placing, and finishing. Maximum slump to be \_\_\_ inch (\_\_\_ mm) with a tolerance of plus \_\_\_ inch (\_\_\_ mm). Consult ASTM C94 for guidance on tolerances.
		4. Air Content: To be \_\_\_ percent by volume with a tolerance of plus 1.5 percent.
		5. Mixture Proportions: Contractor is to furnish the mixture proportions that will meet the strength and fresh and equilibrium density requirements of the concrete specified. Mixture proportions to be prepared in accordance with ACI 318, and subject to approval of the Architect/Engineer.
		6. Moisture Vapor Reduction Admixture (MVRA): For new structural lightweight slabs to receive flooring, coatings, or roofing systems.
			1. Add MVRA in accordance with MVRA manufacturer’s instructions.
			2. Provide batch ticket information showing dosage to MVRA manufacturer.
			3. Use of other admixtures in same batch as MVRA is acceptable; add each admixture separately.
		7. Batching and Mixing: Batch and mix in accordance with the applicable sections of ACI 301 and ASTM C 94.
		8. Freshening onsite with held back mix water is acceptable in accordance with ACI guidelines and if amount does not exceed original water to cementitious material ratio or instructions of the Design Professional responsible.

\*\* NOTE TO SPECIFIER \*\* Use of fibers is acceptable but may compromise the lifetime MVE warranty; fibers can create their own unique routes of moisture vapor emission that the MVRA cannot control if the fibers are improperly incorporated into the mix.

* + 1. Use water reducing admixtures to achieve desired slump.
1. EXECUTION
	1. PREPARATION
		1. Concrete Substrate Surface: Prepared in accordance with the written instructions of the flooring manufacturer, adhesive manufacturer, underlayment manufacturer, roofing manufacturer, or combination thereof.
			1. In the absence of written manufacturers’ instructions, concrete substrate surface shall be prepared in accordance with ASTM F710.
	2. EXAMINATION
		1. Do not begin installation until substrates have been properly prepared.
		2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
		3. Substrate Surface Evaluation:
			1. Field Moisture Evaluation: Such as ASTM D4263, ASTM F1869, and ASTM F2170 shall not be required.
			2. Substrate Surface Dewpoint Evaluation: To be conducted prior to the installation of any material on the concrete substrate surface.
				1. In the absence of written manufacturers’ instructions, substrate surface absorption/porosity evaluation shall be in accordance with ASTM F3191.
			3. Substrate Surface Absorption/Porosity Evaluation: Conducted in accordance with the written instructions of the flooring manufacturer, adhesive manufacturer, underlayment manufacturer, roofing manufacturer, or combination thereof.
				1. In the absence of written manufacturers’ instructions, substrate surface absorption/porosity evaluation shall be in accordance with ASTM F3191.
			4. Mat Bond Evaluation: Conducted in accordance with the written instructions of the flooring manufacturer, adhesive manufacturer, underlayment manufacturer, roofing manufacturer, or combination thereof.
				1. In the absence of written manufacturers’ instructions, mat bond evaluation shall be in accordance with ASTM F3311.
	3. INSTALLATION
		1. Comply with requirements of appropriate Division 03 Section for admixture dosing, concrete mixing, placing, and finishing.
		2. Cold Weather Placement: Comply with most current version of ACI 306R Guide to Cold Weather Concreting.
		3. Hot Weather Placement: Comply with most current version of ACI 305R Guide to Hot Weather Concreting.
	4. CURING
		1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

\*\* NOTE TO SPECIFIER \*\* Self-dissipating curing compounds may require mechanical removal prior to installation of flooring in accordance with ASTM F710. Do not chemically remove. Do not cure concrete slabs to receive moisture sensitive final finishes by ponding, misting, or other means that involves the application of water.

* + 1. Cured concrete slabs to receive moisture sensitive coatings according to ACI 308 by one or more of following methods:
			1. Evaporation Retarder.
			2. Moisture-retaining curing cover.
			3. Water-based ASTM C309 compliant curing compound.
			4. ASTM C1315 compliant cure and seal curing compound.
		2. Verify acceptability of curing method with MVRA manufacturer.
	1. FIELD QUALITY CONTROL
		1. Control of the Concrete: To be under the supervision of the Architect/Engineer.
			1. Field-Testing: Performed by an ACI Certified Field Technician.
			2. Fresh Density: \_\_\_ lbs per cu ft (\_\_\_ kg per cu m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete if pumping is not required.

* + - 1. Pumping: Follow ESCSI information sheet 4770.1, Pumping Structural Lightweight Concrete - The Team Approach, and ACI 304.2R.
			2. Concrete Sampling: Obtain samples in accordance with ASTM C172.
				1. Transport samples to a place on site not to be disturbed for first 24 hours.

\*\* NOTE TO SPECIFIER \*\* Delete if pumping is not required.

* + - * 1. Concrete Placed by Pumping: Obtain samples from the end of the pump discharge line.
			1. Concrete Test Specimens: To be made in accordance with ASTM C31.
				1. Compressive Strength: Tested in accordance with ASTM C39.
				2. Fresh Density: Determined by ASTM C138.
				3. Slump: Determined by AST C143.
				4. Air Content of Freshly Mixed Concrete: Determined ASTM C173.
		1. Project specific quality control process as required by MVRA manufacturer necessary to convey concrete moisture vapor emission failure warranty and stand-alone adhesion warranty.

END OF SECTION