SECTION 03 05 00

INTEGRAL HYDROPHOBIC WATERPROOFING ADMIXTURES

Display hidden notes to specifier. (Don't know how? [Click Here](https://www.arcat.com/sd/display_hidden_notes.shtml))

*Copyright 2022 - 2023 ARCAT, Inc. - All rights reserved*

\*\* NOTE TO SPECIFIER \*\* Hycrete, Inc.; waterproofing and corrosion protection concrete admixtures.
This section is based on the products of Hycrete, Inc., which is located at:14 Spielman Rd. Fairfield, NJ 07004Tel: 201-386-8110 Fax: 201-386-8155Email: [request info (info@hycrete.com)](https://arcat.com/rfi?action=email&company=Hycrete%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(03350hyc)%253A%2520&coid=45522&spec=03350hyc&rep=&fax=201-386-8155)
Web: <https://hycrete.com>
 [ [Click Here](https://arcat.com/company/hycrete-inc-45522) ] for additional information.
Hycrete products make concrete waterproof, by reducing absorption of water and dissolved salts into the concrete and by forming a protective layer over reinforcing steel.
Built on a foundation of corporate and environmental responsibility, Hycrete takes ownership of innovating solutions to the biggest challenges of the world's most widely used building material.
We believe that sustainable construction practices should go hand-in-hand with solutions that yield meaningful cost benefits, simplify, and speed assembly, and create more durable structures. And our green concrete products deliver on that.
Contact Us to learn more about Hycrete.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Hydrophobic Pore Blocking Concrete Admixtures for the following:
			1. Footings.
			2. Foundation walls.
			3. Slabs-on-grade.
			4. Suspended slabs.
			5. Water tanks.
			6. Tunnels.
			7. \_\_\_\_\_\_\_\_.
		2. Hydrophobic Concrete Admixtures for the following:
			1. Footings.
			2. Foundation walls.
			3. Slabs-on-grade.
			4. Suspended slabs.
			5. Water tanks.
			6. Tunnels.
			7. \_\_\_\_\_\_\_\_.
		3. Waterproofing Concrete Admixtures for the following:
			1. Footings.
			2. Foundation walls.
			3. Slabs-on-grade.
			4. Suspended slabs.
			5. Water tanks.
			6. Tunnels.
			7. \_\_\_\_\_\_\_\_.
		4. Corrosion protection and waterproofing concrete admixtures for the following:
			1. Footings.
			2. Foundation walls.
			3. Slabs-on-grade.
			4. Suspended slabs.
			5. Water tanks.
			6. Tunnels.
			7. \_\_\_\_\_\_\_\_.
		5. Migrating Dual-Action Corrosion Inhibitor and Waterproofing Admixture
			1. Bridges and highway infrastructure
			2. Dams, reservoirs, and water and wastewater systems
			3. Ports and marine structures
			4. Pilings
			5. Tunnels
			6. Airport runways
			7. Rail and metro systems
			8. Power and telecom infrastructure
			9. Parking structures
		6. Hydrophobic waterproofing admixture for mortar
			1. CMU Blocks.
			2. Mortar Cement.
			3. ASTM Stucco.
			4. Repair Mortar and Grout.
			5. Underlayment Grout.
	1. RELATED SECTIONS

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

* + 1. Section 03 15 13 - Waterstops.
		2. Section - .
		3. Section 03 30 00 - Cast-in-Place Concrete.
		4. Section - .
		5. Section 03 38 00 - Post-Tensioned Concrete.
		6. Section 03 41 16 - Precast Concrete Slabs.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Concrete Institute (ACI):
			1. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
			2. ACI 301 - Specifications for Structural Concrete.
			3. ACI 302 - Guide for Concrete Floor and Slab Construction.
			4. ACI 305R - Hot Weather Concreting.
			5. ACI 306R - Cold Weather Concreting.
			6. ACI 308 - Standard Specification for Curing Concrete.
			7. ACI 309R - Guide for Consolidation of Concrete.
			8. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
			9. ACI 357 - Guide for the Design and Construction of Fixed Offshore Concrete Structures.
		2. American National Standards Institute (ANSI):
		3. ASTM International (ASTM):
			1. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
			2. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
			3. ASTM A820 / A820M - Standard Specification for Steel Fibers for Fiber-Reinforced Concrete.
			4. ASTM A996 - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
			5. ASTM C31 / C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
			6. ASTM C33 - Standard Specification for Concrete Aggregates.
			7. ASTM C39 / C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
			8. ASTM C94 / C94M - Standard Specification for Ready-Mixed Concrete.
			9. ASTM C138 / C138 M - Standard Test for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
			10. ASTM C143 / C143 M - Standard Test Method for Slump of Hydraulic Cement Concrete.
			11. ASTM C150 - Standard Specification for Portland Cement.
			12. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
			13. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
			14. ASTM C173 / C173 M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
			15. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
			16. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
			17. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
			18. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
			19. ASTM C403 - Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance.
			20. ASTM C494 / C 494 M - Standard Specification for Chemical Admixtures for Concrete.
			21. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
			22. ASTM C597 - Standard Test Method for Pulse Velocity Through Concrete.
			23. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
			24. ASTM C926 - Standard Specification for Application of Cement-Based Plaster.
			25. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
			26. ASTM C1017 / C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
			27. ASTM C1064 / C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
			28. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength.
			29. ASTM C1116 / C1116M - Standard Specification for Fiber-Reinforced Concrete.
			30. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
			31. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
			32. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
			33. ASTM C1556 - Standard Test Method for Determining the Apparent Chloride Diffusion Coefficient of Cementitious Mixtures by Bulk Diffusion.
			34. ASTM C1583 - Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method).
			35. ASTM C1585 - Standard Test Method for Measurement of Rate of Absorption of Water by Hydraulic-Cement Concretes.
			36. ASTM C1602 / C1602 M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
			37. ASTM C1611 - Standard Test Method for Slump Flow of Self-Consolidating Concrete.
			38. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.
			39. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
			40. ASTM G109 - Standard Test Method for Determining Effects of Chemical Admixtures on Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments.
		4. German Institute for Standardization (DIN):
			1. DIN 1048 - Water Permeability Test.
		5. British Standards Institution (BSI)
			1. BS 1881-122 - Testing Concrete Methods for Determination of Water Absorption.
			2. BS EN 12390-8 - Testing hardened concrete - Depth of penetration of water under pressure.
		6. National Sanitation foundation (NSF):
			1. NSF/ANSI 61 - Drinking Water System Components - Health Effects.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data:
			1. Manufacturer's data sheets on each product to be used.
			2. Preparation instructions and recommendations.
			3. Storage and handling requirements and recommendations.
			4. Typical installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not applicable to product type.

* + 1. Verification Samples: Two representative units of each type, size, pattern, and color.
		2. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
	1. QUALITY ASSURANCE

\*\* NOTE TO SPECIFIER \*\* Paragraph below applies to Hycrete System Endure WP (formerly W1000). Delete if not required.

* + 1. Manufacturer Qualifications: Waterproof Concrete Admixture Manufacturer will have a minimum of 15 years of experience on projects of similar scope.

\*\* NOTE TO SPECIFIER \*\* Paragraph below applies to Hycrete (formerly System W). Delete if not required.

* + 1. Manufacturer Qualifications: Hydrophobic Pore Blocking Concrete Admixture Manufacturer Qualifications: Hydrophobic Pore Blocking Concrete Admixture Manufacturer will have a minimum of 15 years of experience on projects of similar scope.
			1. Manufacturer quality assurance during design, preconstruction, and construction:
				1. Hydrophobic Pore Blocking Concrete Admixture Manufacturer will review and approve the waterproofing details and procedures, including the joint detailing, the waterstop detailing, the reinforcing steel detailing, and all related information.
				2. Hydrophobic Pore Blocking Concrete Admixture Manufacturer will review and approve the service penetration details prior to installation.
				3. Hydrophobic Pore Blocking Concrete Admixture Manufacturer will provide pre-placement and placement inspection of hydrophobic concrete production and installation and document specification compliance.
				4. Hydrophobic Pore Blocking Concrete Admixture Manufacturer will provide pre-placement and placement inspection of waterstop installation and document specification compliance.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up on might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
			1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
			2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
			3. Retain mock-up during construction as a standard for comparison with completed work.
			4. Do not alter or remove mock-up until work is completed or removal is authorized.
	1. PRE-INSTALLATION CONFERENCE
		1. Arrange in compliance with Division 1.
		2. Attendance: Contractor, installer, owner, architect, structural engineer, civil engineer, and those requested to attend,

\*\* NOTE TO SPECIFIER \*\* Paragraph below applies to Hycrete (formerly System W). Delete if not required.

* + - 1. Hydrophobic Pore Blocking Concrete Admixture Manufacturer representative, and batch plant representative,
		1. Meeting Time: 3 weeks prior to beginning of work of this Section and work of related Sections affecting the work of this Section.
		2. Location: Project site.
		3. Review procedures for conducting work of this Section, including:
			1. Review of mix design and mix test results.
			2. Mixing procedure.
			3. Conditions for acceptance of concrete at project site.
			4. Placement procedures.
			5. Finishing options and procedures.
			6. Curing and crack control procedures.
			7. Testing for acceptable moisture emissions, alkalinity pH levels, and relative humidity of concrete slab prior to installation of finish flooring.
			8. Effect of the above on the project schedule.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Conform to provisions in the appropriate sections in Division 01 and the hydrophobic pore blocking concrete admixture manufacturer instructions.
		2. Mixing and Delivery: Conform to ASTM C94.
		3. Sampling at Delivery: Conform to ASTM C172. Cure 4 x 8 inch (102 x 203 mm) cylinders to provisions of ASTM C31 and compression test compressive strength of cylinders to ASTM C39.
		4. Batch Tickets: Conform to ASTM C94 Option A or C. Accompany each load, fully executed, and signed. Log in with inspector at time of entry. Conform to Source Quality Control requirements specified by this Section.
			1. Include water content and water withheld at batch plant.
			2. Indicate time to nearest minute that batch was dispatched from plant, when it arrived at site, and when unloading began and was finished.
			3. Indicate ambient air temperature and concrete internal temperature at time of arrival.
			4. Make written record of water and other additives added to design mix, and the amount of concrete in the truck at the time of addition, after the mix truck left the batch plant.
		5. Reject concrete that has reached internal temperature of 89 degrees F ( 32 degrees C) or above and when temperature has risen 5 degrees in 10 minutes, indicating concrete is setting up prior to discharge.
		6. Store products in accordance with ACI 301. Do not use admixtures that have been in storage at project site for more than 12 months or which have been subjected to freezing, except as accepted by the Hydrophobic Concrete Admixture Manufacturer and by the structural engineer based on test results.
	2. PROJECT CONDITIONS AND SLAB OR MEMBER THICKNESS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
		2. Thickness of slab and other member to provide waterproofing to be as specified and not less than 6 inches. Any slab or other member to provide waterproofing that has a thickness of less than 6 inches to be increased to 6 inches (152 mm), with design approved by the Engineer.
	3. WARRANTY
		1. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
		2. Manufacturer's Warranty: 10-year performance based waterproofing warranty, which covers cost of repair of any leak in protection areas through industry-accepted and approved means. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under the contract documents.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Hycrete, Inc., which is located at:14 Spielman Rd. Fairfield, NJ 07004Tel: 201-386-8110 Fax: 201-386-8155Email: [request info (info@hycrete.com)](https://arcat.com/rfi?action=email&company=Hycrete%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(03350hyc)%253A%2520&coid=45522&spec=03350hyc&rep=&fax=201-386-8155);Web: <https://hycrete.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 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete article not required or delete paragraph not required

* 1. WATERPROOFING CONCRETE ADMIXTURES
		1. Hydrophobic Pore Blocking Concrete Admixture:
			1. Basis of Design: Hycrete360 (formerly System W), as manufactured by Hycrete, Inc. A water-based hydrophobic pore blocking concrete admixture for waterproof construction.
				1. Meets or exceeds British Standards Institute (BSI) 1881-122 testing. Less than 1 percent water absorption.
				2. Warranty: 10 Year Performance Based waterproof warranty, which covers cost of repair of any leak in protected areas through industry-accepted and approved means.
			2. Concrete Admixtures: General.
				1. Characteristics of All Admixtures:

Compatible with each other and free of intentionally-added chlorides.

Manufacturer: Acceptable to Hydrophobic Concrete Admixture Manufacturer.

* + - * 1. Superplasticizer: To reduce the water requirement of the concrete and to improve the workability for ease in placing and consolidating the concrete.

Material Standard: ASTM C494, Type E, Type F, or Type G.

* + - * 1. Evaporation retarder.
				2. Curing Compound: Hycrete Endure Cure (No Substitutions).
				3. Polypropylene fiber reinforcement.
				4. Air-Entraining Admixture: Shall conform to ASTM C260.
				5. Mid-Range Water-Reducing Admixture: Shall conform to ASTM C494 Type A.
				6. High-Range Water-Reducing Admixture: Shall conform to ASTM C494 Type F or ASTM C1017 Type I.
				7. Accelerating Admixture: Shall conform to ASTM C494 Type C or E.
				8. Retarding Admixture: Shall conform to ASTM C494 Type B or D.
				9. Shrinkage-reducing admixture.
				10. Alkali-Silica Reaction Inhibiting Admixture:

Shall contain a minimum of 30 percent lithium nitrate.

* + - 1. Mixes:
				1. The concrete ready mix supplier must contact the Hydrophobic Pore Blocking Concrete Admixture Manufacturer before designing and testing any new mix designs, to receive guidance on achieving proper permeability reduction and water absorption characteristics. The concrete ready mix supplier must also report the test results to the Hydrophobic Pore Blocking Concrete Admixture Manufacturer. All values must be within the specification limits.

All concrete materials used for testing must be same as concrete materials used for construction.

Test result requirements for Hydrophobic Pore Blocking Concrete in addition to engineer's performance requirements: Corrected 30 minute water absorption, age at test 7 days (BS 1881-122): Not greater than 1.0 percent.

* + - * 1. Waterproofing System: All concrete in the locations listed in "Section Includes" Article in PART 1 will be waterproofed by the addition of Hydrophobic Pore Blocking Concrete Admixture and additional ingredients including:

Hydrophobic Concrete Admixture at the rate of one U.S. gallon per cubic yard of concrete (5 liters per cubic meter).

Superplasticizer at the manufacturer's recommended rate and appropriate for the placement requirements of the project.

* + - * 1. Cementitious Content: The cementitious content of concrete containing Hydrophobic Concrete Admixture will not be less than 550 lbs per cu yd (325 kg per cu m) with up to 15 percent fly ash or 50 percent slag replacement.
				2. Water-Cement Ratio: 0.42 maximum. Water content of Hydrophobic Concrete Admixture and other admixtures to be included in the water-to-cementitious ratio.

\*\* NOTE TO SPECIFIER \*\* Insert Engineer's performance requirements below:

* + - * 1. Compressive Strength per ASTM C39, 28-day: \_\_\_\_\_\_\_\_
				2. Air Content per ASTM C173:

Required Test Method: \_\_\_\_\_\_\_\_.

Air Content: \_\_\_\_\_\_\_\_.

Tolerance: \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Specify one of the two paragraphs below. Delete paragraph not required.

* + - * 1. Slump per ASTM C143: \_\_\_\_\_\_\_\_.
				2. Slump-Flow per ASTM C1611: \_\_\_\_\_\_\_.
			1. Source Quality Control:
				1. Verification of Performance: Provide ready-mixed concrete from a concrete supplier approved by the Hydrophobic Concrete Admixture Manufacturer and authorized to dispense the Hydrophobic Pore Blocking Concrete Admixture Manufacturer's waterproofing materials.
			2. Accessories:
				1. Waterstops and Groutable Hose Waterstop System:

Waterstops:

Shall be placed at all cold joints and penetrations.

Manufacturer and Product: Acceptable to Hydrophobic Pore Blocking Concrete Admixture Manufacturer.

Groutable Hose Waterstop Systems:

Shall be placed at vertical cold joints where required by Hydrophobic Concrete Admixture Manufacturer.

Manufacturer and Product: Acceptable to Hydrophobic Concrete Admixture Manufacturer.

* + 1. Hydrophobic Concrete Admixture:
			1. Basis of Design: Hycrete Endure WP (formerly W1000), as manufactured by Hycrete, Inc. A water-based hydrophobic concrete admixture.
				1. Meets or exceeds British Standards Institute (BSI) 1881-122 testing to performance of less than 1 percent water absorption.
			2. Concrete Admixtures: General.
				1. Characteristics of All Admixtures:

Compatible with each other and free of intentionally-added chlorides.

Manufacturer: Acceptable to Hydrophobic Concrete Admixture Manufacturer.

* + - * 1. Superplasticizer: To reduce the water requirement of the concrete and to improve the workability for ease in placing and consolidating the concrete.

Material Standard: ASTM C494, Type E, Type F, or Type G.

* + - * 1. Evaporation retarder.
				2. Curing Compound: Hycrete Endure Cure (No Substitutions).
				3. Polypropylene Fiber reinforcement.
				4. Air-Entraining Admixture: Shall conform to ASTM C260.
				5. Mid-Range Water-Reducing Admixture: Shall conform to ASTM C494 Type A.
				6. High-Range Water-Reducing Admixture: Shall conform to ASTM C494 Type F or ASTM C1017 Type I.
				7. Accelerating Admixture: Shall conform to ASTM C494 Type C or E.
				8. Retarding Admixture: Shall conform to ASTM C494 Type B or D.
				9. Shrinkage-reducing admixture.
				10. Alkali-Silica Reaction Inhibiting Admixture: Contain a minimum of 30 percent lithium nitrate.
			1. Mixes:
				1. The concrete ready mix supplier must contact the Hydrophobic Concrete Admixture Manufacturer before designing and testing any new mix designs, to receive guidance on achieving proper water absorption characteristics. The concrete ready mix supplier must also report the test results to the Hydrophobic Concrete Admixture Manufacturer. All values must be within the specification limits.

All concrete materials used for testing must be same as concrete materials used for construction.

Test result requirements for Hydrophobic Concrete in addition to engineer's performance requirements: Corrected 30 minute water absorption, age at test 7 days (BS 1881-122): Not greater than 1.0 percent.

* + - * 1. Waterproofing System: All concrete in the locations listed in "Section Includes" Article in PART 1 will be waterproofed by the addition of Hydrophobic Concrete Admixture and additional ingredients including:

Hydrophobic Concrete Admixture at the rate of one U.S. gallon per cubic yard of concrete (5 liters per cubic meter).

Superplasticizer at the manufacturer's recommended rate and appropriate for the placement requirements of the project.

* + - * 1. Water-Cement Ratio: 0.42 maximum. Water content of Hydrophobic Pore Blocking Concrete Admixture and other admixtures to be included in the water-to-cementitious ratio.
				2. Insert Engineer's performance requirements below:
				3. Compressive Strength per ASTM C39, 28-day: \_\_\_\_\_\_\_\_
				4. Air Content per ASTM C173:

Required Test Method: \_\_\_\_\_\_\_\_.

Air Content: \_\_\_\_\_\_\_\_.

Tolerance: \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* specify one of the two paragraphs below. Delete paragraph not required.

* + - * 1. Slump per ASTM C143: \_\_\_\_\_\_\_\_.
				2. Slump-Flow per ASTM C1611: \_\_\_\_\_\_\_.
			1. Source Quality Control:
				1. Verification of Performance: Provide ready-mixed concrete from a concrete supplier approved by the Hydrophobic Concrete Admixture Manufacturer and authorized to dispense the Hydrophobic Concrete Admixture Manufacturer's waterproofing materials.
			2. Accessories:
				1. Waterstops and Groutable Hose Waterstop System:

Waterstops:

Shall be placed at all cold joints and penetrations.

Manufacturer and Product: Acceptable to Hydrophobic Pore Blocking Concrete Admixture Manufacturer.

Groutable Hose Waterstop Systems:

Shall be placed at vertical cold joints where required by Hydrophobic Concrete Admixture Manufacturer.

Manufacturer and Product: Acceptable to Hydrophobic Concrete Admixture Manufacturer.

* 1. CORROSION PROTECTION AND WATERPROOFING CONCRETE ADMIXTURES
		1. Waterproofing and Corrosion Protection Concrete Admixture:
			1. Basis or Design: Hycrete Endure CP (formerly X1000) as manufactured by Hycrete, Inc.
				1. Admixture to meet 50 percent or greater reduction at seven days according to ASTM C1585.
				2. Admixture to meet or exceed British Standards Institute (BSI) 1881-122 testing to performance of less than 1 percent water absorption.
				3. In chloride-exposed concrete specimens analyzed by chloride depth profiling, admixture to demonstrate a 30 percent or greater reduction in surface concentration of chlorides (Cs) compared to an untreated control and a diffusion coefficient (D) of 50 percent or less than the control according to ASTM C1556.
				4. Admixture to demonstrate a 75 percent or greater reduction in rebar iron loss in an uncracked concrete specimen and a 50 percent or greater reduction in rebar iron loss in a cracked specimen with a pre-formed crack of 0.3 mm after four years of testing according to ASTM G109; Southern Exposure modification: 12 weeks - 4 days wet, 3 days dry, at 100 degrees F, (38 degrees C) then 12 weeks constantly wet.
				5. Concrete Admixtures: General.

Characteristics of All Admixtures:

Compatible with each other and free of intentionally-added chlorides.

Manufacturer: Acceptable to Waterproof Concrete Admixture Manufacturer.

Superplasticizer: To reduce the water requirement of the concrete and to improve the workability for ease in placing and consolidating the concrete.

Material Standard: ASTM C494, Type E, Type F, or Type G.

Evaporation retarder.

* + - * 1. Curing Compound: Hycrete Endure Cure (No Substitutions).

Polypropylene fiber reinforcement.

Air-Entraining Admixture: Shall conform to ASTM C260.

Mid-Range Water-Reducing Admixture: Shall conform to ASTM C494 Type A.

High-Range Water-Reducing Admixture: Shall conform to ASTM C494 Type F or ASTM C1017 Type I.

Accelerating Admixture: Shall conform to ASTM C494 Type C or E.

Retarding Admixture: Shall conform to ASTM C494 Type B or D.

Shrinkage-reducing admixture.

* + - 1. Mixes:
				1. The concrete ready mix supplier must contact the Waterproof and Corrosion Resistant Concrete Admixture Manufacturer before designing and testing any new mix designs, to receive guidance on achieving proper water absorption characteristics. The concrete ready mix supplier must also report the test results to the Waterproof and Corrosion Resistant Concrete Admixture Manufacturer. All values must be within the specification limits.

All concrete materials used for testing must be same as concrete materials used for construction.

* + - * 1. Waterproofing System: All concrete in the locations listed in "Section Includes" Article in PART 1 will be waterproofed by the addition of Waterproofing and Corrosion Protection Concrete Admixture and additional ingredients including:

Waterproofing and Corrosion Protection Concrete Admixture at the rate of two U.S. gallons per cubic yard of concrete (ten liters per cubic meter).

Superplasticizer at the manufacturer's recommended rate and appropriate for the placement requirements of the project.

* + - * 1. Recommended Water-Cement Ratio: 0.45 maximum. Water content of Waterproof Concrete Admixture and other admixtures to be included in the water-to-cementitious ratio.

\*\* NOTE TO SPECIFIER \*\* Insert Engineer's performance requirements below:

* + - * 1. Compressive Strength per ASTM C39, 28 day: \_\_\_\_\_\_\_\_
				2. Air Content per ASTM C173:

Required Test Method: \_\_\_\_\_\_\_\_.

Air Content: \_\_\_\_\_\_\_\_.

Tolerance: \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Specify one of the two paragraphs below. Delete paragraph not required.

* + - * 1. Slump per ASTM C143: \_\_\_\_\_\_\_\_.
				2. Slump-Flow per ASTM C1611: \_\_\_\_\_\_\_.
				3. Source Quality Control:

Verification of Performance: Provide ready-mixed concrete from a concrete supplier approved by the Waterproofing and Corrosion Protection Concrete Admixture Manufacturer and authorized to dispense the Waterproofing and Corrosion Protection Concrete Admixture Manufacturer's waterproofing materials.

* + - * 1. Accessories:

Waterstops (applicable for water-containing structures):

Shall be placed at all cold joints and penetrations

Manufacturer and Product: Acceptable to Waterproof Concrete Admixture Manufacturer.

* + 1. Migrating Dual-Action Corrosion Inhibitor and Waterproofing Admixture.
			1. Basis of Design: Hycrete Endure CP as manufactured by Hycrete, Inc. Provides a permanent barrier against water and chloride ingress that does not degrade and never requires reapplication.
			2. Concrete and Steel Protection:
				1. Migrates to form a protective passivating layer on the surface of reinforcement steel that dramatically reduces corrosion initiation and propagation. Protects reinforcement even in cracked concrete.
				2. Keeps water and corrosive agents out of concrete by reducing absorption to an industry low compared to control concrete.
			3. NSF/ANSI 61 - approved for use in potable water tanks.
			4. Compatible with standard admixture metering equipment.
			5. Cradle to Cradle certified by MBDC.
			6. Non-toxic, no VOCs.
			7. Product Performance:
				1. Water Absorption per BSI 1881-122: Less than 1 percent absorption; up to seven times reduction compared to control.
				2. Capillary absorption per ASTM C1585: Up to 60 percent reduction at 7 days.
				3. Corrosion protection per ATSM G109 and ASTM C1556: Demonstrated protection against reinforcement bar corrosion and chloride penetration over the control (see Hycrete Testing Summary).
				4. Permeability/hydrostatic pressure per DIN 1048 and BS EN 12390-8: Passes DIN 1048; up to 70 percent reduction in permeability.
				5. Crack healing per ASTM C597: Hycrete heals faster and more completely compared to untreated concrete.
				6. Set time per ASTM C403: Set neutral.
				7. Drying shrinkage per ASTM C157: Neutral.
				8. Slump per ASTM C143: Neutral.
				9. Workability: Excellent.
				10. Effect on Concrete Color: None.
				11. Compressive strength per ASTM C39: Water/cement ratios may need to be lowered to account for possible, minor strength decreases associated with some materials. Perform trial mixes.
				12. Potable water per NSF/ANSI 61: Approved for use in potable water tanks 50,000 gallons (189,271 liters) or greater and pipes 84 inches (214 cm) in diameter and greater
				13. Adhesion per ASTM C1583, ASTM C1072, ASTM D3359: Neutral. No adverse effect on bond with concrete.
			8. Mixes:
				1. The concrete ready mix supplier must contact the Waterproof and Corrosion Resistant Concrete Admixture Manufacturer before designing and testing any new mix designs, to receive guidance on achieving proper water absorption characteristics. The concrete ready mix supplier must also report the test results to the Waterproof and Corrosion Resistant Concrete Admixture Manufacturer. All values must be within the specification limits.

All concrete materials used for testing must be same as concrete materials used for construction.

* + - * 1. Waterproofing System: All concrete in the locations listed in "Section Includes" Article in PART 1 will be waterproofed by the addition of Waterproofing and Corrosion Protection Concrete Admixture and additional ingredients including:

Waterproofing and Corrosion Protection Concrete Admixture at the rate of 0.25 to 1 gallon US. gallons per cubic yard of concrete (1 to 4 liters per cubic meter).

Superplasticizer at the manufacturer's recommended rate and appropriate for the placement requirements of the project.

* + - * 1. Recommended Water-Cement Ratio: 0.45 maximum. Water content of Waterproof Concrete Admixture and other admixtures to be included in the water-to-cementitious ratio.
				2. Insert Engineer's performance requirements below:
				3. Compressive Strength per ASTM C39, 28 day: \_\_\_\_\_\_\_\_
				4. Air Content per ASTM C173:

Required Test Method: \_\_\_\_\_\_\_\_.

Air Content: \_\_\_\_\_\_\_\_.

Tolerance: \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* specify one of the two paragraphs below. Delete paragraph not required.

* + - * 1. Slump per ASTM C143: \_\_\_\_\_\_\_\_.
				2. Slump-Flow per ASTM C1611: \_\_\_\_\_\_\_.
				3. Source Quality Control:

Verification of Performance: Provide ready-mixed concrete from a concrete supplier approved by the Waterproofing and Corrosion Protection Concrete Admixture Manufacturer and authorized to dispense the Waterproofing and Corrosion Protection Concrete Admixture Manufacturer's waterproofing materials.

* + - * 1. Accessories:

Waterstops: Aapplicable for water-containing structures:

Shall be placed at all cold joints and penetrations.

Manufacturer and Product: Acceptable to Waterproof Concrete Admixture Manufacturer.

* 1. WATERPROOFING CEMENTITIOUS PRODUCTS
		1. Water-Based Hydrophobic Mortar Admixture.
			1. Basis of Design: Hycrete M1000, as manufactured by Hycrete, Inc. Shuts down capillary absorption and reduces permeability of mortar.
				1. Meets or exceeds British Standards Institute (BSI) 1881-122 testing to performance of less than 1 percent water absorption.
			2. Mixes:
				1. The mortar supplier must contact the Hydrophobic Mortar Admixture Manufacturer before designing and testing any new mix designs, to receive guidance on achieving proper water absorption characteristics. The mortar mix supplier must also report the test results to the Hydrophobic Mortar Admixture Manufacturer. All values must be within the specification limits.

All mortar materials used for testing must be same as mortar materials used for construction.

Test result requirements for Hydrophobic Mortar in addition to engineer's performance requirements: Corrected 30 minute water absorption, age at test 7 days (BSI 1881-122): Not greater than 1.0 percent

Notwithstanding other requirements, the mortar shall be cured and protected in accordance with ACI 308-92 or where applicable an international equivalent.

1. EXECUTION
	1. EXAMINATION
		1. Site verification of conditions:
			1. Verify that site conditions are acceptable for placement of waterproofed concrete.
			2. Utilize Concrete Admixture Manufacturer's pre-placement inspection services.
			3. Do not proceed with concrete placement until conditions unacceptable to the Concrete Admixture Manufacturer are corrected.
		2. Suitable Condition of Reinforcing Steel:
			1. At the time concrete is placed, reinforcement shall be free from mud, oil, or other nonmetallic coatings that decrease bond. Epoxy-coating of steel reinforcement in accordance with standards shall be permitted.
			2. Except for prestressing steel, steel reinforcement with rust, mill scale, or a combination of both shall be considered satisfactory, provided the minimum dimensions (including height of deformations) and weight of a hand-wire-brushed test specimen comply with ASTM A615, ASTM A706, ASTM A996.
		3. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

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

* 1. INSTALLATION FOR WATERPROOFING AND CORROSION PROTECTION ADMIXTURES
		1. Comply with the Concrete Admixture Manufacturer's instructions and recommendations.
		2. Waterstops and groutable hose waterstop system components: Shall be located as on drawings and in accordance with Concrete Admixture Manufacturer's recommendations.
		3. Bentonite Waterstops: Shall be placed at all cold joints and penetrations.
			1. Preparation:
				1. Brush off all dust and debris and apply a coat of primer or spray adhesive to the area where the waterstop is to be placed on the standing structural member.
				2. Using moderate hand pressure press a continuous bead of waterstop firmly into position on the standing structure. Check to be certain that the waterstop has bonded to the primed area.
				3. For proper joining, cut ends with sharp tool at 45 degree angle, and then place ends over one another
				4. Peel the protective backing from the exposed side of the waterstop. Knead the overlapped ends together to form continuous, uninterrupted gasket.
				5. For shotcrete applications, in addition to the instructions above, utilize masonry nails to hold the waterstop in place on the concrete. Masonry nails should be spaced approximately 12 inches (305 mm) apart. Waterstop must be glued and tied with the use of tie wires to all penetrations.
			2. Bentonite waterstops must not be installed more than 2 days prior to concrete placement. After installation of waterstops, cover the waterstop with a plastic sheet to protect from weather damage.
			3. Bentonite waterstops shall be dry and not activated when concrete is placed. Waterstops that have been water damaged shall be replaced before the concrete is placed.
		4. Additional Reinforcement at Re-entrant Angles
			1. Where re-entrant angles occur, three No. 4 or No. 5 bars spaced at 3 inches OC at least 3 feet long must be placed top and bottom at 90 degrees across all the angles.
		5. Concrete: Place, consolidate, and cure concrete in accordance with ACI 301, ACI 306, ACI 308, and ACI 309.

\*\* NOTE TO SPECIFIER \*\* Applies to Hycrete360 (formerly System W). Delete if not required.

* + 1. Closure: Contractor shall allow Hydrophobic Pore Blocking Concrete Admixture Manufacturer access to concrete after concrete placement to allow for closure. Hydrophobic Pore Blocking Concrete Admixture Manufacturer shall advise Contractor when each area of waterproof concrete is available for finishes.

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

* 1. INSTALLATION FOR WATERPROOFING CEMENTITIOUS PRODUCTS
		1. Hydrophobic admixture for mortar is a liquid admixture that is added to mortar mix at dosage of up to 3 gallons per cubic yard of mortar. Refer to manufacturer instructions or contact manufacturer for specific dosage questions.
		2. Trial batches are strongly recommended to assess the local plastic and hardened properties and to determine appropriate mix designs.
		3. It may be appropriate to remove a similar amount of water from the mortar mix as the amount of hydrophobic admixture added.
		4. Allow hydrophobic admixture to thoroughly mix in mortar mix.
		5. Install Mortar as Normal:
			1. For increased water resistance performance, apply mortar to a greater thickness in accordance with project guidelines. See ASTM C926 for more details on application.
			2. Discard any materials that show signs of stiffening or setting - do not wet up by adding water.
			3. Moist cure mortar in accordance with ACI 308; if moist curing is not possible, use curing compound complying with ASTM C309.

\*\* NOTE TO SPECIFIER \*\* Applies to Hycrete System W. Delete if not required.

* 1. FIELD QUALITY CONTROL
		1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
			1. Manufacturer's Field Services: A representative of the Hydrophobic Pore Blocking Concrete Admixture Manufacturer will be present to observe, inspect, and approve the placement of concrete containing Hydrophobic Pore Blocking Concrete Admixture Manufacturer's products.
			2. The Contractor shall notify the Hydrophobic Pore Blocking Concrete Admixture Manufacturer field representative at least 3 days prior to placement.
	1. CLEANING AND PROTECTION
		1. Clean products in accordance with the manufacturer's recommendations.
		2. Protect installed work from damage due to subsequent construction activity on the site.

\*\* NOTE TO SPECIFIER \*\* Delete one of the two following paragraphs.

* + 1. Waterproofing admixtures and corrosion protection waterproofing admixtures:
			1. Apply evaporation reducer (ACI 308) on flatwork immediately after finishing, as needed to maintain a film of water on the surface of the finished concrete until the final curing is applied, anytime the evaporation rate exceeds 0.10 lbs per sq ft per hr (0.49 kg per sq m per hr).
			2. Apply curing compound immediately to finished or stripped surfaces. A wax- or resin-based curing compound should be used if there is no subsequent finish on the structure. If there is a subsequent finish, a water-based curing compound should be used.
		2. Waterproofing Cementitious Products:
			1. Mortar must be cured a minimum of 28 days before applying paint or other coatings. Surface preparation and application should follow guidelines supplied by the paint/coating's manufacturer.

END OF SECTION