SECTION 03 05 10 –CONCRETE POROSITY INHIBITING ADMIXTURE (PIA)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes concrete Porosity Inhibiting Admixture's (PIA's) for all new concrete slabs-on-grade and elevated decks/slabs.

B. Related Sections:

1. Division 01 Section: Sustainable Design Requirements".
2. Division 03 Section: "Cast-in-Place Concrete."
3. Division 09 Flooring: Sections for all moisture sensitive flooring materials installed over power-troweled or burnished concrete substrates requiring nonporous adhesives.

1.2 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 306R-10 Guide to Cold Weather Concreting
2. ACI 305R-10 Guide to Hot Weather Concreting
3. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture Sensitive Flooring
4. ACI 308R-16 Guide to Curing Concrete
5. ACI 302.1R- 96 Guide for Concrete Floor Slab Construction (Topping Depth)
6. ACI 503R-93& 98 Use of Epoxy Compounds with Concrete
7. ACI 544 Fibers

1.3 SUBMITTALS

A. Product Data Sheet

B. Safety Data Sheet

1.4 PHYSICAL PROPERTIES & TESTING

A. ASTM C 494 /C494M: Pass

B. ASTM C 157 (Shrinkage Reduction): 86% Average or Greater Reduction

C. ASTM C 1543 (Reduction in Corrosion - Ponding): 80%

D. ASTM C 1202 (Reduction in Corrosion – Rapid Chloride Ion Test): 42%

E. ASTM C 1260 (Potential Alkali Silica Reactivity of Aggregates): Pass

F. ASTM C 1567 (Potential Alkali Reactivity of Combinations of Cementitious Materials and Aggregate): Pass

G. ASTM C 39 (Strength- PSI): 22% Average Increase or Greater

H. ASTM D 5084 (Hydraulic Conductivity): $\leq 6.0 \times 10^{-9}$ maximum flow rate from project specific samples

I. ASTM C 666 (Freeze Thaw Resistance- Reduction to Mass Change): 63% or Greater

J. ASTM C 232 (Reduction of Bleed Water In Concrete): 19.20% or Greater

K. ASTM C 672 (Scaling Resistance of Concrete Surfaces): No Scaling

L. ASTM C 1152 (Acid Soluble Chloride in Mortar and Concrete): Pass

M. ASTM G 109 (Effects on Chemical Admixtures on Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments): No Notable Corrosion

N. ACI 212.3R (Permeability Reducing Admixture For Hydrostatic Conditions (PRAH): Yes

O. MIP (Mercury Intrusion & Porosimetry (Reduction Of Pore Structure) (Normal Mix): 15%+

P. Mercury Intrusion & Porosimetry (Reduction Of Pore Structure) (Normal Mix): 36%+

Q. Water To Cementitious Materials Ratio Range: (0.31 – 0.52)

R. Integral Biocide to Inhibit Growth of Mold and Bacteria: Yes

S. Sodium Silicate Free: Yes

1.5 DAILY COLLECTION & TESTING

A. Porosity Inhibiting Manufacturer (PIA) manufacturer will provide a contracted Geo-Technical firm to facilitate the collection of one random cylinder per day's concrete placement.

B. The daily sample collection shall be taken by an ACI Concrete Field Testing Technician, Grade 1, or equivalent, on behalf and at the cost of the Porosity Inhibiting Admixture (PIA) manufacturer.

C. The daily sample should be independently tested per ASTM 5084 and/or US Army Corp of Engineers CRD C48-92 testing criteria.

D. Slab Porosity Testing and Evaluation: Personnel performing laboratory tests shall be certified in the conduct of ASTM D5084 and/or Army Corp of Engineers CRD C48-92 under the supervision of a licensed geotechnical engineer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver Porosity Inhibiting Admixture (PIA) in original, undamaged containers.

B. Store and protect Porosity Inhibiting Admixture (PIA) from exposure to harmful weather conditions and in a temperature-controlled area above 36F degrees.

C. Do not allow product to freeze. Should product freeze, immediately contact Barrier One Concrete Admixtures for further instructions.

D. Utilization of Porosity Inhibiting Admixture (PIA) product on hand or in inventory is acceptable as long as the product has not reached its expiration date and the project is registered with Barrier One Concrete Admixtures.

1.7 WARRANTY REQUIREMENTS:

A. Porosity Inhibiting Admixture (PIA) must be installed according to, and in compliance with, the (PIA) Technical Data Sheet.

B. Manufacturer's Warranty Requirements Shall Meet or Exceed the following:

1. Term: "Life of the Concrete" with demonstrated reduction in the concrete's permeability.
2. Warranty must not contain "Limited", "Expirations" or "Term Limits"
3. ASTM D5084 and/or US Army Corps of Engineers CRD C48-92 Daily Testing Required

C. Manufacturer's Adhesion Bond shall include:

1. A warranty term to match that of the adhesive and/or primer manufacturer's material defect warranty per required installation instruction per a defined “nonporous” / power troweled slab (burnished).
2. Adhesive bond as acted upon by the flooring installer’s acceptance of field adhesive bond testing which followed flooring / adhesive / underlayment manufacturer guidelines and requirements noted as in ASTM F-710 for installation on a power troweled and defined nonporous surface.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design: Porosity Inhibiting Admixture (PIA) by Barrier One Concrete Admixtures : 640 Garden Commerce Parkway, Winter Garden, Florida 34787. Phone: (800) 562-9986 Email: contactus@barrierone.com

PART 3 - EXECUTION

3.1 INSTALLATION

A. Pre-installation Conference: Verify that all parties review Porosity Inhibiting Admixture (PIA) project quality control procedures, technical data sheet, concrete mix designs and placement and curing processes ensuring field quality of concrete materials. Project must be registered with Barrier One Concrete Admixtures.

B. Add Porosity Inhibiting Admixture (PIA) in accordance with Technical Data Sheet.

C. Use of water reducing admixtures are recommended to achieve slumps greater than 4” (102mm).

D. Use of other admixtures in the same batch as Porosity Inhibiting Admixture (PIA) is acceptable as long as each admixture is added separately.

E. The dosing or inclusion of a shrink reducing admixture (SRA) is not acceptable.

F. The dosing or addition of a crystalline growth admixture is not acceptable.

3.2 CURING

A. Curing for all concrete to receive moisture sensitive products should be in compliance with ACI 308-16 “Guide to External Curing of Concrete” Section 4.1.4 “Moisture Sensitive Floors”

B. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.

C. Cure concrete slabs to receive moisture sensitive coatings in accordance with ACI 302.2R-06.

END OF SECTION 03 05 10