



IPANEX[®]

Inorganic Copolymer Liquid Admixture For Concrete

1. MANUFACTURER

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2. PRODUCT DESCRIPTION

Basic Uses: IPANEX is used to waterproof concrete in above- and below-grade applications, to provide concrete with greater durability in structures that are historically subject to accelerated deterioration, to provide resistance to reinforcing steel corrosion, and to replace membranes when used in conjunction with peripheral waterproofing.

Typical applications include parking structures, below-grade walls and floors, water and sewage treatment plants, underground vaults, tanks and pits, swimming pools, pressure mats, water storage tanks, tunnels, bridge structures (precast and cast-in-place), curbs and gutters, sidewalks, manholes, catch basins, highways, waterparks, monuments, runways, and dams.

Advantages of IPANEX:

In the Fresh State —

- Contains no calcium chloride (or other chlorides)
- Lower slump concrete is more easily mixed, placed, and consolidated
- Lower water/cement ratio
- Highly cohesive, eliminating voids and honeycombs
- Bleed-water is reduced, providing for earlier finishing
- Excellent workability when floating or troweling
- Easily pumped
- Minimizes segregation

In the Curing State —

- Significantly reduces drying shrinkage
- Lower controlled heat of hydration

In the Hardened State —

- Higher compressive strength (slump for slump and equal air content)
- Meets the requirements of ASTM C 494, Chemical Admixtures for Concrete, Type A
- Positive effect on all physical properties
- Watertight under hydrostatic pressures up to 7 atmospheres—more than 100 psi (0.7 MPa). Forms a completely watertight mass.
- Hard durable surfaces are resistant to dusting or spalling
- Surfaces are also highly resistant to cavitation and abrasion

- Eliminates formation of condensation in the pore matrix, resulting in excellent freeze-thaw resistance
- Is inorganic, thus providing anti-bacterial, fungicidal properties

IPANEX reduces efflorescence and exhibits increased resistance to chloride ion penetration — it cannot wear off like a coating (AASHTO T259-78).

Composition and Materials:

IPANEX is an inorganic copolymer liquid waterproofing admixture that chemically reacts with port-land cement to improve the physical and chemical properties of concrete in all stages of development—fresh, curing- and finished concrete.

• Waterproofing Ability

— The most water-soluble constituents, calcium hydroxide and calcium aluminum-hydroxide (referred to as free lime), are converted into the insoluble minerals, tricalcium silicate and tricalcium-aluminum silicate. These insoluble minerals precipitate into the capillaries as very fine micro-crystals. Combined with the micro-pore structure, this results in a concrete mass which

can withstand the penetration of water, even under extreme pressures.

• Durability

— *Large* numbers of the macro-pores (found in normal concrete) are reduced in size to micro-pores in IPANEX concrete. Approximately 3.8% of the cured mass of IPANEX concrete is occupied by these micro-pores. The micro-pores are hydrophobic and even though the system "breathes," condensation cannot form. This factor, combined with other physical properties of IPANEX concrete, results in a matrix that is extremely durable under the most severe conditions.

• *Corrosion Resistance*— Independent field evaluations and laboratory testing show that IPANEX concrete protects reinforcing steel from corroding.

Packaging: 200l drums, 20 l pails

Shelf Life: 3 years: protect from freezing

Dosage: 1% on cement weight, 0,9L/100kg cement



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3. TECHNICAL DATA

The following is a partial summary of tests made on IPANEX concrete.

- Depth of penetration by water reduced 84%. Volume of penetration by water reduced 98%.
- Compressive Strength, psi, ASTM C 39—Minimum 110% of control—3, 7, 28 day tests
- Flexural Strength, psi, ASTM C 78—3, 7, 28 day strengths all greater than control
- Length Change, ASTM C 157-IPANEX concrete exhibits approximately 25% less shrinkage
- Bond developed with reinforcing steel, psi, ASTM C 234—minimum 105% of control—28 day tests
- Heat of Hydration, cal./g., ASTM C 186-IPANEX concrete exhibits 13% less heat of hydration
- Capillary Water Intake, %— IPANEX exhibits 48% of control at ½" submersion and 44% of control at 5 1/2" submersion
- Freeze-Thaw Durability, AASHTO T161, 300 cycles-101.2% of control
- Resistance of Concrete to Chloride Ion Penetration, AASHTO T259-78/T260-78-75% greater than control
- Reduction in expansion from alkali silica reaction, %, ASTM C 441 —47% less expansion
- Macrocell corrosion test (SCAT) after 48 weeks of alternate cycles of 4 days of 15% NaCl ponding and 3 days at 100°F drying of IPANEX modified concrete, the corrosion currents, half cell potentials, and chloride ion contents were all below established corrosion thresholds. After forty-eight weeks the slabs were demolished and no corrosion of reinforcing steel was evident.
- Turnpike Bridge Evaluation — Wiss, Janney, Elstner Associates, Inc., February 1991
- Pennsylvania State University Research Report on corrosion inhibiting and waterproofing properties of IPANEX modified concrete

4. INSTALLATION

IPANEX admixture is added to the concrete at the job site, batch plant, or precaster's facility. A trained technician shall dispense IPANEX into the concrete.

Procedure—

- Check design mix to specification
- Pre-mix IPANEX. Continue mixing until uniform consistency is achieved.
- Dispense IPANEX into the truck at proper dosage
- Mix IPANEX in the truck by spinning the barrel at maximum mixing speed for 5 minutes

- Permeability of plain concrete as compared to concrete containing IPANEX Admixture F'c = 4000 psi. Based on modified CRD-C 48-55 test procedure.

- Insure that convenience water is not added. Over-addition of water at this point will negate beneficial effects of IPANEX and may void the warranty.

5. IPANEX Specification: Concrete shall contain IPANEX manufactured by IPA. IPANEX shall be added to the concrete at the job site at the rate of 13 fluid ounces per sac of cement in the concrete. After addition of IPANEX into the concrete truck, it shall be mixed into the concrete by rotating the barrel for five minutes at maximum mixing speed. Concrete shall be designed, placed, and cured in accordance with the latest American Concrete Institute Manual of Concrete Practice. The contractor shall submit IPANEX literature and job site dispensing procedure to the engineer prior to commencement of work. IPANEX shall be stored and installed in accordance with manufacturer's recommendations.

Note: Normal concrete procedures, as outlined in the ACI Manual of Concrete Practice, must be employed in handling, placing, working, and finishing IPANEX concrete. To achieve optimum mechanical properties, full vibration is necessary.

Curing procedures, as outlined in the ACI Manual of Concrete Practice (latest edition.), must also be followed.

6. WARRANTY

Contact IPA for details and a sample warranty document, including all limitations.

7. MAINTENANCE

Normal maintenance required for any concrete structure applies to IPANEX concrete.

8. TECHNICAL SERVICES

IPA will provide an architect and/or engineer with:

- A review of structural drawings to determine the compatibility of the IPANEX concrete system with the given project
- Suggested design mix parameters (i.e., slump, water-cement ratio, air content) for IPANEX concrete
- An approved IPA technician to dispense IPANEX admixture at the jobsite