

PRODUCT SPECIFICATION 8-1
"ANTI-HYDRO®"

For Placing Concrete in Cold Weather Conditions

Rev. 06/15



ANTI-HYDRO INTERNATIONAL, INC.

Concrete and Masonry Products and Problem Solving Worldwide Since 1904

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DESCRIPTION:

"ANTI-HYDRO®" admixture is extensively recommended and has been widely used since 1904 to safely place concrete in cold weather conditions, generally in temperatures below 40°F. In cold weather, it accelerates the set times and often eliminates the need for externally applied heat. "ANTI-HYDRO®" produces high strength, durable, non-dusting, water and damp-proofed concrete, inside and outside, below and above grade. It improves workability and reduces shrinkage and cracking.

"ANTI-HYDRO®" has been used successfully by contractors and engineers in placing concrete under adverse temperature conditions in thousands of jobs as one of the measures to protect concrete from frost damage.

"ANTI-HYDRO®" is a set-accelerating, non-corrosive solution of organic and inorganic chemicals that reacts with portland cement to produce more complete hydration. The increased hydration utilizes more of the mixing water and liberates additional heat of hydration over a shorter time, often eliminating the need for externally applied heat and is extremely helpful in the development of initial set and high early strengths at low temperatures thus affording early access to concrete installations. The increased hydration provides internal curing and a much denser, harder and tougher cement paste that binds the aggregates together. Water requirements, bleed water, capillaries and shrinkage are reduced. "ANTI-HYDRO®" is suitable for potable water.

Concrete may be safely placed in cold weather if necessary preparations are made, mixes are properly designed and correct placing, finishing, and curing techniques are followed. The mass and exposure of concrete being placed should be considered in determining cold weather concreting procedure.

SPECIFICATIONS:

In cold weather conditions, all concrete, as indicated on plans and specifications, shall be placed and protected against damages using "ANTI-HYDRO®" admixture, as manufactured by Anti-Hydro International, Inc., in strict accordance with the manufacturer's specifications. Refer to our [Waterproofing Systems Design Considerations](#) <-(click me [Tech. Bulletin W-1-1](#)) and [Waterproofing & Industrial Floor Details](#). <-(click on me to view the detailed book)

RECOMMENDATIONS FOR GOOD COLD WEATHER CONCRETING:

1. Concrete may be safely placed in cold weather if necessary precautions are taken. Early development of approximately 500 psi in the concrete will prevent damage due to early freezing. Tests indicate that concrete containing "ANTI-HYDRO®" will attain such strengths in less than 12 hours before freezing which prevents mdaage due to frost action.

2. The use of "ANTI-HYDRO®" economically provides increased workability with lower water requirements. "ANTI-HYDRO®" enhances internal curing by increasing the amount of cement hydration, produces high early strength which prevents damage due to frost action.

3. Concrete mixes should be designed without the use of retarders. The hydration of portland cement produces heat. The higher the cement content, the greater the heat produced. This is helpful for cold weather protection.

4. Heated water and aggregates should be used. Maximum temperatures are as follows: mixing water 150°F.; aggregates 200°F.; concrete 80°F. The recommended temperature of concrete being placed should be 55°F, in accordance with ACI-306.

5. Concrete floors should never be placed on frozen sub-soil. Forms should be entirely free of ice or any other frozen material. The thawing out effect may cause subsequent movement and failure.

6. Protect concrete, during early curing stages, against change in temperature. Thermal shock may cause cracking of concrete members. Do not place concrete toppings on base slabs where there is more than 30°F temperature differential between the topping mix and existing base. The subsequent thermal movement may cause failure to the bond between base and topping.

7. Do not allow gases from heating devices to be directed on fresh concrete. Carbonation results in soft, weak surfaces.

8. On windy days, erect wind barriers to prevent rapid water loss from freshly placed floors. Leave wall forms on longer. Insulation value of the forms is helpful in retaining the heat of hydration to speed strength gain. Protect exposed concrete from elements.

9. When structural members are involved and strength gain before removal of forms is important, we recommend that concrete test specimens be made and stored under job conditions in accordance with 5.5 and 5.6 of ACI Cold Weather Concreting (306-88). The indicated strength from the test specimens would give adequate evidence that the necessary strengths of the members have been achieved before stripping. The stripping strength criteria will be far above the strengths necessary to protect the concrete against damage from frost

Concrete Batching-

"ANTI-HYDRO®" shall be added with mixing water or to the concrete while partially mixed and mixed for a minimum 1 minute per cubic yard. Addition of "ANTI-HYDRO®" shall be at the jobsite. Do not add "ANTI-HYDRO®" to dry portland cement or concrete mix. All other admixtures shall be added separately, one at a time. No concrete shall be placed on wet or soggy ground without first laying and compacting a bed of broken stone or gravel of adequate thickness to prevent the mud from mixing with the concrete.

Concrete dosage rates in ESTIMATOR'S DATA GUIDE are based on the lowest temperature in the 24 hours period following installation, including wind chill factor. ACI 306 "Recommended Practice for Cold

Weather Concreting” shall be followed when air temperatures are below 50°F. Control joint spacing should be as recommended in ACI Standard 302-3.2.5, Concrete Floor and Slab Construction. Refer to our [Waterproofing & Industrial Floor Details](#) <-(click me)

Mix designs incorporating pozzolans will allow portland cement substitution as follows:

- GGBF Slag40% maximum
- Fly ash – Type C 30% maximum
- Fly ash – Type F 20% maximum

When substituting pozzolans (p), adjustment shall be made for water demand, yield and water/cement ratio=w/(c+p). Where greater plasticity or slump is required, add [A-H® SUPER P](#) <-(click me [Spec.3-8](#)) instead of water.

PRECAUTIONS:

Installation-

Testing for set time is recommended before use as a result of recent globalization of cement sources.

“ANTI-HYDRO®” conforms to the requirements of ACI 318-4.4.1 and ACI 318-3.6.3. “ANTI-HYDRO®”, when tested following ASTM C 876-91, exhibited no corrosion (see our [Technical Bulletin](#) <-(click me [W-1-2](#)). However, **DO NOT use “ANTI-HYDRO®” in pre-stress or post-tension applications or where chlorides are not acceptable.**

Where job specifications require, [“ANTI-HYDRO®-NC](#) <-(click me [Spec.8-1B](#)) may be substituted for “ANTI-HYDRO®”.

Safety-

Use approved safety goggles, rubber gloves, coveralls and work boots. Protect animals, vegetation and food items. Refer to the product Material Safety Data Sheet (MSDS) for details.

Storage-

Store in a dry, cool location. Keep containers tightly closed. KEEP AWAY FROM CHILDREN. Refer to the MSDS for details

TYPICAL PROPERTIES/PERFORMANCE DATA:

Concrete/mortar specimens, with “ANTI-HYDRO®” admixture, tested by various independent laboratories has shown:

- **Impermeability/Waterproofing-** Impermeable¹ at 20 psi (46’ head of water).²
- **Vapor Transmission/Dampproofing-** Produced 85% reduction in transmission of vapor.⁹
- **ACI 318/Non-Corrosive-** Greatly exceed the requirements (non-corrosive).^{1,12} No sign of steel corrosion in concrete.¹
- **Durability-** Highest durability (over a 15 year, freeze/thaw, durability test) of any material tested.³
- **Integral Curing-** Concrete cured internally, survived durability tests of 719 freezing-thawing cycles without any damage.¹⁴
- **Acceleration-** High range accelerator.^{1,13} 30% reduction in concrete setting times at 32°F.⁵
- **High Strength/Compressive Strength-** Concrete showed compressive strength significantly higher at all ages.^{4,6} Concrete exhibited 27% increase in 3 days and 23% in 7 days.⁵ Mortar exhibited 14% increase in 1 day, 11% in 3 days and 12% in 7 days.⁷
- **Bonding Shear Strength-** Poured topping with “ANTI-HYDRO®” bonded as an integral part of the old floor slab and the bond found to be stronger than the original concrete.⁶ (Double the bond strength).^{1,8}
- **Tensile Shear Strength-** Bonded to old concrete, in all cases, the

- failure occurred in the old concrete, no failure seen in the bond.¹¹
- **Abrasion Resistance-** Produced 85% increase in resistance.¹⁰
- **Shrinkage Reduction-** 20-25% reduction in shrinkage.⁶
- **Plasticity-** Produced a 29% increase in plasticity.⁶
- **ASTM Specification-** Meets ASTM C-494, Types A, C & E

* The above laboratory results may vary dependent on real or field conditions.

Test References:

1. Bulletin of the Board of Standards and Appeals, City of New York, Vol. XXVIII, No. 21.
2. US Department of Commerce, Bureau of Standards Tests of Integral and Surface Waterproofings for Concrete, Research Paper No. 394 (20 psi - 46’ Head of Water).
3. US Army Corps of Engineers, Report No. 5, Technical Memorandum No. 6-226 - 15 Year Freeze/Thaw Test.
4. W. R. MacIntosh, C. E., University of Louisville Louisville, KY.
5. Shimel and Sor Testing Laboratories, Inc. Report No. 90-6515.
6. War Department, United States Engineer Office.
7. Fairway Testing Co., Sports Complex Building, West Point, NY.
8. Raymond G. Osborne, Bureau of Tests & Inspection Los Angeles.
9. Shimel and Sor Testing Laboratories, Inc. Report No. 88-2114.
10. Pittsburgh Testing Laboratory - 7512545A/3Y-3160-S.
11. Smith-Emery Company - P-28318, Los Angeles.
12. Shimel and Sor Testing Laboratories, Inc. Report No. 84-273 R
13. Herman G. Protze, Materials Technologist, Highlands, MA
14. War Department, Corps of Engineers, Mississippi River Commission Technical Memorandum No. 6-226

MAINTENANCE:

All due diligence must be exercised to provide a regular and frequent maintenance plan to clean and protect the finished surface from severe or prolonged assault from chemical attack, abrasive attack or similar abuse.

PACKAGING:

1-quart, 1-gallon, 5-gallon, 55-gallon or 220-gallon containers.

SERVICES:

Our technical staff is available to review product selection and detailing during the design stage, provide proper field guidance during the installation stage, evaluate concrete construction problems on-site and make recommendations.

ESTIMATOR’S DATA GUIDE:

Average conditions and mix: 3000 psi, 4” slump, frost free materials. Temperatures must include wind chill conditions:

Temperature Range	“ANTI-HYDRO®” Required
From 40°F to 32°F:	1 gallon per cubic yard.
From 31°F to 23°F:	1½ gallons per cubic yard.
From 22°F to 20°F:	2 gallons per cubic yard.
From 19°F to 15°F:	3 gallons per cubic yard.

WARRANTY: Anti-Hydro International, Inc. (Anti-Hydro) warrants its products to be free of manufacturing defects at the time of delivery to its customer and will, at its option, replace or refund the invoiced price of any materials proven to be defective. This limited warranty is in lieu of any other warranty or guarantee, expressed or implied, including warranties of merchantability and fitness for a particular purpose. Anti-Hydro disclaims liability for any incidental, consequential, or other damages, including but not limited to, loss of profits or damages to a structure or its contents, arising under any theory of law whatsoever beyond the invoiced price of the material to its customer.

To the best of our knowledge, the information contained herein is accurate. However Anti-Hydro International, Inc. does not assume liability whatsoever for the accuracy or completeness of information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present known or unknown hazards, please refer to the Material Safety Data Sheet (MSDS) for this product. This notification may not be detached from the specification. Any copying and redistribution of the specification shall also include copying and redistribution of this notice. Our sales persons or representatives, distributors and their personnel have no authority to change the recommendations contained herein.