

TECHNICAL DATA & PRODUCT DESCRIPTION

SECTION 1: PRODUCT NAME

HydraMix, Hydration Maximizer

SECTION 2: PRODUCED BY

MidCal International, LLC
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SECTION 3: PRODUCT DESCRIPTION

HydraMix is a cloudy-white, odorless, non-toxic, zero VOC / VOS, user friendly, environmentally neutral colloidal silicate liquid.

SECTION 4: BASIC USE

HydraMix added to portland cement concrete's mix water will convert conventional mix designs to high-performance mix designs, generating production of concrete that is extraordinarily hard, dense and impermeable. **HydraMix** causes concrete's enhancement in several ways, beginning with improvement of hydrolysis' actions and reactions, by significantly favorably enhancing hydration's by product quality, i.e., calcium hydroxide, while also, significantly increasing already-included Portland cement utilization. The resultant concrete permeability / durability values become tremendously improved while **HydraMix** causes the production of very fine-textured, extremely homogenous, aggregate zone paste, and bulk paste, finally creating smaller more uniform capillary and gel pore sizes, with virtually no plastic particle separation. **HydraMix** utilization in batching portland cement concrete significantly reduces concrete's total air-void content as it greatly improves its workability, and significantly lowers excess bleed water volumes. **HydraMix**, in a concrete mix provides the mix with ability to initially introduce portland cement to mix water without the usual abruptly violent actions and reactions which creates a cement potency loss, normally ascribable to water dilution and hydrolysis, which will create poor quality early

produced cement paste, paste which initially coats concrete's aggregates. **HydraMix** utilization works to ensure early, initially-produced cement paste (aggregate zone paste), immediately coating the concrete's aggregates, is of the utmost attainable quality, ultimately and significantly improving concrete's paste-aggregate zone and paste-to-aggregate bond quality, virtually eliminating potential for micro cracks. Also, ultimately increasing concrete's PSI and flexural strength. **HydraMix** enhanced, hydration by-products', i.e., calcium hydroxide quality, also sets the stage for concrete to receive a significantly greater, more efficient, calcium lamination of C-S-H's silicate polymer particles, strands, and/or chains, an action also causing reduction in ultimate volume of unutilized calcium hydroxide, left in concrete, which may later interfere with concrete's ability to retain its integrity, due to potential detrimental internal chemical reactions, such as, delayed ettringite formation. **HydraMix's** ingredients prompt prolific formation, extension, and branching of silicate polymer particles, strands, and/or chains, vital constituents in C-S-H's tobermorite gel component, concrete's main strength component. Utilization of **HydraMix**, in a concrete mix results in production of significantly less permeable, more durable concrete, which are major factors that are normally associated with the extension of concrete's useful lifespan. Also, **HydraMix** utilization will create, to some varying degree (6-12%), an increased utilization of each portland cement particle, in the mix, this attribute in turn causes a significantly greater reduction in the sizes of left-over particle cores of each portland cement particle, ultimately left in the concrete, to act as aggregates. The various, smaller than normal, particle core sizes, make these unique particles an extremely valuable filler aggregate, sized somewhere between sand and normal cement particle sizes. Which ultimately and integrally provide's excellent filler benefits. Benefits similar to those of silica fume, resulting in denser, more impermeable, and significantly more durable concrete, that has greater resistance to pollutant / contaminate ingress, freeze-thaw cycle damage, steel corrosion, etc. **HydraMix** requires no special safety gear, handling, storage, finishing, or curing.

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SECTION 5: INSTALLATION SUGGESTIONS

Dry Mix Batching:

As a temporary measure, **HydraMix** can be poured directly into a empty rinsed out transit mixer (*If transit mixer is not clean, add 90% of mix water volume prior to adding **HydraMix**, prior to pulling truck under batch plant for loading.*) Under batching plant, with mixer turning in its mixing mode, load a minimum of 90% of the total planned mix water volume then begin loading cement, aggregate (in any order) and then follow with the remaining balance of mix water. **HydraMix**, in this scenario, is used at 10 fluid ounces per 100 pounds of cement (1 ounce per 10 lbs. of cement) mixed.

Slump may be increased later, if desired, using plain water, followed by 5 minutes of additional mixing by transit mixer.

Central Mixing Operations:

Determine volume needed at 10 ounces of **HydraMix** per 100 pounds of portland cement. Pour or pump the calculated volume of **HydraMix** into mix water pre-measure tank as you add mix water. Then batch concrete as usual. After concrete is batched, extra mixing time will be needed. For best results, a minimum of 50% more mixing time is required. Slump may be increased later, if desired, using plain water, followed by 5 minutes of additional mixing by transit mixer.

Continuous Mixing Operations:

Determining dosage of HydraMix: Calculate volume needed at 10 ounces of **HydraMix** per 100 pounds of portland cement. Calculate amount of mix water needed per 100 pounds of portland cement. This will provide your ratio of **HydraMix** to mix water. (For example, if calculations show that 5 gallons of mix water are required per 100 pounds of cement, then the water in the tank should be treated at the rate of 10 ounces of **HydraMix** per 5 gallons of water.)

SECTION 6: PRECAUTIONS

1. **NEVER ADD HydraMix TO READY-MIX, ONLY ADD TO THE MIX WATER.**
2. HydraMix may etch glass or dull shiny aluminum and can be difficult to remove from other surfaces once it dries.
3. For more information read Material Safety Data Sheet.

SECTION 7: TECHNICAL DATA

Physical: Liquid
Color: Cloudy white
Odor: None
Specific Gravity: 1.10
pH: +/- 11.5
Flash Point: None
Flammability: None
Toxicity: None
Pollants: None
Hazardous Vapors: None
VOC / VOS Content: none
Spill Clean-up: Water Flush (Sewer Safe)
Environmental Impact: None / Neutral
User Status: Friendly

SECTION 8: SOME ADVANTAGES

- Converts regular mix designs to high performance mix designs
- Quicker and Easier Concrete Placement
- Adds Workability by Increased Lubricity
- Stronger Bond of Concrete to Steel
- Decrease Cementitious Material Waste
- Greater Density and Less Permeability
- Reduces Bleed Water Volume
- Reduced Shrinkage and Cracking
- Reduced Honeycombing and Laitance
- Reduced Leaching and Efflorescence
- Reduced Slab Curl Potential
- Reduced Internal/External Dusting Potential
- Reduced Rate of Absorption
- Greater Freeze-Thaw Resistance
- Increased Flexural Strength
- Increased Compressive Strength
- Increased Acid / Chemical Resistance
- Lower Internal Chemical Reaction Potential
- Lowers Chloride Induced Corrosion Potential
- Greatly Improves Durability
- Improves Surface Abrasion Resistance



The Highest Quality Hydration Available
Making Your Concrete Better, One Mix Design at a Time

Advantages to Using HYDRAMIX (HYD)

- **High performance concrete durability with all mix designs**
- **Reduce void content by at least 50%**
- **Quicker and easier placement (save finishing time!)**
- **Less shrinkage and cracking**
- **Virtually no bleed water when properly mixed**
- **Greatly improved durability**
- **Reduced leaching and efflorescence**
- **Greater freeze-thaw resistance/No blanket cold weather concreting**
- **Increased compressive and flexural strength**
- **Reduced honeycombing and laitance**
- **Lower internal chemical reaction potential/controlled heat of hydration**
- **Less slab curl**
- **Reduced internal/external dusting potential**
- **More acid/chemical resistance**
- **Reduced rate of absorption**
- **Hydration of more cement particles**
- **High performance concrete durability at a fraction of the cost**

HydraMix - Applicable Standards:

ASTM C-39: Compressive Strength

(Normal Environment) HydraMix specimen had 10% more strength.

(Severe Environment) Using 15% NaCl, HydraMix specimen had 10% more strength.

ASTM C-67 Section 7: Water Absorption

Water absorption of treated concrete was decreased by 90%.

ASTM C-67-Section 9: Suction

The rate of absorption of concrete (suction) was decreased about 98%.

ASTM C-67-Section 10: Efflorescence

Efflorescence and leaching are greatly reduced or eliminated.

ASTM C-67-Section 13:

ASTM C-67-Section 25:

ASTM C-67-Section 29:

ASTM C-67-Section 65: ORF Method, Dusting Resistance

Treated concrete is four times more abrasion (dusting) resistant.

ASTM C-78: Flexural Tensile Strength

(Normal Environment) HydraMix specimen had 10% more strength.

(Severe Environment) Using 15% NaCl, HydraMix specimen had 10% more strength.

ASTM C-23-69: Artificial Weathering

Artificial weathering does not diminish treated concrete.

ASTM C-114: Chloride Penetration

ASTM C-140: Water Repellency Rating

ASTM C-156: Water Retention

ASTM D-327: Sulfate durability

ASTM C-514: Permeability

ASTM C-496: Splitting Tensile Strength

(Normal Environment) HydraMix specimen had 10% more strength.

(Severe Environment) Using 15% NaCl, HydraMix specimen had 10% more strength.

ASTM C-518: Thermal Conductivity-Thermal Resistance

ASTM C-672-760: Scaling resistance to Deicers

Treated concrete imparts superb resistance to salt attack.

ASTM C-666: Freeze Thaw Resistance

Improves resistance to freeze-thaw damage.

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HydraMix - Applicable Standards: (continued)

ASTM C-856: Petrographic Analysis

Specimens have 50% greater density, which results in less permeability.

ASTM C-1664: Non-volatility

ASTM D-2047: Slip Resistance

Wet and Dry testing showed that treated concrete had better slip resistance

ASTM D-4541: Adhesion "Bond" Test

ASTM D-5084: Permeability Testing

ASTM E-96: Moisture Vapor Transmission

An effective barrier against water vapor emission, without loss of breathability.

ASSHTO T259-80: Chloride Ion Penetration

Reduces chloride intrusion in hardened concrete.

ASSHTO T260: Chloride Ion Content

DIN-1048: Water Penetration

Significantly reduces the depth of water penetration.

CRD-52-54: Abrasion Resistance

Significantly increased abrasion resistance.

NCHRP 244: Reduction of Chloride Penetration

NCHRP 244-Series IV: Moisture Vapor Transmission

USDA Approved For Use In Food Processing Areas

EPA Compliant