

ADMIXTURES

03 30 00	Cast-in-Place Concrete
03 40 00	Precast Concrete
03 70 00	Mass Concrete

MasterAir[®] AE 90

Air-Entraining Admixture

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method" or ASTM C 173/C 173M, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method." The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, "Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete." If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any Master Builders Solutions admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

Master Builders Solutions creates technologies for the construction industry inspiring people to build better. We are active in ~40 countries and operate 35 production sites with over 1,600 employees. We develop, produce, and market high-quality chemical admixtures, as well as adjacent core technologies, to master the challenges of today and support a decarbonized future. Our people are pivotal and pair leading technologies and a strong brand heritage to surpass our customers' expectations and drive continuous value creation.

Limited Warranty Notice

Master Builders Solutions Admixtures US, LLC ("Master Builders Solutions") warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. MASTER BUILDERS SOLUTIONS MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of Master Builders Solutions. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. MASTER BUILDERS SOLUTIONS WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on Master Builders Solutions' present knowledge and experience. However, Master Builders Solutions assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. Master Builders Solutions reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

Master Builders Solutions Admixtures US, LLC



September 20, 2023

**AVR Inc.
14698 Galaxie Avenue
Apple Valley, MN 55124**

Attention: Joshua Edwards, P.E.
Project: 2023 Standard Admixtures
Project location: Minneapolis Metro

Certificate of Conformance
MasterAir® AE 90 Admixture (formerly MB-AE 90)
Admixture for Concrete

I, Richard Hubbard, Sr. Technical Specialist for Master Builders Solutions US LLC, Cleveland, Ohio, certify:

That MasterAir AE 90 admixture is a Master Builders Solutions Air-Entraining Admixture for concrete; and

That MasterAir AE 90 and MB AE 90 admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterAir AE 90 admixture; and

That MasterAir AE 90 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.000068 percent (0.68 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterAir AE 90 admixture meets the requirements of ASTM C260, the Standard Specification for Air-Entraining Admixtures for Concrete, as well as the requirements for air-entraining admixtures as specified in Corps of Engineers' CRD-C 13 and AASHTO M154.

A handwritten signature in black ink that reads "Richard Hubbard III".

Richard Hubbard
Sr. Technical Specialist

03 30 00	Cast-in-Place Concrete
03 40 00	Precast Concrete
03 70 00	Mass Concrete
31 00 00	Earthwork

MasterPozzolith[®] 80

Water-Reducing Admixture

Description

MasterPozzolith 80 ready-to-use, liquid admixture is used for making more uniform and predictable quality concrete.

MasterPozzolith 80 admixture meets ASTM C 494/C 494M requirements for Type A, water-reducing, Type B, retarding, and Type D, retarding and water-reducing, admixtures.

Applications

Recommended for use in:

- Prestressed concrete
- Precast concrete
- Reinforced concrete
- Shotcrete
- Lightweight concrete
- Pumped concrete
- 4x4[™] Concrete
- Pervious concrete
- Self-consolidating concrete (SCC)
- Geotechnical grouting and ground improvement

Features

- Reduced water content required for a given workability
- Controlled setting characteristics – normal or retarded

Benefits

- Increased compressive and flexural strengths
- Improved workability
- Reduced segregation
- Flexibility in the scheduling of placing and finishing operations
- Offsets effects of early stiffening during extended delays between mixing and placing
- Helps eliminate cold joints
- Full-form deflection can take place (before concrete sets) in extended pours for bridge decks, cantilevers, nonshored structural elements, etc.
- Peak temperature and/or rate of temperature rise lowered in mass concrete thereby reducing thermal cracking

Performance Characteristics

Rate of Hardening: The temperature of the concrete mixture and the ambient temperature affect the hardening rate of concrete. At higher temperatures, concrete stiffens more rapidly which may cause problems with placing and finishing. The dosage range of MasterPozzolith 80 admixture can be varied to provide the desired setting characteristics.

Guidelines for Use

Dosage: Depending on the setting characteristics desired, MasterPozzolith 80 admixture is recommended for use within the dosage range of 3-10 fl oz/cwt (195-650 mL/100 kg) of cementitious materials for most concrete mixtures using average concrete ingredients. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterPozzolith 80 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. This admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPozzolith 80 admixture may be used in combination with any Master Builders Solutions admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

Storage and Handling

Storage Temperature: MasterPozzolith 80 admixture should be stored above freezing temperatures. If MasterPozzolith 80 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterPozzolith 80 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterPozzolith 80 admixture has been exceeded.

Packaging

MasterPozzolith 80 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPozzolith 80 admixture

Additional Information

For additional information on MasterPozzolith 80 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

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Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on Master Builders Solutions' present knowledge and experience. However, Master Builders Solutions assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. Master Builders Solutions reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

Master Builders Solutions Admixtures US, LLC



September 20, 2023

**AVR Inc.
14698 Galaxie Avenue
Apple Valley, MN 55124**

Attention: Joshua Edwards, P.E.
Project: 2023 Standard Admixtures
Project location: Minneapolis Metro

Certificate of Conformance
MasterPozzolith® 80
Master Builders Solutions Admixture

I, Richard Hubbard, Sr. Technical Marketing Specialist for Master Builders Solutions, Cleveland, Ohio, certify:

That MasterPozzolith 80 admixture is a Master Builders Solutions Water-Reducing Admixture for concrete; and

That MasterPozzolith 80 admixture and Pozzolith 80 admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterPozzolith 80 admixture; and

That MasterPozzolith 80 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.0002 percent (2.0 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterPozzolith 80 admixture, meets the requirements for a Type A, Water-Reducing, Type B, Retarding and Type D, Water-Reducing and Retarding Admixture specified in ASTM C494/C494M, the Standard Specification for Chemical Admixtures for Concrete, as well as the requirements for Type A, Type B and Type D admixtures as specified in Corps of Engineers' CRD-C 87 and AASHTO M194.

A handwritten signature in black ink that reads "Richard Hubbard III".

Richard Hubbard
Sr. Technical Specialist

03 30 00	Cast-in-Place Concrete
03 40 00	Precast Concrete
03 70 00	Mass Concrete

MasterPolyheed[®] 997

Mid-Range Water-Reducing Admixture

Description

MasterPolyheed 997 admixture is a patented multi-component, mid-range water-reducing admixture. MasterPolyheed 997 admixture meets ASTM C 494/C 494M requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- All concrete applications where superior workability, pumpability and finishability qualities are desired, in particular, flatwork, pumped concrete and pervious concrete
- Concrete containing manufactured sand and harsh concrete mixtures

Features

- True mid-range water reduction (5-15%) and excellent performance across a wide slump range, especially the difficult slump range of 5-8 in. (125-200 mm)
- Superior workability, pumpability and finishability qualities even in concrete mixtures containing low amounts of cementitious materials
- Superior finishing characteristics for residential/commercial flatwork and formed surfaces

Benefits

- Significantly reduced placement and finishing time resulting in lower in-place concrete costs
- Higher strength at all ages
- Enhanced concrete durability
- Increased service life of concrete structures

Performance Characteristics

Mixture Data: 500 lb/yd³ (295 kg/m³) of Type I cement; slump 6-7 in. (150-180 mm); 5-6% air; concrete temperature 70 °F (21 °C); ambient temperature, 70 °F (21 °C).

Setting Time Performance¹

Mixture	Initial Set (h:min)	Difference (h:min)
Reference	6:01	—
MasterPolyheed 997 admixture @		
5 fl oz/cwt (325 mL/100 kg)	6:22	+0:21
10 fl oz/cwt (650 mL/100 kg)	6:57	+0:56
15 fl oz/cwt (980 mL/100 kg)	7:31	+1:30

Compressive Strength, psi (MPa)

Mixture	7-Day	28-Day
Plain	2360 (16.3)	3320 (22.9)
MasterPolyheed 997 admixture @		
5 fl oz/cwt (325 mL/100 kg)	3060 (21.1)	3930 (27.1)
10 fl oz/cwt (650 mL/100 kg)	3740 (25.8)	4610 (31.8)
15 fl oz/cwt (980 mL/100 kg)	4620 (31.9)	5460 (37.7)

**Note: The data shown are based on controlled laboratory tests. Reasonable variations from the results shown here may be experienced as a result of differences in concrete making materials and jobsite conditions.*

Guidelines for Use

Dosage: MasterPolyheed 997 admixture has a recommended dosage range of 3-15 fl oz /cwt (195-980 mL/100 kg) of cementitious material for most concrete mixes.

As the dosage of MasterPolyheed 997 admixture increases to 15 fl oz/cwt (980 mL/100 kg) of cementitious materials, normal concrete setting characteristics are maintained and early and ultimate compressive strengths increase.

Master Builders Solutions does not recommend the use of dosages outside the recommended range without trial testing. Consult your local sales representative for assistance in determining the dosage for optimum performance.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterPolyheed 997 admixture will neither initiate nor promote corrosion of reinforcing or prestressing steel embedded in concrete, or of galvanized steel floor and roof systems. MasterPolyheed 997 admixture does not contain intentionally added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPolyheed 997 admixture may be used in combination with any Master Builders Solutions admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterPolyheed 997 admixture should be stored between 35 and 105 °F (2 and 41 °C). If MasterPolyheed 997 admixture freezes, thaw at 40 °F (5 °C) or above and completely reconstitute using mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterPolyheed 997 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterPolyheed 997 admixture has been exceeded.

Packaging

MasterPolyheed 997 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPolyheed 997 admixture

Additional Information

For additional information on MasterPolyheed 997 admixture or its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

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Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on Master Builders Solutions' present knowledge and experience. However, Master Builders Solutions assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. Master Builders Solutions reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.



September 20, 2023

AVR Inc.
14698 Galaxie Avenue
Apple Valley, MN 55124

Attention: Joshua Edwards, P.E.
Project: 2023 Standard Admixtures
Project location: Minneapolis Metro

Certificate of Conformance
MasterPolyheed[®] 997 Admixture (formerly PolyHeed 997)
Admixture for Concrete

I, Richard Hubbard, Sr. Technical Specialist for Master Builders Solutions US LLC, Cleveland, Ohio, certify:

That MasterPolyheed 997 admixture is a Master Builders Solutions Mid-Range Water-Reducing Admixture for concrete; and

That MasterPolyheed 997 and PolyHeed 997 admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterPolyheed 997 admixture; and

That MasterPolyheed 997 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00012 percent (1.2 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterPolyheed 997 admixture meets the requirements for a Type A, Water-Reducing Admixture, and Type F, Water-Reducing, High Range Admixture specified in ASTM C494/C494M, the Standard Specification for Chemical Admixtures for Concrete, as well as the requirements of Type A and Type F admixtures as specified in Corps of Engineers' CRD-C 87 and AASHTO M194.



Richard Hubbard
Sr. Technical Specialist

MasterGlenium[®] 7700

High-Range Water-Reducing Admixture

Description

MasterGlenium 7700 high-range water-reducing admixture is particularly effective in improving the day to day consistency of concrete mixtures. MasterGlenium 7700 meets ASTM C 494 compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete requiring high-early compressive strength development
- Applications requiring workability retention without retardation
- Concrete where high flowability, increased stability and durability are needed
- Producing self-consolidating concrete (SCC) mixtures
- Concrete with varying water reduction requirements (5-40%)

Features

MasterGlenium 7700 ready-to-use high-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular design with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Superior slump retention
- Excellent early strength development
- High ultimate strengths
- Optimum setting time
- Consistent air entrainment
- Dosage flexibility

Benefits

- Consistency in placement operations
- Optimized mixture costs
- Reduction in patching costs
- Ability to attain difficult combinations of high-early and late-age compressive strengths
- Increased productivity
- Improved operational efficiencies
- Less QC support
- Fewer rejected loads
- Faster form turnover
- Workability retention without retardation

Performance Characteristics

Slump Retention: Concrete produced with MasterGlenium 7700 admixture maintains slump significantly longer than concrete mixtures containing naphthalene, melamine, and first generation polycarboxylate high-range water-reducing admixtures. This slump retention is achieved without affecting rate of hardening or early age compressive strength development.

Mixture Data: Figure 1 represents average slump retention performance across multiple field trials throughout North America. Figure 2 represents average compressive strength results from these same field trials. Materials were all different as were starting consistencies. The reference admixture in this graph represents the first generation of high-early strength polycarboxylate admixture technology.

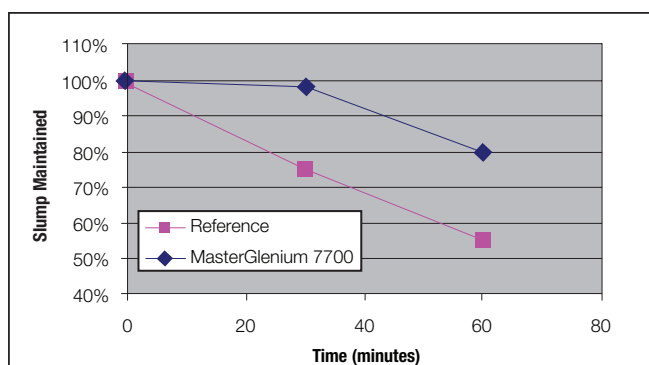


Figure 1. Average Slump Retention Performance

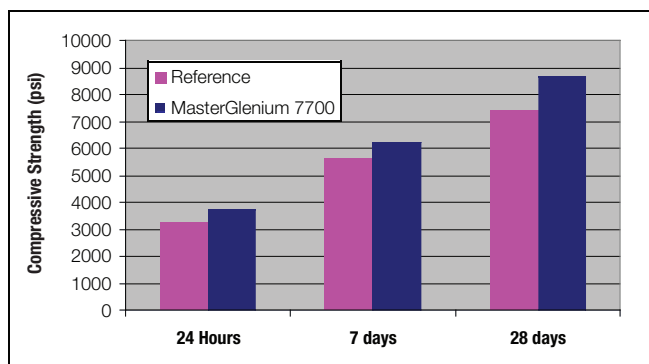


Figure 2. Average Compressive Strength

Guidelines for Use

Dosage: MasterGlenium 7700 has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most applications, dosages in the range of 2-12 fl oz/cwt (130-780 mL/100 kg) will provide excellent performance. For very high performance and self-consolidating concrete mixtures, up to 15 fl oz/cwt (975 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, job site conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7700 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7700 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7700 admixture.

Compatibility: MasterGlenium 7700 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, accelerators, retarders, extended set control admixtures, air-entrainers, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7700 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7700 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7700 admixture freezes, thaw and reconstitute by mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterGlenium 7700 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. To ensure the longest shelf life potential, recirculation is recommended. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7700 admixture has been exceeded.

Packaging

MasterGlenium 7700 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7700 admixture

Additional Information

For additional information on MasterGlenium 7700 admixture or its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

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Limited Warranty Notice

Master Builders Solutions Admixtures US, LLC ("Master Builders Solutions") warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. MASTER BUILDERS SOLUTIONS MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of Master Builders Solutions. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. MASTER BUILDERS SOLUTIONS WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on Master Builders Solutions' present knowledge and experience. However, Master Builders Solutions assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. Master Builders Solutions reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.



Master Builders Solutions Admixtures US, LLC



September 20, 2023

**AVR Inc.
14698 Galaxie Avenue
Apple Valley, MN 55124**

Attention: Joshua Edwards, P.E.
Project: 2023 Standard Admixtures
Project location: Minneapolis Metro

Certificate of Conformance
MasterGlenium® 7700 Admixture (formerly GLENIUM® 7700)
Admixture for Concrete

To Whom It May Concern:

I, Richard Hubbard, Sr. Technical Specialist for Master Builders Solutions US LLC, Cleveland, Ohio, certify:

That MasterGlenium 7700 admixture is a high-range water-reducing admixture manufactured by Master Builders Solutions; and

That MasterGlenium 7700 admixture and Glenium 7700 admixture are the same product having identical composition differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterGlenium 7700 admixture; and

That MasterGlenium 7700 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00021 percent (2.1 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterGlenium 7700 admixture meets the requirements for a Type F, Water-Reducing, High Range Admixture as specified in ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete, as well as the requirements for Type F admixtures as specified in Corps of Engineers' CRD-C 87 and AASHTO M194.

A handwritten signature in black ink that reads "Richard Hubbard III".

Richard Hubbard
Sr. Technical Specialist

3

03 30 00 **Cast-in-Place Concrete**03 40 00 **Precast Concrete**03 70 00 **Mass Concrete**31 00 00 **Earthwork**

4

04 05 16 **Masonry Grouting**

MasterSure® Z 60

Workability-Retaining Admixture

Description

MasterSure Z 60 admixture is a workability-retaining admixture that provides flexible degrees of slump retention without retardation. MasterSure Z 60 admixture provides concrete producers a cost-effective means of maintaining consistency between loads of concrete with respect to slump, workability and air content. MasterSure Z 60 admixture meets ASTM C 494/C 494M requirements for Type S, Specific Performance, admixtures.

Applications

Recommended for use in:

- Concrete with varied slump retention requirements
- Concrete mixtures utilizing supplementary cementitious materials
- Concrete where high flowability, increased stability and durability are needed
- Production of self-consolidating concrete (SCC) mixtures
- Geotechnical grouting and ground improvement

Features

- Provides flexible degrees of slump and workability retention without retardation
- Can be used in low- to high-slump concrete mixtures, including self-consolidating concrete
- Can be used alone or in combination with MasterPozzolith®, MasterPolyheed® or MasterGlenium® normal, mid-range and high-range water-reducing admixtures
- Improved early- and late-age compressive strengths

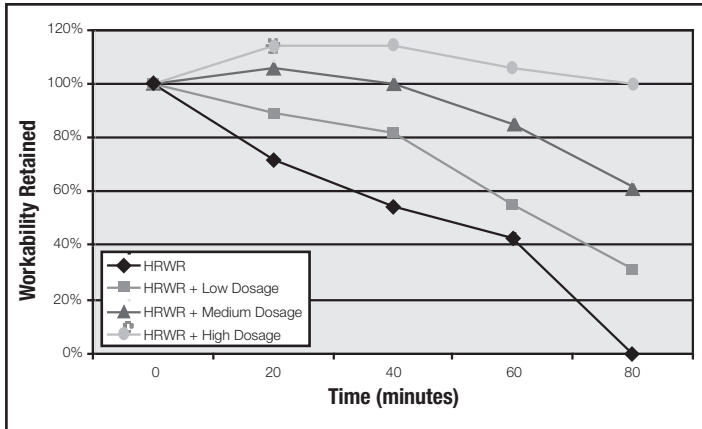
Benefits

- Minimizes the need for jobsite slump adjustment using water or high-range water-reducing admixture
- Provides consistency in air-entrainment, slump, workability and strength
- Fewer rejected loads and better customer satisfaction due to consistent quality of concrete
- Faster truck turn-around time
- Expanded concrete delivery range
- Provides concrete producers with ability to consistently produce and deliver quality concrete mixtures



Performance Characteristics

The data in the following graph represents the slump and workability performance that can be achieved through the use of MasterSure Z 60 admixture. The four mixtures were evaluated at a concrete temperature of 90 °F (32 °C). The first mixture utilized a high-range water reducer (HRWR) without MasterSure Z 60 admixture. The three remaining mixtures utilized the same high-range water reducer with a low, medium and high dosage of the MasterSure Z 60 admixture. These mixtures had 600 lb/yd³ (356 kg/m³) of cement and a water-cement ratio (w/c) of 0.40.



Guidelines for Use

Dosage: MasterSure Z 60 admixture has a recommended dosage range of 2 to 12 fl oz/cwt (130 to 780 mL/100 kg) of cementitious materials. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterSure Z 60 admixture can be added with the initial batch water or as a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterSure Z 60 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterSure Z 60 admixture.

Compatibility: MasterSure Z 60 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterSure Z 60 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

MasterSure Z 60 admixture has only been tested with admixtures manufactured by Master Builders Solutions. As a result, use of MasterSure Z 60 admixture with non-Master Builders Solutions admixtures may produce unpredictable results. Master Builders Solutions denies any warranty expressed or implied with respect to any application using a non-Master Builders Solutions admixture in combination with the use of MasterSure Z 60 admixture.

Storage and Handling

Storage Temperature: MasterSure Z 60 admixture must be stored at temperatures above 40 °F (5 °C). If MasterSure Z 60 admixture freezes, thaw and reconstitute by mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterSure Z 60 admixture has a minimum shelf life of 12 months. Depending on storage conditions, the shelf life may be greater than stated.

Packaging

MasterSure Z 60 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterSure Z 60 admixture

Additional Information

For additional information on MasterSure Z 60 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

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Limited Warranty Notice

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Master Builders Solutions Admixtures US, LLC



September 20, 2023

**AVR Inc.
14698 Galaxie Avenue
Apple Valley, MN 55124**

Attention: Joshua Edwards, P.E.
Project: 2023 Standard Admixtures
Project location: Minneapolis Metro

Certificate of Conformance
MasterSure® Z 60
Master Builders Solutions Admixture for Concrete

I, Richard Hubbard, Sr. Technical Marketing Specialist for Master Builders Solutions, Cleveland, Ohio, certify:

That MasterSure Z 60 admixture is a Workability-Retaining Admixture manufactured by Master Builders Solutions; and

That MasterSure Z 60 admixture and RheoTEC Z-60 admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterSure Z 60 admixture; and

That MasterSure Z 60 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00007 percent (0.7 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100kg (1 fluid ounce per 100 pounds) of cement; and

That MasterSure Z 60 admixture meets the requirements for a Type S, Specific Performance, Admixture as specified in Table 1 of ASTM C494/C494M and AASHTO M194, the Standard Specifications for Chemical Admixtures for Concrete.

A handwritten signature in black ink that reads "Richard Hubbard III".

Richard Hubbard
Sr. Technical Specialist

3	03 30 00	Cast-in-Place Concrete
4	03 40 00	Precast Concrete
	04 05 13	Masonry Mortaring



MasterSet® AC 534

Accelerating Admixture

Description

MasterSet AC 534 patented, ready-to-use, liquid admixture is formulated to accelerate time of setting and to increase early concrete strengths. MasterSet AC 534 admixture does not contain calcium chloride and is formulated to comply with ASTM C 494/C 494M Type C, accelerating, admixture requirements.

Applications

Recommended for use in:

- Reinforced, precast, pumped, flowable, lightweight or normal weight concrete and shotcrete (wet mix)
- Concrete placed on galvanized steel floor and roof systems which are left in place
- Prestressed concrete
- Fast-track concrete construction
- Concrete subject to chloride ion constraints
- 4x4™ Concrete
- Self-consolidating concrete (SCC)
- Pervious concrete
- Masonry Mortar

Features

- Accelerated setting time across a wide range of temperatures
- Increased early compressive and flexural strengths

Benefits

- Earlier finishing of slabs — reduced labor costs
- Reduced in-place concrete costs
- Reduced or eliminated heating and protection time in cold weather
- Earlier stripping and reuse of forms
- Superior finishing characteristics for flatwork and cast surfaces

Performance Characteristics

Mixture Data: 453 lb/yd³ (269 kg/m³) of Type I cement; 3-4 in. (75-100 mm) slump; concrete temperature 74 °F (23 °C); ambient temperature 50 and 75 °F (10 and 24 °C); non-air-entrained concrete.

Setting time

@ 50 °F (10 °C)

	Initial Set (h:min)	Difference
(h:min))		
Plain	13:44	REF
MasterSet AC 534 admixture @		
> 20 fl oz/cwt (1,300 mL/100 kg)	7:11	- 6:33
> 40 fl oz/cwt (2,600 mL/100 kg)	6:05	- 7:39

Setting time

@ 75 °F (24 °C)

	Initial Set (h:min)	Difference
(h:min))		
Plain	8:18	REF
MasterSet AC 534 admixture @		
> 20 fl oz/cwt (1,300 mL/100 kg)	4:59	- 3:19
> 40 fl oz/cwt (2,600 mL/100 kg)	4:18	- 4:00



Guidelines for Use

Dosage

Concrete: The recommended dosage range for MasterSet AC 534 admixture is 10 – 45 fl oz/cwt (0.65 – 2.9 L/100 kg) of cementitious materials for most concrete mixtures using average concrete ingredients. Because of variations in job conditions and concrete materials, dosage rates other than the recommended amounts may be required. In such cases, contact your local sales representative.

The maximum dosage of MasterSet AC 534 admixture in potable water applications that require the use of NSF Certified products is 30 fl oz/cwt (2.0 L/kg) of cementitious materials. For specialty concrete mixtures such as 4x4 Concrete, dosages up to 100 fl oz/cwt (6.5 L/100 kg) may be required.

Masonry Mortar: The recommended dosage range for use of MasterSet AC 534 admixture in masonry mortar is 12 – 30 fl oz/cwt (0.78 – 1.95 L/100 kg) of masonry cement, depending on the ambient temperature and degree of acceleration desired.

The MasterSet AC 534 admixture should be added directly to the mix water prior to the other mortar ingredients. The mortar should be mixed thoroughly for 2 – 3 minutes and placed before it stiffens excessively. Do not add MasterSet AC 534 admixture directly to the masonry cement.

When temperatures after placement of mortar are expected to be at or below 25 °F (-4 °C) for 24 hours or longer, supplemental protection measures such as artificial heating are recommended in addition to the use of MasterSet AC 534 admixture.

Clean Up: Clean all tools and equipment with water.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterSet AC 534 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete.

Compatibility: MasterSet AC 534 admixture may be used in combination with any Master Builders Solutions admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

Storage and Handling

Storage Temperature: MasterSet AC 534 admixture should be stored above freezing temperatures. If MasterSet AC 534 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterSet AC 534 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterSet AC 534 admixture has been exceeded.

Packaging

This product is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterSet AC 534 admixture

Additional Information

For additional information on MasterSet AC 534 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

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Master Builders Solutions Admixtures US, LLC



September 20, 2023

**AVR Inc.
14698 Galaxie Avenue
Apple Valley, MN 55124**

Attention: Joshua Edwards, P.E.
Project: 2023 Standard Admixtures
Project location: Minneapolis Metro

Certificate of Conformance
MasterSet® AC 534
Master Builders Solutions Admixture

I, Richard Hubbard, Sr. Technical Marketing Specialist for Master Builders Solutions, Cleveland, Ohio, certify:

That MasterSet AC 534 admixture is a non-chloride Set Accelerating Admixture for concrete; and

That MasterSet AC 534 and Pozzolith NC534 admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterSet AC 534 admixture; and

That MasterSet AC 534 admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.000045 percent (0.45 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterSet AC 534 admixture meets the requirements for a Type C, Accelerating Admixture specified in ASTM C494/C494M and AASHTO M194, the Standard Specification for Chemical Admixtures for Concrete, as well as the requirements for Type C admixtures as specified in Corps of Engineers' CRD-C 87.

A handwritten signature in black ink that reads "Richard Hubbard III".

Richard Hubbard
Sr. Technical Specialist

03 30 00	Cast-in-Place Concrete
03 40 00	Precast Concrete
03 70 00	Mass Concrete
31 00 00	Earthwork

MasterSet[®] DELVO

Hydration Controlling Admixture

Description

MasterSet DELVO ready-to-use, liquid admixture is used for making more uniform and predictable high-performance concrete. MasterSet DELVO admixture retards setting time by controlling the hydration of portland cement and other cementitious materials while facilitating placing and finishing operations. MasterSet DELVO admixture meets ASTM C 494/C 494M requirements for Type B, retarding, and Type D, water-reducing and retarding, admixtures.

Applications

Recommended for use in:

- Stabilization of concrete washwater
- Stabilization of returned plastic concrete
- Stabilization of freshly batched concrete for long hauls
- 4x4™ Concrete
- Pumped concrete, shotcrete (wet mix) and conventionally-placed concrete
- Plain, reinforced, precast, prestressed, lightweight and normal weight concrete
- Pervious concrete
- Geotechnical grouting and ground improvement

Features

- Reduced water content required for a given workability
- Retarded setting time characteristics
- Improved workability

Benefits

- Provides flexibility in the scheduling of placing and finishing operations
- Offsets the effects of slump loss during extended delays between mixing and placing
- Reduces waste associated with concrete washwater and returned concrete
- Increased strength – compressive and flexural

Performance Characteristics

Rate of Hardening: The temperature of a concrete mixture and the ambient temperature (forms, earth, air, etc.) affect the hardening rate of concrete. At higher temperatures, concrete hardens more rapidly which may cause problems with placing and finishing.

One of the functions of MasterSet DELVO admixture is to retard the set of concrete. Within the normal dosage range, it will generally extend the working and setting times of concrete containing normal portland cement, fly ash, slag cement and silica fume approximately 1 hour to 5 hours compared to a plain concrete mixture. This depends on job materials and temperatures. Field trial mixtures are essential and must be made under approximate job conditions to determine the dosage required for achieving the desired setting time.

Compressive Strength: Concrete produced with MasterSet DELVO admixture will develop higher early (within 24 hours) and higher ultimate strengths than plain concrete when used within the recommended dosage range and under normal, comparable curing conditions. When MasterSet DELVO admixture is used in heat-cured concrete, the length of the preheating period should be increased until the initial set of the concrete is achieved. The actual heat-curing period is then reduced accordingly to maintain existing production cycles without sacrificing early or ultimate strengths.

Guidelines for Use

Dosage: MasterSet DELVO admixture is recommended for use at a dosage of 4 ± 1 fl oz/cwt (260 ± 65 mL/100 kg) of cementitious materials for most concrete mixtures using average concrete ingredients. For long time-to-discharge applications, such as long hauls, dosages higher than the recommended range may be required. Specifically, for shotcrete applications, MasterSet DELVO admixture is recommended for use at a dosage of 1.5 fl oz/cwt to 25 fl oz/cwt (100 mL/100 kg to 1,500 mL/100 kg) of cementitious materials. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative. For concrete washwater and returned concrete stabilization, utilize MasterSet DELVO charts to determine the appropriate dosage rates.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterSet DELVO admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. This admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

Compatibility: MasterSet DELVO admixture may be used in combination with any Master Builders Solutions admixture. When used in conjunction with another admixture, each admixture must be dispensed separately into the mixture.

CAUTION: While MasterSet DELVO and MasterLife CI 30 admixtures are compatible in the same concrete mixture when added separately, these two admixtures are NOT compatible in the same STORAGE TANK OR CONTAINER, in any ratio, as potentially harmful gas may result from blending the two. Contact a Master Builders Solutions representative if there are any questions regarding admixture storage or admixture compatibility.

Storage and Handling

Storage Temperature: MasterSet DELVO admixture should be stored above freezing temperatures. If MasterSet DELVO admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterSet DELVO admixture has a minimum shelf life of 12 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterSet DELVO admixture has been exceeded.

Packaging

MasterSet DELVO admixture is supplied in specially designed 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterSet DELVO admixture

Additional Information

For more information on MasterSet DELVO admixture, contact your local sales representative.

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Master Builders Solutions Admixtures US, LLC



September 20, 2023

**AVR Inc.
14698 Galaxie Avenue
Apple Valley, MN 55124**

Attention: Joshua Edwards, P.E.
Project: 2023 Standard Admixtures
Project location: Minneapolis Metro

Certificate of Conformance
MasterSet® DELVO
Master Builders Solutions Admixture for Concrete

I, Richard Hubbard, Sr. Technical Marketing Specialist for Master Builders Solutions, Cleveland, Ohio, certify:

That MasterSet DELVO admixture is a Master Builders Solutions Hydration Controlling Admixture for concrete; and

That MasterSet DELVO admixture and DELVO Stabilizer admixture are the same product having identical composition, differing only in designation; and

That no calcium chloride or chloride based ingredient is used in the manufacture of MasterSet DELVO admixture and

That MasterSet DELVO admixture, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00014 percent (1.4 ppm) chloride ions by weight of the cement when used at the rate of 65 mL per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That MasterSet DELVO admixture meets the requirements for a Type B, Retarding and Type D, Water-Reducing and Retarding Admixture specified in ASTM C494/C494M, the Standard Specification for Chemical Admixtures for Concrete, as well as the requirements for Type B and Type D admixtures as specified in Corps of Engineers' CRD-C 87 and AASHTO M194.

A handwritten signature in black ink that reads "Richard Hubbard III".

Richard Hubbard
Sr. Technical Specialist