

Description:

MM-500 is a multipurpose admixture for concrete. It is an organic material, white in color, liquid to paste like mass depending on temperature and soluble in water. The product is non-flammable, non hazardous and eco friendly, which can be used in all types of construction where concrete mixture is involved.

Features and Benefits:

- ✓ Water proofing agent (either direction - negative or positive).
- ✓ Provides excellent resistance to air & waterborne corrosive chemicals.
- ✓ Damp proofing agent.
- ✓ Significantly reduces permeability hence increases durability.
- ✓ Protects moisture transmission by creating polymer membrane.
- ✓ Anti-oxidant: Protects rebar against corrosion.
- ✓ Allows perfect compaction (no segregation due to excessive vibration).
- ✓ Allows concrete to gain maximum density with high performance (HPC).
- ✓ Reduces honeycomb, porosity & hairline cracks.
- ✓ Reduces concrete shrinkage and cracking.
- ✓ Anti-salinity and Sulphur resistant.
- ✓ Halts the permanent carbonation process and leaching of sodium.
- ✓ Anti-corrosion: permanently protects and stops internal aging and decay.
- ✓ Allows monolithic bonding of blocks in new and old joints of concrete.
- ✓ Achieves a linear polymerization between noodles & lumps of concrete mass.
- ✓ Plasticizer & concrete lubricant for a better slump.
- ✓ Significantly reduces water-cement ratio with high workability.
- ✓ Partial auto curer.
- ✓ Exceptionally holds temperature.
- ✓ Allows easy release of formwork. Reduces air bubbles of concrete ensuring permanent smooth surfaces.
- ✓ Reduces cost of maintenance and repairs.

Recommended Uses:

- ✓ RCC Roads – Highways, Bridges and Dams.
- ✓ Water treatment plants (WTP), ETP, UTP, sewage, and manholes.
- ✓ Storm surge barriers, docks, levees, jetty & dikes for diversion of rising sea water.
- ✓ Multi-structures, airport runways.
- ✓ Concrete homes including basements, foundations, swimming pools, water reservoir, decks, bathrooms, garages, rooftops & exteriors.
- ✓ Sub-structures & below-grade parking structures, basements, elevator pits and foundations of high-rise towers.
- ✓ Recreational facilities such as aquatic centers, aquariums, zoos, water parks and marinas.
- ✓ Architectural water features: fountains and waterfalls.
- ✓ Traffic tunnels, below-grade pipelines and subway tunnels.

Plastic Properties:

- ✓ **MM-500** minimizes air entrainment.
- ✓ **MM-500** has water reducing properties.
- ✓ **MM-500** has plasticizer properties.
- ✓ **MM-500** allows concrete lubrication.
- ✓ **MM-500** has workability properties.
- ✓ **MM-500** allows fluidity.
- ✓ No segregation by excessive vibration allowing better compaction.

Setting Properties:

- ✓ Controls the temperature.
- ✓ Prevents rapid dehydration, hence density of concrete increases durability (HPC).
- ✓ Hairline crack reducer.

Hardened / Performance Properties:

- ✓ Permeability is reduced. (void porosity)
- ✓ Physical and chemical properties and appearance are the same as for normal concrete.
- ✓ Achieves smoother surface allowing application of paints and easy placement of tiles or other desired finishes

Properties:

Physical properties:

Appearance	Liquid to paste
pH value	7 +/- 0.08
Specific Gravity (H2O=1.07)	0.98
Bulk density	1.02

Plastic properties:

Slump	120 to 150 mm
Plastic density	1.05 (g/cm3)
Air content	2 to 3 %

Setting times:

Initial	45 to 60 mins
Final	10 hours

Compressive Strength:

After 7 days	2800-3000 psi (19-21 MPa)
After 28 days	5000+ psi (35+ MPa)

Property	MM-500
Water Permeability BS/EN 12390-8	Reduced 90%
Concrete Durability	High
Drying Shrinkage	Reduced 70%
Wetting Expansion	Reduced 70%
Absorption	Very Low
RCPT ASTM C1202	VeryLow(120)Low(90)

Tests performed according to ASTM standard by **B.U.E.T, M.I.S.T, H.B.R.I. BETON & TSF GeoTech** (USA). **HOLCIM & COMARCA** (MEXICO). **LaFarge & HOLCIM.** (Dubai, UAE).

According to the ASTM C1202 rating, concrete without admixture was of category " High Permeability " even at 90 days of age. But **MM -500** mixed concrete just reached the " Medium Permeability" range at the age of 28 days and the trend shows the chloride permeability is decreasing. The result after 120 days is "very low". (B.U.E.T & BETON)

Example of Mixing Design Optimization (1 Cubic Yard)

Material	Control Mix	MM-500
Cement	300 kg.	300 Kg.
1.8 To 2.5 FM Sand	450 Kg.	450 Kg.
¾" Downgrade High Density Bolder Stone Chips	900 Kg.	900 Kg.
MM-500	N/A	1.80 Liter
Water	135 Liter	120 Liter

W/C RATIO : 40%-45% MIX DESIGN 1 : 1.5 : 3 SAND / AGGREGATE DAMP OR MOIST SSD

*** PLEASE USE THE CALCULATION SHEET FOR ACCURATE DOSAGE FOR SPECIFIC AREA OF THE WORK TO ACHIEVE IDEAL PERFORMANCES & RESULTS.

Concrete Properties:

Property	Control Mix	MM-500
Slump	50 mm.	120 mm. To 150 mm.
Air Content %	4.7 %	2 % To 3 %
Initial Setting Time	30 To 45 minutes	45 To 60 minutes
Final Setting Time	10 hours	10 hours
Compressive Strength (7 Days)	21 Mpa. (3000 Psi)	21 Mpa. (3000 Psi)
Compressive Strength (28 Days)	28 Mpa. (4000 Psi)	35 Mpa. (5000 Psi)

➤ Concrete is made of locally sourced materials to achieve different properties like strength, workability and durability.(Both in USA & overseas). Results of testing will always vary based on the unique mix design. Testing listed is over a control and is a compilation of different tests in which **MM-500** is best in class. MMCL highly recommends consulting the technical team for extensive support with all design specifications to the clients requirements to achieve the ultimate result and success of the product usage whether in field tests or lab tests to the final site performance.

➤ MMCL does not recommend eliminating standard shrinkage control joints. Follow ACI guidelines and **MM-500** literature for waterproofing joints.

➤ Do not assume strength increase will occur rapidly but due to the effectiveness and chemical reaction within the curing process of **MM-500**, while the plastic state holds the properties initially for best results: the ultimate hardened state will suffice the required strength eventually.

Recommended Dosage:

The maximum dosage is 300 ml / 13.52 oz of **MM-500** for every 50 kg / 110 lb of cement but may vary as per the client's specific need. The table below illustrates an in-depth breakdown of the recommended dosages based on the desired structure.

Piling	250 ml -300 ml with 50 Kg of Cement
Superstructure	200 ml - 250 ml with 50 Kg of Cement*
RMC (Ready mix concrete)	0.4% - 0.5% of Cement Weight
Cement/Mortar	300 ml - 400 ml with 50 Kg of Cement*
Bridge/Culvert/Dam	250 ml - 300 ml with 50 Kg of Cement*
Basement/Sub-Structure	250 ml - 300 ml with 50 Kg of Cement*
Water Tank	250 ml - 300 ml with 50 Kg of Cement*
Swimming Pool	250 ml - 300 ml with 50 Kg of Cement*
Roof	250 ml - 300 ml with 50 Kg of Cement*
Others	As per MMCL's Recommendations / Consultations

* Depending on applications and site/concrete materials conditions.

Certifications & Standards:

Certified by **B.U.E.T, M.I.S.T, H.B.R.I. BETON & TSF GeoTech (USA). HOLCIM & COMARCA (MEXICO). LaFarge & HOLCIM (Dubai, UAE).**

ASTM C-39	Compressive Test
ASTM C-143	Slump
ASTM C-1794	Water Absorption
NT-Build 492	Concrete Durability
ASTM C-1202	Rapid Chloride Penetrability Test
BS EN 12390	Water Penetration Test
ASTM C – 494/C-494M Conformance	Type F water reducing, high range admixture

References:

ASTM C33 / C33M, Standard Specification for Concrete Aggregates, ASTM international, West Conshohocken, PA, USA, www.astm.org.

ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate, ASTM international, West Conshohocken, PA, USA, www.astm.org.

ASTM C29 / C29M, Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate, ASTM international, West Conshohocken, PA, USA, www.astm.org.

RCPT test results using **MM-500** Multipurpose Concrete Admixture ASTM C566, Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying, ASTM international, West Conshohocken, PA, USA, www.astm.org.

ASTM C70, Standard Test Method for Surface Moisture in Fine Aggregate, ASTM international, West Conshohocken, PA, USA, www.astm.org.

ASTM C136 / C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates, ASTM international, West Conshohocken, PA, USA, www.astm.org.

ASTM C494 / C494M, Standard Specification for Chemical Admixtures for Concrete, ASTM international, West Conshohocken, PA, USA, www.astm.org.

ACI 211.1-91. Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete, ACI 211.1-91. Manual of Concrete Practice, (Reapproved 2002), 1-38.

ASTM C143 / C143M. Standard Test Method for Slump of Hydraulic-Cement Concrete, ASTM international, West Conshohocken, PA, USA, www.astm.org..

ASTM C39 / C39M, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens, ASTM international, West Conshohocken, PA, USA, www.astm.org.

ASTM C1202, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride ion Penetration, ASTM International, West Conshohocken, PA, USA, www.astm.org

Applications:

A pre-pour meeting and consultation with the general contractor, concrete supplier, ready-mix company, finisher, material testing engineers or laboratory technicians are strongly recommended. Treat construction joints, dosage and mixing in accordance to recommendations & instructions. Dose **MM-500** up to a maximum 300ml to 50 Kg of cement in consultation with an authorized MMCL representative. Trial batches are required to determine actual plastic properties.

When mixing **MM-500**

Mortar mixing machine – Dilute **MM 500** in water for the batch, mix with cement & aggregates. For proper inclusion, 6-10 revolutions recommended.

Ready Mix Truck – Add **MM 500** directly into the truck at site. For proper inclusion, 24 revolutions recommended.

Ready Mix / Batching Plants – Normal procedures as any other admixture during the mixing at the plant. Consulting MMCL Technical team for accuracy of usage and dosage is highly recommended.

Place and finish concrete in accordance with ACI guidelines. Proper placement and curing are essential to achieve the performance and benefits of **MM-500**. Curing influences the overall quality of the concrete structure; thus, proper curing techniques are important to prevent the concrete from shrinking, drying, and cracking especially at the surface. Other than standard procedures no other special curing methods are required. **MM-500** helps the concrete to hold the water for self-curing.

To achieve monolithic bonding of blocks between new and old joints of concrete

- ✓ Make cement grout by mixing 12.25 kgs of cement, 12.5 liters of water, then add 1 liter of **MM-500**.
- ✓ Pressure-wash the joint key thoroughly if needed.
- ✓ Thoroughly brush on **MM-500** grouting to the surface.
- ✓ Pour new concrete on and properly vibrate to achieve proper compaction.

Misc Recommendations:

- ✓ To achieve leak proof for high performance concrete (HPC), it is suggested to use strong formwork. This will enable proper compaction as extra vibration can be applied.
- ✓ To achieve stronger bonding and leak proof the concrete, it is recommended to follow the construction joint drawing as per fig: 1, 2 & 3 as shown in the swimming pool applications.
- ✓ Before using **MM-500** Cement Grout, please thoroughly clean the surface with water pressure or with a steel brush.
- ✓ After using **MM-500** with the cement grout, it is suggested to apply proper vibration to compact the concrete to get high performance concrete (HPC). Excessive vibration will not cause segregation; thus, it will not be required to use PVC water stoppers or any form of liquid felts at the joints.
- ✓ Plastering & Stucco : Waterproofing & Damp proofing can be achieved for new, preexisting walls or repair works. In the case of old repair , simply sizzle the old mortar plaster and recast a new layer plaster with **MM-500**. The dosage would be 300ml for 50 Kg of cement. Thickness minimum 12mm to maximum 18 mm. Recasting a new layer of concrete over old floors or walls is possible as well. Please consult MMCL's technical team's recommendation to follow precise methods.

The Plaster and Stucco Details Are Given Below:

** The Plaster and Stucco thickness should be 12 mm. to 18 mm.

** Mix design ratio of mortar for Plaster & Stucco should be

1:4 (Cement : Sand)

1. PLASTER: MM-500 suitable for plaster because **MM-500** increases mortar smoothness and flexibility thus helping a mason to finish the work efficiently. **MM-500** also creates membrane which helps the plaster waterproof.

Dosage of **MM-500**

A. Exterior Plaster = 400 ml. per 50 kgs. Cement.

B. Interior Plaster = 300 ml. per 50 kgs. cement.

2. STUCCO : MM-500 is suitable for Stucco since **MM-500** increases mortar smoothness and flexibility thus helping a mason to allow texture of stucco quickly. **MM-500** creates a membrane which helps the Stucco waterproof.

Dosage of **MM-500**

A. Exterior Stucco = 400 ml. per 50 kgs. Cement.

B. Interior Stucco = 300 ml. per 50 kgs. cement.

Limitations:

This Concrete Admixture, **MM-500**, is provided without any representations or warranty, OTHER THAN THOSE THAT ARE CONTAINED IN THE **MM-500** PRODUCT PROFILE, that has been provided to customers. It is the customer's responsibility to review the Product Profile.

Variations or deviations from the specifications, recommended usage or dosages in the product profile may adversely impact the effectiveness of **MM-500**. Multi Mix Company, LLC makes no warranties, representations or guarantees of any kind if the specifications, recommended usage and dosages are not complied.

Health & Safety:

- ✓ Non – Hazardous.
- ✓ Eco Friendly.
- ✓ Non – Flammable.
- ✓ No Special clothing or equipment needed.
- ✓ Precautions to be taken in Handling and Storage.
- ✓ Spilled material is slippery .

SAFETY: Material Safety Data Sheet (MSDS) for this product. For professional use only. Avoid contact with skin or eyes.

Respiratory protection	Not Required
Eye protection	Chemical Goggles Recommended
Protection Gloves	Recommended
Ventilation	General ventilation is recommended
Other Protective equipment	Not Required

Technical Service:

MMCL Technical Services are available on request for onsite support to assist in the accurate use of **MM-500**.

Packaging:

25-liter Canister. 20-liter Bucket. 208 Liter Drum. Bulk upon buyer's request.

Shelf Life:

MM-500 has a minimum shelf-life of 2 years in sealed conditions to be kept within a temperature of 15°C to 40°C in normal & dry places.

Warranty:

Multi Mix Company warrants that MMCL products are free from manufacturing defects and comply with the specifications given in their respective technical data sheet, because conditions of use, such as site conditions, surface preparations, workmanship, concrete materials, weather, structural issues and other factors are beyond the control of MMCL, no warranty can be given as to the results of use unless the client consults on site supervision by MMCL.

Purchaser agrees to seek the advice of qualified professionals and to determine for themselves the suitability of **MM-500** for their intended purpose and assumes all risks.

Purchaser's sole remedy is limited to replacement of any product proven defective. THIS LIMITED WARRANTY CONTAINS THE ENTIRE OBLIGATION OF MMCL. NO OTHER WARRANTIES, EXPRESS OR IMPLIED, SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. MMCL SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. No representative of MMCL has the authority to make any representations or provision except as stated herein.