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SPECIFICATION BULLETIN

Master Builders Technologies

High Performance Floor System, featuring MASTERTOP® HPF

MINERAL AGGREGATE DRY SHAKE SURFACE HARDENER

NOTE TO SPECIFIERS

The purpose of this suggested specification is to assist the Specifier while developing a specification for the use of Master Builders MASTERTOP® HPF surface hardener for the High Performance Floor System. This specification has been prepared to be part of a complete project specification. It has not been prepared to be a stand alone item. This document is not intended to be copied directly into project specifications.

PART 1 - GENERAL

1.01 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

B. Provisions of Section 03300, Cast-In-Place Concrete, apply to this Section.

1.02 Summary

A. This Section specifies a pre-mixed, ready-to-use mineral aggregate surface hardener that is proportioned, mixed, and packaged at the manufacturer's owned and operated factory.

B. This product is composed of processed mineral aggregates, cement binders, plasticizers, water-reducing admixtures, and other proprietary ingredients.

1.03 References

ACI 211.1-91	Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI 301-89	Specification for Structural Concrete Buildings
ACI 302.1R-96	Guide for Concrete Floor and Slab Construction
ACI 304.1R-89	Guide for Measuring, Mixing, Transporting and Placing Concrete
ACI 305 R-91	Hot Weather Concreting
ACI 306 R-89	Cold Weather Concreting
ACI 308	Standard Practice for Curing Concrete
ASTM A 185	Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement
ASTM A 497	Standard Specification for Deformed Steel Welded Wire Fabric
ASTM C 39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	Specification for Ready-Mixed Concrete
ASTM C 309	Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	Specification for Chemical Admixtures for Concrete
ASTM C 779	Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
ASTM C 1028-96	Standard Test Method for Determining Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

1.04 Submittal

A. Refer to Section 01300 “Submittals” for general information.

B. A minimum of two (2) weeks prior to any concrete placement, submit three (3) copies of all concrete mix designs. Proportioning shall conform to ACI 211 Footnote to Table 6.3.6 whenever placement is made with mechanical placing equipment. Submit concrete slab mix design(s) to Master Builders to review. Any requests for admixtures shall be made at this time, including product specifications and historical data. No admixtures will be allowed unless approved by the Engineer. Submit test results of mix using exact components including cement manufacturer and type, aggregate type and supplier, and admixtures.

C. Submit one (1) copy of test and inspection reports required by Quality Assurance provision. Immediately report to the Engineer any deviations from specifications or drawings encountered by testing or inspection personnel.

1.05 Quality Assurance

A. Job Mock-Up: In a location designated by the Architect and/or Engineer, place a minimum 100 ft^2 (10 m^2) floor mock-up using actual jobsite materials and installation procedures proposed for use in the project. Revise materials and procedures as directed by the Architect and/or Engineer to obtain acceptable finish surface. Do not destroy the approved mock-up panel until the floor has been accepted.

1. Maintain the same controls and procedures used in the acceptable mock-up throughout the project.

B. Field Support: During job mock-up and initial period of installation, the manufacturer of the surface hardener will provide, at no cost, a trained, full-time employee to aid in instructing the proper use of the product.

1. Notify surface hardener manufacturer at least one week prior to initial use of the product.

C. Installer Qualifications: Engage an experienced installer who is an Installation Partner for MASTERTOP HPF surface hardener and the High Performance Floor System components, who specializes in the application of floor finishes required for this project. Consult a Master Builders Floor Product Manager for a current list of Installation Partners.

D. Refer to Section 01400 “Quality Control” for payment for testing and ACI Manual of Concrete Inspection.

E. The following testing and inspection requirement shall be done by an independent laboratory approved by the Engineer. Contractor will assist in testing and inspection as necessary and in any corrective work required.

1. Inspect excavations and prepared subgrade suitability for placing concrete. No standing water, organic material, debris, and other deleterious material should be present.

2. Conduct concrete compressive strength tests in accordance with ASTM C 39 and as follows:
   a. Cast concrete cylinders in steel or plastic molds. Cardboard molds are not acceptable.
   b. Cast one (1) set of four (4) test cylinders for the first 150 yd^3 (114.69 m^3) of each mix placed each day. If less than 150 yd^3 (114.69 m^3) is placed, cast one (1) set of four (4) test cylinders for that amount.
   c. Cast one (1) set of four (4) test cylinders for each additional 100 yd^3 (76.46 m^3) of each mix placed each day.
   d. Test one (1) cylinder at seven (7) days and two (2) cylinders at 28 days. (Hold the last cylinder for testing at a later date as required.)
   e. Test each concrete truck for slump, air content and temperature.
   f. If reasonable consistency of slump and air tests is recorded on four (4) consecutive tests, testing laboratory may reduce requirement to test every 50 yd^3 (38.23 m^3).
   g. Deviation from specification shall be grounds for rejection.
   h. Addition of water or admixtures to concrete on site without written approval of Engineer is prohibited and shall be grounds for rejection.

3. Examine location and construction of all joints in concrete for conformance with drawings.

4. Confirm all work is performed in accordance with ACI requirements for hot or cold weather, as applicable.

5. Inspect for adequate consolidation of concrete.

6. Verify specified methods of curing and protection of concrete are being followed.

7. Verify location depth of reinforcing steel in slabs-on-grade.

F. Submit daily reports to Engineer during concrete operations indicating location of pour; quantity of concrete placed; concrete slump; temperature and air content; site conditions including temperature, weather, wind speed; and curing method.

1.06 Field Service

A. Contractor to give a minimum of ten (10) days notice to Master Builders to arrange a pre-job conference related to application procedures to Owner's requirements as evidenced by the job mock-up slab. At the pre-job conference, schedules and application items will be reviewed in detail. Also, a minimum of three (3) days notice prior to initial use of the product and subsequent slab pour schedules will be given. Notification to be submitted by calling Master Builders local representative. At the request of the Owner, Master Builders may video tape the pre-job conference with the Applicator and the floor system construction crew. In addition, selected portions of the installation of the project floor may be video taped. Such video tape will be the property of the Owner and Master Builders.

B. With a minimum three (3) day notice, Master Builders will be available for pre-job, first day pour, and/or periodic onsite review to provide consul on the required application techniques related to jobsite conditions, and within guidelines of ACI 302.

1.07 Warranty

A. If any concrete is found defective in strength, is not true to line or level, is poured out of place, the surface is not finished to the same standard as the approved job mock-up, has not been protected properly against the effects of weather, if any reinforcing is found exposed or not properly placed, the Owner or the Engineer may direct that such concrete be removed and replaced at the Installation Partner's expense.

B. An Installation Partner shall install the High Performance Floor System and provide a one (1) year warranty for labor and materials.

Part 2 - PRODUCTS

2.01 Proportioning and Mix Design

A. Ready-Mixed Concrete: Provide concrete materials complying with requirements of Section 03300 and ASTM C 94.

B. Submit complete mix design(s) to Master Builders for review at least two (2) weeks prior to application.

2.02 Application Materials

A. Surface Hardener: MASTERTOP® HPF surface hardener, manufactured by Master Builders, at a rate 1.5 to 2.0 lb/ft^2 (7.35 to 9.8 kg/m^2).

B. Curing Compound: MASTERKURE® 200W curing compound, or other products approved by Master Builders, as per manufacturer's recommendation.

C. Joint Filler: MASTERFILL® 300 joint filler or other products approved by Master Builders, as per manufacturer's recommendation.

D. Monomolecular Film: CONFILM® evaporation reducer or other products approved by Master Builders, as per manufacturer's recommendation. (Please note: Misuse of this material may compromise color of dry shake.)

2.03 Approved Installation Partner

A. An approved Installation Partner shall install the High Performance Floor System. Acceptable applicators for this project include:

Company:_____
Address:_____
City, State/Province:_____
Postal Code:_____
Phone No., Fax No.:_____

Company:_____
Address:_____
City, State/Province:_____
Postal Code:_____
Phone No., Fax No.:_____

Contact a Master Builders Floor Product Manager for a current list of Installation Partners.

PART 3 - Execution

3.01 Concrete Placement

A. Section 03300, Cast-In-Place Concrete, specifies basic concrete materials and placement requirements.

B. For wear resistant concrete floors, provide concrete with the following additional requirements:

1. Maximum slump of 5 in. (127 mm) for slabs on grade.

2. Do not install over concrete containing more than 3% air content per ASTM C 138, ASTM C 173, or ASTM C 231.

3. Do not use calcium chloride or set-accelerating admixtures containing calcium chloride.

4. Do not use admixtures that substantially increase and/or decrease the rate of bleeding. Consult Master Builders for specific jobsite recommendations.

5. Consult Master Builders for approved mix designs and additives.

3.02 Application of High Performance Floor System

A. An Installation Partner will use the specified Master Builders components to complete the High Performance Floor System.

B. Pump, place or otherwise convey the base concrete at a slump that is not in excess of 5 in. (127 mm) for a slab on grade. After the concrete has been placed, immediately screed, then bullfloat and/or highway straightedge the surface. Allow bleed water to rise to the surface.

C. Early moisture loss and rapid setting around the perimeter of the slab are typical, and should be monitored closely for proper timing of the floating operation. (If excessive bleed water is present, remove standing water by dragging a hose across the surface, use a squeegee or other approved method, and/or wait until the surface has lost its sheen.)

D. After the water sheen has disappeared, just prior to initial set (a finisher with knee boards will leave approximately 1/8 to 1/4 in. {3.17 to 6.35 mm} impression), open the slab by floating the surface of the slab with a mechanical float fitted with float shoes.

E. Completely read and follow dry shake manufacturer's installation instructions. Place and integrate dry shake with a minimum two-pass process. Two-thirds to one-half of the total amount is applied and floated on the first application, and the remaining amount(s) on the succeeding applications. **Do not apply the dry shake into the bleed water.**

1. Apply the first application of the dry shake so that a uniform distribution of the surface hardener is obtained. (The most efficient, economical, and precise method of applying a dry shake is through the use of an automatic spreader.)

2. Once the shake has absorbed sufficient moisture (the surface will somewhat darken), float (incorporate the dry shake into) the surface with a floating machine equipped with flat shoes, or with a wooden bullfloat. (A heavy wood float is preferable as it tends to open the slab rather than closing it off and possibly trapping bleed water under the dry shake layer.) Hand float edges with wood floats and/or darbys.

3. As the floating of the first application of the dry shake proceeds, follow immediately behind this floating operation with the subsequent shake application.

4. Once the shake has absorbed sufficient moisture (the surface will somewhat darken), float the surface with a floating machine equipped with float shoes, or a wooden float. Hand float edges with wood floats and/or darbys.

5. If applicable, as the floating of the dry shake proceeds, follow immediately with subsequent shake application.

   PLEASE NOTE: When more than 1.0 lb/ft^2 (4.9 kg/m^2) will be applied or in hot and windy conditions, more than two shake applications may be necessary. UNDER NO CIRCUMSTANCE should water, evaporation retarders or finishing agents be applied to help “wet up” the dry shake. Early moisture loss and rapid setting around the perimeter of the slab are typical, and should be monitored closely for proper timing of the floating operation.

F. When appropriate, conduct two (2) to three (3) mechanical trowelings.

1. Leave the prepared slab untouched until the surface has lost its sheen and can support the weight of a finisher and finishing machine. At this point, conduct the first troweling of the surface. On the first application, keep trowel blades as flat as possible without digging into the surface.

2. As the surface “tightens” further, the trowel blades may be gradually raised to produce the desired surface.

3. As surface further stiffins, indicated by loss of sheen, hand or mechanically trowel with blades set relatively flat. Remove all marks and pinholes in the final raised trowel application.

   PLEASE NOTE: All moisture used to incorporate dry shake material must come from within the slab. Under no circumstances should water be applied to aid in the incorporation of the dry shake. Under severe or rapid drying conditions, the use of an approved evaporation reducer may be mist-sprayed onto the dry shake according to current installation instructions to prevent rapid moisture loss. (PLEASE NOTE: Misuse of these materials can compromise color and performance of dry shake.)

G. Texture of the surface shall conform to the job mock-up. **Do not burnish trowel.**

3.03 Curing and Protection

A. At the completion of final troweling and when the surface will not be marred, apply a Master Builders approved membrane curing compound according to directions.

B. After drying, protect hardened surface by covering with scuff-proof, non-staining building paper or polyethylene.

C. Keep floors covered and free of traffic and loads for a minimum of 10 days after completion.

D. Maintain ambient temperature of 50 °F (10 °C) or above during the curing period.

E. Colored floors require extra care during construction. Furthermore, the newly constructed floor must be protected from staining and damage until the structure goes into service. Many factors, including jobsite conditions and applicator experience, can affect the final shade, color and appearance of a colored concrete floor.

F. For best results, keep the floor protected throughout the construction process.

G. After a minimum of 30 days, but prior to completion of project, the Installation Partner must return to the project to remove curing compound, and screen the floor, per manufacturer’s instructions to achieve the surface finish desired by the owner.

3.04 Conditioning of Floor Surface

A. Removal of curing compound should be coordinated with the store opening. After a minimum of 30 days, the Installation Partner will return to install the joint filler, remove the curing compound, and begin screening the floor to produce the surface appearance specified by the owner. (This stage is done at an average rate of $\pm$ 12,000 ft^2 (1,100 m^2) per day.

B. Subsequent to above, as soon as possible, the regular daily maintenance of the floor should begin in order to achieve the desired floor conditioning required for store opening. This maintenance is the responsibility of the Owner's maintenance team. (Protection of the floor surface after initial screening is critical.)

C. The final screening phase should be scheduled as close as possible to store opening. During this stage, the Installation Partner will return to the project for any final floor screening, and address any final patching or "punch-list" work.

D. Confirm ASTM C 1028 compliance.

3.05 Joint Filling

A. After a minimum of 30 days*, apply an approved Master Builders joint filler in all non-dynamic control and saw cut construction joints. Place joint filler in a method complying with manufacturer's instructions.

*__Please Note:__ Refer to ACI 302R-96, Chapter 9.10. It is strongly recommended that the installation of the joint filler material be delayed as long as possible. Allowing the slab(s) to cure as long as possible prior to installing joint filler will reduce the amount of separation between the slab and joint filler.

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