



L & M Construction Chemicals, Inc.
14851 Calhoun Rd.
Omaha, NE 68152-1140
Phone: (800) 362-3331
Phone: (402) 453-6600
Fax: (402) 453-0244
E-mail: info@lmcc.com
www.lmcc.com
www.fgs-permashine.com

This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies a dry process of finishing and polishing concrete floors, including products as manufactured by L & M Construction Chemicals, Inc. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 03 35 10 POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: This Section specifies [Dyed and] polished concrete.
- B. Related Sections:

Specifier Note: Include in this Article only those sections that directly affect the work of this section. Do not include Division 00 or Division 01 sections since it is assumed that all technical sections are related to all project Division 00 and Division 01 sections to some degree.

1. Section [03 01 30 Maintenance of Cast-in-Place Concrete].
2. Section [03 30 00 Cast-in-Place Concrete].
3. Section [07 91 16 Joint Fillers].

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Section 01 42 19 - Reference Standards may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section. Retain only those reference standards to be used within the text of this Section. Add and delete as required for specific project.

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 1. ACI 302.1R Guide for Concrete Floor and Slab Construction.
- B. ASTM International:
 1. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 2. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete.

3. ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
- C. Reunion Internationale des Laboratoires D'Essais et de Recherches sur les Materiaux et les Constructions (RILEM):
 1. Rilem Test Method 11.4 Standard Measurement of Reduction of Moisture Penetration Through Horizontal Concrete Surfaces.
- D. National Floor Safety Institute (NFSI):
 1. NFSI Test Method 101-A Standard for Evaluating High-Traction Flooring Materials, Coatings, and Finishes.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide polished flooring that has been selected, manufactured and installed to achieve the following:
 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20 mm) wear in 30 minutes.
 2. Reflectivity: Increase of 35% as determined by standard gloss meter.
 3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.
 4. High Traction Rating: NFSI 101-A, non-slip properties.
- B. Design Requirements:

Specifier Note: Article below summarizes minimum performance requirements of existing concrete floor prior to receiving floor finishing and polishing process. Retain or delete article below to suit project requirements and specifier's practice (integrated with 03 30 00 Cast-in-Place Concrete section).

1. Hardened Concrete Properties:
 - a. Minimum Concrete Compressive Strength: 3500 psi (24 MPa).
 - b. Normal Weight Concrete: No lightweight aggregate.
 - c. Non-air entrained.
2. Placement Properties:
 - a. Natural concrete slump of 4 1/2 inches - 5 inches (114 - 127 mm). Admixtures may be used.
 - b. Flatness Requirements:
 - 1) Overall FF 40.
 - 2) Local FF 20.
3. Hard-Steel Troweled (3 passes) Concrete: No burn marks. Finish to ACI 302.1R, Class 5 floor.

Specifier Note: Retain or delete article below to suit project requirements.

- a. Class 6 floors, special colored mineral aggregate hardener with repeated hard steel trowel finish.
4. Curing Options:
 - a. Membrane forming curing compounds (ASTM C309, Type 1, Class B, all resin, dissipating cure).
 - 1) Acrylic curing and sealing compounds not recommended.
 - b. Sheet membrane (ASTM C171); polyethylene film not recommended.
 - c. Damp Curing: Seven day cure.

Specifier Note: Article below includes the submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Contract Conditions and Section 01 33 00 - Submittal Procedures.

1.04 ACTION SUBMITTALS

- A. General: Submit listed action submittals in accordance with Contract Conditions and Section [01 33 00 - Submittal Procedures] [_____].

- B. Shop Drawings: Indicate information on shop drawings as follows:
 1. Typical layout including dimensions and floor grinding schedule.
 2. Plan view of floor and joint pattern layout.
 3. Areas to receive colored surface treatment.
 4. Hardener, sealer, densifier in notes.
- C. Product Data: Submit product data, including manufacturer's SPEC-DATA® product sheet, for specified products.
 1. Material Safety Data Sheets (MSDS).
 2. Preparation and concrete grinding procedures.
 3. Colored Concrete Surface, Dye Selection Guides.

1.05 INFORMATION SUBMITTALS

- A. Quality Assurance:
 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in 1.03 Performance Requirements.
 2. Certificates:
 - a. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - b. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A.
 - c. Current contractor's certificate signed by manufacturer declaring contractor as an approved installer of polishing system.
 3. Manufacturer's Instructions: Manufacturer's installation instructions.

1.06 CLOSEOUT SUBMITTALS

- A. Warranty: Submit warranty documents specified.
- B. Operation and Maintenance Data: Submit operation and maintenance data for installed products in accordance with Section [01 78 00 - Closeout Submittals] [_____].
 1. Include:
 - a. Manufacturer's instructions on maintenance renewal of applied treatments.
 - b. Protocols and product specifications for joint filing, crack repair and/or surface repair.

1.07 QUALITY ASSURANCE

- A. Qualifications:
 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 2. Installer trained and holding current certification for FGS PermaShine installation.
 3. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Section 01 41 00 - Regulatory Requirements. Repetitive statements should be avoided. Current data on building code requirements and product compliance may be obtained from manufacturer technical support specialists.

- B. Regulatory Requirements.
 1. NFSI Test Method 101-A Phase Two Level High Traction Material.
- C. Mock-Ups:
 1. Construct mock-ups in accordance with Section [01 45 00 - Quality Control] [_____].

Specifier Note: Edit paragraph below to specifying mock-up size.

2. Mock-Up Size: [100 ft² (9.3 m²)] [_____] sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
 3. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
 4. Allow [24] [_____] hours for inspection of mock-up before proceeding with work.
 5. When accepted, mock-up will demonstrate minimum standard of quality required for this work. [Approved mock-up may [Not] remain as part of finished work.] [Remove mock-up and dispose of materials when no longer required and when directed by [Consultant] [_____] [_____].
- D. Preinstallation Meetings: Conduct a preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with [Section 01 31 19 - Project Meetings] [_____]. Review the following:
1. Environmental requirements.
 2. Scheduling and phasing of work.
 3. Coordinating with other work and personnel.
 4. Protection of adjacent surfaces.
 5. Surface preparation.
 6. Repair of defects and defective work prior to installation.
 7. Cleaning.
 8. Installation of polished floor finishes.
 9. Application of liquid hardener, densifier.
 10. Protection of finished surfaces after installation.

1.08 DELIVERY, STORAGE & HANDLING

- A. General: Comply with [01 61 00 - Common Product Requirements] [_____].
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery:
 1. Deliver materials in manufacturer's original packaging with identification labels and seals intact.
- D. Storage and Protection:
 1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 2. Protect concrete slab.
 - a. Protect from petroleum stains during construction.
 - b. Diaper hydraulic power equipment.
 - c. Restrict vehicular parking.
 - d. Restrict use of pipe cutting machinery.
 - e. Restrict placement of reinforcing steel on slab.
 - f. Restrict use of acids or acidic detergents on slab.
- E. Waste Management and Disposal:
 1. Separate waste materials for [Reuse] [And] [Recycling] [_____] in accordance with [Section 01 74 19 - Construction Waste Management and Disposal] [_____].
 2. Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.09 PROJECT AMBIENT CONDITIONS

- A. Installation Location: Comply with manufacturer's written recommendations.

1.010 SEQUENCING

- A. Sequence With Other Work: Comply with manufacturer’s written recommendations for sequencing construction operations.

Specifier Note: Coordinate article below with Conditions of the Contract and with [01 78 36 - Warranties] [_____].

1.011 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.
- B. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty document executed by authorized company official. Manufacturer’s warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

Specifier Note: Coordinate article below with manufacturer’s warranty requirements.

- C. Warranty: Commencing on date of acceptance by [Owner] [Architect] [Consultant] [_____].

1.012 MAINTENANCE

- A. Comply with manufacturer’s written instructions to maintain installed product.

1.013 EXTRA MATERIALS

- A. General Contractor to provide maintenance materials in accordance with Section [01 78 00 - Closeout Submittals] [_____].

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Ensure manufacturer has minimum [5] [_____] years experience in manufacturing components similar to or exceeding requirements of project.

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as “or equal” or “or approved equal” or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining “or equal” products.

2.02 Polished Concrete Finishing Products

- A. Manufacturer: L & M Construction Chemicals, Inc.
 1. Contact: 14851 Calhoun Rd., Omaha, NE 68152-1140; Telephone: (800) 362-3331, (402) 453-6600; Fax: (402) 453-0244; E-mail: info@lmcc.com; website: www.lmcc.com, www.fgs-permashine.com.
- B. Proprietary Products/Systems:
 1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
 - a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Hardener Plus.
 2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.
 - a. Acceptable Material: L & M Construction Chemicals, Inc., Joint Tite 750.
 3. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.
 - a. Acceptable Material: L & M Construction Chemicals, Inc., Petrotex.
 4. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with VOC exempt solvent; formulated for application to polished cementitious surfaces.
 - a. Acceptable Material: L & M Construction Chemicals, Inc., Vivid Concrete Dyes.
 5. Cleaning Solution: Proprietary, mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).
 - a. Acceptable Material: L & M Construction Chemicals, Inc., FGS Concrete Conditioner.

Specifier Note: If more than one concrete finish is required for the project, copy and edit the following articles as required and identify finishes and other variables in a schedule at the end of Part 3 of this section.

6. Finish: Standard [High gloss (HG-1), 1500 grit], or optional [Medium gloss (MG-2), 800 grit] [Very high gloss (VGH-3), 3000 grit] [_____].

Specifier Note: L & M Chemicals' Vivid Dye is currently available in 24 standard colors. L & M Vivid Dye colors can be combined to create an unlimited number of color variations. For color selection, refer to the L & M Chemicals' Vivid Dye color chart that can be found on their website, www.LMCC.com.

7. Color: [_____].

2.03 SOURCE QUALITY CONTROL

- A. Ensure concrete finishing components and materials are from single manufacturer.

Specifier Note: Edit Paragraph below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Section 01 25 13 - Product Substitution Procedures.

2.04 PRODUCT SUBSTITUTIONS

- A. Substitutions: [In accordance with Section 01 25 13 - Product Substitution Procedures] [_____]] [No substitutions permitted].

PART 3 EXECUTION

3.01 MANUFACTURERS INSTRUCTIONS

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and L & M Construction Chemicals, Inc., SPEC-DATA sheets.
- B. Use only L & M certified FGS/PermaShine installers.

3.02 EXAMINATION

- A. Site Verification of Conditions:
1. Verify that concrete substrate conditions, which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete finishing materials.

Specifier Note: Consult floor finishing product manufacturer for additional concrete placement specifications required for application of floor finishing products. Coordinate with Section [03 30 00 Cast-in-Place Concrete] [_____].

- B. Verify Concrete Slab Performance Requirements:
1. Verify concrete is cured to [28 day] [_____] [3500 psi (24 MPa)] [_____] strength.
 2. Verify concrete surfaces received a hard steel-trowel finish (3 passes) during placement.

3.03 PREPARATION

- A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
- B. Examine surface to determine soundness of concrete for polishing.
- C. General Contractor to remove surface contamination.

3.04 INSTALLATION

Specifier Note: Coordinate installation with the manufacturer's written installation details and instructions.

- A. Floor Surface Polishing and Treatment:
1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.

2. Apply floor finish prior to installation of fixtures and accessories.
3. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit using dry method.
 - a. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Level of sheen shall match that of approved mock-up.
 - b. Expose aggregate in concrete surface only as determined by approved mock-up.
 - c. All concrete surfaces shall be as uniform in appearance as possible.
4. Dyed and Polished Concrete (option):
 - a. Locate demarcation line between dyed surfaces and other finishes.
 - b. Polish concrete to final finish level.
 - c. Apply diluted dyes to polished concrete surface.
 - d. Allow dye to dry.
 - e. Remove residue with dry buffer; reapply as necessary for desired result.
5. Apply FGS Hardener Plus, Hardener, Densifier As Follows:
 - a. First coat at 250 ft²/gal (6.25 m²/L).
 - b. Second coat at 350 ft²/gal (8.75 m²/L).
 - c. Follow manufacturer's recommendations for drying time between successive coats.
6. Remove defects and repolish defective areas.
7. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.05 ADJUSTMENTS

- A. Polish to higher gloss those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface.

3.06 FINAL CLEANING

- A. Do cleanup in accordance with Section [01 74 00 - Cleaning and Waste Management] [_____].
- B. Mechanically scrub treated floors for seven days with soft to medium pads with approved cleaning solution.
- C. Upon completion, General Contractor must remove surplus and excess materials, rubbish, tools and equipment.

3.07 PROTECTION

Specifier Note: Coordinate the following Article with Section 01 76 00 - Protecting Installed Construction.

- A. Protect installed product from damage during construction in accordance with Section [01 76 00 - Protecting Installed Construction] [_____].
- B. Protect with EZ Cover™ by McTech Corp., or comparable product.
 1. Contact: Phone: (866) 913-8363; website: www.ezform.net.

3.08 SCHEDULE

Specifier Note: Include a schedule of finish types, colors and locations to suit project requirements.

- A. Standard Finish High Gloss HG-1, Color [_____]: [Location].
- B. Optional Finish Medium Gloss MG-2, Color [_____]: [Location].
- C. Optional Finish Very High Gloss VHG-3, Color [_____]: [Location].

END OF SECTION