SECTION 03 35 00

POLISHED CONCRETE FINISHING

Display hidden notes to specifier. (Don't know how? [Click Here](http://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* L&M Construction Chemicals; polished concrete finishing.
This section is based on the products of L&M Construction Chemicals, which is located at:
1 LATICRETE Park N.
Bethany, CT 06524-3423
Toll Free Tel: 800-362-3331
Tel: 402-453-6600
Email: [request info (info@lmcc.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=L%26M+Construction+Chemicals&coid=41606&rep=&fax=&message=RE:%20Spec%20Question%20(03350lmc):%20%20&mf=)
Web: [www.laticrete.com/lmcc](http://www.laticrete.com/lmcc)
 [ [Click Here](http://www.arcat.com/arcatcos/cos33/arc33748.html) ] for additional information.
L&M Construction Chemicals, Inc. manufactures sealers and sealants building products relating to: Concrete; Specially Placed Concrete; Concrete Curing; Curing, Sealing and Hardening Concrete Floors; Grouts; Concrete Rehabilitation; Masonry; Masonry Grout; Thermal and Moisture Protection; Water Repellents; Finishes and Floor Treatment.

1. GENERAL
	1. SECTION INCLUDES
		1. Polished concrete.
		2. Dyed and polished concrete.
	2. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 01 30 - Maintenance of Cast-in-Place Concrete.
		2. Section 03 30 00 - Cast-in-Place Concrete.
		3. Section 07 91 26 - Joint Fillers.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Concrete Institute (ACI): ACI 302.1R - Guide for Concrete Floor and Slab Construction.
		2. American National Standards Institute (ANSI): Standards B-101.1/2009.
		3. ASTM International (ASTM):
			1. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
			2. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete.
			3. ASTM C 779 - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
		4. Reunion Internationale des Laboratoires D'Essais et de Recherches sur les Materiaux et les Constructions (RILEM): Rilem Test Method 11.4 - Standard Measurement of Reduction of Moisture Penetration through Horizontal Concrete Surfaces.
		5. National Floor Safety Institute (NFSI): NFSI Test Method 101-A - Standard for Evaluating High-Traction Flooring Materials.
	1. SYSTEM DESCRIPTION
		1. Performance Requirements: Provide polished flooring that has been designed, 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, ANSI B-101.1 2009 non-slip properties.
		2. Design Requirements:

\*\* NOTE TO SPECIFIER \*\* 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:
				1. Minimum Concrete Compressive Strength: 3500 psi (24 MPa).
				2. Normal Weight Concrete: No lightweight aggregate.
				3. Non-air entrained.
			2. Placement Properties:
				1. Natural concrete slump of 4-1/2 inches to 5 inches (114 to 127 mm). Admixtures may be used.
				2. Flatness Requirements:

Overall FF 50.

Local FF 40.

* + - 1. Hard-Steel Troweled (3 passes) Concrete: No burnishing marks. Finish to ACI 302.1R, Class 5 floor.

\*\* NOTE TO SPECIFIER \*\* Retain or delete article below to suit project requirements.

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

\*\* NOTE TO SPECIFIER \*\* 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. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. 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 identified in notes.
		3. 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.
		4. Quality Assurance Submittals:
			1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in Performance Requirements.
			2. Certificates:
				1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
				2. 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. ANSI B-101.1 2009 non-slip properties.
				3. Current contractor's certificate signed by manufacturer declaring Contractor as an approved installer of polishing system.
			3. Manufacturer's Instructions: Manufacturer's installation instructions.
		5. Warranty: Submit warranty documents specified.
		6. Operation and Maintenance Data: Submit operation and maintenance data for installed products.
			1. Manufacturer's instructions on maintenance renewal of applied treatments.
			2. Protocols and product specifications for joint filing, crack repair and/or surface repair.
	2. QUALITY ASSURANCE
		1. Installer Qualifications:
			1. Installer with a minimum of 5 years' experience 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 a current certificate as a FGS PermaShine installer.
			3. Current Certification from the CPAA stating that the technicians are trained craftsmen.
		2. Concrete finishing components and materials shall be from single manufacturer.
		3. Manufacturer Qualifications:
			1. Manufacturer capable of providing field service representation during construction and approving application method.
			2. Manufacturer shall have a minimum 5 years of experience in manufacturing components similar to or exceeding requirements of project.

\*\* NOTE TO SPECIFIER \*\* 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.

* + 1. Regulatory Requirements: Comply with NFSI Test Method 101-A Phase Two Level High Traction Material.
		2. Mock-Ups:

\*\* NOTE TO SPECIFIER \*\* Edit paragraph below to specifying mock-up size.

* + - 1. Mock-Up Size: 100 sf (9.3 m2) sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
			2. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
			3. Allow 24 hours for inspection of mock-up before proceeding with work.
			4. When accepted, mock-up will demonstrate minimum standard of quality required for this work.

\*\* NOTE TO SPECIFIER \*\* Delete provision not required.

* + - * 1. 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 Architect.
				2. Approved mock-up may remain as part of finished work.
			1. Mock-Up will demonstrate required level of cut:

\*\* NOTE TO SPECIFIER \*\* Delete level of cut not required.

* + - * 1. Level 1 - Cream Finish: Polishing only the Portland Cement paste at the surface without exposing small, medium or large aggregate. Note: If dye will be used, this is not an acceptable level of grinding. Go to Level 2.
				2. Level 2 - Salt/Pepper Finish: Expose the fine aggregate such as sand and small aggregate with the concrete. The depth of grind will depend greatly on the placement and finishing procedures. Generally, this level of cut can be achieved within 1/16" of the surface.
				3. Level 3 - Medium Aggregate: Exposing more of the overall girth of the coarse aggregate within the concrete. Generally, this level of cut can be achieved within 1/8" of the surface.
				4. Level 4 - Large Aggregate: Exposing the overall girth of the coarse aggregate within the concrete. This level of cut generally can be achieved within 1/4" of the surface.

\*\* NOTE TO SPECIFIER \*\* Used to show level of sheen when concrete is mechanically processed as outlined in Installation article. Delete sheen not required.

* + - * 1. Sheen Level A: Sheen (glossy) as determined by a gloss reading of 45 - 60.
				2. Sheen Level B: Sheen (high gloss) as determined by a gloss reading of 60 - 70.
				3. Sheen Level C: Sheen (very high gloss) as determined by a gloss reading of 70 or higher.

\*\* NOTE TO SPECIFIER \*\* Gloss readings are not to be obtained through the use of any topical protective coating enhancers or the result of resin transfer from resin bond abrasives. Take readings before application of these products. Note: It is important that all parties be informed of the potential for random differences in the exposure of aggregates.

* + 1. Pre-installation Meetings: Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Review the following:
			1. Environmental requirements.
			2. Scheduling and phasing of work.
			3. Coordinating with other work and personnel. Remind all trades that they are working on a surface that is to become a finished surface.
			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.
			11. placing of materials on the concrete surface that may cause staining, etching or scratching
	1. DELIVERY, STORAGE AND HANDLING
		1. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
		2. Delivery: Deliver materials in manufacturer's original packaging with identification labels and seals intact.
		3. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
	2. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
		2. Protect Concrete Slab:
			1. Protect from petroleum stains during construction.
			2. Diaper hydraulic power equipment.
			3. Restrict vehicular parking.
			4. Restrict use of pipe cutting machinery.
			5. Restrict placement of reinforcing steel on slab.
			6. Restrict use of acids or acidic detergents on slab.
		3. 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.
	3. PROJECT AMBIENT CONDITIONS
		1. Installation Location: Comply with manufacturer's written recommendations.
	4. SEQUENCING
		1. Sequence with Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.
	5. WARRANTY
		1. 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.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: L&M Construction Chemicals, which is located at: 1 LATICRETE Park N.; Bethany, CT 06524-3423; Toll Free Tel: 800-362-3331; Tel: 402-453-6600; Email: [request info (info@lmcc.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=L%26M+Construction+Chemicals&coid=41606&rep=&fax=&message=RE:%20Spec%20Question%20(03350lmc):%20%20&mf=); Web: [www.laticrete.com/lmcc](http://www.laticrete.com/lmcc)

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* 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.

* 1. POLISHED CONCRETE
		1. Products/Systems:
			1. Hardener, Sealer, Densifier: Proprietary, water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
				1. Acceptable Material: L & M Construction Chemicals, Inc., FGS Hardener Plus. Basis of design.
				2. Acceptable Material: L&M Construction Chemicals, Inc., Lion Hard may be substituted when conditions exist where disposing of rinse water is in conflict with local building codes.
			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.
				1. 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.
				1. Acceptable Material: L & M Construction Chemicals, Inc., Petrotex.
			4. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with water or VOC exempt solvent; formulated for application to polished cementitious surfaces.
				1. Acceptable Material: L & M Construction Chemicals, Inc., Vivid Concrete Dyes or Vivid Dye WB Plus.

\*\* NOTE TO SPECIFIER \*\* 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.

* + - * 1. Color: [\_\_\_\_\_].
			1. 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).
				1. Acceptable Material: L & M Construction Chemicals, Inc., FGS Concrete Conditioner.
			2. Stain Guard Sealer: Ready to use, is a low odor, VOC compliant, topical sealer consisting of low molecular emulsified cross-linking, coupling polymers that effectively protect concrete and other natural stone floor surfaces from the damaging effects of staining, defacing and deterioration due to contaminant penetration.
				1. Acceptable Material: L& M Construction Chemicals, Inc. Permaguard SPS.

\*\* NOTE TO SPECIFIER \*\* 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. Delete finish not required.

* + - 1. Finish: Standard High gloss (HG-1), 1500 grit.
			2. Finish: Medium gloss (MG-2), 800.
			3. Finish: Very high gloss (VGH-3), 3000 grit.
1. EXECUTION
	1. EXAMINATION
		1. 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.
		2. Do not begin installation until substrates have been properly prepared.
		3. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

\*\* NOTE TO SPECIFIER \*\* 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 Cast-in-Place Concrete.

* + 1. Verify Concrete Slab Performance Requirements:
			1. Verify concrete is cured to 28 day duration and 3500 psi (24 MPa) strength.
			2. Verify concrete surfaces have received a hard steel-trowel finish (3 passes) during placement.
			3. Verify overall floor flatness is a minimum of Ff 40.
	1. PREPARATION
		1. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
		2. Examine surface to determine soundness of concrete for polishing.
	2. INSTALLATION
		1. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions.

\*\* NOTE TO SPECIFIER \*\* Coordinate installation with the manufacturer's written installation details and instructions.

* + 1. 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. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.
				1. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Following the initial passes of metal bond diamonds, the installer shall drop back a minimum of one grit level when transitioning to resin bond diamonds. The separation in grit designation shall be a minimum of 50 for the transitioning step. The installer shall refine each abrasive grit to its fullest potential before moving on to the next level. Floor shall be thoroughly scrubbed between each grit pass to remove all loose material. Level of sheen shall match that of approved mock-up.
				2. Expose aggregate in concrete surface only as determined by approved mock-up.
				3. All concrete surfaces shall be as uniform in appearance as possible.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Dyed and Polished Concrete:
				1. Locate demarcation line between dyed surfaces and other finishes.
				2. Polish concrete to the 400 grit level, (200 grit for water based dyes).
				3. Apply pre-mixed dyes to polished concrete surface.
				4. Allow dye to dry.
				5. Remove residue with water and buffer pad; reapply as necessary for desired result.
			2. Hardener and Densifier Application:
				1. First coat of FGS Hardener Plus at 250 ft2/gal (6.25 m2/L), following the 400 grit level. (Lion Hard at 400-600 sq ft / gallon).
				2. Second coat of FGS Hardener Plus at 350 ft2/gal (8.75 m2/L), prior to the final polishing pass (Lion Hard at 600-800 sq ft / gallon).
				3. Follow manufacturer's recommendations for drying time between successive coats.
			3. Remove defects and re-polish defective areas.
			4. Finish edges of floor finish adjoining other materials in a clean and sharp manner.
	1. ADJUSTMENTS
		1. Re-polish those areas not meeting specified gloss levels per mock-up.
		2. Fill joints flush to surface prior to the start of polishing operations.
	2. FINAL CLEANING
		1. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.
	3. PROTECTION
		1. Protect installed product from damage during construction in accordance with manufacturer's recommendations.

END OF SECTION