**MAPEI Corporation**

**Guide Specification - Ultratop** **Polished System**

Ultratop is a self-leveling, self-curing concrete topping that is specially formulated for fast-track resurfacing of indoor horizontal wear surfaces. Available in white or natural gray, easily installed from 1/4" to 2" (6 mm to 5 cm) neat. It quickly hardens within 2 to 3 hours and is ready to accept stains, sealers or coatings within 24 hours. Ultratop is suitable for diamond polishing.

# SECTION 03 35 00

**POLISHED CONCRETE FINISHING**

# PART 1 - GENERAL

* 1. RELATED DOCUMENTS
		1. Drawings and general provisions of the Contract, including other related construction documents such as Division 01 specifications, apply to this Section.
	2. SUMMARY
		1. This Section includes products and procedures to install Ultratop cementitious self-leveling concrete topping of MAPEI Corporation. This system is designed for resurfacing indoor concrete floor using traditional dry concrete polishing techniques.
			1. Surface preparation and cleaning
			2. Substrate preparation, Primer SN two-component epoxy primer
				1. Alternate primer: Primer SN Fast two-component fast-track epoxy primer;
				2. Alternate primer: Planibond EBA two-component high-modulus epoxy bonding agent.
			3. Self-leveling concrete topping Ultratop (color White or Natural Gray)
			4. Mechanical diamond grinding and polishing equipment
			5. Floor finish/guard for stain and wear protection. [Mapecrete Protector FF] recommended product as determined by intended use of the Ultratop surface.
		2. Related Sections include the following:
			1. Section 03 30 00, Cast-In-Place Concrete
			2. Section 03 53 00, Concrete Floor Topping
			3. Division 09 00 00, Finishes Flooring
			4. Division 03 35 00 Polished Concrete Finishing
	3. REFERENCES
		1. ASTM C109, Compressive Strength of Hydraulic Cement Mortars
		2. ASTM C348, Flexural Strength of Hydraulic Cement Mortars
	4. SUBMITTALS
		1. Product Data: Submit manufacturer’s product data and installation instructions for each material and product used. Include manufacturer’s Safety Data Sheets.
		2. Qualification Data: Provide written documentation confirming that the installer meets the qualifications as specified and is eligible for manufacturer’s warranty.
		3. Maintenance Data: Provide instructions for maintenance of installed work, including methods and frequency recommended.
	5. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Minimum 5 years’ experience in manufacturing similar products.
		2. Installer Qualifications: Minimum 2 years’ experience in installing similar products.
			1. Installer must be experienced in specified work, products, and scope of this project, with a documented track record including the following information for each project reference:
				1. Project Name, Location and Architect information;
				2. Type and quantity of cementitious self-leveling provided sealed with stain wear protection;
				3. Type and quantity of cementitious self-leveling provided diamond polished.
		3. Source Limitations: For repair products, obtain each color, grade, finish, type, and variety of product from a single source and from a single manufacturer with resources to provide products of consistent quality in appearance and physical properties.
		4. Mock-Up: An on-site mock-up shall demonstrate surface preparation, finish, color, sealer, joint design/treatments, and application workmanship that must be installed for review and approval. Use the same personnel, tools, equipment, and methods as will be used for the scope of the project.
			+ 1. Finish areas designated by Architect;
				2. Do not proceed with remaining work until workmanship is approved by Architect;
				3. Refinish mock-up area as required to produce acceptable work.
		5. Pre-Installation Conference: Prior to the installation of the Ultratop Polished System, an on-site conference should take place to review specification requirements. Required attendees include the Owner, Architect, General Contractor, and Installer.
			1. The on-site conference agenda shall include a review of schedule, construction documents, installation procedures, site conditions, protection procedures, and submittals.
	6. DELIVERY, STORAGE AND HANDLING
		1. Deliver all materials in original containers, bearing manufacturer’s labels indicating the brand name and information for storage. The original containers must remain sealed until ready for installation.
		2. Store the materials in a dry location, out of direct sunlight and protected from moisture. Maintain storage temperature by the manufacturer’s recommendations.
		3. Handle materials to avoid damage in accordance with manufacturer’s published recommendations.
	7. SITE CONDITIONS
		1. Ultratop is a self-leveling cementitious material. Make sure that the substrate and ambient room temperatures are between 50°F and 90°F (10°C and 32°C) before application and follow ACI cold-weather application guidelines in cool conditions. Follow ACI hot-weather application guidelines for temperatures above 85°F (29°C).
		2. Verify the surfaces and site conditions prior to the installation of the System. Inspect the substrate and document unsatisfactory conditions in writing. Commencement of work constitutes acceptance of the conditions. Close areas to traffic during and after the installation.

# PART 2 - PRODUCTS

* 1. CAST IN PLACE CONCRETE
		1. Self-Leveling, Self-Drying, Polishable, Concrete Topping formulated for fast-track resurfacing of horizontal indoor surfaces. Packaged, dry mix for repair of concrete, and containing a latex additive as either a dry powder or a separate liquid added during mixing.
			1. Ultratop cementitious self-leveling concrete topping;

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* + - * 1. Primer: Primer SN two-component, filler, epoxy primer for the substrate preparation;
				2. Alternate primer: Primer SN Fast two-component fast-track epoxy primer. Please contact MAPEI Technical Services for installation details;
				3. Alternate primer: Planibond EBA two-component high-modulus epoxy bonding agent. Please contact MAPEI Technical Services for installation details;
				4. Water: Shall be clean, potable and cool, not warmer than 70°F/21°C;
				5. Floor finish/guard: [note add: Mapecrete Protector FF] recommended floor finish/guard as determined by intended use of the Ultratop surface.

* + - 1. Performance and Physical Properties: Values for material cured at 73°F (23°C) and 50% relative humidity:
				1. Application: Barrel Mix or Pump
				2. Flow Time: 15 minutes
				3. Initial Set: Approx. 10 minutes
				4. Final Set: Approx. 45 minutes
				5. Compressive Strength: 6,100 psi (42.06 MPa) at 28 days, ASTM C109
				6. Flexural Strength: 1,400 psi (9.66 MPa) at 28 days, ASTM C78
				7. VOCs: 0
			2. Color:
				1. Ultratop available colors: White and Natural Gray.
			3. Integral Color:
				1. Power and liquid colors designed for use on cementitious toppings may be used. However, extreme caution must be exercised to ensure that the type and amount of color do not alter and/or decrease the performance of Ultratop. A test pour should be conducted to ensure that performance characteristics such as set time, flow, water ratio, ease of finishing, and curing are not significantly altered. Call MAPEI Technical Services – CRS at 888-365-0614 or email CRS@mapei.com for recommendations.
			4. Topical Color:
				1. Dyes and stains colors designed for use on cementitious toppings may be used. However, extreme caution must be exercised to ensure that the type and amount of color do not alter and/or decrease the performance of Ultratop. A test pour should be conducted to ensure that performance characteristics such as set time, flow, water ratio, ease of finishing, and curing are not significantly altered. Call MAPEI Technical Services – CRS at 888-365-0614 or email CRS@mapei.com for recommendations.
	1. CONCRETE POLISH EQUIPMENT
		1. Equipment and tooling for use as part of the multi-step dry mechanical process and accessories. Acceptable products include:
			1. Planetary grinder and polisher
				1. Features: Large Platform: planetary floor polisher.
				2. Tooling

Metal bonded diamonds 120 – 140 Grit of bonded metal

Transitional diamonds pads

Resin bonded diamonds – 100, 200, 400, 800, 1500 Grit, as needed

* + - 1. Micro polisher – burnisher
				1. Specific weight and RPM are required for application of floor finish/guard
				2. Required tooling: resin burnishing pads – 1500 rpm along with a 3000-Grit pad
			2. Additional equipment and tooling as necessary for small areas and edge work.
			3. All grinding and polishing equipment must be connected to a dust collector.

# PART 3 – EXECUTION

* 1. PREPARATION
		1. Examine substrates and conditions under which materials will be installed. All concrete subfloors must be sound, solid, clean, and free of all oil, grease, dirt, curing compounds and any substance that might act as a bond breaker before priming. Mechanically clean if necessary. Acid etching and the use of sweeping compounds and solvents are not acceptable. Do not proceed with installation until unsatisfactory conditions are corrected.
		2. Verify that existing concrete has cured a minimum of 28 days before installing Ultratop and meets the requirement of a minimum 3,000 psi (20.7 MPa) compressive strength, a minimum 100 pcf density and a minimum 200 psi (1.38 MPa) tensile strength. Mechanical preparation of the surface is required to obtain a minimum ICRI Concrete Surface Profile of 3 (CSP 3).
		3. Prior to beginning the installation, the relative humidity within the concrete can be measured (ASTM F2170). No standing water shall be present.
		4. Always use caulking or foam tape to round off any sharp corners that protrude into the room receiving the topping, as well as column bases, supports and equipment pedestals, etc. Include the use of foam tape around the perimeter of the pour.
	2. CRACK AND JOINT TREATMENT
		1. Joint and Crack Preparation: All existing construction/control/expansion joints, or saw cuts, and all moving cracks must be properly repaired up through the topping by installing a flexible sealing compound for control/expansion joints or epoxy adhesive for monolithic sealing of cracks in slabs or other materials specifically designed to use in joints or cracks.

* 1. PRIMING
		1. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.
		2. Concrete shall be mechanically prepared to obtain an International Concrete Repair Institute (ICRI) concrete surface profile (CSP) 3.
		3. Spread Primer SN using a roller or squeegee, ensuring that the minimum required thickness is maintained with a sand broadcast method (section E.1./2.).
		4. Mixing: Comply with manufacturer's printed instructions and the following instructions. Before product use, take appropriate safety precautions; refer to the Safety Data Sheet for details.
			1. Premix all of the Part A resin to a homogenous consistency (for up to 3 minutes) using a low-speed drill (at 300 to 450 rpm) and appropriate paint-mixing paddle to minimize trapped air.
			2. Pour all of the Part B hardener into the Part A container and mix thoroughly to a smooth, homogenous consistency. Do not mix at high speeds, which can trap air within the mixed material.
			3. During the mixing process, scrape down the sides and bottom of the container to completely mix all of the components.
		5. Apply the mixture within the pot life indicated below. Higher temperatures will reduce the mixture’s pot life, while lower temperatures will increase its pot life. Pot life indication: 3.5 hours at 46°F (8°C). 1.5 hours at 73°F (23°C). 0.75 hour at 95°F (35°C).
			1. While application is in a fresh state, sand-broadcast (to rejection) with #20 to #40 mesh sand consistently over the entire area. Avoid all traffic over the surface for a minimum of 6 hours.
			2. After 12 hours, broom-sweep and vacuum the surface to remove all loose sand.
				1. Alternate Primer: Install Primer SN Fast with a sand broadcast. Ultratop can be applied 6 hours after the installation of Primer SN Fast in a primer application. Please contact MAPEI Technical Services for installation details;
				2. Alternate Primer: Install Planibond EBA two-component high-modulus epoxy bonding agent. Please contact MAPEI Technical Services for installation details.
	2. TOPPING APPLICATION
		1. PRE-APPLICATION
			1. Upon removal of all excess sand, no additional priming is needed. The sand-broadcast surface of the Primer SN serves as the primer prior to the Ultratop application.
		2. MIXING
			1. General Mixing: Comply with manufacturer's printed instructions and the following.
				1. Into a clean mixing container, pour the required amount of cool, clean potable water. If available water is not cool, chill water to 70°F (21°C).
				2. Add 5 qts. (4.73 liters) of clean potable water per 50-lb. (22.7-kg) bag of Ultratop.
				3. Using the mixing ratio above, mix with low-speed heavy-duty mixing drill (at about 650 rpm) with a mixing paddle. Mix for approximately 2 to 2-1/2 minutes to obtain a lump-free mix. Do not overmix.
				4. Overmixing or moving the mixer up and down during the mixing process could trap air, which could shorten the pot life or cause pinholing during the product application and curing.
			2. Pump Mixing: For information on pumping, please contact MAPEI’s Technical Services Department for recommendations.
		3. INSTALLATION
			1. General Installation: Comply with manufacturer's printed instructions and the following.
				1. Ultratop can be installed from 1/4" up to a maximum 2" (6 mm to 5 cm), is self-leveling and has an approximate flow time of 15 minutes at 73°F (23°C). The temperature and humidity will affect the working time, flowability and setting time.
				2. Make sure that the substrate and ambient room temperatures are between 50°F and 90°F (10°C and 32°C) before application. To ensure a successful installation, follow ACI cold-weather application guidelines in cool conditions, and follow ACI hot-weather application guidelines for temperatures above 85°F (29°C).
				3. Set the width of the pour at a distance that is ideal for maintaining a wet edge throughout placement. Pour the liquid mix onto the properly primed surface and spread in a wavy pattern to enhance the aesthetic appearance of the surface. Work as a team to provide a continuous flow of wet material to maximize the working/finishing time and achieve a uniform finish throughout.
				4. Ultratop can be ground and polished to achieve the appearance of polished concrete. The high-early strength allows polishing within 24 hours of placement.
				5. Sealers and coatings protect surfaces from contaminants and soiling, optimizing the surface integrity and aesthetics.
			2. Pumping Installation: Application of Ultratop over large areas can be made easier and more efficient by using conventional piston, rotor stator or underlayment-type pumps. Call MAPEI Technical Services – CRS at 888-365-0614 or email CRS@mapei.com for recommendations.
		4. POLISHING PROCESS FOR ULTRATOP
			1. Processing of Ultratop Polished System includes concrete preparation, treatment and chemicals to achieve the intended result.

Use a dust separator and collection system with HEPA filters connected to the planetary grinder, following the recommendations of the planetary grinder manufacturer.

Remove concrete dust using a portable vacuum with HEPA filters when polishing disks are changed.

a. Polish with 120 - to 140-grit metal-bonded diamond pads (XPS 120), first in a north-south direction, and then in an east-west direction.

* + - * 1. Polish with 50-grit transitional diamond pads (STI #3) in a north-south direction.
				2. Polish with 100-grit transitional diamond pads (STI #4) in an east-west direction.
				3. Polish with 200-grit resin-bonded diamond pads (STI #5) in a north-south direction.
				4. Polish with 400-grit resin-bonded diamond pads (STI #6) in an east-west direction.

At this time, a liquid-silicate-based densifier can be applied. It is not critical that a densifier be applied; the decision about using a liquid densifier should be based on the results seen with the pre-job mockup.

* + - * 1. Polish with 800-grit resin-bonded diamond pads (STI #7) in a north-south direction.
				2. Polish with 1,500-grit resin-bonded diamond pads (STI #8) in an east-west direction.
				3. Polish with 3,000-grit resin-bonded diamond pads (STI LUX) in a north-south direction.
				4. Apply the floor finish/guard: [note add: Mapecrete Protector FF] recommended product, with a clean microfiber mop or airless sprayer to coat the entire surface.
				5. Once the [note add: Mapecrete Protector FF] product has dried (at least 60 minutes after the second coat has been applied at 75°F [24°C]), use a burnishing machine at ≥ 1,500 rpm along with a 3,000-grit burnishing pad to burnish the guard/shield into the surface of the polished slab. For details on the burnishing process and recommended products, call MAPEI Technical Services – CRS at 888-365-0614 or email CRS@mapei.com for recommendations.
		1. POST INSTALLATION
			1. All joints and saw cuts shall be filled with an appropriate sealant. Moving joints shall be filled with an elastomeric joint sealant and saw cuts or non-moving joints with a semi-rigid joint filler.
				1. Recommended sealers for expansion or moving joints, Mapeflex P1 SL, or Mapeflex P2 SL;
				2. Recommended sealers for semi-rigid epoxy joint filler or a semi-rigid joint filler for non-moving joints, Planibond JF or Planiseal RapidJoint 15.
	1. PROTECTION
		1. Protect the new Ultratop from spills and contamination by petroleum, oil, hydraulic fluid, acid and acidic detergents, paint, and other liquids. If construction equipment must be used on these substrates, diaper all components that may drip fluids. Protect surface by installing a protective floor covering.
		2. Avoid moisture for 72 hours after installation. Don’t place any protective plastic sheeting, rubber matting, rugs or furniture that can prevent proper drying, thereby trapping moisture, which can result in a cloudy effect on the floor.
	2. MAINTENANCE
		1. IMPORTANT: Maintaining the Ultratop with a recommended cleaning schedule will help the floor hold its polish as well as greatly reduce the absorption of spilled liquids. Specific maintenance recommendations shall be provided by the installer performing the work of this section. Contact MAPEI’s Technical Services Department for recommendations.
			1. The use of a sacrificial finish will extend the service life of the flooring as well as provide a wear surface that is easier to maintain. The wax should be maintained in accordance with manufacturer recommendations. Contact MAPEI’s Technical Services Department for recommendations.
			2. DO NOT USE cleaners that are acidic or that have citrus (D-limonene) or butyl compounds. Do not permit standing liquids at any time.

# END OF SECTION