1. **GENERAL**
	1. **SUMMARY**
	2. This section specifies materials and workmanship for self-leveling topping with an acrylic coating and a polyurethane finish.
	3. **RELATED SECTIONS**
2. Section 03 01 00 – Maintenance of Concrete
3. Section 07 18 00 – Traffic Coating
4. Section 07 90 00 – Joint Protection
5. Section 09 61 00 – Flooring Treatment
6. Section 09 96 00 – High-Performance Coatings
	1. **REFERENCES**
7. ACI 302.1R-15, “Guide for Concrete Floor and Slab Construction”.
8. ACI 504 R-90 (R1997), “Guide to Sealing Joints in Concrete Structures”.
9. ACI RAP-1, “Structural Crack Repair by Epoxy Injection”
10. ACI RAP-2, “Crack Repair by Gravity Feed with Resin”
11. ASTM C-33, “Specification for Concrete Aggregates”.
12. ASTM C-881, “Specification for Epoxy Resin Base Bonding Systems for Concrete”.
13. ASTM C-882, “Test Method for Bond Strength of Epoxy Resin Systems Used with Concrete”.
14. ASTM F1869, “Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride”.
15. ASTM F2170, “Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes”.
16. ICRI Technical Guideline No. 320.1R, “Guide for Selecting Application Methods for the Repair of Concrete Surfaces”.
17. ICRI Technical Guideline No. 310.2R, “Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays”.
18. ICRI Technical Guideline No. 320.2R, “Guide for Selecting and Specifying Materials for Repair of Concrete Surfaces”.
19. ICRI Technical Guideline No. 210.1, “Guide for Verifying Field Performance of Epoxy Injection of Concrete Cracks”.
	1. **SUBMITTALS**
20. Product Data: Submit manufacturer’s data and application instructions for specified materials.
21. Include Product Technical Data Sheets and Material Safety Data Sheets as requested.
22. Samples: Cured samples of materials as required by architect/engineer.
23. Qualification Data: For products required to be installed by workers approved by product manufacturer, include letters of acceptance by product manufacturer certifying installers are approved to apply their products.
	1. **QUALITY ASSURANCE**
24. Contractor shall have experience and proficiency specific to the application type and shall be approved by the architect/engineer.
25. Manufacturer shall be an ISO 9001:2015 certified supplier of specialty products and support services.
26. Pre-installation Conference:
27. Arrange a meeting not less than 30 days ahead of work start-up, convene a job-site meeting of all the people concerned by contract documents or invited by the consultant or project manager to purposely review the work documents relative to this Section to ensure complete understanding of the requirements and establish the proper sharing of responsibilities concerning work execution, materials handling and storage, installation schedule and procedures, access limitations and security control within the work area, quality control and all other matters that may affect the building’s quality, compliance with permits, health, safety and environmental regulations.
28. Source Limitations: Provide all materials from a single manufacturer.
	1. **DELIVERY, STORAGE, AND HANDLING**
29. Deliver and store products in a manner to prevent breakage and damage to containers.
30. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.
31. Prevent damage or contamination to materials by water, moisture, freezing, excessive heat, foreign matter or other causes. Do not stir any frozen material until it has completely thawed.
32. Provide dry storage with heated material facilities at 21 to 27 degrees C (70 to 80 degrees F) and at a maximum of 55 percent ambient relative humidity on site.
33. Deliver and store all materials on site at least 24 hours before work begins.
	1. **PROJECT / ENVIRONMENTAL CONDITIONS**

1. Do not apply when air and substrate temperatures are outside limits permitted by manufacturer.
	1. **WARRANTY**
2. Deliver to architect signed copies of the following written warranties against defective materials and workmanship.
3. Manufacturer’s standard warranty covering materials.
4. Applicator’s standard warranty covering workmanship.
5. **PRODUCTS**

* 1. **MANUFACTURER**
1. MAPEI, Inc. Canada, 2900 Francis-Hughes, Laval, QC, Canada, H7L 3J5. Toll Free Tel: 800-668-1212; Tel: 905-799-6884; Fax: 905-799-9870; Email: TServicesCA@mapei.com; Web: [www.mapei.ca](file:///C%3A%5CUsers%5Cjcamirand%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CTemporary%20Internet%20Files%5CContent.Outlook%5C1QTVEPJN%5Cwww.mapei.ca).
2. MAPEI Americas U.S.A., 1144 E. Newport Center Rd., Deerfield Beach, FL 33442; ASD. Toll Free Tel: 800-42-MAPEI; Tel: 954-246-8888; Fax: 954-246-8801; Email: mapeitechsvcs@mapei.com; Web: www.mapei.us.
3. No submittals for substitutions will be accepted after the bid date. All submittals for substitutions must be made in writing to the architect/engineer with supporting technical data sheets and test data showing complete equivalent performance. Include list of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
	1. **MATERIALS**
4. Joint Filler:
5. MAPEI’s Planibond JF, two-component, moisture-tolerant, semi-rigid epoxy joint filler.
6. Epoxy Crack Repair:
7. MAPEI’s Epojet, high-modulus, low-viscosity epoxy injection resin for crack repair.
8. MAPEI’s Epojet LV, ultra low-viscosity epoxy injection resin for crack repair.
9. Epoxy Primer:
10. MAPEI’s Primer SN, two-component, pre-filled epoxy primer specifically designed to enhance adhesion of multi-layer flooring systems.

1. Self-Leveling Topping:
2. MAPEI’s Ultratop, high-performance, quick-setting, self-leveling topping.

1. Acrylic Coating:
2. MAPEI’s Mapefloor Finish 630 NA, two-component, clear protective acrylic coating for concrete and Ultratop systems.
3. Polyurethane-Based Floor Finish:
4. MAPEI’s Mapefloor Finish 53 W/L, two-component, clear or coloured, glossy aliphatic polyurethane coating.
5. MAPEI’s Mapefloor Finish 54 W/S, two-component, clear or coloured, semi-glossy aliphatic polyurethane coating.
6. MAPEI’s Mapefloor Finish 58 W, two-component, clear or coloured, matte aliphatic polyurethane coating.
7. **EXECUTION**
8. **PREPARATION**

1. Perform surface preparation in compliance with the most recent ICRI Technical Guideline No. 310.2. Concrete must be clean and textured. All oil, dirt, debris, paint and unsound concrete must be removed. The surface must be prepared mechanically using shotblasting, sandblasting, scarifying or other engineered-approved methods, to produce a surface profile matching CSP 2 to 3 per ICRI 310.2.
2. Concrete substrates should have a minimum tensile pull-off strength of 1.38 MPa (200 psi), and a minimum compressive strength of 20.7 MPa (3,000 psi) for pedestrian traffic and 27.6 MPa (4,000 psi) for vehicular traffic.
3. Substrate must be free from hydrostatic pressure and Moisture Vapour Emission Rate (MVER) must not exceed 2.27 kg per 92.9 square metres (5 pounds per 1,000 square feet) per 24 hours (per ASTM F1869) or 85 percent Relative Humidity (per ASTM F2170).
4. An architect/engineer shall determine if a crack is dormant or active and determine a suitable material for filling. Cracks should be routed out or treated by abrasive blasting and blown clean with oil-free compressed air. Cracks should be v-notched to allow material access and create head pressure for adequate penetration.
5. Do not apply products from the Mapefloor line on substrates with a film of surface water.

1. The ambient temperature should be between 8 to 35 degrees C (46 to 95 degrees F) for Mapefloor products, between 10 to 32 degrees C (50 to 90 degrees F) for the self-leveling topping and between 13 to 35 degrees C (55 to 95 degrees F) for the epoxy primer. For optimal installation, the ambient temperature should be between 21 to 27 degrees C (70 to 80 degrees F).
2. The substrate temperature should be at least 2.8 degrees C (about 5 degrees F) above the dew point when applying products from the Mapefloor line.
3. Repair all voids, honeycombs, bug holes and delaminated areas with a cementitious repair mortar.
4. **MIXING**
5. Mixing of joint filler (Planibond JF):
6. Cartridge:
7. Cut the nozzle static tip to the preferred opening for the job and remove the plug from the cartridge. Attach the static mixer with the nut and tighten.
8. Load the cartridge into the proper dispensing gun and dispense a bead of epoxy until the colour is uniform.
9. Pails:
10. Mix the 7.57 L (2 U.S. gallon) kit by opening Part A and Part B containers and mixing each part individually.
11. Pour full containers of Part A and Part B into a separate, clean mixing container. Mix with a low-speed drill (at 400 to 600 rpm) and “jiffy” mixer until blended uniformly.
12. Mixing of epoxy crack repair (Epojet or Epojet LV):
13. Cartridge:
14. Cut the nozzle static tip to the preferred opening for the job and remove the plug from the cartridge. Attach the static mixer with the nut and tighten.
15. Load the cartridge into the proper dispensing gun and dispense a bead of epoxy until the colour is uniform.
16. Pails:
17. Mix the 11.3 L (3 U.S. gallon) kit by opening Part A and Part B containers and mixing each part individually.
18. Pour full containers of Part A and Part B into a separate, clean mixing container. Mix with a low-speed drill (at 400 to 600 rpm) and “jiffy” mixer until blended uniformly.
19. Mixing of epoxy primer (Primer SN):
20. Premix the Part A resin to a homogeneous consistency (for 3 minutes) using a low-speed drill (at 300 to 450 rpm) and a Jiffy (paint mixer) mixing paddle to minimize trapped air. Pour the Part B hardener into the Part A container and mix thoroughly to a smooth, homogeneous consistency. Do not mix at high speeds, which can trap air within the mixed material. During the mixing process, scrape down the sides and bottom of the container to completely mix all of the components.
21. Apply the mixture within the pot life indicated in the table below. Higher temperatures will reduce the mixture’s pot life, while lower temperatures will increase its pot life.

|  |
| --- |
| POT LIFE |
| At 8 degrees C (46 degrees F) | At 23 degrees C (73 degrees F) | At 35 degrees C (95 degrees F) |
| 3.5 hours | 1.5 hours | 0.75 hour |

1. Mixing of self-leveling topping (Ultratop):
2. Barrel mixing:
3. Into a clean mixing barrel, pour 4.50 to 4.73 L (4.75 to 5 U.S. quarts) of cool, clean potable water per 22.7 kg (50 pound) bag of Ultratop PC. Slowly pour the Ultratop powder into the mixing barrel. Mix using a high-speed drill (about 1200 rpm) and an egg-beater mixing paddle to a homogeneous, lump free consistency for about 2 to 2.5 minutes.
4. Pump mixing:
5. Ultratop can be mechanically mixed, using the mixing ratio above, with a continuous mixer and pump with at least 30.5 m (100 feet) of hose or a batch mixer and pump with at least 15.2 m (50 feet) of hose. Mixer and pump must be in good working condition. Periodic cleaning of pumping equipment is required per the manufacturer’s instructions. Be sure to pressure-test rotor and stator for proper mixing. Use a mesh-screen sock at the end of the hose to catch any foreign material that could enter the hopper of the mixer.
6. Mixing of Acrylic Coating (Mapefloor Finish 630 NA):
7. To ensure that all solids are evenly dispersed, mix Part A of Mapefloor Finish 630 NA mechanically for about 1 minute.
8. Pour all of the Part B hardener into the Part A container and mix thoroughly to a smooth, homogenous consistency.
9. Do not mix at high speeds or over mix, which can trap air within the mixed material. Use an adequate mixing paddle with a low-speed drill mixer (at 300 to 400 rpm).
10. During the mixing process, scrape down the sides and bottom of the container to completely mix all of the components.
11. Mixing of Polyurethane Finish (Mapefloor Finish 53 W/L, 54 W/S or 58 W):
12. If a non-slip surface finish is required, add 3 to 5 percent by weight of Mapefloor Filler (2 to 5 percent for Mapefloor 58 W) while mixing.
13. Mix pre-pigmented Part A mechanically for approximately 1 minute prior to mixing parts A and B together to ensure that all solids are evenly dispersed.
14. The two components, which make up Mapefloor Finish 53 W/L, 54 W/S or 58 W must then be blended together. Pour Part B into the pre-mixed Part A and mix thoroughly for at least 2 minutes using a low speed (300 to 400 rpm) drill, until a uniform, lump-free mix has been achieved. Avoid overmixing to minimize air entrainment. During the mixing process, scrape down the sides and bottom of the container to completely mix all of the components.
15. Apply the mixture within 4 hours based at 23 degrees C (73 degrees F). Higher temperatures will reduce the mixture’s pot life, while lower temperatures will increase its pot life.
16. **INSTALLATION**
17. Epoxy joint filler (Planibond JF):
18. Install in non-moving floor joints where indicated. Joint depth is critical to a successful application, especially when subjected to steel-wheeled vehicle traffic. Saw cut joints should be 25 percent of the thickness of the slab. That is, a 10 cm (4 inches) thick slab should be cut a minimum 2.5 cm (1 inch) deep. It is recommended the full depth of the joint be filled with the epoxy joint filler for proper load transfer.
19. Joints should be filled full depth. Avoid using silica sand, backer rods or compressible fillers below the epoxy joint filler.
20. Pour mixed material into the joint, filling it approximately two-thirds its full depth. Allow filler to settle and then complete filling within 1 hour so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.
21. Epoxy crack repair (Epojet or Epojet LV):
22. If the cracks reflect through the substrate, seal the underside.
23. Apply the epoxy crack repair from the cartridge or pour directly neat from properly mixed units into the crack. Continue placement until the crack is completely filled.
24. Lightly sand-broadcast the surface of the exposed epoxy.
25. Epoxy primer (Primer SN):
26. After the concrete surface has been prepared and cleaned, apply one coat of epoxy primer with a 3 mm (0.125 inch) squeegee and back-roll with a caged roller with a 6 mm (0.25 inch) nap roller cover at a rate not to exceed 2 square metres per L (80 square feet per U.S. gallon) of mixed material. Coating thickness shall be a minimum 0.5 mm (20 mils) thickness.
27. Immediately after spreading the epoxy primer, broadcast sand over the surface of the still-wet primer. Broadcast to rejection, maintaining an even dispersion of sand. The sand must be oven-dried, graded, with a mesh size of 16 and free of fines. The amount of sand required is about 4.88 kg per square metres (1 pound per square feet).
28. Remove excess sand on the following day (after at least 16 hours) by sweeping and vacuuming off the excess.
29. Self-leveling topping (Ultratop):
30. Close doors and windows and turn off HVAC systems to prevent drafts during application and until the self-leveling topping is cured. Adjust ventilation system to prevent air movement across surface. Protect areas from direct sunlight.
31. Quickly pour the mixed self-leveling topping onto the properly prepared and primed surface in a ribbon pattern.
32. Set the width of the pour at a distance that is ideal for maintaining a wet edge throughout placement and in consideration of expansion and control joints.
33. Provide a continuous flow of wet material which will help to prevent trapping air or creating a cold joint.
34. Shortly after placing the self-leveling topping, spread the material with a gauge rake to assist in gauging out the self-leveling topping to the desired depth. After achieving the desired depth, smooth the surface with a smoother to obtain evenness. The thickness range of the self-leveling topping must be 6 mm to 5 cm (0.25 inch to 2 inches). Minimum thickness must be 12 mm (0.5 inch) when dealing with rolling dynamic rolling loads such as pallet trucks, forklifts, and other rubber-wheeled vehicles.
35. All existing expansion joints, isolation joints, construction joints and control joints, as well as any moving cracks, must be honoured up through the self-leveling topping. Saw cuts in the self-leveling topping shall be done as soon it is hard enough to accept light foot traffic, typically after 2 to 3 hours depending upon temperature and humidity conditions. Saw cuts in the self-leveling topping shall be full depth and every 3 to 4.5 m (10 to 15 feet) in every direction. The joint filler material within the self-leveling topping should include a bond breaker tape or backer rod at the bottom of the joint to insure two-sided bonding only.
36. Before treating the surface with Mapefloor Finish 630 NA wait at least 48 hours, according to the temperature and the thickness applied.
37. Acrylic Coating (Mapefloor Finish 630 NA):
38. Apply two coats at 0.08 mm to 0.10 mm (3 to 4 mils) of a WFT of Mapefloor Finish 630 NA with a suitable wax mop, sprayer or short-piled lint free roller (6 mm or 0.25 inch).
39. When applying with a roller, roll in opposite directions with each successive coat.
40. If the time between each coat exceeds 24 hours at 20 degrees C (68 degrees F), the existing top coat surface must be mechanically abraded, vacuumed with a brush attachment and wiped with a lint-free, non-oily, solvent-dampened cloth such as an acetone or methyl ethyl ketone, before applying Mapefloor Finish 630 NA.
41. Do not apply the product at a rate of more than 100 g per square metre in a single coat. Higher rates may cause defects in the coating.
42. Before applying a polyurethane finish wait at least 2 to 3 hours, depending on the temperature.
43. Polyurethane Finish (Mapefloor Finish 53/WL, 54 W/S or 58 W):
44. Apply two coats at 0.05 mm to 0.10 mm (2 to 4 mils) WFT of the polyurethane finish with a short-piled lint-free roller (6 mm or 0.25 inch).
45. When applying with a roller, roll in opposite directions with each successive coat.
46. Two coats of the polyurethane finish are mandatory if a colour version is used. If the time between each coat exceeds 24 hours at 20 degrees C (68 degrees F), lightly sand the surface of the first coat, vacuum with a brush attachment and wipe with a lint-free, non-oily, solvent-dampened cloth before applying polyurethane finish. Waiting times are shorter at higher temperatures and longer at lower temperatures.
47. Make sure that application areas are well ventilated with a good amount of air exchange to help the product dry. Do not apply the product at a rate of more than 100 g per square metre in a single coat. Higher rates may cause defects in the coating.
48. **PROTECTION AND MAINTENANCE**
49. Maintain substrate and ambient temperatures over 8 degrees C (46 degrees F) for at least 24 hours after the installation and below 35 degrees C (95 degrees F) for at least 24 hours after the installation.
50. Protect product from water for at least 24 hours after setting.
51. Floors coated with a polyurethane finish can be opened to light foot traffic after 8 hours based at 23 degrees C (73 degrees F).
52. The polyurethane finish develops its full strength after 7 days based at 23 degrees C (73 degrees F), although it depends on the actual surrounding conditions.
53. Regular cleaning of the application surface is recommended in order to maintain slip resistance and aesthetics.

END OF SECTION