POLISHED CONCRETE TOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract, and other related construction documents such as Division 01 specifications apply to this Section

1.2 SUMMARY

A. This section includes products and procedures for the installation of the ARDEX PC-T Polished Concrete Topping component of the ARDEX Polished Concrete System (APCS) using a multi-step dry mechanical process and accessories specified to achieve specified Level (A, B, C) gloss finish:

1. ARDEX PC-T Polished Concrete Topping (Grey, White or Light Grey)
2. ARDEX MC Rapid Substrate Preparation Epoxy
3. Mechanical Diamond Grinding and Polishing Equipment
4. ARDEX Concrete Topping Treatment Chemicals
5. Integral and Topical color

1.3 REFERENCES

A. ASTM C 109M, Compressive Strength Air-Cure Only

B. ASTM C348, Flexural Strength of Hydraulic-Cement Mortar

C. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes

D. AS/NZS 1884-2013 Floor coverings – Resilient sheet and tiles – Installation process

E. ASTM E430, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each

material and product used. Include manufacturer's Material Safety Data Sheets.

B. Qualification Data: Provide written documentation from the manufacturer confirming that installer meets the qualifications as specified and is eligible for manufacturer's warranty.

C. Maintenance Data: Provide instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under intended use. These instructions should contain precautions against cleaning products and methods that may be detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The ARDEX Polished Concrete System (APCS) consists of a process and products engineered and manufactured by ARDEX. Any substitutions are not permitted and void warranty.

B. Installer Qualifications:

1. Product(s) for the ARDEX Polished Concrete System must be installed by an approved installer qualified to provide the warranty as specified.

2. Installer must be approved in writing by ARDEX and experienced in performing specified work similar in design, products and scope of this project, with a documented track record of successful, in-service performance and with sufficient production capabilities, facilities and personnel to produce specified work.

3. A factory-trained, competent supervisor must be maintained on site during all times during which specified work is performed.

C. Mock-Up: Before performing the work in this section, an on-site mock-up of the ARDEX PC-T representative of specified process, surface, finish, color and joint design/treatments must be installed for review and approval. These mock-ups should be installed using the same Installer personnel who will perform work. Approved mock-ups may become part of completed work, if undisturbed at time of substantial completion.

D. Pre-Installation Conference: Prior to the installation of the ARDEX Polished Concrete System, an on-site conference shall be conducted to review specification requirements.

1. Required attendees include the Owner, Architect, General Contractor, Subcontractor and ARDEX Representative.

2. The minimum agenda shall include a review of the site conditions, construction documents, schedule, installation procedures, protection procedures and submittals.

E. Warranty: Provide manufacturer's 15-year ARDEX Polished Concrete System Warranty.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in original containers, bearing manufacturer's labels indicating brand name and directions for storage, factory numbered and sealed until ready for installation.

B. Store all materials in a dry, climate-controlled environment at a minimum of 10°C and maximum of 29°C.

C. Handle products in accordance with manufacturer's printed recommendations.

1.7 SITE CONDITIONS

A. ARDEX PC-T is a cementitious material. Observe the basic rules of concrete work. Do not install below 10°C or above 29°C surface temperature. Install quickly if floor is warm (above 21°C and up to 29°C) and follow warm weather precautions available from the ARDEX Technical Service Department 0800 227 339. Never mix with cement or additives other than ARDEX approved products.

B. Inspect the existing substrate and document unsatisfactory conditions in writing. Verify that surfaces and site conditions are ready to receive work. Correct unacceptable conditions prior to installation of System. Commencement of work constitutes acceptance of substrate conditions.

C. Close areas to traffic during and after the ARDEX PC-T application for a time period recommended by the manufacturer.

PART 2 – PRODUCTS

2.1 POLISHED CONCRETE TOPPING

A. Portland Cement-based, Self-Leveling Topping to Suitable to Receive a Mechanical Polish Concrete Process. Acceptable products include:

1. ARDEX PC-T Polished Concrete Topping; ARDEX New Zealand: 32 Lane Street, Woolston, Christchurch, New Zealand, 0800 227 339, http://www.ardex.co.nz

a. Primer: ARDEX MC Rapid Substrate Preparation Epoxy.
b. Water: shall be clean, potable and sufficiently cool (not warmer than 21°C).

2. Performance and Physical Properties: Meet or exceed the following values for material cured at 20°C and 50% relative humidity:

   a. Flow Time: 10 minutes
   b. Initial Set: Approx. 30 minutes
   c. Final Set: Approx. 90 minutes
   d. Compressive Strength: 42.7 MPa at 28 days, ASTM C109M.
   e. Flexural Strength: 6.89 MPa at 28 days, ASTM C78.
   f. VOC: 0 g/l, calculated SCAQMD Rule 1168

3. Repair materials:

   a. Where spalls, repair or minor patchwork is necessary (please consult ARDEX) apply ARDEX RA 56 as necessary and in accordance with recommendations, applied at the appropriate time during the polishing process.
   b. If necessary, correct excessive pinholes with ARDEX PC-M Polished Concrete Micro-Topping. Contact the ARDEX Technical Services department for recommendations.

4. Topical Color

   a. PANDOMO CC: Colour Concentrate for use with ARDEX Polished Concrete System (APCS). Manufactured as a concentrate that is diluted with water.

5. Integral color

   a. Powder or Liquid pigments can be utilized for integral pigmentation of ARDEX PC-T. The pigments must be suitable for use with a cementitious product.

2.2 CONCRETE POLISH EQUIPMENT & TOOLING

A. Equipment and Tooling for use as part of the multi-step dry mechanical process and accessories. Acceptable products include:

1. Planetary Grinder and Polisher

   a. Features: Large Platform: 32” planetary floor polisher. Head pressure of 600 lbs.
   b. Tooling
      i. Metal Bonded Diamonds - 60/80 Grit of medium and hard bonded metal.
      ii. Transitional Diamonds Ceramic / Flat block resin Bonded - #100 Grit.
      iii. Resin Bonded Diamonds - 200, 400, 800, 1500 Grit, as needed.

2. Micro Polisher – Burnishers

   a. Specific weight and RPM are required to reach temperature of 38˚C for application of ARDEX PC Finish.
   b. Required Tooling: Diamond Impregnated Pads – 400, 800, 1500, 3000 Grit.

3. Other equipment and tooling as necessary for small areas and edge work.

4. Power generator – as needed

5. All grinding and polishing completed with grinder/polisher equipment should be connected to a dust collector.

2.3 CONCRETE TREATMENT CHEMICALS

A. Concrete treatments designed for use in conjunction with the installation of the ARDEX PC-T and the ARDEX Polished Concrete System. Acceptable products include:

1. Treatment Chemicals; ARDEX New Zealand: 32 Lane Street, Woolston, Christchurch, New Zealand, 0800 227 339, www.ardex.co.nz;

a. Densifier: ARDEX PC 10 Lithium Hardener for ARDEX PC-T.
b. Finish Treatment: ARDEX PC FINISH Stain and Wear Protection Treatment.
c. Maintenance recommendations: Contact the ARDEX Technical Services Department (080 227 339) for recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all concrete substrates and conditions under which the ARDEX Polished Concrete System is to be installed.

B. Verify that existing concrete has cured a minimum of 28 days before installing ARDEX PC-T and meets the requirement of 21 MPa and 100 pcf.

C. Conduct pre-installation conference, per Section 1.05 C.

3.2 PREPARATION

A. 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.

B. Substrates shall be inspected for moisture or any other conditions that could affect the performance of the ARDEX system. Moisture vapor emissions shall not exceed 85% RH, ASTM F 2170. For areas where moisture vapor emissions exceed the specified limits refer to Section 07 26 19, Topical Moisture Vapor Mitigation Systems and install the appropriate ARDEX Moisture Control System.

C. Joint Preparation: Honor all joints up through the ARDEX PC-T, including expansion joints, isolation joints and control joints (saw cuts).

1. All non-moving joints shall be filled with ARDEX RA 56

3.3 APPLICATION OF ARDEX PC-T

A. PRIMING

1. Concrete shall be mechanically prepared to achieve a concrete surface profile (CSP) 3 in accordance with ICRI standards and primed with ARDEX MC Rapid. Follow manufacturers installation instructions, for complete instructions please refer to the ARDEX MC Rapid Datasheet.

2. If the ARDEX MC Rapid Moisture Control System is used, no additional priming is needed. The sand-broadcast surface of the ARDEX MC Rapid serves as the primer prior to the PC-T application.

B. MIX DESIGNS

1. Mixing Ratio: The ARDEX PC-T shall be mixed in 2-bag batches. Mix each bag of the powder with the specified amount of water in an appropriate mixing bucket, with an appropriate mixing paddle and a 1/2" heavy-duty drill (12 mm, min. 650 rpm). Mix thoroughly for 2-3 minutes to obtain a lump-free mixture. Follow written instructions on the ARDEX product bag label.

2. Aggregate mix: For pre-leveling and areas to be installed over 50 mm) thick, well graded, washed pea gravel may be added to reduce material costs. Mix the powder with water first, and then add from 1 part by volume of aggregate (3 to 6 mm or larger). Do not use sand. The addition of aggregate will diminish the workability of the product and may make it necessary to install a finish layer. Allow the first layer to dry for 12 to 16 hours. Complete aggregate installation instructions are available in the ARDEX PC-T Technical Brochure.

3. For pump installations contact ARDEX technical services ARDEX New Zealand: 32 Lane Street, Woolston, Christchurch 8025, 0800 227 339, www.ardex.co.nz;

C. COLOR MIX

1. Topical Color: PANDOMO CC colour concentrate will be mixed with up to 2% of trhe maximum weight of ARDEX PC-T.

2. Integral Color: The maximum amount of pigment for powdered pigments is 2% of the total weight of the ARDEX which means 100 kg of ARDEX PC-T being mixed can have up to 2 kg of powered pigments. Liquid pigments use can have a maximum of 0.5 L per 23 kg bag of ARDEX PC-T. Integral pigment loading is done at the sole discretion of the specifier and installer.

D. ARDEX PC-T INSTALLATION

1. The minimum installation thickness for ARDEX PC-T shall be 10 mm. The necessary thickness will vary with jobsite conditions, and must be adequate to achieve the desired finish.

2. Pour or pump the liquid topping and spread in place with an appropriate tool. Use a smoothing tool for featheredge and touch-up. Contact ARDEX Technical Services if a spike roller is to be used. Wear baseball shoes with non-metallic cleats to avoid leaving marks in the liquid topping. The topping can be walked on in 2-3 hours at 21°C.

3. Allow the ARDEX PC-T to cure a minimum of 24 to 72 hours before proceeding with the polishing process. Drying time is a function of jobsite temperature and humidity conditions, as well as the installation thickness.

3.4 POLISHING PROCESS FOR ARDEX PC-T

A. The ARDEX Polished Concrete System is an engineered and integrated complete installation system requiring strict adherence to all specified installation processes, equipment, tooling, concrete preparation, joint treatment and chemicals to achieve the intended result. Any substitutions from the specified products and/or processes without manufacturer approval will void the system warranty.

1. PROCESSING Without Color (Gloss Reading, 41-65, ASTM E 430).

   a. GRIND/POLISH #1: 60/80 Grit Metal Bonded Diamonds. Broom and vacuum floor after each grinding/polishing step to remove dust.
   b. GRIND/POLISH #2: #100 Grit Transitional, Ceramic / Flat block resin bonded diamonds. Broom and vacuum floor after each grinding/polishing step to remove dust.
   c. GRIND/HONING #3: 200 grit Resin Bonded Diamond. Broom and vacuum floor after each grinding/polishing step to remove dust.
   d. Apply ARDEX PC 10, per application instructions at a rate of $10m^2/L$. Allow to dry for 1 hour before beginning the next step.
   e. GRIND/POLISHING #4: 400 grit Resin Bonded Diamond. Broom and vacuum floor after each grinding/polishing step to remove dust.
   f. GRIND/POLISHING #4: 400 or 800 grit Resin Bonded Diamond. Broom and vacuum floor after each grinding/polishing step to remove dust. Use 800 grit when higher gloss level is desired. Proceed with successively higher grits until gloss level desired.
   g. Apply ARDEX PC FINISH per application instructions at a rate of $61m^2/L$. Allow to dry a minimum of 30-60 minutes.
   h. MICROPOLISH/BURNISH Use 800 – 1500 grit pad. Dry, micro fiber mop the floor clean to remove all debris. Floor should be allowed to cool to room temperature prior to second application.
   i. Apply ARDEX PC FINISH per application instructions at a rate of $61m^2/L$. Allow to dry a minimum of 1hour.
   j. MICROPOLISH/BURNISH Use 1500-3000 grit pad. Dry mop the floor clean to remove all debris.

2. PROCESSING – With Color (Gloss Reading, 41-65, ASTM E 430)

a. GRIND/POLISH #1: 60/80 Grit Metal Bonded Diamonds.
   Broom and vacuum floor after each grinding/polishing step to remove dust.
b. GRIND/POLISH #2: #100 Grit Transitional, Ceramic Bonded Diamonds. Broom and vacuum floor after each grinding/polishing step to remove dust.
c. GRIND/HONING #3: 200 grit Resin Bonded Diamond. Broom and vacuum floor after each grinding/polishing step to remove dust.
d. GRIND/POLISHING #4: 400 grit Resin Bonded Diamond. Broom and vacuum floor after each grinding/polishing step to remove dust.
e. Apply PANDOMO CC with HVLP sprayer. Consult Technical Data sheets for all instructions. Allow to dry thoroughly.
f. MICROPOLISH/BURNISH - 400 pad – Dry / micro fiber mop the floor clean to remove all residual color over application.
g. Apply ARDEX PC 10, per application instructions at a rate of $10m^2$/L. Allow to dry for 1 hour before beginning the next step.
h. GRIND/POLISHING #4: 400 or 800 grit Resin Bonded Diamond. Broom and vacuum floor after each grinding/polishing step to remove dust. Use 800 grit when higher gloss level is desired. Proceed with successively higher grits until gloss level desired.
i. Apply ARDEX PC FINISH per application instructions at a rate of $61m^2$/L. Allow to dry a minimum of 30-45 minutes.
j. MICROPOLISH/BURNISH Use 800 – 1500 grit pad. Dry mop the floor clean to remove all debris. Floor should be allowed to cool to room temperature prior to second application.
k. Apply ARDEX PC FINISH per application instructions at a rate of $61m^2$/L. Allow to dry a minimum of 1hour.
l. MICROPOLISH/BURNISH Use 1500-3000 grit pad. Dry mop the floor clean to remove all debris.

B. EDGEWORK

1. Where desired, polished edge work of ARDEX PC-T shall be done with a Hand Held or Walk Behind polishing tool. The edge polishing process will match the corresponding steps outlined above for the desired gloss level.

C. POST INSTALLATION

1. All moving joints and saw cuts shall be filled with ARDEX RA 56.

3.5 PROTECTION

A. Protect the new ARDEX PC-T from spills and contamination by petroleum, oil, hydraulic fluid, acid and acidic detergents, paint and other liquid dripping from trades and equipment working over these substrates. If construction equipment must be used on these substrates, diaper all components that may drip fluids. Protect surface by installing a Protective Floor Covering.

B. **Avoid moisture for 72 hours after installation.** Don't permit standing water for this period or 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.

C. Light pedestrian use only in the 24 hours after installation. Normal traffic recommended 7 days after completion of the ARDEX Concrete Topping System.

3.6 MAINTENANCE

A. IMPORTANT NOTICE: Maintaining the ARDEX Polished Concrete System and adherence to a recommended cleaning schedule will help the floor hold its mechanically polished gloss longer and greatly reduce the absorption of spilled liquids. The treated concrete floor is easily maintained by regular cleaning with the Maintenance/Post Cleaning procedure, accompanied by Micro Polishing. Specific maintenance recommendations shall be provided by the certified installer performing the work of this section. Contact the ARDEX Technical Services Department for recommendations.

B. Newly Installed ARDEX Polished Concrete System

1. **Restrict water cleaning for 72 hours after installation of PC-T.** Use only a dry mop to clean. Avoid putting mats or covering treated surface to allow coating to fully cure out.

2. DO NOT USE cleaners that are acidic or that have citrus (de-limonene) or Butyl compounds. Do not permit standing liquids at any time.

3.7 FIELD QUALITY CONTROL

A. Test Reports: Provide field quality control sheen gloss reading and static coefficient of friction test results conducted as specified and recorded on floor plan diagram confirming compliance with specified performance criteria.

1. Static Coefficient of Friction: A reading of not less than 0.5 for level floor surfaces shall be achieved and documented, as determined by a certified NFSI walkway auditor using the NFSI 101-A quality control test.

2. Gloss readings should be obtained in accordance with ASTM E430, Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry.

a. Readings shall be taken not less than 3m on center in field areas and within 0.3m of floor area perimeters. In no case shall a reading be below 2% of the specified minimum sheen.

END OF SECTION