

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 74 19 - Construction Waste Management

1.2 REFERENCES

- .1 ASTM International (ASTM):
 - .1 ASTM C 309-11 - 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.
- .2 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.
- .3 National Floor Safety Institute (NFSI): NFSI Test Method 101-A - Standard for Evaluating High-Traction Flooring Materials.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-[95], Surface Sealer for Floors
- .5 CSA Group (CSA)
 - .1 CSA A23.1-[14] /A23.2-[14], Concrete Materials and Methods of Concrete Construction/ Test Methods and Standard Practices for Concrete
- .6 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-[A2016], Architectural Coatings

1.3 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 0.20 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.

1.4 ACTION AND INFORMATION SUBMITTALS

- .1 Submit under provisions of Section 01 33 00 - Submittal Procedures.
- .2 Sustainable Design Submittals:
 - .1 LEED Canada submittals: in accordance with Section 01 47 15 – Sustainable Requirements Construction.
- .3 Shop Drawings: Indicate information on shop drawings as follows:
 - .1 Typical layout including dimensions and floor grinding schedule.
- .4 Product Data
 - .1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS Safety Data Sheet (SDS) in accordance with Section 01 47 15 - Sustainable Requirements: Construction and Section 02 81 00 - Hazardous Materials.
 - .1 Submit [2] copies of WHMIS SDS.
 - .3 Include application instructions for concrete floor treatment[s]
- .5 Samples:
 - .1 Minimum [4] weeks prior to beginning Work, submit [2] samples for review and acceptance of materials proposed for use as follows:
 - .1 [5] L of chemical hardeners.
 - .2 [5] L of sealing compounds.
 - .3 [5] L of curing compound.
 - .4 [5] L of concrete stains.
- .6 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.
- .7 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.

1.5 **QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Minimum 4 weeks prior to starting concrete finishing work, provide proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Hardening.
 - .2 Sealing.
 - .3 Curing.
 - .4 Finishes.
- .3 Concrete finishing components and materials shall be from single manufacturer.
- .4 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.
- .5 Regulatory Requirements: Comply with NFSI Test Method 101-A Phase Two Level High Traction Material.
- .6 Mock-Ups: Provide site mock-up for concrete finishes indicating methods and materials, and procedures proposed to achieve concrete finishes in accordance with Section [01 45 00 - Quality Control], and to comply with following requirements, using materials indicated for completed work:
 - .1 Build mock-ups in location and of size as directed by Departmental Representative.
 - .2 Obtain Departmental Representative's acceptance of mock-ups before starting construction; mock-up to be used throughout construction period and used as standard of acceptance for subsequent architectural concrete work.

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- .3 Mock-up may form part of permanent structure when accepted by Departmental Representative repair or replace unacceptable mock-ups at no additional cost to Owner.
 - .4 In presence of Departmental Representative, damage part of exposed face for each finish, colour, and texture, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces. Mock-Up Size: 4.65 m2 sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
 - .5 Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
 - .6 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .7 When accepted, mock-up will demonstrate minimum standard of quality required for this work.
 - .1 Approved mock-up may remain as part of finished work.
 - .8 Mock-Up will demonstrate required level of cut:
 - .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 Sheen Level A: Sheen (glossy) as determined by a gloss reading of 45 - 60.
 - .7 Pre-installation Meetings: Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions. 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.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- .2 Delivery and Acceptance: Deliver materials to site in original factory packaging, labelled with manufacturer's name, and address.
- .3 Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.7 SITE CONDITIONS

- .1 Temporary lighting: Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 m² of floor being treated.
- .2 Electrical power: Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area: Make work area water tight protected against rain and detrimental weather conditions.
- .4 Temperature: Maintain minimum 10 degrees C ambient temperature for 7 days before installation and minimum 48 hours after completion of work and maintain relative humidity maximum 40 % during same period.
- .5 Moisture: Ensure concrete substrate is within moisture limits prescribed by [flooring] manufacturer.
- .6 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .7 Ventilation:
 - .1 Departmental Representative will arrange for ventilation system to be operated during installation of concrete floor treatment materials.
 - .2 Provide continuous ventilation during and after coating application.
- .8 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.
- .8 Waste Management and Disposal:
 - .1 Separate waste materials for Reuse and Recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.8 PROJECT AMBIENT CONDITIONS

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

1.9 SEQUENCING

- .1 Sequence with Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.

Part 2 Products

2.1 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.
 - .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.
 - .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.
 - .4 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).
 - .5 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.
 - .6 Finish: Standard High gloss (HG-1), 1500 grit.

2.2 PERFORMANCE REQUIREMENTS

- .1 Submit written declaration components used compatible and not adversely affect finished flooring products and their installations adhesives.

2.3 CHEMICAL HARDENERS

- .1 Type 1- Sodium Silicate.
- .2 Water: potable.

2.4 SEALING COMPOUNDS

- .1 Surface sealer: acrylic carnuba wax, colour as per Departmental Representative.
- .2 Surface sealers not contain cadmium hexavalent chromium and their compounds.
- .3 VOC limit: maximum 100g/L to SCAQMD Rule 1113 Sealants: maximum VOC limit 250 g/L to SCAQMD Rule 1168.

2.5 CURING COMPOUNDS

- .1 Waterborne membrane forming curing membrane to ASTM C309, Type 1 Clear Class B.
 - .1 Verify compatibility with subsequent finishes.

2.6 CONCRETE STAINS

- .1 Select low VOC, water based concrete stains.

2.7 MIXES

- .1 Mixing ratios in accordance with manufacturer's written instructions.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verify site conditions surfaces are ready to receive work and elevations as indicated on drawings, and as recommended by manufacturer's written instructions
 - .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 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.

3.2 PREPARATION OF EXISTING SLAB

- .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.
- .3 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges, unless otherwise indicated.
- .4 Saw cut control joints to CSA A23.1, 24 hours maximum after placing of concrete.
- .5 Use strong solvent and/or mechanical stripping to remove chlorinated rubber or existing surface coatings.
- .6 Use proper PPE during stripping of chlorinated rubber or existing surface coatings.

3.3 INSTALLATION

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions.
- .2 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.
 - .4 Hardener and Densifier Application:
 - .1 First coat of FGS Hardener Plus at 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 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.

.5 Remove defects and re-polish defective areas.

.6 Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.4 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.

3.5 APPLICATION

.1 Apply concrete finishing floor hardener in accordance with manufacturer's written instructions.

.2 After floor treatment dry, seal control joints and joints at junction with vertical surfaces with sealant.

.3 Apply floor treatment in accordance with Sealer manufacturer's written instructions.

.4 Clean over spray. Clean sealant from adjacent surfaces.

3.6 FINAL CLEANING

.1 Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

3.7 PROTECTION

.1 Protect installed product from damage during construction in accordance with manufacturer's instructions.

END OF SECTION