

PART I – GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to provide the Cast-In-Place Concrete work as indicated or specified including:

- Integrally colored concrete slabs.
- Vapor retarder and granular subbase beneath slabs on grade.
- All other items required to make the work of this Section complete.
- Related sections:
 1. Section 03300: Cast-in-Place Concrete
 2. Section 03331: Polished Concrete Floor System

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

Submit manufacturer's product data, performance criteria and other documentation for each material specified in this Section that is proposed for use including:

- Submit shop drawings showing fabrication dimensions and locations for placing reinforcing steel and accessories and details of steel reinforcement.
- Submit concrete mix design for each class of concrete for review well in advance of concrete placement. Concrete mix design shall include all strength data necessary to show compliance with the project specifications for either the trial batch or field experience method.
- Admixtures
- Curing compound
- Sealing compound
- Proposed placement equipment
- Schedule of events and casting plan regarding placement operations, and records of concrete pours.

QUALITY ASSURANCE

- Provide Special Inspections for concrete as shown on the drawings and as required by Building Official.
- It is the intent of this Section to establish a single component source to be responsible for providing complete, durable concrete floors as specified herein. Including provisions of formwork, reinforcing, concrete and finishing complete as specified herein.
- Concrete Slab Installer qualifications for placing of concrete slab: Slab placing and finishing shall be done by an established Subcontractor with at least five (5) years proven, accredited and satisfactory experience in this trade, employing only skilled personnel. Submit proof on this requirement to the Consultant. Consultant reserves the right to reject installers who do not meet these requirements.

RELATED DOCUMENTS

- Unless otherwise shown or specified, the work shall conform to the following standards:
- Cast-in-place concrete work shall conform to, Section 03300, Cast-in-Place Concrete, (unless specified otherwise), and the applicable requirements of the latest edition of:
 1. CAN/CSA-A23.1
 2. CAN/CSA-A23.2
 3. CSA-A283

FIELD ACCEPTANCE OF CONCRETE

INSPECTION AND TESTING

- Materials and concrete work will be inspected and tested for conformance to CAN/CSA-A23.1, CSA-A283, Section 01410; Inspection and Testing, to these Specifications and as directed by the Consultant. An independent inspection company selected and paid for by the Owner may perform inspection services.
- Test will be executed in accordance with CAN/CSA-A23.2.
- Inspection companies' reports of tests will be forwarded to the Consultant and to the Contractor with an opinion or reason for any abnormalities noted thereon.
- Cooperate with, and assist Inspection Company's personnel during inspections and tests.
- Remove defective materials and completed work, which fail tests and replace as directed by Consultant, at no cost to the Owner. Further inspection and testing required as a result of materials and work that failed original tests, shall be paid for by the Contractor.
- Air-entrained concrete not within the specified limits of air-entrainment shall not be used in the work.
- Concrete not within the specified slump limits at the point of placement shall not be used in the work.
- Concrete not within the specified temperature limits shall not be used in the work.

TOLERANCES

- Place concrete level and true to linear building lines.
- Maximum variation of concrete slab on grade only shall not exceed 6 mm in 6m x 6m (1/4" in 20'-0" x 20'-0") area and shall be sufficiently even to make contact with a 3000 mm (10'-0") long straightedge with a tolerance of 3 mm (1/8").
- A permitted variation in any part of the construction or in any Section of the Specification shall not be construed as permitting violation of more stringent requirements for any other part of construction or in any Specification Section.
- The interior slab shall be checked by the General Contractor (2) weeks after the slab is poured. Maximum tolerance of FF = 50 for flatness and FL = 45 for levelness, shall be required.

- All slabs without floor coverings that are not within the specified tolerance shall be corrected by the removal and replacement of the defective slab. Removal shall be score to score, joint to joint. No other solution will be permitted.
- Slabs without floor coverings must be acceptable to PETSMART and in compliance with, but not limited to, the specifications contained within in regards to stains, abrasions, gouging, marring, etc. Any slab portion that is determined by PETSMART as unacceptable or defective shall be removed and replaced immediately, at no additional cost to PetSmart and with no change in schedule.

JOB CONDITIONS

- Environmental requirements: The minimum temperature of the subgrade at the time of placement of the concrete shall be 12°C when measured by a thermometer embedded 25 mm (1") into the granular material. The minimum ambient air temperature shall be 10°C when measured 305mm (12") above finished floor level.
- During cold weather, provide temporary heating equipped with exhaust vents, pipes or chimneys and enclosures as required. Mix, place and protect concrete in accordance with CAN/CSA-A23.1.

PROTECTION OF IN-PLACE CONCRETE

- Do not allow construction loads to exceed the capacity that the structure can safely support without damage.
- Protect all finished concrete surfaces from damage caused by construction equipment, materials or methods.
- During the curing period, protect concrete from damaging mechanical disturbances including load stresses, shock, and harmful vibration.
- Protect concrete surfaces from mechanical injury, damage by construction traffic, equipment, materials, rain or running water, and other adverse weather conditions.
- Protect all finished surfaces from stains, abrasions, etching, discoloration, gouging, scratches and marring. General Contractor will be responsible for any concrete replacement. Protect surfaces or edges by leaving forms in place, by providing temporary covers, diapers, etc. to avoid marring, gouging, etc. Protect all concrete from rain, flowing water or mechanical injury. Areas that are to be replaced are at PETSMART's discretion. General Contractor is responsible for providing adequate protection of the exposed slab areas.
- Protect all exposed interior slabs at all times from the dropping of plaster, paint, dirt, etc.
- Equipment diapering shall be provided to protect exposed floor slabs from the dripping of oils, acid, rust marks, etc.

DELIVERY, STORAGE AND HANDLING

- Store materials on Site in a manner to prevent damage thereto. Protect materials from inclement weather. Comply with CAN/CSA-A23.1.
- Protect materials and work of this Section from damage. Protect other work from damage resulting from work of this Section. Replace damaged work, which cannot be satisfactorily repaired at no cost to the Owner.

UNIT PRICES

- Unit prices, requested as part of the Bid, shall include addition of super plasticizer where specified, reinforcing, placing, curing and finishing and providing control joints.

PART II – PRODUCTS

CONCRETE MATERIALS

Concrete materials are to meet the requirements of CAN/CSA-A23.1 and Section 03300 Cast-in-Place Concrete, unless otherwise specified herein.

Reinforcing: Bars and mesh as specified in Section 03200 Concrete Reinforcement.

Welded steel wire fabric: to CSA G30.5-M1983 (R1998), supply in flat mats only.

Vapour Barrier: See Drawings

Floor Sealer: Not to be used where cementitious adhesives are used for porcelain floor tile application: "Florseal WB" by Sika, "Masterkure-N-Seal VOC" by Maser Builders or approved equivalent.

Curing Compound: The curing compound shall meet the moisture retention requirements of ASTM C309, and be compatible with scheduled finishing materials.

Granular Subbase: Granular subbase beneath slabs on grade shall conform to the requirements of the geotechnical report. Where no requirements are specified in the geotechnical report, granular subbase shall be fine graded granular material conforming to the following requirements:

- Maximum size: 1-1/4"
- Passing No. 200 Sieve: 15% maximum
- Plasticity Index: 6 maximum
- Liquid Limit: 25 maximum

CONCRETE MIXES

GENERAL

- Minimum twenty-eight (28) day compressive strength of laboratory cured test specimens shall be 27.6 MPa (4000 psi), unless otherwise indicated.
- Maximum slump of 80 mm (3 1/4") +/- 20mm (3/4") before addition of plasticizer. Add plasticizer to achieve workability as required by the steel fibre supplier and concrete placer.
- Slag cement or flyash content shall not be used without prior approval by the Consultant.
- Coarse aggregates not less than 56% of total aggregate. Maximum size of coarse aggregate shall be 25 mm (1").
- Super-plasticizing admixture shall only be used with prior authorization by the Consultant.

- Air entraining admixture shall not be used.
- Total air content of the hardened concrete shall not exceed 3% when the top size coarse aggregate is 25mm.

PART III – EXECUTION

PRE-CONCRETE CONFERENCE

- At least fifteen (15) days prior to the start of the concrete construction schedule, a pre-concrete conference MUST be held. The mix designs shall be reviewed, and the required methods and procedures to achieve the required concrete shall be discussed. The Contractor shall send a pre-concrete conference agenda to all the attendees' ten (10) days prior to the scheduled date of the conference.
- The Contractor shall require responsible representatives of every part who is concerned with the concrete work to attend the conference, including but not limited to the following: the Contractor's super, a representative from the laboratory responsible for the concrete mix design, the laboratory responsible for field quality control, the concrete sub-contractor, the ready mix concrete producer, the admixture manufacturer(s), and the concrete pumping contractor.
- Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within five (5) days of the meeting. One (1) copy of the minutes shall also be transmitted to the following for information purposes: the Owner's representative, the resident engineer, and the Consultant engineer.
- The minutes shall include a statement by the admixture manufacturer(s) indicating that the proposed mix design and placing techniques can produce the concrete quality required by these Specifications.
- The Consultant engineer will be present at the conference. The Contractor shall notify the Consultant engineer at least ten (10) days prior to the scheduled date of the conference.

SLABS ON COMPACTED FILL

- Ensure that compacted fill has been placed and compacted to meet specified requirements in the Soil Report and that under-slab services have been installed, inspected, tested and approved, prior to placing of concrete.
- Pour slabs in one (1) monolithic thickness, screed and strike off to required levels; slope to drain in areas with floor drains; slope exterior slabs to drain.
- If rapid evaporation conditions are present, moisten granular fill, prior to placing of concrete where no dampproof membrane is provided below slab. Allow no standing water on fill.
- Rapid evaporation conditions include relative humidity below 50%, wind in excess of 29 KM per hour, direct sunlight or any combination of these.
- Ensure that screeds do not puncture dampproof membrane. Membrane to have minimum thickness of 10 mil. (0.25 mm) and comply with ASTM E1745-97. Unless otherwise indicated on Drawings, provide 25MPa (3600 psi) concrete.
- Pour floor slabs in sections of maximum 1000 m² (10,000 sq. ft.), scheduled and completed on alternate days.

- Incorporate construction joints into the floor slab at locations detailed on the floor slab drawings. Ensure that construction joints are not located in the aisles.

SAWCUT CONTROL JOINTS

- The use of an early-entry, dry-cut saw ("Soff-Cut") is the preferred method. Sawcut immediately after final finishing and as soon as the slab will support the weight of the saw and operator without damaging the final finish (0-2 hours). Sawcut to a depth of 32 mm (1-1/4") following the manufacturer's recommended procedures.
- Concrete residue MUST be removed by dry method, i.e. dry vac, dry broom. No water must be used on the floor to remove any of the cement residue.
- Ensure that reinforcements and work of other Sections are located below cutting line.
- Chalk used for chalk lining sawcuts shall not be red, blue or any colour with a dye that would stain the floor. Use white or light grey chalk only.

FLOOR SLAB FINISHES

- Curing (Wet Cure, when and where possible):
- The concrete shall be cured for a minimum of seven days by means of polyethylene sheets.
- Apply approved curing/sealing compound after seven (7) days.
- No construction personnel or traffic shall be allowed on the slab during the curing period or after curing, and until eight (8) hours after the first application of the floor sealer material.
- Placement of the polyethylene joints shall allow temporary exposure of the concrete to complete the sawcutting procedure and clean up of associated slurry from this work. The concrete shall be completely re-covered immediately upon completion of this work to maintain proper curing.
- Where the above curing method is not possible in retail areas receiving porcelain tile flooring, spray or 'mist' floor slab entirely, twenty-four to forty-eight (24-48) hours after pouring slab, and every forty-eight (48) hours thereafter for a minimum of two (2) weeks. Maintain floor slab at room temperature during this period and while slab is curing, use propane heaters if required.

FIELD QUALITY CONTROL

- Comply with field quality control requirements specified in Section 03300.

CONCRETE SLAB REPAIR

- After slab has set and cured for fourteen (14) days, and prior to turn over of the slab to the floor finish applicators, (i.e. porcelain tile installer), a thorough floor inspection MUST be carried out. This inspection is for the purpose of ensuring that the slab tolerances set out in this Section have been met. The use of an engineering company MAY be used and paid for, at the request of the Project Manager. Any parts of the slab that show evidence of curling, un-level areas or any other abnormalities that do not meet the quality and

tolerance criteria set out herein and that would be a detriment to a first class floor finish installation, will be repaired to the satisfaction of the floor finish applicator. THE COST FOR THIS REPAIR WILL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. The process used to repair these areas may include, but not be limited to mechanical or hand grinding, shot blasting or scarifying. The Project Manager must approve the repair method.

- Sufficient time has to be accounted for, to allow the entire slab repair process to be satisfactorily completed and to allow the floor finish installers to commence with their work, on schedule.
- The final, repaired, concrete slab must be to the satisfaction of the floor finish installer, in order that the tile installation meets quality and tolerance requirements set out in Section 09300. THE COST FOR ANY ADDITIONAL SURVEYS OR FLOOR INSPECTIONS REQUIRED, WILL BE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
- For floors receiving porcelain tile finish, Blastrac or grind curling that occurs at sawcuts.
- For floors receiving porcelain tile finish, Blastrac or grind peaking that occurs at cold pour joints.
- For floors receiving porcelain tile finish, where crooked or inaccurate sawcuts are made in the slab, prior to the first frost clean out and vacuum the joint and then fill with epoxy to leave no voids in slabs. Re-cut accurate joints as per Drawings.

REINFORCEMENT

- Extend welded wire fabric for slabs on grade to within 2 inches of concrete edge. Lap edges and ends of fabric sheets a minimum of one mesh spacing. Support welded wire fabric during placing of concrete to assure required positioning in the slab.
- Place reinforcement supported from the ground on precast concrete reinforcement supports. Place reinforcement supported from concrete or formwork on reinforcement supports made of metal or plastic. Secure reinforcement as necessary to prevent displacement during placement of concrete.

CONCRETE FINISH SCHEDULE

FLOOR SLABS

- Broom finish: provide broom finish in direction of waterflow at exterior formed slabs.
- Steel trowel finish: provide steel trowel finish at floors exposed to view, at floors to receive resilient flooring or thin set tile and at floors where no specific finish is indicated. Finish shall be hard, smooth, dense, free of laitance, excessive water, trowel marks, blemishes, ridges and discolouration.
- Wood float finish: provide a wood float finish at the stair landings and treads, which are exposed to view. The finish shall provide a "non-slip" texture across the full width of the treads and landings.
- In areas receiving porcelain tile, finish concrete floor surface to ANSI 108.5.

CURING

- Cure all concrete surfaces with the specified curing compound applied per manufacturer's instructions.
- All interior slabs shall receive a cure coat of FGS Hardener Plus applied full strength in accordance with manufacturer's recommendations.

SEALING/HARDENER

- Apply sealer/hardener to all interior exposed concrete slabs.
- Prepare the surface in strict conformance with the manufacturer's printed recommendations.
- Apply in strict accordance with the manufacturer's printed application procedures. All installation of L&M materials shall be performed by an L&M approved applicator.
- Application rate shall be a maximum of 250 s.f. per gallon for the first coat and 350 s.f. per gallon for the second coat. Do not puddle.

END OF SECTION