
Partie 1 General

1.1 RELATED REQUIREMENTS

- .1 Division 03 Concrete
- .2 Section 04 43 16 Granite Veneer Cladding.
- .3 Section 04 43 17 Exterior – Granite Veneer Cladding.
- .4 Section 05 50 00 Metal Fabrications.
- .5 Section 07 19 00 Water Repellents.
- .6 Section 07 92 00 Joint Sealants.

1.2 SUMMARY

- .1 Content:
 - .1 The list of Work in this section applies to the supply and installation of exterior tile work and accessories.
 - .2 The list of Work in this section applies without being limited to the following:
 - .1 Surface tiles.
 - .2 Pedestrian bridge and terrace tiles.
 - .3 QM vestibule tiles.
 - .4 Access ramp tiles.
 - .5 Edge strips.
 - .6 Stair treads.
 - .7 Integration of fences and guard rails.

1.3 REFERENCES

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI/CTI A118.1, Specification for Dry-Set Portland Cement Mortar.
 - .2 ANSI/CTI A118.3, Specifications for Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive.
 - .3 ANSI/CTI A118.4, Latex-Portland Cement Mortar.
 - .4 ANSI/CTI A118.5, Specifications for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation.
 - .5 ANSI/CTI A118.6, Specification for Ceramic Tile Grouts.
 - .6 ANSI/CTI A118.8, Modified Epoxy Emulsion Mortar/Grout.
 - .7 ANSI/CTI A136.1, Organic Adhesives for Installation of Ceramic Tile.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C144, Standard Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C150, Standard Specification for Portland Cement.
 - .3 ASTM C207, Standard Specification for Hydrated Lime for Masonry Purposes.
 - .4 ASTM C568, Standard Specification for Limestone Dimension Stone.

- .5 ASTM C84, Standard Specification for Metal Lath.
- .6 ASTM C615, Standard Specification for Granite Dimension Stone.
- .7 ASTM C629, Standard Specification for Slate Dimension Stone.
- .3 Canadian Standards Association (CSA)/CSA International
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .2 CSA O151, Canadian Softwood Plywood.
- .4 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168, Adhesives and Sealants Applications.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Installation Manual 2006/2007 - Specification Guide 09300.
- .6 Tile Council of America (TCA), Inc.
 - .1 2006 Handbook for Ceramic Tile Installation.
- .8 Other standards
 - .1 ISO 13007 – Grouts and Adhesives.
 - .2 TTMAC (HB) — Handbook for Ceramic, Glass and Stone Tile Installation; Tile Council of North America.
 - .3 TTMAC — Guide Specification 09 30 00 — Tile Installation Manual

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Shop Drawings: indicate special patterns, finishes, mechanical fasteners; include locations and details for proposed control joints.
- .4 Provide the following samples:
 - .1 Stone tiling 300 mm x 300 mm of each type of stone with finishes and colours.
 - .2 Colour grouts.
 - .3 Colour sealants.
 - .4 Minimum 1.2 metre x 1.8 metre x 1.8 metre sample for ground and elevated structures (*pedestrian bridge and universal access ramp*); include components for each sample. See paragraph 1.6.4
 - .5 Obtain approval from Departmental Representative prior to commencing work of this section.
- .5 Submit manufacturer's installation instructions.

1.5 REPLACEMENT MATERIALS

- .1 Replacement materials:
 - .1 Provide required replacement materials.
 - .2 Provide number of each type and colour corresponding to the higher of the two following values: 4 m² “Picasso” and 2 m² “Saint-Sébastien” tiles. Identify packaging as follows:
 - .1 Manufacturer’s name.
 - .2 Product designation.
 - .3 Colour and pattern.
 - .3 Keep granite tiles in original packaging to prevent damage.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer's Qualifications: skilled, trained and experienced in tile work. Departmental Representative may require list of relevant work experience and client references. Work must be done by qualified personnel, familiar with ASTM techniques and recommendations.
- .2 Inspection and tests:
 - .1 Allow and enable Departmental Representative free access at all times to plant and work site, to laboratory to verify, examine, supervise quality of materials and manufacture, and to take samples for tests and analyses.
 - .2 Specialized Contractor must inspect stone tiles and remove and set aside altered tiles prior to installation, including broken, cracked, delaminated or otherwise damaged tiles.
 - .3 Specialized Contractor must inspect tiling accessories and remove and set aside altered accessories prior to installation, including broken, cracked, delaminated or otherwise damaged tiles.
- .3 Certificates:
 - .1 Certificates: Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Samples:
 - .1 Provide required sample installations in accordance with this Section and Departmental Representative’s on-site specifications.
 - .2 Provide 1200 mm x 1800 mm granite sample indicating grout colours and patterns, granite pieces, backing and quality of execution.
 - .3 Samples will be used for the following.
 - .1 Evaluate quality of execution of Work, preparation of substrate, and performance and installation of materials.
 - .2 Sample may become part of completed Work if satisfactory to Departmental Representative.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer’s instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Packing, shipping, handling and unloading:
 - .1 Store materials in dry area, protected from freezing, staining and damage.
 - .2 Store cementitious materials on a dry surface.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.
- .2 Maintain temperatures at or above 10 degrees C until cementitious materials have fully cured.
- .3 Do not apply epoxy mortar and grouts at temperatures below 10 degrees C or above 32 degrees C, during Work and 48 hours after Work is complete.
- .4 Work carried out during hot or cold weather to CAN/CSA-A371
- .5 Field measurements:
Take necessary measurements on site to ensure proper adjustments of installed components.

1.9 ACCEPTABLE PRODUCTS AND MATERIALS

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products

Partie 2 Products

2.1 MATERIALS

- .1 Physical properties of stone:
 - .1 “Saint-Sebastien” granite stone for tile, quarry located in Saint-Sébastien de Frontenac, QC, CA

Absorption by weight	ASTM C97	0.27%	0.27%
Compressive strength	ASTM C170	29,175 Psi	201.2 Mpa
Density	ASTM C97	163.9 lb/ft ³	2,624kg/m ³
Modulus of rupture	ASTM C99	2,037 Psi	14 Mpa

- .2 “Picasso” granite stone for tile, edging A,B,C,D,E,F,G,H,I stairs, quarry located in Magpie, QC, CA

Absorption by weight	ASTM C97	0.16%	0.16%
----------------------	----------	-------	-------

Compressive strength	ASTM C170	23 277 Psi	160.5 Mpa
Density	ASTM C97	165.2 lb/ft ³	2,646 kg/m ³
Modulus of rupture	ASTM C99	2,364 Psi	16.3 Mpa
.3 “Caledonia” granite stone for edging J, quarry located in Rivière-à-Pierre, QC, CA			
Absorption by weight	ASTM C97	0.18%	0.18%
Compressive strength	ASTM C170	24 426 Psi	168.4 Mpa
Density	ASTM C97	167.6 lb/ft ³	2,705 kg/m ³
Modulus of rupture	ASTM C99	1,703 Psi	11.7 Mpa

2.2 STONE MATERIALS

- .1 “Saint-Sebastien” granite tile, to ASTM C615, corresponding to following characteristics.
 - .1 Size: see plan specifications.
 - .2 Thickness: 38 mm.
 - .3 Pattern: see plan specifications.
 - .4 Finish: Flamed on exposed surfaces, sawn on side and undersides.
- .2 “Picasso” granite tile, to ASTM C615, corresponding to following characteristics.
 - .1 Size: see plan specifications.
 - .2 Thickness: 38 mm.
 - .3 Pattern: see plan specifications.
 - .4 Finish: Flamed on exposed surfaces, sawn on side and undersides.
- .3 “Picasso” granite stairs, to ASTM C615, corresponding to following characteristics.
 - .1 Sizes: see plan specifications.
 - .2 Thicknesses: see plan specifications.
 - .3 Pattern: see plan specifications.
 - .4 Finish: Flamed on exposed surfaces, sawn on side and undersides.
- .4 “Picasso” granite edging (high, dropped, transition, ramped, special shapes), to ASTM C615, corresponding to following characteristics.
 - .1 Sizes: see plan specifications.
 - .2 Finish: Flamed on exposed sides, sawn back, underside and joints.
- .5 “Caledonia” granite edging (high, dropped, transition, ramped, special), to ASTM C615, corresponding to following characteristics:
 - .1 Size: 200 mm x 352 mm x 1000 mm min.
 - .2 Finish: sawn surface, underside and joint, guillotined front and back.

2.3 MORTAR MATERIALS

- .1 Mortar for ground tiles on slab (except pedestrian bridges and elevated ramp area) and stairs (except stair tread nos. 19, 20, 27 and 28)
 - .1 Polymer-modified cement adhesive, mortar and additives. Polymer-modified Portland cement based flexible cement adhesive, to ANSI A118.4 and ISO 13007 C2ES2P2: Factory-prepared cement adhesive and latex additive.
- .2 Mortar mixture:
 - .1 Proportions and mixtures to manufacturer's most recent written guidelines and applicable ANSI standards.
- .3 Mortar for pedestrian bridge, elevated ramp area, stair nos. 19, 20, 27 and 28: see section 07 19 00 – Water Repellents.

2.4 GROUT MATERIALS

- .1 Grout:
 - .1 Quick set grout, sand free, polymer modified and to ANSI A118.6, ANSI A118.7 and ISO 13007 CG2WAF standards.
 - .2 Compressive strength no less than 12.5 MPa at 28 days. Maximum aggregate size and settling to CAN/CSA-A179.
 - .3 Polymer-modified, quick-set, superior quality, non-shrink, efflorescence free and colour consistent.
 - .4 Colours approved by Departmental Representative and adapted to following selected stones:
 - .1 Saint-Sébastien granite.
 - .2 Laurentian Green granite.
 - .3 Picasso granite.
- .2 Grout mixing:
 - .1 Mix premixed grout to CSA A23.1/A23.2.
 - .2 Do not use calcium chloride or other chloride admixtures.

2.5 MORTAR AND GROUT TESTS

- .1 Mortar test:
 - .1 Test prepared mortar following CAN/CSA-A179.
- .2 Grout test
 - .1 Test prepared grout following product properties and mixing guidelines.

2.6 SEALANTS

- .1 Expansion joints for ground tiles on slab (except pedestrian bridges and elevated ramp area) and stairs (except stair tread nos. 19, 20, 27 and 28).

Sealing compound/caulking:

- .1 Elastomeric two-component, premium quality, polyurethane base, colours selected by Departmental Representative. Non-sag, chemical curing, self-levelling product.
- .2 Expansion joints for pedestrian bridges, elevated ramp area, East wing entrance porch and stair nos. 19, 20, 27 and 28: see section 07 19 00 – Waterproofing Sealant.

2.7 ACCESSORIES

- .1 Water: clean, cold and potable.
- .2 Backup materials:
 - .1 Polyethylene, urethane, neoprene or vinyl foam foam.
 - .1 Open cell or extruded closed cell foam backer rods.
 - .2 Oversized by 30 to 50%.

Accessories for pedestrian bridges, elevated ramp area, East wing porch entrance and stair nos. 19, 20, 27 et 28: see Section 07 19 00 – Water Repellents.

Partie 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

- .1 Verify existing conditions are ready to receive work.
- .2 Verify substrate surfaces are clean, dimensionally stable, cured and free of contaminants such as oil, sealers and curing compounds.
- .3 Verify that concrete has been allowed to cure for minimum of 28 days.
- .4 Verify concrete floors have not been treated with proprietary curing compounds.
- .5 Verify concrete floors scheduled to receive thin-set applied tile or cleavage membranes are steel trowelled to fine broom finish.
- .6 Sandblast slabs of pedestrian bridge, elevated ramp, East wing entrance porch and stair nos. 19, 20, 27 and 28: See Section 07 19 00 – Waterproofing Sealant.
- .7 Ensure concrete slabs have been finished with maximum permissible variation of 3 mm in 3049 mm from required plane and not more than 1.5 mm in 300 mm when measured from high points in surface.

- .8 Verify concrete floors scheduled to receive tile applied over bonded mortar bed have been screed finished.
 - .1 Verify substrate surface variation does not exceed 6 mm in 3049 mm.
- .9 Beginning of installation implies acceptance of existing conditions.
- .10 Report in writing any unsuitable conditions to Departmental Representative. Proceed with work only after written instruction is received from Departmental Representative.

3.3 PREPARATION

- .1 Protect surrounding work from damage or disfiguration.
- .2 Verify joint size and surfaces to ensure adequate width-depth ratio for application of backing and sealing compounds.
- .3 Clean surfaces which are to receive tile finish to ensure removal of grease, oil or dust film.
- .4 Do not apply sealers to joints treated with filler, hardener, waterproofing or other type of sealer, unless tested for compatibility. Remove sealing compounds if necessary.
- .5 Ensure surfaces are dry and not frozen.
- .6 Prepare surfaces in accordance with manufacturer's instructions.

3.4 INSTALLATION

- .1 Install materials to requirements of TTMAC Tile Installation Manual - Specification Guide 09300 or the TCA Handbook for Ceramic Tile Installation, as scheduled below.
- .2 Carefully sort stones, removing chipped, cracked or stained stones and immediately notify the Departmental Representative.
- .3 Fit tile units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Size, cut and drill on site to ensure tight-fitting uniform joints with a maximum width of 10 mm.
- .4 Level components in specified locations according to pattern and layout. Leave spacing adjacent to vertical elements as indicated on drawings. Use plastic spacers in each corner to align joint width. Follow sizing and pattern as indicated on drawings.
- .5 Make cut edges smooth, even and free from chipping. Do not split tile.
- .6 Lay out tiles as indicated so that perimeter and cut tiles are no less than half size.
- .7 Use levelling materials for bridge, porch, universal ramp access, bridge stairs and stairs and landings of East and West square towers (except slab and slab).
- .8 Set tiles in place while bond coat is wet and tacky, prior to skinning over. Slide tile back and forth to ensure a proper bond and level surface. Avoid slippage.
- .9 Clean backs of tiles and back butter tiles to ensure a 95 % bond coverage. Apply grout to indicated levels, apply grout to concrete and to tile.
- .10 Clean excess mortar from surface prior to final set.

- .11 Sound tiles after setting materials have cured and replace hollow sounding tile before grouting.
- .12 Ungauged Stone Tiles.
 - .1 Immediately prior to setting, backbutter tile through push box or box screed to achieve a uniform thickness of tile and mortar.
- .13 Keep 2/3 of depth of grout joints free of setting material.

3.5 CONTROL JOINTS

- .1 Install control joints and expansion joints in tile work.
- .2 Keep control and expansion joints free of setting materials.

3.6 GROUTING

- .1 Allow proper setting time prior to grouting. Sound tiles after setting materials have cured and replace hollow sounding tile before grouting.
- .2 Preseal tiles requiring protection from grout staining.
- .3 Force grout into joints to ensure dense finish.
- .4 Finish joints 1.6 mm under stones. Tool excess and trowel as indicated.
- .5 Remove excess and polish with clean cloths.

3.7 FIELD QUALITY CONTROL

- .1 Inspection:
 - .1 Inspect completed work and replace broken, cracked, or damaged tile.
- .2 Manufacturer's Field Services:
 - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.8 TOLERANCES

- .1 Level tiles to conform to 1 mm tolerance over 3 mm joint.

3.9 CLEANING

- .1 Proceed with cleaning.
- .2 Remove cement and/or sealant immediately after installation using rubber scraper and allow to dry approximately one half hour before final cleaning.
- .3 Do not allow mortar and/or sealant to dry on stones. Remove all mortar or other stains. No stains will be tolerated.

3.10 PROTECTION

- .1 Protect finished areas from traffic until setting materials have sufficiently cured. Provide and maintain barriers and signposting and employ guards as needed to protect work during curing.
- .2 Protect grouted areas from traffic for 24 hours after grouting.
- .3 Cover ground tiles with damp jute and vinyl tarp for 24 hours after installation until setting materials have sufficiently cured. Protect grouted areas from precipitation for 72 hours until materials have sufficiently cured.

END OF SECTION