DIVISION 03 00 00. CONCRETE

03 00 00 - Concrete
Contractor shall review construction documents and provide labor and materials for concrete and foundations as required in said documents and as specified herein, while complying with all applicable building codes.

03 05 00 - Common Work Results for Concrete
All concrete work shall be designed on the basis of “Strength Design” in accordance with ACI 318 “Building Code Requirements for reinforced Concrete.” Concrete work shall be proportioned in accordance with ACI 301 “Specifications for Structural Concrete” and ACI 211.1 “Recommended Practice for Selecting Proportions for Normal Weight Concrete.” Concrete slabs, patios, driveways, walls and foundations shall be constructed of a minimum 3000 to 3600 psi concrete, 28 day test, with a 4” minimum to 6” maximum slump maximum, air-entrained to 5-8%. No additional water shall be added to concrete after slump test is recorded. Cylinders shall be taken from every batch truck and tested for compressive strength at 7 and 28 days. Concrete should be a mix of high grade Portland cement, clean sand or granular fill and washed gravel or crushed stone as coarse aggregate per ACI 530. Maximum aggregate size shall be 2”. All aggregates shall conform to ASTM C33. Gravel should be well graded and not exceed 11/2” in size. Water shall not exceed 5 1/2 gallons for each bag, unless sand is very dry. Concrete shall be mixed using an approved batch machine or mobile mixer and providing a 4” minimum to 6” maximum slump.

03 10 00 - Concrete Forming and Accessories
Provide all labor, materials and equipment necessary for the completion of the plain and reinforced concrete called for on the plans. Concrete when deposited shall have a temperature ranging between a minimum of 50 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit.

Construction of Forms - Construct wood forms of sound material, and of the correct shape and dimensions, constructed tightly and of sufficient strength to hold forms together. Make joints and seams mortar tight. Install leakage control materials in accordance with manufacturer’s installation instructions.

Chamfered Corners - Unless otherwise noted, provide chamfered corners on all exposed corners. Provide 3/4 inch moldings in forms for all chamfering required.

Embedded Items - make provisions for sleeves, anchors, inserts, water-stops and other features.

Form Ties - Use form ties of sufficient strength and in sufficient quantities to prevent spreading of the forms. Place ties at least 1 inch away from the finished surface of the concrete. Do not use ties consisting of twisted wire loops. Leave inner rods in concrete when forms are stripped. Space all form ties equidistant and symmetrical both vertically and horizontally.

Cleanouts and Access Panels - Provide removable cleanout sections or access panels at the bottom of all forms to permit inspection and effective cleaning of loose dirt, debris and water material. Clean all forms and surfaces to receive concrete.
sawdust, and other debris and thoroughly blow out with compressed air just before concrete is placed.

03 15 13 - Concrete Accessories
Provide 1/2" thick by 4" wide bituminous expansion joint material at all surfaces where slabs adjoin raised slab, crawlspace or basement stem-wall CMU or poured footings.

03 21 00 - Reinforcing Steel
Reinforcing steel (rebar) shall be minimum ASTM A615, grade 40. All reinforcement splices shall be as follows: #5 bars 25” minimum, #7 bars 35” minimum. All rebars shall be located 3” clear from bottom and side of footing and 2” clear from any other reinforcing steel (rebar). All rebar (reinforcing steel) shall be located 3” clear from bottom and side of footing and 2” clear from any other reinforcing steel (rebar). All reinforcement splices shall be in accordance with ACI 318 for “Strength Design.” All reinforcement steel shall be accurately placed, rigidly supported, and firmly tied in place with bar supports and spacers in accordance with ACI 301 and ACI 318.

03 22 00 - Welded Wire Fabric Reinforcing
Welded wire fabric shall conform to ASTM A105 and be located in the center of the slab. Install at slab on grade conditions.

03 30 00 - Footings
Center all footings on walls, piers, or columns above unless otherwise noted. All footings shall rest on undisturbed virgin soil with minimum soil bearing allowable of 2500 psf. Approved soil conditions shall be as follows: 95 percent compaction, or 3/4” stone compacted in 12” lifts to 95 percent density. Footings at building perimeter shall be a minimum of 12” below frost line (check with local building officials for frost line level) constructed of 3000 psi concrete with #5 rebar (reinforcing steel) continuous through footers. Provide #5 rebar (reinforcing steel) corner bars at all corners and intersections of footers, beams and walls. Each side should overlap 2’-0”, with a 90 degree bend. Footers shall bear on undisturbed soil and kept free from ground water. Underneath load-bearing walls and interior or exterior column footings, thicken slabs within a 1’ radius to 12” thick.

03 30 01 - Slab Foundations
Concrete floor slabs shall be constructed of 3000 psi concrete, 4” thick reinforced with 6” x 6” welded-wire mesh continuous and rebar (reinforcing steel) as per plans. Place slabs over well-compacted granular fill compacted in 12 inch lifts to 95 percent density per ASTM T-180 Proctor, and a 4 or 6 mil vapor barrier. Construction or control joints shall be provided in slabs on grade so that the maximum area between joints shall be 400 square feet and the length of that area is not more than twice the width. Provide smooth steel trowel finish for all interior slab areas and garage surfaces. Provide broom finish texture for all exterior slab areas and garage surfaces. Provide broom finish texture for all exterior slab areas. Provide positive drainage and taper lip at garage/overhead door.

03 30 02 - Poured Concrete Basement Walls
Poured walls shall be constructed of 3000 psi concrete with #5 rebar (reinforcing steel) 12” on center (OC) placed in a vertical grid. Thickness of walls shall be a minimum of 8’-0” high, 10” thick for 9’-0” high, 12” thick for 10’-0” high. Patch all voids and depressions exceeding 3/8 inch in any direction. Provide appropriate waterproofing system at exterior perimeter and install drainage as specified by manufacturers recommendations.
**03 35 00 - Concrete Finishing**
Repair of surface defects shall begin immediately after removal of form or pouring of foundation. Provide smooth steel trowel finish for all interior slab areas and garage surfaces. Provide broom finish texture for all exterior slabs. Slope exterior patio or building at 1/4” of drop in elevation for every 1'-0” in distance. At garage, provide positive drainage and taper lip at garage/overhead door. Patch all voids and depressions exceeding 3/8 inch in any direction.

**03 40 00 - Precast Concrete**
Provide all labor, materials and equipment to provide concrete structures as called for on the plans. Erect pre-cast concrete units and accurately install in place with hoisting equipment more than adequate for the loads. At completion, units shall be plumb, level and square, true to line, with angles and edges parallel with related building lines.

**03 50 00 - Cast Decks and Underlayment**
Install cementitious backer-board under ceramic tile, marble and stone finishes. Use straight edge as guide to score sheet’s face with carbide tipped scoring knife and snap upward along the score line. Large cutouts use a circular saw with carbide tipped blade.

**Floor Installation** - Install over interior wood or concrete sub-floor that is structurally sound. Ensure the sub-floor is not damaged. Replace damaged boards. Make certain sub-floor is clean and flat. Exterior grade plywood sub-floor should be at least 1 1/4” thick (5/8” minimum) for a structurally solid, movement free foundation. In addition, the space between the joists should not exceed 16” on center. In any case, the maximum allowable deflection of your sub-floor may not exceed L/360 of the span. Stagger joints. Do not align with plywood joints. Never allow all four corners of sheets to meet at one point. Apply a dry set mortar or modified thinset to sub-floor per manufacturer’s recommendations. Fasten backer-board sheets with proper nails or screws every 8” over the entire surface. Keep the fasteners between 3/8” and 3/4” from sheet edges and 2” in from sheet corners. Provide expansion joints where required.

**Countertop Installation** - Ensure cabinets are level and secure. Use exterior grade plywood positioned across the wood cabinet. Spacing between plywood supports is not to exceed 16” on center. So not align backer-board with plywood joints. Sheet ends and edges must be supported by perimeter framing. Apply a dry set mortar or modified thinset to plywood per manufacturer’s recommendations. Fasten backer-board sheets with proper nails or screws every 8” over the entire surface. Keep the fasteners between 3/8” and 3/4” from sheet edges and 2” in from sheet corners. Provide expansion joints where required.

**Wall Installation** - Ensure framing is structurally sound. Nominal 2” x 4” wood or minimum 20 gauge metal studs must be straight properly aligned and spaced a maximum of 16” on center. In tub and shower enclosures, ensure adequate reinforcement at the corners. Sheets may be installed vertically or horizontally. Score and snap sheets to required sizes and make necessary cutouts. Sheet ends and edges must be supported by a structural framing member or added blocking. In wet areas, install a moisture barrier (such as 15 lb. Felt) between studs and backer-board. Install sheets 1/4” above floor, tub or shower pan. Fasten backer-board to proper nails or screws every 8” over the entire surface. Keep the...
and 3/4” from sheet edges and 2” in from sheet corners. Set fasteners flush with the surface, without overdriving. Provide expansion joints where required.

03 54 00 - Cast Underlayment
Sub-floor shall be structurally sound. Clean sub-floor to remove mud, oil, grease, and other contaminating factors before the installation of the underlayment. Fill cracks and voids with a quick setting patching or caulking material. Allow joints to continue at the same width. Application shall not begin until the building is enclosed, including roof, walls, and other fenestrations.

Gypsum Underlayment - Place gypsum cement a minimum 1 inch (25 mm) thick over sound deadening pad. Spread and screed gypsum cement to a smooth surface. Contractor shall provide continuous ventilation and adequate heat to rapidly remove moisture from the area until the gypsum cement is dry. Contractor shall provide mechanical ventilation if necessary. Under the above conditions, for 1 inch thick gypsum cement 7-10 days is usually adequate drying time. To test for dryness, tape a 24 inch by 24 inch (609 mm by 609 mm) section of plastic or high density rubber mat to the surface of the underlayment. After 48-72 hours, if no condensation occurs, the underlayment shall be considered dry. Perform dryness test 5-7 days after pour.

Portland Cement Underlayment - Fill large cracks, holes and voids 36-48 hours prior to underlayment placement. Contraction and control joints must be marked for later saw cutting. Mix primer as per manufacturers recommendations. Apply an even coat removing any puddles. Very porous surfaces may require a second coat of primer once the first coat has dried to fully seal the floor. Allow primer to dry to touch completely. Keep primed surface clean and protected from abrasion. Mix cementitious underlayment per manufacturers recommendations. Spread out using gauged spreader tool set to the desired depth. Use spiked roller to disperse air bubbles. Repeat mixing and pouring until installation is complete. Use smoother for touchups. To avoid low spots between pours, pour into the leading edge of previous pour before initial set and spread.

03 60 00 - Grouting
Concrete surfaces to receive grout shall be prepared by removing defective concrete, asphalt, grease and other foreign matter to achieve sound, clean concrete surface.

Grouting - Mix up grout per manufacturers recommendations. Use a padded grout float to spread the grout over a workable section of tile. Push the grout into the joints to force it down into the gaps. Grout all the joints except those specified for expansion joints specifically along fixtures, between the floor and walls, or in between walls. Expansion joints will be sealed with caulk after the grouting process. Once the appropriate joints are packed with grout, scrape the surface of the tile with the grout float. Hold the float at a sharp angle and use diagonal strokes to keep from digging grout out of the joints. Clean with a damp sponge and a couple buckets of clean water. Wipe each surface of the tiles using a clean sponge in circular strokes. Once clean, make another pass parallel to the grout lines to shape the grout lines. Smooth the joints down a little below the surface of the tile. Clean the surface of the tile with a sponge or a soft rag. In 24 to 48 hours...
hardened, caulk using a clear tub/shower caulk or one in a color that matches the grout in the areas that you allowed for your expansion joints and over joints that may crack because of movement. Specifically areas between floor tile and cabinet toekick; between floor or wall tile and bathtub or shower; between floor and wall tile; and at the inside corner where two walls meet. Fill the joints completely then smooth out with a damp rag or appropriate tool. Caulk around plumbing valves, sinks and faucets to seal them from water penetration. Glazed ceramic tile surfaces only require grout joints to be sealed which will provide an enhanced water and mildew resistant surface. Apply a silicone or water-based grout sealer to all joints per manufacturer’s recommendations a minimum of 14 days after grout has been installed.

**Nonshrink Grout** - Lightly roughen concrete surface for maximum bonding per manufacturer’s recommendations. Cover concrete areas with protective waterproof covering until ready to place grout. Align and level components to maintain in final position until grout placement is complete and accepted. Install forms for grout around bases and other spaces to be grouted. The tops of such forms shall be one inch above the surfaces to be grouted. Place grout in accordance with the manufacturer’s recommendations. Pour grout from one side only until grout rises at least one inch above the plate on opposite side or said plate. Neatly trowel edges of grout base, tapered at an angle of 60 degrees.