

SECTION 03300 - CAST-IN-PLACE CONCRETE

1. GENERAL:

- A. FURNISH ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND PERFORM ALL WORK AND SERVICES NECESSARY FOR ALL CONCRETE WORK AS SHOWN AND SPECIFIED, IN ACCORDANCE WITH CONTRACT DOCUMENTS, AND COMPLETELY COORDINATED WITH WORK OF ALL OTHER TRADES.
- B. ALTHOUGH SUCH WORK IS NOT SPECIFICALLY INDICATED, FURNISH AND INSTALL ALL SUPPLEMENTARY OR MISCELLANEOUS ITEMS, APPURTENANCES AND DEVICES INCIDENTAL TO OR NECESSARY FOR A SOUND, SECURE AND COMPLETE INSTALLATION.

2. QUALITY STANDARDS:

- A. CODES AND STANDARDS: ACI 301 "SPECIFICATIONS FOR "RECOMMENDED PRACTICE FOR CONCRETE FORMWORK"; ACI 304 "RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE"; COMPLY WITH APPLICABLE PROVISIONS EXCEPT AS OTHERWISE INDICATED.
- B. CONCRETE TESTING SERVICE: EMPLOY AND PAY FOR TESTING LABORATORY ACCEPTABLE TO ARCHITECT AND OWNER TO PERFORM MATERIALS EVALUATION, TESTING AND DESIGN OF CONCRETE MIXES.
- C. CERTIFICATES, SIGNED BY MATERIAL PRODUCER AND CONTRACTOR, MAY BE SUBMITTED IN LIEU OF MATERIAL TESTING WHEN APPROVED BY ARCHITECT.
- D. QUALITY CONTROL: PERFORM SAMPLING AND TESTING DURING CONCRETE PLACEMENT:
 - (1) SAMPLING: ASTM C-172
 - (2) SLUMP: ASTM C-143, ONE (1) TEST FOR EACH LOAD AT POINT OF DISCHARGE.
 - (3) COMPRESSIVE STRENGTH: ASTM C-39, ONE (1) SET OF FOUR (4) CYLINDERS FOR EACH CLASS OF CONCRETE PER DAY'S POUR; TEST ONE AT 7 DAYS, 2 AT 28 DAYS, ONE HOLD CYLINDER FOR TESTING AT 56 DAYS IF REQUIRED.
 - (4) TEST RESULTS SHALL BE SUBMITTED DIRECTLY TO THE ARCHITECT WITH COPIES TO THE CONTRACTOR.
- E. WHEN TOTAL QUANTITY OF A GIVEN CLASS OF CONCRETE IS LESS THAN 50 CU. YDS., STRENGTH TESTS MAY BE WAIVED BY ARCHITECT IF FIELD EXPERIENCE INDICATES EVIDENCE OF SATISFACTORY STRENGTH.
- F. PROMPTLY REPORT TEST RESULTS IN WRITING TO THE ARCHITECT.

3. SUBMITTALS:

- A. **COPIES OF MANUFACTURER'S SPECIFICATIONS WITH INSTALLATION INSTRUCTIONS FOR PROPRIETARY MATERIALS INCLUDING REINFORCEMENT,**

FORMING ACCESSORIES, ADMIXTURES, JOINT MATERIALS, HARDENERS, CURING MATERIALS AND OTHER ITEMS REQUESTED BY ARCHITECT.

- B. COPIES OF LABORATORY TEST OR EVALUATION REPORTS.
 - C. SHOP DRAWINGS OF REINFORCING DETAILS.
 - D. CONCRETE DESIGN MIXES FOR EACH CLASS OF CONCRETE ON THE PROJECT.
4. MATERIALS:
- A. PORTLAND CEMENT: ASTM C-150, TYPE I OR III.
 - B. AGGREGATES: ASTM C-33. LOCAL AGGREGATES OF PROVEN DURABILITY MAY BE USED WHEN ACCEPTABLE TO ARCHITECT.
 - C. WATER: CLEAN, FREE OF OILS, ACIDS, ORGANIC MATTER.
 - D. RELATED MATERIALS:
 - (1) UNDER SLAB VAPOR BARRIER: CLEAR 10 MIL THICK POLYETHYLENE ASTM E1745.
 - (2) SUPPORT CHAIRS FOR REINFORCEMENT (WELDED WIRE FABRIC AND REBAR.)
 - E. MEMBRANE-FORMING CURING COMPOUND: ASTM C-1315, TYPE I, CLEAR, CLASS A, VSC COMPLIANT.
 - F. FORM MATERIALS:
 - (1) EXPOSED CONCRETE SURFACES: ACCEPTABLE PANEL-TYPE TO PROVIDE CONTINUOUS, STRAIGHT SMOOTH FINISH. USE LARGEST PRACTICAL SIZES TO MINIMIZE FORM JOINTS.
 - (2) UNEXPOSED CONCRETE SURFACES: SUITABLE MATERIAL DRESSED ON EDGES AND SIDES FOR TIGHT FIT.
 - G. REINFORCING MATERIALS:
 - (1) REINFORCING BARS: ASTM A-615, GRADE 60.
 - (2) PLAIN-STEEL WIRE: ASTM A-82.
 - (3) PLAIN-STEEL WELDED WIRE FABRIC: ASTM A-185.
 - (4) DEFORMED-STEEL WELDED WIRE FABRIC: ASTM A 497.
 - (5) FABRICATED BAR MATS: WELDED OR CLIP-ASSEMBLED STEEL BAR MATS, ASTM A 184. USE ASTM A 615, GRADE 60 STEEL BARS, UNLESS OTHERWISE INDICATED.
 - (6) JOINT DOWEL BARS: PLAIN STEEL BARS, ASTM A 615, GRADE 60. CUT BARS TRUE TO LENGTH WITH ENDS SQUARE AND FREE OF BURRS.

WEST NAVARRE INTERMEDIATE SCHOOL
5 CLASSROOM ADDITION

(7) HOOK BOLTS: ASTM A 307, GRADE A BOLTS, INTERNALLY AND EXTERNALLY THREADED. DESIGN HOOK BOLT JOINT ASSEMBLY TO HOLD COUPLING AGAINST PAVEMENT FORM AND IN POSITION DURING CONCRETING OPERATIONS, AND TO PERMIT REMOVAL WITHOUT DAMAGE TO CONCRETE OR HOOK BOLT.

(8) SUPPORTS FOR REINFORCEMENT: CHAIRS, SPACERS, DOWEL BAR SUPPORTS AND OTHER DEVICES FOR SPACING, SUPPORTING, AND FASTENING REINFORCING BARS, WELDED WIRE FABRIC, AND DOWELS IN PLACE. USE WIRE BAR-TYPE SUPPORTS COMPLYING WITH CRSI SPECIFICATIONS.

(A). USE SUPPORTS WITH SAND PLATES OR HORIZONTAL RUNNERS WHERE BASE MATERIAL WILL NOT SUPPORT CHAIR LEGS.

H. EXPANSION JOINT MATERIALS:

(1) ASTM D 1751, ASPHALT-SATURATED CELLULOS FIBER

5. UNACCEPTABLE MATERIALS AND METHODS:

A. **TOPPING OF CONCRETE SLABS WILL NOT BE ALLOWED.**

B. **USE OF FIBERMESH IS NOT PERMITTED.**

C. **USE OF AIR ENTRAINING ADD MIXTURE AT INTERIOR FLOOR SLABS TO RECEIVE TROWEL FINISH IS NOT PERMITTED.**

6. CONCRETE STRENGTH, MIX PROPORTIONS AND DESIGN:

A. PROVIDE FOLLOWING STRENGTHS OF CONCRETE:

(1) FOR ALL WORK; 3000 PSI. (MAXIMUM 0.53 W/C RATIO.)

B. PROPORTION MIXES BY EITHER LABORATORY TRIAL BATCH OR FIELD EXPERIENCE METHOD, COMPLYING WITH ACI 211.1.

(1) SUBMIT WRITTEN REPORT TO ARCHITECT FOR EACH PROPOSED CONCRETE MIX AT LEAST 15 DAYS PRIOR TO START OF WORK. DO NOT BEGIN CONCRETE PRODUCTION UNTIL MIXES HAVE BEEN REVIEWED AND ARE ACCEPTABLE TO ARCHITECT.

(2) ADJUST MIX DESIGNS WHEN MATERIAL CHARACTERISTICS, JOB CONDITIONS, WEATHER TEST RESULTS, OR OTHER CIRCUMSTANCES WARRANT. DO NOT USE REVISED CONCRETE MIXES UNTIL SUBMITTED TO AND ACCEPTED BY ARCHITECT.

7. FORMING AND PLACING CONCRETE:

A. JOB-SITE MIXING: USE DRUM TYPE BATCH MACHINE MIXER. MIX NOT LESS THAN 1-1/2 MINUTES FOR ONE CU. YD. OR SMALLER CAPACITY. INCREASE MIXING TIME AT LEAST 15 SECONDS FOR EACH ADDITIONAL CU. YD. OR FRACTION THEREOF.

B. READY-MIXED CONCRETE: ASTM C-94.

C. FORMWORK: CONSTRUCT SO THAT CONCRETE MEMBERS AND STRUCTURES ARE OF CORRECT SIZE, SHAPE, ALIGNMENT, ELEVATION AND POSITION, COMPLYING WITH ACI 347.

WEST NAVARRE INTERMEDIATE SCHOOL
5 CLASSROOM ADDITION

- D. PROVIDE OPENINGS IN FORMWORK TO ACCOMMODATE WORK OF OTHER TRADES. ACCURATELY PLACE AND SECURELY SUPPORT ITEMS BUILT INTO FORMS.
- E. CLEAN AND ADJUST FORMS PRIOR TO CONCRETE PLACEMENT. APPLY FORM RELEASE AGENTS OR WET FORMS, AS REQUIRED. RETIGHTEN FORMS IF REQUIRED TO ELIMINATE MORTAR LEAKS.
- F. POSITION, SUPPORT AND SECURE REINFORCEMENT AGAINST DISPLACEMENT. LOCATE AND SUPPORT WITH CHAIRS, RUNNERS, SPACERS AND HANGERS, AS REQUIRED. SET WIRE TIES SO ENDS ARE DIRECTED INTO CONCRETE, NOT TOWARD EXPOSED CONCRETE SURFACES.
- G. REENTRANT CORNERS OF SLABS: INSTALL PERPENDICULAR TO EACH REENTRANT CORNER (2) #5 x 4'-0" REINFORCING BARS. LOCATE BARS IN CENTER OF SLAB SPACED 4" AND 10" FROM THE POINT OF THE CORNER.
- H. VAPOR RETARDER: FOR ALL SLABS, PADS AND WALKS ON GRADE; INSTALL, PROTECT AND REPAIR VAPOR-RETARDER SHEETS ACCORDING TO ASTM E1643; PLACE SHEETS IN POSITION WITH LONGEST DIMENSION PARALLEL WITH DIRECTION OF POUR.

(1) LAP JOINTS 6 INCHES AND SEAL WITH MANUFACTURER'S RECOMMENDED TAPE. DO NOT CUT OR PUNCTURE VAPOR RETARDER. REPAIR DAMAGE AND RESEAL VAPOR RETARDER BEFORE PLACING CONCRETE.
- I. **PROVIDE CONSTRUCTION, ISOLATION, AND CONTROL JOINTS AS INDICATED OR REQUIRED. LOCATE CONSTRUCTION JOINTS SO AS NOT TO IMPAIR STRENGTH AND APPEARANCE OF STRUCTURE. LOCATE ISOLATION AND CONTROL JOINTS IN SLABS ON GRADE TO STABILIZE DIFFERENTIAL SETTLEMENT AND RANDOM CRACKING. IF THE USE OF SAWED JOINTS ARE APPROVED BY THE ARCHITECT, THE DEPTH OF THE SAWED JOINT SHALL BE A MINIMUM OF ¼ OF THE SLAB THICKNESS. LOCATE CONTROL JOINTS AS SHOWN AND WHERE NOT SHOWN AT A MAXIMUM 1 TO 2 RATIO WITH AREA BOUNDED BY CONTROL JOINTS TO BE NO MORE THAN 150 SQUARE FEET. IN WALKS AND DRIVES LOCATE EXPANSION JOINTS AT INTERVALS OF 30' FEET, UNLESS INDICATED OTHERWISE.**
- J. SET AND BUILD IN ANCHORAGE DEVICES AND OTHER EMBEDDED ITEMS REQUIRED FOR OTHER WORK THAT IS ATTACHED TO, OR SUPPORTED BY CONCRETE. USE SETTING DIAGRAMS, TEMPLATES AND INSTRUCTIONS FOR LOCATING AND SETTING.
- K. PLACE CONCRETE IN COMPLIANCE WITH ACI 304. PLACE IN A CONTINUOUS OPERATION WITHIN PLANNED JOINTS OR SECTIONS. BEGIN PLACEMENT WHEN WORK OF OTHER TRADES AFFECTING CONCRETE IS COMPLETED.
- L. CONSOLIDATE CONCRETE USING MECHANICAL VIBRATORS SUPPLEMENTED WITH HAND RODDING AND TAMPING, SO THAT CONCRETE IS WORKED AROUND REINFORCEMENT AND EMBEDDED ITEMS INTO ALL PARTS OF FORMS.
- M. PROTECT CONCRETE FROM PHYSICAL DAMAGE OR REDUCED STRENGTH DUE TO WEATHER EXTREMES.
 - (1) IN COLD WEATHER COMPLY WITH ACI 306.
 - (3) IN HOT WEATHER COMPLY WITH ACI 305.

WEST NAVARRE INTERMEDIATE SCHOOL
5 CLASSROOM ADDITION

- N. WHEN JOINING EXISTING PAVING, PLACE TRANSVERSE JOINTS TO ALIGN WITH PREVIOUSLY PLACED JOINTS, UNLESS INDICATED OTHERWISE.
 - O. **CONCRETE WALKS AND PADS SHALL HAVE MINIMUM THICKNESS OF 4" AND AN 8" TURNED DOWN EDGE. WALKS AND PADS SHALL BE REINFORCED WITH WELDED WIRE FABRIC. TOOL ALL WALKS INTO SQUARES. ALL WALKS SHALL HAVE UNDER SLAB VAPOR BARRIERS.**
 - P. CURBS AND GUTTERS: SHALL BE CONSTRUCTED IN ACCORDANCE WITH FDOT SPECS. WHEN AUTOMATIC MACHINE PLACEMENT IS USED FOR CURB AND GUTTER PLACEMENT, SUBMIT REVISED MIX DESIGN AND LABORATORY TEST RESULTS THAT MEET OR EXCEED REQUIREMENTS. PRODUCE CURBS AND GUTTERS TO REQUIRED CROSS SECTION, LINES, GRADES, FINISH, AND JOINTING AS SPECIFIED FOR FORMED CONCRETE. IF RESULTS ARE NOT ACCEPTABLE, REMOVE AND REPLACE WITH FORMED CONCRETE.
 - Q. SLIP-FORM PAVERS: WHEN AUTOMATIC MACHINE PLACEMENT IS USED FOR PAVING, SUBMIT REVISED MIX DESIGN AND LABORATORY TEST RESULTS THAT MEET OR EXCEED REQUIREMENTS. PRODUCE PAVING TO REQUIRED THICKNESS, LINES, GRADES, FINISH, AND JOINTING AS REQUIRED FOR FORMED PAVING.
 - (1) COMPACT SUBGRADE OF SUFFICIENT WIDTH TO PREVENT DISPLACEMENT OF PAVER MACHINE DURING OPERATIONS.
 - R. WHEN ADJOINING PAVEMENT LANES ARE PLACED IN SEPARATE POURS, DO NOT OPERATE EQUIPMENT ON CONCRETE UNTIL PAVEMENT HAS ATTAINED 85 PERCENT OF ITS 28-DAY COMPRESSIVE STRENGTH, OR SUFFICIENT STRENGTH TO CARRY LOADS WITHOUT DAMAGE OR INJURY.
8. **CONCRETE FINISHES:**
- A. EXPOSED-TO-VIEW SURFACES: PROVIDE A SMOOTH FINISH FOR EXPOSED CONCRETE SURFACES AND SURFACES THAT ARE TO BE COVERED WITH A COATING OR COVERING MATERIAL APPLIED DIRECTLY TO CONCRETE. REMOVE FINES AND PROJECTIONS, AND PATCH DEFECTIVE AREAS WITH CEMENT GROUT.
 - B. SLAB TROWEL FINISH: APPLY STEEL TROWEL FINISH TO MONOLITHIC SLAB SURFACES THAT ARE EXPOSED-TO-VIEW OR ARE TO BE COVERED WITH RESILIENT FLOORING OR CARPET. CONSOLIDATE CONCRETE SURFACE BY TROWELING, FREE OF TROWEL MARKS, UNIFORM IN TEXTURE AND APPEARANCE. FINISH CONCRETE TO MAXIMUM TOLERANCE OF 1/8 INCH IN 10 FEET.
 - C. WALKS AND PADS SHALL HAVE A LIGHT BROOM FINISH WITH TOOLED EDGES AND JOINTS. PROVIDE SAMPLE FOR ARCHITECT'S APPROVAL PRIOR TO PROCEEDING WITH THE WORK. SAMPLE MAY BE INCORPORATED INTO THE WORK IF APPROVED BY THE ARCHITECT.
 - D. BEGIN CURING AS SOON AS FREE WATER HAS DISAPPEARED FROM EXPOSED SURFACES. WHERE POSSIBLE, KEEP CONTINUOUSLY MOIST FOR NOT LESS THAN 72 HOURS. CONTINUE CURING BY USE OF WHITE MOISTURE RETAINING COVER OR MEMBRANE FORMING CURING COMPOUND FOR A TOTAL CURING TIME OF NOT LESS THAN SEVEN (7) DAYS. FORMS SHALL REMAIN IN PLACE FOR AS LONG A PERIOD AS PRACTICAL. CURE FORMED SURFACES BY MOIST CURING UNTIL FORMS ARE REMOVED. PROVIDE PROTECTION AS REQUIRED TO PREVENT DAMAGE TO CONCRETE.

WEST NAVARRE INTERMEDIATE SCHOOL
5 CLASSROOM ADDITION

- E. TINE FINISH: APPLY TO CURB CUT RAMPS AND OTHER AREAS AS NOTED ON DRAWINGS. FINISH SHALL BE APPLIED BY AN APPROVED HAND METHOD AND SHALL CONSIST OF TRANSVERSE GROOVES WHICH ARE 0.03 TO 0.12 INCH IN WIDTH AND 0.10 TO 0.15 INCH IN DEPTH, SPACED AT APPROXIMATELY ½ INCH CENTER TO CENTER
- F. FINE TOOLING: TOOL EDGES OF PAVING, GUTTERS, CURBS AND JOINTS FORMED IN FRESH CONCRETE WITH A JOINTING TOOL TO THE FOLLOWING RADIUS. REPEAT TOOLING OF EDGES AND JOINTS AFTER APPLYING SURFACE FINISHES. ELIMINATE TOOL MARKS ON CONCRETE SURFACES.

(1) RADIUS: ½ INCH.

9. REPAIRS AND PROTECTION:

- A. REMOVE AND REPLACE CONCRETE WORK THAT IS BROKEN, DAMAGED, MARRED BY GRAFFITI OR DEFECTIVE, OR DOES NOT MEET THE REQUIREMENTS OF THIS SECTION.
- B. DRILL TEST CORES WHERE DIRECTED BY ENGINEER WHEN NECESSARY TO DETERMINE MAGNITUDE OF CRACKS OR DEFECTIVE AREAS. FILL DRILLED CORE HOLES IN SATISFACTORY CONCRETE AREAS WITH PORTLAND CEMENT CONCRETE BONDED TO PAVING WITH EPOXY ADHESIVE.
- C. PROTECT CONCRETE FROM DAMAGE. EXCLUDE TRAFFIC FROM CONCRETE PAVEMENT FOR AT LEAST 14 DAYS AFTER PLACEMENT. WHEN CONSTRUCTION TRAFFIC IS PERMITTED, MAINTAIN CONCRETE AS CLEAN AS POSSIBLE BY REMOVING SURFACE STAINS AND SPILLAGE OF MATERIALS AS THEY OCCUR.
- D. MAINTAIN CONCRETE WORK FREE OF STAINS, DISCOLORATION, DIRT AND OTHER FOREIGN MATERIAL. SWEEP CONCRETE PAVING NOT MORE THAN 2 DAYS PRIOR TO DATE SCHEDULED FOR SUBSTANTIAL COMPLETION INSPECTIONS.

END OF SECTION