1 CONCRETE

A. GENERAL REQUIREMENTS

1. ALL CONCRETE CONSTRUCTION SHALL CONFORM TO REQUIREMENTS SET FORTH IN ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE", AND ACI 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE".
2. CAST-IN-PLACE AND PRECAST CONSTRUCTION TOLERANCES FOR MEMBER SIZE AND LOCATION SHALL BE IN CONFORMANCE WITH ACI 117 AND ACI ITG-7, RESPECTIVELY.
3. NORMAL WEIGHT CONCRETE SHALL BE IN CONFORMANCE WITH ASTM C33 WITH A NOMINAL MAXIMUM AGGREGATE SIZE OF 3/4".
4. LIGHTWEIGHT CONCRETE SHALL BE IN CONFORMANCE WITH ASTM C330 AND THE RESULTS OF ASTM C330 SHALL BE SUBMITTED TO E.O.R. FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT. THE VOLUMETRIC FRACTIONS OF THE AGGREGATE SHALL ALSO BE SUBMITTED TO E.O.R. FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT.
5. PORTLAND CEMENT SHALL BE TYPE I/II IN CONFORMANCE WITH ASTM C150.
6. OTHER CEMENTITIOUS MATERIALS SHALL CONFORM TO THE FOLLOWING:
   a. BLENDED HYDRAULIC CEMENTS: = ASTM C595
   b. EXPANSIVE HYDRAULIC CEMENT: = ASTM C845
   c. HYDRAULIC CEMENT: = ASTM C1157
   d. FLY ASH AND NATURAL POZZOLAN: = ASTM C618
   e. SLAG CEMENT: = ASTM C989
   f. SILICA FUME: = ASTM C1240
7. MIXING WATER SHALL CONFORM TO ASTM C1602.
8. ADMIXTURES MAY BE USED TO INCREASE THE WORKABILITY OF THE CONCRETE UPON WRITTEN APPROVAL OF THE CONCRETE MANUFACTURER OR THE PROJECT TESTING LABORATORY. TESTING ON CONCRETE SHALL BE DONE PRIOR TO THE ADDITION OF ADMIXTURES.
9. ADMIXTURES SHALL CONFORM TO THE FOLLOWING:
   a. WATER REDUCTION AND SETTING TIME MODIFICATION: = ASTM C494
   b. PRODUCING FLOWING CONCRETE: = ASTM C1017
   c. AIR ENTRAINMENT: = ASTM C260
   d. INHIBITING CHLORIDE-INDUCED CORROSION: = ASTM C1528
10. CONCRETE MIXTURE PROPORTIONS SHALL CONFORM WITH ACI 301 AND ESTABLISHED SO CONCRETE CAN BE PLACED READILY WITHOUT SEGREGATION INTO FORMS AND AROUND REINFORCEMENT.
11. ALL CONCRETE MIXING AND TRANSPORTATION OF CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ATM C94 AND ASTM C685.
12. STAIN AND TEXTURE OF EXPOSED CONCRETE SURFACES PER OWNER'S DIRECTION, IF APPLICABLE.
13. THE SLUMP OF THE CONCRETE SHALL BE BETWEEN:
   a. BEAMS/COLUMNS: 3" ± 1"
   b. WALLS/FOUNDATIONS: 5" ± 1"
   c. SLABS-ON-GRADE: 4" ± 1"
14. THE CONCRETE SHALL MEET THE MOST STRINGENT REQUIREMENTS FROM THE FOLLOWING EXPOSURE CLASSES:
15. ALL FOOTINGS, FOUNDATIONS, AND STEM WALLS: = **F1, S0, W0, C0**
16. INTERIOR SLABS-ON-GRADE: = **F0, S0, W0, C0 WITH MIN. 4000 PSI STRENGTH**
17. EXTERIOR SLABS-ON-GRADE: = **F2, S0, W0, C0**
18. CONCRETE EXPOSURE CLASSES AND REQUIREMENTS:

EXPOSURE CATEGORY: F

EXPOSURE CLASS	MAXIMUM w/cm	MINIMUM f'_c (psi)	AIR CONTENT (%)	LIMITS ON MAXIMUM PERCENT OF TOTAL CEMENTITIOUS MATERIALS BY MASS				
F0	N/A	2500	N/A	N/A				
F1	0.55	3500	5	N/A				
F2	0.45	4500	6	N/A				
F3	0.40	5000	6	ASTM C618	ASTM C989	ASTM C1240	TOTAL OF ASTM C618 & ASTM C1240	TOTAL OF ASTM C618 & ASTM C989 & ASTM C1240
				25%	50%	10%	35%	50%

EXPOSURE CATEGORY: S

EXPOSURE CLASS	MAXIMUM w/cm	MINIMUM f'_c (psi)	CEMENTITIOUS MATERIALS			
			ASTM C150	ASTM C595	ASTM C1157	CALCIUM CHLORIDE ADMIXTURE
S0	N/A	2500	N/A	N/A	N/A	N/A
S1	0.50*	4000	II	IP(MS), IS(MS), OR IT(MS)	MS	N/A
S2	0.45	4500	V	IP(HS), IS(HS), OR IT(HS)	HS	NOT PERMITTED
S3	0.45	4500	V + POZZOLAN OR SLAG CEMENT	IP(HS), IS(HS), OR IT(HS) + POZZOLAN OR SLAG CEMENT	HS + POZZOLAN OR SLAG CEMENT	NOT PERMITTED

EXPOSURE CATEGORY: W

EXPOSURE CLASS	MAXIMUM w/cm	MINIMUM f'_c (psi)
W0	N/A	2500
W1	0.50	4000

EXPOSURE CATEGORY: C

EXPOSURE CLASS	MAXIMUM w/cm	MINIMUM f'_c (psi)	MAXIMUM WATER-SOLUBLE CHLORIDE ION (Cl^-) CONTENT IN NONPRESTRESSED CONCRETE, PERCENT BY WEIGHT OF CEMENT
C0	N/A	2500	1.00
C1	N/A	2500	0.30
C2	0.40	5000	0.15

*FOR SEAWATER EXPOSURE THE MAXIMUM w/cm RATIO SHALL BE 0.40.

19. TEMPERATURE REQUIREMENTS OF THE CONCRETE SHALL CONFORM TO THE FOLLOWING:
   a. CONCRETE SHALL BE MAINTAINED AT A TEMPERATURE MINIMUM OF 50°F AND IN A MOIST CONDITION FOR AT LEAST THE FIRST 7 DAYS AFTER PLACEMENT.
   b. ADEQUATE EQUIPMENT SHALL BE PROVIDED FOR HEATING CONCRETE MATERIALS AND PROTECTING CONCRETE DURING FREEZING OR NEAR-FREEZING WEATHER.
   c. FROZEN MATERIALS OR MATERIALS CONTAINING ICE SHALL NOT BE USED.
   d. FORMS, FILLERS, AND GROUND WITH WHICH CONCRETE IS TO COME IN CONTACT SHALL BE FREE FROM FROST AND ICE.
   e. CONCRETE SHALL NOT EXCEED A TEMPERATURE MAXIMUM OF 95°F AT THE TIME OF PLACEMENT.
   f. HANDLING, PLACING, PROTECTION, AND CURING PROCEDURES SHALL LIMIT CONCRETE TEMPERATURES OR WATER EVAPORATION THAT COULD REDUCE STRENGTH SERVICEABILITY, AND DURABILITY OF THE MEMBER OR STRUCTURE.
   g. HOT WEATHER AND COLD WEATHER CONCRETE CONSTRUCTION SHALL BE DONE IN COMPLIANCE WITH ACI 305.1 AND ACI 306.1, RESPECTIVELY.
   h. CONCRETE MATERIALS AND PRODUCTION METHODS SHALL BE SELECTED SO THAT THE CONCRETE TEMPERATURE AT DELIVERY COMPLIES WITHIN THE SPECIFIED TEMPERATURE LIMITS.
   i. PROVISIONS LISTED DO NOT PROTECT CONCRETE AGAINST CHEMICALLY AGGRESSIVE SOLUTIONS, CONTACT E.O.R. IF SUCH CONDITIONS APPLY.

B. PLACEMENT REQUIREMENTS

1. STANDING WATER SHALL BE REMOVED FROM THE PLACE OF DEPOSIT BEFORE CONCRETE IS PLACED UNLESS A TREMIE IS USED.
2. CONCRETE MASONRY UNITS THAT WILL BE IN CONTACT WITH CONCRETE SHALL BE PRE-WETTED PRIOR TO PLACING CONCRETE.
3. CONCRETE SHALL NOT BE CONVEYED WITH PIPES, TREMIES, OR CHUTES MADE OF ALUMINUM OR ALUMINUM ALLOYS.
4. CONCRETE SHALL BE PLACED:
   a. AT A RATE SO CONCRETE AT ALL TIMES HAS SUFFICIENT WORKABILITY TO BE CONSOLIDATED APPROPRIATELY.
   b. WITHOUT SEGREGATION OR LOSS OF MATERIALS.
   c. WITHOUT INTERRUPTIONS TO MAINTAIN WORKABILITY BETWEEN SUCCESSIVE PLACEMENTS TO PREVENT AN UNINTENTIONAL COLD JOINT.
   d. AS NEAR TO ITS FINAL LOCATION AS PRACTICABLE TO AVOID SEGREGATION DUE TO REHANDLING OR FLOWING.
5. CONCRETE THAT HAS BEEN CONTAMINATED OR HAS LOST ITS INITIAL WORKABILITY TO THE EXTENT THAT IT CAN NO LONGER BE CONSOLIDATED APPROPRIATELY SHALL NOT BE USED.
6. RETEMPERING CONCRETE IN ACCORDANCE WITH ASTM C94 SHALL BE PERMITTED AS LONG AS THE LIMITS ON MAXIMUM MIXING TIME AND w/cm ARE NOT VIOLATED.
7. AFTER STARTING, CONCRETING SHALL BE A CONTINUOUS OPERATION UNTIL THE COMPLETION OF A PANEL OR SECTION, AS DEFINED BY ITS BOUNDARIES OR PREDETERMINED JOINTS.
8. CONCRETE SHALL BE CONSOLIDATED APPROPRIATELY DURING PLACEMENT AND SHALL BE WORKED AROUND REINFORCEMENT AND EMBEDMENTS AND INTO CORNERS OF FORMS.
9. TOP SURFACES OF VERTICALLY FORMED LIFTS SHALL BE GENERALLY LEVEL.
10. JOINT LOCATIONS OR JOINT DETAILS NOT SHOWN OR THAT DIFFER FROM THOSE INDICATED IN THE CONSTRUCTION DOCUMENTS SHALL BE SUBMITTED FOR REVIEW BY THE E.O.R.
11. CONSTRUCTION JOINTS SHALL BE CLEANED AND LAITANCE REMOVED BEFORE NEW CONCRETE IS PLACED.
12. THE SURFACE OF CONCRETE CONSTRUCTION JOINTS SHALL BE INTENTIONALLY ROUGHENED.
13. IMMEDIATELY BEFORE THE NEW CONCRETE IS PLACED, CONSTRUCTION JOINTS SHALL BE PRE-WETTED AND STANDING WATER REMOVED.
14. CONCRETE BEAMS, GIRDERS, OR SLABS SUPPORTED BY COLUMNS OR WALLS SHALL NOT BE CAST UNTIL CONCRETE IN THE VERTICAL SUPPORT MEMBERS IS NO LONGER WORKABLE AND SOFT.
15. CONCRETE BEAMS, GIRDERS, HAUNCHES, DROP PANELS, SHEAR CAPS, AND CAPITALS SHALL BE PLACED MONOLITHICALLY AS PART OF A SLAB SYSTEM, U.N.O.
16. SAW CUTTING IN SLABS-ON-GRADE IDENTIFIED IN THE CONSTRUCTION DOCUMENTS AS STRUCTURAL DIAPHRAGMS OR PART OF THE SEISMIC-FORCE-RESISTING SYSTEM SHALL NOT BE PERMITTED U.N.O.
17. ALUMINUM EMBEDMENTS SHALL BE COATED OR COVERED TO PREVENT ALUMINUM-CONCRETE REACTION AND ELECTROLYTIC ACTION BETWEEN ALUMINUM AND STEEL.
18. IN SOLID SLABS, PIPING, EXCEPT FOR RADIANT HEATING FOR SNOW MELTING, SHALL BE PLACED IN THE CENTER OF THE SLAB ABOVE REINFORCEMENT OR BETWEEN TOP AND BOTTOM REINFORCEMENT.
19. CONDUIT AND PIPING SHALL BE FABRICATED AND INSTALLED SO THAT CUTTING, BENDING, OR DISPLACEMENT OF REINFORCEMENT FROM ITS SPECIFIED LOCATION IS NOT REQUIRED

C. FORMWORK REQUIREMENTS

1. FORMWORK SHALL BE DESIGNED, FABRICATED, INSTALLED, AND REMOVED BY THE CONTRACTOR.
2. DESIGN OF FORMWORK SHALL TAKE INTO CONSIDERATION:
   a. METHOD OF CONCRETE PLACEMENT.
   b. RATE OF CONCRETE PLACEMENT.
   c. CONSTRUCTION LOADS, INCLUDING VERTICAL, HORIZONTAL, AND IMPACT.
   d. AVOIDANCE OF DAMAGE TO PREVIOUSLY CONSTRUCTED MEMBERS.
3. FORMWORK FABRICATION AND INSTALLATION SHALL RESULT IN A FINAL STRUCTURE THAT CONFORMS TO SHAPES, LINES, AND DIMENSIONS OF THE MEMBERS AS REQUIRED BY THE CONSTRUCTION DOCUMENTS.
4. FORMWORK SHALL BE SUFFICIENTLY TIGHT TO INHIBIT LEAKAGE OF PASTE OR MORTAR.
5. FORMWORK SHALL BE BRACED OR TIED TOGETHER TO MAINTAIN POSITION AND SHAPE.
6. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL DEVELOP A PROCEDURE AND SCHEDULE FOR REMOVAL OF FORMWORK AND INSTALLATION OF RESHORES AS NEEDED TO ACCOMMODATE ANY LOADS TRANSFERRED TO THE STRUCTURE DURING THIS PROCESS.
7. STRUCTURAL ANALYSIS AND CONCRETE STRENGTH REQUIREMENTS USED IN PLANNING AND IMPLEMENTING THE FORMWORK REMOVAL AND RESHORE INSTALLATION SHALL BE GIVEN BY THE CONTRACTOR TO THE E.O.R. AND TO THE BUILDING OFFICIAL, WHEN REQUESTED OR REQUIRED
8. NO CONSTRUCTION LOADS SHALL BE PLACED ON, NOR ANY FORMWORK REMOVED FROM, ANY PART OF THE STRUCTURE UNDER CONSTRUCTION EXCEPT WHEN THAT PORTION OF THE STRUCTURE IN COMBINATION WITH REMAINING FORMWORK HAS ACHIEVED DESIGN STRENGTH TO SUPPORT ITS WEIGHT AND LOADS PLACED ON IT SAFELY AND WITHOUT IMPAIRING SERVICEABILITY.
9. NO CONSTRUCTION LOADS EXCEEDING THE COMBINATION OF SUPERIMPOSED DEAD LOAD PLUS LIVE LOAD INCLUDING REDUCTION SHALL BE PLACED ON ANY UNSHORED PORTION OF THE STRUCTURE UNDER CONSTRUCTION, UNLESS ANALYSIS INDICATES ADEQUATE STRENGTH TO SUPPORT SUCH ADDITIONAL LOADS AND WITHOUT IMPAIRING SERVICEABILITY.

D. SUBMITTAL REQUIREMENTS

1. SUBMIT PRODUCT DOCUMENTATION OF CONCRETE MIXTURE CHARACTERISTICS, INCLUDING STRENGTH, SLUMP, AIR CONTENT, ADMIXTURES, WATER CONTENT, CEMENTITIOUS MATERIALS, AND LOCATION OF CONCRETE PLACEMENT RELATIVE TO SPECIFIC MIX.

2 REINFORCING STEEL

A. GENERAL REQUIREMENTS

1. ALL ARRANGEMENT, FABRICATION AND DETAILING OF REINFORCING STEEL, INCLUDING BAR SUPPORTS AND SPACERS SHALL BE IN ACCORDANCE WITH THE ACI 315 DETAILING MANUAL.
2. REINFORCING SHALL BE AS FOLLOWS:
   a. #4 BARS AND SMALLER: = ASTM A615, GRADE 40
   b. #5 BARS AND LARGER: = ASTM A615, GRADE 60
   c. TIES AND STIRRUPS: = ASTM A615, GRADE 60
   d. REBAR TO BE WELDED: = ASTM A706, GRADE 60
   e. HEADED DEFORMED BARS: = ASTM A970, GRADE 60
   f. EPOXY COATED BARS: = ASTM D3963 AND A775 OR A934, GRADE 60
   g. SMOOTH WELDED WIRE REINFORCEMENT: = ASTM A185 AND ASTM A1064
   h. DEFORMED WELDED WIRE REINFORCEMENT: = ASTM A497 AND ASTM A1064
   i. FIBER REINFORCEMENT: = ASTM C1116
3. ALL REINFORCING STEEL SHALL BE KEPT CLEAN AND FREE OF RUST.
4. ALL REINFORCING STEEL SHALL BE SUPPORTED IN FORMS, SPACED WITH NECESSARY ACCESSORIES AND SHALL BE SECURELY WIRED TOGETHER, IN ACCORDANCE WITH THE LATEST EDITION OF THE CRSI MANUAL OF STANDARD PRACTICE.
5. ALL REINFORCING SHALL BE BENT COLD. BARS SHALL NOT BE UN-BENT AND RE-BENT. FIELD BENDING OF REBAR SHALL NOT BE ALLOWED UNLESS SPECIFICALLY NOTED.
6. ALL WELDED WIRE REINFORCEMENT (WWR) SHALL BE FLAT SHEETS WITH A MINIMUM YIELD STRENGTH OF 60 KSI.
7. ALL DOWELS, ANCHOR BOLTS AND OTHER HARDWARE TO BE SET IN CONCRETE SHALL BE TIED IN PLACE PRIOR TO THE PLACEMENT OF CONCRETE. NO WET SETTING, STABBING, RODDING, OR OTHER MOVEMENT OF EMBEDDED ITEMS SHALL BE PERFORMED DURING THE PLACEMENT OF CONCRETE.
8. FOR NON-STRUCTURAL SLAB-ON-GRADE, FIBER REINFORCING MAY BE USED IN LIEU OF STEEL REINFORCING. CONTRACTOR TO PROVIDE E.O.R. FIBER SPECIFICATIONS AN SUBMITTAL BEFORE CONSTRUCTION. FIBER REINFORCED CONCRETE SHALL BE PLACED AND FINISHED PER MFR.
9. ALL REINFORCING DOWELS SHALL BE THE SAME GRADE, SIZE AND SPACING AS THE MAIN REINFORCING U.N.O.

B. EXECUTION REQUIREMENTS

1. ALL REINFORCING STEEL SHALL BE ACCURATELY LOCATED AND ADEQUATELY SECURED IN POSITION PRIOR TO AND DURING PLACEMENT OF CONCRETE. TOLERANCES FOR PLACEMENT OF REBARS MUST BE IN ACCORDANCE WITH ACI 301.
2. ALL REINFORCING STEEL SPACINGS SHOWN ARE MAXIMUM ON CENTER DIMENSIONS.
3. ALL REINFORCEMENT SHALL BE CONTINUOUS THROUGH ALL COLD JOINTS U.N.O.
4. ALL LAPS IN WWR SHALL BE MADE SUCH THAT THE OVERLAP MEASURED BETWEEN OUTERMOST CROSS WIRE OF EACH FABRIC SHEET, IS NOT LESS THAN THE SPACING OF CROSS WIRES PLUS 2". SUPPORT FOR WWR IN SLABS ON A MINIMUM (1) CHAIR PER EVERY 25 SQUARE FEET OF COVERAGE.
5. ALL WELDING OF REINFORCING BARS AND DOWELS SHALL BE MODE ONLY AT LOCATIONS INDICATED ON PLANS OR DETAILS.
6. MINIMUM CONCRETE COVER FROM FACE OF CONCRETE TO EDGE OF REINFORCEMENT BASED ON EXPOSURE CONDITION, SHALL BE AS FOLLOWS:
   a. CONCRETE CAST AGAINST EARTH: = 3"
   b. FORMED SURFACES EXPOSED TO EARTH OR WEATHER:
      - #5 BARS OR SMALLER: = 1-1/2"
      - #6 BARS OR LARGER: = 2"
   c. FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER:
      - BEAM, COLUMN, AND PIER TIES: = 1-1/2"
      - #11 BARS OR SMALLER IN SLABS, WALLS, AND JOISTS: = 3/4"
      - #14 BARS OR LARGER IN SLABS, WALLS, AND JOISTS: = 1-1/2"
   d. STRUCTURAL SLABS ON GRADE:
      - FROM BOTTOM OF SLAB: = 2"
      - FROM TOP OF SLAB: = 1-1/2"
7. WHERE #3 STIRRUPS OR TIES ARE USED, ENSURE THAT THE COVER FOR THE LONGITUDINAL BARS IS ADEQUATE.
8. THE CONTRACTOR TO PROVIDE CHAIRS, SPACERS, AND SAND PLATES AS REQUIRED TO MAINTAIN CONCRETE COVER. CHAIRS OR SPACERS SHALL BE NON-FERROUS OR PLASTIC COATED WHEN RESTING ON EXPOSED SURFACES.
9. HOOK ENDS OF BARS INTERRUPTED BY OPENINGS. ALL HOOKS SHALL BE STANDARD HOOKS UNLESS OTHERWISE NOTED.
10. U.N.O. THERE SHALL BE A MIN. OF (1) #4 BAR ON ALL SIDES OF EVERY OPENING WHICH IS LESS THAN 48". WHERE OPENINGS ARE 48" OR GREATER, A MIN. OF (2) #5 BARS SHOULD BE USED. IN BOTH CASES, THE BARS SHALL EXTEND NOT LESS THAN 24" BEYOND THE TOP CORNER OF THE OPENINGS. THIS APPLIES TO BOTH CONCRETE AND MASONRY SLAB, WALL, AND ROOF OPENINGS.
11. MINIMUM REINFORCING LAP SPLICES/DEVELOPMENT LENGTHS:

REINFORCING LAP SPLICE SCHEDULE

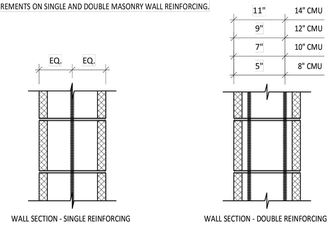
BAR SIZE		NORMAL WEIGHT CONCRETE ($F'c$=3,000 PSI)				MASSONRY ($F'm$=200 PSI)		
	MIN. CENTER TO CENTER BAR SPACING (DIAMETER)	OTHER BARS (YIELD STRENGTH 60 KSI)		TOP BARS (YIELD STRENGTH 60 KSI)		CMU BLOCK SIZE	ALL BARS (YIELD STRENGTH 60 KSI)	
		MIN. EMBED. LENGTH AND CLASS "A" SPLICE LENGTH	CLASS "B" SPLICE LENGTH	MIN. EMBED. LENGTH AND CLASS "A" SPLICE LENGTH	CLASS "B" SPLICE LENGTH		SPLICE LENGTH BARS CENTERED IN WALL (SINGLE)	SPLICE LENGTH BARS AT FACE IN WALL (SINGLE)
#3	2D	25"	33"	33"	42"	6"	18"	---
	3D	17"	22"	22"	28"	8"	18"	18"
	4D	13"	17"	17"	21"	10"	18"	18"
	5D	12"	16"	16"	17"	12"	18"	18"
#4	2D	33"	43"	43"	56"	6"	24"	---
	3D	22"	29"	29"	38"	8"	24"	24"
	4D	17"	22"	22"	28"	10"	24"	24"
	5D	14"	18"	18"	23"	12"	24"	24"
#5	2D	42"	54"	54"	70"	8"	30"	30"
	3D	28"	36"	36"	47"	10"	30"	30"
	4D	21"	27"	27"	35"	12"	30"	30"
	5D	17"	22"	22"	28"	14"	30"	30"
#6	2D	50"	65"	65"	84"	8"	38"	57"
	3D	33"	43"	43"	56"	10"	36"	57"
	4D	25"	33"	33"	42"	12"	36"	57"
	5D	20"	26"	26"	34"	14"	36"	57"
#7	2D	72"	94"	94"	122"	10"	42"	80"
	3D	48"	63"	63"	81"	12"	42"	80"
	4D	36"	47"	47"	61"	14"	42"	80"
	5D	29"	38"	38"	49"	16"	42"	80"
#8	2D	83"	107"	107"	139"	10"	---	---
	3D	55"	72"	72"	93"	12"	50"	---
	4D	42"	54"	54"	70"	14"	48"	---
	5D	33"	43"	43"	56"	16"	48"	---

CONCRETE NOTES:

1. TABLE PRESENTS LENGTHS OF TENSION DEVELOPMENT LENGTHS AND TENSION LAP SPLICE LENGTHS BASED ON ACI 318.
2. MIN. CONCRETE COVER MEASURED FROM THE BAR CENTER SHALL BE AT LEAST 1/2" THE MIN. CENTER TO CENTER BAR SPACING.
3. MULTIPLY LENGTHS SHOWN BY 1.3 FOR LIGHTWEIGHT CONCRETE.
4. LTIPLE LENGTHS SHOWN BY 1.5 (1.3 FOR TOP BARS) FOR EPOXY COATED BARS w/ COVER LESS THAN 3D OR CLEAR SPACING LESS THAN 6D. ALL OTHER EPOXY COATED BARS SHALL BE MULTIPLIED BY 1.2.
5. FOR 4500PSI CONCRETE MULTIPLY VALUES IN TABLE BY 0.816.

MASONRY NOTES:

1. MASONRY LENGTHS IN BOLD ARE BASED ON MSJC, ALL OTHER VALUES ARE BASED ON STANDARD PRACTICE FOR BRACING MASONRY WALLS UNDER CONSTRUCTION.
2. MASONRY LAP LENGTHS ARE DO NOT APPLY TO EPOXY COATED BARS. NOTIFY E.O.F IF THIS CONDITION EXISTS.
3. EE BELOW REQUIREMENTS ON SINGLE AND DOUBLE MASONRY WALL REINFORCING.



12. ANY LENGTHS NOT SPECIFICALLY NOTED IN THE REINFORCING LAP SPLICE SCHEDULE NEED TO BE SUBMITTED AND APPROVED BY THE E.O.R. BEFORE CONSTRUCTION.
13. CLASS "A" LAP LENGTHS APPLY WHEN BAR LAPS ARE STAGGERED TO LAP HALF THE BARS AT THE SAME LOCATION OR WHEN BARS ARE LAPPED AT A LOCATION WHERE THE REINFORCEMENT AREA PROVIDED IS AT LEAST TWICE THAT REQUIRED.
14. CLASS "B" LAP LENGTHS APPLY WHEN THE BARS ARE SPLICED AT A LOCATION OF MAXIMUM STRESS IN THE BARS.
15. TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SO THAT MORE THAN 12" OF CONCRETE IS CAST BELOW THE REINFORCEMENT.
16. BOTTOM BARS SHALL NOT HAVE AN EMBEDMENT LENGTH, CLASS "A" SPLICE LENGTH, AND CLASS "B" SPLICE LENGTH LESS THAN 12".

C. SUBMITTAL REQUIREMENTS

1. SUBMIT SHOP DRAWINGS THAT SHOW ELEVATIONS OF REINFORCED WALLS, DETAILED BENDING, LAP LENGTHS AND PLACEMENT OF REINFORCING BARS.

3 SPECIAL INSPECTIONS & QUALITY ASSURANCE

A. GENERAL REQUIREMENTS

1. AN INDEPENDENT CERTIFIED TESTING LAB AND QUALIFIED INSPECTOR APPROVE BY THE BUILDING OFFICIAL SHALL BE RETAINED BY THE OWNER TO PROVIDE INSPECTIONS AND SPECIAL INSPECTIONS AS DESCRIBED HEREIN.
2. ALL SPECIAL INSPECTIONS SHALL BE PERFORMED TO MEET THE REQUIREMENTS OF THE GOVERNING CODE AS RECOMMENDED BY THE BUILDING OFFICIAL.
3. THE CONTRACTOR SHALL NOT COVER WORK REQUIRED TO BE INSPECTION PRIOR TO THE INSPECTION BEING MADE. IF WORK IS COVERED, THE CONTRACTOR WILL BE RESPONSIBLE FOR UNCOVERING AS NECESSARY.
4. THE CONTRACTOR AND SPECIAL INSPECTOR SHALL NOTIFY THE BUILDING OFFICIAL AND E.O.R. OF ANY ITEMS NOT COMPLYING WITH THE PROJECT SPECIFICATIONS, CONSTRUCTION DOCUMENTS AND/OR APPLICABLE CODES BEFORE PROCEEDING WITH ANY WORK INVOLVING THAT ITEM. THE ENGINEER OF RECORD WILL REVIEW THE ITEM AND DETERMINE ITS ACCEPTABILITY. IF WORK INVOLVING THAT ITEM PROCEEDS WITHOUT PRIOR APPROVAL FROM THE E.O.R., THEN THE WORK WILL BE CONSIDERED NON-COMPLIANT.
5. THE CONTRACTOR SHALL CORRECT ALL NON-COMPLIANT WORK OR DEFICIENCIES AS NOTED WITHIN THE SPECIAL INSPECTION REPORTS AND/OR THE E.O.R. STRUCTURAL OBSERVATION REPORTS TO BRING THE CONSTITUTION INTO COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS, ADDENDUMS, REVISIONS RFI'S AND/OR WRITTEN INSTRUCTIONS.
6. THE CONTRACTOR SHALL SUBMIT TO THE E.O.R. AND ARCHITECT A LETTER STATING THAT ALL OUTSTANDING ITEMS NOTED ON PREVIOUS STRUCTURAL OBSERVATION AND SPECIAL INSPECTIONS REPORTS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS, ADDENDUMS, REVISIONS RFI'S AND/OR WRITTEN INSTRUCTIONS.

B. SPECIAL INSPECTION PROGRAM NOTES

1. ITEMS CHECKED WITH **X** SHALL BE INSPECTED IN ACCORDANCE WITH THE GOVERNING CODE, CHAPTER 17 BY A CERTIFIED SPECIAL INSPECTOR FROM A TESTING AGENCY APPROVED BY THE BUILDING OFFICIAL.
2. SPECIAL INSPECTION IS NOT REQUIRED FOR WORK PERFORMED BY AN APPROVED FABRICATOR MEETING THE REQUIREMENTS OF THE GOVERNING CODE RELATED TO FABRICATION.
3. CONTINUOUS SPECIAL INSPECTION MEANS FULL-TIME OBSERVATION OF THE WORK REQUIRING SPECIAL INSPECTION BY THE APPROVED SPECIAL INSPECTOR PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED.
4. PERIODIC SPECIAL INSPECTION MEANS PART-TIME OR INTERMITTENT INSPECTIONS OF THE WORK AT INTERVALS NECESSARY TO CONFIRM THAT THE WORK REQUIRING SPECIAL INSPECTIONS IS IN CONFORMANCE WITH THE APPROVED PERMIT CONSTRUCTION DOCUMENTS AND SPECIFICATIONS.
5. ALL STRUCTURAL SHOP AND FIELD WELDS SHALL BE VISUALLY INSPECTED. THE SPECIAL INSPECTOR NEEDS TO BE CONTINUOUSLY PRESENT DURING WELDING, EXCEPT AS NOTED, PROVIDED THE MATERIALS, QUALIFICATIONS OF WELDING PROCEDURES AND WELDERS ARE VERIFIED PRIOR TO THE START OF THE WORK; PERIODIC INSPECTIONS ARE MADE OF WORK IN PROGRESS; AND A VISUAL INSPECTION OF ALL WELDS IS MADE AFTER COMPLETION OR PRIOR TO SHIPMENT OF SHOP WELDING.
6. THE CONTRACTOR SHALL SUBMIT A "WELDING PROCEDURE SPECIFICATION" (WPS) IN ACCORDANCE WITH "AMERICAN WELDING SOCIETY" (AWS) FOR REVIEW BY THE SPECIAL INSPECTOR PRIOR TO BEGINNING ANY WORK. THE WPS SHALL INCLUDE ALL INFORMATION RECOMMENDED IN THE SAMPLE FROM OF ANNEX J OF THE AWS CODE INCLUDING RECOMMENDATIONS FROM THE ELECTRODE MANUFACTURER, PROPOSED METHOD OF BASE MATERIAL PREPARATIONS, BACK GOUGING SEQUENCE, METHOD OF PLACEMENT OF NEW WELD MATERIALS, BACKER PLATE AND RUNOFF TAB REMOVAL AND FINAL FINISHING.
7. THE INSPECTOR SHALL VERIFY WELDING QUALIFICATIONS, WPS, WELDING PROCESS, ELECTRODE, ASSEMBLY CONFIGURATION, FIT-UP TOLERANCE (1/16" MAXIMUM), PRE-HEAT AND INTER-PASS TEMPERATURE AND PREPARATION OF ALL STEEL SURFACES.

SPECIAL INSPECTIONS PROGRAM
ESTABLISHED PER 2022 CBC CHAPTER 17

REQ'D.	ITEM	CONTINUOUS	PERIODIC	COMMENTS
X	GENERAL STRUCTURAL INSPECTIONS AS REQUIRED BY SECTION 1704			
X	SLAB REINFORCEMENT			BY BUILDING OFFICIAL
X	FINAL INSPECTION			BY BUILDING OFFICIAL
	CONCRETE			
X	INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, & VERIFY PLACEMENT		X	ACI 318: 20, 25.2, 25.3, 26.6.1-26.6.3
X	REINFORCING BAR WELDING: a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706 b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"; AND c. INSPECT ALL OTHER WELDS.		X X X	AWS D1.4 ACI 318: 26.6.4
X	INSPECT ANCHORS CAST IN CONCRETE		X	ACI 318: 17.8.2
X	INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS: a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS. b. MECHANICAL ANCHORS & ADHESIVE ANCHORS NOT DEFINED IN 4.a.	X	 ACI 318: 17.8.2.4 X ACI 318: 17.8.2
X	VERIFY USE OF REQUIRED DESIGN MIX.		X	ACI 318: CH. 19, 26.4.3, 26.4.4
X	PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP & AIR CONTENT TESTS, & DETERMINE THE TEMPERATURE OF THE CONCRETE.		X	ASTM C31, ASTM C172, ACI 318: 25.5, 26.12
X	INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X		ACI 318: 25.5.3-26.5.5
	INSPECT PRESTRESSED CONCRETE FOR: a. APPLICATION OF PRESTRESSING FORCES; AND b. GROUTING OF BONDED PRESTRESSING TENDONS.	X X	X	ACI 318: 26.10
	INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.		X	ACI 318: 26.9
	FOR PRECAST CONCRETE DIAPHRAGM CONNECTIONS OR REINFORCEMENT AT JOINTS CLASSIFIED AS MODERATE OR HIGH DEFORMABILITY ELEMENTS (MDE OR HDE) IN STRUCTURES ASSIGNED TO SEISMIC DESIGN CATEGORY C, D, E OR F, INSPECT SUCH CONNECTIONS AND REINFORCEMENT IN FIELD FOR: a. INSTALLATION OF THE EMBEDDED PARTS. b. COMPLETION OF TEH CONTINUITY OF REINFORCEMENT ACROSS JOINTS. c. COMPLETION OF CONNECTION