



COATINGS FOR STEEL EMBEDMENTS IN CONCRETE		
EXPOSURE	FIELD WELDING	FINISH
EXTERIOR	EITHER	GALVANIZED
INTERIOR	YES	UNPAINTED
	NO	GALVANIZED

FOOTNOTES:

- ALL WELDING TO PREVIOUSLY GALVANIZED COMPONENTS WILL REQUIRE REMOVAL OF THE GALVANIZING WITH GRINDING FOR AT LEAST 3-INCHES FROM EITHER SIDE OF THE INTENDED WELD AND ON BOTH SIDES OF THE WORKPIECE.
- FIELD WELDED AREAS AND OTHER AREAS WITH REMOVAL OF OR DAMAGE TO THE GALVANIZED COATING SHALL HAVE THEIR COATING RESTORED IN ACCORDANCE TO ASTM A780, USING PAINT CONTAINING ZINC DUST OR SIMILAR PERMITTED PRODUCTS CAPABLE OF PROVIDING A MINIMUM ZINC-RICH COATING THICKNESS OF 2.0 MILS IN A SINGLE APPLICATION.

- B) IN ORDER TO REDUCE THE RISK OF HEAT-INDUCED CONCRETE SPALLING AT FIELD-WELDED EMBED PLATES:
- ALLOW SUPPORTING CONCRETE TO CURE FOR A MINIMUM OF 14-DAYS PRIOR TO FIELD WELDING.
  - PROVIDE THE WELD SIZE SHOWN IN DETAILS AND DO NOT OVER-WELD.
- 9) SHOP PRIMER
- ALL STEEL EXPOSED TO EXTERIOR WEATHER OR AN UNCONTROLLED ENVIRONMENT SHALL BE BLAST CLEANED AND PRIMED WITH A SUBMITTED AND APPROVED ZINC-RICH PRIMER.
  - INTERIOR STEEL SHALL BE SHOP PRIMED WITH THE FABRICATOR'S STANDARD SHOP PRIMER.
  - SHOP PRIMER SHALL NOT BE APPLIED TO THE FOLLOWING AREAS:
    - SURFACES EMBEDDED IN CONCRETE OR MORTAR. EXTEND PRIMING OF PARTIALLY EMBEDDED MEMBERS TO A DEPTH OF 2 INCHES.
    - SURFACES TO BE FIELD WELDED.
    - SURFACES TO BE HIGH-STRENGTH BOLTED WITH SLIP-CRITICAL CONNECTIONS.
    - SURFACES TO RECEIVE SPRAYED FIRE-RESISTIVE MATERIALS.
    - GALVANIZED SURFACES.

#### E. STEEL MISCELLANEOUS:

- ALL EDGE ANGLES SUPPORTING ROOF OR FLOOR DECK SHALL BE CONTINUOUS BUTT-SPlice WELDED OVER SUPPORTS.
- ALL ELEVATED MECHANICAL EQUIPMENT SHALL BE SUPPORTED BY STEEL FRAMING. IF SPECIFIC FRAMING SIZES ARE NOT PROVIDED ON THE FRAMING PLAN, REFER TYPICAL DETAILS FOR ROOF AND FLOOR OPENING FRAME DETAILS.
- SUBSTITUTION OF POST-INSTALLED ANCHORS FOR EMBEDDED ANCHORS SHOWN ON THE DRAWINGS WILL NOT BE PERMITTED UNLESS SPECIFICALLY APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.
- WHERE POST-INSTALLED ANCHORS ARE USED IN CONTINUOUS ANGLES, FABRICATE ANGLE WITH OPTIONAL HOLE LOCATIONS TO ALLOW REMEDIATION OF CASES WHERE ANCHORS FAIL WITH REBAR. AS AN EXAMPLE, FOR A CONTINUOUS ANGLE WITH ANCHORS AT 24" ON CENTER, PROVIDE HOLES AT 6" ON CENTER.
- GALVANIZED LOOSE LEDGE ANGLES SHALL BE PROVIDED OVER ALL MASONRY VENEER OPENINGS OR RECESSES DEEPER THAN 1". LINTELS SHALL HAVE 1" OF BEARING AT EACH END FOR EVERY FOOT OF SPAN, WITH A MINIMUM OF 4" AND SIZED AS FOLLOWS UNLESS SHOWN OTHERWISE IN THE DRAWINGS.
  - UP TO 4'-0".....L3-1/2 x 3-1/2 x 3/8
  - 4'-1" to 6'-0".....L4 x 3-1/2 x 3/8 (LLV)
  - 5'-1" to 6'-6".....L5 x 3-1/2 x 3/8 (LLV)
  - 6'-7" to 8'-0".....L6 x 3-1/2 x 3/8 (LLV)

#### 12) STEEL JOIST AND BRIDGING NOTES

- GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL STEEL JOIST, JOIST GIRDER, JOIST BRIDGING AND ASSOCIATED MATERIALS SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING STEEL JOIST INSTITUTE (SJI) STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
  - SJI 100-15 "STANDARD SPECIFICATION FOR K-SERIES, LH-SERIES, AND DLH-SERIES OPEN WEB STEEL JOISTS AND JOIST GIRDERS"
  - SJI 200-15 "STANDARD SPECIFICATION FOR CJ-SERIES COMPOSITE STEEL JOISTS"
  - SJI TECHNICAL DIGEST NO. 9 "HANDLING AND ERECTION OF STEEL JOISTS AND JOIST GIRDERS"

#### B. COORDINATION BY GENERAL CONTRACTOR:

- THE GENERAL CONTRACTOR SHALL CONFIRM OR REVISE MECHANICAL EQUIPMENT SIZE AND WEIGHT AND PROVIDE THE JOIST MANUFACTURER THE POINT LOADS FOR WHICH SPECIAL JOISTS ARE TO BE DESIGNED. PRELIMINARY ROOF TOP UNIT (RTU) WEIGHTS ARE SHOWN ON THE ROOF PLANS. SHOULD WEIGHTS EXCEED THOSE SHOWN, CONTRACTOR SHALL CONTACT THE OWNER'S REPRESENTATIVE FOR REVIEW.

#### C. JOIST DESIGN BY MANUFACTURER

- AS A MINIMUM REQUIREMENT, THE JOIST MANUFACTURER SHALL DESIGN ALL JOISTS FOR THE DESIGN LOADS SPECIFIED IN THE STEEL JOIST INSTITUTE'S LOAD TABLES. IN ADDITION, JOISTS SHALL BE DESIGNED TO CARRY ANY OTHER LOADS INDICATED ON THE DRAWINGS, INCLUDING BUT NOT LIMITED TO, EQUIPMENT AND/OR PIPING SUPPORTED ON OR SUSPENDED FROM THE ROOF STRUCTURE.
- UNLESS SHOWN OTHERWISE IN THE DRAWINGS, JOISTS SHALL BE DESIGNED BY THE JOIST MANUFACTURER FOR A NET UPLIFT OF 10 PSF IN THE FIELD OF THE ROOF AND 15 PSF WITHIN 10 FEET OF ROOF EDGES.
- BETWEEN PANEL POINTS OF STEEL JOISTS THE CHORD MEMBERS SHALL BE DESIGNED TO SUPPORT 100 LBS VERTICAL LOAD WITHOUT REINFORCEMENT OF THE JOIST. TYPICALLY, UNDERHUNG LOADS SHALL BE SUPPORTED AT JOIST PANEL POINTS. OFF-PANEL POINT LOADING IN EXCESS OF 100 POUNDS WILL REQUIRE JOIST REINFORCING. REFER TYPICAL DETAILS FOR JOIST REINFORCING DETAIL.
- UNLESS MORE STRINGENT PROVISIONS ARE SHOWN IN THE CONTRACT DOCUMENTS, THE JOIST MANUFACTURER SHALL DESIGN ALL JOISTS FOR A MAXIMUM LIVE LOAD DEFLECTION OF L/360.
- JOISTS SEATS SHALL HAVE STANDARD JOIST SEAT DEPTHS UNLESS NOTED OTHERWISE. HOWEVER, FLAT BEARING SEATS SHALL BE PROVIDED FOR ALL JOISTS BY INCREASING THE DEPTH OF THE SEAT AT THE HIGH END OF SLOPED JOISTS. CONTRACTOR SHALL VERIFY FINAL SEAT DEPTHS PRIOR TO DETAILING SUPPORTING STRUCTURE. STANDARD JOIST SEAT DEPTHS ARE AS FOLLOWS:
  - K-SERIES: 2-1/2"
  - LH-SERIES: 5"
  - G-SERIES: 7-1/2"

- CONNECTIONS FOR FRAMING MEMBERS WITH BOTH GRAVITY LOADS (REACTIONS) AND AXIAL LOADS OR TRANSFER FORCES (TENSION OR COMPRESSION) SHALL BE DESIGNED FOR THE COMBINED EFFECT OF BOTH LOADS. NOTE THAT BOLTS IN CONNECTIONS WITH AXIAL LOADS SHALL BE EITHER BEARING TYPE IN STANDARD HOLES OR SLIP-CRITICAL TYPE IN SHORT-SLOTTED HOLES.

- THE FABRICATOR SHALL SUBMIT IN A TIMELY MANNER REPRESENTATIVE SAMPLES OF SUBSTANTIATING CONNECTION INFORMATION TO THE OWNER'S REPRESENTATIVE. THE OWNER'S REPRESENTATIVE WILL REVIEW AND CONFIRM IN WRITING THAT THESE REPRESENTATIVE SAMPLES ARE CONSISTENT WITH THE REQUIREMENTS IN THE CONTRACT DOCUMENTS, OR SHALL ADVISE WHAT MODIFICATIONS ARE REQUIRED TO BRING THE REPRESENTATIVE SAMPLES INTO COMPLIANCE WITH THE REQUIREMENTS IN THE CONTRACT DOCUMENTS. THIS INITIAL SUBMITTAL AND REVIEW IS IN ADDITION TO AND SHALL PRECEDE THE SUBMISSION OF COMPLETE SUBSTANTIATING CONNECTION INFORMATION WITH THE SHOP AND ERECTION DRAWINGS.

- COMPLETE SUBSTANTIATING CONNECTION INFORMATION SHALL BE SUBMITTED PRIOR TO OR CONCURRENTLY WITH THE SHOP AND ERECTION DRAWINGS.
  - THE LICENSED PROFESSIONAL ENGINEER IN RESPONSIBLE CHARGE OF THE CONNECTION DESIGN SHALL REVIEW AND CONFIRM IN WRITING AS PART OF THE SUBSTANTIATING CONNECTION INFORMATION, THAT THE SHOP AND ERECTION DRAWINGS PROPERLY INCORPORATE THE CONNECTION DESIGNS.
  - THE FABRICATOR SHALL PROVIDE A MEANS BY WHICH THE SUBSTANTIATING CONNECTION INFORMATION IS REFERENCED TO THE RELATED CONNECTIONS ON THE SHOP AND ERECTION DRAWINGS FOR THE PURPOSE OF REVIEW.
  - SUBMITTALS NOT COMPLYING WITH THESE REQUIREMENTS WILL BE RETURNED UNREVIEWED.
  - IF CONNECTION CALCULATIONS ARE SUBMITTED CONCURRENTLY WITH THE CORRESPONDING SHOP DRAWINGS, THE ENGINEER-OF-RECORD'S REVIEW TIME FOR THE COMBINED SUBMITTAL SHALL BE INCREASED TO THREE (3) WEEKS.

#### C. STRUCTURAL BOLTS, ANCHOR RODS & BASE PLATES:

- STEEL CONTRACTOR SHALL FURNISH ERECTION BOLTS AS REQUIRED FOR FIELD CONNECTIONS.
- ALL BOLTS SHALL BE 3/4 IN. DIAMETER ASTM A325 WITH SUITABLE WASHERS AND NUTS UNLESS OTHERWISE SHOWN IN THE CONSTRUCTION DOCUMENTS OR APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.
- ALL BOLTS SHALL BE TIGHTENED TO THE SNUG-TIGHTENED JOINT REQUIREMENTS OF RSCC-10 EXCEPT AT SLIP-CRITICAL JOINTS OR WHERE NOTED OTHERWISE IN CONSTRUCTION DOCUMENTS OR IN FABRICATOR'S CONNECTION DESIGN.
- UNLESS OTHERWISE INDICATED IN THE DRAWINGS, ALL ANCHOR RODS SHALL CONFORM TO THE SPECIFIED MATERIAL GRADE SHALL BE A MINIMUM 3/4 INCH DIAMETER WITH A MINIMUM FOUNDATION EMBEDMENT AS INDICATED IN STRUCTURAL DETAILS. THE EMBEDDED END SHALL HAVE EITHER A STANDARD BOLT HEAD, A HEAVY HEX NUT WITH THE THREADS SPOILED ABOVE AND BELOW THE NUT, OR JAMMED DOUBLE NUTS.
- PRIOR TO PLACING CONCRETE, STEEL PLATE TEMPLATES SHALL BE PROVIDED TO FACILITATE PLACEMENT OF ANCHOR RODS IN DETAILED PLAN POSITIONS AND ELEVATIONS.
- BASE PLATES SHALL BE LEVELED WITH LEVELING NUTS AND OVERSIZED WASHER PLATES OR WITH SHIM PACKS AT THE ERECTOR'S OPTION.
- AFTER FINAL BASE PLATE POSITIONING, ANCHOR ROD NUTS SHALL BE INSTALLED TO A SNUG-TIGHT CONDITION AND WASHER PLATES SHALL BE FIELD WELDED AS INDICATED IN THE CONSTRUCTION DOCUMENTS.

#### D. STEEL FABRICATION & FINISH:

- SHOP DRAWINGS SHALL BE SUBMITTED TO AND REVIEWED BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCING FABRICATION. ANY FABRICATION INITIATED PRIOR TO APPROVAL OF SHOP DRAWINGS WILL BE AT THE SOLE RISK OF THE FABRICATOR.
- ALL SHOP AND FIELD WELDS SHALL BE MADE IN ACCORDANCE WITH AWS D1.1. ALL WELDING SHALL USE LOW HYDROGEN PROCESSES.
- ALL BEAMS THAT ARE REQUIRED TO HAVE CAMBER SHALL BE FABRICATED WITH CAMBER UPWARD. BEAMS WITHOUT SPECIFIED CAMBER SHALL BE FABRICATED SUCH THAT AFTER ERECTION, ANY NATURAL CAMBER DUE TO ROLLING OR SHOP FABRICATION IS UPWARD.
- CUTS, HOLES, COPING, ETC. REQUIRED FOR WORK OF OTHER TRADES SHALL BE SHOWN ON THE SHOP DRAWINGS AND MADE IN THE SHOP. CUTS OR BURNING OF HOLES IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.
- THE FABRICATOR SHALL BE RESPONSIBLE FOR ALL ERECTION AIDS. ANY SUCH ERECTION AIDS SHALL BE REMOVED FROM THE COMPLETED STRUCTURE IF DIRECTED BY THE OWNER'S REPRESENTATIVE.
- ALL EXTENSION BARS, RUN-OFF PLATES, AND BACKING BARS USED IN WELDED CONNECTIONS SHALL BE REMOVED AND THE JOINTS SHALL BE GROUND SMOOTH WHERE SUCH CONNECTION IS PERMANENTLY EXPOSED TO VIEW OR IS DESIGNATED AS ARCHITECTURALLY EXPOSED STRUCTURAL STEEL.
- HEADED STUDS AND DEFORMED BAR ANCHORS
  - ALL HEADED STUDS AND DEFORMED BAR ANCHORS SHALL BE INSTALLED USING AUTOMATIC END-WELDING EQUIPMENT RECOMMENDED BY THE STUD OR ANCHOR MANUFACTURER. MANUAL WELDING OF HEADED STUDS OR DEFORMED BAR ANCHORS WILL NOT BE ALLOWED.
  - IF A VISUAL INSPECTION REVEALS ANY STUD THAT DOES NOT SHOW A FULL 360-DEGREE FLASH OR ANY STUD THAT HAS BEEN REPAIRED BY MANUAL WELDING, SUCH STUD SHALL BE BENT TO AN ANGLE APPROXIMATELY 15-DEGREES FROM ITS ORIGINAL AXIS. THE DIRECTION OF BENDING FOR STUDS WITH LESS THAN A 360-DEGREE FLASH SHALL BE OPPOSITE TO THE MISSING PORTION OF THE FLASH.
  - HEADED STUDS AND DEFORMED BAR ANCHORS THAT HAVE SUCCESSFULLY PASSED THE BEND TEST WITHOUT SIGN OF FAILURE SHALL BE ACCEPTABLE FOR USE AND LEFT IN THE BENT POSITION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
  - WELDED STUDS NOT CONFORMING TO THE REQUIREMENTS OF AWS D1.1 SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR. THE CONTRACTOR SHALL REVISE THE WELDING PROCEDURE AS NECESSARY TO ENSURE THAT SUBSEQUENT STUD WELDING WILL MEET AWS D1.1 REQUIREMENTS.

#### 8) STEEL EMBEDMENTS IN CONCRETE:

- ALL STEEL COMPONENTS TO BE EMBEDDED IN CONCRETE SHALL HAVE COATINGS AS DEFINED IN THE TABLE BELOW.

#### F. INSTALLATION

- ALL DRILLING AND CORING EQUIPMENT AND ALL METHODS FOR INSTALLATION OF POST-INSTALLED ANCHORS AND DOWELS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).
- UNLESS OTHERWISE SPECIFIED, ANCHORS SHALL BE INSTALLED IN HOLES DRILLED WITH A ROTARY IMPACT HAMMER DRILL OR, WHERE NOT OTHERWISE PROSCRIBED, A ROCK DRILL. IN ALL CASES, THE BIT DIAMETER SHALL BE IN ACCORDANCE WITH THE MPII.
- EMBEDMENT DEPTH AND MINIMUM ANCHOR PROJECTION OF THE ANCHOR ELEMENT FROM THE CONCRETE SURFACE SHALL BE AS SHOWN ON THE DRAWING OR DETAIL FOR THE PARTICULAR ANCHOR OR GROUP OF ANCHORS BEING INSTALLED.
- ANCHOR CAPACITY IS DEPENDENT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGES OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS. ANCHOR SPACING AND EDGE DISTANCE VALUES SHALL NOT BE LESS THAN RECOMMENDED BY THE ANCHOR MANUFACTURER.
- HOLES FOR POST-INSTALLED ANCHORS:
  - UNLESS SPECIFICALLY SHOWN OTHERWISE, ALL HOLES SHALL BE INSTALLED PERPENDICULAR TO THE CONCRETE OR MASONRY SURFACE.
  - ANCHOR HOLES SHALL BE THOROUGHLY CLEANED IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN THE MPII PRIOR TO ADHESIVE INJECTION. AT A MINIMUM, THIS SHALL CONSIST OF CLEANING WITH OIL-FREE AND MOISTURE-FREE COMPRESSED AIR, USING A NOZZLE EXTENDED TO THE BOTTOM HOLE; SUPPLEMENTED WITH A BRUSH OR OTHER TOOL CLEANING TO REMOVE ALL CONCRETE DUST AND LOOSE MATERIAL; AND FOLLOWED BY A SECOND COMPRESSED AIR CLEANING. THIS IS COMMONLY KNOWN AS BLOW-BRUSH-BLOW OR BBB. SOME ANCHOR MANUFACTURERS HAVE DEVELOPED VACUUM SYSTEMS THAT REPLACE THE TRADITIONAL BBB APPROACH.
  - DRILLED AND CLEANED ANCHOR HOLES SHALL BE PROTECTED FROM CONTAMINATION AND WATER (E.G. RAIN) UNTIL THE ADHESIVE IS INSTALLED.
  - A DRILLED ANCHOR HOLE SHALL BE RE-CLEANED JUST PRIOR TO ADHESIVE INJECTION IF, IN THE OPINION OF THE ENGINEER, INSPECTOR, OR OWNER'S REPRESENTATIVE, THE HOLE HAS BECOME CONTAMINATED AFTER INITIAL CLEANING.

#### 6) INSTALLATION OF ADHESIVE ANCHORS:

- ADHESIVE ANCHORS WITH DIAMETER GREATER THAN 3/8-INCH INSTALLED IN ORIENTATIONS FROM HORIZONTAL TO VERTICAL SHALL EMPLOY A PISTON PLUG FOR THE ADHESIVE INJECTION.
  - ADHESIVE SHALL BE INJECTED IN ACCORDANCE WITH THE MPII USING EQUIPMENT AND PROCEDURES AS SPECIFIED THEREIN FOR THE SPECIFIC CONDITIONS ASSOCIATED WITH THE INJECTION. THIS SHALL BE CLEARLY SPECIFIED IN THE MPII. IF NOT, ANOTHER PRODUCT SHALL BE PROPOSED FOR USE.
  - ANCHOR ELEMENTS TO BE INSTALLED IN THE ADHESIVE SHALL BE CLEAN, OIL-FREE, AND FREE OF LOOSE RUST, PAINT, OR OTHER COATINGS.
  - THREADS ON THE PROJECTING PORTION OF THE ANCHOR ELEMENT SHALL BE PROTECTED FROM ADHESIVE CONTAMINATION.
  - UNLESS SPECIFICALLY SHOWN OTHERWISE ON THE DRAWINGS, ANCHORS SHALL BE INSTALLED PERPENDICULAR TO THE CONCRETE SURFACE.
  - INSTALLED ADHESIVE ANCHORS SHALL BE SECURELY FIXED IN-PLACE TO PREVENT DISPLACEMENT WHILE THE ADHESIVE CURES. ANCHORS DISPLACED BEFORE FULL ADHESIVE CURE SHALL BE CONSIDERED DAMAGED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
- POST-INSTALLED ANCHORS AND DOWELS SHALL NOT BE BENT AFTER BEING INSTALLED UNLESS PERMITTED BY THE ENGINEER IN WRITING.

#### G. SPECIAL INSPECTION REQUIREMENTS

- CONTINUOUS INSPECTIONS: ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS SHALL BE CONTINUOUSLY INSPECTED DURING INSTALLATION BY A CERTIFIED INSPECTOR SPECIFICALLY APPROVED FOR THAT PURPOSE BY THE BUILDING OFFICIAL.
- PERIODIC INSPECTIONS: PERIODIC SPECIAL INSPECTIONS SHALL BE PROVIDED FOR ALL OTHER POST-INSTALLED ANCHORS NOT INCLUDED IN THE CONTINUOUS INSPECTIONS REQUIRED ABOVE.
- REPORTING REQUIREMENTS: THE SPECIAL INSPECTOR SHALL FURNISH A REPORT TO THE ENGINEER AND BUILDING OFFICIAL THAT THE WORK COVERED BY THE REPORT HAS BEEN PERFORMED AND THAT THE MATERIALS AND INSTALLATION PROCEDURES USED CONFORM WITH THE APPROVED CONSTRUCTION DOCUMENTS AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).

#### 11) STEEL CONSTRUCTION NOTES

- GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
    - AISC 303-16 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
    - AISC 341-16 "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS"
    - AISC 360-16 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS"
    - AWS D1.1-2015 "STRUCTURAL WELDING CODE - STEEL"
    - RSCC-2014 "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS"
- CONNECTION DESIGN BY FABRICATOR:
    - THE FABRICATOR SHALL RETAIN A PROFESSIONAL ENGINEER WHO IS REGISTERED IN THE STATE IN WHICH THE PROJECT IS LOCATED, WHO SHALL DESIGN ALL CONNECTIONS AND SPLICE CONNECTIONS SHOWN, NOT SHOWN, OR ONLY PARTIALLY DETAILED ON THE DRAWINGS.
    - CONNECTIONS SHALL BE DESIGNED TO SUPPORT THE FACTORED END REACTIONS SHOWN ON THE DRAWINGS. WHERE END REACTIONS ARE NOT SHOWN OR OTHERWISE SPECIFIED, CONNECTIONS SHALL BE DESIGNED TO SUPPORT A FACTORED END SHEAR OF THE GREATER OF 10 KIPS OR 50% OF THE TOTAL FACTORED UNIFORM LOAD CAPACITY SHOWN IN THE MANUAL OF STEEL CONSTRUCTION FOR THE GIVEN SHAPE, SPAN AND THE SPECIFIED STEEL.
    - IF NOT FULLY DETAILED ON THE DRAWINGS, DESIGN GIRT CONNECTIONS FOR MINIMUM CONCURRENT REACTIONS OF 5K KIP VERTICAL AND 5K HORIZONTAL (I.E., OUT-OF-PLANE) UNLESS HIGHER REACTIONS ARE INDICATED ON DRAWINGS.
    - ALL CONNECTION PLATES, STIFFENERS AND BOLTS SHOWN ON THE DRAWINGS ARE SCHEMATIC ONLY. FABRICATOR SHALL DESIGN ALL CONNECTIONS, SPLICES, PLATES, GUSSET PLATES, STIFFENERS, BOLTS AND WELDS FOR FORCES INDICATED ON DRAWINGS IN ADDITION TO THE REQUIREMENTS OF THE AISC DESIGN SPECIFICATION (LRFD PROVISIONS). IN ALL CASES, A MINIMUM 3/8" PLATE AND A MINIMUM OF (2) 3/4" DIAMETER A325 BOLTS SHALL BE PROVIDED.
    - FULL-DEPTH STIFFENER PLATES IN COLUMNS OR BEAMS SHALL MATCH THE YIELD STRENGTH OF THE BASE MEMBER.

- AT BOND BEAMS OR LINTELS LAID WITH CLOSED BOTTOM UNITS, TERMINATE THE GROUT POUR AT THE BOTTOM OF THE BEAM OR LINTEL WITHOUT FORMING A GROUT KEY.

#### 10) POST-INSTALLED ANCHORS AND DOWELS

- GOVERNING CODES AND STANDARDS: IN ADDITION TO THE REQUIREMENTS OF THE GOVERNING INTERNATIONAL BUILDING CODE, ALL POST-INSTALLED ANCHORS AND DOWELS SHALL BE DETAILED, FABRICATED, AND INSTALLED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.
  - ACI 318-14 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE."
  - ACI 355.2-07 "QUALIFICATION OF POST-INSTALLED MECHANICAL ANCHORS IN CONCRETE."
  - ACI 355.4-11 "QUALIFICATION OF POST-INSTALLED ADHESIVE ANCHORS IN CONCRETE."

#### B. QUALIFICATION REQUIREMENTS FOR INSTALLERS

- CONTRACTOR SHALL REQUEST, SCHEDULE AND FACILITATE THE ANCHOR AND/OR ADHESIVE MANUFACTURER'S REPRESENTATIVE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL THE MANUFACTURER'S SPECIFIED ANCHORING PRODUCTS. THE ENGINEER MUST RECEIVE DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR'S ANCHOR INSTALLATION PERSONNEL ARE TRAINED PRIOR TO COMMENCEMENT OF ANCHOR INSTALLATION OPERATIONS.
- INSTALLATION OF ADHESIVE ANCHORS HORIZONTALLY OR UPWARDLY INCLINED SHALL BE PERFORMED BY PERSONNEL CERTIFIED BY AN APPLICABLE CERTIFICATION PROGRAM. CERTIFICATION SHALL INCLUDE WRITTEN AND PERFORMANCE TESTS IN ACCORDANCE WITH THE ACI/CRSI ADHESIVE ANCHOR INSTALLER (AAI) CERTIFICATION PROGRAM, OR EQUIVALENT. WHEN APPLICABLE, SOME DOWN-HOLE INSTALLATIONS SHOWN ON DRAWINGS SUPPORTING SUSTAINED TENSION LOADS ARE DESIGNATED WITH A (CERT) AFTER THE ANCHOR CALLOUT AND SHALL ALSO REQUIRE INSTALLER CERTIFICATION AS OUTLINED ABOVE.

#### C. QUALIFICATION REQUIREMENTS FOR PRODUCTS

- POST-INSTALLED EXPANSION AND UNDERCUT ANCHORS SHALL MEET THE ASSESSMENT CRITERIA OF ACI 355.2.
- POST-INSTALLED ADHESIVE ANCHORS SHALL MEET THE ASSESSMENT CRITERIA OF ACI 355.4.

- APPROVED ANCHORING PRODUCTS: THE ANCHORING SYSTEMS SHOWN BELOW HAVE BEEN USED IN THE ANCHOR DESIGNS SHOWN IN THE CONSTRUCTION DOCUMENTS. SUBSTITUTION REQUESTS FOR ALTERNATE PRODUCTS MUST BE APPROVED IN WRITING BY THE ENGINEER OF RECORD PRIOR TO USE. CONTRACTOR SHALL PROVIDE CALCULATIONS DEMONSTRATING THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE PERFORMANCE VALUES OF THE SPECIFIED PRODUCT. SUBSTITUTIONS WILL BE EVALUATED BY THEIR HAVING AN ICC ESR SHOWING COMPLIANCE WITH THE RELEVANT BUILDING CODE FOR SEISMIC USES, LOAD RESISTANCE, INSTALLATION CATEGORY, AND AVAILABILITY OF COMPREHENSIVE INSTALLATION INSTRUCTIONS. ADHESIVE ANCHOR EVALUATION WILL ALSO CONSIDER CREEP, IN-SERVICE TEMPERATURE, AND INSTALLATION TEMPERATURE.

#### 1) ANCHORAGE TO CONCRETE

- ADHESIVE ANCHORS:
  - HILTI HIT-HY 200 SYSTEM WITH HILTI HIT-Z ROD OR HAS-E THREADED ROD [ICC ESR-3187].
- MEDIUM DUTY MECHANICAL ANCHORS:
  - HILTI KWIK HUS-EZ AND KWIK HUS-EZ I SCREW ANCHORS [ICC ESR-3027]
  - HILTI KWIK BOLT-TZ EXPANSION ANCHORS [ICC ESR-1917].
  - HILTI KWIK BOLT 3 EXPANSION ANCHORS (UNCRACKED CONCRETE ONLY) [ICC ESR-2302]
- HEAVY DUTY MECHANICAL ANCHORS:
  - HILTI HDA UNDERCUT ANCHORS [ICC ESR-1546]
  - HILTI HSL-3 EXPANSION ANCHORS [ICC ESR-1545]

#### 2) REBAR DOWELING INTO CONCRETE

- ADHESIVE ANCHORS:
  - HILTI HIT-HY 200 SYSTEM WITH CONTINUOUSLY DEFORMED REBAR [ICC ESR-3187].

#### 3) ANCHORAGE TO SOLID GROUTED MASONRY

- ADHESIVE ANCHORS:
  - HILTI HIT-HY 270 MASONRY ADHESIVE ANCHORING SYSTEM WITH HILTI HAS-E CONTINUOUSLY THREADED ROD OR CONTINUOUSLY DEFORMED STEEL REBAR [ICC ESR-4143].
- MECHANICAL ANCHORS:
  - HILTI KWIK BOLT-3 EXPANSION ANCHORS [ICC ESR-1385].

#### 4) ANCHORAGE TO HOLLOW / MULTI-WYTHE MASONRY

- ADHESIVE ANCHORS:
  - HILTI HIT-HY 270 MASONRY ADHESIVE ANCHORING SYSTEM WITH HILTI HAS-E CONTINUOUSLY THREADED ROD OR CONTINUOUSLY DEFORMED STEEL REBAR [ICC ESR-4143].
  - THE APPROPRIATE SIZE SCREEN TUBE SHALL BE USED PER ADHESIVE MANUFACTURER'S RECOMMENDATION.

#### E. PREPARATION PRIOR TO INSTALLATION

- CURING OF BASE MATERIAL: DO NOT DRILL OR CORE HOLES INTO SUPPORTING CONCRETE OR MASONRY MATERIALS UNTIL THE CONCRETE, MORTAR AND/OR GROUT HAVE BEEN ADEQUATELY CURED TO ACHIEVE FULL DESIGN STRENGTH. IN NO CASE SHALL ANCHORS BE INSTALLED PRIOR TO THE CONCRETE HAVING AN AGE OF LESS THAN 21 DAYS.
- TEMPERATURE OF BASE MATERIAL: THE CONCRETE TEMPERATURE AT THE TIME OF ADHESIVE ANCHOR INSTALLATION SHALL BE AT LEAST 50°F (10°C) UNLESS TESTING HAS BEEN CONDUCTED IN ACCORDANCE WITH RECOGNIZED CRITERIA TO VERIFY PERFORMANCE IN CONCRETE AT LOWER TEMPERATURES.
- AVOIDANCE OF EMBEDDED ITEMS: PRIOR TO DRILLING OR CORING OPERATIONS, THE CONTRACTOR SHALL LOCATE AND MARK ALL POTENTIALLY CONFLICTING REINFORCING BARS, UTILITIES AND OTHER EMBEDDED ITEMS BY INDUCTION SCANNING, GROUND PENETRATING RADAR, X-RAY, OR OTHER APPROVED NON-DESTRUCTIVE METHOD. CONTRACTOR SHALL AVOID DRILLING OR CORING HOLES THAT MAY DAMAGE THESE EMBEDDED ITEMS. NOTIFY THE ENGINEER IF CONFLICTING EMBEDDED ITEMS DO NOT ALLOW INSTALLATION OF POST-INSTALLED ANCHORS IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND/OR APPROVED SHOP DRAWINGS.
- CARTRIDGE STORAGE: ADHESIVE CARTRIDGES SHALL BE STORED UNDER CONDITIONS IN COMPLIANCE WITH MANUFACTURER RECOMMENDATIONS REGARDING TEMPERATURE, EXPOSURE TO SUNLIGHT, ETC. AND EVIDENCE OF COMPLIANCE SHALL BE MADE AVAILABLE UPON REQUEST. THE USE OF EXPIRED ADHESIVE, AS INDICATED BY THE EXPIRATION DATE ON THE CARTRIDGE, IS PROHIBITED.
- INSTALLATION EQUIPMENT: THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT REQUIRED TO INSTALL THE EXPANSION AND/OR ADHESIVE ANCHOR INCLUDING, BUT NOT LIMITED TO, DRILLS, SETTING TOOLS, CLEAN-OUT BRUSHES, BLOWOUT BULBS, OIL-FREE COMPRESSED AIR, VACUUMS, WRENCHES, ETC.