



ADDENDUM 1

Client	Cincinnati VA Medical Center	Date	09/05/2012
Project	Relocate Short Term Rehab Community Living Center	VA Project #	539-324

This addendum provides information to clarify or adjust construction items which may affect any or all trade contractors. The original documents for the referenced project are amended as noted in this addendum and made part of said documents and shall govern the work covered by the Form of Proposal. All work to be in strict accordance with the terms, stipulations and conditions of contract documents.

PART 1- ARCHITECTURAL:

DRAWINGS

1. Sheet 2.3A201 – First Floor New Work Plan - **REISSUED**
 - i. Revised layout in toilet rooms 136A and 141A
 - ii. Revised corner detail where shown
 - iii. Revised column furring as shown
2. Sheet 2.3A202 – Roof Plan - **REISSUED**
 - i. Revised roof profile where shown
3. Sheet 2.3A211 – First Floor New Work RCP – **REISSUED**
 - i. Revised notes as shown
4. Sheet 2.3A421 – Wall Sections - **REISSUED**
 - i. New wall section to show revised roof condition
5. Sheet 2.3A500 – Enlarged Plans and Elevations - **REISSUED**
 - i. Revised toilet room layout where shown
 - ii. Revised door clearance dimension where shown
6. Sheet 2.3A611 – Window Types - **REISSUED**
 - i. Revised dimension as shown
 - ii. Revised spandrel glass as shown

SPECIFICATIONS

1. Section 014529 – Testing Laboratory Services - **REISSUED**
 - iii. Replace section 01 45 29 in Bid Document Specifications

PART 2-STRUCTURAL:

DRAWINGS

1. Sheet 2.3S100 – Foundation Plan - **REISSUED**
 - i. Revised layout as shown
2. Sheet 2.3S101 – Level 1 Framing Plan - **REISSUED**
 - i. Revised layout as shown
3. Sheet 2.3S102 – Level 2 Framing Plan - **REISSUED**
 - i. Revised layout as shown

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PART 3-MECHANICAL/ELECTRICAL/PLUMBING:

PLUMBING DRAWINGS

1. Sheet P2 – Details – **REISSUED**
 - i. Revised Detail K where shown.
2. Sheet 2-P2 – Basement Plan - **REISSUED**
 - i. Revised point of connection for domestic water and medical gases from phase 2.
 - ii. Revised sanitary, storm, vent, and domestic water pipe routing where shown.
3. Sheet 2-P3 – First Floor Plan - **REISSUED**
 - i. Revised fixture locations in rooms 136A and 141A.
 - ii. Revised sanitary, storm, vent, and domestic water pipe routing where shown.
4. Sheet 2-P4 – Roof Plan - **REISSUED**
 - i. Revised roof drain locations where shown.
5. Sheet 2-P5 – Soil, Waste & Vent Diagrams
 - i. Revised diagram where shown.

HVAC DRAWINGS

1. Sheet 2-H2 – First Floor Plan - Ductwork - **REISSUED**
 - i. In Room 107, revised duct locations/sizes/heights, quantity and location of slot diffusers, and airflow of various supply diffusers, for revised roof and structural layout, as shown.

ELECTRICAL DRAWINGS

2. Sheet 2-E4 – First Floor - Lighting - **REISSUED**
 - i. Revised layout for restroom change as shown.
3. Sheet 2-E5 – First Floor - Power - **REISSUED**
 - i. Revised layout for restroom change as shown.
4. Sheet 2-E6 – First Floor - Signals - **REISSUED**
 - i. Revised layout for restroom change as shown.

PART4-CONTRACTOR QUESTIONS AND ADDITIONAL CLARIFICATIONS:

1. **Comment:** 21/2.3A711. Is there poplar chair rail behind the handrail as depicted in this detail? Most of it would be hidden by the height of the handrail.
Response: Yes, the chair rail is as noted.
2. **Comment:** 2.3A903A. This sheet is not consistent with the elevation sheets with regard to wall protection and chair rail. Elevations show poplar chair rail but wall protection drawing does not. Which is correct?
Response: Handrail (HR-1) locations on Plan 2.3A903A are correct. All corridor walls receive handrail except that walls at central courtyard receive chair rail only.
3. **Comment:** 2.3A903A. Room 107 calls for CR-1. There is nothing on Finish Legend for CR-1.
Response: CR-1 is the same as note 12 on the elevation sheets. See detail 20/2.3A711.
4. **Comment:** A050. Can you please clarify what is omitted in Alternate 1. If this is accepted do we still construct the walls that would make up the corridor spaces and just the inside of the rooms remain a shell space or do all the walls associated with Alternate 1 go away completely. For instance Room 003 does the East wall stay to construct the corridor 001 or does it go away completely in the alternate. This also goes for the Western walls of rooms 014, 015, 017A, 019, 021 and 023.

- Response:** The corridor walls at boundaries of deduct alternates will still be constructed; the rooms inside the boundaries become shell space.
5. **Comment:** 2.3A211 Note 3. Is this a patient lift system in the dining room?
- Response:** No, please change to Note 10 in Dining Room 113 only. Note 10 shall read "Crown Moulding – refer to detail 19/2.3A711." See revised sheet 2.3A211.



SECTION 01 45 29
TESTING LABORATORY SERVICES**PART 1 - GENERAL****1.1 DESCRIPTION:**

This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained and paid for by Contractor.

1.2 APPLICABLE PUBLICATIONS:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. American Association of State Highway and Transportation Officials (AASHTO):
 - T027-11 Sieve Analysis of Fine and Coarse Aggregates
 - T096-02 (R2006) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - T099-10 The Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
 - T104-99 (R2007) Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
 - T180-10 Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
 - T191-02(R2006) Density of Soil In-Place by the Sand-Cone Method
- C. American Concrete Institute (ACI):
 - 506.4R-94 (R2004) Guide for the Evaluation of Shotcrete
- D. American Society for Testing and Materials (ASTM):
 - A325-10 Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
 - A370-10 Definitions for Mechanical Testing of Steel Products
 - A416/A416M-10 Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
 - A490-10 Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
 - C31/C31M-10 Making and Curing Concrete Test Specimens in the Field
 - C33-11 Concrete Aggregates
 - C39/C39M-12 Compressive Strength of Cylindrical Concrete Specimens
 - C109/C109M-11 Compressive Strength of Hydraulic Cement Mortars
 - C138-10 Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
 - C140-10 Sampling and Testing Concrete Masonry Units and Related Units

C143/C143M-10	Slump of Hydraulic Cement Concrete
C172-10	Sampling Freshly Mixed Concrete
C173-10	Air Content of freshly Mixed Concrete by the Volumetric Method
C330-09	Lightweight Aggregates for Structural Concrete
C567-11	Density Structural Lightweight Concrete
C780-10	Pre-construction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
C1019-11	Sampling and Testing Grout
C1060-11	Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
C1064/C1064M-05	Freshly Mixed Portland Cement Concrete
C1077-06	Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
C1153-10	Location of Wet Insulation in Roofing Systems Using Infrared Imaging
C1314-11	Compressive Strength of Masonry Prisms
D698-07	Laboratory Compaction Characteristics of Soil Using Standard Effort
D1143-07	Piles Under Static Axial Compressive Load
D1188-07	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
D1556-07	Density and Unit Weight of Soil in Place by the Sand-Cone Method
D1557-09	Laboratory Compaction Characteristics of Soil Using Modified Effort
D2166-06	Unconfined Compressive Strength of Cohesive Soil
D2167-08	Density and Unit Weight of Soil in Place by the Rubber Balloon Method
D2216-10	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
D2922-05	Density of soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D2974-07	Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
D3666-09	Minimum Requirements for Agencies Testing and Inspection Bituminous Paving Materials

D3740-10	Minimum Requirements for Agencies Engaged in the Testing and Inspecting Road and Paving Material
E94-10(2004)	Radiographic Testing
E164-08.....	Ultrasonic Contact Examination of Weldments
E329-10.....	Agencies Engaged in Construction Inspection and/or Testing
E543-09.....	Agencies Performing Non-Destructive Testing
E605-93(R2006).....	Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
E709-08.....	Guide for Magnetic Particle Examination
E779-10.....	Determining Air Leakage Rate by Fan Pressurization
E1155-96(R2008).....	Determining FF Floor Flatness and FL Floor Levelness Numbers
E1827-11	Determining Air tightness of Buildings Using an Orifice Blower Door

E. American Welding Society (AWS):

D1.1-10.....	Structural Welding Code-Steel
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1.3 REQUIREMENTS:

- A. Accreditation Requirements: Testing Laboratory retained and paid for by Contractor, must be accredited by one or more of the National Voluntary Laboratory Accreditation Program (NVLAP) programs acceptable in the geographic region for the project. Furnish to the Project Engineer a copy of the Certificate of Accreditation and Scope of Accreditation. For testing laboratories that have not yet obtained accreditation by a NVLAP program, submit an acknowledgement letter from one of the laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process has started, and submit to the Project Engineer for approval, certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory, meets or conforms to the ASTM standards listed below as appropriate to the testing field.
1. Laboratories engaged in testing of construction materials shall meet the requirements of ASTM E329.
 2. Laboratories engaged in testing of concrete and concrete aggregates shall meet the requirements of ASTM C1077.
 3. Laboratories engaged in testing of bituminous paving materials shall meet the requirements of ASTM D3666.
 4. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, shall meet the requirements of ASTM D3740.
 5. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM A880.

6. Laboratories engaged in non-destructive testing (NDT) shall meet the requirements of ASTM E543.
7. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA.
- B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by Project Engineer. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of Project Engineer to such failure.
- C. Written Reports: Testing laboratory shall submit test reports to Project Engineer, Contractor, and Local Building Authority within 24 hours after each test is completed unless other arrangements are agreed to in writing by the Project Engineer. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal Reports: Give verbal notification to Project Engineer immediately of any irregularity.
- E. Test Standards: The Contractor shall include a lump sum allowance of \$5000 for furnishing published standards (ASTM, AASHTO, ACI, ANSI, AWS, ASHRAE, UL, etc.) referred to or specifically referenced which are pertinent to any Sections of these specifications. Furnish one set of standards in single copies or bound volumes to the Project Engineer within 60 days. Photocopies are not acceptable. Billings for the standards furnished shall be at the net cost to Testing Laboratory. A preliminary list of test standards, with the estimated costs, shall be submitted to the Project Engineer for review before any publications of reference standards are ordered.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EARTHWORK:

- A. General: The Testing Laboratory shall provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed shall be as identified herein and shall include but not be limited to the following:
 1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the Project Engineer regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to Project Engineer extent of removal and replacement of unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.

2. Provide full time observation of fill placement and compaction and field density testing in building areas and provide part time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.
3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.

B. Testing Compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with ASTM D698 Method A. .
2. Make field density tests in accordance with the primary testing method following ASTM D2922 wherever possible. Field density tests utilizing ASTM D1556 or ASTM D2167 shall be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they should provide satisfactory explanation to the Project Engineer before the tests are conducted.
 - a. Building Slab Subgrade: At least one test of subgrade for every 185 m^2 (2000 square feet) of building slab, but in no case fewer than three tests. In each compacted fill layer, perform one test for every 185 m^2 (2000 square feet) of overlaying building slab, but in no case fewer than three tests.
 - b. Foundation Wall Backfill: One test per 30 m (100 feet) of each layer of compacted fill but in no case fewer than two tests.
 - c. Pavement Subgrade: One test for each 335 m^2 (400 square yards), but in no case fewer than two tests.
 - d. Curb, Gutter, and Sidewalk: One test for each 90 m (300 feet), but in no case fewer than two tests.
 - e. Trenches: One test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.

C. Testing for Footing Bearing Capacity: Evaluate if suitable bearing capacity material is encountered in footing subgrade.

D. Testing Materials: Test suitability of on-site and off-site borrow as directed by Project Engineer.

3.2 FOUNDATION PILES:

- A. Witness load test procedure for conformance with ASTM D1143 and interpret test data to verify geotechnical recommendations for pile capacity. Submit load test report in accordance with ASTM D1143.
- B. Witness lateral load test procedure for conformance with ASTM D3966. Submit load test

report in accordance with ASTM D3966.

- C. Review Contractor's equipment, methods, and procedures prior to starting any work on site. Provide continuous inspection of pile installation. Maintain a record of all pertinent phases of operation for submittal to Project Engineer.
- D. Auger-Placed Piles: Take and test samples of grout in accordance with ASTM C109 for conformance with specified strength requirements. Not less than six cubes shall be made for each day of casting. Test two cubes at 7 days and two at 28 days, and two cubes held for possible future testing.

3.3 LANDSCAPING:

- A. Test topsoil for organic materials, pH, phosphate, potash content, and gradation of particles.
 - 1. Test for organic material by using ASTM D2974.
 - 2. Determine percent of silt, sand, clay, and foreign materials such as rock, roots, and vegetation.
- B. Submit laboratory test report of topsoil to Project Engineer.

3.4 ASPHALT CONCRETE PAVING:

- A. Aggregate Base Course:
 - 1. Determine maximum density and optimum moisture content for aggregate base material in accordance with AASHTO T180, Method D
 - 2. Sample and test aggregate as necessary to insure compliance with specification requirements for gradation, wear, and soundness as specified in the applicable state highway standards and specifications.
- B. Asphalt Concrete:
 - 1. Aggregate: Sample and test aggregates in stock pile and hot-bins as necessary to insure compliance with specification requirements for gradation (AASHTO T27), wear (AASHTO T96), and soundness (AASHTO T104).
 - 2. Temperature: Check temperature of each load of asphalt concrete at mixing plant and at site of paving operation.
 - 3. Density: Make a minimum of two field density tests in accordance with ASTM D1188 of asphalt base and surface course for each day's paving operation.

3.5 SITE WORK CONCRETE:

Test site work concrete including materials for concrete as required in Article CONCRETE of this section.

3.6 CONCRETE:

- A. Batch Plant Inspection and Materials Testing:
1. Perform continuous batch plant inspection until concrete quality is established to satisfaction of Project Engineer with concurrence of Contracting Officer and perform periodic inspections thereafter as determined by Project Engineer.
 2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to Project Engineer.
 3. Sample and test mix ingredients as necessary to insure compliance with specifications.
 4. Sample and test aggregates daily and as necessary for moisture content. Test the dry rodded weight of the coarse aggregate whenever a sieve analysis is made, and when it appears there has been a change in the aggregate.
 5. Certify, in duplicate, ingredients and proportions and amounts of ingredients in concrete conform to approved trial mixes. When concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips (duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.
- B. Field Inspection and Materials Testing:
1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
 2. Review the delivery tickets of the ready-mix concrete trucks arriving on-site. Notify the Contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the Specification requirements. Rejected loads are to be removed from the site at the Contractor's expense. Any rejected concrete that is placed will be subject to removal.
 3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM C31. Make at least four cylinders for each 80 m³ (100 cubic yards) or less of each concrete type, and at least three cylinders for any one day's pour for each concrete type. Label each cylinder with an identification number. Project Engineer may require additional cylinders to be molded and cured under job conditions.
 4. Perform slump tests in accordance with ASTM C143. Determine the slump for each batch of concrete that super-plasticizer is added to in the field. Test and report slump both before and after super-plasticizer is added.
 5. Determine the air content of concrete per ASTM C173.
 6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.
 7. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.

8. Verify that specified mixing has been accomplished.
9. Environmental Conditions: Determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations:
 - a. When ambient air temperature falls below 4.4 degrees C (40 degrees F), record maximum and minimum air temperatures in each 24 hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.
 - b. When ambient air temperature rises above 29.4 degrees C (85 degrees F), record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.
10. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
11. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
12. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.
13. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
14. Observe preparations for placement of concrete:
 - a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
 - b. Inspect preparation of construction, expansion, and isolation joints.
15. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
16. Observe concrete mixing:
 - a. Monitor and record amount of water added at project site.
 - b. Observe minimum and maximum mixing times.
17. Measure concrete flatwork for levelness and flatness as follows:
 - a. Perform Floor Tolerance Measurements F_F and F_L in accordance with ASTM E1155.
Calculate the actual overall F- numbers using the inferior/superior area method.
 - b. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.
 - c. Provide the Contractor and the Project Engineer with the results of all profile tests,

including a running tabulation of the overall F_F and F_L values for all slabs installed to date, within 72 hours after each slab installation.

18. Other inspections:

- a. Grouting under base plates.
- b. Grouting anchor bolts and reinforcing steel in hardened concrete.

C. Laboratory Tests of Field Samples:

1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one cylinder at 7 days and two cylinders at 28 days. Use remaining cylinder as a spare tested as directed by Project Engineer.
2. Furnish certified compression test reports (duplicate) to Project Engineer. In test report, indicate the following information:
 - a. Cylinder identification number and date cast.
 - b. Specific location at which test samples were taken.
 - c. Type of concrete, slump, and percent air.
 - d. Compressive strength of concrete in MPa (psi).
 - e. Weather conditions during placing.
 - f. Temperature of concrete in each test cylinder when test cylinder was molded.
 - g. Maximum and minimum ambient temperature during placing.
 - h. Ambient temperature when concrete sample in test cylinder was taken.
 - i. Date delivered to laboratory and date tested.

3.7 REINFORCEMENT:

- A. Review mill test reports furnished by Contractor.
- B. Perform sampling at fabricating plant. Take two samples from each 23 t (25 tons) or fraction thereof of each size of reinforcing steel No. 10 thru No. 57 (No. 3 thru No. 18).
- C. Make one tensile and one bend test in accordance with ASTM A370 from each pair of samples obtained.
- D. Written report shall include, in addition to test results, heat number, manufacturer, type and grade of steel, and bar size.
- E. Perform tension tests of mechanical and welded splices in accordance with ASTM A370.

3.8 MASONRY:

- A. Mortar Tests:
 1. Laboratory compressive strength test:
 - a. Comply with ASTM C780.
 - b. Obtain samples during or immediately after discharge from batch mixer.
 - c. Furnish molds with 50 mm (2 inch), 3 compartment gang cube.
 - d. Test one sample at 7 days and 2 samples at 28 days.
 2. Two tests during first week of operation; one test per week after initial test until

masonry completion.

- B. Prism Tests: For each type of wall construction indicated, test masonry prisms per ASTM C1314 for each 460 m² (5000 square feet) of wall area. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.

3.9 STRUCTURAL STEEL:

- A. General: Provide shop and field inspection and testing services to certify structural steel work is done in accordance with contract documents. Welding shall conform to AWS D1.1 Structural Welding Code.
- B. Prefabrication Inspection:
1. Review design and shop detail drawings for size, length, type and location of all welds to be made.
 2. Approve welding procedure qualifications either by pre-qualification or by witnessing qualifications tests.
 3. Approve welder qualifications by certification or retesting.
 4. Approve procedure for control of distortion and shrinkage stresses.
 6. Approve procedures for welding in accordance with applicable sections of AWS D1.1.
- C. Fabrication and Erection:
1. Weld Inspection:
 - a. Inspect welding equipment for capacity, maintenance and working condition.
 - b. Verify specified electrodes and handling and storage of electrodes in accordance with AWS D1.1.
 - c. Inspect preparation and assembly of materials to be welded for conformance with AWS D1.1.
 - d. Inspect preheating and interpass temperatures for conformance with AWS D1.1.
 - e. Measure 25 percent of fillet welds.
 - f. Welding Magnetic Particle Testing: Test in accordance with ASTM E709 for a minimum of:
 - 1) 20 percent of all shear plate fillet welds at random, final pass only.
 - 2) 20 percent of all continuity plate and bracing gusset plate fillet welds, at random, final pass only.
 - 3) 100 percent of tension member fillet welds (i.e., hanger connection plates and other similar connections) for root and final passes.
 - g. Welding Ultrasonic Testing: Test in accordance with ASTM E164 and AWS D1.1 for all complete and partial penetration welds shall be visually inspected. Twenty (20) percent of complete penetration welds shall be inspected ultrasonically for the entire length of

weld. Columns, beams and plate material perpendicular in connections with penetration welds will be checked for lamellar tears. Further testing may be required if unacceptable welds or material are found. Contractor shall pay cost of such additional testing. Rejection of any portion of a weld inspected less than 100%, shall require inspection of 100% of that weld.

- h. Verify that correction of rejected welds are made in accordance with AWS D1.1.
- i. Testing and inspection do not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with the specified requirements.

2. Bolt Inspection:

- a. Inspect high-strength bolted connections in accordance AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts.
 - b. Slip-Critical Connections: Inspect 10 percent of bolts, but not less than 2 bolts, selected at random in each connection in accordance with AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts. Inspect all bolts in connection when one or more are rejected.
 - c. Fully Pre-tensioned Connections: Inspect 10 percent of bolts, but not less than 2 bolts, selected at random in 25 percent of connections in accordance with AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts. Inspect all bolts in connection when one or more are rejected.
 - d. Bolts installed by turn-of-nut tightening may be inspected with calibrated wrench when visual inspection was not performed during tightening.
 - e. Snug Tight Connections: Inspect 10 percent of connections verifying that plies of connected elements have been brought into snug contact.
 - f. Inspect field erected assemblies; verify locations of structural steel for plumbness, level, and alignment.
- D. Submit inspection reports, record of welders and their certification, and identification, and instances of noncompliance to Project Engineer.

3.10 STEEL DECKING:

- A. Provide field inspection of welds of metal deck to the supporting steel, and testing services to insure steel decking has been installed in accordance with contract documents and manufacturer's requirements.
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1. Refer to the "Plug Weld Qualification Procedure" in Part 3 "Field Quality Control."
- C. Submit inspection reports, certification, and instances of noncompliance to Project Engineer.

3.11 SHEAR CONNECTOR STUDS:

- A. Provide field inspection and testing services required by AWS D.1 to insure shear connector studs have been installed in accordance with contract documents.
- B. Shear Stud Inspection: At start of shear stud installation, testing agency will witness construction installation and quality control specified in AWS D1.1 (requirements for stud welding) and perform the following additional requirements:
 - 1. 100% of the first 100 studs and 50% of the next 200 studs installed shall be bend tested to a 15-degree angle. If more than four studs fail, installation shall cease until installation procedures have been adjusted to achieve satisfactory results, and contractor shall bend test all studs installed to date.
 - 2. For balance of job, bend tests at least 10% of all field-applied shear studs. A failure rate of not more than 2% of studs tested will be acceptable.
 - 3. Contractor shall correct failed stud installations.
 - 4. Testing agency shall inspect stud installation using the Contract Drawings and Reviewed Shop Drawings to verify quantity and location of studs.
- C. Submit inspection reports, certification, and instances of noncompliance to Project Engineer.

3.12 SPRAYED-ON FIREPROOFING:

- A. Provide field inspection and testing services to certify sprayed-on fireproofing has been applied in accordance with contract documents.
- B. Obtain a copy of approved submittals from Project Engineer.
- C. Use approved installation in test areas as criteria for inspection of work.
- D. Test sprayed-on fireproofing for thickness and density in accordance with ASTM E605.
 - 1. Thickness gauge specified in ASTM E605 may be modified for pole extension so that overhead sprayed material can be reached from floor.
- E. Location of test areas for field tests as follows:
 - 1. Thickness: Select one bay per floor, or one bay for each 930 m^2 (10,000 square feet) of floor area, whichever provides for greater number of tests. Take thickness determinations from each of following locations: Metal deck, beam, and column.
 - 2. Density: Take density determinations from each floor, or one test from each 930 m^2 (10,000 square feet) of floor area, whichever provides for greater number of tests, from each of the following areas: Underside of metal deck, beam flanges, and beam web.
- F. Submit inspection reports, certification, and instances of noncompliance to Project Engineer.

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