

Section 05312

STEEL ROOF DECK

PART 1 - GENERAL

1-1. SCOPE. This section covers the design, fabrication, and erection of steel roof deck, including flashings, fastening devices, and other accessories and appurtenances as required and as indicated on the drawings.

1-2. DELIVERY, STORAGE, AND HANDLING. Materials shall be handled, transported, delivered, and stored in a manner which will prevent bends, dents, scratches, or damage of any kind. Damaged deck units shall be promptly replaced.

1-3. SUBMITTALS. Detailed fabrication and erection drawings covering the steel deck shall be submitted in accordance with the submittals section.

Drawings shall indicate locations of roof framing supports and the depths, profiles, thicknesses, locations, lengths, and markings of deck units to correspond with the sequence of installation. Drawings shall indicate fastening methods for deck units, accessories, closure pieces, fittings, and auxiliary supports, and the type and sequence of welded connections.

PART 2 - PRODUCTS

2-1. PERFORMANCE AND DESIGN REQUIREMENTS. Except as modified or supplemented herein, or as otherwise indicated on the drawings, steel decking shall conform to the Basic Design Specifications of the Steel Deck Institute.

Metal thicknesses and gages of sheet metal used herein are the minimum required. Gages refer to US Standard gage.

Decking shall be designed to support a minimum total uniform load of 45 psf unless otherwise required. Unit working stress shall not exceed 20,000 psi and deflection shall not exceed 1/240 of the span.

Joints in the deck shall be centered on supporting members, with typical lengths extending over two or more spans.

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Unless otherwise indicated on the drawings, attachments shall secure the deck to the structure against a net uplift of at least 60 psf.

2-2. **MATERIALS**. Materials used in the manufacture and installation of steel roof deck shall be as follows.

|                      |  |
|----------------------|--|
| Steel Deck           | Hot-dip galvanized steel, ASTM A653, min Fy=33,000 psi; prefabricated, side lap units, 1-1/2 inch deep, Type B wide rib deck with 2-1/2 inch wide ribs, 18 gage minimum steel thickness; Vulcraft, Wheeling Corrugating Co. or United Steel Deck, Inc. |
| Zinc Coating         | ASTM A653, coating designation G60 galvanized deck.  |
| Self-Drilling Screws | Hex washer head self-drilling screw, ITW Buildex "Traxx", 10-16 x 3/4 Teks/1 for side laps, 12-24 x 7/8 Teks/4 for bar joist attachment, 12-24 x 1-1/4 Teks/5 for structural steel attachment.   |
| Compressible Filler  | Preformed soft rubber.   |
| Welding Washers      | 0.056 inch minimum thickness, 16 gage, w/nominal 3/8 inch hole. Material to match decking.   |

2-3. **ACCESSORIES**. All accessories, such as flashings and closure pieces and other items as indicated or required, shall be fabricated of the same material and finish as deck units, in the thicknesses indicated or recommended by the deck manufacturer. Sufficient screws and welding washers, if recommended by the manufacturer, shall be furnished to attach the decking as indicated on the drawings. Compressible closure pieces specifically designed to seal end openings and other gaps in the decking during erection shall be furnished.

2-4. **SHOP COATING**. Materials shall be shop prime painted, galvanized or left bare metal as specified. Shop prime painting shall be in accordance with the deck manufacturer's published standards and procedures. Materials left bare shall be clean and free from corrosion.

**PART 3 - EXECUTION**

**3-1. INSTALLATION.** Steel roof deck shall be installed in accordance with the recommendations of the Steel Deck Institute and shall be secured to the supporting steel, including miscellaneous framing around openings and at side joints as follows.

**3-1.01. At Supporting Members.** Unless otherwise indicated on the drawings, roof deck panels shall be secured to each supporting member with fusion welds at least 5/8 inch in diameter, at maximum 12 inch centers, in all roof areas except along the roof perimeter. Deck edges shall be secured to perimeter members parallel to the deck span at 6 inch centers with puddle welds at least 5/8 inch in diameter. Welds shall seal the metal completely, leaving no openings through the deck. Welds shall penetrate all layers of deck material at the point of welding and shall achieve complete fusion to the supporting member. Suitable welding washers shall be used, if welds satisfactory to the Engineer cannot be otherwise achieved.

All welding shall conform with ANSI/AWS D1.3 Structural Welding Code – Sheet Steel.

**3-1.02. At Side Joints.** Unless otherwise indicated on the drawings, roof deck panels shall be secured to each other at supporting members and between supports at intervals not to exceed 15 inch spacing for sidelap fasteners with top seam welds.

**3-1.03. Finishing.** The installed roof deck shall be smooth, unbroken, and free of unnecessary openings, holes, or crevices which might allow leakage of adhesive or bitumen. Any such openings shall be repaired to the satisfaction of Engineer.

Field-cut openings for piping or other projections shall be neatly cut and adequately flashed. Openings larger than three ribs in width shall be supported by structural members or otherwise reinforced.

Unless otherwise indicated on the drawings, steel deck shall not be used to support ceilings, light fixtures, ducts or other utility devices.

**3-3. CLEANUP.** At the completion of installation, all surplus materials, rubbish, and other debris shall be removed from the surface of the roof deck.

End of Section



Section 05550

ANCHORAGE IN CONCRETE AND MASONRY

PART 1 - GENERAL

1-1. SCOPE. This section covers the procurement and installation of anchors in concrete and masonry. It includes cast-in-place anchor bolts, adhesive anchors, and expansion anchors.

1-2. GENERAL. Unless otherwise specified or indicated on the drawings all anchors and anchor bolts shall be cast-in-place anchor bolts with forged heads or embedded nuts and washers. Unless otherwise indicated bolts in concrete shall have a diameter of at least 3/4 inch, and bolts in grouted masonry shall have a diameter of at least 1/2 inch.

Unless otherwise indicated on the drawings, anchors and anchor bolts used in the following locations and applications shall be of the indicated materials. Other anchors and anchor bolts shall be as indicated on the drawings.

Cast-in-Place and Epoxy Grouted Anchor Bolts

|                                       |                   |
|---------------------------------------|-------------------|
| Submerged locations                   | Stainless steel.  |
| Locations subject to splashing        | Stainless steel.  |
| Buried locations                      | Stainless steel.  |
| Anchorage of structural steel columns | Galvanized steel. |
| Other exterior locations              | Galvanized steel. |
| Other interior locations              | Carbon steel.     |

Adhesive, Expansion, and Undercut Anchors

|                                |                  |
|--------------------------------|------------------|
| Submerged locations            | Stainless steel. |
| Locations subject to splashing | Stainless steel. |
| Buried locations               | Stainless steel. |

|                                       |                  |
|---------------------------------------|------------------|
| Anchorage of structural steel columns | Stainless steel. |
| Other exterior locations              | Stainless steel. |
| Other interior locations              | Carbon steel.    |

Adhesive, expansion, and undercut anchors may be used instead of cast-in-place anchors where specifically indicated or permitted on the drawings or with the specific acceptance by Engineer.

1-3. SUBMITTALS. Data and catalog cuts indicating the manufacturer and types of adhesive anchors, expansion anchors, undercut anchors, and epoxy grouts to be supplied shall be submitted in accordance with the submittals section.

1-4. DELIVERY, STORAGE, AND HANDLING. Materials shall be handled, transported, and delivered in a manner which will prevent damage or corrosion. Damaged materials shall be promptly replaced. Materials shall be shipped and stored in original manufacturer's packaging.

PART 2 - PRODUCTS

2-1. MATERIALS. Materials shall be as indicated below.

Anchor Bolts

|                  |  |
|------------------|--|
| Carbon Steel     | ASTM F1554, Grade 36 with compatible nuts.                                 |
| Galvanized Steel | ASTM F1554, Grade 36 with compatible nuts; hot-dip galvanized, ASTM A153.  |
| Stainless Steel  | Bolts, ASTM F593, Alloy Group 1 or 2; nuts, ASTM F594, Alloy Group 1 or 2. |
| Flat Washers     | ANSI B18.22.1; of the same material as anchor bolts and nuts.              |
| Reinforcing Bars | ASTM A615, Grade 60, deformed.   |

|  |  |
|--|--|
| Reinforcing Bars, Weldable                             | ASTM A706, Grade 60, deformed.   |
| Epoxy Grout for Anchor Bolts and Reinforcing Bars      |  |
| Adhesive   |  |
| For Floors and Horizontal Surfaces                     | Sika "Sikadur 35, Hi-Mod LV"; ChemRex "Concresive Liquid LPL"; Sika "Sikadur 32 Hi-Mod".   |
| For Vertical Surfaces and Overhead Applications        | Sika "Sikadur 31 Hi-Mod Gel".  |
| Aggregate  | As recommended by the epoxy grout manufacturer.  |
| Water  | Clean and free from deleterious substances.  |
| Expansion Anchors                                      | Hilti "Kwik-Bolt 3"; ITW Ramset/Red Head "Trubolt Wedge Anchor"; Powers Fasteners "Power-Stud Anchor"  |
| Adhesive Anchors for Concrete and Grout Filled Masonry |  |
| Threaded Rods and Nuts                                 | As specified for Anchor Bolts and as recommended by the adhesive manufacturer.   |
| Adhesive   | Hilti "HIT HY 150 MAX", "HIT-ICE", "HIT RE 500", or "HVA" Systems; ITW Ramset/Redhead "Red Head Epcon C6" System; Powers Fasteners "Power Fast Epoxy Injection Gel" System; Simpson "Acrylic-Tie" Systems. |
| Adhesive Anchors for Hollow Masonry System             |  |

Threaded Rods  
and Nuts

As specified for Anchor Bolts and  
as recommended by the adhesive  
manufacturer.

Adhesive

Hilti "HIT HY 20" System; ITW  
Ramset/Redhead "Econ Ceramic  
6" System; Powers Fasteners  
"Power Fast Epoxy Injection Gel"  
System; Simpson "SET Epoxy"  
or "Acrylic-Tie" Systems.

Screen Tubes

As recommended by the  
manufacturer.

## 2-2. ANCHORS.

2-2.01. Cast-in-Place Anchor Bolts. Cast-in-place anchor bolts shall be delivered in time to permit setting before the structural concrete is placed. Unless installed in pipe sleeves, anchor bolts shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or the supporting template. Two nuts, a jam nut, and a washer shall be furnished for cast-in-place anchor bolts indicated on the drawings to have locknuts; two nuts and a washer shall be furnished for cast-in-place anchor bolts without locknuts.

2-2.02. Epoxy Grouted Anchor Bolts and Reinforcing. Epoxy grout for installing reinforcing bars and anchor bolts not indicated to be adhesive anchors shall consist of a two-component liquid epoxy adhesive of viscosity appropriate to the location and application, and an inert aggregate filler component, if recommended by the adhesive manufacturer.

Anchor bolts and reinforcing bars shall be free of coatings that would weaken the bond with the epoxy.

2-2.03. Adhesive, Expansion, and Undercut Anchors. When adhesive, expansion, or undercut anchors are indicated on the drawings, only acceptable systems shall be used. Acceptable systems shall include only those systems and products specified or specifically indicated by product name on the drawings.

Alternative anchoring systems may be used only when specifically accepted by Engineer. An acceptable adhesive anchor system may be used as an alternative in locations where epoxy grouted anchor bolts are specified or indicated.

Unless otherwise required, single nut and washer shall be furnished for adhesive anchors, expansion anchors, and undercut anchors. Adhesive anchors shall be free of coatings that would weaken the bond with the adhesive.

Adhesive anchors in hollow masonry shall utilize screen tubes as recommended by the manufacturer.

**PART 3 - EXECUTION**

3-1. **GENERAL**. Anti-seize thread lubricant shall be liberally applied to projecting, threaded portions of stainless steel anchors immediately before tightening of the nuts.

3-2. **CAST-IN-PLACE ANCHOR BOLTS**. Cast-in-place anchor bolts shall be carefully positioned with templates and secured in the forms prior to placing concrete. Contractor shall verify that anchorage devices are positioned in accordance with the design drawings and with applicable equipment submittal drawings. Bolts shall be positioned sufficiently in advance of the concrete placement so that an on-site representative of Engineer or Owner will have sufficient time to inspect the bolts prior to placing concrete. If Special Inspection of the anchor bolts is required by the local building code, anchorage shall be placed in sufficient time and with sufficient notification so that such inspection can take place without delaying progress of the work.

Threads, bolts, and nuts spattered with concrete during placement shall be cleaned prior to final installation of the bolts and nuts.

3-3. **EPOXY GROUT**. Epoxy grout components shall be packaged separately at the factory and shall be mixed immediately before use. Proportioning and mixing of the components shall be done in accordance with the manufacturer's recommendations.

3-3.01. **Preparation**. Where indicated on the drawings, anchor bolts and reinforcing bars shall be epoxy grouted in holes drilled into hardened concrete. Diameters of holes shall be as follows:

| Item                              | Diameter of Hole   |
|-----------------------------------|--|
| Anchor Bolts and Reinforcing Bars | 1/8 inch larger than the outside diameter of the bolt or bar |

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The embedment depth for epoxy grouted anchor bolts and reinforcing bars shall be at least 15 bolt or bar diameters, unless otherwise indicated on the drawings.

Holes shall be prepared for grouting as recommended by the epoxy grout manufacturer.

3-3.02. Installation. Anchor bolts and reinforcing bars shall be clean, dry, and free of grease and other foreign matter when installed. The bolts and bars shall be set and the epoxy grout shall be placed in accordance with the recommendations of the grout manufacturer. Care shall be taken to ensure that all spaces and cavities are filled with epoxy grout, without voids.

3-4. ADHESIVE ANCHORS. The embedment depth for adhesive anchors shall be at least 15 rod diameters unless otherwise indicated on the drawings.

Adhesive for adhesive anchors shall be statically mixed in the field during application. All proportioning and mixing of the components shall be in accordance with the manufacturer's recommendations.

Anchors shall be installed in holes drilled into hardened concrete or grout filled masonry. Diameter of holes shall be 1/16 inch larger than the outside diameter of the rod unless recommended otherwise by the anchor system manufacturer. Holes shall be prepared for insertion of the anchors by removing all dust and debris using procedures recommended by the adhesive manufacturer.

Adhesive anchors and holes shall be clean, dry, and free of grease and other foreign matter at the time of installation. The adhesive shall be placed and the rods shall be set in accordance with the recommendations of the material manufacturer. Care shall be taken to ensure that all spaces and cavities are filled with adhesive, without voids.

3-5. EXPANSION ANCHORS. Expansion anchors shall be installed in accordance with the drawings, but in no case shall the embedment depth be less than six bolt diameters. The minimum distance between the center of any anchor and an edge or exterior corner of concrete shall be at least six times the diameter of the bolt. Unless otherwise indicated on the drawings, the minimum distance between the centers of anchors shall be at least 12 times the diameter of the bolt.

End of Section

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Section 05990

STRUCTURAL AND MISCELLANEOUS METALS

PART 1 - GENERAL

1-1. SCOPE. This section covers the fabrication and erection of structural and miscellaneous metal items not covered in other sections.

1-2. SUBMITTALS. Complete data, fabrication drawings, and setting or erection drawings covering all structural and miscellaneous metal items shall be submitted in accordance with the Submittals section.

1-3. DELIVERY, STORAGE, AND HANDLING. Materials shall be handled, transported, and delivered in a manner which will prevent bends, dents, significant coating damage, or corrosion. Damaged materials shall be promptly replaced. Structural and miscellaneous metal work shall be stored on blocking so that no metal touches the ground and water cannot collect thereon. The material shall be protected against bending under its own weight or super-imposed loads.

Bolting materials shall be stored indoors. Weld rod shall be stored in accordance with the supplier's instructions and AWS D1.1.

PART 2 - PRODUCTS

2-1. GENERAL. All structural steel shall be detailed and fabricated to facilitate compliance with OSHA 29 CFR Part 1926, Subpart R and all other pertinent OSHA and local safety regulations.

All field connection materials shall be furnished.

2-2. MATERIALS.

Steel

|                 |                                     |
|-----------------|-------------------------------------|
| Shapes          | ASTM A36 or ASTM A572,<br>Grade 50. |
| Plates and Bars | ASTM A36.                           |

|  |  |
|--|--|
| Sheets                                   | ASTM A1008 CS, Type B or A1011 CS, Type B.   |
| Pipe                                     | ASTM A53, Type E or S, Grade B; ASTM A500, Grade B or C; or ASTM A501.   |
| Square and Rectangular Structural Tubing | ASTM A500, Grade B or C.   |
| Checkered Plate                          | ASTM A786, carbon steel, skid resistant pattern as standard with the manufacturer; Inland "4-way Floor Plate" or U.S. Steel "Multigrip Floor Plate". |
| <b>Bolts and Nuts</b>                    |  |
| Bolts and Nuts, Unfinished               | ASTM A307.   |
| Washers                                  |  |
| Flat, Hardened                           | ASTM F436, Type 1.   |
| Lock                                     | ANSI/ASME B18.21.1, helical spring type.   |
| Beveled                                  | ASTM F436.   |
| Load Indicator                           | ASTM F959, compressible-washer-type direct tension indicator; type compatible with bolts tested in accordance with Article 10.2 of ASTM F959.        |
| Anchor Bolts                             | ASTM F1554, Grade 36   |
| Threaded Rods                            | ASTM A36   |
| Cast Iron                                | ASTM A48, Class 35B or better.   |

## Aluminum

|                               |   |
|-------------------------------|---|
| Sheet and Plate               | ASTM B209, Alloy 6061-T6.   |
| Rolled Sections               | ASTM B308, Alloy 6061-T6.<br>All members shall be Aluminum Association standard shapes. |
| Rod and Bar (Rolled or Drawn) | ASTM B211, Alloy 6061-T6 or 2017-T4.  |
| Extrusions                    | ASTM B221, Alloy 6063-T5 or T6.   |
| Pipe                          | ASTM B429, Alloy 6061-T6.   |
| Rivets                        | ASTM B316, Alloy 6061-T6.   |
| Bolts, Aluminum               | ASTM F468, Alloy 2024-T4.   |
| Nuts, Aluminum                | ASTM F467, Alloy 6061-T6.   |
| Washers, Aluminum             |   |
| Flat                          | ANSI/ASME B18.22.1, Type 6061 T-6.  |
| Lock                          | ANSI/ASME B18.21.1, helical spring type, Type 6061-T6.                                  |
| Castings                      | ASTM B26 or B85.  |
| Checkered Plate               | ASTM B632, Type 6061-T6.  |
| Bird Screen                   | 2 mesh, brass or copper wire cloth, min wire dia 0.063 inch.                            |
| Body Solder                   | Flux-core wire, ASTM B32, Alloy Grade 20B.  |
| Handrail-Setting Cement       | Master Builders "Set 45" or Minwax "Super Por-Rok Cement".                              |

## Shop Coatings

|                  |  |
|------------------|--|
| Universal Primer | As indicated in Protective Coatings section. |
| Epoxy Enamel     | As indicated in Protective Coatings section. |
| Galvanizing      | ASTM A123, A153, A385.                       |

2-3. **FABRICATIONS.** The following fabrications shall be constructed as indicated on the drawings and as specified herein.

2-3.01. **Checkered Floor Plates.** Checkered floor plates shall be painted steel unless specifically designated on the drawings as galvanized steel, stainless steel or aluminum. Shop welded stiffeners or grating backup shall be provided as indicated on the drawings. Stiffeners and grating backup shall be of the same material as the checkered plate.

Checkered floor plates shall be detailed and fabricated in sections which can be lifted by one or two men. Plates which are not required to be bolted or welded in place shall be provided with lifting holes to facilitate removal. Warped or bent plates shall be straightened so they will lie perfectly flat.

Checkered floor plates shall be secured to structural shapes or grating using 3/8 inch stainless steel slotted flathead machine screws at 12 inch centers, Lindapter "Floor-Fast" stepped locking fasteners or as indicated on the drawings. Connection devices shall not protrude above the plate surface. Access holes shall be provided in the plate if required to allow access to grating hold-down devices beneath the plate.

2-4. **OPEN WEB STEEL JOISTS.** Unless otherwise noted, all materials, fabrication, erection, and end anchorage of open web steel joists shall conform to applicable provisions of the Steel Joist Institute "Standard Specifications, Load Tables, and Weight Tables for Steel Joists and Joist Girders".

Joists shall be K-Series with 14 inch maximum depth designed for a minimum dead load of 20 psf, a minimum live load of 30 psf, a minimum snow load of 30 psf plus drift, and a minimum uplift of 60 psf. Joists shall also be designed for the uniform and concentrated loads indicated on the drawings. Live load deflections shall not exceed 1/360 of the span.

Joists shall be shop painted with red oxide primer as specified herein. Bridging for K-Series joists shall be horizontal type, welded in place. All bridging shall be designed by the joist supplier.

Loads shall not be placed on the joists until bridging has been installed and the ends of joists have been securely anchored.

2-5. SHOP COATING. All structural and miscellaneous metal items shall be shop coated as specified herein. The requirements for field painting are covered in the Protective Coatings section.

2-5.01. Cleaning. Surfaces shall be dry and of proper temperature when coated, and shall be free of grease, oil, dirt, dust, grit, rust, loose mill scale, weld flux, slag, weld spatter, and other objectionable substances. Articles to be galvanized shall be pickled before galvanizing. All other ferrous metal surfaces shall be cleaned by solvent, high-speed power wire brushing or by blasting to the extent recommended by the paint manufacturer and as required in the Protective Coatings section.

2-5.02. Edge Grinding. Sharp projections of cut or sheared edges of ferrous metals which will be submerged in operation, except for items specified to be hot-dip galvanized, shall be ground to a radius as needed to ensure satisfactory paint adherence and as required in the Protective Coatings section.

2-5.03. Prime Painted Steel. Unless otherwise specified or indicated on the drawings, all ungalvanized structural and miscellaneous steel shall be given a universal prime coat in the shop after fabrication. The dry film thickness of the universal primer shall be at least 5 mils. Steel surfaces shall be prime-coated as soon as practicable after cleaning. Steel shall not be moved or handled until the shop coat is dry and hard.

2-5.04. Galvanizing. Steel materials required to be galvanized are indicated on the drawings. All galvanizing shall be done by the hot-dip process after fabrication. An approved zinc-rich paint shall be used to touch up minor coating damage. Materials with significant coating damage shall be regalvanized or replaced.

Where galvanized bolts are indicated on the drawings or specified, the use of zinc-plated bolts will not be acceptable.

2-5.05. Aluminum. All surfaces of aluminum which will be in contact with concrete, mortar, or dissimilar metals shall be given a coat of epoxy enamel.

2-5.06. Castings. Shop coating of miscellaneous iron castings will not be required.

2-5.07. Other Surfaces. Painting of zinc coated steel or bronze surfaces will not be required.

### PART 3 - EXECUTION

3-1. MISCELLANEOUS STEEL CONNECTIONS. Connections for miscellaneous steel fabrications not included in the AISC definition of structural steel may be made with unfinished bolts unless indicated otherwise on the drawings. Unless otherwise indicated on the drawings all unfinished bolts shall be snug-tight.

3-2. STRUCTURAL AND MISCELLANEOUS STEEL WELDING. Welding and related operations shall conform to applicable provisions of the Structural Welding Code - Steel, AWS D1.1, of the American Welding Society. All welding shall be performed in accordance with written procedures, using only those joint details which have prequalified status when performed in accordance with AWS D1.1. All welding shall be performed by welders qualified in accordance with the American Welding Society for steel welding and American Society for Mechanical Engineers Section IX for stainless steel welding.

All welds shall be visually inspected in accordance with AWS procedures.

Welds not dimensioned on the drawings shall be sized to develop the full strength of the least strength component of the connection.

Where structural or miscellaneous steel connections are welded, all butt and miter welds shall be continuous and, where exposed to view, shall be ground smooth. Intermittent welds shall have an effective length of at least 2 inches and shall be spaced not more than 6 inches apart.

Surfaces to be welded and surfaces within 2 inches of a weld shall be free from loose or thick scale, slag, rust, moisture, grease, paint and other foreign materials that would prevent proper welding or release objectionable fumes.

Only shielded metal arc, gas metal arc, flux cored arc, submerged arc, and gas tungsten arc welding are permitted. For flux cored arc welding, only E70xx one (1) or five (5) wire electrodes with supplemental gas shielding shall be permitted. Use of electroslag or electrogas welding processes or the short-circuiting transfer mode of the gas metal arc process will not be acceptable.

Field welded connections shall not be substituted for field bolted connections indicated on the drawings.

Deformed bar anchors, headed studs, concrete anchors and shear connectors shall be welded with an automatic stud welding gun per the manufacturer's recommendation. Hand welding will not be acceptable.

**3-3. STRUCTURAL AND MISCELLANEOUS ALUMINUM.** Unless otherwise noted, all work shall conform to applicable provisions of the Aluminum Association "Standard for Aluminum Structures".

**3-3.01. Connections.** Connections not specifically detailed on the drawings shall develop the full strength of the least strength member of the connections. Bolted connections shall be all-bolted bearing type, equipped with a helical spring lock washer under the stationary element (bolt head or nut) and a flat washer under the turned element. All bolts shall be fully tightened. Bolts and nuts for structural aluminum connections shall be stainless steel. Bolts and nuts for nonstructural miscellaneous aluminum assemblies shall be stainless steel or aluminum. A sufficient number of bolts shall be provided in each connection to develop the shear strength of the member.

Welded connections shall be made in accordance with the American Welding Society D1.2, Structural Welding Code – Aluminum. All welding shall be performed by welders qualified in accordance with American Welding Society. Welds shall be free of porosity, cracks, holes, and flux. Welded connections shall not be substituted for bolted connections without prior approval of Engineer.

**3-3.02. Erection.** Structural aluminum shall be erected so that individual pieces are plumb, level, and aligned within a tolerance of 1:500. The elevation of horizontal members shall be within 1/16 inch of the elevation indicated on the drawings.

Baseplates shall be set level in exact position and grouted in place.

End of Section

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