

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 expansion anchors and epoxy grouted anchor bolts to be installed in concrete and masonry.

1-2. GENERAL. Unless otherwise specified or indicated on the drawings all anchors and anchor bolts shall be epoxy grouted anchor bolts. Unless otherwise indicated bolts in concrete shall have a diameter of at least 1/2 inch.

Unless otherwise indicated on the drawings, anchors and anchor bolts shall be stainless steel.

1-3. SUBMITTALS. Data and catalog cuts indicating the manufacturer and types of 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

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.

Epoxy Grout for Anchor Bolts

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.

2-2. ANCHORS.

2-2.01. Epoxy Grouted Anchor Bolts. Epoxy grout for installing anchor bolts 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.

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. 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.

3-2.01. 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

The embedment depth for epoxy grouted anchor bolts and reinforcing bars shall be at least 6 bolt or bar diameters, unless otherwise indicated on the drawings.

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

3-2.02. Installation. Anchor bolts shall be clean, dry, and free of grease and other foreign matter when installed. The bolts 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.

End of Section

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.

Except as otherwise specified or indicated on the drawings, all work shall conform to the applicable provisions of the AISC "Manual of Steel Construction - Allowable Stress Design", Parts 1, 2, 3, and 4, the AISC "Specification for Structural Steel Buildings" and the Aluminum Association "Specifications for Aluminum Structures".

Special inspection during the fabrication and erection of structural steel, if required by the local building code, is addressed in the Quality Control section.

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.

All bolted connections and welds shall be properly identified on the shop drawings. Welding procedures, welding procedure qualification records and welder qualifications shall be submitted.

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 (W, WT)	ASTM A992
Shapes (S, M, HP, C)	ASTM A36 or ASTM A572, Grade 50.
Other Shapes (angles)	ASTM A36
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".
Bolts and Nuts	
Bolts, High Strength	ASTM A325, Type 1; tested in accordance with Article 9.2 thereof.

Bolts, Tension Control Type (Twist-off)	ASTM F1852. Equivalent to ASTM A325
Bolts, unfinished	ASTM A307.
Nuts, Heavy-Hex	ASTM A563, grade and finish compatible with bolts.
Nuts, Self-Locking	Prevailing torque type; IFI-100, Grade A.
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.
Forged Steel Clevises and Turnbuckles	AISI C-1035.
Forged Steel Eyebolts and Eyenuts	AISI C-1030, ANSI B 18.15, Type 2 shoulder pattern unless otherwise required.
Forged Steel Sleeve Nuts	AISI C-1018, Grade 2.
Stainless Steel	
Shapes	ASTM A276, Type 316L.

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Plates	ASTM A240, Type 316L.
Pipe	ASTM A312, Grade TP316L.
Tube	ASTM A269, Grade TP316L.
Checkered Plate	ASTM A793, stainless steel, raised pattern A.
Bolts	ASTM F593, Alloy Group 1 or 2.
Nuts	ASTM F594, Alloy Group 1 or 2.
Washers	
Flat	ANSI/ASME B18.22.1, Type 316.
Lock	ANSI/ASME B18.21.1, helical spring type, Type 316.
Cast Iron	ASTM A48, Class 35B or better.
Aluminum	
Sheet and Plate	ASTM B209, Alloy 6061-T6.
Rolled Sections	ASTM B308, Alloy 6061-T6. 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.

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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.
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. Not used.

2-4. 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.

2-4.01. 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.

2-4.02. 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.

2-4.03. 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.

2-4.04. 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.

2-4.05. Stainless Steel. Unless otherwise specified, all items fabricated from stainless steel shall be thoroughly cleaned and degreased after fabrication. Pickling or a light blast cleaning shall produce a modest etch and remove all embedded iron and heat tint. Surfaces shall be subjected to a 24 hour water test or a ferroxyl test to detect the presence of residual embedded iron and shall be retreated as needed to remove all traces of iron contamination. Surfaces shall be adequately protected during shipping and handling to prevent contact with iron or steel objects or surfaces.

2-4.06. Aluminum. All surfaces of aluminum which will be in contact with concrete, mortar, or dissimilar metals shall be given a coat of epoxy enamel.

2-4.07. Castings. Shop coating of miscellaneous iron castings will not be required.

2-4.08. Other Surfaces. Painting of zinc coated steel or bronze surfaces will not be required.

PART 3 - EXECUTION

3-1. STRUCTURAL STEEL ERECTION. Structural steel shall be erected so that individual pieces are plumb, level, and aligned within a tolerance of 1:500. The elevations of the top of floor and roof members shall be within 1/16 inch of the elevations indicated on the drawings. The faces of girts and other supporting members for rigid wall panels shall be in vertical planes within a maximum variation of 1/8 inch.

All members and parts, as erected, shall be free of warps, local deformations, and unauthorized bends. All parts shall be assembled accurately as indicated on the drawings. Light drifting will be permitted to draw parts together, but drifting to match unfair holes will not be permitted. Any enlargement of holes necessary to make connections in the field shall be done by reaming with twist drills and only with the approval of Engineer. Enlarging holes by burning will not be permitted.

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

All materials shall be erected in compliance with OSHA 29 CFR, Part 1926, Subpart R, and with all other applicable OSHA and local safety regulations.

3-2. STRUCTURAL STEEL CONNECTIONS. Not used.

3-3. 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.

End of Section

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