

SECTION 02560 - FASTENERS

(Follow all instructions and make all edits with “Track Changes” turned on. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the Project. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Comply with Section 02560 of the Standard Specifications modified as follows:

02560.05 Geometry - Replace this subsection, except for the subsection number and title, with the following:

Use a bolt or rod length such that the end of the bolt or rod extends beyond or is at least flush with the outer face of the nut when properly installed.

02560.10(a) Bolts - Replace this subsection, except for the subsection number and title, with the following:

Furnish carbon steel bolts meeting the requirements of ASTM A307, Grade A or B.

02560.10(b) Nuts - Replace the paragraph that begins “Nuts for carbon steel bolts...” with the following:

Furnish nuts for carbon steel bolts meeting the requirements of the following, or equivalent:

02560.20(a) Bolts - Replace the paragraph that begins “High-strength bolts used in...” with the following:

Use Type 3 high-strength bolts in noncoated weathering steel connections. Furnish high-strength bolts meeting the requirements of the following:

02560.20(b) Nuts - Replace the paragraph that begins “Nuts for high-strength bolts...” with the following:

Furnish nuts for high-strength bolts meeting the following requirements, or equivalent:

02560.20(c) Washers - Replace this subsection, except for the subsection number and title, with the following:

Furnish washers for high-strength bolts meeting the requirements of ASTM F436. Use Type 3 washers with Type 3 bolts.

02560.20(d) Direct Tension Indicators - Replace this subsection, except for the subsection number and title, with the following:

Furnish direct tension indicators that are the compressible-washer type, mechanically galvanized, according to ASTM F959. Adjust bolt lengths to accommodate both direct tension indicators and hardened washers.

02560.20(e) Markings - Replace this subsection, except for the subsection number and title, with the following:

Mark all bolts, nuts, washers and direct tension indicators according to the appropriate AASHTO/ASTM specifications and with a symbol identifying the manufacturer.

02560.30(a) Steel Tie Rods, Anchor Bolts, and Anchor Rods - Replace this subsection, except for the subsection number and title, with the following:

Furnish steel tie rods, anchor bolts, and anchor rods meeting the requirements of AASHTO M 314, Grade 36 or 55; ASTM F1554, Grade 36 or 55.

02560.30(b) High-Strength Tie Rods, Anchor Bolts, and Anchor Rods - Replace this subsection, except for the subsection number and title, with the following:

Furnish high-strength tie rods, anchor bolts, and anchor rods meeting the requirements of AASHTO M 314, Grade 105; ASTM F1554, Grade 105; or ASTM A449, Type 1.

End stamp all ASTM F1554, Grade 105 according to ASTM F1554 Supplementary Requirements S2 and S3. If the end of the bolt is to be embedded in concrete, mark the projecting end from the concrete.

02560.30(c) Nuts - Replace the paragraph that begins “Nuts for tie rods...” with the following:

Furnish nuts for tie rods, anchor bolts, and anchor rods meeting the following requirements, or equivalent:

02560.30(d) Washers - Replace this subsection, except for the subsection number and title, with the following:

Furnish washers for anchor bolts meeting the requirements of ASTM F436, Type 1.

02560.60(a) Rotational Capacity Test - Replace the paragraph that begins “Test each combination of bolt...” with the following:

Test each combination of bolt production lot, nut lot and washer lot as an assembly. Assign a rotational capacity lot number to each combination of lots tested. The minimum frequency of testing is two assemblies per rotational capacity lot. Test according to one of the following requirements:

02560.60(a)(1) Method 1 — Replace the paragraph that begins “the above measured torque...” with the following:

Do not allow the above measured torque to exceed the torque value calculated by the following equation:

Replace the paragraph that begins “Continue to tighten the nut until...” with the following:

Continue to tighten the nut until the nut has turned twice the rotation shown in Table 00560-3 of Section 00560 from its snug-tight position mark for bolt lengths up to 8D (for greater than 8D up to 12D bolt lengths tighten to 1 1/6 turn from snug-tight).

02560.60(a)(2) Method 2 - Replace this subsection, except for the subsection number and title, with the following:

Test bolts that are too short to be tested in a direct bolt tension indicating device in a steel joint.

Place the lubricated fastener including a washer in one or more flat structural steel plates. The total thickness including the washer is such that three to five full threads of the bolt are located between the bearing surfaces of the bolt head and the nut. Provide the hole in the joint at the same nominal diameter as the hole in the washer. Using a calibrated torque wrench, tighten the nut to a snug-tight condition to produce an initial torque in the bolt equal to approximately 10 percent of the torque calculated using the equation given in Method 1 above where P is the minimum tension in the bolt according to Table 00560-1 of Section 00560. Mark the nut's position relative to the fixed bolt for this snug tight position.

Using the calibrated torque wrench, further tighten the nut until the nut has turned the rotation shown in Table 00560-3 of Section 00560 from its snug-tight position mark. Prevent the bolt head from turning during the tightening process. Record the measured torque with the nut in motion. The measured torque is not to exceed 1.15 times the torque value calculated in the preceding step of Method 2. Reject assemblies with torque values exceeding the calculated value.

Tighten the nut further until the nut has turned twice the rotation shown in Table 00560-3 from its snug-tight position mark. Reject assemblies that fail this rotation either by stripping or fracture.

Loosen and remove the nut. Examine the threads on the nut and bolt. Reject assemblies showing evidence of thread shear failure, stripping or torsional failure of the bolt.

02560.60(b) Other Test Requirements - Replace the paragraph that begins “Provide three high-strength bolt ...” with the following:

Furnish three high-strength bolt assemblies per size per lot for check testing.

Replace the paragraph that begins “Provide one high-strength tie rod...” with the following:

Furnish one high-strength tie rod, one high-strength anchor bolt, and one high-strength anchor rod assembly per size per lot for check testing.

02560.70 Lubricating Fasteners - Replace the paragraph that begins “Furnish all galvanized and coated...” with the following:

Furnish all galvanized and coated fasteners with a factory applied commercial water-soluble wax that contains a visible dye of a color that contrasts with the color of galvanizing or coating. Furnish black fasteners that are "oily" to the touch when installed.

02560.80 Acceptance - Replace this subsection, except for the subsection number and title, with the following:

Acceptance of fasteners are according to 00165.35 and this Section.