

**460 STRUCTURAL STEEL AND MISCELLANEOUS METALS.**  
**(REV 12-11-13) (FA 1-8-14) (7-14)**

SUBARTICLE 461-5.1 is deleted and the following substituted:

**460-5.1 General:** Use bolts as follows:

1. Use galvanized ASTM A325 Type 1 bolts in all field installed bolted structural steel connections for painted steel.
2. Use either black or galvanized ASTM A 325 Type 1 bolts in all shop installed bolted structural steel connections that will be shop painted.
3. Use black ASTM A325 Type 3 bolts in all bolted structural steel connections for weathering steel that is to remain unpainted.
4. Use the bolts as specified for connected assemblies or parts that are designated as miscellaneous components where the fastener type is specified elsewhere in the Contract Documents.

Tighten ASTM A325 bolts in accordance with the procedures specified below for turn-of-nut or direct-tension-indicator (DTI) tightening.

Lubricate and maintain consistency in lubrication of fastener assembly during Rotational Capacity (RC) testing and installation. Assemblies that exhibit a loss of lubrication, as determined by the Engineer, may be re-lubricated and retested prior to installation.

Use ASTM A490 bolts only with the approval of the Engineer. Provide procedures in accordance with for the handling, lubrication, installation, tightening and testing of ASTM A490 bolts. Do not install ASTM A490 bolts without prior approval of the procedures by the Engineer.

When the Engineer approves ASTM A307 bolts for use in miscellaneous components, tighten them such that the plies of the joint are in firm contact. Use three to five impacts of an impact wrench or the full effort of a person using an ordinary spud wrench to obtain a snug connection.

Fasten aluminum, other materials or assemblies of dissimilar materials in accordance with the Contract Documents.

Install ordinary rough or machine bolts and nuts in accordance with the Contract Documents.

SUBARTICLE 460-7.1.3 is deleted and the following substituted:

**460-7.1.3 Erection Plan:** Submit, for the Engineer's review, an Erection Plan locating all primary members, lifting equipment and temporary supports or braces, and bolting pattern tightening procedures not considered routine. Ensure that the plan includes the Specialty Engineer's signature and stamp. Include supporting calculations indicating that the design unit stresses indicated in the Contract Documents have not been exceeded. Provide this plan or plans to the Engineer three weeks before erecting the piece or pieces.

Include the following information in the Erection Plan:

1. A plan of the work area showing all substructure units and foundations; surface roads and railroads; all streams, creeks and rivers; all overhead utilities; and

any underground utilities that could possibly impact, or be adversely affected by, erection operations as determined by the Specialty Engineer.

2. The erection sequence for all primary load-carrying members and all primary load-carrying member bracing. Note any and all permanent or temporary support and/or bracing locations, including crane-holding positions.

3. The center of gravity locations, pick weight and delivery orientation for all primary load-carrying members.

4. Identify any bolting requirements not considered routine.

5. Locate all pick crane work points.

6. Identify all temporary works and staging areas such as barges, mats and temporary excavation support.

7. Provide capacity charts on the drawings for each crane configuration and boom extension utilized.

8. Details of all temporary bracing, falsework, towers and shoring.

9. Provide any procedures requested by the Engineer and not contained in the QC Plan.