

**ERRATA for
AASHTO LRFD Bridge Construction Specifications, 4th Edition
(LRFDCONS-4)**

March 2018

Dear Customer:

Recently, we were made aware of some technical revisions that need to be applied to the *AASHTO LRFD Bridge Construction Specifications, 4th Edition*.

Please scroll down to see the full erratum. As there is only one replacement page to this erratum, we are including it with this letter.

In the event that you need to download this file again, please download from AASHTO's online bookstore at:

<http://downloads.transportation.org/LRFDCONS-4-Errata.pdf>

Then, please replace the existing pages with the corrected pages to ensure that your edition is both accurate and current.

AASHTO staff sincerely apologizes for any inconvenience to our readers.

Summary of Errata Changes for LRFDCONS-4, March 2018

Page	Existing Text	Corrected Text
11-27	<p align="center"><i>11.5.5.4.1—General</i></p> <p>...</p> <p>Rotation, as used in Table 11.5.5.4.1-2, shall be taken as rotation of the nut relative to the bolt, regardless of the element (nut or bolt) being turned. The tolerances is minus 30, plus 60°.</p> <p>The values, given in Table 11.5.5.4.1-2, shall be</p>	<p align="center"><i>11.5.5.4.1—General</i></p> <p>...</p> <p>Rotation, as used in Table 11.5.5.4.1-2, shall be taken as rotation of the nut relative to the bolt, regardless of the element (nut or bolt) being turned. The tolerances is minus 30, plus 60°.</p> <p>The values, given in Table 11.5.5.4.1-2, shall be <u>applicable only to connections in which all material within grip of the bolt is steel.</u></p> <p><u>For situations in which the bolt length measured from the underside of the head to the end of the bolt exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.</u></p> <p><u>The bolt length used shall be such that the end of the bolt is flush with or extends beyond the outer face of the nut when properly installed.</u></p>

Table 11.5.5.4.1-1—Minimum Required ASTM F3125 Bolt Tension, kips

Bolt Size	Grade A325 or F1852	Grade A490 or F2280
0.5	12	15
0.625	19	24
0.75	28	35
0.875	39	49
1.0	51	64
1.125	64	80
1.25	81	102
1.375	97	121
1.5	118	148

The minimum bolt tension values given in Table 11.5.5.4.1-1 are equal to 70 percent of the minimum tensile strength of the bolts.

Table 11.5.5.4.1-2—Nut Rotation from the Snug Condition

	Geometry of Outer Faces of Bolted Parts		
	Both faces normal to bolt axis	One face normal to bolt axis and other face sloped not more than 1:20. Bevel washer not used.	Both faces sloped not more than 1:20 from normal to bolt axis. Bevel washers not used.
Bolt length measured from underside of head to end of bolt			
Up to and including four diameters	$\frac{1}{3}$ turn	$\frac{1}{2}$ turn	$\frac{2}{3}$ turn
Over four diameters, but not exceeding eight diameters	$\frac{1}{2}$ turn	$\frac{2}{3}$ turn	$\frac{5}{6}$ turn
Over eight diameters, but not exceeding 12 diameters	$\frac{2}{3}$ turn	$\frac{5}{6}$ turn	1 turn

Rotation, as used in Table 11.5.5.4.1-2, shall be taken as rotation of the nut relative to the bolt, regardless of the element (nut or bolt) being turned. The tolerances is minus 30, plus 60°.

The values, given in Table 11.5.5.4.1-2, shall be applicable only to connections in which all material within grip of the bolt is steel.

For situations in which the bolt length measured from the underside of the head to the end of the bolt exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.

The bolt length used shall be such that the end of the bolt is flush with or extends beyond the outer face of the nut when properly installed.

Tolerances are generous and are both plus and minus as the bolt tension in the inelastic range is not very sensitive to rotation.

No research work has been performed by the Research Council on Structural Connections (RCSC) to establish the turn-of-nut procedure when bolt lengths exceed 12 diameters.

The requirement in the last paragraph of this Article related to the minimum bolt length is taken from Section 2.3.2 of RCSC (2014). Contract documents sometimes include a stick-through length requirement or minimum protrusion of the bolt point beyond the nut. However, because the threaded length for any given bolt diameter is constant regardless of the bolt length, an excessive stick-through length requirement, which may require a longer bolt, increases the risk of jamming the nut on the thread run-out. Because a stick-through length requirement does not enhance the performance of the bolt and can reduce the rotational ductility of the fastener, a minimum stick-through requirement should not be specified. Note that there is no specified maximum limitation on bolt stick-through. However, in order to provide the rotational ductility of the fastener required for proper tensioning of high-strength bolts, sufficient threads in the grip must be available. Three full threads located within the grip of the bolt is sufficient to provide the required ductility. The use of an additional flat washer under the bolt head is a common solution to provide the additional threads within the grip or when there is a risk of jamming the nut on the thread run-out. For standard holes, up to two washers may be used under either or both the head and the nut to accommodate variations in bolt and thread length.

11.5.5.4.2—Rotational-Capacity Tests

Rotational-capacity testing by the Manufacturer shall be required for all fastener assemblies with ASTM F3125 Grade A325 or A490 bolts. Rotational-capacity testing shall not be required for twist-off bolts (ASTM F3125 Grade F1852 or F2280). DTIs or captive DTI/nuts shall not be included in rotational-capacity testing assemblies. Assemblies specified as galvanized shall be tested after galvanizing. Washers shall be required as part of the test even though they may not be required as part of the installation procedure. Rotational-capacity testing shall be performed in accordance with ASTM F3125 Annex A2.

C11.5.5.4.2

An assembly lot is defined as a combination of fastener components of different types which are configured as they are to be installed in the steel. An example would be a bolt, nut, and washer. Each component in an assembly lot will have come from a production lot of similar components. Any change in component lots warrants additional testing of the assembly lots into which the component lots are integrated.

Rotational-capacity testing is not appropriate for twist-off bolts (ASTM F3125 Grade F1852 or F2280), or for DTIs and captive DTI/nuts, because these installation processes do not rely upon the ductility of the fastener. DTIs and captive DTI/nuts do not have to be included in rotational-capacity testing assemblies as this test is designed only to test the capacity of the nut and bolt.

The required starting tension in the ASTM F3125 rotational-capacity test is 10 percent of the required minimum installation tension, and is assumed to bring the connection to a snug condition.

The required nut rotations from the snug condition in the rotational-capacity test are approximately twice the required rotations specified in Table 11.5.5.4.1-2, adjusted to provide roughly equal ductility demand across different bolt sizes.