

ROTATIONAL—CAPACITY TEST
Long Bolt Procedure 1-5-95
(For bolts long enough to be tested in a Skidmore.)

Test Number	ber
Date	
Inspector	

Blk & Galv Washer F 436

Corrected Skidmore Tension (P) = 28.4 + 0.6 = 29.0 kips  (Must be = to, or > than TABLE 2 Tension.) OK?_Yes_  Measured Torque = 350 ft-lbs T=0.25x_0.75 "x_29.000 bs  T < 0.25 x dia/12 x P Measured < Max OK?_Yes_ 12"  ***Complete R - C Test Rotation.****  ***Complete R - C Test Rotation.****  ***Complete R - C Test Rotation.***  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  (Must be > than TABLE 3 Tension) OK?_Yes_ Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  (Must be > than TABLE 3 Tension) OK?_Yes_ Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  (Must be > than TABLE 3 Tension) OK?_Yes_ Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  (Must be > than TABLE 3 Tension) OK?_Yes_ Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  (Must be > than TABLE 3 Tension) OK?_Yes_ Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  ***TABLE 2  ***Bolt Dia.  ***TABLE 3  ***Bolt Dia.  ***TABLE 4  ***Bolt Dia.  ***Table 5  ***Table 6	ounty	Project #		Design	#
Alb. Ave - Gauge =	Skidmore Correction		Calcula	ations	
R - C PROCEDURE (I.M. 391)  R - C PROCEDURE (I.M. 391)  TABLE 1  Bolt Dia. Initial Tension Range  Wisc. Information  TABLE 2  Bolt Dia. Specification*  Washers - C 7025 x dia/12 x P Measured Amax OK? Yes  Accord Edd Skidmore Tension (P) = 28.4 + 0.6 = 29.0 kips  Measured Torque = 350 ft-lbs  Table T = 0.25 x 0.75 x 29.000 bs  T < 0.25 x dia/12 x P Measured Amax OK? Yes  Table T = 0.25 x 0.75 x 29.000 bs  T < 0.25 x dia/12 x P Measured Amax OK? Yes  Table T = 0.25 x 0.75 x 29.000 bs  T < 0.25 x dia/12 x P Measured Amax OK? Yes  TABLE 2  TABLE 3  TABLE 4  Bolt Dia. Specification*  Min. Tension  OK? Yes  TABLE 3  TABLE 3  TABLE 4  Bolt Dia. Specification*  Min. Tension  OK? Yes  TABLE 3  TABLE 4  TABLE 5  TABLE 5  TABLE 6  TABLE 6  TABLE 6  TABLE 6  TABLE 7  TABLE 7  TABLE 6  TABLE 7  TABLE 1  TABLE 2  TABLE 2  TABLE 2  TABLE 2  TABLE 2  TABLE 3  TABLE 3  TABLE 3  TABLE 4  TABLE 3  TABLE 4  TABLE 5  TABLE 5  TABLE 6  TABLE 6  TABLE 6  TABLE 7  TABLE 6  TABLE 7  TABLE 6  TABLE 7  TABLE 6  TABLE 7  TABLE 6  TABLE 1  TABLE 2  TABLE 1  TA	Calb. Ave – Gauge = <u>+0.6</u> ki	·	4D = <u>3</u> in.	8D=	<u><b>6</b></u> in.
Bolt Length = 3inches		<u>X</u> No		Misc. Information	
Corrected Skidmore Tension (P) = _28.4 + 0.6 = 29.0 kjps  (Must be = to, or > than TABLE 2 Tension.) OK? _Yes  Measured Torque =350	R – C PROCEDURE (I.M. 391)		TABLE 1		
Measured Torque = 350 ft-lbs  Max. Permitted Torque = 453 ft-lbs T=0.25x 0.75 "x 29,000 bs  T < 0.25 x dia/12 x P Measured < Max OK? Yes 12"  ***Complete R − C Test Rotation. ***  ***Test Rotation. ***  ***Complete R − C Test Rotation. ***  ***Test Rotation. ***Test Rotation. ***  ***Test Rotation. ***Test	Bolt Length = <u>3</u> inches Corrected Skidmore Tension (P) = _			Bolt Dia.	
Max. Permitted Torque =453Tr-lbs	(	Must be = to, or > than TABLE 2	2 Tension.) OK?Yes_	3/4"	3 to 5 kips
Asymptotic for the first service of the side of the form LM. 391  TABLE 3  TABLE 4  TABLE 5  TABLE 5  TABLE 6  TABLE 6  TABLE 6  TABLE 7  TABLE 6  TABLE 7  TABLE 7  TABLE 6  TABLE 7  TABLE 6  TABLE 7  TABLE 7  TABLE 6  TABLE 7  TABLE 6  TABLE 7  TABLE 6  TABLE 7	, , , , , , , , , , , , , , , , , , , ,			7/8"	4 to 6 kips
T < 0.25 x dia/12 x P Measured < Max OK? Yes 12"  *** Complete R - C Test Rotation. ***  TABLE 2  *** Complete R - C Test Rotation. ***  TABLE 3 Kips  (Must be - than TABLE 3 Tension) OK? Yes (Must be			75 " v 20 000 bo	1"	5 to 7 kips
TABLE 2    Specification		_		1-1/8"	6 to 8 kips
**Should bring total rotation to 2x the rotation required by Turn-of-Nut.) Read 40.0 kips  **Corrected Skidmore Tension = 40.0 + 0.6 = 40.6 kips  **Condition of Fastener: Nut OK? Yes Bolt OK? Yes PASS? Yes  **Condition of Fastener: Nut OK? Yes Bolt OK? Yes PASS? Yes  **Production Lot#**  **NOTES:**  **Bolts**  **NOTES:**  **Bolts**  **NOTES:**  **Bolts**  **NOTES:**  **Bolt Dia.**  **TABLE 3  **Min. Adj.**  **Tension  **Ja4" 32.7 kip  **Ja5" 45.2 kip  **Ja5"	<del></del>		TABLE 2		
(Must be > than TABLE 3 Tension) OK? Yes Condition of Fastener: Nut OK? Yes Bolt OK? Yes PASS? Yes 11" 51.5 kip 1-1.76" 56.5 kip 1-1.76" 59.2 kip 1-1.76" 56.5 kip 1-1.76" 59.2	****(Should bring total rotation to 2x the rotation	required by Turn-of-Nut.)		Bolt Dia.	·
Production Lot# NOTES:  **Min. Adj.  **TABLE 3  **Min. Adj.  **Table 4  **Min. Adj.  **Table 4  **Table 5.0 kip  1" 59.2 kip  1" 11/8" 65.0 kib  **TABLE 4  **Bolt Test  **Table 4  **Bolt Test  Length  **Table 5  **Table 4  **Bolt Test  Length  **Table 4  **Bolt Test  Length  **Table 4  **Bolt Test  Length  **Table 5  **Table 4  **Bolt Test  Length  **Table 6  **Table 4  **Bolt Test  Length  **Table 5  **Table 4  **Bolt Test  Length  **Table 4  **Bolt Test  Length  **Total Rotation  **Table 4  **Bolt Test  Length  **Table 5  **Table 6  **Molt Test  Length  **Table 6  **Table 7  **Table 6  **Table 6  **Table 7  **Table 6  **Table 7  **Table 8  **Molt Test  Length  **Table 4  **Bolt Test  Length  **Table 4  **Bolt Test  Length  **Table 9  **Tab	_ <del>_</del>			3/4"	28.4 kip
TABLE 3    Solt Dia.   Table 3   Solt Dia.   Table 3   Solt Dia.   Table 3   Table 3   Solt Dia.   Table 3   Solt Dia.   Table 3   Solt Dia.   Table 3   Solt Dia.   Table 5   Table 5   Table 5   Table 6   Table 7   Table 6   Table 7   Table 6   Table 7   Table 6   Table 7	· ·	,		7/8"	39.3 kip
TABLE 3  Bolts Nuts	Condition of Fastener: Nut OK? Y	es Bolt OK? Yes	PASS? <u>Yes</u>	1"	51.5 kip
Production Lot# Bolts				1-1/8"	56.5 kip
Bolt Dia.    Min. Adj.   Tension	Production Lat#	NOTES:		TAE	BLE 3
R − C Lot #  R − C Procedure from I.M. 391  R − C Procedure from I.M. 391    Place fastener in Skidmore, use washer under "turned" element.   Need a minimum 3 to 5 exposed treads under the nut. (NOTE: May use a maximum of 5 washers &/or or shim plates.)   Initially tension fastener to values in TABLE 1.   Match mark bolt tip, nut corner, washer/shims, and the Skidmore's base plate. (Mark shall be a straight-line.   Tighten fastener to at least MINIMUM specified tension in TABLE 2. (Include any Skidmore correction factors.) This tension is required for a calculation in step 6 and is called "P" in the formula below. Check total rotation for step 4. Should be about the same as rotation for Turn-of-Nut.   Record torque required to develop tension in step 4. (Torque is read with nut in motion.)   Torque in step 5 must be less than "Maximum" torque. "Maximum" torque is calculated by T = 0.25 x bolt dia/12 x P. If step 5's torque is less than Maximum, bolt and nut pass. If not, lot fails and entire lot may be relubricated and retested or else replaced.   Complete nut rotation as required by R − C Rotation listed in TABLE 4.	Bolts Nuts	NOTES.		Bolt Dia.	·
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R − C Procedure from I.M. 391  1-1/8" 65.0 kib  TABLE 4    Place fastener in Skidmore, use washer under "turned" element.			7/8"		
R − C Procedure from I.M. 391  Place fastener in Skidmore, use washer under "turned" element.  Need a minimum 3 to 5 exposed treads under the nut. (NOTE: May use a maximum of 5 washers &/or or shim plates.)  Initially tension fastener to values in TABLE 1.  Match mark bolt tip, nut comer, washer/shims, and the Skidmore's base plate. (Mark shall be a straight-line.  Tighten fastener to at least MINIMUM specified tension in TABLE 2. (Include any Skidmore correction factors.) This tension is required for a calculation in step 6 and is called "P" in the formula below.  Check total rotation for step 4. Should be about the same as rotation for Turn-of-Nut.  Record torque required to develop tension in step 4. (Torque is read with nut in motion.)  Torque in step 5 must be less than "Maximum" torque.  "Maximum" torque is calculated by T = 0.25 x bolt dia/12 x P. If step 5's torque is less than Maximum, bolt and nut pass. If not, lot fails and entire lot may be relubricated and retested or else replaced.  Complete nut rotation as required by R − C Rotation listed in TABLE 4.  Bolt Test Length  L ≤ 4D  Not-L ≤ 8D  1  80-t L ≤ 12D  1-1/3  Bolt Diameters  Fraction  Decimal  TABLE 3. (In the fails and shall be replaced.)  Torque is tep 5's torque is less than Maximum, bolt and nut pass. If not, lot fails and entire lot may be relubricated and retested or else replaced.  Total Rotation  L ≤ 4D  L ≤ 4D  L ≤ 4D  L ≤ 4D  Not-L ≤ 8D  1  80-t L ≤ 12D  1-1/3  Bolt Diameters  Fraction  Decimal  This is greater, fastener passes.  If not, fastener lot fails. If lot fails due to tension being less than minimum shown in TABLE 3, the entire bolt lot fails and shall be replaced.  L ≤ 4D  Not-L ≤ 8D  1  80-t L ≤ 12D  1-1/3				1"	59.2 kip
Place fastener in Skidmore, use washer under "turned" element.  Need a minimum 3 to 5 exposed treads under the nut. (NOTE: May use a maximum of 5 washers &/or or shim plates.)  Initially tension fastener to values in TABLE 1.  Match mark bolt tip, nut corner, washer/shims, and the Skidmore's base plate. (Mark shall be a straight-line.  Tighten fastener to at least MINIMUM specified tension in TABLE 2. (Include any Skidmore correction factors.) This tension is required for a calculation in step 6 and is called "P" in the formula below. Check total rotation for step 4. Should be about the same as rotation for Turn-of-Nut.  Record torque required to develop tension in step 4. (Torque is read with nut in motion.)  Torque in step 5 must be less than "Maximum" torque. "Maximum" torque is calculated by T = 0.25 x bolt dia/12 x P. If step 5's torque is less than Maximum, bolt and nut pass. If not, lot fails and entire lot may be relubricated and retested or else replaced.  Record tension at the end of step 7's added rotation. (Accounting for any Skidmore correction factors.) Step 8's tension must be greater than MINIMUM shown in TABLE 3. If it is greater, fastener passes. If not, fastener lot fails. If lot fails due to tension being less than minimum shown in TABLE 3, the entire bolt lot may be relubricated and tested again. If bolt breaks during step 7, entire bolt lot fails and shall be replaced.  Loosen nut, remove bolt, and inspect bolt and nut for visible signs of damage.  Damage could be thread stripping, nut does not run freely to location of test shims, nut is cracked, bolt is cracked in the threads, etc. If there is evidence of damage, the bolt lot is rejected & shall be replaced.	D. C.D.	and we from LM 204		1-1/8"	65.0 kip
Need a minimum 3 to 5 exposed treads under the nut. (NOTE: May use a maximum of 5 washers &/or or shim plates.)  Initially tension fastener to values in TABLE 1.  Match mark bolt tip, nut comer, washer/shims, and the Skidmore's base plate. (Mark shall be a straight-line.  Tighten fastener to at least MINIMUM specified tension in TABLE 2. (Include any Skidmore correction factors.) This tension is required for a calculation in step 6 and is called "P" in the formula below. Check total rotation for step 4. Should be about the same as rotation for Turn-of-Nut.  Record torque required to develop tension in step 4. (Torque is read with nut in motion.)  Torque in step 5 must be less than "Maximum" torque. "Maximum" torque is calculated by T = 0.25 x bolt dia/12 x P. If step 5's torque is less than Maximum, bolt and nut pass. If not, lot fails and entire lot may be relubricated and retested or else replaced.  Complete nut rotation as required by R − C Rotation listed in TABLE 4.  Record tension at the end of step 7's added rotation. (Accounting for any Skidmore correction factors.) Step 8's tension must be greater than MINIMUM shown in TABLE 3. If it is greater, fastener passes. If not, fastener lot fails. If lot fails due to tension being less than minimum shown in TABLE 3, the entire bolt lot may be relubricated and tested again. If bolt breaks during step 7, entire bolt lot fails and shall be replaced.  Loosen nut, remove bolt, and inspect bolt and nut for visible signs of damage.  Damage could be thread stripping, nut does not run freely to location of test shims, nut is cracked, bolt is cracked in the threads, etc. If there is evidence of damage, the bolt lot is rejected & shall be replaced.				TABLE 4	
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If not, fastener lot fails. If lot fails due to tension being less than minimum shown in TABLE 3, the entire bolt lot may be relubricated and tested again. If bolt breaks during step 7, entire bolt lot fails and shall be replaced.  Loosen nut, remove bolt, and inspect bolt and nut for visible signs of damage.  Damage could be thread stripping, nut does not run freely to location of test shims, nut is cracked, bolt is cracked in the threads, etc. If there is evidence of damage, the bolt lot is rejected & shall be replaced.  ASTM GRADES FOR  Blk & Galv Bolt A 325  Black Nut A 194			kidmore correction factors.)	7/8"	0.875
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Loosen nut, remove bolt, and inspect bolt and nut for visible signs of damage.  Damage could be thread stripping, nut does not run freely to location of test shims, nut is cracked, bolt is cracked in the threads, etc. If there is evidence of damage, the bolt lot is rejected & shall be replaced.  Blk & Galv Bolt A 325  Black Nut A 194	bolt lot may be relubricated and tested again. If bolt breaks during step 7, entire bolt lot fails and shall be		ASTM GRADES FOR		
cracked in the threads, etc. If there is evidence of damage, the bolt lot is rejected & shall be replaced.  Black  Nut A 194	•	d nut for visible signs of damag	e.		
		•			
0. Conduct test on two randomly selected fasteners. Both tested fasteners must pass the R-C test to accept Galvanized Nut A 563					

01/29/16 Appendix 11-13.3

that lot.