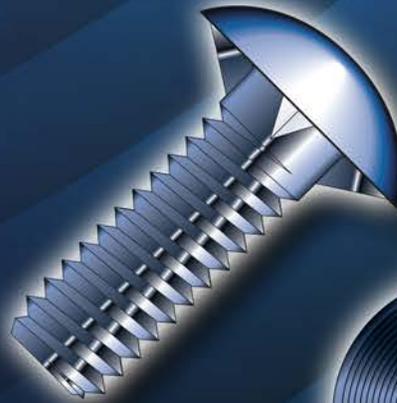


TANK BOLTS

NOW WITH JS1000®
LONG-LIFE PLATING!!!



LELAND
INDUSTRIES INC.

Leland Industries Inc.

Leland Industries Inc. has been producing North American made fasteners for the Grain Storage Industry since 1984. During that time, Leland has grown to be the largest domestic manufacturer of nuts, bolts and fastener programs, with over 300 pieces of equipment designed specifically for agricultural storage and steel tank industry requirements.

JS1000®

Leland's JS1000®, a plating system that meets or exceeds 1,000 hours in salt spray testing, exceeding the performance of commercial zinc plating, with NO RED RUST!

Years of research and experience in the manufacture of long-life fasteners have produced a true innovation: The Leland JS1000® extreme life plating.

Check out the features of Leland's JS1000®:

- Completely non-toxic and compliant to FDA regulations for use around food products!
- Totally compatible with aluminum and other metals used in construction!
- Leland and Canadian Threadall use coatings that meet rigorous industry standards — environmentally friendly!
- Powder coating over JS1000® increases rust resistance (salt spray testing) by over three times!

The proof is in the testing:

The incredible JS1000® has been proven to remain completely rust-free in over 1000 hours of salt spray testing. That's up to 20 times more corrosion resistance than electro-zinc platings - and considerably better than certain post-plating coatings on the market.



Round Head Tank Bolts GR 8 - 5.2



Square Head Chime Bolts GR 8



Rely on North American quality!
JS1000® is exclusive to Leland. And as with all Leland products, JS1000® is 100% North American.

Tank Bolts

Now with JS1000® LONG-LIFE PLATING

- Round head fin neck locking bolts.
 - Lock in to steel surfaces to assist one-man bolt tightening.
- Available in carbon steel, GR 8, JS1000® plating.
- Also manufactured in stainless steel 304, 316, JS600 plating.
- JS600 plating over stainless eliminates galling during assembly.
- Spin fit nut tightening on stainless or carbon steel bolts.
- Smooth round head design eliminates dust or debris build-up on bolt heads.

Available bolt designs include:

- Standard thread length on 1/2" bolts is 1-1/4" (on bolts 1-1/4" and longer). Other sizes, thread length is 2 times the diameter, plus 1/4"
- Special thread lengths available.
- Full thread and full body designs available.
- Available in stainless steel 304, 316, JS600 plating, lengths to 4"
- Undercut head design available.
- Powder coated heads to color match.
- Nylon encapsulated heads, special order.

Rely on North America Quality!

	3/4"	1"	1-1/4"	1-1/2"	1-3/4"	2"	2-1/4"	2-1/2"	3"	3-1/4"	3-1/2"	3-3/4"	4"
3/8" Diameter GR 8	•	•		•									
7/16" Diameter GR 5.2		•	•	•									
1/2" Diameter GR 8		•	•	•	•	•	•	•	•	•	•	•	•
5/8" Diameter GR 8		•	•	•									
1/2" Diameter Flat Pan Head GR 2		•	•										

JS1000® is exclusive to Leland. and as with all Leland products, JS1000® is 100% North American.

NEW PRODUCT... "Indented Square Head Chime Bolts"

- GR 8, 1/2" diameter, 1" to 3" lengths.
- Full body and full thread design available.
- JS1000® plating.

	3/4"	1"	1-1/4"	1-1/2"	1-3/4"	2"	2-1/4"	2-1/2"	3"	3-1/4"	3-1/2"	3-3/4"	4"
1/2" Diameter GR 8 Square Head Chime Bolts		•	•	•	•	•	•	•	•				



TANK BOLTS

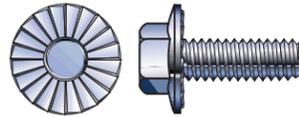


Always specify Leland's JS1000[®] plated fasteners!

Leland also manufactures complete fastener programs for O.E.M, manufacturers, commercial and industrial steel construction, in addition to a full product line for the agricultural building industry.

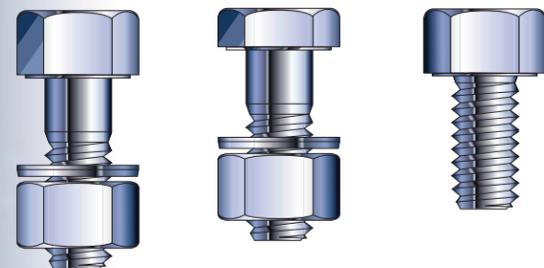
Hex Flange Head Serrated Locking Bolts and Nuts

- Serrated washer face ensures locking action when fastener is tightened - separate washers not required - spin fit nut tightening
- Serrated Flange Nuts are also available in 1/4" to 5/8" diameters.
- Full Body and Full Thread design available.



SIZE	GRADE	5/8"	3/4"	1"	1-1/4"	1-1/2"	1-3/4"	2"	2-1/4"	2-1/2"	2-3/4"	3"	3-1/2"	4"
1/4-20	8		●	●	●	●	●	●	●	●	●	●		
5/16-18	8		●	●	●	●	●	●	●	●	●	●	●	●
3/8-16	8	●	●	●	●	●	●	●	●	●	●	●	●	●
7/16-14	8			●	●	●	●	●	●	●	●	●	●	●
1/2-13	8				●	●	●	●	●	●	●	●	●	●
5/8-11	8				●	●	●	●	●	●	●	●	●	●

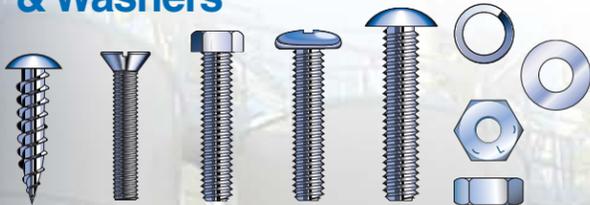
A325/A490 Structural Bolts



ASSEMBLED WITH ONE HEX NUT AND ONE WASHER - BOLTS, WASHERS & NUTS ARE ALSO AVAILABLE SEPARATELY

- All A325 Structural Bolts are available assembled or un-assembled, fully threaded bolts are available in most diameters
- Structural bolts are available in Spec. ASTM A-325 Type 1, plain and hot dip galvanized, Type 3 (Weathering) & ASTM A-490
- Hex Structural Nuts and Hardened Round Washers are available separately from 1/2" to 1-1/4"
- Tension indicating washers available

Standard Nuts, Bolts, Screws & Washers



STANDARD NUTS, BOLTS, SCREWS AND WASHERS

- Cap Screws 1/4" to 1-1/2" diameter, GR.2-5-8
- Machine screws
- Carriage bolts, full body, full thread design available
- Plow bolts
- Hex nuts, flat and lock washers
- Guard rail and culvert bolts

Demand Leland "NF" & "L" head markings that guarantee 100% North American manufactured fasteners made with North American steel

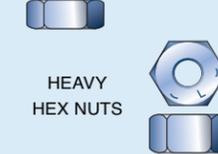


Nuts & Washers

Standard Nuts & Washers Available in Types & Sizes Indicated



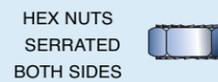
FINISHED HEX NUTS



HEAVY HEX NUTS



PLAIN FLANGE NUTS



HEX NUTS SERRATED BOTH SIDES



SERRATED FLANGE NUTS



REGULAR & HEAVY SQUARE NUTS



FLAT & S.A.E. WASHERS



SPRING LOCK WASHERS

Standard Coating

JS1000[®] PLATING SYSTEM

Withstands 1000 Hours Salt Spray test and 5 cycles in Kesternich (2 litre SO2 per cycle) testing
No Red Rust

HEX NUTS & HEX FLANGE NUTS • CARBON STEEL, 304, 316 STAINLESS

BOLT DIAMETER INCHES	FINISHED HEX NUTS 304-316 SS AND GRADE 2, 5, 8		HEAVY SEMI-FINISHED HEX NUTS GRADE 2		SERRATED HEX FLANGE NUTS GRADE 2 / 5			PLAIN HEX FLANGE NUTS GRADE 2 / 5		
	ACROSS FLATS	HEIGHT	ACROSS FLATS	HEIGHT	ACROSS FLATS	HEIGHT	FLANGE DIA.	ACROSS FLATS	HEIGHT	FLANGE DIA.
1/4"	7/16"	7/32"	1/2"	15/64"	7/16"	7/32"	19/32"	7/16"	7/32"	19/32"
5/16"	1/2"	17/64"	9/16"	19/64"	1/2"	17/64"	43/64"	1/2"	17/64"	43/64"
3/8"	9/16"	21/64"	11/16"	23/64"	9/16"	21/64"	3/4"	9/16"	21/64"	3/4"
7/16"	11/16"	3/8"	3/4"	27/64"	11/16"	3/8"	15/16"	11/16"	3/8"	15/16"
1/2"	3/4"	7/16"	7/8"	31/64"	3/4"	7/16"	1"	3/4"	7/16"	1"
5/8"	15/16"	35/64"	1-1/16"	39/64"	15/16"	35/64"	1-9/32"	15/16"	35/64"	1-9/32"
3/4"	1-1/8"	41/64"	1-1/4"	47/64"						

FINISHED HEX NUTS - SERRATED BOTH SIDES are available bolt dia. 5/16" - 1/2" Across Flats - Height 17/64"

REGULAR & HEAVY SQUARE NUTS

BOLT DIAMETER INCHES	REGULAR SQUARE NUTS GRADE 5		HEAVY SQUARE NUTS GRADE 5	
	ACROSS FLATS	HEIGHT	ACROSS FLATS	HEIGHT
1/4"	7/16"	7/32"	1/2"	1/4"
5/16"	9/16"	17/64"	9/16"	5/16"
3/8"	5/8"	21/64"	11/16"	3/8"
7/16"	3/4"	3/8"	3/4"	7/16"
1/2"	13/16"	7/16"	7/8"	1/2"
9/16"				
5/8"	1"	35/64"	1-1/16"	5/8"
3/4"	1-1/8"	21/32"	1-1/4"	3/4"
7/8"	1-5/16"	49/64"	1-7/16"	7/8"
1"	1-1/2"	7/8"	1-5/8"	1"

HEX LOCK NUTS

NYLON INSERT HEX LOCK NUTS	
ACROSS FLATS	HEIGHT
7/16"	21/64"
1/2"	23/64"
9/16"	15/32"
11/16"	33/64"
3/4"	39/64"
7/8"	21/32"
15/16"	49/64"
1-1/8"	57/64"

OTHER NUT & WASHER SIZES ARE AVAILABLE PLEASE CALL FOR INFORMATION

FLAT WASHERS

BOLT DIAMETER INCHES	HOLE DIA.	OUTSIDE DIA.	THICKNESS
1/4"	5/16"	3/4"	1/16"
5/16"	3/8"	7/8"	5/64"
3/8"	7/16"	1"	5/64"
7/16"	1/2"	1-1/4"	3/32"
1/2"	9/16"	1-3/8"	7/64"
9/16"	5/8"	1-1/2"	7/64"
5/8"	11/16"	1-3/4"	9/64"
5/8" LARGE	3/4"	1-3/4"	9/64"
3/4"	13/16"	2"	9/64"
3/4" LARGE	7/8"	2"	5/32"
7/8"	15/16"	2-1/4"	5/32"
7/8" LARGE	1"	2-1/4"	5/32"
1"	1-1/16"	2-1/2"	5/32"
1" LARGE	1-1/8"	2-1/2"	5/32"
1-1/8"	1-3/16"	2-3/4"	5/32"
1-1/8" LARGE	1-1/4"	2-3/4"	5/32"
1-1/4"	1-5/16"	2-3/4"	5/32"
1-1/4" LARGE	1-3/8"	3"	5/32"

S.A.E. WASHERS

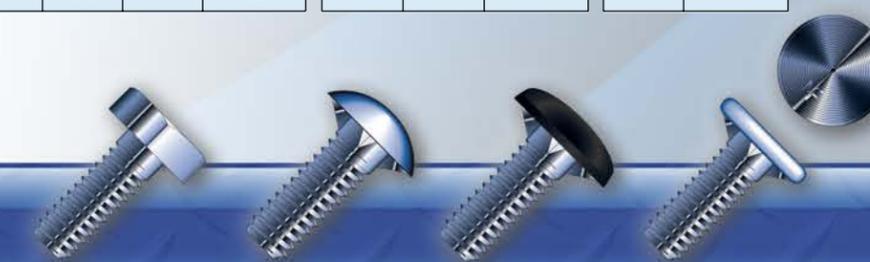
HOLE DIA.	OUTSIDE DIA.	THICKNESS
9/32"	5/8"	1/16"
11/32"	11/16"	1/16"
13/32"	13/16"	1/16"
15/32"	59/64"	1/16"
17/32"	1-1/16"	3/32"
19/32"	1-3/16"	3/32"
	1-5/16"	3/32"
13/16"	1-1/2"	9/64"

MEDIUM SPRING LOCK WASHERS

WIDTH	THICKNESS
.109"	.062"
.125"	.078"
.141"	.094"
.156"	.109"
.171"	.125"
.188"	.141"
.203"	.156"
.234"	.188"



TANK BOLTS



Serrated Flange & Pan Head Fin Neck Locking Bolts Technical Data

Torque-Tension Relationships for SAE Grades 2, 5 / 5.2, 8

Nominal Size and Threads/in	Stress Area (1)	Grade 2 Clamp Load	Grade 2 Torque Dry K = 0.2	Grade 2 Torque Lub K = 0.15	Grade 5 Clamp Load	Grade 5 Torque Dry K = 0.2	Grade 5 Torque Lub K = 0.15	Grade 8 Clamp Load	Grade 8 Torque Dry K = 0.2	Grade 8 Torque Lub K = 0.15	
	in ²	lb	in-lb	in-lb	lb	in-lb	in-lb	lb	in-lb	in-lb	
0.250-28	0.03637	1500	75.0	56.0	2319	116.0	87.0	3273	164	123	
1/4 (20)	0.250-20	0.03182	1313	66.0	49.0	2029	101.0	76.0	2864	143	107
	0.3125-24	0.05806	2395	150.0	112.0	3700	230.0	173.0	5225	327	245
5/16 (18)	0.3125-18	0.05243	2163	135.0	101.0	3342	209.0	157.0	4719	295	221
	0.375-24	0.08783	3623	272.0	204.0	5600	420.0	315.0	7905	593	445
3/8 (16)	0.375-16	0.07749	3196	240.0	180.0	4940	370.0	278.0	6974	523	392
	0.4375-20	0.11870	4896	428.0	321.0	7567	662.0	496.0	10683	935	700
7/16 (14)	0.4375-14	0.10630	4385	384.0	288.0	6777	593.0	445.0	9567	837	628
	0.500-20	0.15995	6598	660.0	495.0	10197	1020.0	764.0	14396	1440	1080
1/2 (13)	0.500-13	0.14190	5853	585.0	439.0	9046	904.0	678.0	12771	1277	958
		in ²	lb	ft-lb	ft-lb	lb	ft-lb	ft-lb	lb	ft-lb	ft-lb
	0.5625-18	0.20298	8373	78	59	12940	121	91	18268	171	128
	0.5625-12	0.18195	7505	70	53	11600	109	82	16376	154	115
	0.625-18	0.25595	10558	110	82	16317	170	127	23036	240	180
5/8 (11)	0.625-11	0.22600	9322	97	73	14407	150	113	20340	212	159
	0.750-16	0.37296	15385	192	144	23776	297	223	33566	420	315
	0.750-10	0.33446	13796	172	129	21532	269	201	30101	376	282
	1.000-12	0.66304	-	-	-	42269	704	528	59674	995	746
	1.000-8	0.60574	-	-	-	38616	644	483	54517	909	681
Tensile Strength Proof Load Stress		74,000 psi 55,000 psi			120,000 psi 85,000 psi			150,000 psi 120,000 psi			

CAUTION - The previously listed torque and resulting tension are provided as an advisory guide. Individual application discretion is recommended. The content has been presented as accurately as possible, but responsibility for its application lies with the user.

EMPIRICAL EQUATION TO OBTAIN TORQUE GUIDE

$$T = KDW$$

where:
 T = Torque (in-lb, in-oz)
 D = Screw or bolt nominal size (in)
 W = Screw or bolt tension (lb-oz)
 K = Torque factor

The tension of the screw or bolt is calculated by multiplying the usable screw or bolt tension strength by the tensile-stress core area of the screw or bolt. The nominal clamp load stress is assumed as 75% of proof load.

The torque factor is the critical parameter in Equation 1 influenced primarily by the frictional conditions along the thread flank and at the bearing surfaces.

The other influence on "K" is the relative resiliency of the fastener and joint material.

a. Therefore:

$$K = K_1 + K_2 + K_3$$

where:

K₁ represents the torque factor wasted by friction on the bearing surface of the nut or bolt, approximately 50% of the total torque factor.

K₂ factor represents the wasted friction on the contact flanks of the threads, about 40% of the total "K".

K₃ factor represents the useful torque producing the bolt tension, about 10% of the total "K".

b. K is 0.15/0.20 when bolts, nuts, and washers of the fastener joint are clean and coated with a thin film of protective oil. When dirt, rust, and other defects of field storage and environmental exposure are present, K can be 0.25/0.40. For torque K factors for other conditions refer to following table.

Torque Factors for Surface Conditions of Mating Fasteners

Mating Parts	K
Dry, clean with thin film of oil	0.15/0.20
Additional lubricating coatings of oil, wax, or dissimilar plating or hard washer	0.10/0.15
Thread and head bearing surfaces covered with high-performance lubricants or with anti-seize compounds	can be as low as 0.05
Combinations of certain materials such as Austenite stainless steel screws/bolts and parts not lubricated or coated	can be as high as 0.35
Stainless fasteners plated with Leland JS600	0.13 ± 0.02

All test results and suggestions are based on laboratory tests. Specific job site conditions should be taken into consideration when specifying the proper fastener. Because applications vary, we assume no liability for use of this information

Bolt Technical Data

Allowable Dimensions

NOMINAL SIZE SCREW SIZE & THREADS PER INCH	SERIES DESIGNATION	MAJOR DIAMETER			PITCH DIAMETER		TOLERANCE
		ALLOWANCE	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	
1/4-20	UNC	.0011	.2489	.2408	.2164	.2127	.0037
5/16-18	UNC	.0012	.3113	.3026	.2752	.2712	.0040
3/8-16	UNC	.0013	.3737	.3643	.3331	.3287	.0044
7/16-14	UNC	.0014	.4361	.4258	.3897	.3850	.0047
1/2-13	UNC	.0015	.4985	.4876	.4485	.4435	.0050
5/8-11	UNC	.0016	.6234	.6113	.5644	.5589	.0055

Mechanical Requirements & Identification Marking for Bolts

GRADE DESIGNATION	PRODUCTS	NOMINAL DIAMETER / INCHES	FULL SIZE BOLTS, SCREWS, STUDS, SEMS		MACHINE TEST SPECIMENS OF BOLTS, SCREWS AND NUTS		SURFACE HARDNESS	CORE HARDNESS		GRADE IDENTIFICATION MARKING	MANUFACTURERS IDENTIFICATION MARKING
			PROOF LOAD (STRESS) PSI	YIELD STRENGTH (STRESS) MIN. PSI	TENSILE STRENGTH (STRESS) MIN. PSI	ELONGATION MIN. %		REDUCTION OF AREA MIN. %	ROCKWELL 30N MAXIMUM		
2	Bolts	1/4 thru 3/4	55000	57000	74000	18	35	-	B80	B100	NF [®]
	Studs	1/2 to 3/4	33000	36000	60000	18	35	-	B70	B100	
8	Bolts	1/4 thru 1	120000	130000	150000	10	35	58.6	C33	C39	NF [®]

Proof Load and Tensile Strength Requirements Coarse Thread Series - UNC

NOMINAL DIAMETER OF PRODUCT & THREADS PER INCH	GRADE 2		GRADE 8		MECHANICAL PROPERTIES - ASTM 593-02 304 AND 316 STAINLESS STEEL	
	PROOF LOAD, LBS	TENSILE STRENGTH MIN. LBS	PROOF LOAD, LBS	TENSILE STRENGTH MIN. LBS	YIELD STRENGTH MIN. LBS	TENSILE STRENGTH MIN. LBS
1/4-20	1750	2350	3800	4750	2070	3180
5/16-18	2900	3900	6300	7850	3410	5240
3/8-16	4250	5750	9300	11600	5040	7750
7/16-14	5850	7850	12800	15900	6910	10630
1/2-13	7800	10500	17000	21300	9230	14190
5/8-11	12400	16700	27100	33900	14690	22600

All test results and suggestions are based on laboratory tests. Specific job site conditions should be taken into consideration when specifying the proper fastener. Because applications vary, we assume no liability for use of this information



TANK BOLTS



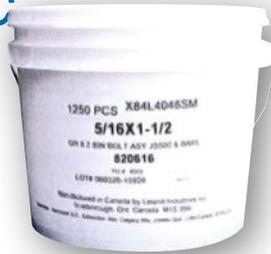
Packaging Programs

- Recyclable Plastic Packaging



SQUARE PLASTIC PAILS

- Product is bulk packed
- Waterproof - tamper proof & resealable
- Features security strip to indicate pail has been opened



ROUND PLASTIC PAILS

- Bulk packed
- Waterproof & resealable



CUSTOM JOB PACKS

All fasteners and accessories individually packed in quantities to suit bill of material requirement and labeled with job number.



1/4 Keg Cartons

- Bulk packed

Standard Coating **JS1000[®]** PLATING SYSTEM

Withstands 1000 Hours Salt Spray test and 5 cycles in Kesternich (2 litre SO₂ per cycle) testing

Longlife Coating **DT[®]1500** LONGLIFE COATING

Withstands 1500 Hours Salt Spray test and 13 cycles in Kesternich (2 litre SO₂ per cycle) testing

302, 304, 316 Stainless JS600 Plated **JS600** PLATING SYSTEM

High lubricity anti-corrosion protection for stainless steel

Powder Coated



Exceeds 50 cycles in Kesternich (2 litre SO₂ per cycle) testing 3000 hrs. salt spray

Accessories and Services

- Butyl tape
- Emseal AST[™] acrylic and multi-use sealant tape
- Custom packaging
- Tube caulking

Metric Fastener Products Available



LELAND INDUSTRIES INC.

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1-800-263-3393 North America-wide • www.leland.ca

Eight branches and warehouses across Canada and the United States



TANK BOLTS