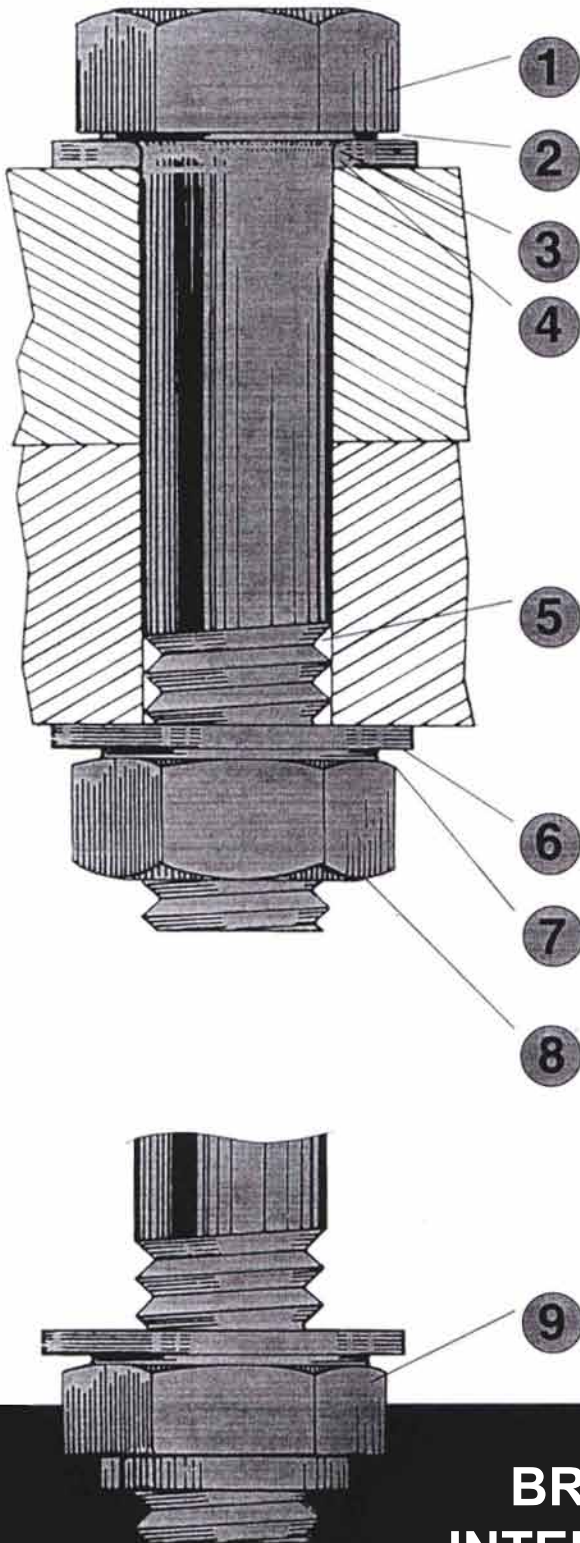


L'9[®] FASTENING SYSTEM

“The Fastening System of the 21st Century”

A HIGH STRENGTH SYSTEM OF HIGHLY ENGINEERED COMPONENTS

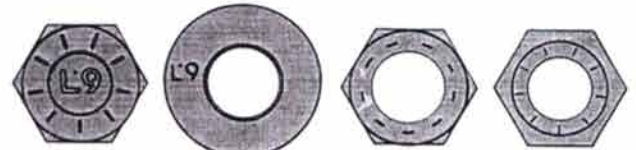
The L'9[®] FASTENING SYSTEM is designed for use in high stress, severe service environments. The highest mechanical strength off-the-shelf fastening system available, its special features control torque-tension characteristics to develop high clamp loads when using properly controlled tightening methods. Brighton Best manufactures L'9[®] Bolts from AISI alloy steels.



1. Thicker than standard bolt head adds wrenching surface.
2. Washer face eliminates corner drag.
3. Radius under bolt head adds strength.
4. Countersunk washer I.D. centers the washer against the bolt head bearing surface during tightening.
5. UNR radiused root bolt thread increases fatigue resistance by reducing the notch effect of conventional UN threads. The UNR thread radius is maintained into the thread runout at the junction of thread to shank.
6. Smooth washer bearing surfaces distribute loads uniformly and reduce brinelling. Plated finish assists torquing.
7. Chamfers eliminate corner drag.
8. Thicker than standard nut side walls facilitate wrenching. Heat treating helps prevent splitting and stripping.
9. Collared L'9[®] prevailing torque metal locknut for assemblies subject to vibration.

L'9[®] components are fabricated from high-grade alloy steel #AISI 8640H on state-of-the-art equipment. All screws are mechanically tested to meet ASTM F606 standards for hardness, classification fit, and elongation. Plating for bolts and washers are ZINC .0002" thick minimum to ASTM B633 Type II Class 5 SCI, Hex nuts and Stover locknuts are CAD plated and waxed to ASTM A165-80 Type TS.

L'9[®] HEAD MARKING IDENTIFICATION



L'9[®] Bolthead L'9[®] Washer L'9[®] Hex Nut L'9[®] Locknut

L'9[®] is a registered trademark of Brighton Best International, Inc.

**BRIGHTON-BEST
INTERNATIONAL, INC.**

www.brightonbest.com | 1800-275-0050





L'9[®] DESIGN FEATURES

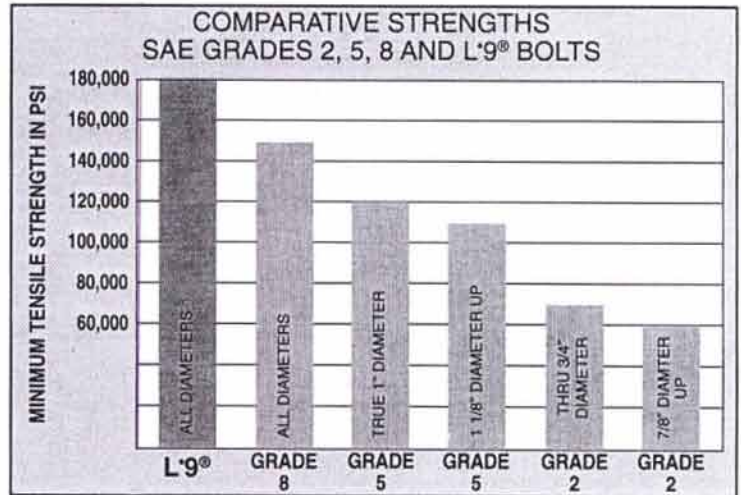
L'9[®] Fastening System features 180,000 to 200,000 psi ultimate tensile strength having the minimum ductility of SAE J429 Grade 8 bolts for reduction in area and elongation.

L'9 [®] SYSTEM HARDNESS SPECIFICATIONS		
PRODUCT	DIAMETER RANGE	ROCKWELL HARDNESS
Bolts	All	R/C 38-42
Nuts	1/4 thru 5/8	R/C 28-34
	3/4 thru 1-1/2	R/C 32-36
Washers	All	15N 82-85

USER CAUTIONS

Avoid fastener, and possible joint failure, by observing the following:

1. Do not substitute components in the L'9[®] Fastening System. Non components may not meet the system's requirements. Brighton Best is not responsible for any failures in use of the L'9[®] fastening system if substitutions are made of any component or finish of the system (i.e. bolt, nut, locknut or washer).
2. Do not alter the coatings as this can result in erratic and unpredictable clamp loads. Do not use supplementary lubricants.
3. Do not use the L'9[®] system in service environments exceeding 400-degrees Fahrenheit. Any cadmium or zinc plated product is subject to degradation of corrosion resistance and possible liquid metal embrittlement at temperatures exceeding 400-degrees F.
4. When tightening L'9[®] bolts, use the recommended torque values. The self lubricating features of the system reduce required torques so that in some instances they are below those needed to tighten Grade 8 bolts.



L'9 [®] SYSTEM PLATING SPECIFICATIONS				
PRODUCT	TYPE PLATE	THICKNESS OF PLATE-INCHES	BAKE	FINISH
Bolts	Zinc	.0002-.004	6 Hours @ 375-425°	Yellow Dichromate
Nuts	Cadmium and Wax	.0002-.0004	6 Hours @ 375-425°	Yellow Dichromate
Locknuts	Cadmium and Wax	.0002-.0004	6 Hours @ 375-425°	Yellow Dichromate
Washers	Cadmium	.0002-.0004	6 Hours @ 375-425°	Yellow Dichromate

NOTE: These specifications exceed the requirements of ASTM B633 Fe/Zn 5, Type II (Zinc) and B766, Class 5, Type II (Cadmium). These finishes will meet a 96-hour salt spray test as specified by ASTM B117.

HEAD MARKING	SPECIFICATION	MATERIAL	BOLT SIZE (Inches)	PROOF LOAD P.S.I.	TENSILE STRENGTH P.S.I.	HARDNESS	
						BRINELL	ROCKWELL
	S.A.E. GRADE 2	Low Carbon Steel	1/4" thru 3/4"	55,000	74,000 min.	149/241	B80/100
			over 3/4"	33,000	60,000 min.	121/241	B70/100
	S.A.E. GRADE 5	Medium Carbon Steel Quenched and Tempered	1/4" thru 1"	85,000	120,000 min.	255/321	25/34-C
			over 1"	74,000	105,000 min.	223/285	19/30-C
	S.A.E. GRADE 8	Alloy Steel Quenched and Tempered	1/4" thru 1 1/2"	120,000	150,000 min.	311/363	33/39-C
	L'9 [®]	Alloy Steel Quenched and Tempered	1/4" thru 1 1/2"	145,000	180,000 min.	362/410	38/42-C

USE THE L'9® FASTENING SYSTEM TO SOLVE THESE COMMON PROBLEMS



1



HEADS SEPARATE

CAUSED BY:

- Improper Material Selection
- Poor Heat Treat Practice
- Poor Heading Practice
- Inadequate Fillet Under Head
- Poor Plating Practice
- Poor Joint Design

2



THICK NECK DOWN

- Improper Strength Grade Selection
- High Service Loads
- Overtightening
- Poor Heat Treat Practice
- Poor Joint Design

3



FATIGUE FRACTURE

- Loss of Clamp Load
- Inadequate Tightening
- Cyclical Service Loads
- Exceeding Initial Clamp Load
- Non-Radiused Thread Roots
- Poor Joint Design

4



DISHED WASHERS

- Soft Low Strength Washer Material (Results in clamp load loss, loosening, and fatigue)

5



CRACKED OR SPLIT WASHERS

- Improper Material Selection
- Poor Material Quality
- Poor Heat Treat Practice
- Poor Plating Practice

6



STRIPPED NUTS

- Improper Strength Grade Selection
- Poor Heat Treat Practice
- Inadequate Nut Design

7



CRACKED OR SPLIT NUTS

- Poor Raw Material Quality
- Poor Heat Treat Practice
- Poor Forming Practice

8



RUST AND CORROSION

- Improper Selection of Materials and Plating for a Specific Corrosive Environment
- Poor Joint Design

USER SPECIFICATIONS - L'9® FASTENING SYSTEM

The table below lists by size the Tensile Strength, Proof Loads and Clamp Loads appropriate for use with the L'9® Fastening System. Recommended torque values to achieve the recommended clamp loads are also shown, for applying torque to the bolt head or to the nut. Notes below show how the loads are calculated. Refer to "User Cautions" prior to installation of L'9® fasteners.

L'9® SYSTEM USER SPECIFICATIONS - Torque Values for bolt and nut assembly - NOT tapped holes.																								
	UNRC -2A COARSE THREAD						UNRF-2A FINE THREAD																	
REFERENCE NOTE	A		B		C		D		E		A		B		C		D		E					
NOMINAL DIAMETER & THDS/IN.	THREADS PER INCH	TENSILE STRENGTH LBS.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE BY HEAD LB.-FT.	TORQUE BY NUT LB.-FT.	THREADS PER INCH	TENSILE STRENGTH LBS.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE BY HEAD LB.-FT.	TORQUE BY NUT LB.-FT.	THREADS PER INCH	TENSILE STRENGTH LBS.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE BY HEAD LB.-FT.	TORQUE BY NUT LB.-FT.	THREADS PER INCH	TENSILE STRENGTH LBS.	PROOF LOAD LBS.	CLAMP LOAD LBS.	TORQUE BY HEAD LB.-FT.	TORQUE BY NUT LB.-FT.
1/4	20	5,720	4,610	3,450	10	11	28	6,550	5,270	3,950	12	13	24	10,440	8,410	6,300	20	23	24	15,800	12,730	9,550	35	38
5/16	18	9,430	7,590	5,700	19	21	24	10,440	8,410	6,300	20	23	24	15,800	12,730	9,550	35	38	24	21,360	17,210	12,900	60	65
3/8	16	13,950	11,230	8,450	30	33	24	15,800	12,730	9,550	35	38	20	28,780	23,180	17,400	95	105	20	28,780	23,180	17,400	95	105
7/16	14	19,130	15,410	11,550	55	60	20	21,360	17,210	12,900	60	65	18	36,540	29,430	22,100	135	150	18	36,540	29,430	22,100	135	150
1/2	13	25,540	20,570	15,450	85	95	20	28,780	23,180	17,400	95	105	18	46,080	37,120	27,800	190	205	18	46,080	37,120	27,800	190	205
9/16	12	32,760	26,390	19,800	120	140	18	46,080	37,120	27,800	190	205	16	67,140	54,080	40,600	330	355	16	67,140	54,080	40,600	330	355
5/8	11	40,680	32,770	24,550	170	185	16	67,140	54,080	40,600	330	355	14	91,620	73,800	55,400	520	585	14	91,620	73,800	55,400	520	585
3/4	10	60,120	48,430	36,350	265	290	14	91,620	73,800	55,400	520	585	14	122,220	98,450	73,800	700	900	14	122,220	98,450	73,800	700	900
7/8	9	83,160	66,990	50,300	475	505	12	154,080	124,120	93,100	1150	1325	12	193,140	155,580	116,700	1600	1750	12	193,140	155,580	116,700	1600	1750
1	8	109,080	87,870	65,900	550	775	12	284,580	229,240	171,900	3300	3650	12	284,580	229,240	171,900	3300	3650	12	284,580	229,240	171,900	3300	3650
1-1/8	7	137,340	110,630	83,000	1025	1150	12	154,080	124,120	93,100	1150	1325	12	193,140	155,580	116,700	1600	1750	12	193,140	155,580	116,700	1600	1750
1-1/4	7	174,420	140,500	105,400	1400	1600	12	193,140	155,580	116,700	1600	1750	12	284,580	229,240	171,900	3300	3650	12	284,580	229,240	171,900	3300	3650
1-1/2	6	252,900	203,720	152,800	2900	3250	12	284,580	229,240	171,900	3300	3650	12	284,580	229,240	171,900	3300	3650	12	284,580	229,240	171,900	3300	3650

NOTE: A - Tensile Strength calculated at 180,000-psi.
 B - Proof Load calculated at 145,000-psi which is 80% of Tensile Strength. The yield strength of L'9® bolts is 155,000-psi.
 C - Clamp Load calculated at 108,750-psi which is 75% of Proof Load.
 D - Based on using on L'9® bolt, one L'9® nut, one L'9® washer under the bolt head and one L'9® washer under the nut.
 E - Same as "D" above.

DIMENSIONAL SPECIFICATIONS - L'9® FASTENING SYSTEM

Dimensions shown below apply to L'9® Fastening System components. Dimensions shown are the same for both UNRC Unified National Coarse and UNRF Unified National Fine thread products. Washers are the same for both thread types.

L'9® SYSTEM DIMENSIONAL SPECIFICATIONS (ALL DIMENSIONS IN INCHES)																
DIAMETER	BOLTS				NUTS						WASHERS					
	WIDTH ACROSS FLATS		HEAD HEIGHT		WIDTH ACROSS FLATS		LOCKNUT THICKNESS		HEX NUT THICKNESS		OUTSIDE DIAMETER		INSIDE DIAMETER		THICKNESS	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1/4	0.437	0.428	0.194	0.181	0.437	0.428	0.301	0.281	0.264	0.250	0.640	0.620	0.286	0.276	0.071	0.056
5/16	0.500	0.489	0.242	0.227	0.500	0.489	0.336	0.316	0.309	0.293	0.703	0.681	0.349	0.339	0.071	0.056
3/8	0.562	0.551	0.290	0.273	0.562	0.551	0.400	0.380	0.377	0.360	0.827	0.805	0.411	0.401	0.112	0.090
7/16	0.625	0.612	0.338	0.319	0.687	0.675	0.449	0.429	0.445	0.426	0.937	0.915	0.474	0.464	0.112	0.090
1/2	0.750	0.736	0.386	0.364	0.750	0.736	0.516	0.496	0.511	0.490	1.092	1.055	0.536	0.526	0.112	0.090
9/16	0.812	0.798	0.433	0.410	0.875	0.861	0.580	0.560	0.575	0.552	1.186	1.149	0.599	0.589	0.112	0.090
5/8	0.937	0.922	0.481	0.456	0.937	0.922	0.660	0.640	0.655	0.630	1.342	1.305	0.663	0.649	0.174	0.146
3/4	1.125	1.110	0.577	0.548	1.125	1.088	0.767	0.747	0.762	0.733	1.499	1.462	0.819	0.805	0.174	0.146
7/8	1.312	1.285	0.672	0.640	1.312	1.269	0.887	0.867	0.882	0.850	1.780	1.743	0.945	0.931	0.174	0.146
1	1.500	1.469	0.706	0.670	1.500	1.450	1.023	1.003	1.018	0.982	2.030	1.993	1.069	1.055	0.174	0.146
1-1/8	1.687	1.631	0.806	0.756	1.687	1.631	1.181	1.161	1.176	1.136	2.030	1.993	1.195	1.181	0.266	0.234
1-1/4	1.875	1.812	0.886	0.832	1.875	1.812	1.277	1.257	1.272	1.228	2.278	2.243	1.319	1.305	0.266	0.234
1-1/2	2.250	2.175	1.062	1.000	2.250	2.175	1.531	1.511	1.526	1.474	2.278	2.243	1.572	1.552	0.266	0.234



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