

# TIGHTENING TORQUE REFERENCE CHART FOR SAE AND METRIC BOLTS

NL = Not Lubricated

L = Lubricated

1 lbs ft = 1.356 N·m



## HEX KEY INTERCHANGE

SAE

Metric

### TIGHTENING TORQUE FOR SAE BOLTS (50% of yield strength $S_y$ ) in lbs ft

MATERIAL	UNC	1/4"-20	5/16"-18	3/8"-16	7/8"-14	1 1/2"-12	2"-12	2 1/2"-12	3"-10	3 1/2"-9	4"-8	5"-8	5 1/2"-7	6"-7	6 1/2"-6	7"-6
GRADE 1	NL	4	8	14	22	34	48	68	100	194	291	492	581	762	1012	1512
	L	3	6	10	17	26	37	51	90	145	218	309	436	572	759	1102
GRADE 2	NL	6	12	22	35	54	78	107	191	294	492	581	762	1012	1512	2202
	L	5	9	17	27	40	58	81	143	145	218	309	436	572	759	1102
GRADE 5/8.2	NL	10	20	38	57	87	126	173	308	496	743	1053	1486	1948	2589	3809
	L	7	15	27	43	65	94	130	239	372	557	790	1194	1681	2239	3339
GRADE 8	NL	14	28	50	81	123	177	246	435	700	1050	1488	2100	2752	3654	5454
	L	10	21	38	60	90	133	184	326	525	787	1116	1575	2084	2740	4040
MATERIAL	UNF	1/4"-28	5/16"-24	3/8"-24	7/8"-20	1 1/2"-12	2"-12	2 1/2"-12	3"-10	3 1/2"-9	4"-8	5"-8	5 1/2"-7	6"-7	6 1/2"-6	7"-6
GRADE 1	NL	4	9	16	25	38	55	77	104	214	325	482	644	868	1038	1538
	L	3	7	12	19	29	41	58	101	160	245	347	483	651	854	1254
GRADE 2	NL	7	14	25	39	61	97	132	213	214	326	482	644	868	1038	1538
	L	5	10	19	30	48	85	91	159	160	245	347	483	651	854	1254
GRADE 5/8.2	NL	11	22	40	64	98	140	196	343	547	834	1181	1648	2217	2929	4329
	L	8	17	30	48	74	105	147	257	410	625	886	1234	1683	2182	3282
GRADE 8	NL	16	31	57	90	139	198	277	485	773	1178	1689	2325	3133	4111	6111
	L	12	24	43	68	104	148	208	364	580	884	1251	1744	2350	3083	4583

### TIGHTENING TORQUE FOR METRIC BOLTS (50% of yield strength $S_y$ ) in lbs ft

MATERIAL	ST. PITCH	M6-1	M8-1.25	M10-1.5	M12-1.75	M14-2	M16-2	M18-2.5	M20-2.5	M22-2.5	M24-3	M27-3	M30-3.5	M33-3.5	M36-4
CLASS 4.6	NL	3	9	16	29	46	71	98	139	189	240	351	477	549	833
	L	3	6	12	21	34	53	74	104	142	180	263	357	486	629
CLASS 8.8	NL	8	22	44	76	122	190	262	370	509	640	896	1271	1730	2221
	L	7	17	33	57	91	142	197	278	378	480	702	953	1297	1658
CLASS 10.9	NL	15	32	64	112	179	279	385	544	739	940	1375	1887	2540	3263
	L	10	24	48	84	134	209	289	408	555	705	1031	1400	1905	2447
CLASS 12.9	NL	16	38	75	131	209	326	451	636	865	1100	1609	2195	2973	3878
	L	12	29	56	98	157	245	338	477	649	825	1207	1639	2230	2883
MATERIAL	FINE PITCH	M6-0.75	M8-1	M10-1	M12-1.25	M14-1.5	M16-1.5	M18-1.5	M20-1.5	M22-1.5	M24-1.5	M27-1.5	M30-1.5	M33-1.5	M36-1.5
CLASS 4.6	NL	4	9	16	27	50	76	110	154	207	273	393	545	733	958
	L	3	7	14	23	37	57	83	116	156	204	295	409	550	719
CLASS 8.8	NL	10	24	49	83	132	202	294	411	553	727	1048	1455	1954	2558
	L	7	18	37	63	99	151	220	308	415	545	789	1091	1486	1917
CLASS 10.9	NL	15	35	72	123	194	296	431	603	813	1088	1529	2136	2870	3754
	L	11	26	54	92	146	222	323	453	610	801	1155	1602	2152	2815
CLASS 12.9	NL	17	41	84	143	227	347	505	708	951	1249	1802	2500	3358	4383
	L	13	31	63	108	170	260	379	530	719	937	1351	1875	2519	3295

5/16"

2

3/32"

2.5

7/64"

3

1/8"

3.5

5/32"

4

3/16"

5

7/32"

6

1/4"

7

5/16"

8

3/8"

10

# Bolt Torque Guide

**Chilton Book Company. Automotive  
Editorial Department**



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## **Table of Contents Bolt Torque Guide**

1. Understanding the eBook Bolt Torque Guide
  - The Rise of Digital Reading Bolt Torque Guide
  - Advantages of eBooks Over Traditional Books
2. Identifying Bolt Torque Guide
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Bolt Torque Guide
  - User-Friendly Interface
4. Exploring eBook Recommendations from Bolt Torque Guide
  - Personalized Recommendations
  - Bolt Torque Guide User Reviews and Ratings
  - Bolt Torque Guide and Bestseller Lists
5. Accessing Bolt Torque Guide Free and Paid eBooks
  - Bolt Torque Guide Public Domain eBooks
  - Bolt Torque Guide eBook Subscription Services
  - Bolt Torque Guide Budget-Friendly Options
6. Navigating Bolt Torque Guide eBook Formats
  - ePub, PDF, MOBI, and More
  - Bolt Torque Guide Compatibility with Devices
  - Bolt Torque Guide Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Bolt Torque Guide
  - Highlighting and Note-Taking Bolt Torque Guide
  - Interactive Elements Bolt Torque Guide
8. Staying Engaged with Bolt Torque Guide

- Joining Online Reading Communities
- Participating in Virtual Book Clubs
- Following Authors and Publishers Bolt Torque Guide
- 9. Balancing eBooks and Physical Books Bolt Torque Guide
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Bolt Torque Guide
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Bolt Torque Guide
  - Setting Reading Goals Bolt Torque Guide
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Bolt Torque Guide
  - Fact-Checking eBook Content of Bolt Torque Guide
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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