

# BOLT TIGHTENING TORQUE RECOMMENDATIONS

Inadequately or improperly tightened hardware can loosen due to vibration or the load reactions imposed by fluid forces. This can result in reduced equipment service life or damage and failure.

Recommended torques for tightening bolts and screws on **LIGHTNIN** Mixers and Aerators and their mounting structures are listed below for your general reference. These average torque values should be considered only as guides and not as absolute values.





The amount of torque required to maintain a tight connection can vary considerably for bolts of the same size under different operating conditions. Variations such as basic joint design, compression factors, type and strength of base and hardware material, surface finish of mating parts and lubrication are only some of the factors that influence the tightness of bolted connections for given bolt torques.

**UNLESS SPECIFICALLY LISTED ELSEWHERE IN THE DETAILED INSTRUCTIONS, TIGHTEN THE MIXER AND MOUNTING HARDWARE TO THE RECOMMENDED VALUES SHOWN.**

Certain assembly connections may require special torques which are not listed in the table. These torques can be found in the detailed assembly and disassembly sections of the manual. **REVIEW THE MANUAL CAREFULLY TO DETERMINE WHERE SPECIAL TORQUES ARE REQUIRED.**

For severe duty service, torques higher than listed, to tighten a bolt to maximum capacity, can often be used. However, due to the many variables previously mentioned, the only absolute method to determine optimum torque is to deliberately yield a bolt under actual conditions. If a bolt does yield or shear, 75% of the torque applied in yielding the bolt can be used to obtain a tight connection that is satisfactory.

**ALL BOLTS SHOULD BE RETIGHTENED 12 HOURS AFTER ASSEMBLY, AND AT EACH SCHEDULED SHUT DOWN THEREAFTER.**

RECOMMENDED TIGHTENING TORQUES FOR COMMERCIAL GRADE STEEL, ①					
GR5, 304 AND 316 STAINLESS					
BOLT THREAD SIZE	TIGHTENING TORQUES IN FT-LBS ②			STEEL SAE GRADE MARKING REFERENCE GUIDE	
	STANDARD BOLTS DRY	STANDARD BOLTS LUBRICATED	WITH FRICTION LOCKING DEVICE ④	GRADE MARKING	STANDARD BOLTS COMMERCIAL GRADES
1/4 - 20	6.1	4.6	5.3		SAE Grades 0, 1 and 2 ②
5/16 - 18	12.8	9.6	11		
3/8 - 16	23	17	20		
7/16 - 14	36	27	31		SAE Grade 3
1/2 - 13	54	41	48		
9/16 - 12	80	60	69		SAE Grade 5
5/8 - 11	110	83	95		
3/4 - 10	194	146	168		
7/8 - 9 ③	189	142	163		All Socket Head Cap Screws SAE Grade 8
1 - 8	282	212	244		
1 1/8 - 7	400	301	346		
1 1/4 - 7	565	425	488		
1 3/8 - 6	741	557	640		
1 1/2 - 6	983	739	850		
1 3/4 - 5 ③	1003	754	868		
2 - 4 1/2	1508	1134	1305		
2 1/4 - 4 1/2	2206	1659	1908		
2 1/2 - 4	3018	2269	2609		

- ① ALL BOLTS SHOULD BE COATED WITH OIL, GREASE OR AN ANTI-SEIZE COMPOUND WHENEVER POSSIBLE. THE THREADS AND BEARING FACE OF BOLTS AND / OR NUTS SHOULD BE LUBRICATED.
- ② **LIGHTNIN** SUGGESTED TORQUE VALUES FOR COMMERCIAL GRADE BOLTS IN STEEL (GRADES 2 & 3), GR5, 304 AND 316 STAINLESS MATERIALS BASED ON CLAMPING STEEL, 304 OR 316 STAINLESS MATERIALS. (**LIGHTNIN** STANDARD STEEL HEX HEAD CAP SCREWS FURNISHED IN SAE GRADE 2 OR 3 PRIOR TO JULY, 1993, AND SAE GRADE 5 AFTER JULY, 1993).
- ③ ALLOWABLE BOLT STRESS VALUES CHANGE AT THESE LOCATIONS AND IS REFLECTED IN THE SUGGESTED TORQUE VALUES.
- ④ THESE TORQUES PERTAIN TO BOLTS OR NUTS WITH FRICTION LOCKING DEVICES SUCH AS NYLON PELLETS OR PATCHES, FIBRE INSERTS OR UPSET THREADS.