

LOCK-WASHER INSTALLATION GUIDELINES

1. **Do not use other washers under these specialty lock-washers.** Other types of washers will disable the function of the Lock-washer.



2. Ensure that bolt holes, bolt, nut threads and mating surfaces are clean and free of particulate matter, adhesives, lubricants and chemicals.
3. Apply a high quality moly or graphite based lubricant (such as Molycoat 1000) to **100% of the surface area of the bolt threads and 100% of the bearing surface under the bolt head.** It is not necessary to coat the lock-washers with lubricant. Anti-seize lubricant is recommended for stainless steel applications.

4. These lock-washers must be used on both the nut and bolt for through-bolt applications. They should be held stationary while the nut is tightened on the bolt.
5. These lock-washers are glued together as a pair. Do not remove the glue or separate the washers. The glue assists in proper orientation of both washer halves during installation. The glue does not affect the mechanics of the wedge lock system. If the washer halves are separated, ensure the cam surfaces face each other during installation or reinstallation.
6. Apply consistent and accurate torque. When possible, impact wrenches and tightening by hand should be avoided. Torque wrenches should be inspected and properly calibrated on a regular basis.
7. Multi-bolt flanges should be torqued in steps and in the appropriate star pattern to ensure even clamp load on the flange. It is common to tighten only one bolt at a time, however, this can result in point loading and load scatter. To avoid this, torque should be applied in stages following a prescribed pattern:
 - Step 1: Hand tighten to ensure that 2 or 3 threads extend above the nut on through-bolt applications.
 - Step 2: Tighten each bolt to one-third of the final required torque in a star pattern.
 - Step 3: Increase the torque to two-thirds following the same pattern.
 - Step 4: Increase the torque to full torque following the same pattern.
 - Step 5: Perform one final pass on each bolt working clockwise from bolt 1, at the full final torque.