

# SOLDERLESS COMPRESSION MOUNT STUDY

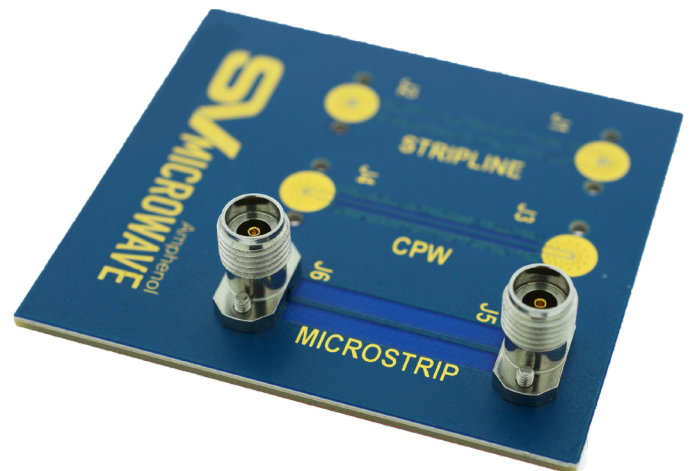
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Solderless compression mounted RF connectors are advantageous for their fast and easy installation compared to standard soldered connectors. However, they suffer the same drawbacks of any screw mounted hardware and may loosen over use, negatively impacting performance. SV has analyzed various methods to counteract this downside and maintain superior RF performance and will present the overview on the following pages.

## Summary

While many methods of retaining screws exist, only a few methods are suitable for an RF PCB launch connector. The use of clamps, nuts, magnets, or lock-wire as fastening methods could damage the connectors or the PCB board. The use of permanent adhesives is also not suitable as these connectors are intended to be easily removable.

Methods include using split-lock washers, nylok screws, and some epoxies that allow for removable fasteners. The results of the split-lock washers and nylok screws are not included as they show no significant variation over the existing “as-is” test set.



The “as-is” screws were set as the standard for which screws with Loctite #271 will be measured against. The Loctite #271 was applied on 3 threads in a single application and was never reapplied. The epoxy was allowed to set before any testing was done.

All tests have been done independently of each other so screw or connector wear did not influence the results of another area of testing. Multiple connectors were used for each style of fastener with average data shown in charts.

## Conclusion

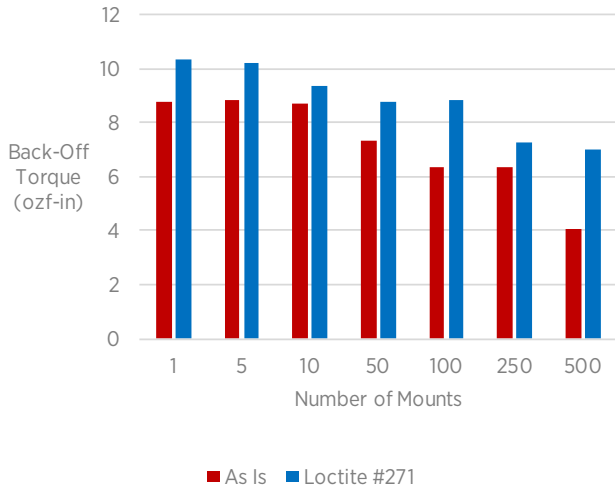
SV Microwave suggests adhering to either of the two following recommendations for optimum performance.

**Option #1:** Apply Loctite #271 to the mounting screws, two threads minimum, one time before mounting the connector to the PCB. This is not a permanent locking adhesive and should not require reapplication.

**Option #2:** Re-torque the mounting screws to 15-20 in-oz after every 25 mates with another connector. The mating action imparts forces that diminish the holding force of the mounting screws.

## Screws Testing

### Test #1

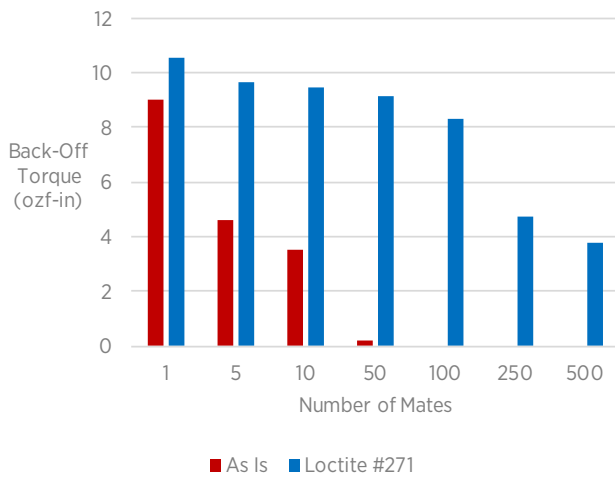


For this test, mounting screws were fully tightened then removed to simulate the effects of removing and placing connectors in multiple locations.

Back-off torque was measured at mounting cycles of 1, 5, 10, 50, 100, 250, and 500. At each mounting, screws were torqued to the recommended 15-20 ozf-in.

Screws with Loctite #271 showed approximately 50% better back-off torque than “as-is” screws after 500 mounting cycles. Electrical performance was consistent when fully torqued.

### Test #2



For this test, the mounting screws were fully torqued then a connector was mated and unmated. This was meant to simulate a high mating cycle environment.

Back-off torque was measured at interface mating cycles of 1, 5, 10, 50, 100, 250, and 500. Mounting screws were torqued to the recommended 15-20 ozf-in only for the first cycle for each interval.

“As-Is” screws were too loose after the 50 mating cycles interval to have a readable back-off torque. Electrical performance was consistent when fully torqued.

## Environmental Testing

For this test, four boards (two with Loctite #217, two without) were put through environmental testing. One board from each group was tested in vibration and the other was tested in thermal shock to the following specifications:

- Vibration Testing done per MIL-STD-202 Method 204, Cond D.
- Thermal Shock Testing cycled between -65°C to 165°C

Before environmental testing, screws were torqued to the recommended 15-20 ozf-in.

All passed environmental testing, screws with Loctite #271 showed approximately 70% higher back-off torque than “as-is” screws after 500 mounting cycles.