



Meet AMS 2590: Rotary Flap Peening of Metal Parts

AMS 2590 is a new specification that was released in December 2010. It was written by a team led by Peter Bailey, formerly a Staff Engineer with General Electric Aircraft Engines, to provide technical improvements to MIL-R-81841. MIL-R-81841 was released in 1972 and it has had an interesting history. It became an AMS document in 2001 and went back to being a MIL spec in 2004, with several revisions along the way. During all of these revisions; however, weaknesses in the spec were never addressed. Mr. Bailey has made AMS 2590 current with the advancements in equipment and procedures of this popular shot peening process.

AMS 2590 has significant technical improvements over MIL-R-81841 in four areas:

- 1) The inclusion of two methods for the determination of intensity that are independent of peening time
- 2) Simplified calculation of required tool speeds for peening inside holes
- 3) Methods for determination of peening time based on material hardness
- 4) Improved operator qualification requirements

1) Intensity Determination Methods

SAE 2590 requires either the SAE J443 10% rule or the Almen strip coverage method, with the 10% rule as the preferred method. (The Almen strip coverage method is helpful when the 10% method doesn't seem to level off or "saturate.")

2) Simplified Calculation of Required Tool Speeds for Parts with Holes

AMS 2590 has an easier method of calculating tool speeds for parts with holes of ½ – 1¼-inch diameter. The required tool speed is established by determining the speed necessary to achieve the required intensity on a flat surface and then multiplying the speed by the hole size factors provided in easy-to-use charts.

3) Part Peening Time

AMS 2590 states, "The area to be peened shall be peened in increments of time and visually inspected for coverage until full coverage is

achieved. Coverage time is a function of part material hardness. Soft parts will receive larger peening dimples and will cover faster than harder parts. For coverage requirements greater than 100%, the time to reach 100% shall be determined first prior to further coverage peening. Higher coverages require time multiples of the 100% coverage time for the peened area." The new spec clarifies that the **part's** hardness determines the appropriate level of coverage, not an Almen strip.

4) Improved Operator Qualification Requirements

Flapper peening is a manual process with a handheld tool. The skill of the operator is therefore crucial to a controlled flapper peening process. AMS 2590 acknowledges the importance of the operator with requirements for:

- Qualification testing based on individual techniques rather than reproducing predetermined intensities vs. RPMs
- Intensity development skills including proper Almen strip and Almen gage handling
- Intensity determination and verification through the use of saturation curves
- Part peening qualification to demonstrate coverage
- Operator qualification records
- Operator status maintenance

AMS 2590 is available for purchase at www.standards.sae.org/ams2590 for \$65.00. Discounts are available for SAE members.

About Peter Bailey

Prior to retirement, Mr. Bailey was Staff Engineer, Advanced Manufacturing Process Development Manufacturing and Quality Technology Department for General Electric Aircraft Engines. During his last 12 years at GE, he concentrated on shot peening and flapper peening, including the flapper peening of GE parts and training of GE operators. Since his retirement from GE, he has worked as a flapper peening trainer and material developer for Electronics Inc. workshops and on-site programs. ●