



# AEROSPACE STANDARD

**AS2592™****REV. B**Issued 2010-12  
Revised 2025-08

Superseding AS2592A

## Flap Assemblies, Rotary Flap Peening

### RATIONALE

AS2592B results from a Five-Year Review and update of the specification with changes to Authority (see 1.2), Construction (see 3.1.2), Flap (see 3.1.3), Shot Material (see 3.1.4), and Mandrels (see 3.2).

#### 1. SCOPE

This SAE Aerospace Standard (AS) covers components of rotary flap assemblies to be used with portable equipment for peening of metal parts.

The flap assemblies consist of a flap attached to a mandrel and shall be of the following sizes:

**Table 1 - Flap assembly sizes**

|                                                                 |
|-----------------------------------------------------------------|
| Mandrel with 9/16 x 1 inch (14 x 25 mm) flaps, see Figure 1     |
| Mandrel with 9/16 x 1-1/4 inch (14 x 32 mm) flaps, see Figure 2 |
| Mandrel with 1 x 2 inch (25 x 51 mm) flaps, see Figure 3        |

#### 1.1 Intended Use

Flap assemblies are used for rotary flap peening, a portable method used to induce surface compressive stresses in metal parts as detailed in AMS2590. The flap is rotated rapidly and manually forced against a substrate being peened. A portion of the flat face of each flap embedded with shot strikes the metal surface, causing peening.

#### 1.2 Authority

The cognizant engineering organization (CEO) may impose requirements or approve allowances that supersede the requirements in this AS.

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## 2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (Outside U.S. and Canada), [www.sae.org](http://www.sae.org).

AMS2590 Rotary Flap Peening of Metal Parts

AS7766 Terms Used in Aerospace Metals Specifications

### 2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9500, [www.astm.org](http://www.astm.org).

ASTM E18 Rockwell Hardness of Metallic Materials

ASTM E384 Microindentation Hardness of Materials

### 2.3 Definitions

Terms used in AMS are defined in AS7766.

## 3. TECHNICAL REQUIREMENTS

### 3.1 Design

Each flap assembly component shall be designed with optimum ergonomics and assure operator safety. Each flap assembly component shall be of such size, material, and strength as to endure without failure the maximum stresses imposed during use with an adequate factor of safety.

#### 3.1.1 Interchangeability

Flaps and mandrels manufactured to this standard shall permit assembly of detail parts without modification regardless of manufacturer. The flaps shall be easily replaceable in the mandrels.

#### 3.1.2 Construction

The flap assembly shall be assembled from a steel mandrel (see 3.2) and a flap inserted in the slot of the mandrel. The flap may be held in the mandrel by crimping the tip of the mandrel, by gluing the flap in place, or by using another mechanical system that allows the proper functionality of the assembly.

#### 3.1.3 Flap

The two halves of the flap shall be bonded together and shall have tungsten carbide shot embedded in the ends. The flap material shall be fabricated of a suitable synthetic material cloth supporting tungsten carbide shot embedded and bonded to the ends with a suitable thermosetting resin or adhesive that also stiffens the cloth. Suitability of material selected shall be established such that the requirements of 4.4 are met (see 8.2).

3.1.3.1 It is acceptable to trim the edges of the flap's synthetic material to allow the shots to more easily impact the part (see Figure 4).

3.1.3.2 It is also acceptable to cut the flap's synthetic material in rows from the edge of the flap to the edge of the joint to provide the flap with more compliance when rotary flapper peening complex geometries (see example in Figure 4).

#### 3.1.4 Shot Material

The shot shall be metallic carbide with a nominal composition of 94% tungsten carbide and 6% cobalt. The nominal size of the shot to be used shall be 0.045 inch  $\pm$  0.003 inch (1.10 mm  $\pm$  0.07 mm) diameter. The sphericity of the shot shall be not more than  $\pm$ 0.003 inch ( $\pm$ 0.07 mm) out of round. The shot shall have a Vickers microindentation hardness of 1710  $\pm$  275 determined in accordance with ASTM E384 or Rockwell A hardness 91  $\pm$  3 (with a 60 kg load) determined in accordance with ASTM E18.

#### 3.1.5 Shot Distribution

The carbide shot shall be a single row of eight shot particles on the outer edges, as shown in Figure 1, or a double row of shot particles on the outer edges, as shown in Figures 2 and 3.

#### 3.2 Mandrels

Mandrels shall be suitable for use in any electrical or pneumatic portable tool. Typical mandrel dimensions are shown in Figure 1, 2, or 3, as applicable for the specified flap size. A standoff guide illustrated in Figure 5, or equivalent, may be employed to help maintain the proper distance between the flap and the part. The mandrel is inserted in the hole of the standoff guide and held by one hand to maintain the distance.

##### 3.2.1 Mandrel Material

The mandrel shall be fabricated from cold finished round carbon steel bar stock, drill rod, or corrosion-resistant stainless steel of sufficient strength to preclude failure through fracture or bending when operated at the maximum operating speed for the process. All surfaces of the mandrel shall be smooth, free from burrs, sharp edges, or other harmful imperfections. The mandrel shall be nickel plated if the material is other than corrosion-resistant stainless steel. When used, plating shall be complete and free from blisters or other defects which might adversely affect the serviceability of the mandrel.

#### 3.3 Sleeves

The 1 x 2 inch (25 x 51 mm) flap, when used with the 3/8 inch (9.53 mm) diameter mandrel, shall require two polymeric sleeves as illustrated in Figure 3 (see 8.3). No polymeric sleeves are required when using a 0.25 inch (6.35 mm) mandrel.

#### 3.4 Dimensional Inspection

Each flap selected in accordance with 4.3 shall be dimensionally examined to verify compliance to Figure 1, 2, or 3.

### 4. QUALITY ASSURANCE PROVISIONS

#### 4.1 Responsibility for Inspections

The supplier is responsible for the performance of all inspection requirements as specified herein. The supplier may use their own or any other facilities suitable for the performance of the inspection requirements specified herein. The cognizant engineering organization reserves the right to sample and perform any testing deemed necessary.

#### 4.2 Lot

A lot is a group of flaps that are fabricated from the same batch of component details: shot, woven fabric, resin, and adhesive material, and presented for inspection at one time.