SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS2592

Issued 2010-12

Flap Assemblies, Rotary Flap Peening

RATIONALE

This standard was issued to cover equipment required to accomplish flap peening in accordance with AMS2590.

1. SCOPE

This Aerospace Standard covers components of rotary flap assemblies, assembled by peening processors, to be used with portable equipment for peening of metal parts. Classification

The flap assemblies shall be of the following types.

TABLE 1 - FLAP ASSEMBLY TYPES

Mandrel with 9/16 x 1 inch flaps, Figure 1
Mandrel with 9/16 x 1 ¼ inch flaps, Figure 2
Mandrel with 1 x 2 inch flaps, 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 tool flaps are 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 .

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 standard and references cited herein, the text of this standard 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 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2590 Rotary Flap Peening of Metal Parts

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

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 by the user from a steel mandrel (3.2) with two radially extended flaps inserted in the slot of the mandrel. The two flaps shall be bonded together and shall have tungsten carbide shot embedded in the ends.

3.1.3 Shot Material

The material used for shot shall be metallic carbide with a nominal composition of 94 percent tungsten carbide and 6 percent cobalt. The nominal size of the shot to be used shall be 0.045 inch ± 0.003 (1.10 mm ± 0.07) diameter. The sphericity of the shot shall be not more than ±0.003 inch (±0.07 mm) out of round. The material for the shot shall have a microhardness equivalent to Rockwell A 91 ± 3 (with a 60 kg load).

3.1.4 Flap Material

The flap material shall be a 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 4.5 are met (See 8.1).

3.1.5 Shot Distribution

The carbide shot shall be a single row of 8 shot particles on the outer edges as shown in Figure 1 or a double row of 8 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 with a three jaw chuck. The mandrel shall conform to the dimensions specified in Figures 1, 2, or 3 as applicable for the specified flap size.

3.2.1 Material

The mandrel shall be fabricated from cold finished round carbon steel bar stock or drill rod of sufficient strength to preclude failure through fracture or bending when operated at the maximum safe operating speed. All surfaces of the mandrel shall be smooth, free from burrs, sharp edges or other harmful imperfections and shall be nickel plated all over. Plated surfaces shall be free from unplated spots, blisters or other defects which might adversely affect the serviceability of the mandrel.

3.2.2 Sleeves

The 1 x 2 inch flap assembly mandrel shall be provided with two polymeric sleeves conforming to the dimensions specified herein and shall be similar in construction to that shown in Figure 3 (See 8.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspections

Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his 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 Definition

A lot of flaps shall be fabricated from the same batch each of the component details: shot, woven fabric, resin and adhesive material combined in the same cure cycle produced in a given production run and presented for inspection at one time.

4.3 Sampling for Inspection

4.3.1 Sampling of Shot Material

For a given batch of shot, a sample shall consist of one layer of shot adhered to tape in a 1 square inch area.

4.3.2 Sampling of Mandrels and Flaps

A random sample of three mandrels and flaps shall be selected from each lot for inspection (4.4) and testing (4.5).

4.4 Quality Conformance Inspection

4.4.1 Examination

Each of the sample mandrels, sleeves, shot, flaps, or flap assemblies selected in accordance with 4.3.2 shall be visually and dimensionally examined to verify compliance with the requirements of this standard. The items shall be checked for such points as general finish, quality of plating (mandrels), and workmanship. Any sample containing one or more defects shall be cause for rejection of the lot.

4.4.1.1 Inspection of Shot

The shot sample shall be examined at 10X to 30X magnification. Any indication of defective shot shall cause rejection of this lot of shot. Shot shall meet the 3.1.3 requirements by examination and testing or accepted by manufacturer certification.

4.4.2 Materials for Components

The supplier shall furnish certification that the materials and component details, including the flap, shot, mandrel, sleeves, adhesive, and resin materials, conform with this standard.

4.5 Flap Assembly Test and Inspection Procedure

4.5.1 Flaps 9/16 x 1 inch (14 x 25 mm) and 9/16 x 1 ¼ inch (14 x 32 mm)

The sample flap assemblies selected in accordance with 4.3.2 shall be mounted in a suitable tool so that the rotation will produce a speed of 5000 ± 200 RPM with typical working flap deflection in accordance with AMS2590. The flap shall be conditioned on a used test strip to remove the resin from the shot surface in accordance with AMS2590 prior to testing for one minute. One new "A" test strip shall be attached to the magnetic strip holder and peened for 1 minute. The amount of arc height shall be measured and shall not be less than 0.010 inch (0.3 mm). The peening operation shall be repeated for three more minutes using the same test strip and arc height measured. The amount of arc height shall not be less than 0.014 inch (0.4 mm). The peening operation shall be repeated for one more minute using the same test strip. The flap shall be visually examined. Not more than two particles of shot shall be missing from the flap. The flap shall be intact and shall show no indication of separation. If the flap fails this test and inspection procedure, the lot shall be subject to rejection.

4.5.2 Flaps 1 x 2 inch (25 x 51 mm)

The sample flap assemblies selected in accordance with 4.3.2 shall be mounted in a suitable tool so that the rotation will produce a speed of 3000 ± 100 RPM with typical working flap deflection in accordance with AMS2590. The flap shall be conditioned on a used test strip to remove the resin from the shot surface per AMS2590 prior to testing for one minute. One new "A" test strip shall be attached to the magnetic strip holder and peened for 1 minute. The amount of arc height shall be measured and shall not be less than 0.010 inch (0.3 mm). The peening operation shall be repeated for four more minutes using the same test strip and arc height measured. The amount of arc height shall not be less than 0.014 inch (0.4 mm). The flap shall be visually examined. Not more than two particles of shot shall be missing from the flap. The flap shall be intact and shall show no indication of separation. If the flap fails this test and inspection procedure, the lot shall be subject to rejection.

5. PREPARATION FOR DELIVERY

Preservation, packaging, packing and marking shall be in accordance with supplier requirements.

6. ACKNOWLEDGEMENT

The supplier shall mention AS2592 in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Flap assemblies that do not conform to this standard or any modification specified by the cognizant engineering organization shall be subject to rejection.

8. NOTES

8.1 A change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

8.2 Nylon square weave cloth has been found to be suitable for the flap material.

8.3 Translucent polyethylene has been found to be suitable for sleeve material.

8.4 Purchase documents shall specify the following:

AS2592
Flap assembly type.

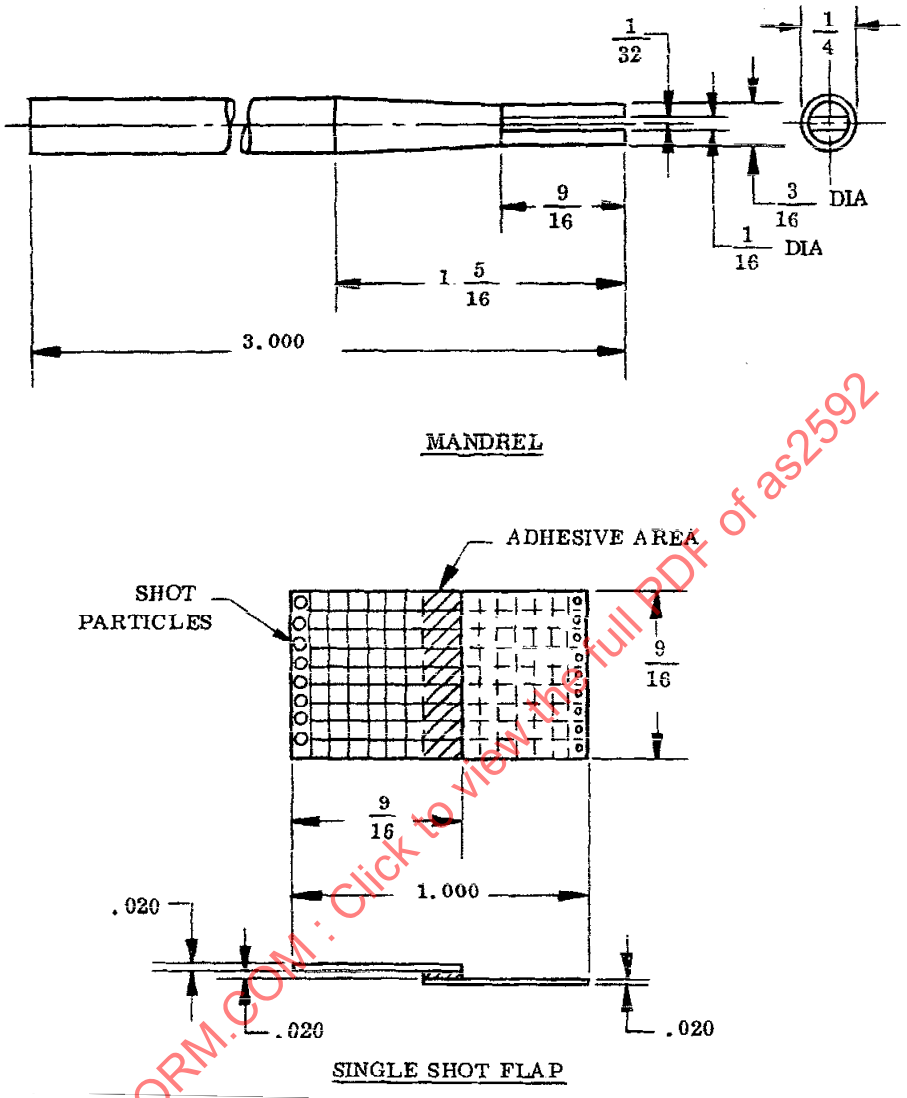

FIGURE 1 - MANDREL WITH 9/16 X 1 INCH FLAP