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Specification for

# Corrosion resisting worm drive clamps for aircraft\*

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\*Index form of title: "Clamps, worm drive, corrosion resisting, for aircraft".

# Foreword

This British Standard has been prepared at the request of the Aerospace Industry to introduce a range of corrosion resisting worm drive clamps to complement the range of normal steel hose clamps given in BS SP 91 and BS SP 92 which correspond dimensionally with BS 3628, “*Hose clips (worm drive type) for general purpose use*”.

The standard specifies dimensional requirements to ensure functional interchangeability, and includes details of hydraulic and pneumatic tests to ensure adequate sealing when the clamps are used on hose connections. It makes provision for clamps with bands having serrations rolled or milled without perforating the band, and for clamps with bands having pierced serrations which extend right through the band, each type having a distinctive identification.

This standard represents the current thinking at the time of publication in the light of known published or projected standards for metric hoses and tubes, and may subsequently require amendment in line with future developments.

This standard makes reference to the following British Standards:

BS 1449, *Steel plate, sheet and strip — Part 4: Stainless and heat resisting plate, sheet and strip*.

BS 1554, *Rust, acid and heat resisting steel wire*.

BS 3073, *Nickel and nickel alloys. Strip*.

BS 3076, *Nickel and nickel alloys. Rods*.

BS F 67, *Hose for aviation fuel and engine lubricating oil for aeronautical purposes*.

NOTE The values stated in metric units are to be regarded as the standard. Approximate imperial units are shown alongside in parentheses or adjacent columns.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

## Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## Amendments issued since publication

| Amd. No. | Date of issue  | Comments                              |
|----------|----------------|---------------------------------------|
| 887      | March 1972     |                                       |
| 1542     | September 1974 | Indicated by a sideline in the margin |
|          |                |                                       |
|          |                |                                       |

This British Standard, having been approved by the Aerospace Industry Standards Committee, was published under the authority of the Executive Board of the Institution on 23 April 1971

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The following BSI references relate to the work on this standard:  
Committee reference ACE/14  
Draft for comment 69/15786

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## 1 General requirements

### 1.1 Scope

These British Standards specify the dimensions, material, finish and test requirements for corrosion resisting worm drive clamps for aircraft.

### 1.2 General principles

The clamp shall consist of a band with serrations pierced, milled or rolled across the longitudinal axis and extending in from one end. A screw with a thread of the same pitch as the serrations shall be retained in a suitable housing attached to the other end of the band, so that when the band is formed as shown in Figure 1 it will engage with the serrations. The loop so formed shall be capable of being tightened and slackened when the screw is turned, and shall be capable of easy fitment and removal.

### 1.3 Materials

**1.3.1** The clamps shall be made from the materials specified in Figure 1 and certified as such by the material supplier.

**1.3.2** The band material shall comply with the test specified in **2.6**.

### 1.4 Range of sizes

The range of sizes of clamps shall be as listed in Table 1. Special sizes larger than this range shall be designated by the maximum diameter in millimetres, e.g. 180 mm (7 in) will be size 180 (see also **2.4.6**), and the working diameter range of these larger sizes shall be 25 mm (1 in).

**Table 1 — Range of sizes**

| Clamp size | Working diameter range |       |                     |       |
|------------|------------------------|-------|---------------------|-------|
|            | From                   |       | Up to and including |       |
|            | mm                     | in    | mm                  | in    |
| 013        | 9                      | 0.375 | 13                  | 0.5   |
| 016        | 13                     | 0.5   | 16                  | 0.625 |
| 019        | 13                     | 0.5   | 19                  | 0.75  |
| 022        | 16                     | 0.625 | 22                  | 0.875 |
| 025        | 19                     | 0.75  | 25                  | 1.0   |
| 028        | 22                     | 0.875 | 28                  | 1.125 |
| 035        | 25                     | 1.0   | 35                  | 1.375 |
| 041        | 28                     | 1.125 | 41                  | 1.625 |
| 048        | 32                     | 1.25  | 48                  | 1.875 |
| 054        | 38                     | 1.5   | 54                  | 2.125 |
| 060        | 44                     | 1.75  | 60                  | 2.375 |
| 070        | 50                     | 2.0   | 70                  | 2.75  |
| 080        | 60                     | 2.375 | 80                  | 3.125 |
| 090        | 70                     | 2.75  | 90                  | 3.5   |
| 100        | 82                     | 3.25  | 100                 | 4.0   |
| 115        | 95                     | 3.75  | 115                 | 4.5   |
| 125        | 105                    | 4.125 | 125                 | 5.0   |

### 1.5 Overall dimensions

The overall dimensions of the clamps shall not exceed those specified in Figure 2.

### 1.6 Band

**1.6.1** The band shall have suitable provision for attachment of the housing at one end and transverse serrations centrally disposed commencing at the other end and extending for a length (dependent upon the size of the clamp) sufficient to enable the clamp to be tightened on to the smallest assembly for which it is designed.

**1.6.2** BS SP 144 and BS SP 145 require that the serrations shall be rolled or milled. Serrations shall not penetrate through the band. The serrations and the metal between them shall be of equal width and such that the screw forms an adequate key in them when engaged. The dimensions of the band shall conform to those given in Figure 3a.

**1.6.3** BS SP 146 and BS SP 147 require that the serrations shall be pierced through the band. Serrations and the metal between them shall be of equal width and shall be such that the screw forms an adequate key in them when engaged. The dimensions of the band shall conform to those given in Figure 3b.

**1.6.4** The internal surface of the band shall be smooth and all surfaces shall be free from burrs, projections or sharp edges.

## **1.7 Tightening device**

**1.7.1** The tightening device shall consist of a cheese head screw permanently retained in a housing firmly attached to one end of the band.

**1.7.2** The clamps shall be capable of being tightened or slackened only by a screwdriver slot.

**1.7.3** The following screw details shall apply:

**1.7.3.1** The screw shall have a washer or retaining device attached to each end, or to a recess in the screw, to retain and adequately support the head of the screw and to prevent sideways or axial movement of the screw.

**1.7.3.2** On clamps having bands with rolled or milled serrations, the screw shall have an 8 mm (0.312 in) nominal or larger diameter. The thread shall be single start, right-hand, and of square or Acme type. For sizes 013, 016 and 019 the screw may have a 6 mm (0.236 in) nominal diameter.

**1.7.3.3** On clamps having bands with pierced serrations, the screw shall have an 8 mm (0.312 in) nominal or larger diameter. The thread shall be single start, right-hand, and of square or buttress type.

**1.7.4** The housing shall hold the screw firmly in engagement with the serrations on the band. The housing shall be of rigid construction and shall not distort permanently when the test load is applied.

**1.7.5** The housing shall be rigidly and securely attached to the band by riveting, welding and/or mechanical keying. This arrangement shall not permit any quick release device; the only method of loosening the clamp shall be by turning the screw in a counter-clockwise direction.

## **1.8 Finish**

Clamps shall be supplied in the “as machined” and lubricated condition.

NOTE The “lubricant” is the anti-seize compound applied during assembly.

## **1.9 Operation**

**1.9.1** The clamp shall expand automatically when the tightening device is turned in a counter-clockwise direction.

**1.9.2** For clamps of sizes larger than 035, after expanding until the band is disconnected from the screw, it shall be possible to open the clamp to provide a gap equal to the largest diameter for which the clamp is designed and so permit easy fitting or removal of the clamp by passing the clamp over the assembly.

**1.9.3** The clamps shall be designed so that when tightened on the assembly they remain secure.

NOTE In some applications, locking wire may be specified. For details see Figure 2.

**1.9.4** Clamps conforming to BS SP 144 and BS SP 146 are suitable for use over the temperature range – 65 °C to + 450 °C.

**1.9.5** Clamps conforming to BS SP 145 and BS SP 147 are suitable for use over the temperature range – 65 °C to + 300 °C.

## **1.10 Marking and identification**

Clamps shall be clearly and indelibly marked with the following minimum information:

- 1) Manufacturer's identification;
- 2) British Standard number (see Table 2).
- 3) Size of clamp, e.g. 025.