CHAPTER 1

# INTRODUCTORY REPAIR INFORMATION

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### Construction

**1.** The Hunter T Mk.7 and 8 are single-engined mid-wing trainers with side by side seating. The two Marks are basically similar, but the Mk.8 version incorporates an arrester hook on the rear fuselage. They have swept-back mainplanes, a variable-incidence swept-back tail-plane, power operated aileron and elevator controls and provision for cabin pressurisation. The Avon gas turbine engine is mounted centrally in the fuselage, has a straight through jet pipe, and twin air-intakes are positioned in the leading edges of the stub wings. One Aden gun is carried on the starboard side of the front fuselage. The aircraft consists of the following main components:-

(1) Front fuselage, incorporating detachable nosing, cockpit canopy and windscreen.
(2) Centre fuselage, with short stub wing.
(3) Rear fuselage, of which the bottom portion of the fin forms an integral part.
(4) Detachable tail cone.
(5) Upper portion of fin.
(6) Rudder.
(7) Tail plane complete with elevators.
(8) Main plane complete with ailerons.
(9) Flaps.
(10) Engine mounting.

**2.** The engine is totally enclosed in the fuselage and access is obtained through the rear transport joint.

**3.** The tricycle alighting gear is operated hydraulically, the nose wheel retracting forward into the nose portion of the front fuselage, and the main wheels retracting inward into the wings.

### Structure classification

**4.** The structure diagrams which appear in subsequent chapters are coloured to indicate the relative importance of each part of the structure.

RED denotes
PRIMARY STRUCTURE

YELLOW denotes
SECONDARY STRUCTURE

The two types of structure are defined as follows:-

(1) Primary structure: All portions of the structure in which a single failure, whether in flight, landing or take-off might cause structural collapse, loss of control, failure of motive power, unintentional release of bombs, pyrotechnics or any other items of jettisonable equipment, or serious injury to the pilot.

(2) Secondary structure: (a) Those portions of the structure which would normally be regarded as primary structure but which unavoidably have such a reserve of strength over design requirements that weakening may be permitted without

risk of failure, and (b) structure which, if damaged, would not impair the safety of the aircraft in any manner specified above for primary structure.

**Location diagrams**

**5.** Location diagrams in the main chapters show the locations of individual repairs and refer to the appropriate repair illustrations.

**Heat treatment of repair materials**

**6.** The only heat treatment necessary when effecting repairs to this aircraft is the normalising of duralumin (L.37) rivets before use, and of light alloy sheet (L.72) prior to forming operations. For further instructions on heat treatment of light alloys, reference should be made to A.P.1464B/3.

**Protective coatings**

**7.** Care must be taken to avoid un-necessary damage to protective coatings. If the protective coating is damaged the instructions given in A.P.1464D, Part 2, Sect.1, Chap.1 must be strictly observed.

**Support of structure during repair**

**8.** The structure must be adequately supported during repair, unless the repair is a very minor one, so as to relieve the affected and adjacent parts from excessive loads and to prevent further damage. The importance of correct support during the cutting out of damage cannot be over-emphasised, as it is essential to keep the structure in correct alignment during this operation. Trestles for this aircraft will be found listed in Vol.1, whilst details of standard trestles will be found in A.P.1464G, Vol.1, Part 2, Sect.2, Chap.9. When operating on soft ground, support the trestle legs on wood planks.

**Removal of Hi-Shear pins**

**9.** Hi-Shear pins should be removed as follows:-

(1) Carefully chisel off the dural collar taking care not to damage the surrounding structure.

(2) Lightly tap out the pin, which may be used again if undamaged.

**Riveting**

**10.** Details of riveting used on this aircraft are shown in fig.2. Flush riveting must be used for all repairs to external skin surfaces exposed to the airstream. Where semi-tubing (bif) rivets have been removed leaving a dimple in the skin, one of the dimpling tools shown in fig.1 should be used to dimple new parts and to form the existing dimple to suit normal 120 deg. countersunk head rivets. For details of riveting in pressurised areas, reference should be made to Chapter 2 of this volume.

**11.** Where blind riveting is authorised for repairs to the aircraft, monel Tucker or Avdel rivets should be used. Where the Tucker type of rivets are used break-head type mandrels are normally preferred but the break-stem type may be utilised bearing in mind that the maximum thickness riveted, for rivets of similar length, is 0.02 in. less in the case of the break-stem type. When Tucker rivets are used it is especially important to ensure that the mandrels are removed from the aircraft, particularly where they might short electrical circuits or foul operating mechanisms. In permanently enclosed areas and air intake skins it is advisable to use Avdel rivets, but if the Tucker type is used it should be the break-stem type where the heads are retained in the rivets after clenching. Blind riveting should always be sealed after assembly. Sizes of rivets available with their part numbers may be found in fig.2.

**Distance tubes**

**12.** Distance tubes of the solid drawn type should be used where possible, but if these are not available, or where accessibility does not permit the use of the solid drawn type, split-type distance tubes may be used. Drifts for expanding distance tubes are listed in Table 1 and may be used for tubes made from T.1, T.26 or S.510.

**Prevention of corrosion**

**13.** Class 1 treatment, as described in A.P.1464D, Vol.1, Part 2, Sect.1, Chap.1, is applicable to this aircraft. When effecting repairs particular care must be exercised to ensure that the original coatings are undamaged and that renewal parts are protected by this treatment. Where lack of facilities prevents Class 1 treatment being given, the best possible substitute must be used; the area so treated must be suitably marked. Corrosion will usually be shown up by cracking of the finish or the finish will flake off when pressed by the finger. When corrosion is detected the area must be carefully examined to determine its full extent.

**Drainage holes**

**14.** To ensure adequate drainage of components, it is essential that drainage holes should be provided in any new or repaired part. If these have been "lost" during repair, suitable new holes must be made. It may also be necessary to provide new drainage holes where a repair forms a trap for moisture.

**Detection of cracks**

**15.** Particular care is necessary to ensure that no cracks in a member go undetected. If a crack is suspected the procedure laid down in A.P.880C, Vol.1, should be followed. Where possible, as a temporary measure, small holes should be drilled in the extremities of the cracks to prevent them from spreading.

**Dressing of damage**

**16.** Before attempting repairs, damage in the form of holes must be carefully cleaned out to leave a smooth edge and must be free from cracks. Where a hole is not circular or elliptical each corner should be provided with a pronounced radius. Any distortion interfering with a repair patch should be dressed out to provide a good seating for the patch.

**Marking out repairs**

**17.** Except for outlines, which may be marked with scribers, all marking out on all alloys used for the repair of airframes is done with a graphite pencil. However, since graphite can cause galvanic corrosion, all traces of pencil line are to be removed when the repair is completed. If it is necessary to delineate a defect such as a crack, where the marking has to remain for more than a few hours, a grease pencil of any colour except black (as this might contain carbon) is to be used.

**Repair of plate members**

**18.** Unless otherwise stated, plate members such as flanged ribs may be repaired by riveting a patch over the damaged portion. The patch should be of the same gauge and specification as the part to be repaired, and when applied at, or near, the flanged holes, flanges, or flanged edges it should itself be flanged to restore the original stiffness of the part. In the absence of specific instructions, the rivet pitch should not exceed 1·0 in. and should not be less than 0·7 in., a minimum landing of 2D (where D = dia. of rivet) must be allowed. These instructions only apply to light alloy plate members not exceeding 20 s.w.g.

**Modification of parts**

**19.** When fitting a repair patch under an existing bracket or angle, it may be necessary to modify the part to suit the thickness of the patch; a small bracket may be more easily replaced by a new bracket which incorporates the new allowances. Machined parts must not be modified, and where it is impossible to fit a patch on the opposite side of a damaged panel to that on which the machined part was mounted, the panel should be replaced by a new part extending to the edges of adjacent structural members.

**Patch repairs to skins**

**20.** Only flush patches may be used on the external surfaces of this aircraft; all other types are prohibited. All patches must be shaped to conform to the exact contour of the skin, and when dealing with the heavier gauges it is recommended that the patches are cut from pre-formed sheet. On the main plane skin no patch repairs may be carried out within an area of one-third of the chord, measured from the leading edge.

**Standard sections**

**21.** Standard sections together with applicable repair sections are shown in fig.3.

**Terms of reference**

**22.** The terms of reference for various sections are shown in fig.4.

**Limiting conditions**

**23.** The repairs illustrated in this Part are typical repairs and their application may be limited by:-

(1) Accessibility and position of adjacent structure.

(2) The amount of sound material left after the damaged portion has been removed; sufficient must be left to allow for adequate fixing of the repair material.

**TABLE 1**

**Standard and Special Tools**

| Ref. No. | Part No. | Description | Remarks |
|---|---|---|---|
| – | ST.1657/1 | Dimpler, 3/32 in. dia. rivets | |
| – | ST.1657/2 | Dimpler, 1/8 in. dia. rivets | |
| 1C/6456 | – | Tool, countersinking | |
| 1C/6553 | – | Head, riveting, pop, offset c/w C and D type jaws and nose pieces | Use with 1C/6574 lazy tongs |
| 1C/6661 | – | Head, riveting, pop, midget, c/w C and D type jaws and nose pieces | |
| – | ST.1312 | Head, riveting, c/w retaining spring | Use with hammers, riveting pneumatic |
| – | ST.1306 | Snap, riveting, for csk/hd. rivets below 1/4 in.dia. | |
| – | ST.1307 | Snap, riveting, for csk/hd. rivets 1/4 in. dia. and over | |
| – | R.526A | Drift, 3/16 in. i/d tube | For expanding split distance tubes |
| – | R.526B | Drift, 1/4 in. i/d tube | |
| – | R.526C | Drift, 5/16 in. i/d tube | |
| – | R.526D | Drift, 3/8 in. i/d tube | |

## TABLE 2

Repair Materials

| Ref. No. | Part No. | Description | Size | Specn. | Remarks |
|---|---|---|---|---|---|
| 30B/1738 | – | Sheet, aluminium alloy | 26 s.w.g. | L.72 | |
| 30B/1736 | – | Sheet, aluminium alloy | 24 s.w.g. | L.72 | |
| 30B/1734 | – | Sheet, aluminium alloy | 22 s.w.g. | L.72 | |
| 30B/1732 | – | Sheet, aluminium alloy | 20 s.w.g. | L.72 | |
| 30B/1730 | – | Sheet, aluminium alloy | 18 s.w.g. | L.72 | |
| 30B/1728 | – | Sheet, aluminium alloy | 16 s.w.g. | L.72 | |
| 30B/1726 | – | Sheet, aluminium alloy | 14 s.w.g. | L.72 | |
| 30B/1723 | – | Sheet, aluminium alloy | 10 s.w.g. | L.72 | |
| 30B/1756 | – | Sheet, aluminium alloy | 14 s.w.g. | L.73 | |
| 30B/1754 | – | Sheet, aluminium alloy | 10 s.w.g. | L.73 | |
| 30A/NIV | – | Sheet, Mild steel | 14 s.w.g. | S.510 | |
| 30A/NIV | – | Sheet, mild steel | 16 s.w.g. | S.510 | |
| 30A/NIV | – | Sheet, stainless steel | 24 s.w.g. | S.520 | |
| 30B/NIV | – | Sheet, tungum | 20 s.w.g. | D.T.D.283 | |
| 30B/887 | – | Sheet, tungum | 22 s.w.g. | D.T.D.283 | |
| 30A/NIV | – | Strip, 0·60 in. wide | 14 s.w.g. | S.520 | To repair stringer Std.1679 |
| 30A/NIV | – | Strip, 0·90 in. wide | 12 s.w.g. | S.520 | To repair stringer Std.1612/2 |
| – | R.622 | Stringer repair section | 18 s.w.g. | L.72 | To repair stringer Std.1679 |
| – | R.623/1 | Stringer repair section | 16 s.w.g. | S.520 | To repair stringers Std.1612/2 and /15 |
| – | R.623/2 | Stringer repair section | 14 s.w.g. | S.520 | |
| – | Std.1679 | Stringer section | – | – | Insertion stringers |
| – | Std.1612/2 | Stringer section | – | – | |
| – | Std.1612/15 | Stringer section | – | – | |
| – | R.626 | Balance weight, rudder | 14 s.w.g. | S.510 | |
| – | R.628/12 | Balance weight, rudder | 12 s.w.g. | S.510 | |
| – | R.628/14 | Balance weight, rudder | 14 s.w.g. | S.510 | |
| – | R.629/12 | Balance weight, rudder | 12 s.w.g. | S.510 | |
| – | R.629/14 | Balance weight, rudder | 14 s.w.g. | S.510 | |
| – | R.630/12 | Balance weight, rudder | 12 s.w.g. | S.510 | |
| – | R.630/14 | Balance weight, rudder | 14 s.w.g. | S.510 | |
| – | A.S.164/308 | Rivet, csk/hd. | 3/32 in.dia. | L.37 | |
| – | A.S.164/404 | Rivet, csk/hd. | 1/8 in.dia. | L.37 | |
| – | A.S.164/405 | Rivet, csk/hd. | 1/8 in.dia. | L.37 | |
| – | A.S.164/406 | Rivet, csk/hd. | 1/8 in.dia. | L.37 | |
| – | A.S.164/505 | Rivet, csk/hd. | 5/32 in.dia. | L.37 | |
| – | A.S.164/506 | Rivet, csk/hd. | 5/32 in.dia. | L.37 | |
| – | A.S.161/406 | Rivet, csk/hd. | 1/8 in.dia. | L.37 | |
| – | A.S.161/506 | Rivet, csk/hd. | 5/32 in.dia. | L.37 | |
| – | A.S.161/507 | Rivet, csk/hd. | 5/32 in.dia. | L.37 | |
| – | A.S.161/508 | Rivet, csk/hd. | 5/32 in.dia. | L.37 | |

TABLE 2 *(continued)*

| Ref.No. | Part No. | Description | Size | Specn. | Remarks |
|---|---|---|---|---|---|
| 28Q/6134 | A.S.161/505 | Rivet, csk/hd. | 5/32 in.dia. | L.37 | |
| 28Q/5994 | A.S.161/607 | Rivet, csk/hd. | 3/16 in.dia. | L.37 | |
| 28Q/14500 | A.S.161/609 | Rivet, csk/hd. | 3/16 in.dia. | L.37 | |
| 28Q/1660 | A.S.156/405 | Rivet, sn/hd. | 1/8 in.dia. | L.37 | |
| 28Q/1661 | A.S.156/505 | Rivet, sn/hd. | 5/32 in.dia. | L.37 | |
| 28Q/1671 | A.S.156/506 | Rivet, sn/hd. | 5/32 in.dia. | L.37 | |
| 28Q/9701 | A.S.156/509 | Rivet, sn/hd. | 5/32 in.dia. | L.37 | |
| 28Q/9417224 | A.G.S. 2050/419/BH | Rivet, pop, dm/hd. | 1/8 in.dia. | D.T.D.10 | |
| 28Q/9417225 | A.G.S. 2050/424/BH | Rivet, pop, dm/hd. | 1/8 in.dia. | D.T.D.10 | |
| 28Q/9417230 | A.G.S. 2050/524/BH | Rivet, pop, dm/hd. | 5/32 in.dia. | D.T.D.10 | |
| 28Q/9417238 | A.G.S. 2050/639/BH | Rivet, pop, dm/hd. | 3/16 in.dia. | D.T.D.10 | |
| 28Q/9417203 | A.G.S. 2051/419/BH | Rivet, pop, csk/hd. | 1/8 in.dia. | D.T.D.10 | |
| 28Q/9417209 | A.G.S. 2051/524/BH | Rivet, pop, csk/hd. | 5/32 in.dia. | D.T.D.10 | |
| 28Q/9417202 | A.G.S. 2051/413/BH | Rivet, pop, csk/hd. | 1/8 in.dia. | D.T.D.10 | |
| 28Q/9417208 | A.G.S. 2051/519/BH | Rivet, pop, csk/hd. | 5/32 in.dia. | D.T.D.10 | |
| 28Q/9417214 | A.G.S. 2051/624/BH | Rivet, pop, csk/hd. | 3/16 in.dia. | D.T.D.10 | |
| 28Q/9417217 | A.G.S. 2051/639/BH | Rivet, pop, csk/hd. | 3/16 in.dia. | D.T.D.10 | |
| 26FX/4428 | R.625 | Bolt, special | 1/4 in.dia. | S.95.B. | |
| 28M/5898 | A.G.S. 2008/E/1 | Nut, anchor | 1/4 in.B.S.F. | | |
| 30B/816 | – | Tube, tungum | 20 s.w.g. × 1/4 in. o/d. | D.T.D.253 | Fuel system pipe lines |
| 30B/NIV | – | Tube, tungum | 20 s.w.g. × 1.3/4 in.o/d. | D.T.D.253 | |
| 30B/NIV | – | Tube, tungum | 20 s.w.g. × 2 in. o/d. | D.T.D.253 | |
| 30B/794 | – | Tube, tungum | 22 s.w.g. × 3/16 in.o/d. | D.T.D.253 | |
| 30B/NIV | – | Tube, tungum | 22 s.w.g. × 1/4 in. o/d. | D.T.D.253 | |
| 30B/796 | – | Tube, tungum | 22 s.w.g. × 5/16 in.o/d. | D.T.D.253 | |
| 30B/797 | – | Tube, tungum | 22 s.w.g. × 3/8 in. o/d. | D.T.D.253 | |

TABLE 2 *(continued)*

| Ref.No. | Part No. | Description | Size | Specn. | Remarks |
|---|---|---|---|---|---|
| 30B/800 | – | Tube, tungum | 22 s.w.g. × 5/8 in. o/d. | D.T.D.253 | Fuel system pipe lines |
| 30B/802 | – | Tube, tungum | 22 s.w.g. × 3/4 in. o/d. | D.T.D.253 | |
| 30B/NIV | – | Tube, tungum | 22 s.w.g. × 7/8 in. o/d. | D.T.D.253 | |
| 30B/803 | – | Tube, tungum | 22 s.w.g. × 1.0 in. o/d. | D.T.D.253 | |
| 30B/804 | – | Tube, tungum | 22 s.w.g. × 1.1/4 in.o/d. | D.T.D.253 | |
| 30B/822 | – | Tube, tungum | 22 s.w.g. × 1.1/2 in.o/d. | D.T.D.253 | |
| 30B/NIV | – | Tube, tungum | 22 s.w.g. × 1.3/4 in.o/d. | D.T.D.253 | |
| 30B/1633 | – | Tube, aluminium | 20 s.w.g. × 1/4 in. o/d. | L.54 | |
| 30B/NIV | – | Tube, aluminium | 17 s.w.g. × 1.3/4 in.o/d. | L.54 | |
| 30B/842 | – | Tube, tungum | 20 s.w.g. × 1/2 in. o/d. | D.T.D.323 | Hydraulic and pneumatic system pipe lines |
| 30B/1055 | – | Tube, tungum | 20 s.w.g. × 3/4 in. o/d. | D.T.D.323 | |
| 30B/838 | – | Tube, tungum | 22 s.w.g. × 3/16 in.o/d. | D.T.D.323 | |
| 30B/839 | – | Tube, tungum | 22 s.w.g. × 1/4 in. o/d. | D.T.D.323 | |
| 30B/841 | – | Tube, tungum | 22 s.w.g. × 3/8 in. o/d. | D.T.D.323 | |
| 30B/843 | – | Tube, tungum | 22 s.w.g. × 1/2 in. o/d. | D.T.D.323 | |
| 30B/1615 | – | Tube, monel | 20 s.w.g. × 1/2 in. o/d. | D.T.D.477 | |
| 30B/NIV | – | Tube, monel | 20 s.w.g. × 3/4 in. o/d. | D.T.D.477 | |
| 30B/1327 | – | Tube, monel | 22 s.w.g. × 3/16 in.o/d. | D.T.D.477 | |
| 30B/1614 | – | Tube, monel | 22 s.w.g. × 1/4 in. o/d. | D.T.D.477 | |
| 30B/1400 | – | Tube, monel | 22 s.w.g. × 3/8 in. o/d. | D.T.D.477 | |

**Note . . .**
***When ordering tube for use in hydraulic and pneumatic systems, a test pressure of 4,500 lb. per sq.in. must be quoted.***

TABLE 2 *(continued)*

| Ref.No. | Part No. | Description | Size | Specn. | Remarks |
|---|---|---|---|---|---|
| 30B/819 | – | Tube, tungum | 20 s.w.g. × 1 in. o/d. | D.T.D.253 | Cabin pressurising and air conditioning system pipe lines |
| 30B/794 | – | Tube, tungum | 22 s.w.g. × 3/16 in.o/d. | D.T.D.253 | |
| 30B/NIV | – | Tube, tungum | 22 s.w.g. × 1/4 in. o/d. | D.T.D.253 | |
| 30B/797 | – | Tube, tungum | 22 s.w.g. × 3/8 in. o/d. | D.T.D.253 | |
| 30B/803 | – | Tube, tungum | 22 s.w.g. × 1 in. o/d. | D.T.D.253 | |
| 30B/804 | – | Tube, tungum | 22 s.w.g. × 1.1/4 in.o/d. | D.T.D.253 | |
| 30B/822 | – | Tube, tungum | 22 s.w.g. × 1.1/2 in.o/d. | D.T.D.253 | |
| 30B/1659 | – | Tube, aluminium | 20 s.w.g. × 1 in. o/d. | L.54 | |
| 30B/NIV | – | Tube, aluminium | 20 s.w.g. × 1.1/2 in.o/d. | L.54 | |
| 30B/NIV | – | Tube, aluminium | 22 s.w.g. × 1.1/2 in.o/d. | L.54 | |
| 30B/794 or /838 | – | Tube, tungum | 22 s.w.g. × 3/16 in.o/d. | D.T.D.253 or D.T.D.323 | De-icing system pipe lines |
| 30B/NIV or /839 | – | Tube, tungum | 22 s.w.g. × 1/4 in. o/d. | D.T.D.253 or D.T.D.323 | |
| 30B/NIV or /843 | – | Tube, tungum | 22 s.w.g. × 1/2 in. o/d. | D.T.D.253 or D.T.D.323 | |
| 30B/522 | – | Tube, copper or | 16 s.w.g. × 3/16 in.o/d. | T.51 | Oxygen system pipe lines |
| 30B/NIV | – | Tube, tungum or | | D.T.D.323 | |
| 30B/NIV | – | Tube, monel | | D.T.D.477 | |
| 30B/1122 | – | Tube, copper or | 22 s.w.g. × 3/16 in.o/d. | T.51 | |
| 30B/838 | – | Tube, tungum or | | D.T.D.323 | |
| 30B/1327 | – | Tube, monel | | D.T.D.477 | |
| 30B/NIV | – | Tube, aluminium | 22 s.w.g. × 5/16 in.o/d. | L.54 | |

TABLE 2 *(continued)*

| Ref. No. | Part No. | Description | Size | Specn. | Remarks |
|---|---|---|---|---|---|
| 30B/1195 | – | Tube, aluminium | 22 s.w.g. × 5/16 in.o/d. | L.56 | Oxygen system pipe lines |
| 30B/838 | – | Tube, tungum | 22 s.w.g. × 3/16 in.o/d. | D.T.D.323 | Anti-G system pipe lines |
| 30B/839 | – | Tube, tungum | 22 s.w.g. × 1/4 in. o/d. | D.T.D.323 | |
| 30B/NIV or /745 | – | Tube, aluminium | 20 s.w.g. × 5/8 in. o/d. | L.54 or T.9 | |
| 30A/NIV | – | Tube, stainless steel | 20 s.w.g. × 3/4 in. o/d. | T.55 | Fire extinguishing system pipe lines |
| 30A/NIV | – | Tube, stainless steel | 22 s.w.g. × 3/4 in. o/d. | T.55 | |
| 30A/NIV | – | Tube, stainless steel | 22 s.w.g. × 1 in. o/d. | T.58 | |
| 30A/NIV | – | Tube, stainless steel | 22 s.w.g. × 3/16 in.o/d. | T.58 | Fuel filter de-icing system pipe lines |
| 30A/NIV | – | Tube, stainless steel | 22 s.w.g. × 1/4 in. o/d. | T.58 | |
| 30A/NIV | – | Tube, stainless steel | 22 s.w.g. × 3/8 in. o/d. | T.58 | |

## TABLE 3

### Alternative materials

This table gives alternative specifications or part numbers of fully interchangeable materials or parts which it may be found necessary to use when repairing or reconditioning this aircraft. In some cases the alternatives may be obsolescent but may be utilised if stocks are available. Reference numbers may be found in the appropriate section of A.P.1086.

| Part No. or Specification | Description | Alternative |
|---|---|---|
| **Aluminium alloy** | | |
| D.T.D.546 | Sheet, aluminium alloy | L.73 |
| D.T.D.610 | Sheet, aluminium alloy | L.72, D.T.D.390 |
| D.T.D.364 | Bar, aluminium alloy | L.65C |
| Sect.3 | | |
| **Steel** | | |
| S.92B | Bar, steel, 40 ton | D.T.D.126, Sect.3 |
| S.93B | Bar, steel, 35 ton | S.6B |
| S.94B | Bar, steel, 55 ton | S.11B, S.69B<br>D.T.D.188, Sect.3<br>D.T.D.600 |
| S.95B | Bar, steel, 55 ton | S.11B, S.69B<br>D.T.D.188, Sect.3<br>D.T.D.600, |
| S.96B | Bar, steel, 55 ton | S.11B, S.69B<br>D.T.D.188, Sect.3<br>D.T.D.600 |
| S.80B | Bar, steel, 55 ton, corrosion resisting | D.T.D.463, Sect.3 |
| S.97B | Bar, steel, 65 ton | S.65B, S.81B |
| S.98B | Bar, steel, 75 ton | D.T.D.473, Sect.3 |
| S.99B | Bar, steel, 80 ton | D.T.D.331, Sect.3 |
| S.510 | Sheet, mild steel | S.3 |
| S.520 | Sheet, stainless steel | D.T.D.166 |
| S.521 | Sheet, stainless steel | D.T.D.171 |
| **Bolts** | | |
| A.25 | Bolts, H.T.S., hex/hd. | A.15Y |
| A.28 | Bolts, light alloy, hex/hd. | A.17 |
| A.57 | Bolts, H.T.S., shear | A.G.S.571 |
| A.26 | Bolts, H.T. stainless, hex/hd. | A.15.Z |

TABLE 3 — *continued*

| Part No. or Specification | Description | Alternative |
|---|---|---|
| **Nuts** | | |
| A.27 | Nuts, medium tensile steel | A.16.Y |
| A.24 | Nuts, H.T. stainless | A.16.Z |
| A.29 | Nuts, light alloy | A.18 |
| A.58 | Nuts, medium tensile steel, shear | A.G.S.572 |
| **Screws** | | |
| A.31 | Screws, steel, ch/hd. | A.G.S.247, B.S.57/42 |
| A.32 | Screws, steel, rd/hd. | A.G.S.245, B.S.57/32 |
| A.33 | Screws, steel, csk/hd. | A.G.S.249, B.S.57/22 |
| A.35 | Screws stainless steel, ch/hd. | A.G.S.896 |
| A.36 | Screws, stainless steel, rd/hd. | A.G.S.967 |
| A.37 | Screws, stainless steel, csk/hd. | A.G.S.968 |
| A.40 | Screws, aluminium alloy, rd/hd. | A.G.S.564 |
| A.43 | Screws, brass, ch/hd. | A.G.S.246, B.S.57/41 |
| A.44 | Screws, brass, rd/hd. | A.G.S.244, B.S.57/31 |
| A.45 | Screws, brass, csk/hd. | A.G.S.248, B.S.57/21 |
| **Washers** | | |
| S.P.13 | Washers, steel | A.G.S.160 |
| S.P.14 | Washers, stainless steel | A.G.S.946 |
| S.P.15 | Washers, aluminium alloy | A.G.S.970, A.S.470 |
| S.P.16 | Washers, aluminium alloy | A.S.471 |
| S.P.18 | Washers, steel | A.G.S.157, A.G.S.161 |
| S.P.19 | Washers, stainless steel | A.G.S.947 |
| S.P.42 | Washers, tab | A.G.S.518 |
| S.P.47 | Washers, single spring, steel | A.G.S.162, A.G.S.585 |
| **Rivets** | | |
| A.G.S.2050 | Rivets, pop, monel, dm/hd. | TLP/D, A.G.S.2040 |
| A.G.S.2051 | Rivets, pop monel, csk/hd. | TLP/K, A.G.S.2041 |
| **Split pins** | | |
| S P.9 | Split pins, nickel alloy | A.G.S.166, A.G.S.784 |
| **Hose clips** | | |
| A G.S.605 | Hose clips (Jubilee type) | A.G.S.1000 |

## TABLE 4. LIMITS FOR HOLES

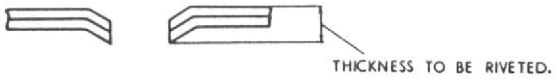
| Size | Clearance hole inclusive of clearance | Drill size for blind rivets | Drill size for solid rivets | Standard hole (Hawker limit) | Fit C hole (Hawker limit) | Fit B hole (Newall limit) | Fit A hole (Newall limit) |
|---|---|---|---|---|---|---|---|
| 1/16 in. | Morse No. 51 | | | 1/16 in. +0·003 in. −0·000 in. | | | |
| 3/32 in. | Morse No. 40 | Morse No. 41 | Morse No. 40 | 3/32 in. +0·003 in. −0·000 in. | | | |
| 7/64 in. | Morse No. 33 | Morse No. 33 | | 7/64 in. +0·003 in. −0·000 in. | | | |
| 6 B.A. = 0·1102 in. | Morse No. 32 | | | Morse No. 33 =0·113 in. +0·003 in. −0·000 in. | | | |
| 1/8 in. | Morse No. 30 | Morse No. 30 | Morse No. 30 | 1/8 in. +0·003 in. −0·000 in. | | | |
| 4 B.A. = 0·1417 in. | Morse No. 25 | | | Morse No. 27 =0·144 in. +0·003 in. −0·000 in. | | | |
| 5/32 in. | Morse No. 21 | Morse No. 20 | Morse No. 21 | 5/32 in. +0·003 in. −0·000 in. | 5/32 in. +0·0015 in. −0·0000 in. | ±0·0005 in. | ±0·00025 in. |
| 2 B.A. = 0·185 in. | Morse No. 10 | | | 3/16 in. +0·003 in. −0·000 in. | Morse No. 13 =0·185 in. +0·0015 in. −0·0000 in. | | |
| 3/16 in. | Morse No. 10 | Morse No. 11 | Morse No. 10 | 3/16 in. +0·003 in. −0·000 in. | 3/16 in. +0·0015 in. −0·0000 in. | | |
| 7/32 in. | 1/64 in. over nominal size | 1/4 in. | Morse No. 1 | +0·005 in. −0·000 in. | +0·002 in. −0·000 in. | | |
| 7/32 in. to 1/4 in. | | | | | | | |
| 1/4 in. | | | Letter F | | | | |
| 1/4 in. to 5/16 in. | | | | | | | |
| 5/16 in. | | Letter O | Letter O | | | | |

Table 4 *(continued)*

| Size | Clearance hole inclusive of clearance | Drill size for blind rivets | Drill size for solid rivets | Standard hole (Hawker limit) | Fit C hole (Hawker limit) | Fit B hole (Newall limit) | Fit A hole (Newall limit) |
|---|---|---|---|---|---|---|---|
| 5/16 in. to 3/8 in. | 1/64 in. over nominal size | Letter V | Letter W | +0·005 in.<br>−0·000 in. | +0·002 in.<br>−0·000 in. | ±0·0005 in. | ±0·00025 in. |
| 3/8 in. | | | | | | | |
| 13/32 in. to 1/2 in. | | | | +0·007 in.<br>−0·000 in. | +0·003 in.<br>−0·000 in. | | |
| 17/32 in. to 1 in. | 1/32 in. over nominal size | | | +0·010 in.<br>−0·000 in. | +0·004 in.<br>−0·000 in. | +0·00075 in.<br>−0·0005 in. | +0·00050 in.<br>−0·00025 in. |
| 1.1/16 in. to 2 in. | | | | +0·010 in.<br>−0·000 in. | +0·004 in.<br>−0·000 in. | +0·0010 in.<br>−0·0005 in. | +0·00075 in.<br>−0·00025 in. |
| 2.1/16 in. to 3 in. | | | | +0·015 in.<br>−0·000 in. | +0·005 in.<br>−0·000 in. | +0·00125 in.<br>−0·00075 in. | +0·0010 in.<br>−0·0005 in. |
| 3.1/16 in. to 4 in. | 1/16 in. over nominal size | | | +0·020 in.<br>−0·000 in. | +0·006 in.<br>−0·000 in. | +0·00150 in.<br>−0·00075 in. | |
| 4.1/16 in. to 5 in. | | | | +0·020 in.<br>−0·000 in. | +0·007 in.<br>−0·000 in. | +0·00175 in.<br>−0·00075 in. | |
| 5.1/16 in. to 6 in. | | | | +0·020 in.<br>−0·000 in. | +0·008 in.<br>−0·000 in. | +0·0020 in.<br>−0·0010 in. | +0·0015 in.<br>−0·0005 in. |

## GENERAL NOTES ON RIVETING.

1. RIVETS WILL BE FOUND LISTED IN A.P. 1086, PART 2, SECTION 28Q FROM WHICH THE APPROPRIATE REFERENCE NUMBERS MAY BE OBTAINED.
2. ATTENTION IS DRAWN TO THE FACT THAT L.37 RIVETS MUST BE NORMALISED.
3. WHERE BLIND RIVETS ARE AUTHORISED FOR USE ON THE OUTER SURFACE CARE MUST BE TAKEN TO ENSURE THAT THE RIVETS ARE SUITABLY SEALED.
4. CUT-COUNTERSINKING SHOULD NOT BE USED ON MATERIAL THINNER THAN 20 S.W.G. DIMPLED HOLES FORMED BY THE TOOLS ILLUSTRATED IN FIG.1. ARE RECOMMENDED FOR THESE THIN GAUGE SKINS.
5. WHERE COUNTERSUNK HEAD RIVETS ARE INSERTED IN DIMPLED HOLES THE MAXIMUM THICKNESS TO BE RIVETED MUST INCLUDE THE DEPTH OF THE DIMPLE.

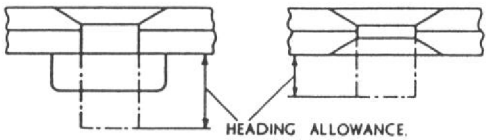



## SOLID RIVETING.

FOUR MAIN TYPES OF RIVETS TO SPECIFICATION L.37 ARE USED ON THIS AIRCRAFT. THE USE OF RIVETS TO OTHER SPECIFICATIONS IS NOT PERMITTED UNLESS OTHERWISE STATED. THESE FOUR TYPES ARE:-

A.S. 156 – SNAP HEAD.
A.S. 158 – MUSHROOM HEAD.
A.S. 161 – 90°CSK HEAD.
A.S. 164 – 120°CSK HEAD.

THE LENGTH OF RIVET REQUIRED TO SECURE ANY GIVEN THICKNESS OF MATERIAL MAY BE CALCULATED BY ADDING THE HEADING ALLOWANCE GIVEN IN THE TABLE BELOW TO THE MAXIMUM THICKNESS TO BE RIVETED WHEN CALCULATING THIS THICKNESS THE MAXIMUM GAUGE SHOWN IN THE ADJACENT TABLE SHOULD BE USED.




| RIVET DIA. | HEADING ALLOWANCE (INS.) | |
|---|---|---|
| | SNAP HEAD. | C.S.K. HEAD. |
| 1/16" | ·08 | ·05 |
| 3/32" | ·12 | ·07 |
| 1/8" | ·16 | ·09 |
| 5/32" | ·20 | ·12 |
| 3/16" | ·24 | ·14 |
| 7/32" | ·28 | ·16 |
| 1/4" | ·32 | ·19 |
| 5/16" | ·40 | ·23 |
| 3/8" | ·49 | ·28 |

RIVETS ARE CALLED UP BY PART NUMBERS WHICH CONSIST OF THE A.S. TYPE NUMBER FOLLOWED BY A STROKE NUMBER THE FIRST DIGIT OF WHICH IS THE SHANK DIA. IN THIRTY-SECONDS OF AN INCH AND THE NEXT TWO DIGITS THE LENGTH IN SIXTEENTHS OF AN INCH.
E.G. A.S. 156/405 IS A 1/8 IN. DIA. SNAP HEAD L.37 RIVET 5/16 IN. LONG

| S.W.G. | SIZE (INS) | |
|---|---|---|
| | NOMINAL. | MAXIMUM. |
| 1 | ·300 | ·314 |
| 2 | ·276 | ·290 |
| 3 | ·252 | ·266 |
| 4 | ·232 | ·246 |
| 5 | ·212 | ·226 |
| 6 | ·192 | ·206 |
| 7 | ·176 | ·188 |
| 8 | ·160 | ·172 |
| 9 | ·144 | ·156 |
| 10 | ·128 | ·138 |
| 11 | ·116 | ·126 |
| 12 | ·104 | ·114 |
| 13 | ·092 | ·102 |
| 14 | ·080 | ·088 |
| 15 | ·072 | ·080 |
| 16 | ·064 | ·072 |
| 17 | ·056 | ·064 |
| 18 | ·048 | ·056 |
| 19 | ·040 | ·046 |
| 20 | ·036 | ·042 |
| 21 | ·032 | ·038 |
| 22 | ·028 | ·034 |
| 23 | ·024 | ·028 |
| 24 | ·022 | ·026 |
| 25 | ·020 | ·024 |
| 26 | ·018 | ·022 |
| 27 | ·0164 | ·0204 |
| 28 | ·0148 | ·0188 |
| 29 | ·0136 | ·0176 |
| 30 | ·0124 | ·0164 |

FIG. 2. RIVETING.

## BLIND RIVETING.

WHERE THE USE OF BLIND RIVETING IS AUTHORISED MONEL RIVETS OF THE TUCKER TYPE TO SPEC.ⁿ D.T.D.10 OR STEEL RIVETS OF THE CHOBERT TYPE TO SPEC.ⁿ D.T.D.720 SHOULD BE USED.

### CHOBERT RIVETS.

A.G.S. 2040 - SNAP HEAD  A.G.S. 2041-C.S.K. HEAD

| MAXIMUM THICKNESS RIVETED | 1/8" DIA. | 5/32" DIA. | 3/16" DIA. |
|---|---|---|---|
| ·064" | 404 | 504 | 605 |
| ·125" | 406 | 506 | 607 |
| ·188" | 408 | 508 | 609 |
| ·250" | 410 | 510 | 611 |
| ·312" | | 512 | 613 |
| ·375" | | 514 | 615 |
| ·437" | | | 617 |
| ·500" | | | 619 |
| ·562" | | | 621 |

RIVETS ARE CALLED UP BY PART NUMBERS WHICH CONSIST OF THE A.G.S. NUMBER FOLLOWED BY THE APPROPRIATE STROKE NUMBER SHOWN IN THE TABLE ABOVE, THE FIRST DIGIT OF WHICH INDICATES THE SHANK DIA. IN THIRTY SECONDS OF AN INCH.

### TUCKER RIVETS.

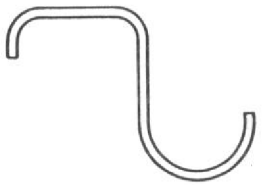
A.G.S. 2050-DOME HEAD  A.G.S. 2051 - C.S.K. HEAD.

RIVETS WITH BREAK HEAD MANDRELS SHOULD NORMALLY BE USED BUT THE USE OF THE BREAK STEM TYPE IS PERMISSIBLE IT MUST BE REMEMBERED HOWEVER THAT THE MAXIMUM THICKNESS WHICH CAN BE RIVETED BY RIVETS WITH BREAK STEM MANDRELS IS ·02"IN. LESS THAN WITH THE CORRESPONDING BREAK HEAD TYPE.

| MAXIMUM THICKNESS RIVETED. | 7/64" DIA | | 1/8" DIA | | 5/32" DIA | | 3/16" DIA | |
|---|---|---|---|---|---|---|---|---|
| | A.G.S. 2050 | A.G.S. 2051 | A.G.S. 2050 | A.G.S. 2051 | A.G.S. 2050 | A.G.S. 2051 | A.G.S. 2050 | A.G.S. 2051 |
| ·05" | | | 413 | | | | | |
| ·08" | | | | 413 | 519 | | | |
| ·09" | 319 | | 419 | | | | | |
| ·11" | | 319 | | | | 519 | | |
| ·12" | | | | 419 | | | 624 | |
| ·14" | | | 424 | | 524 | | | |
| ·15" | | | | | | | | 624 |
| ·17" | | | | 424 | | 524 | 630 | |
| ·19" | | | 429 | | | | | |
| ·20" | | | | | 530 | | | 630 |
| ·22" | | | | 429 | | | | |
| ·23" | | | | | | 530 | 636 | |
| ·25" | | | 435 | | 537 | | 639 | |
| ·26" | | | | | | | | 636 |
| ·28" | | | | 435 | | 537 | | 639 |
| ·29" | | | | | 540 | | | |
| ·30" | | | 440 | | | | | |
| ·32" | | | | | | 540 | | |
| ·33" | | | | 440 | | | | |
| ·34" | | | | | 545 | | | |
| ·36" | | | | | | | 650 | |
| ·37" | | | | | | 545 | | |
| ·39" | | | | | | | | 650 |
| ·51" | | | | | | | 665 | |
| ·54" | | | | | | | | 665 |

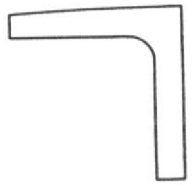
RIVETS ARE CALLED UP BY PART NUMBERS WHICH CONSIST OF THE A.G.S. NUMBER FOLLOWED BY THE APPROPRIATE STROKE NUMBER SHOWN IN THE TABLE ABOVE THE FIRST DIGIT OF WHICH INDICATES THE SHANK DIA. IN THIRTY-SECONDS OF AN INCH. THE MAX THICKNESSES RIVETED SHOWN ABOVE ARE WITH BREAK HEAD MANDRELS.

**RESTRICTED**

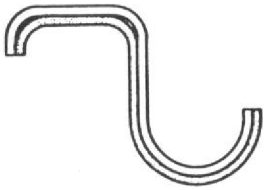


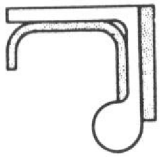
STD. 1224

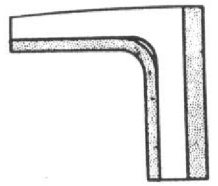
STD. 1679/1

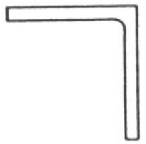


STD. 1612/2

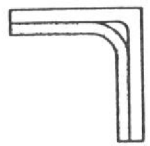








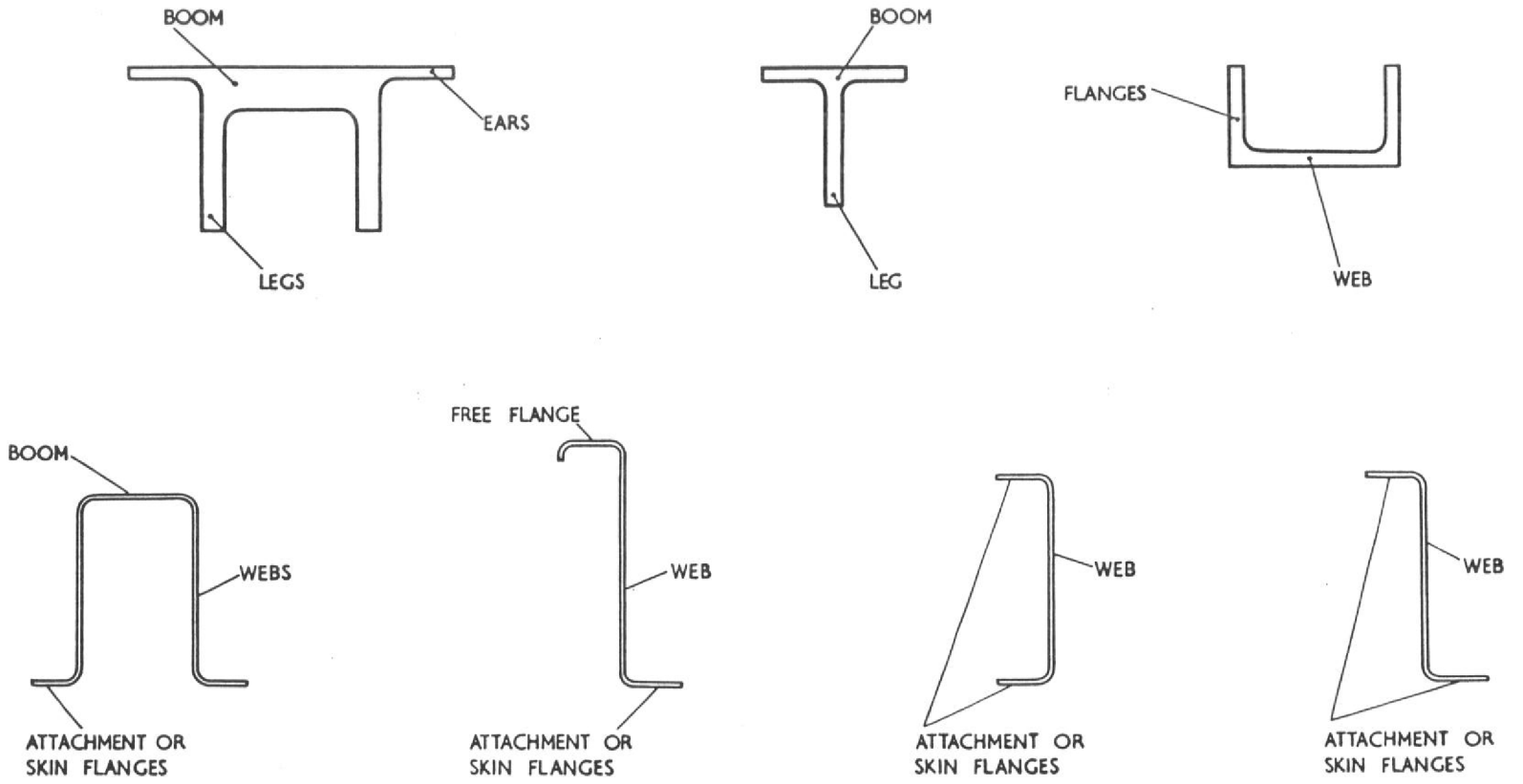
STD. 953 AND
PT. Nº D.179955-8 ITEMS 1



PT Nos C.183884-5 B.184991-2
C.188397-9 C.188401-3 & C.217236-42

| STRINGER. | REPAIR | | |
|---|---|---|---|
| | SECTION | SIZE | MATERIAL |
| STD. 1224-3-20 | R.612-20 | 20 S.W.G. | LA. SPECª L.72 |
| STD. 1679/1 | R.622. | 18 S.W.G. | LA. SPECª L.72 |
| | S.S. STRIP. | 14 S.W.G. X ·60" | S.S. SPECª S.520 |
| STD. 1612/2 | R.623-1 | 16 S.W.G. | S.S. SPECª S.520 |
| | S.S. STRIP | 12 S.W.G. X 90" | S.S. SPECª S.520 |
| STD. 953 | R.623-3 | 16 S.W.G. | S.S. SPECª S.520 |
| PT. Nº D.179955-8 ITEMS 1 | R.623-2 | 14 S.W.G. | S.S. SPECª S.520 |
| PT Nos C.183884-5 C.188397-9 C.188401-3 & C.217236-42. | R.624-1 | 20 S.W.G. | L.A. SPECª L.72 |
| PT Nos B.184991-2 & B.227183-4. | R.624-2 | 20 S.W.G. | L.A. SPECª L.72 |

FIG. 3. REPAIR STRINGER SECTIONS




THESE DIAGRAMS ARE DEVISED TO STANDARDISE THE TERMS OF REFERENCE USED THROUGHOUT THE REPAIR OF THE AIRCRAFT THUS MINIMISING THE RISK OF ANY MISUNDERSTANDING DUE TO THE USE OF VAGUE OR UNFAMILIAR TERMS

FIG. 4. TERMS OF REFERENCE