

**KITFOX AIRCRAFT**

**SUPER SPORT**

**CHAPTER IV**

**HORIZONTAL TAIL ASSEMBLY**

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EXAMPLE

CHAPTER IV. HORIZONTAL TAIL ASSEMBLY

Section A. Introduction

In this chapter you will construct your horizontal stabilizer and elevator, and install them in the fuselage.

The tail of the Kitfox is fully airfoiled by shaped wooden ribs that are bonded into the welded tube structure. Stiffeners are used on some of the ribs to increase their resistance to deflection. End caps are employed to give the surfaces a smoothly rounded and finished tip.

Pitch trim is handled by pivoting the horizontal stabilizer about its trailing edge with a pilot controlled trim system. This provides the ability to trim the aircraft throughout its entire operating envelope.

Section B. Horizontal Tail Assembly

Prepare the horizontal stabilizer and elevator weldments by performing the following reams. For the difficult reams that are close to other weldments, you will find that using a vise grip or similar tool to turn the ream is the best technique.

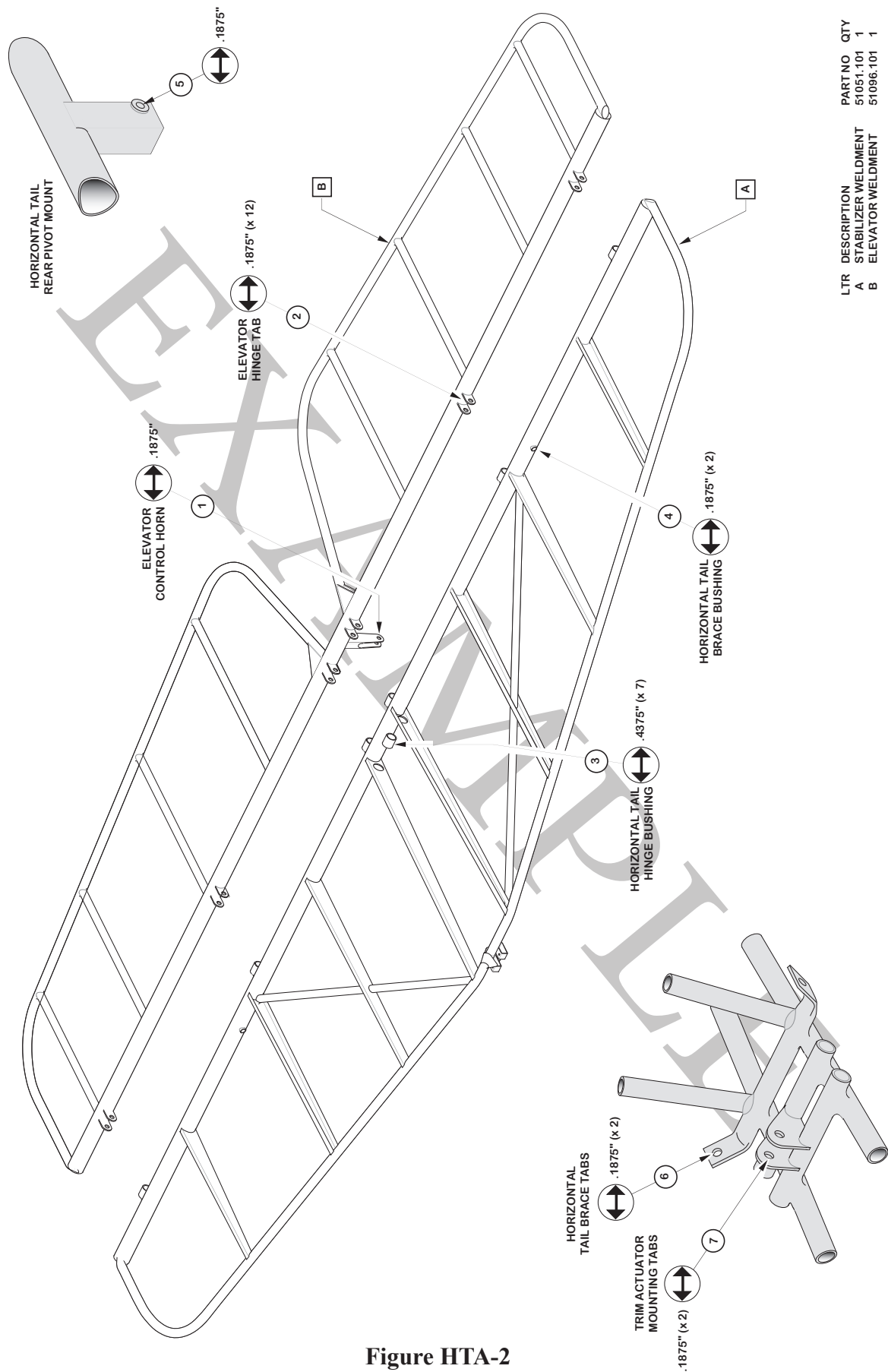
- 1. Ream the tabs in the elevator control horn to .1875".
- 2. Ream all six pairs of elevator hinge tabs to .1875".
- 3. Ream the horizontal tail hinge bushings to .4375" at all seven locations.
- 4. Ream the horizontal tail brace bushings, both left and right, to .1875".

The following reams are all performed on the fuselage.

- 5. Ream the horizontal tail rear pivot mount to .1875".
- 6. Ream the horizontal tail brace tabs to .1875".
- 7. Ream the trim actuator mounting tabs to .1875".

Completion Date

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| LTR | DESCRIPTION         | PART NO   | QTY |
|-----|---------------------|-----------|-----|
| A   | STABILIZER WELDMENT | 51051.101 | 1   |
| B   | ELEVATOR WELDMENT   | 51096.101 | 1   |

Figure HTA-2  
Horizontal Tail Weldment Preparation

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NOTE

During the installation of the airfoil ribs, keep in mind that the layout dimensions are +/- 1/8" tolerance. In particular, the P/N -308 ribs in the horizontal stabilizer can be moved outboard as required to position them against the metal ribs. This will require slight extra trimming of the ribs to make them fit. It is a good idea to align the elevator ribs with the stabilizer ribs. This will help to keep your finish tapes aligned when covering.

8. Trim the ribs for the elevator so that they fit in the locations shown. Ribs that fit over the welded structure are slit to allow the rib to be twisted over the tube, (see Detail "A". When the ribs fit properly, prep them for bonding by sanding the bonding areas with 220 grit sandpaper. Prep the tubes for bonding by cleaning the surfaces with solvent, followed by a scotch brite roughening, and a second solvent wipe.

9. When the ribs are properly fitted to their layout locations and prepped, bond the ribs in place with a adhesive/flox mixture.

**TIP:** Use a touch of modelers glue and a quick dry accelerator to hold the ribs in place while bonding.

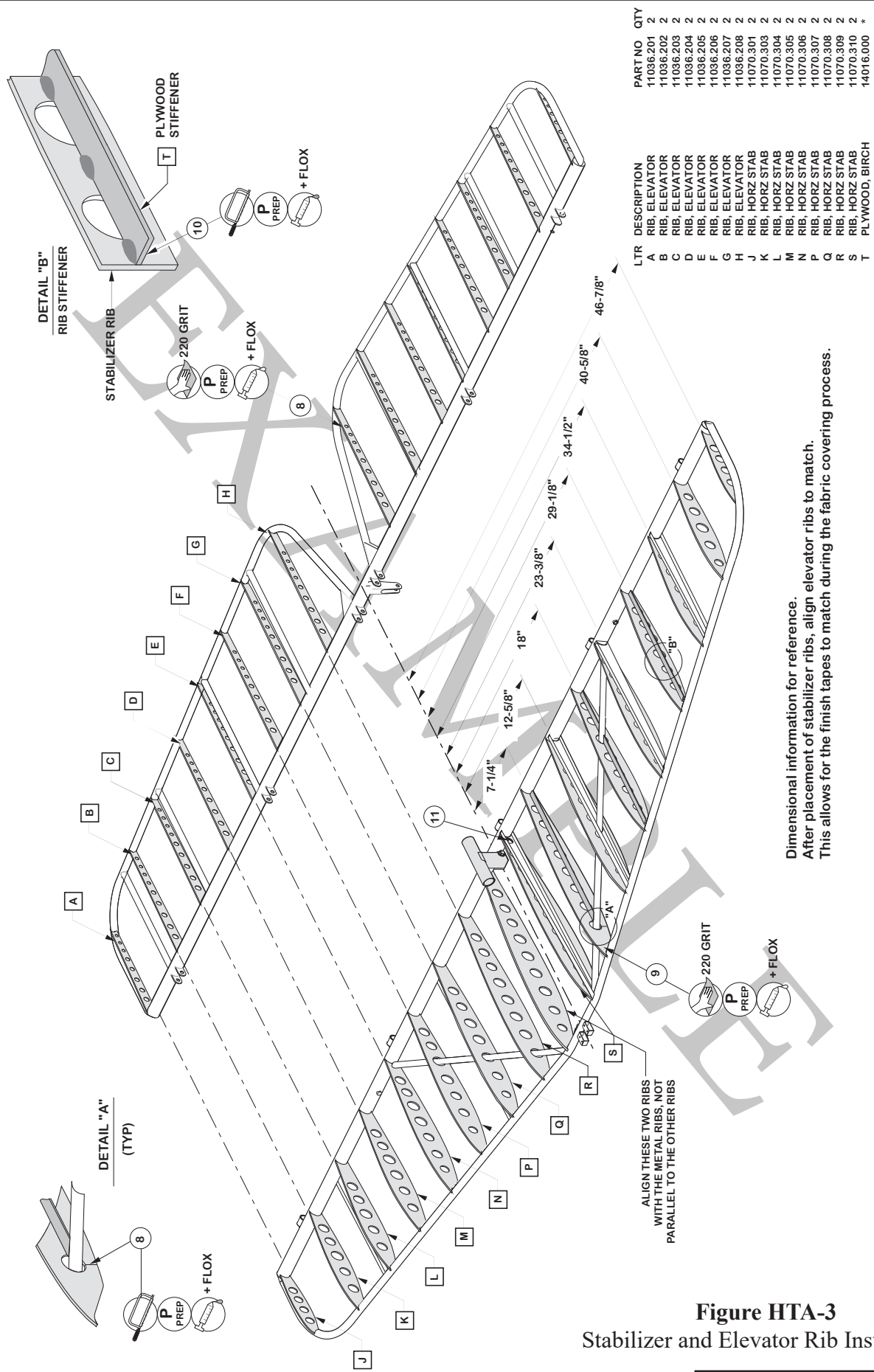
10. Cut rib stiffeners as needed for the ribs. Remember the stiffeners are only to keep the ribs from bowing and only need to be installed on ribs you feel need the support. Prep the stiffeners and ribs for bonding by sanding them with 220 grit sandpaper, and then bond the stiffeners to the ribs with a mixture of adhesive and flox. Clean up any adhesive that oozes out to save weight, and clamp the parts until the adhesive has cured.

11. On the aft ends of the center two metal ribs of the horizontal stabilizer you will find two holes approximately 9/16" in diameter. These holes allow for the proper reaming of the stabilizer hinge bushing, and for the removal and replacement of the stabilizer pivot bearing. Match drill the two -310 ribs installed adjacent to the metal ribs with a 1/2" drill and finish the holes with a round file.

12. All wood should be varnished with an Epoxy Varnish. Poly Fiber EV-400 Epoxy Varnish and EV-410 Epoxy Varnish Catalist is recommended.

Completion Date

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| LTR | DESCRIPTION    | PART NO   | QTY |
|-----|----------------|-----------|-----|
| A   | RIB, ELEVATOR  | 11036.201 | 2   |
| B   | RIB, ELEVATOR  | 11036.202 | 2   |
| C   | RIB, ELEVATOR  | 11036.203 | 2   |
| D   | RIB, ELEVATOR  | 11036.204 | 2   |
| E   | RIB, ELEVATOR  | 11036.205 | 2   |
| F   | RIB, ELEVATOR  | 11036.206 | 2   |
| G   | RIB, ELEVATOR  | 11036.207 | 2   |
| H   | RIB, ELEVATOR  | 11036.208 | 2   |
| J   | RIB, HORZ STAB | 11070.301 | 2   |
| K   | RIB, HORZ STAB | 11070.303 | 2   |
| L   | RIB, HORZ STAB | 11070.304 | 2   |
| M   | RIB, HORZ STAB | 11070.305 | 2   |
| N   | RIB, HORZ STAB | 11070.306 | 2   |
| P   | RIB, HORZ STAB | 11070.307 | 2   |
| Q   | RIB, HORZ STAB | 11070.308 | 2   |
| R   | RIB, HORZ STAB | 11070.309 | 2   |
| S   | RIB, HORZ STAB | 11070.310 | 2   |
| T   | PLYWOOD, BIRCH | 14016.000 | *   |

Dimensional information for reference.  
After placement of stabilizer ribs, align elevator ribs to match.  
This allows for the finish tapes to match during the fabric covering process.

Figure HTA-3  
Stabilizer and Elevator Rib Installation

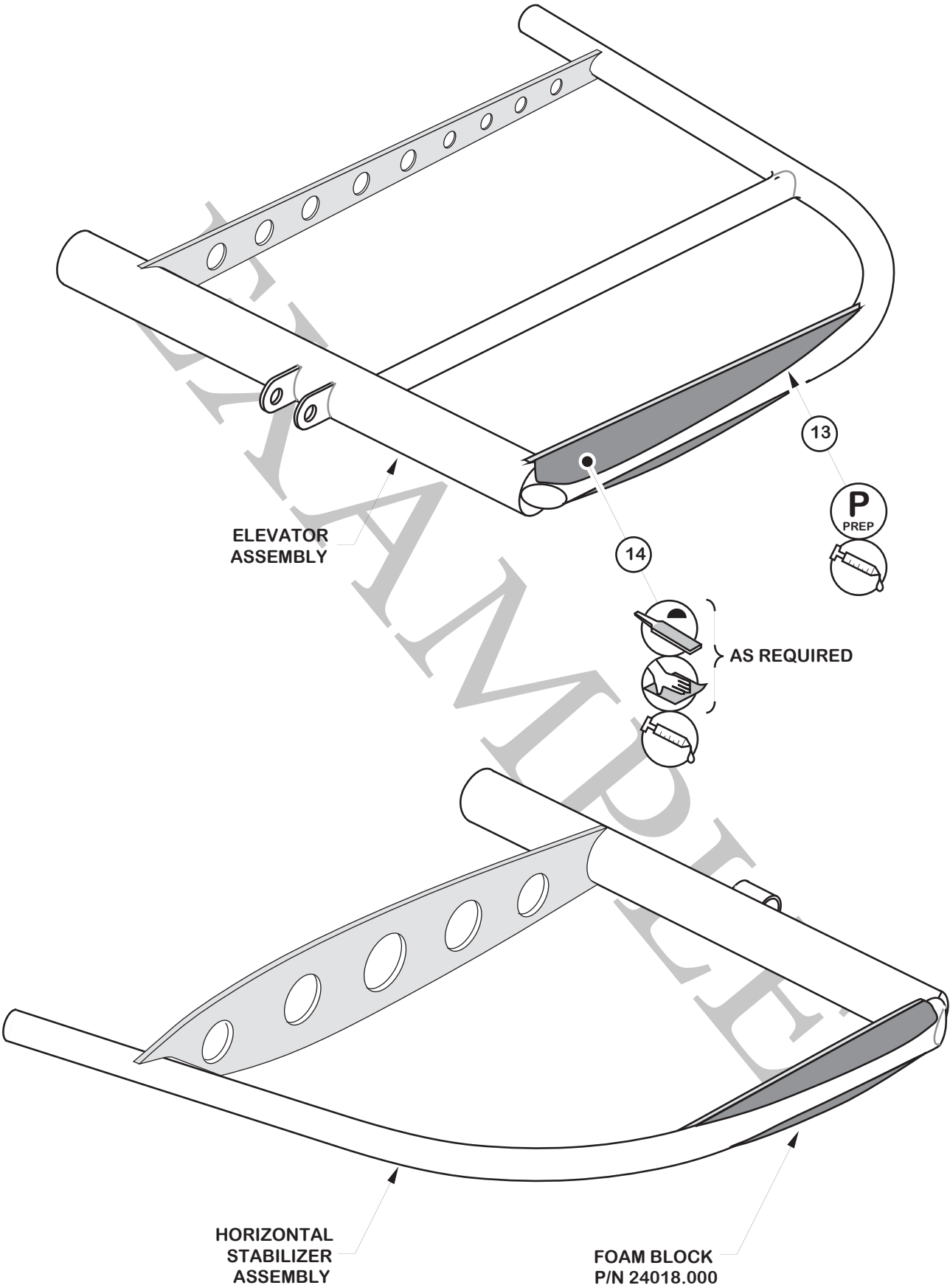
13. Cut and shape the foam blocks for the horizontal and elevator end caps to fit the tubing. Bond the pieces in and let the adhesive cure. Balsa wood blocks (not supplied) may be used in place of the foam.
14. Shape the end caps for a pleasing contour with the surrounding tail surfaces, using sandpaper and a file. When you are satisfied with the final shape of the end caps, coat the exposed surfaces of the foam or balsa with a thin layer of structural adhesive.

Completion Date

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EXAMPLE

|       |         |                                     |                                  |      |      |
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**Figure HTA-5**  
Foam End Cap Installation

Section C. Horizontal Tail Installation

- 15. Press the bearings into the elevator hinge mounting bushings, six places.
- 16. Press the bearing into the aft center elevator hinge.
- 17. Attach the stabilizer to the fuselage using the hardware shown in detail “A”.

NOTE

The P/N 11500.000 bushing can vary in outside diameter by as much as .0025". If the bushing will not slide into the pressed bearing, sand down the outside of the bushing with 220 grit sandpaper initially; then finish the surface with 400 grit. Chucking the bushing into a drill motor or drill press can speed the process.

- 18. Attach the braces to the fuselage with the hardware shown in detail “B”.
- 19. Attach the left and right stabilizer braces to the stabilizer using the rod ends and hardware shown in detail “C”. Start by assembling the left hand brace and rod end onto the fuselage and horizontal tail first, and then adjust the length of the right side brace so that it slips into place without any bending of the horizontal tail. Refer to paragraph 26 of this section for the final rigging and adjustment of the horizontal tail.
- 20. *Reserved.*

Completion Date

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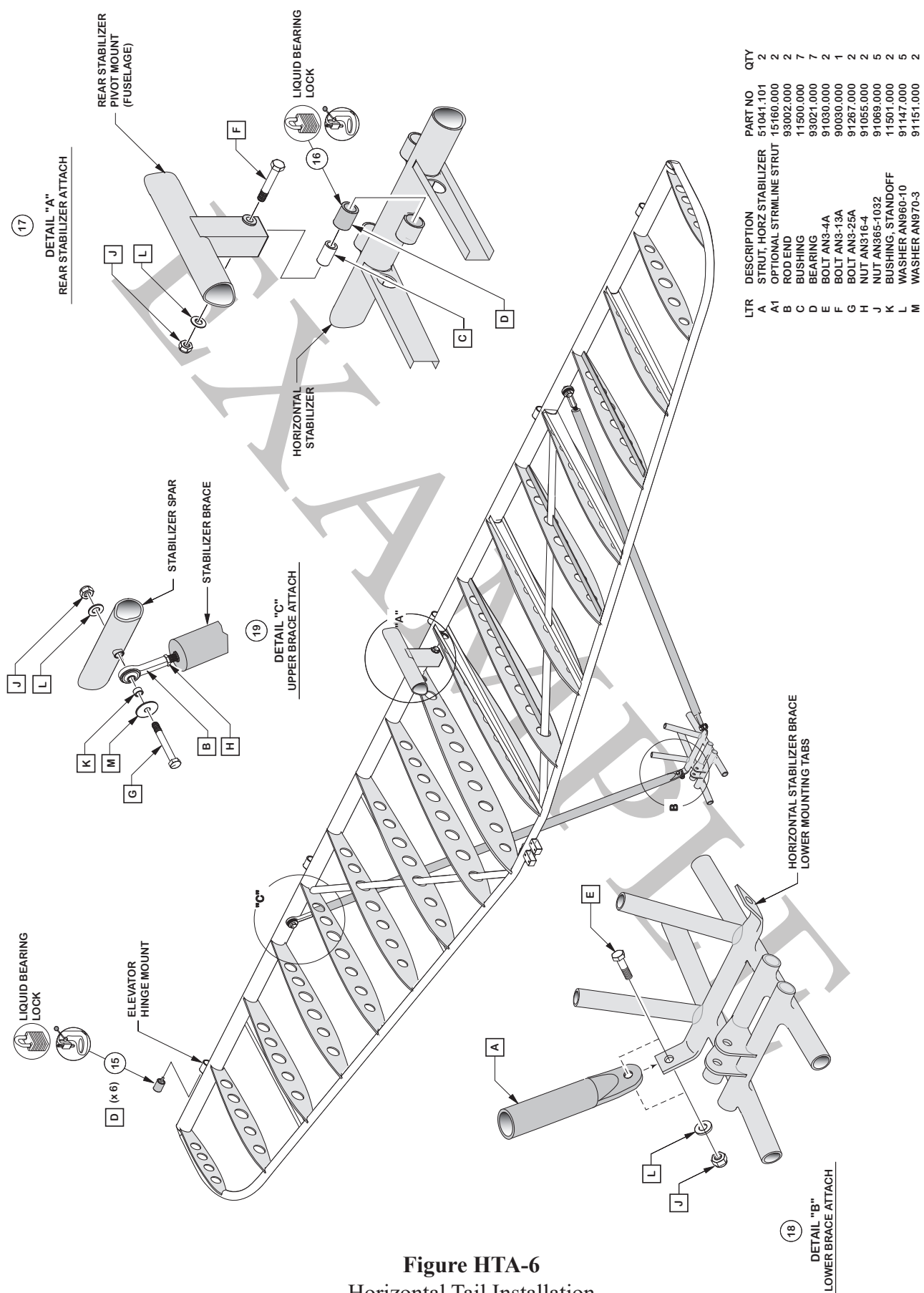


Figure HTA-6  
Horizontal Tail Installation

- 21. Drill four #34 holes at the locations shown in the TOP FACE ONLY of the stabilizer slider block brackets, and deburr the holes.
- 22. Fabricate two slider blocks out of the material provided.
- 23. Position the slider blocks in the slider block brackets so that the distance between each bracket and the square vertical slider tube on the fuselage are equal. With the slider blocks snug against the fuselage tube, back drill though the holes in the brackets, through the blocks and the bottom flanges of the brackets. Cleco as you go to keep the blocks up against the tube. Remove the blocks and deburr the holes.
- 24. Assemble the slider blocks with the hardware shown.
- 25. *Reserved.*

Completion Date

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EXAMPLE

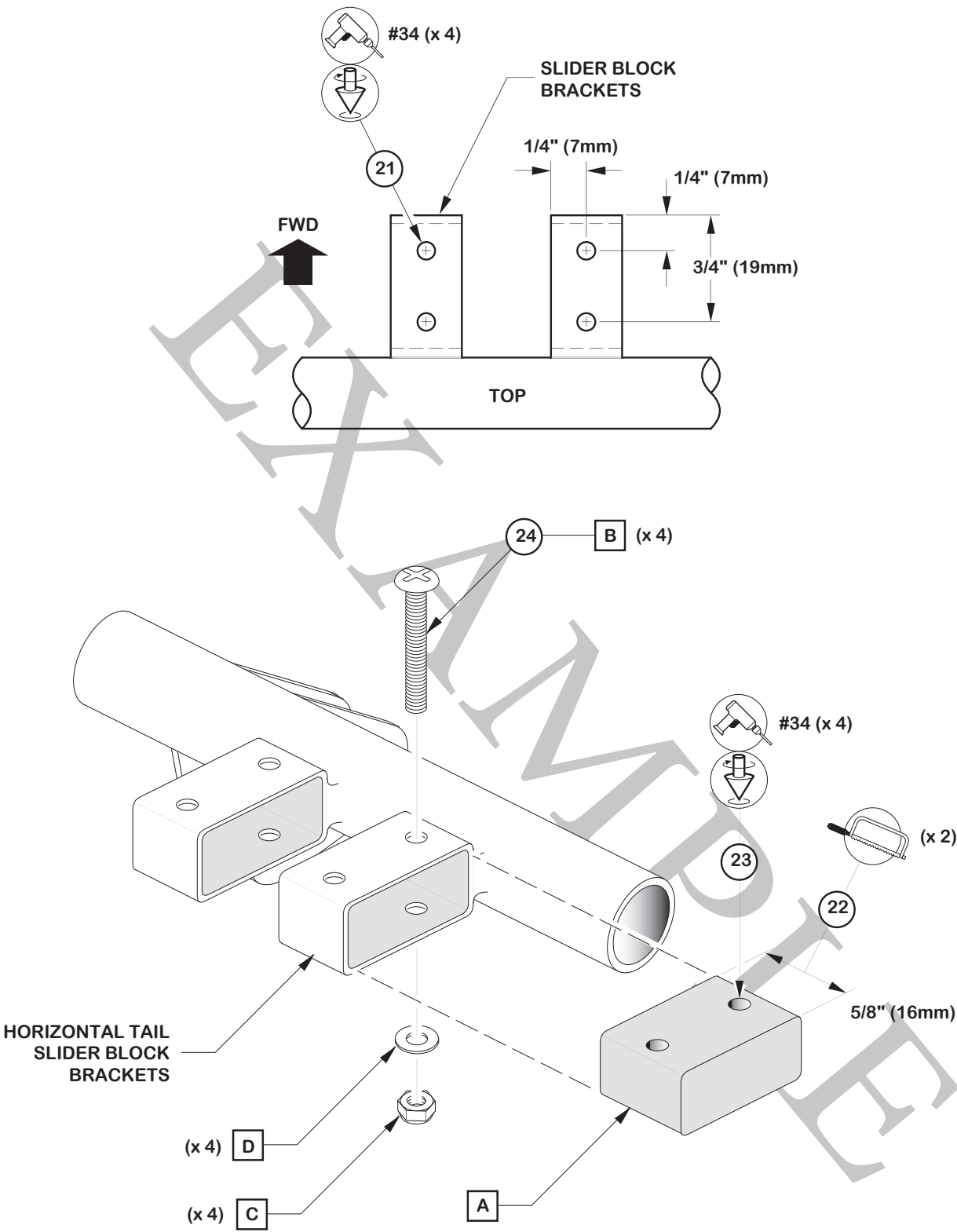


Figure HTA-7  
Slider Block Installation

| LTR | DESCRIPTION           | PART NO   | QTY |
|-----|-----------------------|-----------|-----|
| A   | SLIDER BLOCK MATERIAL | 14017.000 | 1   |
| B   | SCREW, AN526-440R12   | 91270.000 | 4   |
| C   | NUT, AN365-440        | 91159.000 | 4   |
| D   | WASHER, AN960-4       | 91269.000 | 4   |

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| MODEL | CHAPTER | SECTION                                 |
|-------|---------|-----------------------------------------|
| SS    |         | Section C. Horizontal Tail Installation |

26. The horizontal tail should be installed so that it is perpendicular with the vertical tail of the aircraft. To properly adjust the position of the horizontal tail, disconnect the rod end from the right side of the stabilizer trailing edge. Measure from the outboard tip of each side of the horizontal stabilizer to the uppermost tip of the vertical tail. Adjust the length of the left hand stabilizer brace so that the two distances to the tip of the vertical tail are equal. When the stabilizer is in its proper position, tighten the check nut on the left hand brace. Adjust the length of the right hand brace so that the rod end and its bolt slip into the bushing on the stabilizer without any force. Tighten the check nut on the right hand brace when finished.

NOTE

It may be helpful to secure the horizontal stabilizer to the fuselage while the stabilizer is being adjusted. This can be accomplished by placing a clamp on the square vertical slider tube on the fuselage to prevent the horizontal tail from sliding down. Position the clamp so that the stabilizer is parallel to fuselage tube running fore and aft above the stabilizer.

27. Install the elevator assembly on to the stabilizer with the hardware shown in detail “A”.

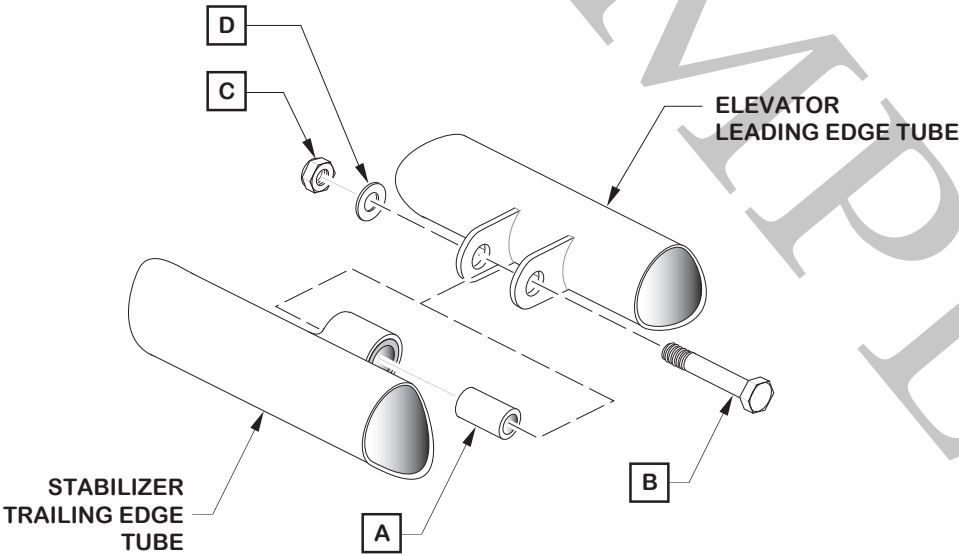
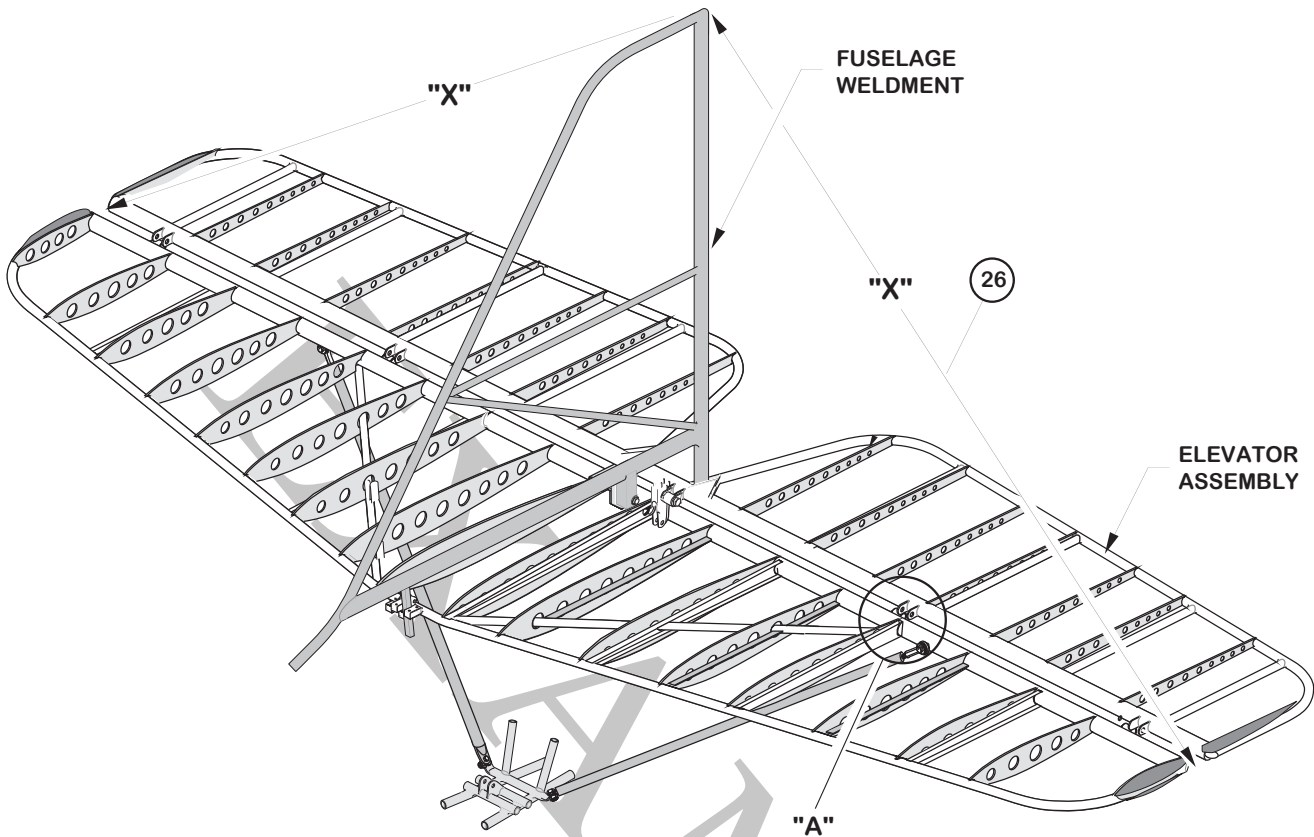
NOTE

The P/N 11500.000 bushing can vary in outside diameter by as much as .0025". If the bushing will not slide into the pressed bearing, sand down the outside of the bushing with 220 grit sandpaper initially; then finish the surface with 400 grit. Chucking the bushing into a drill motor or drill press can speed the process.

28.-29. *Reserved.*

Completion Date

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27  
**DETAIL "A"**  
ELEVATOR HINGE INSTALLATION

| LTR | DESCRIPTION      | PART NO   | QTY |
|-----|------------------|-----------|-----|
| A   | BUSHING          | 11500.000 | 6   |
| B   | BOLT, AN3-12A    | 91041.000 | 6   |
| C   | NUT, AN365-1032  | 91069.000 | 6   |
| D   | WASHER, AN960-10 | 91147.000 | 6   |

**Figure HTA-8**  
Horizontal Tail Rigging and Elevator Installation