

## Assembly Instructions for V-1 (FI-103 A-1) flying bomb

### History

The V-1 flying bomb had its origins at the beginning of the Second World War with a German air force concept for a remotely controlled pilotless bomber. This idea proved too ambitious, but a simplified version – a small pilotless aircraft with an explosive warhead – was developed. The airframe was designed by Fieseler Aircraft, and was given the designation FI-103.

The engine was a unique and simple device known as a pulse jet, which could propel the bomb at high speeds using low-grade gasoline. The flying bomb was gyroscope-stabilized, and was guided by magnetic compass, the distance travelled being measured using an air log windmill in the nose. It was launched from a catapult in the direction of the target, and when the pre-set distance was reached, dove steeply to the ground, detonating its one-ton warhead. The FI-103 was named for propaganda purposes V-1 (*Vergeltungswaffe-ein*, or vengeance weapon one), and plans were made to launch many thousands of these inexpensive weapons at the city of London. Due to development problems and allied air raids on the factories and launching sites the flying bomb attacks did not begin until mid-1944 and never reached the planned intensity, but even with reduced numbers the bombs caused a great deal of destruction in London and southeastern England, and later in Belgium. The growl of the pulse jet, followed by the chilling silence as the engine stopped and the bomb fell to earth, was a nerve-racking experience. To the troops and civilians subjected to this bombardment the V-1s were known as “doodlebugs” or “buzz bombs”, and large numbers of fighter planes, barrage balloons, and anti-aircraft guns were employed to try to stop the stream of flying bombs droning across the English Channel. The V-1, like its larger counterpart the V-2 rocket, was not accurate enough to hit any target smaller than a city, and though it caused much disruption it had little effect on the course of the war. Nevertheless, the Americans were so impressed with the design that they began making their own copies of the weapon, and the concept of the pilotless flying bomb can still be seen today in the modern cruise missile.

### The Model

This model builds into an accurate and detailed 1/32 scale replica of the V-1 with a length of over ten inches and a wing span of over six inches. A word of caution: this is not suitable for assembly by young children, due to the use of sharp tools and the complexity of some assembly steps. It is recommended for those with some previous experience in card modeling. If you have any comments or suggestions regarding this kit, I can be reached by e-mail at [models@currell.net](mailto:models@currell.net)

This document contains the instructions only. Model parts are contained in two separate documents, [v1parts.pdf](#) and [v1b\\_back.pdf](#).

Print out the part document [v1parts.pdf](#) on 8.5"x11" or A4 size white card stock suitable to your printer. Print document [v1b\\_back.pdf](#) onto the reverse side of parts sheet **B** (this is to colour the visible inside of the engine exhaust, which would otherwise be the colour of the blank paper).

### Tools

Before beginning, you will need the following tools and materials:

- a) white glue
- b) a glue applicator such as wooden toothpicks or a small paintbrush
- c) scissors
- d) a sharp knife for cutting
- e) a flat cutting surface
- f) a ruler or straight edge
- g) a scoring tool or blunt knife for creasing the fold lines.

### Hints

- a) Select a well-lit, comfortable work area that will remain undisturbed when you are not there.
- b) Keep your hands and tools clean when working, to avoid getting glue on visible parts of the model.
- c) It's easier to stay organized if you only cut out those parts you need for each step.
- d) Make sure your knife is sharp. When cutting straight lines, use a straight-edge. Scissors, if used carefully, can be used for large curved parts.
- e) Study the diagrams carefully, and always test-fit the parts before applying glue.
- f) You may wish to colour the edges of the parts to make seams less visible. Pencil crayon or paint applied with a fine brush can be used (experiment on scrap pieces to see what works best).

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## Assembly

Scoring of parts is usually indicated by thin black lines outside the part's outline. Score parts *before* cutting them out. In the diagrams, subassemblies are identified by a number within a circle (e.g. ②), corresponding to the step in which it was assembled.

Assemble the fuselage sections (**steps 1–3**). The fuselage is made up of eight assemblies. These assemblies comprise an outer surface segment (the “skin” of the rocket), a connecting strip and (except for the nose and tail segments) a circular former to provide strength and maintain the segment's shape. To construct a typical assembly, carefully cut out the parts and glue the connecting strip to the inside of the surface segment. These strips have a thin line along the centre, which must be lined up with the respective edges of the surface segment (see the diagrams). The segment is then rolled so the edges butt together and are held by the connecting strip. Once dry, the former ring is glued inside the assembly, as close to the narrow end as necessary to obtain a snug fit.

Shape and glue the windmill assembly halves A9 (**step 4**). The rear edges of the completed assembly should be curved to form a circle.

Fold and shape the connector recess A15 (**step 5**). This part will be added to the inside of the fuselage section A7 in step 7.

Join all fuselage sections except for the tail (**steps 6,7**). Ensure that the triangular cutouts in the centre section are toward the front, and that the bottom seams of all sections line up. Note that the camouflage on the section just forward of the centre section will not exactly match the other sections. This is intentional; the warhead of the real V-1 was manufactured and stored separately from the rest of the airframe, so the paint patterns rarely matched exactly. Ensure the recess A15 (assembled in step 5) is glued to the inside surface of part A7 before that section is joined to the others.

Add fuselage details (**step 8**). First, form the fuse cover A10, fold and glue the fuel cap A13 and lifting lug A14, and roll connector sleeves A12a and A12b into a half-cylinder shape. Attach parts as shown to match guidelines printed on fuselage.

Assemble the intake assembly (**step 9**). Ensure the centre vertical line on the grille A17 lines up with the seam of the duct B11. This assembly forms the internal structure of the front engine section B5. The shape of this section is complex, and is created by bending a number of “leaves” and gluing them together (**step 10**). First, attach the connecting strip C21, then bend the leaves to the approximate shape using the template on sheet B. Place the intake assembly on a flat surface with spacer C23 (a temporary part to maintain the spacing between the base of the inner assembly and the outer surface). Starting from one end of B5, attach the end of each leaf to the upper surface of the intake duct (glue to the segment markings printed on the duct), at the same time gluing the leaf edge to the edge of the previous leaf. This procedure will be time-consuming, so do not rush. Ensure the each leaf has dried in place before attaching the next, and that it lines up precisely with the markings inside the duct. The last leaf is abutted to the first leaf, at the same time gluing the connecting strip to butt the edges of part B5 together. Spacer C23 can now be discarded. Glue the fuel pipe halves together (**step 11**), and insert into the intake. This pipe should be vertical (i.e. lined up with the housing and duct seams).

Assemble the remaining engine sections (**step 12**) and glue together, ensuring the bottom seams line up.

Assemble the engine pylon (**step 13**). The pitot tube (attached to the shaping plate A16) protrudes through the hole in the front of the pylon surface B14. Glue the pylon assembly to the top of the fuselage (line up with guidelines).

When putting together the internal wing structure (**step 14**), ensure that the airfoil formers are placed in the proper sequence. The former with triangle and slot cutouts abuts the fuselage. The former with triangular cutout only is placed in the centre, and the remaining former (no cutouts) goes at the wingtip end. Assemble the left wing structure on a flat surface to avoid warping. Glue this structure to the wing surface B9 (**step 15**) and wrap the skin over it so that the trailing edges meet (again, this should be done on a flat surface). Fold together the three leaves at the wingtip to form a rounded edge. The right wing is assembled as a mirror image of the left (**step 16**).

Fold and glue the main and trailing edge wing spars (**step 17**). Slide them through the openings in the fuselage (**step 18**) so that they are about the same length on either side, and glue into place. Slide the wings over the spars to abut the fuselage (**step 19**). The wings have no dihedral angle; they should be at right angles to the fuselage sides.

Assemble the horizontal stabilizer (**step 20**). The procedure is similar to that of the main wings. The internal structure is glued to the covering so that rear struts A34 are flush with the edges of the covering, and the trailing edges of formers A30 protrude from the back end. The wingtip leaves are bent together to form a rounded edge. These leaves should line up with the outer formers.

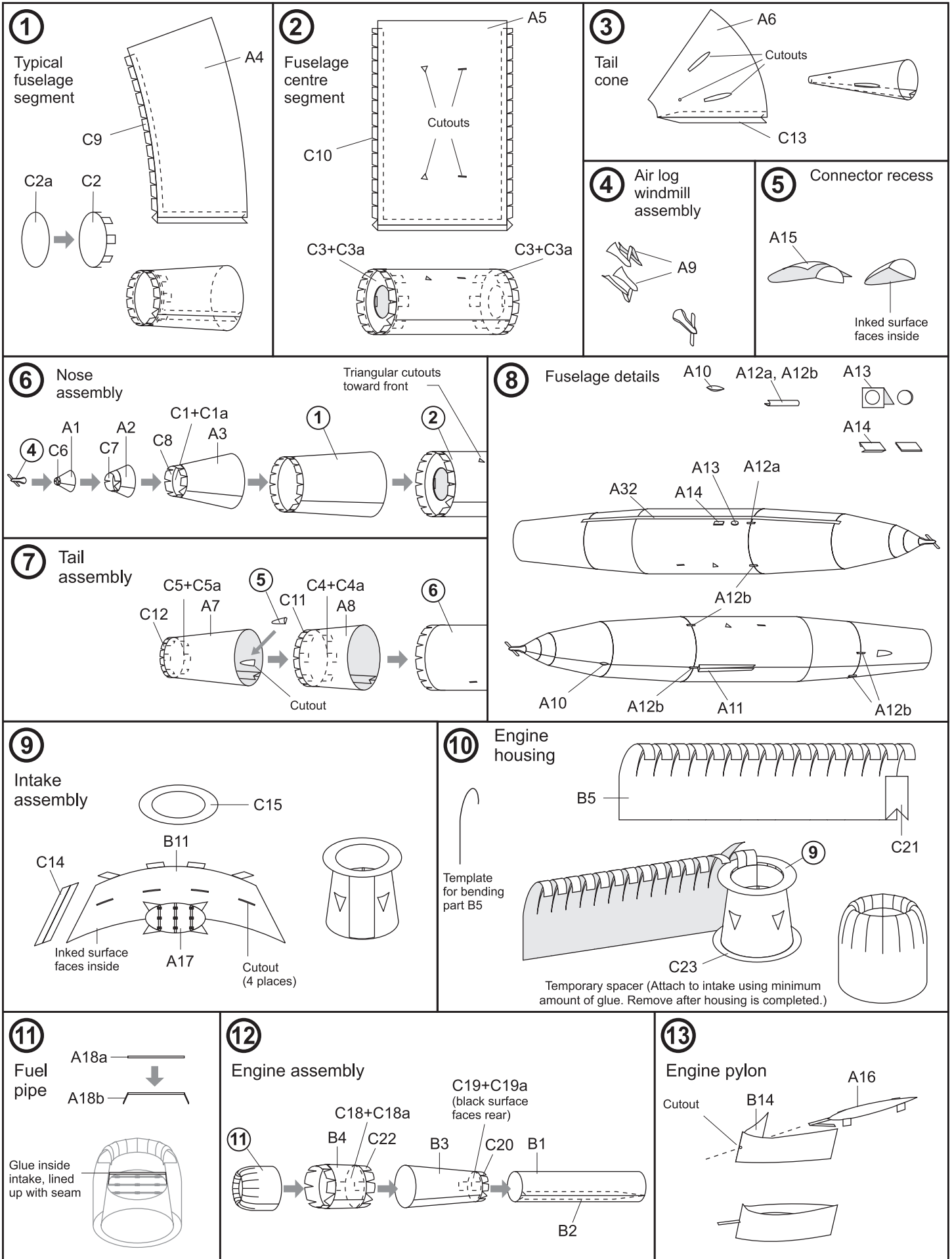
Assemble the vertical stabilizer (**step 21**) in a similar manner to the horizontal stabilizer. Fold the engine bracket A24 and glue into the slot on the top of the stabilizer.

Fold and glue the elevators and rudder (**steps 22, 23**). The outer edges of each part are given two successive folds to create a thick leading edge, then the edges are folded together to form the completed part. Glue the end plates A25 and A31 as shown.

The engine and tailplane are assembled in **step 24**. First, carefully slide the horizontal stabilizer from step 20 through the slots in the tail section (from step 3) until it is centred. Then join the tail section to the fuselage, ensuring the horizontal stabilizer is parallel to the main wings. Glue the elevators from step 22 to the back edges of the horizontal stabilizer. Glue the engine pylon from step 13 and the vertical stabilizer from step 21 to the top of the fuselage as indicated by the printed guidelines. Ensure these parts are vertical, and are at right angles to the wings. Glue the rudder from step 23 to the back edge of the vertical stabilizer. Glue the engine to the engine pylon and to the bracket on top of the vertical stabilizer, so that the front of the engine just meets the upper front edge of the pylon.

Fold the rudder actuator (**step 25**). Slide the narrow end into the hole in the right rear of the fuselage and glue the other end to the rudder as indicated by the printed guidelines.

Finally, fold and assemble the display stand (**step 26**).



**14** Left wing structure

**15** Left wing surface

**16** Right wing

A26R, A27R, A28R,  
B15(2 pcs), B16(2 pcs),  
B10

Right wing is assembled as a mirror image of the left wing.

**17** Wing spars

**18** Wing spar insertion

**19** Wing attachment

**20** Horizontal stabilizer

**21** Vertical stabilizer

A22 (inked surface faces up)

Cutout (2 places)

A24

A19

A20

A23 (inked surface faces down)

B13

**22** Elevators (2 pieces)

**23** Rudder

**24** Engine, control surface assembly

Alignment of engine to front pylon (side view)

**25** Rudder actuator

**26** Display stand