

GERMAN V-2

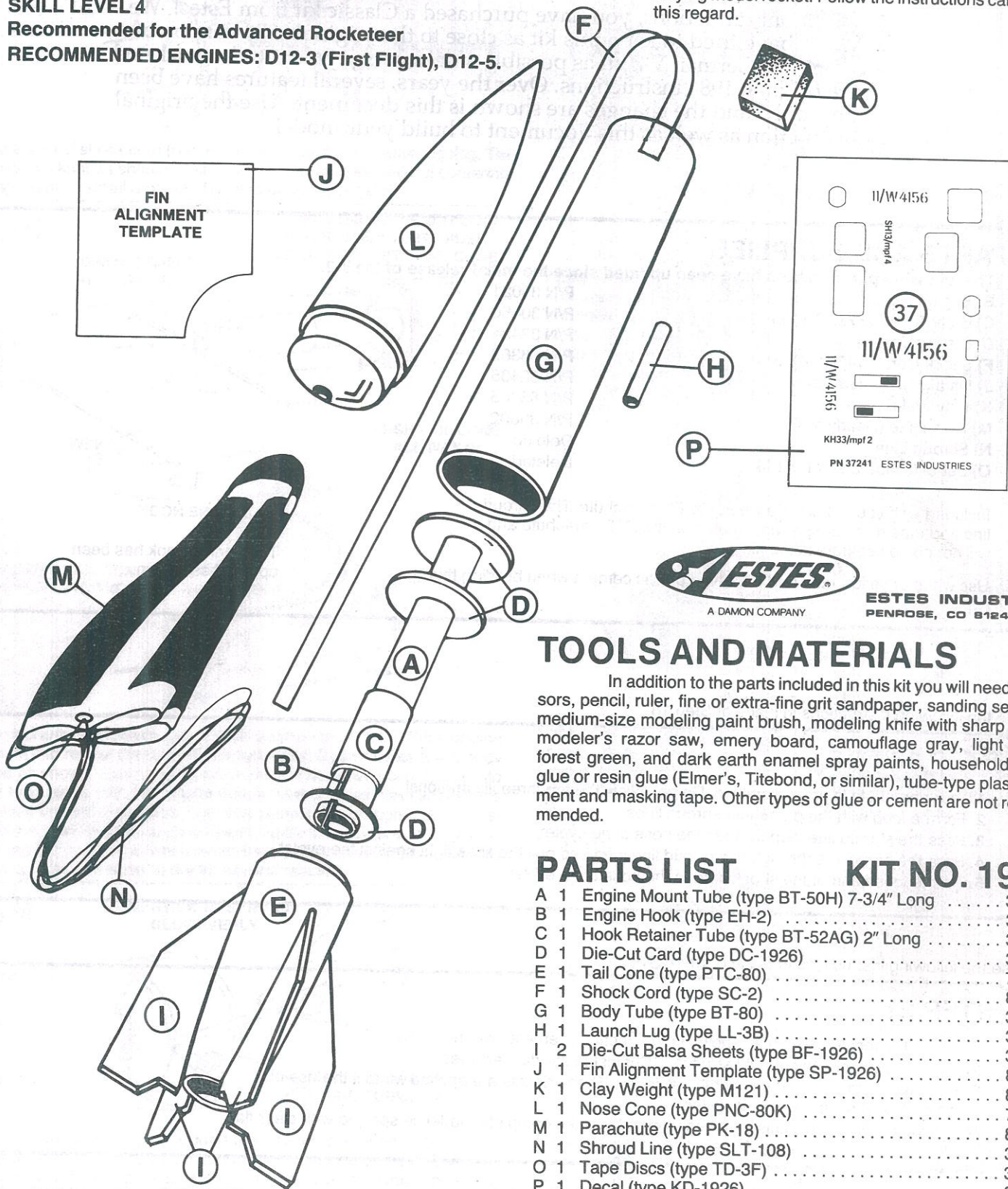
SKILL LEVEL 4

Recommended for the Advanced Rocketeer

RECOMMENDED ENGINES: D12-3 (First Flight), D12-5.

BEFORE YOU START

Read each step and study the accompanying drawings before doing any of the work called for in that step. Make sure you have all parts and materials. Check off each step as you complete it. Always test-fit parts together before applying glue. It will sometimes be necessary to sand edges of rings, tubes, etc. to obtain proper fit. If you are in doubt about the relative size or location of some parts, refer back to this exploded view drawing for clarification. Adequate glue joints are very important for a flying model rocket. Follow the instructions carefully in this regard.



ESTES INDUSTRIES
PENROSE, CO 81240 USA

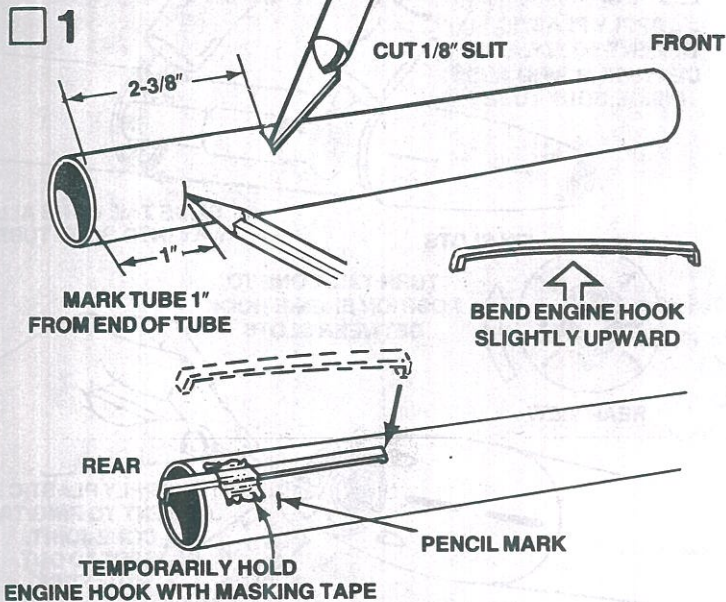
TOOLS AND MATERIALS

In addition to the parts included in this kit you will need: Scissors, pencil, ruler, fine or extra-fine grit sandpaper, sanding sealer, a medium-size modeling paint brush, modeling knife with sharp blade, modeler's razor saw, emery board, camouflage gray, light earth, forest green, and dark earth enamel spray paints, household white glue or resin glue (Elmer's, Titebond, or similar), tube-type plastic cement and masking tape. Other types of glue or cement are not recommended.

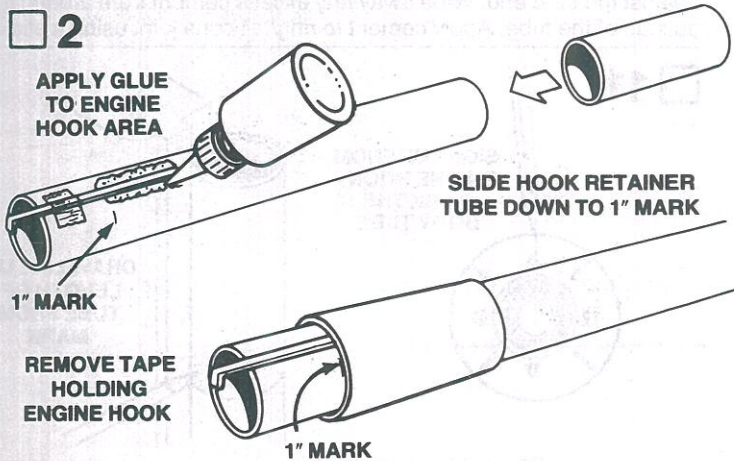
PARTS LIST KIT NO. 1904

| | | | |
|---|---|---|-------|
| A | 1 | Engine Mount Tube (type BT-50H) 7-3/4" Long | 30360 |
| B | 1 | Engine Hook (type EH-2) | 35025 |
| C | 1 | Hook Retainer Tube (type BT-52AG) 2" Long | 30378 |
| D | 1 | Die-Cut Card (type DC-1926) | 32441 |
| E | 1 | Tail Cone (type PTC-80) | 71033 |
| F | 1 | Shock Cord (type SC-2) | 85736 |
| G | 1 | Body Tube (type BT-80) | 30432 |
| H | 1 | Launch Lug (type LL-3B) | 38166 |
| I | 2 | Die-Cut Balsa Sheets (type BF-1926) | 32626 |
| J | 1 | Fin Alignment Template (type SP-1926) | 83698 |
| K | 1 | Clay Weight (type M121) | 85264 |
| L | 1 | Nose Cone (type PNC-80K) | 71035 |
| M | 1 | Parachute (type PK-18) | 85566 |
| N | 1 | Shroud Line (type SLT-108) | 38239 |
| O | 1 | Tape Discs (type TD-3F) | 38406 |
| P | 1 | Decal (type KD-1926) | 37241 |

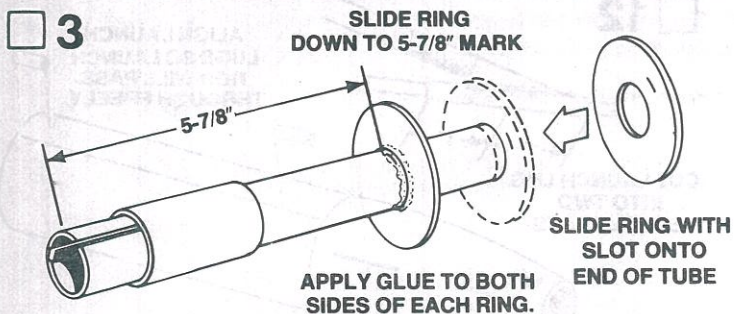
ASSEMBLY INSTRUCTIONS



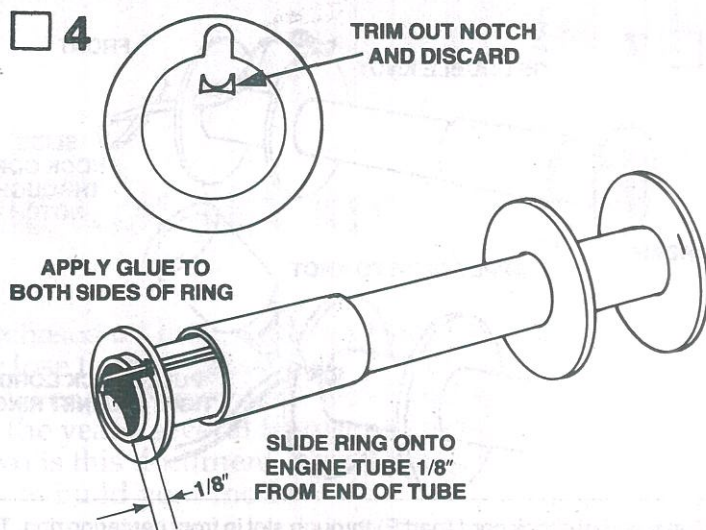
Mark the engine mount tube (part A) at 1" and 2-3/8" from one end. Cut a 1/8" long slit at the 2-3/8" mark. Gently bend the engine hook (part B) so that it bows upward very slightly in the middle. (Study the drawing. Don't bend the wrong way.) Insert one end of the engine hook into the slit in the tube. Temporarily tape engine hook in place.



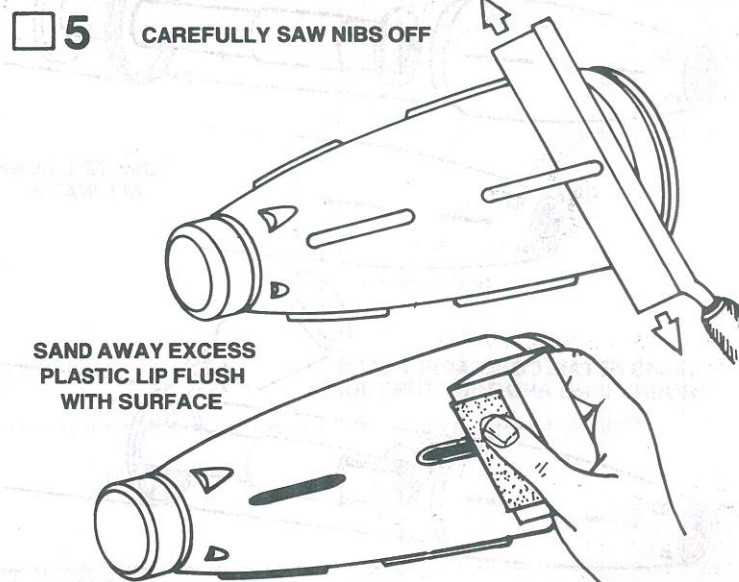
Apply a heavy line of glue on the engine hook rearward from the slit to the 1" mark. Slip hook retainer tube (part C) down onto forward end of engine mount tube and slide it back over engine hook to the 1" mark. Wipe away any excess glue and remove tape from engine hook.



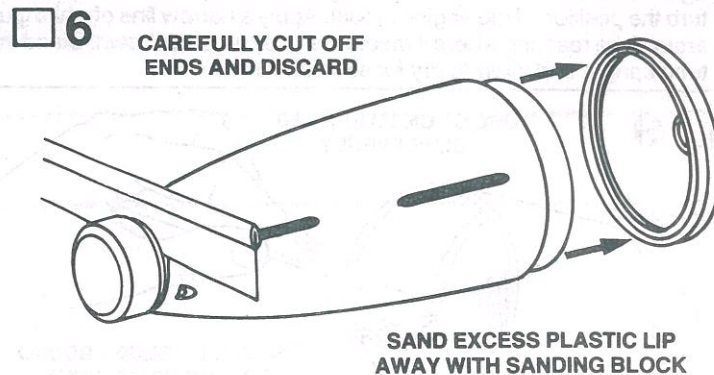
Mark the engine mount tube 5-7/8" from the rear of the tube. Remove the two large centering rings from the die-cut card sheet (part D). Slide the ring without the slot over the front of the tube and down to the mark. Slip the centering ring with slot onto the front of the tube. Apply a line of glue to the ring/tube joint on both sides of each ring. Smooth glue out with finger and wipe away excess glue.



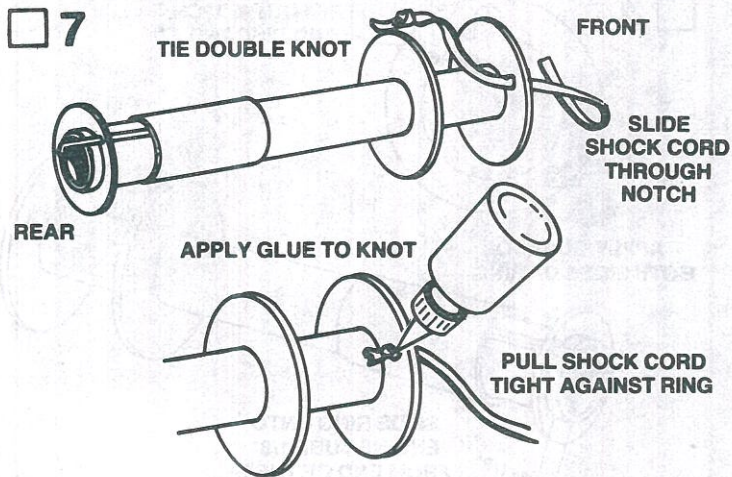
Remove the remaining centering ring from the die-cut card sheet. Trim out the notch as shown. Apply a line of glue around rear end of engine mount tube. Be sure not to get glue onto engine hook. Slide ring over end of tube into glue. Make sure centering ring is 1/8" from end of tube and notch is over engine hook. Apply glue to both sides of ring/tube joint and smooth glue out with your finger. Wipe away excess glue. Be sure not to get glue in notch or under hook.



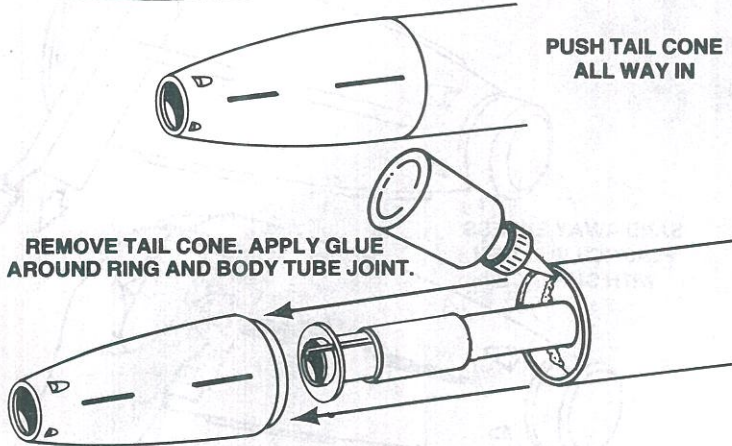
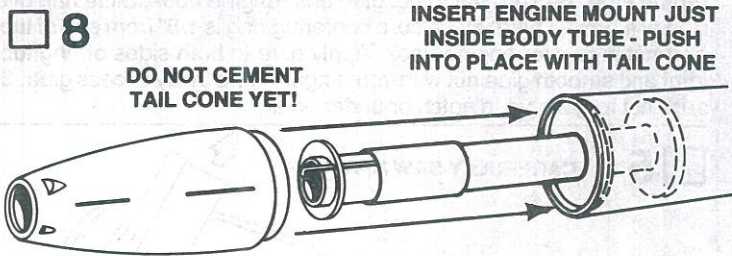
Select the tail cone (part E). Remove the eight raised nibs that cover the slots for the fins. Carefully sand the nibs off with a sanding block. Sand each nib down flush with the surface of the tail cone.



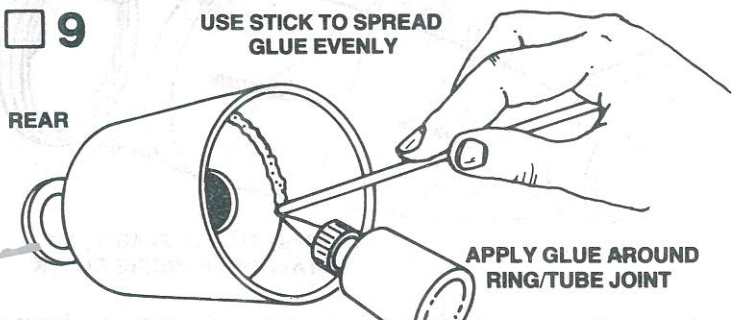
Cut the ends from the tail cone with a modeler's razor saw. Make repeated light cuts around the grooves. Work slowly to avoid tearing the plastic. Sand excess plastic lip away at the front and rear of the part with an emery board or sanding block.



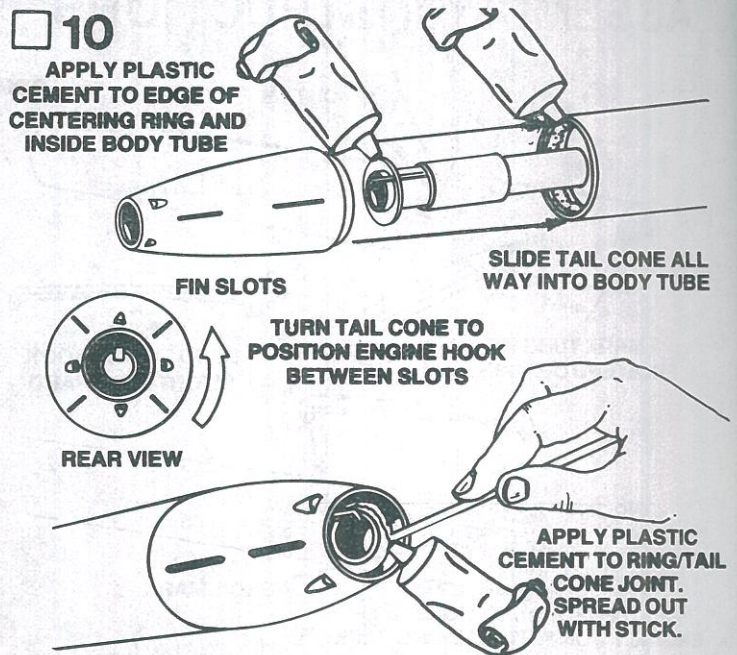
Pass end of shock cord (part F) through slot in front centering ring. Tie a double knot as shown. Pull knot tight against backside of centering ring. Apply a small amount of glue to each side of slot.



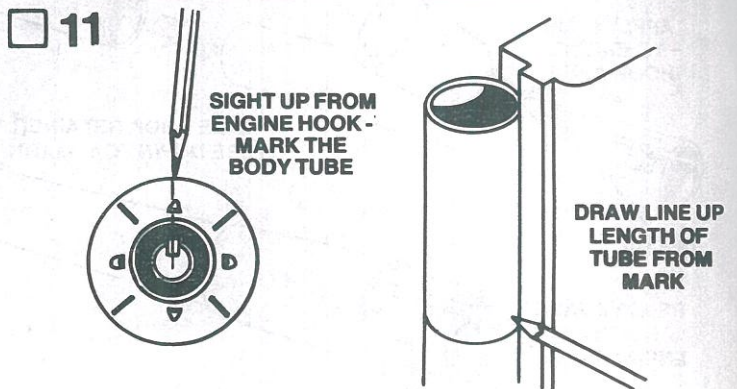
Temporarily stuff shock cord inside engine mount tube. Slide engine mount into rear of the rocket body tube (part G) so it's just inside body tube as shown. Insert the tail cone into the body tube and push it into the tube along with the engine mount tube until tail cone shoulder is against the end of the tube. Carefully remove the tail cone. Do not disturb the position of the engine mount. Apply a narrow line of white glue around the rear ring where it meets the body tube as shown. Stand the tube upright and allow to dry for several minutes.



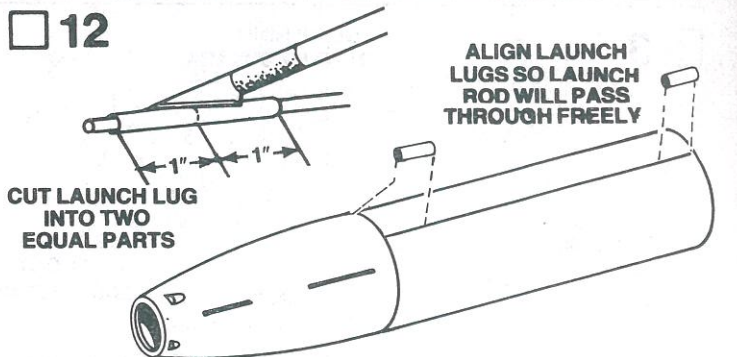
Apply a line of white glue around the forward centering ring where it meets the body tube. Stand the tube upright while glue dries. Check to be sure that there are no gaps or holes in the glue joint when dry. Apply more glue if necessary.



Apply a line of tube-type plastic cement around the inside of the body tube rear and on the edge of the small centering ring. Slide tail cone into body tube. Looking at the rear of the rocket, position the tail cone so that the engine hook is centered between two slots in tail cone as shown. Push cone into the tube until shoulder of cone is evenly against the tube end. Wipe away any excess cement from around the outside of the tube. Apply cement to ring/tail cone joint using a stick.

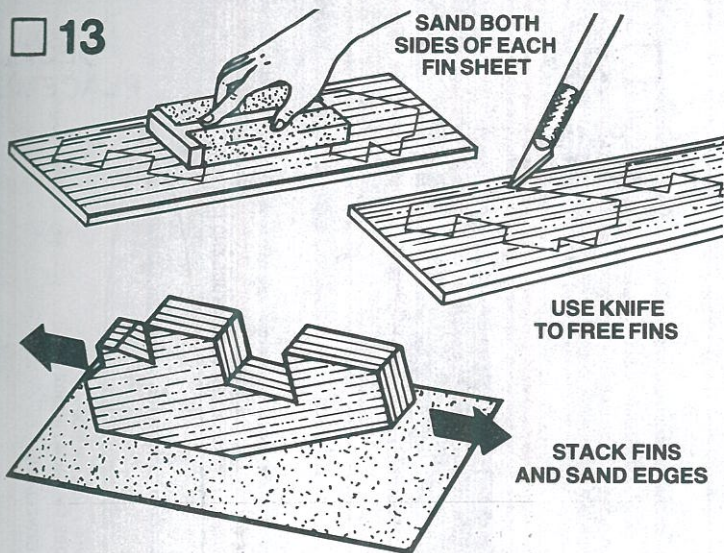


Looking at the rear of the rocket, sight up from the engine hook as shown. Make a mark on the body tube in line with the engine hook. Draw a straight line up the tube on the mark. A door frame inside edge can be used as a guide as shown. Extend the line the length of the tube.

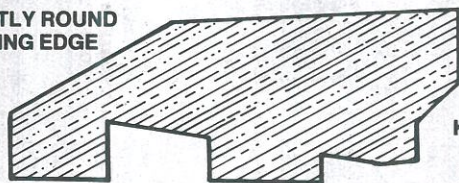


Cut two 1" lengths from the launch lug (part H). Use a dowel or stick for internal support when cutting to prevent crushing the lug. Glue lugs to body on alignment line, even with tube ends as shown. Sight-align lugs carefully to be sure that the launch rod will slide freely through them.

□ 13



SLIGHTLY ROUND LEADING EDGE



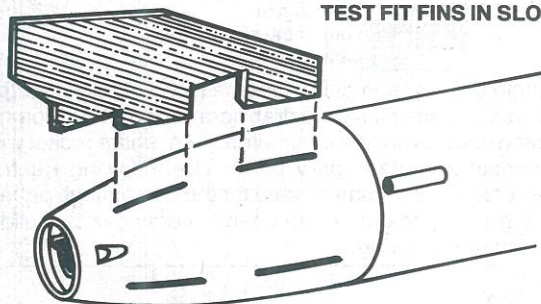
ROOT EDGES

KEEP ALL EDGES EXCEPT LEADING EDGE SQUARE

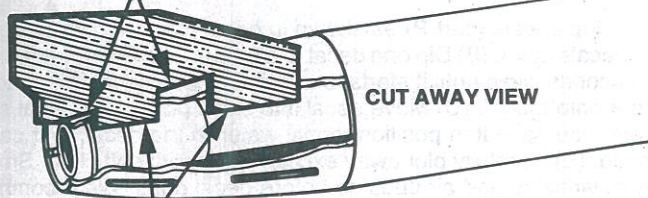
Fine-sand the balsa die-cut sheets (part I). Free the fin edges with a sharp knife, then carefully remove the die-cut fins from the sheet. Stack fins together and lightly sand edges square and straight. Sand leading edge of each fin round. Leave all other edges square.

□ 14

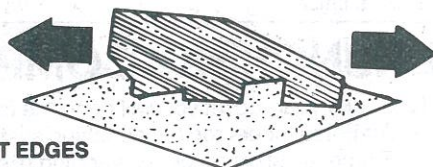
TEST FIT FIN S IN SLOTS



ROOT EDGES TOUCH OUTSIDE SURFACE OF TAIL CONE



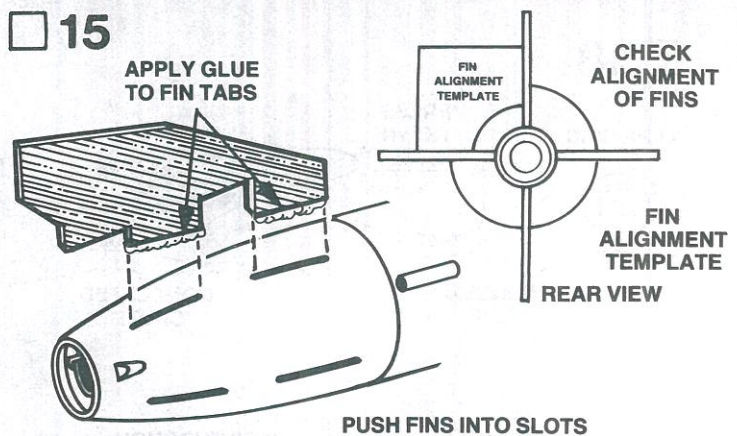
ROOT EDGES OF TAB S TOUCH ENGINE TUBE



LIGHTLY SAND ROOT EDGES DON'T SAND TOO MUCH!

Using a scrap piece of balsa sheet as a gauge, sand slots in tail cone with emery board or piece of sandpaper to enlarge slots, if necessary, to have a good fit. Test-fit each fin in its slot. Make sure the fin root edges touch the engine tube inside the tail cone and the outside surface of the tail cone. If the fin does not fit properly, lightly sand the end tabs of the fins until you get a good fit.

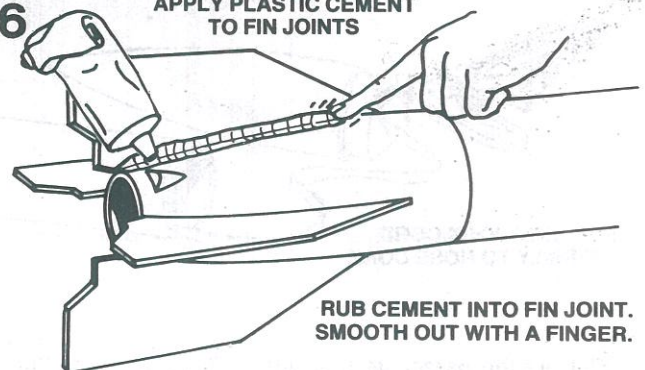
□ 15



Cut out the fin alignment template (part J) from the pattern sheet on the back of the panel. Coat the fin tabs with generous amounts of white glue. Push each fin all the way into its slot until it touches the engine tube and seats against the outside surface of the tail cone. Check alignment with fin alignment template. Repeat this procedure with each fin. After all fins are in place, check alignment again with template. Stand rocket body upside down. Do not set rocket on its fins while glue sets.

□ 16

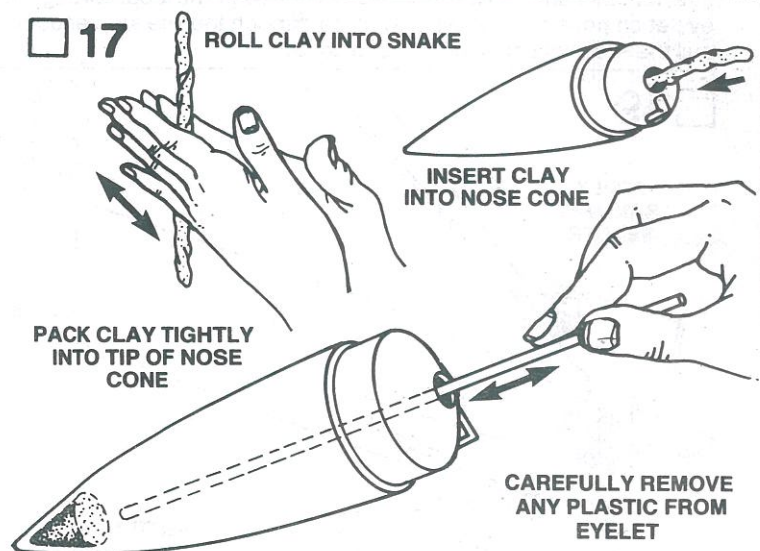
APPLY PLASTIC CEMENT TO FIN JOINT S



When fins have dried, apply a plastic cement reinforcement along fin and tail cone joints. Hold model level and apply a line of tube-type plastic cement to both sides of each fin joint. Rub cement into fin and tail cone joint. Smooth out the cement with your finger. Keep the model level until cement dries.

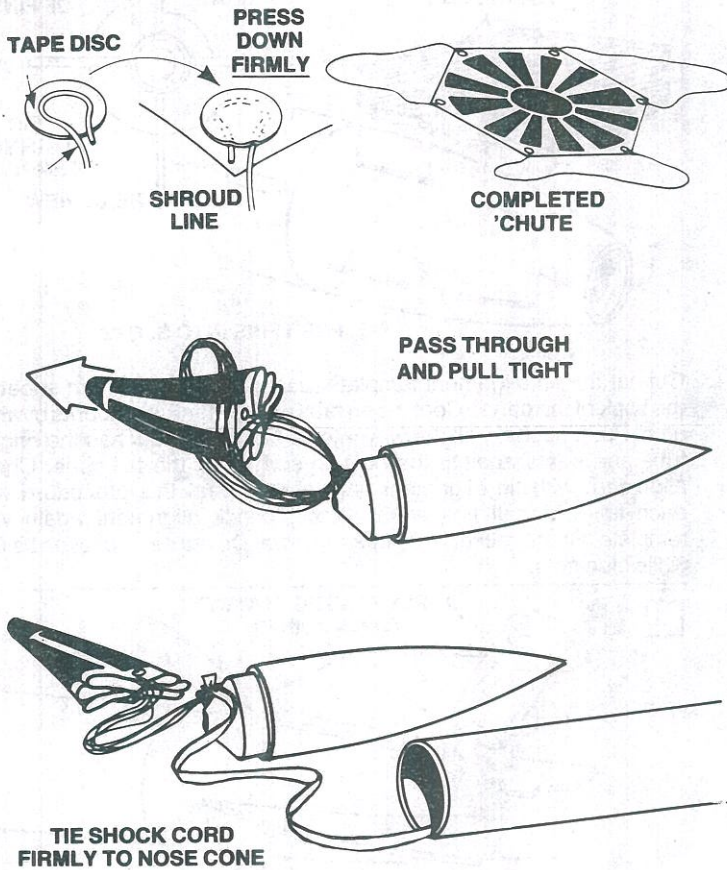
□ 17

ROLL CLAY INTO SNAKE



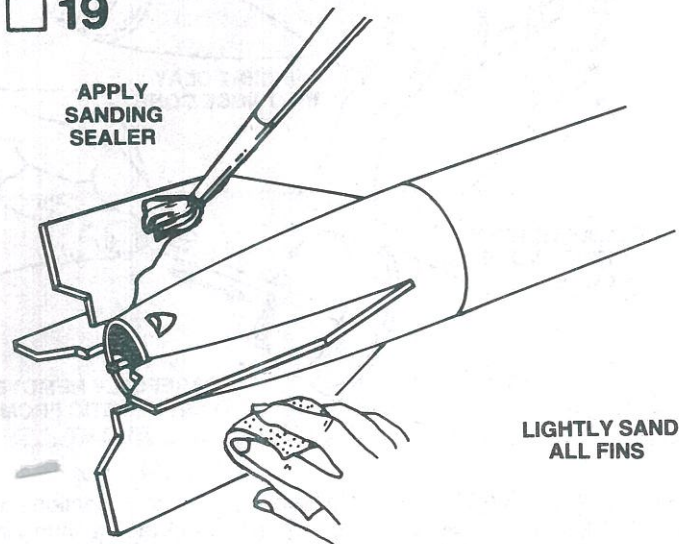
Roll clay weight (part K) into a thin "snake". Cut into 1" sections and drop through hole in rear of nose cone (part L). Pack the clay firmly into the nose using a small dowel or stick. Use all the clay. Trim and sand all excess plastic from the nose cone. Carefully open the molded eyelet at the rear of the nose cone. Wash all outside surfaces of nose cone with lukewarm, soapy water, rinse, and thoroughly dry.

□ 18



Cut out the parachute (part M) on its edge lines. Cut three equal lengths of shroud line (part N). Form a small loop in the end of a shroud line. Holding the loop, gently center loop inside tape disc (part O) on sticky side. Then carefully press tape disc onto top side of parachute in its proper place. Firmly press the disc into place until both tape disc and parachute material are molded around the shroud line loop. Repeat for other shroud line ends. Pass the shroud line loops through the eyelet on nose cone. Pass parachute through the line loop ends and pull the lines tight against the nose cone.

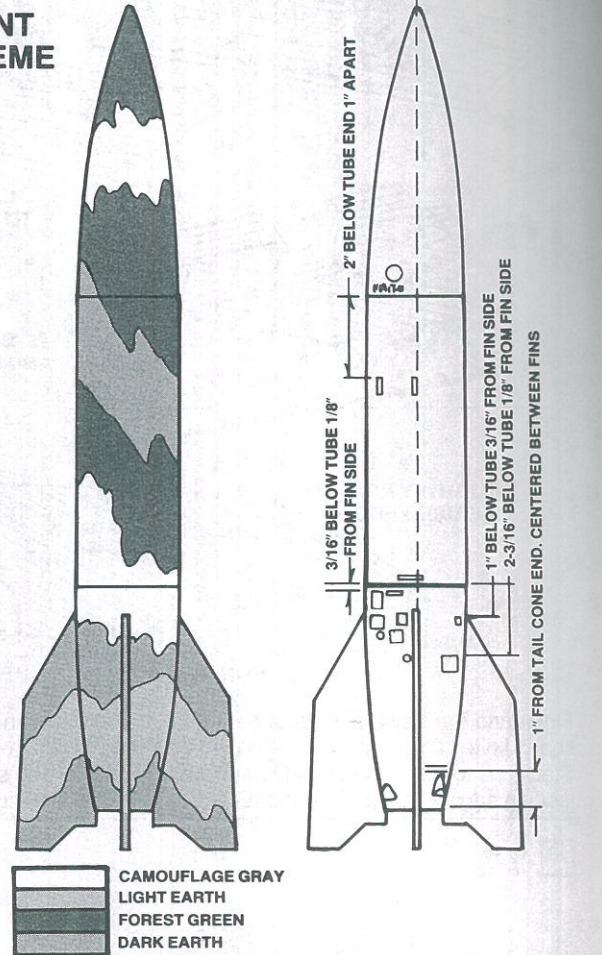
□ 19



Apply a coat of sanding sealer to all balsa wood parts. When sealer is dry, lightly sand all the sealed surfaces. Repeat sealing and sanding process until balsa grain is filled and smooth.

□ 20

PAINT SCHEME



A single color, green paint scheme is the simplest for the V-2. Pactra flat forest green or flat olive drab spray enamel is recommended. If you prefer a camouflage paint scheme, paint entire rocket with a base coat of camouflage gray spray paint. The following Pactra flat enamel spray colors are recommended for the camouflage pattern: light earth, forest green, and dark earth enamel spray paints. Follow the camouflage pattern drawing.

□ 21

Apply the decals (part P) as shown in decal placement drawing. (A) Cut decals apart. (B) Dip one decal at a time in lukewarm water for 10-20 seconds. Hold until it starts to uncurl. (C) Slip decal from backing paper onto model. (D) Move decal into exact position. If decal sticks before you have it in position, apply water to the decal so it can be moved. (E) Carefully blot away excess water with soft cloth. Smooth out all wrinkles and air bubbles before decal dries. We recommend that the completed model be sprayed with clear flat to protect the model's finish.

LAUNCHING COMPONENTS

To launch your rocket you will need the following items:

- An Estes model rocket launching system
 - Flame resistant recovery wadding (Estes Cat. No. 2274)
 - Estes D12-3 or D12-5 model rocket engines.
- Use a D12-3 engine for your first flight.

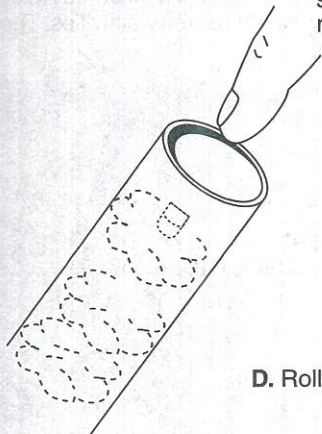
Be sure to follow the HIAA-NAR* Model Rocket Safety Code when carrying out your model rocket activities.

*HIAA—Hobby Industry of America

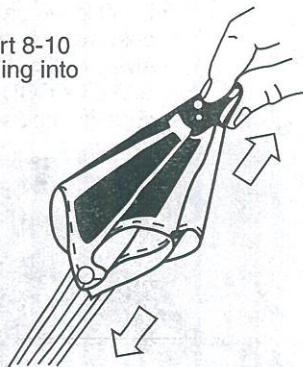
*NAR—National Association of Rocketry

PREPARE PARACHUTES FOR FLIGHT

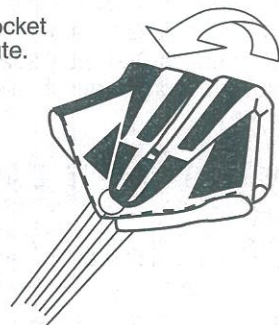
A. Loosely crumple and insert 8-10 squares of recovery wadding into rocket body.



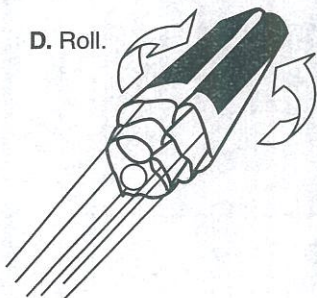
B. Spike rocket parachute.



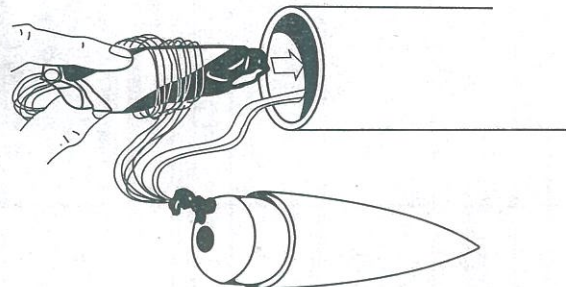
C. Fold.



D. Roll.

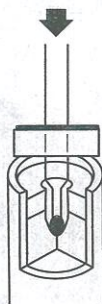


E. Wrap shroud lines loosely around rocket chute. Insert parachute into rocket, and insert the nose cone.



PREPARE ENGINE

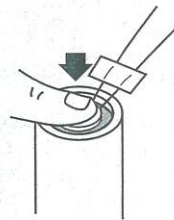
WARNING: FLAMMABLE
Before proceeding read instructions & NAR Safety Code included with engines.
PREPARE YOUR ENGINE ONLY WHEN YOU ARE OUTSIDE AT THE LAUNCH SITE PREPARING TO LAUNCH!
If you do not use your prepared engine, remove the igniter before storing your engine.



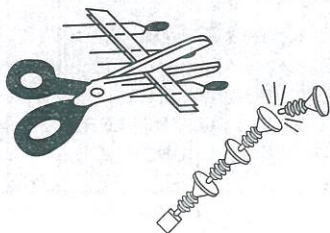
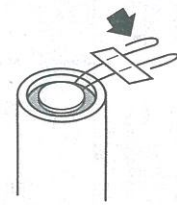
C. Insert igniter plug



D. Press down firmly.



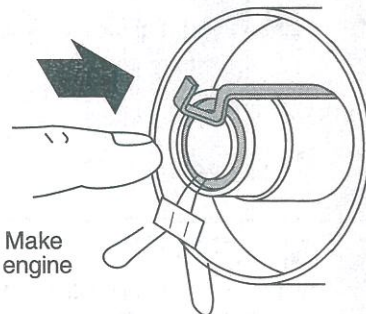
E. Bend igniter wires back and form leads as shown.



A. Separate igniter and plug

B. Hold engine upright, drop in igniter. Igniter tip must touch propellant. Do NOT bend igniter!

F. Insert engine in rocket. Make sure engine hook locks engine securely in place.



LAUNCH SUPPLIES

To launch your rocket, you will need the following:

- Launch Pad (Estes Porta-Pad® II)
- Launch Controller (Estes Electron Beam®)
- Recommended Estes Engines: D12-3 (first flight) and D12-5
- Recovery Wadding (EST 302274)
- Igniters and igniter plugs (included with Estes engines)
- Estes Maxi™ Launch Rod (EST 302244)

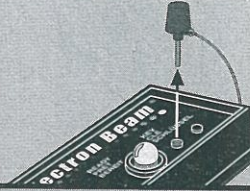
Use only Estes products to launch this rocket.

TIPS FOR FLYING YOUR ROCKET

- Choose a large field away from power lines, buildings, tall trees, and low flying aircraft. Try to find a field at least 500 feet (152 meters) square. The larger the launch area, the better your chance of recovering your rocket.
- Launch area must be free of dry weeds and brown grass.
- Launch only during calm weather with little or no wind and good visibility.
- Don't leave parachute packed more than a minute or so before launch during cold weather (colder than 40° Fahrenheit [4° Celsius]).
- Always follow the National Association of Rocketry (NAR) MODEL ROCKETRY SAFETY CODE while participating in any model rocketry activities. The safety code is enclosed with this kit.

COUNTDOWN AND LAUNCH

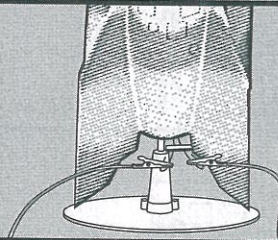
10... Make sure that the safety key is **not** inserted in the launch controller.



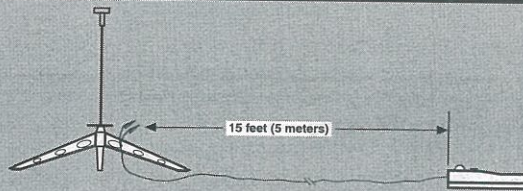
9... Remove the safety cap from the launch rod. Slide the rocket's launch lugs down the launch rod. Make sure rocket slides freely.



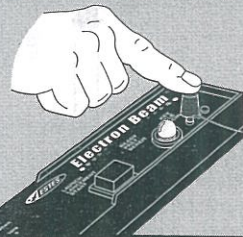
8... Make sure micro-clips are clean. Attach micro-clips on the igniter wire leads as shown. Arrange the clips so they do not touch each other, the launch rod or the metal blast deflector.



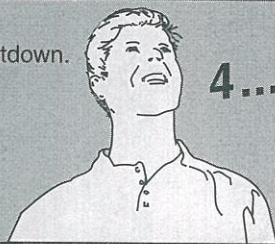
7... Move everyone away from your rocket as far as the launch wire will permit. (At least 15 feet - 5 meters)



6... Insert safety key. Press the safety key in until bulb glows, hold during the countdown and launch. **NOTE:** The engines can only be ignited when the safety key is held down.



5... Start audible countdown.



4...3...2...1...

LAUNCH!

While pushing the key down, push launch button until the engine ignites. **IMMEDIATELY REMOVE THE SAFETY KEY FROM THE LAUNCH CONTROLLER. REPLACE THE SAFETY CAP ON THE LAUNCH ROD.**

MISFIRES

When an ignition failure occurs, **remove the safety key** from the launch control system and **wait one minute before approaching the rocket.** Remove the expended igniter from the engine and install a new one. Be certain the coated tip is in direct contact with the engine propellant. Broken or chipped coating will not affect the performance of the igniter. Reinstall the igniter plug as illustrated previously. Repeat the countdown and launch procedure.



Estes Industries
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Penrose, CO 81240

www.estesrockets.com

GERMAN V-2

FLYING MODEL ROCKET KIT

NO. 1904

Congratulations, you have purchased a Classic kit from Estes! We have tried to keep this kit as close to the original 1984 version of the German V-2 kit as possible. For your enjoyment we've enclosed the original 1984 instructions. Over the years, several features have been improved and the changes are shown in this document. Use the original instruction as well as this document to build your model.

PARTS AND SUPPLIES

The following part numbers have been updated since the initial release of the V-2:

| | |
|-------------------------------|-----------|
| B) Engine Hook | P/N 35021 |
| C) Body Tube (52 AG 2.1 in.) | P/N 30450 |
| D) Die cut Card | P/N 32434 |
| F) Shock Cord (1/4" x 24") | P/N 38383 |
| J) Fin alignment template | P/N 32435 |
| K) Clay Weight | P/N 85705 |
| M) Parachute (Ready-to-Fly) | P/N 35802 |
| N) Shroud Line | Deleted |
| O) Set of 6 Tape Discs TD-144 | Deleted |

Included with your V-2 kit is a Ready-to-Fly parachute. The shroud line and tape discs are pre-assembled on the RTF parachute and will not come separate in the kit.

Use white or yellow glue and tube-type plastic cement when building this kit.



ENGINE HOOK

The engine hook has been updated as shown.

Use the following instructions in place of Step 18.

STEP 18

1. Your parachute is pre-assembled. Do not follow the top three illustrations!
2. Form a loop with the parachute shroud lines.
3. Pass the shroud line loop through the nose cone eyelet.
4. Pass the parachute through the shroud line loop and pull the lines tight against the eyelet.
5. Tie the loose end of the shock cord to the nose cone eyelet.

Use the following instructions in place of Step 21.

STEP 21

1. Apply the decals (Part P) as shown in the decal placement drawing.
2. Use a hobby knife to cut out the decals. Cut inside the dashed lines.
3. You have been provided self adhesive decals. These decals are applied without the use of water. **Do NOT** dip or soak in water.
4. To protect the models finish, we recommend that the complete model be sprayed with clear flat.