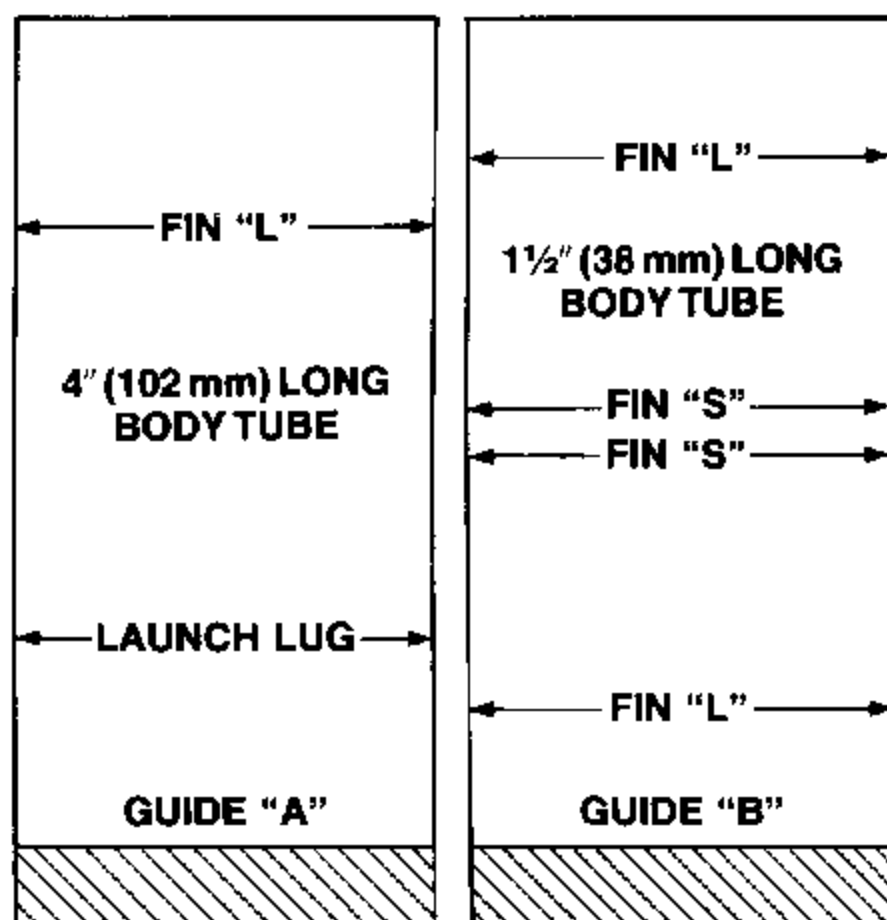
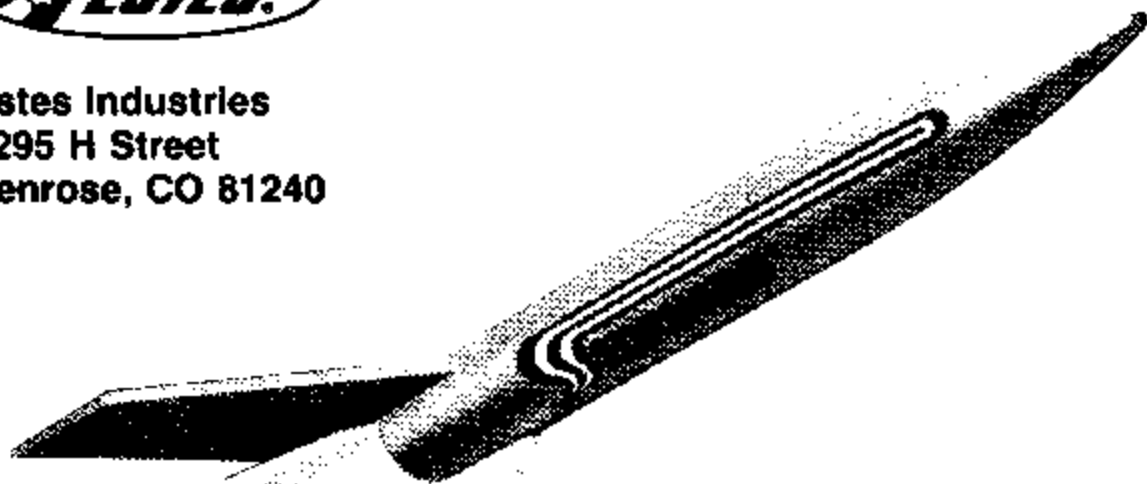


TORNADO™

Flying Model Rocket #2004



Estes Industries
1295 H Street
Penrose, CO 81240

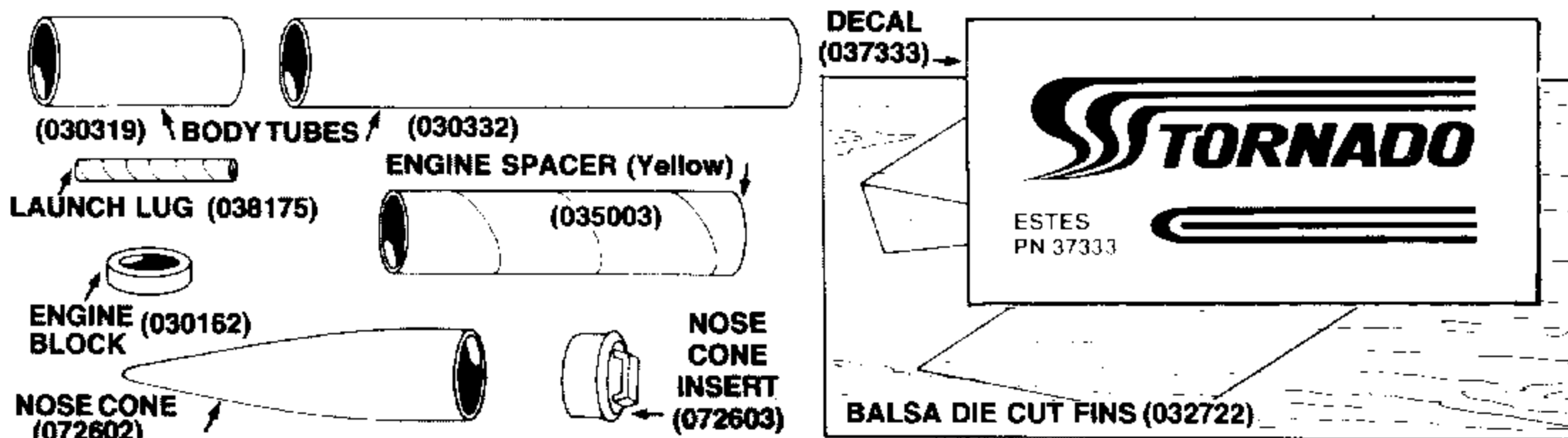
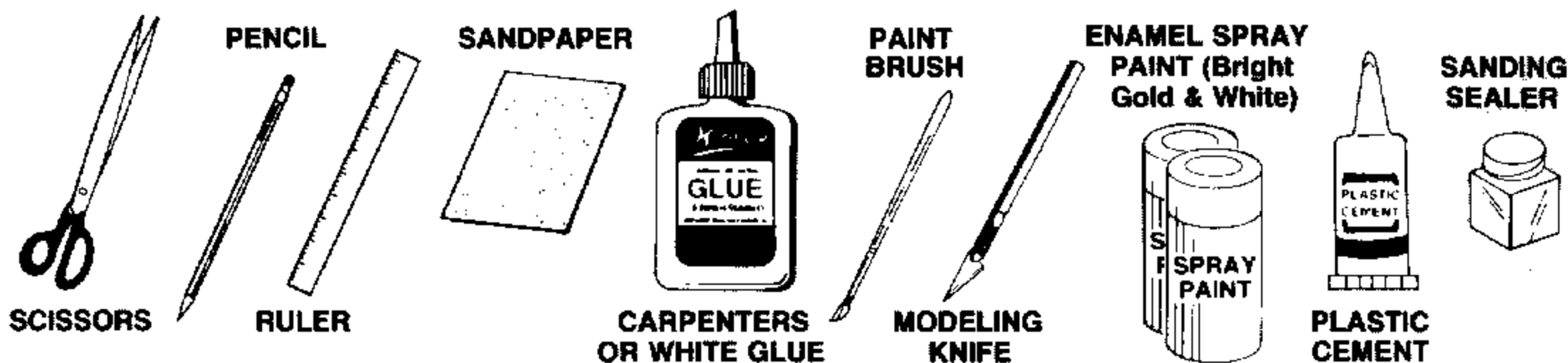


ASSEMBLY TIP

Read all instructions before beginning work on your model. Make sure you have all parts and supplies. Test-fit all parts together before applying any glue. If any parts don't fit properly, sand as required for precision assembly.

PARTS AND SUPPLIES

Locate the parts shown below and lay them out on the table in front of you. In addition to the parts included in the kit you will also need:



ROCKET ASSEMBLY

1.

- A. Cement nose cone insert to nose cone using plastic cement.
- B. Cement finished nose cone into end of 4" (102 mm) long body tube.

2.

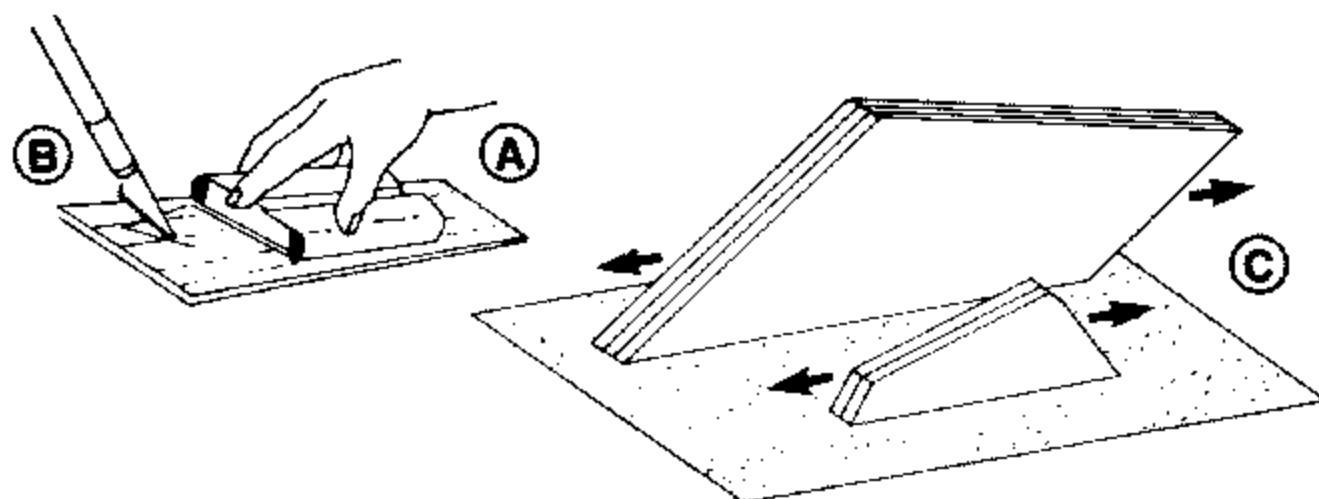
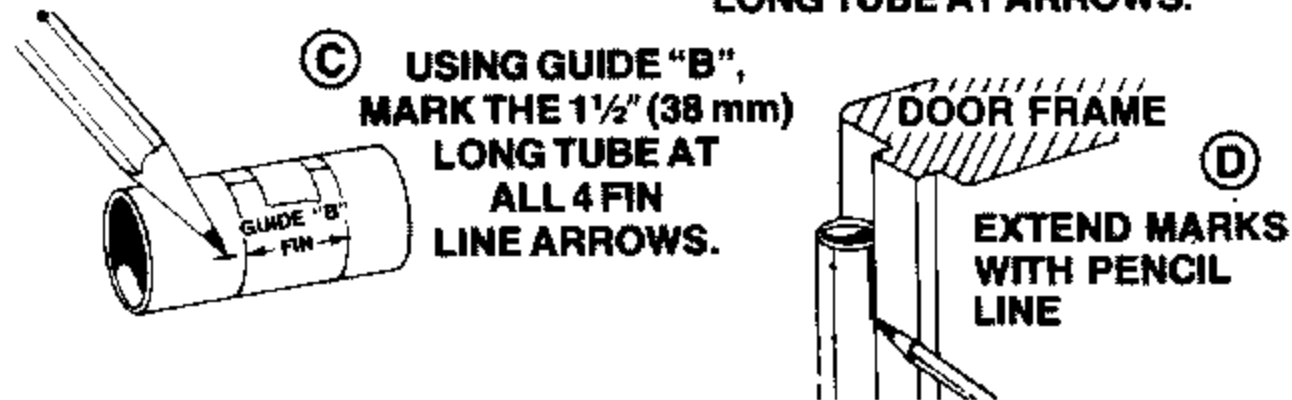
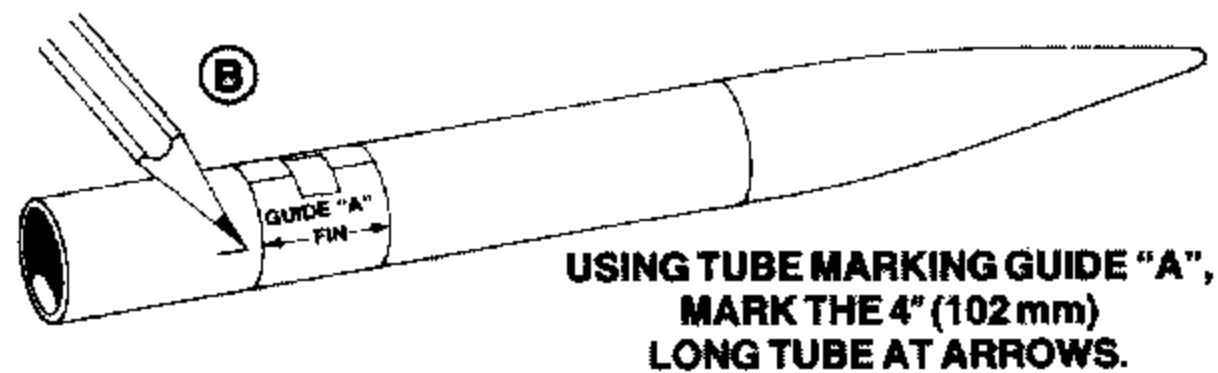
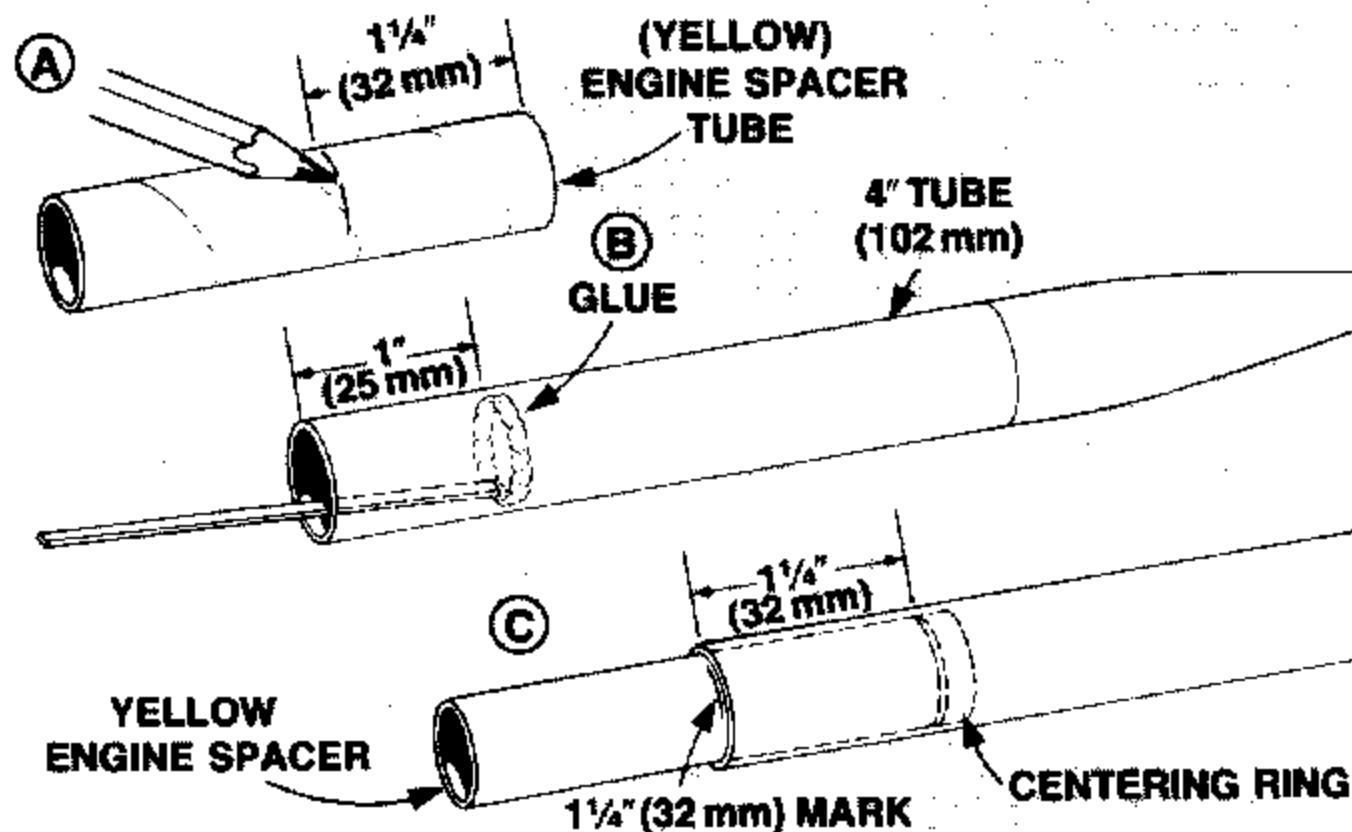
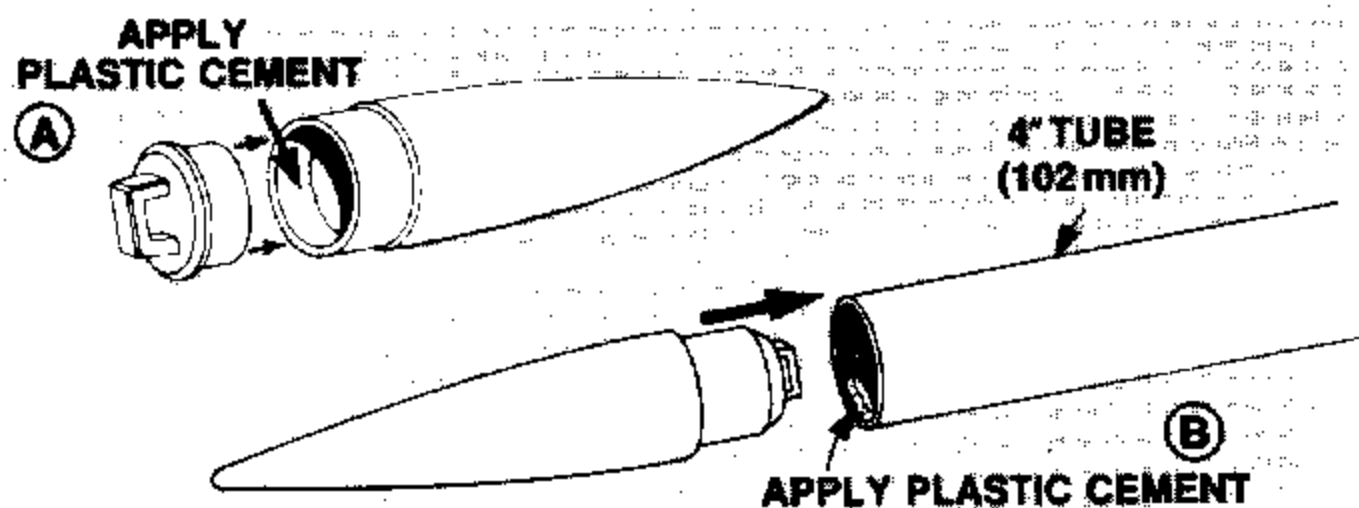
- A. Make a pencil mark $1\frac{1}{4}$ " (32 mm) from one end of yellow engine spacer tube.
- B. Apply wood glue 1" (25 mm) inside open end of 4" (102 mm) body tube.
- C. Insert centering ring into tube and push with yellow engine spacer until ring is exactly $1\frac{1}{4}$ " (32 mm) into body tube. Remove yellow tube immediately. Allow glue to dry.

3.

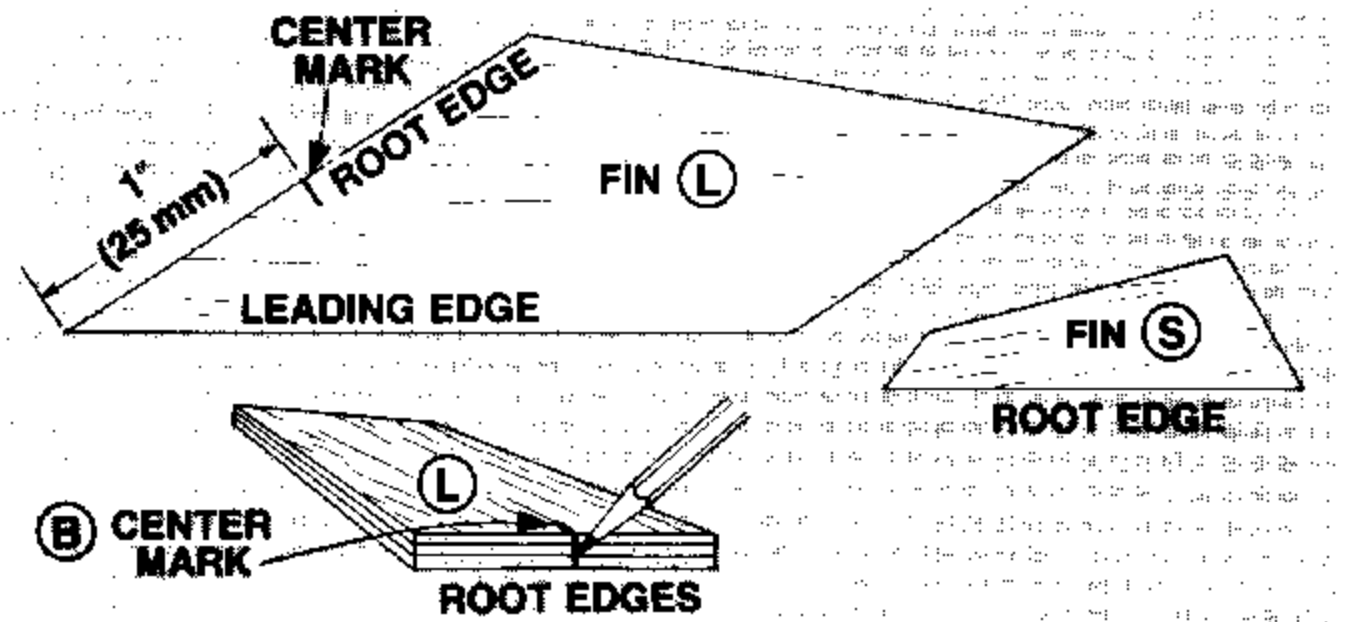
- A. Cut out both tube marking guides on front page of instructions.
- B. Wrap guide "A" around 4" (102 mm) long body tube assembly and tape, mark tube at both fin and launch lug arrows.
- C. Wrap guide "B" around $1\frac{1}{2}$ " (38 mm) long body tube and tape. Mark tube at all fin line arrows.
- D. Remove both guides and extend marks to make fin and launch lug alignment lines the length of the tubes.

4.

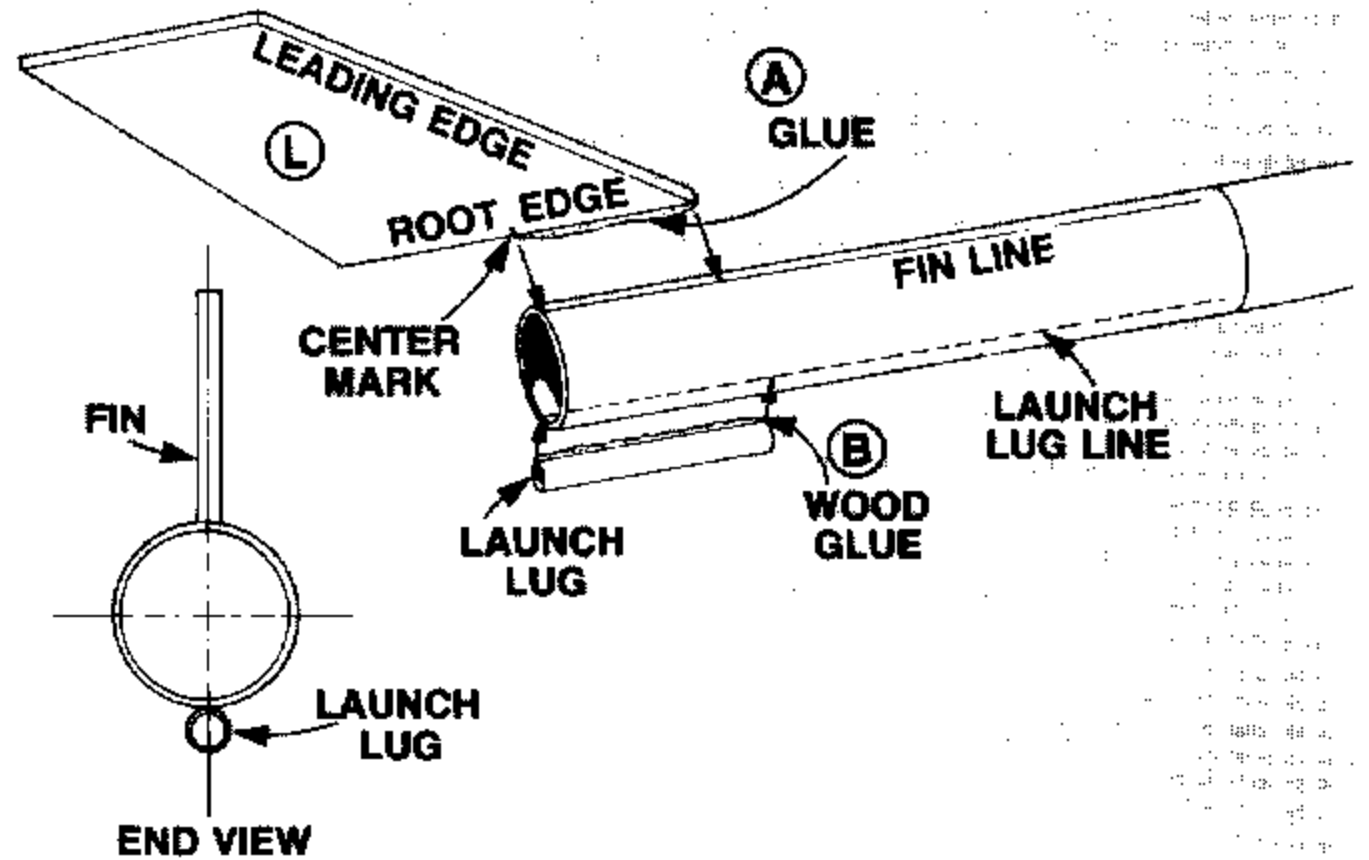
- A. Sand balsa die cut fin sheet smooth with fine grit sandpaper.
- B. Carefully remove fins from sheet with modeling knife if necessary.
- C. Stack similar fins together and sand edges smooth.



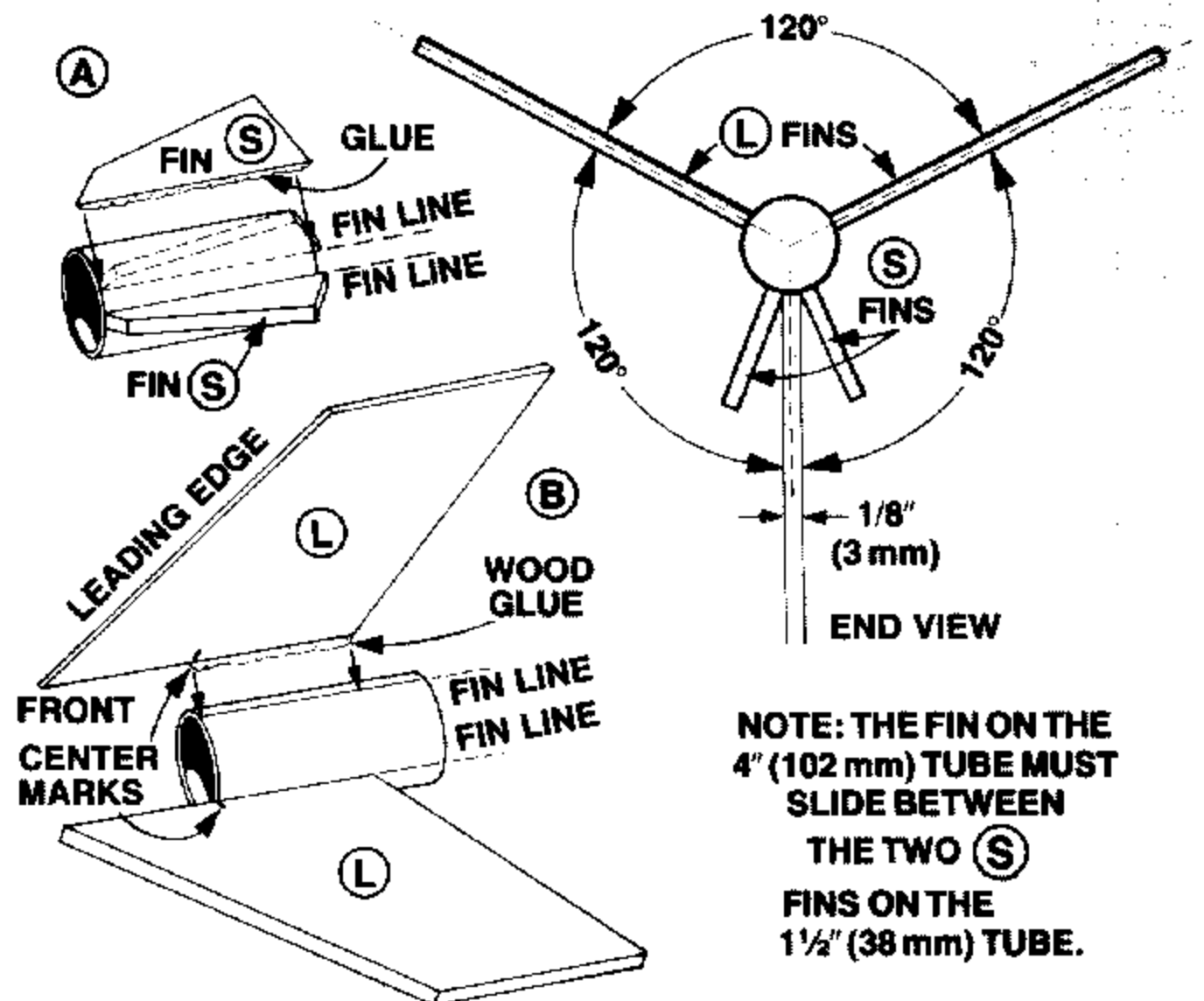
- 5.**
- Use fin patterns to locate root (gluing) edges.
 - Stack 3 larger "L" fins together and locate root edge. Mark all three root edges at the 1" (25 mm) center mark as shown.



- 6.**
- Apply a thin coat of glue to root edge of one "L" fin in front of center mark. Allow glue to become tacky. Reapply another film of glue and position fin onto fin line of 4" (102 mm) long body tube as shown. Allow to dry.
 - Glue launch lug line opposite glued fin, and flush with end of body tube.



- 7.**
- Apply a thin film of glue to root edge of both small "S" fins. Allow glue to become tacky, reapply more glue and position fins on outside edges of the two close fin lines on the short (1 1/2" - 38 mm) body tube section. (Fins should be spaced 1/8" (3 mm) at point where they are glued to body tube.)
 - Apply a thin film of glue to the root edge of the two remaining "L" fins, behind the center mark as shown. Reapply glue when tacky and position fins on 2 remaining fin lines as shown.
 - Apply glue reinforcement fillets to all fin and launch lug joints.

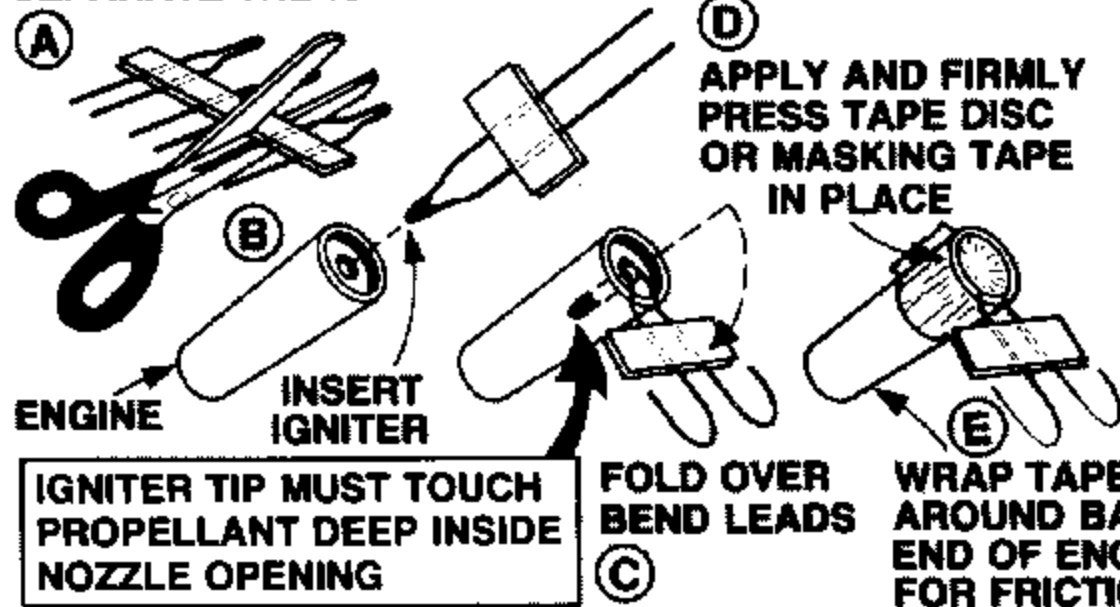


FINISHING YOUR ROCKET

Apply sanding sealer to wood parts with small brush. When sealer is dry, lightly sand all sealed surfaces. Repeat sealing and sanding until balsa grain is filled and smooth. When sanding sealer and glue are completely dry, paint model with spray enamel. Follow instructions on spray can for best results. Paint

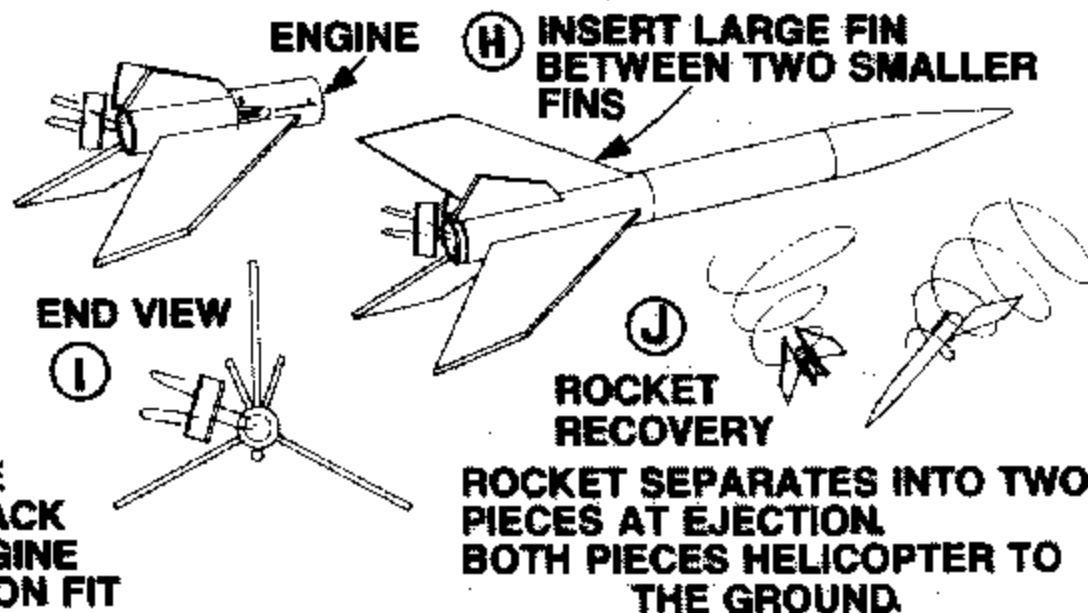
PREPARE ENGINE AND ROCKET

SEPARATE THE IGNITERS



F INSERT ENGINE INTO ENGINE/TAIL SECTION OF ROCKET

G SLIP NOSE CONE SECTION OVER PROTRUDING ENGINE FROM TAIL SECTION



LAUNCH SUPPLIES

To launch your rocket you will need the following items:

—Estes Electrical Launch System and Launch Pad

—Estes Recovery Wadding No. 2274

—Recommended Estes Engines: B4-2, B6-2, C5-3, or C6-3.

To become familiar with your rocket's flight pattern, use a B4-2 engine for your first flight.

Use only with Estes products.

FLYING YOUR ROCKET

Choose a large field away from power lines, tall trees, and low flying aircraft. Try to find a field at least 250 feet (76 meters) square. The larger the launch area, the better your chance of recovering your rocket. Football fields and playgrounds are great.

Launch area must be free of dry weeds and brown grass.

Launch only during calm weather with little or no wind and good visibility.

MISFIRES

Failure of the model rocket engine to ignite is nearly always caused by incorrect igniter installation. An Estes igniter will function properly even if the coated tip is chipped. However, if the coated tip is not in direct contact with the engine propellant, it will only heat and not ignite the engine.

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, then tape the igniter leads firmly to base of engine as illustrated above. Repeat the countdown and launch procedure.

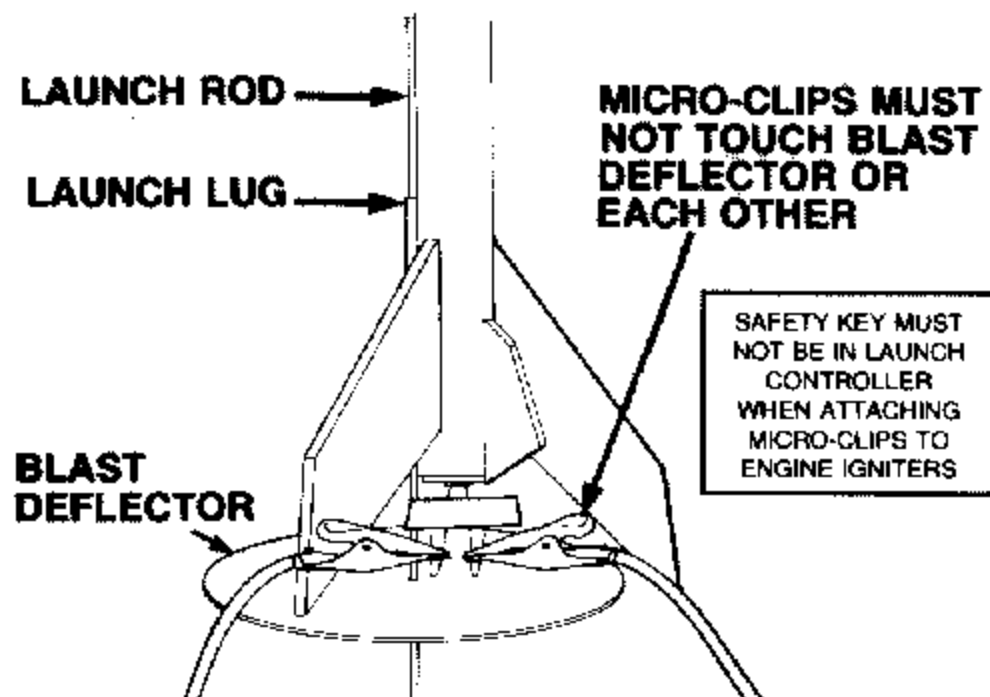
FOR YOUR SAFETY AND ENJOYMENT

Always follow the NAR* MODEL ROCKETRY SAFETY CODE while participating in any model rocketry activities.

*National Association of Rocketry
page 4

nose cone section Bright Gold and engine/tail section white. Let paint dry overnight before applying decals. To apply decals, cut each out, dip in lukewarm water for 20 seconds, and hold until it uncurls. Refer to photograph on front page of instructions or on front of panel for decal placement. Slip decal off backing sheet and onto model. Blot away excess water. For best results, let decals dry overnight.

COUNTDOWN AND LAUNCH



- 10** BE CERTAIN SAFETY KEY IS NOT IN LAUNCH CONTROLLER.
- 9** Remove safety cap and slide launch lug over launch rod to place rocket on launch pad. Make sure the rocket slides freely on the launch rod.
- 8** Attach micro-clips to the igniter wires. Arrange the clips so they do not touch each other or the metal blast deflector. Attach clips as close to protective tape on igniter as possible.
- 7** Move back from your rocket as far as launch wire will permit (at least 15 feet - 5 meters).
- 6** INSERT SAFETY KEY to arm the launch controller. Give audible countdown 5...4...3...2...1

LAUNCH!! PUSH AND HOLD LAUNCH BUTTON UNTIL ENGINE IGNITES

REMOVE SAFETY KEY FROM LAUNCH CONTROLLER. REPLACE SAFETY KEY AND SAFETY CAP ON LAUNCH ROD.