ROCKET BUILDER'S MARKING GUIDE

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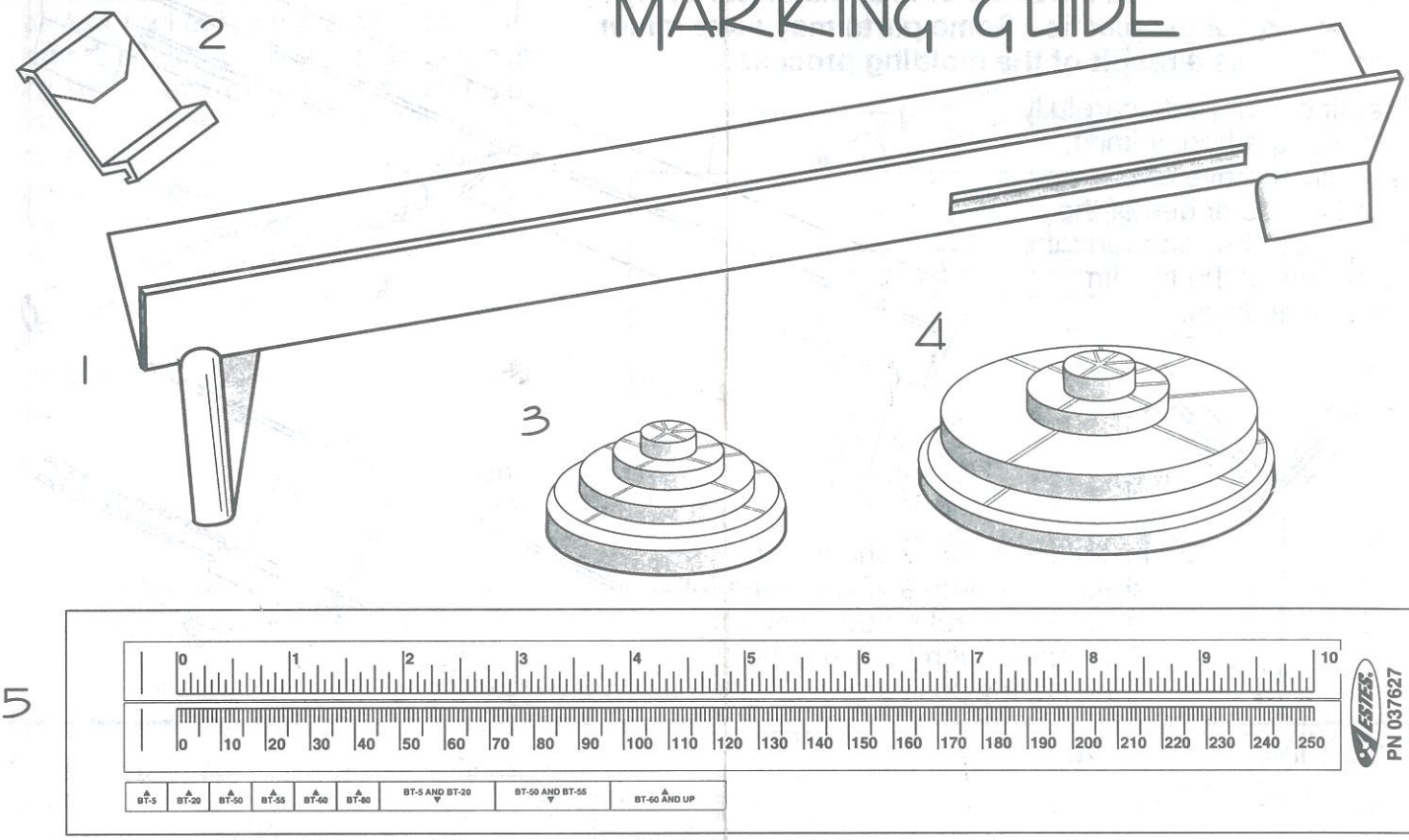


PARTS LIST

1. Ruler Body; 2. Ruler Slide; 3. Fin Placement Disc (small); 4. Fin Placement Disc (large); 5. Pressure Sensitive Decal Sheet

TOOLS AND MATERIALS

Hobby Knife

Wooden Pencil

Rubber Band

ROCKET BUILDER'S MARKING GUIDE

The rocket builder's marking guide was designed with both beginner and advanced model rocket enthusiasts in mind. It is a multi-purpose tool which provides several functions essential to precision model rocket building. First, it provides an accurate method for measuring and marking rocket body tubes to specific lengths. This function is especially helpful when measuring a body tube that you intend to cut. It allows you to mark an exact line around the circumference of the tube, which you can then follow with your hobby knife.

Accurate spacing for three and four fin arrangements is the second major function made easier by this tool. It can be used, in most cases, in place of the paper patterns supplied in Estes kits using BT-5, BT-20, BT-50, BT-55, BT-60, and BT-80 tube sizes. Scratch builders will find this feature especially helpful.

SPECIAL NOTE: *When using the Rocket Builder's Marking Guide with existing Estes kits, you must mark the fin placement lines BEFORE installing the engine mount.*

The Rocket Builder's Marking Guide™ can also be used to make perfect lengthwise lines along the outside surface of most any common rocket body tubes. Great for accurate fin and launch lug alignment.

This tool also incorporates a unique feature which allows fins up to 3 mm (1/8") thick to be held steady and true during the gluing operation.

All these features plus measuring scales to 10 inches and 254 millimeters make this a truly valuable and useful addition to any rocket modeler's tool box.

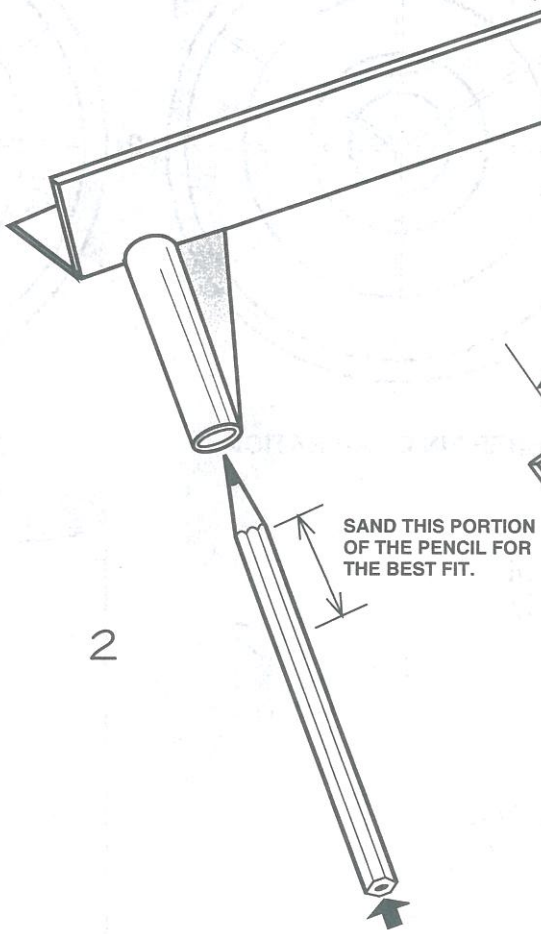
USING YOUR MARKING GUIDE

MARKING ROCKET BODY TUBES TO LENGTH

1. Install the slide on the ruler body as explained earlier.
2. Install an ordinary wooden pencil in the pencil grip as shown.

NOTE: Your marking guide has been designed to hold most hexagon-shaped wooden pencils. The pencil should fit tightly and stay in place once installed. If, however, you find it difficult to insert the pencil, try another brand or lightly sand the surface of the pencil until a good fit is achieved.

3. Set the slide to the desired measurement. (See example). Align the forward edge of the slide with the measurement desired.



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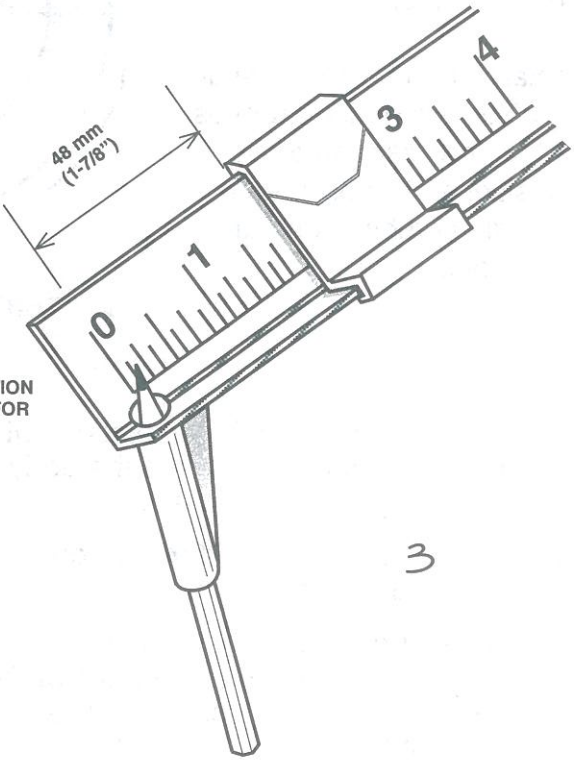

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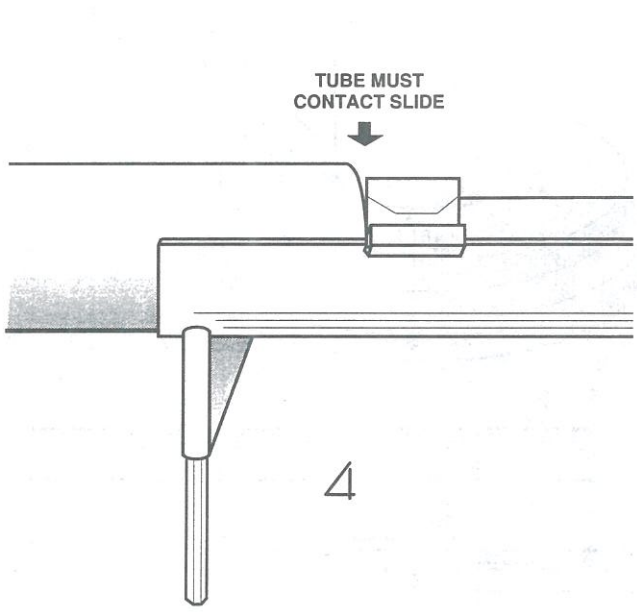

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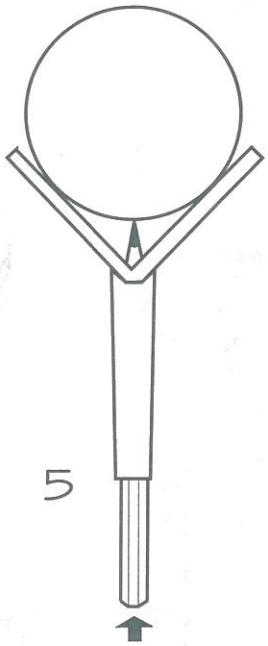

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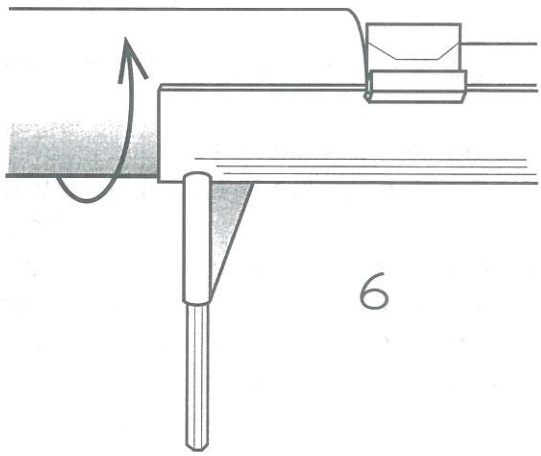

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4. Position the tube you wish to mark so that it makes contact with the slide and lays firmly in the 'V' of the ruler body as shown.
5. Adjust the pencil so that it makes contact with the body tube as shown.
6. Simply rotate the tube being careful to keep it against the slide as you turn. The result will be a line drawn part way or all the way around the body tube at precisely the dimension of your slide setting. (In the case of our example = 48 mm [1-7/8"] from the tube end).

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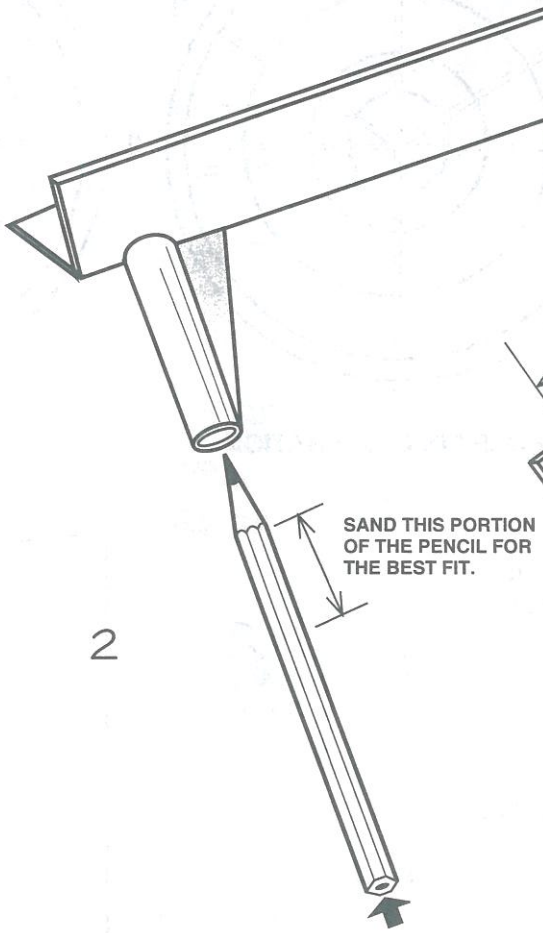

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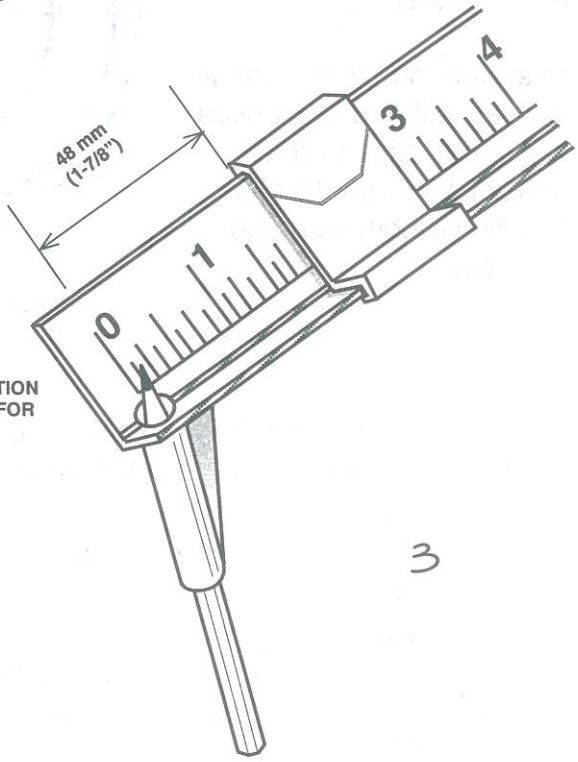

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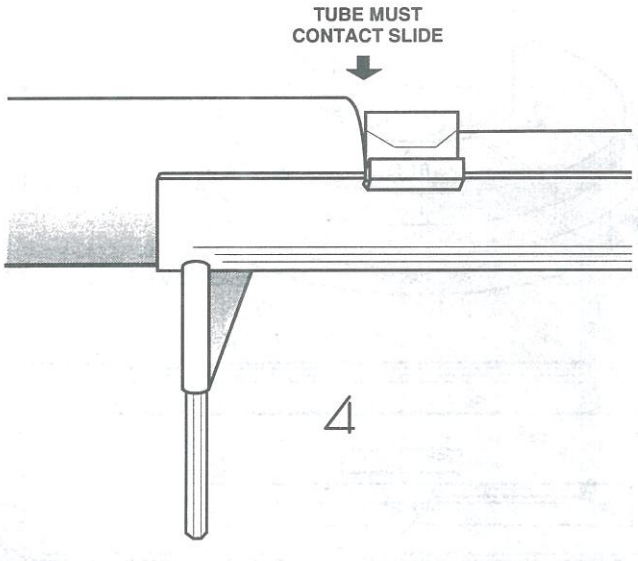

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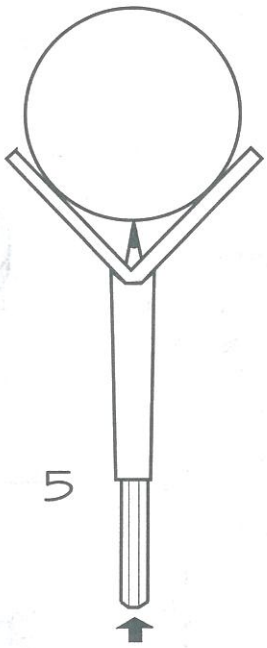

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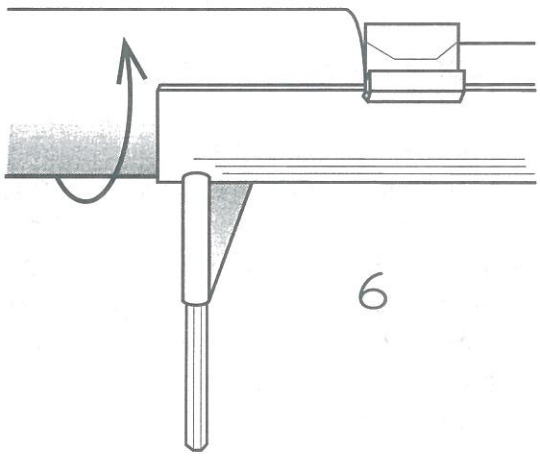

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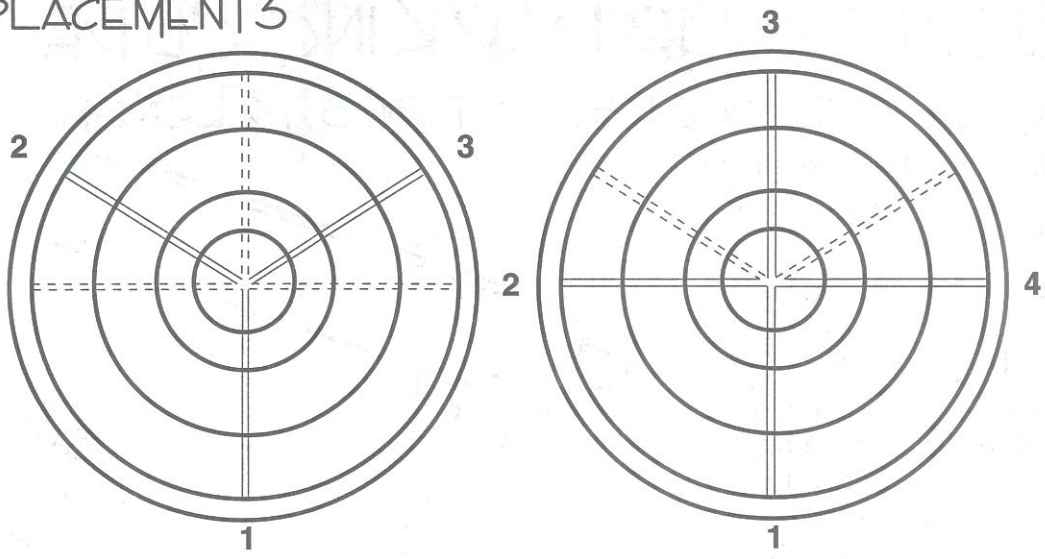
MARKING FOR FIN PLACEMENTS

Your marking guide comes with two fin placement "discs". Between them, they will accommodate six of the most common Estes body tube sizes.

Examine the discs carefully. You will notice grooves which correspond to fin positions. Either three or four fin combinations are possible.



THREE FIN COMBINATION

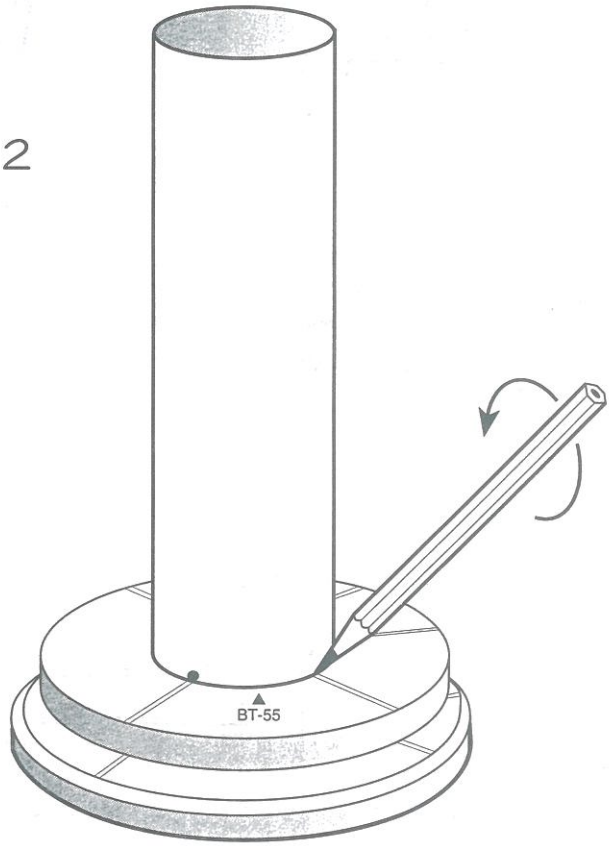
FOUR FIN COMBINATION

1. Locate the level on the fin placement disc which fits properly into the body tube that you have chosen.
2. Next, choose either a three or four fin pattern and do the following:

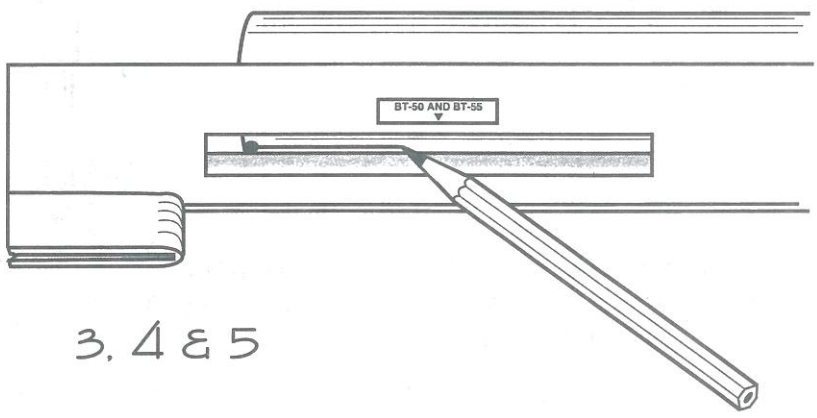
   Place a pencil point into one of the appropriate grooves at approximately a 45 degree angle. Push the pencil point up to the body tube and twist.

   This will place an accurate mark at the bottom of the tube. Repeat this process at grooves 2 & 3 or 2, 3, & 4.
3. Remove the slide and the pencil from the ruler body.
4. Place the body tube in the "V" of the ruler body with the fin position marks opposite the pencil grip end of the ruler body.
5. Choose the correct slot for the body tube you have marked. Example: If you marked a BT-55 tube, choose the slot marked BT-50 and BT-55. Rotate the tube so that one of the fin placement marks lines up with the edge of the slot and make a pencil line as shown. Repeat for the remaining marks.

NOTE: For tubes larger than BT-60, use the upper edges of the ruler body to guide your pencil.



1 & 2



3, 4 & 5

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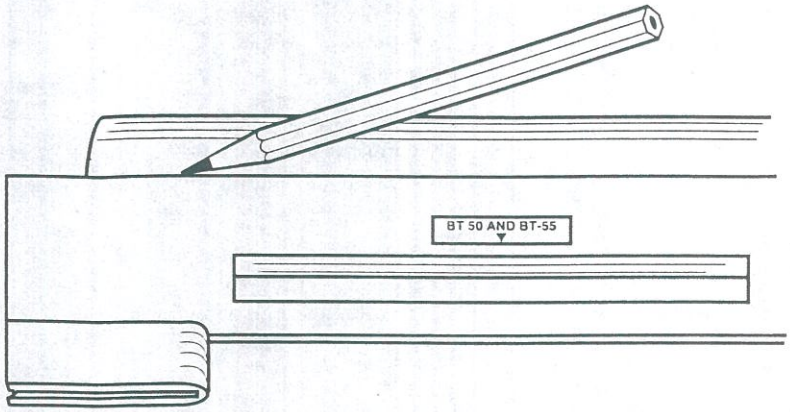
MARKING LENGTHWISE LINES

Accurate straight lines along the length of your rocket body are also possible with this tool. Engine clip and launch lug alignment, reference lines for gluing components to your rocket body, masking lines for paint schemes, and decal reference marks, just to name a few, are all made easier with your marking guide.

NOTE: This tool can be used in all Estes kits where the use of a door jamb is suggested to mark your body tube or engine mount tube.



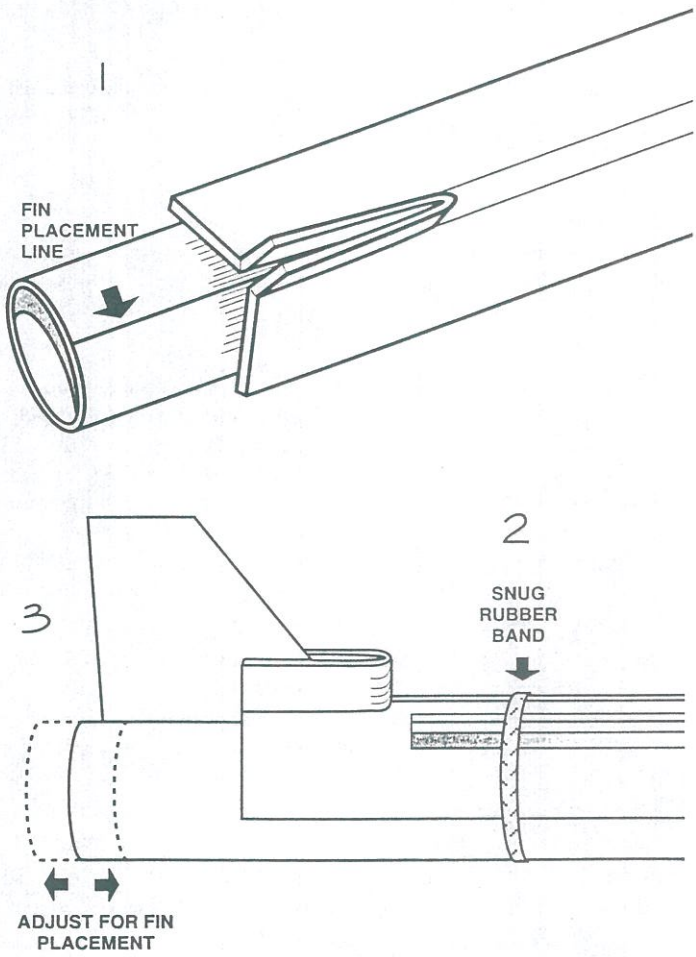
1. Simply remove the slide and pencil from the ruler body and place your tube in the "V" of the ruler body.
2. Depending on tube diameter, use the slots or the ruler body edges to guide your pencil down the length of your tube.

FIN ATTACHMENT GUIDE

You will notice a fitting at the opposite end of the ruler body from the pencil grip. This is a simple device which allows you to hold fins in place during the gluing operation. It will work when attaching most fin shapes to the most widely used tube diameters.

NOTE: The attachment guide will accept fins with thicknesses ranging from 1/16" (3 mm) to 1/8" (6 mm).

1. Remove the slide and pencil from the ruler body. Lightly sand the rocket tube along the fin position lines. Do not sand the lines away; just rough up the tube surface for a better glue joint. Place your rocket tube in the "V" of the ruler body so that one of the fin placement lines is centered directly under the fin attachment guide.
2. Place a snug-fitting rubber band around the ruler and rocket body tube as shown. Caution: Do not crush or distort the tube.
3. Position a fin as shown and adjust the rocket tube to achieve correct distance between the rear of the fin and the rear of the rocket body tube.
4. When you are satisfied with the fin position, carefully remove the fin. Apply glue to the edge and return it to the attachment guide. Allow the glue to dry and follow the same procedure for the remaining fins.



Let us know about other uses you may discover for your Rocket Builder's Marking Guide.

NAR Model Rocketry Safety Code

1. **Materials** - My model rocket will be made of lightweight materials such as paper, wood, rubber, and plastic suitable for the power used and the performance of my model rocket. I will not use any metal for the nose cone, body, or fins of a model rocket.

2. **Motors/Engines** - I will use only commercially-made NAR certified model rocket engines in the manner recommended by the manufacturer. I will not alter the model rocket engine, its parts, or its ingredients in any way.

3. **Recovery** - I will always use a recovery system in my model rocket that will return it safely to the ground so it may be flown again. I will use only flame resistant recovery wadding if required.

4. **Weight and Power Limits** - My model rocket will weight no more than 1,500 grams (53 ounces) at liftoff, and its rocket engines will produce no more than 320 Newton-seconds (4.45 Newtons equal 1.0 pounds) of total impulse. My model rocket will weigh no more than the engine manufacturer's recommended maximum liftoff weight for the engines used, or I will use engines recommended by the manufacturer for my model rocket.

5. **Stability** - I will check the stability of my model rocket before its first flight, except when launching a model rocket of already proven stability.

6. **Payloads** - Except for insects, my model rocket will never carry live animals or a payload that is intended to be flammable, explosive, or harmful.

7. **Launch Site** - I will launch my model rocket outdoors in a cleared area, free of tall trees, power lines, buildings, and dry brush and grass. I will ensure that people in the vicinity are aware of the pending rocket launch and are in a position to see the rocket's lift-off before I begin my audible 5-second countdown.

8. **Launcher** - I will launch my model rocket from a stable launch device that provides rigid guidance until the model rocket has reached a speed adequate to ensure a safe flight path. To prevent accidental eye injury, I will always place the launcher so the end of the rod is above eye level, or I will cap the end of the rod when approaching it. I will cap or disassemble my launch rod when not in use, and I will never store it in an upright position. My launcher will have a jet deflector device to prevent the engine exhaust from hitting the ground directly. I will always clear the area around my launch device of brown grass, dry weeds, or other easy-to-burn materials.

9. **Ignition System** - The system I use to launch my model rocket will be remotely controlled and electrically operated. It will contain a launching switch that will return to "off" when released. The system will contain a removable safety interlock in series with the launch switch. All persons will remain at least 15 feet (5 meters) from the model rocket when I am igniting model rocket engines totalling 30 Newton-seconds or less of total impulse and at least 30 feet (10 meters) from the model rocket when I am igniting model rocket engines totalling more than 30 Newton-seconds of total impulse. I will use only electrical igniters recommended by the engine manufacturer that will ignite model rocket engine(s) within one second of actuation of the launching switch.

10. **Launch Safety** - I will ensure that people in the launch area are aware of the pending model rocket launch and can see the model rocket's liftoff before I begin my audible five-second countdown. I will not launch a model rocket using it as a weapon. If my model rocket suffers a misfire, I will not allow anyone to approach it or the launcher until I have made certain that the safety interlock has been removed or that the battery has been disconnected from the ignition system. I will wait one minute after a misfire before allowing anyone to approach the launcher.

11. **Flying Conditions** - I will launch my model rocket only when the wind is less than 20 miles (30 kilometers) an hour. I will not launch my model rocket so it flies into clouds, near aircraft in flight, or in a manner that it hazardous to people or property.

12. **Pre-Launch Test** - When conducting research activities with unproven model rocket designs or methods, I will, when possible, determine the reliability of my model rocket by pre-launch tests. I will conduct the launching of an unproven design in complete isolation from persons not participating in the actual launching.

13. **Launch Angle** - My launch device will be pointed within 30 degrees of vertical. I will never use model rocket engines to propel any device horizontally.

14. **Recovery Hazards** - If a model rocket become entangled in a power line or other dangerous place, I will not attempt to retrieve it.

Estes Note: The largest "model" rocket engine as defined by CPSC is an "F" (80 NS). To launch rockets weighing over one pound including propellant or rockets containing more than 4 oz. of propellants (net weight), you must obtain a waiver from the FAA. Check your telephone directory for the FAA office nearest you.

FULL ONE YEAR WARRANTY

Your Estes product is warranted against defects in materials or workmanship for one year from the date of original purchase. Any Estes product, except computer software, which, because of a manufacturing mistake, malfunctions or proves to be defective within the one-year warranty period will be repaired or replaced, at Estes' option and at no charge to you, provided it is returned to Estes with proof of purchase.

This warranty does not cover incidental or consequential damage to persons or property caused by the use, abuse, misuse, failure to comply with operating instructions or improper storage of the warranted product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other right which vary from state to state.

For repair or replacement under this warranty, please return the defective part of your Estes product with proof of purchase to: Estes Industries, Customer Service Department, Penrose, CO 81240.