

MODEL ROCKET ENGINE PERFORMANCE CHART

Prod. No.	Engine Type	Total Impulse		Time Delay		Est. Max. Lift Wt.	Max Thrust		Thrust Duration		Initial Weight		Propellant Weight	Diameter	Quantity per Pack	Retail Price per Pack
		N-sec	Sec	Sec	Sec		oz	g	lbs	Sec	oz	g				
SINGLE STAGE ENGINES																
1502	1/4A3-3T	0.625	3	1.0	28	4.90	1.1	0.25	0.21	5.9	0.05	1.3	13	4	\$10.29	
1503	1/2A3-2T	1.25	2	2.0	57	8.30	1.9	0.30	0.23	6.4	0.07	1.9	13	4	\$10.29	
1507	A3-4T	2.50	4	2.0	57	6.80	1.5	0.60	0.28	8.0	0.12	3.3	13	4	\$10.29	
1511	A10-3T	2.50	3	3.0	85	13.00	2.9	0.80	0.29	8.1	0.12	3.5	13	4	\$10.29	
1593	1/2A6-2	1.25	2	2.0	57	8.90	2.0	0.30	0.48	13.6	0.10	2.7	18	3	\$10.29	
1598	A8-3	2.50	3	3.0	85	10.70	2.4	0.50	0.55	15.5	0.14	4.1	18	3	\$10.29	
1601	B4-2	5.00	2	4.0	113	13.20	3.0	1.10	0.66	18.6	0.27	7.6	18	3	\$10.79	
1602	B4-4	5.00	4	3.5	99	13.20	3.0	1.10	0.68	19.2	0.27	7.6	18	3	\$10.79	
1605	B6-2	5.00	2	4.5	127	12.10	2.7	0.80	0.61	17.3	0.23	6.5	18	3	\$10.79	
1606	B6-4	5.00	4	4.0	113	12.10	2.7	0.80	0.63	17.8	0.23	6.5	18	3	\$10.79	
1617	C5-3	10.00	3	8.0	227	20.40	4.6	1.85	0.83	23.6	0.39	11	18	3	\$11.79	
1613	C6-3	10.00	3	4.0	113	15.30	3.4	1.60	0.83	23.4	0.43	12.2	18	3	\$11.79	
1614	C6-5	10.00	5	4.0	113	15.30	3.4	1.60	0.85	24.0	0.43	12.2	18	3	\$11.79	
1522	C11-3	10.00	3	6.0	170	22.10	4.9	0.80	1.13	32.1	0.44	12.4	24	2	\$7.99	
1523	C11-5	10.00	5	5.0	142	22.10	4.9	0.80	1.18	33.4	0.44	12.4	24	2	\$7.99	
1566	D12-3	20.00	3	14.0	396	32.90	7.4	1.60	1.57	44.5	0.85	24.2	24	2	\$11.99	
1567	D12-5	20.00	5	10.0	283	32.90	7.4	1.60	1.61	45.7	0.85	24.2	24	2	\$11.99	
1692	E12-4	30.00	4	17.0	482	30.60	6.9	2.70	2.16	61.2	1.3	36.9	24	3	\$23.99	
1693	E12-6	29.50	6	14.0	397	29.60	6.7	2.70	2.23	63.2	1.3	36.9	24	3	\$23.99	
1651	F15-4	49.61	4	21.0	595	25.26	5.7	3.45	3.59	101.5	2.12	60	29	2	\$26.99	
1652	F15-6	49.61	6	17.0	482	25.26	5.7	3.45	3.66	103.7	2.12	60	29	2	\$26.99	
1696	E16-4	33.68	4	20.0	566	26.44	5.9	2.09	2.86	81.0	1.41	40	29	2	\$22.99	
1697	E16-6	33.68	6	16.0	453	26.44	5.9	2.09	2.92	82.7	1.41	40	29	2	\$22.99	



MODEL ROCKET ENGINE PERFORMANCE CHART (cont'd)

Prod. No.	Engine Type	Total Impulse		Time Delay	Est. Max. Lift Wt.	Max Thrust		Thrust Duration	Initial Weight		Propellant Weight		Diameter	Quantity per Pack	Retail Price per Pack
		N-sec	g			oz	g		oz	g	oz	g			
UPPER STAGE ENGINES															
1504	1/2A3-4T	1.25	4	1.0	28	8.30	1.9	0.30	0.23	6.6	0.07	1.9	13	4	\$10.29
1599	A8-5	2.50	5	2.0	57	13.30	3.0	0.50	0.55	15.7	0.14	4.1	18	3	\$10.29
1607	B6-6	5.00	6	2.5	71	12.10	2.7	0.80	0.64	18.2	0.23	6.5	18	3	\$10.79
1615	C6-7	10.00	7	2.5	71	15.30	3.4	1.60	0.85	24.3	0.43	12.2	18	3	\$11.79
1524	C11-7	10.00	7	4.0	113	22.10	4.9	0.80	1.19	33.8	0.44	12.4	24	2	\$7.99
1568	D12-7	20.00	7	8.0	226	32.90	7.4	1.60	1.62	46.0	0.85	24.2	24	2	\$11.99
1694	E12-8	29.80	8	12.0	340	31.80	7.1	2.70	2.24	63.5	1.3	36.9	24	3	\$23.99
1653	F15-8	49.61	8	15.0	425	25.26	5.7	3.45	3.69	104.4	2.12	60	29	2	\$26.99
1698	E16-8	33.68	8	14.0	396	26.44	5.9	2.09	2.99	84.7	1.41	40	29	2	\$22.99
BOOSTER STAGE ENGINES															
1510	A10-0T	2.50	NONE	4.0	113	13.00	2.9	0.80	0.24	6.8	0.12	3.5	13	4	\$10.29
1600	A8-0	2.50	NONE	3.0	85	13.30	3.0	0.30	0.47	13.5	0.14	4.1	18	3	\$10.29
1608	B6-0	5.00	NONE	4.0	113	12.10	2.7	0.80	0.55	15.7	0.23	6.5	18	3	\$10.79
1616	C6-0	10.00	NONE	4.0	113	15.30	3.4	1.60	0.76	21.4	0.43	12.2	18	3	\$11.79
1521	C11-0	10.00	NONE	6.0	170	22.10	4.9	0.80	1.03	29.2	0.44	12.4	24	2	\$7.99
1565	D12-0	20.00	NONE	14.0	396	32.90	7.4	1.60	1.43	40.4	0.84	23.8	24	2	\$11.99
1691	E12-0	28.80	NONE	16.0	454	31.30	7.0	2.60	2.05	58.1	1.3	36.9	24	3	\$23.99
1650	F15-0	49.61	NONE	19.0	539	25.26	5.7	3.45	3.32	94.0	2.12	60	29	2	\$26.99
1695	E16-0	33.68	NONE	18.0	509	26.44	5.9	2.09	2.58	73.2	1.41	40	29	2	\$22.99
PLUGGED ENGINES—FOR USE WITH ROCKET-POWERED RACERS & R/C ROCKET GLIDERS															
1505	A10-PT	2.50	NONE	3.0	85	13.00	2.9	0.80	0.26	6.83	0.13	3.5	13	4	\$10.29

*Delays have a tolerance of +/- 10% or one second, whichever is greater. The data listed above is from randomly chosen production samples. There are four mini-engines per package. All other engines are two or three per package. NOTE: The "T" designates a mini-engine. All Estes engines come complete with starters and starter plugs. The Estes starter plug makes engine ignition extremely reliable.

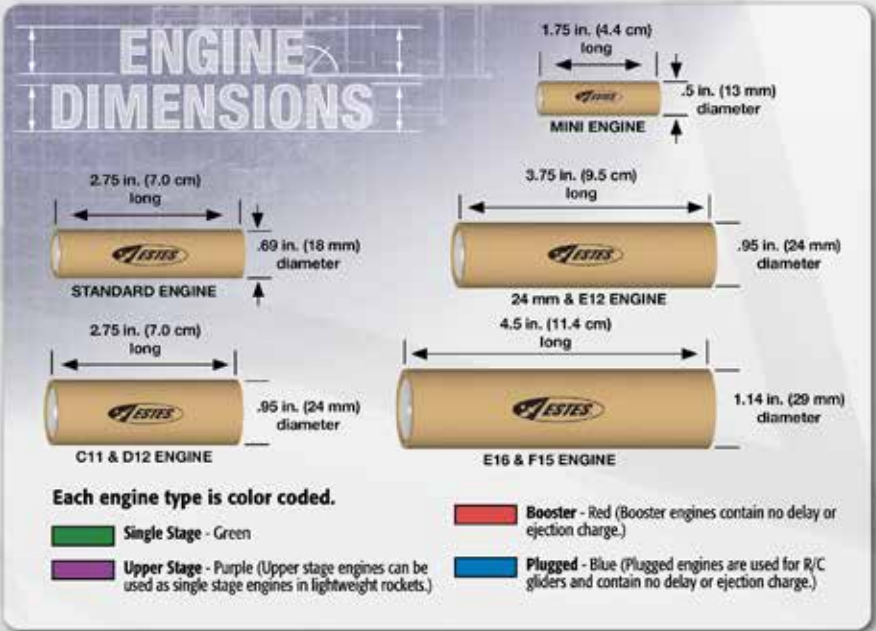


WARNING:
 This product can expose you to silica, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.
 This warning is on all Estes engine packaging.

Estes Model Rocket Engines

The famous model rocket engines that made model rocketry the safe activity it is today! Estes® model rocket engines have been proven consistent and reliable in more than 500 million launches.

- The concept of a factory assembled model rocket engine is the foundation of this scientific and educational activity!
- 3% of all Estes® engines are static-tested at the factory for reliability and adherence to performance specifications.
- All engines comply with the code requirements of the National Fire Protection Association and are certified by the National Association of Rocketry.



LETTER = TOTAL IMPULSE

This letter is the total power (in Newton-seconds) produced by the engine. Each succeeding letter has up to twice the total power as the previous letter. (Example: 'B' engines have up to twice the power of 'A' engines, which results in approximately twice the altitude the rocket will reach.)

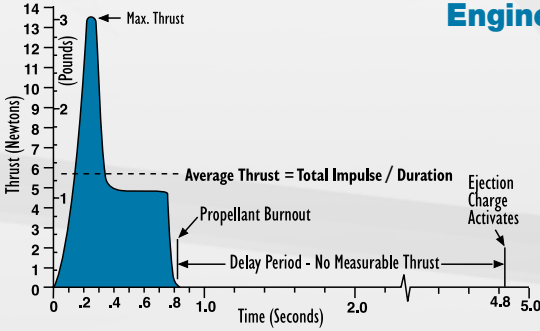
FIRST NUMBER = AVERAGE THRUST

This number shows the engine's average thrust push or how fast the engine powers the rocket to go. The higher the number, the faster the speed. It is measured in Newtons (4.45 Newtons = 1lb.).

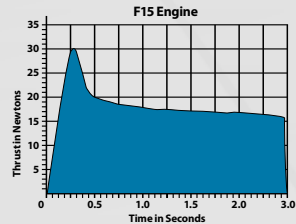
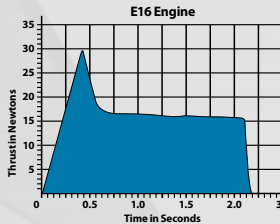
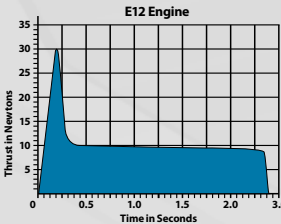
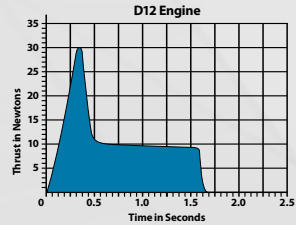
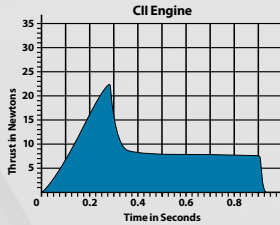
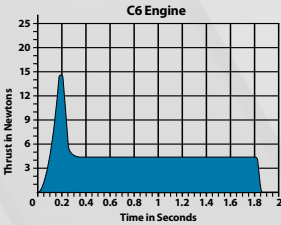
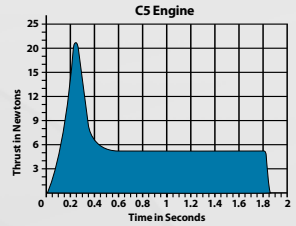
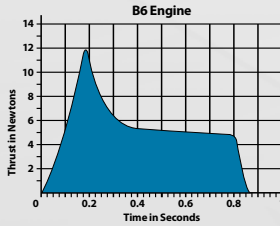
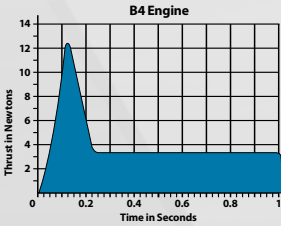
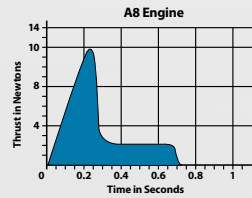
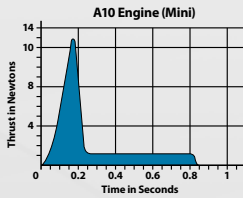
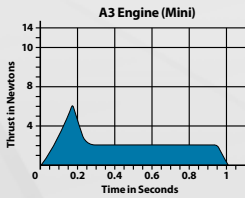
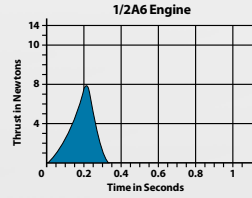
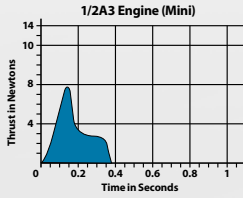
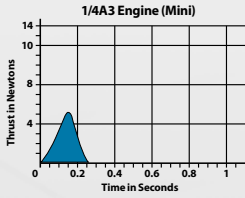
SECOND NUMBER = TIME DELAY

This number gives you the time delay in seconds between the end of the thrust phase and the ignition of the ejection charge. Engine types ending in '0' have no time delay or ejection and are used for booster stages and special purposes only. Engines ending in 'P' have no time delay or ejection charge and the forward end is plugged.

Engine Time/Thrust Curves



- Time/thrust curves are representative of random production samples.
- Graphs are not drawn to the same scale.

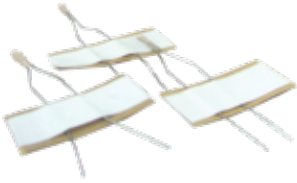


The Estes® model rocket starter is the basic ignition device used to start the combustion process in the rocket engine. Starters are placed inside of all Estes® model rocket engines.

2302 Model Rocket Starters

Easy-to-use Estes® starters in a convenient six pack. It's always good to have spares.

MSRP - \$5.49

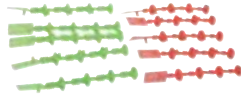


Estes® starter plugs are used to safely secure your model rocket starters to your Estes® engines during ignition. Different colored starter plugs are designed to accommodate different sized engines. They are a convenient way to ensure the success of your rocket launches; they are reusable.

2250 Plugs for Mini Engines

1/4A3, 1/2A3, A3, and A10 (20 pack)

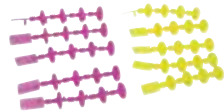
MSRP - \$5.99



2251 Plugs for Standard Engines

1/2A6, A8, B4, B6, and C6 (20 pack)

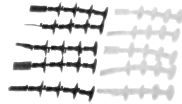
MSRP - \$5.99



2252 Plugs for Large Engines

C11, D12, E9, E12, E16 and F15 (20 pack)

MSRP - \$5.99



Shock cords hold the parts of a model rocket together once they separate during the ejection phase. The shock cord is made of an elastic material to help absorb the shock placed upon the rocket when the parachute ejects, then opens — creating drag during the recovery phase. Shock cord mounts fasten the shock cord to the inside of the rocket's body tube.

2278 Shock Cords & Mounts Pack

Includes three 1/8 in. x 36 in. (3 mm x 91.4 mm) and one 1/4 in. x 36 in. (6 mm x 91.4 mm) rubber shock cords (enough for four shock cords). Includes shock cord mounts and instructions.

MSRP - \$5.99



Model rocket recovery wadding is placed inside the rocket to protect the parachute from intense heat during the rocket's ejection stage. All Estes® recovery wadding is flame resistant, ensuring the safety of your rocket flights. Crumple sheets lightly, insert wadding into rocket making sure it touches the body tube walls and then insert the recovery system!

2274 Recovery Wadding

Flame-resistant wadding protects recovery system. Required in most Estes rockets. Contains approximately 72 squares — enough for about 18-25 flights!

MSRP - \$5.49

Recovery Parachutes

(plastic)

2268 9 in. (22.9 cm)
MSRP - \$3.49

2262 6 in. (15.2 cm)
MSRP - \$2.99

2264
12 in. (30.5 cm)
MSRP - \$3.99

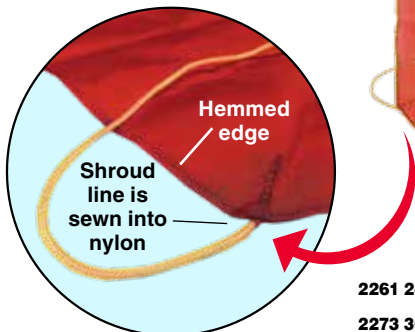
2265
15 in. (38.1 cm)
MSRP - \$4.49

2267 18 in. (45.7 cm)
MSRP - \$4.99

2271
24 in. (61 cm)
MSRP - \$5.49

All Parachutes are Fully-Assembled

Sturdy sewn fabric chutes for your biggest, heaviest rockets.



2261 24 in. (61 cm) Nylon Parachute MSRP - \$12.99

2273 30 in. (76.2 cm) Nylon Parachute MSRP - \$16.99

Launch equipment is what you'll need to safely and successfully launch your rocket time after time. The essentials are: launch base, launch rod, blast plate and launch controller. Different sized launch bases and launch rods are used to accommodate different sized rockets.

The 2230 E Launch Controller has the longer 30 foot cable you need when launching E and F engines.

2222 Porta-Pad® II and Electron Beam® Launch Controller

Quick assembly - no glue or tools required! Launch rod angle is adjustable. Comes complete with blast deflector, standoff, two-piece 1/8 in. (3 mm) launch rod and safety cap. Can accommodate a 3/16 in. (5 mm) Maxi™ launch rod - not included. Launch controller comes assembled with safety key and 15 ft. (4.6 m) of cable. Requires 4 new 1.5V AA alkaline batteries - not included.

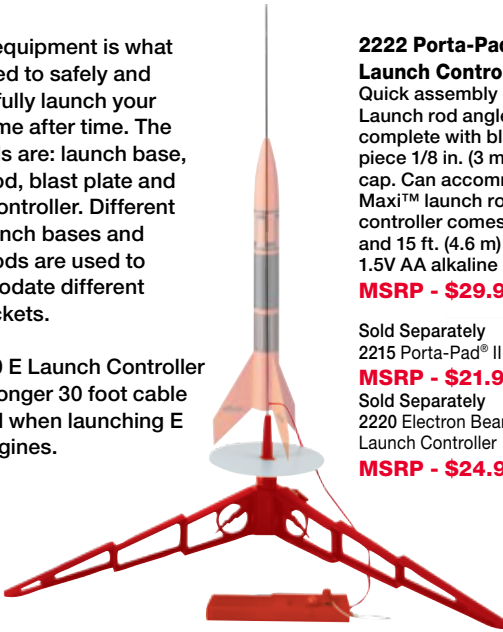
MSRP - \$29.99

Sold Separately
2215 Porta-Pad® II Launch Pad

MSRP - \$21.99

Sold Separately
2220 Electron Beam® Launch Controller

MSRP - \$24.99



2230 E Launch Controller

Comes assembled with safety key and 30 ft. (9.7 m) of cable. Requires 4 new 1.5V AA alkaline batteries - not included.

MSRP - \$32.99

2243 1/8 in. (3 mm) Two-Piece Launch Rod

Replacement rod ideal for most rockets.

MSRP - \$6.99

2244 3/16 in. (5 mm) Two-Piece Maxi™ Launch Rod

Launch rod with extra strength and length for larger rockets.

MSRP - \$11.99

38206 1/4 in. (6 mm) Two-Piece Launch Rod

Screws together. For use with the 2238 Porta-Pad® E Launch Pad and PS II™ Launch Pad.

MSRP - \$16.99



2238 Porta-Pad® E Launch Pad

Quick assembly - no glue or tools required. Launch rod angle is adjustable. Includes a three-piece 1/4 in. (6 mm) launch rod, but can accommodate a 3/16 in. (5 mm) Maxi™ launch rod - not included.

MSRP - \$30.99

2241 Blast Deflector Plate

Replaces that worn-out deflector. For use with 2215 Porta-Pad® II

MSRP - \$5.99



Now you can make exact, easy measurements when attending to your fleet of Estes® model rockets. Tube marking guides and fin alignment tools help make your hobby rocket endeavors fast, efficient and fun! These are must-have items for the advanced model rocket enthusiast.

3 Different Building Tools!



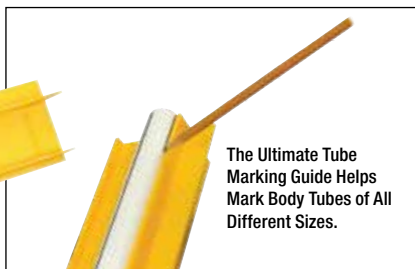
2227 Tube Marking Guide

The tube marking guide is an easy way to mark your fin and launch lug placement. The marking guide is a must for any rocket builder!

MSRP - \$12.99



The Tube Marking Guide Allows for Accurate and Consistent Fin Placement When Building Your Rocket.



The Ultimate Tube Marking Guide Helps Mark Body Tubes of All Different Sizes.

2228 Ultimate™ Tube Marking Guide

Accurately mark your body tubes for a variety of rocket-assembly purposes.

MSRP - \$11.99

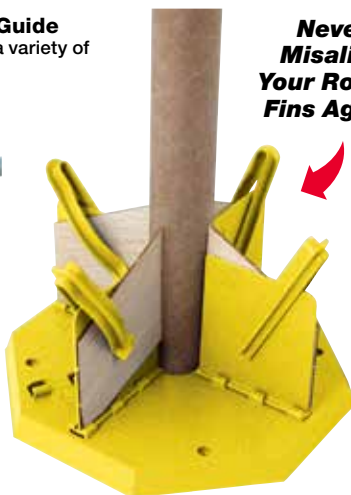


2315 Tube Cutting Guides

Assorted sizes: BT-5, BT-20, BT-50, BT-55, and BT-60 (hobby knife not included).

MSRP - \$11.99

Never Misalign Your Rocket Fins Again!



2231 Fin Alignment Guide

Fast and accurate fin alignment for three- or four-finned rockets.

MSRP - \$21.99

Model rockets are constructed using various essential parts. Nose cones streamline a rocket's ascent. Nose cone weights help stabilize a rocket's trajectory. Payload sections allow the rocketeer to view their cargo.

With Estes model rocket parts, you can build, launch, repair and create using any of the items listed here!



3180 Clay Nose Cone Weights
MSRP - \$5.99



3175 BT-5 through BT-55 Centering Ring Assortment
MSRP - \$5.99

NOSE CONE ASSORTMENTS

Each package of nose cones may contain a variety of shapes. Some are one piece, others two piece. All have eyelets for shock cord and shroud line attachments. (3173 shown)



- 3160 NC-5 Assortment (5 pack) **MSRP - \$5.49**
- 3161 NC-20 Assortment (4 pack)..... **MSRP - \$5.49**
- 3162 NC-50 Assortment (5 pack) **MSRP - \$8.99**
- 3163 NC-55 Assortment (4 pack) **MSRP - \$7.99**
- 3164 NC-56 Assortment (4 pack) **MSRP - \$7.99**
- 3165 NC-60A Assortment (3 pack)..... **MSRP - \$8.99**
- 3168 NC-80B Assortment (1 Pack) **MSRP - \$4.49**
- 3173 Sci-Fi Assortment (5 pack) **MSRP - \$16.99**



3171 Clear Payload Section Assortment
MSRP - \$17.99

BODY TUBE PACKS

High quality spiral wound paper tubes. Use tube couplers to connect tubes of the same diameter. Outer diameters listed. (not all body tube sizes shown)



- 3084 BT-5 • 0.54 in./14 mm diameter • 18 in./45.7 cm long (4 pack)
MSRP - \$7.49
- 3085 BT-20 • 0.74 in./19 mm diameter • 18 in./45.7 cm long (4 pack)
MSRP - \$8.49
- 3086 BT-50 • 0.98 in./25 mm diameter • 18 in./45.7 cm long (3 pack)
MSRP - \$8.49
- 3087 BT-55 • 1.33 in./34 mm diameter • 18 in./45.7 cm long (3 pack)
MSRP - \$8.99
- 3089 BT-60 • 1.64 in./42 mm diameter • 18 in./45.7 cm long (3 pack)
MSRP - \$9.49
- 3090 BT-80 • 2.60 in./66 mm diameter • 14.2 in./36 cm long (2 pack)
MSRP - \$8.99



3176 Tube Couplers
for BT-5, BT-20, BT-50 (2 each)
MSRP - \$3.99



3177 Tube Couplers for BT-
55, BT-60 (2 each)
MSRP - \$5.49



3178 Tube
Couplers for BT-80 (2 each)
MSRP - \$4.99



3196 Tube Coupler
Assortment Pack
Includes two couplers for BT-55,
BT-56 and BT-60; One for BT-80.
MSRP - \$6.99

3179 2x Sets
Laser Cut Centering
Rings and 2 Sets
Shroud Templates
MSRP - \$8.49



3181 Engine Mount Parts Assortment
Engine mounts for mini-engines, standard
engines, and D engines. (3 each)
MSRP - \$8.49

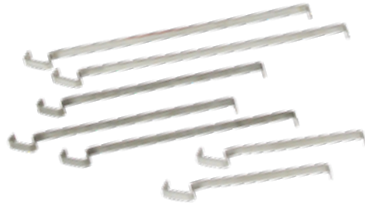


3158 Standard Engine Mount Kit
Fits BT-50, BT-55 and BT-60 tubes. Can
also be used to make a conversion mount
for lightweight D powered rockets.
MSRP - \$7.49



3159 D and E12 Engine Mount Kit
Heavy duty engine mounts for D and E12
engines. Fits BT-55, BT-60 and BT-80 tubes.
MSRP - \$10.99

3143 Engine Hook Accessory Pack
 Hooks fit mini engines (two), regular and D engines (three) and E12 engines (two).
MSRP - \$5.49



9750 Pro Series II™ Engine Retainer Set 29 mm (2 sets)
MSRP - \$8.99



9751 Engine Retainer Set 24 mm (2 sets)
MSRP - \$7.99



3187 Engine Retainer Set 18 mm (3 sets)
MSRP - \$6.99



2316 Mini to Standard Engine Adapters
 Two simple steps transform a mini-engine into a standard size. Insert a mini-engine into the adapter, and insert the adapter into a rocket. 3 adapters per pack. Reusable. (Engines not included).
MSRP - \$5.99



2317 Standard to D Engine Adapters
 Two simple steps transform a standard engine into a D size. Insert a standard engine into the adapter, and insert the adapter into a rocket. 3 adapters per pack. Reusable. (Engines not included).
MSRP - \$5.99



2320 Launch Lug Pack
 Contains 4 each: 1/8 in. x 2 3/8 in. (3 mm x 60 mm), 1/8 in. x 1 1/4 in. (3 mm x 32 mm), 3/16 in. x 2 in. (5 x 51 mm) and 1/4 in. x 1 in. (6 mm x 25 mm) launch lugs.
MSRP - \$5.99



3170 Waterslide Decal Set
MSRP - \$12.99

**The Model Rocket Cradle
Holds Rockets in a Horizontal Fashion.**



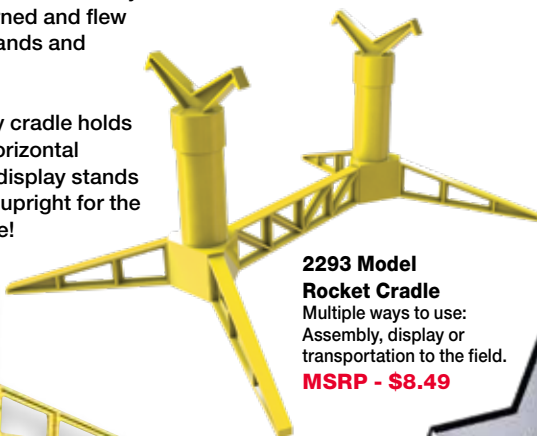
**Proudly
Display Your
Rockets!**

The world of hobby rocketry, models become more than mere ships — they become works of art that must be treated as such! Proudly display the rocket that you meticulously constructed, adorned and flew using your bare hands and brawny brain!

The rocket display cradle holds your rocket in a horizontal fashion while the display stands hold your rockets upright for the whole world to see!



**2290 Model Rocket
Display Stand**
For 13 mm engines. (3 pack)
MSRP - \$7.49



**2293 Model
Rocket Cradle**
Multiple ways to use:
Assembly, display or
transportation to the field.
MSRP - \$8.49



**2291 Model Rocket
Display Stand**
For 18 mm engines. (3 pack)
MSRP - \$7.49



**2292 Model Rocket
Display Stand**
For 24 mm engines. (3 pack)
MSRP - \$7.49

Estes® Rocket Display
Stands come in various
sizes and hold different
sized rockets upright.

Challenge Your *Imagination!*



Contains 100+ Parts. Design and Build the Rockets of Your Dreams!

Experiment with your own designs. Includes enough parts to build at least 8 complete rockets. Just add imagination.

1980 Designer's Special™

MSRP - \$86.99

Designs shown are for inspiration only and may include other imaginative parts not included in your Designer's Special.



HEIGHT

HYPOTENUSE

2232 Altitrak™

Measure altitude with this easy to use device. Follow the rocket in the sights to apogee, and release the trigger to lock the reading.

MSRP - \$21.99



How High Did It Fly?

Altitrak™: Part of the fun in launching a model rocket is knowing how high it goes. The Estes® Altitrak is a favorite, easy-to-use rocketry tool that provides fairly accurate measurements of flight altitudes.

The process uses good old reliable trigonometry, and it requires creating an invisible right triangle. A right triangle is any triangle that has a 90-degree angle (also called a right angle). The three points of this invisible triangle are the launch pad, the person who tracks the rocket's altitude with the Altitrak, and the point in the sky where the rocket reaches peak altitude (apogee).

The Altitrak works like a protractor, providing the angle between the base line and the triangle's hypotenuse (a big math word for

the straight line between the person using the Altitrak and the rocket when it's at peak altitude).

RIGHT
90°
ANGLE

If you measure the base line as given in the instructions (500 feet), the Altitrak also provides your rocket's altitude. The Altitrak is great for students' science experiments and for teachers' math lessons!

Altimeter: Another method for measuring the altitude without the need for a helper is by using an electronic altimeter. These onboard electronic devices can attach to the nose cone or be inserted into a payload bay. Altimeters incorporate a highly sensitive barometric sensor and an electronic triggering logic that provides maximum altitude at apogee. The Estes® 2246 Electronic Altimeter provides a direct LCD readout and can record heights in one-foot increments up to 10,000 feet (+/- 3 feet) and can store up to 10 launches in the unit's memory. The Estes® Altimeter weighs about 1/2 oz. and is slightly over 5/8 in. in diameter.



2246 Altimeter

Record up to 10 flights. LCD display, battery included.

MSRP - \$39.99



Altimeter

The Altimeter hooks onto the nose cone of your rocket and is inserted into the body tube right above the parachute. As your rocket climbs in altitude, the Altimeter digitally calculates the maximum height attained.

The Hand-Held Altitrak™ Quickly Tells How High Your Rocket Flies!

The Altitrak™ Measures This Angle.