AEROTECH® CONSUMER AEROSPACE

Division of RCS Rocket Motor Components, Inc.

NON-STD CLASS 1.4 'G' MOTOR INSTRUCTIONS

WARNING-FLAMMABLE: Read Instructions Before Use.

NOTE: SALE TO PERSONS UNDER 18 YEARS OF AGE PROHIBITED BY FEDERAL LAW. DO NOT SMOKE when using these motors or use in the vicinity of open flames. **CAUTION:** Keep Out Of Reach Of Children.

READ AND FOLLOW all instructions before use. Use these model rocket motors only in accordance with these instructions. AEROTECH Composite Model Rocket Motors are NOT toys! Handle with care and respect. Read and follow all instructions before and during use.

GENERAL INFORMATION

AEROTECH Composite Model Rocket Motors are the most technically advanced model rocket motors in the world. AEROTECH motors use the same propellant as America's space boosters. Pound for pound, this propellant delivers nearly 3 times the power of black powder used in other model rocket motors. AEROTECH Composite Model Rocket Motors allow you to fly larger rockets, heavier payloads, and achieve higher altitudes than ever before!

MOTOR CLASSIFICATION

Each AEROTECH Composite Model Rocket Motor is stamped with a code (e.g. E15-4W) which gives important information about the motor's performance. The letter indicates the total impulse (in Newton-seconds) produced by the motor. Each succeeding letter indicates a power level up to twice that indicated by the previous letter. For example, an "F" motor can be twice as powerful as an "E" motor. The number following the letter code indicates the motor's average thrust in Newtons. The next number of the code shows the time delay in seconds between propellant burnout and the firing of the ejection charge. The letter following the time delay code shows the type of propellant formulation used in the motor. "W" for WHITE LIGHTNING™, "T" for BLUE THUNDER™, and "J" for BLACK JACK™.

STORAGE AND HANDLING

Store AEROTECH Composite Model Rocket Motors in a dry place where the temperature will remain between 45°F and 100°F. Do not cut, saw, attempt to alter the size, attempt to disassemble, attempt to modify, or drop an AEROTECH Composite Model Rocket Motor. Do not use an AEROTECH Composite Model Rocket Motor that you believe has been damaged in any way. Do not ignite an AEROTECH Composite Model Rocket Motor indoors. Do not breathe fumes from the rocket motor exhaust.

USE

Use AEROTECH Composite Model Rocket Motors only in model rockets designed and built for them.

IGNITION AND LAUNCHING

1. Select and carefully straighten the AeroTech Copperhead™ igniter provided.

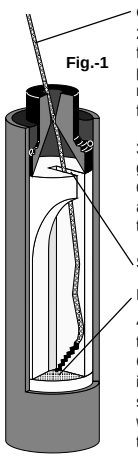


Fig.-1

2. **Fig.-1** Holding the Copperhead™ between thumb and forefinger, insert the black-coated end into the nozzle and probe for the slot in the propellant grain. Slowly rotating the motor while probing with the tip of the igniter may help in finding the slot.

3. Once the COPPERHEAD™ has entered the propellant grain slot, continue inserting it until contact is made with the delay element at the forward end of the motor. Failure to insert a COPPERHEAD™ igniter as described may result in low-thrust ignition of the motor.

4. **Fig.-2** Gently bend the end of the Copperhead that protrudes from the nozzle into an "S". (Avoid sharply bending a Copperhead as a crack in the copper foil may occur if the igniter is straightened.) Use the supplied red elastic band to secure the igniter to the side of the nozzle. **NOTE:** 'E' motors will require "doubling" the elastic band to achieve a snug fit on the nozzle.

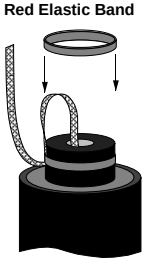


Fig.-2

5. Insert the AEROTECH Composite Model Rocket Motor into your rocket. If your rocket does not have a motor mount with a motor hook or motor block or has a motor block deeper than the motor length, simply wrap a layer of 1/2" wide masking tape tightly around the nozzle end of the motor to a thickness equal to that of the motor tube. Wrap a layer of masking tapearound the motor tube/motor junction to secure the motor in the rocket and to prevent motor ejection when the ejection charge fires. NEVER friction fit an AEROTECH Composite Model Rocket Motor into the motor mount.

6 Prepare the recovery system of your rocket. Make sure that all elements of the recovery system are in good working order.

7. Slide the rocket onto the rod or rail of your launch pad. Model rockets powered by AEROTECH Composite Model Rocket Motors must be flown from a launch pad having a launch rod or rail at least 36 inches long or two-thirds the combined length of the rocket body and nose cone, whichever is greater. Do not launch a model rocket powered by an AEROTECH Composite Model Rocket Motor from any launch rod or rail shorter than that specified in the rocket kit assembly and use instructions. The AEROTECH MANTIS™ model rocket launch pad will accommodate launch rods of several diameters and lengths and may be used with all types of model rockets.

8. Make sure the electrical launch controller is disarmed and then attach the igniter clip to the AEROTECH COPPERHEAD™ igniter. Use only an AEROTECH INTERLOCK™ electrical launch controller (or other electrical launch controller with an INTERLOCK™ igniter clip) to initiate the COPPERHEAD™ igniter of an AEROTECH Composite Model Rocket Motor. Test the INTERLOCK™ electrical launch controller for proper safe operation before each flying session: testing and operating procedures are detailed in the instructions for the INTERLOCK™ electrical launch controller.

9. Stand at least 30 feet from the launch pad when flying a model rocket powered by an AEROTECH Composite Model Rocket Motor. Do not allow spectators to stand less than 30 feet from the launch pad. After arming the INTERLOCK™ electrical launch controller give a loud, audible five second countdown before pressing the launch button.

10. Read and follow the Model Rocket Safety Code of the National Association of Rocketry (NAR) and comply with all federal, state and local laws in all activities with model rockets.

MISFIRES

If a misfire occurs and an AEROTECH Composite Model Rocket Motor does not ignite for any reason within five seconds of pressing the launch button, release the launch button and remove the safety key from the INTERLOCK™ electrical launch controller. WAIT ONE MINUTE before approaching or allowing anyone else to approach the model rocket. Keep your fingers and hands out from underneath the model rocket and away from the possible path of the exhaust jet. Do not place any part of your body over the launch pad Disconnect the INTERLOCK™ igniter clip from the COPPERHEAD™ igniter. Carefully remove the model rocket from the launch pad. Keeping trhe motor nozzle pointed away from your face and body - and away from any other person's face or body - remove the red plastic cap and the COPPERHEAD™ igniter, and repeat the motor preparation and launching process.

CAUTION: The nozzle and the plastic casing of an AEROTECH Composite Model Rocket Motor remain hot for several minutes after operation. Do not touch any part of the motor for at least five minutes after operation. Remove an expended motor casing from a model rocket with pliers.

FIRST AID

For a minor burn, apply a burn ointment. For a severe burn, immerse the burned area in ice water at once and see a physician as quickly as possible.

In the unlikely event of oral ingestion of the propellant, induce vomoting and see a physician as quickly as possible. The AEROTECH Composite Model Rocket Motor contains a propellant that consists of ammonium perchlorate and a rubber like plastic elastomer.

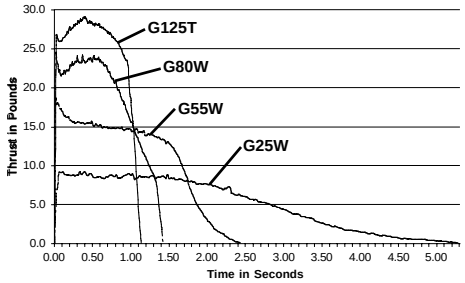
DISPOSAL

Damaged, defective, or unwanted motors should be disposed of in the following manner. Pack the motor firmly in the ground,with just the nizzle showing, away from buildings, people,animals, and flammable materials. Be sure the nozzle is pointing straight up and is clear. Ignite electrically, per ignition instructions, from a distance of 30 feet or more. Propellant,delay, and ejection charge will burn until consumed. Do not approach for at least five minutes after the firing. Do not put any part of your bodyover the motor during the process. Dispose of spent motor in inert trash. **WARNING:** Remember thatn the motor will be very hot after firing. Allow time for it to cool down!

FIRE SAFETY

Controlled tests show that composite propellant model rocket motors will not explode in fires and normally will not ignite if subjected to intense, sustained fires for two minutes or less. Use water to fight fires in which AEROTECH Composite Model Rocket Motors may become involved; direct the water at the AEROTECH Composite Model Rocket Motors to keep them belowtheir 550°F autoignition temperature. Foam and carbondioxide fire extinguishers will NOT extinguish buring propellant of the type used in AEROTECH Composite Model Rocket Motors.

TYPICAL TIME-THRUST CURVES



MOTOR PERFORMANCE DATA

MOTOR TYPE	PROPELLANT WEIGHT		TOTAL IMPULSE		AVERAGE THRUST	
	oz.	gms	lb-sec	N-sec	lbs	N
G55-5,10,15W	2.20	62.5	27.0	120.0	12.4	55.0
G25-5,10,15W	2.20	62.5	27.0	120.0	5.6	25.0
G80-4,7,10W	2.20	62.5	27.0	120.0	18.0	80.0
G125-5,10,15T	2.01	57.1	29.2	130.0	28.1	125.0

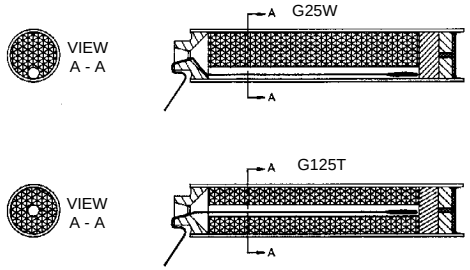
MAXIMUM RECOMMMENDED LIFTOFF WEIGHT

Maximum liftoff weight is a recommendation that is provided only as a general guideline and should not be used at the exclusion of overall considerations of rocket flight stability, recovery and safety.

MOTOR TYPE	SHORT DELAY		MEDIUM DELAY		LONG DELAY	
	oz	gms	oz	gms	oz	gms
G55W	30.0	851	18.9	536	12.0	340
G25W	24.0	680	16.0	454	10.0	284
G80W	52.0	1,474	27.0	120	20.0	567
G125T	48.0	1,361	24.0	680	12.0	340

SPECIAL IGNITER INSTALLATIONS

The G25W and G125T motors require igniter installations different than most AEROTECH motors. Please follow the following igniter installation diagrams carefully for these particular motors.



NOTICE: AEROTECH certifies that it has exercised reasonable care in the design and manufacture of its products. As we cannot control the storage and use of our products, once sold, we cannot assume any responsibility for product storage,transportation or usage. AEROTECH shall not be held responsible for any personal injury or property damage resulting from the handling, storage or use of our product. The buyer assumes all risks and liabilities therefrom and accepts and uses AEROTECH products on these conditions. No warranty either expressed or implied is made regarding AEROTECH products, except for replacement or repair, at AEROTECH's option, of those products which are proven to be defective in manufacture within one year from the date of original purchase. For repair or replacement under this warranty,please contact AEROTECH. Proof of purchase will be required. Note: Your state may provide additional rights not covered by this warranty.

NAR MODEL ROCKET SAFETY CODE

1. Construction. My model rockets will be made of lightweight materials such as paper, wood, rubber, and plastic without any metal or other hazardous materials as structural parts.

2. Engines. I will use only pre-loaded factory made NAR certified rocket engines in the manner recommended by the manufacturer. I will not alter or dismantle model rocket engines or their ingredients in any way, or attempt to reload these engines.

3. Recovery. I will always use a recovery system in my model rockets that will return them safely to the ground so that they may be flown again. I will use only flame resistant recovery wadding in my rockets.

4. Weight Limits. My model rockets will weigh no more than 1500 grams (53 oz) at liftoff and the engines will contain a total of no more than 125 grams (4.4 oz) of propellant. My model rockets will weigh less than the engine manufacturer's recommended maximum liftoff weight for the engines used, or I will use engines recommended by the manufacturer for my rockets.

5. Stability. I will check the stability of my model rockets before their first flight, except when launching models of already proven stability.

6. Payloads. My model rockets will never carry live animals, or payloads that are intended to be flammable or explosive.

7. Launch Area. I will launch model rockets outdoors in a cleared area, free of tall tress, power lines, and buildings. I will ensure that people in the launch area are aware of the pending rocket launch and are in a position to see the rocket's liftoff before I begin my audible five-second count down.

8. Launcher. I will launch my model rockets from a launch rod or other device that provides rigid guidance until the rocket has reached a speed adequate to ensure a safe flight path. To prevent accidental eye injury, I will always place the launcher so that the end of the rod is above eye level or will cap the end of the rod when approaching it. I will cap or disassemble my launch rod when not in use and 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, and other easy-to-burn materials.

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

10. Launch Safety. I will not let anyone approach a model rocket on a launcher until I have made sure that the safety interlock has been removed or the battery has been disconnected from the ignition system. In the event of a misfire I will wait one minute 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 per hour and under conditions where the model will not fly into clouds, fly near aircraft in flight, or be hazardous to people or property.

12. Pre-Launch Test. When conducting research activities with unproven designs or methods I will, when possible, determine their reliability through pre-launch tests. I will conduct launchings of unproven designs in complete isolation from persons not participating in the actual launch.

13. Launch Angle. I will not launch model rockets so that their flight path will carry them against targets. 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 becomes entangled in a power line or other dangerous place, I will not attempt to retrieve it.

NOTICE: As we cannot control the storage and use of our products, once sold, we cannot assume any responsibility for product storage,transportation or usage. RCS shall not be held responsible for any personal injury or property damage resulting from the handling, storage or use of our product. The buyer assumes all risks and liabilities therefrom and accepts and uses AeroTech/RCS products on these conditions. No warranty either expressed or implied is made regarding AeroTech/RCS products, except for replacement or repair, at RCS's option, of those products which are proven to be defective in manufacture within one year from the date of original purchase. For repair or replacement under this warranty,please contact RCS. Proof of purchase will be required. Note: Your state may provide additional rights not covered by this warranty.

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P/N 21001 Rev. 8/12/04
Made in U.S.A.

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