

I'm not robot!

Model rocket motors, also called "engines", are what make a rocket go. The propellant, a slow-burning delay cap, and then black powder used as the ejection charge. These are all wrapped up in a casing that is made of paper, plastic or aluminum. Motors are all single-flight use, though the casing may be reusable. Model rocket motors are made up of a fuel and an oxidizer, this is the propellant. These two ingredients can vary but both are required to produce the appropriate thrust. The most common model rocket engines are made of black powder and have only three ingredients: charcoal, potassium nitrate, and sulfur. Read on, or click the jump links below for more information. To read model rocket engines, you just need to understand the simple code they use in the manufacturing process. It consists of a letter and two numbers. The letter, at the front of the code, corresponds to the total amount of energy contained in the motor, this is measured in Newton-seconds. The first number, directly beside the letter, is the average thrust of the motor. The higher the number the faster it burns through the propellant, the more thrust per second. The third number, located after the dash, represents the time delay from ignition to the time the ejection charge fires and deploys the parachute. Let's take an example so you can see how to read the charts. We'll look at AeroTech's "E28-4T" motor. Breaking it down, we have four bits of information. "E" "28," "4," and "T" Power: The first letter "This, "E," in our example, is the power level classification of the motor, measured in impulse of Newton-seconds. If you look at the chart at the right, you can see that "E" motor ratings range between 20 and 40 Newton-seconds of "Total Impulse" Each letter classification's maximum total impulse is twice that of the prior. For a full chart of impulse classification levels, check out the Wikipedia page. In our example, the E28-4T has 39.69 N-s of total impulse per the manufacturer, so it would be considered a "Full" E motor since it is so close to the maximum of 40 N-s. Average Thrust: The number after power "This is the average thrust level of the rocket measured in Newtons, each unit of which is equivalent to 0.225 pounds of force. That means in our example, the motor has an average thrust of 28 Newtons. Delay: The value after the dash OR This is the length of time in which the "delay charge" burns before it allows the flame to reach and ignite the ejection charge, which deploys your parachute. Delay allows time for the rocket to coast and slow down so the parachute doesn't rip out of the tube at ejection. In our example, the rocket would coast for 4 seconds before deployment. Most single-use motors give a hard number for the delay, and you will need to purchase the appropriate one for your kit. Some loadable, larger single use or reloadable motors will often have a maximum delay that, with a specially designed tool, you can use to shorten the delay to what is best for your rocket. Look at the "Max Delay" statistic for that particular motor. If the delay is missing but there is a letter such as "M," it stands for "Medium" which is typically around 10s. If it is an N/A, or not listed, you cannot adjust the delay. A "T" stands for plugged and requires electronics to deploy the parachute because there is no ejection charge in plugged motors. Color: The letter after the delay, maybe. OR This notation is optional, and depending on the brand, may actually come before the delay indicator, such as with an H123W-M. This denotes the propellant type, or color, of the motor. The exception to this is Estes, who uses a "T" to denote a "Tiny" 13mm motor. Black powder motors do not have color choices, whereas composite motors have a variety. Each brand uses a different lettering scheme. Our example is an Aerotech motor, and the "T" tells us that it is a Blue Thunder propellant. Propellant type doesn't affect the way your rocket flies, it just affects the way it looks at takeoff. For more information on motor flame-color, see Peak-of-Flight Newsletter #217. At Apogee, we sell rocket motors of two different types: Black Powder and Composite. There are others available, such as Hybrids (liquid and solid combination), but we do