and information to help you have a happy relationship with your 2-stroke glow engine.

**Easy Starting** Nothing is more frustrating than owning an engine that's difficult to start. Our frustration often leads to a flight that ends with a dead-stick landing or a crash. When you start any engine, there are three things to remember. For combustion to occur, your engine needs air, fuel and fire (heat). If your engine won't start, check the carburetor to make sure that air and fuel are available, and check your glow plug to ensure that it provides enough heat to ignite the air/fuel mixture. Remove the glow plug and attach the glow driver; its element should glow brightly. If it doesn't, replace it; if it does, reinstall it. Close the needle valve and then open it three full turns. Place your thumb over the carb, and flip the prop several times until fuel is drawn through the fuel line and into the carb. If you remove any one of these three elements from the equation, your engine will not start.

**Secure fuel lines** Proper fuel-line installation is very important. If your fuel line is too big, it may leak air or even slip off in flight. Fuel lines come in several sizes, so use the size that best fits the carburetor's fuel fittings. Air bubbles in the fuel line may cause the engine to run lean, and if the line slips off, the engine will die. Be sure that there is adequate slack in the line, and secure it to the fuel fitting with a wire clip or a small length of fuel line slipped over the end of the main line.

**Tight Seals** If your engine begins to run erratically, and the mixture leans out even after you've adjusted the needle valve, you may have an air leak in the carb. Make sure that the carb is firmly and properly attached to the crankcase. If the intake is sealed with an O-ring, check it for cracks or breaks and make sure that it's seated properly, lies flat and isn't distorted when the carb-attachment screw/s are tightened. Make sure that all the adjustment screws and the needle-valve assembly are properly sealed and work correctly.

Last, check that the fuel-intake fitting is tightly screwed into place and that it isn't damaged or cracked. The fuel tank and fuel lines must be properly and securely installed. If you have previously nosed the model over or made a hard landing, the fuel pick-up clunk may have shifted forward in the tank; this can pinch off the fuel supply. The clunk and pick-up line should move freely, and you should be able to hear the clunk rattle in the tank.

**Fuel Flow** If your engine always runs rich or floods easily, check the position of the fuel tank. The tank should be installed in the fuselage so its centerline is at or slightly below the carburetor's spray bar. Use scraps of foam to position it securely so it can't move around in the tank compartment. If the tank is too high in the fuselage, fuel will tend to be siphoned out and run freely into the carb. Conversely, if the tank is too low or too far away from the carb, the engine may have difficulty drawing fuel into the carb, and it will run lean. To improve fuel draw, attach a line from the pressure fitting on your muffler to the tank's vent line. If you use a third filler line with your tank close it off to allow the muffler pressure to enhance fuel draw.

**Idle reliability** An engine that idles poorly can be frustrating. The last thing you want is for your engine to quit during a landing. Proper fuel mixture, too much fuel line between the tank and the engine and the type of fuel and glow plug you use can all affect an engine's ability to idle reliably. The most common problem is a too-rich mixture. Adjust the high-speed needle for a slightly rich mixture and then adjust the idle. Start the engine and adjust the throttle for an idle of 2,100 to 3,000 rpm. After several seconds, advance the throttle to full open. If the engine sputters and spits raw fuel out of the carb, the idle mixture is too rich. Stop the engine, and turn the idle adjustment clockwise (in) about 1/4 turn to lean the mixture. Repeat this procedure until the engine transitions smoothly from low to high speed. If you have an air-bleed carburetor with a small hole at the front of the carb body and an adjustment screw control idle, turn the idle screw in to richen the mixture.

**Happy glow plugs** The glow plug is a critical part of the engine's overall performance; you can choose from several types, but always refer to your engine's instructions for the recommended plug. Glow plugs come with long and short thread parts, with or without an idle bar and are rated for hot or cold operating temperatures, but they don't last forever. The first sign that a plug is on its way out is a drop in rpm when you remove the glow-plug driver; also, when an engine that normally idles well suddenly doesn't run well at low rpm, you have a problem. If you use a plug that is too hot for your engine, the engine may suffer from detonation and pre-ignition and might overheat and run lean. Using a plug that is too cold will result in lower top-end rpm and poor idling. Small engines (.15 and smaller) should use short-reach plugs; a plug that's too long may hit the top of the piston and damage the engine.

**Staying cool** A cool engine is a happy engine. One of the worst things you can do to an engine is to run it lean. This increases its temperature and can drastically