



October 2012

## Tempest Tech-Tip

### Changing Spark Plugs

#### Background

Although complaints from the field about Tempest spark plugs rarely occur, most take place immediately after their installation, reporting that the engine ran rough. If requested, we expeditiously send replacement plugs to get the customer back in the air ASAP and arrange to have the suspect plug(s) returned to us for analysis. Upon receipt, we inspect and test each one. In virtually all cases, after cleaning, the plugs test ok. So, what's going on?

#### Carbon and Combustion By-Products Accumulation

In most engines a crust of carbon and other combustion by-products accumulates inside the cylinder head. This crust bridges from the head onto the shell of the spark plug. When the spark plug is turned to remove it, this crust is broken and bits of debris fall free in the cylinder. Subsequent movement of the piston sweeps the debris to the upper end of the cylinder. Then it falls into the recess around the bottom spark plug where it takes but one flake across a spark plug's gap to short the spark plug out. The flake may become a glowing 'hot spot' in the cylinder once the engine starts. If this occurs, it can cause pre-ignition. An indicator of pre-ignition is popping and snapping noises originating from the running engine.

Typically, the debris is blown from the cylinder within a few seconds after the engine starts. But, sometimes a flake sticks in place, shorting a spark plug and causing a rough running engine with a large mag drop. (Similar problems may occur with the initial start after an engine overhaul. In that case, it's usually oil or grease from the engine buildup process that's the culprit.) Of course, once the plugs are removed and cleaned or replaced with new ones, the problem vanishes because the offending material has been removed.

#### Tempest Recommendation

Tempest recommends the following; for safety purposes, remove **all** spark plugs from the engine, use shop air to blow back and forth through the cylinder, down through the top hole, out through the bottom, and vice versa. Turn the prop so the pistons chase loose particles to the upper end of the cylinder where they're easier to blow out. Then install the spark plugs per Tempests' recommended installation procedures (please go to [www.tempestplus.com/literature](http://www.tempestplus.com/literature)). This will help to remove the particles that could cause problems.

[www.tempestplus.com](http://www.tempestplus.com)





If you do have excessive mag drop, here's a helpful way to isolate the problem to a specific cylinder. Buy a 600 to 700 F degree 'Temp Stick' (manufactured by Tempil®) at your local welding supply store. Start the engine and let it warm up. Shut the engine down and let the exhaust pipes cool down until you can safely touch them. Make marks, starting at the cylinder head and going down the side of the pipe, 12 to 18 inches long, so that observers standing on each side of the airplane can see them.

Crank the engine. Immediately turn off the good mag. Operate only on the rough mag and immediately increase rpm to the rough running speed. The observers will see the marks quickly burn off of the properly running cylinders' pipes. The mark will remain on non-firing cylinder's pipe. Remove and clean the fouled spark plug. Check the resistor value. If it's more than 5000 ohms, replace the spark plug. If resistance is ok, reinstall the spark plug. In the vast majority of cases, these steps will resolve your problem!

#### **Additional Information**

For additional information on this tech tip and other Tempest products, please go to [www.tempestplus.com](http://www.tempestplus.com) or call (800) 822-3200.

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