



### Snowmobile Tuning Tips

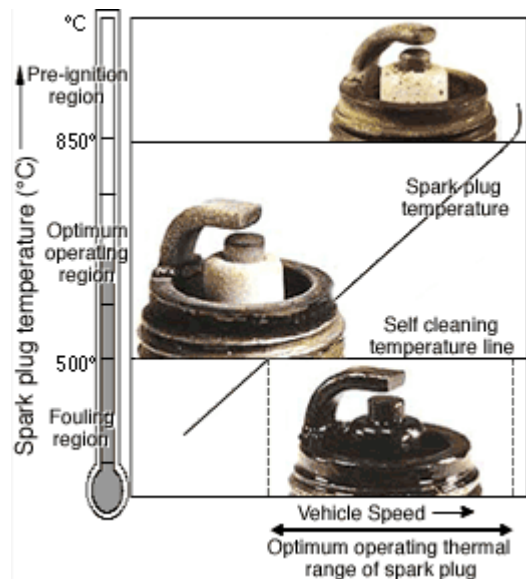
Every year avid snowmobile enthusiasts start preparing for another exciting snowmobile season. Its pertinent time is taken to properly tune your snowmobile before hitting the trails. Failure to take the time to properly tune your snowmobile can lead to costly engine repairs and down time.

#### Spark Plug Fouling:

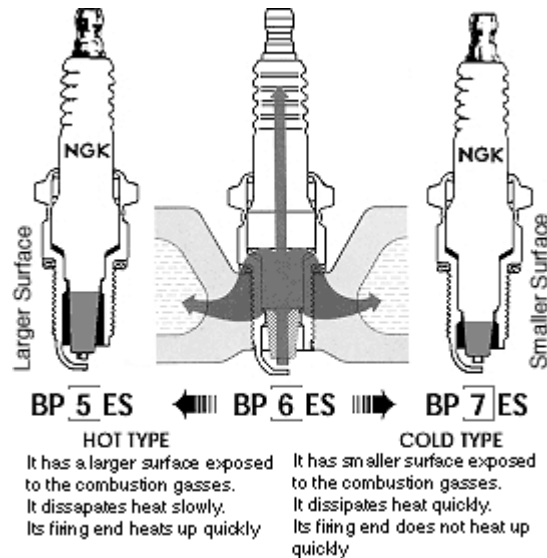
The largest volume of calls our technical department receives is in reference to spark plug fouling. In order to understand spark plug fouling you must first understand how the spark plug works.

The spark plug has two functions; one is to ignite the air/fuel mixture and the other is to transfer heat from the combustion chamber. Spark Plug heat range is selected through a series of pre-ignition tests. Thermal couple spark plugs are used to record internal center electrode and ground electrode tip temperatures. Optimum firing end temperatures must fall between 500°C to 800°C. If the tip temperature falls below 450°C the spark plug is considered to be in the fouling region. This means the tip temperature isn't hot enough to burn off carbon deposits. If the tip temperature rise's above 800°C the spark plug tip temperature is too hot and the spark plug is considered to be in the pre-ignition region. Pre-ignition is detrimental to an engine and can ultimately lead to spark plug failure and extensive engine damage.

(Fig 1)



(Fig 2)



Spark Plug engineers spend countless hours selecting and testing spark plugs for each engine application. Spark Plugs installed in an application have already been tested and are correct for the application.



## **Preventing Fouling:**

So you're probably asking yourself, why are my spark plugs fouling? The answer is simple.

Snowmobile manufacturers tend to jet carburetors on the rich side as a safety factor in order to prevent engine damage and warranty claims. In addition, manufacturers have to consider changes in temperature and elevation. Snowmobile engines are for the most part two-stroke, carbureted engines. Unlike fuel injection systems, carburetors can't compensate for changes in humidity, ambient temperatures and elevation. Therefore it's up to the consumer to make sure carburetors are jetted and synchronized correctly. Yes jetting can be a pain, however, jetted correctly a spark plug should last the whole season.

Carburetor jetting is quite simple and easy to learn. Many carburetor manufacturers have jetting charts located on their websites. Take the time to review these charts and learn how to jet properly. If you're uncomfortable jetting and synchronizing your carburetors we highly recommend taking your snowmobile to a trained professional. An important thing to consider is your technician can only jet for the conditions in your area. If you plan on traveling outside your area to a place with higher elevation and different ambient temperatures the tune-up will most likely be incorrect for the location you're planning to ride. In this case re-jetting may be required.

## **Hotter Spark Plugs:**

Many snowmobile enthusiasts believe the spark plug is the root cause of spark plug fouling. Again, spark plug fouling occurs as a result of incorrect carburetor jetting. A bandage approach to fix a fouling issue is to install a hotter spark plug. This can, in some cases fix the problem however this only masks the real problem which is fuel delivery.

A snowmobile can be rich or lean at idle, mid and wide open throttle depending on how it's jetted. A properly tuned carburetor should supply the correct amount of air/fuel throughout the entire power band. A hotter spark plug may temporarily fix the problem however under certain lean conditions be too hot. Under these conditions pre-ignition can occur resulting in insulator failure and extensive engine damage. Fix it right the first time and you will save yourself time and money.

## **Fuel Quality:**

Fuel degradation occurs much faster than it did twenty years ago. Today's so called "clean fuels" have a much shorter life as a result of EPA mandated reformulated fuels. Newly formulated fuels contain oxygenate additives, derivatives of methyl alcohol and ethyl alcohol. Studies have shown shelf life of these "clean fuels" is much shorter especially when the fuel is exposed to heat and moisture.

Storing snowmobiles outdoors in a covered trailer a hot shed or garage can deteriorate fuel quality. Running your snowmobile with degraded fuel will most likely lead to pre-ignition causing spark plug insulator failure and extensive engine damage. This can be costly and ruin your weekend. Using fuel stabilizing products is always recommended, however the best choice is to drain the fuel at the beginning and end of the snowmobile season and replace with fresh fuel.



High Performance Snowmobiles require premium fuels. We recommend purchasing fuel in larger cities for the first couple of months. Premium fuel isn't sold as frequently in smaller rural towns so premium fuel quality is poor.

### **Fogging Oil:**

Fogging oil is an excellent product and protects two and four stroke internal engine components from corrosion while being stored. Fogging oil is sprayed into the carburetors or throttle bodies while running coating internal engine components. When fogging your engine it's recommended you do so in a well ventilated area due to the heavy smoke, and follow the recommended safety precautions.

Fogging oil fouls spark plugs. When first starting your snowmobile at the beginning of each season it's recommended you install new spark plugs. The spark plugs used during the fogging process will most likely be fouled and the snowmobile won't start.

### **Important Tips:**

1. When starting your snowmobile try to shut the choke off as soon as possible after engine starts. Do not let the snowmobile idle with the choke on. The choke richens the mixture and this is when spark plug fouling is at its worst.
2. Always jet your carburetors and synchronize before each season. Take the time to check conditions where you plan on snowmobiling and adjust settings accordingly.
3. Always drain fuel and replace with fresh fuel before and after each season. If you don't plan on draining fuel stabilize the fuel with a premium brand fuel stabilizer.
4. When storing your snowmobile, find a location with low humidity and avoid areas with high temperatures.
5. Always use the OE recommended spark plug and adjust the air/fuel mixture to the spark plug.
6. Avoid fueling at small rural gas stations for the first couple of months of the snowmobiling season. Find high traffic gas stations in bigger cities as they will provide the freshest fuel.
7. Always follow torque specifications.
8. Check wires and resistor caps and replace as needed.
9. In the case of two strokes requiring oil mixing follow the mixing instructions and then jet the carburetor to the spark plug
10. Fogging oil fouls spark plugs. At the beginning of each season install new spark plugs before the first start.



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11. Plug exhaust holes with steel wool and place moth balls in and around the sled to prevent rodents from making a home.

For more information regarding snowmobile tuning tips or for general questions contact NGK Spark Plugs Technical Hotline at (877) 473-6767 option # 2 or visit our website at [www.ngksparkplugs.com](http://www.ngksparkplugs.com).