



Pop's Shop

HOT PLUGS-COLD PLUGS

Hot Plugs

A hot plug is one in which the firing end of the insulator is maintained at a comparatively high temperature; this is accomplished by having a large area of the insulator exposed to the burning gases in the combustion chamber of the cylinder and therefore tends to vaporize any oil or liquid fuel that may come into contact with the insulator, thereby preventing the formation of carbon on the insulator. Hot plugs should be used for slow speed drivers, low compression engines, door to door delivery, extremely cold climates and oil pumping engines.

Cold Plugs

A cold plug is one having a small area of the insulator exposed to the burning gases in the combustion chamber and therefore a shorter heat path to the cooling water, thereby maintaining a lower temperature in the insulator. If cold plugs are used in low compression engines or oil pumping engines, the insulator does not become hot enough to prevent oil from accumulating and the plugs will foul. Cold plugs should be used for severe service, high speed driving, high compression, heavy load-long haul and extremely hot climate.

Above information taken from Ford Service Manual – subject No. 12405. Date unknown.

Ken's notes

Parade driving once or twice a year. Hot-rodding at 60 mph once a week (Ken style). Tooling to the mall or a Saturday Tour with the group at 35 to 40 mph. Worn out engine that smokes and knocks. High compression head or standard Model A head. Recent rebuilt engine. Different kinds of driving under different conditions coupled with different engines create different amounts of heat in a Model A engine. Some of the heat generated by the firing of the spark plug is dissipated to the head, then to the water, through the shell of the spark plug.

The spark plug you are using in your engine can help either create or disperse the heat and in turn control the performance of your engine.

Spark Plugs come in different heat ranges. Chart below shows some of those plugs

Champion – hotter down to colder

W95D

W89 D

W16Y

W20

W18

W14

W10

W85N

W80N

Champion 3X and W18 listed as normal.

C16C discontinued in 1979 and replaced with the W16Y

Motorcraft

TT15 Same as W89D

TT10 Same as W14

TT8 Same as W14

TT4 Same as W10

Autolite

3076 Same as W14 and TT10

Chart compliments of Larry Brumfield and Fordbarn.com

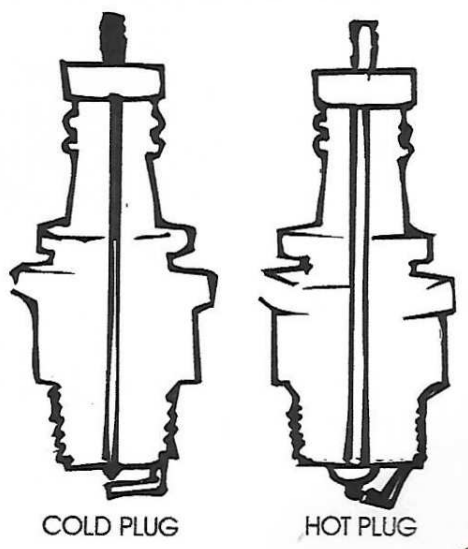
The number in the spark plug name is the "heat range".

1 – 25 automotive and small engines

26 – 50 aviation

51- 75 high performance

76 – 99 special applications.



What the heat range boils down to is the further into the combustion chamber the electrode extends the hotter the plug will run. Very little of the heat is dissipated thru the threads - most of its heat is sent thru the seating area where the plug contacts the head - as thru the plug gasket area.

Heat Range

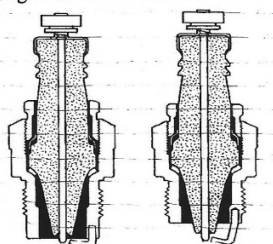
The heat range of a spark plug is one of the most important design factors. Every spark plug has a certain limited range of temperature within which it must work to give best results. Hot operating plugs have a long ceramic insulator, while cold plugs have a short ceramic insulator. The ceramic insulator on hot operating plugs will usually extend beyond the end of the threaded end of the plug. The metal gasket ring is part of the heat path and therefore, has a lot to do with the operating characteristics of the plug. The gasket ring should be replaced each time the spark plug is replaced. Corrosion should always be removed from the plug hole, allowing good conduction of heat transfer from the plug to the cast iron head. Engines driven under severe operating conditions require cooler running spark plugs than do engines operating at continuously low speeds. A spark plug that is too cool for the operating conditions of the engine will soot up with oil and carbon and eventually short out.

The heat range in the 7/8-inch thread size varies from cold to hot. The 3X spark plug used in the Model A is a moderately hot plug. The Model A can use this hot plug because it has a moderate compression, and the engine is so well cooled.

Preferably, the plug should always be hot enough to burn any carbon that may be formed, but not hot enough to cause preignition. Unfortunately, the temperature range marked between these two limits is comparatively narrow—only about 350 degrees C, which explains why plugs may easily cause trouble.

Very little heat flows through the threaded part of the plug. This explains why a Metric plug, when used in a 7/8-inch spark plug hole, does not give the same results as using a Metric plug in a hole tapped directly in the cylinder head. The extra resistance to flow of heat through threads of adapter bushings offsets the gain due to reduced heat-exposed area.

The Champion 3X spark plug is the correct heat range for the Model A engine under normal driving conditions. The Champion W16Y spark plug has a little hotter range and may be needed if driving conditions consists of short slow trips or if there is more than normal oil consumption. The Autolite TT10 spark plug runs



Champion 3X
Moderately Hot

Champion W16Y
Hot Plug

a little on the cooler side and may be used under more severe running conditions such as highway speeds or with a higher compression head.

My apologies. The scanner missed the last half of the above sentence and I had to type it in.

Ken