der, the nose of the plug will project down into the combustion chamber, where it will quickly overheat, prompting preignition.

If a short-reach plug is installed in a long-reach cylinder, the threads in the plug boss will become contaminated with carbon and lead deposits. This crud will have to be cleaned before the proper reach plug can be installed.

The heat-range puzzle

Aircraft spark plugs also are rated by heat range. A high number in the part number signifies a hotter plug than does a lower number. Spark-plug and engine manufacturers print service instructions specifying which plugs are approved for installation. In some cases there may be more than one plug on that list—in almost every case the only difference between the plugs is the heat range. The heat-range number signifies the ability of the plug to transfer heat from the firing end of the plug to the cylinder head. A hot plug has a longer insulator tip than does a cold plug. The longer tip makes the heat travel farther before it's transferred through the threads of the plug to the cylinder head. Cooler-running engines use hotter plugs.

Colder plugs (those with lower numbers in the part number) are used on higher-performance engines, which typically achieve their higher output by turbocharging or with increased compression ratios. For instance, the Champion plug specified for a turbocharged TSIO-520 engine is an RHM 32E and the Champion plug for the carbureted TCM O-470R engine is the RHM 40E. When the compression ratio was raised from 7.0-to-1 in the O-470R to 8.6-to-1 in the O-470U engine, the plug was changed to the colder RHM 32E.

Different heat-range spark plugs are needed to maintain the desired spark-plug insulator nose temperature. The center electrode of aircraft spark plugs is surrounded by a special super-hard ceramic material. The correct heat-range spark plug maintains insulator nose temperatures above 900 degrees F (when idling) and below 1,300 degrees F (at takeoff power). This prevents the formation of deposits that cause lead fouling at idle speeds, and overheating at high power settings.

A visual inspection of the firing end of a spark plug is the best method of determining if the plug heat range is

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