

# LAB - Spark Plug Service



Students: 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_

Fill in each box with the appropriate information.

Be sure to have the Instructor's initials before moving on to the next step. These are there to ensure everything is **SAFE** and **CORRECT**. Each team member must be able to answer questions from your instructor to receive credit for this lab.

## LAB CREDITS


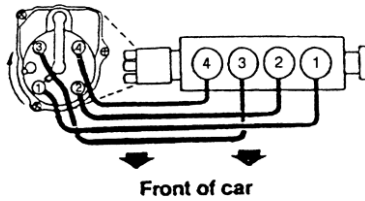
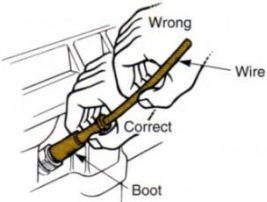

INLINE ENGINES:	<b>1 LAB</b>	V-ENGINES:	<b>2 LABS</b>
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## VEHICLE IDENTIFICATION

Year:		Make:	
Model:		Plug Gap Spec (AllData):	

Today, Spark Plugs are the only things left to maintain in the ignition system. A "Tune Up" no longer exists. Inexpensive "Copper Core" spark plugs should be replaced about once a year. Platinum and Iridium plugs can go 5 years or more (but cost 5 times as much). A clean, properly gapped spark plug is important to power, fuel economy, smooth running, and low emissions.

## SPARK PLUG REMOVAL

<b>1</b>	<p><b>CLEAN</b> the areas around the Spark Plugs with compressed air</p> 	<p>Debris around the spark plugs can fall into the engine when the plug is removed, which could <b>DAMAGE</b> your engine!</p>
<b>2</b>	<p><b>LABEL</b> the plug wires to prevent mixing them up.</p> 	<p>Every engine has a <b>FIRING ORDER</b>. The correct wire must go to the correct plug in the correct sequence or the engine may not run.</p>
<b>3</b>	<p><b>PULL</b> the Spark Plug Wires by the <b>BOOT</b> <b>NOT</b> by the wire!</p> 	<h1 style="text-align: center;">READ THIS!</h1> <p>The wire can be <b>DAMAGED</b> if you don't pull with the boot. Sometimes it can be repaired, sometimes not.</p>
<b>4</b>	<p>Use a <b>SPARK PLUG SOCKET</b> to remove the spark plugs. Lay them out <b>IN ORDER</b> so you know which plug came from which cylinder</p> 	<h1 style="text-align: center;">READ THIS TOO!</h1> <p>Spark Plug Sockets have a foam rubber insert <b>PROTECT</b> the <b>VERY FRAGILE</b> Spark Plug Ceramic. The wrong socket, or abuse, will crack the ceramic, <b>RUINING</b> the plug.</p> <p><b>ALSO – DO NOT DROP SPARK PLUGS!!!!</b></p>

# VISUAL INSPECTION

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“Reading” a Spark Plug can be a fantastic tuning aid. Hard-Core tuners use a magnifying glass to carefully study the plug to tell what the engine wants.

PROBLEM	EVIDENCE	CAUSE
Normal	Light brown or gray	Normal
Carbon Deposits	Dry, black, sooty	Rich fuel mixture or weak ignition system
Oil Deposits	Wet, black, shiny	Burning oil
Too Hot	White insulator, no deposits	Incorrect spark plug, lean fuel mixture, air leak, sticking valve, advanced ignition timing, cooling system fault
Preignition	Very white insulator, black “pepper” marks	Incorrect plug, low grade fuel, advanced ignition timing, lean mixture, cooling system fault
High Speed Glazing	Melted deposits, glazed/glossy appearance	
Gap Bridging	Deposits joining gap	Incorrect plug, mechanical fault, or tuning fault



Carbon Deposits



Oil Deposits



Too Hot



Preignition



High Speed Glazing



Gap Bridging

**DESCRIBE** the condition of your spark plugs (using the chart above):

Cylinder #1: \_\_\_\_\_ Cylinder #2: \_\_\_\_\_

Cylinder #3: \_\_\_\_\_ Cylinder #4: \_\_\_\_\_

Cylinder #5: \_\_\_\_\_ Cylinder #6: \_\_\_\_\_

Cylinder #7: \_\_\_\_\_ Cylinder #8: \_\_\_\_\_

**STOP!!!**

**INSTRUCTOR'S INITIALS:**

**SERVICE**

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**WEAR EYE PROTECTION**

Connect an air hose to the Spark Plug Cleaner (it is basically a small sand blaster)

Insert a spark plug into the rubber hole in the top

Flick the lever to "SAND"

Press the blast button as shown, while rotating and wiggling the spark plug to clean the plug thoroughly



7

Flick the lever to "AIR"

Press the blast button and repeat, this time ensuring that EVERY spec of sand is removed from the spark plug

8

Check the existing gap using a wire feeler gauge (one type shown) – the wire that **JUST** fits is the gap, do not FORCE it.

Use the C-shaped cutouts on the tabs to bend **ONLY** the side electrode to the correct gap  
**DO NOT PRY AGAINST THE CENTER ELECTRODE**  
**IT IS VERY FRAGILE**



36.5b To change the gap, bend the side electrode only, as indicated by the arrows, and be very careful not to crack or chip the porcelain insulator surrounding the center electrode

**STOP!****INSTRUCTOR'S INITIALS:**

<b>9</b>	<p>Apply <b>ANTI-SIEZE</b> compound to the spark plug threads (vitaly important with Aluminum Heads)</p> 
<b>10</b>	<h1>READ THIS!</h1> <p><b>CAREFULLY</b> thread each spark plug back into the engine <b>BY HAND</b></p>
<b>11</b>	<p>When the hand-tightened plugs have seated, tighten them just <b>SNUGLY</b> with the spark plug socket</p>
<b>12</b>	<p><b>CONNECT</b> the Spark Plug Wires to the correct plugs</p>
<b>13</b>	<p><b>START</b> the engine and ensure that the engine runs correctly and smoothly</p>

## **CAUTION!**

Spark Plugs must be threaded into the engine **fully by hand FIRST.**

It is **VERY** easy to “cross-thread” spark plug holes in an engine, *especially* an aluminum engine.

Using a wrench on a cross-threaded spark plug could result in a **LOT** of time and money to repair.

**Torque Specifications**



Plug Thread & Seat	Cast Iron Heads		Aluminum Heads	
	SAE	Metric	SAE	Metric
10mm Gasket	7-11 ft lb	10-15 nm	7-11 ft lb	10-15 nm
12mm Gasket	11-19 ft lb	15-25 nm	11-19 ft lb	15-25 nm
14mm Gasket	16-29 ft lb	35-40 nm	15-22 ft lb	20-30 nm
18mm Gasket	32-38 ft lb	43-52 nm	28-34 ft lb	38-46 nm
14mm Tapered	7-15 ft lb	9-20 nm	7-15 ft lb	9-20 nm
18mm Tapered	15-20 ft lb	20-27 nm	15-20 ft lb	20-27 nm

**NOTE:** Spark plugs should be installed with clean and dry threads to avoid over-torquing. This can distort the metal plug shell, which often results in engine damage.

<b>STOP!</b>	<b>INSTRUCTOR'S INITIALS:</b>	
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