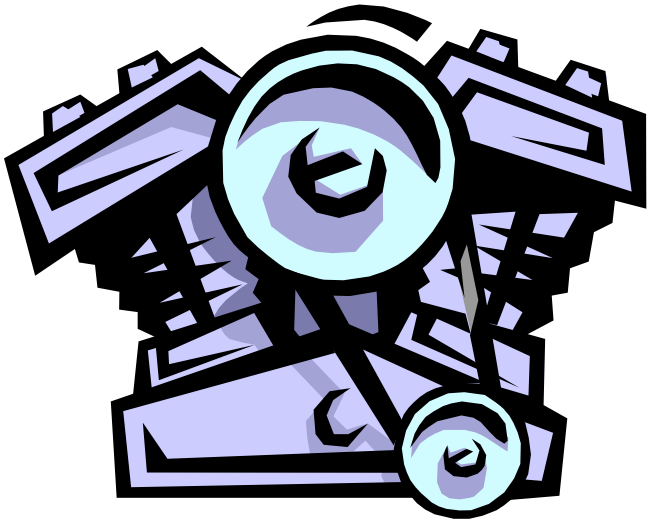
Job Introduction
~ Spark Plug & Air Cleaner ~

Maintenance is key to both engine reliability and longevity.

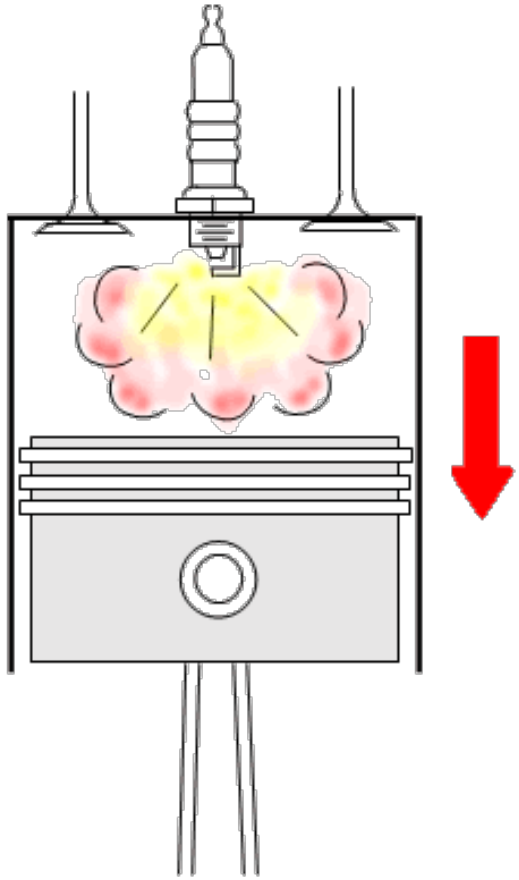
The job you are about to do will have you perform two common maintenance tasks, servicing your engine's spark plug and its air cleaner.



Spark Plugs

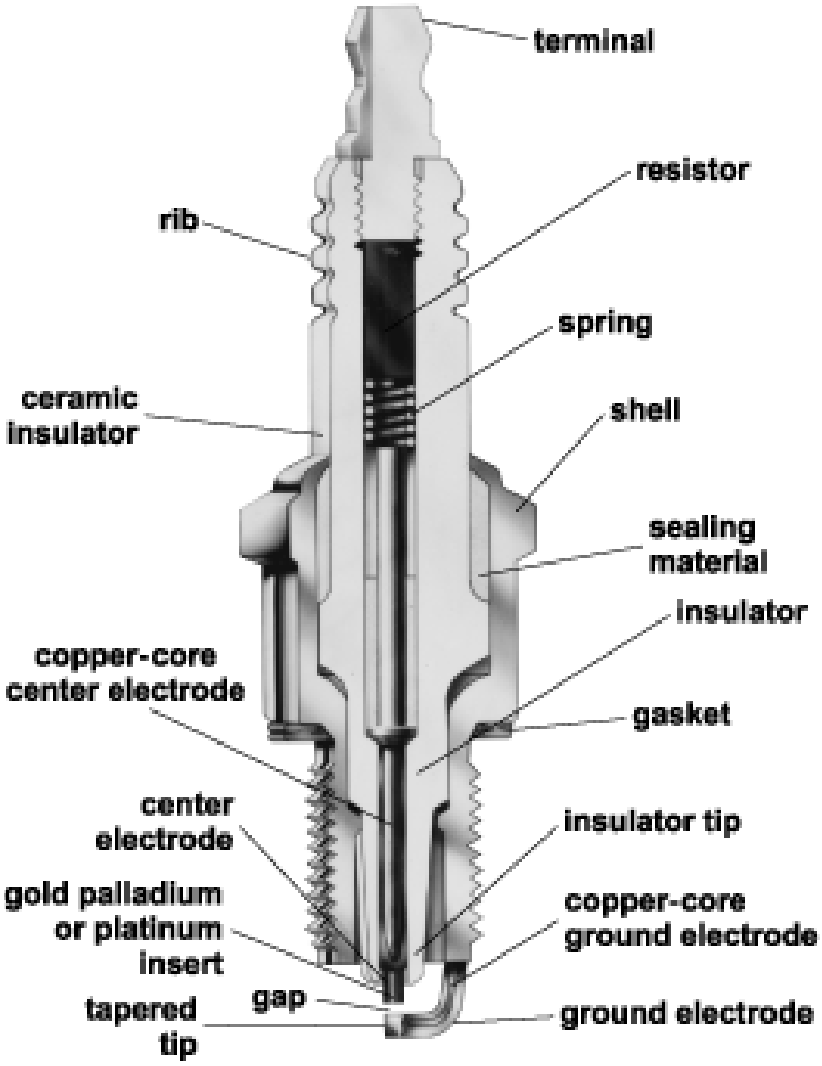
Review

As you know, your engine uses a spark to ignite the air/fuel mixture in the combustion chamber.



Anatomy of a Spark Plug

Spark plugs are more complicated then they first appear.

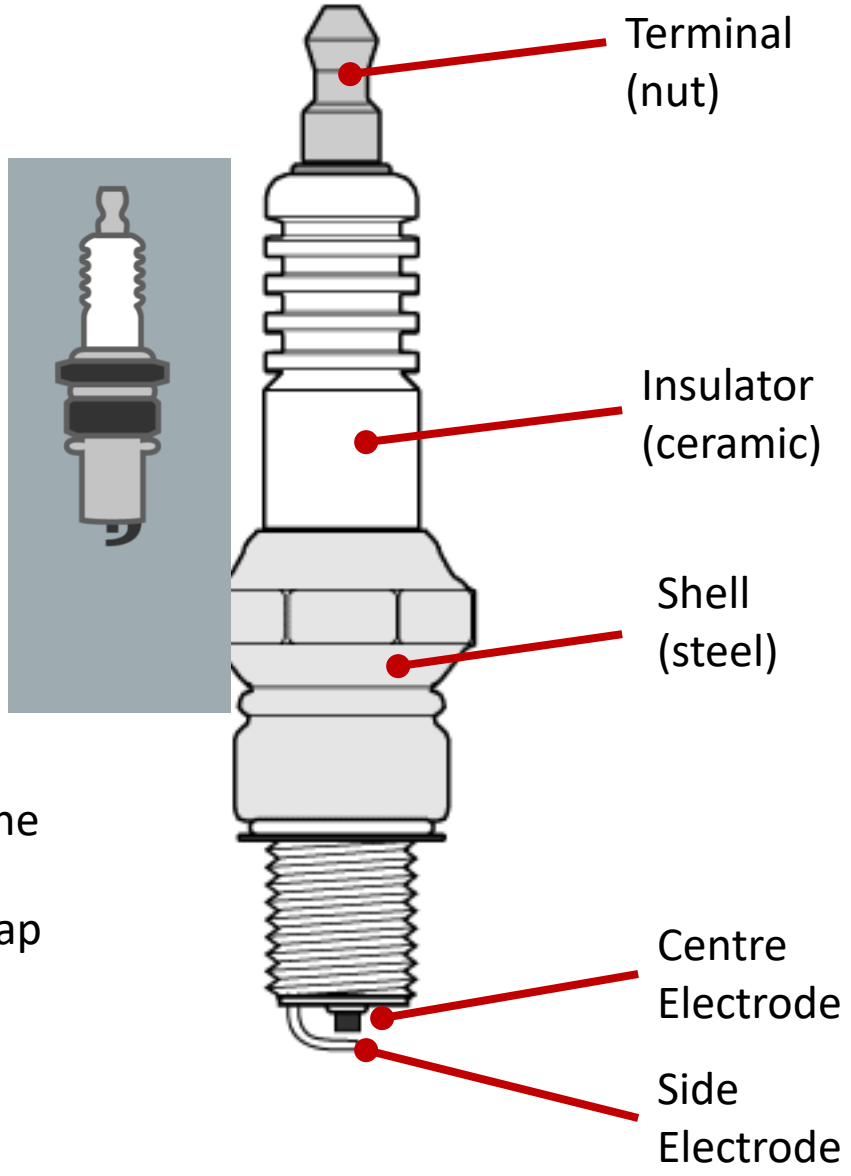


Anatomy of a Spark Plug Cont'd

Thankfully, since we aren't making spark plugs we need only concern ourselves with four key areas

4 parts to know:

1. Terminal (sometimes threaded)
2. Insulator – ceramic; easily broken
3. Shell – allows for screwing into engine
4. Electrodes – electricity arcs across gap



Spark Plug Know How

Maintenance of a spark plug involves two things:

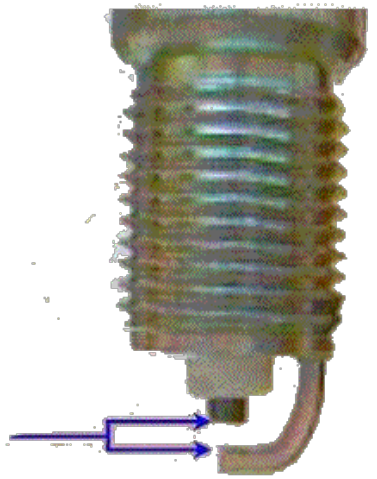
1. Cleaning
2. Gapping

Spark Plug Know How

Cleaning the plug:

1. If oily, a suitable degreaser can be used.
2. Soot & carbon build up is removed using a soft metal (brass) brush.

Spark Plug Know How



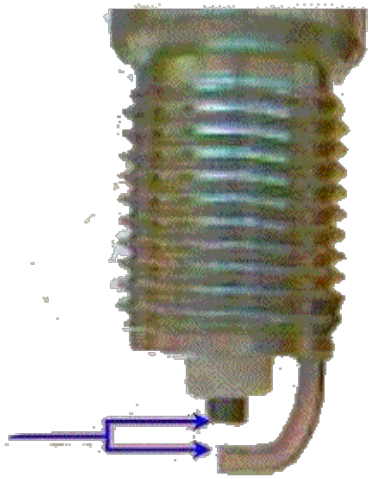
Before spark plugs are installed the gap needs to be checked and if necessary set.

If the gap is **TOO LARGE**…

The voltage generated by the ignition system (more about this later) won't be able to 'push' the electrons across the gap.

Result: no spark or intermittent spark (misfire)

Spark Plug Know How Cont'd



If the gap is **TOO SMALL…**

The electrons will jump the gap too easily and not release enough energy.

Result: weak spark = poor/inefficient burn

Spark Plug Know How Cont'd – Setting Plug Gap

Step 1 – Consult the service manual, check chart or **GOOGLE IT** to find the correct specification

HANDY REPAIR CHECK CHART

COMMON SPECIFICATIONS FOR ALL POPULAR ENGINE MODELS

1. Spark plug gap: .030 All Models
2. Condenser capacity: .18 to .24 MFD. All Models
3. Contact point gap: .020 All Models
4. Top governed speed: See Briggs & Stratton Service Bulletin No. 467 or Engine Replacement Data
5. Crankshaft End Play: .002-.008 All Models
6. Spark Plug Torque: 180in-lbs (15ft-lbs)

	BASIC MODEL SERIES	IDLE SPEED	ARMATURE AIR GAP TWO LEG	ARMATURE AIR GAP THREE LEG	VALVE CLEARANCE INTAKE	VALVE CLEARANCE EXHAUST	VALVE GUIDE REJECT GAGE	TORQUE SPECIFICATIONS FLYWHEEL NUT FT. LBS.	TORQUE SPECIFICATIONS CYLINDER HEAD IN. LBS.	TORQUE SPECIFICATIONS CONN. ROD IN. LBS.	CRANKSHAFT REJECT SIZE MAG. JOURNAL	CRANKSHAFT REJECT SIZE CRANKPIN	CRANKSHAFT REJECT SIZE P.T.O. JOURNAL	MAIN BEARING REJECT GAGE	CYLINDER BORE STD. ▲
ALUMINUM	6B, 60000	1750	.006 .010	.012 .016	.005 .007	.009 .011	19122	55	140	100	.6726	.8697	.6726	19166	2.375* 2.374
	8B, 80000, 82000	1750	.006 .010	.012 .016	.005 .007	.009 .011	19122	55	140	100	.6726	.9963	.6726	19166	2.375 2.374
	92000, 94000	1750	.006 .010		.005 .007	.009 .011	19122	55	140	100	.6726	.9963	.6726	19166	2.5625 2.5615
	100000	1750	.010 .014	.012 .016	.005 .007	.009 .011	19122	60	140	100	.6726	.9963	.9976	19166 Mag 19176 PTO	2.500 2.499
	110000	1750	.006 .010		.005 .007	.009 .011	19122	55	140	100	.6726	.9963	.6726	19166	2.7812 2.7802
	130000	1750	.010 .014		.005 .007	.009 .011	19122	60	140	100	.6726	.9963	.9976	19166 Mag 19176 PTO	2.5625 2.5615
	140000	1750	.010 .014	.016 .019	.005 .007	.009 .011	19151	65	165	165	.9975	1.090	1.1790	19176	2.750 2.749
	170000. 171700●	1750 **	.010 .014		.005 .007	.009 .011	19151	65	165	185	.9975 1.1790●	1.090	1.1790	19176	3.000 2.999
	190000. 191700●	1750 **	.010 .014		.005 .007	.009 .011	19151	65	165	165	.9975 1.1790●	1.122	1.1790	19176	3.000 2.999
	220000, 250000	1750 **	.010 .014		.005 .007	.009 .011	19151	65	165	190	1.3760	1.2470	1.3760		3.4375 3.4365
	401400, 401700 421400, 421700	1400 **	.010 .014		.004 ■ .006 ■	.007 ■ .009 ■	19151	145	160	190	1.378	1.622	1.376		3.4375 3.4365
CAST IRON	5, 6, N	1750		.012 .016	.007 .009	.014 .016	19122	55	140	100	.6726	.7433	.6726	19166	2.000 1.999
	6	1750		.012 .016	.007 .009	.014 .016	19122	55	140	100	.6726	.7433	.6726	19166	2.250 2.249
	9	1200			.007 .009	.014 .016	19151	60	140	140	.9832	.8726	.9832	19117	2.250 2.249
	14	1200			.007 .009	.014 .016	19151	65	165	190	1.1790	.9964	1.1790	19117	2.625 2.624
	19, 190000, 200000●	1200 **	.010 .014	.022 .026	.007 .009	.014 .016	19151	115	190	190	1.1800	.9964 1.1219●	1.1790	19117	3.000 2.999
	23, 230000	1200 **	.010 .014	.022 .026	.007 .009	.017 .019	19151	145	190	190	1.3769	1.1844	1.3759	19117	3.000 2.999
	243000	1200 **	.010 .014		.007 .009	.017 .019	19151	145	190	190	Ball	1.3094	Ball	Ball	3.0625 3.0615
	300000	1200 **	.010 .014		.007 .009	.017 .019	19151	145	190	190	Ball	1.3094	Ball	Ball	3.4375 3.4365
	320000	1200 **	.010 .014		.007 .009	.017 .019	19151	145	190	190	Ball	1.3094	Ball	Ball	3.5625 3.5615

INITIAL CARBURETOR ADJUSTMENT ALL MODELS

CARBURETOR TYPE	TURNS OPEN FROM SEAT NEEDLE VALVE	IDLE VALVE
Pulsa-Jet	1¼	
Two Piece Flo-Jet (Single Cylinder)	1½	¾
Two Piece Flo-Jet (Twin Cylinder)	1¼	1
One Piece	2¼	1¼
One Piece Flo-Jet (6, 7, 8, 10 & 11 H.P. Vertical Crankshaft With Governor)	1¼	1⅜
One Piece Flo-Jet (11 H.P. Horizontal Crankshaft)	1½	1

CYLINDER RESIZING

▲ Resize if .003 or more wear or .0015 out of round on C.I. cylinder engines. .0025 out of round on aluminum alloy engines.

Resize to .010, .020 or .030 over Standard.

*Model 6B series and early Models 60000 and 61000 series engines have cylinder bore of 2.3125 - 2.3115.

RING GAP REJECT SIZES

MODEL	COMP. RINGS	OIL RING
Alum. Cylinder Models	.035"	.045"
C.I. Cylinder Models	.030"	.035"

GOVERNED IDLE

For Adjustment Procedures, see Service & Repair Instructions MS-4750 or 270982 for Single Cylinder Models and Repair Instructions MS-7000 or 271172 for Twin Cylinder Models.

● With Valve Springs Installed.

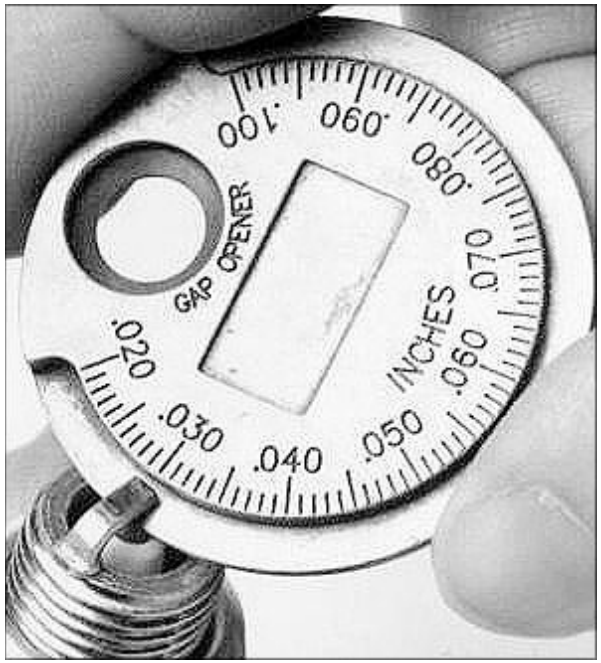
COMMONLY USED TOOLS FOR SERVICING BRIGGS & STRATTON ENGINES

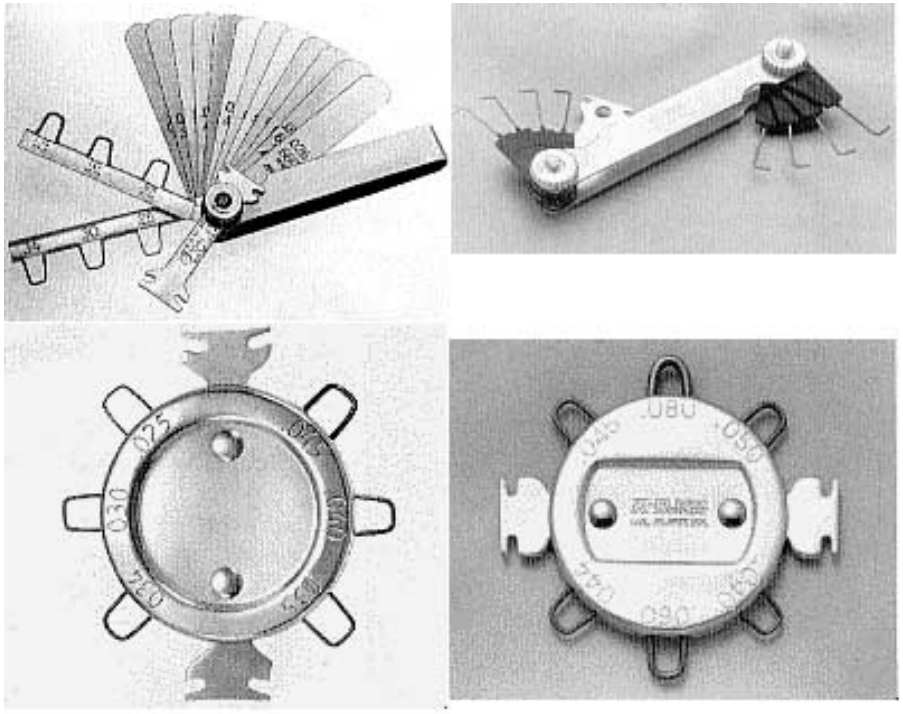
19051	Spark Tester, all models
19061	Carburetor jet screwdriver, all models
19062	Carburetor jet screwdriver, all models
19063	Valve spring compressor, all models
† 19161	Starter clutch wrench, use with ½" drive torque wrench
19203	Flywheel Puller, 170000 thru 421000 Aluminum Models & Cast Iron Models
	Flywheel puller, all models thru 130000
19069	Piston ring compressor, all models
19230	Starter clutch wrench, all rewind starter models
19114	Flywheel Puller, 140000, 170000, 190000 & 250000 Models
19165	Flywheel holder, all models thru 130000
19167	

Refer to Briggs & Stratton's Repair Instructions (MS-4750, 270982, MS-7000 or 271172), for a complete list of tools.

Spark Plug Know How Cont'd – Setting Plug Gap

Step 2 – Obtain a spark plug gapping tool





Spark Plug Know How Cont'd – Setting Plug Gap

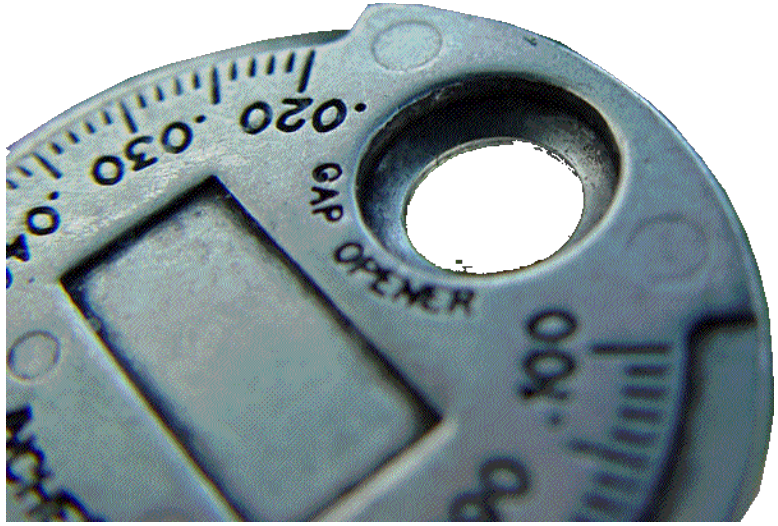
Step 3 – Measure the existing gap

Spark Plug Know How Cont'd – Setting Plug Gap

Step 4 – Tap side electrode on solid surface to adjust smaller

Spark Plug Know How Cont'd – Setting Plug Gap

Step 5 – Use expanding method on gapping tool to make gap larger

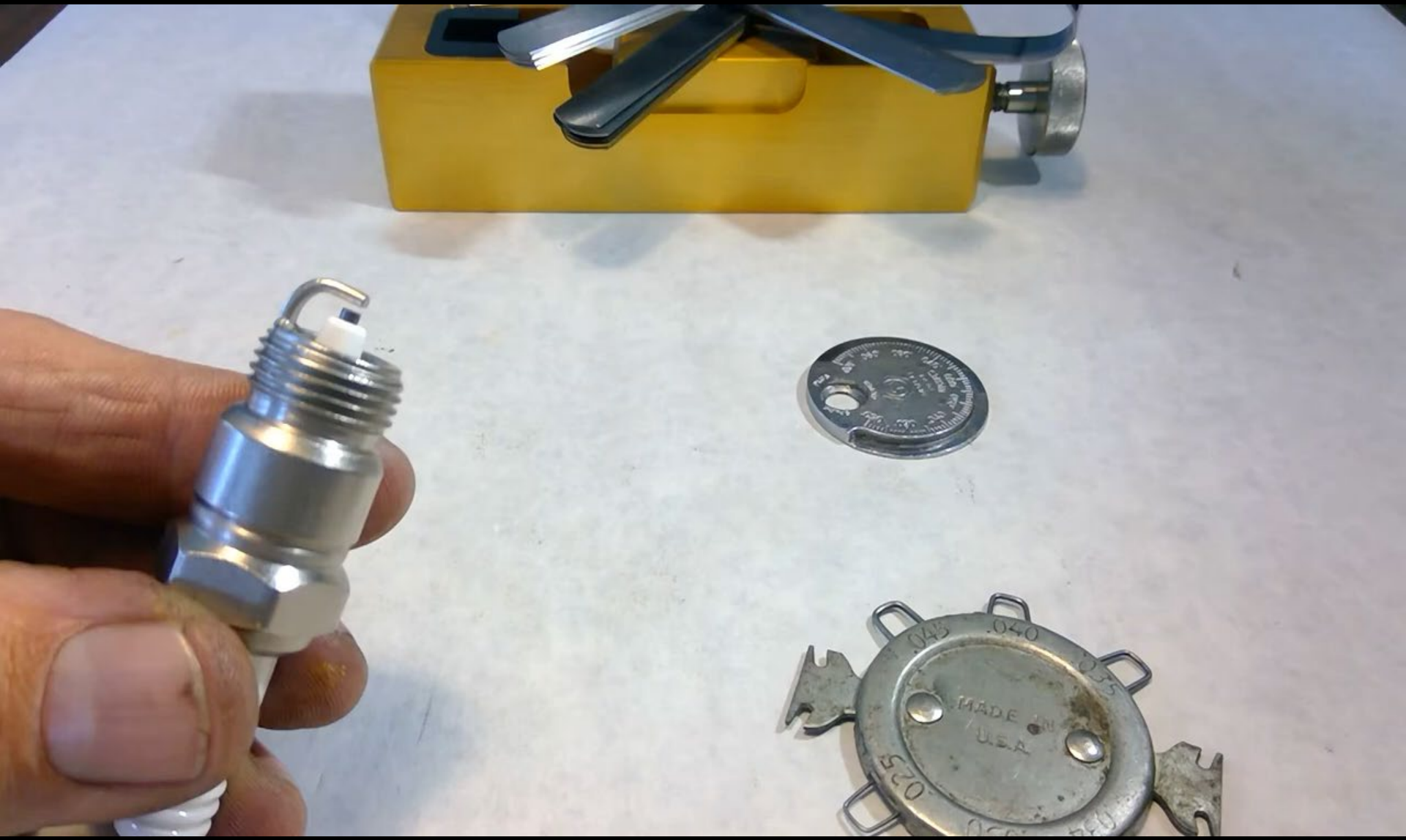


The spark plug gap on your motor is .030inches

Common Maintenance - Spark Plug & Air Cleaner

Movie time: How to Gap a Sparkplug

Common Maintenance - Spark Plug & Air Cleaner



https://www.youtube.com/watch?v=jQlP-DmVmeQ

Spark Plug Know How Cont'd – Installing

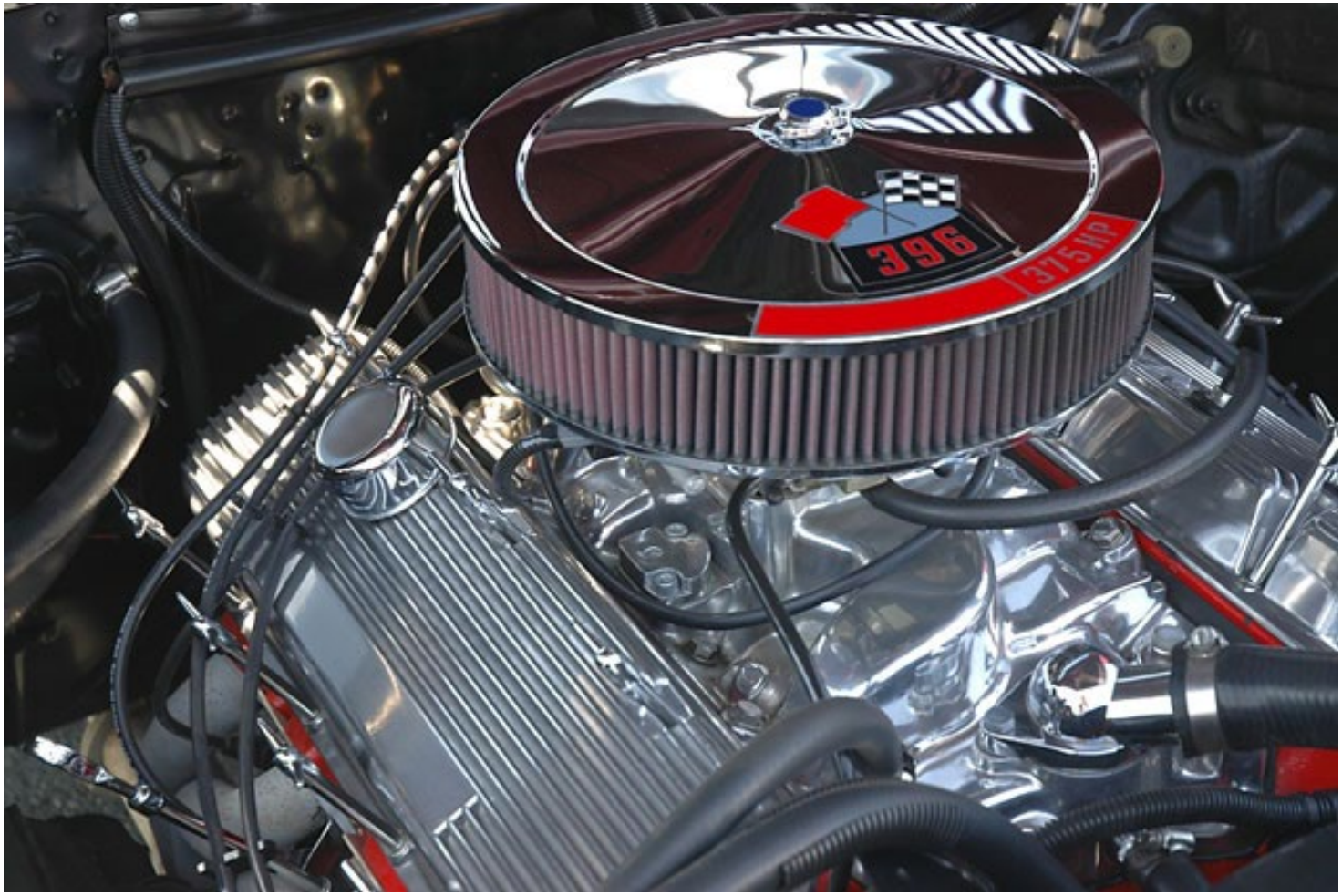
When installing observe the following:

1. Use a proper spark plug socket to avoid damage to the insulator

2. Place a drop of oil on the threads to ensure accurate torque is achieved

3. Torque to proper spec (180inlbs or 15ftlbs).

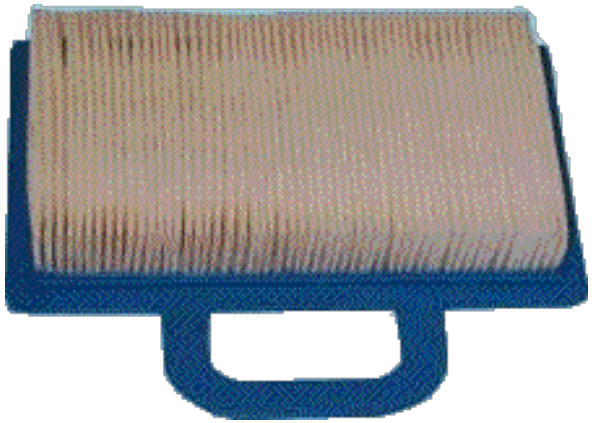
Air Cleaners



Your engine has an air cleaner.

Once upon a time there weren't any air cleaners on engines.

This wasn't because they couldn't be made but was because engine manufacturers didn't know how much good they could do!



Basically, air can contain contaminants (dirt) that can harm the engine and shorten its life!

As parts in the engine work against each other they naturally wear out.

If contaminants were to move through the engine's cylinder with the air, the engine's parts would wear out much quicker.

By filtering the air, engines last longer.

Air filters are great, until they begin to restrict air flow as they become clogged.

A dirty air filter can impede the flow of air so much that it becomes difficult to burn the fuel in the cylinder.

This situation can result in:

1. Hard Starting
2. Loss in engine power
3. Higher fuel costs
4. Contaminated/fouled spark plugs

Two types of air cleaners are generally found on small engines:

Serviceable:

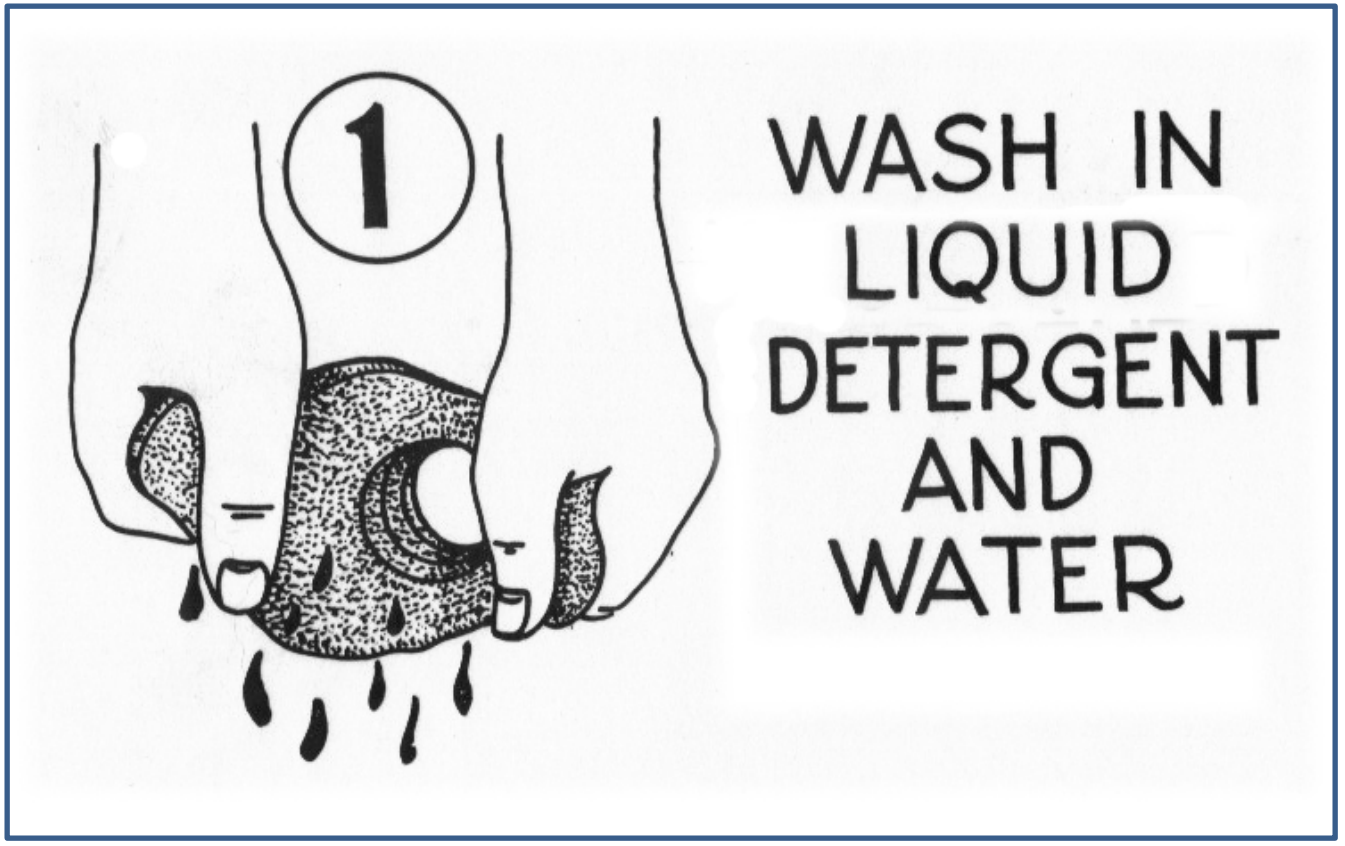
- Oil-foam (OURS ☺)

Non-serviceable:

- Cellulose (paper element)

The air filter on the Briggs & Stratton motors in class is an Oil-Foam

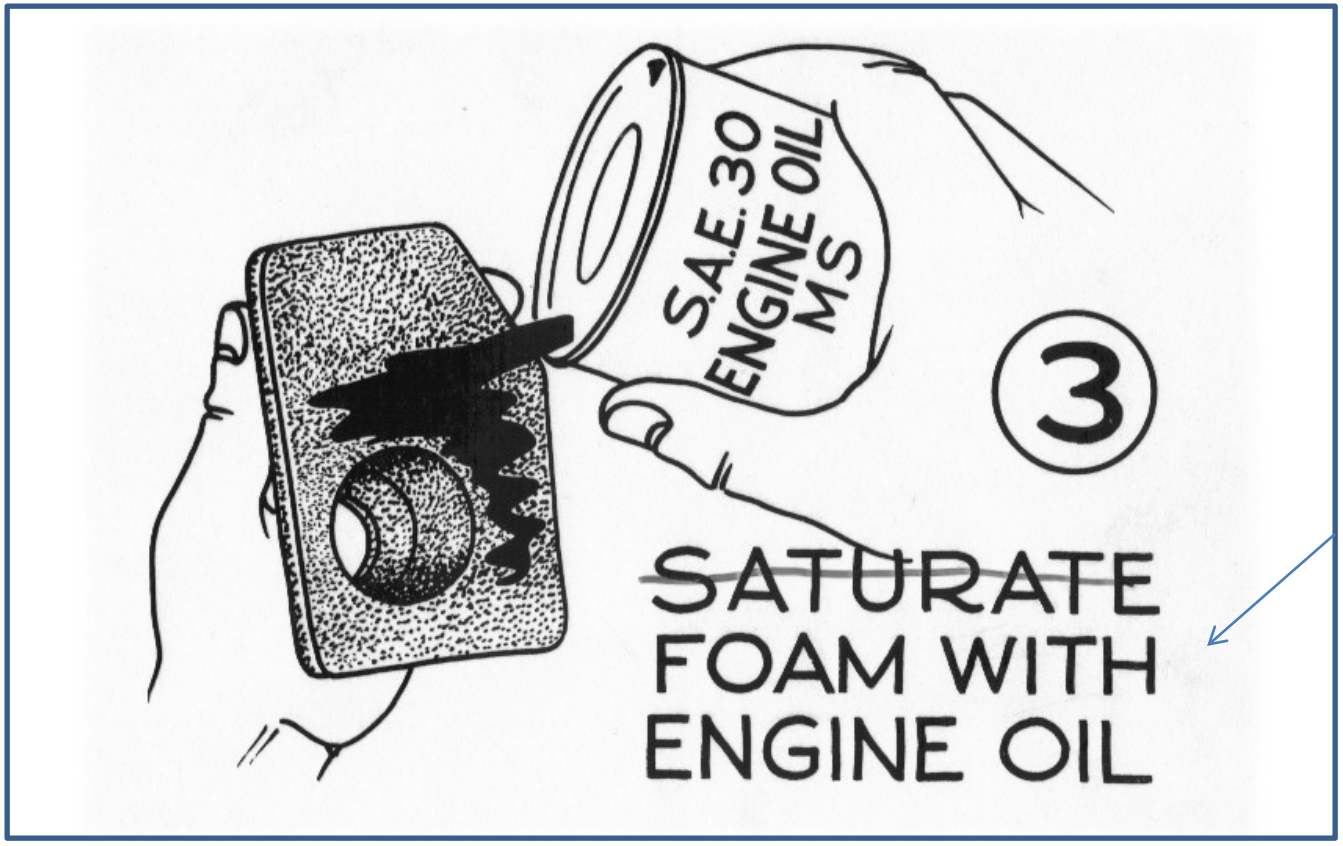
How To Service An Oil-Foam Type Air Filter



This process removes all of the old oil along with the dirt that has stuck to it.

Very important to do this well and rid the foam of all water.

Common Maintenance - Spark Plug & Air Cleaner



The idea is to be able to obtain a light coat of oil throughout the foam filter.

Too much oil will impede air flow, exactly what we don't want.

Summary of Oil-foam Type Air Cleaner Service:

1. Wash thoroughly with detergent
2. Squeeze out all water (dry)
3. Oil foam completely and evenly with clean engine oil
4. Squeeze out any excess oil

Job Time

Spark Plug and Air Filter