Zenith Model A Ford Carburetor
Restoration Worksheet

These worksheets are evolving as a sequential guide to help Model A Ford owners restore their Zenith carburetors. These sequential steps are intended to keep the restorer on track but, not necessarily provide the details on how to do each step. Some good sources, which provide information on theory of operation, specifications, and how-to restoration details, are identified at the end of these worksheets as "References and Acknowledgements".

What is known about the specific carburetor being restored?

Vehicle: _____

Owner: _____

_____

Owners experience driving with this carburetor:

Why do they think this Carburetor may have a problem? _____

Starting: _____

Gas Mileage: _____

Idle - Slow Speed: _____

Idle - High Speed: _____

Leaks: _____

Not Recently Used: _____

Other: _____

Remind owner that no carburetor can perform well on an engine without a good ignition system that is timed correctly. If possible, verify that carburetor is likely a problem by running a known good carburetor on the vehicle.

Carburetor Description:

Lower Casting Markings: _____

_____

Upper Casting Markings: _____

_____

Do castings match year of vehicle manufacturer? _____

_____

Paint & Rust Conditions: _____

_____

Do external parts appear to be compatible with casting manufacturer and timing? _____

_____

_____

Attached tags or labels: _____

_____

Completely Disassemble Carburetor For Reconditioning:

- If carburetor is badly rusted and corroded, it may need to be thermal shocked to loosen parts and threads.
- After making sure that gasoline is completely evaporated from carburetor, try heating with torch.
- Need to get to nearly red and then quench in cold water.
- Be careful with small brass parts and soft metal Venturi.
- View the "Venturi Extraction Tool" from the Special Tools section at the end.

Dig out all old gaskets. Discard all old gaskets. _____

Don't forget to remove hidden, brass Gas Adjusting Valve seat if there is one. _____

Drill out brass passage plugs from both castings. _____

Soak castings and components in solvent. _____

Castings: (Cleaning, Inspection, Repair, and Painting)

Verify all parts have been removed. _____

Clean off and dig out remains of all gaskets. _____

Brush Castings with wire brush. _____

Carefully bead blast castings, including internals surfaces, passages, vents, etc. _____

Thoroughly clean out ALL passages and vents. _____

View the "Fiber Optic Light" from the Special Tools section.

Very important step! Make sure none were missed.

Chase threads with correct taps, watching for stripped and cross threads. _____

Thread Tap Size	Location	Tapped Hole	
1/2 20 UNF (SAE)	Upper Casting	Fuel Line Input Port	_____
1/2 20 UNF (SAE)	Upper Casting	Fuel Screen Assembly	_____
1/2 20 UNF (SAE)	Upper Casting	Float Valve	_____
3/8-24 UNF (SAE)	Upper Casting	Bolt, Hex	_____
3/8-24 UNF (SAE)	Lower Casting	Drain Plug	_____
3/8-24 UNF (SAE)	Lower Casting	Secondary Well	_____
5/16-18 UNC (SAE)	Upper Casting	Carb Mount Bolts (2 Places)	_____

(Most likely to be stripped or cross threaded)
View the "Heli-Coil Thread Repair Kits" from the Special Tools section. _____

1/8-27 NPT (Pipe)	Lower Casting	Gas Adjust Valve	_____

(Use caution not to cut threads deeper, as it is a pipe thread) _____

M5 x .75 (Metric)	Upper Casting	Air Adjust Screw	
M5 x .75 (Metric)	Lower Casting	Main Jet	
M5 x .75 (Metric)	Lower Casting	Cap Jet	
M5 x .75 (Metric)	Lower Casting	Compensator Jet	
M5 x .75 (Metric)	Upper Casting	Idle Jet	

Verify that this tapped hole, for Idle Jet, provides for taper fit.

Check mating gasket surfaces for flatness and parallel between two castings.

Idle Air & Secondary Well vent hole was 9/32" to mid 1929 ____ & then 3/8"

1/8" bowl vent was added in mid 1930 to improve hot weather performance.

Modified to adapt sidebowl filter assembly in early 1931.

Painting of Castings:

Mask all openings to internal carburetor areas.

Paint with: Orr-Lac, Gloss Black #903; Duracryl, Acrylic Lacquer Low Gloss DIA 9468; or "Plasti-kote", Flat Black #344 for computability with high temperature and gasoline to some degree.

Suggest that paint be baked at 250 degrees F for a couple hours.

Press in brass plugs. A9593

Testing Lower Casting Internal Passages Using "Passage Testing Kit":

View the "Passage Testing Kit" from the Special Tools section.

1. Plug Compensator Jet / Cap Jet / Secondary Well.

2. Replace GAV with Air GAV Tester (a GAV with Tubing Attached to help blow through)

3. Blow air in Air GAV Tester - Should get air flow between GAV and Float Bowl.

4. Plug Compensator Jet / Cap Jet / Float Bowl hole.

5. Blow air in Air GAV Tester - Should get air flow between GAV and Secondary Well.

6. Plug Compensator Jet / Secondary Well / Float Bowl hole.

7. Blow air in Air GAV Tester - Should get air flow between GAV and Cap Jet.

8. Plug Secondary Well, Cap Jet, and Float Bowl hole.

9. Blow air in Air GAV Tester and get airflow between GAV well and Compensator Jet.

10. Install Main Jet, plug drain, and Get air Flow between Main Jet and float Bowl outlet.

Testing Gas Adjusting Valve Seat Using "Passage Testing Kit":

View the "Passage Testing Kit" in the Special Tools section.

1. Assemble "Test Hardware" in Lower casting
   A. Cap jet with o-ring and vinyl tubing
   B. Main jet with o-ring
   C. Compensating jet (Solder closed old jet) with o-ring
   D. 3/8-24 Bolt, with o-ring, to seal secondary well hole
   E. Drain plug with o-Ring
   F. GAV Seat (if needed), Needle, Housing, and Choke Driver, that will be used in carburetor

2. Fill bowl about half full with water.

3. Blow air into cap jet vinyl tubing while adjusting GAV.

When GAV is open air should bubble out thru the water in bowl.

With the GAV closed no air should bubble out.

4. If air bubbles out when the GAV is closed, the seat needs to be honed smooth for a tight seal.

   View the "Gas Adjusting Valve Seat Honing Tool & Guide" from the Special Tools section.

5. Remove water from Float Well, Secondary Well, etc.

6. Remove all Test Hardware and parts.

7. Dry water out of Casting immediately, bake in oven or heat up with torch, to minimize rusting.

Testing Upper Castings Internal Passages:

1. Blow air thru Fuel input, Strainer, and Float Valve holes.
   (Make sure old strainer tip isn't left inside)

2. Install an Idling Jet and Air Adjust Screw Assembly

3. Blow through Idling jet to verify passage is open between idling jet and idling port.

4. Verify that Air Adjusting screw assembly can actually shut off all air flow:

Block idling port in throat, and blow in Idling Jet.

When Air adjusting screw is all the way in, No air should flow out air input passage.

Throttle Assembly: (Inspect, Clean With Solvent, Repair, and Assemble)

Plate:	20 degree to June 1928, after 18 1/2 degree; Check for fit and motion.	A9585
Lever / Shaft:	Check for rotational motion and slop in bearing areas.	A9581

	Lever forged steel, nickel finish to mid 28, forged brass, nickel or plain finish to early 30, then Stamped steel , cadmium or plain finish. It may be desirable to salvage original shafts, versus replace, by building them up with solder and then file / emery cloth them down to size. When shaft holes get worn, they leak vacuum, and may need to be drilled out for bushings.		
Bushings:		A9581-S	
Plate Screws:	Oval 5-40 UNF (SAE) Thread x 19/64 (2 Places)	A20042-S7	
Fillister Screw:	1/2" long until early 30, then 5/8" 8-36 UNF(SAE)	A20108-S7	
	Check for head and slot damage		
Adjustment:	Off engine, initial screw setting should slightly open throttle plate.		



Throttle Assembly Parts

- The Throttle Arm / Shaft / Plate assembly controls the flow of vacuum that pulls gasoline and air into the intake manifold.
- Shaft and hole wear leads to vacuum leaks around the shaft, particularly on the arm end of the shaft.
- The most noticeable effect is poor idle.
- The soft metal of the shaft tends to wear faster than the casting hole.
- To address Shaft wear:

  Replacement Throttle Shaft Assemblies are available from your

suppliers.

- To salvage old arm styles, I build up the worn area with solder and turn down.
- If Casting hole is worn, drill out hole and press in bushings.
  Bushings are available from your suppliers.
- Use high temperature grease on throttle shaft bearing surfaces to reduce friction, wear, and small air leaks.
- Idle Adjust Fillister Screws were 1/2 inch long until early 30 and then 5/8 inch.
- The Fillister screw threads are 8-36 UNF (SAE)

Air Adjusting Screw Assembly: (Inspect, Clean With Solvent, Repair, and Assemble)
Function is to introduce air into fuel stream, metered by the idling Jet.

Needle:		A9577	
Shaft Length:	Minus head = 1 & 3/16" or 1.1875" Including head = 1 & 11/32" or 1.344"		
Head Diameter:	1927-29 = 3/8" or .375"; 1930-End = 5/16" or .3125"		
Cap:		A9579	
Spring:		A9578	
	(Off Engine initial setting should be 1 & 1/2 turns from full clockwise)		



Air Adjustment Screw Needle Valve

- The Air Adjustment Screw controls the volume of air added and mixed with the fuel introduced through the Idling Jet to the Idle Port. The combination of Idling Jet and Air Adjustment Screw controls the idle air to fuel ratio. Remember, the Idling Jet receives its fuel from the Secondary Well that gets its fuel from the float bowl through the Compensator Jet.
- As the Air Adjustment Screw is turned in, the idling mixture is enriched due to the less air being mixed with the idling jet gasoline. (Mixture is leaned down, as it is turned out)
- The Air Adjustment Screws should be 1 and 3/16 inches long.
- There are some floating around that are shorter, which causes the spring to collapse and stop before it can seat properly. If Air Adjust Screw Needle is too short or misadjusted, or if upper casting hole does not allow a good seat, the result will be an erratic idle.
- The threads are M5 X .75 (Metric)

Strainer: (Inspect, Clean With Solvent, and Assemble)

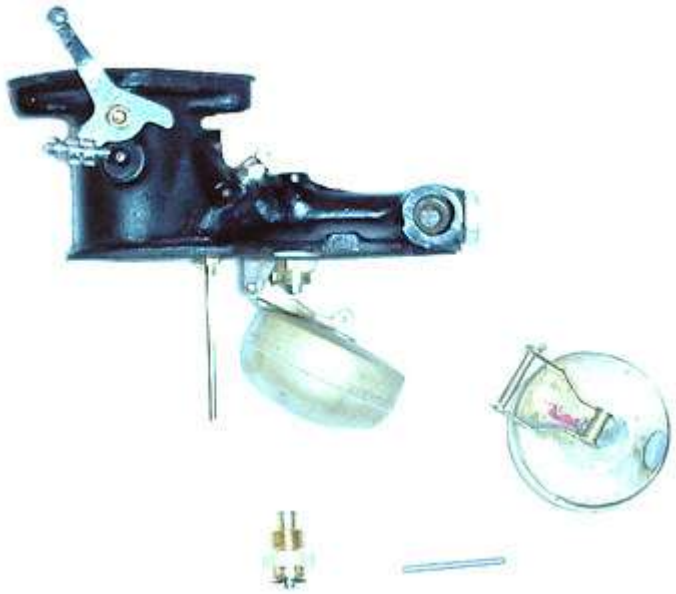
Strainer:	A9559	
Washer:	A2233 (1/2")	

Float and Valve Assembly: (Inspect, Clean With Solvent, Repair, and Assemble)
Controls the level of fuel allowed into the bowl

Valve:	Valves can be intermittent: Leak when they should be closed or stick partly open when they should be open. Push in hard and twist valve stem a few times to seat it.	A9564A	
	Consider replacing with gas resistant rubber tip or "Gross Jet" designs.	A9564-M A9564-Z	
Float:	Test for Leaks.	A9550	
Float Hinge Pin:		A9558	
Hinge:	Check for damage and security. If hinge rivets are a problem, either replace rivets or drill out, tap, and insert 6/32" screws.	A9554	
Washer:		A9502Z	
	Inspect Float for a small dimple worn into the top of the float by the valve needle. The effect of this dimple is a lateral bind on the valve needle that prevents it from closing completely and sealing.		
	To get float solder seam to be parallel with upper casting surface, gasket		

thickness may need to be varied.

Float Tab may need to be bent so that float does not drop too far down.



Idling Jet: (Inspect, Clean With Solvent, Adjust, Test, and Assemble)
Delivers fuel (from the Secondary Well) to the engine at idle (effect only at low speed).

This jet's orifice is very small and is easily clogged by dirt or sediment. If jet is too large, the adjustment screw will need to be turned out very far (>4 turns). If jet is too small, it will be impossible to obtain a satisfactory mixture except by turning idling adjustment screw in all the way.

Inspect for fractures / breaks along the shaft and stems that turn in its base. A9542

Orifice Size recommendations:

Altitude	Drill	Diameter in Inches
For Zero to 3000 Foot	# 75	.021
For 3000 to 5000 Foot	# 75	.021
For 5000 Plus Foot	# 76	.020

Recommended Flow (measured at desired altitude) 44 to 48 milliliters per minute.
(Some Carburetor to Engine combinations require +/- 5 milliliter from this)

Orifice Size Measured: _____ Adjusted To: _____

Flow Measure at Adjusted To:

Altitude: _____ _____

No washer is used with this jet because it is a tapper fit.



Idling Jet

- The Idling Jet provides gasoline (from the Secondary Well) to the engine at idle.
- Original Jets were marked with a number to signify orfice size
  From Oct 1927 through June 1928 they were numbered "2010", which was 0.0197" diameter.
  From July 1928 through 1931 they were numbered "11", which was 0.0217" diameter.
- I recommend that orifice is drilled with at #75 to #76 Drill. (That's 21 - 20 thousands of an inch)
- To resize jet orifice:
  Heat jet at orifice end and fill with solder (Do Not fill beyond 1/8" deep)
  Carefully drill out orifice (again with pen vise) and clean out with air preasure
- The flow should be between 44 and 48 milliliters per minute.
- This is a very small orifice hole and flow. It's easily clogged by dirt, rust, etc.
- If the jet is too large, the Air Adjustment Screw will need to be turned out very far.
- If the jet is too small or restricted, it will be impossible to obtain a satisfactory mixture:
  Except by turning the Air adjustment screw all the way in.
- Some carburetors, on some engines, need to have the Idle jet slightly larger or smaller than a #75 Drill. Steve Pargeter's book has a very good explanation of this.
- No washer is used with this jet because it is a taper fit.
- Watch for fractures / breaks along the shaft and stems that turn in its base.
- The total length of an Idle Jet is 3 inches.
- If you run across one that is longer than 3 inches, it's a little rare, and it belongs to a Zenith Carburetor with a Double Venturi.
- The Double Venturi carburetor did not originally use a Brass inserted secondary well, so to compensate, the Idling Jet was made a little longer.
- Less than 5% of the carburetors made were Double Venturi.
- The threads on the idling jet are M5 x .75 (Metric)

Main Jet: (Inspect, Clean With Solvent, Adjust, Test, and Assemble)
Delivers the major portion of the fuel to the engine at over 30 miles per hour.

Usually is the cause of high speed carburetor problems. If the jet is too large, it will make the mixture rich, give low mileage, sooty plugs, smell of gas, and irregular running. If the jet is too small, it will make the mixture lean, the car won't go very fast, and might even backfire at high speed.

Should have indented tip to prevent capillary action leaks when engine is off. A9534B _____

Critical Length should be:	1 and 15/32" or 1.46875"	Measured Length:	_____

Orifice Size recommendations:

Altitude	Drill	Diameter in Inches
For Zero to 3000 Foot	# 63	.037
For 3000 to 5000 Foot	# 64	.036
For 5000 Plus Foot	# 65	.035

Recommended Flow (measured at desired altitude) 150 to 160 milliliters per minute.

Orifice Size Measured:	_____	Adjusted To:	_____
Flow Measure at Altitude:	_____	Adjusted To:	_____

Washer (One Only!): A22086 _____

Verify that Main Jet is 3/8" from the top of the Lower Casting & in line with the narrowest point of venturi.



Main Jet

- The Main Jet delivers the major portion of the fuel to the engine at 30 plus MPH.
- It's accessed via the Drain Plug hole with a screw driver.
- When installed with a washer, its tip should be 3/8 inch from the top of the Lower Casting.
- So, when you remove a Main Jet, make sure you also dig out the old gasket.
- If you end up with multiple gaskets installed, it will cause poor performance and leaks.
- Because the Jet tip isn't precisely where it should be in the Venturi.
- The Jet needs to have an indented (dished out) tip, to prevent capillary action leaks when engine is off.
- Original Jets were marked with a number to signify orfice size

  From Oct 1927 through June 1928 they were numbered "20", which was 0.0394" diameter.

  From July 1928 through 1929 they were numbered "19.5", which was .0384" diameter.

  From 1930 through 1931 they went back to a number "20".
- I recommend that orifice is drilled with a #63 to #65 drill. (That's 37 – 35 thousands of an inch)
- To resize jet orifice:

  Heat jet at orifice end and fill with solder (Do Not over heat or fill beyond 1/8" deep with solder)

  Carefully remove solder from indented area with a 5/64" drill, using a pen vise (not a drill motor)

  Carefully drill out orifice (With pen vise! Do NOT use drill motor) and clean out with air preasure
- I suggest #63 for sea level driving and #64 for altitude.
- The issue is that the best flow should be 150 to 160 milliliters per minute, at the atmospheric pressure that your driving at.
- Very good instructions for doing jet flow testing can be found in:

  Steve Pargeter's book, "Zenith Model A Carburetor, Restoration Guidelines".
- I definitely recommend flow testing of jets.
- The Main Jet is usually the cause of high-speed carburetor problems.
- If the jet is too large, the excessive flow will result in:

  A rich mixture, low mileage, sooty plugs, smell of gas and irregular running.
- If the jet is too small or restricted, the insufficient flow will result in:

A lean mixture, reduced high speed, and it might even cause backfire at high speed.

- Bullet shaped tips are notorious for causing low flow leaks when parked.
- The threads are M5 x .75 (Metric)

Drain Plug: (Inspect, Clean With Solvent, and Assemble)

Plug: A9590 (3/8 - 24) Washer: A22256

Plug was brass unfinished to early 1930, then steel, cadmium, and plain finish were used.

Cap Jet: (Inspect, Clean With Solvent, Adjust, Test, and Assemble)
Delivers the fuel provided by the Compensator jet and the Gas Adjusting Valve.

If the jet is too large, gives low mileage, sooty plugs, smell of gas, and irregular running only at low speeds. If the jet is too small, it will give a lean mixture & miss / jerk on hard pulls (at low speeds).

Should have indented tip to prevent capillary action leaks when engine is off. A9538B

Critical Length should be: 1 and 3/32" or 1.09375" Measured Length:

Orifice Size recommendations:

Altitude	Drill	Diameter in Inches
For Zero to 3000 Foot	# 63	.037
For 3000 to 5000 Foot	# 64	.036
For 5000 Plus Foot	# 65	.035

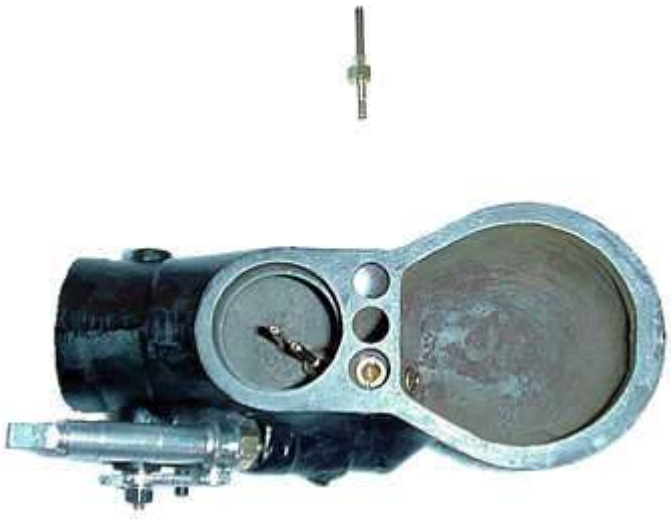
Recommended Flow (measured at desired altitude) 150 to 185 milliliters per minute.

Orifice Size Measured: Adjusted To:

Flow Measure at Altitude: Adjusted To:

Washer (One Only!): A22086

Verify that Cap Jet top is 7/16" from the top of Lower Casting.



Cap Jet

- The Cap Jet delivers most of the fuel at low speeds driving.
- It gets its gasoline from the Compensator Jet and the Gas Adjusting Valve.
- It's removed from the lower casting with a 5/16" Nut driver.
- When installed with a washer, its tip should be 7/16" from the top of the Lower Casting.
- Jet needs to have an indented (dished) out tip.
- Original Jets were marked with a number to signify orfice size
  - From Oct 1927 through June 1928 they were numbered "19", which was 0.0374" diameter.
  - From July 1928 through 1929 they were numbered "21", which was 0.0413" diameter.
  - From 1930 through 1931 they were numbered "20", which was 0.034" diameter.
- I recommend that orifice is drilled with a #62 to #65 Drill. (That's 38 – 35 thousands of an inch)
- To resize jet orifice:
  - Heat jet at orifice end and fill with solder (Do Not over heat or fill beyond 1/8" deep with solder)
  - Carefully remove solder from indented area with a 5/64" drill, using a pen vise (not a drill motor)
  - Carefully drill out orifice (With pen vise!) and clean out with air preasure
- I suggest #62 for seal level driving and #65 for altitude.
- The flow should be between 150 to 185 milliliters per minute.
- If the jet is too large, the excessive flow will cause irregular running at low speeds.
  The excessive flow also causes low mileage, sooty plugs, and smell of gas.
- If the Cap Jet is too small or restricted, the insufficient flow will cause:
  A lean mixture and Miss / Jerk on hard pulls at low speed.
- The threads are M5 x .75 (Metric)

Secondary Well: (Inspect, Clean With Solvent, Dig Dirt and Rust From Holes and Assemble)

Integral well was used until mid 1928, then the brass Secondary Well was used: A9545

There were several variations of brass Secondary Well designs, with the undercut in different places. In some castings, the secondary well restricted gasoline flow from the Compensator Jet. The undercut area needs to be matched with the Compensator Jet. To determine this, remove compensator jet, insert a sharp pencil in the compensator jet hole, and mark the secondary well. Then remove the well from the bowl and if the undercut section of the well is not at the point marked by pencil, the well needs to be exchanged with one that does.



Secondary Well

- The Secondary Well provides an extra shot of gasoline instantly when the Throttle is opened rapidly in the same manner as an accelerator pump in late model carburetors.
- The in-flow of extra fuel at low speeds takes care of an otherwise lean mixture that would occur just off idle.
- There were several variations of Secondary Well design, with the undercut in different places.

  In some castings, the secondary well restricts gasoline flow from the Compensator Jet.

  This happens when the Secondary Well undercut area does NOT matched with the Compensator jet.

  To determine this, remove compensator jet, insert a sharp pencil in the compensator jet hole, and mark the secondary well.

  Then, remove well from the bowl and if the undercut section of the well is not at the point marked by pencil, the well needs to be exchanged with one that will align.
- What goes wrong with a Secondary Well? Not Much!
- But, on REALLY dirty carburetors, all its small holes may need to be cleaned out.
- The small hole in one side is a #70 drill size, but it’s not critical.
- The small hole that goes through both sides is a #54 drill size, but it’s not critical.
- The threads on the end are 3/8" x 24 UNF (SAE)

Compensator Jet: (Inspect, Clean With Solvent, Adjust, Test, and Assemble)
Compensates for the enriching effect of the Main Jet as airflow increases and it thus provides a more constant air / fuel ratio mixture.

If the jet is too large, gives low mileage, sooty plugs, smells of gas, and irregular running only at low speeds. If jet is too small, it will give a lean mixture and miss / jerk on hard pulls (at low speeds).

A hard slow pull uses this jet the most and is its best test. A9575 _____

Orifice Size recommendations:

Altitude	Drill	Diameter in Inches
For Zero to 3000 Foot	# 65	.035
For 3000 to 5000 Foot	# 65	.035
For 5000 Plus Foot	# 65	.035

Recommended Flow (measured at desired altitude) 138 to 142 milliliters per minute.

Orifice Size Measured: _____ Adjusted To: _____

Flow Measure at Altitude: _____ Adjusted To: _____

Washer (One Only!): A22086 _____

Choke Air Shutter Assembly: (Inspect, Clean With Solvent, Repair, and Assemble)
The Choke provides vehicle driver a manual control for closing the Air Shuttle plate.

Plate:	Check for fit and motion.	A9549	_____
Shaft:	Check for motion and slop in bearing.	A9547	_____
Choke Arm Lever:	(Lower leg added in early 1928)	A9548	_____
Screws:		A20042-S7	_____
Nut:	Check for fit and motion. (8-36 UNF (SAE) Thread)	34078-S7 and 34902-S (5/32)	_____
Washer:		34902-S (5/32)	_____

Zenith Model A Carburetor Component Details and Photos



Choke Arm & GAV Driver

- This mechanism allows a single control to provide two functions that interact.
- Choke Arm Cams wear and can cause binding of both Choke and GAV movement.
- A Bent Choke Arm can cause binding.
- Bent Choke Drivers and Rods can also cause binding.
- Choke shafts and choke arms must be compatable to insure that nuts neither bind nor provide sloppy fit.

  Early (28-29)Choke shafts had "steps" that were 0.165" long for the arms that were 5/32" thick.

  Later (30-31)Choke shafts had "steps" that were 0.13" long for the arms that were 1/8" thick.

Gas Adjusting Valve Assembly: (Inspect, Clean With Solvent, and Assemble)
Provides vehicle driver a manual fuel adjustment to increase the flow of gas thru Cap jet.

Choke:	(Check for bends, twist and damage at control end and for in and out choke motion)	A9570
Needle:	(Check length, condition of tip, and smoothness of thread action in housing)	9525

Housing:	(Check wrench nut condition and internal & external thread conditions)	A9528	_____
	Note: Housing hex nut may be either 7/16 or 13/32.		
	Click here to view the "Gas Adjusting Valve Wrench" from the Special Tools section.		_____
Seat:	(Must provide a smooth, tight fitting seal for Needle - Brass insert used until Jan 1930)	A9532	_____



Gas Adjusting Valve (GAV) And Seat

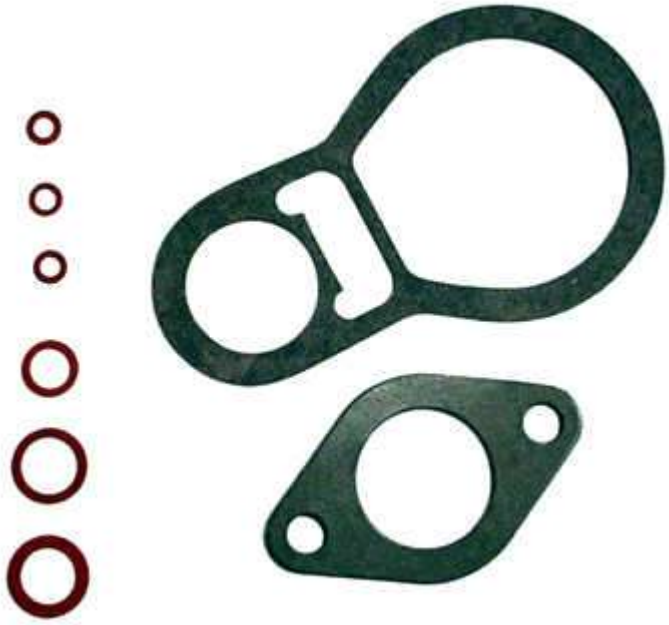
- The Gas Adjusting Valve provides a manual adjustment for additional gasoline to the Cap Jet, bypassing the metering effect of the Compensator Jet. The carburetor was designed slightly lean to allow for high altitude driving and, with the GAV, is able to provide additional fuel as needed. This extra fuel is normally needed when the vehicle is cold and at low engine speeds.

- The replaceable Brass Seat was used through 1929.
- An integral Seat, Machined in the Lower Casting, was used after that.
- The Seat opening is honed to match the shape of the GAV Needle.
- Notice that the Brass GAV Seat looks much like the Compensating Jet.
- However, they are different! They are NOT interchangeable.
  The Brass Seat is also longer than a Compensator Jet.
- The Gas Adjusting Valve housing threads are 1/8" 27NPT (Pipe). Use Caution not to cut threads deeper, as it is a pipe thread.

Large Gaskets:

Glue tack manifold Gasket to carburetor. A9447-A

Install Large Gasket onto Upper Casting A9592-A



Gaskets

- Missing and dried out old Gaskets have caused more problems.
- They're very Cheap! Replace them!
- Gaskets have to be cinched down tight to function properly.
- Sometimes after they soak up gasoline, Jets become loose.
- Some people recommend retightening after in use for a week.
- The red fiber gaskets are difficult to seal and are also too thick in many cases.
- I have switched to the carburetor gaskets from MARK AUTO.
- They are thinner, softer, and work better for sealing the jets.
- I think they are made from neopream.
  I have had no problems getting them to seal well.

Venturi: (Inspect, Clean With Solvent, and Assemble)

Double Verturi: To Mid 1928 A9586-A

Single Venturi: Started in June 1928 A9586-B

Bolt holding two castings together: (Inspect, Clean With Solvent, and Assemble)

Bolt: A209233-S7 (3/8 - 24X3 3/16) _____ Lock Washer: A22257-S2 _____

Variations in Hex Head Sizes

	1928	1929 to mid 1930	Mid 1930 to End
Width:	1/2"	9/16"	9/16"
Height:	5/16"	5/16"	1/4"

Sidebowl Filter Assembly :

(Only on models made after early 1931) _____

Bench Reconditioning and Testing Completed **Date:** _____

Final checks and adjustments, once carburetor is installed on vehicle:

Carburetor is being installed, checked and adjusted on:

Check that fuel filter on vehicle firewall is clean. _____

Install carburetor and check for fuel leaks. _____

Leaks and Float Level are best tested with a full tank of fuel. **Fuel Tank Level:** _____

Verify Bowl Float Level with a float tube. **Measured Level:** _____

View the "Fuel Level Sight Tube" from the Special Tools section.

(Should be 1/2 to 5/8" below top of lower casting)

Fine Tune Throttle, Idle Adjusting Fillister Screw and Air Idle Adjusting screw on Vehicle.

1. Start the engine and let run at a fast idle until normal operating temperature is reached. _____

2. Full retard the Spark Advance Control Rod (Up). _____

3. Turn the Fuel Mixture Control (On passenger side) full CW to its seat position then back 1/4 turn.

   Check that Fuel Mixture Control turns and pulls smoothly. _____

   At higher altitudes adjust control back to full clockwise. _____

4. Set throttle, Idle Adjusting, Fillister screw for a slow idle.

   It's important that idle speed is slow enough to make the idle circuit be in effect. (500 or less RPM) _____

5. Slowly turn the Air Adjustment Screw CW until engine begins to stall. Note the screw slot position. _____

6. Slowly turn the Air Adjustment Screw counter clockwise until engine begins to stall.

   Note the position. _____

   Turn the screw half way between the two positions. _____

   As screw is opened, it leans out the mixture being fed to the idle port in the side of the carburetor throat.

   As Screw is closed, it reduces the amount of air mixed with fuel coming from the idling jet.

7. If Adjustment does not cause the engine to stall at some point, it is an indication that the Air Adjust Screw seat in not functioning properly or that there is an air leak in the intake system.
   Check for Leaks: Throttle shaft, Manifold to carburetor gasket, manifold to block gasket, and vacuum to wiper. _____

8. If engine runs best with needle closed - Idling Jet may be too small. _____

9. If engine runs best with needle very open - Idling Jet may be too large. _____

10. Advance the Spark Control Rod about 3/4 the way down. _____

11. Adjust Throttle, Idle Adjusting, Fillister Screw for desired idle speed. _____

It's important to remember that changes in the ignition system such as timing, re-gapping spark plugs, new spark plugs, a change in breaker point gap or a new condenser will all change idle adjustments.

Many so called carburetor troubles can be traced to one or more of these issues.

The idle adjustments of the carburetor should be made after any ignition work or changes.

With a mechanically sound engine and good ignition, the engine should idle smoothly at low speed, accelerate evenly at all speeds and deliver at least 16 miles per gallon of gasoline out on the highway.

Test Drive vehicle around town, at highways speeds, and if possible on a long, slow, steep climb.

Notes on performance, problems and resolution:

Testing and Adjustment on Vehicle Completed **Date:** _____

Replacement Parts List (5/22/2012)

Description	Ford Part #	Estimated Price	
Air Adjusting Screw Needle Brass 28-29	A9577	$4.50	
Cad 30-31	A9577	$3.20	
Air Adjusting Screw Cap	A9579	$0.00	

Air Adjusting Screw Spring	A9578	$0.00	
Air Shutter Lever	A9548	$2.75	
Air Shutter Nut/Washer	34078-S7 (8-36) & 34902-S(5/32)	$0.60	
Air Shutter Plate Screws	A20042-S7 (Oval 5-40 x 19/64)	$0.65	
Air Shuttle Plate	A9549	$2.10	
Air Shuttle Shaft	A9547	$5.85	
Bolt, Hex Head	A209233-S7 (3/8 - 24X3 3/16)	$1.65	
Cap Jet	A9538B	$6.35	
Choke Driver	A9570	$9.50	
Choke Housing	A9528	$7.60	
Choke Needle	9525	$4.70	
Choke Seat	A9532	$2.20	
Compensator Jet	A9575	$2.60	
Drain Plug Brass 28-29 Cad 30-31	A9590 (3/8 - 24)	$2.10 $1.55	
Float	A9550	$18.80	
Float Pin	A9558	$0.45	
Float Valve	A9564A	$17.95	
Float Valve Gasket	A9564G	$1.20	
Gasket Set	A9502-Z	$1.50	

Idling Jet	A9542	$7.15	
Main Jet	A9534B	$6.50	
Passage Plugs	A9576	$2.00	
Secondary Well	A9545	$4.90	
Strainer Brass 28-29 Cad 30-31	 A9559	 $8.00 $8.25	
Throttle Fillister Screw	A20108-S7 A9528S (8-36 x 5/8)	$0.55	
Throttle Plate	A9585	$4.25	
Throttle Plate Screws	A20042-S7 (Oval 5-40 x 19/64)	$0.65	
Throttle Shaft	A9581	$16.75	
Throttle Shaft Bushings	A9581-S	$2.30	
Venturi (Single)	A9586-B	$4.95	
		Total:	

Special Tools:

When working on Model A Zenith carburetors there are some tasks, which are made easier or more effective with "Special Tools" that may not already exist in ones tool box. These are the ones that I use most:



Drilled Out 9/32 Nut Driver
To remove Cap and Idling Jets, a 9/32" Nut Driver with a very deep throat is needed.
Drilling a drivers socket out with a long drill, allows clearance for the long stems of the jets.
I drilled mine out with a long 3/16" drill, to a depth of 2 and 1/2 inches.



Fiber Optic Light
"Maglite" flashlights now provide a fiber optic adapter that can be pushed over their small flashlights for illuminating small areas. It works great for seeing the inside of carburetor passages. Stick the fibers into one end of the passage and observe the other end of the passage.



Fuel Level Sight Tube
This is an accurate tool for measuring true fuel level regulated in the float well by the float and valve. One can be obtained from most Model A parts suppliers or you can likely make one yourself.

To use it:
Turn fuel valve off and drain gas from carburetor bowl as you remove drain plug. Screw Fuel Level Sight Tube into drain hole. Turn fuel valve on. As the gas fills the carburetor float bowl, it will fill the sight tube to the same elevation as inside the bowl. The fuel level should be 5/8 inch below the seam of the halves of the carburetor. Adjust float level by adding or reducing gasket thickness under float valve.



Gas Adjusting Valve Seat Honing Tool & Guide
To obtain a good seat when Gas adjusting valve is closed, the seat sometimes needs to be polished to remove pits, dirt scratches, etc. This tool and guide provides a mating, aligned surface that can be spun against the seat with polishing compound on it. The tool is made by soldering two needles together, back

to back. The end that will go into the guide and provide the polishing surface needs to have its threads removed to enable it to be spun continuously with a drill. Using an old GAV housing, I've removed the spring to let the tool spin more freely. Some people also cut down both ends of the housing.



Gas Adjusting Valve Wrench
GAV Housing hex nut may be either 7/16 or 13/32. 7/16 open wrenches are readily available. But, 13/32 can be hard to find. So, I've carefully filed out an open 3/8 wrench to snuggly fit 13/32 housing hex nuts. I've painted the arm of the wrench so that it is readily identifiable and isn't confused to be the original 3/8 wrench.



Heli-Coil Thread Repair Kits
Sometimes threads are stripped or cross-threaded, especially the ones for the mounting flange bolts (5/6-

18). Heli-Coil Thread Repair kits are available for this size at some hardware stores and most machine tool stores. The kit inserts are precision coils of stainless steel, diamond-shaped wire. The kit has a tang for installation, which is notched for easy removal. The insert is larger than the tapped hole before installation. During installation, the insert is compressed so it will enter the tapped hole. After installation, each coil expands outward to permanently anchor the insert. Since the insert is made of wire, it automatically adjusts itself to any expansion or contraction of casting.

Recommended procedure for installing one:
- Drill out damaged threads with recommended drill size (for mounting flange use 21/64").
- Use Heli-Coil tap supplied with kit, to cut oversize threads for coil insert.
- Screw insert onto the mandrel, of provided tang, until driving tang is fully engaged in slot.
- With mandrel, screw insert into tapped hole until insert is 1/4 to 1/2 turn below top surface.
- Trim off excess wire.



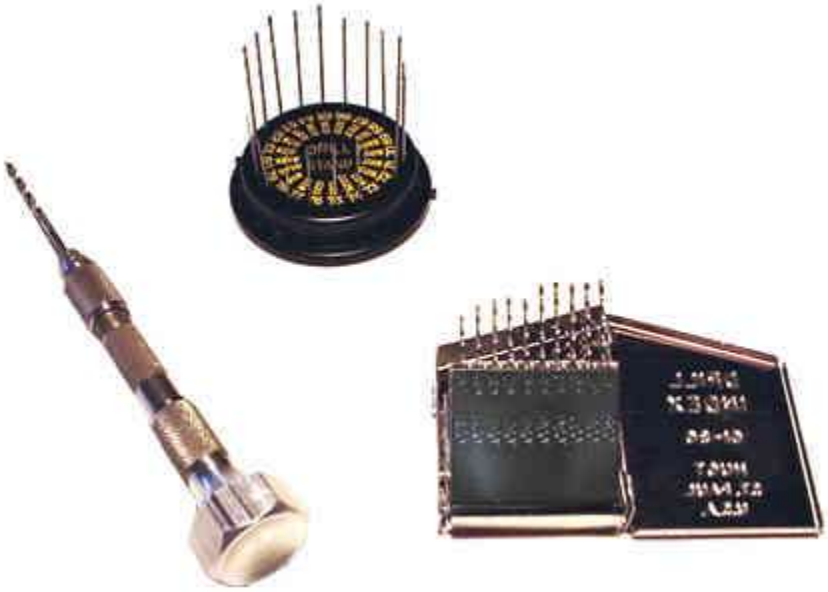
Jet Flow Testing Setup
I recommend flow testing and resizing jets using the methodology documented by Steve Pargeter, in his booklet "Zenith Model A Carburetor Restoration Guidelines". Steve's book is available directly from him or from most Model A parts suppliers. These photos are of the setup based on Steve's guidance.



Passage Testing Kit
To facilitate testing of casting passage flows with ease; I keep this zip-lock bag of hardware available:

- An old GAV housing with tubing attached to help blow through
- An old Cap Jet with an o-ring and tubing attached to help blow through
- An old Cap Jet with an o-ring and it's orifice has been sealed with solder
- A Main Jet with an o-ring
- A Compensator Jet with an o-ring and it's orifice has been sealed with solder
- A 3/8-24 bolt, with o-ring, to seal secondary well hole
- A Drain Plug, with o-ring

Procedure for testing upper and lower casting passages can be found within the "Restoration Worksheets".



Small Drill Sets
When resizing jet orifices, you solder the jet closed and drill it out with very small drill bits. The photo shows two different very small drill bit sets that arefound available at good hardware stores. They contain #61 to #80 drills (.039 to .0135"), which easily covers the range needed for jets. Use a Pin Vise (as shown in photo) to drill the holes by hand.



Throttle Shaft Bushing Drill Fixture Plate
To add bushings for sloppy throttle shafts, upper castings need to be properly drilled. This precision machined fixture plate aids in accurately locating the drill position.

First, place a drill, that fits snuggly, into existing throttle shaft holes. Mount casting onto fixture plate and position into vise on drill press, aligning drill in chuck.

Without moving fixture in vise, replace drill with a 5/16" drill and drill out hole. Tap in bushing, with knurl end facing out, using soft hammer or piloted drift.

If a heavier press fit is used the hole may have to be ground or resized using a 9/32" drill or reamer.

To install bushing by bonding using an epoxy or superbonders, use "O" (.316") drill size. The inside blind hole is not normally re-bushed, and bushing may have to be shortened, if done.

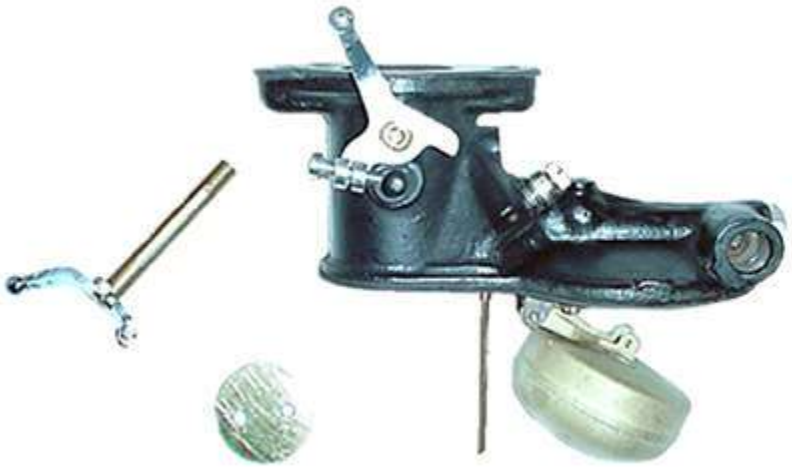


Venturi Extraction Tool

Even after heating carburetors up with a torch, Venturi's can be difficult to remove from casting. This fixture is very effective for pressing out even very stubborn ones. It's made up of materials found at most hardware stores and one special machined steel disk at the left side of the photo. It's 1.1875 outside diameter, 1/2 inch long, and it's drilled 3/8 inch deep and tapped for 1/2 inch Std thread. The pipe is 1 and 3/8 inch inside diameter. I had to grind out inside burrs for venturi to slide easily through it. Tightening the 1/2 inch nut pulls the venturi out of the castings.

Component Details:

Zenith Model A Carburetor Component Details and Photos



Throttle Assembly Parts

- The Throttle Arm / Shaft / Plate assembly controls the flow of vacuum that pulls gasoline and air into the intake manifold.
- Shaft and hole wear leads to vacuum leaks around the shaft, particularly on the arm end of the shaft.
- The most noticeable effect is poor idle.
- The soft metal of the shaft tends to wear faster than the casting hole.
- To address Shaft wear:

  Replacement Throttle Shaft Assemblies are available from your suppliers.
- To salvage old arm styles, I build up the worn area with solder and turn down.
- If Casting hole is worn, drill out hole and press in bushings.

  Bushings are available from your suppliers.
- Use high temperature grease on throttle shaft bearing surfaces to reduce friction, wear, and small air leaks.
- Idle Adjust Fillister Screws were 1/2 inch long until early 30 and then 5/8 inch.
- The Fillister screw threads are 8-36 UNF (SAE)



Air Adjustment Screw Needle Valve

- The Air Adjustment Screw controls the volume of air added and mixed with the fuel introduced through the Idling Jet to the Idle Port. The combination of Idling Jet and Air Adjustment Screw controls the idle air to fuel ratio. Remember, the Idling Jet receives its fuel from the Secondary Well that gets its fuel from the float bowl through the Compensator Jet.
- As the Air Adjustment Screw is turned in, the idling mixture is enriched due to the less air being mixed with the idling jet gasoline. (Mixture is leaned down, as it is turned out)
- The Air Adjustment Screws should be 1 and 3/16 inches long.
- There are some floating around that are shorter, which causes the spring to collapse and stop before it can seat properly. If Air Adjust Screw Needle is too short or misadjusted, or if upper casting hole does not allow a good seat, the result will be an erratic idle.
- The threads are M5 X .75 (Metric)



Float Valve And Float

- As the Float rises, it pushes up on the Float Valve, reducing and, eventually, shutting off the flow of gasoline.
- So, when many people experience carburetor leaks, they immediately blame the valve.
- Sometimes Float Valves do not seat properly due to dirt, rust, or material failure and need to be replaced.
- But, don't be too quick to jump on this as the cause. Make sure:

  Main and Cap Jets heights are correct.

  Main and Cap Jets tips are indented.

  Measure the bowl fuel level at 1/2 to 5/8" below top of the Lower Casting, using an external gauge. Most suppliers carry them.

  Sometimes you need to add an extra valve gasket or a partial thickness to get 1/2 to 5/8".

  Often one needs to play with sanding down the gasket thickness to get the float level set correctly.
- Float Valves must be very tight against their gasket or they leak, especially if casting threads are sloppy.

  When installing a valve, I recommend pushing the Valve Stem in hard and twist a few times to seat it.
- There a few variations of replacement valve designs available.

  I've seen them all work and them all fail.

  My preference is a gas resistant, rubber tip one known as a VITRO needle valve.
- The Float Valve threads are 1/2" 20 UNF (SAE)
- Inspect Float for a small dimple worn into the top of the float from valve needle rubbing.

  The effect of this dimple is a lateral bind on the valve needle that prevents it from closing completely and sealing.
- Occasionally, I've run across Floats that leak gasoline into them, and don't float very well.

To salvage float:

Drill a very small hole into float.

Blow air into hole and find where it escapes through leak area.

Rotate Float until gasoline drains out of leak area, as air is blown in.

Solder up both leak area and drilled hole.

- To pressue test Float for leaks, push float down into hot water to least one foot depth.
  Rotate Float all around and look for air bulbs escaping from any leak areas.



Idling Jet

- The Idling Jet provides gasoline (from the Secondary Well) to the engine at idle.
- Original Jets were marked with a number to signify orfice size

  From Oct 1927 through June 1928 they were numbered "2010", which was 0.0197" diameter.

  From July 1928 through 1931 they were numbered "11", which was 0.0217" diameter.
- I recommend that orifice is drilled with at #75 to #76 Drill. (That's 21 - 20 thousands of an inch)
- To resize jet orifice:

  Heat jet at orifice end and fill with solder (Do Not fill beyond 1/8" deep)

  Carefully drill out orifice (again with pen vise) and clean out with air preasure
- The flow should be between 44 and 48 milliliters per minute.
- This is a very small orifice hole and flow. It's easily clogged by dirt, rust, etc.
- If the jet is too large, the Air Adjustment Screw will need to be turned out very far.
- If the jet is too small or restricted, it will be impossible to obtain a satisfactory mixture:

  Except by turning the Air adjustment screw all the way in.
- Some carburetors, on some engines, need to have the Idle jet slightly larger or smaller than a #75 Drill. Steve Pargeter's book has a very good explanation of this.
- No washer is used with this jet because it is a taper fit.
- Watch for fractures / breaks along the shaft and stems that turn in its base.
- The total length of an Idle Jet is 3 inches.
- If you run across one that is longer than 3 inches, it's a little rare, and it belongs to a Zenith Carburetor with a Double Venturi.
- The Double Venturi carburetor did not originally use a Brass inserted secondary well, so to compensate, the Idling Jet was made a little longer.
- Less than 5% of the carburetors made were Double Venturi.

- The threads on the idling jet are M5 x .75 (Metric)



Main Jet

- The Main Jet delivers the major portion of the fuel to the engine at 30 plus MPH.
- It's accessed via the Drain Plug hole with a screw driver.
- When installed with a washer, its tip should be 3/8 inch from the top of the Lower Casting.
- So, when you remove a Main Jet, make sure you also dig out the old gasket.
- If you end up with multiple gaskets installed, it will cause poor performance and leaks.
- Because the Jet tip isn't precisely where it should be in the Venturi.
- The Jet needs to have an indented (dished out) tip, to prevent capillary action leaks when engine is off.
- Original Jets were marked with a number to signify orfice size

  From Oct 1927 through June 1928 they were numbered "20", which was 0.0394" diameter.

  From July 1928 through 1929 they were numbered "19.5", which was .0384" diameter.

  From 1930 through 1931 they went back to a number "20".
- I recommend that orifice is drilled with a #63 to #65 drill. (That's 37 – 35 thousands of an inch)
- To resize jet orifice:

  Heat jet at orifice end and fill with solder (Do Not over heat or fill beyond 1/8" deep with solder)

  Carefully remove solder from indented area with a 5/64" drill, using a pen vise (not a drill motor)

  Carefully drill out orifice (With pen vise! Do NOT use drill motor) and clean out with air preasure
- I suggest #63 for sea level driving and #64 for altitude.
- The issue is that the best flow should be 150 to 160 milliliters per minute, at the atmospheric pressure that your driving at.
- Very good instructions for doing jet flow testing can be found in:

  Steve Pargeter's book, "Zenith Model A Carburetor, Restoration Guidelines".
- I definitely recommend flow testing of jets.

- The Main Jet is usually the cause of high-speed carburetor problems.
- If the jet is too large, the excessive flow will result in:
  A rich mixture, low mileage, sooty plugs, smell of gas and irregular running.
- If the jet is too small or restricted, the insufficient flow will result in:
  A lean mixture, reduced high speed, and it might even cause backfire at high speed.
- Bullet shaped tips are notorious for causing low flow leaks when parked.
- The threads are M5 x .75 (Metric)





Cap Jet

- The Cap Jet delivers most of the fuel at low speeds driving.
- It gets its gasoline from the Compensator Jet and the Gas Adjusting Valve.
- It's removed from the lower casting with a 5/16" Nut driver.
- When installed with a washer, its tip should be 7/16" from the top of the Lower Casting.
- Jet needs to have an indented (dished) out tip.
- Original Jets were marked with a number to signify orfice size
  - From Oct 1927 through June 1928 they were numbered "19", which was 0.0374" diameter.
  - From July 1928 through 1929 they were numbered "21", which was 0.0413" diameter.
  - From 1930 through 1931 they were numbered "20", which was 0.034" diameter.
- I recommend that orifice is drilled with a #62 to #65 Drill. (That's 38 – 35 thousands of an inch)
- To resize jet orifice:
  - Heat jet at orifice end and fill with solder (Do Not over heat or fill beyond 1/8" deep with solder)
  - Carefully remove solder from indented area with a 5/64" drill, using a pen vise (not a drill motor)
  - Carefully drill out orifice (With pen vise!) and clean out with air preasure
- I suggest #62 for seal level driving and #65 for altitude.
- The flow should be between 150 to 185 milliliters per minute.
- If the jet is too large, the excessive flow will cause irregular running at low speeds.
  - The excessive flow also causes low mileage, sooty plugs, and smell of gas.
- If the Cap Jet is too small or restricted, the insufficient flow will cause:
  - A lean mixture and Miss / Jerk on hard pulls at low speed.
- The threads are M5 x .75 (Metric)



Secondary Well

- The Secondary Well provides an extra shot of gasoline instantly when the Throttle is opened rapidly in the same manner as an accelerator pump in late model carburetors.
- The in-flow of extra fuel at low speeds takes care of an otherwise lean mixture that would occur just off idle.
- There were several variations of Secondary Well design, with the undercut in different places.

  In some castings, the secondary well restricts gasoline flow from the Compensator Jet.

  This happens when the Secondary Well undercut area does NOT matched with the Compensator jet.

  To determine this, remove compensator jet, insert a sharp pencil in the compensator jet hole, and mark the secondary well.

  Then, remove well from the bowl and if the undercut section of the well is not at the point marked by pencil, the well needs to be exchanged with one that will align.
- What goes wrong with a Secondary Well? Not Much!
- But, on REALLY dirty carburetors, all its small holes may need to be cleaned out.
- The small hole in one side is a #70 drill size, but it's not critical.
- The small hole that goes through both sides is a #54 drill size, but it's not critical.
- The threads on the end are 3/8" x 24 UNF (SAE)



Compensator Jet

- The Compensator Jet compensates for the enriching effect of the Main Jet as airflow increases and it thus provides a more constant air to fuel mixture.
- It should also be installed with a gasket washer.
- Original Jets were marked with a number to signify orfice size
  From Oct 1927 through June 1928 they were numbered "18", which was 0.03543" diameter.
  From July 1928 through 1931 they went numbered "19" which was 0.0374".
- I recommend that orifice is drilled with a #65 to #66 Drill. (That's 35 - 33 thousands of an inch)
- To resize jet orifice:
  Heat jet at orifice end and fill with solder (Do Not over heat or fill beyond 1/8" deep with solder)
  Carefully drill out orifice (With pen vise! No NOT use drill motor) and clean out with air preasure
  When soldering and drilling orifice of this jet, be cautious of leaving solder inscrew driver slot area.
  A screw driver can move the solder, when jet is installed, and reduce the orifice opening.
- The flow should be between 138 - 142 milliliters per minute.
- I find it critical that this jet is flow tested and it often takes multiple attempts to get this narrow range of flow.
- If the jet is too large, the excessive flow will cause irregular running at low speeds.
  The excessive flow also causes low mileage, sooty plugs, and smell of gas.
- If the Compensator Jet is too small or is restricted, the insufficient flow will cause:
  A lean mixture and Miss / Jerk on hard pulls at low speed.
- Note that these symptoms match that of the Cap Jet.
- The threads are M5 x .75 (Metric)



Choke Arm & GAV Driver

- This mechanism allows a single control to provide two functions that interact.
- Choke Arm Cams wear and can cause binding of both Choke and GAV movement.
- A Bent Choke Arm can cause binding.
- Bent Choke Drivers and Rods can also cause binding.
- Choke shafts and choke arms must be compatable to insure that nuts neither bind nor provide sloppy fit.

  Early (28-29)Choke shafts had "steps" that were 0.165" long for the arms that were 5/32" thick.

  Later (30-31)Choke shafts had "steps" that were 0.13" long for the arms that were 1/8" thick.



Gas Adjusting Valve (GAV) And Seat

- The Gas Adjusting Valve provides a manual adjustment for additional gasoline to the Cap Jet, bypassing the metering effect of the Compensator Jet. The carburetor was designed slightly lean to allow for high altitude driving and, with the GAV, is able to provide additional fuel as needed. This extra fuel is normally needed when the vehicle is cold and at low engine speeds.

- The replaceable Brass Seat was used through 1929.
- An integral Seat, Machined in the Lower Casting, was used after that.
- The Seat opening is honed to match the shape of the GAV Needle.
- Notice that the Brass GAV Seat looks much like the Compensating Jet.
- However, they are different! They are NOT interchangeable.
  The Brass Seat is also longer than a Compensator Jet.
- The Gas Adjusting Valve housing threads are 1/8" 27NPT (Pipe). Use Caution not to cut threads deeper, as it is a pipe thread.

SPECIAL TOOLS

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- With mandrel, screw insert into tapped hole until insert is 1/4 to 1/2 turn below top surface.
- Trim off excess wire.



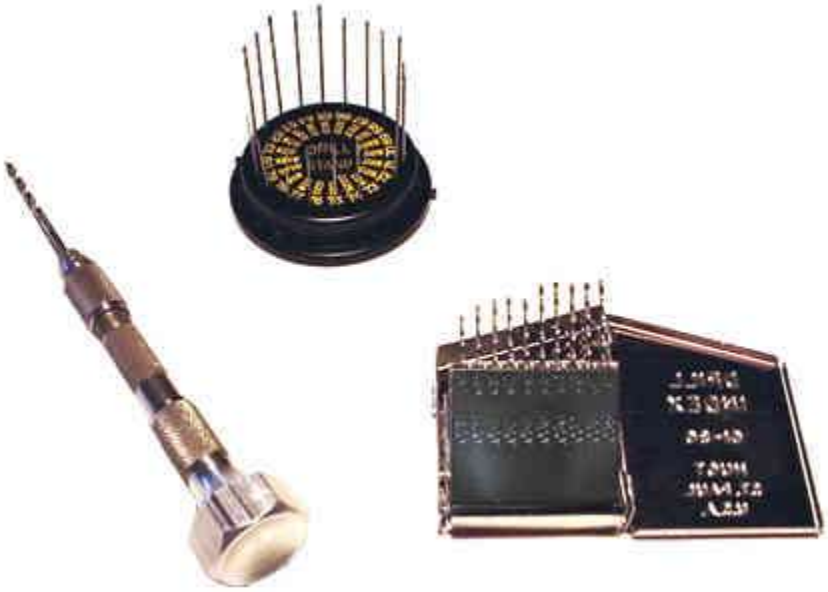
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Procedure for testing upper and lower casting passages can be found within the "Restoration Worksheets".



Small Drill Sets
When resizing jet orifices, you solder the jet closed and drill it out with very small drill bits. The photo shows two different very small drill bit sets that I have found available at good hardware stores. They contain #61 to #80 drills (.039 to .0135"), which easily covers the range needed for jets. I use a Pin Vise (as shown in photo) to drill the holes by hand.



Throttle Shaft Bushing Drill Fixture Plate
To add bushings for sloppy throttle shafts, upper castings need to be properly drilled. This precision machined fixture plate aids in accurately locating the drill position.

First, place a drill, that fits snuggly, into existing throttle shaft holes. Mount casting onto fixture plate and position into vise on drill press, aligning drill in chuck.

Without moving fixture in vise, replace drill with a 5/16" drill and drill out hole. Tap in bushing, with knurl end facing out, using soft hammer or piloted drift.

If a heavier press fit is used the hole may have to be ground or resized using a 9/32" drill or reamer.

To install bushing by bonding using an epoxy or superbonders, use "O" (.316") drill size. The inside blind hole is not normally rebushed, and bushing may have to be shortened, if done.



Venturi Extraction Tool

Even after heating carburetors up with a torch, Venturi's can be difficult to remove from casting. This fixture is very effective for pressing out even very stubborn ones. It's made up of materials found at most hardware stores and one special machined steel disk at the left side of the photo. It's 1.1875 outside diameter, 1/2 inch long, and it's drilled 3/8 inch deep and tapped for 1/2 inch Std thread. The pipe is 1 and 3/8 inch inside diameter. I had to grind out inside burrs for venturi to slide easily through it. Tightening the 1/2 inch nut pulls the venturi out of the castings.