Zenith Model A Ford Carburetor Restoration Worksheets

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These worksheets are evolving as a sequential guide to help Model A Ford owners restore their Zenith carburetors. These sequencial 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 do restoration details, are identified at the end of these worksheets as "References and Acknowledgements".

What is known about the specific carburetor being restored:

th this carburetor - Why do they think this Carburetor may have a problem?
t

Remind owner that no carburetor can perform well on an engine without good ignition system, that is timed com 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:

Castings

After making sure that g Need to get to nearly rec Be careful with small br	sted and corroded, it may ne		ıds
Don't forget to remove h	nidden, brass Gas Adjusting	g Valve seat if there is one.	
Drill out brass passage p	olugs from both castings.		
Soak castings and comp	onents in solvent.		
(Cleaning, inspection, repa Verify all parts have bee			
Clean off and dig out rea	mains of all gaskets.		
Brush Castings with wir	e brush.		
Carefully bead blast cas	ting, including internals sur	faces, passages, vents, etc.	
Thoroughly clean out A Very importan	LL passages and vents nt step! Make sure none we	ere missed.	
Chase threads with corre	ect taps, watching for stripp	bed and cross threads	
<u>Thread Tap Size</u> 1/2 20 UNF (SAE)	Location Upper Casting	<u>Tapped Hole</u> 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 (Most li	Carb Mount Bolts (2 Places) kely to be stripped or cross threaded)	
1/8-27 NPT (Pipe)	Lower Casting	Gas Adjust Valve	
M5 X .75 (Metric)	Upper Casting	cut threads deeper, as it is a pipe thread) 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	
	Upper Casting ed hole, for Idle Jet, provide rfaces for flatness and paral		
Idle Air & Secondary W	/ell vent hole was 9/32" to	mid 1929 & then 3/8"	
1/8" bowl vent was adde	ed in mid 1930 to improve	hot weather performance.	
Modified to adapt sidebo	owl filter assembly in early	1931?	

Testing Lower Castings internal passages

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 / 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.	

	ng Gas Adjusting		
1.		rdware" in Lower casting et, with o-ring and vinyl tubing	
		jet with o-ring	
		pensating jet (Solder closed old jet) with o-ring	
	-	4 Bolt, with o-ring, to seal secondary well hole	
		n plug w/ o-Ring	
		Seat (if needed), Needle, Housing, and Choke Driver, that will be used in ca	arburetor
2	Fill bowl about hal	· · · ·	
	Blow air into cap je	et vinyl tubing while adjusting GAV. AV 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 v	when the GAV is closed , the seat needs to be honed smooth for a tight seal.	
5.	Remove Water or	Gasoline from Float well, Secondary well, etc.	
6.	Remove all Test H	ardware and parts	
7.	If water was used,	Dry water out of Casting immediately with a torch, to minimize rusting.	
1. I 2. I	Blow air thru Fuel i install an Idling Jet	is internal passages input, Strainer, and Float Valve holes. (Make sure old strainer tip isn't left ir and Air Adjust Screw Assembly g jet to verify passage is open between idling jet and idling port.	side)
4. 1	5 5	usting screw assembly can actually shut off all air flow	
		ock idling port in throat, and blow in Idling Jet. hen Air adjusting screw is all the way in, No air should flow out air input pa	
Pain	ting of Castings Mask all	openings to internal carburetor areas.	
	Paint wit	h: Orr-Lac, Gloss Black #903; Duracryl, Acrylic Lacquer Low Gloss DIA 9	468; or
	"Plasti	-kote", Flat Black # 344 for compatability with high temperature and gasolin	e to some degree.
	Suggest t	that paint be baked at 250 degrees F for a couple hours.	
	Press in l	brass plugs	
	Paint two	o stop pins with Aluminum paint	
Thro	ttle Assembly	(Inspect, clean with solvent, repair and assemble) 20 degree to June 1928, after 18 1/2 degree; Check for fit and motion	A9585
		Check for rotational motion and slop in bearing areas	A9581
	ever forged steel, nickler be disirable to salvage	e finish to mid 28, forged brass, nickle or plain finish to early 30, then Stamped steel , cadm orginal shafts, versus replace, by building them up with solder and then file / emroy cloth t aft holes get worn, they leak vacuum, and may need to be drilled out for bushings.	ium or plain finish
	Bushings:		A9581-S
	Plate Screws:	A20042-S7	(Oval 5-40 UNF (SAE) Thread x 19/64)
		5-40 UNC (SAE) Threads (2 Places)	
	Fillister Screw:	1/2" long until early 30, then 5/8" A20	108-S7 (8-36 UNF (SAE) Thread x 5/8)
		Check for head and slot damage	
	Adjustment:	Off engine, initial screw setting should slightly open throttle plate	
Air A	Adjusting Screw A Functi Needle	on is to introduce air into fuel stream, metered by the idling Jet.	A9577
	Shaft Length:	(minus head = 1 & 3/16 or 1.1875"; Including head = 1 & 11/32" or 1.34	4"
	Head Diameter:	1927-30 = 3/8" or .375"; 1930 - End = 5/16" or .3125"	
	Cap: (Off Eng	A9579 Spring:	A9578
Strai	ner (Inspect	, clean with solvent and assemble)	
	Strainer:	,	A22333 (1/2")

	alve Assembly (Inspect, clean with solvent, repair and assemble) Controls the level of fuel allowed into the bowl Valve:	A9564A
	Valves can be intermittent: Leak when they should be closed or stick par	
	should be open. Push in hard and twist valve stem a few times to seat it. Consider replacing with gas resistant rubber tip or "Gross Jet" designs.	A9564-Z
	Float: Test for Leaks	A9550
	Float Hinge Pin <u>:</u>	A9558
	Hinge: Check for damage and security	
	If hinge rivets are a problem: Either replace rivets or tap and insert 6/32 S Washer	crews A9502Z
	Inspect Float for a small dimple worn into the top of the float by the valve needle. dimple is a lateral bind on the valve needle that prevents it from closing comple To get float solder seam to be parrellel with upper casting surface, gasket thickness Float Tab may need to be bent so that float does not drop too far down.	The effect of this ely and sealing.
dling Jet	(Inspect, clean with solvent, adjust, test, and assemble) Delivers fuel (from the Secondary Well) to the engine at idle (effect only at low a This jets orfice is very small and is easily clogged by dirt or sediment. If jet is too la screw will need to be turned out very far (>4 turns). If jet is too small, it will be im 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.	rge, the adjustment
		A9542
	For Zero to 3000 Foot #75 For 3000 to 5000 Foot #75	ter in inches 021 021 020
	Recommended Flow (measured at desired altitude) 44 to 48 milliliters per minute (Some Carburetor to Engine combinations require +/- 5 milliliter from this.)	
	Orfice Size Measured: Adjust	ed to:
	Flow Measure at Altitude: Adjust No washer is used with this jet because it is a taper fit. Adjust	ed to:
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 wil rich, give low mileage, sooty plugs, smell of gas, and irregular running. If the jet is make the mixture lean, the car won't go very fast, and might even backfire at high s Should have indented tip to prevent capillary action leaks when engine is off.	too small, it will
		A9534B
	Orfice Size recomendations:	l Length:
	For Zero to 3000 Foot #63 For 3000 to 5000 Foot #64	ter in inches 037 036
	For 5000 Plus Foot #65 Recommended Flow (measured at desired altitude) 150 to 160 milliliters per minute	035
	Orfice Size Measured: Adjus	
	Flow Measure at Altitude: Adjus	
	Gasket / Washer (One Only!):	
	Verify that Main Jet is 3/8" from the top of the Lower Casting & in line with the nar	
Drain Plug		A22086 rowest point of ventrui.

Cap Jet

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 <u>only at low</u> <u>speeds</u>. 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:	
	Orfice Size recomendations: 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 milliliter	s per minute	
	Orfice Size Measured:		Adjusted to:	
	Flow Measure at Altitude:		Adjusted to:	
	Gasket / Washer (One Only!): Verify that Cap Jet top is 7/16" from the top of Lower Cas	ting.		A22086
Compensator	• Jet (Inspect, clean with solvent, adjust, test, an Compensates for the enriching effect of the Main Jet as a provides a more constant air / fuel ratio mixture. If the jet of gas, and irregular running <u>only at low speeds</u> . If jet is to on hard pulls (at low speeds). A hard slow pull uses this ju	irflow increas is too large, g o small, it wi	gives low mileage, sooty plugs, sn ll give a lean mixture and miss / ju	
	· · · · · · · · · · · · · · · · · · ·			A9575
	Orfice Size recomendations:			
	Altitude	Drill	Diameter in inches	
	<u>Altitude</u> For Zero to 3000 Foot	<u>Drill</u> #65	<u>Diameter in inches</u> .035	
	For Zero to 3000 Foot	#65	.035	
	For Zero to 3000 Foot For 3000 to 5000 Foot	#65 #65 #66	.035 .035 .033	
	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot	#65 #65 #66	.035 .035 .033	
	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to	#65 #65 #66	.035 .035 .033 s per minute	
	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured:	#65 #65 #66	.035 .035 .033 s per minute Adjusted to:	A22086
Sacardam, W	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!):	#65 #65 #66 142 milliliter	.035 .035 .033 s per minute Adjusted to:	A22086
Secondary W	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!):	#65 #65 #66 142 milliliter	.035 .035 .033 s per minute Adjusted to:	
Secondary W	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!):	#65 #65 #66 142 milliliter	.035 .035 .033 s per minute Adjusted to:	A22086 A9545
	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!):	#65 #65 #66 142 milliliter	.035 .035 .033 s per minute Adjusted to:	
2	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!): /ell (Inspect, clean with solvent, dig dirt and rust from Integral well until mid 1928, then Secondary Well:	#65 #65 #66 142 milliliter holes and ass	.035 .035 .033 s per minute Adjusted to: Adjusted to:	
	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!): /ell (Inspect, clean with solvent, dig dirt and rust from Integral well until mid 1928, then Secondary Well: utter Assembly (Inspect, clean with solvent, repair an The Choke provides vehicle driver a manual control for Dutte Charl for fixed matting	#65 #65 #66 142 milliliter holes and ass d assemble) closing the A	.035 .035 .033 s per minute Adjusted to: Adjusted to:	
	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!): /ell (Inspect, clean with solvent, dig dirt and rust from Integral well until mid 1928, then Secondary Well: utter Assembly (Inspect, clean with solvent, repair an The Choke provides vehicle driver a manual control for Plate: Check for fit and motion	#65 #66 142 milliliter holes and ass d assemble) closing the A	.035 .035 .033 s per minute Adjusted to: Adjusted to: emble)	A9545 A9549
5	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!): /ell (Inspect, clean with solvent, dig dirt and rust from Integral well until mid 1928, then Secondary Well: utter Assembly (Inspect, clean with solvent, repair an The Choke provides vehicle driver a manual control for Plate: Check for fit and motion Shaft: Check for motion and slop in bearing	#65 #66 142 milliliter holes and ass d assemble) closing the A	.035 .035 .033 s per minute Adjusted to: Adjusted to: emble)	<u>A9545</u> <u>A9549</u>
2	For Zero to 3000 Foot For 3000 to 5000 Foot For 5000 Plus Foot Recommended Flow (measured at desired altitude) 138 to Orfice Size Measured: Flow Measure at Altitude: Gasket / Washer (One Only!): /ell (Inspect, clean with solvent, dig dirt and rust from Integral well until mid 1928, then Secondary Well: utter Assembly (Inspect, clean with solvent, repair an The Choke provides vehicle driver a manual control for Plate: Check for fit and motion Shaft: Check for motion and slop in bearing	#65 #66 142 milliliter holes and ass d assemble) closing the A	.035 .035 .033 s per minute Adjusted to: Adjusted to: emble)	<u>A9545</u> <u>A9549</u> <u>A9547</u> A9548

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 Driver: (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 and external thread conditions)	A9528
Note: Housing hex nut may be either 7/16 or 13/32.	
Seat: (Must provide a smooth, tight fitting seal for Needle - Brass insert used until Jan 1930)	A9532

Large Gaskets:		
Glue tack manifold Gasket to carburetor		A9447-A
Install Large Gasket onto upper Casting		A9592-A
Venturi (Inspect, clean with solvent and assemble) Double Verturi: to mid 1928		A9586-A
Single Venturi: Started in June 1928		А9586-В
Bolt, which holds two casting together (Inspect, clean with solve Bolt: <u>A209233-S7 (3/8 - 24X3 3/16)</u>	nt and assemble) Lock Washer:	A22257-S2 (3/8")
Install sidebowl filter assembly (Only on models made after early 193	31)	

Final checks and adjustments, once carburetor is installed on vehicle:
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Carburetor is being installed, checked and adjusted on:	
Check that Sediment Bowl on the 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 float tube (1/2 to 5/8" below top of lower casting) Measured Level:
Fine Tune Throttle, Idle Adjusting Fillister Screw and Air Idle Adjusting scr 1. Start the engine and let run at a fast idle until normal operating temperature is	
2. Full retard the Spark Advance Control Rod (Up).	
3. Check that Fuel Mixture Control (on passenger side) turns and pulls smoothly	у
At sea level and low altitudes, leave control 1/4 turn from Full CV	N
At higher altitudes, leave control full clockwise.	
 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 eff 	ect. (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 positon.	
Turn the screw half way between the two positions or for Miximum engine R As screw is opened, it leans out the mixture being fed to the idle port in the s As Screw is closed, it reduces the amount of air mixed with fuel coming from7. If Adjustment does not cause the engine to stall at some point, it is an indicati 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	side of the carburetor throat. n the idling jet. ion that the Air Adjust Screw n.
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, spark plugs, a change in breaker point gap or a new condenser will all change Many so called carburetor troubles can be traced to one or more of these issu	idle adjustments.
The idle adjustments of the carburetor should be made after any ignition work	k or changes.
With a mechanically sound engine and good ignition, the engine should idle s accelerate evenly at all speeds and deliver at least 16 miles per gallon of gasol	
Test Drive vehicle around town, at highways speeds, and if possible on a lon	ıg, slow, steep climb.
Notes on performance, problems and resolution	

Date:

Replacement Parts Shopping List

Description	Ford <u>Part #</u>	Estimated <u>Price</u>
Air Adjusting Screw Cap	A9579	\$0.00
Air Adjusting Screw Needle	A9577	\$2.75
Air Adjusting Screw Spring	A9578	\$0.00
Air Shutter Lever	A9548	\$2.00
Air Shutter Nut/Washer	34078-S7 (8-36)&34902-S(5/32)	\$0.40
Air Shutter Plate Screws	A20042-S7 (Oval 5-40 x 19/64)	\$0.25
Air Shuttle Plate	A9549	\$1.75
Air Shuttle Shaft	A9547	\$3.25
Bolt, Hex Head	A209233-S7 (3/8 - 24X3 3/16)	\$1.00
Cap Jet	A9538B	\$3.00
Choke Driver	A9570	\$5.25
Choke Housing	A9528	\$3.50
Choke Needle	9525	\$2.50
Choke Seat	A9532	\$1.00
Compensator Jet	A9575	\$1.00
Drain Plug	A9590 (3/8 - 24)	\$1.25
Float	A9550	\$14.00
Float Pin	A9558	\$0.40
Float Valve	A9564A	\$4.75
Float Valve, Gas resist tip	A9564-Z	\$7.50
Gasket Set	A9502-Z	\$1.50
Idling Jet	A9542	\$3.00
Main Jet	A9534B	\$2.25
Passage Plugs	A9593	\$1.50
Secondary Well	A9545	\$4.00
Strainer	A9559	\$4.50
Throttle Fillister Screw	A20108-S7 (8-36 x 5/8)	\$0.50
Throttle Plate	A9585	\$4.25
Throttle Plate Screws	A20042-S7 (Oval 5-40 x 19/64)	\$0.25
Throttle Shaft	A9581	\$10.25
Throttle Shaft Bushings	A9581-S	\$1.00
Venturi (Single)	А9586-В	\$5.00
		Total:

References and Acknowledgements

"Zenith Model "A" Carburetor Restoration Guidelines" by, Steve Pargeter (Version 3) "The Model A Ford Carburetor" by Paul Moller "Model A Ford Mechanics Handbook" by Les Andrews "Model A Ford Mechanics Handbook by Les Andrews "Model A Ford Judging Standards & Restoration Guidelines" Seminar information and guidance from Steve Pargeter and Bill Lancaster "Gas Adjusting Valve Seat Leak Testing and Repair" by Bill Cilker ""Carburetors and Carbohydrates" video by Doube D Productions "Model A Ford, Zenith Carburetor Troubleshooting Chart" by Chris Pelikan Numerous articles in "The Restorer" and "Model A News" The many Model A Ford Owners who have trusted me to work on their carburetors

The guy who helped me solve my first Model A carburetor problem in my garage, Glenn Wildman