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Problems I have Seen with Commercially Rebuilt Q-Jets

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Introduction

As the Q-Jet carbs keep getting older, fewer and fewer are original carbs that have not been tampered with or altered. Rebuilding a Q-Jet is becoming a significant problem for the novice, because the carbs cannot be simply bolted together the way they came apart: The carbs have been altered, and these alterations must be identified and corrected before the carb will run as it was designed to do.

The carbs with the most significant amount of problems and alterations are the "commercially rebuilt" carbs. These are carbs which have been through assembly-line type rebuild operations by unskilled workers. Every carb is altered and modified to produce a semi-consistent, "generic" level of performance to limit the warranty claims against the rebuilder, and carbs are often built with a mix-match of parts from various years: You may have a "correct" '72 Chevy carb number on the float bowl, but the throttle plate could be from a '66 Buick with a Chevy throttle lever screwed in place, and the airhorn may be from a '69 Chevy truck. As a result, you get a carb that performs marginally well or just moderately bad (and sometimes, really bad). Repairing one of these carbs can be a costly experience, since Q-Jet replacement parts have been discontinued by all sources: You have to buy a few "parts carbs" to get the repair parts needed. Examples of commercially rebuilt carbs are carbs procured from Checker Auto Parts, NAPA, AutoZone, and carbs rebuilt by name-brand suppliers such as Holley. Most commercial carbs can be easily identified by a paper sticker placed on the carb body near the rear, driver's side corner. You can also identify most of them by the bead-blasted appearance which will have removed all plating and color from the carb and components (often leaving all of the steel linkage parts rusty). Most commercially rebuilt carbs have a blocking baffle pressed into the bowl vent hole located just forward of the air cleaner stud hole (so you won't try to stick the stud down the vent hole and damage the float) – a non-commercial carb has no obstruction at all in the vent hole. Many commercial builders also install Phillips-head screws in the carb – a sure-fire give-away of a commercial carb.

The following article consists of two "postings" I did on the CorvetteForum a few years ago after tearing down some commercially rebuilt carbs, along with some findings from a third carb I just finished setting

up. These are my findings and comments. Be aware of all of these potential problems on any commercially rebuilt Q-Jet you come across.

Posting #1:

Forum member "Bobs77vet" (Bob K) sent me a carb he procured via the internet (correct me if I'm wrong, Bob, but I think it was an eBay purchase or something similar). I want to use Bob's carb as an example of all the things that can be wrong with a carb, and why you simply can't just disassemble a Q-Jet, slap a kit in it, put it back together, and expect it to run right.

In all my papers and postings, I always warn people against buying "commercially rebuilt carbs," and I keep getting the question from people, "What's wrong with a commercially rebuilt carb?"

Bob's carb was a commercially rebuilt carb that had been recently rebuilt by a "commercial carb builder." Whoever bought it put it right back up for sale...

Here are the issues I found with this "near-new" 1975 Q-Jet rebuild and some of the things that had to be done to fix it:

1. Bent APT needle. Also called the "altitude compensator," this device controls part-throttle mixture using an adjustable needle in a 3rd "jet" in the float bowl. The needle had been bent during rebuilt, causing the needle to not be engaged in the jet. This resulted in a "full rich" condition that somebody tried to compensate for with other "tuning" methods. Read on...
2. Lead plugs installed in idle air bleed holes. This is a common practice by most commercial builders. The Q-Jet uses an idle air bleed system that allows idle air to be pulled into the intake just below the throttle blades. By allowing a controlled amount of air to bypass the throttle blades, the throttle blade opening can be decreased, allowing effective use of the transition slots in the throttle plate. Plugging the holes for the idle air bleed results in the idle speed screw needing to be cranked up to the point that the transition slots are excessively exposed, causing off-idle stumble and hesitation.
3. Extreme rich jetted - damaged #78 jets. To compensate for other setup issues, the builder had installed #78 jets in a carb that should have #72 jets. In addition, they had slipped a bit with the screwdriver during assembly, damaging the jets and the fuel flow.
4. Throttle plate loose. The screws attaching the throttle plate to the fuel bowl were loose due to the factory-installed lock washers being deleted. This caused vacuum leaks at the throttle plate and a lean condition.
5. Severely bent primary throttle shaft & lever. The primary throttle shaft was bent, causing binding and sticking of the throttle.
6. Stripped inlet threads. Common problem on a Q-Jet. But in this case, the builder had installed a self-threading oversized inlet fitting, deleted the fuel filter and filter spring, and polluted the carb with metal debris from the self-tapping fitting.
7. Bent & destroyed secondary lockout lever. In an attempt to "adjust" the secondary lockout lever, the builder had bent the lever to the point of breaking the tang off the lower portion of the lever. The secondary engagement tang was broken, and the rest of the lever was severely bent and unusable.
8. Sandblasted finish. Common practice with the commercial builders: The entire carb had been sandblasted, removing and destroying all finishes and corrosion protection on aluminum and steel surfaces. Result is that aluminum surfaces are covered in white oxidation, and all steel parts are badly rusted. The carb had to be acid dipped and chemical conversion coated to bring back some of its correct finish.
9. Secondary airvalve loose & sticking. The builder had ground the staked feature of the retaining screws off, resulting in the screws loosening and jamming the airvalve.
10. Incorrect float installed. Brass floats don't cut it on a Q-Jet. Always use a NitroFill float.
11. Extreme low float level (.620"). To compensate for other issues, the float level had been dropped to an extreme .620" level. Correct level is .420. This low float level assured that the carb would not operate on the idle circuit, and the carb was idling on the main discharge circuit once the idle speed screw was turned in far enough.

12. Incorrect power piston spring. Common commercial rebuild problem: They install a "generic" power piston spring. This may work okay on a truck, but it sure doesn't work on a Vette. GM just discontinued the "Corvette" power piston springs...
13. Stripped threads in bowl for throttle body attach screws. Another common problem with these carbs is that they tighten the screws so far that the threads strip out. You have to have a handful of 10-32 HeliCoils any time you try to rebuild a commercial carb.
14. Bent primary rods. The tips of the primary rods were bent from incorrect attempt at installation into the jets. This eliminated any fuel metering control.
15. Accel pump rod broken. The commercial builders use junk parts from junk carbs. The rod attached to the accel pump lever was broken off at the top "jog," and the builder just installed a snap retainer rather than replacing the rod.
16. Bent primary throttle blades. In an attempt to get the throttle geometry right, the builder actually bent the primary throttle blades at an angle. This resulted in the primary throttles not fully closing. With the way the rest of the carb was set up, this was probably irrelevant, since the carb needed all the throttle opening it could get to idle at all..
17. Secondary throttles set to open over-center. Another common "speed trick." The secondary throttle on a Q-Jet should not open past vertical. In fact, they need to stop just short of vertical in order to produce most effective airflow through the secondary side.
18. Broken throttle plate. A common issue on the commercial carbs is that the builders install throttle shaft bushings in these carbs, whether they're needed or not. Very few Q-Jets really need throttle shaft bushings, and most people who install them screw up the install. In this case, the builder bored the throttle plate for oversized bushings and broke the throttle plate in the process. No problem - they just smacked the bushings into the broken throttle plate, left the massive vacuum leak unresolved, and let 'er go. The plate had to be repaired with correctly installed K-Liner type bushings.
19. Plugged idle fuel tubes. The smallest metering orifaces in a Q-Jet are the Idle Fuel Transfer Tubes. These tubes are pressed into the carb, and only the top oriface of the tube is visible in the top of the float bowl adjacent to the venturies. Commercial builders often pull these tubes out and install "generic" tubes with incorrect orifaces in the top and bottom of the tubes to compensate for the other "tricks" they do to the carb. In this case, the builder had installed tubes with lower orifaces too small, and these had been plugged up with the metal debris from the oversized inlet fitting. There was no idle fuel flow possible.

These commercial carbs obviously create some unique tuning and setup problems, and they are contributing to the notion that "Q-Jets are junk," since they never run right. If you have one of these carbs, be sure you look critically at every aspect of the carb during any setup and rebuild process - you cannot simply "install a carb kit" in one of these carbs and have it run right...

Posting #2:

As most of you know, I've been warning people about the problems with the commercially-rebuilt Q-Jet carbs from various sources. The commercial rebuilders do some really odd things with Q-Jets, and set them up so that many of them simply don't run. Many of the modifications are such that a rookie Corvette handy-guy would not be able to fix these issues with a "carb kit" rebuild, resulting in a myriad of bizarre drivability problems and a bad rap for the Q-Jet carbs.

A couple of weeks ago, I posted some results from the teardown and inspection of "Bobs77" carb. This week, I have a Q-Jet belonging to Jim from MA. This carb has been "remanufactured" by Holley, so let's take a look at how Holley set this carb up...

Carb: 7044202 (1974 350 Chevy)
Should be set up and jetted with 75 primary jets, 46 primary rods, and the "CH" secondary rods (.057"). Pretty standard jetting.

Here are the issues I found:

1. Stripped fuel inlet. The inlet threads were stripped out and a self-tapping inlet fitting had been installed. Bad way to repair a bad inlet, since these self-tapping fittings can easily tear the rest of the threads out. Repair: Machine and tap the inlet for a stainless steel helical insert.
2. Sticking secondary airvalve. The airhorn casting was distorted at the rear edge of the airvalve from over-torquing of the rear airhorn screws, resulting in jamming and sticking of the airvalve. Repair: File the displaced metal from the airhorn to obtain correct clearance to the airvalve.
3. Bent accel pump lever. The lever had been bent to better align with the accel pump lever rod (see next item). The bend looked "factory", but Q-Jet levers are straight... Repair: Straighten the lever.
4. Accel pump lever rod cut off. The "jog" on the top of the rod had been cut off and an odd retainer had been used to keep the rod in the lever. This slightly changed the geometry of things, requiring the lever to be bent. Repair: Replace the rod.
5. Bent secondary airvalve linkage & lever. The airvalve linkage system had some very odd, creative bends in it. It might look factory if you hadn't seen one before, but this just wasn't right. Repair: Bend it all back to match a "virgin" carb I had sitting here in the shop.
6. Incorrect vacuum nipples. Some very odd configuration vacuum nipples had been installed in the carb. Repair: Replace vacuum nipples with correct, stock nipples.
7. Warped airhorn. Holley had installed a big, fat airhorn gasket to compensate for a severely bent airhorn. Even with the fat gasket, the fuel transfer passages were not sealing - the idle circuit was not getting fuel on this carb. Repair: Straighten and machine the airhorn flat.
8. Incorrect secondary rods. Holley had installed a set of "generic" .040" diameter rods. Repair: Install the correct .057" Corvette rods.
9. Power piston installed without primary rods engaged in jets, bending and destroying both primary rods. Power piston was inoperative. No kidding: When the power piston was installed, they missed installation of the rods and simply jammed the airhorn down on top of the thing. This folded the rods over in the bottom of the float bowl, breaking one rod and destroying the other. The rods were not installed in the jets, resulting in an extreme rich condition. Repair: Replace the rods with OEM rods of the right size.
10. Accel pump jammed in bore - inoperative. When the accel pump was installed, it was installed "dry" with no lube. This resulted in the accel pump cup turning itself inside-out against the accel pump wall and jamming the pump into the bottom of the bore. The accel pump was completely inoperative. Repair: Replace accel pump and install correctly.
11. Very high float level. Float level on this carb should be about .375". Float level was set at .200" - too high for a street driven application. Repair: Replace the float and set to .375".
12. Float clip installed backwards. The clip attaching the needle to the float must be installed around the rear edge of the float arm in order to avoid binding the needle in the seat. The clip was installed around the forward edge. There was a GM Service Bulletin on this issue in the late 60's. Repair: Install the new needle clip the right way.
13. Idle air bleed holes plugged with lead plugs. The holes in the float bowl that transfer air to the idle air bleed holes below the throttle blades had been intentionally plugged with lead plugs, making the idle air bleed system inoperative. When this is inoperative, the idle speed screw must be cranked in a lot further, resulting in excessive exposure of the transition slots. This, again, will result in stumbles and off-idle hesitations. Repair: Knock the lead pluigs out of the holes with a pin punch and hammer.
14. Incorrect power piston spring. I don't know where Holley got this thing from, but it looked like the front spring off of a 3/4 ton truck. In order to spot incorrect springs, you have to know the correct part number for the right spring, and have some of the "correct" springs on hand for comparision purposes. Repair: Replace the spring with the correct OEM spring.
15. Idle mixture screws fully closed. This was likely not done by Holley. With all the problems with this carb, it would have run incredibly rich. The installer tried to lean it out by closing the idle mixture screws. I doubt this fixed the problem... Repair: Correctly set idle mixture screws during setup and test running to 2 turns out.

16. Incorrect springs on mixture screws. Long springs had been installed on the screws, resulting in the springs being in coil bind upon closing the screws. Repair: Install the correct short springs from a donor carb.
17. Fuel filter spring missing. The self-tapping inlet did not allow for a spring to be installed. The filter was installed with no backing spring, which means that the fuel was simply by-passing the filter. Repair: Install a spring.
18. Power piston stop pin cut off - piston destroyed. This is a favorite "trick" by many of the builders, and Holley always does this: The lower stop pin on the power piston, which determines how deep the power piston rides at cruise (and how far the rods engage in the jets to lean the carb out at cruise), had been cut off. This makes the rods ride way too deep in the jets, running the carb very lean. Repair: Find a virgin piston out of a donor carb and replace the piston.
19. Extreme lean jetted. The carb was jetted with #71 jets. If the rods had been installed in the jets, the carb would have run extremely lean, especially with the pin cut off the power piston. Without the rods in the jets, it ran incredible rich. Repair: Jet the carb correctly per spec.

20. One secondary discharge tube missing. On the secondary side, fuel is discharged out of two 1/4" diameter tubes sticking out of the airhorn. One of these tubes was never installed in the carb, resulting in little or no fuel discharge on the secondary side. Repair: Pull the tube out of a donor carb and install it in the carb.

Another Carb I Just Rebuilt:

This carb came in for rebuild from Forum member "Young69Owner." It was a commercially rebuilt carb, of the type you'd get from AutoZone or Checker. Adam's complaints were an erratic idle and leaking gas. Carb number 7044203 (1974 Chevy 350 Truck sold as a '69 Vette carb)
Here is what I found with the carb:

1. Carb was commercially rebuilt - typical of an AutoZone or Checker Auto type carb. It had been sandblasted and stripped of all protective coatings, and it had been assembled using mismatched junk parts. Repair: Replace all mismatched and junk parts with parts from donor carbs. Acid dip the good parts to remove corrosion. Chemical conversion coat to restore some original color back to the carb.

2. The divorced choke coil sent with the carb had been destroyed - it had been bent to keep the choke closed under all conditions, possibly in an attempt to compensate for the other problems listed below… Repair: Have owner order a new reproduction divorced choke coil from Paragon.

3. The throttle lever was bent and binding. Repair: Since the entire throttle plate was incorrect for the carb, it was replaced (see item #20).

4. The entire choke mounting plate was loose. If this had been the only choke problem, it could have caused erratic choke function. Repair: Since the entire choke mounting plate and choke system was incorrect for the carb it was replaced (see item #21).

5. The secondary airvalve windup spring was set way too loose, resulting in premature secondary opening and a likely stumble or sag going into the secondaries. Repair: Since the entire airhorn was incorrect for the carb, the complete assembly was replaced and the airvalve on the new assembly was set correctly (see item #24).

6. The base gaskets used with the carb were incorrect for the manifold in use – the engine probably had a base gasket leak. Repair: Correct base gasket was provided with the carb.

7. Bent/destroyed accel pump rod. Someone had bent the rod and destroyed it to remove the airhorn off the carb. Repair: Replace rod with a good used rod from a donor carb.

8. Bent/destroyed choke intermediate rod. The rod had been severely bent and modified in an attempt to alter choke operation. Repair: Replace rod with a good used rod from a donor carb.

9. Secondary rod hanger had been bent and destroyed – jamming the hanger against airhorn. Repair: Replace with hanger from donor carb.

10. The commercial rebuilder had removed the original secondary rods and replaced them with brass, generic, "no-size" "no-stamp" rods. They were not of the correct dimensions, and were producing faulty secondary fuel metering. Repair: Replace the rods with correct, OEM rods from a donor carb.

11. The power piston had been cut off and destroyed with a pair of side cutters. Repair: Replace the power piston with a correct, OEM piston from a donor carb.

12. The primary rods had been removed and replaced with generic "no-size" "no-stamp" rods (approx #42), really screwing up cruise mixture. Repair: Replace the rods with correct, OEM rods from a donor carb of a size suitable for the engine mods (headers, free-flowing exhaust and a good intake require a slight increase in fuel flow).

13. The air cleaner stud had been broken off and seized in the float bowl. Repair: Since the entire airhorn was incorrect for the carb, the complete assembly was replaced (see item #24).

14. The float was jamming against the float bowl casting, locking the float in the fully raised position. Repair: Replace float with a correct float for the application.

15. Primary metering jets had been replaced with generic "no-size" jets, adversely affecting mixture. Repair: Replace jets with correct jets for the application.

16. Needle/seat had been stripped out of the float bowl and repaired with a low-flow, press-in seat. Repair: The float bowl was machined, a Helicoil was installed, and the correct, high-flow needle/seat was installed.

17. Incorrect power piston spring was installed – it was so soft that the power piston probably never went into the power enrichment mode. Repair: Install correct, OEM power piston spring for vehicle application.

18. Defective aftermarket brass inlet fitting installed - the sealing cone was defective and would not allow fuel line to seal properly. Repair: Replace fuel inlet fitting with a correct, OEM inlet.

19. Incorrect Holley fuel filter installed. Repair: Install correct inlet filter.

20. Throttle plate ("carb baseplate") was incorrect for the model/series carb. Chevy throttle lever had been cut off a donor carb and screwed to this non-Chevy throttle plate. Fuel transfer holes in the throttle plate did not align with the float bowl, contributing to an erratic idle. Repair: Replace entire throttle plate with correct Chevy throttle plate for the ’74 float bowl from a donor carb.

21. Entire choke pulloff mounting plate, fast idle system, and choke system was off of a mid-60's Buick or Olds – was not compatible with the ‘74 Chevy carb. Repair: Replace entire choke system with parts from a donor carb.

22. Incorrect idle mixture screws - did not fit throttle plate and could not regulate idle fuel flow. Repair: Install correct idle mixture screws in the “new” throttle plate.

23. Idle air bleed holes in the float bowl had been plugged with epoxy. Repair: Knock the epoxy out of the holes to restore correct idle air flow operation.

24. Incorrect airhorn ("top of carburetor") for model/series carb. Incompatible with '74 choke and airvalve system. Repair: Replace entire airhorn with a correct ’74 airhorn from a donor carb.

25. Warped float bowl. Repair: Straighten to fit and seal against “new” airhorn and throttle plate.

The carb is now back to its correct configuration, and it's set up and running as it should. So watch out for those commercial carbs, and look critically at every aspect of them if you ever find yourself rebuilding one.

Keep on tuning those Vettes!

Lars