

Changing Clutch Fluid of C7 and Grand Sport



A forum Post reminded that the C7 is similar to the C6 and some prior Vettes. The clutch fluid gets dirty with use! The dirty fluid has been reported to cause the clutch pedal to be:

- Hard,
- Soft,
- Slow to return or lazy,
- Hung mid-way up, or
- Stuck to the floor

What Causes Dirty Fluid?

It appears the clutch wear dust attaches itself to the part of the shaft that goes into slave cylinder, located in the bell housing. There are seals, but with heavy use clutch particles are found in the fluid. The other contaminate, as with all hydraulic fluids, is water. The 2014 Owner's Manual recommends changing every 30,000 miles or two years whichever occurs first. However the 2016 and the 2017 Owner's Manual that came with the Grand Sport states 45,000 miles or 3 years.

Cleaning the Fluid:

A simply procedure, called the "Ranger Clutch Cleaning Procedure" by the poster, and referring to links that describe it, discuss what needs to be done and the tools needed. Bought both the DOT4 fluid and syringe for under \$8. It took about 1/2 hour and had clean fluid.

Was It Needed?

Can't be sure! But looking at the color in the above picture after the 1st drain and with such a low cost and little time, why not! C7 had only ~3000 miles and although there were no maximum speed launches, it does get periodic max rev 1st to 2nd and 2nd to 3rd shifts.

NOTE, the 2014 and 2017 Owner's Manual it states:

"The fluid will darken over time. See Maintenance Schedule on page 11-3 for when to replace the fluid." There is a GM Bulletin that indicates the dark color is caused by carbon black from the throwout bearing seals. Key parts are presented at the end of this document. Note clutch/brake fluid is also a good paint remover! BE CAREFUL DON'T ALLOW GET IT ON A PAINTED SURFACE.

The following is a picture review of how I changed fluid in my C7:

Photo Sequence

This info was posted on a forum: *“The C7 has the same issues as the C5 and C6 when it comes to clutch fluid. This is how bad mine looked (right) and this is with no track time and not a lot of aggressive driving...”*

However another forum member noted that the fluid darkens soon after it's changed. Another performs the Ranger Method (detailed below) monthly to keep the fluid “looking cleaner.”

As mentioned GM states dark fluid may not indicate any problem! IMO performing every oil change is every oil change is sufficient, has worked with my C6 for over 6 years.

To follow the GM recommendation of changing fluid every 2 or 3 years requires bleeding from the slave cylinder. That requires removing a driver's side exhaust pipe and CAT. Then removing some sheet metal to access. Then bleeding like brakes. NOT easy or cheap!



Many posters recommended and use a procedure called Ranger Clutch Care. You can search for the term. I found this link:

http://www.rangeracceleration.com/Clutch_Care.html

I highly recommend viewing as it also has a good video showing not only the cause but the simple procedure to clean the fluid.

The picture right is from the video which was taken after 6 hard launches and 18 shifts! The particles are clutch dust!



The solution is simple:

All that is needed is to drain the clutch fluid reservoir periodically. It describes a very simple procedure. The following covers what I did on my Z51 C7 and will perform on my Grand Sport at the OLM required oil change.

Bought these as recommend from Walmart, The DOT 4 Synthetic ~\$4 and the syringe (found as the video said near the gas cans) is for mixing oil for two cycle engines.



The small clutch fluid reservoir cap is labeled DOT 4, which is the fluid recommended. Be careful when you remove the cap, brake fluid will eat your paint! I put a towel around the reservoir and another from that towel draped over the fender so any drops would not touch the car!

When I removed the cap, saw no visible level marks so I measured the current level from the rim, 1 inch. As the Owner's Manual states there should be no losses.

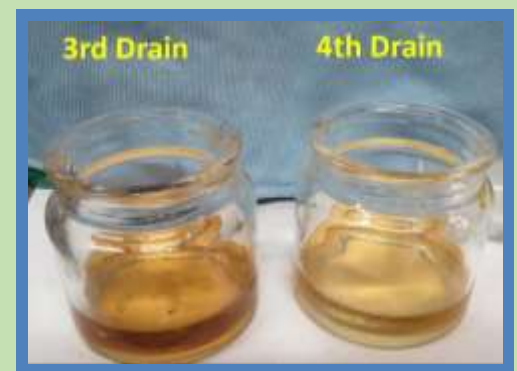


Procedure: 1) drained the reservoir with the syringe; 2) filled with new DOT 4; 3) depressed the clutch 30 times; 4) repeat as needed. That mixes the new fluid to some degree with the fluid in the line and slave cylinder. New clean fluid is mixed with old dirty fluid.

Pic on right was after the 2nd flush and clutch activation.

After the 3rd and 4th cycle the fluid is getting clean, not as clear as the new DOT 4 fluid, but close.

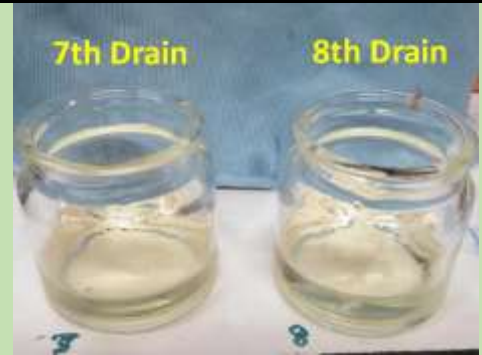
NOTE: Although it is a dark color there are no particles found as were shown in the Ranger Method website. I do not make frequent high rpm starts from a standing start and slip the clutch!



Even the 5th time still showed some discoloration compared to the 6th

Decided since reusing the fluid from an opened can is not recommended after a few weeks continued to a 7th and 8th change. They both look the same and close to new fluid.

NOTE: Brake fluid is hygroscopic; it picks up water and water vapor from the air like a sponge! Water causes brake fluid to boil at a lower temperature and reduces its performance.



The picture on the right is fluid directly from the DOT 4 can. This synthetic DOT 4 is what is recommended and in the Rodger procedure Prestone is what he used.

Be sure to extend and clean the inside of the cap, which takes up space to reduce the amount of humid air that will be in the reservoir. Brake fluid is hygroscopic (it picks up water) and its performance deteriorates.

As recommended do not use brake fluid from an open container and minimize the times you remove the reservoir cap to look at fluid levels.

For track and drag racing where more clutch dust is present, it is more prudent to use the Rodger procedure after every race!



This is the cap with the extender pushed back the way it was found. The fluid level was filled to where it was found, ~ 1 inch from the rim.

Note the 30,000 mile or two years max recommendation in the Owner's Manual may refer to bleeding the system. That appears to be a difficult procedure. Using this partial procedure, which appears to get essentially new fluid in ~6 drain cycles, it is simple and if done once per year should be satisfactory for "normal" driving-whatever that means with a Vette!

Second Change After 2 Years

Thought perhaps if, as GM statement about darkening over time, if due to staining from the seals as some reports indicate, it would be better for this 2nd year change. As seen from the pic right, it's just as dark!

However I have never found particles in the removed fluid. I'm not concerned about the color, as GM states it will darken with time.

1st Removed



As a reminder, Brake fluid will remove paint! Note a towel was wrapped around the filler neck and another was placed on the fender.

This pic also shows the syringe we purchased for this task. As was done for the first change the cap rubber was extended and cleaned.

The 6th change looks identical to the 6th change in the one done after 1 year! The fact that it progressively gets lighter with each 30 clutch pumps shows that the fluid does circulate as the clutch is depressed.

5th Change



6th Change



The Owner's Manual and the label on the clutch fluid reservoir state DOT 4 is to be used. This Prestone 12 ounce bottle was ~\$4 at Walmart! We used $\frac{3}{4}$ of the bottle and discarded the remainder. Don't use fluid from an opened container. It picks up water like a sponge!

The Ranger Procedure is Not the Same as Bleeding the Clutch

Some have pointed out that the “Ranger Procedure” is not as good a bleeding the system since it will not get particles that settle in the slave cylinder. However as shown in the video on page 2 of this report it will eliminate some particles that occur with aggressive use such as drag racing or tracking. I’ve used the procedure successfully for 6 years in my C6 with no clutch issues. I also have not seen any particles in fluid changes made with my “normal,” occasionally aggressive driving.

If tracking or drag racing perhaps you’ll want to consider bleeding the system. However as one drag racer finds, using the Ranger Procedure after each race may be better than letting the excess clutch dust etc. accumulate. Your choice.

Some who have had the dealer perform the bleeding service say it cost ~\$200 plus. If you want to bleed the system or have a dealer perform the service, this is the procedure:

Bleeding Procedure:

Page 17-334 of the 2014 Service Manual, outlines the bleeding process that starts with ***“Remove the left Catalytic Converter then get an assistant, etc.***

Those steps refer to page 9-890 that outlines a 5 step procedure to remove the left Catalytic Converter starting with,

- 1) Remove the floor panel tunnel...***
- 2 & 3) Disconnect the heated Oxygen sensors,...***
- 4) Place jack to support exhaust ...***
- 5) Disconnect intermediate pipe from the exhaust....***

Step 5 is outlined on page 9-888, these are the key points: ***1) Remove fasteners and discard seals (note will need new ones. 2) Remove intermediate pipe, 3) Separate intermediate pipe from muffles.***

At that point you can access the slave cylinder bleed valve and using an assistant with fresh fluid in the clutch reservoir press the clutch and have an assistant open the valve. Tighten the valve and per the Service Manual repeat 5 to 8 times keeping the reservoir full of new fluid.

Reinstall the exhaust pipes catalytic converter and floor tunnel panel.

If you have the dealer perform the service you can understand the cost.

WHY CLUTCH FLUID TURNS BLACK

The Ranger Method original information show contamination is caused by clutch particles getting past the seals in the throwout bearing. For drag races or when accelerating rapidly from a standing start, clutch slipping causes particles to fill the bell housing and allows this “clutch dust” to enter the sliding parts of the throwout bearing. However in normal driving the clutch fluid turns dark quickly. So what is causing the dark color?

The following is an old GM Bulletin that discusses the issue

Bulletin #PIP4938: Discolored Dirty Dark Sludge And/Or Grease In The Clutch Fluid Reservoir - (Aug 4, 2011)

Subject: Discolored Dirty Dark Sludge and/or Grease in the Clutch Fluid Reservoir

Condition/Concern: *It may be observed on some vehicles that the clutch fluid in the reservoir appears to be discolored, dirty, have sludge or grease contaminates in it after being in service for a period of time.*

The level of discoloration will vary with factors such as driving conditions, under hood temperatures etc.

This is a phenomenon that may occur with time due to the interaction between the clutch system rubber parts and hydraulic clutch fluid. Comments have been received about the fluid in the hydraulic clutch system being discolored. This discoloration is the result of carbon black used in the seal manufacturing process leaching into the hydraulic fluid used in the clutch system. The discoloration may also collect on the inside of the clutch reservoir at the top of the fluid. This discoloration does not affect the operation of the clutch system and should not be considered a reason to flush the clutch hydraulic system

Therefore, although some of the dark color is probably caused by clutch dust, it is also caused by carbon black from throwout bearing entering the fluid.

Other 2017 Grand Sport & 2014 Stingray PDF's Available:



Some 40 items discuss improvements or information about a 2017 Grand Sport and 2014 Stingray function and/or esthetics. Some are minor and others, like the installing ceramic brake pads, include detailed install information.

Below are the PDF's available. Click on picture (may need Ctrl pressed.) Or just copy and paste the PDF info (Blue type) into your browser. Or email me at GUtrachi@aol.com and state the title desired, shown in Yellow:

Note: GS indicates the info was updated from that available for the C7 Z51 PDFs.

Rusty GS/C7 Muffler

*Why the C7 muffler is rusted and a simply way to make rust turn matte black.
Bottom pic rusted, top pic treated*

http://netwelding.com/Muffler_Rust.pdf



Change GS/C7 Oil

*WHY change your own oil and HOW to do it
Revised, includes C7 Lifting Methods*

http://netwelding.com/Changing_Oil.pdf



C7 Carbon Fiber Side Skirts

*How to install side skirts with jacking information for
DIY's without lifts*

http://netwelding.com/Side_Skirts.pdf



C7 Carbon Fiber Splitter w/End Plates

How to install Splitter & Nylon bra fit

http://netwelding.com/CF_Splitter.pdf



C7 Removing GM Plastic Film

How To Remove The Rocker Panel Film

http://netwelding.com/Rocker_Panel_Film.pdf



GS/C7 Mirror Proximity Alarm

Limit switch alarm warns when passenger mirror is too close to door frame

http://netwelding.com/Mirror_Proximity_Alarm.pdf



Jacking Pads for GS/C7

Jacking Pads must 2 1/2 inch max OD. Made four. Bought 2 1/2 inch OD x 2 inch high pads after installing side skirts; Bought pads right for the GS.

http://netwelding.com/Jacking_pads.pdf



GS/C7 Radar Power

For C7 tapped rear fuse panel. For GS tapped mirror

http://netwelding.com/Radar_Detector_Power.pdf



GS/C7 Belt Rattle

Passenger seat belt rattles against the seat back. The solution, add a shoulder belt pad.

http://netwelding.com/Eliminate_Rattle.pdf



Aluminum C7 Chassis and Weld Repair

The C7 has an all aluminum chassis, made from 117 welded pieces

http://netwelding.com/Aluminum_Chassis.pdf



GS/C7 Ceramic Brake Pads

The Z51 has very dusty brakes. These pads help!

http://netwelding.com/Ceramic_Pads.pdf



GS/C7 License Plate Frame;

Must Meet South Carolina Law

http://netwelding.com/License_Plate_Frame.pdf



Manage GS/C7 Spilled Gas

Protect the side of the Vette when filling up with gas

http://netwelding.com/Manage_Spilled_Gas.pdf



GS/C7 License Plate & Cargo Lights

LED license plate light & cargo area bulbs are brighter and whiter

http://netwelding.com/License_Plate_Light.pdf



GS/C7 Rear Cargo Area

Rear cargo area needs storage device and rear protector

http://netwelding.com/Rear_Cargo_Area.pdf



GS/C7 Door Panel Protector

Black plastic protector added to prevent scuffing of door when exiting

http://netwelding.com/Door_Panel_Protector.pdf



GS/C7 Improved Cup Holder

A solution to the cup holder spilling under hard braking or sharp turns.

http://netwelding.com/Improved_cup_Holder.pdf



GS/C7 Wheel Chatter/Hop

Why sharp, low speed turns with cold tires causes the front tires to chatter/hop.

http://netwelding.com/Wheel_Chatter.pdf



C7 Carbon Fiber Grille Bar

Install genuine carbon fiber grille bar overlay

http://netwelding.com/CF_Grille_Bar.pdf



Jacking a GS/C7 Vette

Safely jacking either front only or back & front

http://netwelding.com/Jacking_A_C7.pdf



Deer Whistle Installed on GS/C7

Do they work? Plus Install Info

http://netwelding.com/Deer_Whistle.pdf



Replacing C7 Battery

After using a GM type charger and showing fully charged a voltage low, replaced battery with AGM!

http://netwelding.com/Battery_Issues.pdf



GS/C7 Window Valet

Lower Windows with FOB

Window Valet Helps 2014/2015 Latch Hatch

http://netwelding.com/Hatch_Latch.pdf



GS/C7 Splash Guards

GM offers splash guards for the C7 Corvette. An easy DIY installation. ACS Best Front Guards for GS.

http://netwelding.com/Splash_Guard.pdf



GS/C7 Blind Spot Mirror

Smaller rear and side windows cause C7 blind spots. Small "blind spot mirrors" help

http://netwelding.com/Blind_Spot.pdf



GS/C7 Skid Pad Protector

After the air dam, the aluminum "skid pad" hits driveway ramps etc. Plastic protector helps.

http://netwelding.com/Skid_Pad_Protector.pdf



GS/C7 Wheel Locks

Wheel locks, torqued to required 100 ft-lbs, help protect your expensive wheels from theft.

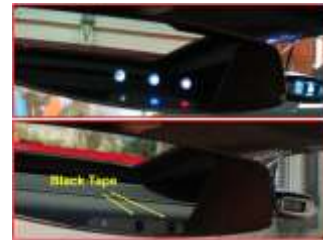
http://netwelding.com/Wheel_Locks.pdf



GS/C7 OnStar Lights

The OnStar LED's in the rear view mirror, at a quick glance, look like a police car flashing light! This is a fix.

http://netwelding.com/OnStar_Lights.pdf



GS/C7 Skip Shift Eliminator

Skip Shift Eliminator install with suggestions on jacking a C7.

http://netwelding.com/Skip_shift_Eliminator.pdf



C7 Catch Can & Clean Oil Separator

Direct inject engines like the LT1, are particularly subject to "coking." What is Coking and how to reduce the potential?

http://netwelding.com/Catch_Can.pdf



GS/C7 Round Shift Knob

A round shift knob shortens throw.

http://netwelding.com/Shift_Knob.pdf



GS/C7 Stingray Sill Plate

Stingray sill plate replaces original.

http://netwelding.com/Sill_Plate.pdf



GS/C7 Nylon Bra

Nylon Bra Stops Bugs on Front and Grill. Fits with Stage 3 Winglets

http://netwelding.com/Nylon_Bra.pdf



GS/C7 Clutch Fluid Change

Clutch fluid after 3000 miles gets dirty

http://netwelding.com/Clutch_Fluid.pdf



C7 Carbon Fiber Hood Vent

Replaces Plastic Hood Vent

http://netwelding.com/Hood_Vent.pdf



GS/C7 Cold Air Intake

Low Restriction Air Filter & Duct

http://netwelding.com/Cold_Air_Intake.pdf



Garmin GPS for GS Cubby

Garmin Mounts in GS Cubby

http://netwelding.com/GPS_In_Cubby.pdf



GS Splitter Stage 3 Winglet

Stage 3 Winglets Integrate with Spats

http://netwelding.com/Stage_3_Winglets.pdf



GS 2LT to 2.5 LT

Red Upper Dash Pad Like 3LT

http://netwelding.com/Red_Dash_Pad.pdf



Jake Emblem/Decals for GS

Jake Symbols Support GS Racing Image

http://netwelding.com/Jake_Emblems.pdf



GS Splitter Protector

Rugged Plastic Protection for Splitter

http://netwelding.com/Splitter_Protectors.pdf



GS Engine Compartment Mods

Cosmetic Additions in Engine Compartment

http://netwelding.com/Engine_Compartment.pdf



GS Vitesse Throttle Controller: Fits All C7s

Adjustable Throttle-by-Wire Control

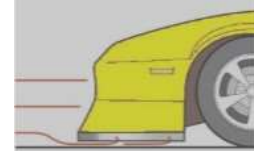
http://netwelding.com/Throttle_Control.pdf



GS Air Dam, Functions

Why Missing from Z51, Some GS & Z06

http://netwelding.com/Air_Dam.pdf



May Be Of Interest:

Engineering a ProStreet Rod

*How Our '34 ProStreet Rod Was Designed and Built
8.2 Liter Engine, 4 Wheel Disk Brakes & Coilovers*

<http://netwelding.com/Engineering%20Street%20Rod%203-08.pdf>

