

## Battery Issues

A number of Forum comments relate to Corvette "Battery Issues." The C7 Stingray is no exception. One of the reasons is the Corvette may not be the daily driver or driven as often in the winter. Or infrequent short drives cannot supply sufficient recovery to keep a battery fully charged.



After measuring the voltage in my C7 I was concerned that it was too low at ~12.4 volts where it should have been a minimum of 12.8 volts. However, I was out of town for several weeks. It also rained a number of days and I did not drive the Vette! Decided to first fully charge the battery, and then measure the voltage ~12 hours after it was charged, to eliminate the surface charge. Bought a CTEK

3300 charger from Amazon, which is identical to the Chevy labeled charger but 60% of the price, to see if it might help! It charged about like my old large charger but still ~12.4 volts after 12 to 24 hrs to eliminate the surface charge!

When the car was at the dealer for a differential fluid check had them also check the battery. They said it was fine (as expected!) In fairness after 34 months the battery performed satisfactorily. That includes three 2 ½ week vacations where it started just fine when returning without the use of a charger. I live 16 miles from town so most car usage is always 40 to 50 miles minimum. That is enough to charge the battery. The C7 is used a minimum of 3 to 4 times per week so it's sufficient to not allow the battery to discharge excessively.

However, the C7 would be three years old in two months. Before the coming winter, (and before I decided to sell it to buy a Grand Sport!) thought it would be prudent to replace the battery when "I wanted" and when I found an AGM (Absorbed Glass Matt) battery on sale. So, bought and installed a DieHard AGM battery. Would have bought an Optima like I have in my street rod and installed in my C6. However, the replacement needs to have a special top shape in addition to the correct size to fit properly! More about what is needed in the following.

This is a picture overview "How To" Install the New Battery.

Found an AGM (Absorbed Glass Matt) that said it fit and it did! This Sears DieHard is size G48; Their Model 50748

Specs Compared to **OEM:**

CCA @ 0F: DieHard = 760; **OEM = 565**

20hr Ah: DieHard = 70; **OEM = 70**

RC DieHard =120; **OEM ??**

Weight DieHard = 44 lbs; **OEM ~40 lbs**



Used my CTEK 3300 to fully charge the battery before installing. In < 20 hrs it showed fully charged.

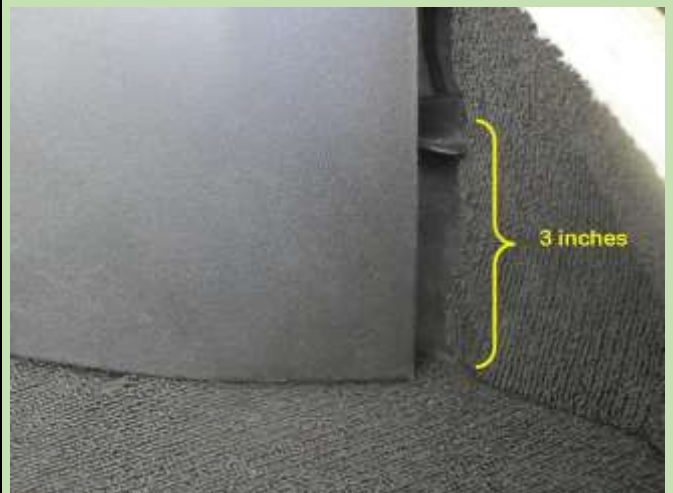
All accessories that came with the charger are shown; the cigarette plug connection was purchased separately.

Note; have not used a charger on the C7 in 2½ years. Have had no need.

Strongly recommend pulling out the bottom clip from the right plastic wheel well cover to provide extra room for the carpet to slide out. If not, it could easily rip on the unbound edge of the carpet corner under the wheel well cover.

Note: The clip is 3 inches from the floor. Pulls out by hand! Inserts back with swift blow using the side of your hand.

Once the carpet corner is slide out from under the wheel well cover, pullup the carpet edge starting from the right rear corner. Only need to remove enough to expose just past the battery. Fold it back.





A hard foam cover just sits on top of the battery. That is what is between whatever is put in on the hatch floor and the top of the battery. It must fit properly.

Note the wood used to hold the plastic wheel well cover away from the car inside surface. It also served another function. Tied the negative power cord and its end terminal up in the air so it was out of the way when the battery was removed and new one installed!

There is a wire coming from the side receptacle attached to the negative cable terminal, so it can only be raised.

This is what you'll see with the foam cover removed. The negative cable and terminal is visible but the positive terminal is covered by a large power fuse block with several high amperage fuses and a plastic cover. The cover slips off.

There is a high current positive cable along the rear of the battery with red shrink tubing covering and a visible bare metal buss bar section. It routes all the way to the front of the car.



The first thing to disconnect from a safety standpoint is always the negative battery cable terminal. The C7 uses a positive mechanical clamping mechanism. No need to spread terminals, just loosen the 10-mm nut and the terminal slips easily off the battery post.

Note the small ground wire attached to the terminal. This comes from behind the interior panel (*I thought was the power receptacle but a poster found a wiring diagram that showed in going to a wiring plug!*) I tied the assembly to the wood spacer holding the plastic wheel well away from the side. Kept it out of the way when removing the battery.



**CAUTION:**

One point of caution, Be Sure the wrench used to loosen the 10-mm nut *Does Not Touch* any metal or the bare buss bar on positive cable on the rear of the battery.

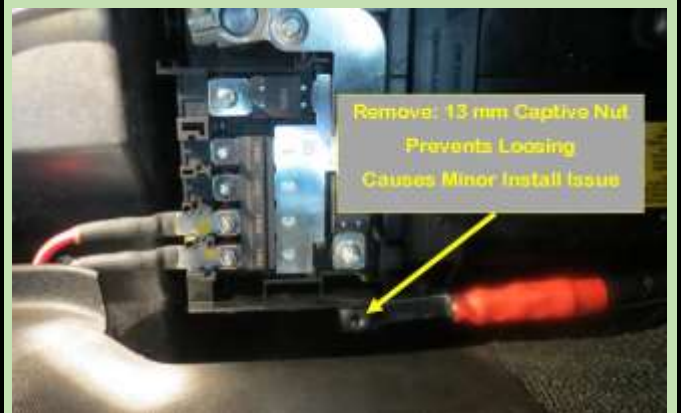


This is a view of the power fuse block with its plastic cover off.

Next remove the 13-mm nut that secures the positive cable that goes to the front of the car to the fuse block. It has a 350-amp fuse.

The nut is captive so no need to worry about losing it, however the captive nut pulls up and tilts the metal buss bar. It requires grabbing the bar metal bar with your hand and pulling straight up to have it clear the metal stud.

*Note: That captive nut creates an install issue! To get the nut started, found I had to slightly twist the buss bar so the nut was perpendicular to the stud. Not hard, but don't strip the stud threads by using a wrench before you start the nut!*



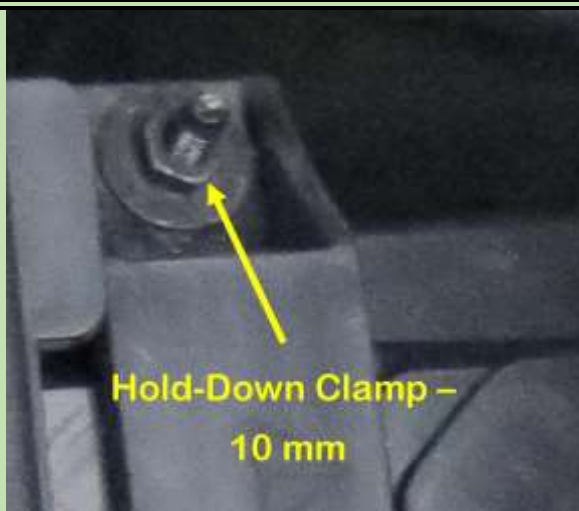
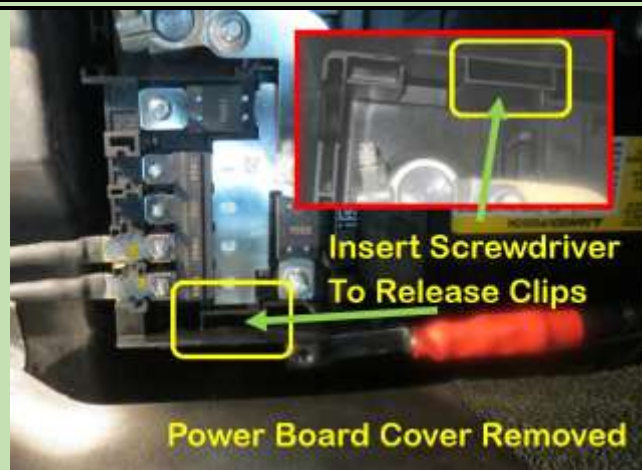
The positive terminal clamp is similar to the negative terminal. It is a mechanical fastening device, no spreading of a clamp required. Also, no need to remove any other nuts as the whole fuse block assembly will be moved as a unit. I just tuned it upside down and moved it to the left of the battery well on to the hatch floor. .

Use a 10-mm wrench to loosen.

To remove the power block, per the Service Manual, *“Release the tabs on the fuse block.”* Love folks who write manuals, you wonder if they ever worked on a car! 😊

Looked all over for the “tabs” than decided to slip a screwdriver in the openings in the front and back. Sure, enough the power block clips released! Not obvious!

Then the manual states; *“Set Aside.”* I put it on the left hatch floor and secured with a heavy weight to keep it in place.



Now remove the two 10 mm nuts that fasten the plastic hold-down. They are at the base of the battery. Be careful not to drop them, however no big deal now as when the battery is removed you'll find them in the battery well!

However, don't drop them when reinstalling as you'll have to remove the battery to find them. Don't want to do that more than necessary! 😊



There is no way to grab the battery to lift it out of the well. You'll need a tool! I bought this inexpensive one locally. It connects to the battery terminals. It worked OK but the terminals are on one side of the battery so it tilts. *It also slipped off once when I started to lift!*

I would not trust this device to lift over the rear bumper and spoiler. After lifting high enough to clear the battery well, I rested it on the edge of the left hatch floor. Then I grabbed and lifted the battery out with my hands! Much safer! Glad I use my weight machine and treadmill 7 days/week and have for 35 years! 😊 *Not that bad, about 40 lbs!*

*There are more expensive tools that operate like an old ice block carrier that would be better but for one time use I was not going to invest in one!*

## REQUIRED BATTERY TOP CONFIGURATION

Wondered if a recess was required to accept the battery hold-down. Turns out although the OEM battery has a recess, it is significantly narrower than the plastic battery hold-down, see pic!

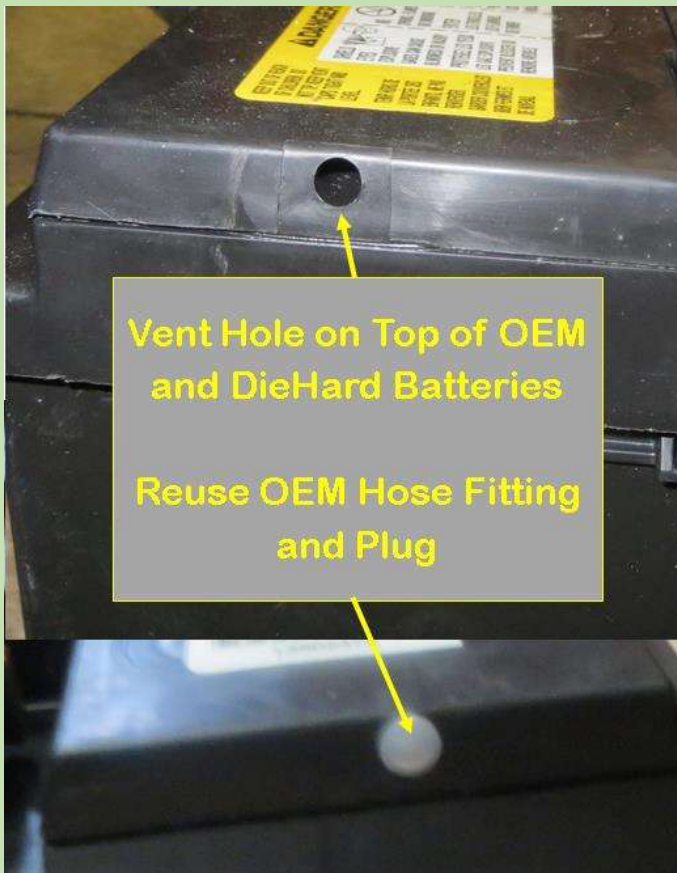
### BOTTOM LINE:

A flat battery top would be fine but it must have recessed terminals to have the large power fuse block fit properly.

*Note: Battery Carrier attached to The OEM Delco. The Diehard has handles that worked great.*



*That is my cheap battery strap. A poster said they used two vice grip pliers!*



AGM batteries do vent! Quoting from a marine source- they should know:

*“Even though AGM batteries are normally sealed, they do have a venting system integrated into the case top. In the event of an overcharge condition, it is possible for excess pressure to build up inside the battery and then release after a 2 or 3 psi accumulation. If it occurs, hydrogen gas will vent and it is quite explosive.”*

The Diehard comes with holes on both sides of the battery top. The OEM battery has a hose that exits out the bottom of the car. The 90-degree plastic hose fitting on the OEM battery fit the Diehard as did the OEM plug that fit the other hole on the Diehard.

The 90-degree angle elbow fitting was placed on the hose that comes from the C7 battery well floor. It was tucked under the right-side carpet to clear the new battery during the install. After the battery install it was placed in the right-side vent hole by “feel” as there is little room to get your hand in and no visibility.



This is a pic of the left side on the installed battery showing the plugged vent.

The power fuse block is slipped on the case next and the plastic tabs that are integral with the block snap in place. The positive terminal slides about half way on the post. I used the handle of a small hammer to hold it fully down on the post while tightening the 10-mm terminal nut. Just easier than getting two hands in the tight space.

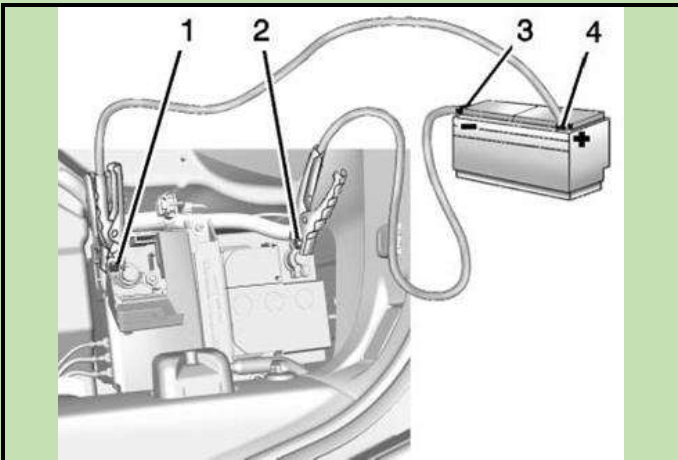


The last step prior to reinstalling the foam cover and carpet is to tighten the negative post clamp. Again, be careful not to allow the 10-mm wrench hit any metal or the positive cable passing in the rear.

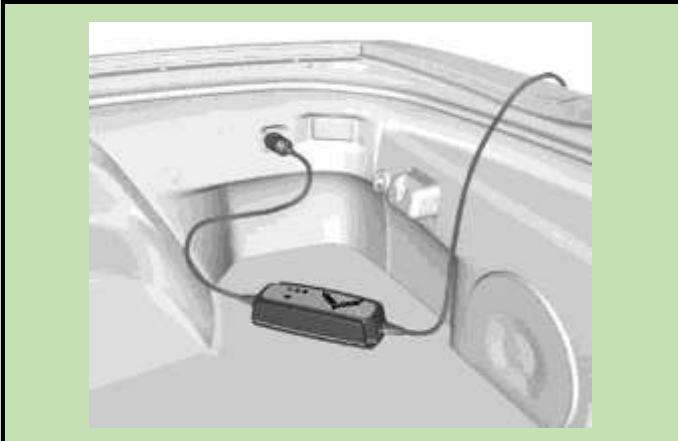
The remainder of this PDF is battery info and may or may not be of interest.

## JUMP STARTING THE BATTERY:

If you every have to jump start the C7, you'll have to access the battery as there are only questionably usable terminals in the engine compartment (See Note Page 8.) The battery is in the rear right corner. The carpet must be pulled up the foam cover removed.



A better way to charge the battery is with the 20-amp, always-on, auxiliary receptacle on inside right rear fender. GM sells a low amp charger that they recommend be used when the car is being used infrequently or stored for the winter. As with many other "trickle chargers" this one automatically shuts off when the battery is fully charged. The GM MSRP price is ~\$100. Amazon etc sell a similar capacity one from the same manufacturer without the Vette logo for ~\$60.



## INFO RE BATTERY VOLTAGE

**One reference notes;** *“Lead acid batteries have diverse plate compositions that must be considered when measuring SOC (State of Charge) by voltage. Calcium, an additive that makes the battery maintenance-free, raises the voltage by 5–8 percent. Temperature also affects the open-circuit voltage; heat raises it while cold causes it to decrease.”*

**Another reference states;** *“Depending on the plate chemistry, the Open Circuit Voltage can range from 12.22 to 13.00 when fully charged.”*

Thought perhaps from that last comment that might be the case with the OEM C7 battery, (for whatever reason) with plate chemistry that results in a low voltage.

That is not the case! Forum posters reported >12.8 to 12.9 OCV!

The chart right shows the temperature effect on SOC using another approach.

OCV	% Charge* at 0°C (32°F)	% Charge* at 25°C (75°F)
12.75	100%	100%
12.70	100%	90%
12.60	90%	75%
12.45	75%	65%
12.20	65%	45%
12.00	40%	20%

**IMPORTANT:** Can only measure battery voltage after the car is off or battery charger removed for over 12 hours! The surface charge from the alternator or charge needs to bleed off! I measure at the Alternator terminal and a chassis bolt for ground. Just pull back the rubber covering.

## (Note from Page 7) Jump Starting Under Hood

There are conflicting statements in the early 2014 Owner's Manual about jump starting the C7 from the engine compartment! The GM Customer Service folks who monitor the Forum could not get their “technical sources” to validate what to use (after a number of tries from PM I sent!)

Some Forum Posters say it is the terminal supplying power to the front fuse panel. That incoming cable looks very small, I'm not sure it is designed to carry 200+ amps starting current! Without GM officially stating, *“use it,”* I'll use the battery terminals if ever needed!

**CONFLICT SOLVED!!** The 2015 and later Owner's Manuals no longer says there is a place to jump start under the hood! Use the under-hood fuse panel input connection at your own risk! I would NOT jump a car from that small wire!



Note: My Street Rod has its battery in the far right rear, like the C7. I calculated the wire size required and it's ~4 times larger than the small wire bringing power to the front fuse block!



The following data was taken from the 2014 Corvette C7 Service Manual. In addition to the quantitative data of battery voltage vs percentage charge at two temperatures there is a table showing the time that can be expected for the car to go from an 80% charge to 50% charge. It states a 50% charge is sufficient to start the car under most conditions.

## 2014 Service Manual

**Note:** The table is accurate to 10 % only after the battery has been at rest for 12 hours.

4. Measure the battery voltage at the battery terminals. Refer to the following table to determine the state of charge according to the estimated battery temperature:

Battery Voltage	% Charge at 0°C (32°F)	% Charge at 25°C (75°F)
12.75 V	100%	100%
12.7 V	100%	90%
12.6 V	90%	75%
12.45 V	75%	65%
12.2 V	65%	45%
12.0 V	40%	20%

Service Manual states typical battery drain is less than 40 mA with spikes from time to time, like for OnStar that wakes up occasionally but shuts down very quickly. After 30 minutes all peak loads go to sleep.

If battery is at 80% charge, the chart below shows about how many days until it reaches 50% charge depending on current draw. That is enough to start the car!

Current Drain	Days
25 mA	33
50 mA	16.5
75 mA	11
100 mA	8.25
250 mA	3.3
500 mA	1.65
750 mA	1
1 A	0.8
2 A	0.4

**REVIEW OF THE DATA:** The data on battery voltage versus state of charge is the same as the generic data in the table previously presented. Assuming it's accurate, the Delco battery apparently does not have any special construction or materials so when measuring my relatively low voltage (and forum comments from folks who have reported measuring higher voltage) makes me believe mine had a week cell or cells. However, it performed fine for ~3 years so replaced it purely as a precaution and since I found an AGM battery on sale!

There are several pages in the manual devoted to trouble shooting and measuring what is called parasitic current draw. As noted, they indicate it should be less than 40 mA. As mentioned there are various functions will have higher peak spikes and most go to sleep as it's referred to after 30 minutes. There is no specific mention of differences in options like the extra alarms in a 3LT but that must have some effect. They note that OnStar does wake up periodically causing a spike in current draw but quickly goes "back to sleep."

**Bottom Line:** The C7 is similar to all modern cars! A fully charged battery should be able to start the car after ~30 days without any additional charging!

## “48” 2017 Grand Sport & 2014 Stingray PDF's Available:



48 PDFs discuss improvements or information about a 2017 Grand Sport and 2014 Stingray function and/or esthetics. Some are minor and others, like the installing the rear diffuser & MGW shifter, 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](mailto:GUtrachi@aol.com) and state the title desired, shown in Yellow:

**Note:** A GS in the title 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](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](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](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](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](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](http://netwelding.com/Mirror_Proximity_Alarm.pdf)



### **Jacking Pads for GS/C7**

*Manual says Jacking Pads 2 1/2 inch max OD.. Have 1 inch, 2 inch pads semi-permanent pads.*

[http://netwelding.com/Jacking\\_pads.pdf](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](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](http://netwelding.com/Eliminate_Rattle.pdf)



### **Aluminum C7 Chassis and Weld Repair**

*The C7 has an all aluminum chassis, made from 117 welded pieces. Includes weld repair info.*

[http://netwelding.com/Aluminum\\_Chassis.pdf](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](http://netwelding.com/Ceramic_Pads.pdf)



### **GS/C7 License Plate Frame;**

*Must Meet South Carolina Law*

[http://netwelding.com/License Plate\\_Frame.pdf](http://netwelding.com/License_Plate_Frame.pdf)



### **Manage GS/C7 Spilled Gas & Door Lock**

*Protect the side of the Vette when filling up with gas. Includes info on preventing door lock failure.*

[http://netwelding.com/Manage\\_Spilled\\_Gas.pdf](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](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](http://netwelding.com/Rear_Cargo_Area.pdf)



### **GS Rear Diffuser (Fits Any C7)**

*Rear Carbon Flash Composite Diffuser*

[http://netwelding.com/Rear\\_Diffuser.pdf](http://netwelding.com/Rear_Diffuser.pdf)





### **GS/C7 Door Panel Protector**

*Black plastic protector added to prevent scuffing of door when exiting*

[http://netwelding.com/Door\\_Panel\\_Protector.pdf](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](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](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](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](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](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](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](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](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](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](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](http://netwelding.com/Wheel_Locks.pdf)



### **GS/C7 OnStar Lights**

*Rear view mirror OnStar LED's, at a quick glance, look like a police car flashing light! This is a fix.*

[http://netwelding.com/OnStar\\_Lights.pdf](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](http://netwelding.com/Skip_shift_Eliminator.pdf)



### **GS/C7 Catch Can & Clean Oil Separator**

*Direct inject engines are subject to "coking." What is Coking and how to reduce the potential?*

[http://netwelding.com/Catch\\_Can.pdf](http://netwelding.com/Catch_Can.pdf)



### **GS MGW Flat Stick Shifter**

*The MGW shifter shortens throw and is more precise*

[http://netwelding.com/MGW\\_Shifter.pdf](http://netwelding.com/MGW_Shifter.pdf)



### **GS/C7 Round Shift Knob**

*A round shift knob shortens throw on OEM shifter*

[http://netwelding.com/Shift\\_Knob.pdf](http://netwelding.com/Shift_Knob.pdf)



### **GS/C7 Stingray Sill Plate**

*Stingray sill plate replaces original.*

[http://netwelding.com/Sill\\_Plate.pdf](http://netwelding.com/Sill_Plate.pdf)



### **GS/C7 Nylon Bra**

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

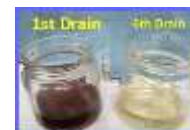
[http://netwelding.com/Nylon\\_Bra.pdf](http://netwelding.com/Nylon_Bra.pdf)



### **GS/C7 Clutch Fluid Change**

*Clutch fluid after 3000 miles gets dirty*

[http://netwelding.com/Clutch\\_Fluid.pdf](http://netwelding.com/Clutch_Fluid.pdf)



### **C7 Carbon Fiber Hood Vent**

*Replaces Plastic Hood Vent*

[http://netwelding.com/Hood\\_Vent.pdf](http://netwelding.com/Hood_Vent.pdf)



<p><b>GS/C7 Cold Air Intake</b>  <i>Low Restriction Air Filter &amp; Duct</i>  <a href="http://netwelding.com/Cold_Air_Intake.pdf">http://netwelding.com/Cold_Air_Intake.pdf</a></p>	
<p><b>GS/C7 Soler Modified Throttle Body</b>  <i>For Improved Throttle Response</i>  <a href="http://netwelding.com/Soler_Mod_TB.pdf">http://netwelding.com/Soler_Mod_TB.pdf</a></p>	
<p><b>Garmin GPS for GS Cubby</b>  <i>Garmin Mounts in GS Cubby &amp; Apple CARPLAY</i>  <a href="http://netwelding.com/GPS_In_Cubby.pdf">http://netwelding.com/GPS_In_Cubby.pdf</a></p>	
<p><b>GS Splitter Stage 3 Winglet</b>  <i>Stage 3 Winglets Integrate with Spats</i>  <a href="http://netwelding.com/Stage_3_Winglets.pdf">http://netwelding.com/Stage_3_Winglets.pdf</a></p>	
<p><b>GS 2LT to 2.5 LT</b>  <i>Red Upper Dash Pad Like 3LT</i>  <a href="http://netwelding.com/Red_Dash_Pad.pdf">http://netwelding.com/Red_Dash_Pad.pdf</a></p>	
<p><b>Jake Emblem/Decals for GS</b>  <i>Jake Symbols Support GS Racing Image</i>  <a href="http://netwelding.com/Jake_Embles.pdf">http://netwelding.com/Jake_Embles.pdf</a></p>	
<p><b>GS Splitter Protector</b>  <i>Scrape Armor Protection for Splitter</i>  <a href="http://netwelding.com/Splitter_Protectors.pdf">http://netwelding.com/Splitter_Protectors.pdf</a></p>	
<p><b>GS Engine Compartment Mods</b>  <i>Cosmetic Additions in Engine Compartment</i>  <a href="http://netwelding.com/Engine_Compartment.pdf">http://netwelding.com/Engine_Compartment.pdf</a></p>	
<p><b>GS Vitesse Throttle Controller: Fits All C7s</b>  <i>Adjustable Throttle-by-Wire Control</i>  <a href="http://netwelding.com/Throttle_Control.pdf">http://netwelding.com/Throttle_Control.pdf</a></p>	
<p><b>Boomy Bass Solution</b>  <i>Use Presets to Adjust Bass etc Tone/Balance</i>  <a href="http://netwelding.com/Boomy_Bass">http://netwelding.com/Boomy_Bass</a></p>	
<p><b>GS/C7 Air Dam, Functions</b>  <i>Why Missing from Z51, Some GS &amp; Z06</i>  <a href="http://netwelding.com/Air_Dam.pdf">http://netwelding.com/Air_Dam.pdf</a></p>	
<p><b>Engineering a ProStreet Rod</b>  <i>How Our '34 ProStreet Rod Was Designed and Built</i>  <a href="http://netwelding.com/Engineering%20Street%20Rod%203-08.pdf">http://netwelding.com/Engineering%20Street%20Rod%203-08.pdf</a></p>	
<p><b>Motorsports Welding Article</b>  <i>Wrote a 5 Page Article for AWS March 2018 Journal Covers NHRA and NASCAR Chassis Design</i>  <a href="http://netwelding.com/Motorsports_Welding_2018.pdf">http://netwelding.com/Motorsports_Welding_2018.pdf</a></p>	