

The Solid Scoop



SEPTEMBER 2016

A Newsletter for the Southern Calif.
Chapter of the Solid Axle Corvette Club

Vol. 12 No. 3

"Look Us Over at" www.socalsacc.com

The SoCal SACC Chapter Welcomes our Newest Members!

| <u>Member #</u> | <u>Name</u> | <u>Location</u> | <u>C1 Year</u> |
|-----------------|---------------|-----------------|----------------|
| 243 | Joseph Berman | Encino | 56, 63,67,66 |
| 244 | Ted Feder | Northridge | 95ZR1 |

Calendar of Coming SACC Events:

2016 SoCal Planned Events

| <u>Date</u> | <u>Event Name</u> | <u>Location</u> | <u>Coordinator</u> |
|-------------|--------------------------|-------------------------|--------------------|
| Nov 12 | Fall Tech Session | Kent Browning Facility | Werstein |
| 2018 | SACC National Convention | Tentatively Ventura, CA | ? |



1955 SoCalSACC Featured

SACC Members Mike & Sandy Cromer are also long-time members of the Vintage Chevrolet Club of America (VCCA) and they own several restored C1's. The VCCA held a 55th National Anniversary Meet this summer at Lake Tahoe and the Cromer's towed their '55 and entered it in the car show, C1 - Class. During awards the car was awarded Best in Class.

Front & Rear Cover Car: 1960 One-Owner Corvette belonging to Bob Johnson . A Profile of Bob Johnson and the car surviving all these years is contained in this SCOOP issue Member Profile (page 6)

PLEASE NOTE:

**Jim Lundal, SCOOP Newsletter Editor, has a NEW Email Address:
jlundal43@gmail.com**

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SPECIAL NEWSLETTER REMINDER: If you have Email and are not receiving notices please contact Jim Lundal (Editor) jlundal43@gmail.com or Greg Davidian (Membership) GDDavidian@gmail.com to make sure we have the correct address. Also, let any changes to home address, telephone, email, etc. be sent to the above individuals.



Solid Axle Corvette Club (SACC)
 A National Organization dedicated to
 keeping these Corvettes
 "on the road".

Club Features:

- Membership Chapter Clubs across the U.S.
- National Quarterly Magazine
- Annual National Convention
- Web Site: www.solidaxle.org (non-profit affiliation)

**Also visit the
 SACC National
 Web Site**

www.solidaxle.org

The Solid Scoop is a quarterly Newsletter published for the Southern California Chapter of the Solid Axle Corvette Club (SoCalSACC). The SoCalSACC Chapter is affiliated with the National Solid Axle Corvette Club (SACC). The SACC organization is a non-profit group with the intended purpose of bringing together owners and those interested in the early C-1 Corvettes (1953-1962) to help in appreciating these vehicles and "keep them on the road".

C-1 Ownership is not a requirement for membership.

MEMBERSHIP: A prerequisite to become a SoCal SACC Chapter member, a person must belong to the National SACC. Applications for membership are available on our Chapter Web Site, www.socalsacc.com. Submitting an application along with the appropriate listed dues, is necessary for membership. The SoCal SACC Chapter will forward your National dues to assure your National membership. Once becoming a National member you will receive *On Solid Ground*, the National quarterly published magazine. Again, **MEMBERSHIP APPLICATIONS AVAILABLE: WWW.SOCALSACC.COM**

The Solid Scoop, is intended as a communication for Chapter members about chapter activities, technical articles, classified ads and past events to maintain in keeping our membership informed. The Editor and the Board of Directors of So Cal SACC have made every effort to ensure that the *Solid Scoop* contains no inaccuracies or errors, either in technical articles, tour information, listings regarding flyer and non-flyer events or in advertisements and is non-offensive and non-political and disclaim liability for any that may occur. Should you find any problem, please do not hesitate to contact the Editor. We will make every reasonable effort to rectify the situation.

Member submitted technical articles are encouraged. Many times these technical articles are based on personal experiences and preferences and as such are intended only as guidelines or helpful information for club members.

**Solid Axle Corvette Club
 Southern California Chapter Board
 2016 Club Officers**

CHAPTER VOTING BOARD OFFICES

| | | |
|------------------------------|----------------|-----------------------------|
| President | Phil Roche | pdr44@aol.com |
| Vice President | Nyma Ardalan | nyma@ardalan.org |
| Secretary | Larry Pearson | lpears1941@att.net |
| Treasurer | Jenni Werstein | jennibeth.w@gmail.com |
| Membership | Greg Davidian | gddavidian@gmail.com |
| Technical Manager | Chip Werstein | chipsgarage@aol.com |
| Newsletter Editor | Jim Lundal | jlundal43@gmail.com |
| Merchandising Manager | Barry Caires | barrycaires@att.net |
| Events Manager | Barry Charles | bcharles@bc-forensiccpa.com |

VOLUNTEER OFFICE

| | | |
|-------------------------------|---------------------|---------------------|
| Webmaster | Jim Lundal | jlundal43@gmail.com |
| SACC Western Reg. Rep. | Bill & Debi Stalder | stalder53@yahoo.com |

TECH ADVISORS

| | | | |
|-------------------------|-----------------|--------------|---------------------------|
| 1953 – 1955 | Bruce Fuhrman | 805-482-4396 | bruce4info@aol.com |
| 1956 – 1957 | Chip Werstein | 818-883-5766 | chipsgarage@aol.com |
| 1958 – 1960 | Chip Werstein | 818-883-5766 | chipsgarage@aol.com |
| 1961 – 1962 | Larry Pearson | 818-848-2653 | lpears1941@att.net |
| Fuel Injection | Doug Prince | 818-348-6998 | spankey496@socal.rr.com |
| Body & Paint | | | |
| Interior | John Engelhardt | 714-267-9996 | littlejohns@sbcglobal.net |





SO. CAL. SACC FALL TECH SESSION

Saturday, November 12

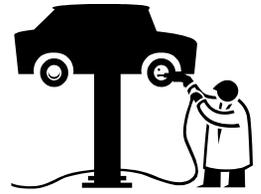
Cerritos, CA

So. Cal. SACC member Kent Browning #118 will host our Tech Session at his FACILITY in Cerritos, Calif.. See the map below. Only C-1 parking in the lot, please! The address is 16625 Norwalk Boulevard Cerritos, CA 90703

Sessions will begin around 10:30 AM, with a catered lunch at Noon, and more sessions after lunch.

This is NOT a business meeting but a forum to receive and share C1 information.

Member Car (C1's) Inspection by our Talented Team of Inspectors.



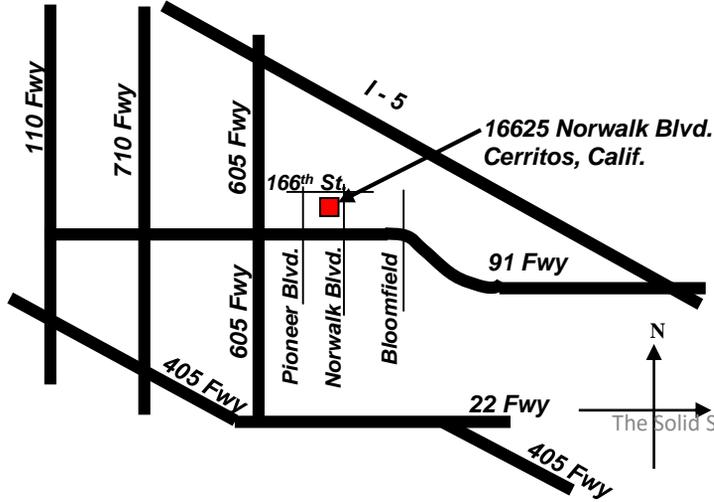
THIS IS A PAY IN ADVANCE EVENT!!!

- Cost for the Tech Session is \$25 per person.
- Includes a Sit down lunch and refreshments.
- Cut off RSVP date is Nov. 8th.
- Send your check (Made out to SoCalSACC) to Jenni Werstein, 23317 Schoenborn St., West Hills, CA 91304

*Meal Cost, \$25,
Payable In Advance.
Cut-Off Date is Nov. 8*

C-1 Tech Session Topics:
Member Car Inspections

If you want to volunteer to have your car inspected, contact Chip at Chipsgarage@aol.com. Prefer cars that haven't been prior inspected. Also need volunteer inspectors.



From Downtown LA/Pasadena (south on 110)
• Exit on 91 Fwy and go east to Norwalk Blvd. Exit on Norwalk and go north to address.

From Riverside/Orange County (west on 91)
• Travel west on 91 to Norwalk Blvd. Exit on Norwalk and go north to address.

From Huntington Beach/San Diego (north 405)
• Travel north on 405 (east on 22 Fwy) and go north on 605 Fwy. Exit 605 east on 91 Fwy. Exit on Norwalk and go north to address.

From Ventura/SF Valley (I - 5)
• Exit on 110, or 710 or 605 and travel to 91 Fwy and exit east on 91 Fwy. Exit on Norwalk Blvd. and go north to address.

From 405 South.
• Take 110 Fwy north to 91 and exit east on 91. Cross the 710 and 605 and Exit on Norwalk Blvd. and go north to address.

Southern California Solid Axle Corvette Club (SoCal SACC)

Chapter & National Dues Notice – 2017

SoCal SACC membership requires current membership in the National SACC organization. For recordkeeping purposes SoCal SACC collects both the National and Chapter dues and remits to National your dues.

Please do not pay National directly.

SoCal SACC annual dues are **\$20** and the National SACC dues are **\$35** for a total of **\$55**. Annual dues are payable starting in October and are due by December 1st.

SoCal Chapter publishes **“The Solid Scoop”** and SACC publishes **“On Solid Ground”**.
Our Chapter website is: www.SoCalSACC.com

I would like to volunteer for the National “Road Assistance” list for members traveling.
If not checked you will not be on the National “Roadside Assistance” list

I do not wish to be included in the National SACC published roster
If not checked you will be on the National SACC published roster

Please fill out the information below. If you are renewing your membership and have no changes simply enclose your check for **\$55**. **Please do not pay National directly**

Make checks payable to: SoCal SACC and mail to:

Greg Davidian / SoCal SACC Membership
1686 Mesa Ridge Ave
Westlake Village, CA 91362
gddavidian@gmail.com
(818) 282-3277

Member Name _____

Co-Member Name _____

Address _____ City _____

State _____ Zip Code _____

Home Phone _____ Cell Phone _____

E-Mail (please print clearly) _____

Corvettes presently owned – Please include VIN for all C1’s. C1 ownership not required for membership.

Auto liability carrier and policy number _____

Membership form 8/22/16 GDD

SoCalSACC Member Profile

Bob Johnson, #166

Growing up in St. Louis, Missouri and having a friend whose father was a manager at the Corvette facility there, I was aware of the Corvette story early on. I couldn't entertain having a Corvette until my first job in 1959. A friend at work tossed me the keys to his 1959 red/white Vette and that's when I made up my mind to pursue acquiring my own Corvette.

I started out in early 1960 looking for a used Corvette. My father let me know he would not sign for a "used" Vette. This meant I needed to negotiate with the Chevrolet dealers in the St. Louis area, trying to get the price down to where I could afford a new '60 Vette. I finally succeeded at Milner Chevrolet in July. Delivery was to be in mid-August, actually took photos on August 16, 1960 when I got home from work and found that my father had gone to Milner and brought the car home.



I used the Corvette as my only means of transportation, driving to work and messing around. Within the first 10,000 miles it wasn't performing as I expected and I went round and round with the dealer until I decided to try myself to get it running the way I wanted it to. Found the spark advance was at the core of the problem and that the dealer had broken off an idle screw in the forward carburetor. By then there was carbon built up on the valves.



Took off the heads and had the valves redone, installing PC seals on the valves and threaded the valve stem guides. A few months after getting it right I was hit from behind, sending the Vette under a flatbed truck. Front left fender was broken off along with rear end damage. Milner Chevrolet repaired the damage. The job they did wasn't done very well and I later repaired the fiberglass damage myself.

I didn't have any other problems for over 100,000 miles. Around this time I witnessed a motorcycle accident on an interstate, stopped to help, raced to a phone breaking a couple of compression rings on the way. I took the engine apart, had it bored, put in new pistons, took the heads back to the shop that fixed them at 10,000 miles for evaluation.

During the rebuild the heads were not touched, main bearings and connecting rod bearings were replaced with standard size ones. The speed shop I used said they thought the engine had been blueprinted at the factory from what they saw during disassembly/assembly.

Started going to college, I still used the Corvette exclusively. Got drafted during graduate school and spent two years in the Army (Fort Richardson, Alaska). Didn't drive the Vette during this time but allowed my sister the use it. Came back to find the Vette had been in at least one accident. Went back to graduate school and subsequently got my first post college job in California. I drove the Vette from St. Louis to California in 1970. I continued to drive it as my principle car for work and etc. In early 1973 I decided to restore it. The engine had another 100,000 miles on it by then and I didn't want to bore it out more than it already had been. Purchased a different block, rebuilt it with the Corvette heads, crank, manifolds/carburetors, and etc. Basically did a frame on restore with modifications to the body. The picture with a red finish and "no teeth" shows the results of this effort.



1973 Restoration

Still drove the car occasionally, keeping it garaged most of the time. In 2011 I started restoration of the 1960 Vette.

This time I wanted it back to its original configuration and condition. It was finished in time to get a Top Flight at the 2012 regional NCRS inspection. I didn't have to do a frame off restoration since the running gear was still in super shape. Presently it is has a T-10, four speed tranny, 3.70 Positraction rear end, radio, heater, auxiliary hardtop, and the engine is updated to use today's fuels/oils (roller lifter valve system with a 10.5:1 combustion ratio, that dyno'd at 360 Hp, 333 foot-lbs. torque).

Bob Johnson



Photos of recent restoration in 2012. Note Posi rear diff. with war paint. War Paint is paint applied during final assembly signifying the correct gear pumpkin is installed per order. "War Paint" designation was discussed by Chip Werstein at a Tech Session in Aug. 2006 SCOOP.



The building in this photo shows the Milner facility as it appeared in the early 1900's. It was Roberts Chevrolet (1931 to 1957), prior to Milner taking over the site in 1958. This photo is from the National Register of Historic Places and as you can see it was a Pope-Hartford Motor Car Company building. It is located in the 5800 block of Delmar Blvd, about 10 minutes from the old Chevy plant.



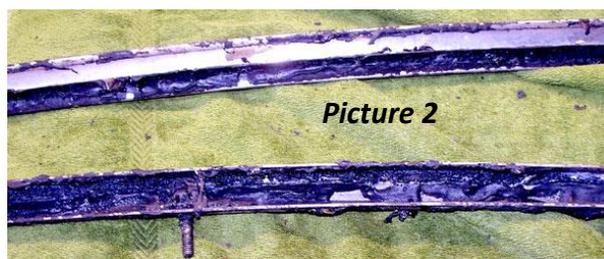
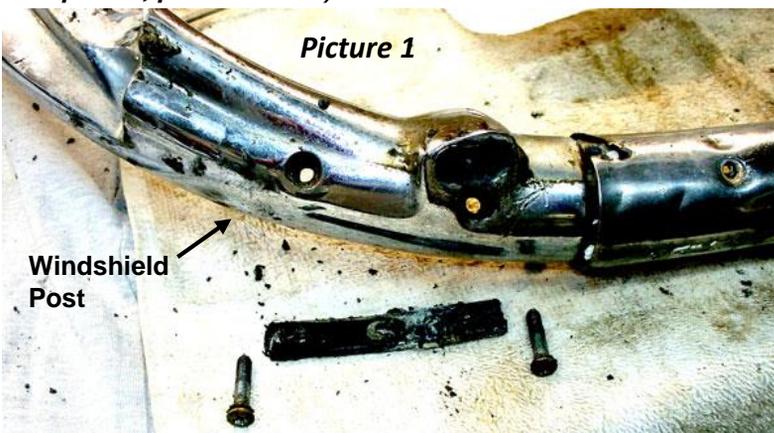
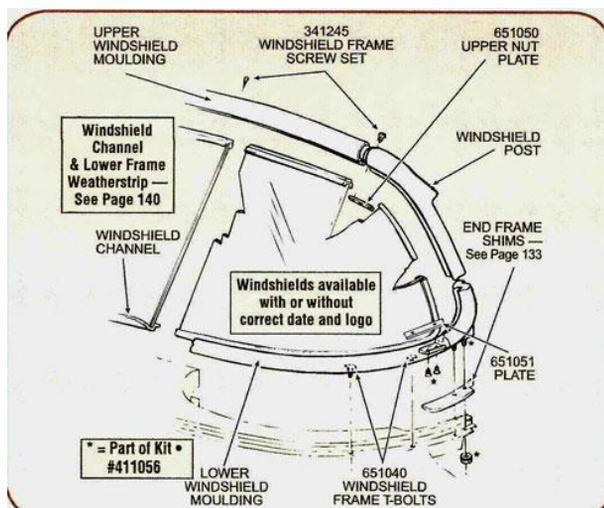
C1 Restoration, Article 16Chuck Gibney

Editor note: Two 1962 C1's in-process of restorations began during 2011. Both C1's are being completed somewhat concurrently. I (Editor) thought it would be of some interest to follow the restoration on-going process issues in the SCOOP. These articles might also be some assistance to motivate others or restart their work and/or also share the steps and recommend "how" best to proceed. Both restorations began by dismantling the cars and currently have completed the Frame and Body restoration process. The SoCalSACC member owner's of the '62's being reported are Chuck Gibney, #139, and George Iverson, #62. Assisting both owners are Steve Clifford, #58, and a couple additional non-members. The June 2012 SCOOP was the kick-off article and all copy's from previous SCOOP's are posted on the Chapter Web Site (www.socalsacc.com).

Repairing and Installing the Windshield

We had removed the windshield and frame as a unit about 4 years ago during the disassembly of the car. The windshield glass had been damaged years ago by a bad windshield wiper, and needed to be replaced. This is a picture reproduced from the Corvette Central catalog which identifies the major components of the windshield frame.

We disassembled the frame, being careful to take pictures of how everything fit together. (Picture 1) The frame pieces were covered with old bedding compound, and rust. Much of this was cracked, and stuck to the frame like glue. (Picture 2 compound, picture 3 rust).

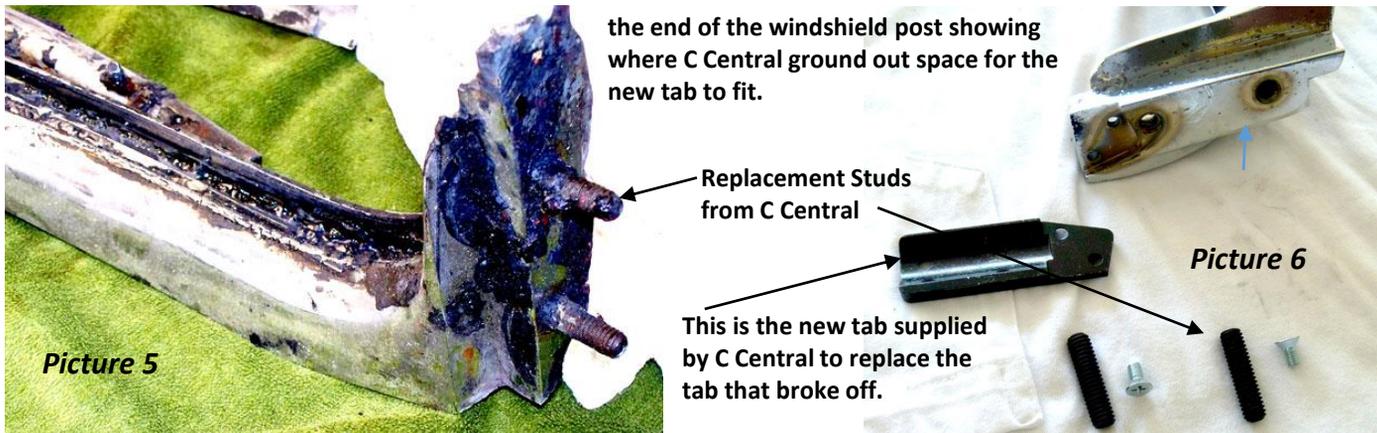


We cleaned the frame with solvent, plastic chisels, and paint thinners. Once the parts were clean, we were surprised to see that the metal work was in very good condition. There was only surface rust on the lower window channel, which we removed with phosphoric acid picture 4 on the next page.



Picture 4

The windshield posts were in bad condition. They are made of pot metal, and are not very strong. The tabs were broken off, as is true of many of these old cars. The tabs are at the ends of the window posts and are designed to strengthen the post where they attach to the body (picture 5). We found that Corvette Central offers a service repairing this problem. They grind out the end of the post, drill and tap holes for new bolts, and create new tabs to replace the old ones. We sent the posts to C Central for repair. Six weeks later they came back, and the repair looked and worked very well. (Picture 6). Now they would need to be re-chromed.



the end of the windshield post showing where C Central ground out space for the new tab to fit.

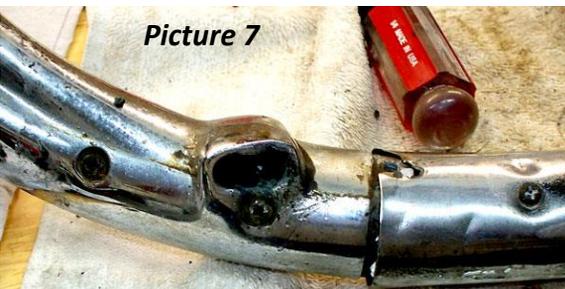
Replacement Studs from C Central

This is the new tab supplied by C Central to replace the tab that broke off.

Picture 6

Picture 5

The stainless steel upper windshield moulding at the top of the windshield was dented, and broken on both ends where it attached to the windshield posts. (Picture 7) It would need to be welded to close the gaps, and then re-drilled to provide screw holes. It is quite a process to remove the outer stainless windshield moulding from the inner steel channel. But, two people using dull edged putty knives can pry them apart. It would need to be removed to allow us to repair the dents, and weld the holes. (Picture 8)



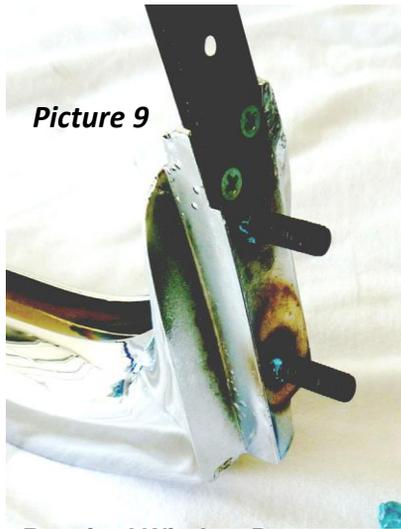
Picture 7



Picture 8

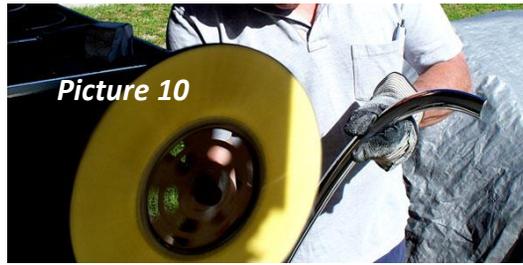
We took the stainless steel moulding to be welded, and the windshield posts to Buena Park Chrome for resurfacing and re-chroming. Once this was done, we attached the new tabs, and installed new studs, with Loctite to keep them in place, see picture 9 on next page.

We took the other stainless steel parts to Steve Clifford's house to remove scratches, and dents, and to polish them. Elbow grease, and a high speed polishing wheel worked wonders. (Picture 10) (This is not part of the windshield frame, as I forgot to take a picture of that being polished.)

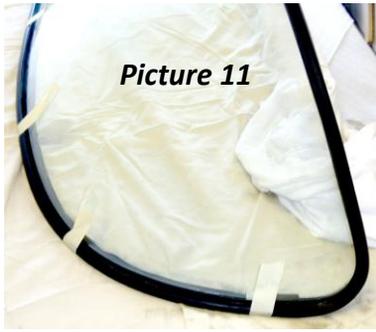


Picture 9

Repaired Window Post



Picture 10



Picture 11

Our paint shop had said they would need to test fit the windshield on the car to ensure a good fit before the car was painted. When everything was ready we began the reassembly. A new rubber weatherstrip was placed around the window (picture 11), and we began the reassembly by attaching the top inner channel and outer stainless moulding to the window posts (picture 12).

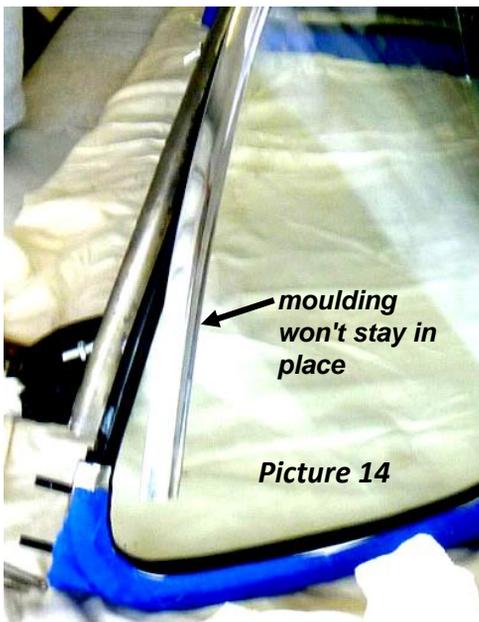


Picture 12

These were then placed on the window glass. The assembly was turned over, and we tried to place the lower inner channel and the lower stainless windshield moulding on the window. The mounting bolts need to be placed in the channel before it is placed on the glass/weatherstrip. (Picture 13) The stainless moulding fits into the inner channel, and is held in place by the channel as these two pieces are put in place on the windshield. It took three of us to do this, and we had a great deal of difficulty getting it to stay together. The lower stainless moulding did not want to stay in place. (picture 14) We spent hours taking the assembly apart and putting the pieces back together, starting with either the upper or the lower channel first, or last. Finally, it seemed to fit properly. (Picture 15)



Picture 13



Picture 14



Picture 15

Windshield Assembly completed.

Gentle Curve up and Down

We took the window frame assembly to the paint shop for a trial fit, to ensure it would look correct. The fiberglass channel where the window sits is not flat from end to end. It has a very subtle curve up and down. (picture 16)

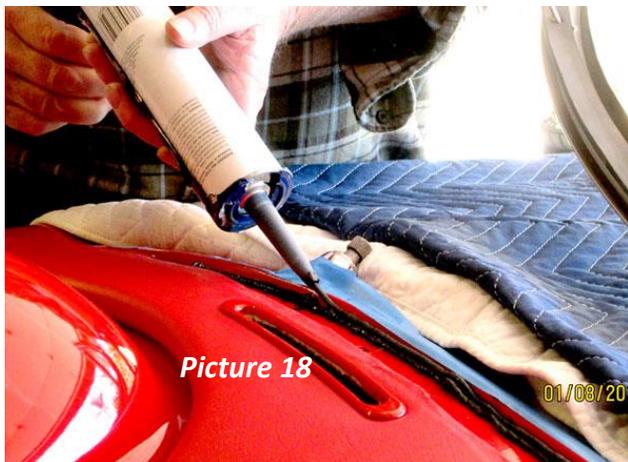
My frame would not fit correctly. It left gaps under the frame. We had reassembled George Iverson's frame with little problem, and it fit his car properly. We swapped the two windshield assemblies, and realized mine had the wrong curve at the bottom. We took it apart, and reassembled it a few times, and could not get it to fit. It seemed that the lower stainless moulding was pulling the inner channel out of the proper shape, and wouldn't allow it to curve properly.

I needed help! We took the entire assembly to Walden Dahl in Hesperia. Walden restores Corvettes and really knows what he is doing. Walden compared my parts with some extra pieces he had in his shop. After some diagnosis, he determined that the lower stainless steel moulding was warped and was pulling the inner steel channel out of the proper alignment. This piece has a complicated shape, with an inner V shaped channel that hooks over the edge of the inner channel. We now believe that we were probably too aggressive when we polished the piece at Steve's house, and caused it to straighten out from the correct curved shape.

Walden worked on it for a couple of hours, sliding it back and forth using gentle pressure, over the edge of a workbench that was covered by a piece of rug to protect the finish. This process of gentle bending, and checking, resulted in the proper fit between the two pieces. We reassembled the windshield frame, again, and took it back to the paint shop, Randy's Custom Paint to check the fit on the car. It was a great relief to have it finally fit properly.

Months later, after the car was painted, and the dash pad was installed, we assembled the windshield frame to the car. The windshield frame has the mounting bolts installed in the lower frame channel during assembly, (picture 17)

We did George's car first, as he had gotten it back from the painter first. We used tape to protect the paint. Bedding compound was placed into the channel in the fiberglass to keep rain from going under the windshield and into the passenger compartment. Use plenty of it. (Picture 18) This picture also shows the T bolts in the lower frame, and these must be carefully pushed through the weatherstrip and the holes in the fiberglass as the frame is lowered into place. (Another 3 person job).



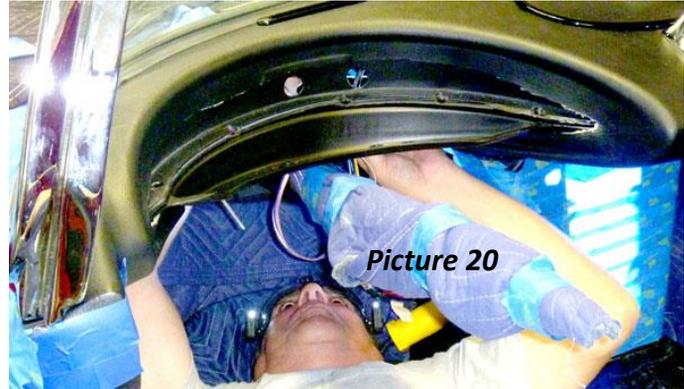
Picture 18

Picture 16
Side view of C1 Dash area.



Picture 17

When we placed my windshield on the car, I probably used way too much tape, but it lowered my blood pressure while we were working on the car. (picture 19) The frame is bolted to the body through the fiberglass and the steelwork under the dashboard. The windshield posts are also bolted through the ends of the dashboard, behind the dash pad. This needs to be done before installing the defroster vents. (picture 20) The finished job looked very nice, and fit well (picture 21. See pictures next page.



SoCalSACC Chapter News in Brief....

SACC Western Region Representative Announced

The National SACC Club is divided into several regions within the U.S. and each Region is assigned a representative to assist in coordinating the various Chapters within their region. The Rep for the West Coast Region recently resigned and a volunteer was being sought. One of the SoCal Chapter members, Bill & Debi Stalder, have volunteered.

Bill's contact information is now included on page 3 of this SCOOP. They are very interested in forming a NO CAL chapter. They have a Freightliner truck to "trailer" their '57 F/I Corvette. The Stalder's picture is to the right taken at the recent Convention in Illinois.



SoCalSACC Membership Dues Coming Quickly...

It will be reminded often to the Chapter membership over the next few months, that RENEWAL dues are due by December 1, 2016. PLEASE send your dues to our Treasurer, Greg Davidian, soon. A renewal form is included in this SCOOP issue on page 5. The form contains Greg's address to send your check. PLEASE send the total dues (\$55) which includes your National and Chapter dues. Greg will forward your National dues to the National SACC. Following this process of paying total dues to Greg alleviates the communication problem of the National notifying Greg that you have made your payment. Membership in the National is a requirement for Chapter membership.

SoCalSACC Chapter Web Site Work in Progress.....

Our Chapter has had a Web Site for approximately 10 years, www.socalsacc.com. The site was originated by member Jim Lundal (SCOOP Editor) and has been maintained by Jim until 2 years ago. At that time the computer application used to develop the site was discontinued by everyone and technology has progressed. However the site is still visible, but out-of-date. Recently, to make a long story short, Jim and Nyma Ardalan (Chapter Vice President) are teaming up to bring the site back "alive" and then proceed to update with missing information. Nyma has extensive experience with IT Web Sites. He also is tutoring Jim who then can assist in loading some of the information. There is no finish date as yet as this work only began a few weeks ago.

2016 23rd SACC Convention - Effingham, IL

Submitted by Bruce Fuhrman



Convention Corvette's on Mike Yeager's front lawn.

September 12 – 15, 2016



This year's convention featured good weather, great events, 17 Solid Axle Corvettes and a prelude to the annual Corvette "FUN FEST" at Corvette Central in Effingham. SO CAL attendees included: Bob Brown, Bruce & Janice Fuhrman and Bill & Debi Stalder (new SACC Western Regional Rep).

Monday- Included SACC board meetings and the Chapter meetings. Decisions made included;

- SACC will not be making the newsletter available to the membership via e-mail. The risk is too high in distribution outside SACC and would reduce membership.
- Dues collection "on-line" was discussed as an option. Most chapters collect dues for National SACC and their chapter. We did investigate the possibility of splitting the dues on-line (like Pay-Pal) and it was determined to be very complex. Decided not to pursue.
- SO CAL summarized the 2018 convention as potentially being held in July and in Ventura. A road trip and a bus tour to the Petersen were in consideration.

Mike & Laurie Yeager (Mid America) opened their beautiful big back yard to us for a cocktail party. We were all impressed!

Tuesday- Bus tour to ST. Louis. About 36 toured the Bush Brewery (one HP Clydesdales), Gateway ARCH and a stage show at the FOX theatre. Very enjoyable, returned at midnight!

Wednesday- We had tech seminar's for the men and ladies (button collection) in the AM. A shop tour of SGC Schultheis classics in the afternoon included several cars (Corvettes) going thru the retro mod and restoration process. The evening banquet was held at Mid America (Museum and banquet area). Mike Yeager was the guest speaker and he was very informative about the development of his business.

Fun Fest started on Thursday and ran until Sunday at Mid America grounds. Bob Brown attended this event driving his '59 from San Diego.

NOTICE!!!.....**LOOKING AHEAD**

The 2018 SACC National Convention is being hosted by the SoCalSACC Chapter (us) during the summer (June) of 2018. Looking Back, our Chapter hosted a Great Convention during 2009 with headquarters in Ventura, CA. Tentative plans are to return to the same location with all new tours and excitement. The location site (Four Points Inn, Ventura, CA) has been refurbished and looks forward to our return. As a point of interest, go to our Web Site (www.socalsacc.com) and view a past SCOOP (September 2009) for a review of the festivities.

The convention will last for several days and host tours around SoCal nearby sites. Actually, due to the traffic issues a bus tour might be added to some sites.

Stay tuned for the planning.

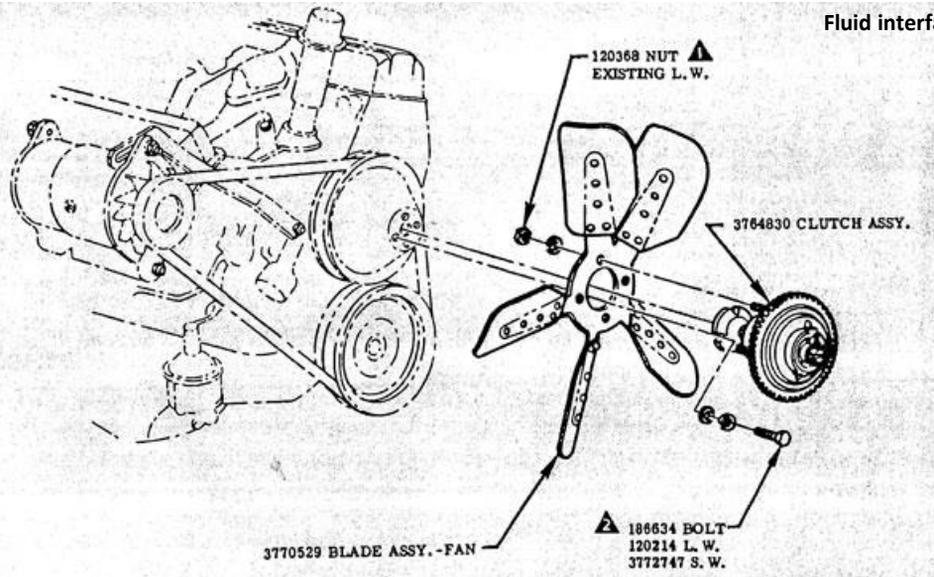
Temperature-Controlled Fan Clutches

Article presented by member Jim Lundal. Significant content extracted from article distributed by Larry Pearson at a recent Tech Session. Original article written by Henry Morlatch and distributed by Corvette World Magazine.

Engine fans on the C1's serve a single purpose, to draw outside air through the radiator when driving at slow or idle speeds in order to maintain a constant engine temperature. When driving, air is flowing through the radiator. C1's produced till 1960 used a direct-drive engine fan bolted to the water pump shaft. In 1960 a optional accessory (RPO 121) became available labeled as a Temperature Controlled Radiator Fan. The design is intended to increase or decrease the coupling between the engine rpm and the fan at various driving engine temperatures. When the fan is decoupled it also saves using the engine hp. After 1960 this fan/clutch became a standard item on C1's, and continued till present day on many models and makes. Direct-drive fans on earlier C1's were constantly rotating using engine power.

Engine operating temperature is the key parameter to determine the fan clutch decoupling. Upon initial engine start-up the temperature is cold and the coupling is less so the fan is somewhat free-wheeling. As the engine nears operational temperatures the coupling increases and the fan uses the engine to draw air through the radiator. At higher speeds the engine temperature remains constant and the clutch coupling lessens and the fan can free-wheel more. This coupling is referred to as friction although it is a increase or decrease of fluid flowing in the clutch.

Larry Pearson spoke briefly on the subject of fan/clutches and adjustments. Larry was constrained by time and had to be brief but this subject will be repeated at the 2017 Spring Tech Session.



Fluid interface between fan and water pump shaft.

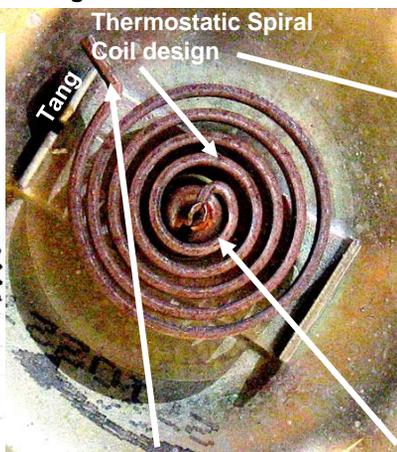
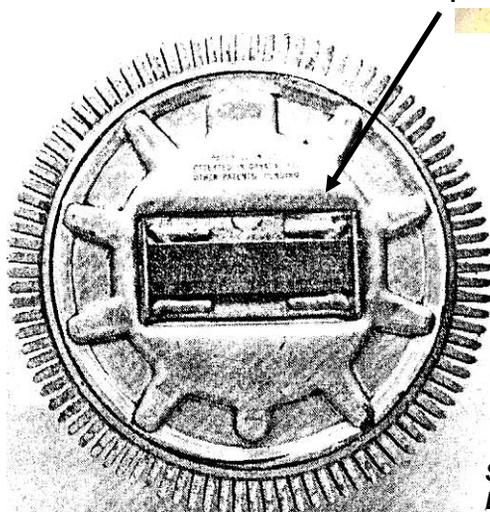


The above figure illustrates a fan/clutch assembly and the interface between engine fan, the central shaft and the engine water pump pulley. The fan/clutch interface is between the engine fan and engine shaft as indicated. The friction at this interface is the primary mechanical component controlling the engine fan rotation. The friction level is temperature controlled by engine temperature. Cold engine clutch friction is low allowing higher engine rpm's and lower fan rpm's (increased hp available not pulling air through radiator). Conversely, higher clutch friction at idle rpm's at hot engine temperatures increases fan rpm's to draw more outside air through radiator to maintain engine temperature.

Basically there are 2 interface designs used on the C1. Both designs use a fluid interface but each has a different technique of controlling the fluid flow/friction.

1. **Bi-metallic Flat Plate Design:** The first design is a bi-metallic strip (sometimes noted as a flat plate/plunger design) controlling the position of a brass plunger to control the friction. A bi-metallic strip is a two metal alloy strip which will flex/bend as temperature is changed. This mechanical flexing rests against a brass cylindrical plunger/rod and moving the plunger changes the friction fluid within the clutch. An example is increasing or reducing the fluid coupling, i.e., less fluid coupling the less friction and vice versa.
2. **Thermostatic Spiral Coil Design:** A spiral coil seen in the center Figure below. This coil is permanently fastened at the center and the outer end of the coil is held in position by a bracket/tang fixed on the housing. The outer tang is not a fixed connection and allows the outer end of the spiral coil to be removed and rotated CW or CCW to change the coil tension. This tension exerts force at the assembly center resulting in a change of the center coupling and internal clutch friction.

Bimetallic flat plate design



Spiral Coil end at tang.
Easily taken out and moved
to another location.



End of coil spiral fixed at
center to adjust friction inside
of clutch.

Quick Fan/Clutch Evaluation:

A quick evaluation on the "functionality" of your fan/clutch component is to observe the operational performance without removing the assembly. This simple test begins by starting your engine while cold and allow to run a few minutes. While observing the fan blade rotation (with hood open), shut the engine off and observe/count fan blade rotation once engine stops. The fan should rotate a couple of revolutions and stop. Since start-up is the "minimum friction" condition a few revolutions is acceptable. If many revolutions are observed there maybe concern that the friction is to low at slow car speeds.

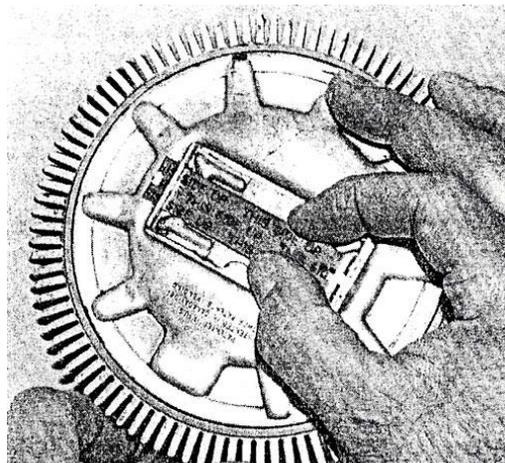
Next warm the engine to operational temperature and repeat the engine shutdown test. The fan rotation should stop significantly sooner than the previous test. The friction is now maximum and the connection between water pump rotation and fan rotation is needed to draw air through the radiator.

Test Result Sample: All fans tested are of the spiral coil design. #1: My (editor) fan has "air noise" cold and the fan stops immediately at engine shutdown indicating too much friction at cold temps. #2: Three different cars results at cold temps: 1 rotated a couple blades, 1 rotated one-turn and 1 (Steve Clifford) rotated 2 turns at cold engine shutdown.

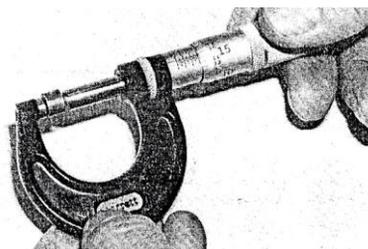
This test as reported in the handout from Larry Pearson reported that 2 to 3 turns at cold temperature is normal while in all cases at engine operational temperatures the fan should stop rotating immediately at engine shutdown. If your fan doesn't operate properly, you may want to adjust the clutch.

Clutch Adjustment:

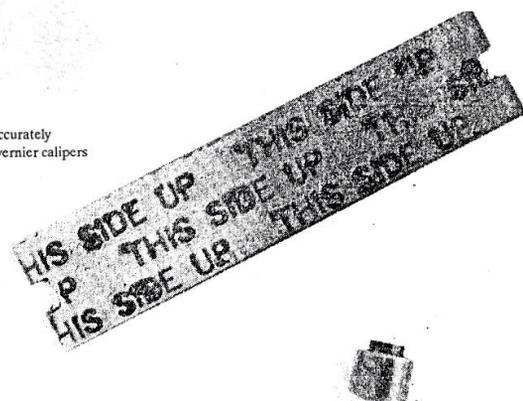
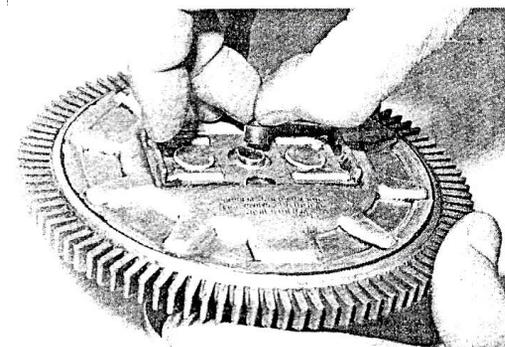
Bi-metallic Flat Design: This reproduced design is sold in the Corvette Central Catalog (and possibly other vendors) and is listed as a Schwitzer Style Design. Any adjustment of the friction/temperature limits begins by removing (very carefully) the flat bimetallic strip. This process is described in Figure XX. After the removal of the brass plunger, the adjustment is removing material from the plunger length which adjusts the friction flow in the clutch. Usually, this is done to increase the friction flow to assure a required engine fan rpm at slower engine rpm and operational temperature. That is the goal for the adjustment to improve engine cooling while in slow traffic. Shortening the plunger begins with measuring accurately the original plunger length and removing material in stages of .005 inch. A standard of .005 inch removal will equal a 10-degree drop in lower operational engine temperature by increasing the clutch friction.



Above: The flat plate/plunger design clutch works by the plate bowing out towards the radiator as the temperature increases and allows a brass plunger to move slightly. This controls fluid flow in the clutch and increases friction. To adjust this clutch, remove the bi-metallic plate. Do not bend the tabs supporting the plate on either end. The small cut in one of the tabs will allow you to press down on the plate until it clears the cutout. Then, slide the plate about 1/8" until the end clears the tab. The plate can then be lifted over the tab and slid out of the second tab.



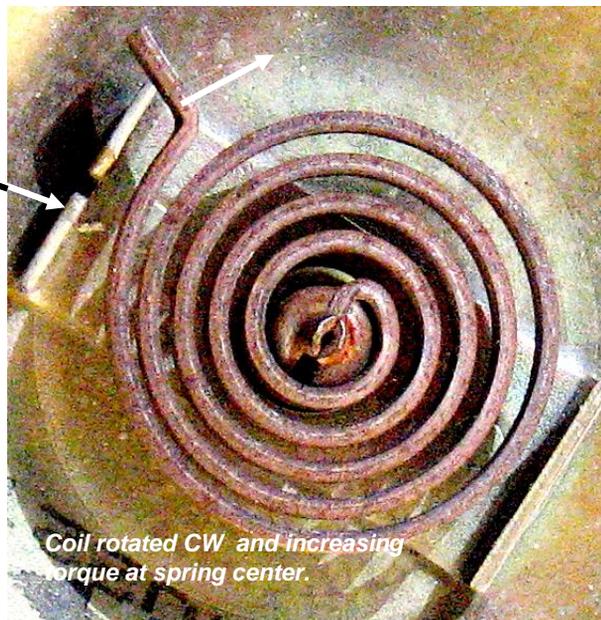
Above: The first step in shortening the plunger pin is to accurately measure the length before starting. Use a micrometer or vernier calipers for this.



Above: With the plate out of the way, you can remove the brass plunger from the clutch housing.

Spiral Thermo-coil Design: Examining the picture of the spiral coil design it is seen that the center of the clutch is permanently fastened to the item controlling the clutch friction. The outer end of the coil is held fixed by the tang fastened to the clutch plate. This coil can be grabbed and rotated to remove the end from at the tang. The coil can then be rotated to another tang position. SOME fan clutches have more than one tang and the coil can be inserted easily to a second position. Rotating the coil increases or reduces the torque at the center. Since the object is to assure increased friction and operating temperature the rotational adjustment will release the torque on the center which means a CCW rotation. However this will also increase friction at cold operation and maybe increase air noise on cold start-up.

Tang captures end of coil spring. Center of tang slot is original coil position. Picture shows coil rotated CW and resting on edge. It is noted some spiral coil assemblies have more tangs and slots to provide more adjustment. This adjustment is not "calibrated" as reported in the flat-pack configuration and a performance check is to run the car.



Coil rotated CW and increasing torque at spring center.

Final Fan/Clutch Words:

(Editor) Although I am far from an expert on the fan/clutch operational aspects, it is a assembly which has been added to many automobile makes and models in some form and design. The whole reason for this item is to provide more functional interface between the engine fan and engine basic rpm. Fans are not really needed at highway speeds but are needed at lower speeds to create air flow through the radiator and dissipate heat created for engine operation. Some of our Corvettes become very sensitive to overheating at slower idle speeds and we want to assure that the engine fan is providing the maximum rpm to draw air. With direct drive fans this is assured. However if reduced friction has occurred at slow speeds with your fan/clutch arrangement you can be in trouble. The clutch assembly technique presented here is not to scare everyone but to provide insight what is occurring when stuck on the freeway at idle and the temp gauge is rising. The adjustments presented appear to assure increasing the friction and "knowing" your slow speed driving is maximized. It is not to say you may not have another reason for rising temperature.

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