

P-R-H-S G-Z-D-Z-O-W 054



We Got Cars

Les Rajczi Modified 2003 Corvette see Page 12 for Original Photos



**SOUTHERN
CALIFORNIA
CHAPTER**



Table of Contents

2009 Board Members	Page 3
Calendar	Page 4
Chairman's Comments.... by Don Troyer, Region IX Directors Report by Ed Vignone	Page 5
SCC/NCRS Technical Presentation / Judging School on March 1, 2009	Pages 6
Road tour to the Lake Tahoe Regional on 5/13/09.	Pages 7
SCC Fall Meet Calabassas	Pages 8– 9
Match Mounting by Wendel Hans	Pages 10 - 11
Holiday Brunch and General Board Meeting Sunday, December 7th, 2008	Pages 12 - 13
Authenticating Rally Wheels to Fit a 1967 Corvette by Wendel Hans	Pages 14 - 17
Cruise to Fuddruckers, November 1, 2008	Page 18
Lake Tahoe Registration and Schedule, May 14 - 17, 2009	Page 19
Compression Ratio By Duke Williams, and John McRae	Pages 20 - 23
Annual Cruisin For A Cure Registration September 26, 2009	Page 23
SCC/NCRS Spring Meet Registration, Lake Forest "the Garage" March 21, 2009	Pages 24 - 25
Palm Springs Cruise to the Sun , April 4, 2009	Page 26
SCC/NCRS Membership and Renewal Application	Page 27
Condensed Minutes NCRS/SCC Executive Board Meetings by Diana Wright	Page 28 - 30
Member Classified	Pages 31
Classified Ads	Pages 32 - 35

Keeping your Email address up-to-date is important, so please contact our Webmaster, Ed Vignone, at sccncrs@ncrs.org with any corrections. Email is the method used to notify members of calendar changes and events that take place between issues of the Bonding Strip.

Please send your correct Email address to sccncrs@ncrs.org and add **sccncrs@ncrs.org** and **socalchapt@cox.net** to your Spam Checker **friends** list. Also SCC mail is often flagged as spam because of the numerous email addresses in their BCC (Blind Carbon Copy) fields. Members can protect SCC mail from being flagged as SPAM by putting SCC 's return addresses (**sccncrs@ncrs.org** and **socalchapt@cox.net**) into their email program's *Address Book*.

The board has a meeting at Harbor Chevrolet in Long Beach on the second Monday of each month. Members are welcome to attend.

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Calendar of Upcoming Events

February 2009

9 Board Meeting 7 PM - Harbor Chevrolet, Long Beach

March 2009

1 SCC/NCRS Technical Presentation / Judging School

10 Board Meeting 7 PM - Harbor Chevrolet, Long Beach

21 SCC Spring Meet The Garage Lake Forest. Contact: Allen Morris, 949.367.9000 amorrismv@aol.com

April 2009

4 Palm Springs Cruise to the Sun, Contact: Bob Crane-714-458-6395

13 Board Meeting 7 PM - Harbor Chevrolet, Long Beach

23 - 25 Lowes Motor Speedway Regional - Concord, NC

May 2009

11 Board Meeting 7 PM - Harbor Chevrolet, Long Beach

13 SCC/ NCRS Road Tour to the Lake Tahoe Regional , Contact: DAROLD M. SHIRWO - (310) 278-2000/
DSHIRWO@AOL.COM

14 - 16 Western Consortium Regional - Lake Tahoe NV

June 2009

8 Board Meeting 7 PM - Harbor Chevrolet, Long Beach

July 2009

12 - 16 NATIONAL CONVENTION - San Jose, CA

13 Board Meeting National Convention

August 2009

10 Board Meeting 7 PM - Harbor Chevrolet, Long Beach

September 2009

14 Board Meeting 7 PM - Harbor Chevrolet, Long Beach

26 The 10Th Annual Cruisin For A Cure

Note: Board Meetings are open to all members



Chapter Shirts and Sweatshirts

Polo Shirts \$25

Sweatshirt \$30

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Photo Contributors:

Many thanks to Darold Shirwo, Ed Vignone, Ron Bartow, Pat and Jerry Louer who contributed photos for this publication.



Chairman's Comments

by Don Troyer



The chapter closed out 2008 with a judging school, a judged meet, a cruise-in, a brunch and a membership meeting. October was the time for the chapter's annual Fall Judged Meet. We returned to the parking lot at The Commons in Calabasas for the third year. It is an excellent location, with shopping and restaurants available for anyone who wants a little diversion from the Corvettes. The turnout, of members and corvettes, was great and the cars generated a lot of interest from the shoppers in the area. The meet was preceded on Saturday afternoon by a judging school. November was the time for the annual Cruise-In. Fuddruckers in Lake Forest was the site for the first time. Everyone enjoyed lunch, seeing old friends, meeting new members and checking out the Corvettes. In December, the annual Holiday Brunch was hosted by Verity and Rusty Hobbs at their beautiful home. The weather was a little cool, but it was a nice day.

The recipient of the Chapter Distinguished Service Award, John Piovesan and Boyan Brkic, were announced during the membership meeting. John has supported the chapter for a number of years including opening his facility for judging schools. Boyan has arranged the Fall Meet for three years and organized a number of judging schools and tech. sessions. Bob Crane will be the Activities Chairman for 2009. The other board members will return for another year. I would like to thank everyone who helped plan and prepare for the many chapter events in 2008. Also thanks to those who attended the events. The NCRS Chapter Award Program keeps track of member participation and Barbara reports that the chapter completed all of the requirements to be a Top Flight chapter again for 2008.

Congratulations to Ed Vignone who was elected NCRS Region IX Representative for the next three years.

As we move into the new year, I would like to wish everyone a happy, healthy and prosperous NEW YEAR. The board has been busy planning a number of events. A Judging School/Technical Session will be held on March 1st. Our chapter member who lives in Italy, Fabrizio Sama, is planning to attend this event. Everyone who made the trip to Italy should attend.

The Spring Judged Meet will return to the Garage in Lake Forest on the 21st of March. The judged cars will be inside, which the chassis judges like and is a plus in case the weather does not cooperate. This is a convenient location close to the junction of the I-5 and I-405. The second Cruise to the Sun will take place on April 4th. Last year everyone that went on this drive to Palm Springs had a great time. It's a full day of low key activities that can include shopping, eating, meeting other car owners with similar interests, showing your car, gambling and did I mention eating.

The Lake Tahoe 2009 Regional is May 14-17. The chapter is responsible for judging. If you attend and have some extra time, check with the judging chairman, Jerry Louer, to see if he needs any assistance. A road tour to Lake Tahoe will leave Southern California on May 13th. It is always better to travel with a group in case you have any unexpected trouble.

Complete information and registration forms for these events are in this issue.

Last year the chapter donated \$200 to Cruisin' for a Cure and \$400 to Kingdom Adventures International Ministries. An application was submitted to the NCRS National Charity Program for consideration of matching funds for these charities. We received a 50% match which has been forwarded to the charities. The chapter has made arrangements with Crusin' for a Cure to preregister chapter members. The registration form is in this issue and take note that the chapter will contribute \$10 of the fee.

The Western Consortium will be hosting the 2009 National Convention in San Jose in July. The chapter is responsible for registration. If you attend and have extra time, check with Diana Wright or myself to see if we need assistance. The National Road Tour will pass through Southern California. For road tour information contact Jerry Louer. Complete details will be in the next issue of the Driveline.

The chapter sends out e-mails to members for event reminders, timely information that was not in the last issue of the Bonding Strip and Corvette related information. If you have not received an e-mail from the chapter for some time, we may not have a correct address. You can send updates to the chapter address, sccncrs@ncrs.org.



SCC/NCRS Technical Presentation / Judging School

Date: Saturday, 1 March 2009

Time: 10:00 AM – 3:00 PM

5053 Calvin Ave., Tarzana, CA 91356

A technical presentation and discussion on rebuilding mid year trailing arms and a judging school discussing engine block stampings and re-stamps. These subjects may be changed and others may be added as details for the day are confirmed.

A BBQ lunch will be provided to the attendees.

Fabrizio Sama, our Chapter member from Italy who hosted our Italy Chapter Meet, will be attending these sessions. Come say hello to Fabrizio.

Member Name/s: _____ Phone: _____

Guest Name/s : _____

Registration Fee:

Members: _____ \$5.00 per person. \$ _____

Non-Members/Guests: _____ \$7.00 per person. \$ _____

Total: \$ _____

Make check out to SCC/NCRS and mail with this registration form to:

Jerry Louer, 425 Atwood Dr. Corona, CA 92879.

All registrations must be received by February 25th

For information call Jerry Louer (951-734-9818) or Boyan Brkic (818-517-5016).

Region IX Directors Report

By Ed Vignone

I am proud to now serve as your Regional Representative. The National Corvette Restorers Society is a unique and exciting organization. It provides opportunities for those of us who appreciate our cars to see rare models, share information about their history and technology, and enjoy driving them with other enthusiasts.

Yet it is the membership that makes NCRS so special. The time we spend with those who share the hobby – at car meets, dinners, road tours, and meetings – enables us to visit with old friends and make new ones. I have enjoyed my involvement in the national events and our regional and local activities,.



I believe my most important responsibility is to keep open the communication between the National Board and our members and to bring our region's concerns to the NCRS Board, and I will support you in any way I can. If you have any questions or comments, please contact me by phone or email.

I will report any important NCRS information as it develops and be reporting on the National Board meeting in March 2009.

Ed Vignone

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SCCINCRS ROAD TOUR TO LAKE TAHOE

May 13,2009

Southern California Chapter of NCRS will lead a road tour to the Lake Tahoe Regional on 5/13/09.

We will be driving there in groups:

- a. Tour "A" will leave from Darold Shirwo's house at 15267 Valley Vista Blvd., Sherman Oaks, Ca. 91403 at 6:00 a.m.
- b. Tour "B" will leave from Krispy Kreme at 4485 Mills Drive, Ontario, Ca. 91764 at 6:00 a.m.
- c. Tour "C" is anyone leaving from some other place.

Tour "A" will take route 405 to 14 to 395 and will join tour "B" and "C" at the Coso Junction Rest Area at about 8:30 a.m.*

Tour "B" will take route I-15 to 395 and will join tour "A" and "C" at the Coso Junction Rest Area at about 8:30 a.m.*

Any other NCRS members that wish to join the tour the meeting place is the Coso Junction rest area at about 8:30 a.m.

The "A", "B" and "C" tour will stop at Bishop for lunch.

We expect to arrive in Lake Tahoe about 5:30 p.m.

If you are going to tour with us please contact Darold M. Shirwo at (310) 278-2000; (310) 625-6457 [cell]; DShirwo@aol.com so we can coordinate scheduling.

Please plan on bringing your FRC handheld radio for chatting.

DAROLD M. SHIRWO - (310) 278-2000/DSHIRWO@AOL.COM



SCC Fall Meet in Calabasas

Sunday, October 19, 2008

at **THE COMMONS**

Judging Results

Top Flight:

- ◆ Linda Boisclair 1957
- ◆ James Meyers 1959
- ◆ John Campbell 1963
- ◆ Brad Chiet 1967

2nd Flight

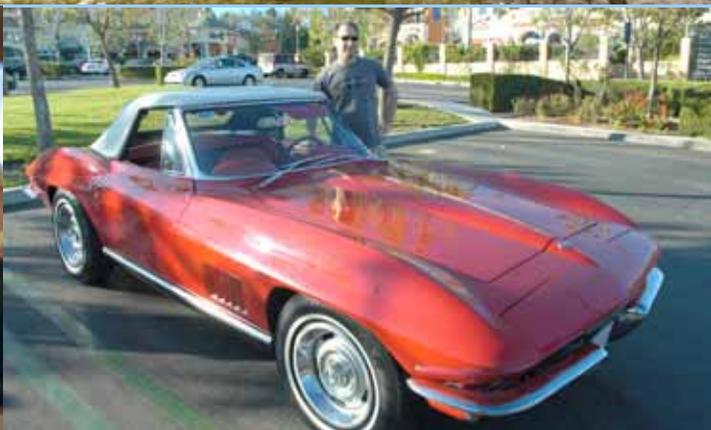
- ◆ Bob Heffley 1967
- ◆ Fred Ross 1966
- ◆ Steve Tvorik 1973

Sportsman:

- ◆ Bill Kluss 1956
- ◆ Jerry Louer 2001
- ◆ Norm Shier 1986
- ◆ Don Troyer 1967
- ◆ Chip Werstein 1962



Judging School; correct parts finish Identification



Brad Chiet with his Top Flight 1967



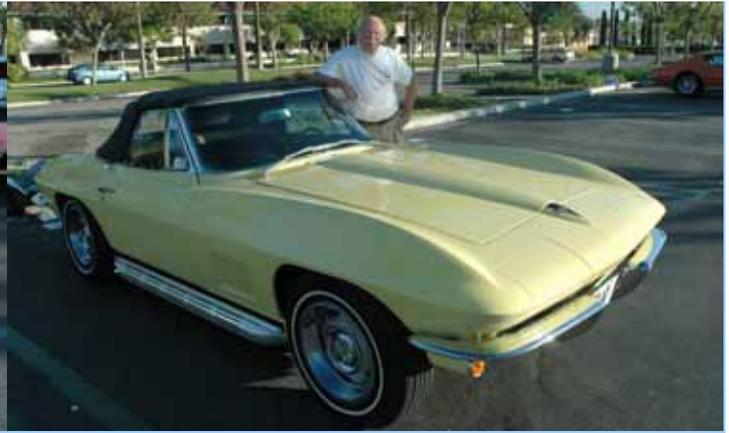
James Meyers with his Top Flight 1959



Fred Ross with his 2nd Flight 1966



Linda Boisclair with her Top Flight 1957



Bob Heffley with his 2nd Flight 1967



John Campbell with his Top Flight 1963



Tabulators hard at work



Don Troyer discussing judging results with Brad Chiet



No caption needed!



Sportsman and NCRS members Parking

Match Mounting

By: Wendel Hans

This is Wendel Hans second installment of several dealing with the Match-Mounting of Wheels and Tires. The following article appeared in a trade magazine for the auto service industry.

"Motor" (www.motormagazine.com), April 2008. Titled "Tire Match Mounting & Custom Wheel Handling" the author is Mike Mavrigian. The article is significant. It illustrates a science re-garded today as "new" that Corvette implemented in 1969, forty years ago, for three years. I have omitted the wheel handling section of Mikes article.



2008 Wheel sticker on rim marks geometric low point/ white dot on the tire is least weight point/red dot is tire high point

Mike begins:

Adding performance vehicle owners to your customer list can give a huge boost to your shop's bottom line. These owners may be demanding—even picky—but they will pay well to get the job done exactly the way they want it. Some of the most common types of work done on performance vehicles involve the wheels and/or tires. The wheels are one of the most visible parts of a vehicle, so any work done on them must be top-notch—meaning clean, pretty and accurate. Custom wheel service can be broken down into two primary topics, essentially—tire match mounting and custom wheel handling. Since you'll never mount a wheel without a tire, we'll cover the ins and outs of tire match mounting first.

What Is Match Mounting?

Match mounting involves positioning the tire onto the wheel to minimize or eliminate the final combination of radial force variation and/or imbalance (radial force variation is explained later in this article). One match mounting approach involves aligning the tire's point of maximum radial force variation (its high spot) to the wheels radial low spot (where the wheels radial run out is the lowest). This is called the **Uniformity Method**. The other approach involves aligning the tires lightest balance point to the wheels

heaviest balance point. This is called the **Weight Method**.

OE tire suppliers are required to mark a tires radial run out high point. OE wheel makers are required to mark a wheels radial run out low point. This makes it easy for OEMs to match-mount tires to wheels from a radial force variation standpoint during production. In some cases these marks are made with paint dots that help service technicians remount tires down the road. Sometimes these marks are made with temporary stickers, which either fall off or are removed after mounting. This leaves no readily visible reference marks for the tire technician for future service.

If a tire does feature color dots on the sidewall, one or two dots may be used. A red dot indicates the tires radial run out high point. A yellow dot indicates the tires point of least weight from the balance standpoint.

For decades, it was common practice in the aftermarket to mount a tire so its red dot aligned with the wheel's valve stem, since the valve stem area was normally (but wrongly) assumed to be the wheel's lowest point of radial run out. Aligning the tire's high point to the wheel's low point (theoretically) reduces or eliminates the chance of developing a radial force variation (RFV) in the tire/wheel assembly. RFV (again, an issue of run out, not imbalance) can cause a vibration that might be mistakenly diagnosed as an imbalance problem. Times change. With the advent of styled custom wheels, the valve stem location may no longer indicate the wheel's low radial run out spot. In other words, it may no longer be viable to assume that aligning a tire's red dot to the wheel's valve stem will address any potential RFV issues. Consequently, a procedure that was once easy has now become complicated.

(Wendel Hans note: the procedure of aligning the valve stem to a tire mark was never correct and never made sense...assembling a manufacturer measured tire to a wheel using the valve stem as the geometric low point has never been justified by engineering data. How this myth got incorporated into the tire mounting industry cannot be explained...I encountered it myself at tire dealerships...it is our luck that match mounting is now possible again and an explanation is now available...procedures are described in shop manuals for newer cars...and commercial equipment to make the measurements are available at performance minded tire and auto dealerships)

The only way to accurately match mount a tire to a wheel is to actually measure tire and wheel run out. The end goal remains the same: to align the tire's high point to the wheel's low point. The wheel itself can be easily checked for radial run out by mounting it to a hub and slowly rotating it while monitoring the rim edge with a rigidly

mounted dial gauge. However, the only acceptable method to check the assembled tire/wheel package for radial uniformity under load is to use a state-of-the-art wheel balancing machine that features a load-roller that applies road-simulated load to the inflated tire. Such a machine will not only check for dynamic balance but will also locate the tire's high spot. If this high spot doesn't correlate to the wheel's low spot, the machine will let you know where to relocate the tire on the wheel to minimize RFV: If you don't have access to a road-wheel type of balancing machine, and you don't know where a wheel's lowest radial rollout spot is located, you can default to using the Weight Method, which involves aligning the tire's yellow dot to the wheel's valve stem. As you can see, tire/wheel match mounting isn't a cut-and-dried method.

Your approach to match mounting will depend on several variables: whether the tire is run out- and weight-matched, whether the wheel's low run out spot can be determined, and whether you have access to a load-applying balancing machine. Regardless of the specific approach you take, it's important to understand that "stacked-up" run out and imbalance conditions can be addressed. Of course, once tire matching has been accomplished, the mounted package must then be checked and corrected for dynamic balance. There are two types of radial run out--static and dynamic. Static run out, as we noted earlier, refers to the high spot of the tire, a physical characteristic that can be measured with no load placed on the tire. Radial force variation, however, refers to a dynamic run out condition, which occurs only when the tire rolls at speed, under load, due to variations in construction stiffness.

Radial force variation is so named because the radius of the tire varies according to vehicle speed and load. Of course, any tire, because of its pliability, will vary slightly in radius at the load spot during operation. Although a "radial force" might be the result of a run out area pronounced enough to affect the tire's impact on the road, a radial "force variation" may occur if the tire has appreciably different "soft" spots and "stiff" spots in the carcass and/or tread or in the sidewall construction. Given the precise quality control processes used by today's tire makers, it's rare that a force variation problem will occur. But when it does, it can be a tricky demon to chase.

Even though no problems may be found as the tire rotates on the balancer, when the tire experiences a load,

the transition of the harder and softer sections of the tire may create a series of harmonic vibrations as the various sections of the tire contact and leave the road surface. Depending on conditions, this harmonic may occur once per tire revolution, or in a series of multiple vibrations per revolution. It's possible that this phenomenon may vary according to changes in tire pressure, vehicle speed, individual tire load and road surface conditions, all of which may serve to reduce and/or amplify the vibration problem. In other words, the vibration the driver feels may not occur at anyone rate of speed, or on any particular road surface, because the problem may appear only under a specific combination of these variables.

If a tire/wheel will not balance properly, or if a vibration exists after a successful balance job, don't automatically blame the tire. If you haven't checked the hub and wheel for run out, you may be jumping to conclusions. If, however, all balance, static run out and chassis parts variables have been exhausted, then it may be time to suspect a radial force variation problem.

To check for and attempt to actually verify a dynamic radial run out condition, a spin-balancer with a built-in load roller is recommended. This type of balance machine places a load (which attempts to simulate road load) onto the tire as it spins, while monitoring and recording variances of run out. If load variation is found, it may be corrected to an acceptable level via balance-verify that the tire should be replaced.

A minimum range of between .3 and .5 oz. (7 to 14grams) of imbalance is usually enough for the average motorist to notice an imbalance-induced vibration. If a vehicle is sensitive enough to exhibit noticeable vibration at only .3 to .5 oz. of imbalance, that same amount of vibration may be present with as little as 10 to 15 lbs. of radial force variation, which (although hard to believe) can be caused by as little as .010 to .015 in. of loaded radial run out. Using this as an example, it's easy to see how loaded run out can dramatically affect vibration. In other words, a little bit of loaded" tire run out variance can produce a notable impact on operating smoothness or harshness.

Wendel Hans, NCRS #13085 wjhdyno@aol.com 805 966 6542

Pediatric Cancer Research Foundation (PCRF)

NOTICE!!! PCRF is accepting Cellular Phones that are no longer needed. You can give your old phones to any SCC Board Member or send them to PCRF 9272 Jeronimo Road, Suite A-107A, Irvine CA 92618

Holiday Brunch and General Meeting

Dec. 7, 2008



Corvette Parking



Don, Barbara & Carol



Pat, Gary & Sharon



Darold & Verity



Joan, Diana & Kay



Ed, Joan, Bob, Mary, Les, & Caroline



Mary, Les, Allen, Mike, Caroline, Bob, Joan, & Dorothy



Pat, Kay, Pat, Jerry, John, Barbara, Jack & Donna



Sharon, Gary, Mark, Judy & Marv



Bob, Larry, Diana, Kathryn, Steve & Bob



Don, Marty, Barbara, Darold, Carolyn, Carol & Brian



Don Troyer Presenting John Piovesan the "Distinguished Service Award"



Les Rajczi "Car"



John Campbell's 1957 Cadillac Eldorado Brougham

Authenticating Rally Wheels to Fit a 1967 Corvette

by Wendel Hans



I have recently received a number of requests from NCRS members regarding 1967 Rally wheel information. They own 1967 Corvettes. They have heard that there may be a way to nail down the probable broadcast code for wheels for their cars. They do not have original wheels. They are shopping for correct wheels. Stamps illustrated in this article may be of interest to Corvette owners of years prior to 1967.

I have looked at a lot of Rally Wheels and I wrote about them years ago. The articles were published in the "Corvette Restorer Magazine" around 2001/2002. I had to disclaim my observations. Here is my disclaimer. The information I am about to share with you is my opinion based on observation. The 1967 TIM allows you to have DC or DG broadcast codes on your wheels. Here is the forensic challenge. Were there other codes? Were there damaged stamps? When were damaged stamps used? Is there additional knowledge to date your wheels? Which cars actually got DC stamped wheels? Which cars actually got DG stamped wheels? Which cars got B stamped wheels? If you are shopping for 1967 wheels you should know what to look for.

I was lucky enough to get an interview in 2000 with the Director of Advanced Engineering at Hayes-Lerner Corporation, in Northville Michigan, close to Romulus Michigan. His name is Tom Heck. Kelsey Hayes had dissolved in the late 1980s. Hayes Wheels had acquired the German wheel maker Lerner in 1996 to form the worlds largest wheel manufacturing company. Tom took an interest in my project to explain the unexplainable about 1967 stamps. He had contacts with retired Kelsey-Hayes engineers and manufacturing people. Old guys told Tom that when a stamp broke, manufacturing went looking for an idle machine. Engineering wrote a temporary change order. When the original machine got fixed they built what was on the drawing. Lack of DOT enforcement allowed them to take liberties. Kelsey-Hayes did not have the "DC" stamp ready for the August production run of Corvette wheels. The "B" machine was available. It was already assigned to 1967 Camaro 14X5 drum brake wheels. The machine had unused capacity. "DB" was already assigned to the 15X5 Chevrolet passenger car with disc brakes. When the "DC" stamp finally gave up in December of 1966, the "DG" machine was available for two months. It was already as-

signed to 1967 Camaro 14X5 SS wheels. The "DG" machine was also used for January and February Corvette wheel production. Some June cars have the "DC" stamp upside down. The pundits say "B" and "DG" belong to other carlines. They are right. It is just that "B" wheels are also found on September 1966 Corvettes and "DG" wheels are found on early January 1967 to mid March 1967 Corvettes. You must dismount a tire to absolutely determine if you have a 15X6JK Corvette rim contour. If you see a 15" tire on a "B" or "DG" wheel you are not looking at Camaro or Chevy 14" wheel. Tom Heck said it takes a few seconds to punch a valve stem hole. I have seen and photographed the wheels. I have talked to owners. NCRS member Bob Wykoff documented the B and DB wheels in the 1990s. NCRS member Pete Lindahl confirmed that 15X6JK "B" wheels exist. They are on his Corvette, vin# 1476, build date B22. See the chart at the end.

There is some basic knowledge you need to know about stamps on 1967 Rally Wheels. Rally wheels first appeared on some 1967 model year GM performance cars including all Corvettes. There are supposed to be four stamps on the rim hidden by the tire. There are two stamps on the wheel center. There is a stamp next to the valve stem. Sometimes a stamp will be broken or missing. There are always enough stamps to determine what wheel you have if you dismount a tire.

Four Stamps Hidden by the Tire ... the TRA Stamp

The first stamp identifies the inspection of the rim by the TRA, the Tire and Rim Association. The TRA produced a set of standards that assured tires would fit rims from multiple wheel manufacturers. The numeral "8" in the center of the TRA stamp was originally assigned to the Detroit inspector at Kelsey-Hayes when wheels were made in Detroit. When Kelsey-Hayes manufacturing moved to Romulus Michigan the stamp followed unchanged.



KelseyHayes Logo

The second stamp identifies Kelsey-Hayes as the manufacturer of the wheel. The circular logo stamp contains the words "Kelsey Hayes" and "MADE IN USA".

Wheel Size and Rim Contour

A third stamp identifies the wheel size. 1967 Corvette rally wheels are 15X6JK. "15" is the 15 inch diameter of the rim where the tire bead sits. "6" is the width of the rim in inches between the beads. "JK" is the TRA rim contour which allows an offset for disc brakes. Drum brake mid-year Corvettes had a different rim contour. 15X5-1/2JK is a 1966 wheel.



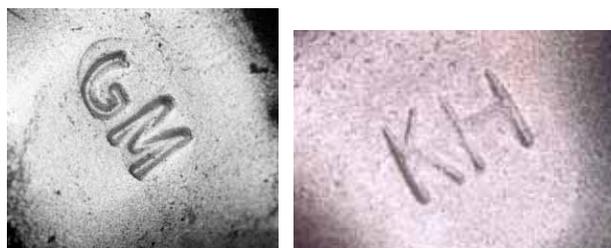
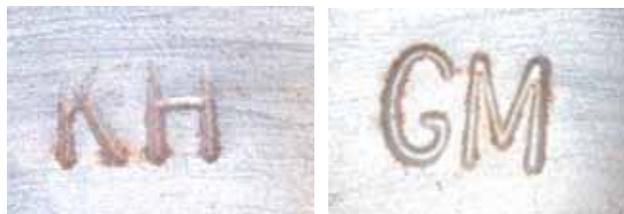
Rim Assembly Date

The final stamp forms the date code of the rim assembly. Hand applied with separate stamps, the month of wheel assembly can be "1" through "12". The year of assembly can be a "66" for 1966 or a "67" for 1967. The month and year stamps can be upside down or right side up at angles or not to each other and sometimes broken, illegible, or missing. Be a forensic scientist. It is worth looking at these stamps with a magnifier. Better yet, take a high resolution photo and enlarge it on your computer. Often the stamps were applied at an angle or broken. It took about two weeks for a pallet of wheels to get from Romulus Michigan to St Louis Missouri. Wheels from the August 1966 production run of rally wheels with the "B" stamp showed up on Corvettes made in the first weeks of September 1966. We have never seen a 15X6JK "B" wheel that was not made in August 1966. Look at my chart at the end of this article.

Two Wheel Center Stamps

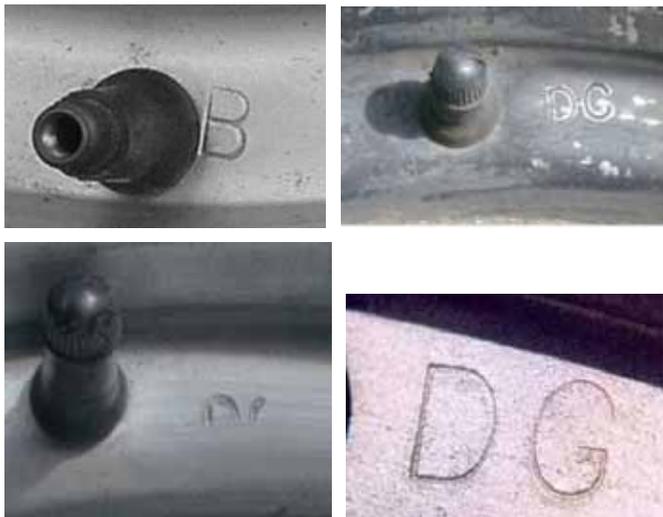
On the wheel center are two more stamps visible from the street with the wheel center cap removed. They appear

on raised bosses between wheel mounting studs. One stamp is a "GM". It identifies General Motors as the end user of the wheel. On several months of wheel center production the "G" broke and Kelsey Hayes kept using the stamp. It looks like a bad "6". The broken "G" wheel centers have been seen on every vin# between 5556 to vin# 17905. An intact "GM" was seen on an April 27 built car, vin # 18105. A broken "G" was seen again on a Corvette built May 11 1967, vin # 19367. Tom Heck explained Kelsey-Hayes would use wheel centers from a pile that contained centers from consecutive production runs. A center could be reworked and put back on the pile. The other stamp is a "KH". It identifies Kelsey-Hayes as the manufacturer of the wheel. President Lyndon Johnson and his band of consumer do-gooders created the Department of Transportation in 1966. One of the goals of the DOT was to identify manufacturers of products so they could be sued by soon to be litigious consumers. Wheel stamps were a required part of this effort to punish carmakers. The wheel center stamps were present on all 1967 Rally Wheels. The DOT did not enforce broken stamps.



Valve Stem Broadcast Code

Finally, at the valve stem, a broadcast code was stamped. It is visible from the street with the trim ring removed. This code stamp was part of the tool that punched the valve stem hole. This code identified the carline the wheel was assigned to. On the 1967 Corvette rally wheel assembly drawing the broadcast code is specified as "DC". However, the "DG" broadcast code appears on wheels manufactured in January and February of 1967. The broadcast code "B" appears on wheels manufactured in August of 1966. NCRS member Bob Wykoff documented these 15X6JK B wheels. He also saw some DB wheels. We have not seen a DB wheel dismounted. The DB wheels on Corvettes did not look like 15X5 passenger car rims. His research appears in my database. Wheels manufactured in November and December of 1966 have a broken "C" which renders the "C" barely or not legible. The "DG" stamp chronologically follows the broken "DC" stamp. An intact "DC" stamp again follows "DG" in March 1967. The small "DC" shows up with a date code stamped at the valve stem. These are Corvette service replacement wheels made after December 1967 or possibly 1968 Camaro Z28 15X6 wheels.



Wheel Paint

What color are 1967 rally wheels. Original dealer sales handouts show black rims behind the wheel covers and trim rings just like 1966 wheels. The black was a lacquer primer applied by Kelsey-Hayes. The silver topcoat was applied by Corvette in St Louis. The current NCRS owner of vin# 00148 says the car was delivered with black rallies. The wheels were later top coated with silver paint at a shop so



they would look like the newer 1967 Corvette wheels. The TIM calls for "Argent". "Argent" is a word for silver metallic. The images below are original "argent" paint, with runs: grey argent, white argent, green argent, chrome argent. All are real. All are correct. There were good and bad painters. Wheels were hung from the valve stem hole and washed. Runs are always opposite the stem hole on original wheels. Water is often trapped in the runs. Who knows where Corvette got the paint.



I expect you have seen by example how to use my opinions to find the correct wheels for your 1967 Corvette. The Following chart documents wheels observed and links stamps to build days and vin# when available.

- [i] Disc used interchangeably with words wheel center, spider, handhold
- [ii] boss is raised steel between lugs
- [iii] FGM flat grey metallic. GGM gloss grey metallic. GWS gloss white silver GRM greenish metallic. BLP black primer. FBS flat bright silver. BYL bus yellow
- [iv] quantity of wheels available for observation
- [v] all B wheels observed and logged by NCRS members Robert Wykoff. Additional B wheels confirmed by NCRS member Pete Lindahl.
- [vi] car known by present owner from 1966, bought from original owner by NCRS member in 1970, car delivered with black wheels, argent topcoat applied by original owner to match newer 1967 Corvettes
- [vii] bB= partial B or broken B
- [viii] "b" means broken
- [ix] described as Big DC
- [x] Dx means second character illegible
- [xi] Top of G missing, looks like a 6
- [xii] stamp height measures 5/16 inch
- [xiii] DG left of valve stem and inverted, 1/4 inch stamp
- [xiv] DbG intact D, missing bar G, looks like a C
- [xv] Big DC stamp height 1/4 inch;
- [xvi] DC, left of valve stem and inverted, part of C off radius
- [xvii] DbG= intact D, broken bar G, bDbG= broken D, broken bar G
- [xviii] DC described as Big DC
- [xix] SRP means service replacement wheel
- [xx] hidden rim date 8 67
- [xxi] hidden rim date 11 67
- [xxii] little DC 3/16
- [xxiii] interpret 1968 12=December D=fourth week

Model Year	Build Date	Vin#	Valve Stem Stamps	Rim Assy Date	Disc[i] Boss1	Boss2[iii]	Color[iii]	Qty[iv]
1967		112	v B[v]	8 66	KH	GM		5
1967	B 02	148	v B	8 66	KH	GM	black[vii]	2
1967		332	v B	8 66	KH	GM		5
1967		511	v B	8 66				1
1967		512	v B	8 66	KH	GM		5
1967	B	529	- v B	8 66	KH	GM		1
1967	B 15	893	v B	8 66	KH			1
1967		1207	v B	8 66				5
1967		1321	v B	8 66	KH	GM		2
1967	B 22	1426	v B DB	8 66	KH KH	GM GM		2 1
1967	B 22	1476	lindahl v B	8 66	KH	GM		5
1967		1584	barbieri v B DB DC	8 66 9 66	KH KH KH	GM GM GM		3 1 1
1967	B 23	1596	wyckoff v B DC	8 66 9 66	KH KH	GM GM		4 1
1967			v bB[viii]	8 66	KH	GM		1
1967		1995	v DC	9 66	KH	GM		5
1967		2278	v DG		KH	GM		4
1967	C 04	2290	v DbG[viii]		KH small	GM small		5
1967	C26	2333	staffrd v DC	10 66	KH	GM		5
1967			Lundberg v DC	10 66				
1967		2482	v DC[ix]		KH	GM		5
1967	D03	2970	Mario b v DB		KH	GM		1
1967	D 03	3046	D navales v DC		KH	GM	GGM	5
1967			v Dx[x]	66	KH	GM		1
1967			v Dx	66	KH	bGM6[xi]		1
1967	E 07	5556	v Dx	66	KH	bGM6		5
1967	F04	7333	niemann v DG		KH	bGM6		4
1967			v Dx	67	KH	bGM6		
1967	F 20	8242	W Nichols v DG	1 67	KH	bGM6	GGM	1
1967	G 03	9778	v DG[xii]	1 67	KH	bGM6	GWS	5
1967	G 27	12062	v DG	2 67	KH	bGM6		5
1967			inv DG[xiii] v	2 67	KH	bGM6		1
1967			v DbG[xiv]	3 67		bGM6		
1967		13051	v DC	3 67	KH	bGM6		5
1967			v DC	3 67	KH	bGM6		1
1967	I 17	16359	L kohler v DbG	4 67	KH	bGM6		5
1967		17905	Steve Sales DC		KH	bGM6		5
1967	I 27	18105	v DC[xv]	4 67	KH	GM	GWS	5
			v DC	E 67				
1967	J 11	19367	W bonner v DC		KH	BGM6	GGM	5
1967	K 05	20104	v DC		KH	GM		5
1967	K12	21396	v DC	67	KH	GM		1
1967	K 22	21628	inv DC[xvii] v		KH	GM		4
1967	K 28	21971	v DbG[xvii]	5 67	KH	GM		1
			v bDbG	6 67	KH	GM		2
1967		22940	v DC[xviii]		KH	GM		5
67SRP[xix]			v DC[xx]	8 67	KH	GM	BLP	1
67SRP			v DC[xxi]	11 67	KH	GM		1
67SRP			K18 10 v 7 DC xx	10 A				
67SRP			8 11 v 15 DC	11	K1/8	GM N		1
67SRP			K18 v 12 DC[xxii] 5	K1/8 12D[xxiii]				

NOVEMBER 1ST CRUISE-IN TO FUDRUCKERS NOVEMBER 1, 2008



Lake Tahoe 2009 Regional Registration Form May 14-17

NCRS Membership Number _____
Name: _____ **Spouse/Companion:** _____
Address: _____ **Guest** _____
City: _____ **State:** _____ **Zip:** _____
Phone: _____ **E-mail:** _____

EVENT REGISTRATION

____ Family Registration	@\$50 (\$60 after April 15th)	\$ _____
____ Guest (non NCRS member)	@\$25 EACH	\$ _____
____ Friday Cabaret (Adult Humor)	@\$28	\$ _____
____ Friday MS Dixie Dinner Cruise	@\$65	\$ _____
____ Saturday Awards Banquet	@\$40 <u>Steak</u> <u>Chicken</u> <u>Veggie</u>	\$ _____
____ Event T-shirt (Circle One)	@\$20 S M L XL XXL XXXL	\$ _____
____ Polo Shirt (Pre-Order only)	@\$40 S M L XL XXL XXXL	\$ _____
____ Swap Meet Space	Thursday _____ Friday _____ Saturday _____	FREE

CORVETTE REGISTRATION (one registration form per car)

Year: _____ **CID/HP:** _____ **Coupe** _____ **Convertible** _____ **Exterior Color:** _____
Complete VIN _____
Interior Color: _____ **Interior Type:** _____ **Insurance Policy:** _____

Circle One: Driven/ Trailered

____ Flight Judging Entry	@\$50	\$ _____
____ Bowtie/Crossed Flags Candidate Judging	@\$50	\$ _____
____ Qualified PV Entry	@\$50 (Proof of third flight or higher)	\$ _____
____ Sportsman Entry	@\$15	\$ _____
____ Founders Entry	@\$20 (Proof of Chapter third flight or higher)	\$ _____
____ Special Display	Bowtie-Duntov-McLellan-American Heritage-Crossed Flags (Circle One)	FREE
____ Trailer Parking	@\$25	\$ _____

Make check payable to: NCC/NCRS **TOTAL \$** _____
 Send to Sharyl Ingham, 6047 Lawton Avenue, Oakland, CA 94618
NO refunds after April 15, 2009; NO car entries accepted after April 15, 2009

JUDGING PARTICIPATION

Name		Name
Flight Judging _____	Judging Level _____	Flight Judging _____
1 st Choice _____	2 nd Choice _____	1 st Choice _____
Shirt Size S M L XL XXL XXXL		Shirt Size S M L XL XXL XXXL
Mech. _____ Chassis _____ Ext. _____ Int. _____ Ops. _____		Mech. _____ Chassis _____ Ext. _____ Int. _____ Ops. _____

All members must sign the Hold Harmless Agreement below, whether or not you bring a Corvette. Anyone bringing a Corvette(s), whether to be judged or not, must read and sign the following Hold Harmless Agreement, and provide proof of registration and in-force insurance at the Meet Registration Desk when you check in, BEFORE the car can be Operations Checked and / or placed in its final location.

HOLD HARMLESS AGREEMENT

I agree to insure my vehicle(s) and property against loss, damage, and liability and to provide proof of such insurance to NCRS at time of registration. I agree to assume the risk of any and all damages or injury and to indemnify and hold harmless NCRS, its officers, directors, agents, employees, and chapter for any acts or omissions that may result in the theft, damage, or destruction of my property or injury to me or to others, occurring during, or as a consequence of this event.

Signature: _____ **Date:** _____

Hotel Reservations: The Horizon Casino, 50 Highway 50, Lake Tahoe, NV. <http://www.horizoncasino.com/> 800-322-7723.
 A block of rooms will be available until April 15,2009 : Use Code: SHNCRS9.

Compression Ratio

By Duke Williams, Southern California Chapter and John McRae, New England Chapter

Photos by John McRae



When restoring vintage Corvette engines care must to be exercised in machining and selecting components to ensure a compression ratio that yields maximum detonation-free torque and power with available premium gasoline.

Static compression ratio (SCR) is the ratio of the swept *plus* clearance volume to clearance volume. The number 10:1 means the clearance volume at TDC, which is the *total* combustion chamber volume, not just the head chamber volume, is one-tenth the *total* volume with the piston at BDC. The higher the compression ratio the more torque/power the engine will produce across the entire operating range, and peak torque is basically a function of displacement and SCR. At any given engine speed, volumetric efficiency and internal friction come into play to determine torque at that particular speed, and all other things equal, a 10:1 SCR will produce about 5-10 percent more torque/power across the operating range than 8:1 and also deliver 5-10 percent better fuel economy.

Dynamic compression ratio (DCR) is the ratio of the *total* volume with the piston at the point the inlet valve closes (rather than BDC) to the clearance volume at TDC. Thus, for a given SCR, the later the inlet valve closes, the lower the DCR, which means the engine will tolerate a higher SCR. This is why SHP engines with their relatively late closing inlet valves have higher SCR than base engines. But there is no “industry standard” way to compute DCR. Some calculators use the SAE valve closing point, which is .006” valve lift, and some use an arbitrary number of degrees after the .050” closing point or some other methodology that may not even be specified, so DCR calculations are neither exact nor consistent. DCR is not a go/no-go criterion – just a general guideline.

The limiting factor in compression ratio is detonation, which is the spontaneous and instantaneous reaction of the unburned fuel-air mixture before it is consumed by normal flame front propagation. Octane number is an indication of a fuel’s resistance to detonation, and the best currently available unleaded premiums are 93-94 PON or “Pump Octane Number”, which is the arithmetic average of Motor Octane Number and Research Octane Number. The difference between MON and RON is called the fuel’s “sensitivity”, and it is generally in the range of 8-10. So today’s 93-94 PON is equivalent to 97-99 RON, which is nearly the equal of sixties vintage leaded premiums that were generally in the range of 98-100 RON. (“Super Pre-

miums” of that era were slightly over 100 RON.) California and some other areas in the country only have 91 PON premium fuel, so the equivalent RON is no more than about 96, and Californians may want to keep SCR up to a quarter point below the recommended maximums for various OE configurations listed below.

The advertised SCR of early 327/300s is 10.5:1, but this was reduced to 10.25:1 in 1967 because of the slightly larger (about 1.5 cc) 462 head chamber volume that resulted from the elimination of the small quench zone on the spark plug side of the previous 461 heads. The “as-built” SCR of Corvette engines of the era are typically about 0.5 point lower than advertised, primarily because *deck clearance/deck height* is usually higher than the nominal blueprint values of .025”/9.025”. Also, beginning as a running change during the ’62 model year, SHP/FI engines were “double gasketed” at least through the ’63 model year to reduce customer detonation complaints, but it’s not clear how long this practice lasted. So most vintage Corvette engines will operate without significant detonation on 91-93 PON premium fuel with, at worst, a slight reduction in initial spark advance or slowing the centrifugal spark advance curve.

Also, the 3830711 small block service head gasket is .026” thick, while the OE Flint-installed 3783631 gasket (which was only available in service until circa 1963 when it was replaced by the ...711) is only .018” thick. If a head was ever removed and reinstalled using an OE service replacement gasket after 1963, the compression is about 0.2 below the original build, and most engines are rebuilt with thicker composition gaskets, so when using exact OE replacement pistons, the actual compression may end up as much as a full point lower than the OE advertised value!

For this reason, it is very important to take the required measurements and run the calculations to compute the actual as-built compression ratio. You don’t want detonation, but neither should you leave anything on the table. I see a lot of “advice” that recommends “lowering compression ratio” as if the only available fuel was unleaded regular. This is nonsense!

Anecdotal evidence indicates that 300 HP engines will operate detonation free at about 9.8:1, which is about what the maximum true SCR was when they left Flint with the *thin head gasket*, and this will drop to about 9.6 if you merely remove the head and replace the .018” Flint gasket with the .026” service replacement gasket. Duntov and L-79 cam engines will accept 10.25 and 30-30 and LT-1 cam engines can tolerate 10.5:1. The evidence I have for big blocks is scant, but I believe 10.0:1 is acceptable for L-36/68 and 10.25 for SHP versions with the mechanical lifter camshaft. These *true* SCR’s are obtainable with the OE pistons and judicious head gasket selection even if the

block deck and head surfaces have been machined.

The illustrated engine (Figure 1.) is a base '67 300 HP that is being restored with a custom design low overlap camshaft that has a very late closing inlet valve, and the target true SCR is the range of 10.25-10.5:1. The low overlap yields OE 300 HP idle characteristics, and the late closing inlet valve in conjunction with "massaged" original 462 heads and the high compression will yield considerably more top end power and an extended useable power bandwidth.

Prior to disassembling the short block, the "as built" measurements *must* be made. These include deck clearance for each cylinder and head gasket compressed thickness, and this data along with published piston and nominal head chamber volumes (assuming the heads show no evidence of chamber grinding and the mating surface has not been milled) can be used to compute the SCR range as it was before disassembly.

Deck Clearance is the distance at TDC between the piston *crown* (the machined flat surface at the top of the piston exclusive of any dome, dish, or valve clearance notches) and the block deck. In this case the *deck clearance* measurements varied from 0.025" to 0.031" among the eight cylinders. The nominal .025" blue print OE *deck clearance* for all 327s is derived by subtracting the sum of nominal crank throw radius (half the stroke, 1.625"), nominal connecting rod length (5.700"), and piston compression height (1.675", the distance from the center of the wrist pin to the crown) from nominal blueprint block *deck height* (9.025"), which is the distance from the crankshaft centerline to block deck. (OE 350s also have .025" nominal deck clearance, which is achieved with 1.560" piston compression height.) Be sure you understand the difference between *deck clearance* and *deck height*, and do not confuse them.

Analyzing the deck clearance data for all cylinders will tell you whether each deck is parallel to the crankshaft axis and whether or not both decks are equal height. Since crank throw radius, rod length, and compression height are closely controlled dimensions (+/- .001" or less), any significant deviation from nominal *deck clearance* is usually due to *deck height* deviation from the nominal 9.025", and they are often high by up to .015".

With proper care, your deck clearance measurements should be within a thousandth or two of true, and if the deck clearances along a bank show no obvious "slope" then boring the cylinders using common boring equipment that indexes off the deck will result in good bores that are perpendicular to the crankshaft axis. If any slope is indicated, find a machine shop with boring equipment that indexes off the crankshaft axis, which is less common. If one deck averages more than a few thousandths higher than

the other, different thickness gaskets on each side can be employed to equalize compression ratio. Commercially available head gaskets range in thickness from .015" to over .050" in five to ten thousandth increments. If the left deck *only* is high, it can be machined down without any effect on Flight judging because there are no ID numbers or tooling marks to observe and judge on the left deck.

[Picture of deck clearance check. Caption: Setup for checking deck clearance. In this case the clearance of the original Flint-built engine is being checked prior to disassembling the block. It will be checked again during the assembly phase with the new KB157 pistons that have a specified compression height .003" greater than the OE pistons. All other things equal, the measured deck clearance of the newly assembled short block should be .003" less.]

The owner built a tool using a machined bar that is set up to mount a dial indicator. The indicator can be used to find the exact TDC point. (Once TDC is accurately located, tap the piston to zero out any bearing clearance.) The indicator dial is then "zeroed" on the deck and moved over to the piston crown to measure deck clearance. Care must be taken to ensure that the piston crown is square in the bore as the slight skirt clearance can allow tilt, especially on SHP engines whose forged pistons should be installed with about .0035" clearance compared to about .001" for cast pistons. The deck clearance should be the same on each side of the wrist pin or the piston is not square in the bore. It is a good idea to go around at least twice and look for consistency in the data sets, which is a good indication of accuracy.

Another way to measure with simpler tools is to use a "machinists bar" or a known accurate straight edge and two feeler gages. After using a dial indicator to find TDC, if the same size gage fits between each side of the crown and the bar, the piston is square in the bore, and you should have an accurate measurement. The base engine flattop pistons are easy to measure. SHP engines are a little tougher because of the domes, but there is a machined ring around the outside of the crown and this is the piston surface for gauging deck clearance.

The machinist's bar and a .0015" feeler gage can also be used to measure flatness of the block deck and head mating surfaces. The surfaces are flat if the same force is required to extract the .0015" feeler gage from between the bar and surface at any point along the bar. Measurements should be made between corners including the diagonals. If surfaces pass this flatness test an OE type shim gasket will seal.

The measured head gasket thickness was .018", which indicates that this was the original Flint-installed head gasket, and the gasket cylinder bore opening measured 4.08".



Figure 1.



Figure 2.

The head chamber volumes were measured using the illustrated setup(Figure 2.). Measuring head chamber volume is explained in many “How to Hot Rod/Rebuild...” books, and is a relatively simple operation for the amateur restorer

[Picture of CC apparatus, Caption, if used; “Homemade apparatus for checking head chamber volume. The equipment was purchased at a lab supply house, and the fluid is denatured alcohol with food coloring dye added.”]

Once you have accurate measurements for (1) original *deck clearances*, (2) *gasket thickness/cylinder opening diameter* and accurate dimensions or specifications for (3) *head chamber volumes*, and (4) *piston volume*, which can usually be gathered from published specifications, many of which are online, you can compute the original nominal compression ratio and range. In prehistoric times I had to do the arithmetic with a calculator (and even a slide rule), but nowadays I use a Web-based calculator: <http://www.csgnetwork.com/compcalc.html> that accepts measured values/specifications without the need for any unit

conversions.

From these initial SCR calculations you can proceed with “what-ifs”. What is the SCR with a different thickness gasket or a piston with a different volume or compression height? Although there are some discrepancies in published specifications, I use -5 cc for the valve relief notch volume of the OE 300 HP pistons. Be careful about piston volume algebraic sign. Even though these notches add to total clearance volume, they are entered in the above calculator as a negative number, and the 327 SHP piston’s 5.3 cc net dome volume should be entered as a positive number. Also, beware that some piston manufacturers use different conventions. Sealed Power/Speed Pro OE replacement pistons from Federal Mogul express a “dome” such as on the SHP pistons as a positive number. Keith Black pistons express a net “dome” as a negative number. Be certain you understand the piston manufacturers convention and reverse the sign if necessary – as is required with KB pistons – for input into the calculator.

Check it out. Input your direct measurements/specifications, and the calculator does all the math to double precision accuracy! Run a test case for a nominal ’67 300 HP engine - .025” deck clearance, .018” x 4.08” gasket, 62 cc head chamber volume, and -5 cc “dome” volume to account for the piston clearance notches. Then try the same year L-79 – same deck clearance and gasket, but increase head chamber volume to 64cc and use $+5.3$ cc piston dome volume. Then for either configuration increase the deck clearance by five or ten thousandths to simulate typical OE blocks as machined by Flint, and increase gasket thickness in five to ten thousandths increments to get a feel for the effect. Also change cylinder head chamber volume by 1-2 cc. You will see that small changes in these parameters have a significant effect on SCR!

If you plan to restore an OE engine to OE specifications, including the same camshaft, and it didn’t detonate before the rebuild, there is no reason to lower the compression ratio. Most commercial rebuilders use thick composition gaskets, so you typically end up with considerably less compression than OE even if OE replacement pistons are used, and this will cost you performance and fuel economy!

Use the SCR calculator to select components to achieve the target SCR range, and upon assembly take all the measurements again and run them through the calculator to ensure you are in the target range, and at this point you make the final head gasket selection to zero in on your target. There will always be some variation among the cylinders - typically a few tenths of a point. My recommendation is to grind the chambers of the highest computed compression ratio cylinders to reduce the variation to 0.1 maximum, especially if you are pushing the recommended SCR maximums.

In the case of this "Special 300 HP" prototype engine, the final measurements yielded a range of 10.37 to 10.51 with the "Keith Black" KB157 (<http://kb-silvolite.com/index2.php>) cast hypereutectic pistons (0.5 cc dome, 1.678" compression height) and the 3830711 OE replacement .026" shim gasket. The head chambers had been previously "relieved" to eliminate bore overhang and the final volumes varied from 62.0 to 62.8 cc, so it was merely

a matter of a little more chamber grinding to remove about 0.2 cc to bring the two highest cylinders down to about 10.45, so the final CR spread is .08.

A special thanks to John McRae for his patience, perseverance, extreme attention to detail, and great photographic documentation of his Special 300 HP engine project.

Join SCC/NCRS in supporting "Cruisin For A Cure"

The 10Th Annual Cruisin For A Cure Saturday, September 26, 2009

SCC will pay **\$10 of SCC member's \$40** registration fee if you register through our Chapter by **July 15, 2008**.

We will have reserved parking for the event.

Complete the registration form and return it by **July 15, 2008** (with \$30 check made out to SCC/NCRS) to **Treasurer:** Larry Wright, 6727 Kurl Way, Reseda, CA. For SCC/NCRS information, call Allen Morris at 949-367—9000.

Cruisin For A Cure

Orange County Fair & Expo Center, Costa Mesa, CA Car Show 7:00 AM to 5:00PM.

Gates open to participants at 4:30 AM

Open to all American made rods, customs, muscle & classic cars Corvettes, trucks, specialty vehicles, and EVEN SOME NEW RIDES Cruisin' all day! Limited to 3,300 entries.

Call the Doubletree Hotel and mention "Cruisin For A Cure" for special rates Tel: 714-825-3333

General show info or questions, Vendor/Exhibitor information: call 949-752-5115 Ext. 10

Name: _____ Street _____
City: _____ State: _____ Zip: _____
Make: _____ Model: _____ year: _____
E-mail: _____ @ _____

Send Participant Entry \$30 (Check payable to SCC/NCRS) to: Larry Wright, 6727 Kurl Way, Reseda, CA

The undersigned agrees to indemnify and hold harmless Cruisin' For a Cure volunteers, Jonsson Cancer Center Foundation, UCLA Jonsson Cancer Center, or employees from the Jonsson Cancer Center, State of California, the District Agricultural Associations, County of Orange County, or Citrus Associations, City of Costa Mesa, Orange County Fairgrounds, Orange County Marketplace and their officers, agents, servants, directors, employees, or volunteers, and against all liability of less or damages that the participant or family, relatives, or guest may sustain or incur as a result of claims, cost or judgments arising from the participants involvements to the "Cruisin' For a Cure" show. Participant(s) acknowledge he/she/they have liability insurance as required by the State of California Department of Motor Vehicles-CYC 16020 section (a-d)

Please fill in the required information below.

Company: _____ Policy # _____ Expiration Date: _____

Signature _____ Date _____



Spring Meet Registration

Saturday March 21, 2009

Lake Forest Automotive The Garage

23222 Lake Center Drive Lake Forest, CA 92630

949.597.1189



Irvine Suites Hotel, 23192 Lake Center Dr. Lake Forest, CA 92630.

Reservations: 1-800-347-8483' **Phone:** 949-380-9888, **FAX:** 949-380-8307, <http://www.irvinesuites.com/>

Special Room Rate \$79 until Feb. 28, (King or Double) Mention; NCRS Southern California

Event Information: Contact: Allen Morris, PO Box 3238, Mission Viejo, CA 92690-1238 H 949.367.9000 amorrismv@aol.com

Cars must be in place at **7:30 AM Saturday**, with a judge's meeting at 8:00 followed by an owner's meeting.

We do request that you mail in the registration form on or before **March 1, 2009**.

The following information will be used on your judging summary sheet if you are having a car judged.

Fees:

Meet Registration Members **\$20.00** (spouse & children under 23 yrs) **Includes Lunch** \$ _____

\$25.00 Postmarked after March 15, 2009

Meet registration Guests 1/2 of members registration. **\$10.00** , **Postmarked after March 1, 2009, \$12.50** \$ _____

Flight Judging **\$ 50.00** \$ _____

Sportsman Award **\$10.00 (No Ribbon \$2)** \$ _____

Make checks payable to **SCC/NCRS** and Mail registration form and fees to: Jerry Louer **Total \$** _____

425 Atwood Drive. Corona, CA 92879 Phone: 951.734.9818 Email: pnjlouer@sbcglobal.net

Please enter the following car for [] Flight Judging 53-93, [] Sportsman Award, [] Bowtie display/Special interest Display (no fee).

Year _____ Complete Vin # _____

Horsepower _____ Exterior Color _____ Interior Color & Fabric _____

[] Convertible [] Coupe [] Corvette Driven [] Corvette Trailered, [] Need trailer parking

Notice: There will be a limit of 10 Corvettes. First come first serve. No cars accepted after March 18

I would like to help with:

Name _____ [] Flight Judge, Judging 1st Choice _____ 2nd Choice _____
[] Observer Judge, [] Tabulate

Name _____ [] Flight Judge, Judg-
ing 1st Choice _____ 2nd Choice _____
[] Observer Judge, [] Tabulate

Member, Spouse _____ Guest _____

Address _____ City _____ State _____ Zip _____

E-mail: _____ Chapter Affiliation (if any): _____

Phone (Home): _____ Work: _____ Cell: _____

NCRS National Membership Number (see mailing label on your Driveline or Restorer): _____

All registrants (even if you are not having your car judged) must read and sign the hold harmless agreement as follows: Whereas owner voluntarily enters his/her vehicle in the NCRS event described above, it is agreed as follows: (1) that in consideration of SCC/NCRS and NCRS permitting the undersigned owner(s) to participate in this event, the owners(s) will insure his/her vehicle against loss, damage, and liability and will provide proof of such insurance being in effect at the time of the event. (2) That the owner(s) does hereby agree to indemnify and hold harmless the SCC/NCRS and NCRS, all its officers, directors, agents, employees or assigns for any such acts of omissions which may result in the theft, damage, or destruction or injury occurring during or as a consequence of this event, wherever located. (3) That owner(s) in attending this event does so voluntarily and agrees and assumes the risk of any and all damage to his/her vehicle or of injury to his/her self or others and hold SCC/NCRS and NCRS harmless therefrom. (4) The vehicle must be insured and "registered" to the person showing the vehicle for judging.

Please fill in the required information below. You must also provide/bring proof of in-force liability insurance and current registration for the Corvette to be judged.

Company _____ Policy # _____ Expiration Date _____

Signature _____ Date _____



Spring 2009 Meet Information

Saturday March 21, 2009
Lake Forest Automotive Group
The Garage

23222 Lake Center Drive Lake Forest, CA 92630



Meet Location: Lake Forest Automotive Group at **The Garage (949.597.1189)** is a Large Showroom and event center which is next to the Irvine Suites Hotel.

Judging Field: Indoors at **The Garage.**

Accommodations: **Irvine Suites Hotel** 23192 Lake Center Dr. Lake Forest / Irvine, CA 92630.

Reservations: 1-800-347-8483, Phone: 949-380-9888, Group Sales: 949-380-9888 ext. 107,

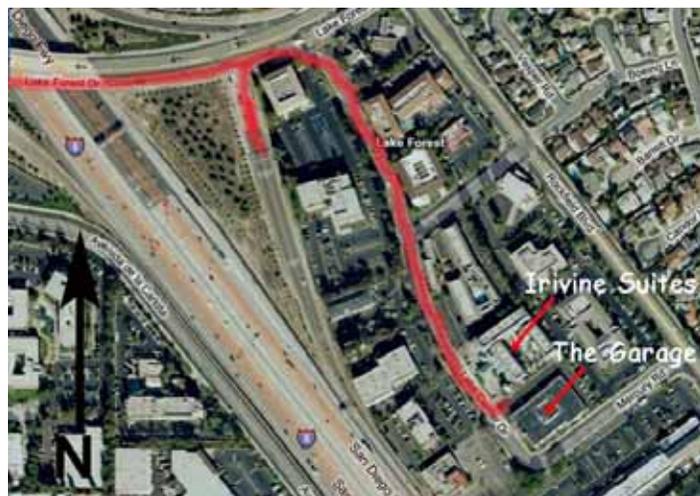
Elegant, spacious, two room suites all have a balcony, a private bedroom/bath and separate living room. We offer you a choice of 100 Rooms on 4 Floors, with a king or two double beds. Each suite has a sofa in the living room, two telephones w/voice mail, data port and hi speed Internet access, remote control w/ two - 25" TVs, hairdryer, in-room safe, iron/board, microwave, refrigerator, wet bar, coffee maker. There are nine upgraded Jacuzzi suites available. The hotel offers free garage parking, and **complimentary transportation to and from Orange County Airport.** Parking for 4 Trailers at the Irvine Suites with additional trailer parking at The Garage.



Attractions:

- **Laguna Beach** - 9 Miles
- **John Wayne Airport** - 15 Miles
- **Irvine Spretum Entertainment Center** -1 Mile
- **Disneyland Park** - 18 Miles
- **Knott's Berry Farm** - 23 Miles
- **Lake Forest Golf Course** - 5 Miles
- **Laguna Hills Shopping Mall** - 1.5 Miles

Directions: Driving south or north on **Interstate 405** or **Interstate 5** - exit **Lake Forest Drive** go east, Quick right turn past the 405 north on ramp (aprox. 50 ft.) to Lake Center Drive, 2 blocks to the **Irvine Suites & The Garage.**

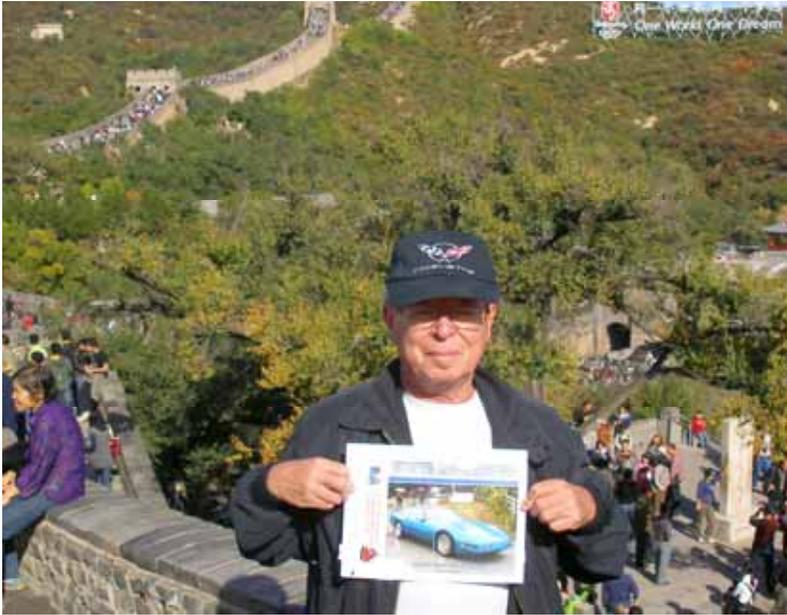


WELCOME

To the following new Members

David Laneve

Gene Stanley



Darold Shirwo our Membership Chairman on the "Great Wall of China". He brought the Bonding Strip and is trying to recruit new Chapter members.

As a reminder if you haven't renewed your membership use the application shown above

SCC/NCRS PALM SPRINGS CRUISE TO THE SUN

April 4, 2009

Road Tour, Car Shows, Afternoon BBQ, Shopping, Gambling, Tire Kicking

Meeting Place: Carrow's Restaurant-91 Hwy - Main St Exit.

NORTH SIDE OF THE 91- CORONA, CA

TIME: Meet 8:30 AM – Leave 8:45 AM

Cruise to PALM SPRING to the 4th Annual Un-Car Show – Downtown Palm Springs. NO CHARGE FOR THIS SHOW

This is located on Palm Canyon Drive & Mesquite Ave.

Approx. 1:00 PM cruise to NCRS Member Tom Pinard's home for a BBQ. Hamburgers, Turkey-burgers, Hot Dogs will be hosted. **Bring your own drinks and chair.**

Approx. 4:00 PM cruise to the Spa for the April cruise night by the Palm Springs Cruisers. There is a nominal charge for this show.

Dinner after the show:(Suggestion) Mexican on Canyon Drive

If you want to spend the night: Royal Sun Inn 760-327-1564 and mention "Un Car Show" to get the \$59.00 Rate plus tax.

RSVP by March 25, 2009 Tom needs to know how much food to buy for the BBQ

Contact: Bob Crane-714-458-6395, Allen Morris-949-466-7273

SCC/NCRS Membership and Renewal Application

Name _____ Address _____

City _____ State _____ Zip _____

Phone: home _____ work _____

E-mail address _____ Nation NCRS Membership # _____

(Note, you have to be a member of the National Corvette Restorers Society to join the SCC/NCRS Chapter)

Corvettes Owned _____

You have my permission to publish my name, address and phone number in the annual SCC roster.

Yes [] No [] _____ Signature _____

Make \$28.00 annual membership fee check payable to SCC/NCRS and mail to:

Darold Shirwo
8484 Wilshire Blvd., #605
Beverly Hills, CA 90211
(310) 278-2000

Membership in the SCC/NCRS includes a subscription to the chapter newsletter The Bonding Strip, which is published four times per year and includes details on chapter activities, tech tips, free classified advertising for members and discounts to chapter meets and functions.

The Southern California Chapter represents members of the National Corvette Restorer's Society from Central California through the Mexican border. It was formed in 1981 and we currently have over 200 members. Any membership inquirers and change of address should be sent to :

Membership Chairman

Darold Shirwo,

8484 Wilshire Blvd., #605

Beverly Hills, CA. 90211

**Opinions stated herein are those of the authors and do not represent those of NCRS, Inc.
or the NCRS/ Southern California Chapter.**

Condensed Minutes

EXECUTIVE BOARD MEETING

Sept. 8, 2008

By Diana Wright, Secretary



Chairman Don Troyer opened the meeting at 7pm at Harbor Chevrolet in Long Beach.

Those members in attendance: Ed Vignone, Pat & Jerry Louer, Randy Hines, Allen Morris, Larry & Diana Wright & Brian Quadt. One Guest: Bob Crane.

Secretary's Report: Was read and Pat made a motion to approve the minutes and Ed seconded. All were in favor.

Treasurer's Report: Larry stated the treasury is in fine shape. Allen made a motion to approve this report and Randy seconded. All were in favor.

Officer's Reports:

Brian checked with an oil Retailer about an ad in the Bonding Strip and also stated that they will give NCRS members a discount when shopping with them. Thank You!

Cruisin' for a Cure: Allen reported that there were about 2500 cars registered and about 300 vendors. Lots of prizes were given away that day. All our members who attended said it was lots of fun. See you all there next year.

Chapter Picnic: Oct. 4th is the date. Allen made a motion for an unlimited budget within reason and Larry seconded. All in favor.

Fall Meet: There may be no electricity at this event. We still need a place for a Friday Evening dinner. Lunch this year will be at Johnny Rockets for all registered members and guests. The topic for the judging school will be Metal Finals. Jerry reported we have 4 flight cars and 4 sportsman cars registered so far.

Chapter Cruise In: Starts at 11am at the Fuddruckers in Lake Forest. General Meeting to follow after lunch. This date is Nov. 1st.

Holiday Brunch: Applications for the party will be in the next issue of the Bonding Strip. We will check with Pat Collins and Verity Hobbs as to a caterer. Allen made a motion to allow \$1100.00 for a working budget for the event and Brian seconded. All in favor.

2009 Regional: We will have a meeting in Arroyo Grande in Oct. at the CCC Meet with the other chapters who are putting on this event. SCC will be in charge of judging this year at the Regional in Lake Tahoe. The dates to put on your calendar are: May 14-16. Put your judging caps on and away we go.

Oct. 10th is the deadline for the Bonding Strip. Hope some of you have your Technical Articles ready. And maybe think about volunteering to be the Editor. Ed is

ready for a helper. Allen & Brian made a motion to close the meeting tonight.

EXECUTIVE BOARD MEETING October 5, 2008

Chairman Don Troyer opened the meeting at 1:45 in Alhambra at our chapter Picnic. Those attending: Barbara & Ed Vignone, Pat & Jerry Louer, Darold Shirwo, Larry & Diana Wright, Allen Morris. Guests: Pat & Kay Collins and Bob Crane

Secretary's Report: Minutes were not available for this meeting.

Treasurer's Report: Larry stated that the treasury is doing well. Allen made a motion to accept the treasurer's report and Darold seconded. All were in favor.

Officer's Reports:

Darold as membership chairman stated that we now have 187 members, 4 of which are new. He has been doing a great job with renewals. Please send your check to Darold if you wish to remain a member in good standing.

Barbara reported on the standings of the Chapter of the Year Award Program. She gave a summary of the first 3 quarters reported to National. We are right on track.

Ed stated we needed nominations for 2009 Board Members. Most of the existing officers stated they would remain in their positions (if no one else would like to fill these shoes) Our newest member proudly stated he would fill one vacated spot. Bob Crane will run for Activities Chair as Randy Hines will be leaving this position. Thanks Bob for being so brave.

This time of the year we nominate a person for the esteemed award of Member of the Year. The committee was selected to handle the voting. They are: Barbara Vignone, Kay Collins and Diana Wright. If you have someone in mind that you think has done an outstanding job supporting SCC this past year, let us know.

Jerry Louer reported that all items donated by Lisa Kopala have been sold and these monies will be donated to the charity that Walt Kopala was so fond of. It is Kingdom Adventures.

Cruisin' for a Cure: This year Allen Morris once again organized SCC's involvement in this worthy cause. Many of our members joined hundreds of Car owners and spectators for a day of fun. This charity is all about giving people knowledge about Prostate Cancer and finding a Cure.

Chapter Picnic: As we write these minutes the picnic is winding down. Beautiful day, lovely picnic area and most importantly, lots of catching up with friends. And did I mention the Card sharks and the Wild Chefs? You will have to come to the next event to find out what a fabulous time we really had.

Fall Judged Meet: Jerry reported that we have 7 cars to be judged so far. They are: 4-mid years, 1- 59 and 2 sharks. 5 Sportsman. Jerry has received a copy of insurance from Jeff Cook for this event. We will be dining at

Johnny Rockets for all people who are registered for the meet.

Membership Meeting will be held at Fuddrucker's in Lake Forest at 11am. Our regular Board Meeting will be held on Nov. 10th at Harbor Chevrolet in Long Beach at 7pm.

Holiday Brunch: Verity Hobbs will chair this event and is going over menus as we speak to find the best luncheon for our party. A flyer will be in the next issue of the Bonding Strip.

2009 Regional: A lot of progress has been made by the NCC chapter. Darold Shirwo will head up the Road Tour going to Tahoe on May 12th, 2009.

2009 Convention: Glorie has volunteered to put together a Booklet of Ads for supporters of the Convention. All other aspects of the Convention are on track.

Jerry Palmer is working on a shirt that will be available to all of the California members to unite us a one state when we go to Conventions. More info on this to follow.

Bonding Strip deadline is Oct 10th. We will order 220 issues.

Pat Louer made a motion to close the meeting and Ed Vignone seconded. All in favor. Next meeting will be Nov. 10th at Harbor Chevrolet.

EXECUTIVE BOARD MEETING November 10th, 2008

Chairman Don Troyer opened the meeting at 7pm at Harbor Chevrolet in Long Beach. Members attending: Darold Shirwo, Allen Morris, Pat & Jerry Louer, Ed Vignone, Brian Quadt & Larry & Diana Wright. Also attending: Kay & Patrick Collins, Carol Troyer, Bob Crane & Dick Bottis. So glad you all could make it to the meeting.

Secretary's Report for Sept. was read and approved with one amendment. All in favor.

Secretary's Report for Oct. was read and Allen could not find one mistake. Ed made a motion to approve the minutes, Brian seconded. All in favor.

Treasurer's Report: Larry reported that the chapter is doing well. Ed made the motion to approve his report and Pat Louer seconded. All in favor.

Officer's Report:

Ed Vignone stated that NCRS has set up an Editor's Forum. This will be helpful for the next Bonding Strip Editor. Any volunteers?

Jerry Louer suggested we order several more Judging Reference Manuals to sell at Chapter Meets. The last batch for sale went quickly.

Old Business:

Brian Quadt updated the Technical Article Award Program. We will have several awards to present soon.

Chapter Picnic: All bills have been turned in to the Treas-

urer. Everyone in attendance had a fun time.

Chapter Fall Meet: Jerry got great feed back from the Owners whose cars were judged. His expenses were turned in. All papers were sent to Roy Sinor and the Owners.

Chapter Cruise IN: This event was held at Fuddrucker's in Lake Forest. We had a fair turn out. Some very nice Corvettes. And the day turned out to be Beautiful!

Jerry will hold off ordering supplies until a later date.

Holiday Brunch: Don Troyer has talked to Verity Hobbs about the Menu. Allen & Ed made a motion to go with Mexican Fair. All were in favor. We will let Verity choose the actual menu. Center pieces will be part of the door prizes. Carol Troyer has volunteered to handle the collection of prizes.

2009 Regional: Don has no new updates. Registration Form has been submitted to National.

2009 National: No updates at this time.

Bonding Strip: Closing date for articles will be Jan. 20th. Ed stated he has 2 Technical Articles that have been submitted for publication so far.

2011 Regional: Pat Collins checked with Ca. Speedway, but they were a bit out of our budget range. We would like to talk to the NHRA Museum and Darold will talk to Disneyland for this event, also. Allen Morris will check out some sites also.

2012 National: Application to be sent in by Jan. 15th if we want a proposal. Talks are in the works for San Diego. Allen & Jerry made a motion to work with a Convention Center there for a possible site.

Ca. Chapter Shirts: There has been no new updates on these.

Spring Judged School and Tech Session: Darold is checking into a place with a possible date of Feb. 21st, 2009.

Spring Meet: Lake Forest Garage came up as a possible site. March 21st, 2009 as a possible date. Allen will call for details with the owner. Darold made a motion to approve this date and Larry seconded. All in favor.

Cruisin for a Cure: Sept. 26th, 2009 is next years date for this event. Mark your calendars now. You don't want to miss this. Ed will put a registration Form in the Bonding Strip. Allen made the motion to approve this event and Darold seconded. Motion passed.

Marvin Burnett Memorial: Our friend Marvin passed away recently and a Memorial has been set up in his name. One chapter has challenged all other chapters to contribute to this fund. Allen made a motion that So. Cal. Not participate and Jerry seconded. Most were in favor. We all really liked Marvin and his wife Joan, but we felt this was not fair to all the other Wonderful Chapter Members who have passed and didn't get a Memorial.

The motion to close the meeting was made by Ed and seconded by Pat Louer. All in favor.

MINUTES OF EXECUTIVE BOARD MEETING

December 8, 2008

By Diana Wright, Secretary

The meeting was held after our Holiday Party at Rusty & Verity Hobbs home. The meeting started at 2:12 pm by Chairman Don Troyer. Those members in attendance: Allen Morris, Ed & Barbara Vignone, Pat & Jerry Louer, Larry & Diana Wright, Darold Shirwo and Bob Crane. Also attending: Pat Collins.

Secretary's Report: Ed made a motion to approve as amended, Allen seconded. All in favor.

Treasurer's Report: Allen made a motion to approve the report and Barbara seconded. All in favor.

Old Business:

Holiday Brunch: All agreed it was a Wonderful Event. Thank you, Rusty & Verity for once again opening your home to us.

Regional: Registration form will be in the next Drive Line. Allen Tremain stated they will do a Practice Judging on the 1994 to 1996 Corvettes for Tahoe Meet.

National: Walk through will be held on Sat. Feb. 7th in San Jose. This will be our last time to see the center before the Meet in July.

Bonding Strip: Closing date is on January 20th.

New Business:

Spring Judged School and Tech Session: Don Troyer will be checking on a location.

Spring Judged Meet: Two tentative dates are: March 14th or 21st. Allen will check with "The Garage" as to availability.

2011 Regional: Pat Collins checked with the NHRA Museum for a possible meet, but this site will not meet all our requirements. Barbara talked to NCC and found that they are submitting a bid for this event. SCC would like to work with them on this project. Allen made a motion to approve and Pat Louer seconded. All were in favor.

2012 National: Don notified the Consortium Chapters that we were putting in a bid for this event. Don also reported to Mark Lincoln about our proposal. Pat Collins reported that the team met with the Towne & Country Convention Center in San Diego. The center is brand new. He informed us that the Trolley for downtown San Diego stops at the back door of the Center. Easy shopping, Ladies. Pat, Darold and Don will be co-chairman for this Proposal.

Jerry Louer was contacted by Bill Sangrey to head up an SCC Road Tour to the San Jose National. Jerry was happy to help out with this event. A motion to adjourn was made.

Technical Articles Needed

Free NCRS Portfolio

The Bonding Strip needs you to share your latest Corvette repair or restoration in a technical article. With digital cameras and word processors it's a snap to write an article. Just send in a Microsoft Word, Word Perfect or a text document along with some photos and we will take care of the rest.

The SCC Board will provide an embroidered NCRS portfolio and luggage tag as an award in recognition of those members who write three articles which are accepted for publication. Send articles to Ed Vignone, 5 Via Pasa, San Clemente, CA 92673 Email: scncrs@ncrs.org Phone: 949.248.0931



Embroidered NCRS Portfolio

Members Classifieds

License Plates For Sale: Contact: Allen Morris 949-367-9000

California 63-69 (black-yellow) Have about 75 pairs. All different condition and pricing. You will be able to put these plates on your car July 2009. Call for your needs and pricing.

Parts For Sale: Contact: Boyan Brkic 818.517.5016 bbrkic@msn.com

350 4 bolt main short block. Standard bore, never decked, steel crank and rods. Dated March, 1970 make offer

Parts For Sale: Contact: Gary Leonhardt at 714 533-7693H, 714.318.3056C or vettedoc99@sbcglobal.net

Hundreds of Corvette parts and cores for C1 through C5. Parts list on PDF or Word Files. Can e-mail lists and prices.

Parts For Sale: Contact: Ed Vignone 949.248.0931 vignone@ieee.org

1964 intake Manifold PN 3844459 Date Code L103 \$60 plus Shipping

Parts For Sale: Contact: Dana Hurt 714.925.0473

1966 big block rear end, center section, 4:11 positraction dated March 66, good condition \$750. 1966 big block hood, original, nice condition \$1,250.

Parts For Sale: Contact: Gary L Hiltunen 530-259-5997 or e-mail arunner@frontiernet.net for photos and prices.

1953-55 Reproduction exhaust extensions. Both short (early) and long (late) styles available. 53-62 windshield post tab repair, \$65 ea. plus shipping.

Parts For Sale: Contact: Jim Sanders at 951 780 1389 or sand370@pacbell.net

1969 Corvette 427/390hp (LM) # 512 long block with headers. Date L25 8 (Dec 25 1968);\$2600.00. 1972 Corvette 454/270hp (Blank pad) # 289 long block. Date G7 72 engine has been professionally restored but never installed; \$1500.00. 1975 Chevy "over the counter" 427 long block with 4 bolt mains; \$2000.00. Buy all three for \$5900.00. Buyer is responsible for shipping.

Corvette For Sale: Boyan Brkic 818.517.5016 bbrkic@msn.com

1964 Corvette coupe. Project. Originally 365 hp, with factory A/C, P/W, 4 speed, P/B. Silver with silver interior. Non original motor. Needs full restoration. \$19,000 obo.

Parts Wanted: Contact: Boyan Brkic 818.517.5016 , bbrkic@msn.com

63-79 rear end housing, complete with gears etc. 3.36 ratio preferred, but will consider all ratios.

Parts Wanted: Contact: Darold M. Shirwo 310.278.2000 DShirwo@aol.com

1964 Corvette, Original fuel line and cooler clamps needed (square end ones), original battery "J" bolts, original pet-cock and extension, original shock washers, firewall insulation driver' side (original) - condition is not to important.

Chapter Badges \$5.00

Includes Shipping

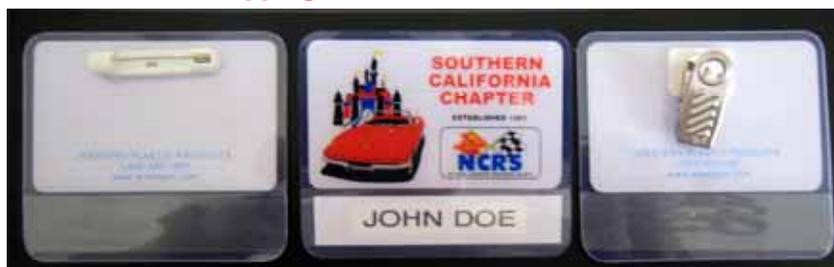
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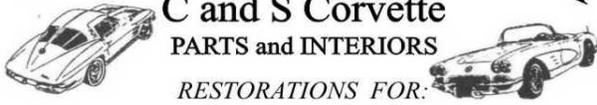
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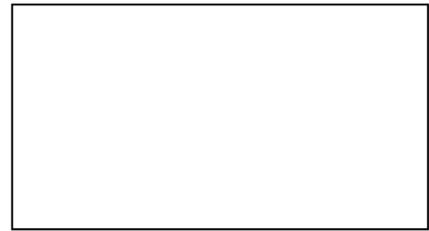
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 Redliner50@hotmail.com

Cell 951-505-3331
 Office 909-946-5928

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Circulation:
Diana Wright
6727 Kurl Way
Reseda, CA 91335



Mail to:



Advertising Rates for the Bonding Strip

The Official Publication of the Southern California Chapter of the National Corvette Restorer's Society Effective January 1, 2008

Yearly rates are based on a calendar year. All funds payable to SCC/NCRS. Payment terms are net 30 from date of billing. Rates do not include additional artwork services, as required. Photographs should be high resolution at least 300 ppi. Advertising copy should be submitted to the Editor no later than 15 days before the first month of the issue advertising is required to run in. Submit all advertising and payment in full to the editor.

Business Card Advertising. Business cards must be no larger than 2-inches by 3 1/2-inches. Larger cards will be reduced to fit.

Yearly Rates; SCC members: \$20.00 , non-members: \$30.00

Commercial advertising	Yearly Rate	Per Issue Rate
Full Page (8.5" x 11")	\$250.00	\$65.00
1/2 Page	\$140.00	\$35.00
1/4 Page	\$75.00	\$20.00
1/16 Page	\$50.00	\$15.00

Members Classified "Wanted and Parts for Sale" are free, However, they can not be carried over to the next issue unless requested before the Editorial/Advertising Deadlines.

The Bonding Strip Editorial/Advertising Deadlines

Following is a list of Deadlines for submitting material to be printed in future issues of The Bonding Strip

- Volume 1. February - April issue: January 10,**
- Volume 2. May - July issue: April 10,**
- Volume 3. August - October issue: July 10**
- Volume 4. November - January issue, October 10**

Send editorial contributions and advertising to the Editor, Preferred media for submissions is by e-mail and or attachment in MS Word® or its equivalent , or by mail on computer disk. Chapter email scncrs@ncrs.org