InfraMation

Infrared Training Center itc™

November 2002 *Gary Orlove – Editor & Publisher* **Volume 3, Issue 11**

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Welcome to our New Format [top]

Hi {{user("firstname")}},

Welcome to our new format for the newsletter. Now you won't need to download the newsletter anymore as it is delivered in readable format directly to your email software.

For those of you who can't read html email, you have two options, you can click the following link to view this newsletter on the web:

HTML Version

Or you can click this link to download a pdf version as before:

PDF Version

Either way you will still be able to receive your newsletter. We hope you enjoy this new format.

To change your preferences for receiving email, click the unsubscribe/change profile link at the bottom of this page.

Until next month,

Gary Orlove,
Editor and Publisher

Thermography for Drag Racing? [top]

By Joe DeMonte
ASNT/PdM TIR Level 3
ITC Senior Thermography Course Instructor

I have two hobbies that make up my off-time during the course of my life. One includes a family car, and the other includes my job. What luck would it be if my job could roll over into my hobby? Having the privilege of being able to use infrared devices in the course of my day job is still overwhelming to me. I cannot even consider teaching for the Infrared Training Center a "job". It is an ADVENTURE!! This summer I decided to try my hand at drag racing the family car on two courses in Pennsylvania. What turned out to be a fad has quickly become the joining of two of my favorite things: racing and infrared. This article is the beginning of my long road of introducing infrared to a new avenue. Look for future articles to be much more detailed as I continue to find new ways for infrared to make my car more successful.

My current drag race machine is not your run-of-the-mill car. I own a '98 Buick Regal GS sport

sedan with the L67 engine package. What does this car look like? Here is a pic outside my house:

Pic 1: Regal outside my house.

It doesn't look very aggressive. It doesn't look like it can go very fast. It is a Sleeper (def: a car that goes but doesn't show). The stock L67 engine is a 3800 Series 2 motor from the General with an Eaton M90 roots type supercharger on top making about 7.5 pounds of boost. My engine is no longer stock, but the stock engine produces a steady 240 horsepower and a whopping 280 lb-ft of torque. Weighing in at just about 3500 pounds, it was one of the fastest four door sedans ever made in the USA when it was brand new. Some automotive purists would scoff at the fact that it is front wheel drive and not very good at straight line performance when compared to rear wheel drive machines. I agree that front wheel drive is not easy to work with. Components like the transmission have to be smaller, and traction during straight line launches is difficult when the weight of the car transfers off the front of the car to the rear. This makes traction with a front drive difficult at the track.

Pic 2: My Regal on the left of the picture launching at Beaver Springs Drag way.

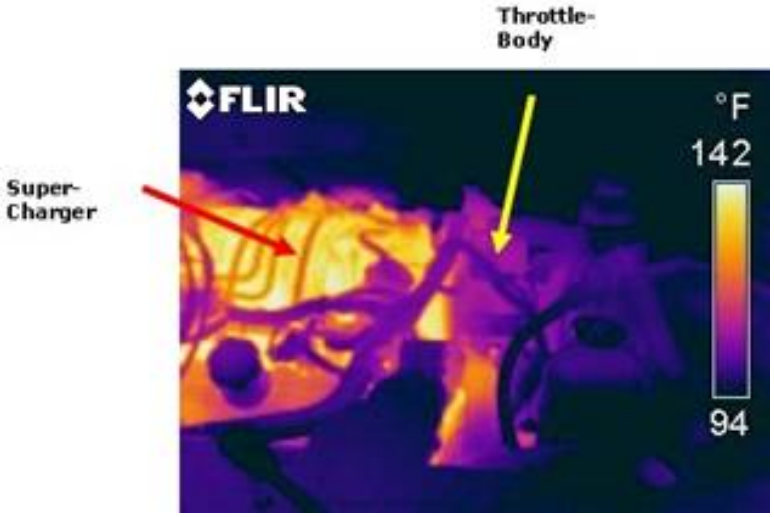
What concerns are there with today's modern OBDII computer controls and superchargers? HEAT!! Hot air is the biggest drain of power, and new PCM controls will introduce timing changes to protect our motors. To keep the engine safe from knock and increase horsepower, we have available to us a number of heat reducing components. My car suffered from nearly seven degrees of KR (knock retard), and was not running as fast as it should. I contacted a few of the high performance manufacturers that deal with late model Regals and found that I needed to cool the incoming air prior to the supercharger. The basic flow of air to the engine follows the path shown in the next picture.

The incoming air to the engine is drawn through the driver's side headlight fender area and then into the cold air induction system. The purpose of "cold air" induction is to keep engine bay air temperatures, which are hotter than outside air temperatures, out of the air we want in the engine. My cold air system uses a polycarbonate sealed box that mates with my inner fender behind my headlight. In Pic 1, my car is seen without the driver's side headlight. We remove this to keep the incoming outside air from having to go around the headlight. The air then continues through the K&N cone filter and into the throttle body inlet. It (air) is then drawn through the throttle body and into the twin screws of the Eaton supercharger. From the supercharger, the air is compressed and forced into the intake of the engine.

The throttle body is an area of concern for us. Coolant from the engine circulates through the throttle body, and the throttle body is only separated from the very warm supercharger housing with a small gasket. Heat conducts from the supercharger to the throttle body by physical contact and is also added to the throttle body by forced convection from the hot coolant flowing through it. With the air

flowing quickly across the throttle body, heat transfer by convection to the incoming air from the hot internal surface area of the throttle body is greatly increased. How do we cool this important section of the air path? One way is to separate the throttle body and supercharger. Pic 4 shows the thermal profile of my engine after the installation of a ZZPerformance TB (throttle body) poly spacer between the throttle body and supercharger.

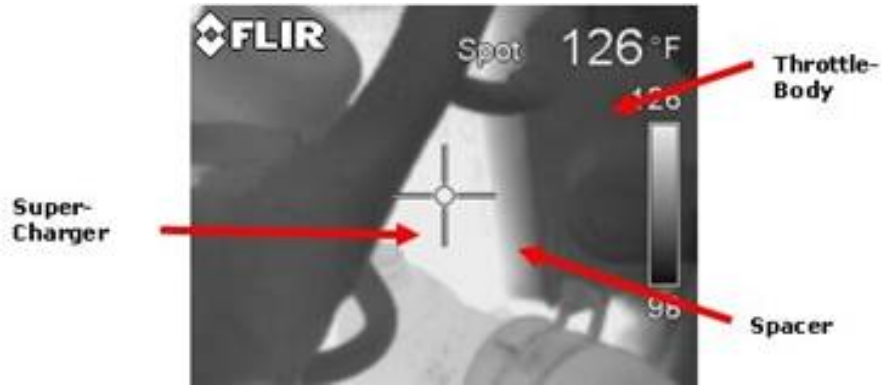
Pic 3: L67 engine with extras!!



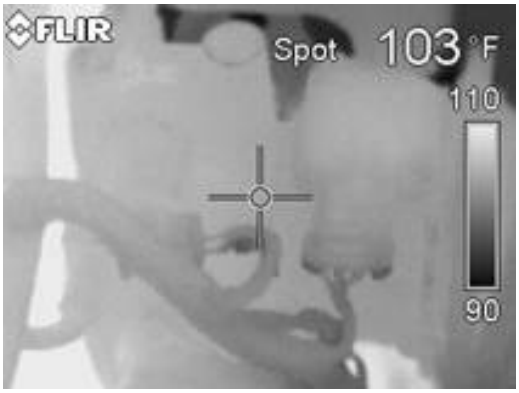
Pic 4: SC and TB separated by a spacer.

I did not get the chance to perform the "before" thermography on my engine to see what the throttle body temperatures were, but the throttle body was definitely hot to the touch. The spacer insulated the heat from conducting between the supercharger and TB, and it blocks coolant flow to keep the TB temperatures down even further.

Pics 5 and 6 were taken after about 1 hour of cooldown following a 5-10 minute drive. I noticed the difference in temperature with my hand. I knew that my throttle body always got hot, and after the spacer was installed, I did a test run for 5 or so minutes. I popped the hood of the car and touched the throttle body and supercharger with my hand. The supercharger was uncomfortably hot as usual and the throttle body was cool to the touch!! I decided to take a look at the components with my E-2 FLIR imaging radiometer a little too late, but the IR images told me exactly what my fingers were telling me.



Pic 5: Supercharger temp after 1 hour of cooldown.



Pic 6: Throttle Body temp after 1 hour of cooldown.

In the next few months, I will be changing some of my components and upgrading them. After my next engine is installed into the Regal, I will perform a much more scientific study of the

before and after comparisons with and without the throttle body spacer. Also look for a comprehensive study on the effectiveness of engine headers, wrapped engine headers, and coated engine headers.

Remember, when a four door Buick pulls up next to you at the drag strip, go ahead and laugh. The crowd always laughs and wonders why a guy would race his Buick grocery getter. But this Buick isn't your Mom's or Grandfather's. It is built for racing, but also takes my two children and wife to the

Pic 7: Yes, that's smoke left over from me

grocery store in comfort. I only lost one head to head race out of eleven this Summer and it was due to a transmission slip. My victims included Eclipses, 5.0 and 4.6 Mustangs, a new Camaro SS, a 455 modded Trans Am, and one very slow Thunderbird. I look forward to adding to my shocked victim list next year with a new more powerful Regal. Zoomer, the owner of ZZPerformance became the first 11 second L67 car in the world this summer, and I will follow his lead, adding the advantage of using infrared imaging radiometers to increase performance beyond what was originally thought.!

InfraMation 2002 Exceeds Expectations [top]

Judging by the feedback from InfraMation 2002 attendees, this year's Infrared Camera Applications Conference was the best yet — for both novice and experienced thermographers.

"I really enjoyed being there. The best conference I have attended."

"InfraMation reinforces basics and provides insight to new IR technology advances and applications."

"The contacts I made will be very valuable in the years to come."

"As a newcomer to the IR field, I found InfraMation very useful and informative. I look forward to applying the principles learned when I return to work."

Herb Kaplan prepares to open the second day of the conference.

The IR Clinics were very popular. Here, Mikael Cronholm assists Ron Lucier at the Roofing Clinic.

Held at the beautiful Wyndham Resort in Orlando Resort from September 29 – October 2, this year's event featured 31 diverse infrared application presentations all available in both a bound print proceedings book and in a fully searchable CD-ROM. An Exhibitors' Showcase included FLIR and ITC and eight other vendors covering a range of IR services, consulting, ultrasound, corona detection, and reliability. Back by popular demand, the InfraMation Application Clinics were held on Sunday, September 29 and covered Reporter and Researcher Software, IR reporting tips and tricks, roofing and electrical inspection. For the first time, InfraMation also hosted a law enforcement and homeland security clinic where the new FLIR ThermoVision Scout, a handheld infrared camera custom made for police and local law enforcement applications, was introduced. And everyone had fun at our special event night at Universal Studios where we enjoyed a dinner and experienced the Twister Tornado attraction.

Thanks to all who attended and we look forward to seeing you next year!

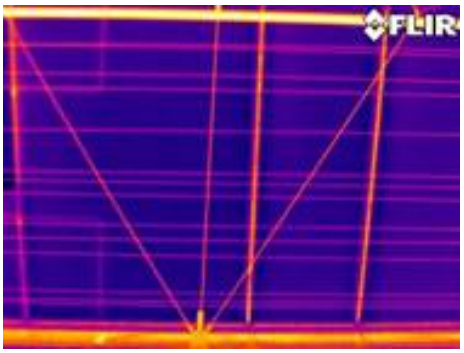
John Keane and Ken James discuss IR applications for pest control in the exhibit area.

COMING SOON --- InfraMation 2003

Next year's event is being planned for Las Vegas and will be even bigger! ITC would like to hear from you now! Would you like to pre-register for next year's conference? If so, contact Laurie Kelley. Anyone **pre-registering before December 31, 2002 will receive a $200 discount off the registration fee.** Register today and take advantage of this one-time opportunity. Also, anyone interested in exhibiting next year is encouraged to contact ITC early since this part of the conference is expected to grow.

Further information can be obtained at http://www.inframation.org or by calling 978-901-8291 or toll-free 866-TRAINIR (872-4647).

Last Month's Brainteaser [top]



Last month's brainteaser is a shot of the inside of a green house. Congratulations to Jim McCreery of Cami Automotive in Ingersoll, Ontario, Canada for his correct identification.

Brainteaser of the Month [top]

Here is this month's brainteaser. First reader to email me with the correct Make, Model, and Year wins $20 in Infrabucks. Please put "**Brainteaser**" as the subject of the message.

Click here to email your guess

Upcoming Classes [top]

Click the links below to see our course calendars.

Americas
International
Germany
France

About the ITC [top]

The Infrared Training Center offers training and certification in all aspects of infrared thermography use. Our world-class training facilities are located near Boston, Massachusetts, USA and Stockholm, Sweden and have the world's most extensive hands on laboratories for infrared applications. Please join us in exploring the fascinating world of the infrared!

Your comments and suggestions about this newsletter are welcomed and encouraged. If you have an interesting application or case study to share, we encourage you to submit it for publication. **Published articles earn credit towards recertification**.

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