

# Technical Session at Discount Tire

## Topic: Heat Cycling

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The March 2002, Technical Session was graciously hosted by Gerry Gutierrez, General Manager of the Discount Tire Store located at 4355 Genessee, San Diego. The topics: Heat Cycling, a service offered by Discount Tire, as well as two products sold by

Discount Tires, Kumho Tires and Kinesis Motorsport custom wheels.

Kumho's 2002 performance tire offerings were discussed by Rick Brennan, Kumho's High Performance Brand Manager, as well as a presentation on the latest from Kinesis Motorsport, by the owner, Peter Stacy, and his Sales Manager Alan Baylis.

The evening was kicked off with an introduction by San Diego PCA Tech Sessions Chair, Neil Heimburge. The subject matter assured a good turn out, high performance tires and wheels, two out of the three factors that keep a car on the race track or road, the third being the driver, of course. The opportunity to hear about the latest offerings from Discount Tire, Kumho Tires and Kinesis Motorsport, and the possibility of meeting up with some long time racing buddies, was too much for about 100 of the combined PCA San Diego and the local BMW Club to pass up. Now add in the critical factor driving attendance, lots of food and great door prizes. Together the Clubs devoured about a half a dozen of the largest submarine sandwiches known to man, plus soft drinks galore, thanks Gerry! And the door prizes, I'll conclude with those details.

Eric Richards from Discount Tires opened the initial session. Why Heat Cycling, what problem does it address, is it worth \$15.00 a tire extra? Given: A new race tire has a finite life. During its lifetime, performance is not uniform over the life of the tire. Race tires rapidly come up to maximum

performance, reach their peak, and then gradually drop off to the point where the tires have noticeably lost their grip. With the typical track tire lasting a few thousand miles, all agreed it would be great if performance could be optimized throughout the life of the tire. Heat Cycling addresses this issue.

In the Heat Cycling process, the tire is brought up to temperature, approximately 150° F. over a period of several hours, burning off anti-oxidants as well as tire mold lubricants and other chemicals that detract from initial tire performance. Once the process is complete, the tire is allowed to cure for approximately 24 hours serving to tighten the molecular structure of the tire.

That is well and good you may say, but why bother with heat cycling? Wouldn't few hot track laps accomplish the same thing? Yes and no: As you recall, a car with new race rubber will feel slippery for the first few laps. You are experiencing first hand, heat cycling on the fly. You may get the tire up to temperature as heat cycling does, but there is a 99.9% chance you won't allow the tire to cure for 24 hours after these initial hot laps. I say may, because for those of you that track your cars, and use a pyrometer to monitor heat build up, you have noticed the greatest heat build occurs on the side of the car taking the most abuse, as an example, the left side at Willow Springs International Raceway. It is very possible to get the left side, specifically the left rear tire temperatures up to 150° F, the right will accumulate far less heat, possibly as much as 20° F cooler. As you will see below, the tire needs to reach 150° F for the curing to take effect. 130° F is not hot enough for the desired curing, resulting in maximum performance, to take place.

Eric Richards suggests that a properly cured tire results in 50% more grip life over the life expectancy of the tire. Basically, the tire will remain stickier over a longer period of time than a non-heat cycled tire. Heat Cycled tires will come on sooner, and go away later, in race track parlance.

The “nuts and bolts” of Heat Cycling: The mounted race tire, inflated to about 15 PSI, is placed vertical into a Heat Cycling machine with a series of rollers, at least one of which is powered, and another that transfers regulated heat. The tire is seated on the rollers, and the securing roller is brought down over the top of the tire. Once secure, power is applied, and the tire rotated

and heated on the treadmill. The tire temperature is monitored, with the tire heated to the ideal temperature of 150° F, 68% of a race tires upper heat range of 220° F. Once the tire achieves temperature, it is removed from the device and allowed to cool for 24 hours as the molecular bonds of the tire tighten.

To conclude this section, recall the words of Carroll Smith in Tune to Win, “The second and third laps that a set of road racing tires do will be the fastest laps of their life.” With Heat Cycling, perhaps it will be the first and second lap.

Now that you have an appreciation for Heat Cycling, the topic of tire shaving came up. Unfortunately at present, this is not a service offered by Discount Tire, perhaps in the future, Gerry? More “Nuts and Bolts”: Kumho race tires are delivered with 6/32 of tread depth. In the literature, it is recommended you shave the tires to 4/32 before they are heat cycled.

As described in The Bouncing Tire, (<http://www.rod fathers.com/tires.html>) “a tire truing (shaving) machine appears somewhat like a tire balancing machine only where the tire lay horizontal rather than vertical. Once the tire is mounted, mounted in the machine, an "arm" would swing into place. On this arm was a razor sharp wheel, about 2 inches in diameter. This razor wheel was electrically (or belt) driven and was on a spiral shaft so that it would travel up and down the face (tread area) as the tire was spinning. The razor wheel would be placed up against the tire and as the tire spun around, the razor wheel would trim off all the high spots. This procedure would be repeated until the tire was trimmed into round.”

As a result of tire shaving, tires will experience greatly reduced lateral tire squirm, equating to a more stable tire as well as a lighter and truer (round) tire. In conclusion, because of the reduced mass, the shaved tire is prone not to overheat in contrast to a non-shaved tire, assuming tire pressures and alignment are optimal. Some say the shaved tire may last longer than its non-shaved counterpart. I am having problems with this concept. The jury is still out here, in my opinion.

Race tire performance all comes down to heat management. Kumho race tires perform in the range from 150° to 220°. Run them too cold, stickiness is sub-optimized, run them too hot and they will loose their grip, and can eventually chunk and possibly blister. This applies to all brands of tires, race

and otherwise, for that matter. Now you know the general ins and outs of Heat Cycling and tire shaving.

Rick Brennan, Kumho Tire's High Performance Brand Manager was up next to discuss Kumho 2002 high performance tires, both present and future offerings. Kumho Tire is the "baby" in the tire industry, being "born" in South Korea in 1964. Their original products were a line of passenger and light truck tires. The company has grown to the point where they now sell tires around the world.

Kumho has been interested in the "top of the line" high performance passenger car, tire marketplace, for quite some time. In order to "play here", brand name recognition is required to command a fair price for these products. In their analysis of this niche market segment, it was very obvious, for success to come to Kumho, they needed brand name recognition as a producer of reliable, high quality tires. Employing conventional advertising techniques, this process could take years: This extended time frame was not what Kumho was looking for.

It was decided that a quantum leap in brand name recognition, serving to identify Kumho Tire as a quality tire producer, would most likely occur, if Kumho were to demonstrate they can produce a high quality, world-class racing tire, both affordable and widely available. As most of us are aware, Kumho accomplished this feat with the very successful VICTORACER V700 tire. Brand name recognition for Kumho, as a manufacturer of "top of the line" performance tires has developed to the point where they are releasing two new tires for the "top of the line" market segment tires in June of this year. We will soon be seeing the ECSTA MX and the ECSTA 711.

Kumho has not forgotten those of us that take our cars to the track. The VICTORACER V700 is now being supplemented with a new race tire, the ECSTA V700. For purpose of review, recall that VICTORACER V700 is designed with asymmetrical tread design. As a result, tires can be rotated from side to side on the car, allowing for more even wear. In addition, the tires can be "flipped", with the inside of the tire now facing outside. The newest tire, the ECSTA V700, has a directional tread design, however, because of the symmetrical internal construction, this tire too can be flipped as described above. As inside tire wear gets to a point where you no longer feel comfortable with the tread depth, go back to Discount Tire and have Gerry and his crew flip the tires and remount them.

In comparing the latest from Kumho, the ECSTA V700 to its older brother, the VICTORACER V700, the ECSTA V700 is designed with increased side wall stiffness for better turn in. The tread shoulder is now rounded on the new tire, in contrast to the VICTORACER V700's square shoulder, another tire performance enhancement. Also, comparing tires of the same size from both models, you will observe the ECSTA V700 is approximately 6% wider, putting more rubber on the road. This latest race tire from Kumho is also lighter than the VICTORACER V700 providing for reduced un-sprung weight. There is some good news/bad news with the ECSTA V700, being that it is a little softer (more stick), it may not wear quite as well as the VICTORACER V700.

Because of the \$30,000 + cost of a new tire mold, Kumho Tire cannot offer all possible tires sizes within each brand of race tire. Kumho Tire will manufacture both tire series for at least the next several years, and eventually the VICTORACER V700 line will be phased out, replaced by the ECSTA V700. In conclusion, Kumho Tire offers two incredible race tires, stocked and sold locally by Discount Tire. With this in mind, Gerry probably has your size in stock. His crew can mount and balance (State of the art Hunter Balance Machine) these tires for you. In addition, Gerry keeps 16", 17", 18" Porsche wheels in stock. Once you place your order, Gerry and his crew can have your Kumho tires already heat cycled for you when you come in 24 hours later for mounting and balancing.

The final presentation of the evening, was given by Peter Stacy, backed up by his Sales Manager Alan Baylis. They discussed the latest from Kinesis Motorsport a San Diego County company with offices newly relocated to Vista.

Kinesis Motorsport specializes in three piece wheels for high performance vehicles. Their mission is to build the strongest and lightest wheel possible, while still remaining affordable. Their wheels are made to order, and designed with variable back pad thickness and rim widths, hence spacers are not required.

Kinesis Motorsport wheels can be ordered through Discount Tire, with your specifications relayed directly to Kinesis for the build. They want to know about such key things as your car model and year, off set, type of brake

caliper, and how you will be using your car, be it Racing, Time Trials, Autocross, or Street.

The wheels are designed using CAD and are tested utilizing finite element analysis (FEA). With this data, prototypes can be built and sent out for extensive testing. Testing is generally 2X more extreme than the Industry standards.

At the heart of the Kinesis Motorsport 3 piece wheel is the forged wheel center. Kinesis centers are forged from 6061-T6 aircraft quality aluminum. This process is very similar to that used to make the classic Porsche Fuchs wheels

Essentially, a dowel of heated aluminum is placed between two dies forming the front and back half of the wheel center. Once in place the dies are compressed together at extremely high pressure creating the center. As a result of this forging process, a radial grain structure develops adding strength to the wheel, and porosity is eliminated. Upon completion of the process, the centers are then machined to their final configuration.

The rim cross section is also made of aluminum. They are spun by a computer operated machine, over tooling mandrels specifically designed for each rim size. The rim cross sections are cold forged and imparted with an aligned grain structure for added strength, with any porosity eliminated in this process as well.

Once the three individual pieces making up the wheel are complete, the outer rims are polished, the center is anodized and the wheel bolted together with forty aircraft quality bolts.

Other than the esthetics, additional advantages of the Kinesis three piece wheel are flexibility of design, replaceable sub-components (Should you bend a rim), a lighter cross section resulting in reduced un-sprung weight and a shot peened and anodized finish for strength and durability.

Note that three piece wheels offer a safety advantage as well. In the event a wheel encounters a solid object at speed, the rim section(s) will absorb a portion of the impact energy, reducing energy transfer to the vehicle. Cast one piece wheels are brittle by comparison. Unfortunately, in an impact as

described above, cast wheels will most likely demonstrate reduced energy absorbing qualities, and may fracture as well.

In addition to enhanced safety, custom anodized finishes for that personal touch, are available on Kinesis wheels. Bottom line, Kinesis Motorsport builds custom wheels to your order, wheels designed and manufactured with quality focused processes. Their products provide distinct advantages to the high performance orientated consumer.

To conclude the evening, a drawing was held. Discount Tire, Kumho Tire and Kinesis Motorsport provided ample door prizes, from ball caps, to wind breaker jackets and golf shirts, to the grand prize, a set of Kumho Tires. Everybody went home a winner, with greater knowledge of products and services from Discount Tire, Kumho Tires, Kinesis Motorsport Wheels. Thanks again to Gerry and his crew for hosting the evening, and to the speakers Eric Richards, Rick Brennan, Peter Stacy and Alan Baylis.

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