



A set of Chicken Hawk Racing tire warmers was placed on the Burnham Boilers NASCAR Busch North car driven in competition by multiple series champion Mike Stefanik at the Lime Rock Park event in October 2003. Stefanik said it takes four to six laps to get the tires up to proper pressure.

The Heat Is On

TOM GALLO

Tire warmers provide better grip potential *By David Podolsky*

The smart racer looks for the competitive advantage. He keeps his eye on the trends in the sport and strives to be the leader. When the heat is on, the real winner will head for the front.

The idea behind using a tire warmer is a little more complex than meets the eye. The warmer itself is not a confusing piece of equipment, but the tires it heats can be. The benefits of a tire warmer are obvious: It keeps the surface rubber of the tire hot (170-210 degrees F, depending on tire brand and compound). Having the surface rubber hot increases the coefficient of friction of the rubber, increasing its ability to grip the track surface.

More subtle issues become apparent with time and usage of the tire warmers. The benefits include:

- Heat-soaking the carcass
- Eliminating the chance of cold tire incidents
- Saving heat cycles



A crewmember cleans the tires already in the warmers. While the surface rubber heating is obvious, the carcass of the tire is picking up needed temperature as well.

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- Tuning your tires—brand and compound.
- Setting hot pressures and sizing your tires.

The practice of heat-soaking the carcass is almost as important as getting heat into the surface rubber. This means the tire is hot and stable throughout the carcass and inside the tire. Through the use of data acquisition equipment, we have found that a tire with a surface temperature of 200 degrees has about 175-degree heat inside the tire's air-space. This is found by a thermocouple passed through the rim, measuring the inside surface of the tire, actually touching the tire.

A tire's carcass is more flexible when heated to race temperature. It is also more consistent. During actual use, a tire is deformed under braking, cornering, and accelerating due to the forces being applied. Of course, the tire is also part of the suspension, and suspension

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The tire warmers can be used without having an effect on other necessary maintenance.

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frequencies will change as the tire is warmed on the track. By warming the tire before the race, the tire will perform much the same at the beginning of the race as it will during the middle. This enables better choice of proper compounds, not to mention the elimination of cold tire incidents. The issue of heat-soaking is why the quality of insulation that a warmer uses is important; you want

to drive the heat into the tire, not heat up your garage.

COLD TIRE TROUBLES The cold tire accident is certainly more common on sub-50 degree days, but overzealous throttle application can get the same result on a 90 degree day. The tire still starts out cold, especially when selecting harder compounds for higher track

temperatures or abrasive surfaces. The cost of an off-track incident can more than pay for a set of warmers, even if you're not destined to be the class champion. Having a consistent tire on all days, in all conditions, takes one more variable out of the equation.

In the words of Michelin Race Tire Director Ron Wood on the use of tire warmers during the summer, "Hey, 90 isn't 190." Have you ever seen the sweltering hot races in Sugo, Japan? The crews apply dry ice to the gas tanks to keep fuel cool, blowers cool off sweaty drivers, and the warmers are always on the tires. In other words, just because you're sweating doesn't mean your tires are hot.

SAVING HEAT CYCLES Each time your tire is heated and then cooled, it hardens up. A NASCAR Busch North driver once stated, "Tires harden up when they cool off, just like cookies that come out of the oven and get placed on the counter." A warmer can help avoid this by keeping the tires warm between sessions on the track. A temperature adjustable warmer works better in this case because you can turn the heat down to about 130 degrees F and keep the tires warm enough to prevent them from going through a heat cycle without overheating them.

For example, a team turns the Friday practice days into one heat cycle. The tires go from the warmer to the track and right back to the warmer on a low setting. In this way, six track sessions put the tires through only one heat cycle. We also keep the tires warm between the two races on Sunday, which are normally separated by about 2 hours. This helps get the most life out of tires.

To truly understand tires, you must remember that rubber has moisture. Every time rubber is heated or "worked," the chemical composition changes. When a tire is heated on the racetrack by weaving or "working" the tire, it warms very quickly, usually less than a few

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This graph shows the carcass temperature as well as the surface temperature. A thermocouple-equipped data logging system provided the inside information through the rim to the computer.

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minutes. This causes a chemical reaction and the moisture moves toward the surface quickly. If it happens too rapidly, drivers may experience this as the tire going off or "greasy." The moisture of the tire is migrating to the surface and causing a lack of grip. When it cools, that moisture evaporates and the tire dries, hardens, and loses grip. When tire warmers are applied and the warming process is much longer, the polymers that bind the rubber are retained in the compound of the rubber. When the preheated tire is raced, it provides much more consistent grip.

TUNING THE TIRES Different tire brands and different compounds work best at different temperature settings. For example, Goodyear and Hoosier work better in different temperature ranges. These are good brands, each with their own

personalities, so to speak, and strong points, but they do work better in a specific range of temperature. Some tires won't put you off track when they're cold, but the trade-off for cold tire traction is usually limited hot temperature grip.

SETTING HOT PRESSURES Many teams have found benefit in setting their hot pressures in the pits. You must realize that your tire pressure will rise when the tire gets hot from use on the track or in the pits from the use of a warmer. By getting the tire to operating temperature in the pits, you can ensure that your hot pressure will be on target on the race-track. This also gets the tire in mid-race condition before the green flag.

SIZING OF TIRES This is more important for some race classes than others, but getting the hot pressure set and being able to check how much

growth occurs is another way we see teams tune the tires with a warmer. When performing a tire change, it is nice to use a

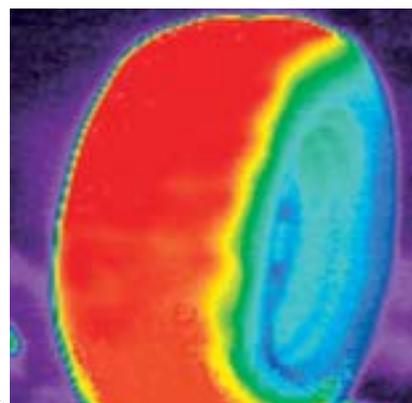
preheated tire from the warmers because the hot pressure is already set and the tire is already at its hot size. This keeps the stagger set where it should be.

We realize this may seem like a lot to think about. If you're a new racer, it's better to pay attention to your suspension setup, tires, and your ability to drive, rather than extracting extra horsepower from the motor. If you're a seasoned racer, it is most important to get the last bit of performance from your tires. **CT**

David Podolsky is a motorcycle roadracer who has won 6 national championships in the AHRMA Progressive Suspension National Roadrace series aboard an Aprilia RSV-1000 R. He is also founder of Chicken Hawk Racing tire warmers.



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A thermal image of the tire warmer in operation.

GREG EMMOLO

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The Chicken Hawk Racing tire warmer is an easy installation. The standard model comes with a two-year warranty.