

Tire Ball® Limitation of Use - Effects of High Temperature

The Tire Ball® multi-cell inflation system was originally designed for use in off-road motorcycles and ATV - UTV vehicles. Tire Ball® cells are not authorized for highway use; **do not use on paved roads**. If you use Tire Balls for Enduro racing and have a transfer section that is on a paved road, stay within the legal speed limit! Additional silicone lubricant should be used in the tire carcass and on the Tire Ball® cells when high-speed desert types of events are the intended use.

- Tires inflated with Tire Ball® cells are designed for off-highway (non-paved) environments; like tires, Tire Ball® air cells can fail due to high temperature-related circumstances. Simply stated any sustained speeds in excess of 80 MPH are not recommended.
- Intermittent, short duration paved road use can be tolerated (i.e., like Enduro), but high speed must be limited
- Consumers must understand that excessive high temperature limitations exist when using the Tire Ball® inflation system. If "tire surface temperatures" approach 200°F (93° C) the potential for Tire Ball® heat-related failure exists. Heat failure is not covered by our warranty.

Heat Experience with Tire Ball® Air Cells

Driven (Front) Wheel(s) - there have been no known heat related failures on a driven (front) wheel, whether it be motorcycle or ATV/UTV. The Tire Ball® system can be used in all **off-road** applications on the front wheel, including Baja 1000 and Vegas to Reno high-speed events. These two events are the two highest sustained high speed off road events in North America. Tire Ball® inflation cells have been successfully used by top level riders in both of these events with certain preparations.

Drive (Rear) Wheel(s) - heat related failures using the Tire Ball® inflation system have occurred in heavier vehicles (650cc and up) traveling at sustained speeds (10-20 minutes at a time) in excess of 80 MPH. Any paved highway use at these high speeds will quicken heat rise in a tire and shorten the time to possible Tire Ball® heat failure.

Sources of Heat within a Rotating Tire

- when the tire is forced onto a surface under load (deformation) as it is rotated, temperature of the tire will increase; lower inflation pressure will exacerbate the temperature rise as will the speed (frequency) of rotation.
- when rubber is deformed continuously, heat is generated; the inflation pressure of a tire determines the amount of tire deformation and how big the contact patch is. Lower pressure means more deformation, bigger contact patch and more heat generation in the tire.
- rubber hardness can also be directly related to heat generated.; softer compounds will deform more than hard compounds will and thus generate more heat (all other conditions being equal). If you are going to race in the desert at high-speed events, you need to use hard rubber compound tires or risk destructive high tire temperatures.
- foam inserts (mousse tubes) and Tire Ball® cells have a potential source of frictional heat generation within the tire and for this reason both inflation systems are supplied with lubricants to reduce friction and lower/eliminate heat generation from this source. Improper lubricants, too little lubricant or allowing dirt into the tire can cause friction heat

to occur

- dirt inside a tire and abrasion of the inside of the tire can absorb lubricant and reduce the remaining lubricant's ability to reduce frictional heating. Sufficient lubricant in tires used at high speed events will help reduce the chance that dirt and dust do not soak up all of the lubricant and reduce its functionality.
- use of Tire Ball® cells that are too small for the tire carcass will cause abnormally high deformations and frictionally generated heat.