This brochure has been developed to assist you in getting the most out of your tires during a given race or track session. This information is general in nature, and numerous variables such as track conditions, car setup and driver preference will play an important role in determining the optimum race configuration for your car.

BFGoodrich Tires
TAKE CONTROL®

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The g-Force™ Family Control Manual

BFG g-Force™ R1™ BFG g-Force™ R1™ S BFG g-Force™ Rival™

BFGoodrich Tires
TAKE CONTROL®

Congratulations on taking control.

The technology behind your new BFGoodrich® g-Force™ tires is the result of decades of motorsports domination and we are confident that these tires will provide the exceptional dry cornering and track performance you have come to expect from our brand.

This guide offers a solid foundation for tuning your suspension and tires so they work together at the highest level. However, this general information doesn't address every possible track condition, car setup, or unique driver preference. As always, first-hand experience and data acquisition are invaluable to tuning your setup for optimum performance.

A bit of information about the family:

- BFG g-Force™ R1™ (DOT-legal competition)
  Designed to simply be the best competition tire in its class. They are non-directional, symmetric tires intended for track use. They can be rotated clockwise or counter clockwise and can be mounted with the dated DOT marking side in or out. They are not suitable for use when standing water is present, but offer unsurpassed dry grip and, in fact, maintain outstanding performance in damp track conditions.

- BFG g-Force™ R1™S (DOT-legal competition)
  Very similar to the R1, but designed to "come in" faster specifically for qualifying, sprint races, and autocross applications – comes in quicker to provide fast and consistent performance lap after lap.

- BFG g-Force™ Rival™ (DOT)
  Designed to be a leader in the extreme performance category targeting enthusiasts who participate in competitive events requiring a minimum UTQG of 140. The tires have an asymmetric tread pattern and can be mounted in any wheel postition. Turn heads on the street and post fast, consistent times at the track.

A word about DOT-legal competition tires

- Competition tires ("slicks"):
  These tires are not street-legal and are designed for track use only. They will not be addressed in this document.

- DOT-legal competition tires:
  g-Force R1/R1S: meet the minimum requirements established by the Department of Transportation for tires used on public roads. However, DOT approval doesn't necessarily mean that a tire is well suited for use on public roads. This is especially applicable for tires like the g-Force R1 and R1S. We recommend that they not be used on public roads.

- DOT ("street") tires:
  g-Force Rival: exceeds the minimum requirements required by the DOT for public roads but was designed to be competitive at the track. Its fast lap times, consistent performance, and almost-new look after hard use will bring you back to the track time after time. And you'll still be confident driving home.

- Please see the **warranty for complete details**. To achieve maximum performance, start with the pressure recommendations in this guide.

Innovative design means the BFGoodrich® g-Force™ R1™ responds to pressure changes differently than your old tires. To achieve maximum performance, start with the pressure recommendations in this guide.

Tire Pressures

Determining the ideal tire pressure involves finding the optimum balance between grip, vertical stiffness and lateral stiffness from the tire as it relates to your vehicle setup.

General performance impact of tire pressure:		
Performance	Pressure Increase	Pressure Decrease
Initial Response	Faster	Slower
Firmness	Increased	Decreased
Spring Rate	Increased	Decreased
Contact Patch	Slightly smaller	Slightly larger
Tire "roll over"	Less	More
Time to "come in"	Faster	Slower

In general, based on internal testing, hot pressure changes tend to affect vehicle handling as follows:

- Increasing front tire pressure increases lateral stiffness, reduces turn-in understeer and improves initial response.
- Reducing front tire pressure decreases lateral stiffness, increases turn-in understeer and reduces initial response.
- Increasing rear tire pressure can add rear lateral stiffness which can increase understeer on some RWD vehicles.
- Decreasing rear tire pressure can allow the car to rotate more on corner entry for some RWD vehicles. Be sure to stay within the recommended pressure range.

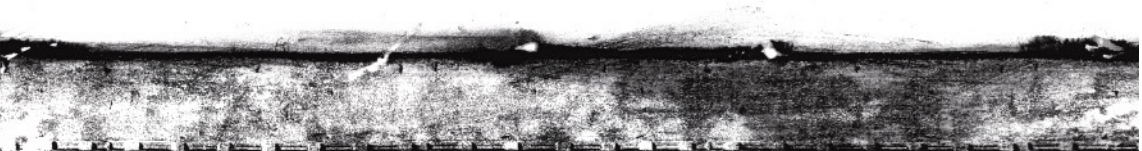
A logical tuning approach would be to target pressures toward the middle of the recommended range and adjust target hot pressures based on vehicle, track conditions and your driving style. Vehicle balance can be somewhat adjusted by varying hot tire pressures.

The cold pressure required to get the desired hot pressure is dependent on variables such as humidity level inside the tire (ex: compressed air versus nitrogen), vehicle setup, track layout, ambient and track temperatures, and your driving style. If you have track experience with your vehicle and a reliable air source, you probably have a good idea how much pressure increase you'll see.

In general, set cold pressures 5-7 psi below target hot pressures. When in doubt, err on the high side of target hot pressures since lowering pressure is quicker and easier than raising it. Plus, overestimating pressure increase can lead to running on underinflated tires which could be a safety concern. Keep in mind that vehicle balance can be impacted by varying hot pressures.

g-Force™ R1/R1™S: optimum hot pressures should be in the 36-48 psi range.
g-Force™ Rival™: optimum hot pressures should be in the 35-45 psi range.

Example pressure setups for R1/R1-S			
Track Use	Vehicle Rec.	Rec. Hot Pressure (F)	Rec. Hot Pressure (R)
	FWD	38-45	38-48
	RWD/AWD	36-42	36-42
Autocross	FWD	34-44	38-48
	RWD/AWD	32-42	32-42
Notes:	Camber challenged cars may require higher pressures on the front positions		
	RWD/AWD should target the upper pressure end for heavier vehicles		
	Higher pressures should be used on "rovals" (road courses inside banked ovals that use the banking)		



Camber Recommendations

Track layout, suspension geometry, aerodynamic down-force, maximum on-track speed – the list goes on. There are so many variables surrounding high performance tuning, it makes it impossible to know in advance what the ideal static camber should be for any given competition. The only way to get it right is to run the car, then "read" the tires:

- First make sure the hot pressure is in the recommended operating range.
- Next, using a probe (contact) type pyrometer, look at the temperature spread across the surface of the tire. Is either the inside or the outside of the tire significantly hotter than the rest of the tire? The temperature distribution across the tire should be fairly even (or at least within about 20°F-25°F).
- Finally, check the worn appearance of the tire to help ensure that you are wearing the entire surface of the tire evenly, making good use of both the inside and outside shoulders. If you are using one shoulder significantly more than the rest of the tire, this will compromise both performance and wear life of the tire.

Beyond Tire Pressures

Your new BFGoodrich® g-Force™ tires offer a level of control that can mask certain suspension shortcomings. Be careful not to use tire pressure adjustments as a quick fix for more involved setup issues — particularly if your vehicle and/or its suspension has been heavily modified. To get the most out of your tires, you'll want to make vehicle adjustments first, then use tire pressures only to fine-tune for optimum overall balance.

In general, we recommend that front camber be in the -2° to -4° range, and that rear camber be in the -1° to -2.5° range. If a track has significantly more turns in one direction than the other, it might be necessary to have different camber settings on the left and right sides of the vehicle to optimize performance. For "rovals" (road courses inside banked ovals where the road course also uses the banking) the front camber should be in the -1° to -2.5° range with rear camber in the -0.5° to -1.25° range. Keep in mind that higher hot pressures should be used when running on high banked tracks.

Heat Cycling

Heat cycling is the process by which the tire is heated up to typical operating temperatures (160°F-220°F) and pressures and then allowed to cure off of the car for 24-48 hours.

g-Force™ R1™/R1™S: heat cycling can benefit these tires by helping them perform more consistently over periods of constant extended use, especially on vehicles or tracks that tend to be hard on tires. In addition, on-track heat cycling adds texture to the smooth surface of your new R-compound tires.

g-Force™ Rival™: heat cycling will not damage or cause degradation in the performance of these tires. However, it's not necessary for consistent performance, nor will it cause a noticeable improvement.

Note: An initial break-in, or 'scuff', is important in order to ensure that the industrial mold release agent is completely removed prior to competition.

Collecting Data

On most road courses, a minimum of six hot laps should be run before considering any changes based on temperature and pressure readings. This is because it takes a certain amount of "energy input" for tire pressures and tread temperatures to stabilize. Taking readings before the tires have reached stable operating conditions is not recommended and may lead you to miss the proper setup.

After a hot lap session, temperatures should be taken at three points across the tire with a contact probe pyrometer; start at the inside shoulder of the tire, move to the center, then finish at the outer shoulder. Readings on the outboard sections of the tire should be taken about 1.5" from the shoulder. Taking temperatures too close to the "corner" of the shoulder will give an inaccurate reading.

Due to heat dissipation, time plays a critical role in collecting the most accurate data. It is recommended that you begin with the outside tires and be sure to focus on the tread temperatures first. Below is an example of the minimum data you should collect from each run — with some sample comments added.

We've also provided a typical data acquisition sheet for your convenience. A blank form is included in this guide. Please feel free to make copies and use as needed.

Data Acquisition Example

Track	Date	Time	Temperature	Weather
Rolling Hills Raceway Session#: 2	Jan 1.	1:15 PM	81°	Sunny, intermittent clouds, low humidity

Left Front

Tire Pressure (PSI)		Tread Temperatures		
Cold Pressure	Hot Pressure	Outside	Center	Inside
30	41	210°	190°	180°
		Avg. Temp.	193°	

Right Front

Tread Temperatures			Tire Pressure (PSI)	
Inside	Center	Outside	Hot Pressure	Cold Pressure
173°	182°	185°	38	30
Avg. Temp.	180°			

Left Rear

Tire Pressure (PSI)		Tread Temperatures		
Cold Pressure	Hot Pressure	Outside	Center	Inside
31	38	186°	180°	195°
		Avg. Temp.	187°	

Right Rear

Tread Temperatures			Tire Pressure (PSI)	
Inside	Center	Outside	Hot Pressure	Cold Pressure
180°	189°	189°	38	31
Avg. Temp.	186°			

Data Acquisition Form

Track	Date	Time	Temperature	Weather
			°	

Left Front

Tire Pressure (PSI)		Tread Temperatures		
Cold Pressure	Hot Pressure	Outside	Center	Inside
		°	°	°
		Avg. Temp.	°	

Right Front

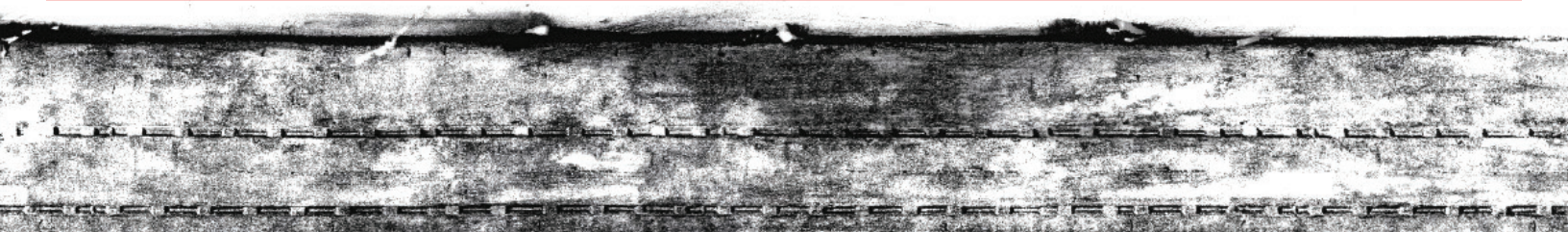
Tread Temperatures			Tire Pressure (PSI)	
Inside	Center	Outside	Hot Pressure	Cold Pressure
°	°	°		
Avg. Temp.	°			

Left Rear

Tire Pressure (PSI)		Tread Temperatures		
Cold Pressure	Hot Pressure	Outside	Center	Inside
		°	°	°
		Avg. Temp.	°	

Right Rear

Tread Temperatures			Tire Pressure (PSI)	
Inside	Center	Outside	Hot Pressure	Cold Pressure
°	°	°		
Avg. Temp.	°			



Data Acquisition Example

Diagnosing the Problem

The chart on the previous page shows example readings of a set of tires that completed a hot lap session before being measured. Let's assume the driver was complaining about understeer. Looking at the left rear temperatures and pressures of the set of tires, you might be tempted to add 1.5 psi or 2.0 psi to the left rear tire — after all, the tire pressure is on the low side of recommended hot pressures, and the tire temperature is lowest in the center, indicating the pressure is too low. Furthermore, it should help the understeer in right-hand corners. However, a little additional analysis shows that there is another problem with the car. By looking carefully at the left front temperatures, we see that there is not enough negative camber in that position because the outside temperature is warmer than the rest of the surface of the tire.

The Solution

The most logical solution for this situation is to slightly increase the negative camber of the left front wheel and rerun the car without changing the tire pressures. This should increase the grip at the left front tire, reducing the understeer. This in turn will reduce the work going into the left front tire, lowering its temperatures and pressures. Increasing the grip on the left front tire will put more stress on the left rear tire, increasing its temperatures and pressures, thus bringing the entire car into a better balance. This example demonstrates that incorrect tire pressures can be the result of vehicle setup, as well as a cause of handling problems. Careful analysis is required to determine whether the pressures are the cause of, or result of, a classic setup problem Again, tire pressures should be one of the final adjustments made to a car's setup, used for very fine tuning. Remember, any adjustments that affect handling are interrelated, and tire data should be collected after each change is made to the car. Never skip this step.

When it comes to making handling adjustments, there's nothing like a good cheat sheet. Cut out the card below for quick setup tips at a glance.

Guide to High Performance Handling

Adjustments	Decrease Understeer	Decrease Oversteer
Front Tire Pressure	Higher	Lower
Rear Tire Pressure	Lower	Higher
Front Tire Section	Larger	Smaller
Rear Tire Section	Smaller	Larger
Front Wheel Camber	More Negative	More Positive
Rear Wheel Camber	More Positive	More Negative
Front Wheel Toe	Toward Toe-out	Toward Toe-in
Rear Wheel Toe	Toward Toe-in	Toward Toe-out
Front Wheel Caster	More Positive	More Negative
Front Springs	Soften	Stiffen
Rear Springs	Stiffen	Soften
Front Anti-sway Bar	Soften (Thinner)	Stiffen (Thicker)
Rear Anti-sway Bar	Stiffen (Thicker)	Soften (Thinner)
Weight Distribution	More Rearward	More Forward

Safety Considerations

Purchasing one of the BFGoodrich® g-Force™ family of tires proves that you're not inclined to make bad decisions. Hopefully, this manual will provide ample information for making smart choices at the track. That being said, the quest for speed has been known to cloud even the best judgment. Please observe these important safety warnings:

- Never race on an underinflated tire.
- We strongly discourage "soaking" of tires. It can be hazardous to the person soaking the tires, the environment, and the tire itself. The additional complexity and components in radial tires put the product at risk when solvents are used in an attempt to "soften" the tread area of the tire.
- We strongly discourage pressure bleeders. A bleeder is another item that can fail. With a proper pressure management program, you can obtain repeatable and correct hot pressures without the risk of additional components.
- Always inspect each tire thoroughly prior to and immediately following each use.