The g-Force™ R1™ Control Manual

BFGoodrich Tires
TAKE CONTROL®

Congratulations on taking control.

Your new BFGoodrich® g-Force™ R1™ tires are the result of decades of motorsports domination, and represent exceptional no-compromise dry cornering and track performance. As the newest member of the g-Force™ family, the BFGoodrich g-Force R1 was designed simply to be the best tire in its class. If you're okay with that, let's get started.

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

The BFGoodrich g-Force R1

Your BFGoodrich g-Force R1 tires 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.

A word about DOT-legal competition tires

DOT-legal tires 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 frequent use on public roads, particularly in the case of competition tires. The BFGoodrich g-Force R1 is such a tire, and we recommend that it not be used on public roads.

See warranty for complete details.

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 ideal tire pressures means finding the optimum balance between grip, vertical stiffness and lateral stiffness from the tire. Let's talk about hot pressures first.

In developing the BFGoodrich g-Force R1, we have seen that optimum hot pressures should be in the 34-48 psi range. Vehicle balance can be adjusted somewhat by varying hot pressures. Based on our testing, hot pressure changes tend to affect handling as follows:

- Increasing front tire pressure reduces turn-in understeer.
- Reducing front tire pressure increases turn-in understeer.
- Increasing rear tire pressure adds rear cornering grip, increasing understeer.
- Decreasing rear tire pressure allows car to rotate more on corner entry.

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.

The cold pressure required to get the desired hot pressure is dependent on variables such as humidity level inside the tire (especially when inflated with compressed air rather than nitrogen), vehicle setup, track layout, ambient and track temperatures, and your driving style.

If you have track experience with your vehicle, 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 since lowering pressure is quicker and easier than raising it. Plus, overestimating pressure increase can lead to running on underinflated tires — a safety concern.

Road Racing & Track Event Inflation Pressure Recommendations

Vehicle Weight *(with driver)*	Recommended Hot Pressure	Probable Cold Pressure
1800-2200 lbs	34-36 +	27-32
2300-2600 lbs	35-37 +	28-33
2700-3000 lbs	36-42 +	28-33
over 3100 lbs	37-43 +	29-34

FOR AUTOCROSS APPLICATIONS, you'll need to run significantly higher cold pressures than you would on the track. The short autocross format means tires see less heat and less time for pressure increase. Therefore, cold pressures must be set much closer to target hot pressures.

Beyond Tire Pressures

Your new BFGoodrich® g-Force™ R1™ 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.

Camber Recommendations

Track layout, suspension geometry, aerodynamic downforce, maximum on-track speed — with so many variables coming into play, you can't know in advance what your ideal static camber should be. 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 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.

In general, we recommend that front camber be in the -1.5° to -3.5° 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.

Heat Cycling

Heat cycling can benefit the BFGoodrich g-Force R1 by helping it perform more consistently over periods of constant extended use. In addition, on-track heat cycling adds texture to the smooth surface of your new R compound tires. The process is painless. Simply run a few laps to get the tire up to operating temperature (160°F-220°F) and pressure, then allow the tires to sit off the car for 24 hours. That's it.

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 rear tire 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. You'll want to make plenty of photocopies, as you'll use one sheet per run or session.

Data Acquisition Example			LEFT FRONT		RIGHT FRONT				
Cold Pressure	**Hot Pressure**	**Outside**	**Center**	**Inside**	**Inside**	**Center**	**Outside**	**Hot Pressure**	**Cold Pressure**
29	**36**	195°	201°	195°	185°	182°	173°	**35**	**29**
			Average = 197°		Average = 180°				
			LEFT REAR		RIGHT REAR				
Cold Pressure	**Hot Pressure**	**Outside**	**Center**	**Inside**	**Inside**	**Center**	**Outside**	**Hot Pressure**	**Cold Pressure**
32	**37.5**	186°	183°	195°	189°	189°	180°	**39.5**	**32**
			Average = 187°		Average = 180°				

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 may not be enough negative camber in that position because the outside temperature is equal to the inside temperature.

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

NOTE: Information on this card applies to the BFGoodrich® g-Force™ R1™, but is relatively general in nature. It may not apply directly to your application, and is not intended to take the place of a good data acquisition program.

Safety Considerations

Your purchase of BFGoodrich® g-Force™ R1™ tires proves you're not inclined to make bad decisions. And hopefully, this manual will provide ample information for making smart choices at the track.

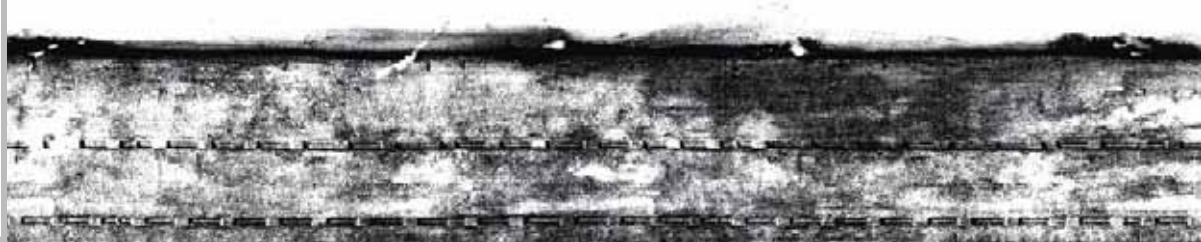
Having said that, the quest for speed has been known to cloud even the best judgment. Please observe these important safety warnings.

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.



Run Data Acquisition Sheet

Car Number	Session	Ambient Temp.	Day/Time

LEFT FRONT

Temperature

Outside	Middle	Inside

COLD P.S.I.	HOT P.S.I.

RIGHT FRONT

Temperature

Outside	Middle	Inside

COLD P.S.I.	HOT P.S.I.

LEFT REAR

Temperature

Outside	Middle	Inside

COLD P.S.I.	HOT P.S.I.

RIGHT REAR

Temperature

Outside	Middle	Inside

COLD P.S.I.	HOT P.S.I.

Change/Alignment _____

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.

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