

# Quarter Scale Beginners Guide to Tires



*Let us first establish that this guide is for the beginner racer and as such will be limited in scope. Tire selection and usage is a complex subject and experience tends to be the best educator. The information within this article is the opinion of the author and/or that of several sources from the internet that have been paraphrased. There is no stated assurance that this information is accurate and is simply a reference for you the read to use at your discretion.*

Quarter Scale Race Cars have a myriad of tuning adjustments. Tires are by far the most critical of those tuning aids. Tire options are the following:

Brand

Width

Compounds

Host

Circumference

Stagger



Brand : QSAC ( sanctioning body) rules set a homologation process, as of this writing the two approved tire brands are BRP tires and RC4less tires.

Bishop Racing Products have been the standard in QSR for decades. This article will refer to tires as that from BRP unless otherwise noted.

RC4less is a newer player in the tire game. They have been around for a couple of years and have had some success. These tires have proven to be competitive, please check with racers that have used them for more detailed info.

***Design:*** BRP tires are designed with multi section construction. The rim is of a durable polymer material. They have an industry standard four bolt pattern. This is true across all wheels fronts, backs, lefts, and rights, they all have the industry standard bolt pattern.

Next the foam Host is glued onto the rim, once set the host is trued down to the desired circumference.

The last step in the design is to glue onto the wheel assembly the rubber tire band.

***Identifying Marks:*** There are some identifying marks on tires . Left side tires have one dimple (wear dots) in the center of the tire and at the 180degree side have two dimples.



Right front tires have a hexagonal shaped dimple in the center, except Dual Band compound tires they can be identified by the characteristic seam that runs the circumference of the tire.



Flat Band cap are used for the Left side tires i.e. L10,L20,L30 compounds and used in the RF Dual Band compound. This design is identified by the seam that runs perpendicular to circumference of the tires contact patch, also the cap stops just short of the edge of the foam host.



Wrap around band cap is used on all Right Rear tire compounds as well as the Right front 96 and 96Z compounds. This is identified by a continuous seamless band that on the outside edge of the tire "wraps

over the edge of the host. This is done to provide a bit of protection on that outside edge, cars that drift up into the boards would surly cause more damage to the right tires if not for the added rubber along that edge.



**Tire Size limits:** Please be aware that QSAC rules do limit the size of tires to certain widths and circumferences. Refer to current QSAC tire rules to see which apply to the type of class you will be racing.

**Traction Promoters:** Any type of traction promoter is **PROHIBITED**

No cleaning tires with any liquid or foam. No treating of any kind per QSAC rules .

**Compounds** : Left side tire compounds are as follow:

**L10** (softest) **L20** (medium) **L30** (firmest)

Right Rear compounds as follow ;

**C4** (softest) **405 , C5 , 407 , 410** (firmest), listed softest to firmest

Right Front compounds as follows

**96** (less bite) **96Z** (more bite) **Dual Band** ( the inside 2/3rds more bite and the outside 1/3rd is less bite)

The tire's "band" or surface layer is made of rubber this rubber is made in different hardnesses or Compounds. The softer the compound is the "stickier" the tires are. The question is often raised; why not just use the stickiest tire compound? Although stickier tires grip better they also wear faster. Keep in mind we might have 100-500 lap mains your tire might wear down, blister, grain up, or completely peel away from the host/rim. An other important reason to chose less than the softest tire is that too much grip in a certain corner might actually be slowing you down.,Remember the old saying " loose is fast" Grip creates friction, and friction creates drag. Drag kills speed. Suppose that your car is pushing exiting a turn that is that it is not turning as close to the inside line of the track . This tends to be because the rear of the car has more grip than the front does, several attributes can be involved, but if one or both of the tires were to have a tad less grip that can help in getting rid of some of the push.

**Host**: are offered in the following

Left side tires , Soft (**S**) Medium (**M**) Firm (**F**)

Right side , Soft (**S**) Medium (**M**) Firm (**F**) ExtraFirm (**XF**) and (**XXF**)

Host firmness is akin to a tires air pressure. The softer the host the more traction you will get. However too soft a host and the sidewall might deform severely under heavy cornering enough to cause loss of traction.

A firmer host will cause the same compound tire to have some degree of less traction.

**Circumference:** Qsac rules have limitations on tire circumference.

Minimum circumference is 17" on all corners except the Left Rear. LR corners minimum is 16-3/4"

Circumferences are offered in 1/8th in increments ranging from 16-3/4" up to 18-3/4" from BRP.

Circumferences are measured using a soft "tailors tape" and wrapping it around the center of the tire. The ride height will change



along with circumference but not to a proportional size. That is to say that if you had a RR at 18-1/2" and swapped out to and 18-1/4" RR you

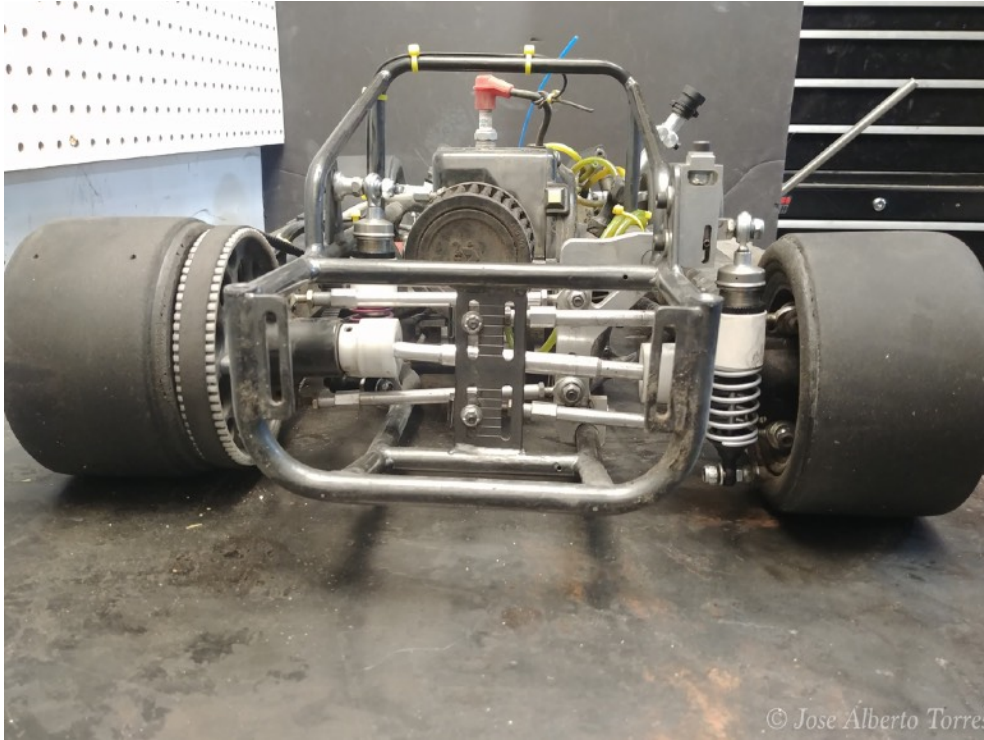
changed 1/4" in circumference , however your ride height didn't not change by a 1/4", no as a matter of fact if you run the numbers the radius of a 18-1/2" tire is 2.94436" and that of a 18-1/4" is 2.90457" , the difference is .03979" or a tad over 1/32" . This is the change in ride height , some racers believes this ride height difference to be nominal and not readjust ride height while others will, this is one of those things that you the racer will have to decide, as a new racer, I suggest not to worry to much about it.

Use a silver sharpie to mark the circumference on the tire band rather than the rim , as tires wear their circumference changes.

Circumferences are offered in so many sizes for the reason that they help you fine tune your stagger.

**Stagger**: The difference in size of left side tire vs right side tire. Ever notice on a full size sprint car that the left tire is considerably smaller than the right side tire. This is done because these types of race cars do not have differentials, but rather have both wheels attached to one shared axle, so both wheels turn at the same rate . When turning left (oval track cars) the inside tire (left) has to travel a shorter distance than the right side tire , so by sizing the left smaller i.e. less circumference than the right , the left will travel less distance than its right side counterpart making it easier for the live axle race car to turn. Imagine if you will a tall tapered drinking glass on its side , if you push it will it roll straight ? no it will roll in an arch into the direction of the smaller of the two ends, this is how Stagger works in our Quarter Scale race cars. This of course applies





to the rear drive wheels. How much stagger is a race craft skill set that will take trial and error. The theory is to find the right balance of stagger for



your track, short banked tracks , long flat tracks . Not enough stagger and your car might not turn well , it might push high into the turn , too much stagger and you might be scrubbing to much speed on the straights. Typical rear stagger can be found from 3/8" to 1" or slightly more. Remember that left turn cars will always have a smaller left tire than a right tire.

Front stagger is a hotly debated topic. While the front tires are independent from each other, that is that each tire rolls on its own axle and can travel at different rates . Some believe that front stagger is a non-existent concern while others believe that by using front stagger it will aid in tuning in cross weight. This belief stems from the fact that if you put a taller right side tire than what was on previously without adjusting the ride height , you've essentially added weight to that corner because the tire is now an 1/8th" or more pushing into the ground . Typically you can find racers running from 0" to 3/4" of front stagger.

### **Tire strategies**

Keep in mind that the following ideas are just some of many ways to approach your tire game. It is always best to talk to your local racer to get more insight.

Keep your RR circumference size locked. There are scores of tire compound to host to size combinations , how do the manage to keep your tire arsenal to a minimum with maximum effect. One such strategy is to chose a RR circumference size that works for your car and keep it large enough that when you change the LR tire to size your stagger you don't run out of head room . Say you had a 17-1/2" RR and you want to try a 1" stagger , well the smallest LR per QSAC rules is 16-3/4". in this scenario you could not achieve the stagger you desired. If you had say a 18-1/4" RR you can achieve any stagger up to an 1-1/2" using the LR to size the stagger. Left side tires wear dramatically less than the right side tires, this will mean that your LR tires should last multiple seasons under normal racing conditions . Beginner racers should not be burning up more than one or possible two RR tires a season.

Keep your RR compound locked. Rather than trying multiple compound and host combinations on your RR tire as a beginner you might find it simpler to stick with the same compound and just use the host firmness to achieve more or less traction . This will help the beginning racer with consistency . A good majority of racers use the 405 compound rear tire . As a beginner you really cant go wrong with this tire. Be sure to check with your local Seasoned racer as to what they run.

Engrave the inside wheel with the type of tire When you buy new tires they may or may not have the compound engraved into the inside of the wheel . It is a good idea to engrave the compound and the host grading on the wheel . Do not engrave the circumference as it changes as the tire wears .

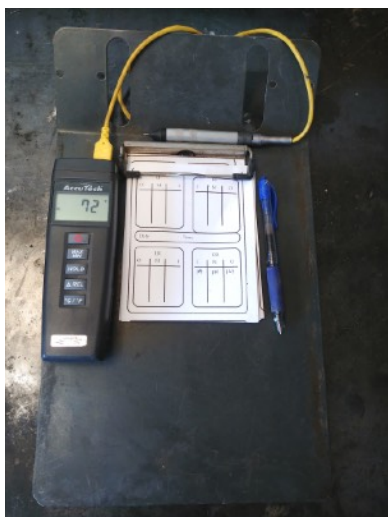


Check your tire temps Cold tires are looser tires. The hotter the tire gets the stickier it will be. Its not uncommon for a car to get tossed on the track first thing in the morning and the driver smashes the throttle only to have the car spin out . This is due to the tires being cold, the driver should ease onto the throttle and slowly work up the speed around the track in order to build up the heat in the tires, this usually takes a few laps. Keeping an eye on your tire temps will help dial in the race car. Tire temps can tell you what corner of the car is getting the most load , tire temps can tell you if you have too much or not enough camber. In fact Camber is usually adjusted using tire temps . If your tire temps are considerably higher on one edge over the over the tires camber needs adjusting. If the outside of the Right tire is hotter than the inside considerably then adjust the camber lean towards the colder edge , run



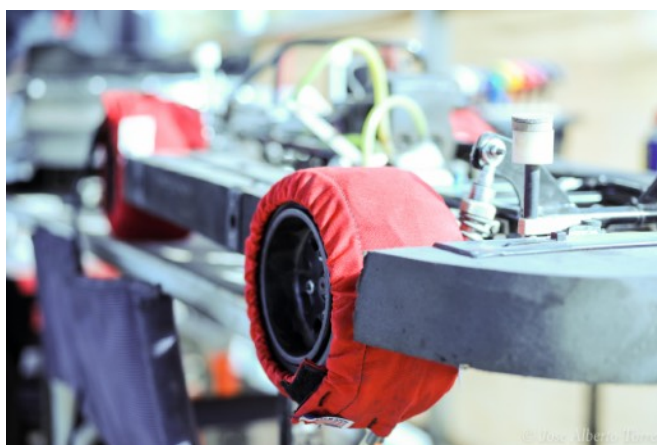
the car again and check temps. The closer you get with the temps say within 10 degrees the more tire contact you'll have, and edge tire wear will also decrease.

When taking tire temps i suggest that you have a quality pyrometer , However IR temp guns are plentiful and economical . Take



your car around the track for several laps 15-30 laps just be consistent , as soon as you pull it off the track be ready to record the tire temps, I start on the RR and move counter clockwise around the car . When taking your temps be consistent start on an , I always start on the outside edge (O) about 1/4" in and move to the center (C) and finally the inside edge (I) , develop a habit here .

What tire temps should you look for? The Right side tires will tend to run hotter than the left side tires with the Right Rear being the hottest . Over heating tires are their biggest enemy, tires are assembled with a quality adhesive but even the highest of grade adhesive have there limit.



Constant heat cycles will start to break down the tire bond. Getting the max performance out of your tires you will be running hotter temps. Longevity of the tire commands more moderate temps, this is the balance you as the racer must dictate. The adhesive will breakdown at

temps reaching 200 degrees. Racing conditions, driving style, chassis setups all play into how hot tires get. Keep a good habit of recording your tire temps and over a short time you'll be able to develop a knowledge of what temps perform best to your needs. The reality is it will take time, trial and error on your part, this is how the fast guys got fast, its hard to find a short cut here.

Tire balancing Checking the tire for balance should be done on all tires . The easiest way is to mount the tire on a free spinning front hub , give the the tire a soft spin and see how the tire settles . If the tires swings back and forth like a pendulum as it comes to a stop , that indicates that the tire is off balance and the heaviest point is at the bottom of the tire arch as it settled . add some lead tape at the opposite end of the inside rim and check again with a soft spin . This is a bit of a time consuming process . Not all tires will need added weight as most are relatively balanced from the factory.

Dual Band RF tires This tire is similar in bite to the 96Z but more forgiving. The idea behind the DB RF tire is that with proper camber in the tire the more bite inner compound will have more grip going into the turn , and as the chassis rolls over the camber will change , stand up putting a bit more weight on the outside of the tire which is a tad less bite compound , this should give the tire a little bit less bite allowing it to push a hair more so that the car wont get to loose coming out of the corner.

Tire storage Brush your tires clean and store them in a climate controlled area. Its advisable no to let your tires dip below the freezing

point. Some racers will use zipper style bags to store their tires, the thought being that it will help prevent the tires from drying out.

There is a lot of information that I wish I could give you a solid straight forward answer. When it comes to "what compound should I use at this temperature?" Or "I'm loose out of turn 4 what firmness should my host be?" These are the questions you the racer with your unique driving style and set up will have to learn the old fashioned way, by trying it out on your track.

I hope the new racer is able to get some helpful direction from this article. It is intended for us new racers and as such is limited in scope

See you all on the pavement

A special thanks to those seasoned racers that help with fact checking and answering technical questions on this article.

Tito





AS Per QSAC rules

### TIRES AND WHEELS (11.12.05)

1. Wheels and tires may be substituted and modified within the specific class requirements. 2. Maximum wheel width 3.00 inches, maximum diameter 4.00 inches (at the bead).
3. Wheels must be scale appearing with a maximum offset of 1.00 inch.
4. Wheel knockoffs are not allowed with the exception of the open wheel classes.
5. All wheels must have minimum 2 lugs.
6. All classes shall use tire configurations as follows: A molded foam host mounted on an approved wheel and shall have a rubber outer band or cap. Spikes are allowed for dirt tracks only.
7. No tire cleaners or tire traction treatments permitted. Tires may not be cleaned with any liquid or foam of any kind. 8. Track preparation to improve traction is permitted.
9. Tire circumference (roll-out) is measured as an average of the center and outside edge measurements. This measurement shall be 22.00" maximum and 17.00" minimum (LF, RF, RR) and 16.75" minimum (LR).
10. Maximum tread width is 3.25 inches, with a minimum tread width of 2.75 inches, and 3.75 inches maximum sidewall width. 11. Competitors in all classes must utilize the QSAC approved right front tire-bands on the competitor's choice of host.

12. Right front tire bands will have a unique (molded into the band) identifier to designate it is an "Approved" tire band.

13. Approved compounds as submitted by the manufacturers with suggested corner locations are as follows:

Bishop Racing Products (BRP)

- Left Front/Left Rear = L10, L20, L30
- Right Rear = 410, 405, 407, C-4. And C-5
- Right Front = 96, 96Z or Dual Band (12.31.13)

WCM Diamondback

- Left Front/Left Rear = RZ2, ZR, XZR • Right Rear = M3, M4,

Signature

- Right Front = A or B

RC4Less (01.15.16)

- Left Front/Rear = marked with White dot & "L"(01.15.16)
- Right Rear = Marked with either a Yellow or Pink dot & "RR"(01.15.16) - Right Front = Marked with either a Red or Blue dot & "RF" (01.15.16)

The above are the ONLY allowable compounds permitted and can ONLY be run where designated (Example: Approved Right Rear compounds on Right Rear Only.) (11.22.07)

14. No mixing of Brands/Manufacturers of tires allowed. This is to say that all four tires being ran in competition must be from the same manufacturer. (01.15.16)