

## Safety Precautions for Mounting Racing and Competition Tyres

**TYRE MOUNTING IS DANGEROUS AND MUST BE DONE ONLY BY SPECIALLY TRAINED PROFESSIONALS USING PROPER TOOLS AND PROCEDURES. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.**

**ALWAYS** mount tyres only on rims which are undamaged, smooth and clean.

**ALWAYS** be sure the rim diameter matches the nominal tyre diameter. The bead diameter must be exactly the same as the diameter of the rim on which it will be mounted. The beads cannot be forced out against rim flanges by using more air pressure because this will break the beads, and the tyre will explode with force sufficient to cause serious injury or death.

**ALWAYS** be sure both beads and rim flanges are adequately lubricated with an approved mounting lubricant. A "solid" soap is recommended to prevent moisture entering the inside surfaces of the tyre.

**NEVER** force the bead(s) over the rim flange or use sharp-edged or improper tools that could damage the bead(s) or other parts of the tyre. When passing tyre beads over the rim flange, ensure as much as possible of the bead already over the rim flange is sitting in the wheel well.

**ALWAYS** inflate tyres in a safety cage or with another restraint device.

**ALWAYS** inflate the tyre without the valve core inserted into the valve stem. Inflation air should be as dry as possible.

**ALWAYS** use a clip-on chuck connected to an extension hose attached to a hand air pressure regulator incorporating a pressure gauge, when inflating and/or seating beads. **NEVER** use a clip-on chuck connected directly to an air supply when inflating and/or seating beads.

**NEVER** stand next to or lean over the tyre and rim while inflating.

**ALWAYS** after seating the beads, insert the valve core (strong spring-type) and adjust operating inflation pressure. Conditions affecting inflation pressure vary from circuit to circuit. Cooper Tire & Rubber Company Europe Sales Engineers can offer guidance on optimum performance inflation pressures. Tyres must always hold enough inflation pressure to avoid distortion or rolling under during cornering.

**Cooper Tire & Rubber Company Europe** does not recommend using tyre pressure regulating valves, because they can lead to under-inflated tyre operation and sudden tyre destruction.

**NEVER** apply direct heat or perform "hot work" on any wheel fitted with an inflated tyre, because explosions can occur. Tyres inflated with nitrogen do not make hot work safe.

**ONLY** specially trained Cooper Tire & Rubber Company Europe-approved personnel can hand-cut tyre patterns.

**NEVER** modify any portion of an Avon racing or competition tyre, for example, by chemically treating the tread compound ("soaking" or "softening" the tread).

Any modification could result in premature or catastrophic tyre failure with personal injury or death the result

For most purposes, racing tyres will benefit from an appropriate 'scrubbing in' procedure. This provides the best combination of performance and longevity under race conditions.

There are several difficulties that arise when using racing tyres if they are not scrubbed in prior to use. The most common is "Cold Graining", where the layer of the tread compound in contact with the track, fails in shear with the layer below. The result is a very visible low frequency, high amplitude rippling effect. This is more common with new tyres particularly when used in wet, damp or greasy conditions.

Avon Tyres Motorsport recommends that a standard scrubbing in procedure be used whenever possible (conditions and regulations allowing). This consists of subjecting the tyres through one gentle heat cycle, gradually loading them up whilst avoiding drifting the car. This should take about three to four laps of a circuit where the lap time is in the region of 60 to 100 seconds. The last lap should only be about 80% race speed. If possible, scrub in at least one new set of tyres during free practice, and put these aside for the race. In this way you will know that they have been balanced correctly, and have no slow punctures etc. Getting this done early is important as the qualifying session may become wet or be red flagged, which could force the use of new tyres in a race.

When regulations or circumstances do not allow the above procedure to be carried out, then the following should be borne in mind: -

- Graining of the loaded front tyre can be avoided if it is ensured that they are fully up to temperature before pushing hard. It is relatively easy to generate temperature in the driven tyres as they are transmitting power most of the time. The front tyres, however, will need to be given more time and be loaded up progressively before they will be 'In' fully. It should be noted that it is the loading of tyres that introduces the significant heat, not sliding or wheel spinning.
- For qualifying, the best results have been shown to have been achieved when the front and rear tyre temperatures are the same when measured at the base of the tread. If pushed too early, the rear will come in before the front causing understeer, and taken to the extreme, cold graining as detailed above.
- It is quite possible to get the rear tyres to go off before the front tyres come in, which will lead to a car that is never balanced, making set-up and qualifying very difficult. Thus to get the best from a set of scrubbed tyres, look after the rear tyres by not using full power out of corners, and instead work the front tyres progressively without inducing large amounts of understeer. When the fronts are fully up to temperature, go for a time (really hooked up lap). Push hard for 2 to 3 laps, and then back off the pace for a lap to allow the tyres to recover, and to get some clear track. Repeat this procedure for the best results.

It should be noted that there is always going to be a slight performance peak from new tyres, but it will only be possible to take advantage of this if the car is balanced on its tyres. A correctly scrubbed in set of tyres will always give more consistent performance over its lifetime than a set that has been used hard from new, even if it hasn't grained.

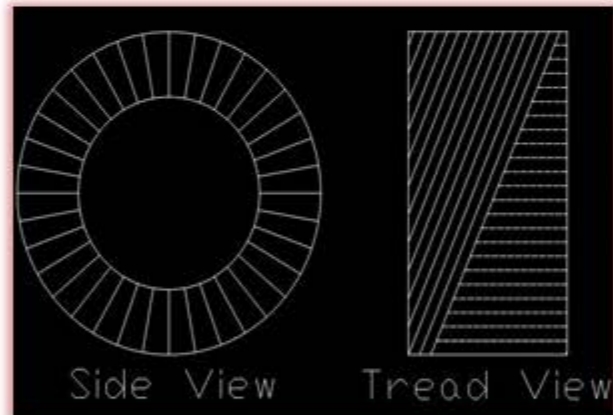
## Radial Slicks

Nylon Plies  
Kevlar and/or Steel Breakers  
Nylon Restrictors

Plies Are @  $\approx 90^\circ$  Additional support for tread from Breakers (Belts) @  $\approx 23^\circ$

More consistent with respect to size  
More convenient with respect to corner weights  
Provides a stable platform for aerodynamics  
Use more camber to get their best, potentially less drag on straight

### Radial Tyre Construction



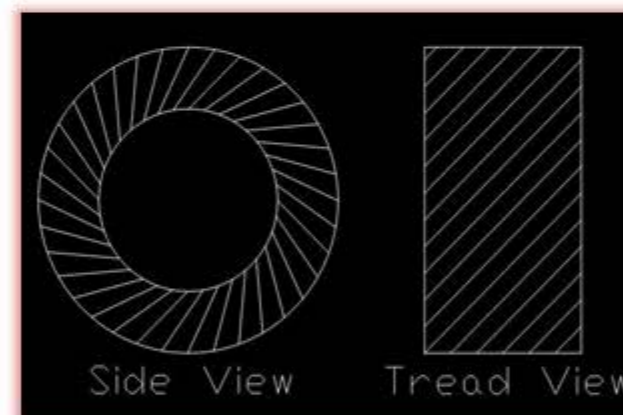
## Crossply Slicks

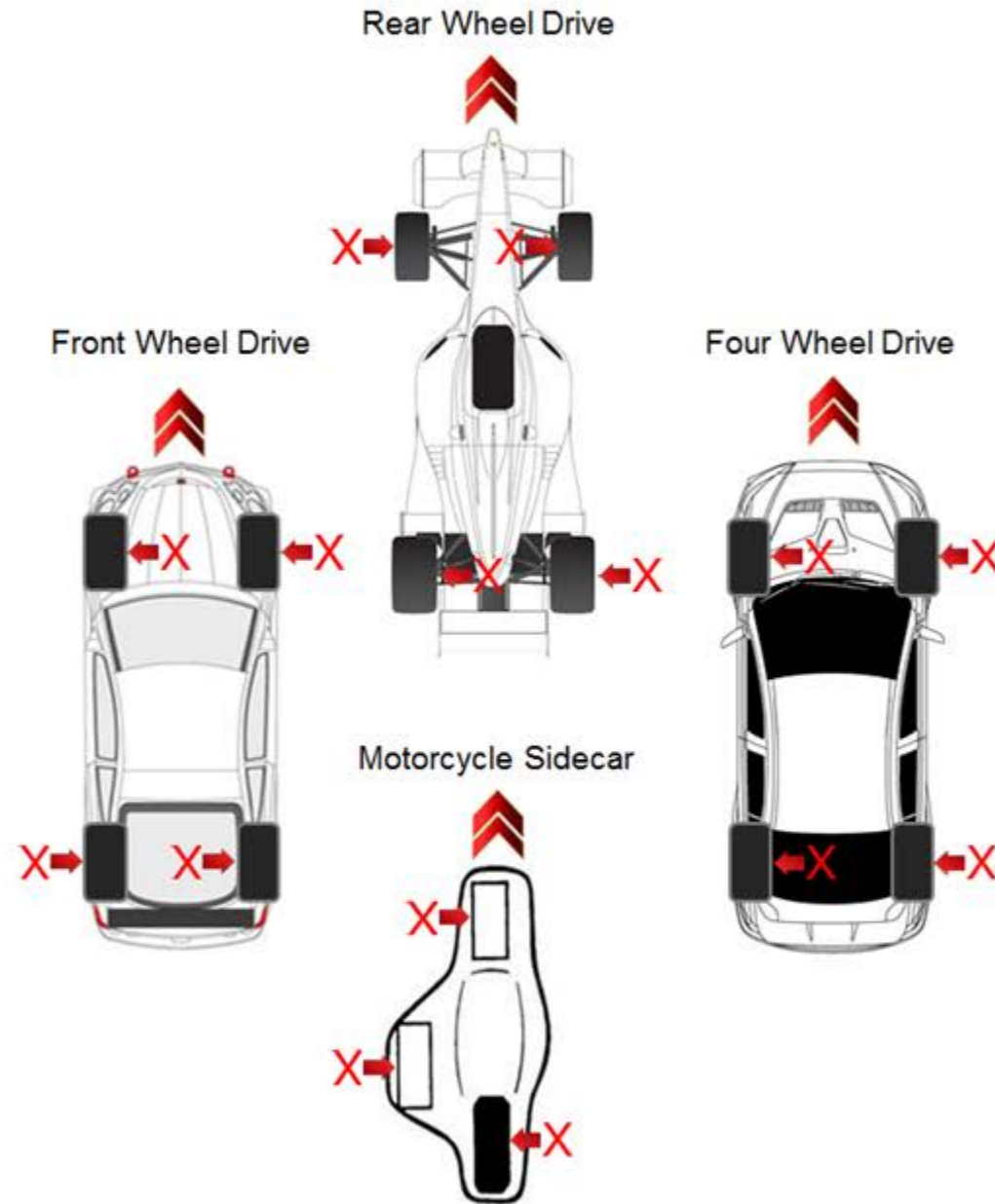
Nylon Plies  
Kevlar Plies

Plies @  $\approx 45^\circ$  Same components support tread as sidewall

More forgiving, more progressive & easier to drive on  
Lighter and hence cooler running  
Simpler and quicker to make  
Require less camber to work at their best

### Crossply Tyre Construction





X = Specification Number – Located on one sidewall of each tyre