

WHEELS and TYRES

In almost every type of motoring competition, the choice of tyres, their construction, and their tread pattern, is free, subject to them always complying with open-road legal requirements for rallies.

Group N:

On Group N cars, no changes to the standard road-car specification wheels are allowed by the regulations, although on the SIERRA XR4 × 4, wheel studs and nuts can be fitted in place of the wheel bolts which are standard.

Group A:

On Group A cars, there is no restriction as to what make, style, or type of wheel is to be fitted. As from 1 January 1988, changes to the FIA Homologation Regulations mean that:

For the SIERRA RS/RS500 COSWORTH, the maximum limit on tyre and wheel rim width which can be used is 10.0 in/25.4 cm.

This applies equally to front or rear wheels.

Be assured that all suspension development for the various SIERRA models has been carried out with these limitations in mind.

Ford experience with the 'works' cars, which run on Pirelli and Michelin competition tyres, for racing and rallying, is that the inflated tyre is always wider than the wheel rim itself. In Ford's experience, the maximum wheel rim width which allows the tyre itself to be no more than 10 in/25.4 cm wide is 8.75 in./22.22 cm. This advice may not apply if a different make and type of tyre is used - the customer must ask his own tyre supplier for advice.

Before committing yourself to the purchase of quantities of wheels and tyres, particularly of the largest variety, you should carry out a clearance check with fitted units, correctly inflated, to ensure that:

- a) There is clearance for the tyres to move between full bump and full rebound, without fouling the body, the wheel arches or the suspension and steering linkages, plus brake cooling ducts if fitted.
- b) There is clearance for the front wheels, on full lock on full bump or full rebound, especially from brake ducts, brake pipes, steering and suspension links.
- c) That the units do not protrude outside the 'body envelope', when viewed from the front, or from above - because such protrusion would mean that the car does not comply with sporting regulations.

In the case of the SIERRA RS/RS500 COSWORTH (but **not** the SIERRA XR4 × 4), the body shell and its fittings have been specially modified so that wide-section racing tyres may be used for competition purposes. If suitable wheels are chosen it is possible to use rim widths up to 8.75 in., allied to tyres of up to 10 in. width, without the regulations being broken.

On this model, special composite material wheel arch panels surround the steel front and rear wheel arch cut-outs. These slightly cut down the available clearance for the use of high-profile/off-road treaded tyres. Where the regulations allow, it may be advisable to locally modify the outline of the wheel arch extensions, to increase the available clearance. The normal appearance of the car must be retained at all times.

Rim Widths:

In motor racing, experience has shown that the cars should always use the widest possible wheel/tyre combination (except perhaps in extreme cases where there is deep standing water on the track), although in rallying this is by no means the case.

In almost every case, therefore, rims of 8.75 in. width are used on race cars, but in rallies rim widths may vary between 5 in. (for use in deep snow), to 8.75 in. for use on tarmac-surfaced stages.

Wheel and Tyre diameters:

In the case of Group N competition, no choice of different wheels or wheel diameters is authorised. This means that the SIERRA RS COSWORTH must use its 15 in. diameter wheels, with 7.0 in./17.8 cm. rim width, and that the SIERRA XR4 × 4 models must use their 14 in. diameter wheels, with 5.5 in./14 cm rim width.

In the case of Group A competition, the choice of wheel diameters is free, within plus or minus 2 in./5 cm of the original specification. This means that the SIERRA RS COSWORTH and SIERRA RS500 COSWORTH may use wheels of up to 17 in./43.18 cm. diameter, and that the SIERRA XR4 × 4 may use wheels of up to 16 in./40.6 cm. diameter.

Extensive experience with 'works' cars has led to the rally team standardising on the use of 16 in. diameter wheels for the SIERRA RS COSWORTH **and** the SIERRA XR4 × 4 models, while the Eggenberger and Andy Rouse race-prepared SIERRA RS COSWORTH and SIERRA RS500 COSWORTH cars use 17 in. diameter wheels.

Before making a wheel choice, remember that:

- a) There is a restricted choice of 14 in. diameter race or rally tyres.
- b) That all the Group A competition parts for suspension and steering items have been developed with 16 in. wheels in mind.

Although every effort has been made to try and commonise suspension, brakes and steering parts between SIERRA XR4 × 4 and SIERRA RS/RS500 COSWORTH models, it is not possible to use all Group A parts with 14 in. or 15 in. diameter wheels.

This is the situation regarding compatibility:

- 1) All the 'works' cars developed and built at Boreham and the supported cars which draw heavily on Boreham's expertise, use 16 in. wheels. All the suspension, steering, and most of the braking installations now stocked by the Motorsport Parts Division, are intended to be used with 16 in. wheels.

- 2) On the Group A Sierra XR4 × 4 model, however, the Group A suspension and steering parts, plus suitable 285 mm diameter brake discs and their related calipers and other details, are completely compatible with 15 in. wheels having the appropriate rim-to-hub offset dimensions and caliper clearance.

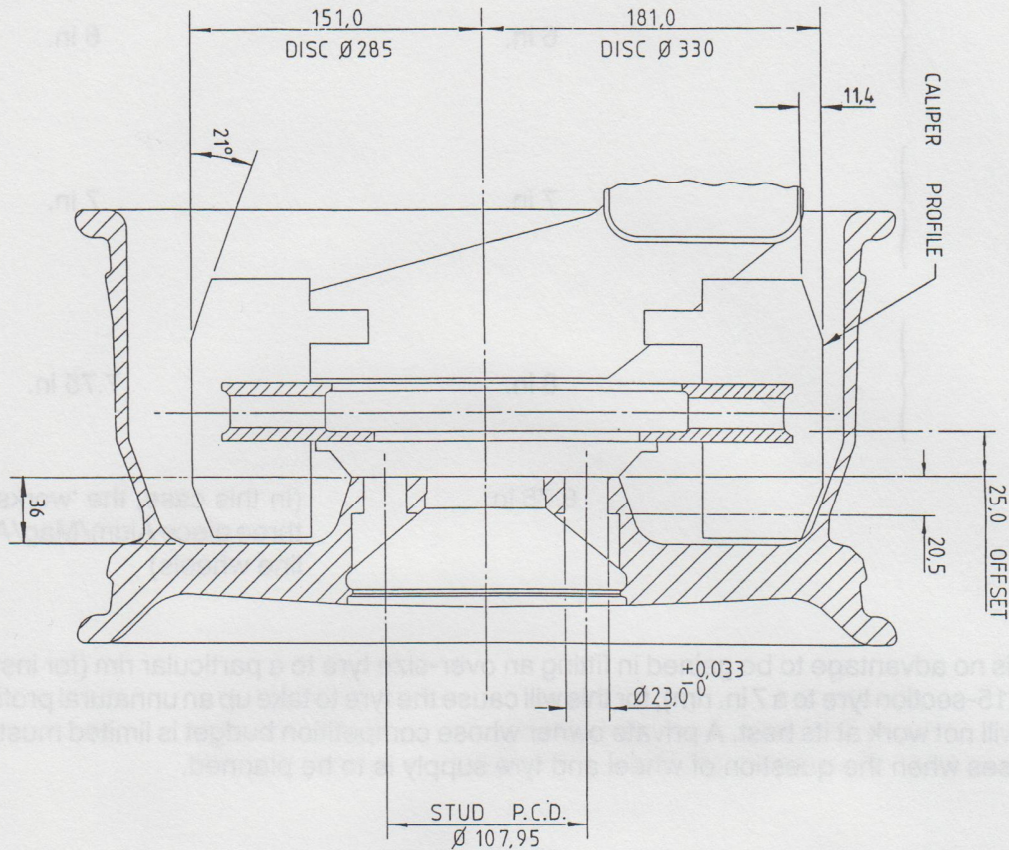
- 3) On the Group A Sierra RS Cosworth model, it is not possible to fit the existing Group A items inside 15 in. wheels, as the steering ball joint fixing, where it is attached to the steering arm, would foul the inside of the rim.

Alternative Wheels

The Motorsport Parts Division has available a range of specially-developed competition wheels for the SIERRA models. Several designs of alternative road wheels are also available from specialist wheel manufacturers in the UK and in Europe. The wheels used on 'works' rally cars are manufactured by Speedline, while the British company Revolution also makes a selection of suitable wheels for these cars.

Before purchasing a quantity of proprietary wheels, please ensure that these have a suitable hub/rim offset dimension which is compatible with the design geometry of the Group A SIERRA front suspension, steering and rear suspension. Ensure, also, that the spokes and inner profile of these wheels give adequate clearance over the disc brake calipers, their associated pipework and linkages, and over the steering arm/ball joint location.

A profile of the wheel spoke/rim profile which will clear the Group A front and rear suspension hardware is illustrated here.



This drawing shows the minimum clearances required if special wheels are fitted around the SIERRA's Group A suspension/brake assemblies. All dimensions are quoted in mm.

The compatibility of various disc brake diameters with wheel rim diameters is covered in the section on **BRAKES**.

With racing and with high-speed pit stops in mind, a centre-lock wheel kit is also homologated. It is necessary to match such wheels to the homologated centre-lock hubs and fixing nuts, which have been developed for this purpose.

Wheel Rim and Tyre Compatability:

As far as the SIERRA models are concerned, the following tyre sections should always be mated with the following rims:

Tyre Section	Wheel rim width (inches)	
	For Pirelli tyres	For Michelin tyres
135	5 in.	5in.
155	6 in.	6 in.
165		
175		
185	7 in.	7 in.
195	8 in.	7.75 in.
205		
215		
230	8.75 in.	(In this case, the 'works' team uses three piece Alum/Mag/Alum Speed-line wheels)
245		

There is no advantage to be gained in fitting an over-size tyre to a particular rim (for instance, don't fit a 215-section tyre to a 7 in. rim), for this will cause the tyre to take up an unnatural profile and the tread will not work at its best. A private owner whose competition budget is limited must make compromises when the question of wheel and tyre supply is to be planned.

Tyre Choice for particular conditions (Rallies):

SIERRA XR4 × 4: Experience shows that the four-wheel-drive SIERRA chassis performs best with the same size wheels and tyres at front and rear. Even if the driver is tempted to experiment with different rim widths at front and rear it is vital that the same tyre **diameter** is always used for the front and rear wheels; otherwise the permanent four-wheel-drive system might be damaged. On the Monte Carlo rally, the 'works' XR4 × 4 used 6 in. rims and 155/85 section tyres for slippery going. SIERRA RS COSWORTH: This model is used in many different conditions; and surfaces. The following chart shows the range of Pirelli tyres used by the 'works' team on events during 1987:

Conditions	Front	Rear
Snow:	135/90-16 155/85-16	135/90-16 155/85-16
Gravel:	165/80-16 MS90 175/75-16 MS90/SG90 185/70-16 MS90/SG90 195/65-16 SG90	185/70-16 MS90 195/65-16 SG90 205/65-16 SG35 215/60-16

Tyre Choice (cont)

Conditions	Front	Rear
Tarmac:		
Rain Tyres	230/620-16	245/640-16
Intermediate Tyres	230/640-16 245/640-16	245/640-16 245/640-16
Slick Tyres	245/640-16	245/640-16

MS = Mud/Snow tyres, for loose/wet/slippy tracks.
 SG = Sand/Gravel, for hard packed gravel-type tracks.

Pressures normally used are 1.6 Bar/23 psi all round, sometimes being raised to 1.75 Bar/25 psi all round for tough off road conditions.

Although, in a few conditions, it has been found that the SIERRA RS COSWORTH performs well with equal rim widths front and rear, it is always desirable to use wider-rim tyres at the rear to help transmit the engine's torque, without allowing excessive wheelspin. In normal conditions, the use of wider rear rims is usually justified.

As a general rule, the SIERRA should be fitted with the widest-section tyres that the driver can deal with, because braking performance increases as wider wheels/tyres are fitted.

The selection of 'setting-up' chassis specification sheets shows that different tyre/rim combinations are used in different combinations. Here is an extract of typical choices:

	Front	Rear
Lombard-RAC Rally (wet/muddy/loose)	185/70-16 on 7 in. rims	205/60-16 on 8 in. rims
Ulster/Manx/San Remo (Tarmac)	245/640-16 230/620-16 (Wets)	245/640-16 245/640-16 (Wets)
1000 Lakes (Gravel)	185/70-16	205/65-16 or 215/60-16
Scottish (Gravel)	165/80-16 or 185/70-16	185/70-16 or 215/60-16

Normally, in gravel/loose-surface conditions, the SIERRA RS COSWORTH 'works' cars use 6 in. or 7 in. front rims, and 7 in. or 8 in. rear rims.