MOTORHOMES AND TYRES

(Written by Richard Clark)

INTRODUCTION

Most common road vehicles comply with a factory specification, and thus have predictable tare and gross permissible masses that can be found in tables available from tyre retailers, or from the vehicle manufacturer. Choice of correct tyres for such vehicle should therefore not be a problem. Equally important is the provision of correct inflation pressures, front and back, for the loads that such tyres will be expected to bear on that particular vehicle.

Motorhomes, on the other hand, differ in that they are extensively and invariably modified and/or customised after manufacture, to the extent that it has been said that there is virtually no such thing as a "standard motorhome" of predictable kerb mass. Tyre loadings for any individual motorhome can therefore only be known by measurement on a weighbridge or load-palette and recording these readings. Front-end and rear-end measurements (there will be errors, if the vehicle is not level) as well as total vehicle mass, loaded as if the motorhome would be prepared for use, should be recorded. It is illegal for any vehicle to have a left-to-right-side mass that differs in excess of 10%. It is also illegal for any motorhome to be on the road with a loaded-up total mass that exceeds the plated GVM, or either of the plated permissible maximum "axle masses", front or back.

IMPORTANT CONSIDERATIONS

A tyre should have a compatible fit with the rim to be used. Complete tyre tables provide a list of the legally acceptable rim types for each particular tyre. Various manufacturers have their own tyre tables, but the SABS tables are "official".

Beware of the following, when contemplating the use of after-market rims.

- The mount offset should be the same as the manufacturer's original rim
- Likewise, do not use wheel spacers or the like to increase the width of the vehicle track. There will be adverse effects on steering geometry, that will lead to abnormal wear, prejudice safe control of the vehicle (especially with a blow-out, or heavy braking) besides damaging wheel-bearings resulting from the tyre footprint no longer being directly below the wheel bearing. Tyre footprint will also be wrongly aligned with respect to the king pin rotational axis on the front wheels.

Check wheel alignment, and look for evidence of suspension wear, if there is abnormal tyre wear, or poor steering characteristics.

When buying new tyres, check the manufacture date (digits 1 and 2 = week of manufacture; digits 3 and 4 = year of manufacture) as your guarantee expires the day a tyre reaches 5 years of age. You might be taking old stock from a supplier. Motorhomes should have commercially-rated radial-ply tyres, not car tyres.

Always renew valves when renewing tyres.

Suburban tyre retailers often do not have equipment that can balance a truck wheel. On bigger vehicles travelling under 100 km/h, balancing is hardly necessary, unless you have the misfortune of having bought a tyre that is seriously out of balance.

Be aware of the risk of being sold tyres that are intended for light-vehicle use (cars, bakkies and 4 x 4s; no suffix C on the tyre specification code). This can often arise through the ignorance or indifference of the retailer, especially if wheel-load data from recently determined weighbridge readings of the motorhome are not available at the time. Using under-rated tyres puts life and property at risk, can lead to prosecution and prejudice your case in the event of an insurance claim. You could also be held liable by third party claimants after an accident.

Rotation of tyre positions, at intervals, will equalise tread wear. However, with twin wheels, always keep these pairs together, as it is essential that they retain equal circumferences, to avoid stresses associated with road "creep".

Check and adjust "cold and static" tyre pressures to the correct values before starting a trip. These are the values given in the table below. As tyres heat during long-distance running, it is acceptable for the pressure to rise, provided that this does not exceed 20%. Do not bleed air from a hot tyre to "correct" the pressure. Slow leaks should always be investigated. A tyre should hold pressure for a month, without losing more than 20 kPa.

Over-inflation of a tyre gives an uncomfortable ride, contributes to suspension wear, and compromises adhesion with the road, as the patch in contact with the road is reduced in area. The tread will also wear more rapidly down the centre-line. Over-inflation increases the possibility of tyre damage by impact with sharp obstacles in the road.

Under-inflation compromises fuel economy, over-flexes the tyre, leading to "runaway" overheating, damage of the tyre structure, and ultimate failure, often through catastrophic blow-out. The thicker the tyre, the greater the risk, to wit, the

common occurrence of shredded lorry tyre rubber on the highway. The practice of softening tyres for a more comfortable ride on a rough or corrugated dirt road is most dangerous one. In addition, sharp stones can "bite" the folded side-wall of an underinflated tyre, through upward contact against the rim edge. Damage may not be immediately obvious, but can be instrumental to a disaster later on down the road.

Some motorhomers experience recurrent problems with tyres that shed their treads. This is invariably from overflexure, reasons for which have already described, leading to overheating within the tyre structure ("thermal runaway") which results in delamination (separation) of the tread from the tyre body. The tyre may appear perfect in exterior view, but may emit strange road noises, especially at higher speed. By the time that exterior splits on the sidewall are visible, tyre structural degradation has reached the point where it is likely to disintegrate. This type of tyre failure arises from product abuse, though it is common for motorhomers to explain their misfortune as a consequence of being sold an inferior quality tyre.

Do not mix tyre types (radial and cross-ply, or textile with steel) particularly on the same axle. New tyres should be fitted on both sides, and if only to one axle, it should be to the rear. This is because worn tyres at the back can lead to tail break-away and vehicle spin in the event of severe braking.

Remember that it the tyres that stop a vehicle; not the brakes. Brakes only apply resistance to wheel rotation. Worn treads on wet roads have extremely poor adhesion, especially at speed and/or are over-inflated. Tread depth of less than one millimetre on any part of a tread is illegal, and can invalidate an insurance claim in the event of an accident.

Cultivate the habit of checking all tyres visually at each stop on a long journey. Overheating is evident from excessive rubber odour, confirmed by cautious touching with the hand.

Punctures can only be repaired if the damage is in the tread area. If the problem is on the tyre wall, the tyre must be scrapped. Externally fitted quick-fix puncture plugs and liquid sealants offer temporary assistance in an emergency, but are not regarded as safe permanent remedies. At the earliest opportunity, a punctured tyre should be removed from its rim and inspected carefully, inside and outside, for possible structural damage, before being repaired, if judged as repairable, using the proper equipment, methods and materials recognised by the industry as proper practice.

TYRE LOADING TABLES

As has been implied in earlier comment, a tyre is in balanced equilibrium between the downward force of the vehicle mass on that wheel, and the upward force of the air under pressure within the tyre. The tyre is carefully designed to operate with a specific degree of deflection on the road, and for that reason, tyre inflation pressure and the measured load on the wheel must match one another in accordance with the data given by the manufacturer's tyre loading tables.

Data are extensive, making it impractical to list more than the popular wheel sizes and mass loadings for motorhomes in the table below. More information should always be available from a tyre dealer, or by phone from the technical information department of any tyre manufacturer, if you need it. Don't buy tyres on "blind spec". Have your measured wheel loads at hand, as without this, you are relying on guesswork.

If a wheel is loaded to 90% of the maximum permissible load for a given tyre, although "legal", for reliability, it would be better to select a tyre of greater load rating. A particular "stress" for motorhome tyres is intermittent use, with extended periods of standing, during which time some of the pliability of the rubber is lost through the simple process of static ageing.

The table below is an extract from Table 24, SABS 1550-3:1992 (amended 1997) for single-mounted commercial radial ply tyres. Double-mounted tyres of the same type should be weight-derated (reduced) by about 6% per tyre. Load in kg appears as normal type for 6-ply tyres, and as red type for 8-ply tyres. Column 1 gives tyre/rim sizes. Row 1 gives tyre pressures. The body of the table lists the correct single tyre load in kg for a particular tyre size and given inflation pressure. Regard these weights as minimum (cold) values, adding up to 20% for a working margin. The tyre wall should have a slight but not excessive bulge on either side of the road contact area. Blank cells in the table indicate that the tyre should not be used at these pressures.

	250kPa	275kPa	300kPa	325kPa	350kPa	375kPa	400kPa	425kPa	450kPa
145R13C	400	425	445	465	487	**505**	**525**	**540**	**560**
155R13C	425	445	470	495	515				
165R13C	485	515	540	565	590	615	**630**	**650**	**670**
175R13C	530	560	590	615	645	670	**690**	**710**	**730**
185R13C	575	610	640	670	700	730	**750**	**775**	**800**
155R14C	460	485	510	535	560				
165R14C	515	540	570	600	625	650	**680**	**705**	**730**
175R14C	560	590	625	655	680	710	**730**	**750**	**775**
185R14C	610	645	680	715	745	775	**800**	**825**	**850**
195R14C	670	710	745	780	815	850	**885**	**920**	**950**

205R14C	730	770	810	850	890	925	**960**	**995**	**1030**
215R14C	790	835	880	920	960	1000	**1045**	**1085**	**1120**
145R15C	435	460	485	510	530	**555**	**575**	**595**	**615**
165R15C	530	560	590	615	645	670	**685**	**705**	**730**
185R15C	630	665	700	735	770	800	**820**	**845**	**875**
215R15C	745	805	860	920	975	1030			
175R16C	590	625	660	690	720	750	**775**	**800**	**825**
185R16C	650	690	725	760	790	825	**845**	**870**	**900**
195R16C	710	750	790	830	865	900	**925**	**950**	**975**
205R16C	750	790	835	875	910	950	**990**	**1025**	**1060**
215R16C	835	885	930	975	1020	1060	**1085**	**1115**	**1150**
	250kPa	275kPa	300kPa	325kPa	350kPa	375kPa	400kPa	425kPa	450kPa

While every attempt is made to provide reliable information, errors may inadvertently be present. It remains the responsibility of the reader to verify the correctness of any part of this document by consulting the original source of data quoted.