



The Importance of Tyre Pressure Management

the number of revolutions that the tyre performs in a given time. The heating occurs once per revolution so a tyre that is turning faster gets hotter, despite the greater cooling airflow.

So the temperature that a tyre runs at depends upon inflation pressure, ambient temperature, load level, vehicle speed, the slip that occurs between the road and the tyre tread (see the July article for a description of tyre slip).

The shape of the tyre is determined by the inflation pressure. Best tyre wear and best road handling performance occur when the cold-tyre pressure is at the manufacturer's recommended value. The tyre has the optimum shape. If the vehicle does not have a Central Tyre Inflation System (CTI) then the cold-tyre pressure will usually be set as a compromise between values for the different load conditions.

The tyre pressure will increase by 15 -20 % between a cold tyre and a tyre that has been carrying rated load for 2 hours. So inflation pressure should always be measured cold. The inflation pressures for a vehicle that runs consistently in high ambient temperature might be set at about 95% to avoid centre-band tread wear. It is safer to set tyre pressure higher rather than lower because an under-inflated tyre runs hotter. If a common tyre pressure is to be used on all axles, it should be based upon the recommended cold-tyre pressure for the most heavily laden axle. It is common practice to set tyre pressure

The ISO tyre description

If the ISO tyre description has the form 295 / 80 R 22.5 146/143 L, for example, it means the section width is 295 mm; the aspect Ratio is 80 per cent; and the construction is radial (R); while 22.5 is the nominal rim diameter; 146 is the load index (single tyre) and 143 is the load index (dual tyre); L is the speed rating.

on interstate-running trucks to 6.9 Bar (100 psi). However, there is no excuse for not doing the sums and determining the manufacturer's recommended tyre pressure before determining company policy about tyre inflation.

Under-inflation can significantly reduce the life expectancy of the tyre. As a guide, a tyre with a cold inflation pressure of 90 per cent the recommended level will have a life expectancy of 95 per cent. If the cold-inflation pressure is 80 per cent of the recommended level than the life expectancy is 87 per cent. However, this latter figure ignores the sidewall deterioration that will probably occur and the possible inability to retread the carcass that will result. Furthermore, a tyre that is underinflated at the 80 per cent level will absorb double the energy of a perfectly inflated tyre so under-inflation reduces fuel economy. Under-inflation must be avoided.

The load rating of a tyre used on a dual wheel is less than for a single wheel. This allows for the overloading that occurs on one tyre when the other tyre is underinflated. It also allows for road crowning, which tends to increase the load on the inner tyre.

For a Michelin XTE1, 11 R22.5 tyre (load rating 142 J), the optimum contact patch area is about 430 cm². The recommended tyre pressure for different loads and operating speeds is shown in Graph 1. If the tyre experiences a 3:1 load variation between laden and unladen (which is typical for a trailer), the unladen tyre will be significantly over-inflated.

In 2007, the USA mandated tyre-pressure monitoring on light-vehicles (with a gross rating of less than 4536 kg - rule FMVSS 138). There is an international UN ECE (which the Australian ADRs are being harmonized to) that specifies uniform provisions for a tyre monitoring system (Regulation 64); but the technology is not mandated.

The case for using Central Tyre Inflation

is that the high life expectancy of the tyres can be achieved and the road-handling performance of the vehicle is kept at its best. Graph 1 illustrates how significant the need for tyre pressure adjustment can be. Another advantage of a CTI is that it incorporates tyre pressure monitoring features so the driver will be informed about tyre problems as they develop and can respond before failure occurs. The photo shows the driver controls and display information for one local CTI. Finally, the quality of the inflation gas can be important to the life of the truck and trailer tyre. Nitrogen inflation has its devotees. Operators using air should use a compressor with a drier function because moisture inside the tyre reduces tyre case life.



Yours Sincerely,
Dr Peter Hart

SPEED RATING CODE	MAXIMUM OPERATING SPEED (KM/H)	LOAD RATING CODE	MAXIMUM LOAD / TYRE (KG)	LOAD RATING CODE	MAXIMUM LOAD / TYRE (KG)
F	80	139	2430	146	3000
G	90	140	2500	147	3070
J	100	141	2575	148	3150
K	110	142	2650	149	3250
L	120	143	2725	150	3350
M	130	144	2800	151	3450
		145	2900	152	3550

Graph 1 - Indicative Tyre Pressures for an 11 R22.5 tyre

