

CHOOSING TRACTOR TYRES

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Larger tyres, which form a bigger contact patch with the ground, pull well and, more importantly with to-day's machinery weights, achieve lower ground pressures. Big tyres can carry heavy loads at low inflation pressures. Low inflation pressures result in low ground pressures. All tyres have load and inflation tables which indicate the load that can be carried at various pressures. An example of a tyre load/inflation pressure table is given in Table 4.

Table 4 - Tyre load capacities (kg) at various inflation pressures

Inflation pressure (bar)	0.8	1.0	1.5
<i>Tyre size</i>	<i>Load (kg)/tyre</i>		
13.6-38	1230	1410	1840
16.9-34	1715	1935	2495
18.4-38	2085	2370	3070

Tyre selection should be based on the axle loads being carried and the level of ground pressure required. Ground pressures required will depend on the work being done and soil conditions. For cultivations and drilling work, tyres large enough to operate at pressure of 0.8 bar (12 psi) and below are now frequently used. It is important to note that the trend is towards lower ground pressure, particularly for cultivation and drilling equipment, i.e. larger tyres capable of running at lower pressures. Even on grassland there is concern at the potential damage that heavy axle loads on conventional tyres can cause.

Recent tyre developments are aimed at satisfying these demands. The lowering of minimum inflation pressures below the previous 0.8 bar limit and the introduction of wider low profile (60-70% aspect ratio) tyres are two such developments.

Lowering Tyre Pressures

Until a few years ago, conventional tractor tyres had a minimum inflation pressure requirement of 0.8 bar (12 psi). Even if very large tyres were used with more than adequate load-carrying capacity at 0.8 bar, the inflation pressure could not be lowered below this point. Effectively, this resulted in a higher ground pressure being exerted than the tyre size would indicate, as the tyre was not allowed to 'flatten' to form a good-sized contact patch with the ground. Recent tyre developments allow lower inflation pressures to be used; down to about 0.5 bar (7 psi) provided the tyre is large enough to carry the load. This allows the full benefits of larger tyres to be gained. Some manufacturers are also allowing more weight to be carried at a given inflation pressure. Table 5 shows the change in load, and corresponding inflation pressure requirements, for a 16.9-34 tyre over a 10-year period.

Table 5 - Load capacity (kg) and inflation pressure values for a 16.9-34 tyre

Pressure (bar)	0.5	0.6	0.8	1.0	1.4
<i>Load (kg)/tyre</i>					
1983 values			1515	1730	2105
1986 values			1715	1935	2380
1992 values	1470	1710	1860	2005	2380

Allowable pressures have dropped and load capacities have increased. It remains vital, however, that the tyre is inflated to the correct pressure for the load being carried. Tyre pressures should be adjusted to suit the job in hand. Axle loads must be known and an accurate pressure gauge must be used.

Low-Profile and Very Wide Section Tyres

The introduction of low profile tyres and very wide tractor tyres has greatly increased the options available to those selecting tyres.

Most of the major tyre manufacturers are now producing a lower profile tyre range (60-70% aspect ratio) in addition to their conventional range. The use of lower aspect ratios allows a wider section tyre to be fitted to a rim of the same diameter as a standard tyre and yet have the same overall diameter. Seventy per cent aspect

ratio tyres are normally about 12% wider than conventional tyres of the same overall diameter. The low aspect ratio, in addition to providing greater width, is also claimed to improve tractive performance by providing better contact between the tyre and the ground.

One of the advantages of '70' series tyres is that they offer a simple solution of increasing tyre width on 4WD tractors without altering the drive axle ratios. With conventional '80' series tyres, size options on 4WD tractors are more limited.

The increased carrying capacity of the wider section '70' series tyres is illustrated in Table 6.

Table 6 - Load capacity (kg) of '70' series tyres compared to conventional tyres (Pirelli)

Pressure (bar)	0.4	0.6	0.8	1.0
<i>Tyre size</i>	<i>Load (kg)/tyre</i>			
16.9-34	-	-	1715	1935
480/70-34	1710	1920	2120	2320
18.4-38	-	-	2085	2370
520/70-38	2110	2360	2610	2860

In many situations, '70' series tyres can be fitted to the same rims as their narrower '80' series tyre counterparts. This makes up-grading of tyre equipment relatively inexpensive. However, care must be taken in this regard. To get good performance from the '70' series tyres and to avoid tyre and rim damage, they should only be fitted to the recommended rim size. Sometimes this will correspond to the rim used on the '80' series tyre fitted as standard, but often the '70' series tyre requires a wider rim. It is likely that '70' series tyres will take-over from '80' series tyres in the not too distant future. Tyre manufacturers are not stopping there however. Sixty-five and sixty per cent aspect ratio tyres are in production, particularly where very wide high load capacity tyres are required.

Wide Section Tyres

Coupled with the introduction of low-profile tyres, some manufacturers have introduced a range of very wide tractor tyres with widths of up to 800 mm and maybe more. These tyres can carry heavy loads at very low inflation pressures and are a real alternative to dual wheels. They are designed as a full traction tyre unlike Terra Tires which are only intended for LGP use. Their narrower overall width compared to a dual wheel combination, is an advantage. Wider rims are needed for these 65% (or lower) aspect ratio tyres.

Wide Tyres or Duals

With all these developments in tyres and machine weights, how does an individual decide what tyre option to use? There are no set answers. A 110 HP 4WD tractor operating a 3m one-pass is taken as an example. When lifted at the headland, the rear axle load would be about 7 tonnes. A number of tyre options and their corresponding inflation pressure requirements are given in Table 7.

Table 7 - Inflation pressure requirements for a number of different tyres

Size	Inflation pressure for 7 t axle load (bar)
16.9-38 single	Not capable of carrying load
18.4-38 single	1.9
520/70-38 single	1.5
650/65-38 single	0.7
16.9-38 dual	0.5
520/70-38 dual	0.4

This table shows that dual wheels are still a good option for many situations. The 70 series option given in this table has not an adequate carrying capacity. The 650/65-38 tyre shows the exceptional load-carrying capacity of modern wide-section traction tyres.

With the weight of modern machinery, tyre selection needs to be taken very seriously. The challenge is to convince users of this equipment that investment in expensive tyres will reap benefits in the long term.