
TMC
TECHNICAL & MAINTENANCE
CONFERENCE
PACCAR & DEALER
2017

TYRE AND WHEEL MAINTENANCE

Chair

Bob Woodward – Ron Finemore Transport

Panel members

Darren Wong - Michelin

Michael Nicholls - Alcoa

Chet Cline - Air CTI

Darren Wong – Michelin

Tyres

- Basics
- Importance of tyre selection
- Tyre maintenance, including: pressures (importance and how to determine pressures), fitting and balancing, rotations
- Ultrawide single tyres (X One)

Basics

- What is a tyre?
  - Tyre is the only connection to the ground
  - Holds/contains the air
- Functions of a tyre
  1. Supports the Load
  2. Provides Directional control (Handling, Cornering)
  3. Provides Mobility (Adherence)
  4. Absorbs Shocks (Comfort, Noise)
  5. Lasts with Time (Durability)

IMPORTANCE OF TYRE SELECTION

Choosing the Right Tyre

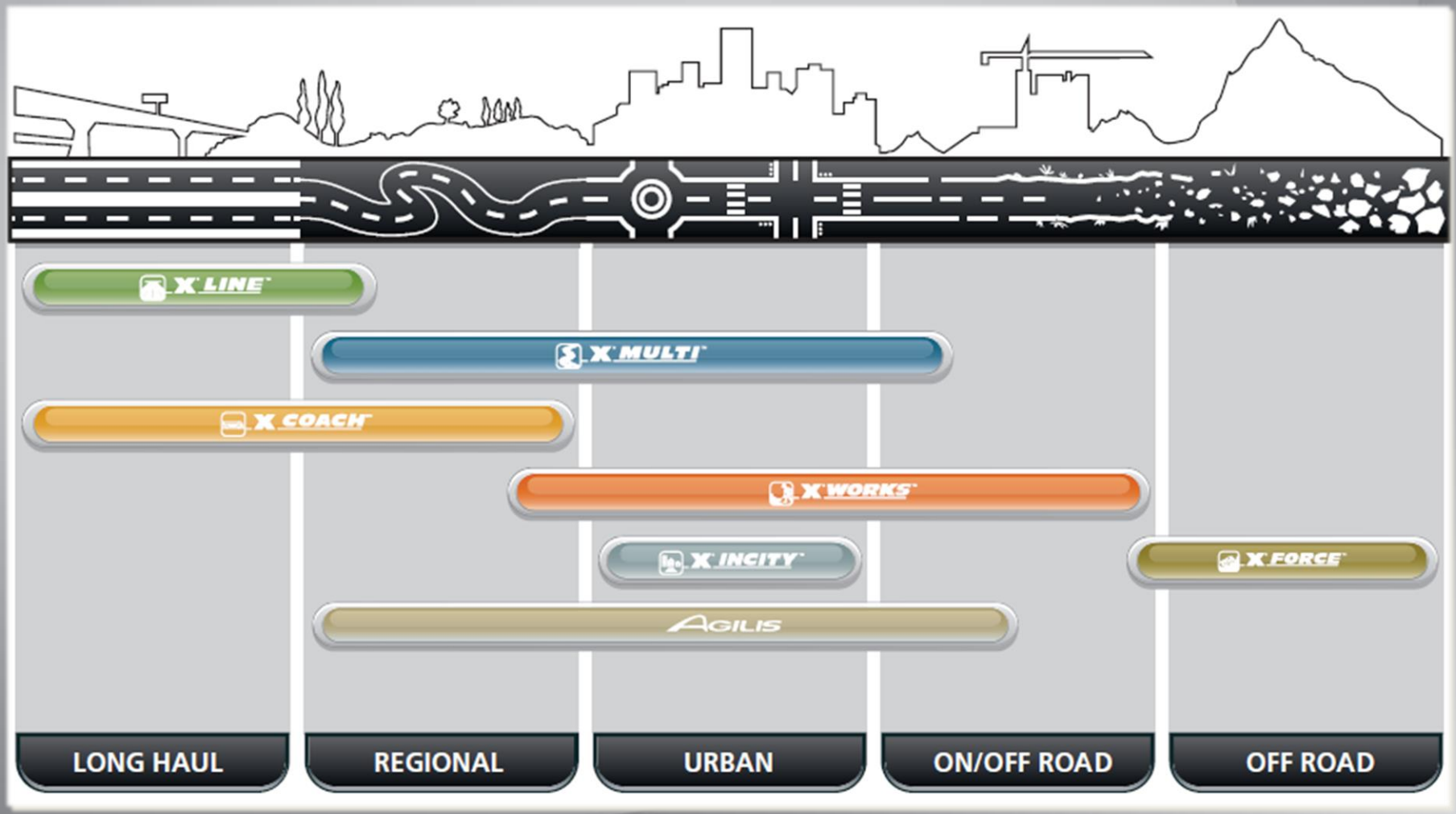
Three (3) questions that need to be asked

1. What are the Conditions of use?
2. What is the appearance of the tread?
3. What is the tyre mileage of the current fitment?

ANSWER =

- The right tyre for the application
- Lowest cost of ownership

Segmentation of Tyres



Importance of Tyres

- 3rd in Transport operating costs (after Fuel, Wages)
- Main contributors to Fuel consumption

Tyres = 1/3 of Fuel Usage

TYRE MAINTENANCE

- Pressures
- Fitting
- Balancing
- Rotations

PRESSURES

- Most Critical factor
- Direct impact on
  - Tyre Performance
  - Fuel Economy
  - Casing life
- Pressure depends on the load, speed and condition of use
- Manufacturers provide load/pressure tables

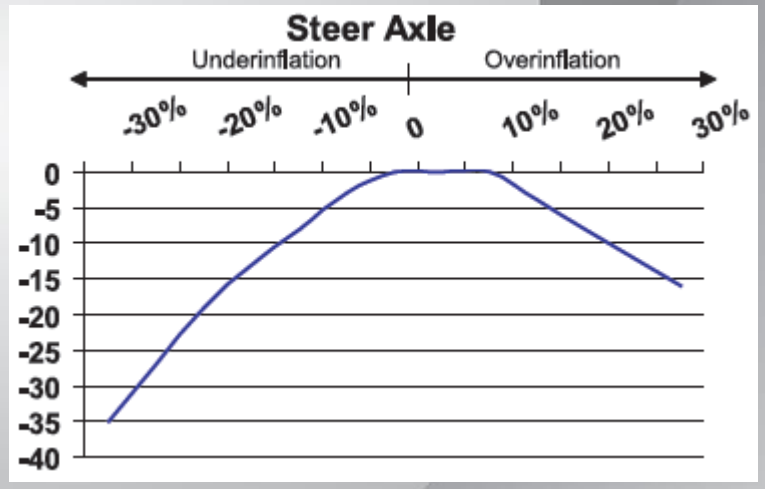
Example:

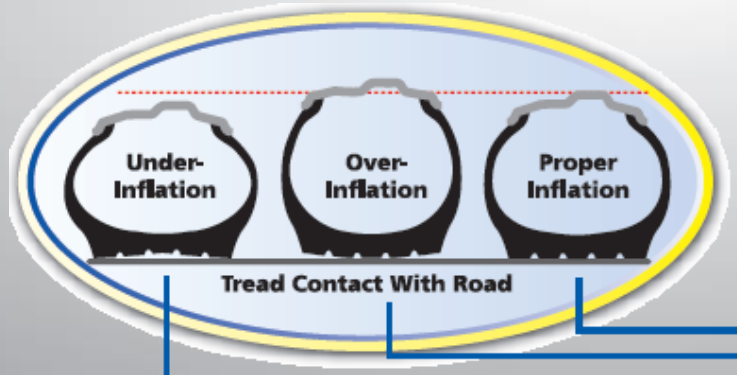
11 R22.5 X Multi D – Drive 17,000kg

	psi	73	76	80	83	87	91	94	98	102	105	109	112	116
	bar	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00
X MULTI D	single	4140	4320	4500	4680	4860	5040	5220	5400	5580	5760	5940	6120	6300
	dual	7620	7950	8290	8620	8950	9280	9610	9940	10270	10610	10940	11270	11600

PRESSURE

- Calibrate/ replace gauges regularly
- Requires maintenance, moving & wearing parts!





UNDERINFLATION
Causes abnormal tyre deflection, which builds up heat and causes irregular wear. Similar to the rim being too wide.

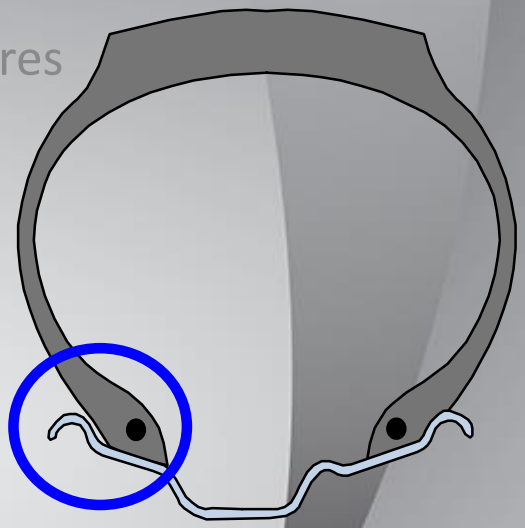
OVERINFLATION
Causes tyre to run hard and be more vulnerable to impacts. It also causes irregular wear. Similar to the rim being too narrow.

PROPER INFLATION
The correct profile for full contact with the road promotes traction, braking capability and safety.

FITTING

Important to practise good fitting procedures

- Lubrication
- Cleaning rim
- Cleaning tyre
- Lie flat
- Double inflation



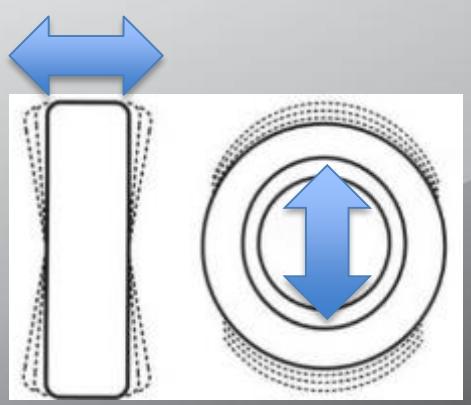
What happen if not fitted correctly

FITTING

How to check if the tyre has seated correctly

Balancing

- Correct balancing reduces vibrations
- Show fitting errors
- Balancing only hides the imbalance. The imbalance is still there!
- Check for excessive runout
  - Lateral
  - Radial



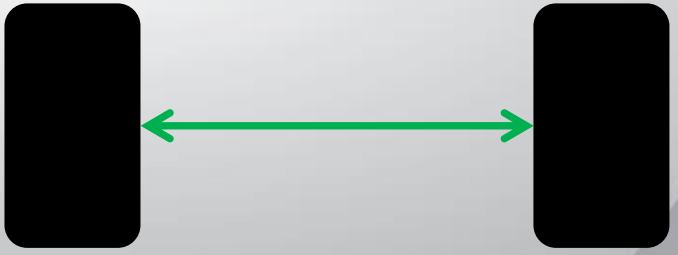
Stacking of Tolerances

Combined Tolerance – Radial run out	
Wheel Bearings	0.13mm
Hub to Wheel Clearance	0.61mm
Hub to drum Assembly	0.50mm
Aluminium Wheel Run out	0.76mm
Tyre Mis Mount	1.6mm
Tyre only	0.56mm
Total	**4.16mm**
Max. Industry Tolerance	2.4mm
Difference	1.76mm

ROTATIONS

Rotations

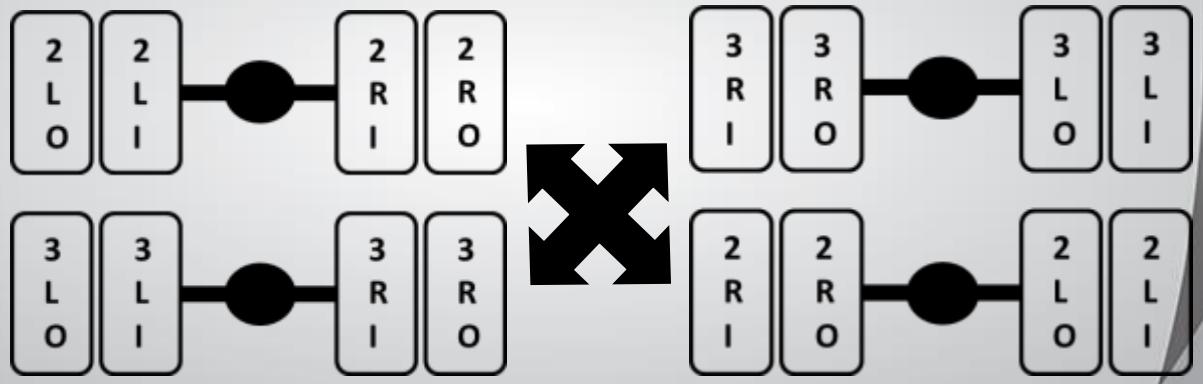
- Not all tyres on the same axle wear at the same rate
- Important to maximise tyre life
- Minimise irregular wear



- At 50% worn, rotate from left to right. If shoulder wear is present on the tyres, flip the tyre on the rim as well

ROTATIONS

- As a general rule, the inner tyres of a dual assembly have more pronounced wear on the inside shoulder. This effect is due to several factors: The tyre load, camber angle, type of suspension and route



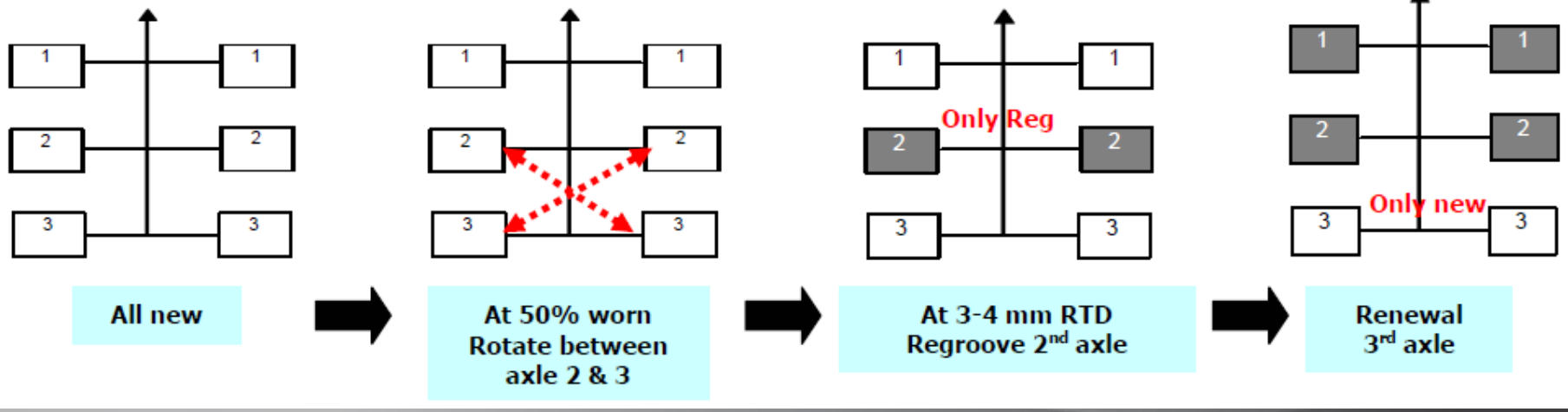
- Recommendation
- On boogie Drive rotate front to rear and inside to out when the fastest wearing tyres are at 50% worn
- Rotate tyres with heel and toe wear so they will run opposite to it original direction of rotation

Rotations

Tri Axle Wear Rate	
Axle	**Mileage**
1	75%
2	100%
3	60%

- Rotate tyres between faster and slower wearing axles when tyres are 50% worn – swap inside to outside positions.
- If inside shoulder wear is present rotate the tyre on the rim to minimize additional tyre wear

3 Axle Semi-Trailer



MICHELIN X One®

Reasons to Convert

1. **Save Fuel**

2. **More Payload**

3. **Drivers Love'em**

4. **Minimized Downtime**

5. **Increased Productivity**

6. **Be "Green"**

Michelin X One®

#1 Save Fuel

- Up to 10% reduction in fuel consumption
- 2 sidewalls instead of 4
- Advanced tread and casing technology

#2 More Payload

- Up to 40kg per position saving
- More when moving from steel rims
- B Double Trailer 500kg saving!

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Michelin X One

4. Save Time
   - One tyre to check instead of two
   - Only one tyre to mount instead of two
   - Fewer Flats on the road

Easier and Quicker Pressure Maintenance

Easier and Quicker Tyre Mounting

Michelin X One®

- Longer Brake List
  - Due to the outset of the wheel that goes with the MICHELIN® X One® Tyres, more brake drum is exposed. Providing greater flow around the brake drum.

Allows the brakes to ***run cooler***

Fleets have reported ***longer brake life***

OPTIMIZE YOUR TYRE PRESSURES

CHET CLINE AIR CTI

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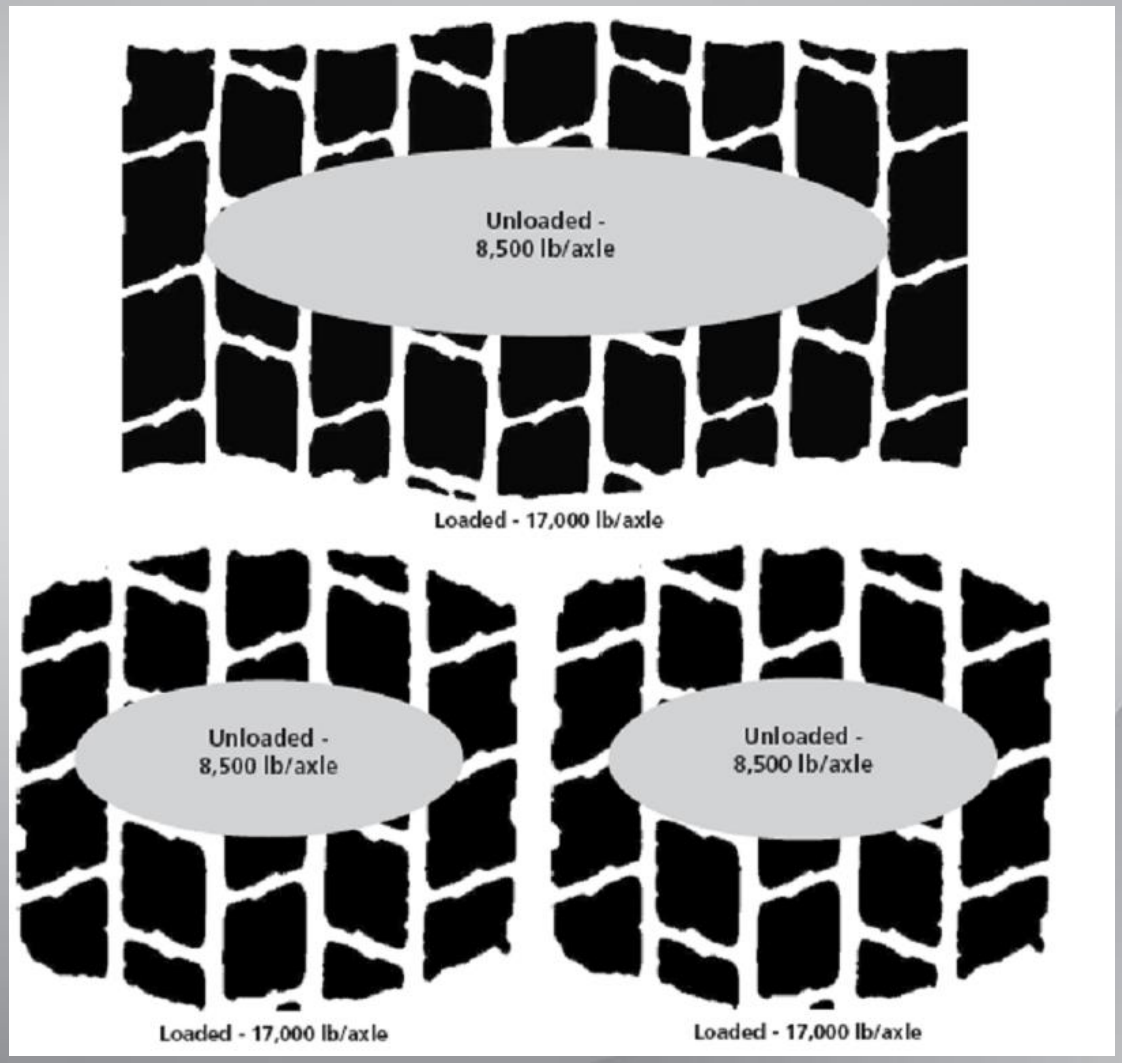
TYRE PRESSURE CONTROLS THE FOOTPRINT



The optimal footprint is important. It's dimensions are specific: An 11R22.5 footprint at 7,727 kg is 204 mm long. Imagine how small it is when unloaded.

TIRE	AXLE LOAD (lbs)	PRESS (psi)	LOADED SECTION WIDTH	FOOTPRINT LENGTH	FOOTPRINT WIDTH	TOTAL FOOTPRINT AREA		CONTACT SURFACE RATIO		TOTAL CONTACT AREA	% OF 2 DUALS
			mm	mm	mm	mm		sq mm		sq mm	
445/50R22.5 X One XDA	17,000	105	459	201	376	69,400	x	0.686	=	47,600	0.98
275/80R22.5 XDA2	17,000	105	297	200	216	39,450	x	0.616	=	24,300	
455/55R22.5 X One® XDA-HT™	17,000	100	472	227	385	74,350	x	0.697	=	51,800	0.95
11R22.5 XDA-HT™	17,000	100	304	204	216	41,250	x	0.674	=	27,800	
275/80R24.5 XDA-HT	17,000	100	298	206	215	40,750	x	0.670	=	27,300	

Picture

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Use All of Your Rubber

5.9 Bar = 85 psi 3.4 Bar = 49 psi
The Optimum pressure depends upon the load

Charge par enveloppe *Load per tire* (Kg)		Vitesse - *Speed* (Km/h 130 120 110 100
Nominal route *Nominal road conditions*	2650	8.0
	2500	7.5
	2250	6.7
	2000	5.9
	1750	5.0
	1500	4.2
	1250	3.4

When the load changes, the ideal tyre pressure changes

Recommended Cold Tyre Pressure Load to Inflation Table

22.5 inches

Table of Inflation Pressure (bar) in relation to maximum load per axle (kg)

	54	58	62	65	69	73	76	80	83	87	91	95	98	102	105	109	112	116	120	124
	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00	8.25	8.50
11R single tyre axle load						4140	4320	4500	4680	4860	5040	5220	5400	5580	5760	5940	6120	6300		
11R dual tyre axle load						7620	7950	8290	8620	8950	9280	9610	9940	10270	10610	10940	11270	11600		

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Use All of Your Rubber

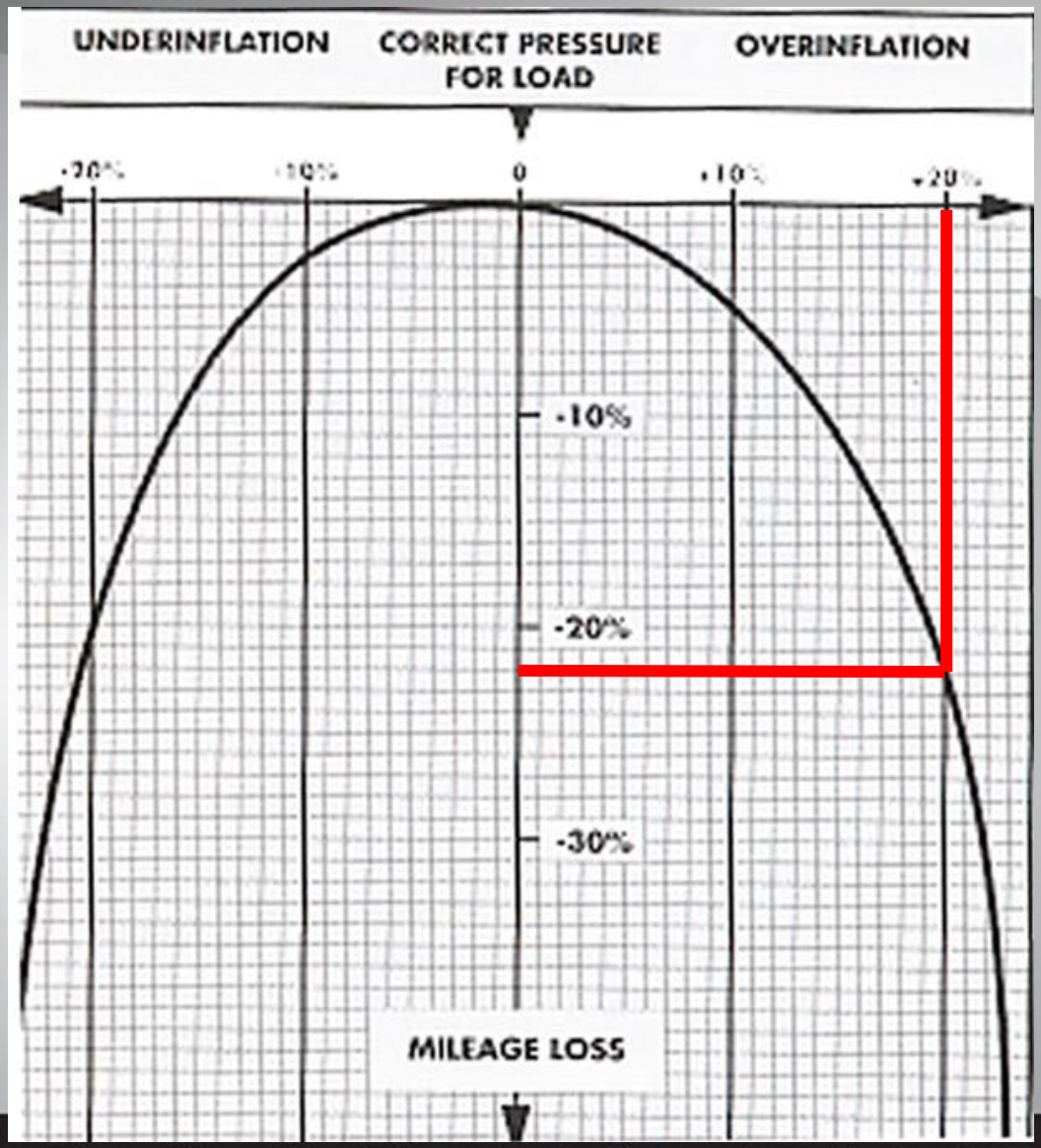
Michelin Second Most important point is: Put in the right pressure for the load

9 KEY POINTS FOR OPTIMUM TYRE MANAGEMENT

- Choose the right tyre for the right job: select the correct tyre and fitment according to vehicle type and operating requirements, whether for replacement or specification on new vehicles
- **Inflate your tyres in relation with load per axle and tyre sizes**
- Monitor regularly the wear and general condition of your tyres (tread pattern, sidewall, wheels etc.) and inflation pressure
- Utilise the Michelin multi-life casing New/Regrooving/Retreading
- Regroove to increase tread depth and mileage by as much as 25% with increased safe
- Retread Michelin casings with Michelin technology
- Manage potential life of casing for further retreading
- Choose Michelin Retreading tread patterns depending on your needs
- The benefit of Michelin Retreading is the quality and performance which is similar to a new Tyre

Use All of Your Rubber

Mileage loss of a drive tyre on Aussie roads (Michelin)



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Use All of Your Rubber

Change the tyre pressure for different roads

11R22.5 Recommendations

	Charge Kg	Vitesse Km/h	Pression bar
Utilisation route - *Road use*	2650	100	8.0
Utilisation piste - *Track use*	1700	65	3.1
Utilisation sable/boue - *Sand/mud use*	1700	20	1.7
Utilisation en jumelé - *Dual fitment use*	2650	100	8.0

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There is one ideal tyre footprint for each tyre

This is an 11R22.5 Michelin tyre spec

EMPREINTE AU SOL - *GROUND CONTACT AREA**			
Longueur - *Length*	240 mm	Surface totale - *Total area*	427 cm^2
Largeur - *Width*	184 mm	Surface réelle - *Net area*	365 cm^2

*AUX CONDITIONS NOMINALES ROUTE - *FOR NOMINAL ROAD CONDITIONS*

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This chart is for a single tyre, like a typical steer tyre
Dual tyres need higher pressures for the same load
This is recommended pressures at different loads

Charge par enveloppe *Load per tire* (Kg)		11R22.5 SINGLE TYRE			
		130	120	110	100
Nominal route	3150	116 psi		8,0	8,0
	3000	110 psi		7,6	7,6
	2750			6,9	6,9
Nominal road conditions	2500			6,2	6,2
	2250			5,5	5,5
	2050	71 psi		4,9	4,9
	2000			4,8	4,8
	1750			4,1	4,1
	1500			3,4	3,4
	1250			2,7	2,7
	1000	29 psi		2,0	2,0

NO FLAT SPOT
THIS TINY FOOTPRINT IS DANGEROUS
THIS TYRE IS SEVERELY OVER INFLATED!

THIS TYRE IS EVEN WORSE
THIS TYRE IS SEVERELY OVER INFLATED!

THESE TYRES ARE SEVERELY OVER INFLATED

Use All of Your Rubber

Note the flat spot
This is closer to correct pressure for the load

NOTE THE FLAT SPOT
THIS IS HOW EVERY TYRE SHOULD LOOK WHEN COLD

DOES IT MATTER?
OVER INFLATION AGGRAVATES OR CAUSES ALL UNEVEN WEAR PATTERNS

OVER INFLATED TYRES CAUSE VERY HIGH LOADS ONTO SHARP ROCKS DAMAGING TYRES AND GET 60% MORE PUNCTURES AND STAKING.

OVER INFLATED TYRES ON GRAVEL ROADS SUFFER

WOULD YOU RUN 100 PSI IN THESE TYRES?

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THESE DRIVE TYRES HAVE LESS WEIGHT ON EACH TYRE THAN YOUR FALCON IT SHOULD HAVE 25 PSI

LOWER PRESSURES FOR SOFT GROUND ARE SUPERB

Use All of Your Rubber

Thank you for letting me rave on.

Chet Cline
AIR CTI
www.aircti.com

Aussie Made, World's Best Central Tyre Inflation

Michael Nichols - Alcoa

Wheels

- Rims
- Different wheels on different trucks
- Different types of wheels and interchangeability
- Which nuts to use
- What to look out for

WHEEL SIZES

- 10/285. 22.5x8.25. US Fitment
- 10/335. 22.5x8.25. European Fitment

- Most commonly used wheel sizes in both Truck and Trailer fitment

10/285 US FITMENT

- 26mm Stud Holes
- Long wheel studs used
- Conventional wheel nut used
- Commonly used on Kenworth, Mack, Western Star, Freightliner

10/335 EUROPEAN

- 26mm stud holes
- Long wheel studs used
- Conventional wheel nut used
- Commonly used on Scania, Mercedes, Iveco

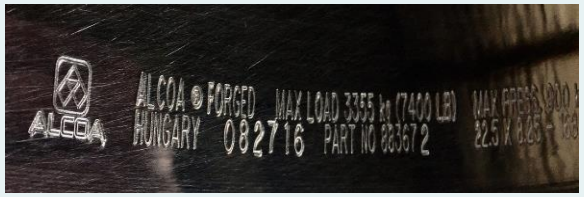
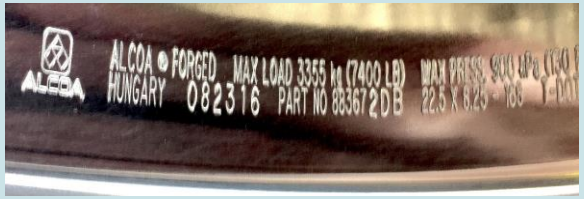
10/335 EUROPEAN RETROFIT

- 32mm stud holes
- Used on trucks and trailers with short wheel studs.
- Tube nut used or retrofit nut
- Tube size differs from single wheel to dual wheel

10/335 VOLVO FITMENT

- 26mm internal, 30mm external stud holes
- To be used only on Volvo trucks
- Special Volvo nut
- Wheel nut does nut differ from single wheel to dual wheel

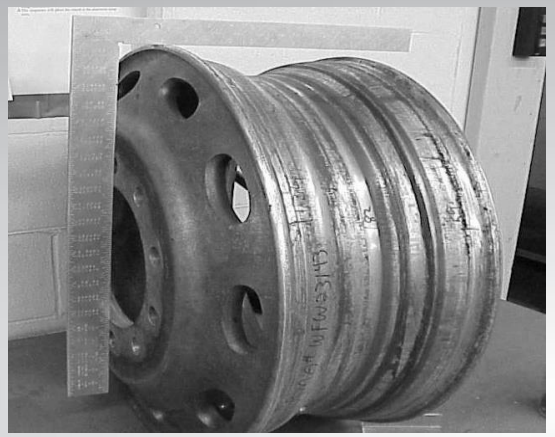
WHEEL MARKINGS

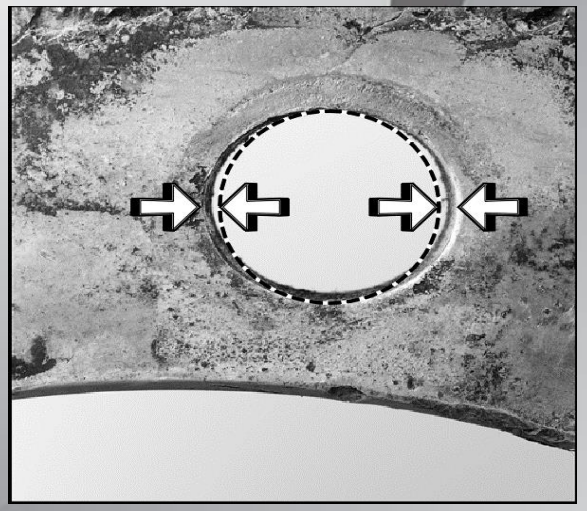
Wheel Decal	Wheel Roll Stamp	Part Numbers
		LvL ONE® Wheels 883677
		Polished Wheels 883672 883671
		Dura-Bright® EVO Wheels 883672DB 883671DB

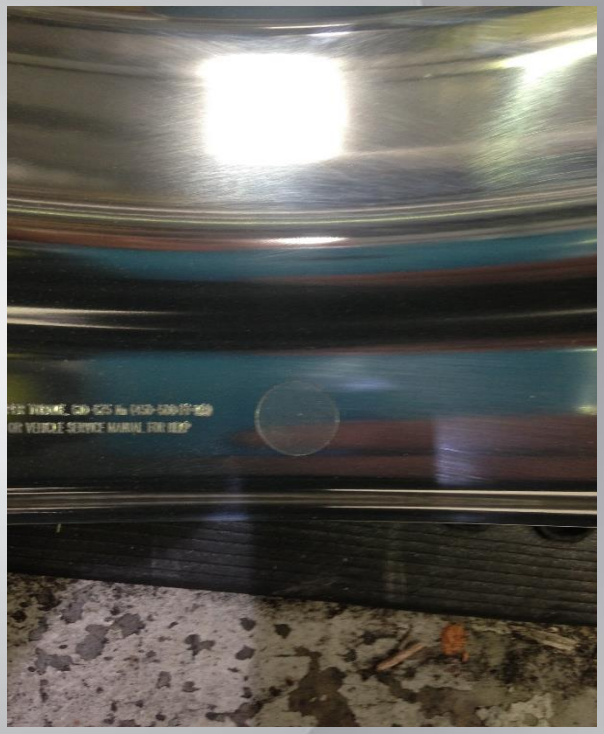
WHEEL MARKINGS

Wheel Decal	Wheel Roll Stamp	Part Numbers
		ULTRA ONE™ Wheels ULTRA2 ULTRA1 ULTRA7
		ULTRA ONE™ Dura-Bright® XBR ULTRA2DB ULTRA1DB

DAMAGED WHEELS







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