Elite XP
Total Evolution

TRELLEBORG
WHEEL SYSTEMS

Trelleborg presents a new step in Solid Tire Technology

The rapid evolution of modern material handling equipment, the increase in lifting capacity, the use of powerful engines resulting in higher torques and stress is creating a major wind of change in the requirements for solid tires. This has led the industry to develop new sizes and solutions.

Trelleborg, a leader in the field of design and production of rubber resilients and press-on solid tires, has decided to take action and respond to this market trend through the technological leadership of its R&D and Technical centers. The result of new design concepts (named CDM) is a new range of resilient tires called ELITE XP, which was born under the historical Bergougnan brand. Elite XP is a premium quality 3-stage tire designed to meet requirements of all applications, up to the heaviest duty.

The new range fully complies with ETRTO standards and, through extensive field testing on various types of handling equipment, industrial trailers, excavators, etc, it is of course an OEM approved product.
Elite XP is available in standard and in LOC mounting versions, for the best productivity of people committed to deliver reliable on time service to the industry.

An important step for Trelleborg, a Total Evolution for Solid Tire technology... Join us in this galaxy of innovation.

CDM Technology

The new Elite XP has been developed by Trelleborg Wheel Systems R&D department, which is a leading center for the development of new tire solutions used in Agriculture and Industrial/Material handling sectors, has developed the new Elite XP with state of the art technology. Furthermore the close cooperation with important laboratories and universities lead up to **new solutions**.

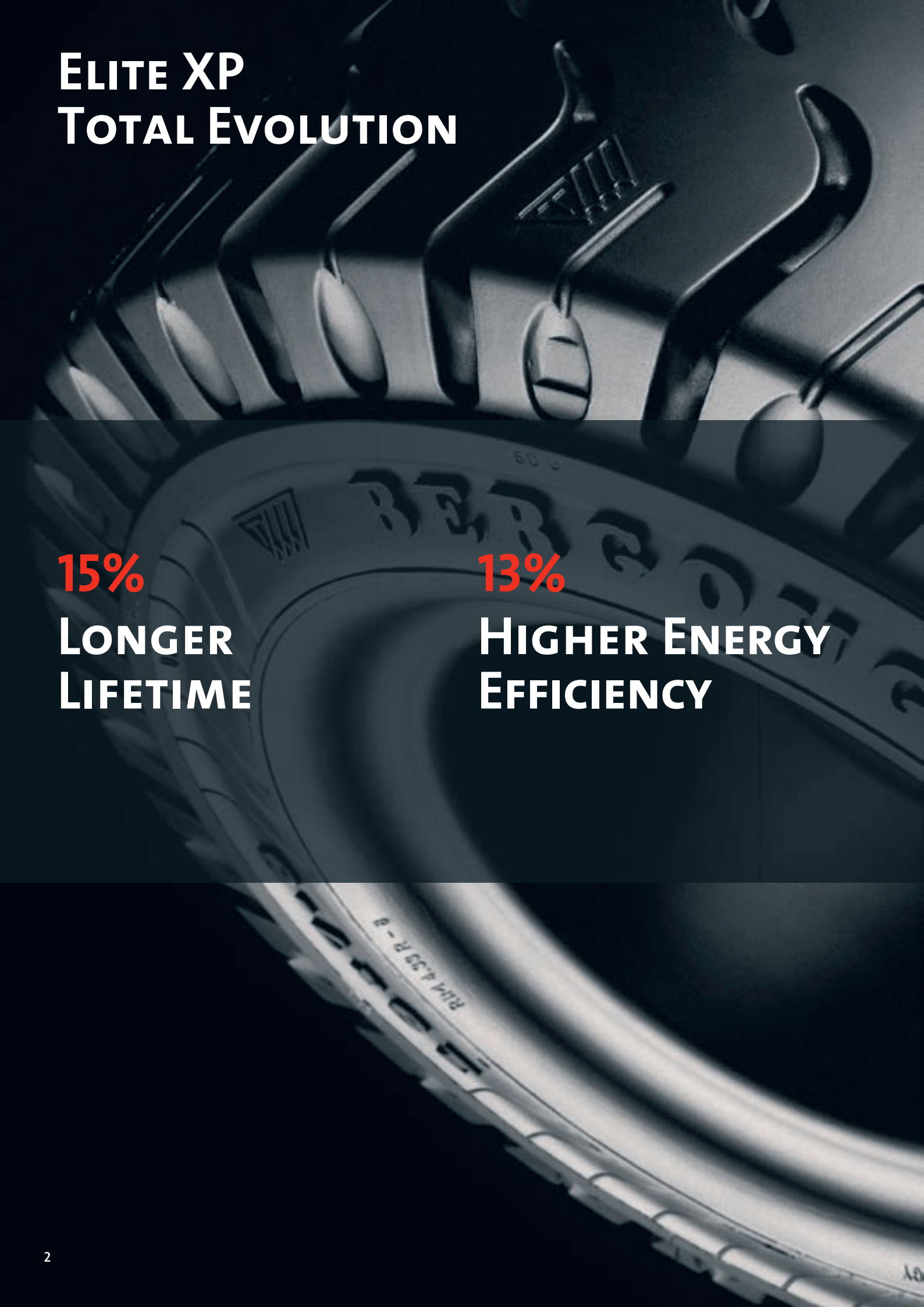
The concept of controlling the internal deformation of tires both under load in variable speed and acceleration conditions is one of the keys to success for the next generation of tires.

Trelleborg's **Controlled Deformation Matrix** technology links the results of finite elements analysis applied on rubber based products with the XP Design System for crown and sidewall area definition.

A number of parameters have been selected, field-acquired, analysed and then correlated to Tire Design and Indoor tests allowing for controlled tuning of tire performances.

ELITE XP: COMPARISON BETWEEN UNLOADED AND LOADED CONDITIONS

Elite XP
Total Evolution



15%

Longer Lifetime

13%

Higher Energy Efficiency

20%

Better Stability

Elite XP Design Evolution

Up to 15% more life

Nowadays material handling equipment represents an investment for any company producing or trading goods. The perceived value of this investment can be greatly affected by the choice of tires fitted on these machines.
Tires are made of rubber, a material that naturally shows a certain degree of wear during operations.

Trelleborg has managed to reduce this wear through construction design and new rubber compound recipes: ELITE XP today brings up to 15% more lifetime to your investment.
Nowadays ELITE XP standard black compound, a totally new development in the field of Polymer technology, has more wear and chemical resistance than ever.

20% More rubber

- Elite XP tread pattern ensures the maximum contact area (FOOTPRINT) between the tire and the ground - PICTURE 1

- Elite XP shows the greatest NET AREA, i.e. quantity of rubber permanently in contact with soil - CHART 1

- The higher the contact area, the lower is the specific pressure, this means:
  1. less stress on the tire (preventing uneven wear phenomena and possible early failure)
  2. less aggressiveness on pavements of modern logistic sites

- Last but not least the squarer footprint ensures better stability

10% More tread depth

- More tread depth allowing tire consumption to its maximum ensuring a longer lifetime

- Careful design of grooves between lugs in order to minimize distortion of blocks and increase overall stiffness of tire and tread

- **Special wear indicators** show at any time the level of consumption and give an estimation of left tire life - PICTURE 2

15% Less heat build up

- Deformation control under any working condition cuts down heat build-up by up to 15% - CHART 2 - This reduces the well known risk of tire failures and the need for careful driving.

- With Elite XP **operating speed and carrying hauls** are higher

- Thermo-camera analysis in field testing - PICTURE 3 - proves that **Elite XP is really cool!** The best result against any competitor's tire.

CHART 1 - Footprint net area - Wear Level
Higher is better

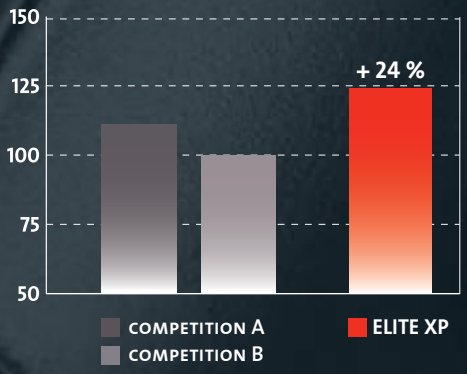
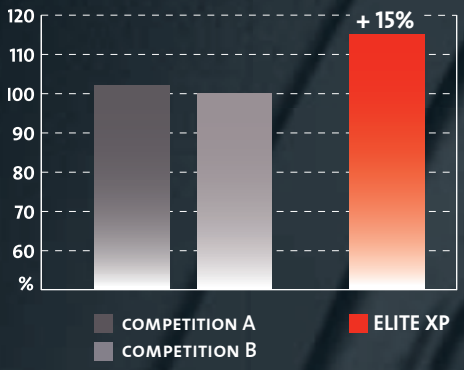
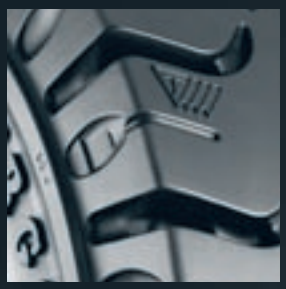


CHART 2 - Reduction in Heat build up
Durability/Problem free

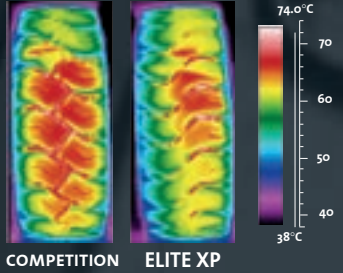


PICTURE 1
Footprint area

PICTURE 2
Sidewall with wear indicators



PICTURE 3
Thermo-camera analysis
of heat build-up



13% HIGHER ENERGY EFFICIENCY

Efforts of Trelleborg's R&D department have been strongly focused on how to optimize energy consumption linked to the use of forklift trucks. In modern industry, reducing fuelling needs means both a saving in terms of money (fuel) and increased availability time of equipment.

Availability is a measure of efficiency for any investment in equipment: it can be defined as the number of hours worked by the machine divided by the total number of working hours. Especially for electric forklift trucks, for which battery recharching time is a loss of productivity, reducing energy consumption brings great benefit and grants intensive usage of your investment.
It's not without reason that forklift manufacturers are continuously investing in technology to reduce more and more the causes of (internal) energy loss (combustion, rotating parts, friction, batteries etc).

Energy efficiency

- Elite XP shows **up to 13% better energy efficiency** compared to competition tires in terms of Rolling Resistance coefficient (the typical index used for resilient tires) - CHART 3

- This can result in **savings in battery life** (for ITA class 1 equipment), **gas and diesel** (for ITA class 4&5 machines)

Better equipment performances

Elite XP also offers the following improved machine performances :
- higher maximum speed
- higher acceleration
- benefit from reduced tire deformation and lower friction

Total quality

Energy Efficiency is obtained through the combination of new rubber compounds plus tire construction optimization
- Elite XP highest quality rubber compound cuts down the effect of **hysteresis and plastic deformations** and avoids the loss of energy when the tire is deforming - CHART 4
- Elite XP raw materials are sourced directly from manufacturers and supplies are under the control of the Trelleborg Group to ensure production consistency
- the 3 stage structure of Elite XP, the distribution of the different layers and the shape of the tire are optimized by means of CDM technology for controlled deformation.

CHART 3 - ROLLING RESISTANCE - ENERGY SAVING
LOWER IS BETTER

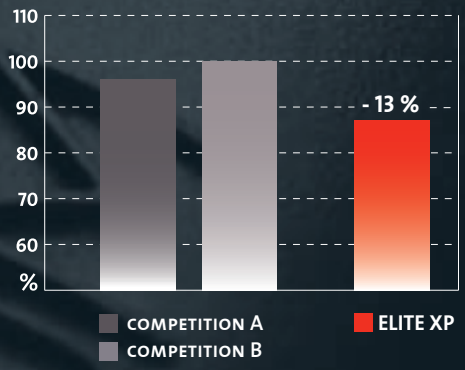
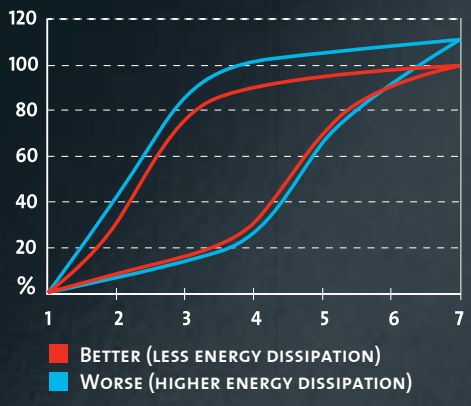


CHART 4 - HYSTERESIS CHART FOR DIFFERENT RUBBER COMPOUNDS



20% BETTER STABILITY UNDER ANY WORKING CONDITION

The main target for a resilient tire fitted on industrial equipment is to run problem-free as long as possible and ensure safe operations.

Especially in sharp turns, hard braking or sudden change of direction, it is vital to keep the forklift truck as stable as possible in order to avoid displacement or, even worse, loss of the carried load.

This both to preserve goods and not to cause accidents involving operators.

Optimal lateral stability

- During extensive lab and field tests, TWS has measured all parameters related to **LATERAL STIFFNESS** and road holding after unexpected steering **(LANE CHANGE)**

- In every condition both steering and load tires have been analysed

- Results show up to **20% better performance** compared to the current market offer
CHART 5 AND 6

Why take any risk then?

Extra load stability

- Elite XP **large footprint** and **higher contact** area is a further guarantee for good stability

- Whenever sudden events such as hard braking, hits or skidding endanger the stability of the transported load, it is proven that a large support area is the best way **to prevent drop of goods and increase people's safety**

- Elite XP features a **high rim compression** factor for firm fitment on wheels

Higher damping capacity

- Elite XP extra stability is also related to its damping capacity

- **Trelleborg's new range offers better absorption (up to 10% over competition)** of hits and vibrations caused by impact with bumps and holes - CHART 7

- Elite XP's control of deformations means also less time required to come back to normal running

CHART 5 - LATERAL FRICTION - LATERAL STABILITY
HIGHER IS BETTER

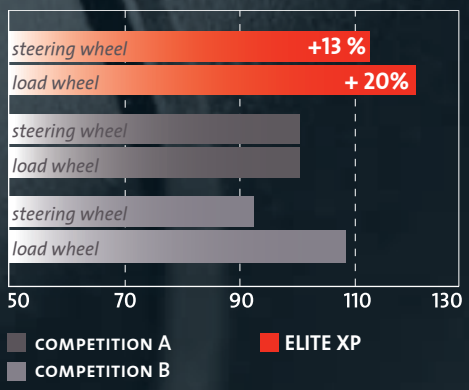


CHART 6 - LANE CHANGE TEST - LOAD STABILITY
HIGHER IS BETTER

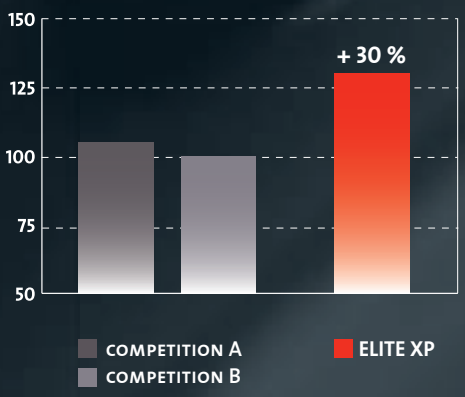
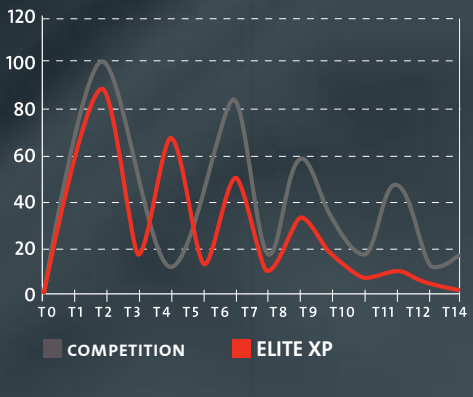


CHART 7 - SHOCK-ABSORPTION ANALYSIS AFTER IMPACT



New design concepts

One of the main Elite XP features is that it benefits from a change in design approach. Together with standard criteria applied in the sector of Resilient tires for many years, Trelleborg R&D has introduced new concepts derived from parallel sectors such as Truck, Light Industrial Vehicles and MPT (Multi Purpose Tires).

Elite XP is not only the perfect tire for the end-user but also for people providing service to the industry: Elite XP is designed as an «assembly unit», it means that it's compatible with rims and wheels of any manufacturer respecting the ETRTO recommendations. Furthermore, Elite XP is anticipating the most severe directives in terms of Environmental Protection issued by the European Union legislation.

That's why Elite XP offers all the following features.

Total tread traction

- high traction both in indoor and outdoor applications due to its aggressive lug design

- maximum grip both on dry and wet surfaces with self-draining grooves

Noise control

- Elite XP integrates a truck technology solution to reduce noise normally generated by the impact of the tread surface on the ground

- Elite XP tires can reduce tire related noise generation up to 8% - chart 8

- Better compliance with health and safety standards for indoor working environments

Easy to work with

- Mounting and dismounting of the XP range are tested and approved by Trelleborg partners worldwide

- maximum compatibility with rims of the main wheel manufacturers

- high rim compression factor for firm fit on wheels

Care for environment

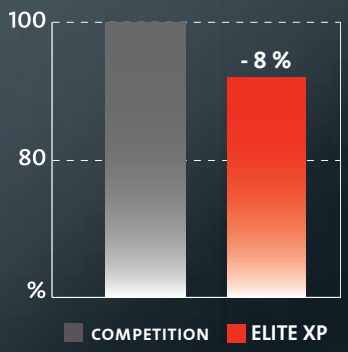
The new Elite XP is made of rubber compounds which are "Oil Free".

This anticipates the prescriptions of EU Directive 2005/69/CE article 3 (2) coming from the European Commission.
In this document it has been decided that starting from 01.01.2010 all polycyclic aromatic oils (plastifizers) will have to be eliminated from industrial processes while Benzo[a]pyrene have to be used up to a maximum of 1 ppm.

Elite XP:
more attention to people, more attention to our future!

picture 5 - Elite XP tread design

chart 8 - Perceived noise level from driver seat on Electrical FLT



picture 6 - Mounting and Dismounting operation

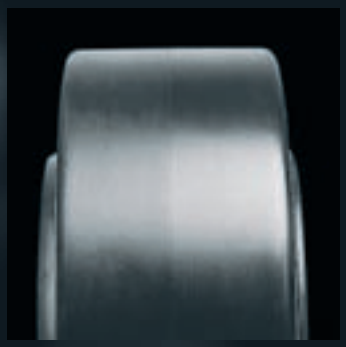
eliteXP

Size	Rim width	ETRTO	Profile					Dimensions		Load capacity (kg)				
								Max.	Overall	Forklift up to 25 km/h		Other vehicles (trailers)		
			XP	LG	L	Elite XP	Elite XP Loc	width (mm)	diam (mm)	load wheel	steer wheel	6 km/h	10 km/h	25 km/h
3.00 - 4	2.10 - 4	■	●			x		84	250	260	195	260	235	195
	2.50C - 4		●			x		84	250	260	195	260	235	195
4.00 - 4	2.50C - 4	■	●			x		93	306	535	410	535	485	410
4.00 - 8	3.00D - 8	■	●	●		x	x	104	406	950	730	950	860	730
	3.75 - 8			●		x		IN PREPARATION		1005	775	1005	915	775
5.00 - 8	3.00D - 8	■	●			x	x	122	457	1415	1090	1415	1285	1090
15x4 1/2 - 8	3.00D - 8		●	●		x	x	118	377	1040	800	1040	940	800
	3.25I - 8	■	●			x		118	377	1040	800	1040	940	800
16x6 - 8	4.33R - 8	■	●			x	x	152	411	1455	1120	1455	1320	1120
18x7 - 8	4.33R - 8	■	●		●	x	x	158	456	2145	1650	2145	1950	1650
6.00 - 9	4.00E - 9	■	●			x	x	141	524	1885	1450	1885	1710	1450
140/55 - 9	4.00E - 9	■	●			x	x	132	380	1170	900	1170	1060	900
21x8 -9	6.00E - 9	■	●			x	x	186	516	2755	2120	2755	2505	2120
6.50 - 10	5.00F - 10	■	●			x	x	160	574	2340	1800	2340	2125	1800
23x9 - 10	6.50F - 10	■	●			x	x	200	583	3445	2650	3445	3125	2650
200/50 - 10	6.50F - 10	■	●			x	x	197	456	2470	1900	2470	2240	1900
7.00 - 12	5.00S - 12	■	●		●	x	x	171	650	2920	2240	2920	2640	2240
23x10 -12	8.00G - 12	■	●			x	x	240	583	3770	2900	3770	3420	2900
27x10 - 12	8.00G - 12	■	●			x	x	240	676	3900	3000	3900	3540	3000
23x5	3.75P - 13	■	●			x		138	617	1495	1150	1495	1355	1150
5.50 - 15	4.50 - 15		●			x		143	664	2195	1625	2155	1870	1495
6.00 - 15	4.50 - 15		●			x		150	693	2455	1820	2435	2095	1675
7.00 - 15	5.50 - 15	■	●			x	x	180	730	3545	2725	3545	3215	2725
7.50 - 15	5.50 - 15		●			x		194	744	3900	3000	3900	3540	3000
	6.00 - 15	■	●			x		194	744	3900	3000	3900	3540	3000
	6.50 - 15		●			x		194	744	3900	3000	3900	3540	3000
8.25 - 15	5.50 - 15		●			x		208	806	4530	3485	4530	4110	3485
	6.50 - 15	■	●		●	x	x	208	806	4750	3650	4750	4300	3650
28x9 - 15	7.00 - 15	■	●			x	x	225	692	3900	3000	3900	3540	3000
(8.15 - 15)														
28x12 1/2-15	9.75 - 15	■	●			x	x	284	710	5525	4250	5525	5015	4250
250 - 15	7.00 - 15	■	●			x	x	225	709	4640	3570	4640	4200	3570
	7.50 - 15		●			x	x	236	709	4640	3570	4640	4200	3570
300-15	8.00 - 15	■	●		●	x	x	255	812	5850	4500	5850	5310	4500
355/65 - 15	9.75 - 15	■	●			x	x	284	812	7800	6000	7800	6430	6000
7.50 -16	6.00F 16		●			x		204	752	3950	3050	3950	3600	3050
9.00-20	6.50 - 20	■	●			x		220	974	5400	4500	5400	4910	4500
	7.00 - 20	■	●			x		220	974	5400	4500	5400	4910	4500
10.00-20	6.50 - 20	■	●			x		250	1009	5840	4865	5840	5290	4865
	7.50 - 20	■	●		●	x		250	1009	6000	5000	6000	5455	5000
	8.00 - 20	■	●			x		250	1009	6000	5000	6000	5455	5000
11.00 - 20	8.00 - 20	■	●			x		260	1040	6540	5450	6540	5925	5450
12.00 - 20	8.00 - 20	■	●		●	x		260	1090	7560	6300	7560	6870	6300
	8.50 - 20	■	●			x		260	1090	7560	6300	7560	6870	6300
	10.00 - 20	■	●			x		313	1090	7800	6500	7800	7100	6500
12.00 - 24	8.50 - 24	■	●			x		295	1178	8040	6700	8040	7300	6700
	10.00 - 24	■	●			x		295	1178	8280	6900	8280	7530	6900
14.00 - 24	10.00 - 24	■	●			x		326	1318	11100	9250	11100	10100	9250
16.00 - 25	11.25 - 25		●			x		410	1442	15000	12500	15000	13600	12500

Available tread patterns

XP

LG



L

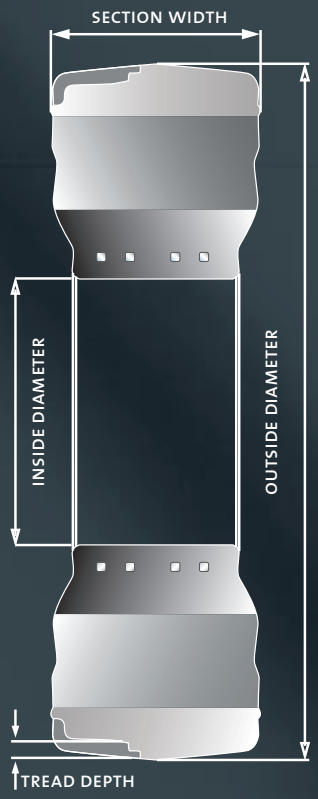
Available compounds

NM Non marking - White compound eliminating black tire marks on any surface. High performance tire.

CR cut resistant - Very efficient on rough, jagged surfaces. Prevents chunking and sidewall damage.

Elcon - Prevents electric shock and sparks. Required in explosive environments where static electricity build-up is a concern.

HL High load - A two-stage tire with excellent performance in high load circumstances. Good ride quality and reduced heat build up.



Resilient sizes and dimensions

For Resilient tires there are 4 different size designation used

5.00	–	8
section width		nominal wheel diameter
inch		inch

250	–	15
section width		nominal wheel diameter
mm		inch

18	x	7	–	8
outside diameter		section width		nominal wheel diameter
inch		inch		inch

200	/	50	–	10
section width		aspect ratio		nominal wheel diameter
mm		%		inch

Elite XP
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TRELLEBORG
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