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SELECTION, APPLICATION, MAINTENANCE

Proper tire selection, application and maintenance continue to be the most important factors in earthmoving economics. Wheel tractors, loaders, scrapers, trucks, motor graders, etc. are earthmoving equipment whose productivity and payload unit cost may depend more on tire performance than any other factor.

Off-the-road tires must operate under a wide variety of conditions ranging from dry “potato dirt” through wet severe shot rock. Speed conditions vary from less than 1 mph average to 72 km/h (45 mph). Gradients may vary from 75% favorable to 30% adverse. Climatic conditions, operator skills, maintenance practices, etc. all may have a profound effect on tire life and unit costs.

Although one specific tire construction may be acceptable in a variety of applications, no one tire can meet all requirements on any one machine and perhaps not even one job. The many differences in tire requirements on earthmoving machines have resulted in a wide variety of tread and casing designs being made available. The optimum tire selection for a specific machine on a given job should be a joint decision between the user and tire supplier. Several tire manufacturers have technical and application representatives in the field for proper guidance in tire selection.

When job conditions change, it may be desirable to select a different tire configuration to meet the new requirements.

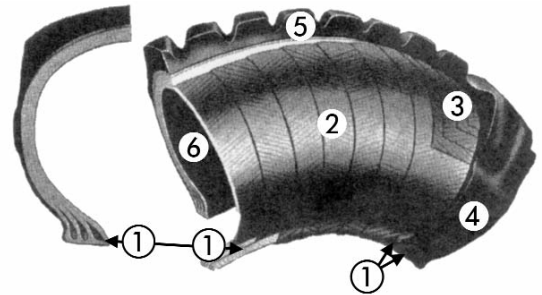
TIRE CONSTRUCTION

The pneumatic tire is essentially a flexible pressure vessel utilizing structural members (nylon, steel cable, etc.) to contain the hoop tension resulting from the inflation pressure. Rubber is utilized as a protective coating and sealant over the structural members and makes up the tread pattern which provides the wearing medium at the ground interface. The following brief explanation of the various tire constructions will assist you in selecting tires for your specific application.

Two distinct tire constructions approved on all Cat machines are the BIAS PLY and RADIAL PLY tires. Radial tires are designated by an “R” while a “.” represents a Bias constructed tire. For example, a 45/65-45 tire would be of Bias construction and a 45/65R45 would be of Radial construction. The following is a brief explanation of the principal features of these two constructions.

Bias Ply

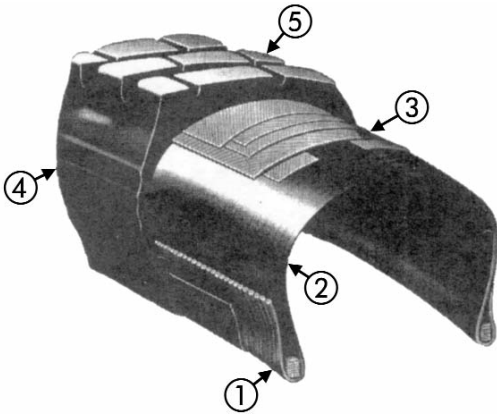
1. *Beads* — The tire beads consist of steel wire-bundles (3 or 4 in larger tires) which are forced laterally by tire inflation pressure to wedge the tire firmly on the rim’s tapered bead seat. The nylon plies tie into the bead bundles. The forces inherent in the tire are transmitted from the rim through the bead bundles into the nylon.
2. *Body plies* — Layers of rubber-cushioned nylon cord comprise the tire casing. Alternating plies of cord cross the tread centerline at an angle (bias). The term “ply rating” is an index of tire strength and not the actual number of tire plies.



Bias Ply Construction

3. *Breakers or tread plies* — These, if used, are confined to the tire’s tread area and are intended to improve casing strength and provide additional protection to the body plies. Some “work” tires employ steel breakers or belts to further protect the casing.
4. *Sidewalls* — These are the protective rubber layers covering the body plies in the sidewall.
5. *Tread* — The wearing part of the tire that contacts the ground. It transmits the machine weight to the ground and provides traction and flotation.
6. *Inner liner* — This is the sealing medium that retains the air and, combined with the “O” ring seal and rim base, eliminates the need for inner tubes and flaps.
7. *Tubes and flaps (not shown)* — Required if the tire is not of tubeless construction with an inner liner.
8. *Undertread* — Protective rubber cushion lying between tread and body ply.

Radial Ply



Radial Ply Construction

1. *Beads* — A single bead bundle of steel cables or steel strip (spiraled like a clock spring) comprise the bead at each rim interface.
2. *Radial casing* — This consists of a single layer or ply of steel cables laid archwise (on the radian) bead to bead.
3. *Belts* — Several layers or plies of steel cable form the belts which underlie the tread area around the tire circumference. The cable in each belt crosses the tread centerline at an angle with the angle being reversed from the preceding belt.
4. *Sidewalls*.
5. *Tread*.
6. *Undertread* — Protective rubber cushion lying between tread and steel belts.

Bias and Radial Tire Advantages

	Bias	Radial
Tread Life		X
Heat Resistance		X
Cut Resistance — Tread		X
Cut Resistance — Side Wall	X	X
Traction		X
Flotation		X
Stability	X	
Fuel Economy		X
Repairability		X

TIRE TYPES

Off-the-road tires are classified by application in one of the following three categories:

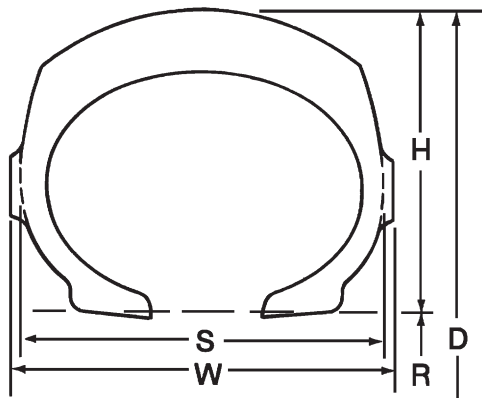
1. *Transport tire* — For earthmoving machines that transport material such as trucks and wheel tractors.
2. *Work tire* — Normally applied to slow moving earth-moving machines such as graders and loaders.
3. *Load and carry* — Wheel loaders engaged in transporting as well as digging.

TIRE SIZE NOMENCLATURE

Tire size nomenclature is derived from the approximate cross section width and rim diameter typically in the format of Tire Width, Aspect Ratio, and Rim Diameter (example: 45/65-45). Available tire types include:

1. A wide base tire has a section height to section width ratio in the range of 0.83. As an example, a 29.5-25 tire has an approximate cross section width of 749 mm (29.5") (first number) and a rim diameter of 635 mm (25") (second number).
2. A conventional tire has a section height to section width ratio in the range of 0.96. As an example, a 24.00R35 tire has an approximate cross section width of 610 mm (24") (first number) and a rim diameter of 889 mm (35") (second number).
3. A low profile tire has a section height to section width ratio in the range of 0.65. As an example, a 45/65-45 tire has an approximate cross section width of 1143 mm (45") (first number), a 65% aspect ratio designated as 65 (second number), and a rim diameter of 1143 mm (45") (third number).
 If designated 45/65 R39, then the R denotes radial construction.

When comparing a wide base tire to a standard base tire, a larger first number on a wide base tire with the same rim diameter does not mean the wide base is larger in overall diameter. For example, the 18.00-25 conventional tire is larger in diameter than the 20.5-25 wide base tire. The 18.00-25 is comparable in overall diameter to the 23.5-25 wide base tire.



Tire cross-section

- D = Tire Overall Diameter
- R = Nominal Rim Diameter
- H = Tire Section Height
- S = Tire Section Width
- W = Tire Width (includes ornamental ribs)
- $\frac{H}{S}$ = Aspect Ratio

CODE IDENTIFICATION FOR OFF-HIGHWAY TIRES

The tire industry has adopted a code identification system to be used for off-the-road tires. This identification system will reduce the confusion caused by the trade names for each type of tire offered by each tire manufacturer. The industry code identification is divided into six main categories by types of service as follows:

- C** — Compactor Service
- E** — Earthmover Service
- G** — Grader Service
- L** — Loader and Dozer Service
- LS** — Log-Skidder Service
- F** — Industrial
- R** — Agricultural Tractor
- I** — Agricultural Implement

The sub-categories are designated by numerals, as follows:

Code Identification		% Tread Depth
Compactor		
C-1	Smooth	100
C-2	Grooved	100
Earthmover		
E-1	Rib	100
E-2	Traction	100
E-3	Rock	100
E-4	Rock Deep Tread	150
E-7	Flotation	80
Grader		
G-1	Rib	100
G-2	Traction	100
G-3	Rock	100
G-4	Rock Deep Tread	150
Loader and Dozer		
L-2	Traction	100
L-3	Rock	100
L-4	Rock Deep Tread	150
L-5	Rock Extra Deep Tread	250
L-3S	Smooth	100
L-4S	Smooth Deep Tread	150
L-5S	Smooth Extra Deep Tread	250
L-5/L-5S	Half Tread Extra Deep	250
Log-Skidders		
LS-1	Regular Tread	100
LS-2	Intermediate Tread	125
LS-3	Deep Tread	150
HF-4	Extra Deep Tread	250
Industrial		
F-3	Traction Tread	
Agricultural Tractor		
R-1	Regular Tread	
R-3	Shallow Tread	
R-4	Industrial Tractor	
Agricultural Implement		
I-3	Tractor Tread	

Tire and Rim Assoc. Code	Tread Type	FIRESTONE	GOODYEAR DUNLOP	BRIDGESTONE	MICHELIN
Compactor					
C-1	Smooth Compactor		SMC-1A	RR	COMPACTEUR
C-2	Grooved Compactor			AL2	
Earthmover					
E-1	Rib		HRR-1A XDR-1A		
E-2	Traction	Super Ground Grip	GP-2B GP-3D AT-2 AT-2A RL-2F SGL-2A	VKT VSB VHB VFT VHS VSW	XGC X-CRANE XMH (S) XSNOPUS 170E XS XR XTLA
E-3	Rock	Super Rock Grip E67	GP-2B GP-3D HRL-3A HRL-3B HRL-3C HRL-3F RL-3 RL-3+ RL-3A RL-3F RL-3J RT-3A RT-3B WRL-3A	VLT VMT VJT VEL VRL VRD VRF WL RL	XK XR XMS XH XADN XAD65-1 SUPER E3 X-TRACTION RD S XTS XDM X-STRADDLE
E-4	Rock Deep Tread	Super Rock Grip Deep Tread	GP-4B GP-4B AT GP-4D HRL-4A HRL-4B MRL-4B, F RL-4 RL-4A RL-4B RL-4F RL-4H RL-4HII RL-4J RL-4JII RL-4L RL-4M+ RT-4A	VLTS VSNT VMTS VMTP VZTS VZTP VELSL VELS VRLS VRDP VRPS VRQP RLS ELS2	XDT XDR XRS XADT X SUPER TERRAIN AD XDM XHAUL XHAUL S XHD1 XKD1 X-QUARRY X-QUARRY S X-TRACTION RD
E-5	Rock Extra Deep Tread				
E-7	Flotation		EAW-7A SAW-7A SHY-7A SR-7A SRB-7A SRB-7A, 7B	VSJ SCP2	

Tires | Manufacturer's Designation

Tire and Rim Assoc. Code	Tread Type	FIRESTONE	GOODYEAR DUNLOP	BRIDGESTONE	MICHELIN
Grader					
G-1 G-2	Rib Traction	Super Ground Grip Road Builder	RBG-1A GP-2B GP-3D AS-3A ASG-2A AT-2A RL-2+ RL-2F SG-2A SG-2B SGG-2A SGL D/L-2A	RG FG GL VKT VSW VUT	XTL X SNOPLUS XGLA2 XR
G-3	Rock		GP-2B GP-3D HRL D/L-3A RKG-3A RKG-3C RL-3J RT-3B	RL	XH XLD L3
G-4	Rock Deep Tread	Super Rock Grip Deep Tread Road Builder	GP-4B GP-4B AT GP-4D SGG-4B		XLD D1 XLD SUPER L3
G-5	Rock Extra Deep Tread		HRL D/L-5A		XLD D2
Soil Compactor					
R-1	Regular Tread	Super All Traction II Super All Traction			
R-3	Shallow Tread	All Non-Skid Tractor	SFT105		

Tire and Rim Assoc. Code	Tread Type	TRIANGLE	EUROTIRE	YOKOHAMA	BELSHINA
Compactor					
C-1	Smooth Compactor				
C-2	Grooved Compactor				
Earthmover					
E-1	Rib				
E-2	Traction	TM518 TL508			
E-3	Rock	TB516		Y67 RB31	
E-4	Rock Deep Tread		Y11 U11 U12 U14		FT-116AM BEL-102 FT-117 FT-115
E-5	Rock Extra Deep Tread				
E-7	Flotation				
Grader					
G-1	Rib				
G-2	Traction	TL508			
G-3	Rock				
G-4	Rock Deep Tread				
G-5	Rock Extra Deep Tread				

Tire and Rim Assoc. Code	Tread Type	FIRESTONE	GOODYEAR DUNLOP	BRIDGESTONE	MICHELIN
Log Skidder					
LS-1 LS-2	Intermediate	Forestry Special CRC Forestry Special Severe Service		TGS	
LS-3 HF-4	Deep Extra Deep				
Loader and Dozer					
L-2	Traction	Super Ground Grip LD	GP-2B GP-3D AT-2 AT-2A RL-2F SGL D/L-2A SPT9 ET91 ET91-2	VUT VKT VSW GL FG	XLT XGL 2 XF X SNOPLUS M&S XMCA
L-3	Rock	Super Rock Grip LD	GP-2B GP-3D ELV-3A HRL D/L-3A HRL D/L-3B HRL D/L-3C HRL-3A RL-3 RL-3F RL-3J RT-3B	VLT VMT VJT VTS RL VL2	XH A XH A2 XLD L3 XKA XZSL
L-4	Rock Deep Tread	Super Rock Grip Deep Tread LD	AMS DMS D/L-4/15C AMS-4/5A GP-4B GP-4B AT GP-4C GP-4D HRL D/L-4/15C HRL D/L-4A HRL D/L-4G NRL D/L-4A NRL NDL D/L-4/15C RL-4K	VLTS VSNT VSNL RLS NL	XKD1 XLD D1 XLD SUPER L3

Tire and Rim Assoc. Code	Tread Type	FIRESTONE	GOODYEAR DUNLOP	BRIDGESTONE	MICHELIN
Loader and Dozer (cont'd)					
L-5	Rock Extra Deep Tread	Super Deep Tread LD	AMS D/L-5/8H AMS D/L-5/9A AMS DMS D/L-4/15C AMS-5/11F AMS-5/15C AMS-5/8F DRL D/L-5A HRL D/L-5A HRL D/L-5B NRL D/L-5A NRL NDL D/L-5/15C RL-5C,E,F RL-5K RL-5S RT-5C	VSDT VSDL DL	XLD D2 X MINE D2
L-3S	Smooth Tread	Plain Tread LD	SM-3A SMO D/L-3A		
L-4S	Smooth Deep Tread	Plain Tread LD	NSM D/L-4B SMO D/L-4A, B SMO-4B		
L-5S	Smooth Extra Deep Tread	Plain Tread LD Plain LD UMS	NSM D/L-5B SM-5A SMO D/L-5A, B SMO-5A, B, C	VSMS STMS	XSMD 2
L-5/L-5S	Half Smooth	Half Tread LD		DL2	
Backhoe Loader					
F-3	Industrial Multiple- Rib Tread	Industrial Special			
I-3	Traction Tread	Super Traction Loader			
R-4	Drive Wheel, Industrial Tractor Tread	All Traction Utility	SG Lug IT525 Industrial Sure Grip		XMCL

Tires | Manufacturer's Designation

Tire and Rim Assoc. Code	Tread Type	TRIANGLE	EUROTIRE	YOKOHAMA
Log Skidder				
LS-1				
LS-2	Intermediate			
LS-3	Deep			
HF-4	Extra Deep			
Loader and Dozer				
L-2	Traction	TL508		
L-3	Rock	TB516 TL612	F-220	RB31
L-4	Rock Deep Tread			Y524
L-5	Rock Extra Deep Tread		Euro 50	
L-3S	Smooth Tread			
L-4S	Smooth Deep Tread			
L-5S	Smooth Extra Deep Tread			
L-5/L-5S	Half Smooth			

Tire and Rim Assoc. Code	Tread Type	NOKIAN	BELSHINA	PIRELLI
Log Skidder				
LS-1				
LS-2	Intermediate			
LS-3				
HF-4				
Loader and Dozer				
L-2	Traction	Loader Grip TL		
L-3	Rock			
L-4	Rock Deep Tread		FBEL-283	RM99
L-5	Rock Extra Deep Tread			
L-3S	Smooth Tread			
L-4S	Smooth Deep Tread			
L-5S	Smooth Extra Deep Tread			
L-5/L-5S	Half Smooth			

RADIAL TIRE IDENTIFICATION

Code Identification for Michelin Tires

All Michelin earthmover tires are radial construction, designated by the “X” marking. They contain a single steel radial ply with a series of steel belts placed around the tire’s circumference which reinforce and stabilize the tread.

Following are the tread designs currently available from Michelin with the different internal constructions depending on the application.

- Type A4** Particularly resistant to cuts, tread tearing and abrasion on very rough surfaces.
- Type A** Particularly resistant to cuts, tread tearing and abrasion at average speeds which are higher than those for A4 (above).
- Type B4** Compromise solution between abrasion resistance and average speed on rough surfaces (available in sizes 49 inch rim diameter and above).
- Type B** Higher resistance to internal heat generation on surfaces which are not particularly rough.
- Type C4** For running on long cycles at high speeds on well maintained roads.
- Type C** Very high resistance to high average speeds on long cycles run on well maintained roads.

The current combinations of tread patterns, construction, and tread depths offered, and primary TRA codes are:

Tread Design	Tread Compounds				Primary TRA Code(s)
	Type A4	Type A	Type B	Type C	
X MINE D2		X			L-5
XAD 65-1			X		E-3
XADN			X		E-3
XADT			X		E-4
XDC			X	X	E-3
XDM		X	X		E-3, E-4
XDR	X	X	X	X	E-4
XDT	X	X	X	X	E-4
XGLA2		X			G-2, L-2
XH		X			G-3, E-2, E-3
X-HAUL			X		E-4
XK		X	X		E-3
XKD1	X	X	X		E-4
XLD		X			G-3, L-3
XLD D1		X			L-4
XLD D2		X			L-5
XLISSE				X	C-1
XMH				X	E-2
XMS		X	X		E-3
X-QUARRY			X		E-4
XR			X	X	E-3, L-3
XRS			X		E-4
XSMD2+		X			L-5S
XSNPLUS		X			L-2, G-2
XTL		X			G-2, L-2
X-TRACTION					
RD (X)			X		E-4
XTS			X		E-3

Since Michelin radial tires contain a single steel casing ply, they utilize the industry method of designating radial tire strength in terms of “stars.” Their system consists of a one star, two star, and three star rating as an indication of the tire’s carrying capacity. The one star is the lightest construction, generally used on work and slow moving transport machines. Two star tires are used on most medium and high speed transport machines. Three star construction provides the greatest carrying capacity for a given size and is only available in small standard base tires.

This combination of tread designs and types of construction provides a range of radial tires which cover most earthmoving applications. We recommend that in applying steel radial tires to your machines you provide all site condition data to the tire manufacturer. Obtain their recommendations as to which tire will provide the most economical operation.

Code Identification for Goodyear Radial Tires

All Goodyear steel radial earthmover tires have been designated *Unisteel* followed by a three or four digit alpha-numeric code that identifies the particular tread. For example, for a RL-2+, RL stands for Rock Lug and indicates that the upper sidewall has rock protection. The number in the code corresponds to the tire industry identification system (2-traction, 3-rock, etc). The fourth digit, if any, is used to designate tread design differences for the same basic tread type.

Following are the radial tread designs currently available from Goodyear with the compound and construction types depending on the application.

Compound Description	Compound Code
Heat Resistant	2
Standard Abrasion Resistant	4
Ultra Abrasion Resistant	6
Construction Description	Construction Code
Standard	S
Heavy Duty	H
Extra Heavy Duty	HW
Steel Breakers	J
Heavy Undertread	U
Low Angle Belts	SL

Tread Design	Compound Code			Primary TRA Code(s)
	2S	4S	6S	
AT-2A	X	X	X	E-2, L-2, G-2
GP-2B	X	X	X	E-2, E-3, G-2, G-3, L-2, L-3
GP-3D	X	X	X	E-2, E-3, G-2, G-3, L-2, L-3
GP-4B AT	X	X	X	E-4, G-4, L-4
GP-4D	X	X	X	E-4, G-4, L-4
RL-2+	X	X	X	G-2
RL-2F	X	X	X	E-2, G-2, L-2
RL-3	X	X	X	E-3, L-3
RL-3+	X	X	X	E-3
RL-3A	X	X	X	E-3
RL-3F	X	X	X	E-3, L-3
RL-3J	X	X	X	E-3, G-3, L-3
RL-4	X	X	X	E-4
RL-4A	X	X	X	E-4
RL-4B	X	X	X	E-4
RL-4F	X	X	X	E-4
RL-4H	X	X	X	E-4
RL-4HII	X	X	X	E-4
RL-4J	X	X	X	E-4
RL-4JII	X	X	X	E-4
RL-4K	X	X	X	L-4
RL-4M+	X	X	X	E-4
RL-5K	X	X	X	L-5
RT-3A	X	X	X	E-3
RT-3B	X	X	X	E-3, G-3, L-3
RT-4A	X	X	X	E-4

A star rating system instead of the ply rating system indicates the casing strength of radial tires. These symbols indicate the recommended inflation for a particular tire load. Following the star rating code is Goodyear's Custom Compound and Construction code. For a tire designated "2S" the 2 indicates a heat resistant compound and the S indicates standard construction. The higher the number the greater the abrasion and cut resistance with a corresponding lower TKPH/TMPH rating.

Code Identification for Bridgestone Radial Tires

The Bridgestone steel radial earthmover has been designated as V-Steel. Following are the radial tread designs currently available from Bridgestone with the compound and construction types depending on the application.

Bridgestone Compound and Structure Codes

1A	Standard
2A	Cut-Resistant
2V	Special Cut Resistant (Steel Breaker)
2Z	Special Cut Resistant (Side Steel Breaker)
3A	Heat-Resistant
E	Earthmover
G	Grader
D	Loader and Dozer
S	Logging

The casing strength, i.e., load carrying capacity of tire is indicated by star rating system; 1-star, 2-star and 3-star. Bridgestone's Off-the-Road tires are designed and produced to meet the commonly accepted international standards, those set by the TRA (Tire and Rim Association) in the U.S.A., by the ETRTO (European Tire and Rim Technical Organization) in Europe and/or by the JATMA (Japan Automobile Tire Manufacturers' Association) in Japan. Where differences exist between the TRA, ETRTO and JATMA standards, Bridgestone selects the most appropriate.

Tread Design	Tread Name	Compound/ Structure Codes					TRA Code(s)
		1A	2A	2V	2Z	3A	
VEL	V-Steel E-Lug					X	E-3
VELS	V-Steel E-Lug S	X	X			X	E-4
VELSL	V-Steel E-Lug S (Long Haul)						E-4
VFT	V-Steel F-Traction	X				X	E-2
VHB	V-Steel H-Block						E-2
VHS	V-Steel H-Service						E-2
VJT	V-Steel J-Traction						E-3, L-3
VKT	V-Steel K-Traction	X	X				E-2, G-2, L-2
VLТ	V-Steel L-Traction	X	X				E-3, L-3
VLTS	V-Steel L-Traction S			X			E-4, L-4
VMT	V-Steel M-Traction	X	X			X	E-3, L-3
VMTPr	V-Steel M-Traction Premium	X	X				E-4
VMTS	V-Steel M-Traction S	X	X			X	E-4
VRD	V-Steel Rock Deep	X				X	E-3
VRDP	V-Steel Rock Deep Premium	X	X			X	E-4
VRF	V-Steel Rock Fast						E-3
VRL	V-Steel R-Lug	X	X			X	E-3
VRLS	V-Steel R-Lug S	X	X			X	E-4
VRPS	V-Steel Rock Premium Service						E-4
VRQP	V-Steel Rock Quarry Premium			X			E-4
VSБ	V-Steel S-Block			X		X	E-2
VSDL	V-Steel D-Lug			X			L-5
VSDT	V-Steel Super Deep Traction			X			L-5
VSJ	V-Steel Jamal						E-7
VSMS	V-Steel Smooth Tread-MS						L-5S
VSNL	V-Steel N-Lug			X			L-4
VSNT	V-Steel N-Traction			X			E-4, L-4
VSW	V-Steel Snow Wedge			X			E-2, G-2, L-2
VTS	V-Steel Traction- Stability			X			L-3
VUT	V-Steel U-Traction			X			G-2, L-2
VZTP	V-Steel Z-Traction Premium						E-4
VZTS	V-Steel Z-Traction S	X	X			X	E-4

TON-KILOMETER PER HOUR (TKPH)

Tire selection and machine operating practices have, in some cases, become the critical factors in the over-all success of earthmoving ventures. One of the most serious problems occur when tires are operated at temperatures above their capabilities. Separation and related failures occur. To help you avoid temperature related failures, Caterpillar has been instrumental in developing the *Ton-Kilometer Per Hour (TKPH)*, also known as *Ton-Mile Per Hour (TMPH)*, method of rating tires. The formula to convert a TKPH rating to a TMPH rating is:

$$\text{TMPH} = \text{TKPH} \times 0.685$$

Heat and Tire Failure

Tire manufacturing requires heat in the vulcanizing process converting crude rubber and additives into a homogeneous compound. The heat required is typically above 132° C (270° F).

A tire also generates heat as it rolls and flexes. Heat generated faster than it can be radiated into the atmosphere gradually builds within the tire and reaches maximum level at the outermost ply or belt.

Over time, enough heat can develop from overflexing to actually reverse the vulcanizing process or “revert” the rubber causing ply separation and tire failure. Only a brief time at reversion temperature initiates the failure. Experience shows that few pure heat separation cases occur. Most so-called heat separations are in tires operating below the reversion level.

As a tire’s operating temperature increases the rubber and textiles within significantly lose strength. The tire becomes more susceptible to failures from cornering, braking, impact, cut through, fatigue and heat separation. If operating tires at higher temperatures is absolutely necessary, it is essential the machines be operated to reduce the probability of premature tire failure. No hard cornering without superelevation, no panic braking, etc.

The TKPH formula was developed to predict tire temperature buildup. The system is a method of rating tires in proportion to the amount of work they can do from a temperature standpoint. It utilizes the product of *load* × *speed* to derive an index of the tire temperature buildup. Even at or below a tire’s TKPH, failures may be initiated by overstressing the tires.

It is possible by using a needle type pyrometer to measure temperature at any desired point within the tire casing. However, the instrumentation and the technique does not lend itself to general field use. The greatest difficulty is locating the thickest (therefore the hottest) tread bar in any given tire using giant calipers. The tire must then be drilled along the centerline of this bar from shoulder to shoulder at 52 mm (2") intervals. These 3.18 mm (1/8") diameter holes extend down through the tread and undertread to the topmost reinforcement. This procedure is fully described under SAE Recommended practice J1015.

The TKPH rating system as given in this SAE specification is approved by most tire manufacturers. Michelin, in addition to providing TKPH ratings has developed their own speed/load carrying rating system and we recommend that Michelin be consulted where high tire temperatures are a concern.

Heat generation in a specific tire at recommended pressure depends on three factors:

- the weight the tire is carrying (flex per revolution),
- the speed the tire is traveling over the ground (flexures over a period of time), and
- the air temperature surrounding the tire (ambient temperature) and road surface temperature.

Once a tire manufacturer has determined a tire’s temperature characteristics and expressed them in TKPH, the above listed specific job conditions can be used to determine any tire’s maximum work capacity. These conditions provide on site ability to predict and avoid costly tire separations.

Ton-Kilometer-Per-Hour Rating System

The tire TKPH can be matched to the site TKPH as well as compared with TKPH values of different makes and types of tires.

TKPH Job Rate

Average Tire Load × Average Speed for the shift

Average Tire Load

$$\frac{\text{“Empty” tire load} + \text{“loaded” tire load}}{2}$$

Average Speed

$$\frac{\text{Round trip distance in kilometers} \times \text{number of trips}}{\text{Total Hours (in the shift)}}$$

For excessive haul length (32 kilometers or more) consult your tire representative for modification to the TKPH value.

To use in the United States Customary System, change kilometers to miles and use short tons.

It should be noted that prolonged operation at high casing temperatures can fatigue the nylon at the flex points in the sidewalls.

The following are the most recent TKPH ratings as made available by Goodyear, Michelin and Bridgestone, and are subject to change on their part at any time. Other tire manufacturers’ TKPH ratings will be included in future handbook editions when and if made available. For latest TKPH ratings, consult specific tire manufacturer at time of machine and/or tire purchase.

Load-and-Carry TKPH (TMPH)

The wheel loader, when used in load-and-carry applications, may encounter temperature problems similar to those normally associated only with tires on scrapers, trucks and wagons. **Do not place the vehicle in load-and-carry applications without first consulting the tire manufacturer, or obtaining maximum load and speed ratings and pressure recommendations from the tire manufacturer.**

Conventional and Radial Steel Cord Tire Options

Tire options now provide types to operate in conditions ranging from rock and abrasive materials, to jobs with high speed hauls in good materials.

The best tire type can be different for the drive tires than for other tires on the same machine. TKPH (TMPH) should be calculated for all tires.

TIRE DRIVE-AWAY RECOMMENDATIONS

Heat separation can be a problem during machine delivery and moving machines from one job to another. Whenever roading earthmoving machines, *check your supplier for the tire manufacturer’s recommended speed limitations on the specific tires involved.*

Some tire manufacturers also recommend that vehicles equipped with extra tread depth or special compounded tires should not be roaded without their specific approval. Our tests support this recommendation, especially for L-3, L-4, E-4 and L-5 tires.

**TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Lengths of 32 km (20 miles) or Less One Way
Maximum Speed Not to Exceed 48 km (30 miles) per Hour**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

GOODYEAR RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	Tread Design	E-3																	
		GP-2B			GP-3D			RL-2+			RL-3+			RT-3A			RT-3A+		
Custom Code		2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S
17.5R25	TKPH TMPH	200 135	150 105	140 95				150 100	110 75										
18.00R33	TKPH TMPH																		
21.00R33	TKPH TMPH																		
23.5R25	TKPH TMPH	260 175	200 135	170 115				200 135	150 100										
24.00R35	TKPH TMPH										440 300	340 230	260 180						
26.5R25	TKPH TMPH	280 195	230 155	190 130				230 155	170 115										
27.00R49	TKPH TMPH	600 410	500 340	300 205															
29.5R25	TKPH TMPH	340 235	270 185	230 155				270 185	200 140										
29.5R29	TKPH TMPH																		
33.00R51	TKPH TMPH																		
33.25R29	TKPH TMPH													420 285	320 220				
37.00R57	TKPH TMPH																		
40.00R57	TKPH TMPH																		
40.5/75R39	TKPH TMPH	580 400	450 305	350 240													550 375	420 290	320 220
46/90R57	TKPH TMPH																		
750/65R25	TKPH TMPH				240 162	180 120	110 78	230 155	170 115	110 75									

**TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE**
**For Haul Lengths of 32 km (20 miles) or Less One Way
Maximum Speed Not to Exceed 48 km (30 miles) per Hour**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

GOODYEAR RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	E-4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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	TMPH			400	305		375	290	225	345	265	300	340	275	165	340	275	165	29.5R25	TKPH																			TMPH																		29.5R29	TKPH																			TMPH																		33.00R51	TKPH									685	525	365				685	525	365		TMPH									470	360	250				470	360	250	33.25R29	TKPH																			TMPH																		37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																								
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	TMPH																		29.5R29	TKPH																			TMPH																		33.00R51	TKPH									685	525	365				685	525	365		TMPH									470	360	250				470	360	250	33.25R29	TKPH																			TMPH																		37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																														
29.5R29	TKPH																			TMPH																		33.00R51	TKPH									685	525	365				685	525	365		TMPH									470	360	250				470	360	250	33.25R29	TKPH																			TMPH																		37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																	
	TMPH																		33.00R51	TKPH									685	525	365				685	525	365		TMPH									470	360	250				470	360	250	33.25R29	TKPH																			TMPH																		37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																				
33.00R51	TKPH									685	525	365				685	525	365		TMPH									470	360	250				470	360	250	33.25R29	TKPH																			TMPH																		37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																							
	TMPH									470	360	250				470	360	250	33.25R29	TKPH																			TMPH																		37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																																										
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	TMPH																		37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																																																																																
37.00R57	TKPH									960	715	460								TMPH									655	490	315							40.00R57	TKPH						1150	870	530											TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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	TMPH						785	600	360										40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
40.5/75R39	TKPH																			TMPH																		46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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46/90R57	TKPH	1200	920	540																TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	TMPH	825	630	370															750/65R25	TKPH																			TMPH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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**TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE**
**For Haul Lengths of 32 km (20 miles) or Less One Way
Maximum Speed Not to Exceed 48 km (30 miles) per Hour**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

GOODYEAR RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	E-4									G-4			L-4			L-5		
	RT-4A			RT-4A+			GP-4B AT			GP-4C			RL-4K			RL-5KI		
Tread Design	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S
Custom Code	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S	2S	4S	6S
17.5R25																		
TKPH																		
TMPH																		
18.00R33	230	180	140															
TKPH	160	125	94															
TMPH																		
21.00R33																		
TKPH																		
TMPH																		
23.5R25							200	150	130	200	150	130					80	70
TKPH							135	104	90	135	104	90					55	50
TMPH																		
24.00R35				400	300	240												
TKPH				275	210	165												
TMPH																		
26.5R25							210	160	130									
TKPH							147	109	91									
TMPH																		
27.00R49				570	440	340												
TKPH				390	300	235												
TMPH																		
29.5R25							240	190	150					130	120		100	100
TKPH							165	130	105					90	85		70	65
TMPH																		
29.5R29																	120	110
TKPH																	80	75
TMPH																		
33.00R51																		
TKPH																		
TMPH																		
33.25R29																		
TKPH																		
TMPH																		
37.00R57																		
TKPH																		
TMPH																		
40.00R57																		
TKPH																		
TMPH																		
40.5/75R39																		
TKPH																		
TMPH																		
46/90R57																		
TKPH																		
TMPH																		
750/65R25																		
TKPH																		
TMPH																		

TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Lengths of 32 km (20 miles) or Less One Way
Maximum Speed Not to Exceed 48 km (30 miles) per Hour

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

BRIDGESTONE RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	E-2						E-3											
	VKT			VFT			VMT			VJT			VLT			VRL		
Tread Design	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A
Custom Code	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A
17.5R25 TKPH TMPH		95 65					144 99											
18.00R33 TKPH TMPH																		
21.00R33 TKPH TMPH																		
23.5R25 TKPH TMPH	263 180	205 140						190 130			190 130							
24.00R35 TKPH TMPH																		
26.5R25 TKPH TMPH							293 201	220 151			220 151							
27.00R49 TKPH TMPH					557 382	804 551												
29.5R25 TKPH TMPH	376 258	310 212												266 182				
29.5R29 TKPH TMPH	401 275	330 226																
33.00R51 TKPH TMPH																		
33.25R29 TKPH TMPH													476 326	349 239		435 298	319 218	
37.00R57 TKPH TMPH																		
37.25R35 TKPH TMPH	644 441	530 363											569 390	417 286		563 386	413 283	
40.00R57 TKPH TMPH																		
40.5/75R39 TKPH TMPH													682 467	500 342		675 462	495 339	
46/90R57 TKPH TMPH																		
750/65R25 TKPH TMPH														225 154				
59/80R63 TKPH TMPH																		

NOTE: For cycle lengths of 5 km (3 miles) or less (round trip), multiply the TKPH (TMPH) value in this table by 1.12.
Additional tread compounds are available to meet specific TKPH (TMPH).

**TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Lengths of 32 km (20 miles) or Less One Way
Maximum Speed Not to Exceed 48 km (30 miles) per Hour**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

BRIDGESTONE RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	Tread Design	E-4											
		VMTS			VELS			VMTP			VRQP		
Custom Code		E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A
17.5R25	TKPH TMPH												
18.00R33	TKPH TMPH	246 168	199 136		211 145	170 116	246 168	229 157	185 127			122 84	
21.00R33	TKPH TMPH							293 201	237 162				
23.5R25	TKPH TMPH												
24.00R35	TKPH TMPH	418 286	338 232	489 335				388 266	314 215				
26.5R25	TKPH TMPH												
27.00R49	TKPH TMPH	492 337	398 273						361 247	522 358			
29.5R25	TKPH TMPH												
29.5R29	TKPH TMPH												
33.00R51	TKPH TMPH												
33.25R29	TKPH TMPH												
37.00R57	TKPH TMPH												
37.25R35	TKPH TMPH												
40.00R57	TKPH TMPH				940 644	773 529	1117 765						
40.5/75R39	TKPH TMPH												
46/90R57	TKPH TMPH												
750/65R25	TKPH TMPH												
59/80R63	TKPH TMPH												

NOTE: For cycle lengths of 5 km (3 miles) or less (round trip), multiply the TKPH (TMPH) value in this table by 1.12.
Additional tread compounds are available to meet specific TKPH (TMPH).

TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Lengths of 32 km (20 miles) or Less One Way
Maximum Speed Not to Exceed 48 km (30 miles) per Hour

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

BRIDGESTONE RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	E-4											
	VRLS			VLTS			VSNT			VRDP		
Tread Design	VRLS			VLTS			VSNT			VRDP		
Custom Code	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A	E1A	E2A	E3A
17.5R25 TKPH TMPH												
18.00R33 TKPH TMPH												
21.00R33 TKPH TMPH	281 192	227 155										
23.5R25 TKPH TMPH					161 110							
24.00R35 TKPH TMPH	388 266	314 215	453 310									
26.5R25 TKPH TMPH					186 127			165 113				
27.00R49 TKPH TMPH	513 351	415 284	600 411									
29.5R25 TKPH TMPH					225 154			220 151				
29.5R29 TKPH TMPH								232 159				
33.00R51 TKPH TMPH	603 413	496 340	717 491									
33.25R29 TKPH TMPH												
37.00R57 TKPH TMPH	845 579	694 475	1009 691									
37.25R35 TKPH TMPH												
40.00R57 TKPH TMPH												
40.5/75R39 TKPH TMPH												
46/90R57 TKPH TMPH										968 663	796 545	1150 788
750/65R25 TKPH TMPH					195 134							
59/80R63 TKPH TMPH										1515 1038	1228 841	1773 1214

NOTE: For cycle lengths of 5 km (3 miles) or less (round trip), multiply the TKPH (TMPH) value in this table by 1.12.
Additional tread compounds are available to meet specific TKPH (TMPH).

**TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Cycles Less than 5 km (3 miles) Round Trip**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

MICHELIN RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	Tread Design	E-2	E-3			E-4							
			XV	XR	XK	XKD1	X-QUARRY	X-QUARRY S	XDT			X-HAUL	X-HAUL S
									A4	A	B		
Type		C	B	B	A								
18.00R33	TKPH TMPH	436 299	305 209		157 108	122 84	116 114	157 108	192 132	262 179	262 179		
21.00R33	TKPH TMPH											280 192	
24.00R35	TKPH TMPH	740 507	518 355	474 325		207 142	281 192	266 182	326 223	444 304	355 243		
27.00R49	TKPH TMPH	1090 747						392 269	480 329	654 448			
33.00R51	TKPH TMPH							558 382	682 467	930 637			
37.00R57	TKPH TMPH												
40.00R57	TKPH TMPH												
50/80R57	TKPH TMPH												
56/80R63	TKPH TMPH												
59/80R63	TKPH TMPH												

NOTE: Consult Michelin for TKPH (TMPH) rating on haul cycles greater than 5 km (3 miles). Additional tread compounds are available to meet specific TKPH (TMPH).

**TKPH (TMPH) RATINGS
 AT 38° C (100° F) AMBIENT TEMPERATURE
 For Haul Cycles Less than 5 km (3 miles) Round Trip**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

MICHELIN RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	Tread Design	E-4									
		XDR					XDR S			X-TRACTION RD	
Type		A	B4	B	C4	C	B4	B	C4	A4	B
18.00R33	TKPH TMPH										
21.00R33	TKPH TMPH										
24.00R35	TKPH TMPH										
27.00R49	TKPH TMPH	392 269	480 329	597 388						392 269	654 448
33.00R51	TKPH TMPH	496 340	620 425	744 510							
37.00R57	TKPH TMPH	678 464	848 581	1018 697	1145 784	1272 871					
40.00R57	TKPH TMPH	768 526	960 658	1152 789	1296 888	1440 986					
50/80R57	TKPH TMPH		1168 800		1518 1040	1285 880					
56/80R63	TKPH TMPH	1229 842	1536 1052	1843 1262	2150 1473						
59/80R63	TKPH TMPH	1267 868	1584 1085	1901 1302	2218 1519		1901 1302	2218 1519	2535 1736		

NOTE: Consult Michelin for TKPH (TMPH) rating on haul cycles greater than 5 km (3 miles).
 Additional tread compounds are available to meet specific TKPH (TMPH).

**TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Cycles Less than 5 km (3 miles) Round Trip**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

MICHELIN RADIAL PLY CONSTRUCTION CONVENTIONAL SIZES

Industry Code	E-4									
	X-TRACTION S RD		XDC			XDM				
Tread Design	A		B	B4	C	C4	B4	C	C4	C
Type	TKPH TMPH		TKPH TMPH	TKPH TMPH	TKPH TMPH	TKPH TMPH	TKPH TMPH	TKPH TMPH	TKPH TMPH	TKPH TMPH
18.00R33	TKPH TMPH									
21.00R33	TKPH TMPH									
24.00R35	TKPH TMPH									
27.00R49	TKPH TMPH		589 403	763 523						
33.00R51	TKPH TMPH				1054 722	1209 828	1395 968			
37.00R57	TKPH TMPH									
40.00R57	TKPH TMPH						1056 723	1248 855	1440 986	1584 1085
50/80R57	TKPH TMPH									
56/80R63	TKPH TMPH									
59/80R63	TKPH TMPH									

NOTE: Consult Michelin for TKPH (TMPH) rating on haul cycles greater than 5 km (3 miles).
Additional tread compounds are available to meet specific TKPH (TMPH).

- TKPH (TMPH) Rating
ISO Load Index Speed Symbol
● Michelin Radial Ply — Wide Base Sizes

**TKPH (TMPH) RATINGS
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Cycles Less than 5 km (3 miles) Round Trip**

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Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

MICHELIN RADIAL PLY CONSTRUCTION WIDE BASE SIZES

Industry Code	E-3			E-4	
	Tread Design	XTS	XMS		XRS
Type			B	A	
29.5R29	TKPH TMPH	348 239			
33.25R29	TKPH TMPH	429 294			
37.25R35	TKPH TMPH	540 370			415 284
40.5/75R39	TKPH TMPH		766 525	500 342	

NOTE: Consult Michelin for TKPH (TMPH) rating on haul cycles greater than 5 km (3 miles).

**ISO LOAD INDEX SPEED SYMBOL
AT 38° C (100° F) AMBIENT TEMPERATURE
For Haul Cycles Greater than 5 km (3 miles) Round Trip**

Because of the variance between specific tires it is recommended that at the time of purchase you check with your tire supplier for the manufacturer's specific TKPH (TMPH) ratings for the tires purchased.

MICHELIN RADIAL PLY CONSTRUCTION WIDE BASE SIZES

Industry Code	E-3	E-3 (DT)	E-3	E-4
Tread Design	XADN	XADT	XAD65-1	X SUPER TERRAIN
23.5R25	185B*	185B		185B
26.5R25	193B	193B		193B
29.5R25	200B*	200B		200B
650/65R25 Super E3			180B	
750/65R25 Super E3			190B	
850/65R25 Super E3			196B	

*E Speed option available via special field request.

TIRE AND RIM ASSOCIATION RATINGS

While the TKPH (TMPH) Rating System provides a method to determine the tire's work capacity, Tire and Rim Association Ratings provide a guide for evaluating a tire's structural capacity. These two rating systems should be used in conjunction to evaluate tire performance.

TIRE SELECTION

Selecting the optimum tire for a given application is particularly critical for earthmoving. The machines have the capability to outperform the tires and, unless proper practices are observed, very costly premature tire failures can occur. Job conditions vary greatly throughout the world, as well as within any given job site, and selecting the optimum tire requires careful consideration of all factors involved. In general, the tire manufacturer should be consulted before making the selection for any given application. In some cases, the tire manufacturer can fabricate tires specifically tailored for a given job site.

For those applications where wear is extremely slow, especially as a result of only occasional operation throughout the year, the cheapest lightweight tire needs to be given strong consideration.

As job conditions become severe, the following factors should be evaluated in selecting a tire:

Transport or Load-and-carry —

- TKPH (TMPH) (primary consideration)
- Minimum approved star/ply rating or greater
- Largest optional size
- Thickest tread commensurate with TKPH (TMPH)
- Most cut resistant tread commensurate with TKPH (TMPH)
- Belted construction

Grader —

- Tire load rating suitable for maximum equipped machine weight (See Tire Load Worksheet on next page)
- Application specific tire (snow, construction, road maintenance, mining, general purpose, all season)
- Bias or radial based on initial cost, puncture resistance, rolling resistance, life to retread/repair

Loader or Dozer —

- Minimum approved ply rating or greater
- Largest optional size
- Thickest tread
- Thickest available undertread
- Buttressed shoulder
- Most cut resistant tread
- Belted construction
- Lowest aspect ratio

All tires should be operated at the tire manufacturer's recommended inflation pressure for a given application. Inflation pressure should be checked every working day with an accurate gauge. This gauge should be checked against a known standard such as a dead weight tester at least once a month.

Excess loads may result from factors such as varying material density, field modifications to equipment, mud accumulation, load transfer, etc. Only under these conditions may the actual in service tire load exceed the rated machine load. When excess loads are encountered, cold inflation pressures **must** be increased to compensate for higher loads. Increase tire inflation pressure 2% for each 1% increase in load.

	Maximum Excess	
	Load	Pressure
Bias Ply	15%	30%
Radial Ply	7%	14%

The above loads will result in reduced tire performance and must be approved by the tire manufacturer.

The use of chains is difficult to justify except under a few conditions. Chains are very costly and heavy, and require more maintenance than most operations can provide. On some models sufficient clearance does not exist for chains with all tire combinations. Extensive modifications may be required if chains are needed for the job.

Foam filling tires is normally not recommended due to high cost and lack of local filling facilities. Its use should be confined to loader and dozer applications where penetrations occur almost daily. If foam is used be sure to adhere to recommended equivalent pressures of nitrogen and use highest available ply rating. Consult tire manufacturer for specific warranty concerns.

Tire Load Worksheet (Motor Graders)

Tire positions (top view)



A Machine information:

Base operating weight (kg) (1a) = _____
 Rear operating weight (%) (2a) = _____
 Front operating weight (%) (3a) = _____

B Tire loads:

Weight on rear tire before attachments (kg) (1b) = $(1a) \times (2a) / 4 =$ _____ (Tires # 1, 2, 3, 4)
 Weight on front tire before attachments (kg) (2b) = $(1a) \times (3a) / 2 =$ _____ (Tires # 5, 6)

C Attachment information (reference Caterpillar Price List):

Attachment Type	Tires affected	Attachment weight distribution
Ripper	1, 2, 3, 4	25% per tire
Push Block	5, 6	50% per tire
Front blade (any type)	5, 6	62% per tire
Mid-Mount Scarifier	5, 6	40% per tire
	1, 2, 3, 4	5% per tire
Snow Wing	6	34% per tire
	3, 4	55% per tire

Attachment #1 Attachment type: _____ Attachment weight (kg) (1c) = _____
 Tire positions affected (see chart) _____
 _____ Tire #1 Tire #2 Tire #3 Tire #4 Tire #5 Tire #6

Attachment weight distribution per tire (see chart) (2c) = _____
 Attachment weight per tire (kg) = (1c) × (2c) (3c) = _____

Attachment #2 Attachment type: _____ Attachment weight (kg) (4c) = _____
 Tire positions affected (see chart) _____
 _____ Tire #1 Tire #2 Tire #3 Tire #4 Tire #5 Tire #6

Attachment weight distribution per tire (see chart) (5c) = _____
 Attachment weight per tire (kg) = (4c) × (5c) (6c) = _____

Attachment #3 Attachment type: _____ Attachment weight (kg) (7c) = _____
 Tire positions affected (see chart) _____
 _____ Tire #1 Tire #2 Tire #3 Tire #4 Tire #5 Tire #6

Attachment weight distribution per tire (see chart) (8c) = _____
 Attachment weight per tire (kg) = (7c) × (8c) (9c) = _____

NOTE: Repeat for additional attachments if needed.

D Sum of attachment weights and Total weight per tire (kg)

_____ Tire #1 Tire #2 Tire #3 Tire #4 Tire #5 Tire #6
 (1d) = (3c) + (6c) + (9c) = _____
 (2d) = (1d) + [(1b) or (2b)] = _____

E Controlling tire weight = maximum value from (2d) (1e) = _____ kg

F Summary

- Choose a tire with a rated load capacity equal to or greater than the controlling tire weight = Tire rating > (1f)
- Attachments may cause the maximum weight per tire to exceed tire capacity. In these cases the tire supplier should be consulted.
- Contact your tire supplier for machine specific inflation pressures to ensure compensation for different tire loads.

TIRE SELECTION GUIDE

Material	Road or Ground Condition	Treads		
		Trucks and Wheel Tractor-Scrapers	Wheel Tractors or Wheel Loaders	Graders*
Silt and clay: – No rock. – High moisture content.	Good varying to poor. High rolling resistance.	Traction Type (E-2).	Traction Type (L-2).	Traction Type (G-2).
Silt and clay: – Some rock. – Variable moisture content.	Good varying to poor.	Rock-type (E-3) best unless traction is a problem — then use traction tires (E-2). Rock-type offers more resistance to cutting.	Rock-type (L-3, L-4, L-5) best unless traction is a problem — then use traction tires (L-2). Rock-type offers more resistance to cutting.	Rock-type (G-3, G-4) best unless traction is a problem — then use traction tires (G-2). Rock-type offers more resistance to cutting.
Silty/clayey gravel/sand: – Low moisture content.	Excellent to good. Firm surface.	Rock-type (E-3, E-4) offers better wear.	Rock-type (L-3, L-4, L-5) offers better wear.	Rock-type (G-3, G-4, L-3, L-4, L-5) offers better wear.
Silty/clayey gravel/sand: – High moisture content.	Poor, rutted, pot holes.	Rock-type (E-3, E-4).	Rock-type (L-3, L-4, L-5).	Rock-type (G-3, G-4, L-3, L-4, L-5).
Blasted rock.	Hard surface, rough.	Rock-type (E-4).	Rock-type (L-5, L-5S).	Rock-type (G-4, L-4, L-5).
Sand – Very low silt/clay content.	Good to fair surface.	Rock-type (E-3) or Flotation (E-7) if possible with low pressure. Creates minimum soil disturbance resulting in improved flotation.	Rock-type (L-3, L-3S) with low pressure. Creates minimum soil disturbance resulting in improved flotation.	Rock-type (G-3) with low pressure. Creates minimum soil disturbance resulting in improved flotation.

*NOTE: In some cases, an L type tire is appropriate for use on a Grader application, consult your tire supplier for proper tire selection.

RECOMMENDED MOUNTING LUBRICANTS FROM SUPPLIERS

The following table documents tire supplier recommendations for Tire Mounting Compounds.

Tire Mounting Compounds

Tire-Slick
Michelin “Tigre 80” Grease
REMA Tiptop
Fuchs Silkolene
IZY-SEEL

TIRE SUPPLIER RECOMMENDED COLD INFLATION PRESSURES

The following tables present commonly found Caterpillar and the *tire suppliers’* recommended cold inflation pressures for tires on Cat machines. For inflation pressures of tire suppliers not listed please obtain them directly from the respected supplier.

The inflation pressure is based on a ready-to-work vehicle weight, rated payload, and average operating conditions. **Pressures for each application may need to be varied from those shown and should always be obtained from your tire supplier.**

Pressures for all tires apply to rib, traction, rock, deep tread, and super deep tread tires.

NOTE: Caterpillar recommends using dry nitrogen (N₂) gas for both tire inflation and pressure adjustments on all current and past production machines.

EXCAVATORS

For complete tire data and inflation pressures, see the Excavator section in this handbook.

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

STANDARD COLD INFLATION PRESSURES SKIDDERS — Bias Ply

Model	Tire Size	Ply Rating	Inflation Pressure			
			Front		Rear	
			kPa	psi	kPa	psi
525C	30.5L-32	20	240	35	240	35
	30.5L-32	26	310	45	310	45
	DH35.5LB32	20	210	30	210	30
	DH35.5LB32	24	240	35	240	35
535C	30.5L-32	20	240	35	240	35
	30.5L-32	26	310	45	310	45
	DH35.5LB32	20	210	30	210	30
	DH35.5LB32	24	240	35	240	35
545C	30.5L-32	20	240	35	240	35
	30.5L-32	26	310	45	310	45
	DH35.5LB32	20	240	30	240	30
	DH35.5LB32	24	240	35	240	35

Tires

Standard Cold Inflation Pressures

- Skid Steer Loaders — Bias and Bias Belted
- Telehandlers

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

SKID STEER LOADERS — Bias and Bias Belted

Model	Tire Size	Ply Rating	Inflation Pressure							
			Galaxy Beefy Baby		Caterpillar Premium Conventional		Caterpillar XD (Extreme Duty)		Michelin XZSL	
			kPa	psi	kPa	psi	kPa	psi	kPa	psi
216B2	10-16.5	8, 10 for XD	345	50	410	60	345	50	310	45
226B2	10-16.5	8, 10 for XD	345	50	410	60	345	50	310	45
236B2	12-16.5	10, 14 for XD	310	45	310	45	345	50	310	45
232B2	10-16.5	8, 10 for XD	345	50	410	60	345	50	380	55
242B2	10-16.5	8, 10 for XD	345	50	410	60	345	50	380	55
	12-16.5	10, 14 for XD	310	45	310	45	345	50	310	45
252B2	12-16.5	10, 14 for XD	310	45	310	45	345	50	345	50
246C	12-16.5	10, 14 for XD	310	45	310	45	345	50	345	50
256C	12-16.5	10, 14 for XD	310	45	310	45	345	50	345	50
262C	12-16.5	10, 14 for XD	310	45	310	45	345	50	345	50
272C	12-16.5	10, 14 for XD	310	45	310	45	345	50	345	50

TELEHANDLERS

Model	Tire Size	Ply Rating	Inflation Pressure	
			kPa	psi
TL642	13.00 x 24	12	448	65
TL943	13.00 x 24	12	448	65
TL1055	14.00 x 24	12	448	65
TL1255	14.00 x 24	12	448	65
TH255	12.00 x 16.5	12	551	80
	14.00 x 17.5	10	482	70
TH406	15.5/80 – 24 400/80R24 460/70R24	16	See machine OMM for operating pressures.	
	15.5 – 25 15.5/80 – 24	16		
TH407	15.5/80 – 24 400/80R24 440/80R24 460/70R24 500/70R24	16		
	15.5 – 25			
	15.5/80 – 24	16		

Standard Cold Inflation Pressures
 ● Backhoe Loaders (Front/Rear)
 ● Paving Products — Bias Ply and Radial Pneumatic Tires

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

BACKHOE LOADERS (Front)

Tire Size	Ply/Speed Symbol	Inflation Pressure	
		kPa	psi
11Lx16 (F-3)	12	441	64
12.5/80-18 (I-3)	12	372	54
340/80R18	143 A8	400	58
15-19.5	12	414	60

BACKHOE LOADERS (Rear)

Tire Size	Ply/Speed Symbol	Inflation Pressure	
		kPa	psi
16.9-24 (R-4)	10	221	32
19.5-24 (R-4)	12	234	34
19.5L-R24	157 A8	317	46
16.9-28 (R-4)	12	262	38
18.4-26 (R-4)	12	262	38
440/80R24	154 A8 161 A8	317 269	46 39
440/80R28	156 A8	317	46
440/80-28 (R-4)	12	317	46
480/80-26 (R-4)	12	317	46
21L-24 (R-4)	16 18	276 310	40 45
500/70R24	164 A8	400	58

**PAVING PRODUCTS —
Bias Ply and Radial Pneumatic Tires**

Model	Tire Size	Ply/ Strength Rating	Inflation Pressure ^{1, 2, 3}	
			kPa	psi
CS323C	11.2 – 24	6	179	26
	11.2 – 24	8	248	36
CP323C	11.2 – 24	8	248	36
CS423E	14.9 – 24	6	138	20
	14.9 – 24	8	179	26
CS433E	14.9 – 24	6	138	20
	14.9 – 24	8	179	26
CP433E	14.9 – 24	8	179	26
CS54	23.1 – 26	8	110	16
CS56	23.1 – 26	8	110	16
CP56	23.1 – 26	8	110	16
CS64	23.1 – 26	8	110	16
	23.1 – 26	12	165	24
CP64	23.1 – 26	12	165	24
CS74	23.1 – 26	8	110	16
	23.1 – 26	12	165	24
CS76	23.1 – 26	12	165	24
CP76	23.1 – 26	12	165	24
AP600D	16.00 – 24 445/95R25	12 ★★	552	80
AP1000D	18.00 – 25	16	345	50
	445/95R25	★★	552	80
BG-260D	18.00 – 25	16	379	55
	445/95R25	★★	552	80
PS150C	8.50/90 – 15	6	345	50
	7.50 – 15	12	758	110
	7.50 – 15	14	862	125
PS360C	14/70 – 20	12	448	65
	14/70 – 20	20	758	110
RM300	28L – 26 (Front)	16	241	35
	18.4 – 30 (Rear)	12	221	32
RM500	26.5 – 25 (Front)	20	345	50
	23.1 – 26 (Rear)	16	241	35

¹Inflation pressures are maximum rated tire pressures.

²Pressure varies with application for Pneumatic Tire Compactors (PS).

³Consult your local tire supplier for operating pressures.

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

MOTOR GRADERS — Bias Ply*

Model	Tire Size	Ply Rating	Inflation Pressure							
			Goodyear				Bridgestone/Firestone			
			Front		Rear		Front		Rear	
		kPa	psi	kPa	psi	kPa	psi	kPa	psi	
120M	13.00-24	12					241	35	345	50
	14.00-24	12, 16	172	25	248	36	207	30	276	40
	17.5-25	12, 16	172	25	228	33	207	30	241	35
12M	14.00-24	12, 16	172	25	276	40	207	30	276	40
	17.5-25	12, 16	172	25	248	36	207	30	241	35
140M	14.00-24	12, 16	172	25	303	44	207	30	276	40
	17.5-25	12, 16	172	25	276	40	207	30	276	40
160M	14.00-24	12, 16	200	29	303	44	207	30	276	40
	17.5-25	16	200	29	352	51	207	30	276	40
14M	16.00-24	16	172	25	324	47	172	25	310	45
	20.5-25	16, 20	172	25	303	44	241	35	379	55
16M	18.00-25	16					207	30	241	35
	23.5-25	16, 20	172	25	276	40	207	30	241	35
24M	29.5-29	28					241	35	310	45

*Refer to Tire Load Worksheet to determine proper ply rating.

MOTOR GRADERS — Radial Ply

Model	Tire Size	Strength Rating	Inflation Pressure							
			Michelin		Goodyear		Bridgestone			
			Front	Rear	Front	Rear	Front	Rear		
		kPa	psi	kPa	psi	kPa	psi	kPa	psi	
120M	13.00R24	★	310	45	345	50				
	14.00R24	★	241	35	276	40	248	36	303	44
	17.5R25	★	207	30	241	35	200	29	248	36
12M	13.00R24	★	276	40	345	50	303	44	400	58
	14.00R24	★	207	30	310	45	228	33	324	47
	17.5R25	★	207	30	241	35	200	29	276	40
140M	14.00R24	★	207	30	310	45	248	36	352	51
	17.5R25	★	241	35	310	45	200	29	276	40
160M	14.00R24	★	241	35	310	45	248	36	372	54
	17.5R25	★	207	30	276	40	228	33	303	44
14M	16.00R24	★	241	35	345	50	248	36	372	54
	20.5R25	★	207	30	276	40	200	29	303	44
16M	23.5R25	★, ★★	207	30	276	40	172	25	303	44
24M	29.5R29	★, ★★	310	45	379	55	324	47	372	54

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

WHEEL TRACTOR-SCRAPERS — Bias Ply

Model	Tire Size	Ply Rating	Inflation Pressure							
			Goodyear				Bridgestone/Firestone			
			Front		Rear		Front		Rear	
		kPa	psi	kPa	psi	kPa	psi	kPa	psi	
613G	23.5-25	16, 20	324	47	324	47	345	50	345	50
621G	29.5-29	28, 34	427	62	427	62	379	55	379	55
	33.25-29	26, 32	400	58	276	40				
623G	33.25-29	26, 32	400	58	372	54	379	55	379	55
627G	33.25-29	26, 32	400	58	400	58	379	55	379	55
631G	37.25-35	36, 42	427	62	372	54	448	65	448	65
637G	37.25-35	36	448	65	427	62				

WHEEL TRACTOR-SCRAPERS — Radial Ply

Model	Tire Size	Strength Index	Inflation Pressure											
			Michelin		Goodyear		Bridgestone							
			Front	Rear	Front	Rear	Front	Rear						
			kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi		
613G	23.5R25	★, ★★	379	55	345	50	372	54	372	54	379	55	379	55
621G	29.5R29	★★	483	70	414	60	572	83	572	83	517	75	517	75
	33.25R29	★★	448	65	379	55	448	65	352	51	448	65	448	65
623G	29.5R29	★★	483	70	414	60	448	65	427	62	517	75	517	75
	33.25R29	★★									448	65	448	65
627G	29.5R29	★★	517	75	448	65	448	65	448	65	517	75	517	75
	33.25R29	★★									448	65	448	65
631G	37.25R35	★★	552	80	483	70	476	69	427	62	552	80	552	80
637G	37.25R35	★★	552	80	483	70	524	76	476	69	552	80	552	80
657G	40.5/75R39	★★	586	85	517	75	600	87	600	87	621	90	621	90

Tires

Standard Cold Inflation Pressures

- Articulated Trucks — Radial Ply
- Construction and Mining Trucks and Tractors — Radial Ply

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

ARTICULATED TRUCKS — Radial Ply

Model	Tire Size	Ply Rating	Inflation Pressure																	
			Michelin						Goodyear						Bridgestone					
			Front		Center		Rear		Front		Center		Rear		Front		Center		Rear	
kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	
725	23.5R25 750/65R25	★★	345	50	379	55	379	55	372	54	372	54	372	54	379	55	379	55	379	55
		★★	276	40	310	45	310	45							310	45	310	45	310	45
730	23.5R25 750/65R25	★★	414	60	448	65	448	65	372	54	448	65	448	65	414	60	483	70	483	70
		★★	310	45	345	50	345	50	303	44	352	51	352	51	345	50	379	55	379	55
730 EJ	750/65R25	★★	345	50	379	55	379	55	276	40	400	58	400	58	310	45	414	60	414	60
735	26.5R25 850/65R25	★★	448	65	448	65	448	65	448	65	400	58	400	58	483	70	448	65	448	65
		★★	345	50	345	50	345	50												
740	29.5R25 850/65R25	★★	379	55	414	60	414	60	372	54	372	54	372	54	448	65	414	60	414	60
		★★	379	55	414	60	414	60												
740 EJ	29.5R25	★★	379	55	448	65	448	65	324	47	427	65	427	62	379	55	483	70	483	70

CONSTRUCTION AND MINING TRUCKS — Radial Ply

Model	Tire Size	Strength Index	Inflation Pressure													
			Michelin				Goodyear				Bridgestone					
			Front		Rear		Front		Rear		Front		Rear			
kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	
770	18.00R33	★★, ★★★	752	109	752	109	800	116	800	116	800	116	800	116	800	116
772	21.00R33	★★	703	102	703	102	703	102	703	102	689	100	689	100	689	100
773F	24.00R35	★★	703	102	703	102	676	98	600	87	689	100	689	100	689	100
775F	24.00R35	★★	703	102	703	102	703	102	703	102	689	100	689	100	689	100
777D	27.00R49	★★	703	102	703	102	724	105	724	105	689	100	689	100	689	100
777F	27.00R49	★★	703	102	703	102	724	105	724	105	689	100	689	100	689	100
785C	33.00R51	★★	703	102	703	102	800	116	800	116	724	105	724	105	724	105
785D	33.00R51	★★	703	102	703	102	800	116	800	116	724	105	724	105	724	105
789C	37.00R57	★★	655	95	655	95	752	109	752	109	724	105	724	105	724	105
793D	40.00R57 46/90R57	★★	703	102	752	109	752	109	752	109	724	105	724	105	724	105
		★★						752	109	752	109	689	100	689	100	689
793F	40.00R57 46/90R57 50/80R57	★★	752	109	752	109										
		★★					772	112	724	105	689	100	689	100	689	100
		★★	655	95	655	95										
797F	59/80R63	★★	703	102	703	102					Consult Bridgestone					

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

WHEEL LOADERS — Bias and Bias Belted

Model	Tire Size	Strength Index	Inflation Pressure ¹							
			Goodyear				Bridgestone/Firestone			
			Front		Rear		Front		Rear	
kPa	psi	kPa	psi	kPa	psi	kPa	psi			
904H	12-16.5	10					241	35	172	25
	33-15.5x16.5	12								
914G	15.5-25	12								
	17.5-25	12								
924H	17.5-25	12	352	51	248	36				
	20.5-25	12	248	36	207	30				
924Hz	17.5-25	12								
	20.5-25	12								
928Hz	17.5-25	12								
	20.5-25	12								
	23.1-26	14								
930H	17.5-25	12								
	20.5-25	12								
	23.1-26	14								
938H	20.5-25	16, 20	400	58	276	40	310	45	207	30
950H	23.5-25	16, 20	400	54	276	40	345	50	207	30
962H	23.5-25	16, 20	427	62	276	40	379	55	241	35
966H	26.5-25	20, 26	448	65	276	40	414	60	276	40
972H	26.5-25	20, 26	476	69	303	44	448	65	276	40
980H	29.5-25	22, 28	427	62	276	40	586	85	379	55
988H	35/65-33	42	627	91	427	62	655	95	414	60
990H	41.25/70-39	42	552	80	352	51	586	85	414	60
992K	45/65-45	58	469	95	503	73	724	105	483	70
993K	50/65-51	62					724	105	483	70
994F	49.5/85-57	76					724	105	483	70
	50/80-57	68					724	105	483	70
	52/80-57	68	600	87	400	58				
	53.5/85-57	76					724	105	483	70
	58/85-57	84					724	105	483	70

¹For pressures not listed, consult your local tire supplier for operating pressures.

Tires

Standard Cold Inflation Pressures

- Log Loaders — Bias and Bias Belted
- Integrated Toolcarriers — Bias and Bias Belted

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

LOG LOADERS — Bias and Bias Belted

Model	Tire Size	Strength Index	Inflation Pressure							
			Goodyear				Bridgestone/Firestone			
			Front		Rear		Front		Rear	
		kPa	psi	kPa	psi	kPa	psi	kPa	psi	
IT14G	15.5-25	12								
	17.5-25	12								
924H Versalink	17.5-25	12	352	51	248	36	Consult Bridgestone/Firestone			
	20.5-25	12								
930H Versalink	20.5-25	12								
938H	20.5-25	16, 20	400	58	276	40	310	45	207	30
950H	23.5-25	20	372	54	276	40	345	50	207	30
966H	26.5-25	20, 26	448	65	276	40	414	60	276	40
980H	29.5-25	28	427	62	276	40	586	85	379	55
988H	35/65-33	42					655	95	414	60

NOTE: Contact your tire supplier to obtain or confirm proper Log Loader pressures.

INTEGRATED TOOLCARRIERS — Bias and Bias Belted

Model	Tire Size	Strength Index	Inflation Pressure											
			Goodyear				Bridgestone/Firestone							
			Front		Rear		Front		Rear					
		kPa	psi	kPa	psi	kPa	psi	kPa	psi					
IT14G	15.5-25		310	45	207	30	Consult Bridgestone/Firestone							
	17.5-25		276	40	172	25								
924H Versalink	17.5-25		310	45	241	35					Consult Bridgestone/Firestone			
	20.5-25		276	40	207	30								
930H Versalink	20.5-25		276	40	207	30	Consult Bridgestone/Firestone							
IT38H	20.5-25		400	58	276	40					379	55	276	40
IT62H	23.5-25		372	54	248	36					345	50	207	30

NOTE: Contact your tire supplier to obtain or confirm pressures.

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

WHEEL LOADERS — Radial Ply

Model	Tire Size	Strength Index	Inflation Pressure											
			Michelin				Goodyear				Bridgestone			
			Front		Rear		Front		Rear		Front		Rear	
kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi			
906H	340/80R18	★												
	405/70R18	★												
	335/80R18	★	310	45	207	30					317	46	317	46
	340/80R18	★	276	40	207	30								
908H	375/75R20	★	276	40	207	30								
914G	17.5R25	★	241	35	207	30					414	60	276	40
924H	17.5R25	★	276	40	207	30					414	60	310	45
	550/65R25	★												
	20.5R25	★	276	40	207	30	324	47	228	33	414	60	276	40
924Hz	17.5R25	★									414	60	310	45
	20.5R25	★	276	40	207	30					414	60	276	40
928Hz	17.5R25	★	345	55	207	30								
	20.5R25	★	276	40	207	30					414	60	310	45
	600/65R25	★	276	45	207	30								
930H	17.5R25	★	345	50	207	30					483	70	310	45
	20.5R25	★	276	40	207	30					414	60	310	45
	600/65R25	★	276	45	207	30								
938H	20.5R25	★	345	50	207	30	448	65	303	44	310	45	207	30
	550/65R25	★	379	55	241	35								
	650/65R25	★	276	40	207	30					276	40	172	25
950H	23.5R25	★, ★★	310	45	207	30	476	69	303	44	345	50	207	30
	650/65R25	★	379	55	207	30								
	750/65R25	★	345	50	207	30					310	45	172	25
962H	23.5R25	★, ★★	345	50	207	30	476	69	303	44	379	55	241	35
966H	26.5R25	★, ★★	414	60	241	35	448	65	303	44	414	60	276	40
	750/65R25	★	379	55	241	35								
972H	26.5R25	★, ★★	448	65	241	35	476	69	303	44	448	65	276	40
	750/65R25	★	379	55	241	35								
980H	29.5R25	★, ★★	517	75	276	40	503	73	303	44	586	85	379	55
988H	35/65R33	★, ★★	586	85	414	60	627	91	427	62	793	115	524	76
990H	45/65R39	★	586	85	345	50	552	80	352	51	621	90	483	70
992K	45/65R45	★	621	90	414	60								
	45/65R45	★★					655	95	503	73	724	105	483	70
993K	50/65R51	★★	621	90	414	60					724	105	483	70
994F	55/80R57	★	703	102	586	85								
	55.5/80R57	★★									724	105	483	70

NOTE: Bridgestone/Firestone inflation pressure for Giant Loader Tires (992K and above) are in reference to applications without chains. For use with chains please consult your Bridgestone/Firestone representative.

Tires

Standard Cold Inflation Pressures

- Log Loaders — Radial Ply
- Integrated Toolcarriers — Radial Ply

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

LOG LOADERS — Radial Ply

Model	Tire Size	Strength Index	Inflation Pressure											
			Michelin		Goodyear		Bridgestone							
			Front	Rear	Front	Rear	Front	Rear						
			kPa	psi	kPa	psi	kPa	psi	kPa	psi				
IT14G	15.5R25	★	414	60	276	40	414	60	310	45	345	50	276	40
	17.5R25	★	345	50	207	30	414	60	310	45	345	50	276	40
924H	17.5R25	★	414	60	207	30	427	62	276	40	345	50	276	40
	20.5R25	★	310	45	207	30	324	47	228	33	345	50	276	40
	550/65R25	★	310	45	207	30	324	47	228	33	414	60	310	45
930H	20.5R25	★	379	55	207	30	414	60	310	45	345	50	276	40
	650/65R25	★	310	45	207	30					414	60	310	45
938H	20.5R25	★	414	60	276	40	448	65	303	44	310	45	207	30
	550/65R25	★	414	60	241	35								
	600/65R25	★												
	650/65R25	★	345	50	207	30								
950H	23.5R25	★, ★★	414	60	276	40	476	69	303	44	345	50	207	30
	650/65R25	★	345	50	241	35								
	750/65R25	★	276	40	207	30								
966H	26.5R25	★, ★★	414	60	276	40	448	65	303	44	414	60	276	40
	750/65R25	★	414	60	276	40								
980H	29.5R25	★, ★★	517	75	276	40	503	73	303	44	586	85	379	55
988H	35/65R33	★, ★★	621	90	414	60	800	116	600	87	655	95	414	60

NOTE: Contact your tire supplier to obtain or confirm proper Log Loader pressures.

INTEGRATED TOOLCARRIERS — Radial Ply

Model	Tire Size	Strength Index	Inflation Pressure											
			Michelin		Goodyear		Bridgestone							
			Front	Rear	Front	Rear	Front	Rear						
			kPa	psi	kPa	psi	kPa	psi	kPa	psi				
IT14G	15.5R25	★	276	40	207	30	414	60	310	45	345	50	276	40
	17.5R25	★	241	35	207	30	414	60	310	45	207	30	310	45
924H	17.5R25	★	345	50	207	30	414	60	310	45	345	50	276	40
	20.5R25	★	310	45	207	30	414	60	310	45	345	50	276	40
	550/65R25	★	276	40	207	30					414	60	310	45
930H	17.5R25	★	345	50	207	30	414	60	310	45	345	50	276	40
	20.5R25	★	276	40	207	30	414	60	310	45	345	50	276	40
	550/65R25	★									414	60	310	45
	600/65R25	★	310	45	207	30								
IT38H	20.5R25	★	276	40	207	30	427	62	276	40	448	65	241	35
IT62H	23.5R25	★	276	40	207	30	427	62	276	40	345	50	207	30

NOTE: Contact your tire supplier to obtain or confirm pressures.

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

WHEEL TRACTORS — Bias Ply

Model	Tire Size	Ply Rating or Strength Index	Inflation Pressure							
			Goodyear				Bridgestone/Firestone			
			Front		Rear		Front		Rear	
			kPa	psi	kPa	psi	kPa	psi	kPa	psi
814F2	23.5-25	12, 20	248	36	228	33				
824H	29.5-25	22, 28	248	36	248	36	276	40	276	40
834H	35/65-33	24, 30, 42	324	47	324	47	345	50	345	50
844H	41.25/70-39	34, 42	303	44	303	44	414	60	414	60
854K	45/65-45	58	400	58	400	58	517	75	448	65

WHEEL TRACTORS — Radial Ply

Model	Tire Size	Ply Rating or Strength Index	Inflation Pressure											
			Michelin		Goodyear		Bridgestone							
			Front	Rear	Front	Rear	Front	Rear						
			kPa	psi	kPa	psi	kPa	psi	kPa	psi				
814F2	23.5R25	★	310	45	310	45								
	26.5R25	★	276	40	276	40								
824H	29.5R25	★, ★★	276	40	276	40	303	44	303	44	345	50	345	50
834H	35/65R33	★	379	50	379	50	400	58	400	58	345	50	345	50
	875/65R33	★★					400	58	400	58				
844H	45/65R39	★	379	55	345	50	400	58	400	58	414	60	414	60
854K	45/65R45	★	483	60	483	60	427	62	427	62	483	70	414	60
	45/65R45	★★									427	62	427	62

Optimal pressures may vary depending on specific applications and working conditions. Always consult your local tire supplier for operating pressures.

UNDERGROUND MINING — Bias and Radial Ply

LOAD – HAUL – DUMP			Inflation Pressure							
Model	Tire Size	Ply Rating	Bridgestone Bias				Bridgestone Radial			
			Front		Rear		Front		Rear	
			kPa	psi	kPa	psi	kPa	psi	kPa	psi
R1300G	17.5R25 17.5-25	★★ 20	689	100	586	85	689	100	586	85
R1600G	18.00R25 18.00-25	★★ 32	676	100	414	60	689	100	407	60
R1700G	26.5R25 26.5-25	★★ 36	621	90	414	60	621	90	414	60
R2900G	29.5R29 35/65R33 29.5-29	★, ★★ ★★ 34	586	85	414	60	621 655	90 95	414 414	60 60
ARTICULATED TRUCKS										
AD30	26.5R25	★, ★★					586	85	621	90
AD45B	29.5R29	★, ★★					655	90	655	95
AD55B	35/65R33	★★					648	95	648	95

BIAS PLY TIRES

RADIAL PLY TIRES

Tire Size	Weight Increase Per Tire		Mixing Proportions				Weight Increase Per Tire		Mixing Proportions			
	kg	lb	CaCl		Water		kg	lb	CaCl		Water	
			kg	lb	L	gal			kg	lb	L	gal
13.00-24TG	188	414	55	122	132	35	185	407	57	125	128	34
14.00-24TG	215	475	63	140	151	40	256	565	79	173	179	47
15.5-25	192	423	56	125	136	36	224	493	69	151	155	41
16.00-24TG	333	735	98	217	234	62	355	783	109	240	246	65
17.5-25	262	577	77	170	185	49	311	686	95	210	216	57
18.00-25	454	1002	134	296	322	85	502	1107	154	340	348	92
18.4-34	417	919	123	272	295	78	—	—	—	—	—	—
20.5-25	405	892	119	263	284	75	448	987	137	303	310	82
23.1-26	522	1151	154	340	367	97	—	—	—	—	—	—
23.5-25	585	1291	173	382	412	109	633	1396	194	428	439	116
24.5-32	703	1549	207	458	496	131	—	—	—	—	—	—
26.5-25	758	1671	224	494	533	141	841	1853	258	568	583	154
26.5-29	752	1658	222	490	530	140	928	2045	284	627	644	170
28L-26	709	1563	209	462	500	132	—	—	—	—	—	—
29.5-25	970	2139	286	632	685	181	1073	2368	328	723	745	197
29.5-29	1050	2315	310	684	738	195	1190	2623	365	804	825	218
29.5-35	1159	2556	344	758	821	217	1286	2835	394	869	892	236
30.5L-32	874	1928	258	570	617	163	—	—	—	—	—	—
33.25-35	1485	3275	439	968	1048	277	1592	3508	487	1074	1105	292
37.25-35	1712	3775	505	1115	1211	320	2128	4692	653	1439	1476	390
38-39	1870	4123	552	1218	1317	348	—	—	—	—	—	—
35/65-33	1339	2953	396	873	942	249	1430	3152	438	967	992	262
40/65-39	2077	4580	614	1353	1465	387	2194	4836	673	1483	1522	402
41.25/70-39	1897	4183	561	1236	1336	353	—	—	—	—	—	—
45/65-45	2548	5617	753	1659	1794	474	—	—	—	—	—	—

NOTE: Ballast weight for bias ply tires from Goodyear data, radial ply weights from Michelin data. Contact your tire supplier for additional information. Under abnormal tire wear conditions, ballasting of rear tires may be desirable. Ballasting of front tires also should only be done where extremely rapid tire wear rates are encountered. Excessive weight will reduce machine performance.

NOTE: Fillage beyond 75% of tire enclosed volume is not recommended. With liquid ballasting, inflation pressure must be checked at least once per day.

NOTE: 1.6 kg (3½ lb) Calcium Chloride per gallon water. Solution weighs 4.6 kg (10.15 lb) per gallon.

NOTE: Total machine mass including all attachments in operating condition, all reservoirs at full capacity and ballasted tires must not exceed certification mass listed on the ROPS certification label.

NOTE: Special air to water valves are required for liquid filled tires.

