YOKOHAMA

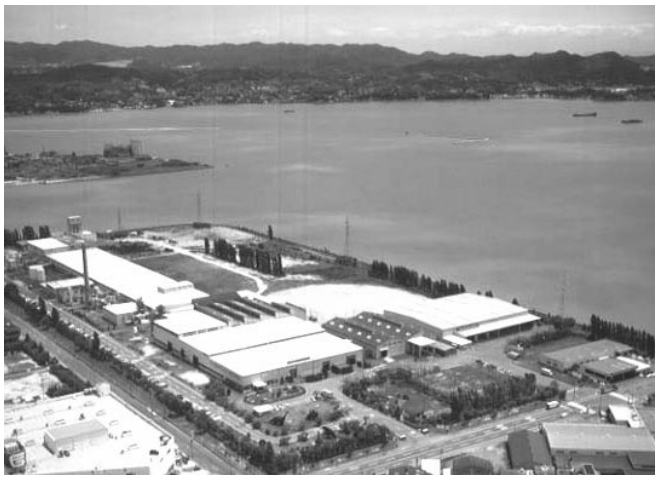
OFF-THE-ROAD TIRES HANDBOOK

Get Your Job Done Anywhere In The World

Preface

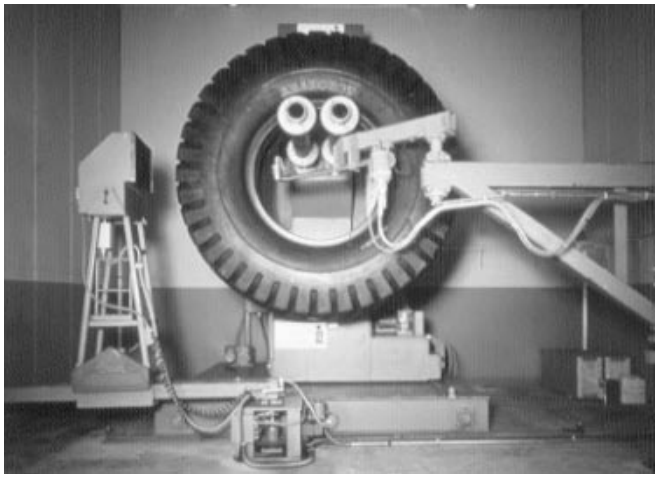
YOKOHAMA has prepared this handbook to provide detailed, practical information pertaining to off-the-road tires. This handbook discusses basic construction, selection, use, maintenance, and other important aspects of the wide variety of Yokohama off-the-road tires available for the various applications encountered. It is the desire of Yokohama that you will make good use of this handbook so that you may realize total cost efficiency.

YOKOHAMA has built its advanced technological capabilities over the years. Its off-the-road tires are high quality products manufactured in integrated production facilities with rigid quality control. Full advantage of these off-the-road tires can be gained by following the guidelines contained within.

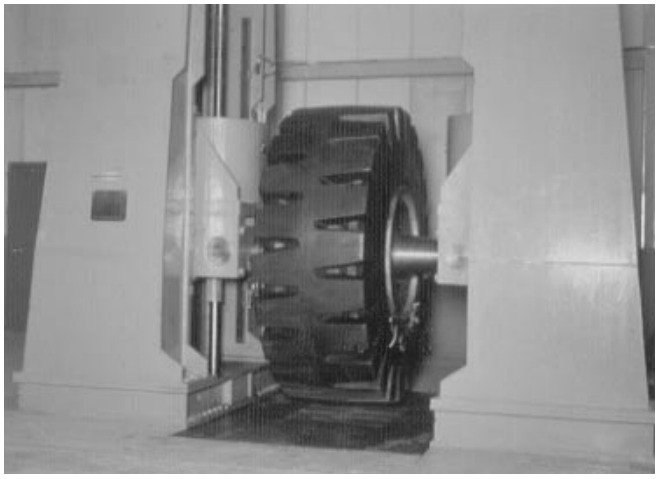


ONOMICHI Off-The-Road Tire Plant

Tire Drum Tester



X-Ray Spectrophotometer



Load Tester

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1. OUTLINE OF OFF-THE-ROAD TIRES

TRA CLASSIFICATION OF OFF-THE-ROAD TIRES

YOKOHAMA off-the-road tires are classified as follows by the Tire and Rim Association, Incorporated (TRA).

EARTHMOVER TIRES (Dump Trucks and Scrapers)

TRA CODE	TREAD TYPE	YOKOHAMA CODE	
		Radial	Bias
E-1	Rib Regular		Y41
E-2	Traction Regular		Y103
E-3	Rock Regular	RT31, RB31, RL31	Y67, Y565, Y529
E-4	Rock Deep Tread	RB41, RB42, RT41	Y523, Y523R, Y523U, Y522, Y530
E-7	Flotation		Y65

LOADER AND DOZER TIRES (Front-End Loaders and Dozers)

TRA CODE	TREAD TYPE	YOKOHAMA CODE	
		Radial	Bias
L-2	Traction Regular		Y103
L-3	Rock Regular	RT31, RB31, RL31	Y67, Y526K, Y575
L-4	Rock Deep Tread		Y67E, Y545, Y522
L-5	Rock Extra Deep Tread		Y524, Y524Z, Y525
L-4S	Smooth Deep Tread		Y69, Y69K, Y69U
L-5S	Smooth Extra Deep Tread		Y69, Y69K, Y69U

GRADER TIRES (Motor Graders)

TRA CODE	TREAD TYPE	YOKOHAMA CODE	
		Radial	Bias
G-2	Traction Regular	RT21	Y25, Y103
G-3	Rock Regular		Y67

COMPACTOR TIRES

TRA CODE	TREAD TYPE	YOKOHAMA CODE	
		Radial	Bias
C-1	Smooth		Y69

INDUSTRIAL TIRES (Straddle Carriers, Transfer Cranes, Towing Tractors, Reach Stackers and Fork Lifts)

TRA CODE	TREAD TYPE	YOKOHAMA CODE	
		Radial	Bias
IND-3	Traction Regular		Y532, Y92, Y67, Y69PS, Y543
IND-4	Deep Tread	RL-43, RR41	Y523, Y69
IND-5	Extra Deep Tread		

Caution: Never replace a tire mounted on a vehicle with any tire designed for a different type of vehicle. For example, you should never place an earthmover tire on a loader.

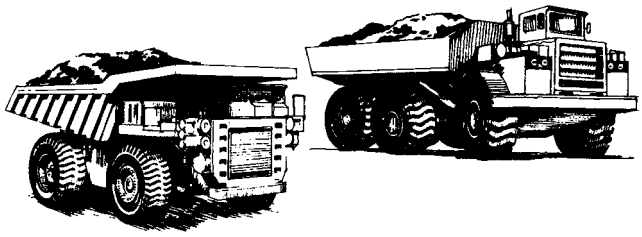
TIRES BY TYPE OF VEHICLE

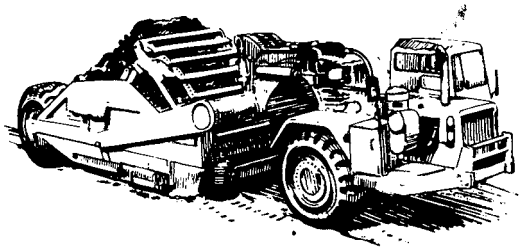
YOKOHAMA off-the-road tires are also classified by type of vehicle and application suitable for usage.

Dump Trucks

(TRA Codes E-1, E-2, E-3, E-4 and E-7)

Since dump trucks must travel under heavy load at high speeds over relatively long distances, tire for dump trucks must have high heat and wear resistance. High resistance to cuts is sometimes also necessary.





Scrapers

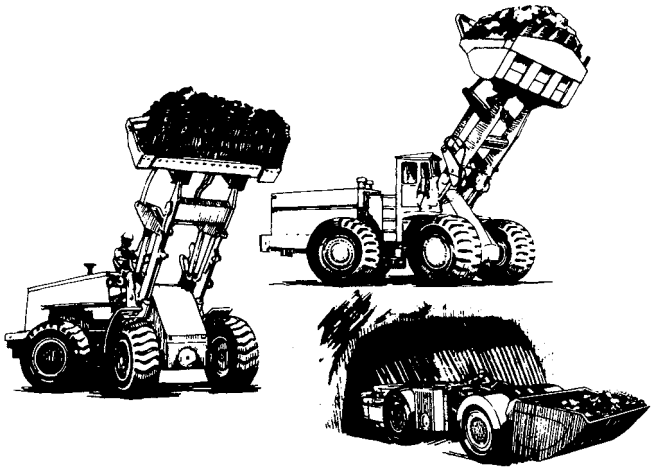
(TRA Code E-2, E-3, E-4 and E-7)

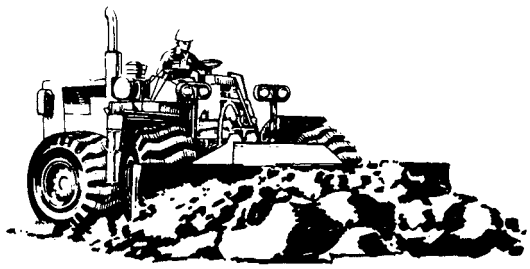
Scraper tires, of which the wide base type is most common, should have the same properties as those for dump trucks. Superior flotation and traction are also occasionally required.

Front-End Loaders

(TRA Codes L-2, L-3, L-4, L-5, L-4S and L-5S)

Since front-end loaders operate on rough ground, cut and wear resistance are vital and the tires must provide stability for the loader body. Flotation and traction properties may also be necessary, depending on the working conditions. In certain cases, such as the wet and rough conditions of underground mines, the L-4S and L-5S with smooth treads are used because of their high wear and cut resistant properties.





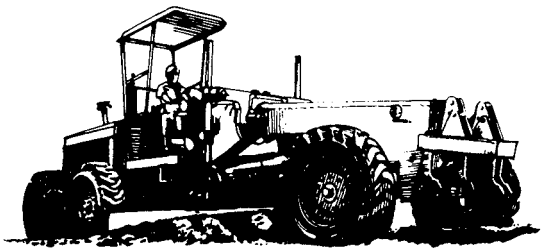
Tire Dozers

(TRA Codes L-2, L-3, L-4 and L-5)

Since a tire dozer is used not only for dozing and leveling, but sometimes for pushing a motor scraper, tires with better traction than loader tires are necessary. Other requirements vary widely depending on job conditions.

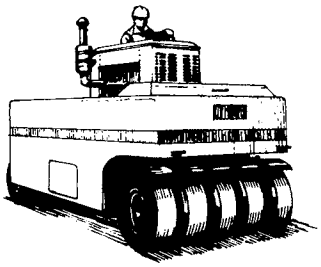
Motor Graders
(TRA Codes G-1, G-2 and G-3)

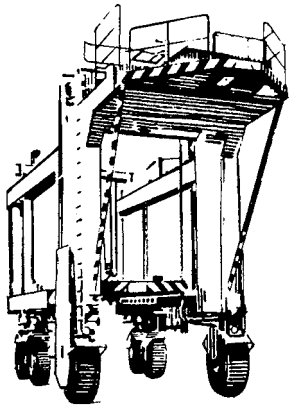
The motor grader, which is used for road leveling, clearing and snow removal, needs tires that provide high traction and directional stability. Other characteristics depend on job requirements.



Tire Rollers
(TRA Codes C-1)

Tire rollers use wide tread tires that uniformly distribute weight because of their primary use in compacting road surfaces.





Straddle Carriers
(TRA Codes IND-3)

Straddle carriers are special vehicles that are mainly used at seaport areas to carry ocean-going freight containers. These tires require extra heavy-duty performance, and wear and heat resistance, because straddle carriers operate continuously and turn frequently.

Towing Tractors
(TRA Codes IND-3)

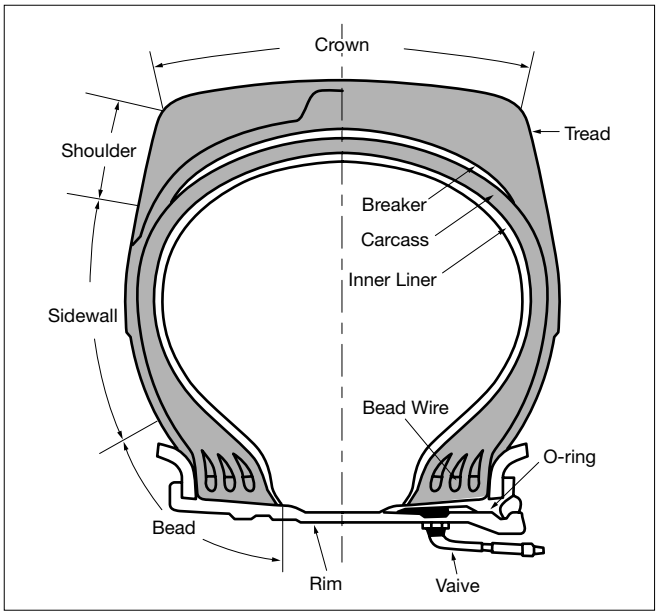
Towing tractors are used to move large aircraft. Thus, these tires mainly rquire extra traction.

CONSTRUCTION OF OFF-THE-ROAD TIRES

Basic Components

The construction of off-the-road tires depends, to a large extent, on the intended use of the tire. However, common components to all off-the-road tires are the tread, carcass, beads, breakers and sidewalls. Tubeless type tires also have an inner liner.

Cross Sectional Diagram of Off-The-Road Bias Tires



Tread

The tread is the outermost covering of the tire, and is the only part that normally comes in contact with the road surface. It, therefore, must be designed to protect the body of the tire from cuts and wear. Depending on the intended use of the tire, the rubber compound applied to the tread will be changed to customize cut resistance, heat resistance and oil resistance. The tread pattern also has a large effect on the performance of the tire.

Carcass

The compressed air in a tire supports the load placed on the tire. The carcass forms a semi-rigid frame for the compressed air, but it is flexible enough to absorb some shocks and jolts. The carcass of Bias tire consists of a number of rubber-coated layers of fabric called "piles."

Beads

The beads fix the tire to the rim to support the load.

Breakers

The breakers of Bias tire are rubber-coated layers of cord between the tread and carcass, binding the two together. The breakers prevent cuts in the tread from reaching the carcass and absorb shocks.

Sidewalls

The sidewalls are composed of a flexible, crack resistant rubber, and protect the carcass from damage. For jobs where chuck holes, large rocks, etc. are a problem, tires with high cut resistant sidewalls can be used.

Inner Liner

The inner walls of tubeless tire are lined. The liner is made of an air-impermeable rubber compound and is comparable to tubes used in tube type tires. Tubeless tires generally weigh less than comparable tube type tires and are simpler to maintain because tube and flap are eliminated.

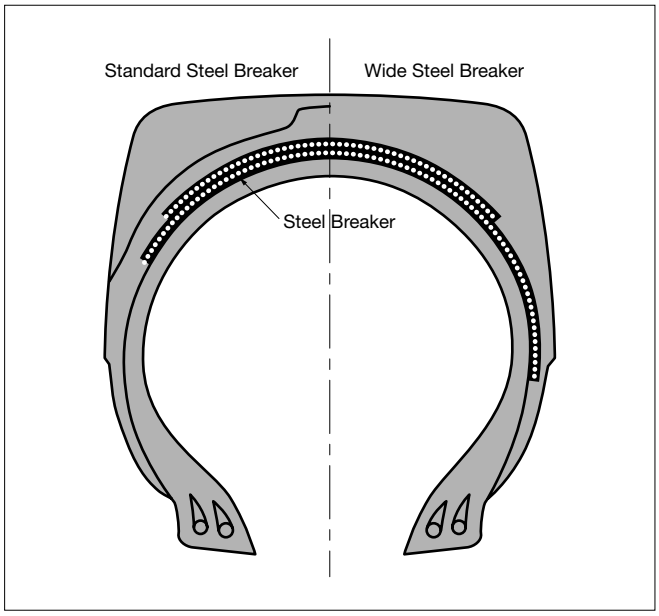
Structural Diagram of Off-The-Road Bias Tires

① Breaker
② Tread
③ Sidewall
④ Carcass
⑤ Bead
⑥ Inner

Steel Breakers

The steel breaker tire has steel cord breakers that give it very high cut resistance. It is specially useful where sharp rock is a problem, and is applicable to loader, dozer, dump truck and occasionally earthmover type tires. The adhesiveness between the steel cord and rubber is, however, more susceptible to heat damage than that of nylon cord and rubber, Accordingly, steel breaker tires should not be subjected to conditions where heat generation is great. Because of the difficulty involved in retreading steel breaker tires, they should not be used for jobs where more easily retreaded tires can be used. Steel breakers that extend to the side wall are also available for jobs where high sidewall cut resistance is required.

Steel Breaker Diagram



Construction of Off-The-Road-Radial Tires

The radial tire has 2 carcass components, both consist of steel. The first is a single bead to bead carcass ply which carries the load and supports tread.
The carcass ply runs at 90 degree angle in relation to the tire bead. The second is low angle steel Belts which are placed on the top of the carcass ply and under tread rubber to minimize tread distortion.

Structural Diagram of Off-The-Road Bias Tires

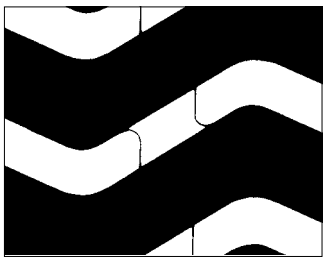
① Belt
② Carcass
③ Inner liner
④ Bead wire
⑤ Chafer
⑥ Sidewall
⑦ Tread

TREAD PATTERNS

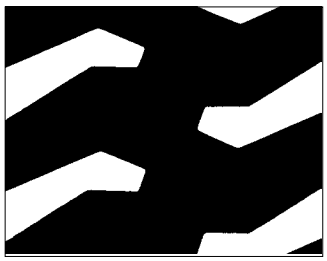
The tread pattern is designed to produce varying degrees of traction, cut, floatation, wear and heat resistance. So selection of the proper off-the-road tire depends on the job and the conditions. For example, different tread patterns are used to produce maximum traction or floatation on sand, mud and rock. There are five basic tread patterns: rock, traction, block, rib and smooth.

Rock Pattern

The rock pattern is specially designed to prevent cuts caused by sharp rock. Its large ground contact area provides excellent wear resistance. Characteristical grooves running across the direction of travel mark the most popular tread pattern for off-the-road tires.



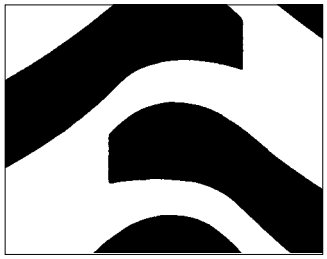
Rock pattern



Rock-flush pattern

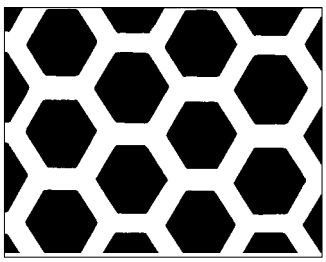
Traction Pattern

The traction pattern is a directional tread design, which means the direction of mounting on the rim is important. For example, the mounting direction should place the tread facing one way on the drive wheels to produce proper traction, while on free rolling wheels the tread should face the opposite direction.



Traction pattern

Block Pattern

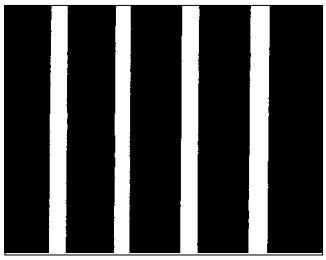


Block pattern

The block pattern tire is mostly characterized by wide tread width and rounded shoulders. Under heavy loads the block pattern's large ground contact area creates low ground contact pressure for good flotation properties. It is therefore well suited for use on soft, muddy ground. This pattern is also called the "alligator" or "button" pattern.

Rib Pattern

The rib pattern has grooves running parallel to the direction of travel and gives high directional stability. The rib-lug pattern a variation of the rib pattern has lugs on the shoulders of the tread. Rib pattern tires are manly used on free-rolling wheels.



Rib pattern

Smooth Pattern

The smooth tread pattern, designed for tire rollers, has no grooves. It is used for compacting and leveling. A smooth pattern tire is also sometimes used on loaders in underground mines because of its high wear and cut resistance. The smooth pattern for loaders, however, has two narrow grooves that are used to measure tread wear.

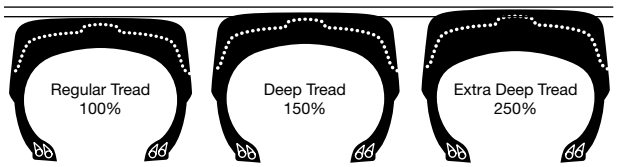
Smooth for tire rollers

Smooth for loaders

TREAD THICKNESS

According to the Tire and Rim Association, Incorporated, there are three general classifications for tread thickness for off-the-road tires: regular, deep and extra deep. Deep and extra deep are 1.5 and 2.5 times thicker than regular, respectively. The thicker treads have greater cut and wear resistance. The TRA tread codes are classified as follows:

Extra Deep Tread	L-5, L-5S
Deep Tread	E-4, L-4, L-4S
Regular Tread	E-2, E-3, G-2, G-3, L-2, L-3



Regular, deep and extra deep tread comparison

Although thicker treads give greater wear and cut resistance, they also generate and retain more heat. Accordingly, work conditions for thick tread tires should be thoroughly evaluated to prevent heat separation and other heat related damage. Deep and extra deep tread tires have almost the same overall diameter which is larger than regular tread tires. When replacing regular tread tires with deep or extra deep tread tires, the larger overall diameters of the thicker tread tires should be taken into consideration.

SIZE IDNTIFICATION AND ASPECT RATIO

The size of an off-the-road tire is normally indicated by tire width, rim diameter and ply rating. The nomenclature for this is as follows:

Tire Width		Rim Diameter	Ply Rating
21.00	–	35	36PR (Bias Narrow Base)
16.00	R	25	☆☆☆ (Radial Narrow Base)
26.5	–	25	20PR (Bias Wide Base)
23.5	R	25	☆☆ (Radial Wide Base)
(inches)		(inches)	

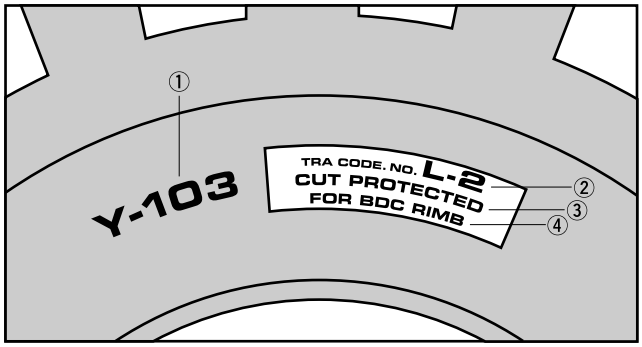
A narrow base tire has an aspect ratio (tire height/tire width) of 96 to 98%, and a wide base tire has an aspect ratio of 80 to 82%. Widths of narrow and wide base tires of the same diameter are shown below:

13.00-15.5	21.00-26.5
14.00-17.5	24.00-29.5
16.00-20.5	27.00-33.5
18.00-23.5	30.00-37.5

According to TRA guidelines, tires with and aspect ratio of 65 to 70% are called *super low profile tires* and provide high flotation and stability and are usually indicated as follows: *Tire width/aspect ratio-rim diameter* (40/65-39). Some low profile tires are also indicated by *overall diameter* × *tire width rim diameter* (42 × 17-20). A suffix, NHS, TG or K, may be attached. These are TRA designations used to differentiate between tires requiring certain conditions. NHS: Not for highway service, TG: Tractor-grader tires, not for highway use, and K: Compactor tire for use on 5° drop center or semi-drop center rims having bead seats with nominal minus 0.032 diameter.

TIRE SPECIFICATION CODE

It is most critical that off-the-road tires are properly matched to the job and road conditions anticipated. Accordingly, off-the-road tires are classified by three types: "regular tire," "cut resistant tire" and "hat resistant tire." The regular type provides general performance for use under standard conditions. Where many obstacles pose cut damage, cut protected types are most suitable. And under good road conditions where higher speeds can be attained, heat resistant types are recommended.
YOKOHAMA follows the above classifications and marks tire specifications on the sidewalls as depicted below:



① Design number, e.g. Y67, Y523, Y575, etc.
② TRA code, e.g. E-3, E-4, L-5, etc.
③ Tire specification code, e.g. cut protected, heat resistant, RE-X (regular), CP-X (cut protected) or HR-X (heat resistant).
④ Rim specifications where applicable, e.g. for SDC rim use only.

LOAD INDEX

The LOAD INDEX is a international numerical code associated with the maximum load a tire can carry at the speed indicated by its Speed Symbol under service specified conditions.

L1	kg	L1	kg	L1	kg	L1	kg	L1	kg	L1	kg
0	45	50	190	100	800	150	3350	200	14000	250	60000
1	46.2	51	195	101	825	151	3450	201	14500	251	61500
2	47.5	52	200	102	850	152	3550	202	15000	252	63000
3	48.7	53	206	103	875	153	3650	203	15500	253	65000
4	50	54	212	104	900	154	3750	204	16000	254	67000
5	51.5	55	218	105	925	155	3875	205	16500	255	69000
6	53	56	224	106	950	156	4000	206	17000	256	71000
7	54.5	57	230	107	975	157	4125	207	17500	257	73000
8	56	58	236	108	1000	158	4250	208	18000	258	75000
9	58	59	243	109	1030	159	4375	209	18500	259	77500
10	60	60	250	110	1060	160	4500	210	19000	260	80000
11	61.5	61	257	111	1090	161	4625	211	19500	261	82500
12	63	62	265	112	1120	162	4750	212	20000	262	85000
13	65	63	272	113	1150	163	4875	213	20600	263	87500
14	67	64	280	114	1180	164	5000	214	21200	264	90000
15	69	65	290	115	1215	165	5150	215	21800	265	92500
16	71	66	300	116	1250	166	5300	216	22400	266	95000
17	73	67	307	117	1285	167	5450	217	23000	267	97500
18	75	68	315	118	1320	168	5600	218	23600	268	100000
19	77.5	69	325	119	1360	169	5800	219	24300	269	103000
20	80	70	335	120	1400	170	6000	220	25000	270	106000
21	82.5	71	345	121	1450	171	6150	221	25750	271	109000
22	85	72	355	122	1500	172	6300	222	26500	272	112000
23	87.5	73	365	123	1550	173	6500	223	27250	273	115000
24	90	74	375	124	1600	174	6700	224	28000	274	118000
25	92.5	75	387	125	1650	175	6900	225	29000	275	121000
26	95	76	400	126	1700	176	7100	226	30000	276	125000
27	97	77	412	127	1750	177	7300	227	30750	277	128000
28	100	78	425	128	1800	178	7500	228	31500	278	132500
29	103	79	437	129	1850	179	7750	229	32500	279	136000
30	106	80	450	130	1900	180	8000	230	33500		
31	109	81	462	131	1950	181	8250	231	34500		
32	112	82	475	132	2000	182	8500	232	35500		
33	115	83	487	133	2060	183	8750	233	36500		
34	118	84	500	134	2120	184	9000	234	37500		
35	121	85	515	135	2180	185	9250	235	38750		
36	125	86	530	136	2240	186	9500	236	40000		
37	128	87	545	137	2300	187	9750	237	41250		
38	132	88	560	138	2360	188	10000	238	42500		
39	136	89	580	139	2430	189	10300	239	43750		
40	140	90	600	140	2500	190	10600	240	45000		
41	145	91	615	141	2575	191	10900	241	46250		
42	150	92	630	142	2650	192	11200	242	47500		
43	155	93	650	143	2725	193	11500	243	48750		
44	160	94	670	144	2800	194	11800	244	50000		
45	165	95	690	145	2900	195	12150	245	51500		
46	170	96	710	146	3000	196	12500	246	53000		
47	175	97	730	147	3075	197	12850	247	54500		
48	180	98	750	148	3150	198	13200	248	56000		
49	185	99	775	149	3250	199	13600	249	58000		

SPEED SYMBOL

The SPEED SYMBOL indicates the sped at which the tire can carry a load corresponding to its Load Index under service specified conditions.

Speed Symbol	Speed (km/h)
A1	5
A2	10
A3	15
A4	20
A5	25
A6	30
A7	35
A8	40

Speed Symbol	Speed (km/h)
B	50
C	60
D	65
E	70
F	80
G	90

CONVERSION TABLE: START MARK TO PLY RATING

Loader			Earthmover			Grader		
TIRE SIZE	STAR MARK (*)	PLY RATING	TIRE SIZE	STAR MARK	PLY RATING	TIRE SIZE	STAR MARK	PLY RATING
17.5R25	☆	UP T0 16 PR	17.5R25	☆☆	UP T0 16 PR	1400R24	☆	UP T0 16 PR
20.5R25	☆	UP T0 24 PR	20.5R25	☆☆	UP T0 24 PR			
23.5R25	☆	UP T0 24 PR	23.5R25	☆☆	UP T0 24 PR			
26.5R25	☆	UP T0 24 PR	26.5R25	☆☆	UP T0 32 PR			
			29.5R25	☆☆	UP T0 34 PR			
			16.00R25	☆☆	UP T0 36 PR			

(*)STAR MARK: The load capacity of a tire is indicated by the star mark in case of radial tire.

TUBES AND FLAPS

Tube type tires employ tubes to retain air under pressure within the carcass. The flap is a liner which is placed between the rim and tube to protect the tube from damage by the rim and beads. The size of the tube and flap are usually indicated by the size of tire for which they can be used, without regard for the ply rating. For example, a 23.5-25 size tube or flap can be used with a tire of 23.5-inch width and a diameter of 25 inches. Some tubes and flaps can be used for more than one size of tir. For example, a size 13.00-24 and 13.00-25.

Storage of Tubes and Flaps

Tubs and flaps should be cleaned and all of the air expelled before storage. They should always be stored in a dry, cool place. The tubes should be packed lightly when storing to prevent the metal valve stems from causing damage.

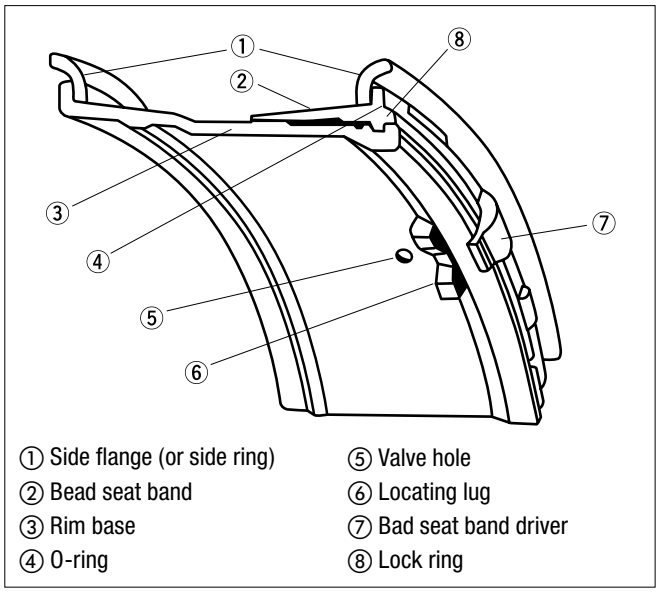
Valves for Tube Type Tires

The type of valve used for a tube type tire depends on the type of rim it is mounted to. Therefore, when purchasing tubes, proper attention should be given to the valve type.

RIMS

Normally, a rim is composed of a rim base, two side flanges (or side rings), bead seat band and lock ring. On some smaller size rims parts may be joined. For tubeless tires, an O-ring is also used.

Rim Construction diagram



Rim Identification

Rims are normally identified by a three-part code consisting of rim width (inches), flange shape (alphabetical) and rim diameter (inches). A flat base rim example would be: 9.00 V x 24. This follows the nomenclature of tire size with the addition of the flange identification, in this case.
The code for full tapered bead seat rims does not indicate the flange shape, but some indicate flange height in inches. An example would be 17.00 x 25 - 2.0, where 2.0 is the flange height in inches.

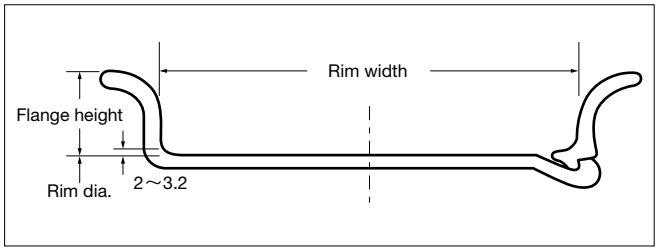
Type of Rims

Tire can function properly only when they are mounted on the right rim. There are four basic types of rims for off-the-road tires: flat base, full tapered bead seat, semi-drop center and drop center.

Flat Base Type Rims

There are two sub-classifications of interchangeable flat base type rims as shown below. A tire which fits on one kind of flat base rim will fit on all flat base rims of the same width and diameter. These rims are used for relatively small tube type off-the-road tires.

Flat Base Rims/5° Flat Base Rims



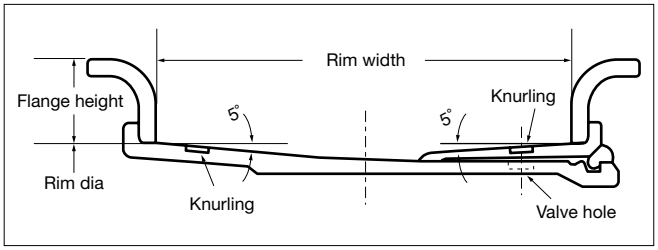
RIMS SIZE		TIRE SIZE	
FLAT BASE RIMS	5º FLAT BASE RIMS	STANDARD	ALTENATIVE
6.50T	6.5	8.25-20	9.00-20
7.00T	7.0	9.00-20	10.00-20
7.50V(VM)	7.5	10.00-20	11.00-20
8.00V	8.0	11.00-20	12.00-20.24
8.50V(VM)	8.5	12.00-20.24	13.00-24
9.00V	9.0	13.00-24	12.00-20.24, 14.00-20.24
10.00WI(W)	—	14.00-20.24, R24	13.00-24

Full Tapered Bead Seat Rims

Most large-wheeled construction machinery employ full tapered bead seat rims. There rims have a 5° taper in the bead seat which strengthens the rim/bad binding. Additionally, a fine groove called "knurling" lines the bead surface to prevent further slippage. Flat base rims have a looser fit and some slippage may occur under quick acceleration if used on the same

large-wheeled vehicle. Almost all rims with diameters over 25" are full tapered bead seat types. Wide base variations are also available.

Full Tapered Bead Seat Rims



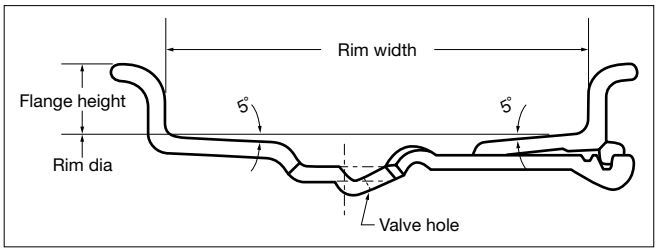
NARROW BASE	
RIM SIZE	TIRE SIZE
8.50	12.00-25, 13.00-25
10.00	14.00-25
11.25	16.00-25, 16.00R25
13.00	18.00-25, 33, 18.00R33
15.00	21.00-25, 35
17.00	24.00-25, 29, 35, 49
19.50	27.00-49
22.00	27.00-33, 30.00-51
24.00	33.00-51
26.00	36.00-51
29.00	40.00-57

WIDE BASE	
RIM SIZE	TIRE SIZE
12.00	15.5-25
14.00	17.5-25, 17.5R25
17.00	20.5-25, 20.5R25
19.50	23.5-25, 23.5R25
22.00	26.5-25, 26.5R25
25.00	29.5-25, 29, 35, 29.5R25
27.00	33.25-35
28.00	33.5-33, 39, 35/65-33
31.00	37.25-35
32.00	37.5-33, 39, 51, 40/65-39
36.00	45/65-45

Semi-Drop Cnter Rims

This rims has a 5°-inclined bead seat and a depressed center. It is abbreviated as the "SDC" rim. Most SDC rims for OTR tires have diameters of 20" or 24". They are used on graders and loaders, and are identified by the marking on the tire sidewall: "For SDC RIM" or "FOR SDC RIMS".

Semi-Drop Center Rims



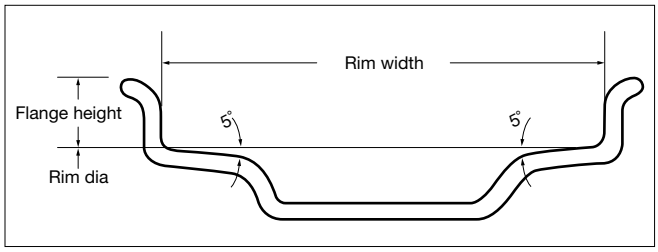
RIM SIZE	TIRE SIZE
8.00TG	12.00-20, 24
	13.00-24
	14.00-24, 14.00R24
10.00VA	13.00-24
	14.00-24, 14.00R24
	16.00-24

RIM SIZE	TIRE SIZE
11.00TG	14/70-20
14.00TG	42/17-20
12.00SDC	15.5-25
14.00SDC	17.5-25, 17.5R25

Drop Center Rim

The drop center rim also has a 5°-inclined bead seat, but with a deeply depressed center (dropped rim center) section for easier tire mounting. Most DC rims are used on small loaders.

Drop Center Rims



RIM SIZE	TIRE SIZE
7JA	23 × 8.50-12
	27 × 8.50-15
	27 × 9.50-15
8-1/2JA	10.0/70-12
W10L	12.5/65-18
10LB	12.5/70-16

RIM SIZE	TIRE SIZE
11LB	14.0/65-15
W13	15.5/60-18
	15.5/70-18.20
W14L	17.5/65-20
W15L	16.9-24, 28, 30
W16L	18.4-24
12.00DC(☆)	15.5-25
13.00DC(☆)	15.5-25, 17.5-25, R25
14.00DC(☆)	17.5-25, R25

(☆): Bias-12PR max. Radial-one star max

Caution with wheel use

Wheel defects such as cracks or corrosion can lead to air leakage, causing among other dangers, deteriorated traction and braking performance. Service life of the tire will degrade, also. More importantly, safe operation of the vehicle will be jeopardized.

- ☞ Do not us wheels with defects such as corrosion or cracks.
- ☞ Do not use rims for tubeless application that have been welded, have rust or have air leakage.
- ☞ Do not use wheels with cracks, breakage or rust erosion on the nut seat of the wheel.
- ☞ Do not use wheels if packing gutters are deformed by rust.
- ☞ Do not re-use O-rings.

VALVES

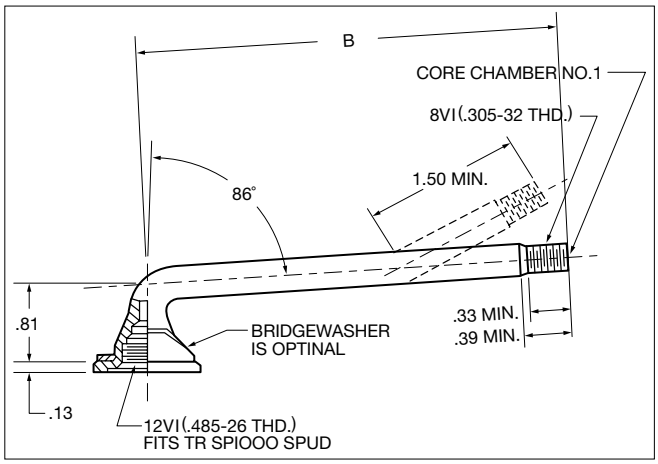
Valves for OTR tires are of two types, tube or rim valves and are available in there makes: standard bore, large bore and air/water. Tube valves are for tube type tires and rim valves are for tubeless type tires.

Tube Valves

Standard Bore Tube Valve

This valve has an opening to accommodate a standard valve core. This type of valve is mainly used for tires smaller than 14.00-24.

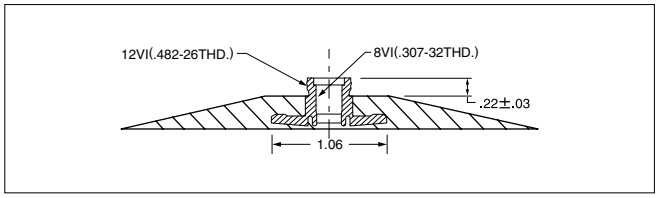
SCREW-ON STANDARD BORE TUBE VALVES



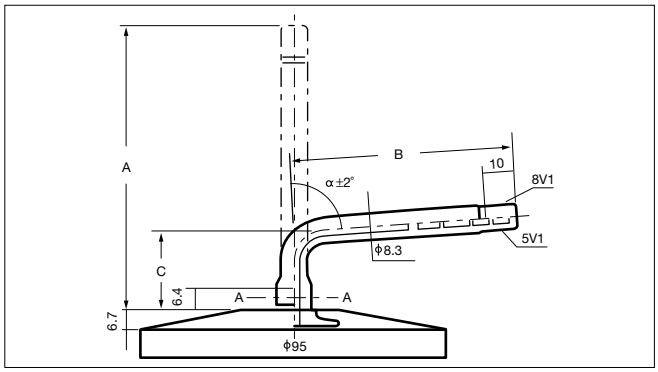
unit inch (mm)

SIZE \ TR VALVE No.	1075A	1077A	1078A	1175A	1177A	1179A
B (mm)	3.0 (76)	4.1 (105)	5.0 (127)	4.5 (115)	3.7 (95)	5.6 (142)

TR SP1000 SPUD AIR-LIQUID TYPE



RUBBER BASE VALVES



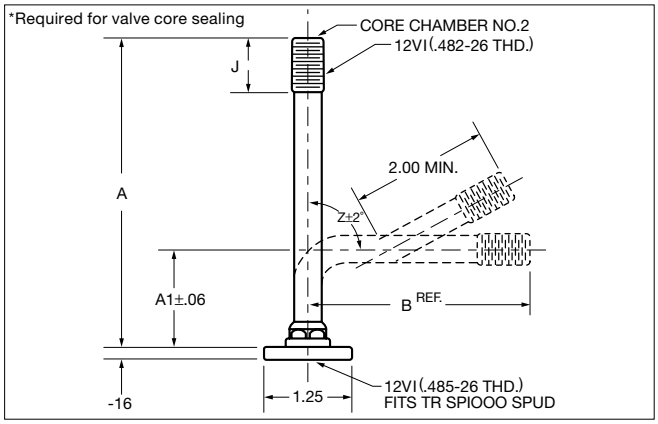
unit inch (mm)

SIZE \ VALVE No.	TR76A	TR77A	TR78A	TR175A	TR177A	TR179A	JS1	JS179	JS75	JS179A
A (mm)	4.1 (105)	4.9 (124)	5.7 (146)	5.2 (134)	4.5 (114)	6.3 (160)	3.1 (79.5)	6.5 (164)	3.5 (89.5)	6.3 (161)
B (mm)	3.4 (86)	4.1 (105)	5.1 (127)	4.5 (115)	3.7 (95)	5.4 (141)	2.4 (60)	5.2 (133)	2.8 (70)	5.4 (137)
C (mm)	0.9 (24)	0.9 (24)	0.9 (24)	0.9 (24)	0.9 (24)	0.9 (24)	0.9 (24)	1.4 (36)	0.9 (24)	1.1 (29)
α (°)	86	86	86	86	86	82	82	86	82	86

Large Bore Tube Valve

More air is required to fill lager tires. To decrease the filling time, a large bore valve can be utilized due to its increased internal diameter. This type of valve is used for wide base and narrow base tires with tread widths larger than 15.5 and 16.00, respectively. The large bore valve is also called a "jumbo valve", for which the third letter of its part number stands for.

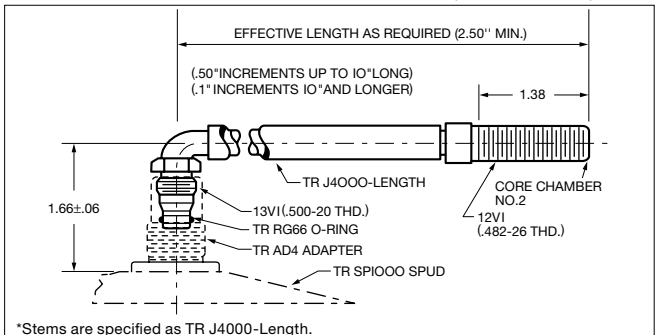
SCREW-ON LARGE BORE CONVERTIBLE TUBE VALVES



unit inch (mm)

VALVE No.	A	A1	B (Ref.)	J	Z
TRJ1014A	1.91 (41)	—	—	1.44 (37)	—
TRJ1076A	4.16 (105)	—	—	0.75 (19)	—
TRJ1076D	—	2.06 (52)	2.31 (59)	0.75 (19)	90
TRJ1076E	—	1.38 (35)	3.00 (76)	0.75 (19)	88
TRJ1175A	5.28 (134)	—	—	0.75 (19)	—
TRJ1175C	—	1.38 (35)	4.13 (105)	0.75 (19)	88
TRJ1178A	5.78 (147)	—	—	0.75 (19)	—
TRJ1078B	—	1.38 (35)	4.62 (117)	0.75 (19)	82
TRJ1179A	6.41 (163)	—	—	0.75 (19)	—
TRJ1179B	—	1.38 (35)	5.25 (134)	0.75 (19)	88
JSJ1175	—	1.22 (31)	4.13 (105)	0.63 (16)	88
JSJ1175B	—	1.22 (31)	4.13 (105)	0.63 (16)	80
JSJ1078S	—	4.7 (121)	1.18 (30)	0.75 (19)	84

TRJ4000 LARGE BOR TUBE VALVES (SWIVEL TYP)

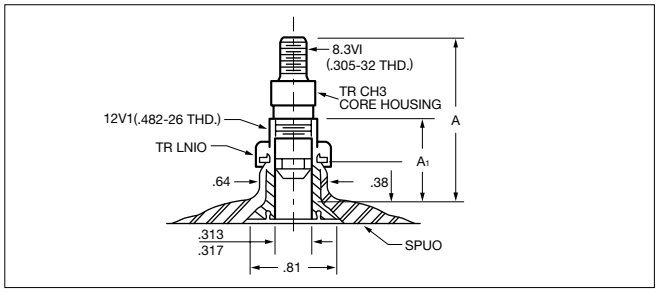


*Stems are specified as TR J4000-Length.
Example: For an effective length of 9.50", the stem number is TR J4000-9.50.
Recommended torque at installation: 70-80 inch-pounds.
Valve core: TR C2

Air/Water Tube Valve

A liquid compound (normally a calcium chloride solution) can be injected into a tube with this valve. Two types are available, the TR218A and TR220A.

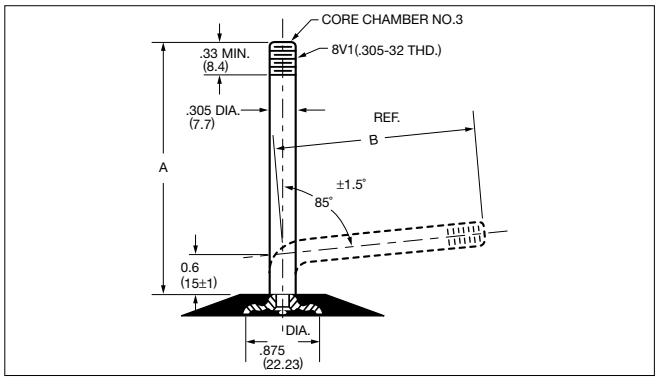
AIR-LIQUID TYPE



unit inch (mm)

VALVE No.	A_1	A
TR 218A	0.81 (20.6)	1.63 (41.1)
TR 220A	1.19 (30.2)	2.00 (50.7)

CONVERTIBLE TUBE VALVES AIR-LIQUID TYPE



unit inch (mm)

VALVE No.	A	B (REF)
440	3.35 (85)	3.0 (75)
441	4.13 (105)	3.7 (95)
442	4.53 (115)	4.1 (105)
443	4.92 (125)	4.5 (115)
444	5.51 (140)	5.1 (130)
445	6.10 (155)	5.7 (145)

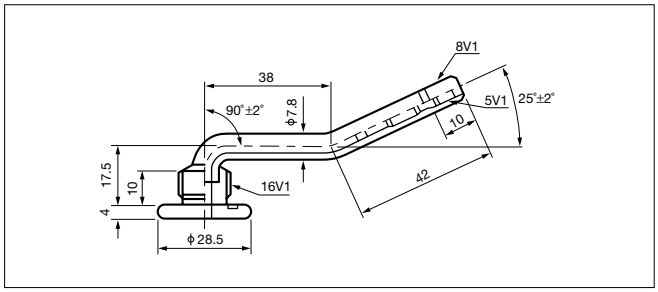
Valve Core: TR Ca (short core only)

Rim Valves

Standard Bore Rim Valve

This is the rim valve counterpart to the standard bore tube valve explained on the opposite page.

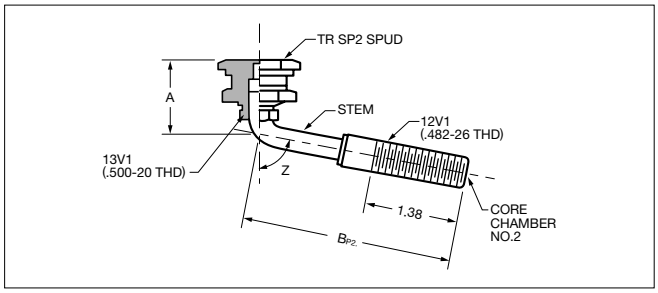
TR503A Dimension



Large Bore Rim Valve

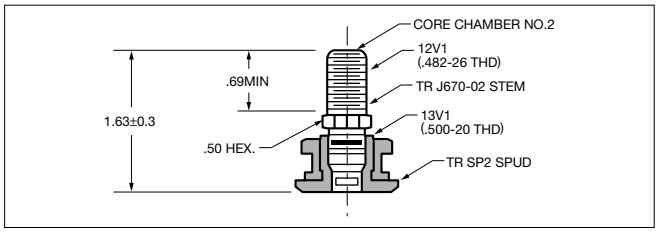
This is a rim valve with a large valve core, corresponding to the large bore tube valve. There are three types available.

LARGE BORE TUBLESS VALVES (SWIVEL TYPE)

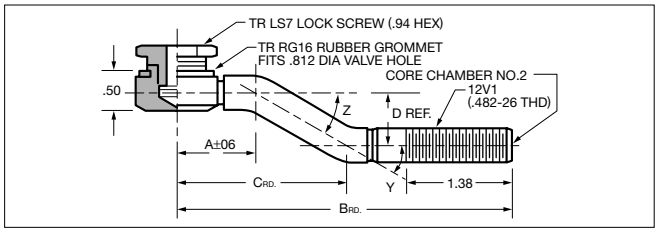


TR VALVE No.	*TR STEM NO.	A	B	Z°
J650-03	J650-02	1.08	3.12	80

TR J670-03LARGE BORE TUBELESS VALVE (STRAIGHT TYPE)



LARGE BORE TUBELESS VALVES (TURRET TYPE)



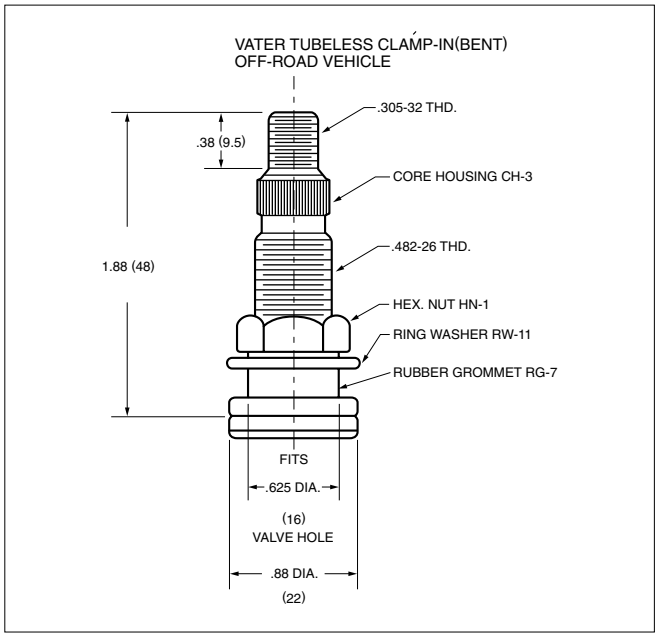
TR VALVE No.	A	B	C	D	Y°	Z°
J690	1.25	4.69	2.31	0.56	28	28

Valves (for tube/tubeless type OTR tires)

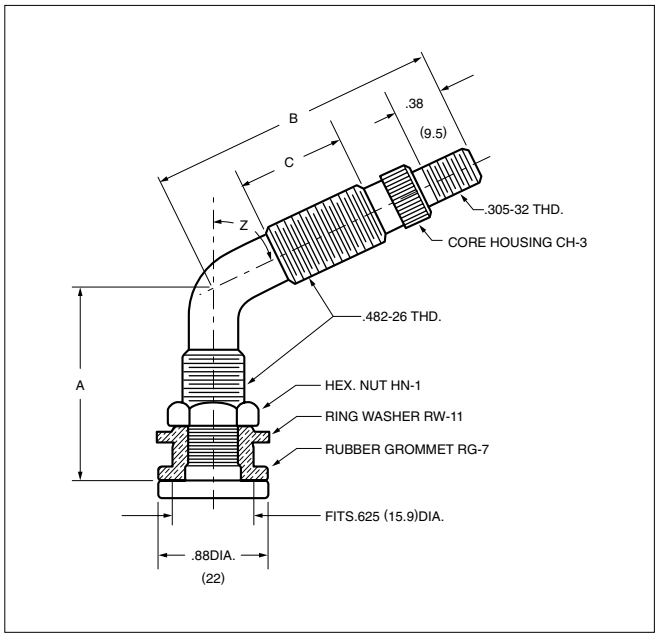
Air/Water Rim Valve

This is a rim valve with a core housing, corresponding to its tube valve type explained previously. There are four types of these valve available: TR618A, TR621A, TR622A and TR623A.

TR618A Dimensions



TR621A, TR622A and TR623A Dimensions



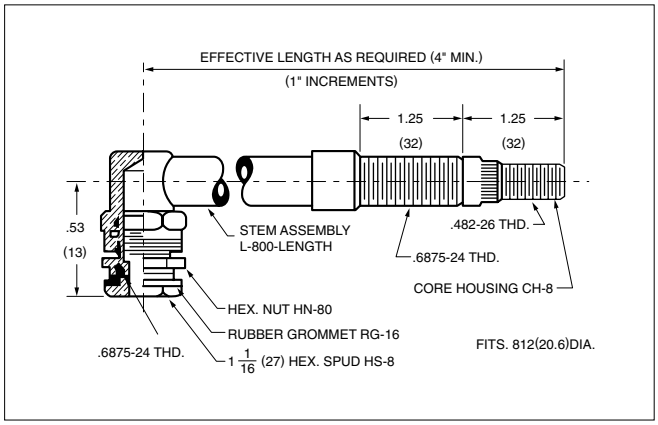
unit inch (mm)

VALVE No.	A	B	C	Z
TR 621A	1.53 (39)	2.97 (75)	1.59 (40)	65°
TR 622A	1.75 (44)	4.53 (115)	1.84 (47)	65°
TR 623A	1.53 (39)	2.25 (57)	0.88 (22)	65°

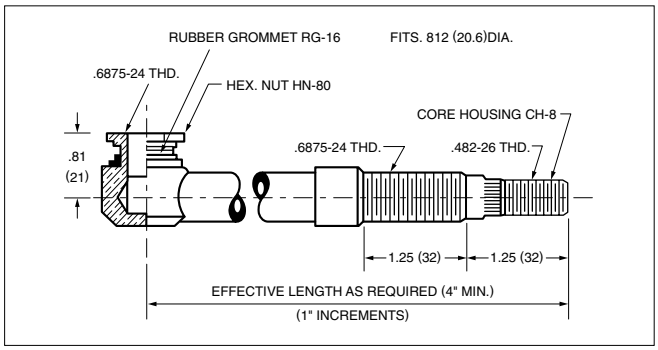
Super Large Bore Rim Valve

Super large bore rim valves have an internal diameter 50% larger than large bore valves which makes air inflation easier and faster.

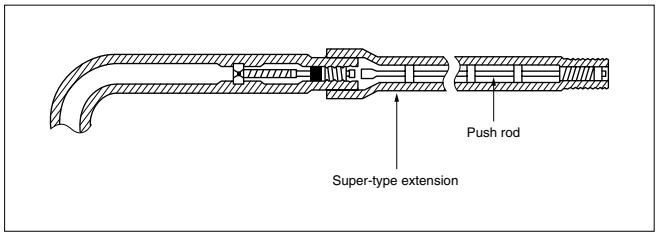
TR L850 Length (Swivel Type) Dimensions



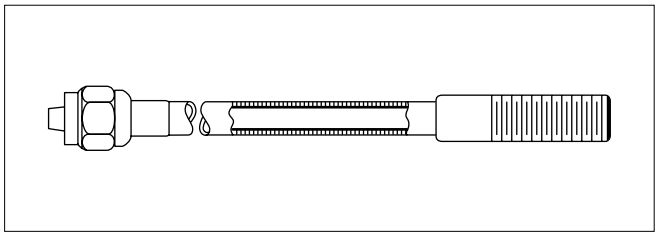
TR L890 Length (Turret Type) Dimensions



Extension



Semi-flexible Extension



TYPE	NUMBER	OVERALL LENGTH(mm)	EFFECTIVE LENGTH(mm)	THRED LENGTH(mm)
SUPER TYPE EXTENSION	3605	55	38	25
	3607	75	58	36
	3610	100	83	36
	3612	120	103	36
	3613	133	116	36
	3616	165	148	36
	3620	200	183	36

Caution with tubeless air valves

Whenever the tubeless tire is demounted and changed, the tubeless air valve (rim valve) must be replaced with a new one, regardless of appearance.

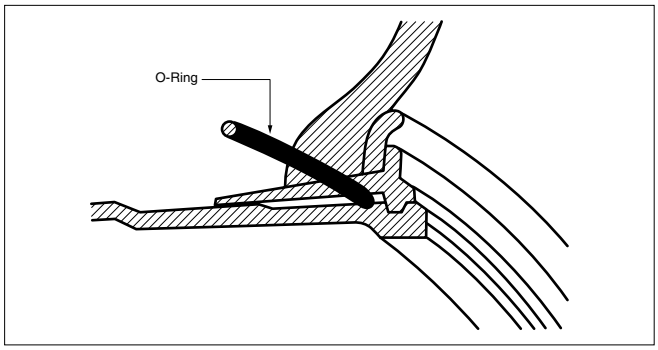
VALVE CLASSIFICATION BY RIM TYPE			
TYPE OF RIM	TIRE WIDTH	TUBE TYPE	TUBELESS
FLAT BASE TYPE	1400 AND UNDER 1600 AND OVER	STANDARD BORE TUBE VALVE LARGE BORE TUBE VALVE	STANDARD BORE RIM VALVE LARGE BORE RIM VALVE
FULL TAPERED	1400 AND UNDER 1600 AND OVER 15.5 AND OVER	STANDARD BORE TUBE VALVE LARGE BORE TUBE VALVE LARGE BORE TUBE VALVE	STANDARD BORE RIM VALVE LARGE BORE RIM VALVE LARGE/SUPER LARGE BORE RIM VALVE
SEMI-DROP CENTER	ALL SIZES	STANDARD BORE TUBE VALVE AIR/WATER TUBE VALVE	AIR/WATER RIM VALVE
DROP CENTER	ALL SIZES	AIR/WATER TUBE VALVE	AIR/WATER RIM VALVE

Notes:
Valves for inside dual-pair tire are quipped with a supplemental valve extension to facilitate air inflation. The extension is made of brass which is apt to nicks, scratches and dents. Care is required when (de)mounting, and storage should be in a clean, moisture free area.

O-RINGS

Rims for tubeless OTR tire require the use of an O-ring. Also referred to as a "seal ring" or "gasket," the O-ring forms an air-tight seal between separate parts of the rim. It must be used properly. It is very important to note that even if rim diameters are the same, different size O-rings may be necessary depending on the type of rim used.

O-ring Structure



O-RING No.	RIM	TIRE	SECTION DIAMETER		INSIDE CIRCUMFERENCE	
			mm	inch	mm	inch
OR224TG	24" SDC	24" rim diameter	6.7	0.26	1768	69.61
OR225T	25" SDC	14.00-25 and under	6.7	0.26	1802	70.94
	25" TB	17.5-25 and under *20.5-25 (uses 17.00 x 25-1.7 rim)				
OR325T	25" TB	16.00-25 and over 20.5-25 and over (except *rim)	9.8	0.39	1800	71.06
OR329T	29" TB	29" rim diameter	9.8	0.39	2127	83.74
OR333T	33" TB	33" rim diameter	9.8	0.39	2447	96.34
OR335T	35" TB	35" rim diameter	9.8	0.39	2560	100.79
OR339T	39" TB	39" rim diameter	9.8	0.39	2868	112.91
OR345T	45" TB	45" rim diameter	9.8	0.39	3311	130.35
OR349T	49" TB	49" rim diameter	9.8	0.39	3572	140.63
OR451T	51" TB	51" rim diameter	12.7	0.50	3666	144.33
OR457T	57" TB	57" rim diameter	12.7	0.50	4103	161.54

SDC: semi-drop center rim TB: tapered bead seat rim

O-ring identification

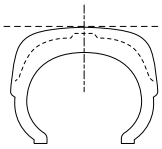
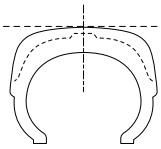
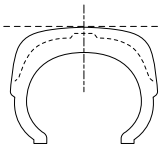
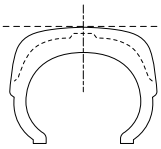
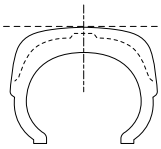
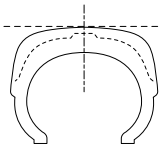
OR 3 25 T

- T → Type of rim (Full tapered bad sat rim)
- 25 → Rim diameter (Bead diameter in inches)
- 3 → Cross section diameter of ring (in eights of an inch)
- OR → Indicates that the ring is for off-the-road tires

Caution with O-Rings

- ☞ Do not use used or damaged O-rings.
- ☞ Clan rim and then lubricate with vegetable oil before mounting the O-ring.
- ☞ Take caution not to damage O-ring with tire lever. Avoid twisting.
- ☞ Keep spare O-rings on hand for emergencies. A 20% backup rate is recommended.

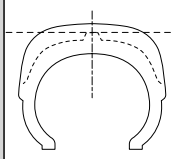
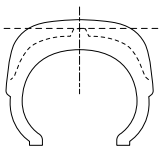
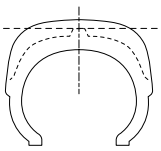
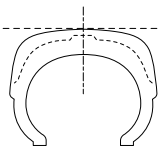
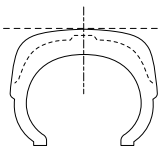
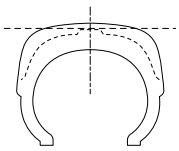
Off-The-Road Tires Applications: Radial

TRA Code		L-3	L-3	L-3	E-3	E-3	E-3
		Regular Tread	Regular Tread	Regular Tread	Regular Tread	Regular Tread	Regular Tread
Tread Depth Index							
		100%/125%	100%	100%/125%	100%/125%	100%	100%/125%
Tread Type		ROCK	ROCK	ROCK	ROCK	ROCK	ROCK
Pattern		RT31	RB31	RL31	RT31	RB31	RL31
Tread Design							
Machines	Loader & Dozer	◉	◉	◉	—	—	—
	Dump Truck	—	—	—	—	—	—
	Articulated Dump Truck	—	—	—	◉	◉	◉
	Grader	—	—	—	—	—	—
	Mobile Crane	—	—	—	—	—	—
Surface	Sand	◉	○	—	◉	○	—
	Mud	◉	○	—	◉	○	—
	*Silt & Clay	○	◉	◉	○	◉	◉
	Rock	○	◉	◉	○	◉	◉
	Paved	—	—	—	—	—	—

◉ Recommended ○ Suitable — Not applicable *Some rock surfaces acceptable

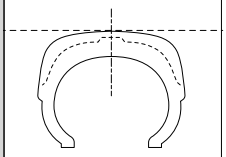
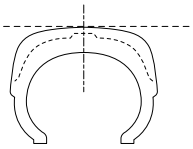
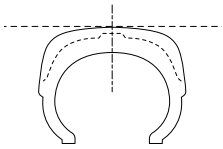
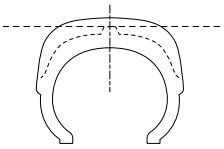
Off-The-Road Tires Applications: Radial

1

TRA Code		E-4 Deep Tread	E-4 Deep Tread	E-4 Deep Tread	G-2 Regular Tread	Mobile Crane Regular Tread	IND-4 Deep Tread	
Tread Depth Index								
		150%	150%	150%	100%	100%	150%	
Tread Type		ROCK	ROCK	ROCK	TRACTION	—	—	—
Pattern		RB41	RT41	RB42	RT21	RB01	RR41	RL43
Tread Design								
Machines	Loader & Dozer	—	—	—	—	—	—	—
	Dump Truck	—	—	◉	—	—	—	◉
	Articulated Dump Truck	◉	◉	—	—	—	◉	—
	Grader	—	—	—	◉	—	—	—
	Mobile Crane	—	—	—	—	◉	—	—
Surface	Sand	○	○	○	◉	—	—	—
	Mud	○	○	○	◉	—	—	—
	*Silt & Clay	◉	◉	◉	○	—	—	—
	Rock	◉	◉	◉	○	—	—	—
	Paved	—	—	—	—	◉	◉	◉

◉ Recommended ○ Suitable — Not applicable *Some rock surfaces acceptable

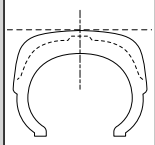
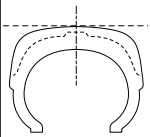
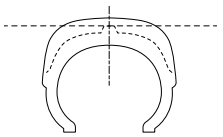
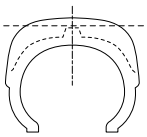
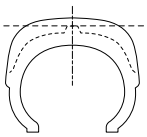
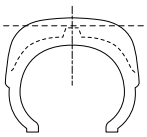
Off-The-Road Tires Applications: Bias
(for Earthmover)

TRA Code		E-1	E-2	E-3		E-4	
		Regular Tread	Regular Tread	Regular Tread		Deep Tread	
Tread Depth Index							
		100%	100%	100%		150%	
Tread Type		RIB	TRACTION	ROCK		ROCK	
Pattern		Y41	Y103	Y67 Y565	Y529	Y522 Y523/R/U	Y530
Tread Design							
Machines	Dump Truck	◉	—	◉		◉	
	Scraper	—	◉	◉	—	—	
	Mobile Crane	—	—	—	◉	—	
Surface	Sand	○	◉	○	○	○	
	Mud	○	◉	○	○	○	
	*Silt & Clay	◉	○	◉	—	◉	
	Rock	—	—	◉	—	◉	
	Paved	—	—	—	◉	—	

◉ Recommended ○ Suitable — Not applicable *Some rock surfaces acceptable

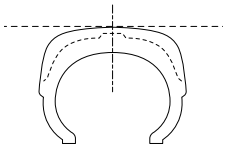
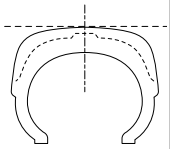
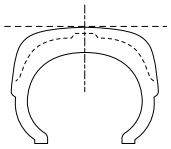
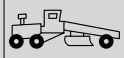
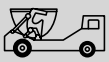
Off-The-Road Tires Applications: Bias
(for Loader & Dozer)

1

TRA Code		L-2	L-3	L-4		L-5		L-4S	L-5S
		Regular Tread	Regular Tread	Deep Tread		Extra Deep Tread		Deep Tread	Extra Deep Tread
Tread Depth Index									
		100%	100%	150%		250%		150%	250%
Tread Type		TRACTION	ROCK	ROCK		ROCK		SMOOTH	
Pattern		Y103	Y67 Y526K Y575	Y67E Y545	Y522	Y524 Y524Z	Y525	Y69/Y69K/Y69U	
Tread Design									
Machines	Loader	◉	◉	◉	◉	◉	—	◉	◉
	Dozer				—			—	—
	L.H.D.	—	—	○	◉	—	◉	◉	◉
Surface	Sand	◉	○	—		—	—	—	—
	Mud	◉	○	—		—	—	—	—
	*Silt & Clay	○	◉	○		—	—	—	—
	Rock	○	◉	◉		◉	◉	◉	◉
	Paved	—	—	—	—	—	—	—	—

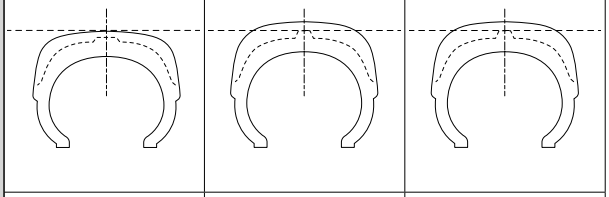
◉ Recommended ○ Suitable — Not applicable *Some rock surfaces acceptable

Off-The-Road Tires Applications: Bias
(for Grader & Industrial Tires)

TRA Code		G-2		G-3	IND-3			
		Regular Tread		Regular Tread	Regular Tread			
Tread Depth Index								
		100%		100%	100%			
Tread Type		TRACTION	TRACTION	ROCK	—	—	—	—
Pattern		Y25	Y103	Y67	Y532	Y67	Y92	Y69PS
Tread Design								
Machines	Grader 	◉	◉	◉	—	—	—	—
	Forklift 	—	—	—	—	◉	◉	◉
	Straddle Carrier 	—	—	—	—	◉	◉	◉
	Yard Service Vehicle 	—	—	—	◉	◉	—	—
	Transfer Crane 	—	—	—	—	◉	—	—
	Towing Tractor 	—	—	—	—	◉	—	◉
Surface	Sand	◉	◉	○	—	—	—	—
	Mud	◉	◉	○	—	—	—	—
	*Silt & Clay	○	○	◉	—	—	—	—
	Rock	—	—	◉	—	—	—	—
	Paved	—	—	—	◉	◉	◉	◉

◉ Recommended ○ Suitable — Not applicable *Some rock surfaces acceptable

Off-The-Road Tires Applications: Bias
(for Grader & Industrial Site)

TRA Code	IND-3	IND-4	
	Regular Tread	Deep Tread	Deep Tread
Tread Depth Index			
	100%	150%	150%
Tread Type	—	—	—
Pattern	Y543	Y523	Y69
Tread Design			
Grader	—	—	—
Forklift	—	◉	◉
Straddle Carrier	—	—	—
Yard Service Vehicle	◉	—	—
Transfer Crane	◉	—	—
Towing Tractor	—	—	◉
Sand	—	—	—
Mud	—	—	—
*Silt & Clay	—	—	—
Rock	—	—	—
Paved	◉	◉	◉

◉ Recommended ○ Suitable — Not applicable *Some rock surfaces acceptable

2. YOKOHAMA OFF-THE-ROAD TIRES

RT31
E-3 ROCK

Specially designed for articulated dump trucks. Non-directional tread pattern provides better traction, self-cleaning and flotation on soft and muddy surface operation.

Use: Articulated dump trucks 

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
23.5R25	☆☆		○	19.50 × 25-2.5	1600	63.0	612	24.1	703	27.7	694	27.3	—
*26.5R25	☆☆		○	22.00 × 25-3.0	1730	68.1	671	26.4	778	30.6	748	29.4	—

*E-3+, Tread Depth 125% level

RB31
E-3 ROCK

Specially designed for articulated dump trucks. The tread pattern design with non-directional block pattern provides both abrasion resistance and excellent traction on soft surfaces.

Use: Articulated dump trucks 

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
17.5R25	☆☆		○	14.00 × 25-1.5	1348	53.1	442	17.4	607	23.9	500	19.7	—
20.5R25	☆☆		○	17.00 × 25-2.0	1476	58.1	530	20.9	658	25.9	610	24.0	—
23.5R25	☆☆		○	19.50 × 25-2.5	1600	63.0	612	24.1	720	28.3	672	26.5	—
26.5R25	☆☆		○	22.00 × 25-3.0	1730	68.1	671	26.4	785	30.9	744	29.3	—

29.5R25 will be available soon.

RL31
E-3 ROCK

Specially designed for articulated dump trucks. The rock flush pattern and shoulder protector provides excellent cut resistance (tread & sidewall).

Use: Articulated dump trucks 

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
17.5R25	☆☆		○	14.00 × 25-1.5	1342	52.8	445	17.5	622	24.5	486	19.1	—
20.5R25	☆☆		○	17.00 × 25-2.0	1496	58.9	536	21.1	686	27.0	571	22.5	—
*23.5R25	☆☆		○	19.50 × 25-2.5	1600	63.0	640	25.2	720	28.3	665	26.2	—

*E-3+, Tread Depth 125% level

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

RB41

E-4 ROCK DEEP TREAD

Specially designed for dump trucks. The tread pattern design with non-directional block pattern provides both abrasion resistance and excellent traction on soft surfaces. Deep tread with side protectors.

Use: Dump trucks 

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
16.00R25	☆☆		○	11.25 × 25-2.0	1532	60.3	450	17.7	706	27.8	500	19.7	—

RT41

E-4 ROCK DEEP TREAD

Specially designed for articulated dump trucks. Thee tread pattern design with non-directional block pattern provides both abrasion resistance and excellent traction on soft, rocky and gravel surfaces.

Use: Articulated dump trucks 

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
26.5R25	☆☆		○	22.00 × 25-3.0	1732	68.2	670	26.4	781	30.7	740	29.1	—
29.5R25	☆☆		○	25.00 × 25-3.5	1865	73.4	755	29.7	846	33.3	833	32.8	—

Not available yet and YRC will inform when available.
23.5R25 will be available soon.

RB42

E-4 ROCK DEEP TREAD

Specially designed for dump trucks. Tread pattern design with non-direction block pattern and deep tread provides both abrasive resistance and excellent traction on muddy and soft surfaces. High resistance to wearing ensures long tread life.

Use: Dump trucks 

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
1800R33	☆☆		○	13.00 × 33-2.5	1870	73.6	507	20.0	864	34.0	—	—	—

Not available yet and YRC will inform when available.

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Loader & Dozer Tires: Radial

RB31
L-3 ROCK

The tread pattern design with non-directional block pattern provides both abrasion resistance and excellent traction on soft surfaces.

Use: Loaders and Dozers

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
17.5R25	☆		○	14.00 × 25-1.5	1348	53.1	442	17.5	623	24.5	486	19.1	—
20.5R25	☆		○	17.00 × 25-2.0	1476	58.1	530	20.9	676	26.6	586	23.1	—
23.5R25	☆		○	19.50 × 25-2.5	1600	63.0	612	24.1	703	27.7	694	27.3	—
26.5R25	☆		○	22.00 × 25-3.0	1730	68.1	671	26.4	763	30.0	760	30.0	—

29.5R25 will be available soon.

RT31
L-3 ROCK

Specially designed for wheel loaders used on soft and muddy roads. Non-directional tread pattern provides better traction, self-cleaning and flotation on soft and muddy surface operation.

Use: Loaders

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
23.5R25	☆		○	19.50 × 25-2.5	1600	63.0	612	24.1	720	28.3	672	26.5	—
*26.5R25	☆		○	22.00 × 25-3.0	1730	68.1	671	26.4	760	29.9	765	30.1	—

*E-3+, Tread Depth 125% level

RL31
L-3 ROCK

Specially designed for wheel loaders & dozers. The rock flush pattern and shoulder protector provides excellent cut resistance (tread & sidewall).

Use: Loaders and Dozers

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
17.5R25	☆		○	14.00 × 25-1.5	1342	52.8	445	17.5	617	24.3	489	19.3	—
20.5R25	☆		○	17.00 × 25-2.0	1496	58.9	536	21.1	673	25.1	595	23.4	—
*23.5R25	☆		○	19.50 × 25-2.5	1600	63.0	640	25.2	703	27.7	682	26.9	

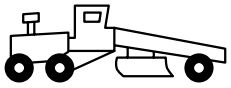
*E-3+, Tread Depth 125% level

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

RT21
G-2 TRACTION

The tread pattern design with non-directional block pattern provides good traction and flotation on soft, muddy surfaces as well as better self cleaning.

Use: Motor graders



TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
14.00R24	☆		○	8.00TG × 24SDC	1346	53.0	383	15.1	621	24.4	433	17.0	—

RB01
HIGHWAY USE

The RB01 is designed for mobile crane at highway use. Excellent performance for even wear and long life tread by new tread pattern and new rubber compound. Lower fuel consumption, lower tire noise, better driving stability and high speed durability by adopting tough casing construction.

Use: Wheel cranes and All-terrain cranes

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
385/95R25	170E		○	10.00 × 25-1.5	1353	53.3	384	15.1	629	24.8	420	16.5	—
445/95R25	177E		○	11.25 × 25-2.0	1485	58.5	445	17.5	690	27.2	487	19.2	—
505/95R25	183E		○	13.00 × 25-2.5	1602	63.1	513	20.2	739	29.1	566	22.3	—
14.00R24	☆☆☆	○		10.00W × 24	1353	53.3	384	15.1	625	24.6	424	16.7	14.00R24/25

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

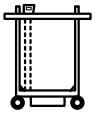
Industrial Tires: Radial

RR41

IND-4 DEEP TREAD

RR41 is designed yard service vehicles especially straddle carrier.

Use: Straddle carriers



TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
16.00R25	☆☆☆		○	11.25 × 25-2.0	1499	59.0	423	16.7	656	25.8	497	19.6	—

RL43

IND-4 DEEP TREAD

RL 34 is designed for use by forklift and terminal tractor.
This type provides better stability in heavy load operations.

Use: Forklifts

TIRE SIZE	STAR MARK	TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
					OVERALL DIAMETER		OVERALL WIDTH						
		T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
1400R24	☆☆☆	○		10.00W × 24 (9.00V × 24)	1379	54.3	375 (365)	14.8 (14.4)	610	24.0	431 (421)	16.9 (16.6)	1400R24

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y41
E-1 RIB

Designed for front and trailer wheels. Provides good directional stability.

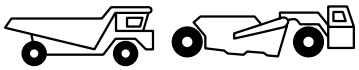
Use: Dump trucks (front)

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
14.00-24	20		10.00W × 24 (10.00WI × 24)	1373	54.1	373	14.7	627	24.7	399	15.7	14.00-24/25

Y103
E-2 TRACTION

Offers good traction and flotation on muddy ground. However, on hard surface, wear is slightly more than rock tread types. Self cleaning action results from directionally opposed lugs.

Use: Dump trucks and Scrapers



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
23.5-25		16	19.50 × 25-2.5	1620	63.8	612	24.1	711	28.0	658	25.9	23.5-25

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Earthmover Tires: Bias
(Dump Trucks & Scrapers)

Y67
E-3 ROCK

For hauling over rock, coal and log-strewn terrain. Tough tread resists cuts and snags. Less heat buildup enables smooth running over longer distances than the deep tread (E-4) types.

Use: Dump trucks and Scrapers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
10.00-20	14, 24		7.50V × 20 (7.5 × 20)	1060	41.7	280	11.0	498	19.6	295	11.6	10.00-20
11.00-20	14, 16		8.00V × 20 (8.0 × 20)	1100	43.3	295	11.6	510	20.1	310	12.2	11.00-20
12.00-20	16, 18, 24		8.50V × 20 (8.5 × 20)	1135	44.7	325	12.8	533	21.0	340	13.4	12.00-20
14.00-20	28, 32		10.00WI × 20	1250	49.2	386	15.2	583	23.0	401	15.8	14.00-20
12.00-24	16, 18, 20		8.50V × 24 (8.5 × 24)	1230	48.4	305	12.0	575	22.6	330	13.0	11.00/12.00-24
13.00-24	18		10.00W × 24	1280	50.4	340	13.4	586	23.1	370	14.6	13.00-24/25
14.00-24	20, 24, 28		10.00W × 24 (10.00WI × 24)	1345	53.0	380	15.0	624	24.6	408	16.1	14.00-24/25
14.00-25	20, 24	20, 24	10.00 × 25-1.5	1345	53.0	380	15.0	624	24.6	408	16.1	14.00-24/25
16.00-24	20	16, 24	11.25 × 24-2.0	1475	58.1	445	17.5	686	27.0	467	18.4	16.00-24/25
16.00-25	20, 24, 28	24, 28, 32	11.25 × 25-2.0	1475	58.1	445	17.5	686	27.0	467	18.4	16.00-24/25
18.00-25	16, 20, 24, 28, 32	16, 20, 24, 28, 32	13.00 × 25-2.5	1600	63.0	510	20.1	736	29.0	534	21.0	18.00-25
21.00-25	20, 24, 28	24	15.00 × 25-3.0	1726	68.0	575	22.6	777	30.6	624	24.6	21.00-25
24.00-25	24	24	17.00 × 25-3.5	1855	73.0	640	25.2	826	32.5	695	27.4	24.00-25
18.00-33		28, 32, 36	13.00 × 33-2.5	1800	70.9	520	20.5	840	33.1	554	21.8	—
21.00-35		32, 36, 40	15.00 × 35-3.0	2004	78.9	580	22.8	935	36.8	622	24.5	—
24.00-35		36, 42	17.00 × 35-3.5	2130	83.9	662	26.1	975	38.4	705	27.8	—
24.00-49		36, 42	17.00 × 49-3.5	2507	98.7	659	25.9	1160	45.7	704	27.7	—
27.00-49		42, 48	19.50 × 49-3.5	2645	104.1	750	29.5	1220	48.0	800	31.5	—
20.5-25	16, 20	16, 20	17.00 × 25-2.0	1485	58.5	520	20.5	690	27.2	540	21.3	20.5-25
23.5-25	16, 20	16, 20, 24	19.50 × 25-2.5	1605	63.2	592	23.3	745	29.3	616	24.3	23.5-25
26.5-25	20	20, 24, 26	22.00 × 25-3.0	1730	68.1	700	27.6	778	30.6	732	28.8	26.5-25
29.5-25	22	22, 28	25.00 × 25-3.5	1876	73.9	778	30.6	822	32.4	826	32.5	
26.5-29		26	22.00 × 29-3.0	1834	72.2	691	27.2	829	32.6	723	28.5	
29.5-29		28, 34	25.00 × 29-3.5	1952	76.9	770	30.3	876	34.5	806	31.7	
33.25-29		26, 32, 36	27.00 × 29-3.5	2080	81.9	849	33.4	924	36.4	873	34.4	
33.5-33		32, 38	28.00 × 33-4.0	2232	87.9	873	34.4	1008	39.7	909	35.8	
37.5-33		42	32.00 × 33-4.5	2390	94.1	970	38.2	1060	41.7	1020	40.2	
29.5-35		28, 34	25.00 × 35-3.5	2120	83.5	776	30.6	965	38.0	819	32.2	
33.25-35		32, 38	27.00 × 35-3.5	2248	88.5	853	33.6	1003	39.5	898	35.4	
37.25-35		30, 36	31.00 × 35-4.0	2390	94.1	960	37.8	1060	41.7	1010	39.8	
37.5-39		44, 52	32.00 × 39-4.5	2515	99.0	967	38.1	1137	44.8	1015	40.0	

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y565
E-3 ROCK

For hauling over rock, coal and log-strewn terrain. Tough tread resists cuts and snags. Less heat buildup enables smooth running over longer distances than the deep tread (E-4) types.

Use: Dump trucks 

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
36.00-51		66	26.00 × 51-5.0	3200	126.0	1045	41.1	1460	57.5	1100	43.3	—

Y529
E-3 ROCK

Specially designed for long distance haul or travel on good surface. It is not recommended to run on rough road. Please consult your Yokohama service representatives for wheel crane use. ("for wheel crane" is marked on the tire.)

Use: Dump trucks and Wheel cranes 

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
14.00-24	24		10.00W × 24 (10.00WI × 24)	1344	52.9	390	15.4	632	24.9	405	16.0	14.00-24/25
16.00-25	24, 28	24, 28	11.25 × 25-2.0	1465	57.7	435	17.1	676	26.6	464	18.3	16.00-25

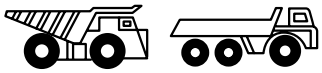
• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Earthmover Tires: Bias
(Dump Trucks)

Y522
E-4 ROCK DEEP TREAD

Specially designed rock pattern for abrasive, short haul operation.
Deep tread, deeper than Y523, produces long life and high cut resistance.

Use: Dump trucks

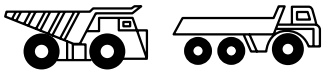


TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
18.00-25	32	32	13.00 × 25-2.5	1674	65.9	510	20.1	770	30.3	545	21.5	18.00-25

Y523
E-4 ROCK DEEP TREAD

Specially designed for use under highly abrasive conditions. Large ground contact area of wide, deep double chevron 'flush' pattern provides good cut resistance and long service life.

Use: Dump trucks



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
16.00-25	24	24, 28	11.25 × 25-2.0	1540	60.6	443	17.4	724	28.5	467	18.4	16.00-25
18.00-25	32	28, 32, 36, 40	13.00 × 25-2.5	1652	65.0	517	20.4	772	30.4	541	21.3	18.00-25
18.00-33		32, 36, 40	13.00 × 33-2.5	1850	72.8	518	20.4	869	34.2	542	21.3	—
21.00-35		32, 36, 40	15.00 × 35-3.0	2045	80.5	590	23.2	951	37.2	623	24.5	—
24.00-35		36, 42, 48	17.00 × 35-3.5	2147	84.5	666	26.2	990	39.0	710	28.0	—
24.00-49		42, 48	17.00 × 49-3.5	2529	99.6	655	25.8	1184	46.6	697	27.4	—
27.00-49		42, 48	19.50 × 49-4.0	2679	105.5	748	29.4	1245	49.0	791	31.1	—
30.00-51		46, 52	22.00 × 51-4.5	2876	113.2	848	33.4	1339	52.7	896	35.3	—
33.00-51		50, 58	24.00 × 51-5.0	3039	119.6	927	36.5	1404	55.3	985	38.8	—
36.00-51		50, 58, 66	26.00 × 51-5.0	3198	125.9	1040	40.9	1476	58.1	1090	42.9	—
40.00-57		68, 76	29.00 × 57-6.0	3551	139.8	1127	44.4	1624	63.9	1200	47.2	—

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y523R
E-4 ROCK DEEP TREAD

Specially designed for long haul operation.

Use: Dump trucks 

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
36.00-51		58, 66	26.00 × 51-5.0	3205	126.2	1036	40.6	1456	57.3	1097	43.2	—

Y523U
E-4 ROCK DEEP TREAD

Specially designed for long haul operation.

Use: Dump trucks 

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
18.00-33		32, 36, 40	13.00 × 33-2.5	1861	75.3	519	20.4	874	34.4	545	21.5	—

Y530
E-4 ROCK DEEP TREAD

Specially designed for abrasive conditions. Deep tread, deeper than Y523, provides long tread life and tough tread cut resistance.

Use: Dump trucks 

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
21.00-35		36, 40	15.00 × 35-3.0	2054	80.9	589	23.2	963	37.9	617	24.3	—

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Loader & Dozer Tires: Bias

Y103
L-2 TRACTION

Good traction and flotation on muddy ground. Its directionally opposed lugs produce self cleaning action.

Use: Loaders and Dozers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
10.00-20	8, 10		7.50V × 20	1082	42.6	292	11.5	492	19.4	313	12.3	10.00-20
12.00-24	8		8.00TG × 24SDC	1230	48.4	310	12.2	553	21.8	350	13.8	11.00/12.00-24
13.00-24	12, 16		8.00TG × 24SDC	1288	50.7	351	13.8	566	22.3	393	15.5	13.00-24/25
14.00-24	8, 12	12, 16	10.00VA × 24SDC	1351	53.2	396	15.6	595	23.4	442	17.4	14.00-24/25
16.00-24	12, 16	16	10.00VA × 24SDC	1465	57.7	445	17.5	646	25.4	494	19.4	16.00-24
10-16.5	4	6	8.25 × 16.5	772	30.4	275	10.8	350	13.8	286	11.3	10-16.5
13.5-20	14		11.00TG × 20SDC	1075	42.3	344	13.5	483	19.0	368	14.5	13.5-20
42 × 17-20	10		14.00TG × 20SDC	1078	42.4	416	16.4	482	19.0	432	17.0	42 × 17-20
15.5-20	8, 12, 14	12	12.00 × 25-1.3 (12.00SDC × 25-1.3)	1286	50.6	390	15.4	575	22.6	433	17.0	15.5-25
17.5-25	8, 12, 16	12, 16	14.00 × 25-1.5 (14.00SDC × 25-1.3)	1364	53.7	435	17.1	599	23.6	477	18.8	17.5-25
20.5-25	12, 16, 20	12, 16, 20	17.00 × 25-2.0	1495	58.9	535	21.1	647	25.5	583	23.0	20.5-25
23.5-25	16	12, 16, 20	19.50 × 25-2.5	1620	63.8	612	24.1	686	27.0	680	26.8	23.5-25
16.9-24	10, 12	10	WI5L × 24	1292	50.9	450	17.7	582	22.9	480	18.9	16.9-24
18.4-24	10	10	WI6L × 24	1372	54.0	477	18.9	612	24.1	518	20.4	18.4-24
12.5/70-16		6	10LB × 16	860	33.9	316	12.4	389	15.3	329	13.0	—
15.5/60-18		10	W13 × 18	939	37.0	396	15.6	422	16.6	406	16.0	—
15.5/70-18		8	W13 × 18	1016	40.0	400	15.7	449	17.6	415	16.3	—
17.5/65-20		10	W14 × 20	1097	43.2	442	17.4	489	19.3	459	18.1	—
33 × 12.5-15	6		10.00F × 15SDC	845	33.3	315	12.4	377	14.8	334	13.1	33 × 12.50-15

*Provided with subsidiary grooves on lugs.

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y67
L-3 ROCK

For loaders and dozers that are mainly used on rock, coal and log-strewn terrain. Its tough tread is protected from cuts and snags, and its wide ground contact area lengthens service life.

Use: Loaders and Dozers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
*12.00-24	16, 20		8.50V × 24	1230	48.4	3.5	12.0	559	22.0	340	13.4	11.00/12.00-24
*13.00-24	12, 16, 18	16	8.00TG × 24SDC	1280	50.4	348	13.7	578	23.1	383	15.1	13.00-24/25
*14.00-24	12, 16, 20, 24	12, 16	10.00VA × 24SDC	1344	52.9	383	15.1	604	23.8	416	16.4	14.00-24/25
*16.00-24		16	10.00VA × 24SDC	1475	58.1	436	17.2	656	25.8	470	18.5	—
*16.00-25		24	11.25 × 25-2.0	1475	58.1	448	17.6	668	26.3	483	19.0	—
*18.00-25	16, 24	12, 16, 24	13.00 × 25-2.5	1620	63.8	530	20.9	716	28.2	588	23.1	18.00-25
*16.9-24	10	10	W15L × 24	1295	51.0	442	17.4	588	23.1	472	18.6	16.9-24
**15.5-25	12	12	12.00 × 25-1.3 (12.00SDC × 25-1.3)	1308	51.5	398	15.7	589	23.2	433	17.0	15.5-25
**17.5-25	12, 16, 20	12, 16	14.00 × 25-1.5 (14.00SDC × 25-1.3)	1349	53.1	443	17.4	600	23.6	483	19.0	17.5-25
**20.5-25	12, 16, 20, 24	12, 16, 20, 24	17.00 × 25-2.0	1498	59.0	528	20.8	651	25.6	578	22.8	20.5-25
**23.5-25	12, 16, 20, 24	16, 20, 24, 32	19.50 × 25-2.5	1605	63.2	596	23.5	709	27.9	636	25.0	23.5-25
**26.5-25	16, 20, 24	16, 20, 24, 26	22.00 × 25-3.0	1745	68.7	694	27.3	765	30.1	738	29.1	26.5-25
**29.5-25		22, 28	25.00 × 25-3.5	1863	73.3	776	30.6	803	31.6	835	32.9	—
**29.5-29		22, 28	25.00 × 29-3.5	1972	77.6	781	30.7	849	33.4	840	33.1	—
33.5-33		38, 44	28.00 × 33-4.0	2232	87.9	873	34.4	1002	39.4	903	35.6	—
33.25-35		38, 44	27.00 × 35-3.5	2248	88.5	853	33.6	982	38.7	902	35.5	—

*Steel breaker construction available upon request.
**Steel breaker & wide steel breaker available upon request.

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Loader & Dozer Tires: Bias

Y526K
L-3 ROCK

Developed especially for use on loaders. Side protector improves shoulder to sidewall cut resistance.

Use: Loaders and Dozers to be used in quarries

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
**20.5-25	16, 20	16, 20	17.00 × 25-2.0	1486	58.5	542	21.3	677	26.7	574	22.6	20.5-25
**23.5-25	12, 16, 20, 24	12, 16, 20, 24	19.50 × 25-2.5	1610	63.4	615	24.2	711	28.0	662	26.1	23.5-25

**Steel breaker & wide steel breaker available upon request.

Y575
L-3 ROCK

The Y575 features an optimized configuration for improved durability and cut resistance. Its flush tread pattern provides greater contact area meaning a steady, more constant area remains in contact over varying surfaces. Also features rim cushion.

Use: Loaders and dozers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
**17.5-25	16, 20	12, 16, 20	14.00 × 25-1.5 (14.00SDC × 25-1.3)	1340	52.8	435	17.1	595	23.4	473	18.6	17.5-25
**20.5-25	16, 20	12, 16, 20	17.00 × 25-2.0	1495	58.8	532	20.9	663	26.1	574	22.5	20.5-25
**23.5-25	12, 16, 20	12, 16, 20, 24	19.50 × 25-2.5	1605	63.2	605	23.8	708	27.9	645	25.4	23.5-25
**26.5-25	20, 24	16, 20, 24, 26, 28	22.00 × 25-3.0	1740	68.5	690	27.2	770	30.3	733	28.9	26.5-25
**29.5-25		22, 28	25.00 × 25-3.5	1855	73.0	765	30.1	813	32.0	830	32.7	—

**Steel breaker & wide steel breaker available upon request.

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y67E
L-4 ROCK DEEP TREAD

Suited for loaders and dozers on rock, coal and log-strewn terrain. Deep tread has good wear and cut resistance.

Use: Loaders and Dozers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
**17.5-25	20	12, 16	14.00 × 25-1.5 (14.00SDC × 25-1.3)	1390	54.7	443	17.4	637	25.1	474	18.7	17.5-25
*29.5-29		28	25.00 × 29-3.5	2013	79.3	770	30.3	903	35.6	823	32.4	—

*Steel breaker construction available upon request. **Steel breaker & wide steel breaker available upon request.

Y545 [with side protector]
L-4 ROCK DEEP TREAD

Suited for loaders and dozers on rock, coal and log-strewn terrain. Deep tread has good wear and cut resistance.

Use: Loaders and dozers

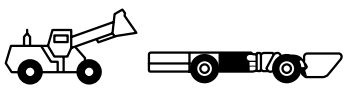
TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
23.5-25	20	16, 20, 24	19.50 × 25-1.5	1660	65.4	615	24.5	760	29.9	660	26.0	23.5-25
**26.5-25		20, 24, 26, 32	22.00 × 25-3.0	1786	70.3	704	27.7	800	31.5	764	30.1	—
**29.5-25		22, 28	25.00 × 25-3.5	1900	74.8	785	30.9	847	33.3	842	33.1	—
***35/65-33		24, 30, 42, 48	28.00 × 33-3.5	2083	82.0	902	35.5	952	37.5	925	36.4	—
***45/65-45		38, 50, 58	36.00 × 45-4.5	2730	107.5	1150	45.3	1240	48.8	1205	47.4	—

**Steel breaker & wide steel breaker available upon request. ***Steel breaker construction.

Y522
L-4 ROCK DEEP TREAD

Specially designed rock pattern for abrasive operation. Deep tread produces long life and high cut resistance.

Use: Loaders and Underground vehicles



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
*18.00-25	24	24	13.00 × 25-2.5	1674	65.9	510	20.1	756	29.8	560	22.0	18.00-25

*Steel breaker construction available upon request.

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Loader & Dozer Tires: Bias

Y525

L-5 ROCK EXTRA DEEP TREAD

Specially designed for use in underground mines. Its extra deep tread gives long service and outstanding cut resistance.

Use: Loaders for underground mines

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
12.00-24	16, 20		8.50V × 24	1280	50.4	330	13.0	596	23.5	360	14.2	11.00-12.00-24

Y524

L-5 ROCK DEEP EXTRA TREAD

Specially designed for loaders and dozers in highly abrasive conditions. Extra deep tread has strong resistance to cuts and wear.

Use: Loaders and Dozers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
23.5-25	12, 16, 20, 24	16, 20, 24	19.50 × 25-2.5	1666	65.6	620	24.4	764	30.1	662	26.1	23.5-25
*29.5-29		22, 28, 34	25.00 × 29-3.5	2040	80.3	771	30.4	914	36.0	831	31.5	—
33.25-35		32, 38	27.00 × 35-3.5	2310	90.9	846	33.3	1073	42.2	886	34.9	—
37.25-35		36, 42	31.00 × 35-4.0	2457	96.7	945	37.2	1107	43.6	1007	39.6	—

*Steel breaker construction available upon request.

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y524 [with side protector]

L-5 ROCK EXTRA DEEP TREAD

Specially designed for loaders and dozers. Extra deep tread and side protector improves shoulder to sidewall cut resistance and wear.

Use: Loaders and Dozers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
20.5-25	12, 16	12, 16, 20	17.00 × 25-2.0	1558	61.3	539	21.2	721	28.4	575	22.6	20.5-25
*26.5-25	24	20, 24, 26, 28, 32, 36	22.00 × 25-3.0	1797	70.7	682	26.9	820	32.3	722	28.4	26.5-25
*29.5-25		22, 28	25.00 × 25-3.0	1908	75.1	774	30.5	868	34.2	825	32.5	—
***35/65-33		24, 30, 36, 42, 48	28.00 × 33-3.5	2075	81.7	900	35.4	952	37.5	933	36.7	—
***40/65-39		30, 36, 56	32.00 × 39-4.0	2404	94.6	1025	40.4	1169	43.7	1067	42.0	—
***45/65-45		38, 46, 50, 58	36.00 × 45-4.5	2740	107.9	1180	46.5	1260	49.6	1230	48.4	—

*Steel breaker construction available upon request.

Y524Z

L-5 HALF SLICK EXTRA DEEP TREAD

Specially designed half slick asymmetric tread pattern provides superior tread and sidewall cut resistance, resulting in better tire life.

Use: Loaders and Dozers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
***35/65-33		24, 30, 42	28.00 × 33-3.5	2065	81.3	906	35.7	956	37.6	935	36.8	—
***40/65-39		36, 56	32.00 × 39-4.0	2400	94.5	1025	40.4	1108	43.6	1062	41.8	—
***45/65-45		38, 46, 50, 58	36.00 × 45-4.5	2740	107.9	1180	46.5	1260	49.6	1230	48.4	—

***Steel breaker construction.

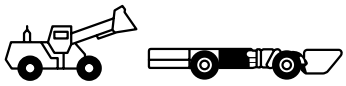
• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Loaders & Dozer Tires: Bias

Y69
L-4S SMOOTH DEEP TREAD

Suited for loaders in underground mines. Deep and smooth tread plus reinforced sidewalls give long service life and high cut resistance.

Use: Loaders and Underground vehicles

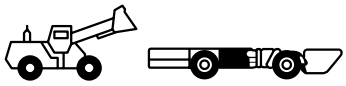


TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
12.00-24	16, 20		8.50V × 24	1285	50.6	340	13.4	604	23.8	363	14.3	11.00-12.00/24
14.00-24	20, 24		10.00W × 24	1365	53.7	392	15.4	651	25.6	404	15.9	14.00-24/25
16.00-25	24		11.25 × 25-2.0	1534	60.4	438	17.2	709	27.9	475	18.7	16.00-25
18.00-25	24	24, 28, 32	13.00 × 25-2.5	1638	64.5	537	21.1	755	29.7	571	22.5	18.00-25
17.5-25	16, 20		14.00 × 25-1.5 (14.00SDC × 25-1.3)	1390	54.7	430	16.9	649	25.6	454	17.9	17.5-25
20.5-25	16, 20	28	17.00 × 25-2.0	1545	60.8	540	21.3	714	28.1	564	22.2	20.5-25
23.5-25		20	19.50 × 25-2.5	1642	64.4	617	24.3	747	29.4	652	25.7	—
26.5-25		32	22.00 × 25-3.0	1798	70.8	690	27.2	798	31.4	731	28.8	—

Y69K [with side protector]
L-4S SMOOTH DEEP TREAD

Reinforced smooth deep tread for long tread wear life and strong cut resistance. Unique profile with side protector for improved resistance to shoulder and sidewall cuts.

Use: Loaders and Underground vehicles



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
1800-25	24		13.00 × 25-2.5	1700	66.9	520	20.5	785	30.9	550	21.9	18.00-25
26.5-25		32	22.00 × 25-3.0	1790	70.5	695	27.4	825	32.5	723	28.5	—

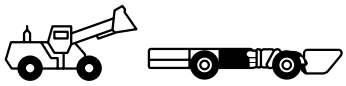
• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y69K [with side protector]

L-5S REINFORCED, SMOOTH EXTRA DEEP TREAD

Reinforced extra deep tread for longer tread wear life and stronger cut resistance. Modified sidewall profile decreases sidewall cuts.

Use: Loaders and Underground vehicles



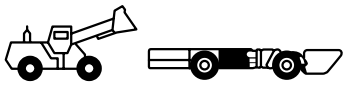
TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
18.00-25	24	24, 28, 32	13.00 × 25-2.5	1700	66.9	520	20.5	785	30.9	555	21.9	18.00-25
26.5-25	24	26, 32	22.00 × 25-3.0	1790	70.5	695	27.4	825	32.5	723	28.5	26.5-25
29.5-29		28, 34, 40	25.00 × 29-3.5	2019	79.5	782	30.8	938	36.9	820	32.3	—

Y69

L-5S SMOOTH EXTRA DEEP TREAD

Extra deep tread and reinforced sidewalls offer superior resistance to damage and wear.

Use: Loaders and Underground vehicles



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
12.00-24	16, 20		8.50V × 24	1280	50.4	333	13.1	604	23.8	356	14.0	11.00-12.00/24
14.00-24	20, 24		10.00W × 24	1365	53.7	380	15.0	654	25.7	393	15.5	14.00-24/25
16.00-25		24	11.25 × 25-2.0	1542	60.7	445	17.5	691	27.2	500	19.7	—
18.00-25	24, 28	24, 28, 32	13.00× 25-2.5	1651	65.0	533	21.0	751	29.6	571	22.5	18.00-25
17.5-25	20	16, 20, 28	14.00× 25-1.5 (14.00SDC × 25-1.3)	1390	54.7	430	16.9	649	25.6	454	17.9	17.5-25
20.5-25	16, 20	16, 20, 28	17.00 × 25-2.0	1545	60.8	540	21.3	714	28.1	564	22.2	20.5-25
23.5-25		20, 24	19.50 × 25-2.5	1642	64.4	617	24.3	747	29.4	652	25.7	—
26.5-25	24	24, 26, 28, 32, 36	22.00 × 25-3.0	1798	70.8	690	27.2	798	31.4	731	28.8	26.5-25

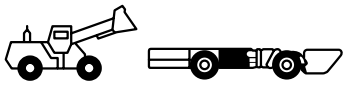
• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y69U

L-4S SMOOTH DEEP TREAD

Specially developed for underground vehicle. Unique wavy side profile with special reinforcement, such as ZSC or cable wire, provides excellent sidewall cut resistance.

Use: Loaders and Underground vehicles



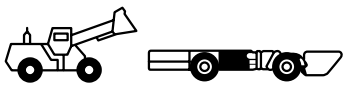
TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
1200-24	16		8.50V × 24	1254	49.4	328	12.9	590	23.2	348	13.7	1100/1200-24

Y69U

L-5S SMOOTH EXTRA DEEP TREAD

Specially developed for underground vehicle. Unique wavy side profile with special reinforcement, such as ZSC or cable wire, provides excellent sidewall cut resistance.

Use: Loaders and Underground vehicles



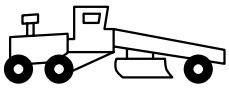
TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
1200-24	16		8.50V × 24	1275	50.2	332	13.1	602	23.7	351	13.8	1100/1200-24
17.5-25		20	14.00 × 25-1.5	1400	55.1	452	17.8	658	25.9	473	18.6	—
1800-25		24, 28, 32	13.00 × 25-2.5	1670	65.7	536	21.1	780	30.7	571	22.5	—
26.5-25		28, 32	22.00 × 25-3.0	1796	70.7	710	28.0	837	33.0	739	29.1	—

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y25
G-2 TRACTION

Features good traction. The directionally opposed lugs produce self cleaning action.

Use: Motor graders

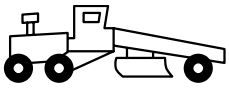


TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
10.00-20	10		7.50V × 20 (8.00V × 20)	1075	42.3	273	10.8	491	19.3	289	11.4	10.00-20
11.00-20	10, 12		8.00V × 20 (8.50V × 20)	1105	43.5	288	11.3	497	19.6	317	12.5	11.00-20
14.00-24	14		8.00TG × 24SDC	1330	52.4	360	14.2	606	23.9	400	15.7	14.00-24/25

Y103
G-2 TRACTION

Features optimum traction and flotation on muddy ground. Directionally opposed lugs produce self cleaning action.

Use: Motor graders

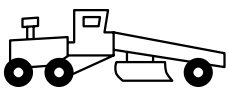


TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
11.00-20	10		8.00V × 20 (8.50V × 20)	1092	43.0	304	12.0	500	19.7	322	12.7	11.00-20
13.00-24	12, 16	12, 14	8.00TG × 24SDC	1280	50.4	346	13.6	576	22.7	383	15.1	13.00-24/25
14.00-24	10, 12, 14, 16, 20	10, 12, 16	8.00TG × 24SDC	1340	52.8	372	14.6	604	23.8	409	16.1	14.00-24/25
16.00-24	12, 16	12, 16	10.00VA × 24SDC	1448	57.0	445	17.5	654	25.7	489	19.3	16.00-24
15.5-25	12	12	12.00 × 25-1.3 (12.00SDC × 25-1.3)	1274	50.2	383	15.1	590	23.2	400	15.7	15.5-25
17.5-25		12	14.00 × 25-1.5 (14.00SDC × 25-1.3)	1349	53.1	434	17.1	620	24.4	460	18.1	—

Y67
G-3 ROCK

For grader use on rock, coal and log-strewn terrain. Tough tread prevents cuts and snags. Large ground contact area provides long service life.

Use: Motor graders



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
13.00-24	12	12	8.00TG × 24SDC	1280	50.4	334	13.1	586	23.1	358	14.1	13.00-24/25
14.00-24	12, 16	16	8.00TG × 24SDC	1351	53.2	362	14.3	624	24.6	388	15.3	14.00-24/25
16.00-24	12, 16	16	10.00VA × 24SDC	1475	58.1	445	17.5	686	27.0	467	18.4	16.00-24
18.00-25		12, 16	13.00 × 25-2.5	1600	63.8	510	20.1	734	29.3	540	21.3	—

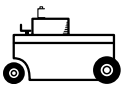
• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Compactor Tires: Bias

Y69
C-1 SMOOTH

Specially designed for tire roller use. Rubber compound used provides good resistance to oily chemicals such as coal tar. Produces highly uniform rolling performance.

Please consult with the machine manufacturer prior to tire selection as vehicle specifications may very greatly.

Use: Tire rollers 

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
7.50-15	12		6.00GS × 15SDC	790	31.1	216	8.5	359	14.1	234	9.2	7.00/7.50-15
7.50-16	6		6.00GS × 16SDC	815	32.1	221	8.7	387	15.2	235	9.3	7.50-16
8.25-20	12		6.50T × 20	973	38.3	240	9.4	451	17.8	261	10.3	8.25-20
9.00-20	10		7.00T × 20	1019	40.1	264	10.4	473	18.6	289	11.4	9.00-20
11.00-20	14		8.00V × 20	1095	43.1	310	12.2	487	19.2	344	13.5	11.00-20
14/70-20	12		11.00TG × 20SDC	965	38.0	369	14.5	459	18.1	374	14.7	14/70-20
15.0-20	16		9.00V × 20	960	37.8	350	13.8	458	18.0	355	14.0	15.0-20

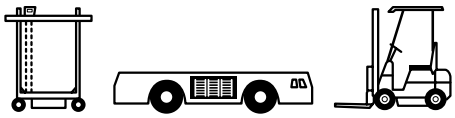
• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y92

IND-3

The Y92 is suited for vehicles such as straddles carriers for container handling and towing tractors used at airports. This tire has a large tread width and ground contact area for good traction on paved ground surfaces.

Use: Straddle carriers, Towing tractors and forklifts



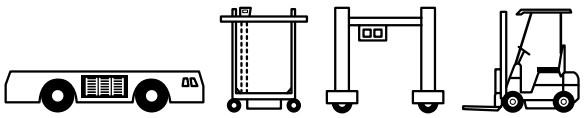
TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
14.00-24	24, 28		10.00W × 24 (10.00WI × 24)	1356	53.4	377	14.8	632	24.9	400	15.7	14.00-24/25

Y67

IND-3

Designed for towing tractors at airports and straddle carriers that require better traction than Y92 provides.

Use: Towing tractors, Straddle carriers, Transfer cranes and Forklifts



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
12.00-20	18, 20		8.50V × 20	1139	44.8	334	13.1	516	20.3	357	14.1	12.00-20
44 × 18-20		36	15.00T × 20	1150	45.3	443	17.4	525	20.7	463	18.2	—
50 × 20-20		36		1260	49.6	512	20.2	577	22.7	503	19.8	—
12.00-24	20		8.50V × 24	1231	48.5	307	12.1	562	22.1	330	13.0	11.00/12.00-24
14.00-24	20, 24, 28		10.00W × 24 (10.00WI × 24)	1351	53.2	382	15.0	596	23.5	432	17.0	14.00-24/25
14.00-25		24	10.00 × 25	1363	53.7	373	14.7	627	24.7	428	16.9	—
16.00-25	28	28, 32, 36	11.25 × 25-2.0	1480	58.3	445	17.5	672	26.5	499	19.6	16.00-25
18.00-25	28, 32, 36	28, 32, 36, 40	13.00 × 25-2.5	1612	63.5	512	20.2	722	28.4	549	21.6	18.00-25
21.00-25		36, 40	15.00 × 25-3.0	1750	68.9	588	23.1	769	30.3	635	25.0	—
24.00-29		42	17.00 × 29-3.5	1941	76.4	658	25.9	830	32.7	738	29.1	—
23.5-25		36	19.50 × 25-2.5	1605	63.2	596	23.5	709	27.9	636	25.0	—
24.00-35		48	17.00 × 35-3.5	2130	83.9	670	26.4	947	37.3	724	28.5	—
29.5-29		40	25.00 × 29-3.5	1972	77.6	781	30.8	849	33.4	840	33.1	—
33.25-35		44	27.00 × 35-3.5	2250	88.6	853	33.6	982	38.7	902	35.5	—
37.5-39		60	32.00 × 39-4.5	2515	99.0	967	38.1	1137	44.8	1015	40.0	—

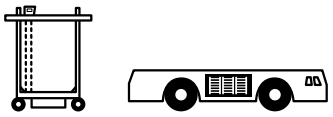
• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y69PS

IND-3

The Y69PS is suited for vehicles such as straddle carriers for container handling and towing tractors used at airports. This tire has a large tread width and ground contact area for good traction on paved ground surfaces.

Use: Straddle carriers and Towing tractors



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
16.00-25	28, 32	28, 32	11.25 × 25-2.0	1470	57.9	417	16.4	658	25.9	457	18.0	16.00-25

Y532

IND-3

The Y532 is designed for yard service vehicles at steel mills. This tire provides excellent steering stability and minimizes uneven tread wear.

Use: Yard service vehicles at steel mills

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
10.00-20	14		7.50V × 20	1060	41.7	270	10.6	486	19.1	290	11.4	10.00-20
12.00-20	18		8.50V × 20	1127	44.4	312	12.3	511	20.1	335	13.2	12.00-20
13.00-20	20		9.00V × 20	1190	46.9	348	13.7	535	21.1	370	14.6	13.00-20
14.00-24	24		10.00WI × 24	1364	53.7	385	15.2	623	24.5	425	16.7	14.00-24/25
14.00-25		24	10.00 × 25	1364	53.7	385	15.2	623	24.5	425	16.7	—

Y543

IND-3

The Y543 is designed for yard service vehicles. This tire provides excellent abrasion resistance.

Use: Yard service vehicles

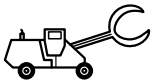
TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
12.00-20	18		8.50V	1138	44.8	318	12.5	520	20.5	345	13.6	12.00-20
12.00-24	18, 20		8.50V	1238	48.7	316	12.4	566	22.3	342	13.5	12.00-24
14.00-24	28		10.00W	1370	53.9	385	15.2	624	24.6	410	16.1	14.00-24/25

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

Y523
IND-4 DEEP TREAD

This tire is suited for log stackers and log handlers with a reinforced bead area and heavy load allowance capacity.

Use: Log stackers and log handlers



TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
16.00-25		36	11.25 × 25-2.0	1540	60.6	443	17.4	724	28.5	467	18.4	—
18.00-25		36, 40	13.00 × 25-2.5	1652	65.0	517	20.4	772	30.4	541	21.3	—
18.00-33		36	13.00 × 33-2.5	1850	72.8	518	20.4	869	34.2	542	21.3	—
24.00-35		42	17.00 × 35-3.5	2170	85.4	673	26.5	960	37.8	743	29.3	—
27.00-49		42	19.50 × 49-3.5	2671	105.2	757	29.8	1170	46.1	862	33.9	—
36.00-51		58	26.00 × 51-5.0	3198	125.9	1040	40.9	1379	54.3	1150	45.3	—
40.00-57		68	29.00 × 57-6.0	3584	141.1	1143	45.0	1567	61.7	1271	50.0	—

Y69
IND-4 DEEP TREAD

The Y69 is suited for vehicles such as straddle carriers for container handling and towing tractors used at airport. This tire has a large tread width and ground contact area for good traction on paved ground surfaces.

Use: Container handlers, Forklifts and Log handlers

TIRE SIZE	PLY RATING & TYPE		RIM SIZE	INFLATED DIMENSIONS				STATIC LOADED RADIUS		STATIC LOADED WIDTH		TUBE SIZE
				OVERALL DIAMETER		OVERALL WIDTH						
	T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	
16.00-25	28	28	11.25 × 25-2.0	1534	60.4	438	17.2	709	27.9	475	18.7	16.00-25
18.00-25	36	28, 32, 36, 40	13.00 × 25-2.5	1638	64.5	537	21.1	755	29.7	571	22.5	18.00-25
21.00-35		42	15.00 × 35-3.0	2036	80.2	600	23.6	920	36.2	650	25.6	—

• Subject to change without notice T/T: Tube Type T/L: Tubeless Type

LOAD & INFLATION PRESSURE TABLES: RADIAL

Off-The-Road Haulage Service (for Dump Tracks & Scrapers)

Wide Base Radial Ply Tires

50 KPH (30 MPH) Maximum Speed Distance: Up to 4 km (2.5 miles) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES											
	kPa psi	275 40	300 44	325 47	350 51	375 54	400 58	425 62	450 65	475 69	500 73	525 76
17.5R25	kg lbs	3350 7400	3550 7850	3750 8250	4000 8800	**4125**☆ **9100**☆	4375 9650	4625 10200	4750 10500	5000 11000	5150 11400	**5450**☆☆ **12000**☆☆
20.5R25	kg lbs	4375 9650	4750 10500	5000 11000	5300 11700	**5600**☆ **12300**☆	5800 12800	6150 13600	6500 14300	6700 14800	6900 15200	**7300**☆☆ **16100**☆☆
23.5R25	kg lbs	5600 12300	6000 13200	6500 14300	6700 14800	**7100**☆ **15700**☆	7500 16500	7750 17100	8250 18200	8500 18700	9000 19800	**9250**☆☆ **20400**☆☆
26.5R25	kg lbs	7100 15700	7500 16500	8000 17600	8500 18700	**9000**☆ **19800**☆	9500 20900	9750 21500	10300 22700	10600 23400	11200 24700	**11500**☆☆ **25400**☆☆
29.5R25	kg lbs	8500 18700	9250 20400	9750 21500	10300 22700	**10900**☆ **24000**☆	11500 25400	11800 26000	12500 27600	12850 28300	13600 30000	**14000**☆☆ **30900**☆☆

NOTES 1: Bold face figures denote maximum load for symbols shown.
2: For 65 km/h (40 mph) maximum speed, the above loads must be reduced 12% with no change in inflation pressure.

Off-The-Road Haulage Service (for Dump Tracks & Scrapers)

Conventional Radial Ply Tires

50 KPH (30 MPH) Maximum Speed Distance: Up to 4 km (2.5 miles) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES											
	kPa psi	450 65	475 69	500 73	525 76	560 80	575 83	600 87	625 91	650 94	675 98	700 102
16.00R25	kg lbs	5150 11400	**5450**☆ **12000**☆	5600 12300	5800 12800	6000 13200	6300 13900	6500 14300	6700 14800	6900 15200	7100 15700	**7300**☆☆ **16100**☆☆
18.00R33	kg lbs	7750 17100	**8000**☆ **17600**☆	8500 18700	8750 19300	9000 19800	9250 20400	9750 21500	10000 22000	10300 22700	10600 23400	**10900**☆☆ **24000**☆☆

NOTES 1: Bold face figures denote maximum load for symbols shown.
2: For 65 km/h (40 mph) maximum speed, the above loads must be reduced 12% with no change in inflation pressure.

Off-The-Road Slow Speed Service (for Loaders & Dozers)

Wide Base radial Ply Tires

10 KPH (5 MPH) Maximum speed Distance: Up to 76 m (250 feet) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES											
	kPa psi	400 58	425 62	450 65	475 69	500 73	525 76	550 80	575 83	600 87	625 91	650 94
17.5R25	kg lbs	6000 13200	6150 13600	6500 14300	6700 14800	**7100**☆ **15700**☆	7300 16100	7500 16500	7750 17100	8000 17600	8250 18200	**8500**☆☆ **18700**☆☆
20.5R25	kg lbs	8000 17600	8250 18200	8750 19300	9000 19800	**9500**☆ **20900**☆	9750 21500	10000 22000	10300 22700	10900 24000	11200 24700	**11500**☆☆ **25400**☆☆
23.5R25	kg lbs	10300 22700	10600 23400	11200 24700	11500 25400	**12150**☆ **26800**☆	12500 27600	12850 28300	13200 29100	13600 30000	14000 30900	**14500**☆☆ **32000**☆☆
26.5R25	kg lbs	12850 28300	13200 29100	14000 30900	14500 32000	**15000**☆ **33100**☆	15500 34200	16000 35300	16500 36400	17000 37500	18000 39700	**18500**☆☆ **40800**☆☆

NOTES 1: Bold face figures denote maximum load for symbols shown.
2: On front tires for front end loaders, it is permissible to increase inflation pressure up to 100 kPa (15 psi) above that shown in the table with no increase in load.
3: For tire load limits at various speed:

Max. Speed	% Load Change From Above 5 MPH Table
Stationary	+60%
Creep	+30%
4 km/h (2 1/2 mph)	+15%
10 km/h (5 mph)	No Change
15 km/h (10 mph)	-13%
25 km/h (15 mph)	-20%

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

Off-The-Road Tractor & Grader Service

Conventional Radial Ply Tires

40 KPH (25 MPH) Maximum speed Distance: Unlimited

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES								
	kPa psi	200 29	225 33	250 36	275 40	300 44	325 47	350 51	375 54
14.00R24TG	kg lbs	2240 4940	2430 5360	2650 5840	2800 6150	3000 6600	3250 7150	3350 7400	**3650**☆ **8050**☆

NOTES 1: Bold face figures denote maximum load for symbols shown.
2: For maintenance work on established highways, inflation pressures may be increased 50% if desired with no increase in loads.
3: For slope and ditching service, inflation pressures should be increased 15 psi (100 kPa) with no increase in load rating.
For extreme conditions, consult tire and rim manufacturers for additional recommended operating requirements.

Off-The-Road in Highway Service (for Mobile Cranes)

70 KPH (44 MPH) Maximum Speed

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES													
	kPa psi	600 87	625 91	650 94	675 98	700 102	725 105	750 109	775 112	800 116	825 120	850 123	875 127	900 131
385/95R25	kg lbs	4735 10400	4845 10700	4960 10900	5070 11200	5180 11400	5285 11600	5395 11900	5495 12100	5600 12300	5700 12600	5805 12800	5900 13000	**6000** **13200**
445/95R25	kg lbs	5760 12700	5900 13000	6035 13300	6170 13600	6300 13900	6435 14200	6560 14500	6690 14700	6815 15000	6940 15300	7060 15600	7180 15800	**7300** **16100**
505/95R25	kg lbs	7395 16300	7575 16700	7750 17100	7920 17500	8095 17800	8260 18200	8425 18600	8590 18900	**8750** **19300**				

Off-The-Road Tires in Highway Service (for Mobile Cranes)

Tire Load Limits at Various Speed

Max. Speed (km/h)	Load Capacity Index
Stationary	3.03
Creep	2.46
5	2.18
10	1.89
30	1.30
40	1.24
50	1.18
60	1.12
70 Reference Speed	1.00
80	0.82
90	0.70
100	0.60

Size Conversion Table

METRIC	INCH
385/95R24, 25	14.00R24, 25
445/95R25	16.00R25
505/95R25	18.00R25

Off-The-Road in Highway service (for Wheeled Cranes)

45 KPH (28 MPH) Maximum speed

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES													
	kPa psi	600 87	625 91	650 94	675 98	700 102	725 105	750 109	775 112	800 116	825 120	850 123	875 127	900 131
14.00R24	kg lbs	4750 10500	4895 10800	5040 11100	5190 11400	5330 11700	5470 12100	5610 12400	5750 12700	5800 12800	6030 13300	6170 13600	6300 13900	**6500**☆☆☆ **14300**☆☆☆

Off-The-Road Tire in Highway Service (For Wheel Cranes)

Tire Load Limits at Various Speed

Max. Speed (km/h)	Load Capacity Index
Stationary	2.50
Creep	2.03
5	1.80
10	1.56
40	1.05
45	1.00
50	0.95

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

LOAD AND INFLATION PRESSURE TABLES: BIAS

Off-The-Road Haulage Service (for Dump Trucks & Scrapers)

Code No. E-1, E-2, E-3, E-4 and E-7

Narrow Base Bias Ply Tires

50 KPH (30 MPH) Maximum Speed Distance: Up to 4 km (2.5 miles) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES													
	kPa psi	275 40	300 44	325 47	350 51	375 54	400 58	425 62	450 65	475 69	500 73	525 76	550 80	575 83
12.00-20NHS	kg lbs	2180 4800	2300 5080	2430 5360	2500 5520	**2650 (14)** **5840 (14)**	2725 6000	2800 6150	**2900 (16)** **6400 (16)**	3000 6600	3075 6800	3125 6950	**3250 (20)** **7150 (20)**	
12.00-24, *25NHS	kg lbs	2500 5520	2575 5680	2725 6000	2800 6150	**3000 (14)** **6600 (14)**	3075 6800	3150 6950	**3250 (16)** **7150 (16)**	3350 7400	3450 7600	3550 7850	**3650 (20)** **8055 (26)**	
13.00-24, *25NHS	kg lbs	2900 6400	3000 6600	3150 6950	3250 7150	3450 7600	3550 7850	3650 8050	**3875 (18)** **8550 (18)**					
14.00-20NHS	kg lbs	3000 6600	3150 6950	3350 7400	3450 7600	**3650 (16)** **8050 (16)**	3750 8250	3875 8550	4000 8800	**4125 (20)** **9100 (20)**				
14.00-24, 25NHS	kg lbs	3350 7400	3550 7850	3750 8250	3875 8550	**4000 (16)** **8800 (16)**	4250 9350	4375 9650	4500 9900	**4625 (20)** **10200 (20)**	4750 10500	4875 10700	5000 11000	**5150 (24)** **11400 (24)**
16.00-25	kg lbs	4375 9650	4625 10200	4865 10700	5000 11000	5300 11700	**5450 (20)** **12000 (20)**	5600 12300	5800 12800	**6000 (24)** **13200 (24)**	6300 13900	6500 14300	6500 14300	**6700 (28)** **14800 (28)**
① 18.00-25	kg lbs	**5600 (16)** **12300 (16)**	6000 13200	6300 13900	**6500 (20)** **14300 (20)**	6900 15200	7100 15700	**7300 (24)** **16100 (24)**	7500 16500	7750 17100	**8000 (28)** **17600 (28)**	8250 18200	8500 18700	**8750 (32)** **19300 (32)**
18.00-33	kg lbs	6500 14300	6900 15200	7300 16100	7500 16500	8000 17600	8250 18200	**8500 (24)** **18700 (24)**	8750 19300	9000 19800	**9250 (28)** **20400 (28)**	9750 21500	10000 22000	**10300 (32)** **22700 (32)**
21.00-25	kg lbs	7300 16100	7750 17100	8000 17600	8500 18700	**8750 (24)** **19300 (24)**	9000 19800	**9500 (28)** **20900 (28)**	9750 21500	10000 22000	**10300 (32)** **22700 (32)**			
② 21.00-35	kg lbs	8750 19300	9000 19800	9500 20900	10000 22000	10300 22700	10900 24000	**11200 (28)** **24700 (28)**	11500 25400	11800 26000	**12150 (32)** **26800 (32)**	12500 27600	**12850 (36)** **28300 (36)**	
24.00-25	kg lbs	9500 20900	10000 22000	**10300 (24)** **22700 (24)**	10900 24000	11200 24700	**11800 (30)** **26000 (30)**							
③ 24.00-35	kg lbs	11200 24700	11800 26000	12150 26800	12850 28300	13200 29100	**14000 (30)** **30900 (30)**	14500 32000	15000 33100	**15500 (36)** **34200 (36)**	15500 34200	16000 35300	16500 36480	**17000 (42)** **37500 (42)**
④ 24.00-49	kg lbs	13200 29100	14000 30900	14500 32000	15500 34200	16000 35300	**16500 (30)** **36480 (30)**	17000 37500	18000 39700	**18500 (36)** **40800 (36)**	19000 41900	19500 43000	20000 44100	**20600 (42)** **45400 (42)**
27.00-33	kg lbs	13200 29100	14000 30900	14500 32000	**15500 (30)** **34200 (30)**	16000 35300	**16500 (36)** **36480 (36)**							
27.00-49	kg lbs	16500 36480	17000 37500	18000 39700	19000 41900	19500 43000	20600 45400	**21200 (36)** **46700 (36)**	21800 41800	22400 49400	**23000 (42)** **50700 (42)**	23600 52000	24300 53600	**25000 (48)** **55100 (48)**
30.00-51	kg lbs	20000 44100	21200 46700	22400 49400	23000 50700	24300 53600	25000 55100	25750 56800	27250 60000	28000 61500	**29000 (46)** **64000 (46)**	29000 64000	**30000 (52)** **66000 (52)**	
33.00-51	kg lbs	23600 52000	24300 53600	25750 56800	27250 60000	28000 61500	29000 64000	30000 66000	31500 69500	32500 71500	**33500 (50)** **74000 (50)**	34500 76000	35500 78500	**35500 (58)** **78500 (48)**
⑤ 36.00-51	kg lbs	28000 61500	30000 66000	31500 69500	32500 71500	**34500 (42)** **76000 (42)**	35500 78500	36500 80500	**37500 (50)** **82500 (50)**	38750 85500	40000 88000	**41250 (58)** **91000 (58)**		
⑥ 40.00-57	kg lbs	36500 80500	38750 85500	40000 88000	41250 91000	43750 96500	75000 99000	46250 102000	48750 107500	**50000 (60)** **110000 (60)**	51500 113500	53000 117000	**54500 (68)** **120000 (68)**	

① 12 ply rating: 4750 kg @200 kPa (10500 lbs @29 psi) ② 40 ply rating: 13500 kg @600 kPa (29800 lbs @87 psi) ③ 48 ply rating: 18300 kg @650 kPa (40300 lbs @94 psi) ④ 48 ply rating: 21800 kg @650 kPa (48100 lbs @94 psi) ⑤ 66 ply rating: 44500 kg @600 kPa (98100 lbs @87 psi) ⑥ 76 ply rating: 58700 kg @625 kPa (129400 lbs @91 psi)

NOTES: Figures in parenthesis denote ply rating for which loads and inflation pressure are maximum.
*: Unavailable from The Yokoyama Rubber Company, Ltd.
For 40 MPH (65 KPH) maximum speed, the above loads must be reduced 15% with no change in inflation pressure.
NHS: Not for highway service

Wide Base Bias Ply Tires

50 KPH (30 MPH) Maximum Speed Distance: Up to 4 km (2.5 miles) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES										
	kPa psi	175 25	200 29	225 33	250 36	275 40	300 44	325 47	350 51	375 54	500 73
15.5-25	kg lbs	**2575 (8)** **5680 (8)**	2800 6150	3000 6600	**3250 (12)** **7150 (12)**						
17.5-25	kg lbs	3075 6800	3350 7400	**3650 (12)** **8050 (12)**	3875 8550	4000 8800	**4250 (16)** **9350 (16)**	4500 9900	4625 10200	4875 10700	**5000 (20)** **11000 (20)**
20.5-25	kg lbs	4125 9100	**4500 (12)** **9900 (12)**	4875 10700	5150 11400	**5450 (16)** **12000 (16)**	5800 12800	**6000 (20)** **13200 (20)**			
23.5-25	kg lbs	**5300 (12)** **11700 (12)**	5800 12800	**6150 (16)** **13600 (16)**	6500 14300	6900 15200	**7300 (20)** **16100 (20)**	7750 17100	**8000 (24)** **17600 (24)**		
26.5-25	kg lbs	6700 14800	7300 16100	7750 17100	**8250 (20)** **18200 (20)**	8750 9300	**9250 (24)** **20400 (24)**	**9500 (26)** **20900 (26)**	**10000 (28)** **22000 (28)**		
26.5-29	kg lbs	7100 15700	7750 17100	8250 18200	8750 19300	**9250 (22)** **20400 (22)**	9750 21500	**10300 (26)** **22700 (26)**			
29.5-25	kg lbs	8000 17600	8750 19300	9250 20400	**10000 (22)** **22000 (22)**	16000 23400	10900 24000	**11500 (28)** **25400 (28)**			

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES										
	kPa psi	175 25	200 29	225 33	250 36	275 40	300 44	325 47	350 51	375 54	500 73
29.5-29	kg lbs	8500 18700	9250 20400	10000 22000	**10600 (22)** **23400 (22)**	11200 24700	11800 26000	**12150 (28)** **26800 (28)**	12850 28300	13200 29100	**14000 (34)** **30900 (34)**
29.5-35	kg lbs	9250 20400	10000 22000	10900 24000	11500 25400	12150 26800	12850 28300	**13600 (28)** **30000 (28)**	14000 30900	14500 32000	**15000 (34)** **33100 (34)**
33.25-29	kg lbs	10300 22700	11200 24700	12150 26800	12850 28300	**13600 (26)** **30000 (26)**	14000 30900	**15000 (32))** **33100 (32)**			
33.25-35	kg lbs	11200 24700	12150 26800	12850 28300	14000 30900	14500 32000	15500 34200	**16000 (32)** **35300 (32)**	17000 37500	17500 38600	**18000 (38)** **39700 (38)**
33.5-33	kg lbs	11500 25400	12500 27600	13200 29100	14000 30900	15000 33100	16000 35300	**16500 (32)** **36400 (32)**	17500 38600	18000 39700	**18500 (38)** **40800 (38)**
*33.5-39	kg lbs	12500 27600	13600 30000	14500 32000	15500 34200	16000 35300	17000 37500	**18000 (36)** **39700 (36)**	18500 40800	19500 43000	**20000 (38)** **44100 (38)**
37.25-35	kg lbs	13600 30000	14500 32000	15500 34200	16500 36400	**17500 (30)** **38600 (30)**	18500 40800	**19500 (36)** **43000 (36)**	20000 44100	21200 46800	**21800 (42)** **48100 (42)**
37.5-33	kg lbs	14000 30900	15000 33100	16000 35300	17000 37500	**18000 (30)** **39700 (30)**	19000 41900	**20000 (36)** **44100 (36)**	20600 45500	21800 48100	**22400 (42)** **49400 (42)**
① 37.5-39	kg lbs	15000 33100	16000 35300	17000 37500	18500 40800	19500 43000	20600 45400	**21200 (36)** **46700 (36)**	22400 49400	23000 50700	**24300 (44)** **53600 (44)**
*37.5-51	kg lbs	17000 37500	18000 39700	19500 43000	20600 45400	21800 48100	23000 50700	**24300 (36)** **53600 (36)**	25000 55100	26500 58400	**27250 (44)** **60000 (44)**

① 52 ply rating: 26000 kg @450 kPa (57300 lbs @65 psi)

NOTES: Figures in parenthesis denote ply rating for which loads and inflation pressure are maximum.
*: Unavailable from The Yokoyama Rubber Company, Ltd.
For 40 MPH (65 KPH) maximum speed, the above loads must be reduced 17% with no change in inflation pressure.

Off-The-Road Slow speed Service (for Loaders & Dozers) Code No. L-2, L-3, L-4, L-5, L-4S and L-5S

Narrow Base Bias Ply Tires

10 KPH (5 MPH) Maximum Speed Distance: Up to 76 meters (250 feet) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES												
	kPa psi	475 69	500 73	525 76	550 80	575 83	600 87	625 91	650 94	675 98	700 102	725 102	750 109
8.25-20NHS	kg lbs	2650 5840	2725 6000	2800 6150	**2900 (10)** **6400 (10)**	2900 6400	3000 6600	3075 6800	3150 6950	**3250 (12)** **7150 (12)**			
9.00-20NHS	kg lbs	3150 6950	3250 7150	3350 7400	3450 7600	3450 7600	**3550 (12)** **7850 (12)**						
10.00-20NHS	kg lbs	3550 7850	3650 8050	3750 8250	**3875 (12)** **8550 (12)**	4000 8800	4125 9100	4125 9100	**4250 (14)** **9350 (14)**				
11.00-20NHS	kg lbs	3875 8550	4000 8800	**4125 (12)** **9100 (12)**	4250 9350	4250 9350	4375 9650	**4500 (14)** **9900 (14)**					
12.00-20NHS	kg lbs	4375 9650	4500 9900	4625 10200	4750 10500	**4875 (14)** **10700 (14)**	5000 11000	5150 11400	5300 11700	**5450 (16)** **12000 (16)**			
12.00-24NHS	kg lbs	5000 11000	5150 11400	5300 11700	5450 12000	5600 12300	5600 12300	5800 12800	6000 13200	**6150 (16)** **13600 (16)**			
14.00-20NHS	kg lbs	6000 13200	6300 13900	6500 14300	6700 14800	6700 14800	6900 15200	**7100 (18)** **15700 (18)**	7300 16100	7500 16500	**7500 (20)** **16500 (20)**		
14.00-24NHS	kg lbs	6700 14800	6900 15200	7100 15700	7300 16100	7500 16500	7750 17100	8000 17600	8250 18200	8250 18200	**8500 (20)** **18700 (20)**		
16.00-25	kg lbs	8750 19300	9000 19800	9250 20400	**9750 (20)** **21500 (20)**	10000 22000	10000 22000	10300 22700	**10600 (24)** **23400 (24)**	10900 24000	11200 24700	11200 24700	**11500 (28)** **25400 (28)**
① 18.00-25	kg lbs	**11500 (20)** **24500 (20)**	11800 26000	12150 26800	**12500 (24)** **27600 (24)**	12850 28300	13200 29100	13600 30000	**13600 (28)** **30000 (28)**	14000 30900	14500 32000	14500 32000	**15000 (32)** **33100 (32)**

① 12 ply rating: 8250 kg @275 kPa (18200 lbs @40 psi) NHS: Not for highway service 16 ply rating: 1000 kg @375 kPa (22000 lbs @54 psi)

65 Series Bias Ply Tires Code No. L-2, L-3, L-4, L-5, L-4S and L-5S

10 KPH (5 MPH) Maximum Speed Distance: Up to 76 meters (250 feet) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES															
	kPa psi	300 44	325 47	350 51	375 54	400 58	425 62	450 65	475 69	500 73	525 76	550 80	575 83	600 87	625 91	650 94
35/65-33	kg lbs	17000 37500	18000 39700	**19000 (24)** **41900 (24)**	19500 43000	20000 44100	21200 46700	**21800 (30)** **48100 (30)**	22400 49400	23000 50700	**23600 (36)** **52000 (36)**	24300 53600	25000 55100	25750 56800	**26500 (42)** **58400 (42)**	
40/65-39	kg lbs	23600 52000	25000 55100	25750 56800	**27250 (30)** **60000 (30)**	28000 61500	29000 64000	30000 66000	30750 (36) 68000 (36)							
① 45/65-45	kg lbs	31500 69500	32500 71500	34500 76000	35500 78500	37500 82500	**38750 (38)** **85500 (38)**	40000 88000	41250 91000	42500 93500	**43750 (46)** **96500 (46)**	45000 99000	**46250 (50)** **102000 (50)**	47500 104500	48750 107500	**50000 (58)** **110000 (58)**

① 4 ply rating: 47500 kg @600 kPa (104500 lbs @87 psi)

NOTES: Figures in parentheses denote ply rating for which bold face loads and inflations are maximum. One front tires for front end loaders, it is permissible to increase the inflation pressure up to 15 psi above that shown in the table with no increase in load.
For tire load limits at various speeds:

Max. Speed	% Load Change From Above 5 MPH Table
Stationary	+60%
Creep	+30%
4 km/h (2 1/2 mph)	+15%
10 km/h (5 mph)	No Change
15 km/h (10 mph)	-13%
25 km/h (15 mph)	-20%

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

Load & Inflation Pressure Tables: Bias

Wide Base Bias Ply Tires

10 KPH (5 MPH) Maximum Speed Distance: Up to 76 meters (250 feet) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES																
	kPa psi	225 33	250 36	275 40	300 44	325 47	350 51	375 54	400 58	425 62	450 65	475 69	500 73	525 76	550 80	575 83	600 87
15.5-25	kg lbs	4000 8800	**4250 (8)** **9350 (8)**	4500 9900	4750 10500	**4875 (10)** **10700 (10)**	5150 11400	5300 11700	**5600 (12)** **12300 (12)**								
17.5-25	kg lbs	4750 10500	5000 11000	5300 11700	5600 12300	5800 12800	**6150 (12)** **13600 (12)**	6300 13900	**6700 (14)** **14800 (14)**	6900 15200	7100 15700	**7300 (16)** **16100 (16)**	7500 16500	7750 17100	8000 17600	**8250 (20)** **18200 (20)**	
② 20.5-25	kg lbs	6300 13900	**6700 (12)** **14800 (12)**	7100 15700	7500 16500	7750 17100	**8250 (16)** **18200 (16)**	8500 18700	8750 19300	9250 20400	**9500 (20)** **20900 (20)**	9750 21500	10000 22000	**10300 (24)** **22700 (24)**			
③ 23.5-25	kg lbs	**8000 (12)** **17600 (12)**	8500 18700	9000 19800	**9500 (16)** **20900 (16)**	10000 22000	10600 23400	**10900 (20)** **24000 (20)**	11200 24700	11800 26000	12150 26800	**12500 (24)** **27600 (24)**					
④ 26.5-25	kg lbs	**10000 (14)** **22000 (14)**	10900 24000	11500 25400	12150 26800	12500 27600	**13200 (20)** **29100 (20)**	13600 30000	**14000 (24)** **30900 (24)**	14500 32000	**15000 (26)** **33100 (26)**	**15500 (28)** **34200 (28)**	16000 35300	16500 36480	**17000 (32)** **37500 (32)**		
26.5-29	kg lbs	10900 24000	11500 25400	12150 26800	12850 28300	13600 30000	14000 30900	**14500 (22)** **32000 (22)**	15000 33100	15500 34200	**16000 (26)** **35300 (26)**	17000 37500	17500 38600	**18000 (30)** **39700 (30)**			
29.5-25	kg lbs	12150 26800	**12850 (16)** **28300 (16)**	13600 30000	14500 32000	**15000 (22)** **33100 (22)**	16000 35300	16500 36480	17000 37500	**17500 (28)** **38600 (28)**	18500 40800	19000 41900	19500 43000	**20000 (34)** **44100 (34)**			
29.5-29	kg lbs	12850 28300	14000 30900	14500 32000	15500 34200	**16000 (22)** **35300 (22)**	17000 37500	17500 38600	18000 39700	**19000 (28)** **41900 (28)**	19500 43000	20000 44100	20600 45400	**21200 (34)** **46700 (34)**			
29.5-35	kg lbs	14000 30900	15000 33100	16000 35300	17000 37500	17500 38600	18500 40800	19000 41900	20000 44100	**20600 (28)** **45400 (28)**	21200 46700	21800 48100	22400 49400	**23000 (34)** **50700 (34)**			
33.25-35	kg lbs	17000 37500	18000 39700	**19000 (20)** **41900 (20)**	20000 44100	21200 46700	**22400 (26)** **48400 (26)**	23000 50700	24300 53600	25000 55100	**25750 (32)** **56800 (32)**	26500 58400	27250 60000	**28000 (33)** **61500 (38)**			
33.5-33	kg lbs	17500 38600	18500 40800	19500 43000	20600 45400	21800 48100	22400 49400	23600 52000	24300 53600	**25750 (32)** **56800 (32)**	26500 58400	27250 60000	28000 61500	**29000 (38)** **64000 (38)**	30000 66000	30000 66000	**30750 (44)** **68000 (44)**
*33.5-39	kg lbs	19000 41900	20000 44100	21200 46700	22400 49400	23600 52000	24300 53600	25750 56800	26500 58400	27250 60000	28000 61500	29000 64000	30000 66000	**30750 (38)** **68000 (38)**			
37.25-35	kg lbs	20600 45400	21800 48100	23000 50700	24300 53600	25750 56800	26500 58400	**28000 (30)** **61500 (30)**	29000 64000	30000 66000	**30750 (36)** **68000 (36)**	31500 69500	32500 71500	**33500 (42)** **74000 (42)**			
*37.5-33	kg lbs	21200 46700	22400 49400	23600 52000	25000 55100	25750 56800	27250 60000	**28000 (30)** **61500 (30)**	29000 64000	30750 68000	**31500 (36)** **69500 (36)**	32500 71500	33500 74000	**34500 (42)** **76000 (42)**			
*37.5-39	kg lbs	22400 49400	24300 53600	25000 55100	26500 58400	28000 61500	29000 64000	30750 68000	31500 69500	32500 71500	**33500 (36)** **74000 (36)**	34500 76000	35500 78500	37500 82500	**37500 (44)** **82500 (44)**		
*37.5-51	kg lbs	25750 56800	27250 60000	29000 64000	30000 66000	31500 69500	33500 74000	34500 76000	35500 78500	37500 82500	**38750 (36)** **85500 (36)**	40000 88000	41250 91000	42500 93500	**42500 (44)** **93500 (44)**		

② 28 ply rating: 11100 kg @600 kPa (24500 lbs @87 psi) ③ 28 ply rating: 13600 kg @550 kPa (30000 lbs @80 psi) ④ 36 ply rating: 17900 kg @600 kPa (39500 lbs @87 psi) *: Not available from The Yokohama Rubber Co., Ltd.

NOTES: Figures in parentheses denote ply rating for which bold face loads and inflations are maximum.
One front tires for front end loaders, it is permissible to increase the inflation pressure up to 15 psi above that shown in the table with no increase in load.
For tire load limits at various speeds:

Max. Speed	% Load Change From Above 5 MPH Table
Stationary	+60%
Creep	+30%
4 km/h (2 1/2 mph)	+15%
10 km/h (5 mph)	No Change
15 km/h (10 mph)	-13%
25 km/h (15 mph)	-20%

10 KPH (5 MPH) Maximum Speed

Distance: Up to 76 meters (250 feet) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES												
	kPa psi	325 47	350 51	375 54	400 58	425 62	450 65	475 69	500 73	525 76	550 80	575 83	600 87
⑤ 12.00-24TG	kg lbs	**4000 (8)** **8800 (8)**											
13.00-24TG	kg lbs	4500 9900	4750 10500	**5000 (10)** **11000 (10)**	5150 11400	5300 11700	**5600 (12)** **12300 (12)**	5600 12300	5800 12800	6000 13200	6150 13600	6300 13900	**6500 (16)** **14300 (16)**
14.00-24TG	kg lbs	5450 12000	**5600 (10)** **12300 (10)**	6000 13200	6150 13600	**6300 (12)** **13900 (12)**	6500 14300	6700 14800	6900 15200	7100 15700	**7300 (16)** **16100 (16)**		
16.00-24TG	kg lbs	**7100 (12)** **15700 (12)**	7300 16100	7750 17100	8000 17600	**8250 (16)** **18200 (16)**							

⑤ 10 ply rating: 4520 kg @400 kPa (9960 lbs @58 psi) 12 ply rating: 4995 kg @475 kPA (11010 lbs @69 psi)
16 ply rating: 6000 kg @650 kPa (13230 lbs @94 psi)
TG: Tractor-Grade tire - Not for highway service.

NOTES: Figures in parentheses denote ply rating for which load and inflation pressure are maximum.
Consult your Yokohama service representative for data concerning front end loaders or shovels used in load and carry service.

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

ETC Bias Ply Tires

10 KPH (5MPH) Maximum Speed Distance: Up to 76 meters (250 feet) one way

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES																	
	kPa psi	140 20	160 23	180 26	200 29	220 32	240 35	260 38	280 41	300 44	325 47	350 51	375 54	400 58	425 62	450 65	475 69	500 73
33 × 12.5-15	kg lbs			1510 3330	1605 3540	1695 3735	**1785 (6) 3935 (6)**											
12.5/70-16	kg lbs	1145 2525	1240 2735	1330 2930	**1410 (6) 3110 (6)**	1495 3295	1570 3460	**1645 (8) 3625 (8)**										
**10-16.5	kg lbs			1140 2515	1215 2680	**1285 (4) 2830 (4)**	1350 2975	1415 3120	1475 3250	1540 3395	**1610 (6) 3550 (6)**	1685 3715	1750 3860	**1820 (8) 4010 (8)**				
**10-18	kg lbs			1450 3195	1540 3395	1630 3595	1715 3780	1795 3995	1875 4135	**1955 (6) 4310 (6)**	2045 4510	2140 4175	2225 4905	2310 5090	2395 5280	2475 5455	2550 5630	**2635 (10) 5810 (10)**
15.5/70-18	kg lbs	1885 4160	2040 4500	2185 4820	2325 5125	**2455 (8) 5410 (8)**												
15.5/60-18	kg lbs	1670 3680	1805 3980	1935 4265	2060 4540	**2195 (8) 4840 (8)**	2290 5050	**2400 (10) 5290 (19)**										
**13.5-20	kg lbs			2300 5070	2445 5390	2585 5700	2720 5995	2850 6285	2980 6570	3100 6835	3250 7165	**3395 (10) 8485 (10)**	3535 7795	3670 8090	3800 8380	3930 6665	4055 3940	**4180 (14) 9215 (14)**
17.5/65-20	kg lbs	2320 5135	2520 5555	2700 5950	2875 6340	3040 6700	**3195 (10) 7045 (10)**											
42 × 17-20	kg lbs			**2740 (6) 6040 (6)**	2915 6425	3080 6790	3240 7140	3395 7485	3545 7815	**3690 (10) 8135 (10)**								
**16.9-24	kg lbs	2520 5550	2725 6005	2920 6435	3105 6845	3280 7230	**3455 (10) 7615 (10)**	3620 7980	**3780 (12) 8335 (12)**									
**18.4-24	kg lbs	3025 6670	3270 7210	3505 7725	3725 8210	**3940 (10) 8685 (10)**												

**On front tires for front end loaders

NOTES: Figures in parentheses denote ply rating for which load and inflation pressure are maximum.
Consult your Yokohama service representative for data concerning front end loaders or shovels used in load and carry service.
It is permissible to increase inflation pressure up to 15 psi above that shown in table with no increase of load.
For tire load limits at various speeds.

Max. Speed	% Load Change From Above 5 MPH Table
Stationary	+60%
Creep	+30%
4 km/h (2 1/2 mph)	+15%
10 km/h (5 mph)	No Change
15 km/h (10 mph)	-13%
25 km/h (15 mph)	-20%

Off-The-Road Tractor and Grader Service (for Motor Graders) Code No. G-1, G-2 and G-3

Narrow Base Bias Ply Tires

40KPH (25 MPH) Maximum Speed Distance: Unlimited

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES										
	kPa psi	125 18	150 22	175 25	200 29	225 33	250 36	275 40	300 44	325 47	350 51
12.00-24TG	kg lbs	1450 3200	1600 3520	1750 3860	**1900 (8) 4180 (8)**						
⑥ 13.00-24TG	kg lbs	1700 3740	1900 4180	**2060 (8) 4540 (8)**	2240 4940	**2360 (10) 5200 (10)**	2500 5523	2650 5840	**2725 (12) 6000 (12)**		
⑦ 14.00-24TG	kg lbs	2060 4540	2300 5080	2500 5520	2650 5840	**2800 (10) 6150 (10)**	**3075 (12) 6800 (12)**	3250 7150	3450 7600	3550 7850	**3650 (16) 8050 (16)**
16.00-24TG	kg lbs	2650 5840	3000 6600	3250 7150	3450 7600	**3650 (12) 8050 (12)**	4000 8800	4250 9350	**4500 (16) 9900 (16)**		
18.00-25	kg lbs	3150 6950	3550 7850	3875 8550	**4125 (12) 9100 (12)**	4500 9900	**5000 (16) 11000 (16)**				

⑥ 16 ply rating 3055 kg @350 kPa (6745 lbs @51 psi) ⑦ 20 ply rating 4230 kg @450 kPa (9320 lbs @65 psi)

TG: Tractor-Grader tires - Not for highway service.

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES												
	kPa psi	140 20	160 23	180 26	200 29	220 32	240 35	260 38	280 41	300 44	325 47	350 51	375 54
10.00-20	kg lbs	1080 2380	1170 2580	1255 2765	1335 2945	1410 3110	**1485 (8) 3275 (8)**	1555 3430	1625 3580	1690 3725	**1770 (10) 3900 (10)**	1850 4080	**1925 (12) 4245 (12)**
11.00-20	kg lbs	1175 2590	1275 2810	1365 3010	1450 3195	1535 3385	1615 3560	1690 3725	1765 3890	1840 4055	**1925 (10) 4245 (10)**	2010 4430	**2095 (12) 4620 (12)**

Note: Figures in parentheses denote ply rating for which bold face loads and inflations are maximum.

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

Load & Inflation Pressure Tables: Bias

Wide Base Bias Ply Tires

40 KPH (25 MPH) Maximum Speed

Distance: Unlimited

TIRE SIZE DESIGNATION	TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES										
	kPa psi	125 18	150 22	175 25	200 29	225 33	250 36	275 40	300 44	325 47	350 51
**15.5-25	kg lbs	1750 3860	**1950 (8)** **4300 (8)**	**2180 (10)** **4800 (10)**	2360 5200	2500 5520	**2650 (12)** **5840 (12)**				
**17.5-25	kg lbs	2120 4680	2360 5200	2575 5680	**2900 (12)** **6400 (12)**	**3000 (14)** **6600 (14)**	3150 6950	**3350 (16)** **7400 (16)**	3550 7850	**3650 (20)** **8050 (20)**	
**20.5-25	kg lbs	2800 6150	3150 6950	**3550 (12)** **7850 (12)**	3750 8250	**4000 (16)** **8800 (16)**	4250 9350	**4500 (16)** **9900 (20)**			
**23.5-25	kg lbs	3650 8050	**4000 (12)** **8800 (12)**	4375 9650	**4750 (16)** **10500 (16)**	5150 11400	**5450 (20)** **12000 (20)**				

**For slope and ditching service, inflation pressure should be increased 15 psi with no increase in load rating.

NOTES: Figures in parentheses denote ply rating for which load and inflation pressure are maximum.
For maintenance work on established highways, inflation pressure may be increased 50% if desired with no increase in load.

Compactor Vehicle Service (for Tire Rollers) Code No. C-1

10 KPH (5 MPH) Maximum Speed

TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES			
INFLATION PRESSURE (kPa/psi)	7.50-15NHS	9.00-20NHS	11.00-20NHS
350 51	1700 3740	2900 6400	3550 7850
375 54	1750 3860	3000 6600	3750 8250
400 58	1850 (6) 4080 (6)	3150 6950	3875 8550
425 62	1900 4180	3250 7150	4000 8800
450 65	1950 4300	3350 7400	4125 9100
475 69	2060 4540	3450 7600	4250 9350
500 73	2120 4680	3550 7850	4375 9650
525 76	2180 4800	**3650 (10)** **8050 (10)**	4500 9900
550 80	2240 4940	3750 8250	**4750 (12)** **10500 (12)**
575 83	2300 5080	3875 8550	4750 10500
600 87	2300 5080	4000 8800	4875 10700
625 91	**2360 (10)** **5200 (10)**	**4000 (12)** **8800 (12)**	5000 11000
650 94	2430 5360	4125 9100	**5150 (14)** **11400 (14)**
675 98	2500 5520	4250 9350	5300 11700
700 102	2575 5680	4375 9650	5300 11700
725 105	2575 5680	**4375 (14)** **9650 (14)**	**5450 (16)** **12000 (16)**
750 109	**2650 (12)** **5840 (12)**	4500 9900	5600 12300
775 112	2725 6000	4625 10200	5600 12300
800 116	2725 6000	4750 10500	5800 12800
825 120	2800 6150	**4750 (16)** **10500 (16)**	**5800 (18)** **12800 (18)**
850 123	2900 6400		6000 13200
875 127	**2900 (14)** **6400 (14)**		6150 13600
900 131			6150 13600
925 134			**6300 (20)** **13900 (20)**

TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES			
INFLATION PRESSURE (kPa/psi)	7.50-15NHS	9.00-20NHS	11.00-20NHS
950 138			6300 13900
975 141			6500 14300
1000 145			6500 (22) 14300 (22)

TIRE LOAD LIMITS AT VARIOUS COLD INFLATION PRESSURES				
INFLATION PRESSURE (kPa/psi)	750-16	825-20	14/70-20	15.0-20
350 51	1750 3860	2410 5310	3460 7630	
375 54	1820 4010	2510 5530	3600 7935	
400 58	**1890 (6)** **4170 (6)**	2605 5740	3740 8245	3325 7330
425 62		2700 5950	3875 8540	
450 65		2790 6150	**4005 (12)** **8830 (12)**	3565 7860
475 69		2880 6350		
500 73		2970 6550		3790 8355
525 76		3055 6735		
550 80		3140 6920		4010 8840
575 83		**3225 (10)** **7110 (10)**		
600 87		3305 7290		4215 9290
625 91		3385 7460		
650 94		3460 7630		4420 9745
675 98		3540 7805		
700 102		**3615 (12)** **7970 (12)**		**4615 (16)** **10175 (16)**
725 105		3690 8135		
750 109		3765 8300		
775 112		3840 (14) 8465 (14)		

NOTES: Figures in parentheses denote ply rating for which load and inflation pressure are maximum.

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

Load capacities at various speeds for Industrial Vehicles

TIRE SIZE	FOR OFF-THE-ROAD USE									FOR SMOOTH FLOORS & RUNWAYS USE							
	PLY RATING	I.P. (kPa)	0 KPH (kg)	1 KPH (kg)	5 KPH (kg)	10 KPH (kg)	15 KPH (kg)	20 KPH (kg)	25 KPH (kg)	I.P. (kPa)	0 KPH (kg)	1 KPH (kg)	5 KPH (kg)	10 KPH (kg)	15 KPH (kg)	20 KPH (kg)	25 KPH (kg)
12.00-24/25	16	675	9,850	8,000	6,950	6,150	5,700	5,400	5,250	810	11,100	9,850	8,900	8,300	8,000	7,800	7,700
	20	825	11,000	8,950	7,800	6,900	6,400	6,050	5,850	990	12,400	11,000	10,000	9,300	8,950	8,750	8,650
13.00-24/25	12	450	8,950	7,300	6,350	5,600	5,200	4,950	4,750	540	10,100	8,950	8,100	7,550	7,300	7,100	7,000
14.00-24/25	12	425	10,100	8,200	7,100	6,300	5,850	5,550	5,350	510	11,300	10,100	9,150	8,500	8,200	8,000	7,900
	20	700	13,600	11,100	9,600	8,500	7,900	7,500	7,250	840	15,300	13,600	12,300	11,500	11,100	10,800	10,600
	24	650	15,200	12,400	10,700	9,500	8,850	8,350	8,100	1,000	17,100	15,200	13,800	12,800	12,400	12,100	11,900
	28	925	16,000	13,000	11,300	10,000	9,300	8,800	8,500	1,000	18,000	16,000	14,500	13,500	13,000	12,700	12,500
16.00-24/25	16	425	13,200	10,700	9,300	8,250	7,650	7,250	7,000	510	14,900	13,200	12,000	11,100	10,700	10,500	10,300
	20	550	15,600	12,700	11,000	9,750	9,050	8,600	8,300	660	17,600	15,600	14,100	13,200	12,700	12,400	12,200
	24	650	17,000	13,800	12,000	10,600	9,850	9,350	9,000	780	19,100	17,000	15,400	14,300	13,800	13,500	13,300
	28	750	18,400	15,000	13,000	11,500	10,700	10,100	9,800	900	20,700	18,400	16,700	15,500	15,000	14,600	14,400
	32	875	20,000	16,300	14,100	12,500	11,600	11,000	110,600	1,000	22,500	20,000	18,100	16,900	16,300	15,900	15,600
	36	975	21,800	17,700	15,400	13,600	12,600	12,000	11,600	1,000	24,500	21,800	19,700	18,400	17,700	17,300	17,000
18.00-24/25	12	275	13,200	10,700	9,300	8,250	7,650	7,250	7,000	330	14,900	13,200	12,000	11,100	10,700	10,500	10,300
	16	375	16,000	13,000	11,300	10,000	9,300	8,800	8,500	450	18,000	16,000	14,500	13,500	13,000	12,700	12,500
	20	475	18,400	15,000	13,000	11,500	10,700	10,100	9,800	570	20,700	18,400	16,700	15,500	15,000	14,600	14,400
	24	550	20,000	16,300	14,100	12,500	11,600	11,000	10,600	660	22,500	20,000	18,100	16,900	16,300	15,900	15,600
	28	650	21,800	17,700	15,400	13,600	12,600	12,000	11,600	780	24,500	21,800	19,700	18,400	17,700	17,300	17,000
	32	750	24,000	19,500	17,000	15,000	14,000	13,200	12,800	900	27,000	24,000	21,800	20,300	19,500	19,100	18,800
	36	850	25,600	20,800	18,100	16,000	14,900	14,100	13,600	1,000	28,800	25,600	23,200	21,600	20,800	20,300	20,000
	40	950	27,200	22,100	19,200	17,000	15,800	15,000	14,500	1,000	30,600	27,200	24,700	23,000	22,100	21,600	21,300
18.00-33	36	850	29,600	24,100	20,900	18,500	17,200	16,300	15,700	1,000	33,300	29,600	26,800	25,000	24,100	23,500	23,100
21.00-25	24	500	24,000	19,500	17,000	15,000	14,000	13,200	12,800	600	27,000	24,000	21,800	20,300	19,500	19,100	18,800
	28	575	26,400	21,500	18,600	16,500	15,300	14,500	14,000	690	29,700	26,400	23,900	22,300	21,500	21,000	20,600
	32	650	28,000	22,800	19,800	17,500	16,300	15,400	14,900	780	31,500	28,000	25,400	23,600	22,800	22,200	21,900
	36	750	30,400	24,700	21,500	19,000	17,700	16,700	16,200	900	34,200	30,400	27,600	25,700	24,700	24,100	23,800
	40	825	33,000	26,800	23,300	20,600	19,200	18,100	17,500	990	37,100	33,000	29,900	27,800	26,800	26,200	25,800
21.00-35	28	575	31,200	25,400	22,000	19,500	18,100	17,200	16,600	690	35,100	31,200	28,300	26,300	25,400	24,800	24,400
	32	650	33,900	27,600	24,000	21,200	19,700	18,700	18,000	780	38,200	33,900	30,700	28,600	27,600	26,900	26,500
	36	750	36,800	29,900	26,000	23,000	21,400	20,200	19,600	900	41,400	36,800	33,400	31,100	29,900	29,200	28,800
	40	825	38,900	31,600	27,500	24,300	22,600	21,400	20,700	990	43,700	38,900	35,200	32,800	31,600	30,900	30,400
24.00-29	24	425	30,400	24,700	21,500	19,000	17,700	16,700	16,200	510	34,200	30,400	27,600	25,700	24,700	24,100	23,800
	30	525	34,900	28,300	24,600	21,800	20,300	19,200	18,500	630	39,200	34,900	31,600	29,400	28,300	27,700	27,300
	36	650	38,900	31,600	27,500	24,300	22,600	21,400	20,700	780	43,700	38,900	35,200	32,800	31,600	30,900	30,400
	42	750	42,400	34,500	29,900	26,500	24,600	23,300	22,500	900	47,700	42,400	38,400	36,800	34,500	33,700	33,100
24.00-35	36	650	42,400	34,500	29,900	26,500	24,600	23,300	22,500	780	47,700	42,400	38,400	36,800	34,500	33,700	33,100
	42	750	46,400	37,700	32,800	29,000	27,000	25,500	24,700	900	52,200	46,400	42,100	39,200	37,700	36,800	36,300
	48	850	50,400	41,000	35,600	31,500	29,300	27,700	26,800	1,000	56,700	50,400	45,700	42,500	41,700	40,000	39,400
24.00-49	36	650	52,000	42,300	36,700	32,500	30,200	28,600	27,600	780	58,500	52,000	47,100	43,900	42,300	41,300	40,600
	42	750	55,200	44,900	39,000	34,500	32,100	31,200	29,300	900	62,100	55,200	50,000	46,600	44,900	43,800	43,100
27.00-49	36	575	58,400	47,500	41,200	36,500	33,900	323,100	31,000	690	65,700	58,400	52,900	49,300	47,500	46,400	45,600
	42	675	64,000	52,000	45,200	40,000	37,200	35,200	34,000	810	72,000	64,000	58,000	54,000	52,000	50,800	50,000
	48	775	70,000	56,900	49,400	43,800	40,700	38,500	37,200	930	78,800	70,000	63,500	59,100	56,900	55,600	54,700
23.5-25	36	675	24,800	20,200	17,500	15,500	14,400	13,600	13,200	810	27,900	24,800	22,500	20,900	20,200	19,700	19,400
29.5-29	40	625	37,800	30,700	26,700	23,600	21,900	20,800	20,100	750	42,500	37,800	34,200	31,900	30,700	30,000	29,500
37.5-39	60	750	72,000	58,500	50,900	45,000	41,900	39,600	38,300	900	81,000	72,000	65,300	60,800	58,500	57,200	56,300
36.00-51	58	675	113,600	92,300	80,250	71,000	66,050	62,500	60,350	810	127,800	113,600	103,000	95,850	92,300	90,200	88,750
40.00-57	68	725	148,000	120,300	104,500	92,500	86,000	81,400	78,600	870	166,500	148,000	134,100	124,900	120,300		115,600

NOTES: Industrial Vehicle: Consists of usage on vehicles such as counterbalanced lift trucks, container handlers, straddle carriers, aircraft tow tractors, mobile crushers, log stackers and rough terrain trucks.
Check maximum air pressure requirements of rims and wheels to ensure ability to accommodate correct air pressure of tire.
For steer wheel roads on lift trucks, multiply the above load by 0.8.

PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

Combination Tables

Off-The-Road Tire, Tube, Flap and O-Ring Combination Table

TIRE SIZE	TUBE SIZE	VALVE SIZE		FLAP SIZE	O-RING SIZE
		TUBE VALVE	RIM VALVE		
33 × 12.5-15	33 x 12.5-15	JS 75	—	—	—
12.5/70-16		—	TR 575, TR 415	—	—
10-16.5	10-16.5	TR 15	TR 575	—	—
15.5/60-18	—		TR 618A	—	—
15.5/70-18	—	—	TR 618A	—	—
42 × 17-20	42 x 17-20	TR 179A	—	42 x 17-20	
13.5-20	13.5-20	TR 78A	—	13.5-20	
15.0-20	15.0-20	TJ 179W	—	15.0-20	—
17.5/65-20	17.5/65-20	TR 218A	TR 618A	—	—
16.9-24	16.9-24	TR 218A	TR 618A	—	—
18.4-24	18.4-24	TR 218A	TR 618A	—	—
15.5-25	15.5-25	JSJ 1175B, JSJ 1175	TRJ 650, TRJ 670, TRJ 690	15.5/17.5-25	OR 25T
17.5-25	17.5-25	JSJ 1175B, JSJ1175	TRJ 650, TRJ 670, TRJ 690	15.5/17.5-25	OR 25T
20.5-25	20.5-25	JSJ 1175B, JSJ 1175	TRJ 650, TRJ 670, TRJ 690	20.5-25	OR 325T/OR 25T
23.5-25	23.5-25	JSJ 1175B, JSJ 1175	TRJ 650, TRJ 670, TRJ 690	23.5-25	OR 325T
17.5R25	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 25T
20.5R25	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 325T/OR 25T
23.5R25	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 325T
26.5-25	26.5-25	JSJ 1175	TRJ 650, TRJ 670, TRJ 690	26.5-25	OR 325T
29.5-25	—		TRJ 650, TRJ 670, TRJ 690	—	OR 325T
29.5-29	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 329T
29.5-35	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 335T
33.25-35	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 335T
3.5-33	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 333T
37.25-35	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 335T
37.5-33	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 333T
37.5-39	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 339T
35/65-33	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 333T
40/65-39	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 339T
45/65-45	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 345T
385/95R25	—	—	TR 618A	—	OR 25T
445/95R25	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 325T
505/95R25	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 325T

PSI × 0.0703 = kg/cm^2 POUND × 0.4536 = kg PSI × 6.895 = kPa

Off-The-Road Tire, Tube, Flap and O-Ring Combination Table

TIRE SIZE	TUBE SIZE	VALVE SIZE		FLAP SIZE	O-RING SIZE
		TUBE VALVE	RIM VALVE		
7.50-15	7.00/7.50-15	TR 75A	—	7.00/7.50-15	—
8.25-20	8.25-20	TR 77A, TR 175A	—	8.25/9.00-20	—
9.00-20	9.00-20	TR 175A. TR 76A	—	8.25/9.00-20	—
10.00-20	10.00-20	TR 78A, TR 76A	—	10.00/11.1-20	—
12.00-20	12.00-20	TR 78A, TR 76A	—	11.00/12.00-20	—
12.00-24	11.00/12.00-24	TR 78A, TR 77A	—	10.00/11.00/12.00-24	—
13.00-24	13.00-24/25	TR 77A, JS 179A	TR 618A	13.00/14.00-24/25	OR 224TG
14.00-24	14.00-24/25	TR 77A, TR 175A, TR 179A	TR 618A	13.00/14.00-24/25	OR 224TG
14.00R24	14.00R24/25	JS 179	TR 618A	13.00/14.00-24/25	OR 224TG
14.00-25	14.00-24/25	TR 77A, TR 175A, TR 179A	TR 618A	13.00/14.00-24/25	OR 25T
16.00-24	16.00-24/25	JSJ 1175B, JSJ 1175	TRJ 650, TRJ 670, TRJ 690	16.00-24/25	OR 24TG
16.00-25	16.00-24/25	JSJ 1175B, JSJ 1175	TRJ 650, TRJ 670, TRJ 690	16.00-24/25	OR 325T
1600R25			TRJ 650, TRJ 670, TRJ 690	—	OR 325T
18.00-25	18.00-25	JSJ 1175B, JSJ 1175C	TRJ 650, TRJ 670, TRJ 690	18.00-24/25	OR 325T
18.00-33	—		TRJ 650, TRJ 670, TRJ 690	—	OR 333T
21.00-25	21.00-25	JSJ 1175	TRJ 650, TRJ 670, TRJ 690	21.00-24/25	OR 325T
24.00-25	24.00-25	JSJ 1175	TRJ 650, TRJ 670, TRJ 690	20.5/24.00-25	OR 325T
24.00-35	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 335T
24.00-49	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 349T
27.00-49	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 349T
30.00-51	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 451T
33.00-51	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 451T
36.00-51	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 451T
40.00-57	—	—	TRJ 650, TRJ 670, TRJ 690	—	OR 457T

The valve sizes for tubes and rims shown in tables (pp. 56-57) correspond with the conventional standards of TRA, JATMA, etc.

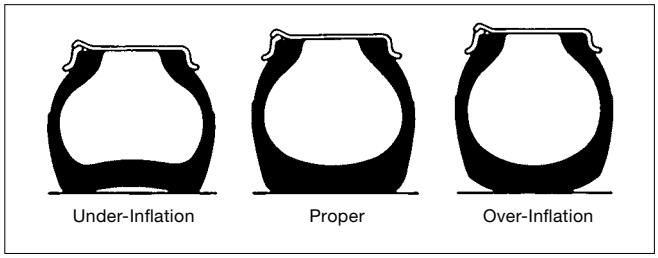
PSI × 0.0703 = kg/cm^2 POUND × 0.4536 = kg PSI × 6.895 = kPa

3. TIRE MAINTENANCE

Off-The-road tires are very expensive, therefore it is very important to use them under proper conditions. It cannot be overemphasized to have a good maintenance program for obtaining the best tire performance.

INFLATION PRESSURE

Proper inflation pressure is essential to get the best performance from tires. Optimum traction, flotation, and load endurance can only be obtained if the proper inflation pressure is maintained. Both over-inflation and under-inflation shorten tire life and can result in tire failures. Proper inflation pressure depends on the vehicle, ground conditions, load, speed, and other factors.



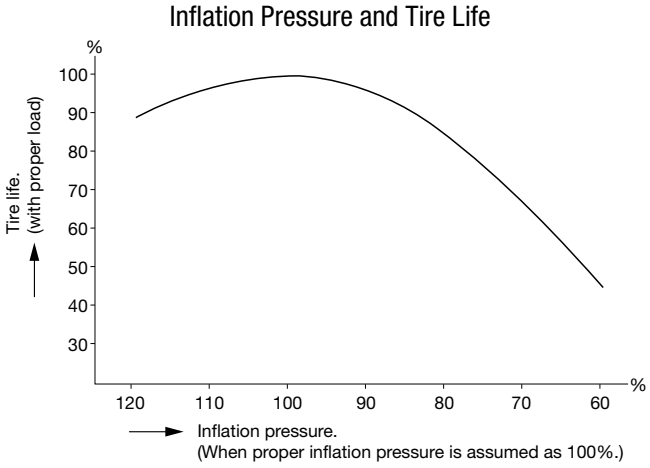
Results of Under-inflation

- ☞ Excessive deflection develops, generating heat and leading to early tire failure.
- ☞ Tread and ply separation.
- ☞ Cord fatigue is accelerated, leading to broken cord.
- ☞ Sidewalls become susceptible to rupture.
- ☞ Tread wear is uneven and radical cracks develop.
- ☞ Rim becomes displaced, creating air leaks in tubeless tires.
- ☞ Cracks at the inner liner.

Results of Over-inflation

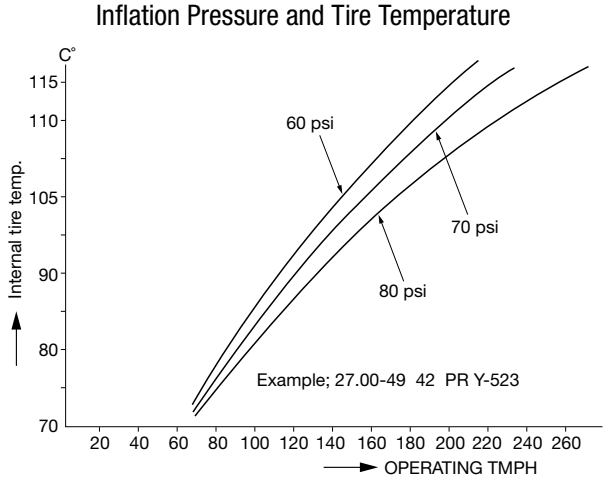
- ☞ Increased ground contact pressure at the center of the tread, causing excessive wear there.
- ☞ Reduced protection of the cord against shocks from uneven road surfaces, resulting in vulnerability to rupture from cuts or shock.
- ☞ Excessive pressure is exerted on the beads, increasing the potential for beads to burst.
- ☞ Riding comfort deteriorates and tendency to slip develops.

Inflation pressure and tire life have the following general relationship:



Caution:

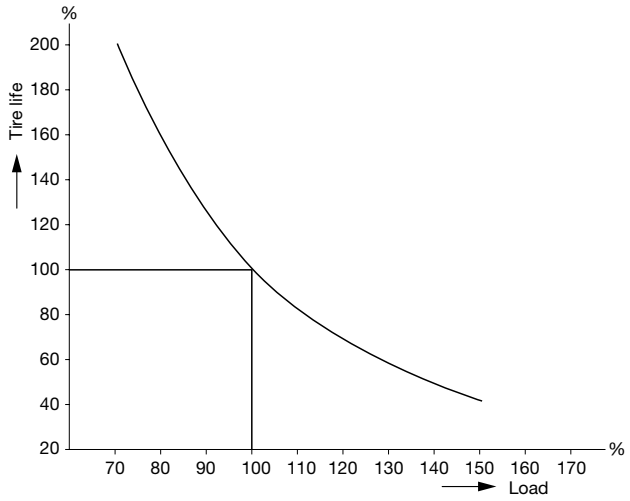
- ☞ In the course of operation air pressure rises inside tires in correlation with heat build up. This is a normal occurrence. The rise in pressure differs among tires, and should be kept in mind especially for tires used in continuous operation. If heat generated in operation results in a rise of 25% or more in inflation pressure, the cold inflation pressure should be rechecked. If the cold inflation pressure shows to be correct, either traveling speed and/or load must be reduced. Otherwise, overheating may cause separation in the tire.
- ☞ Tires should not be bled to compensate for the increase in pressure resulting from operation. Reducing inflation pressure can cause the internal temperature to rise, leading to tire failure.
- ☞ A pressure gauge used for checking inflation pressure should be checked and calibrated if necessary, periodically.
- ☞ Valves should always be capped. This keeps mud and dust out of the valve core and protects the air seal.



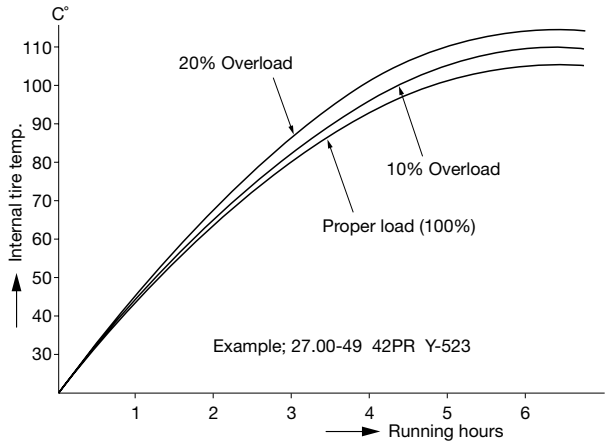
LOAD

Overloading shortens tire life and increases the chance of early tire failure. For the best tire performance, the maximum recommended load should not be exceeded. If the load exceeds the specified capacity of the tire, a tire with a higher ply rating should be used.

Load and Tire Life



Load and Tire Temperature



Results of Overloading

- ☞ Excessive heat generation causes separation.
- ☞ Excessive tire deflection causes broken cords.
- ☞ Rapid wear due to excessive tread movement against road surface.
- ☞ Bead failure due to excessive bead movement.
- ☞ Risk of bursting due to increased cord tension.

SPEED

Excessive traveling speeds produce abnormally high internal temperatures in tires. A vehicle has two speed limitations: the actual maximum speed that the vehicle can attain and the average operating speed that the vehicle can sustaion. The average sustainable operating speed is limited by the tires' ton-mile-per-hour (TMPH) rating (refer to page 66).

Speed and Load Relation (according to TRA)

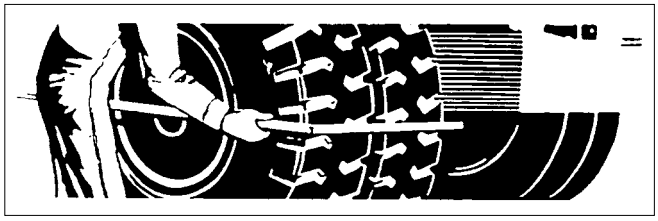
The load capacity of a tire is influenced by the maximum speed of the vehicle as follows:

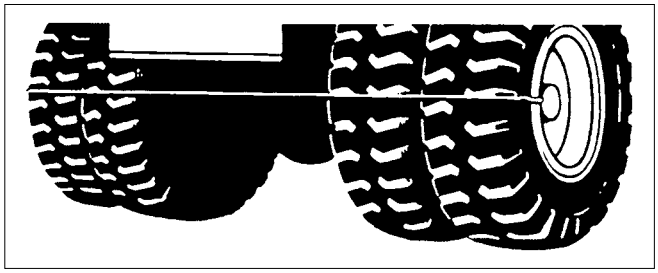
VEHICLE	MAXIMUM SPEED	VARIATION IN LOAD CAPACITY	
		Bias tire	Radial tire
Loaders and Dozers	Stationary	160%	160%
	Creep	130%	130%
	2 1/2 mph (4 km/h)	115%	115%
	5 mph (10 km/h)	100%	100%
	10 mph (15 km/h)	87%	87%
	15 mph (25 km/h)	80%	80%

VEHICLE	MAXIMUM SPEED	VARIATION IN LOAD CAPACITY	
		Bias tire	Radial tire
Dump Trucks and Scrapers	30 mph (50 km/h)	100%	100%
	40 mph (65 km/h)	Narrow Base 85%	Narrow Base 88%
		Wide Base 83%	Wide Base 88%

PROPER MATCHING OF DUAL TIRES

It is essential that dual tires have the same overall diameter. Otherwise, the one with the larger diameter will carry most of the load and will be prone to damage and wear. If the difference in outer diameters is extremely large, the smaller tire slips and scrapes along the ground, causing the center of the tread to wear quickly. Naturally, the larger tire will be prone to excessive heart generation from overloading. The allowable difference in dual-tire pair diameters is shown in the table to the right.





In no case should a difference in diameters be corrected by adjusting inflation pressure.

SECTION WIDTH	MAXIMUM DIFFERENCE (BIAS TIRE)	
	DIAMETER (m/m)	CIRCUMFERENCE (m/m)
~ 8.25	8	25
9.00 ~ 14.00	12	38
16.00 ~ 18.00	22	69
21.00 ~	24	75

SECTION WIDTH	MAXIMUM DIFFERENCE (RADIAL TIRE)	
	DIAMETER (m/m)	CIRCUMFERENCE (m/m)
~ 8.25	6	19
9.00 ~ 14.00	8	25
16.00 ~ 18.00	15	47
21.00 ~	19	60

Diameter Measuring Methods

- ☞ Use a 1-inch x 2-inch wooden stud.
- ☞ Use a rubber cord across the dual tires.
- ☞ Use a steel tape to measure the circumference of each tire.

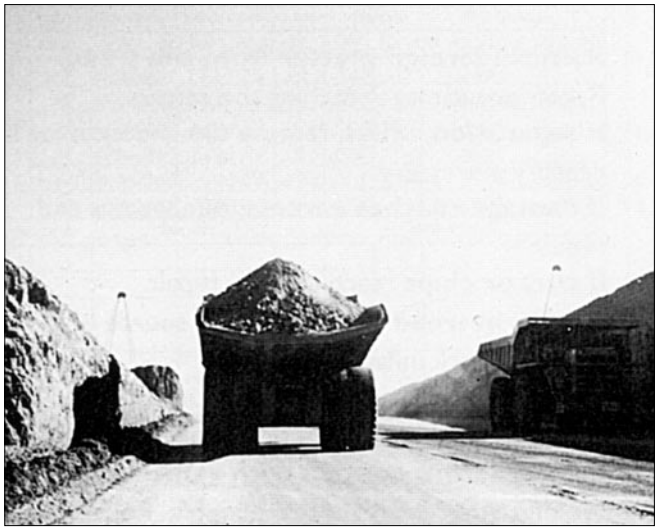
For Example:

When the overall diameters of dual tires differ from each other, load distribution is uneven.
The tire with the larger diameter has to bear a higher load than the tire with the smaller diameter. For dual tires with differences in diameter of 20 mm, 40 mm and 60 mm with actual load on each tire at 100% (TRA SPEED 30 MPH (50 KPH)) is as follows:

TIRE SIZE \ DIFFERENCE OF OVERALL DIAMETER		20 mm	40 mm	60 mm
21.00-35 36PR	Large	14.4 tons	15.7 tons	17.0 tons
	Small	11.7	10.4	9.1
24.00-35 42PR	Large	17.5	18.9	20.3
	Small	14.6	13.2	11.8
24.00-49 42PR	Large	20.9	22.6	24.2
	Small	17.6	15.9	14.3

RORD SURFACE MAINTENANCE

The Maintenance of road surfaces is one of the most important factors in determining the life of a tire. Bumps, check holes, rocks and so on cut and wear tires. Even bursting can result. Of particular importance is the maintenance of loading and dumping areas because the chances of damage at these places are great. Road and ground conditions there have a large effect on the productivity of the vehicles.



Good Condition

Poor Condition

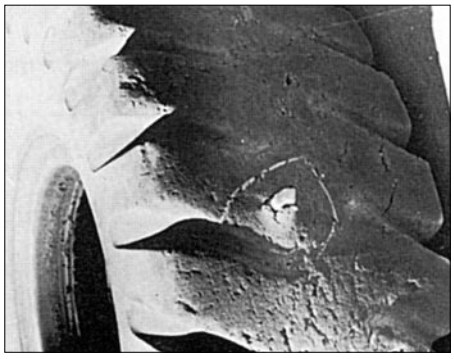
TIRE PROBLEMS AND MAJOR CAUSES

Any aberrations causing tire problems should be prompt repaired. The following is a list of tire problems and causes:

TIRE PROBLEMS	OVERLOAD	HIGH SPEED TRAVEL	SLIPPAGE	OVER INFLATION	UNDER INFLATION	EXCESS BRAKING	POOR ROAD CONDITION	POOR VEHICLE MAINTENANCE	POOR RIM
1. Tread cuts and snags	○	○	○	○	○		○		
2. Uneven, rapid tread wear	○	○	○	○	○	○	○	○	
3. Cracked and broken tread	○		○	○		○	○	○	
4. Sidewall cuts and snags	○				○		○		
5. Tread separation	○	○			○				
6. Ply separation	○	○			○				
7. Bead failure	○		○	○	○	○		○	○
8. Inner liner failure	○	○			○				○
9. Impact breaks	○	○		○			○		

Impact Break

Tread Separation



Tread Cuts (Rock Penetration)

INSTRUCTIONS FOR OPERATIONS

Even if tires and roads are properly maintained, tire life can be seriously shortened by improper use. The following are musts for maximum efficiency.

General:

☞ Avoid abrupt starts and stops.
☞ Do not operate on road shoulders.
☞ Reduce speed on turns.
☞ Do not turn wheels while stationary.
☞ Do not spin tires.
☞ Maintain proper inflation pressure.
☞ Remove any objects, such as rocks which get stuck in the tread or between dual tires.
☞ Check tires, rims and valves regularly for any abnormalities.
☞ Repair any damaged tires immediately.
☞ Avoid rocks at loading and dumping areas.
☞ Avoid running over oil or grease spills.

Loader Operating:

☞ Keep loading areas clear of rocks and other obstacles.
☞ Avoid spilling load around the tires.
☞ Avoid over-loading.
☞ Load to the center of the dump truck's decks.

Motor Scraper Operating:

☞ Prevent tires from slipping when loading.
☞ Avoid cornering when the pusher is in operation.

Operating under ambient temperatures below -40˚C:

☞ Consult Yokohama Rubber Co., Ltd.

TIRE APPEARANCE CHECKUP

In order to prevent tire troubles, it is helpful to make routine visual checkups of the tire, rim, valve, inflation pressure, etc. Make inspections for the following and carry out any procedure recommended.

Tire Tread:

☞ Remove foreign matter from the tread.
Repair any damage reaching the carcass.
☞ If separation exists, remove tire and examine if repair is necessary.
☞ If damage reached carcass, remove tire and repair.
☞ If cuts or chips reach carcass, repair.
☞ Cracks in tread groove may be source of air leakage; check inflation pressure.
☞ Uneven wear may be caused by improper inflation pressure. Rotate tires if necessary.
☞ Damage from contact with vehicle should be avoided. Alter body parts if possible. Repair any tire damage if necessary.
☞ Oil or grease on tire should be washed off.

Shoulder and sidewall:

☞ Repair any cuts reaching the carcass.
☞ Identify cause of cracks e.g. from under-inflation, overloading, ozone or cut growth and repair if necessary.
☞ Wash off oil or grease spots.

Valve:

☞ Replace valve or valve parts if leakage exists from valve core, deflection of stem or extension.
☞ Ensure valve cap is in position.

Dual Tires:

☞ Remove any foreign object stuck between duals.
☞ Repair stone ejector if bent or out of position.

Inflation Pressure:

☞ Adjust if not proper.
☞ Detect location and repair if leakage exists.

Rim:

☞ Replace if deformation or cracks exist.

INSPECTION SHEETS AND TIRE CARDS

The following are examples of inspection sheets and tire cards which can be used to maintain off-the-road tires in good condition.

DATE: 1995/JAN/15 RUNNING TYRE CHECK SHEET PAGE: 1
USER: ABC MINING CO.LTD.

Ps	TYRE NO	TYRE SERIAL	SPECIFICATION	R.G.DEPTH(IN/OUT/AVE)			TYRE CONDITION
VEHICLE NO: 45		TYRE SIZE: 30.00-51 46PR T/L					METER READING: 84,052 KM
1	27	AR7W3B117	Y523 E4	53.0	52.5	52.75	NONE
2	28	AR6W3B113	Y523 E4	54.5	54.0	54.25	ROCK CUT
3	29	AR5W3B100	Y523 E4	59.0	58.5	58.75	NONE
4	30	AR4W3B092	Y523 E4	57.0	57.5	57.25	NONE
5	31	MK7K2D027	Y523 E4	57.5	56.5	57.0	NONE (WITHOUT VALVE CAP)
6	32	HK8X2D050	Y523 E4	59.0	57.5	58.25	NONE
VEHICLE NO:		TYRE SIZE:					METER READING:
1							
2							
3							
4							
5							
6							
VEHICLE NO:		TYRE SIZE:					METER READING:
1							
2							
3							
4							
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VEHICLE NO:		TYRE SIZE:					METER READING:
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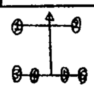


TYRE CARD TIRE NO. 2379

MAKE OF TYRE: YOKOHAMA SIZE & PLY: 40.00-57 76PR T/L
SERIAL NO: AD7KBZ392 PATTERN & SPEC: Y523 E-4

VEHICLE NO	POSITION	FITTED		EMOVED		RUNNING Km, Mile Hour	REASON FOR REMOVAL
		DATE	METER	DATE	METER		
252	1	'93/6/02	07253	'93/2/08	11706	4453	Rotation/Matching (Spare)
257	4	'93/3/07	09657	'94/1/26	14472	4815/9268	S/W Mech. Damage Repair
253	6	'94/4/25	17906	'94/5/31	18361	455/9723	Rim Crack
253	6	'94/6/1	18361	'94/9/02	19943	1582/11305	W/OUT (Scrap)

Entry Scrap on '94/9/02 11305 Code 6

DATE: 1995/JAN/15 SCRAP TYRE CHECK SHEET PAGE: 1/1

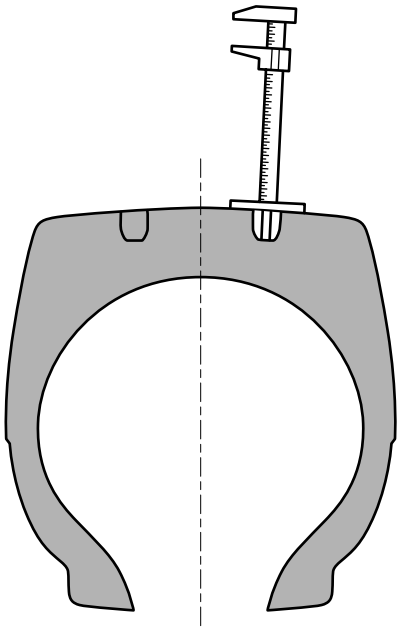
USER: AXX

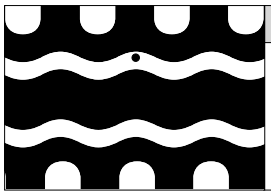
BRAND: YOKOHAMA TYRE SIZE: 40.00-57 76PR Y523 E-4 T/L

TYRE NO	SERIAL NO	ON	OFF	GROOVE DEPTH IN	OUT	AVE	LIFE (HS) Km MiLe	SCRAP REASON
1	XS8RTA686	'94/06/30	'94/12/03	46.0 MM	50.0 MM	48.0 MM	1938	S/W CUT
2	AV8MTA063	'94/3/15	'95/01/08	20.4	17.8	19.1	3566	TREAD IMPACT
3	XY6ATA966	'94/05/05	'94/12/15	58.2	61.4	59.8	2506	TREAD ROCK CUT
4	AS8RTA184	'94/07/04	'94/11/15	67.0	76.0	71.5	1860	S/W CUT
5	AVIMTA606	'94/4/20	'95/01/03	25.6	30.2	27.9	3184	S/W CUT
6	XS8RTA391	'93/12/05	'94/11/30	10.0	5.8	7.9	4676	W/OUT
7	AVOMTA575	'94/2/28	'94/12/30	21.6	19.6	20.6	3454	TREAD ROCK CUT
8								
9								

MEASURING TREAD WEAR

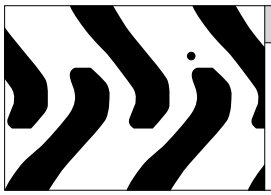
Tread wear can be determined by comparing the groove depth with that of a new tire. For a rib pattern, the depth should be measured at the groove specified by the manufacturer. For rock or traction patterns, measure the depth at the position which is one-fourth of the tread width from the shoulder. There is a special mark indicating this position in the grooves of YOKOHAMA tires.
The average figures obtained by measuring groove depth at the inside and outside of the tire should be used. A depth gauge is used to measure the depth of the grooves as shown below:





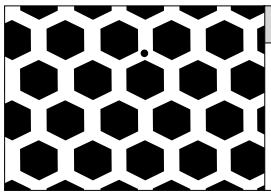
RIB

Y41 (E-1)



TRACTION

Y103 (E-2, L-2, G-2)
Y25 (G-2)

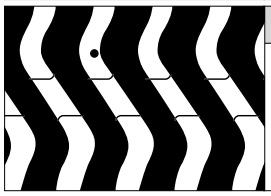


BLOCK

Y65 (E-7)

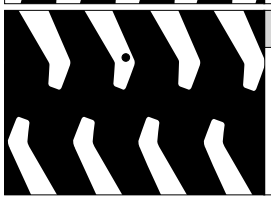
SMOOTH

Y69ET, Y69KET (L-4S)
Y69SET, Y69KSET (L-5S)



ROCK

Y67 (E-3, L-3, G-3)
Y522 (E-4, L-4)
Y529 (E-3)
Y67ET (L-4)
Y525 (L-5)

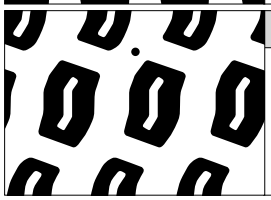


ROCK (FLUSH)

Y565 (E-3)
Y523/R/U (E-4)
Y530, Y535 (E-4)
Y526, Y575 (L-3)

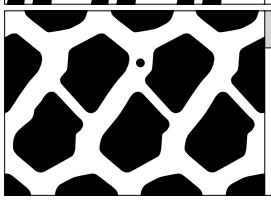
ROCK (FLUSH)

Y545 (L-4)
Y524/Z (L-5)



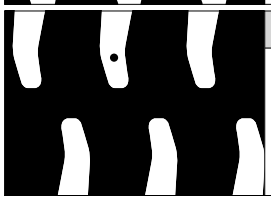
ROCK

RT31 (E-3, L-3)



ROCK

RB31 (E-3, L-3)



ROCK

RL31 (E-3, L-3)

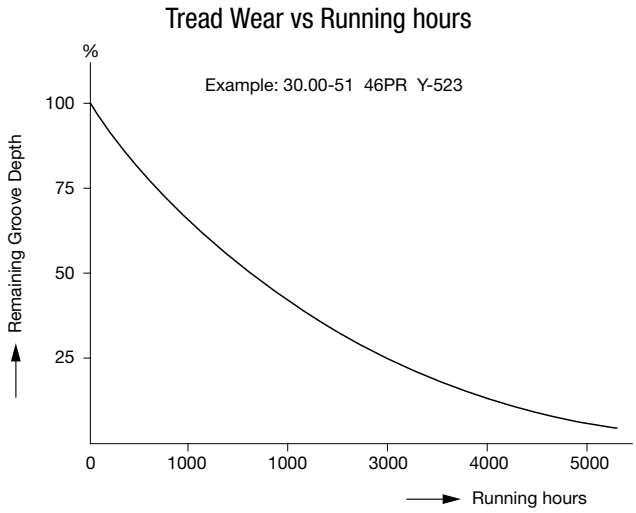
• Measuring poin

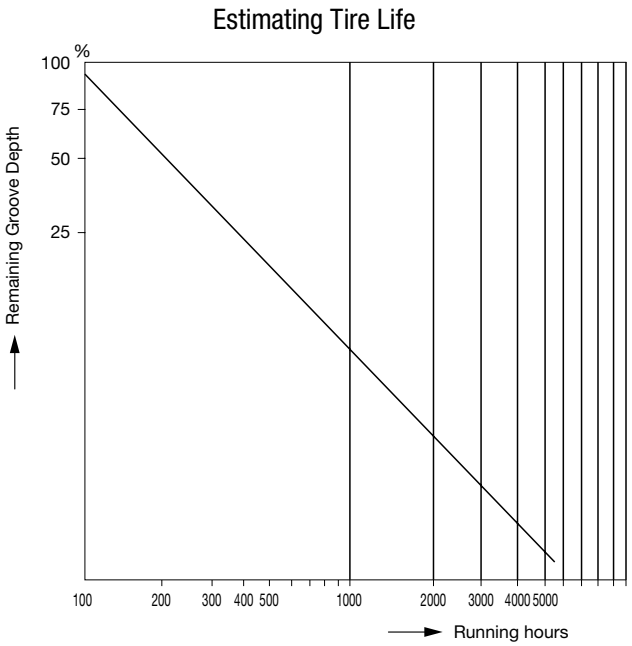
ESTIMATING TIRE LIFE

Tire life can be estimated by using two methods, first by 'wear graph' and second by 'usage parameters'.

Estimation by Wear Graph

The general relationship between tire wear and operating time (or distance) is formulated as y = axb, where y is the degree of wear, x is the number of running hours, and a and b are coefficients. If plotted, the general shape of the graph would be appeared as shown below.





Difficulty in choosing accurate coefficients leads to a simpler method of analyzing recorded data on tire wear and running hours, and then simple, straight-line extrapolation to obtain an estimate of the remaining tire life. While this method is not entirely accurate, it does provide an estimate.

Estimatinon by Usage Parameter

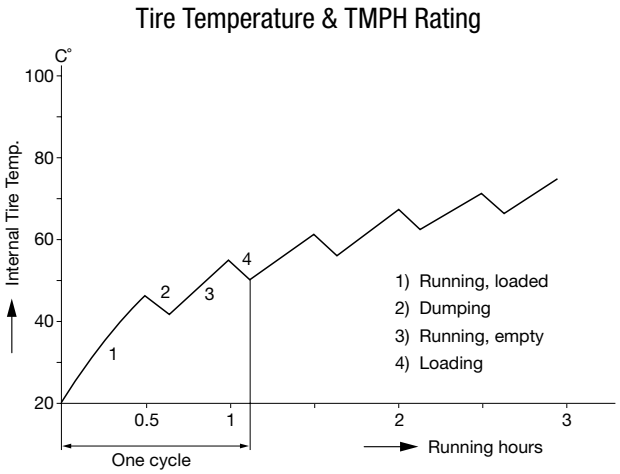
The life of a tire can be estimated by using the parameters of usage listed below where: Estimated life Expectancy = 2000 km/mm original groove depth (mm) × Value for Item A x Value for Item B ×...× Value for Item H.

Item	State of Application	Value
(A) Maximum Speed	10 miles per hour (15 kilometers per hour) 20 miles per hour (30 kilometers per hour) 30 miles per hour (50 kilometers per hour)	1.0 0.8 0.6
(B) Road Surface	Sand or soft soil without rock Soft soil with rock Gravel road in good condition Gravel road in poor condition Rough road with sharp-edged stones and rocks	1.0 0.9 0.9 0.7 0.6
(C) Position of Tire	Trailer wheel Front wheel Drive wheel (rear dump) (bottom dump) (motor scraper)	1.0 0.9 0.8 0.7 0.6
(D) Tire Load	Standard 10% overload 20% overload 40% overload	1.0 0.9 0.8 0.5
(E) Curved in Road	Straight or slightly curved Curved Sharply curved	1.0 0.9 0.8
(F) Road Grade (for drive wheels)	Flat 6% maximum 15% maximum Other than drive wheels	1.0 0.9 0.7 1.0
(G) Braking	Infrequent Average Frequent	1.0 0.9 0.8
(H) Tire Maintenance	Good Average Poor	1.0 0.9 0.7

Tire Temperature and Ton-Miles-Per-Hour (TMPH) Rating

TIRE TEMPERATURE AND TON-MILES-PER-HOUR

Rating Materials and adhesives used in tires are especially vulnerable to damage from high temperatures which limit the amount and type of usage for tires. This is especially true for OTR tires for dump trucks and scrapers where high internal temperatures are not uncommon, because rapid dissipation of heat is hindered by the thick tire construction. Various conditions also influence the limits of use for OTR tires. TMPH is the measure of usage that normally indicates the limits of use under average working conditions.



Operating TMPH

Operating TMPH is computed to compare actual use with the tire's TMPH rating. The operating TMPH is calculated in the following manner by observation and measurement of actual operation.

Operating TMPH = (average tire load in short tons) x (average speed in miles per hour).

Where,

Average tire load =

1/2 [(load on tire when vehicle is empty) + (load on tire when vehicle is laden)]

Average speed =

(roundtrip distance in miles) x (number of trips) ((total hours from start of first shift to end of last shift)

For actual computation and reference this data should be collected:

☞ Vehicle empty: Load on front axle ÷ number of tires = ___tons/tire
Load on rear axle ÷ number of tires = ___tons/tire

☞ Vehicle loaded: load on front axle (number of tires = ___tons/tire
Load on rear axle (number of tires = ___tons/tire

☞ Payload = ___tons

☞ Hauling distance per trip = ___miles

☞ Number of trips per day = ___times

☞ Number of shifts per day hours of each shift
Number of shifts ___times
Hours per shift ___hours
(including inspection ___hours, lunch ___hours and rest___hours.)

☞ Actual maximum speed in operation ___miles/hour

☞ Ambient temperature High ___°C/Average___°C

Use of TMPH Rating

With the formula described above, the operating TMPH required for a particular job can be computed and off-the-road tires which satisfy the requirement can be selected. Operating TMPH should always be less than the tire's TMPH rating. The real factor limiting tire usage is heat. TMPH measurements and ratings are only tools used to construct guidelines so that tires do not overheat. As previously started, these guidelines are constructed assuming average operating conditions. Under some conditions it is possible for more heat to be generated than would normally be expected at a given operating TMPH level. This should be kept in mind when operating TMPH approaches the tire's TMPH rating to prevent heat damage.

TKPH (Ton-Kilometers-Per-Hour)

Generally, TMPH is the common measure, but TKPH, the metric measure is also used. Care should be taken when converting from TMPH, since TMPH uses the short ton (2,000 lbs) and mileage (1 km = 0.621 miles) and TKPH uses the metric ton (2,204.6 lbs or 1.1023 short tons). To convert TKPH to TMPH, divide TKPH by 1.459.

Adjusting TMPH for Ambient Temperature

The TMPH ratings are based on an ambient temperature of 100°F (38°C), so in calculating operating TMPH, adjustment must be made to

compensate for temperature differences. (°C = (5 ÷ 9) × (°F - 32)). The ambient temperature is the daytime high. To find the adjusted TMPH rating, conduct the following calculations:

Adjusted TMPH rating = Tire TMPH rating × F (t):

1) if ambient temperature is less than 38°C:

$$F(t) = \frac{115 - 38}{(115 - 38) - t} = \frac{77}{77 - t}$$

t = 1/2 (38°C - ambient temperature)

2) if outside temperature is more than 38°C:

$$F(t) = \frac{115 - 60}{(115 - 60) + t} = \frac{55}{55 + t}$$

t= 1/2 (ambient temperature - 38°C)

TMPH of Steel Breaker Tires

A TMPH rating is not given for steel breaker tires. However, the TMPH capability can be estimated by multiplying the TMPH rating of a comparable tire of standard construction by 0.7.

Yokohama Off-The-Road Tires Ton-Miles-Per-Hour and Ton-Kilometers-Per-Hour Rating Chart

SPECIFICATIONS			CUT PROTECTED		REGULAR		HEAT RESISTANT		*HEAT RESISTANT-V	
TIRE SIZE	CODE	PATTERN	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH
13.00-24, 25	E-2 E-3	Y103 Y67	65	95	65	95				
14.00-24, 25	E-2 E-3 E-3	Y103 Y67 Y529	75 65	189 95	90 75	131 109	85	124	155	226
16.00-24, 25	E-2 E-3 E-4	Y103 Y67 Y523	95 85 70	139 124 102	110 95 80	160 139 117	105 90	153 131		
18.00-24, 25	E-3 E-4 E-4	Y67 Y522 Y523	110 85 95	160 124 139	120 105	175 153	135 115	197 168		
21.00-24, 25	E-3	Y67	125	182	145	212	165	241		
24.00-25	E-3	Y67	130	190	150	219				
24.00-29	E-3	Y67	145	212	165	241	180	263		
17.5-25	E-2 E-3	Y103 Y67	50 40	73 58						
20.5-25	E-2 E-3	Y103 Y67	65 55	95 80	80 65	117 95	75	109		
23.5-25	E-2 E-3	Y103 Y67	90 80	131 117	105 90	153 131	100	146		
26.5-25	E-3	Y67	90	131	105	153	115	168		
26.5-29	E-3	Y67	110	160	125	182	135	197		
29.5-25	E-3	Y67	95	139	110	160	120	175		
29.5-29	E-3	Y67	115	168	135	197	150	219		
29.5-35	E-3	Y67	150	219	170	248	185	270		
33.25-35	E-3	Y67	155	226	180	263	200	292		
33.5-33	E-3	Y67	155	226	180	263	200	292		
37.25-35	E-3	Y67	190	277	225	328	245	357		
37.5-33	E-3	Y67	190	277	225	328	245	357		
37.5-39	E-3	Y67	220	321	225	328	280	409		

Yokohama Off-The-Road Tires Ton-Miles-Per-Hour and Ton-Kilometers-Per-Hour Rating Chart

SPECIFICATIONS			CUT PROTECTED **UG		CUT PROTECTED		REGULAR	
TIRE SIZE	CODE	PATTERN	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH
17.5R25	E-3	RB31	—	—	90	131	105	153
17.5R25	E-3	RL31	60	88	85	124	—	—
20.5R25	E-3	RB31	—	—	105	153	135	197
20.5R25	E-3	RL31	—	—	93	135	—	—
23.5R25	E-3	RB31	—	—	115	168	145	212
23.5R25	E-3	RT31	—	—	120	175	155	226
23.5R25	E-3+	RL31	75	109	100	146	—	—
26.5R25	E-3+	RT31	—	—	125	182	155	226
1600R25	E-4	RB41	—	—	85	124	110	160

*High TMPH rating tires can be offered to meet certain conditions. Consult your Yokohama technical representative.

**For underground use

TKPH = TMPH × 1.459

TMPH = TKPH ÷ 1.459

Tire Temperature and Ton-Miles-Per-Hour (TMPH) Rating

Yokohama Off-The-Road Tires Ton-Miles-Per-Hour and Ton-Kilometers-Per-Hour Rating Chart

SPECIFICATIONS			CUT PROTECTED-S		CUT PROTECTED-C		REGULAR-R		REGULAR-T		HEAT RESISTANT-H		*HEAT RESISTANT-V	
TIRE SIZE	CODE	PATTERN	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH
18.00-33	E-3	Y67			130	190	145	212	160	233	175	255		
	E-4	Y523			105	153	125	182	135	197	150	219		
	E-4	Y523U	80	117	100	146	115	168						
21.00-35	E-3	Y67			160	233	180	263	195	285	215	314		
	E-4	Y523	105	153	130	190	150	219	165	241	180	263		
	E-4	Y535	105	153	130	190	150	219	170	248	185	270	205	299
	E-4	Y530	100	146	125	182	140	204	150	219				
24.00-35	E-3	Y67			190	277	215	314	235	343	260	379		
	E-4	Y523	120	175	155	226	180	263	200	292	220	321		
24.00-49	E-3	Y67			245	357	280	409	300	438	330	481	360	525
	E-4	Y523	150	219	190	277	220	321	240	350	265	387	290	423
27.00-49	E-3	Y67			280	409	330	481	360	525	400	584	440	642
	E-4	Y523	180	263	230	336	265	387	285	416	310	452	340	496
30.00-51	E-4	Y523	210	306	265	387	310	452	340	496	370	540	405	591
	E-4	Y535	210	306	265	387	310	452	340	496	370	540	405	591
33.00-51	E-4	Y523	240	350	295	430	350	511	380	554	400	584	440	642
36.00-51	E-3	Y565									540	790	600	875
	E-4	Y523	260	379	330	481	390	569	430	627	470	686	515	751
	E-4	Y523R					425	620	470	686	500	730	550	802
	E-4	Y535	290	423	360	525	425	620	470	686	500	730	550	802
40.00-57	E-4	Y523	280	409	350	511	410	598	450	657	490	715	540	788

NOTES: *High TMPH rating tires can be offered to meet certain operating conditions. Consult your Yokohama technical representative.
Figures are subjected to change without prior notice.
TKPH = TMPH × 1.459
TMPH = TKPH ÷ 1.459

Yokohama Off-The-Road Tires Ton-Miles-Per-Hour and Ton-Kilometers-Per-Hour Rating Chart

TIRE SIZE	Y103 L-2				Y67 L-3				Y575 L-3				Y526 L-3				Y67/*Y545 L-4				Y524 L-5				Y69E L-4S		Y69E L-5S	
	CP		REGULAR		CP		REGULAR		CP		REGULAR		CP		REGULAR		CP		L & C		CP		L & C		CP		CP	
	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH
15.5-25	50	73	63	91	40	58	50	73																				
17.5-25	60	88	75	110	45	66	56	83	50	73	63	91	40	58	50	73	35	51	46	67					35	51	30	44
20.5-25	80	117	100	146	55	80	69	100	55	80	69	100	50	73	63	91					30	44	39	57	45	66	30	44
23.5-25	100	146	125	182	75	109	94	136	80	117	100	146	65	95	81	119	*50	*73	*65	*95	40	58	52	75	55	80	40	58
26.5-25					90	131	113	164	90	131	113	164					65	95	85	124	45	66	59	86	60	88	45	66
29.5-25					100	146	125	183									*65	*95	*85	*124	55	80	72	104				
29.5-29					110	160	138	200									85	124	111	161	70	102	91	133				
33.25-35																					90	131	117	170				
37.25-35																					95	139	124	181				
35/65-33																	80	117	104	152	60	88	78	114				
40/65-39																					95	139	124	181				
45/65-45																					100	146	130	190				
10.00-20	45	66	56	82	35	51	44	64																				
12.00-24	60	88	75	110	45	66	56	83																	35	51	25	36
13.00-24	70	102	88	127	55	80	69	100																				
14.00-24	80	117	100	146	60	88	75	110																	45	66	35	51
16.00-24/25	95	139	119	174	70	102	88	128																	55	80	45	66
18.00-25					95	139	119	174																	70	102	55	80

NOTES: *Y545 L-4 only
Figures are subjected to change without prior notice. TMPH figures are 0.7 of table for steel breaker types.
TMPH figures are 0.6 of table for wide steel breaker types.
18.00-25 Y522 L-4 85 (124) TMPH (TKPH)
12.00-24 Y525 L-5 30 (44) TMPH (TKPH)
TKPH = TMPH × 1.459
TMPH = TKPH ÷ 1.459

Yokohama Off-The-Road Tires Ton-Miles-Per-Hour and Ton-Kilometers-Per-Hour Rating Chart

TIRE SIZE	PB31 (L-3)				RL31 (L-3)				RT31 (L-3)			
	CP		REG		CP		REG		CP		REG	
	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH
17.5R25	62	90			55	80						
20.5R25	72	105			65	95						
23.5R25	99	145			75	110			103	150		
26.5R25									117	170		

LOAD-AND-CARRY OPERATION OF FRONT END LOADERS

In loading and grading with loaders and dozers tire heat does not pose a large problem because the average operating speed is very low compared with dump trucks and scrapers. However, for load-and-carry operations the average operating speed is higher and tire temperature may become an important factor. This is especially important for the L-5 tire which has a very thick tread. In this case, operation must be limited by the TMPH rating. If the use of L-5 tires is too limiting, L-4 tires are an alternative.

Maximum haul length, Speed, and Load Table

MAXIMUM HAUL LENGTH	MAXIMUM SPEED	MAXIMUM LOAD
L-3 610 m (2000 ft.)	25 kph (15 mph)	Std. Load × 0.8
L-4 244 m (800 ft.)	25 kph (15 mph)	Std. Load × 0.8
L-5 76 m (250 ft.)	10 kph (5 mph)	Std. Load × 1.0

When tires designed for dig and load vehicles are used in load-and-carry operations, the haul distance must be limited to 76 meters and maximum speed to 10 kph (5 mph).

PROTECTING TIRES ON VEHICLE IN HIGHWAY DRIVE-AWAY

Because of the special extra-heavy construction of OTR tires, special precautions must be observed to protect these expensive tires when the vehicle is driven on the highway for delivery, or moved by an operator to a new job site. If the precautions are not observed, excessive tire heat may develop and the tire may fail prematurely. Always consult the vehicle or tire manufacturer for specific information before starting out on a trip. Vehicles in transit should be accompanied by responsible personnel in a pilot car to enforce the following precautions and maintain a check on equipment. This is good insurance for a large investment. The following precautions apply to tires on all vehicles in transit, driven or towed. Check the following guidelines and consult Yokohama.

Load and Pressure

☞ Empty vehicles before starting.

☞ Instructions for use of drive-away tables:

1) Determine the load each tire will carry.

2) Using the table, select the inflation pressure shown for the load determined. This is the pressure required for drive-away service.

3) Ignore tire ply rating when determining drive-away load and pressure conditions.

☞ Check inflation pressure before starting out each day and adjust to pressure recommended for highway drive-away by vehicle manufacturer.

☞ Do not drive or tow vehicles using tires with 'dry ballast' in highway drive-away.

☞ Do not reduce inflation pressure by bleeding tires during highway drive-away. During highway drive-away pressure build-up in tires is normal.

Maximum Highway Speed

✎ **Regular Tread Tires (E-3)**

Narrow Base 30 mph (50 kph)

Wide Base 20 mph (30 kph)

☞ Average operating speed (Running Mileage ÷ (Running Hours + Stop Hours)) should be under the speed obtained by the following equation:

$$\text{Speed} = \frac{\text{Tire TMPH}}{\text{Tire Load (s-ton)}} \times 0.8$$

0.8 is a safety coefficient.

☞ Where narrow base and wide base tires are mixed on a vehicle, use the guidelines specified for wide base tires.

✎ **Deep Tread (E-4) & Special Compound Tires**

☞ Do not drive vehicles equipped with deep tread (E-4) and special compound tires over the highway unless the proposed trip is reviewed and approved by qualified Yokohama personnel.

✎ **Extra Deep Tread Tires**

☞ Do not under any circumstances move extra deep tread tires over the highway.

Operation Mode

Yokohama recommends the following mode of operation:

☞ Stop for a 30-minute cooling period after each 2 hours of sustained operation.

☞ A one-hour minimum stop period should be observed after every four hours of operation.

Driving	Stop	Driving	Stop	Driving	Stop
2H	0.5H	2H	1.0H	2H	0.5H

…

The following is an example for driving a vehicle on the highway for delivery:

1) Vehicle model: YOKO 100 (85 s-ton)

2) Tire size: 24.00-49 42PR E-3

3) Temperature: 50°F~100°F (10°C~38°C)

4) Tire load: Empty before starting, load on front tire 14.3 s-ton (13.0 m-ton)

5) Inflation pressure: 90 psi (6.30 kg/cm2)

6) Maximum speed: 30 mph (50 kph)

7) Average speed:

YOKOHAMA Pattern Code	TRA Code	TIRE SPEC	TON-MILEAGE		AVERAGE SPEED	
			TMPH	TKPH	MPH	KPH
Y67	E-3	CPC	245	360	13.71	22.15
		REG	280	410	15.66	25.23
		HRH	330	480	18.46	29.50

8) Recommended Operation Mode

2H Driving	0.5H Stop	2H Driving	1H Stop	2H Driving	0.5H Stop	2H Driving	1H Stop
Speed (V)		Speed (V)		Speed (V)		Speed (V)	

…

YOKOHAMA Pattern Code	TRA Code	TIRE SPEC	*SPEED (V)	
			MPH	KPH
Y67	E-3	CP	18.85	30.45
		REG	21.53	34.69
		HR	25.38	40.56

$$\text{*Speed} = \text{Average Speed} \times \frac{\text{Driving Hours + Stop Hours}}{\text{Driving Hours}}$$

$$= \text{Average Speed} \times (5.5 \div 4)$$

Load and Inflation Pressure Table for Transit (as recommended by the TRA)

Narrow Base Earthmover Tires in drive-Away Service Only

30 MPH (50 KPH) Maximum speed

Tire Size Designation	Tire Load Limits at Various Cold Inflation Pressures (PSI)															
	Radial Ply															
	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
	Diagonal Ply															
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
16.00*25	5380	5980	6550	7100	7600	8050	8550	9000	9400	9850	10200	10600	11000	11400	11800	12100
18.00*25	6950	7750	8500	9150	9800	10400	11000	11600	12200	12700	13200	13700	14200	14700	15200	15700
18.00*33	8050	9000	9850	10600	11400	12100	12800	13500	14100	14700	15400	15900	16500	17100	17600	18200
18.00*49 (**)	10200	11400	12400	13400	14400	15300	16200	17000	17800	18600	19400	20200	20900	21600	22300	23000
21.00*25	8950	9550	10900	11800	12600	13400	14200	14900	15700	16400	17000	17700	18300	18900	19600	20200
21.00*35	10600	11800	12900	14000	15000	15900	16900	17700	18600	19400	20200	21000	21700	22500	23200	23900
21.00*49 (**)	12900	14300	15700	17000	18200	19300	20400	21500	22500	23500	24500	25400	26300	27200	28100	29000
24.00*25	11600	12900	14100	15200	16300	17400	18400	19300	20200	21100	22000	22900	23700	24500	25300	26000
24.00*29	12400	13800	15100	16300	17500	18600	19700	20700	21700	22600	23600	24500	25400	26200	27100	27900
24.00*35	13600	15100	16600	17900	19200	20400	21600	22700	23800	24800	25800	26800	27800	28800	29700	30600
24.00*43 (**)	15200	16900	18500	20000	21400	22700	24000	25300	26500	27700	28800	29900	31000	32100	33100	34100
24.00*49	16300	18100	19900	21500	23000	24500	25900	27200	28500	29800	31000	32200	33400	34500	35600	36700
27.00*33	16200	18100	19800	21400	22900	24400	25800	27100	28400	29700	30900	32100	33200	34400	35500	36600
27.00*49	20000	22200	24300	26300	28200	30000	31700	33300	34900	36500	38000	39400	40900	42300	43600	44900
30.00*33 (**)	20000	22200	24300	26300	28200	30000	31700	33300	34900	36500	38000	39400	40900	42200	43600	44900
30.00*51	24700	27500	30100	32500	34900	37100	39200	41300	43200	45200	47000	48800	50600	52300	54000	55600
33.00*51	28600	31900	34900	37700	40400	43000	45400	47800	50100	52300	54500	56500	58600	60500	62500	64500
36.00*51	34900	38800	42500	45900	49200	52300	55300	58200	61000	63500	66500	69000	71500	74000	76000	78500
40.00*57	44500	49600	54200	58600	63000	67000	70500	74500	78000	81500	84500	88000	91000	94000	97500	100000

*Tire size designation will include "R" (Radial Ply) or "-" (Diagonal or Bias Ply)
**Not available from The Yokohama Rubber Co., Ltd.

NOTES: Figures are subjected to change without prior notice.
Figures listed are in pounds.

Tire Size Designation	Tire Load Limits at Various Cold Inflation Pressures (PSI)															
	Radial Ply															
	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110
	Diagonal Ply															
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
15.5*25 (**)	3740	4160	4540	4920	5260	5600	5920	6250	6550	6800	7100	7400	7650	7900	8150	8400
17.5*25	4460	4960	5440	5880	6300	6700	7100	7450	7800	8150	8500	8800	9150	9450	9750	10000
20.5*25	5960	6650	7250	7850	8400	8950	9450	9950	10400	10900	11300	11800	12200	12600	13000	13400
23.5*25	7600	8450	9250	10000	10700	11400	12100	12700	13300	13900	14500	15000	15600	16100	16600	17100
26.5*25	9550	10600	11600	12600	13500	14300	15200	16000	16700	17500	18200	18900	19600	20200	20900	21500
26.5*29	10200	11400	12400	13400	14400	15300	16200	17000	17900	18700	19400	20200	20900	21600	22300	23000
29.5*25	11500	12800	14000	15200	16300	17300	18300	19200	20200	21000	21900	22800	23600	24400	25200	25900
29.5*29	12300	13700	14900	16200	17300	18400	19500	20500	21500	22400	23300	24200	25100	26000	26800	27600
29.5*35	13400	14900	16300	17600	18800	20000	21200	22300	23400	24400	25400	26400	27300	28300	29200	30100
33.25*29 (**)	15100	16800	18400	19900	21300	22700	24000	25200	26500	27600	28800	29900	30900	32000	33000	34000
33.25*35	16400	18200	20000	21600	23100	24600	26000	27400	28700	29900	31200	32400	33500	34700	35800	36900
33.5*33	16500	18400	20100	21700	23300	24800	26200	27500	28900	30100	31400	32600	33800	34900	36000	37100
33.5*39 (**)	17800	19800	21600	23400	25100	26700	28200	29700	31100	32500	33800	35100	36400	37600	38800	40000
37.25*35	19800	22000	24100	26000	27900	29600	31300	33000	34500	36100	37600	39000	40400	41800	43100	44400
37.5*33	19800	22100	24200	26100	28000	29800	31500	33100	34700	36200	37700	39200	40600	42000	43300	44700
37.5*39	21300	23700	25900	28000	30000	32000	33800	35600	37300	38900	40500	42100	43600	45100	46500	47900
37.5*51 (**)	24100	26800	29300	31700	34000	36100	38200	40200	42100	44000	45800	47600	49300	51000	52600	54200

*Tire size designation will include "R" (Radial Ply) or "-" (Diagonal or Bias Ply)
**Not available from The Yokohama Rubber Co., Ltd.

NOTES: Figures are subjected to change without prior notice.
Figures listed are in pounds.

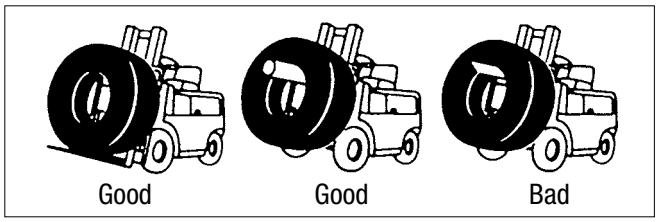
PSI × 0.0703 = kg/cm^2 POUND × 0.4536 = kg PSI × 6.895 = kPa

HANDLING OF TIRES

Improper handling of tires can lead to damage, especially to the beads. Therefore, it is necessary to prevent excess pressure from being exerted on the beads.

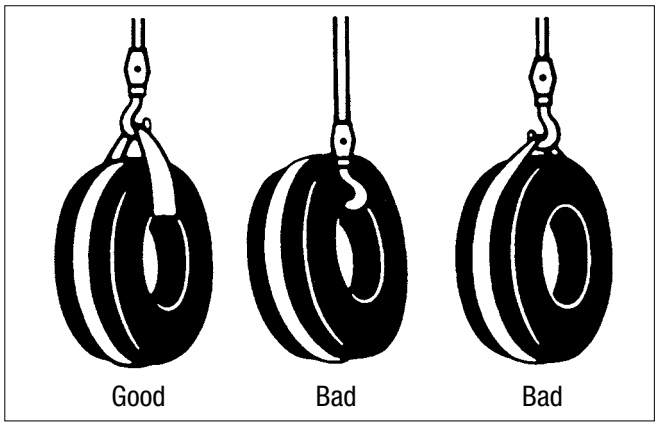
When using a fork lift to lift a tire:

☞ Lay the tire vertically across the fork, or
☞ Use a round fork at least six-inches in diameter.
☞ Do not insert a flat type fork within the tire.



When lifting tires by crane:

☞ Use a wide nylon or rubber sling.
☞ Do not use a rope sling.
☞ Do not hook the tier beads.



SAFETY PRECAUTIONS

WARNING
Tire and rim servicing can be dangerous, and should be done by trained personnel using proper tools and procedures. Failure to comply with these procedures may result in faulty positioning of the tire and/or rim, and cause the assembly to burst with explosive force, sufficient to cause serious physical injury or death.

DEMOUNTING

Before Demounting

☞ Always exhaust all air from a single tire and from both tires of a dual assembly prior to removing any wheel components such as nuts and rim clamps. (A broken rim part under pressure can blow apart and cause serious injury or death.
☞ Make sure to remove the valve core to exhaust all air from the tire. Remove both cores to exhaust all air from a dual assembly. (The wheel assembly may fly apart if the tire is still under pressure when the wheel lugs are removed.)
☞ Check the valve stem by running a piece of wire through it to make sure it is not clogged. (Foreign material may clog the valve stem during deflation, or ice may form as the air escapes.)

During demounting

☞ Demounting tools apply pressure to rim flanges to unseat tire beads. Keep your finger clear. Always stand to one side and hold the tool with one hand when you apply hydraulic pressure. (If the tool slips off it can fly with enough force to cause serious injury or death.)
☞ Do not use the tool in the vicinity of the flange butt weld.

After Demounting

☞ Clean rims and repaint chipped areas to prevent the detrimental effects of corrosion and facilitate checking and tier mounting. Be extremely careful to clean all dirt and rust from the lock ring and gutter. This is important to secure the lock ring in its proper position. A filter on the air line helps prevent corrosion. The filter should be checked periodically to see that it is working properly. (Parts must be clean for a proper fit. Particularly, the gutter section which holds the lock ring in proper position.)

MOUNTING

Before Mounting

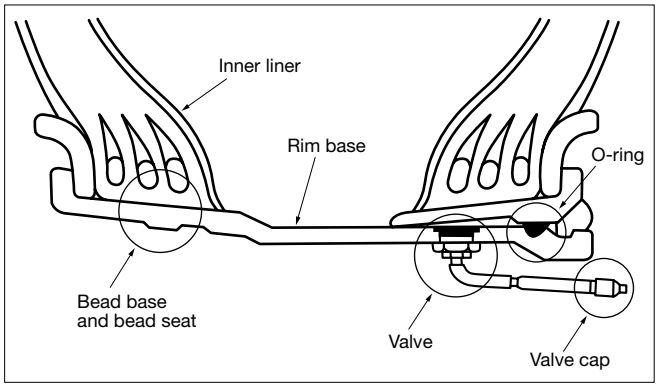
- ☞ Check rim components for cracks. Replace all cracked, badly worn, damaged and severely rusted components with new parts of the same size and type. When the condition of a component is in doubt, replace it. (Parts that are cracked, damaged or excessively corroded are weakened. Bent or repaired parts may not engage properly.)
- ☞ Do not, under any circumstances, attempt to rework, weld, heat, or braze any rim components that are cracked, broken, or damaged. Replace them with new parts or parts that are not cracked, broken, or damaged and which are of the same size and type. (Heating may weaken a part to the extent it is unable to withstand forces of inflation or operation.)
- ☞ Make sure correct parts are being assembled. Check your distributor or the manufacturer if you have any doubts. (Mismatched parts may appear to fit, but when the tire is inflated may fly apart with explosive force.)
- ☞ Mixing parts of one type rim with those of another is potentially dangerous. Always check rim manufacturer for approval.
- ☞ Removing rust, dirt and other foreign matter from the rim surface, particularly on the bead seats and O-ring slot.
- ☞ Clean the inside of the tire.
- ☞ For tube type tires, make sure tube and flap are correct and not damaged.
- ☞ Always prepare a new O-ring for tubeless type tires.
- ☞ Do not reinflate a tire that has been run-flat or has been run at 80% or less of its recommended operating pressure, or when there is obvious or suspected damage to the tire or wheel components. (Components may have been damaged or dislocated during the time the tire was run-flat or seriously underinflated.)

During Mounting and Inflation

- ☞ Do not try to seat rings or other components by hammering while a tire is inflated or partially inflated.
- ☞ Double check to make sure all components are properly seated prior to inflation.
- ☞ Do not inflate a tire before all components are properly in place. Place the tire in a safety cage, or other restraining device, and inflate to approximately 5 psi, recheck components for proper assembly. Observe that the O-ring does not roll out of its groove. If the assembly is not proper, deflate and correct. Never hammer on an inflated or partially inflated tire/rim assembly. If assembly is proper at approximately 5 psi, continue to inflate to fully seat the tire beads.
- ☞ Never sit on or stand in front of a tire/rim assembly that is being inflated. Always use a clip-on chuck with a sufficient length of hose to permit the person inflating the tire to stand clear of the potential trajectory of the wheel components. Use an inline valve with a gauge or a pressure regulator preset to a desired value when inflating a tire. When a tire is in a restraining device, do not lean any part of your body or equipment on or against the restraining device. (If parts are improperly installed they may fly apart with explosive force.)
- ☞ Never attempt to weld or heat on or near a tire/rim assembly. (Heat from welding will cause a sudden drastic increase in air pressure, resulting in an explosion with the force of a bomb. Deflated tires can catch fire inside the air chamber.)

After Inflation

- ☞ Make sure no air leakage can be suspected, especially in tubeless tires. Checking points for air leakage are pictured below.

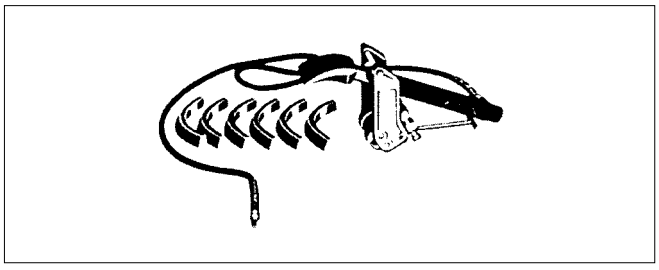


OPERATION

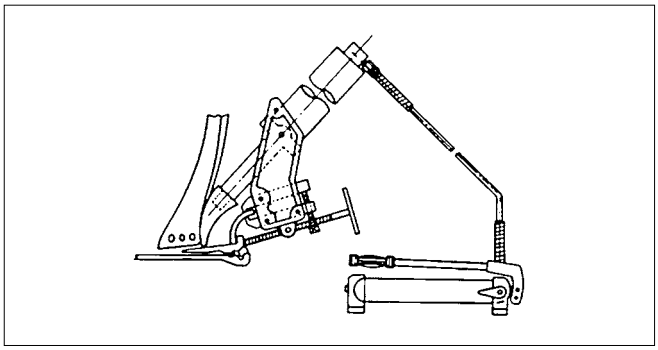
- ☞ Do not use underinflated tires.
- ☞ Do not bleed or remove air to compensate for the increase in pressure resulting from operation.
- ☞ Do not use undersized rims. Use recommended rims. Consult catalogs for proper tire/rim matching.
- ☞ Do not overload or overinflate the tire/rim assembly. Check for adequate rim strength if special operating conditions are required. (Excessive overload can cause tire/rim assembly damage.)
- ☞ Never run a vehicle on one tire of a dual assembly. (The carrying capacity of the single tire and rim is dangerously exceeded an operating a vehicle in this condition can result in damage to the rim and tire or cause a tire fine.)
- ☞ Never use a tube in a tubeless tire/rim assembly if the rim is suspected of leaking. (Loss of air pressure through fatigue cracks or other fractures in a tubeless rim warns of a potential rim failure. This safety feature is lost when tubes are used with leaking rims. Continued use may cause the rim to burst with explosive force.)
- ☞ Always inspect rims and wheels for damage during tires checks. (Early detection of potential rim failure may prevent serious injury.)
- ☞ Never add or remove an attachment or other-wise modify a rim (especially by heating, welding, or brazing) unless the tire has been removed and rim maker approval has been received. (Modification or heating of a rim or one of its parts may weaken it so that it cannot withstand forces created by inflation or operation.

Tools for Mounting and Demounting Tires

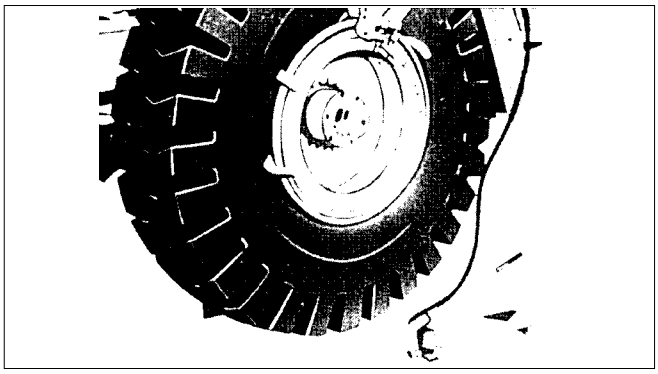
The following are all portable tools, and can be used both horizontally and vertically.



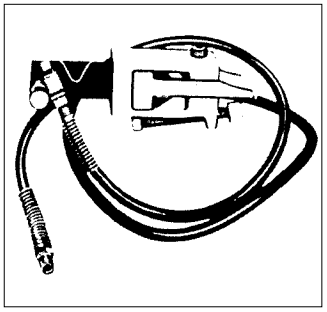
Hydraulic tire remover (tire push type) and bead wedges. Commonly used for 25-inch rims.



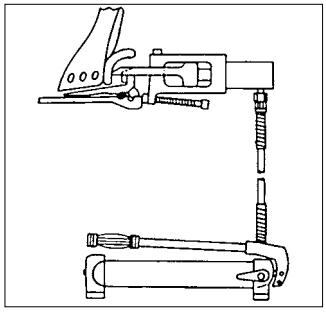
A man-powered hydraulic pump attached to a tire push type hydraulic tire remover.



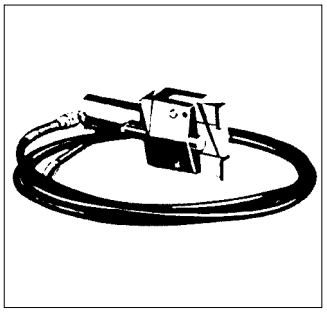
Hydraulic tire remover in operation.



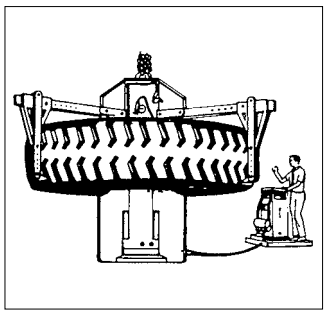
Hydraulic tire remover (rim flange push type). Commonly used for 33-inch or larger rims.



Man-powered hydraulic pump attached to rim flange push type hydraulic tire remover.



Another kind of hydraulic tire remover for 33-inch or larger rims (rim flange push type).



Tire, mounting and demounting machine (unit-rig type) mainly used for 49-inch or larger rims. It is stationary and for horizontal use only. Hydraulic ram is driven by an electric pump.

BALLASTED TIRES

A Liquid or dry ballast is injected into the tires to add weight to graders, tire dozers, or loaders to increase traction and stability, hence the name ballasted tire. The advantage of this is that the ballast does not add any weight to the load on the axles.
Generally, a solution of calcium chloride and water is considered best ballast. This solution has a low freezing temperature and will result in increased weight. It does, however, tend to corrode rims. Amounts and strength's of solutions used for different tire sizes, and resulting weight increases are shown in the table below. The generally recommended amount of ballast is 75% of the tire's inner volume. The amount is limited to this to preserve the tire's cushioning properties. Rotate the tire so that the valve is at its highest point and fill until the solution overflows; this is approximately the 75% point. Then, inflate to the recommended air pressure.

Liquid Inflation Chart

Narrow Base...75% Full or Valve Level

TIRE SIZE	GALLONS of WATER	3 1/2 LBS OF CALCIUM CHLORIDE PER GALLON SPECIFIC GRAVITY 1.2 FROZEN TEMP -26°C			5 LBS CALCIUM CHLORIDE PER GALLON SPECIFIC GRAVITY 1.3 FROZEN TEMP -47°C		
		GALLONS of WATER	LBS of CaCl2	TOTAL WEIGHT (lbs)	GALLONS of WATER	LBS of CaCl2	TOTAL WEIGHT (lbs)
8.25-20	14.5	12.5	44	148	12	59	157
9.00-20	18	15.5	54	182	14.5	78	194
10.00-20	21	18	63	213	17	85	227
11.00-20	23.8	20	71	241	19	96	257
12.00-24	28	24	84	284	22.5	113	301
12.00-24	31	26	92	311	25	124	331
13.00-24, 25	38	33	115	390	31	155	414
14.00-20	43	36	128	432	34	172	459
14.00-24, 25	48	41	143	485	39	193	516
16.00-24, 25	67	58	203	686	55	273	729
18.00-24, 25	96	82	287	971	77	387	1032

Liquid Inflation Chart

Wide Base...75% Full or Valve Level

TIRE SIZE	GALLONS of WATER	3 1/2 LBS OF CALCIUM CHLORIDE PER GALLON SPECIFIC GRAVITY 1.2 FROZEN TEMP -26°C			5 LBS CALCIUM CHLORIDE PER GALLON SPECIFIC GRAVITY 1.3 FROZEN TEMP -47°C		
		GALLONS of WATER	LBS of CaCl2	TOTAL WEIGHT (lbs)	GALLONS of WATER	LBS of CaCl2	TOTAL WEIGHT (lbs)
15.5-25	46	40	139	470	37	187	500
17.5-25	60	51	180	609	48	243	647
20.5-25	90	77	269	910	72	362	967
23.5-25	118	101	354	1198	95	478	1274
26.5-25	159	136	477	1614	129	643	1716
26.5-29	174	149	521	1764	141	703	1875
29.5-25	207	177	618	2090	167	833	2223
29.5-29	224	192	673	2275	181	907	2419
29.5-35	251	215	753	2547	203	1015	2708
33.25-35	319	274	958	3242	258	1292	3447
33.5-33	328	281	983	3326	265	1325	3536
33.5-39	363	311	1089	3684	294	1470	3917
37.25-35	373	320	1115	3770	302	1510	4030
37.5-33	423	362	1268	4290	342	1710	4562
37.5-39	466	339	1397	4729	377	1885	5028
37.5-51	552	473	1656	5603	447	2235	5958
35/65-33	291	250	880	2970	235	1175	3140
40/65-39	416	357	1250	4230	336	1680	4485
45/65-45	586	502	1757	5920	474	2369	6304

Gallons × 3.7853 = Liters Pounds × 0.4536 = Kilograms

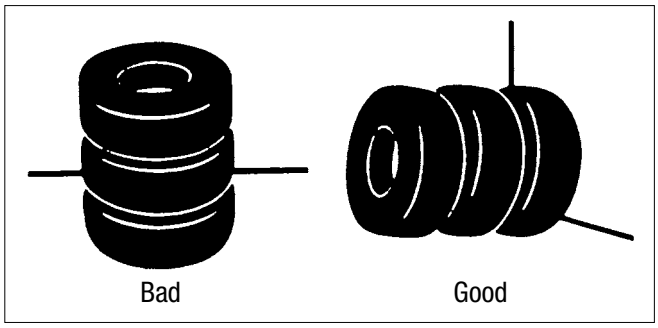
Tires Storage
How to Reduce Tire Costs

TIRE STORAGE

In general, tires should be removed from the rim, cleaned, and stored in a cool, dry room. They should be stored in an upright position, not horizontally, so that the proper space between the beads will be maintained. Make sure that the tire is not deformed by any external pressure exerted on it.
Avoid the following when storing tires:

☞ Direct sunlight.
☞ Ozone.
☞ Oil and grease.
☞ High temperatures and humidity.

If tires must be stored outside, cover them with a tarpaulin for protection. If a vehicle is stored with tires mounted, rest the vehicle on blocks to relieve the load on the tires. Deflate the tires and cover them. Rotate the tires once a month to prevent permanent deformation, if the vehicle cannot be rested on blocks.



HOW TO REDUCE TIRE COST

✎ **Select the proper tire for the job:**
☞ Tire size.
☞ Ply rating.
☞ Tire specification.

✎ **Maintain a tire record:**
☞ Keep a tire card for each tire.
☞ Analyze scrap tires.

✎ **Carry out good tire maintenance:**
☞ Perform regular inflation pressure checks.
☞ Regularly inspect tire appearance.
☞ Ensure proper matching of dual tires.
☞ Prevent oil saturation.
☞ Prevent high temperature and humidity.
☞ Prevent wavy condition.
☞ Keep haul road, loading and dumping area clean.
☞ Provide good drainage.

✎ **Maintain good job conditions:**
☞ Do not overload.
☞ Avoid excessive speed.
☞ Train operator.

4. MISCELLANEOUS DATA

EARTHMOVER DATA

Formulas and Rules

The following are useful formulas and rules of thumb:

☞ Production, hourly = Load (BCY)/Cycles × Cycles/hr
= Load (BM3)/Cycles × Cycles/hr

☞ Load factor (L.F.) = $\frac{\text{Band cubic yards (BCY)}}{\text{Loose cubic yards (LCY)}}$

☞ Load factor (L.F.) = $\frac{\text{Bank cubic meters (B M3)}}{\text{Loose cubic meters (LM3)}}$

☞ Load factor (L.F.) = $\frac{100\%}{100\% + \%\text{ of swell}}$

☞ Load (bank measure) = Loose cubic yards (LCY) × L.F.
= Loose cubic meters (LM3) × L.F.

☞ Shrinkage factor (S.F.)
= $\frac{\text{Compacted cubic yards (CCY)}}{\text{Bank cubic yards (BCY)}}$

☞ Shrinkage factor (S.F.)
= $\frac{\text{Compacted cubic meters (CM}^3\text{)}}{\text{Bank cubic yards (BM}^3\text{)}}$

☞ Density = Weight/Unit volume

☞ Load (bank measure) = $\frac{\text{Weight of Load}}{\text{Bank density}}$

☞ Rolling resistance factor
= 40 lbs/ton + (30 lbs/ton/inch × inches)
= 20 kg/ton + (15 kg/ton/2.5 cm × cm)

☞ Rolling resistance
= 2% of GVW + 1.5% of GVW × inch of tire penetration
= 2% of GVW + 0.6% of GVW × cm of tire penetration

☞ Grade resistance factor
= 20 lbs/ton × % of grade
= 10 kg/ton × % of grade

☞ Grade resistance
= GR factor (lbs/ton) × GVW (tons)
= GR factor (kg/ton) × GVW (tons)

☞ Grade resistance = 1% of GVW × % of Grade

☞ Total resistance =
Rolling resistance (lbs or kg) + Grade resistance (lbs or kg)

☞ Rolling Resistance (%)
= 2% + 1.5% per inch of tire penetration
= 2% + 0.6% per cm of tire penetration

☞ Grade (%) = % of grade

☞ Effective grade (%) = PR (%) + GR (%)

☞ Usable pull (traction limitation)
= Coeff. Of traction × Weight on drivers
= Coeff. Of traction × (Total wt × % on drivers)

☞ Pull required
= Rolling resistance + Grade resistance
= Total resistance

☞ Total cycle time = Fixed time + Variable time

☞ Fixed time: Refer to respective machine production section.

☞ Variable time = Total haul time + Total return time

☞ Travel time = $\frac{\text{Distance (ft)}}{\text{Speed (fpm)}}$

☞ Travel time = $\frac{\text{Distance (m)}}{\text{Speed (m/min)}}$

☞ Cycles per hour = $\frac{60\text{ minutes}}{\text{Total cycle time (minutes)}}$

☞ Adjusted productivity = Hourly productivity × Efficiency factor

☞ No. of units requires = $\frac{\text{Hourly production required}}{\text{Unit hourly production}}$

☞ No. of scrapers a pusher will load
= $\frac{\text{Scraper cycle time}}{\text{Unit hourly production}}$

Typical Rolling Resistance Factors

ROAD SURFACE	lbs/ton	(kg/ton)
A roadway of hard, smooth, stabilized surface without penetration under load, watered, maintained:	40	(20)
A firm, smooth rolling roadway with dirt or light surface flexing slightly under or undulating, maintained fairly regularly, watered:	65	(35)
Snow packed:	50	(25)
Snow loose:	90	(45)
A dirt roadway, rutted, flexing under load, little if any maintenance, no water, 1" (25 mm) or more tire penetration:	100	(50)
Rutted dirt roadway, soft under travel, no maintenance, no stabilization, 4" (100 mm) to 6" (150 mm) tire penetration:	150	(75)
Loose sand or gravel:	200	(100)
Soft, muddy, rutted roadway, no maintenance:	200 to 400	(100 to 200)

Various tire sizes and inflation pressures will greatly reduce or increase the above figures. The quantities given are sufficiently accurate for estimating purposes when specific information on performance of particular equipment on given soil conditions is not available. See other Earthmoving Data Section tables for additional information.

Approximate Coefficient of Traction Factors

ROAD SURFACE	TRACTION FACTORS	
	Rubber Tires	Tracks
Concrete	.90	.45
Dry clay loam	.55	.90
Wet clay loam	.45	.70
Rutted clay loam	.40	.70
Dry sand	.20	.30
Wet sand	.40	.50
Quarry pit	.65	.55
Loose gravel road	.36	.50
Packed snow	.20	.25
Ice	.12	.12*
Firm earth	.55	.90
Loose earth	.45	.60
Stockpiled coal	.45	.60

*Semi-skeleton shoes = .27

Material* Swell Percentage & Load Factors

MATERIALS	Swell %	Load Factor (%)
Cinders	45	69
Clay, dry or wet	40	72
Clay and gravel dry or wet	40	72
Coal, anthracite or bituminous	35	74
Earth, loam and dry or wet	25	80
Gravel, dry	12	89
wet	11	89
Gypsum	74	57
Hardpan	50	67
Limestone	67	60
Rock, well blasted	65	60
Sand, dry or wet	12	89
Sandstone	54	65
Shale and soft rock	65	60
Slag, bank	23	81
Slate	65	60
Trap rock	65	61

*Varies with moisture content, grain, size, degree of compactness, etc. Tests must be made to determine exact material characteristic.

Swell-Voids-Load Factor Table

Swell (%)	Voids (%)	Load Factor
5	4.8	.952
10	9.1	.909
15	13.0	.870
20	16.7	.833
25	20.0	.800
30	23.1	.769
35	25.9	.741
40	28.6	.714
45	31.0	.690
50	33.3	.667
55	35.5	.645
60	37.5	.625
65	39.4	.606
70	41.2	.588
75	42.9	.571
80	44.4	.556
85	45.9	.541
90	47.4	.526
95	48.7	.513
100	50.0	.500

Swell-Voids-Load Factor Table

Load Factor (%)	Voids (%)	Swell (%)
95	5	5.3
90	10	11.1
85	15	17.6
80	20	25.0
75	25	33.3
70	30	42.9
65	35	53.8
60	40	66.7
55	45	81.8
50	50	100.0

CONVERSION TABLES

Metric to Standard (UK, US, etc.)

MULTIPLY METRIC UNIT	BY	TO OBTAIN ENGLISH UNIT
Kilometer (km)	0.6214	Mile
Meter (m)	1.0936	Yard
Centimeter (cm)	0.0328	Foot
Millimeter (mm)	0.03937	Inch
Square Kilometer (km^2)	0.3861	Square Mile
Hectare (Ha)	2.471	Acre
Square meter (m^2)	10.76	Square foot
Square centimeter (cm^2)	0.1550	Square inch
Cubic meter (m^3)	1.308	Cubic yard
kilograms/cubic meter ($kg/(m^3)$)	1.686	Pounds/cubic yard
Liter (l or ltr.)	0.2642	Gallon (US)
Imperial gallon	1.20	US gallon
Kilometer per hour (kph)	0.621	MPH
Liter (l or ltr.)	61.02	Cubic inch
Cubic centimeter (cm^3)	0.0338	Fluid ounce
Metric tonne (t)	0.984	Long ton
Metric tonne (t)	1.102	Short ton
Kilogram (kg)	2.205	Pound, avdp.
Gram (g or gr.)	0.0353	Ounce, avdp.
Calorie, Kilo (C or Cal.)	3.968	BTU
Kilogram-meter (kgm)	7.233	Foot-pound
Meter-kilogram (m-kg)	7.233	Pound-foot
Metric horsepower (CV)	0.9863	HP
kg/square centimeter ($kgs./cm^2$)	13.225	Pounds/square inch
kilopascal (kPa)	0.14503	Pounds/square inch

1 km = 1,000 m 1m = 100 cm 1 cm = 10 mm 1 km^2 = 100 Ha
1 Ha = 10,000 m^2 1 m2 = 10,000 cm^2 1 cm^2 = 100 mm^2
1 m^3 = 1,000 liters 1 liters = 1,000 cm^3
1 metric ton = 1,000 kg 1 quintal = 100 kg 1 kg = 1,000 g
1 Cal = 427 kgm = 0.0016 CVH = 0.00116 KWH
1 kg/cm^2 = 98.066 kPa Torque unit: 1 CV = 75 kgm/sec
1 kg/cm^2 =0.97 atmosph 1 bar = 100 kPa

Standard (UK, US, etc.) to Metric

MULTIPLY METRIC UNIT	BY	TO OBTAIN ENGLISH UNIT
Mile, statute (M)	1.609	Kilometer
Foot (ft)	0.3048	Meter
	30.48	Centimeter
Inch (in., “)	0.025	Meter
Square mile ($mile^2$)	2.590	Square kilometer
Acre	0.4047	Hectare
Square foot (ft^2)	0.0929	Square meter
Square inch (in^2)	6.452	Square centimeter
Cubic yard (yd^3)	0.765	Cubic meter
Cubuc foot (ft^3)	0.0283	Cubic meter
Pound/cubic yard (lbs/yd^3)	0.5933	Kilogram/cubic meter
US gallon (US gal)	3.785	Liter
US gallon	0.833	Imperial gallon
MPH	1.61	Kilometer per hour
TMPH	1.459	TKPH
Cubic inch (in^3)	0.016	Liter
Fluid ounce (fl oz)	29.57	Cubic centimeter
Long ton (lg ton)	1.016	Metric tonne
Short ton (sh ton)	0.907	Metric tonne
Pound (lb)	0.4536	Kilogram
Ounce (oz)	28.35	Gram
BTU	0.2520	Kilogram-calorie
Food-pound (ft-lb)	0.1383	Kilogram-meter
Hourse power (HP)	1.014	Metric horsepower
Pound/square inch (PSI)	0.0703	Kg/square centimeter
Pound/square inch (PSI)	6.895	Kilopascal

1 mile = 1,760 yds 1yd = 3 ft 1 ft = 12 in 1 sq mile = 640 acres
1 acre = 43,560 sq ft 1 sq ft = 144 sq in 1 cu ft = 7.48 gal
1 gal = 231 cu in = 4 quarts liq 1 quart = 32 fl oz 1 fl oz = 1.80 cu in
1 sh ton = 2,000 lbs 1 lg ton = 2,240 lbs 1 lb = 16 oz, avdp.
1 BTU = 778 ft lb = 0.000393 HPH = 0.000293 KWH
1 HP = 550 ft lb/sec 1 atmosph = 14.7 psi

Inches to Millimeters

in/32	mm	in/32	mm	in/32	mm	in/32	mm
1	0.8	21	16.7	41	32.5	105	83.3
2	1.6	22	17.5	42	33.3	110	87.3
3	2.4	23	18.3	43	34.1	115	91.3
4	3.2	24	19.1	44	34.9	120	95.3
5	4.0	25	19.8	45	35.7	125	99.2
6	4.8	26	20.6	46	36.5	130	103.2
7	5.6	27	21.4	47	37.3	135	107.2
8	6.4	28	22.2	48	38.1	140	111.1
9	7.1	29	23.0	49	38.9	145	115.1
10	8.0	30	23.8	50	39.7	150	119.1
11	8.7	31	24.6	55	43.7	155	123.0
12	9.5	32	25.4	60	47.6	160	127.0
13	10.3	33	26.2	65	51.6	165	131.0
14	11.1	34	27.0	70	55.6	170	134.9
15	11.9	35	27.8	75	59.5	175	138.9
16	12.7	36	28.6	80	63.5	180	142.9
17	13.5	37	29.4	85	67.5	185	146.9
18	14.3	38	30.2	90	71.4	190	150.8
19	15.1	39	31.0	95	75.4	195	154.8
20	15.9	40	31.8	100	79.4	200	158.8

Millimeters to Inches

mm	in/32	mm	in/32	mm	in/32	mm	in/32
1	1	19	24	37	47	75	95
2	3	20	25	38	48	80	101
3	4	21	27	39	49	85	107
4	5	22	28	40	50	90	113
5	6	23	29	41	52	95	120
6	8	24	30	42	53	100	126
7	9	25	32	43	54	105	132
8	10	26	33	44	55	110	139
9	11	27	34	45	57	115	145
10	13	28	35	46	58	120	151
11	14	29	37	47	59	125	158
12	15	30	38	48	61	130	164
13	16	31	39	49	62	135	170
14	18	32	40	50	63	140	176
15	19	33	42	55	69	145	183
16	20	34	43	60	76	150	189
17	21	35	44	65	82		
18	23	36	45	70	88		

Pounds to Kilograms

lbs	kg	lbs	kg	lbs	kg	lbs	kg
1	0.5	260	117.9	1200	544.3	5000	2268.0
10	4.5	280	127.0	1300	589.7	5200	2358.7
20	9.1	300	136.1	1400	635.0	5400	2449.4
30	13.6	320	145.2	1500	680.4	5600	2540.2
40	18.1	340	154.2	1600	725.8	5800	2630.9
50	22.7	360	163.3	1700	771.1	6000	2721.6
60	27.2	380	172.4	1800	816.5	7000	3175.2
70	31.8	400	181.4	1900	861.8	8000	3628.8
80	36.3	420	190.5	2000	907.2	9000	4082.4
90	40.8	440	199.6	2200	997.9	10000	4536.0
100	45.4	460	208.7	2400	1088.6	11000	4989.6
110	49.9	480	217.7	2600	1179.4	12000	5443.2
120	54.4	500	226.8	2800	1270.1	13000	5896.8
130	59.0	520	235.9	3000	1360.8	14000	6350.4
140	63.5	540	244.9	3200	1451.5	15000	6804.0
150	68.0	560	254.0	3400	1542.2	16000	7257.6
160	72.6	580	263.1	3600	1633.0	17000	7711.2
170	77.1	600	272.2	3800	1723.7	18000	8164.8
180	81.6	700	317.5	4000	1814.4	19000	8618.4
190	86.2	800	362.9	4200	1905.1	20000	9072.0
200	90.7	900	408.2	4400	1995.8		
220	99.8	1000	453.6	4600	2086.6		
240	108.9	1100	499.0	4800	2177.3		

Kilograms to Pounds

kg	lbs	kg	lbs	kg	lbs	kg	lbs
1	2	130	287	600	1323	2500	5512
5	11	140	309	650	1433	2600	5732
10	22	150	331	700	1543	2700	5952
15	33	160	353	750	1654	2800	6173
20	44	170	375	800	1764	2900	6393
25	55	180	397	850	1874	3000	6614
30	66	190	419	900	1984	3500	7716
35	77	200	441	950	2094	4000	8818
40	88	210	463	1000	2205	4500	9921
45	99	220	485	1100	2425	5000	11023
50	110	230	507	1200	2646	5500	12125
55	121	240	529	1300	2866	6000	13228
60	132	250	551	1400	3086	6500	14330
65	143	260	573	1500	3307	7000	15432
70	154	270	595	1600	3527	7500	16535
75	165	280	617	1700	3748	8000	17637
80	176	290	639	1800	3968	8500	18739
85	187	300	661	1900	4189	9000	19841
90	198	350	772	2000	4409	9500	20944
95	209	400	882	2100	4630	10000	22046
100	221	450	992	2200	4850		
110	243	500	1102	2300	5071		
120	265	550	1213	2400	5291		

Miles per Hour to Kilometer per Hour

mph	kph	mph	kph	mph	kph	mph	kph
1	1.61	14	22.53	27	43.44	40	64.36
2	3.22	15	24.14	28	45.05	41	65.97
3	4.83	16	25.74	29	46.66	42	67.58
4	6.44	17	27.35	30	48.27	43	69.19
5	8.05	18	28.96	31	49.88	44	70.80
6	9.65	19	30.57	32	51.49	45	72.41
7	11.26	20	32.18	33	53.10	46	74.01
8	12.87	21	33.79	34	54.71	47	75.62
9	14.48	22	35.40	35	56.32	48	77.23
10	16.09	23	37.01	36	57.92	49	78.84
11	17.70	24	38.62	37	59.53	50	80.45
12	19.31	25	40.23	38	61.14		
13	20.92	26	41.83	39	62.75		

Kilometers per Hour to Miles per Hour

mph	kph	mph	kph	mph	kph	mph	kph
0.62	1	16.16	26	31.70	51	47.23	76
1.24	2	16.78	27	32.32	52	47.86	77
1.86	3	17.40	28	32.94	53	48.48	78
2.49	4	18.02	29	33.56	54	49.10	79
3.11	5	18.65	30	34.18	55	49.72	80
3.73	6	19.27	31	34.80	56	50.34	81
4.35	7	19.89	32	35.43	57	50.96	82
4.97	8	20.51	33	36.05	58	51.58	83
5.59	9	21.13	34	36.67	59	52.21	84
6.22	10	21.75	35	37.29	60	52.83	85
6.84	11	22.37	36	37.91	61	53.45	86
7.46	12	23.00	37	38.53	62	54.07	87
8.08	13	23.62	38	39.15	63	54.69	88
8.70	14	24.24	39	39.78	64	55.31	89
9.32	15	24.86	40	40.40	65	55.94	90
9.94	16	25.48	41	41.02	66	56.56	91
10.57	17	25.10	42	41.64	67	57.18	92
11.19	18	26.72	43	42.26	68	57.80	93
11.81	19	27.35	44	42.88	69	58.42	94
12.43	20	27.97	45	43.51	70	59.04	95
13.05	21	28.59	46	44.13	71	59.66	96
13.67	22	29.21	47	44.75	72	60.29	97
14.29	23	29.83	48	45.37	73	60.91	98
14.92	24	30.45	49	45.99	74	61.53	99
15.54	25	31.08	50	46.61	75	62.15	100

Grade in Degrees to Grade in Percent

Grade in Degrees	Grade in Percent	Grade in Degrees	Grade in Percent
1°	1.8%	11°	19.4%
2°	3.5%	12°	21.3%
3°	5.2%	13°	23.1%
4°	7.0%	14°	24.9%
5°	8.8%	15°	26.8%
6°	10.5%	16°	28.7%
7°	12.3%	17°	30.6%
8°	14.0%	18°	32.5%
9°	15.8%	19°	34.4%
10°	17.6%	20°	36.4%

Conversion Tables

Inflation Pressure (kg/cm² to lbs/in²)

kg/cm²	lbs/in²	kg/cm²	lbs/in²	kg/cm²	lbs/in²	kg/cm²	lbs/in²
0.1	1	2.6	37	5.1	72	7.6	108
0.2	3	2.7	38	5.2	74	7.7	109
0.3	4	2.8	40	5.3	75	7.8	111
0.4	6	2.9	41	5.4	77	7.9	112
0.5	7	3.0	43	5.5	78	8.0	114
0.6	9	3.1	44	5.6	80	8.1	115
0.7	10	3.2	45	5.7	81	8.2	116
0.8	11	3.3	47	5.8	82	8.3	118
0.9	13	3.4	48	5.9	84	8.4	119
1.0	14	3.5	50	6.0	85	8.5	121
1.1	16	3.6	51	6.1	87	8.6	122
1.2	17	3.7	53	6.2	88	8.7	124
1.3	18	3.8	54	6.3	89	8.8	125
1.4	20	3.9	55	6.4	91	8.9	126
1.5	21	4.0	57	6.5	92	9.0	128
1.6	23	4.1	58	6.6	94	9.1	129
1.7	24	4.2	60	6.7	95	9.2	131
1.8	26	4.3	61	6.8	97	9.3	132
1.9	27	4.4	62	6.9	98	9.4	133
2.0	28	4.5	64	7.0	99	9.5	135
2.1	30	4.6	65	7.1	101	9.6	136
2.2	31	4.7	67	7.2	102	9.7	138
2.3	33	4.8	68	7.3	104	9.8	139
2.4	34	4.9	70	7.4	105	9.9	141
2.5	36	5.0	71	7.5	107	10.0	142

Temperature (Centigrade to Fahrenheit)

°C	°F	°C	°F	°C	°F	°C	°F
-19	-2.2	+24	+75.2	+67	+152.6	+110	+230.0
-18	-0.4	25	77.0	68	154.4	111	231.8
-17	+1.4	26	78.8	69	156.2	112	233.6
-16	3.2	27	80.6	70	158.0	113	235.4
-15	5.0	28	82.4	71	159.8	114	237.2
-14	6.8	29	84.2	72	161.6	115	239.0
-13	8.6	30	86.0	73	163.4	116	240.8
-12	10.4	31	87.8	74	165.2	117	242.6
-11	12.2	32	89.6	75	167.0	118	244.4
-10	14.0	33	91.4	76	168.8	119	246.2
-9	15.8	34	93.2	77	170.6	120	248.0
-8	17.6	35	95.0	78	172.4	121	249.8
-7	19.4	36	96.8	79	174.2	122	251.6
-6	21.2	37	98.6	80	176.0	123	253.4
-5	23.0	38	100.4	81	177.8	124	255.2
-4	24.8	39	102.2	82	179.6	125	257.0
-3	26.6	40	104.0	83	181.4	126	258.8
-2	28.4	41	105.8	84	183.2	127	260.6
-1	30.2	42	107.6	85	185.0	128	262.4
0	32.0	43	109.4	86	186.8	129	264.2
+1	33.8	44	111.2	87	188.6	130	266.0
2	35.6	45	113.0	88	190.4	131	267.8
3	37.5	46	114.8	89	192.2	132	269.6
4	39.2	47	116.6	90	194.0	133	271.4
5	41.0	48	118.4	91	195.8	134	273.2
6	42.8	49	120.2	92	197.6	135	275.0
7	44.6	50	122.0	93	199.4	136	276.8
8	46.8	51	123.8	94	201.2	137	268.6
9	48.2	52	125.6	95	203.0	138	280.4
10	50.0	53	126.4	96	204.8	139	282.2
11	51.8	54	129.2	97	206.6	140	284.0
12	53.6	55	131.0	98	208.4	141	285.8
13	55.4	56	132.8	99	210.2	142	287.6
14	57.2	57	134.6	100	212.0	143	289.4
15	59.0	58	136.4	101	213.8	144	291.2
16	60.8	59	138.2	102	215.6	145	293.0
17	62.6	60	140.0	103	217.4	146	294.8
18	64.4	61	141.8	104	219.2	147	296.6
19	66.2	62	143.6	105	221.0	148	298.4
20	68.0	63	145.4	106	222.8	149	300.2
21	69.8	64	147.2	107	224.6	150	302.0
22	71.6	65	149.0	108	226.4		
23	73.4	66	150.8	109	228.2		

APPROXIMATE WEIGHT OF MATERIALS*

Materials	Lbs per Loose Yd^3	kg per Loose M^3	Lbs per Bank Yd^3	Kg per Bank Yd^3
Bauxite	2400	1425	3200	1900
Caliche	2500	1485	3700	2200
Cinders	1100	650	—	—
Dry Excavated Clay	2500	1485	3100	1840
Wet Excavated Clay	2900	1725	4500	2675
Natural Bed Clay	2800	1650	3400	2015
Dry Clay & Gravel	2000	1185	2800	1650
Wet Clay & Gravel	2800	1650	3100	1840

Materials	Lbs per Loose Yd^3	kg per Loose M^3	Lbs per Bank Yd^3	Kg per Bank Yd^3
Anthracite Raw Coal	2000	1190		
Bituminous Raw Coal	1600	950		
Decomposed Rock				
75% R 25% E†	3300	1955	4720	2800
50% R 50 E	2900	1725	3860	2290
25% R 75% E	2650	1580	3320	1970
Dry Earth	2600	1550	3000	1780
Wet Earth	2900	1725	3500	2075
Loam Earth	2100	1250	2700	1600
Granite	2800	1650	4600	2725

Materials	Lbs per Loose Yd^3	kg per Loose M^3	Lbs per Bank Yd^3	Kg per Bank Yd^3
Pit Run Gravel	3200	1900	3700	2200
Dry Gravel	2500	1485	2800	1650
Dry 1/4" - 2" Gravel	2800	1650	3200	1900
Wet 1/4" - 2" Gravel	3400	2015	3800	2250
Sand & Gravel	2700	1600	3400	2015
Gypsum	2700	1600	3400	2015
Limestone	2600	1550	4400	2600
Dry Peat	700	415	1150	675
Moist Peat	1350	800	2250	1340
Wet Peat	1900	1125	3200	1900
Sandstone	2660	1550	4300	2550
Dry Sand	2400	1425	2700	1600
Damp Sand	2850	1680	3200	1900
Wet Sand	3100	1840	3500	2075

Materials	Lbs per Loose Yd^3	kg per Loose M^3	Lbs per Bank Yd^3	Kg per Bank Yd^3
Dry Sand & Gravel	2900	1725	3400	2015
Wet Sand & Gravel	3400	2015	3800	2250
Slag	3000	1780	5000	2965
Dry Snow	220	130		
Wet Snow	860	515		
Crushed Stone	2700	1600		
Top Soil	1600	960	2300	1365
Trap Rock	2900	1725	4400	2600

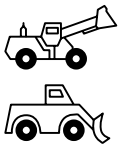
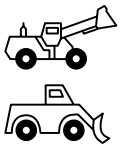
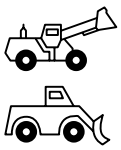
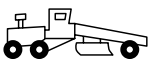
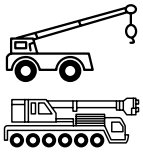
*Varies with moisture content, grain, degree of compactness, etc. Tests must be made to determine exact material characteristics.

†R: Rock, E: Earth

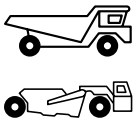
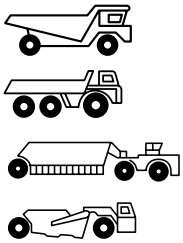
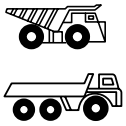
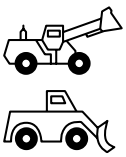
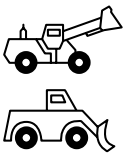
Comparative Tread Patterns: Radial Tires

	YOKOHAMA	Bridgestone	Michelin	Goodyear
E-3				
	RB31 	VMT 		GP-3D 
	RT31 	VLT 	XADN 	RL-2+ 
	RL31 		XKA 	GP-2B 
E-4				
	RB41 	VMTS 	XHD1 	RL-4J 
	RB42 	VZTS/VMTP 	XDT 	RT-4A 
	RT41 	VLTS 	XADT 	GP-4B 

Comparative Tread Patterns: Radial Tires

	YOKOHAMA		Bridgestone	Michelin	Goodyear
L-3	 RB31		 VMT	 XHA	 GP-2B
	 RT31		 VLT		 RL-2+
	 RL31			 XKA	 GP-2B
G-2	 RT21		 VKT	 XGLA2	 SG-2B
HIGH WAY USE	 RB01		 VHS	 XGC/XVC	 GP-2B

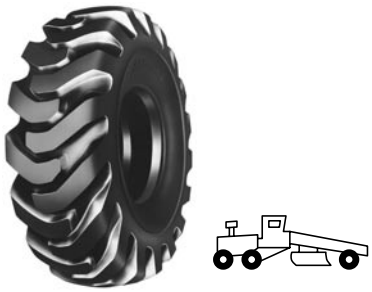
Comparative Tread Patterns: Bias Tires

	YOKOHAMA	Bridgestone	Firestone
E-2	Y103  	 Fast Grip	 Super Ground Grip
E-3	Y67  	 R-Lug	 Super Rock Grip
E-4	Y523  	 R-Lug S E-Lug S	 Rock Master Deep Tread Super Rock Grip Deep Tread
L-2	Y103  	 Fast Grip	 Super Ground Grip Loader Dozer
L-3	Y67  	 R-Lug	 Super Rock Grip Loader Dozer

Comparative Tread Patterns: Bias Tires

General	Michelin	Goodyear	Toyo
 D.T.L E-Lug S	 XLB	 SGL-2A	 G-15
 ND LCM SL 100	 XKB XRB	 HRL-3A	 G-18
 CM 150	 XHD1	 HRL-4B	 G-18ET G-36ET
 Loader Grader	 XGLA2	 SGL D/L 2A	 G-15
 LD ND LCM	 XRA XKA	 HRL D/L-3A	 G-18

Comparative Tread Patterns: Bias Tires

	YOKOHAMA	Bridgestone	Firestone
L-4	Y67ET Y545 	 R-Lug S/S2 N-Lug	 Super Rock Grip Deep Tread Loader Dozer
L-5	Y524 	 D-Lug	 Super Deep Tread Loader Dozer
G-2	Y103 	 Fast Grip	 Super Ground Grip Road Builder
G-3	Y67 	 R-Lug	 Rock Grip Road Builder

Comparative Tread Patterns: Bias Tires

General	Michelin	Goodyear	Toyo
 LD 150	 XLD D1	 HRL D/L-4A NRL D/L-4A	 G-64ET
 LD 250	 XLD D2 X Mine D2	 HRL D/L-5A/5B	 G-55 EDIT G-65 EDIT
 Loader Grader	 XTLA	 SGG-2A	 G-15
 LD ND LCM	 XRA XHA	 RKG-3A	 G-18

Safety Precautions For Mounting, Demounting and Operation

WARNING

Tire and rim servicing can be dangerous, and should be performed only by trained personnel using proper tools and procedures. Failure to comply with these procedures may result in faulty positioning of the tire and/or rim, and cause the assembly to burst with explosive force, sufficient to cause serious physical injury or death.

Demounting

1. Before Demounting

- Always exhaust all air from a single tire and from both tires of a dual assembly prior to removing any wheel components such as nuts and rim clamps. (A broken rim part under pressure can blow apart and cause serious injury or death.)
- Make sure to remove valve core to exhaust all air from the tire. Remove both cores from a dual assembly. (When you remove the wheel lugs, if the tire is still under pressure, the assembly may fly apart.)
- Check the valve stem by running a piece of wire through the stem to make sure it is not plugged. (Foreign material may clog the valve stem during deflation or ice may form as the air leaves the tire, clogging the valve stem.)

2. During Demounting

- Demounting tools apply pressure to rim flanges to unseat tire beads. Keep your fingers clear.
- Always stand to one side and hold the tool with one hand when you apply hydraulic pressure. (If the tool slips off it can fly with enough force to cause serious injury or death.)
- Do not use tools in the vicinity of the flange butt weld.

3. After Demounting

- Clean rims and repaint to stop detrimental effects of corrosion and facilitate checking and tire mounting. Be very careful to clean all dirt and rust from the lock ring and gutter. It is important to secure the lock ring in its proper position. A filter on the air inflation equipment to remove the moisture from the air line helps prevent corrosion. The filter should be checked periodically to see that it is working properly. (Parts must be clean for a proper fit - particularly the gutter section which holds the lock ring in its proper position.)

Mounting

1. Before Mounting

- Check rim components for cracks. Replace all cracked, badly worn, damaged and severely rusted components with new parts of the same size and type. When a component condition is in doubt, replace it. (Parts that are cracked, damaged or excessively corroded are weakened. Bent or repaired parts may not engage properly.)
- Do not, under any circumstance, attempt to rework, weld, heat or braze and rim component that is cracked, broken or damaged. Replace with a new part that is not cracked, broken or damaged and which is of the same size and type. (Heating may weaken a part to extent that it is unable to withstand forces of inflation or operation.)
- Make sure correct parts are being assembled. Check your distributor or the manufacturer if you have any doubts. (Mismatched parts may appear to fit, but when the ire is inflated, it may fly apart with explosive force.)
- Mixing parts of one type rim with those of another is potentially dangerous. Always check rim with manufacturer for approval.
- Remove rust, dirt and other foreign matter from the rim surface, particularly on the bead seats and O-ring slot.
- Clean the inside of the tire.
- Make sure tube and flap are correct and not damaged for tube type tires.
- Always prepare a new O-ring for tubeless tires.
- Do not reinflate a tire that has been run flat or has been run at 80% or less of its recommended operating pressure, or when there is obvious or suspected damaged to the tire or wheel components. (Components may have been damaged or dislocated during the time the tire was run flat or seriously underinflated.)

2. During Mounting and Inflation

- Do not try to seat rings or other components by hammering while tire is inflated or partially inflated.
- Double check to make sure all components are properly seated prior to inflation.
- Do not inflate tire before all components are properly in place. Place in safety cage or use a restraining device and inflate to approximately 0.35 kg/cm2 (5 psi), recheck components for proper assembly. Observe that O-ring does not roll out of its groove. If assembly is not performed properly, deflate and correct. Never hammer or an inflated or partially inflated tire/rim assembly. If assembly is correct at approximately 0.35 kg/cm2 (5 psi), continue to inflate fully to seat the tire beads.
- Never sit or stand in front of a tire and rim assembly that is being inflated. Always use a clip-on chuck with a sufficient length of hose to permit the person inflating the tire to stand clear of the potential trajectory of the wheel components, and use an in-line valve with gauge or a pressure regulator preset to a desired value when inflating a tire. When a tire is in a restraining device, do not lean any part of your body or equipment on or against the restraining device. (If parts are improperly installed, they may fly apart with explosive force.)
- Never attempt to weld on an inflated tire/rim assembly or on a rim assembly with a deflated tire. (Heat from welding will cause a sudden, drastic increase in pressure, resulting in an explosion with the force of a bomb. Deflated tires can catch fire inside the air chamber.)

3. After Inflation

- Make sure no air leakage can be suspected, especially in tubeless tires.

Operation

- Do not use underinflated tires.
- Do not bleed or reduce air pressure to compensate for the increase in pressure resulting from operation.
- Do not use under-size rims. Use recommended rim for the tire. Consult catalogues for proper tire/rim matching.
- Do not overload or overinflate tire/rim assemblies. Check for adequate rim strength if special operating conditions are required. (Excessive overload can cause damage to the tire and rim assembly.)
- Never run a vehicle on one tire of a dual assembly. (The carrying capacity of the single tire and rim is dangerously exceeded, and operating a vehicle in this manner can result in damage to the rim and tire or cause a tire fire.)
- Never use a tube in a tubeless tire/rim assembly where the rim is suspected of air leakage. (Loss of air pressure through fatigue cracks or other fractures in a tubeless rim warns you of a potential rim failure. This safety feature is lost when tubes are used with leaking rims. Continued use may cause the rim to burst with explosive force.)
- Always inspect rims and wheels for damage during tire checks. (Early detection of potential rim failure may prevent serous injury.)
- Never add or remove an attachment or otherwise modify a rim (especially by heating, welding or brazing) unless the tire has been removed and approval has been received from the rim manufacturer. (Modification or heating of a rim or one of its parts may weaken it so that it cannot withstand forces created by inflation or operation.)

Specifications subject to change without notice.

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