Safety Precautions Concerning 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, and 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. This 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 component with new parts of the same size and type. When a components 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 any 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.)
- Check type of rim and make sure all parts of such rim are being assembled properly. Follow instruction manual of rim or ask your distributor if you have any doubts.(Mismatched parts may appear to fit, but when the tire is inflated they 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 damage to the tire or wheel components. (Components may have been damaged or dislocated during the time the tire was run flat or seriously under-inflated.)

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/cm^2 (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 on partially inflated tire/rim assembly. If assembly is correct at approximately 0.35 kg/cm^2 (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 under-inflated 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.
- Do not overload or over-inflate 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.)
- Never mount bias tire and radial tire on the same axle. Follow vehicle manufacturer's recommendation.
- Never use tire under unintended service conditions for the tire.Please consult YOKOHAMA if vehicle operation requires specialized tire fitment.

Specifications subject to change without notice.

YOKOHAMA

06, 2015
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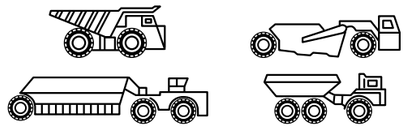
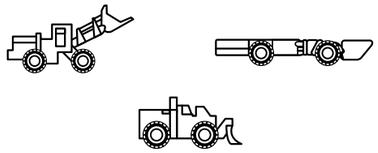
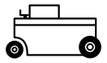
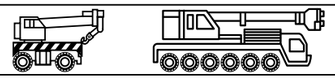
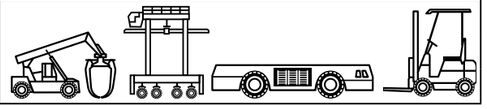
■TRA Classification of OFF-THE-ROAD TIRES

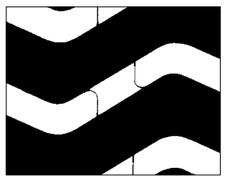
YOKOHAMA OFF-THE-ROAD TIRES are classified as follows by the Tire and Rim Association (TRA).

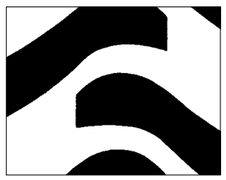
Application	TRA Code	Tread Type	Vehicles
Earthmover	E-2 E-3 E-4 E-7	Traction Regular Rock Regular Rock Deep Flotation	
Grader	G-2 G-3	Traction Regular Rock Regular	
Loader & Dozer	L-2 L-3 L-4 L-5 L-4S L-5S	Traction Regular Rock Regular Rock Deep Rock Extra Deep Smooth Deep Smooth Extra Deep	
Compactor	C-1 C-2	Smooth Grooved	
Mobile Crane	-	-	
Industrial	IND-3 IND-4 IND-5	Traction Regular Deep Extra Deep	

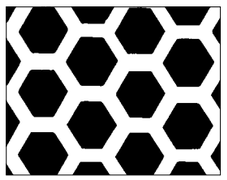
Caution: Never replace a tire mounted on a vehicle with any tire designed for a different type of vehicle.
For example, you should never place an earthmover tire on a loader.

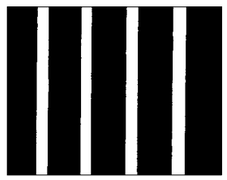
■Tread Pattern

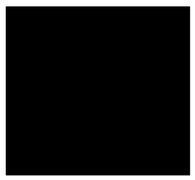
The tread pattern is designed to produce varying degrees of traction, cut resistance, flotation, wear and heat resistance. Selection of the proper OFF-THE-ROAD TIRES depends on the job and the conditions.
For example, different tread patterns are used to produce maximum traction or flotation on sand, mud and rock. There are five basic tread patterns: rock, traction, block, rib and smooth.


Rock Pattern


Traction Pattern

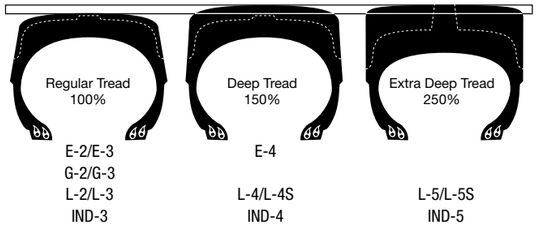

Block Pattern


Rib Pattern


Smooth

■Tread Thickness

According to the Tire and Rim Association (TRA), 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.



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.

■Construction of OFF-THE-ROAD TIRES

Structural Diagram of OFF-THE-ROAD RADIAL TIRES

① Belt
② Carcass
③ Inner Liner
④ Bead Wire
⑤ Chafer
⑥ Sidewall
⑦ Tread

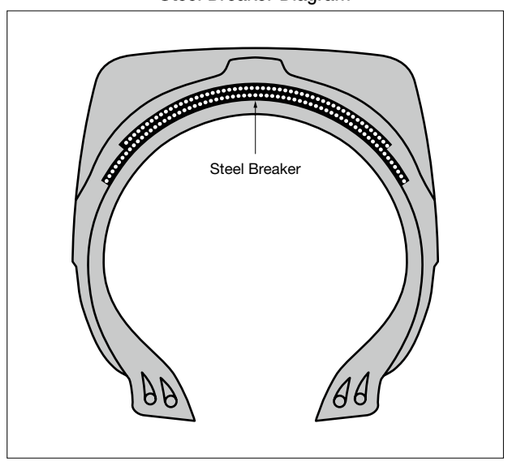
Structural Diagram of OFF-THE-ROAD BIAS TIRES

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

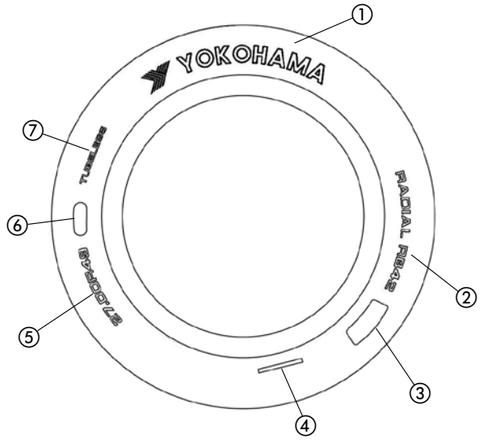
Steel Breakers(Bias Tires)

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 Breaker Diagram



■Tire Marking(Radial)



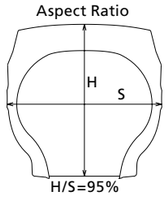
① Brand Name
② Tread Pattern Name
③ Tire Specification Code
④ Serial Number
⑤ Tire Size
⑥ Star Mark / Load Index & Speed Symbol
⑦ Tubeless or Tube Type

■Size Identification and Aspect Ratio

Narrow Base Tires

27.00 R 49 ☆☆ (Radial)

- Star Mark
- Rim Diameter (inches)
- Radial Construction
- Section Width (inches)



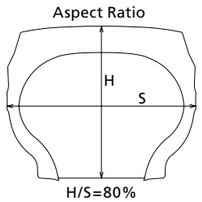
27.00-49 48PR (Bias)

- Ply Rating
- Rim Diameter (inches)
- Section Width (inches)

Wide Base Tires

29.5 R 25 ☆☆ (Radial)

- Star Mark
- Rim Diameter (inches)
- Radial Construction
- Section Width (inches)



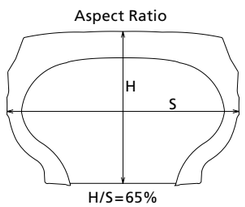
29.5-25 34PR (Bias)

- Ply Rating
- Rim Diameter (inches)
- Section Width (inches)

Super Wide Base Tires

750/65 R 25 ☆ (Radial)

- Star Mark
- Rim Diameter (inches)
- Radial Construction
- Aspect Ratio (65%)
- Section Width (mm)



45/65-45 58PR (Bias)

- Ply Rating
- Rim Diameter (inches)
- Aspect Ratio (65%)
- Section Width (inches)

Other Tires

445/95 R 25 174 F (Radial)

- Speed Symbol
- Load Index
- Rim Diameter (inches)
- Radial Construction
- Aspect Ratio (95%)
- Section Width (mm)

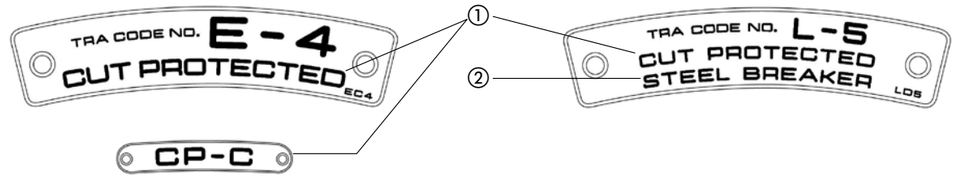
42×17-20 10PR (Bias)

- Ply Rating
- Rim Diameter (inches)
- Section Width (inches)
- Overall Diameter (inches)

Widths of narrow and wide base tires of the same diameter are shown below:

Narrow Base Tires	Wide Base Tires
13.00	15.5
14.00	17.5
16.00	20.5
18.00	23.5
21.00	26.5
24.00	29.5
27.00	33.5
30.00	37.5

■Tire Specification Code



① Tire Specification Code

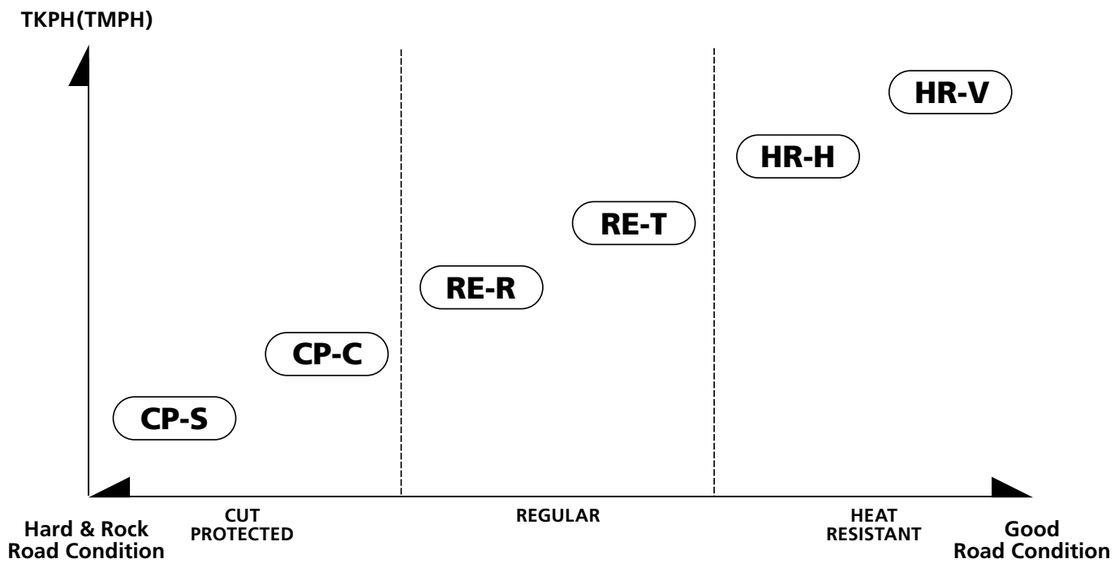
Code Type Ⅰ	Specification
CUT PROTECTED	Cut Resistance Type
REGULAR	Regular (Standard) Type
HEAT RESISTANT	Heat Resistance Type

Code Type Ⅱ	Specification
CP-S	Special Cut Resistance Type
CP-C	Cut Resistance Type
RE-R	Regular (Standard) Type
RE-T	Regular (Standard) Type With Heat Resistant
HR-H	Heat Resistance Type
HR-V	Special Heat Resistance Type

② Special Code

Code	Specification
FOR SDC RIM	Semi-Drop Center Rim Use Only
STEEL BREAKER	Steel Breaker For Bias Tires
WIDE STEEL BREAKER	Wide Steel Breaker For Bias Tires

Positioning Map of Tire Specification Code

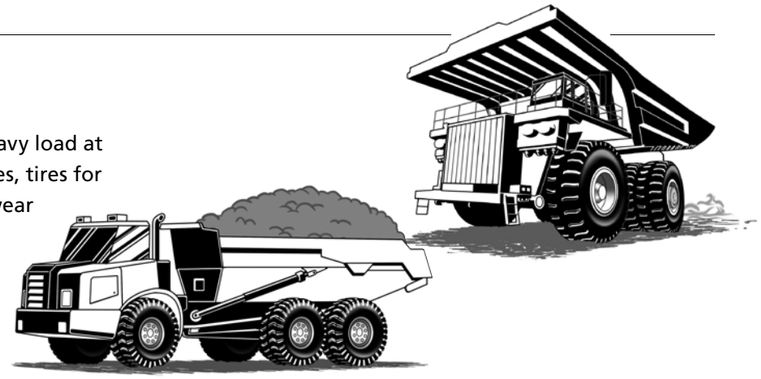


Tires by Type of Vehicle

YOKOHAMA OFF-THE-ROAD TIRES are also classified by type of vehicle and application suitable for usage.

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

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

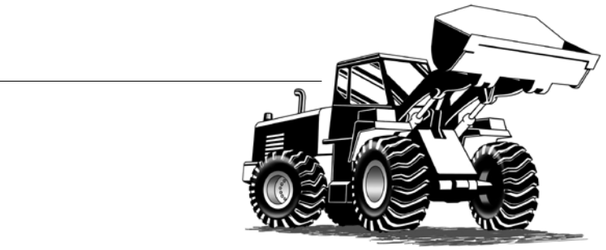


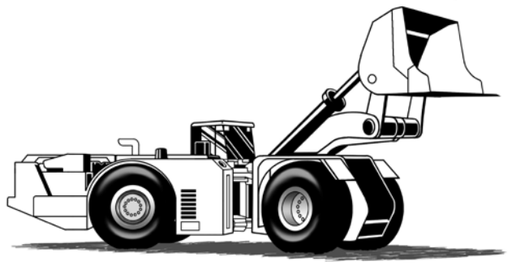
Scrapers
(TRA Codes E-2, E-3, E-4 and E-7)

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.



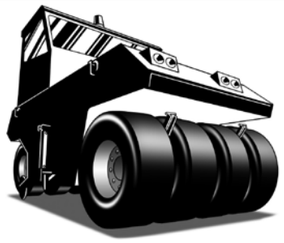


Tire Dozers
(TRA Codes L-2, L-3, L-4 and L-5)

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.

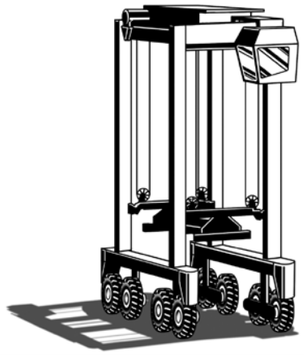


Tire Rollers
(TRA Code C-1)

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

Straddle Carriers
(TRA Code 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.

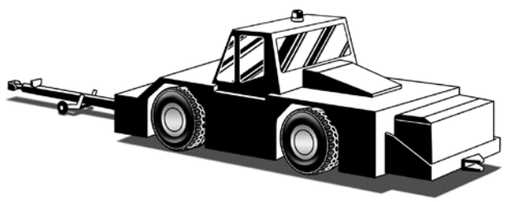


Rubber Tired Gantry Crane(RTG)
(TRA Codes IND-3 and IND-4)

Rubber tired gantry cranes are special cranes mainly used to load and unload containers at seaport areas. These tires require abrasion resistance and durability.

Towing Tractors
(TRA Code IND-3)

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



■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.

L I	kg	L I	kg	L I	kg	L I	kg	L I	kg	L I	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	121500
26	95	76	400	126	1700	176	7100	226	30000	276	125000
27	97	77	412	127	1750	177	7300	227	30750	277	128500
28	100	78	425	128	1800	178	7500	228	31500	278	132000
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		

Outline of OFF-THE-ROAD TIRES 1

■Speed Symbol

The Speed Symbol indicates the speed 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: Star 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	14.00R24	☆	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 28 PR	29.5R25	☆☆	UP T0 34 PR			
			14.00R25	☆☆☆	UP T0 32 PR			
			16.00R25	☆☆	UP T0 36 PR			
			18.00R33	☆☆	UP T0 40 PR			
			24.00R35	☆☆	UP T0 48 PR			
			27.00R49	☆☆	UP T0 54 PR			
			33.00R51	☆☆	UP T0 66 PR			

*Star Mark: The load capacity of a tire is indicated by the Star Mark in case of radial tire.

■Radial : Application

Earthmover

Tire Size	Star Mark	TRA Code / Pattern							
		E-3	E-3	E-3	E-4	E-4	E-4	E-4	E-4
		RT31	RB31	RL31	RT41	RL45	RB41	RB42	RL42
									
		Type							
		T/L	T/L	T/L	T/L	T/L	T/L	T/L	T/L
14.00R25NHS	☆☆☆						●		
16.00R25	☆☆						●		
18.00R33	☆☆							●	●
24.00R35	☆☆							●	●
27.00R49	☆☆							●	
33.00R51	☆☆							○	
17.5R25	☆☆		●	●					
20.5R25	☆☆	*●	●	●					
23.5R25	☆☆	●	●	*●	●				
750/65R25	☆☆	●							
26.5R25	☆☆	*●	●		●	●			
29.5R25	☆☆		●		●				

NHS : Not for highway service.
○ : Not available yet and YOKOHAMA will inform when available.
* : E-3+,Tread Depth 125% level
T/L : Tubeless Type

YOKOHAMA OFF-THE-ROAD TIRES 2

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 surfaces operation.

Use: Articulated dump trucks

RB31 E-3 ROCK

Specially designed for articulated dump trucks. Non-directional block pattern provides both abrasion resistance and excellent traction on soft surfaces.

Use: Articulated dump trucks

RL31 E-3 ROCK

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

Use: Articulated dump trucks

RT41 E-4 ROCK DEEP TREAD

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

Use: Articulated dump trucks

RL45 E-4 ROCK DEEP TREAD

Specially designed for articulated dump trucks. Non-directional block pattern provides both abrasion and cut resistance on rocky and gravel surfaces.

Use: Articulated dump trucks

RB41 E-4 ROCK DEEP TREAD

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

Use: Dump trucks

RB42 E-4 ROCK DEEP TREAD

Specially designed for dump trucks. Non-directional block pattern and deep tread provide both abrasive resistance and excellent traction on muddy and soft surfaces. High resistance to wearing ensures long tread life.

Use: Dump trucks

RL42 E-4 ROCK DEEP TREAD

Specially designed for dump trucks. Deep flush pattern and shoulder protector provide both abrasion and high cut resistance on rocky and gravel surfaces.

Use: Dump trucks

■Radial : Application

Loader & Dozer

Tire Size	Star Mark	TRA Code / Pattern						
		L-3	L-3	L-3	L-4	L-4	L-5	L-5
		RT31	RB31	RL31	RT41	RL45	RL51	RL52
								
		Type						
		T/L	T/L	T/L	T/L	T/L	T/L	T/L
17.5R25	☆		●	●				
20.5R25	☆	●	●	●				
23.5R25	☆	●	●	●	●		○	
750/65R25	☆	●						
26.5R25	☆	●	●		●	●		○
29.5R25	☆		●		●			

○ : Not available yet and YOKOHAMA will inform when available.
T/L : Tubeless Type

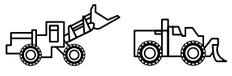
RT31 L-3 ROCK

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 

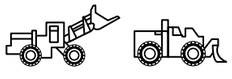
RB31 L-3 ROCK

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

Use: Loaders and Dozers 

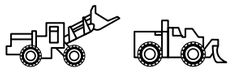
RL31 L-3 ROCK

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

Use: Loaders and Dozers 

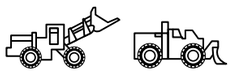
RT41 L-4 ROCK DEEP TREAD

Specially designed for wheel loaders & dozers. Non-directional block pattern provides both abrasion resistance and excellent traction on soft, rocky and gravel surfaces.

Use: Loaders and Dozers 

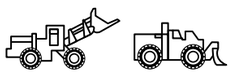
RL45 L-4 ROCK DEEP TREAD

Specially designed for wheel loaders & dozers. Non-directional block pattern provides both abrasion and cut resistance on rocky and graval surfaces.

Use: Loaders and Dozers 

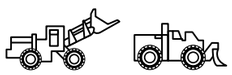
RL51 L-5 ROCK EXTRA DEEP TREAD

Specially designed for wheel loaders & dozers. The tread pattern is designed with a non-directional block pattern. It provides both abrasion resistance and excellent traction on soft, rocky and gravel surfaces. Also extra deep tread improves more cut resistance.

Use: Loaders and Dozers 

RL52 L-5 ROCK EXTRA DEEP TREAD

Specially designed for wheel loaders & dozers in highly abrasive conditions. Extra deep tread provides both abrasion and cut resistance.

Use: Loaders and Dozers 

■Radial : Application

Grader

Tire Size	Star Mark	TRA Code / Pattern
		G-2
		RT21
		
		Type
		T/L
14.00R24TG	☆	●

Mobile Crane

Tire Size	Star Mark LI/SS	Pattern				
		RB01		RB03		RS01
						
		Type				
		T/T	T/L	T/T	T/L	T/L
14.00R24NHS	☆☆☆	●		●		
385/95R25	170E		●		●	●
385/95R25	170F		○		○	
445/95R25	174F		●			
505/95R25	183E		●			

Industrial

Tire Size	Star Mark LI/SS	TRA Code / Pattern	
		IND-4	IND-4
		RL43	RR41
			
		Type	
		T/T	T/L
14.00R24NHS	☆☆☆ 186 A5	●	
16.00R25	☆☆☆		●

TG : Tractor-Grade tire. Not for highway service.
NHS : Not for highway service.
○ : Not available yet and YOKOHAMA will inform when available.
T/T : Tube Type T/L : Tubeless Type

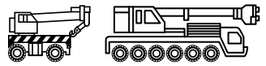
RT21 G-2 TRACTION

Non-directional block pattern provides good traction and flotation on soft, muddy surfaces as well as better self cleaning.

Use: Motor graders 

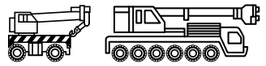
RB01 HIGHWAY USE

The RB01 is designed for highway use on mobile cranes. Excellent performance, even wear, and long tread life are provided by a new tread pattern and new rubber compound. Lower fuel consumption, reduced tire noise, better driving stability and improved high speed durability are achieved by adopting a tough casing construction.

Use: Wheel cranes and All-terrain cranes 

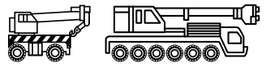
RB03 HIGHWAY USE

The RB03 is designed for highway use on wheel cranes and all-terrain cranes. A specially designed tread pattern and compound provide excellent performance, even wear, and long tread life. A tough casing construction and optimized rib pattern provide lower fuel consumption, reduced tire noise, better driving stability and improved high speed durability.

Use: Wheel cranes and All-terrain cranes 

RS01 HIGHWAY USE WINTER TRACTION

Specially designed for highway use on wheel crane and all-terrain crane. The RS01 provides winter traction as well as wear resistance.

Use: Wheel cranes and All-terrain cranes 

RL43 IND-4 DEEP TREAD

RL43 is designed for forklifts and terminal tractors.
This type provides better stability in heavy load operations.

Use: Forklifts 

RR41 IND-4 DEEP TREAD

RR41 is designed for yard service vehicles, especially straddle carriers.

Use: Straddle carriers 

YOKOHAMA OFF-THE-ROAD TIRES 2

■Radial : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Star Mark	Type T/T	Type T/L	TRA Code or Application	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
14.00R24TG	RT21	☆	-	○	G-2	1346	53.0	383	15.1	621	24.4	433	17.0	24.6	31	-	-	-	-	8.00TG
14.00R25NHS	RB41	☆☆☆	-	○	E-4	1405	55.3	393	15.5	652	25.7	431	17.0	38.0	48	82	119	REG	-	10.00-1.5
16.00R25	RB41	☆☆	-	○	E-4	1532	60.3	450	17.7	706	27.8	500	19.7	45.1	57	110	160	REG	-	11.25-2.0
																85	124	CP		
18.00R33	RB42	☆☆	-	○	E-4	1870	73.6	507	20.0	857	33.7	569	22.4	55.3	70	115	168	CP	-	13.00-2.5
	RL42					1860	73.2	507	20.0	854	33.6	569	22.4	50.0	63					
24.00R35	RB42	☆☆	-	○	E-4	2170	85.4	660	26.0	978	38.5	745	29.3	63.5	80	190	277	CP	-	17.00-3.5
																208	304	REG		
	RL42					2156	84.9	664	26.1	978	38.5	749	29.5	58.7	74	190	277	CP		
27.00R49	RB42	☆☆	-	○	E-4	2683	105.6	735	28.9	1220	48.0	830	32.7	73.7	93	295	430	CP	-	19.50-4.0
																367	535	REG		
*2 33.00R51	RB42	☆☆	-	○	E-4	3061	120.5	915	36.0	1380	54.3	1021	40.2	91.0	115	*3	*3	CP	-	24.00-5.0
																*3	*3	REG		
17.5R25	RB31	☆☆	-	○	E-3	1348	53.1	442	17.4	623	24.5	486	19.1	31.0	39	90	131	CP	-	14.00-1.5
		☆			L-3	1348	53.1	442	17.4	607	23.9	500	19.7	31.0	39	-	-			
	RL31	☆☆			E-3	1342	52.8	445	17.5	622	24.5	486	19.1	31.9	40	85	124			
		☆			L-3	1342	52.8	445	17.5	617	24.3	489	19.3	31.9	40	-	-			
20.5R25	RT31	☆☆	-	○	*1 E-3	1490	58.7	535	21.1	676	26.6	586	23.1	40.7	51	95	139	CP	-	17.00-2.0
		☆			*1 L-3	1490	58.7	535	21.1	658	25.9	610	24.0	40.7	51	-	-			
	RB31	☆☆			E-3	1476	58.1	530	20.9	676	26.6	586	23.1	33.8	43	105	153			
		☆			L-3	1476	58.1	530	20.9	658	25.9	610	24.0	33.8	43	-	-			
	RL31	☆☆			E-3	1496	58.9	536	21.1	686	27.0	571	22.5	35.1	44	93	135			
		☆			L-3	1496	58.9	536	21.1	673	25.1	595	23.4	35.1	44	-	-			
23.5R25	RT31	☆☆	-	○	E-3	1600	63.0	612	24.1	720	28.3	672	26.5	35.8	45	120	175	CP	-	19.50-2.5
		☆			L-3	1600	63.0	612	24.1	703	27.7	694	27.3	35.8	45	-	-			
	RB31	☆☆			E-3	1600	63.0	612	24.1	720	28.3	672	26.5	35.9	45	115	168			
		☆			L-3	1600	63.0	612	24.1	703	27.7	694	27.3	35.9	45	-	-			
	RL31	☆☆			*1 E-3	1600	63.0	640	25.2	720	28.3	665	26.2	40.7	51	100	146			
		☆			*1 L-3	1600	63.0	640	25.2	703	27.7	682	26.9	40.7	51	-	-			
	RT41	☆☆			E-4	1614	63.5	606	23.9	728	28.7	674	26.5	54.0	68	95	139			
																85	123	CPUG		
		☆			L-4	1614	63.5	606	23.9	708	27.9	691	27.2	54.0	68	-	-	CP		
	RL51	☆			*2 L-5	1658	65.3	621	24.4	740	29.1	694	27.3	78.3	99	-	-			
750/65R25	RT31	☆☆	-	○	E-3	1625	64.0	750	29.5	730	28.7	817	32.2	43.7	55	154	225	CP	-	24.00-3.0
		☆			L-3	1625	64.0	750	29.5	707	27.8	835	32.9	43.7	55	-	-			

Tire Size	Pattern	Application Max Speed km/h mph	Tire Load Limits at Various Cold Inflation Pressures															
14.00R24TG	RT21	Grader	kPa	200	225	250	275	300	325	350	**375**							
			psi	*29*	*33*	*36*	*40*	*44*	*47*	*51*	***54***							
		40	kg	2240	2430	2650	2800	3000	3250	3350	**3650☆1**							
		25	*lbs*	*4940*	*5360*	*5840*	*6150*	*6600*	*7150*	*7400*	***8050☆1***							
14.00R25NHS	RB41	Earthmover	kPa	450	475	500	525	550	575	600	625	650	675	700	725	750	775	**800**
			psi	*65*	*69*	*73*	*76*	*80*	*83*	*87*	*91*	*94*	*98*	*102*	*105*	*109*	*112*	***115***
		50	kg	4000	4125	4375	4500	4625	4750	5000	5150	5300	5450	5600	5710	5830	5940	**6050☆3**
		30	*lbs*	*8800*	*9100*	*9650*	*9900*	*10200*	*10500*	*11000*	*11400*	*11700*	*12000*	*12300*	*12500*	*12800*	*13100*	***13400☆3***
16.00R25	RB41	Earthmover	kPa	450	475	500	525	550	575	600	625	650	675	**700**				
			psi	*65*	*69*	*73*	*76*	*80*	*83*	*87*	*91*	*94*	*98*	***102***				
		50	kg	5150	5450	5600	5800	6000	6300	6500	6700	6900	7100	**7300☆2**				
		30	*lbs*	*11400*	*12000*	*12300*	*12800*	*13200*	*13900*	*14300*	*14800*	*15200*	*15700*	***16100☆2***				
18.00R33	RB42 RL42	Earthmover	kPa	450	475	500	525	550	575	600	625	650	675	**700**				
			psi	*65*	*69*	*73*	*76*	*80*	*83*	*87*	*91*	*94*	*98*	***102***				
		50	kg	7750	8000	8500	8750	9000	9250	9750	10000	10300	10600	**10900☆2**				
		30	*lbs*	*17100*	*17600*	*18700*	*19300*	*19800*	*20400*	*21500*	*22000*	*22700*	*23400*	***24000☆2***				
24.00R35	RB42 RL42	Earthmover	kPa	450	475	500	525	550	575	600	625	650	675	**700**				
			psi	*65*	*69*	*73*	*76*	*80*	*83*	*87*	*91*	*94*	*98*	***102***				
		50	kg	13200	13600	14000	14500	15500	16000	16500	17000	17500	18000	**18500☆2**				
		30	*lbs*	*29100*	*30000*	*30900*	*32000*	*34200*	*35300*	*36400*	*37500*	*38600*	*39700*	***40800☆2***				
27.00R49	RB42	Earthmover	kPa	450	475	500	525	550	575	600	625	650	675	**700**				
			psi	*65*	*69*	*73*	*76*	*80*	*83*	*87*	*91*	*94*	*98*	***102***				
		50	kg	19500	20000	20600	21800	22400	23000	23600	25000	25750	26500	**27250☆2**				
		30	*lbs*	*43000*	*44100*	*45400*	*48100*	*49400*	*50700*	*52000*	*55100*	*56800*	*58400*	***60000☆2***				
33.00R51	RB42	Earthmover	kPa	450	475	500	525	550	575	600	625	650	675	**700**				
			psi	*65*	*69*	*73*	*76*	*80*	*83*	*87*	*91*	*94*	*98*	***102***				
		50	kg	27250	29000	30000	30750	32500	33500	34500	35500	36500	37500	**38750☆2**				
		30	*lbs*	*60000*	*64000*	*66000*	*68000*	*71500*	*74000*	*76000*	*78500*	*80500*	*82500*	***85500☆2***				
17.5R25	RB31 RL31	Earthmover	kPa	275	300	325	350	375	400	425	450	475	500	**525**				
			psi	*40*	*44*	*47*	*51*	*54*	*58*	*62*	*65*	*69*	*73*	***76***				
		50	kg	3350	3550	3750	4000	4125	4375	4625	4750	5000	5150	**5450☆2**				
		30	*lbs*	*7400*	*7850*	*8250*	*8800*	*9100*	*9650*	*10200*	*10500*	*11000*	*11400*	***12000☆2***				
		Loader & Dozer	kPa						400	425	450	475	**500**					
			psi						*58*	*62*	*65*	*69*	***73***					
		10	kg						6000	6150	6500	6700	**7100☆1**					
		5	*lbs*						*13200*	*13600*	*14300*	*14800*	***15700☆1***					
20.5R25	RT31 RB31 RL31	Earthmover	kPa	275	300	325	350	375	400	425	450	475	500	**525**				
			psi	*40*	*44*	*47*	*51*	*54*	*58*	*62*	*65*	*69*	*73*	***76***				
		50	kg	4375	4750	5000	5300	5600	5800	6150	6500	6700	6900	**7300☆2**				
		30	*lbs*	*9650*	*10500*	*11000*	*11700*	*12300*	*12800*	*13600*	*14300*	*14800*	*15200*	***16100☆2***				
		Loader & Dozer	kPa						400	425	450	475	**500**					
			psi						*58*	*62*	*65*	*69*	***73***					
		10	kg						8000	8250	8750	9000	**9500☆1**					
		5	*lbs*						*17600*	*18200*	*19300*	*19800*	***20900☆1***					
23.5R25	RT31 RB31 RL31 RT41	Earthmover	kPa	275	300	325	350	375	400	425	450	475	500	**525**				
			psi	*40*	*44*	*47*	*51*	*54*	*58*	*62*	*65*	*69*	*73*	***76***				
		50	kg	5600	6000	6500	6700	7100	7500	7750	8250	8500	9000	**9250☆2**				
		30	*lbs*	*12300*	*13200*	*14300*	*14800*	*15700*	*16500*	*17100*	*18200*	*18700*	*19800*	***20400☆2***				
	RT31 RB31 RL31 RT41 RL51	Loader & Dozer	kPa						400	425	450	475	**500**					
			psi						*58*	*62*	*65*	*69*	***73***					
		10	kg						10300	10600	11200	11500	**12150☆1**					
		5	*lbs*						*22700*	*23400*	*24700*	*25400*	***26800☆1***					
750/65R25	RT31	Earthmover	kPa	275	300	325	350	375	400	425	450	**475**						
			psi	*40*	*44*	*47*	*51*	*54*	*58*	*62*	*65*	***69***						
		50	kg	6900	7300	7750	8250	8750	9250	9750	10300	**10600☆2**						
		30	*lbs*	*15200*	*16100*	*17100*	*18200*	*19300*	*20400*	*21500*	*22700*	***23400☆2***						
		Loader & Dozer	kPa						400	425	450	**475**						
			psi						*58*	*62*	*65*	***69***						
		10	kg						13200	13600	14500	**15000☆1**						
		5	*lbs*						*29100*	*30000*	*32000*	***33100☆1***						

*1 E-3+, L-3+, Tread Depth 125% level
*2 Not available yet and YOKOHAMA will inform when available.
*3 Not fixed yet and YOKOHAMA will inform when available.

TG : Tractor-Grade tire. Not for highway service.
NHS : Not for highway service.

• Type T/T : Tube Type T/L : Tubeless Type
• Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant CPUG : Cut Protected for Underground

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Radial : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Star Mark	Type T/T	Type T/L	TRA Code or Application	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
26.5R25	RT31	☆☆	-	○	*1 E-3	1730	68.1	671	26.4	778	30.6	748	29.4	45.6	57	125	182	CP	-	22.00-3.0
		☆			*1 L-3	1730	68.1	671	26.4	760	29.9	765	30.1	45.6	57	-	-			
	RB31	☆☆			E-3	1730	68.1	671	26.4	785	30.9	744	29.3	38.8	49	125	182			
		☆			L-3	1730	68.1	671	26.4	763	30.0	760	30.0	38.8	49	-	-			
	RT41	☆☆			E-4	1732	68.2	670	26.4	781	30.7	740	29.1	60.1	76	110	160			
																98	143	CPUG		
		☆			L-4	1732	68.2	670	26.4	757	29.8	761	30.0	60.1	76	-	-	CP		
	RL45	☆☆			E-4	1760	69.3	675	26.6	796	31.3	744	29.3	60.1	76	110	160			
		☆			L-4	1760	69.3	675	26.6	776	30.6	769	30.3	60.1	76	-	-			
	RL52	☆			*2 L-5	1784	70.2	697	27.4	800	31.5	737	29.0	96.0	121	-	-			
29.5R25	RB31	☆☆	-	○	E-3	1850	72.8	760	29.9	831	32.7	842	33.1	48.0	60	185	270	CP	-	25.00-3.5
		☆			L-3	1850	72.8	760	29.9	806	31.7	866	34.1	48.0	60	-	-			
	RT41	☆☆			E-4	1865	73.4	760	29.9	846	33.3	833	32.8	65.0	82	140	204			
																125	182	CPUG		
		☆			L-4	1865	73.4	760	29.9	833	32.8	855	33.7	65.0	82	-	-	CP		

Tire Size	Pattern	Application	Max Speed km/h mph	Tire Load Limits at Various Cold Inflation Pressures											
26.5R25	RT31 RB31 RT41 RL45	Earthmover		kPa	275	300	325	350	375	400	425	450	475	500	**525**
				psi	40	44	47	51	54	58	62	65	69	73	**76**
		50		kg	7100	7500	8000	8500	9000	9500	9750	10300	10600	11200	**11500☆2**
		30		lbs	15700	16500	17600	18700	19800	20900	21500	22700	23400	24700	**25400☆2**
	RT31 RB31 RT41 RL45 RL52	Loader & Dozer		kPa						400	425	450	475	**500**	
				psi						58	62	65	69	**73**	
		10		kg						12850	13200	14000	14500	**15000☆1**	
		5		lbs						28300	29100	30900	32000	**33100☆1**	
29.5R25	RB31 RT41	Earthmover		kPa	275	300	325	350	375	400	425	450	475	500	**525**
				psi	40	44	47	51	54	58	62	65	69	73	**76**
		50		kg	8500	9250	9750	10300	10900	11500	11800	12500	12850	13600	**14000☆2**
		30		lbs	18700	20400	21500	22700	24000	25400	26000	27600	28300	30000	**30900☆2**
		Loader & Dozer		kPa						400	425	450	475	**500**	
				psi						58	62	65	69	**73**	
		10		kg						15500	16000	17000	17500	**18000☆1**	
		5		lbs						34200	35300	37500	38600	**39700☆1**	

*1 E-3+, L-3+, Tread Depth 125% level
*2 Not available yet and YOKOHAMA will inform when available.

Application : Mobile Crane

Tire Size	Pattern	Star Mark LI/SS	Type T/T	Type T/L	TRA Code or Application	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
14.00R24NHS	RB01	☆☆☆	○	-	Mobile Crane	1353	53.3	384	15.1	625	24.6	424	16.7	22.5	28	-	-	-	14.00R24/25	10.00W
	RB03					1352	53.2	377	14.8	628	24.7	418	16.5	23.8	30					
385/95R25	RB01	170E	-	○	Mobile Crane	1353	53.3	384	15.1	629	24.8	420	16.5	22.5	28	-	-	-	-	10.00-1.5
		*2 170F																		
	RB03	170E				1352	53.2	377	14.8	633	24.9	414	16.3	23.8	30					
		*2 170F																		
	RS01	170E				1350	53.1	380	15.0	628	24.7	417	16.4	24.0	30					
445/95R25	RB01	174F	-	○	Mobile Crane	1485	58.5	445	17.5	690	27.2	487	19.2	23.3	29	-	-	-	-	11.25-2.0
505/95R25	RB01	183E	-	○	Mobile Crane	1602	63.1	513	20.2	739	29.1	566	22.3	25.2	32	-	-	-	-	13.00-2.5

Tire Size	Pattern	Star Mark LI/SS	kPa psi	Tire Load Limits at Various Speeds											
14.00R24NHS	RB01 RB03	☆☆☆	900 130	km/h	0	Creep	5	10	40	**45**	50				
				mph	Stationary	Creep	3	5	25	**28**	30				
				kg	16300	13200	11700	10100	6800	**6500☆3**	6200				
				lbs	35900	29100	25800	22300	15000	**14300☆3**	13700				
385/95R25	RB01 RB03 RS01	170E	900 130	km/h	0	Creep	5	10	30	40	50	60	**70**	80	90	100
				mph	Stationary	Creep	3	5	20	25	30	37	**43**	50	56	62
				kg	18200	14800	13100	11300	7800	7400	7100	6700	**6000(170E)**	4900	4200	3600
				lbs	40100	32600	28900	24900	17200	16300	15700	14800	**13200(170E)**	10800	9300	7900
	RB01 RB03	170F		km/h	0	Creep	5	10	30	40	50	60	70	**80**	90	100
				mph	Stationary	Creep	3	5	20	25	30	37	43	**50**	56	62
				kg	15000	---	12600	10800	7500	6900	6700	6600	6300	**6000(170F)**	5600	5100
				lbs	33100	---	27800	23800	16500	15200	14800	14600	13900	**13200(170F)**	12300	11200
445/95R25	RB01	174F	900 130	km/h	0	Creep	5	10	30	40	50	60	70	**80**	90	100
				mph	Stationary	Creep	3	5	20	25	30	37	43	**50**	56	62
				kg	16800	---	14100	12100	8400	7700	7500	7400	7000	**6700(174F)**	6300	5700
				lbs	37000	---	31100	26700	18500	17000	16500	16300	15400	**14800(174F)**	13900	12600
505/95R25	RB01	183E	800 116	km/h	0	Creep	5	10	30	40	50	60	**70**	80	90	100
				mph	Stationary	Creep	3	5	20	25	30	37	**43**	50	56	62
				kg	26500	21500	19100	16500	11400	10900	10300	9800	**8750(183E)**	7200	6100	5300
				lbs	58400	47400	42100	36400	25100	24000	22700	21600	**19300(183E)**	15900	13400	11700

*2 Not available yet and YOKOHAMA will inform when available.

NHS : Not for highway service.
• Type T/T : Tube Type T/L : Tubeless Type
• Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant CPUG : Cut Protected for Underground

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Radial : Technical Data

TRA Code : IND

Tire Size	Pattern	Star Mark LI/SS	Type *4 T/T	Type *4 T/L	TRA Code or Application	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
14.00R24NHS	RL43	☆☆☆ 186A5	○	-	IND-4	1379	54.3	375 (365)	14.8 (14.4)	610	24.0	431 (421)	16.9 (16.6)	48.0	61	-	-	-	14.00R24	10.00W (9.00V)
16.00R25	RR41	☆☆☆	-	○	IND-4	1499	59.0	423	16.7	656	25.8	497	19.6	52.4	66	-	-	-	-	11.25-2.0

Tire Size	Pat-tern	Star Mark LI/SS		kPa psi	Tire Load Limits at Various Speeds							
14.00R24NHS	RL43	☆☆☆ 186A5	Load Wheel	1000 145	km/h	0	Creep	5	10	15	20	25
					mph	*Stationary*	*Creep*	*3*	*5*	*9*	*12*	*19*
					kg	18000	16000	14500	13500	13000	12700	12500
					lbs	*39700*	*35300*	*32000*	*29800*	*28700*	*28000*	*27600*
			Steer Wheel	1000 145	km/h	0	Creep	5	10	15	20	25
					mph	*Stationary*	*Creep*	*3*	*5*	*9*	*12*	*19*
					kg	14400	12800	11600	10800	10400	10200	10000
					lbs	*31700*	*28200*	*25600*	*23800*	*22900*	*22500*	*22000*
16.00R25	RR41	☆☆☆		1000 145	km/h	0	Creep	5	10	15	20	25
					mph	*Stationary*	*Creep*	*3*	*5*	*9*	*12*	*19*
					kg	22300	19800	18000	16700	16100	15700	15500
					lbs	*49200*	*43700*	*39700*	*36800*	*35500*	*34600*	*34200*

NHS : Not for highway service.
• Type T/T : Tube Type T/L : Tubeless Type
• Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant CPUG : Cut Protected for Underground

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Appendix(Radial)

Haulage Service (OFF-THE-ROAD for Dump Trucks & Scrapers)

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

Wide Base Radial Ply Tires

Conventional Radial Ply Tires

NOTES 1. Bold face figures denote maximum load for symbols shown.
2. For 65 km/h (40 mph) maximum speed, the loads must be reduced 12% with no change in inflation pressure.
3. When haul length exceeds 4 km one way, consult your YOKOHAMA service representative.

Slow Speed Service (OFF-THE-ROAD for Loaders & Dozers)

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

Wide Base Radial Ply Tires

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 speeds:

Max. Speed	% Load Change From 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%

4. Creep
This is movement of equipment at very slow speed (not over 60 m (200 feet) in 30 minutes). During creep motion, loads on the tires are very high and consideration must be given to the type of surface over which the equipment is traveling.

Tractor & Grader Service (OFF-THE-ROAD)

40 KPH (25 MPH) Maximum speed Distance: Unlimited

Conventional Radial Ply Tires

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.
4. For tire load limits at various speeds with no increase in inflation pressure:

Max. Speed	% Change To Loads In Table
40 km/h (25 mph)	No Change
50 km/h (30 mph)	-9%
60 km/h (35 mph)	-18%
65 km/h (40 mph)	-27%

Highway Service (OFF-THE-ROAD for Mobile / Wheeled Cranes)

Size Conversion Table

Metric	Inch
385/95R24, 25	14.00R24, 25
445/95R25	16.00R25
505/95R25	18.00R25

NOTES: Bold face figures denote maximum load for symbols shown.

Industrial Service (OFF-THE-ROAD for Smooth Floors & Runways Use)

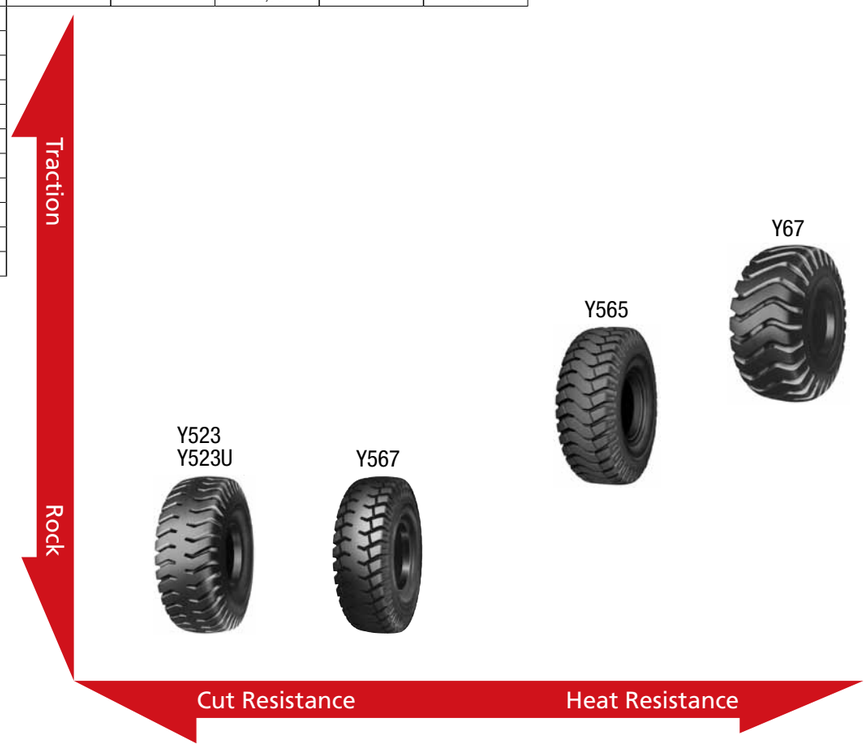
NOTES 1. Industrial Vehicle
Consists of usage on vehicles such as counterbalanced lift trucks, container handlers, straddle carriers, aircraft tow tractors, log stackers and rough terrain trucks.
2. Smooth Floors and Runways
These are defined as paved or protected operating surfaces which are free of undulations, obstructions or discontinuities.
3. Creep
This is movement of equipment at very slow speed (not over 60 m (200 feet) in 30 minutes). During creep motion, loads on the tires are very high and consideration must be given to the type of surface over which the equipment is traveling.
Check maximum air pressure requirements of rims and wheels to ensure ability to accommodate correct air pressure of tire.

■Bias : Application

Earthmover

Tire Size	TRA Code / Pattern						
	E-3		E-3	E-4		E-4	E-4
	Y67		Y565	Y523		Y523U	Y567
							
	Ply Rating & Type						
	T/T	T/L	T/L	T/T	T/L	T/L	T/L
10.00-20NHS	14,24						
11.00-20NHS	14						
12.00-20NHS	16,18,24,28*						
14.00-20NHS	32						
12.00-24NHS	16,20						
14.00-24NHS	20,24,28						
16.00-24NHS	24	24					
14.00-25NHS	20	20,24					
16.00-25	24*,28	24*,28*,32			24,28		
18.00-25	32	32,40		32	32,40		
21.00-25	24	24					
18.00-33		28,32,36			32,36,40	32	
21.00-35					36*,40		
24.00-35					36,42*,48		
24.00-49					42,48		
27.00-49		48			42,48*		
30.00-51					46,52		
33.00-51					50*,58		50*,58
36.00-51			58,66		50,58,66		
40.00-57					68,76		68
20.5-25		28					
23.5-25		32					
26.5-25		26					
29.5-25		28,34					
26.5-29		26					
29.5-29		28,34*					
33.25-29		26,32*					
29.5-35		34					
33.25-35		32,38					
37.25-35		30,36*					
37.5-39		44,52*					

* Steel breaker construction available.

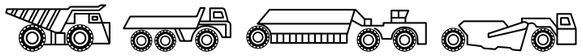


NHS : Not for highway service.
T/T : Tube Type T/L : Tubeless Type

Y67 E-3 ROCK

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

Use: Dump trucks and Scrapers



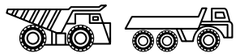
Y565 E-3 ROCK

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

Use: Dump trucks 

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 

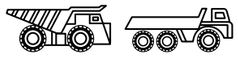
Y523U E-4 ROCK DEEP TREAD

Specially designed for short haul operation.

Use: Dump trucks 

Y567 E-4 ROCK DEEP TREAD

Specially designed for long haul operation. Less heat buildup enables smooth running over longer distances than the deep tread(Y523 E-4) type.

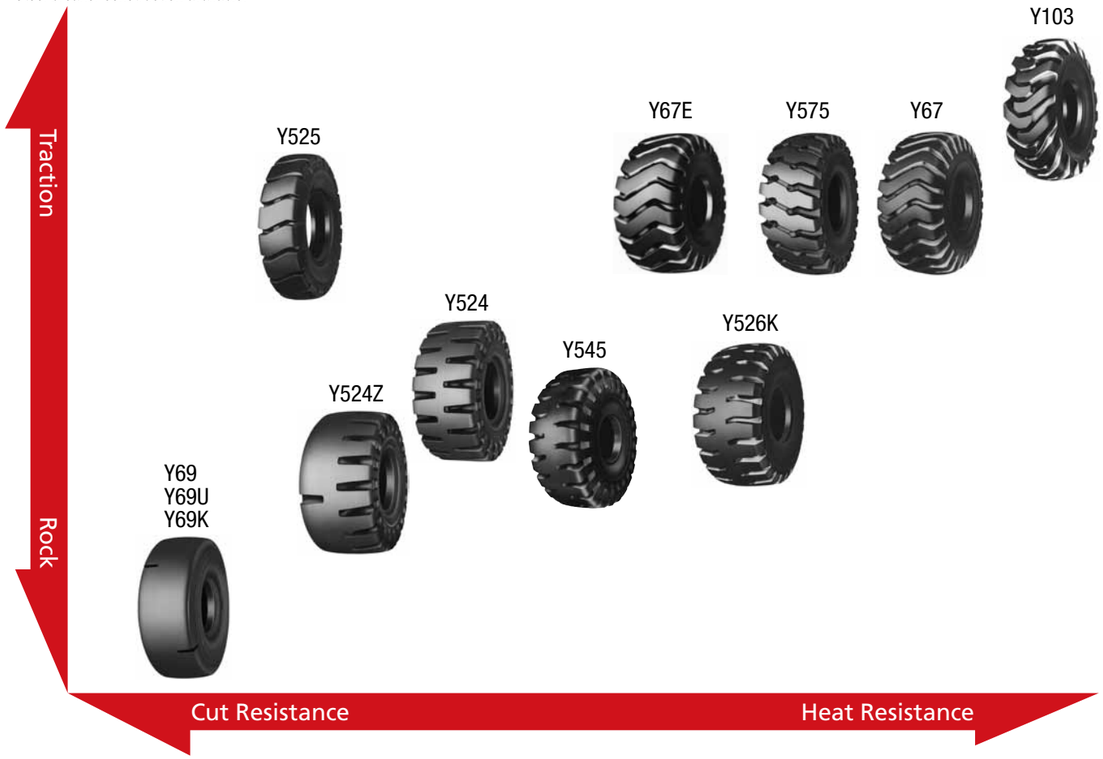
Use: Dump trucks 

■Bias : Application

Loader & Dozer

Tire Size	TRA Code / Pattern									
	L-2		L-2		L-3		L-3		L-3	
	Y103		Y548		Y67		Y526K		Y575	
										
	Ply Rating & Type									
	T/T	T/L	T/T	T/L	T/T	T/L	T/T	T/L	T/T	T/L
12.5/70-16		6		6						
10-16.5NHS	4	4,6								
13.5-20	14									
42×17-20	10									
17.5/65-20		10		10						
16.9-24	10,12	10,12	10	10,12	10*	10*				
18.4-24	10	10		10						
10.00-20NHS	8,10,14									
12.00-24NHS					16,20					
13.00-24TG					12	16*				
13.00-24NHS					18					
14.00-24TG	12	12			12*,16	12*,16				
14.00-24NHS					20,24					
16.00-24TG	16	16								
18.00-25					16	16				
15.5-25		12			12	12				
17.5-25	12,16	12,16	12,16	12,16	12*,16	12*,16			12	12*,16
20.5-25		12,16	12,16,20	12,16,20	12,16,20	12,16,20	16,20	16*,20	12*,16*,20	12*,16*,20
23.5-25		12,16			12,16,20,24	16*,20,24	16*,20	16*,20*	16*,20	12,16*,20*,24
26.5-25					20,24	16,20,24,26,28			20,24*	16,20*,24,28
29.5-25						22,28				22*,28*,34*
29.5-29						28				

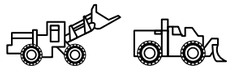
* Steel breaker construction available.



TG : Tractor-Grade tire. Not for highway service. NHS : Not for highway service.
T/T : Tube Type T/L : Tubeless Type

Y103 L-2 TRACTION

Good traction and flotation on muddy ground. Its directional tread pattern produce self cleaning action.

Use: Loaders and Dozers 

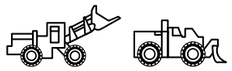
Y548 L-2 SNOW

Specially designed for operation on snowy roads, directional tread pattern provides excellent traction and pulling performance.

Use: Loaders 

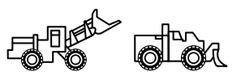
Y67 L-3 ROCK

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 

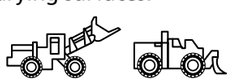
Y526K L-3 ROCK

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

Use: Loaders and Dozers to be used in quarries 

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.

Use: Loaders and Dozers 

■Bias : Application

Loader & Dozer

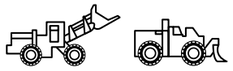
Tire Size	TRA Code / Pattern							
	L-4	L-4		L-5		L-5	L-5	L-5
	Y67E	Y545		Y524		**Y524	Y524Z	Y525
								
	Ply Rating & Type							
	T/L	T/T	T/L	T/T	T/L	T/L	T/L	T/T
12.00-24NHS								20
17.5-25	12							
20.5-25						12,16,20		
23.5-25		16	16*,20*,24	24	16,20,24			
26.5-25			20,24,26,32			20,24,26,28,32*,36		
29.5-25			22,28			22,28*		
29.5-29	28				22,28,34*			
35/65-33			24*,30*,36*,42*,48			24*,30*,36*,42*,48*	24*,30,36*,42*	
40/65-39						30*,36*,56*		
45/65-45			50,58*			38*,46*,50*,58*	38*,46,50,58*	

** Y524 with side protector
* Steel breaker construction available.

NHS : Not for highway service.
T/T : Tube Type T/L : Tubeless Type

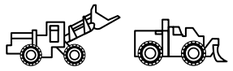
Y67E L-4 ROCK DEEP TREAD

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

Use: Loaders and Dozers 

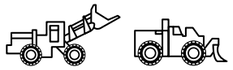
Y545 [with side protector] L-4 ROCK DEEP TREAD

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

Use: Loaders and Dozers 

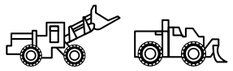
Y524 L-5 ROCK EXTRA DEEP TREAD

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

Use: Loaders and Dozers 

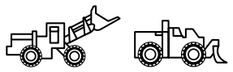
Y524 [with side protector] L-5 ROCK EXTRA DEEP TREAD

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

Use: Loaders and Dozers 

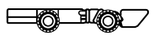
Y524Z L-5 HALF SLICK EXTRA DEEP TREAD

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

Use: Loaders and Dozers 

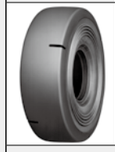
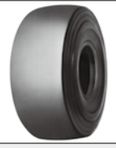
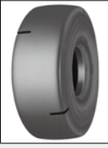
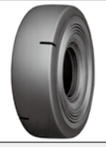
Y525 L-5 ROCK EXTRA DEEP TREAD

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

Use: Loaders for underground mines 

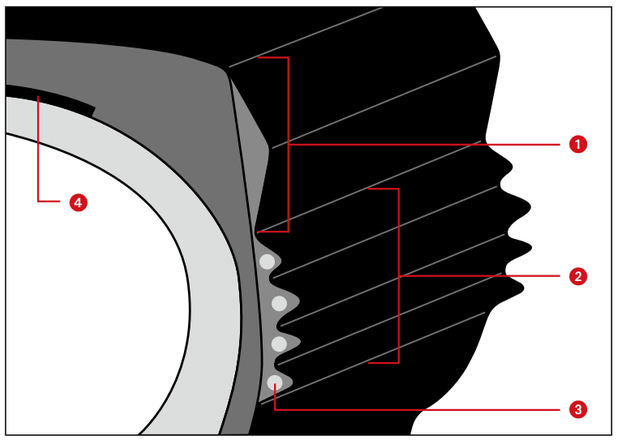
■Bias : Application

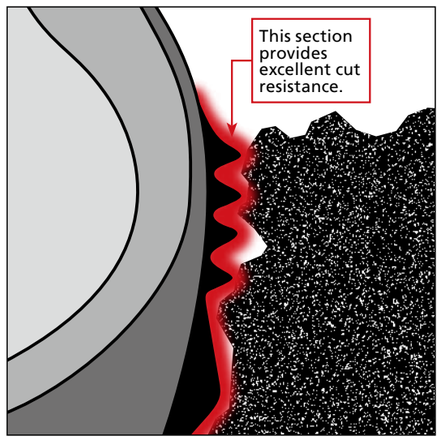
Loader & Dozer

Tire Size	TRA Code / Pattern					
	L-4S	L-5S		L-5S	L-5S	
	Y69U	Y69		Y69K	Y69U	
						
	Ply Rating & Type					
	T/T	T/T	T/L	T/L	T/T	T/L
12.00-24NHS	16*	16,20			16*	
14.00-24NHS		20,24				
16.00-25			24			
18.00-25		28	24,28,32	28*,32		24*,28*,32*
17.5-25		20	16,20,28			20*
20.5-25		16	16,28			
23.5-25		28	20			
26.5-25			28,32,36	26,32,36		28*,32*
29.5-29				34,40*		

* Steel breaker construction available.

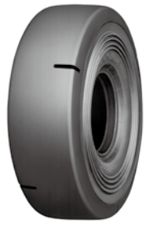
Construction of ZSC





1. Buttress Shoulder Profile
2. Special Reinforcement (Wavy Side +ZSC)
3. ZSC or Cable Wires
4. Steel Breaker Construction

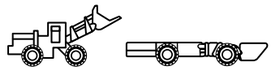
NHS : Not for highway service.
T/T : Tube Type T/L : Tubeless Type

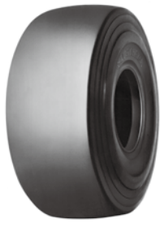


Y69U [with ZSC side protector] L-4S SMOOTH DEEP TREAD

Specially developed for underground vehicle. Unique wavy side profile with special reinforcement(*ZSC) provides excellent sidewall cut resistance.

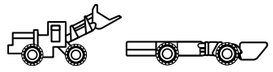
*ZSC : Zeon Super Composite

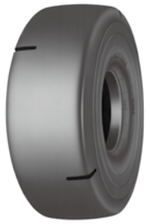
Use: Loaders and Underground vehicles 



Y69 L-5S SMOOTH EXTRA DEEP TREAD

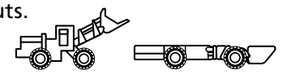
Extra deep tread and reinforced sidewalls offer superior resistance to damage and wear.

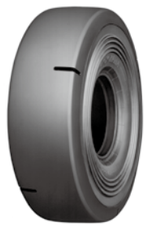
Use: Loaders and Underground vehicles 



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 increases resistance to cuts.

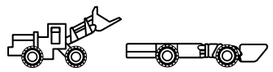
Use: Loaders and Underground vehicles 



Y69U [with ZSC side protector] L-5S SMOOTH EXTRA DEEP TREAD

Specially developed for underground vehicle. Unique wavy side profile with special reinforcement(*ZSC) provides excellent sidewall cut resistance.

*ZSC : Zeon Super Composite

Use: Loaders and Underground vehicles 

■Bias : Application

Grader

Tire Size	TRA Code / Pattern			
	G-2		G-3	
	Y103		Y67	
				
	Ply Rating & Type			
	T/T	T/L	T/T	T/L
11.00-20TG	10,12			
12.00-24TG	12			
13.00-24TG	8,10,12	8,10,12	12	12
14.00-24TG	10,12,14,16,20	10,12	12*,16	12*,16
16.00-24TG		12	12,16	16
18.00-25				16
17.5-25		12		

* Steel breaker construction available.

Compactor

Tire Size	TRA Code / Pattern
	C-1
	Y69
	
	Ply Rating & Type
	T/T
7.50-16NHS	6
9.00-20NHS	10
11.00-20NHS	14
14/70-20NHS	12
15.0-20NHS	16

TG : Tractor-Grade tire. Not for highway service.
NHS : Not for highway service.
T/T : Tube Type T/L : Tubeless Type

Y103 G-2 TRACTION

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

Use: Motor graders 

Y67 G-3 ROCK

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

Use: Motor graders 

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 vary greatly.

Use: Tire rollers 

■Bias : Application

Industrial

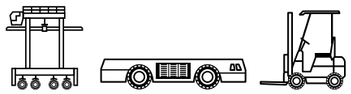
Tire Size	TRA Code / Pattern												
	IND-3	IND-3		IND-3		IND-3		IND-3	IND-4	IND-4	IND-4		IND-4
	Y92	Y67		Y69PS		Y505		Y573	Y523	Y523U	Y69		Y505
													
	Ply Rating & Type												
	T/T	T/T	T/L	T/T	T/L	T/T	T/L	T/L	T/L	T/L	T/T	T/L	T/L
11.00-20NHS		16,18											
12.00-20NHS		18,20,22											
12.00-24NHS		20,28				20					18,20		
13.00-24NHS		18,20											
14.00-24NHS	24,28	20,24,28	28			28	28				30		
14.00-25NHS		24	24*										
16.00-25		28	28,32,36	28,32	28,32				36				
18.00-25		32,36	32,36,40						32,36,40			36,40	40
21.00-25			36,40									40	
24.00-29			42										
18.00-33									36,40*	40		40	
21.00-35			40									42	
24.00-35			42,48						42				
27.00-49									42				
33.00-51									58				
36.00-51									58,72				
40.00-57									68*,76				
17.5-25								36					
29.5-25			34										
33.25-35			44										

* Steel breaker construction available.

Y92 IND-3

The Y92 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.

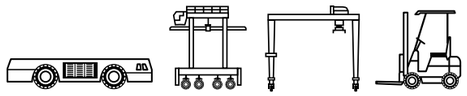
Use: Straddle carriers, Towing tractors and Forklifts



Y67 IND-3

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

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

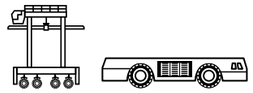


NHS : Not for highway service.
T/T : Tube Type T/L : Tubeless Type

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



Y505 IND-3

The Y505 is designed specially for reach stackers and container handlers. This tire provides excellent durability performance with good tread wear resistance and less uneven tread wear.

Use: Container handlers, Forklifts and Reach stackers.

Y573 IND-3

The Y573 is designed specially for towing tractors. This tire provides excellent wear resistance and good traction performance.

Use: Towing tractors

Y523 IND-4 DEEP TREAD

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

Use: Log stackers and Log handlers

Y523U IND-4 DEEP TREAD

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

Use: Log stackers and Log handlers

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

Y505 IND-4 DEEP TREAD

The Y505 is designed specially for reach stackers and container handlers. This tire provides excellent durability performance with good tread wear resistance and less uneven tread wear.

Use: Container handlers, Forklifts and Reach stackers.

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
12.5/70-16	Y103	6	-	○	L-2	860	33.9	316	12.4	389	15.3	329	13.0	21.7	27	-	-	-	-	10LB
	Y548					855	33.7	321	12.6	388	15.3	337	13.3	21.8	27					
*10-16.5NHS	Y103	4	○	○	L-2	772	30.4	275	10.8	350	13.8	286	11.3	18.8	24	-	-	-	10-16.5	8.25
		6	-	○															-	
*13.5-20	Y103	14	○	-	L-2	1075	42.3	344	13.5	483	19.0	368	14.5	23.4	29	-	-	-	13.5-20	11.00TG
42×17-20	Y103	10	○	-	L-2	1078	42.4	416	16.4	482	19.0	432	17.0	22.6	28	-	-	-	42×17-20	14.00TG
17.5/65-20	Y103	10	-	○	L-2	1097	43.2	442	17.4	489	19.3	459	18.1	24.7	31	-	-	-	-	W14L
	Y548					1100	43.3	442	17.4	491	19.3	467	18.4	24.8	31					
*16.9-24	Y103	10	○	○	L-2	1292	50.9	450	17.7	582	22.9	480	18.9	28.5	36	-	-	-	16.9-24	W15L
		12																		
	Y548	10	○	○	L-2	1300	51.2	448	17.6	596	23.5	476	18.7	34.1	43					
		12	-	○															-	
	Y67	10	○	○	L-3	1295	51.0	442	17.4	588	23.1	472	18.6	28.4	36				16.9-24	
*18.4-24	Y103	10	○	○	L-2	1372	54.0	477	18.9	612	24.1	518	20.4	30.8	39	-	-	-	18.4-24	W16L
	Y548		-	○		1380	54.3	485	19.1	628	24.7	515	20.3	34.3	43				-	

Tire Size	Pattern	Application Max Speed km/h mph		Tire Load Limits at Various Cold Inflation Pressures														
12.5/70-16	Y103 Y548	Loader & Dozer	PR					(6)										
			kPa	120	140	160	180	**200**										
			psi	17	20	23	26	**29**										
		10	kg	1050	1145	1240	1330	**1410**										
		5	lbs	2310	2520	2730	2930	**3110**										
10-16.5NHS	Y103	Loader & Dozer	PR	(4)			(6)											
			kPa	**210**	240	280	**310**											
			psi	**30**	35	40	**45**											
		10	kg	**1250**	1370	1480	**1590**											
		5	lbs	**2760**	3020	3260	**3500**											
13.5-20	Y103	Loader & Dozer	PR															(14)
			kPa	180	200	220	240	260	280	300	325	350	375	400	425	450	475	**500**
			psi	26	29	32	35	38	41	44	47	51	54	58	62	65	69	**73**
		10	kg	2300	2445	2585	2720	2850	2980	3100	3250	3395	3535	3670	3800	3930	4055	**4180**
		5	lbs	5070	5390	5700	6000	6280	6570	6830	7160	7480	7790	8090	8380	8660	8940	**9220**
42×17-20	Y103	Loader & Dozer	PR							(10)								
			kPa	180	200	220	240	260	280	**300**								
			psi	26	29	32	35	38	41	**44**								
		10	kg	2740	2915	3080	3240	3395	3545	**3690**								
		5	lbs	6040	6430	6790	7140	7480	7820	**8130**								
17.5/65-20	Y103 Y548	Loader & Dozer	PR							(10)								
			kPa	120	140	160	180	200	220	**240**								
			psi	17	20	23	26	29	32	**35**								
		10	kg	2130	2330	2520	2700	2875	3040	**3195**								
		5	lbs	4700	5140	5560	5950	6340	6700	**7040**								
16.9-24	Y103 Y548 Y67	Loader & Dozer	PR							(10)		(12)						
			kPa	120	140	160	180	200	220	**240**	260	**280**						
			psi	17	20	23	26	29	32	**35**	38	**41**						
		10	kg	2300	2520	2725	2920	3105	3280	**3455**	3620	**3780**						
		5	lbs	5070	5560	6010	6440	6850	7230	**7620**	7980	**8330**						
18.4-24	Y103 Y548	Loader & Dozer	PR						(10)									
			kPa	120	140	160	180	200	**220**									
			psi	17	20	23	26	29	**32**									
		10	kg	2765	3025	3270	3505	3725	**3940**									
		5	lbs	6100	6670	7210	7730	8210	**8690**									

* On front tires for front-end loaders.

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
10.00-20NHS	Y67	14			E-3	1060	41.7	280	11.0	498	19.6	295	11.6	20.4	26	-	-	-	10.00-20	7.50V
		24																		
	Y103	8	○	-	L-2	1082	42.6	292	11.5	492	19.4	313	12.3	21.2	27					
		10																		
		14																		
11.00-20TG	Y103	10	○	-	G-2	1092	43.0	304	12.0	500	19.7	322	12.7	21.9	28	-	-	-	11.00-20	8.00V
		12																		
11.00-20NHS	Y67	14	○	-	E-3	1100	43.3	295	11.6	510	20.1	310	12.2	24.9	31					
12.00-20NHS	Y67	16	○	-	E-3	1135	44.7	325	12.8	533	21.0	340	13.4	25.5	32	-	-	-	12.00-20	8.50V
		18																		
		24																		
		28				1144	45.8	322	12.9	516	20.6	347	13.9	25.5	32					

Tire Size	Pattern	Application Max Speed km/h mph		Tire Load Limits at Various Cold Inflation Pressures														
10.00-20NHS	Y67	Earthmover	PR											(14)	(24)			
			kPa	260	280	300	325	350	375	400	425	450	475	**500**	**850**			
			psi	38	41	44	47	51	54	58	62	65	69	**73**	**123**			
		50	kg	1685	1760	1830	1920	2005	2085	2170	2245	2320	2395	**2470**	**3370**			
		30	lbs	3710	3880	4030	4230	4420	4600	4780	4950	5110	5280	**5450**	**7430**			
	Y103	Loader & Dozer	PR		(8)				(10)							(14)		
			kPa	350	**375**	400	425	450	**475**	500	525	550	575	600	625	**650**		
			psi	51	**54**	58	62	65	**69**	73	76	80	83	87	91	**94**		
		10	kg	2970	**3090**	3210	3325	3440	**3550**	3650	3750	3875	4000	4000	4125	**4250**		
		5	lbs	6550	**6800**	7100	7350	7600	**7850**	8050	8250	8550	8800	8800	9100	**9350**		
11.00-20TG	Y103	Grader	PR										(10)		(12)			
			kPa	140	160	180	200	220	240	260	280	300	**325**	350	**375**			
			psi	20	23	26	29	32	35	38	41	44	**47**	51	**54**			
		40	kg	1175	1275	1365	1450	1535	1615	1690	1765	1840	**1925**	2010	**2095**			
		25	lbs	2590	2810	3010	3200	3380	3560	3730	3890	4060	**4240**	4430	**4620**			
11.00-20NHS	Y67	Earthmover	PR										(14)					
			kPa	260	280	300	325	350	375	400	425	450	**475**					
			psi	38	41	44	47	51	54	58	62	65	**69**					
		50	kg	1830	1910	1990	2085	2180	2270	2355	2440	2525	**2605**					
		30	lbs	4030	4210	4390	4600	4810	5000	5190	5380	5570	**5740**					
12.00-20NHS	Y67	Earthmover	PR		(16)		(18)							(24)				(28)
			kPa	425	**450**	475	**500**	525	550	575	600	625	650	**675**	700	725	750	**775**
			psi	62	**65**	69	**73**	76	80	83	87	91	94	**98**	102	105	109	**112**
		50	kg	2800	**2900**	3000	**3075**	3150	3250	3350	3450	3550	3650	**3750**	3750	3875	4000	**4000**
		30	lbs	6150	**6400**	6600	**6800**	6950	7150	7400	7600	7850	8050	**8250**	8250	8550	8800	**8800**

TG : Tractor-Grade tire. Not for highway service. NHS : Not for highway service.

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
14.00-20NHS	Y67	32	○	-	E-3	1250	49.2	386	15.2	583	23.0	401	15.8	27.5	35	-	-	-	14.00-20	10.00WI
12.00-24TG	Y103	12	○	-	G-2	1223	48.1	312	12.3	561	22.1	342	13.5	26.8	34	-	-	-	11.00/12.00-24	8.00TG
12.00-24NHS	Y67	16			E-3	1230	48.4	305	12.0	575	22.6	330	13.0	26.4	33					8.50V
		20																		
		16			L-3	1230	48.4	305	12.0	559	22.0	340	13.4	26.4	33					
		20																		
	Y525	20			L-5	1280	50.4	330	13.0	596	23.5	360	14.2	58.2	74					
	Y69	16			L-5S	1280	50.4	333	13.1	604	23.8	356	14.0	54.8	69					8.50V
		20																		
	Y69U	16			L-4S	1254	49.4	328	12.9	590	23.2	348	13.7	43.3	55					
		16			L-5S	1275	50.2	332	13.1	602	23.7	351	13.8	55.6	70					
13.00-24TG	Y103	8																		
		10	○	○	G-2	1280	50.4	346	13.6	576	22.7	383	15.1	27.0	34					
		12																	13.00-24/25	
	Y67	12	○	○	G-3	1280	50.4	334	13.1	586	23.1	358	14.1	27.9	35	-	-	-		8.00TG
		12	○	-	L-3	1280	50.4	348	13.7	578	23.1	383	15.1	27.9	35					
		16	-	○															-	
13.00-24NHS		18	○	-															13.00-24/25	
14.00-24TG	Y103	10	○	○																
		12	○	○																
		14	○	-	G-2	1340	52.8	372	14.6	604	23.8	409	16.1	28.5	36					8.00TG
		16	○	-																
		20	○	-																
		12	○	○	L-2	1351	53.2	396	15.6	595	23.4	442	17.4	28.5	36	-	-	-		10.00VA
	Y67	12	○	○	G-3	1351	53.2	362	14.3	624	24.6	388	15.3	27.7	35					8.00TG
		16	○	○																
		12	○	○	L-3	1344	52.9	383	15.1	604	23.8	416	16.4	27.7	35				14.00-24/25	10.00VA
		16	○	○																
14.00-24NHS	Y67	20	○	-																
		24	○	-	E-3	1345	53.0	380	15.0	624	24.6	408	16.1	27.7	35	65	95	CP		10.00W
		28	○	-																
		20	○	-	L-3	1344	52.9	383	15.1	604	23.8	416	16.4	27.7	35					10.00VA
		24	○	-												-	-	-		
	Y69	20	○	-	L-5S	1365	53.7	380	15.0	654	25.7	393	15.5	63.1	79					10.00W
		24																		
16.00-24TG	Y103	12	-	○	G-2	1448	57.0	445	17.5	654	25.7	489	19.3	34.2	43				-	
		16	○	○	L-2	1465	57.7	445	17.5	646	25.4	494	19.4	34.2	43					
	Y67	12	○	-	G-3											-	-	-		10.00VA
		16	○	○		1475	58.1	445	17.5	686	27.0	467	18.4	34.3	43				16.00-24/25	
16.00-24NHS	Y67	24	○	○	E-3											95	139	REG		11.25-2.0

Tire Size	Pattern	Application Max Speed km/h mph		Tire Load Limits at Various Cold Inflation Pressures														
14.00-20NHS	Y67	Earthmover	PR											(32)				
			kPa	500	525	550	575	600	625	650	675	700	725	**750**				
			psi	73	76	80	83	87	91	94	98	102	105	**109**				
		50	kg	4250	4375	4500	4625	4750	4875	5000	5150	5150	5300	**5450**				
		30	lbs	9350	9650	9900	10200	10450	10750	11000	11350	11350	11700	**12000**				
12.00-24TG	Y103	Grader	PR								(12)							
			kPa	125	150	175	200	225	250	275	**300**							
			psi	18	22	25	29	33	36	40	**44**							
		40	kg	1450	1600	1750	1900	2000	2120	2240	**2360**							
		25	lbs	3200	3520	3860	4180	4400	4680	4940	**5200**							
12.00-24NHS	Y67	Earthmover	PR								(16)			(20)				
			kPa	275	300	325	350	375	400	425	**450**	475	500	525	**550**			
			psi	40	44	47	51	54	58	62	**65**	69	73	76	**80**			
		50	kg	2500	2575	2725	2800	3000	3075	3150	**3250**	3350	3450	3550	**3650**			
		30	lbs	5520	5680	6000	6150	6600	6800	6950	**7150**	7400	7600	7850	**8050**			
	Y67 Y525 Y69 Y69U	Loader & Dozer	PR									(16)						(20)
			kPa	475	500	525	550	575	600	625	650	**675**	700	725	750	775	800	**825**
			psi	69	73	76	80	83	87	91	94	**98**	102	105	109	112	116	**120**
		10	kg	5000	5150	5300	5450	5600	5600	5800	6000	**6150**	6150	6300	6500	6700	6700	**6900**
		5	lbs	11000	11400	11700	12000	12300	12300	12800	13200	**13600**	13600	13900	14300	14800	14800	**15200**
13.00-24TG	Y103 Y67	Grader	PR			(8)		(10)			(12)							
			kPa	125	150	**175**	200	**225**	250	275	**300**							
			psi	18	22	**25**	29	**33**	36	40	**44**							
		40	kg	1700	1900	**2060**	2240	**2360**	2500	2650	**2725**							
		25	lbs	3740	4180	**4540**	4940	**5200**	5520	5840	**6000**							
	Y67	Loader & Dozer	PR				(12)						(16)		(18)			
			kPa	375	400	425	**450**	475	500	525	550	575	**600**	625	650	**675**		
			psi	54	58	62	**65**	69	73	76	80	83	**87**	91	94	**98**		
13.00-24NHS		10	kg	5000	5225	5415	**5600**	5800	5975	6150	6180	6340	**6500**	6655	6810	**6965**		
		5	lbs	11020	11520	11940	**12350**	12790	13170	13560	13620	13980	**14330**	14670	15010	**15350**		
14.00-24TG	Y103 Y67	Grader	PR	(10)	(12)		(14)		(16)				(20)					
			kPa	**225**	**250**	275	**300**	325	**350**	375	400	425	**450**					
			psi	**33**	**36**	40	**44**	47	**51**	54	58	62	**65**					
		40	kg	**2800**	**3075**	3250	**3450**	3550	**3650**	3800	3950	4090	**4230**					
		25	lbs	**6150**	**6800**	7150	**7600**	7850	**8050**	8400	8700	9000	**9350**					
	Y103 Y67 Y69	Loader & Dozer	PR	(12)	(16)					(20)						(24)		
			kPa	**425**	**575**	600	625	650	675	**700**	725	750	775	800	825	**850**		
			psi	**62**	**83**	87	91	94	98	**102**	105	109	112	116	120	**123**		
		10	kg	**6285**	**7500**	7750	8000	8250	8250	**8500**	8750	8750	9000	9250	9250	**9500**		
		5	lbs	**13900**	**16500**	17100	17600	18200	18200	**18700**	19300	19300	19800	20400	20400	**20900**		
14.00-24NHS	Y67	Earthmover	PR				(20)				(24)			(28)				
			kPa	400	425	450	**475**	500	525	550	**575**	600	625	**650**				
			psi	58	62	65	**69**	73	76	80	**83**	87	91	**94**				
		50	kg	4250	4375	4500	**4625**	4750	4875	5000	**5150**	5300	5450	**5600**				
		30	lbs	9350	9650	9900	**10200**	10500	10700	11000	**11400**	11700	12000	**12300**				
16.00-24TG	Y103 Y67	Grader	PR					(12)			(16)							
			kPa	125	150	175	200	**225**	250	275	**300**							
			psi	18	22	25	29	**33**	36	40	**44**							
		40	kg	2650	3000	3250	3450	**3650**	4000	4250	**4500**							
		25	lbs	5840	6600	7150	7600	**8050**	8800	9350	**9900**							
	Y103	Loader & Dozer	PR											(16)				
			kPa	200	220	240	260	280	300	325	350	375	400	**425**				
			psi	29	32	35	38	41	44	47	51	54	58	**62**				
		10	kg	5345	5650	5945	6230	6505	6775	7100	7365	7670	7965	**8250**				
		5	lbs	11780	12460	13110	13730	14340	14940	15650	16240	16910	17560	**18190**				
16.00-24NHS	Y67	Earthmover	PR									(24)						
			kPa	275	300	325	350	375	400	425	450	**475**						
			psi	40	44	47	51	54	58	62	65	**69**						
		50	kg	4375	4625	4875	5000	5300	5450	5600	5800	**6000**						
		30	lbs	9650	10200	10700	11000	11700	12000	12300	12800	**13200**						

TG : Tractor-Grade tire. Not for highway service. NHS : Not for highway service.

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
14.00-25NHS	Y67	20	○	○	E-3	1345	53.0	380	15.0	624	24.6	408	16.1	27.7	35	65	95	CP	16.00-24/25	10.00-1.5
		24	-	○												75	109	REG	-	
16.00-25	Y67	24	○	○	E-3	1475	58.1	445	17.5	686	27.0	467	18.4	34.3	43	85	124	CP	16.00-24/25	11.25-2.0
		28	○	○																
		32	-	○												95	139	REG	-	
	Y523	24	-	○	E-4	1540	60.6	443	17.4	724	28.5	467	18.4	59.3	75	70	102	CP		
		28																		
	Y69	24	-	○	L-5S	1542	60.7	445	17.5	691	27.2	500	19.7	78.1	98	-	-	-		
18.00-25	Y67	32	○	○	E-3	1600	63.0	510	20.1	736	29.0	534	21.0	38.5	49	110	160	CP	18.00-25	13.00-2.5
		40	-	○															-	
		16	-	○	G-3	1600	63.8	510	20.1	734	29.3	540	21.3	38.5	49	-	-	-		
		16	○	○	L-3	1620	63.8	530	20.9	716	28.2	588	23.1	39.2	49				18.00-25	
	Y523	32	○	○	E-4	1652	65.0	517	20.4	772	30.4	541	21.3	61.3	77	95	139	CP		
		40	-	○															-	
	Y69	24	-	○	L-5S	1651	65.0	533	21.0	751	29.6	571	22.5	83.4	104					
		28	○	○															18.00-25	
		32	-	○																
	Y69K	28			L-5S	1700	66.9	520	20.5	785	30.9	555	21.9	84.1	106	-	-	-	-	
		32																		
	Y69U	24	-	○	L-5S	1670	65.7	536	21.1	780	30.7	571	22.5	84.1	106					
		28																		
		32																		
21.00-25	Y67	24	○	○	E-3	1726	68.0	575	22.6	777	30.6	624	24.6	40.6	51	145	212	REG	21.00-25	15.00-3.0
18.00-33	Y67	28			E-3	1800	70.9	520	20.5	840	33.1	554	21.8	41.1	52	130	190	CP-C	-	13.00-2.5
		32																		
		36																		
	Y523	32	-	○	E-4	1850	72.8	518	20.4	869	34.2	542	21.3	56.2	71	105	153	CP-C		
		36																		
		40																		
	Y523U	32			E-4	1861	75.3	519	20.4	874	34.4	545	21.5	67.0	84	100	146	CP-C		
21.00-35	Y523	36	-	○	E-4	2045	80.5	590	23.2	951	37.2	623	24.5	63.2	80	130	190	CP-C	-	15.00-3.0
		40														150	219	RE-R		
24.00-35	Y523	36	-	○	E-4	2147	84.5	666	26.2	990	39.0	710	28.0	64.6	81	155	226	CP-C	-	17.00-3.5
																180	263	RE-R		
		42														120	175	CP-S		
																155	226	CP-C		
																180	263	RE-R		
																220	321	HR-H		
		48														155	226	CP-C		
24.00-49	Y523	42	-	○	E-4	2529	99.6	655	25.8	1184	46.6	697	27.4	64.6	81	190	277	CP-C	-	17.00-3.5
		48														190	277	CP-C		
																290	423	HR-V		

Tire Size	Pattern	Application	Max Speed km/h	Max Speed mph	Tire Load Limits at Various Cold Inflation Pressures															
14.00-25NHS	Y67	Earthmover			PR							(20)				(24)				
					kPa	300	325	350	375	400	425	450	**475**	500	525	550	**575**			
					psi	44	47	51	54	58	62	65	**69**	73	76	80	**83**			
			50		kg	3550	3750	3875	4000	4250	4375	4500	**4625**	4750	4875	5000	**5150**			
			30		lbs	7850	8250	8550	8800	9350	9650	9900	**10200**	10500	10700	11000	**11400**			
16.00-25	Y67 Y523	Earthmover			PR								(24)				(28)			(32)
					kPa	300	325	350	375	400	425	450	**475**	500	525	550	**575**	600	625	**650**
					psi	44	47	51	54	58	62	65	**69**	73	76	80	**83**	87	91	**94**
			50		kg	4625	4875	5000	5300	5450	5600	5800	**6000**	6300	6500	6500	**6700**	6900	7100	**7300**
			30		lbs	10200	10700	11000	11700	12000	12300	12800	**13200**	13900	14300	14300	**14800**	15200	15700	**16100**
	Y69	Loader & Dozer			PR								(24)							
					kPa	475	500	525	550	575	600	625	**650**							
					psi	69	73	76	80	83	87	91	**94**							
			10		kg	8750	9000	9500	9750	10000	10000	10300	**10600**							
			5		lbs	19300	19800	20900	21500	22000	22000	22700	**23400**							
18.00-25	Y67 Y523	Earthmover			PR										(32)					(40)
					kPa	350	375	400	425	450	475	500	525	550	**575**	600	625	650	675	**700**
					psi	51	54	58	62	65	69	73	76	80	**83**	87	91	94	98	**102**
			50		kg	6500	6900	7100	7300	7500	7750	8000	8250	8500	**8750**	9000	9250	9500	9500	**9750**
			30		lbs	14300	15200	15700	16100	16500	17100	17600	18200	18700	**19300**	19800	20400	20900	20900	**21500**
	Y67	Grader			PR						(16)									
					kPa	125	150	175	200	225	**250**									
					psi	18	22	25	29	33	**36**									
			40		kg	3250	3650	4000	4125	4625	**5000**									
			25		lbs	7150	8050	8800	9100	10200	**11000**									
	Y67 Y69 Y69K Y69U	Loader & Dozer			PR	(16)				(24)				(28)				(32)		
					kPa	**375**	475	500	525	**550**	575	600	625	**650**	675	700	725	**750**		
					psi	**54**	69	73	76	**80**	83	87	91	**94**	98	102	105	**109**		
			10		kg	**10000**	11500	11800	12150	**12500**	12850	13200	13600	**13600**	14000	14500	14500	**15000**		
			5		lbs	**22000**	25400	26000	26800	**27600**	28300	29100	30000	**30000**	30900	32000	32000	**33100**		
21.00-25	Y67	Earthmover			PR					(24)										
					kPa	275	300	325	350	**375**										
					psi	40	44	47	51	**54**										
			50		kg	7300	7750	8000	8500	**8750**										
			30		lbs	16100	17100	17600	18700	**19300**										
18.00-33	Y67 Y523 Y523U	Earthmover			PR			(28)			(32)		(36)			(40)				
					kPa	450	475	**500**	525	550	**575**	600	**625**	650	675	**700**				
					psi	65	69	**73**	76	80	**83**	87	**91**	94	98	**102**				
			50		kg	8750	9000	**9250**	9750	10000	**10300**	10500	**10700**	10900	11200	**11500**				
			30		lbs	19300	19800	**20400**	21500	22000	**22700**	23100	**23600**	24000	24700	**25400**				
21.00-35	Y523	Earthmover			PR								(36)			(40)				
					kPa	375	400	425	450	475	500	525	**550**	575	600	**625**				
					psi	54	58	62	65	69	73	76	**80**	83	87	**91**				
			50		kg	10300	10900	11200	11500	11800	12150	12500	**12850**	13200	13600	**14000**				
			30		lbs	22700	24000	24700	25400	26000	26800	27600	**28300**	29100	30000	**30900**				
24.00-35	Y523	Earthmover			PR				(36)				(42)			(48)				
					kPa	400	425	450	**475**	500	525	550	**575**	600	625	**650**				
					psi	58	62	65	**69**	73	76	80	**83**	87	91	**94**				
			50		kg	14000	14500	15000	**15500**	15500	16000	16500	**17000**	17500	18000	**18500**				
			30		lbs	30900	32000	33100	**34200**	34200	35300	36400	**37500**	38600	39700	**40800**				
24.00-49	Y523	Earthmover			PR								(42)			(48)				
					kPa	400	425	450	475	500	525	550	**575**	600	625	**650**				
					psi	58	62	65	69	73	76	80	**83**	87	91	**94**				
			50		kg	16500	17000	18000	18500	19000	19500	20000	**20600**	21200	21800	**21800**				
			30		lbs	36400	37500	39700	40800	41900	43000	44100	**45400**	46700	48100	**48100**				

NHS : Not for highway service.

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
27.00-49	Y67	48	-	○	E-3	2645	104.1	750	29.5	1220	48.0	800	31.5	50.3	63	440	642	HR-V	-	19.50-4.0
	Y523	42			E-4	2679	105.5	748	29.4	1245	49.0	791	31.1	71.3	90	230	336	CP-C		
																265	387	RE-R		
		48														180	263	CP-S		
																230	336	CP-C		
																265	387	RE-R		
																310	452	HR-H		
																340	496	HR-V		
30.00-51	Y523	46	-	○	E-4	2876	113.2	848	33.4	1339	52.7	896	35.3	84.1	106	210	306	CP-S	-	22.00-4.5
																265	387	CP-C		
																340	496	RE-T		
		52														265	387	CP-C		
																405	591	HR-V		
33.00-51	Y523	50	-	○	E-4	3039	119.6	927	36.5	1404	55.3	985	38.8	82.7	104	240	350	CP-S	-	24.00-5.0
		58														295	430	CP-C		
																350	551	RE-R		
																440	642	HR-V		
	Y567	50														288	420	CP-S		
																420	613	RE-R		
		58														354	516	CP-C		
																420	613	RE-R		
																456	664	RE-T		
																528	770	HR-V		
36.00-51	Y565	58	-	○	E-3	3200	126.0	1045	41.1	1460	57.5	1100	43.3	51.8	65	500	730	RE-T	-	26.00-5.0
		66														500	730	RE-T		
																600	875	HR-V		
	Y523	50			E-4	3198	125.9	1040	40.9	1476	58.1	1090	42.9	92.2	116	330	481	CP-C		
		58																		
		66														430	627	RE-T		
40.00-57	Y523	68	-	○	E-4	3551	139.8	1127	44.4	1624	63.9	1200	47.2	92.8	117	450	657	RE-T	-	29.00-6.0
																540	788	HR-V		
		76														410	598	RE-R		
																450	657	RE-T		
																540	788	HR-V		
	Y567	68				3544	139.5	1127	44.4	1621	63.8	1200	47.2	92.8	117	420	613	CP-C		
																492	717	RE-R		
																648	945	HR-V		

Tire Size	Pattern	Application Max Speed km/h mph	Tire Load Limits at Various Cold Inflation Pressures													
27.00-49	Y67 Y523		PR										(42)			(48)
		Earthmover	kPa	275	300	325	350	375	400	425	450	475	**500**	525	550	**575**
			psi	*40*	*44*	*47*	*51*	*54*	*58*	*62*	*65*	*69*	***73***	*76*	*80*	***83***
		50	kg	16500	17000	18000	19000	19500	20600	21200	21800	22400	**23000**	23600	24300	**25000**
		30	*lbs*	*36400*	*37500*	*39700*	*41900*	*43000*	*45400*	*46700*	*48100*	*49400*	***50700***	*52000*	*53600*	***55100***
30.00-51	Y523		PR										(46)		(52)	
		Earthmover	kPa	275	300	325	350	375	400	425	450	475	**500**	525	**550**	
			psi	*40*	*44*	*47*	*51*	*54*	*58*	*62*	*65*	*69*	***73***	*76*	***80***	
		50	kg	20000	21200	22400	23000	24300	25000	25750	27250	28000	**29000**	29000	**30000**	
		30	*lbs*	*44100*	*46700*	*49400*	*50700*	*53600*	*55100*	*56800*	*60000*	*61500*	***64000***	*64000*	***66000***	
33.00-51	Y523 Y567		PR										(50)			(58)
		Earthmover	kPa	275	300	325	350	375	400	425	450	475	**500**	525	550	**575**
			psi	*40*	*44*	*47*	*51*	*54*	*58*	*62*	*65*	*69*	***73***	*76*	*80*	***83***
		50	kg	23600	24300	25750	27250	28000	29000	30000	31500	32500	**33500**	34500	35500	**35500**
		30	*lbs*	*52000*	*53600*	*56800*	*60000*	*61500*	*64000*	*66000*	*69500*	*71500*	***74000***	*76000*	*78500*	***78500***
36.00-51	Y565 Y523		PR					(50)			(58)			(66)		
		Earthmover	kPa	350	375	400	425	**450**	475	500	**525**	550	575	**600**		
			psi	*51*	*54*	*58*	*62*	***65***	*69*	*73*	***76***	*80*	*83*	***87***		
		50	kg	32500	34500	35500	36500	**37500**	38750	40000	**41250**	42500	43750	**45000**		
		30	*lbs*	*71500*	*76000*	*78500*	*80500*	***82500***	*85500*	*88000*	***91000***	*93500*	*96500*	***99000***		
40.00-57	Y523 Y567		PR									(68)			(76)	
		Earthmover	kPa	350	375	400	425	450	475	500	525	**550**	575	600	**625**	
			psi	*51*	*54*	*58*	*62*	*65*	*69*	*73*	*76*	***80***	*83*	*87*	***91***	
		50	kg	41250	43750	45000	46250	48750	50000	51500	53000	**54500**	56000	58000	**58000**	
		30	*lbs*	*91000*	*96500*	*99000*	*102000*	*107500*	*110000*	*113500*	*117000*	***120000***	*123500*	*128000*	***128000***	

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
*15.5-25	Y103	12	-	○	L-2	1286	50.6	390	15.4	575	22.6	433	17.0	25.5	32	-	-	-	-	12.00-1.3
	Y67		○	○	L-3	1308	51.5	398	15.7	589	23.2	433	17.0	28.0	35				15.5-25	
*17.5-25	Y103	12	-	○	G-2	1349	53.1	434	17.1	620	24.4	460	18.1	27.0	34	-	-	-	-	14.00-1.5
		12	○	○	L-2	1364	53.7	435	17.1	599	23.6	477	18.8	27.0	34				17.5-25	
		16	○	○																
	Y548	12	○	○	L-2	1360	53.5	454	17.9	610	24.0	486	19.1	33.2	42					
		16																		
	Y67	12	○	○	L-3	1349	53.1	443	17.4	600	23.6	483	19.0	30.3	38					
		16																		
	Y575	12	○	○	L-3	1340	52.8	435	17.1	595	23.4	473	18.6	30.2	38					
		16	-	○																
	Y67E	12	-	○	L-4	1390	54.7	443	17.4	637	25.1	474	18.7	45.0	57				-	
	Y69	16	-	○	L-5S	1390	54.7	430	16.9	649	25.6	454	17.9	69.0	87					
		20	○	○															17.5-25	
		28	-	○																
	Y69U	20	-	○	L-5S	1400	55.1	452	17.8	658	25.9	473	18.6	69.0	87				-	
*20.5-25	Y103	12	-	○	L-2	1495	58.9	535	21.1	647	25.5	583	23.0	31.5	40	-	-	-	-	17.00-2.0
		16																		
	Y548	12	○	○	L-2	1509	59.4	551	21.7	670	26.4	590	23.2	33.8	43				20.5-25	
		16																		
		20																		
	Y67	28	-	○	E-3	1485	58.5	520	20.5	690	27.2	540	21.3	33.4	42	75	109	HR	-	
		12	○	○	L-3	1498	59.0	528	20.8	651	25.6	578	22.8	33.4	42	-	-	-		
		16	○	○																
		20	○	○																
	Y526K	16	○	○	L-3	1486	58.5	542	21.3	677	26.7	577	22.7	34.9	44				20.5-25	
		20																		
	Y575	12	○	○	L-3	1495	58.8	532	20.9	663	26.1	574	22.5	32.7	41					
		16																		
		20																		
	Y524	12	-	○	L-5	1558	61.3	539	21.2	721	28.4	575	22.6	80.3	101				-	
		16																		
		20																		
	Y69	16	○	○	L-5S	1545	60.8	540	21.3	714	28.1	564	22.2	81.0	102				20.5-25	
		28	-	○															-	
*23.5-25	Y103	12	-	○	L-2	1620	63.8	612	24.1	686	27.0	680	26.8	36.0	45	-	-	-	-	19.50-2.5
		16																		
	Y67	32	-	○	E-3	1605	63.2	592	23.3	745	29.3	616	24.3	42.4	53	100	146	HR		
		12	○	-	L-3	1605	63.2	596	23.5	709	27.9	636	25.0	42.4	53	-	-	-		
		16	○	○																
		20	○	○															23.5-25	
		24	○	○																
	Y526K	16	○	○	L-3	1610	63.4	615	24.2	711	28.0	662	26.1	40.5	51					
		20																		
	Y575	12	-	○	L-3	1605	63.2	605	23.8	708	27.9	645	25.4	42.2	53				-	
		16	○	○															23.5-25	
		20	○	○																
		24	-	○															-	
	Y545	16	○	○	L-4	1660	65.4	615	24.2	760	29.9	660	26.0	56.0	71				23.5-25	
		20	-	○															-	
		24	-	○																
	Y524	16	-	○	L-5	1666	65.6	620	24.4	764	30.1	662	26.1	88.0	111					
		20	-	○																
		24	○	○															23.5-25	
	Y69	20	-	○	L-5S	1642	64.6	617	24.3	747	29.4	652	25.7	93.2	117				-	
		28	○	-															23.5-25	

Tire Size	Pattern	Application Max Speed km/h mph	Tire Load Limits at Various Cold Inflation Pressures													
15.5-25	Y103 Y67	Loader & Dozer	PR								(12)					
			kPa	225	250	275	300	325	350	375	400					
			psi	33	36	40	44	47	51	54	58					
		10	kg	4000	4250	4500	4750	4875	5150	5300	5600					
		5	lbs	8800	9350	9900	10500	10700	11400	11700	12300					
17.5-25	Y103	Grader	PR				(12)									
			kPa	125	150	175	200									
			psi	18	22	25	29									
		40	kg	2120	2360	2575	2900									
		25	lbs	4680	5200	5680	6400									
	Y103 Y548 Y67 Y575 Y67E Y69 Y69U	Loader & Dozer	PR	(12)					(16)				(20)	(28)		
			kPa	350	375	400	425	450	475	500	525	550	575	825		
			psi	51	54	58	62	65	69	73	76	80	83	120		
		10	kg	6150	6300	6700	6900	7100	7300	7500	7750	8000	8250	10000		
		5	lbs	13600	13900	14800	15200	15700	16100	16500	17100	17600	18200	22000		
20.5-25	Y67	Earthmover	PR													(28)
			kPa	175	200	225	250	275	300	325	350	375	400	425	450	475
			psi	25	29	33	36	40	44	47	51	54	58	62	65	69
		50	kg	4125	4500	4875	5150	5450	5800	6000	6300	6500	6700	7100	7300	7500
		30	lbs	9100	9900	10750	11400	12000	12800	13200	13900	14300	14800	15700	16100	16500
	Y103 Y548 Y67 Y526K Y575 Y524 Y69	Loader & Dozer	PR	(12)				(16)				(20)		(28)		
			kPa	250	275	300	325	350	375	400	425	450	525	625		
			psi	36	40	44	47	51	54	58	62	65	76	91		
		10	kg	6700	7100	7500	7750	8250	8500	8750	9250	9500	10300	11500		
		5	lbs	14800	15700	16500	17100	18200	18700	19300	20400	20900	22700	25400		
23.5-25	Y67	Earthmover	PR													(32)
			kPa	175	200	225	250	275	300	325	350	375	400	425	450	475
			psi	25	29	33	36	40	44	47	51	54	58	62	65	69
		50	kg	5300	5800	6150	6500	6900	7300	7750	8000	8250	8750	9000	9250	9500
		30	lbs	11700	12800	13550	14300	15200	16100	17100	17600	18200	19300	19800	20400	20900
	Y103 Y67 Y526K Y575 Y545 Y524 Y69	Loader & Dozer	PR	(12)			(16)			(20)		(24)	(28)			
			kPa	225	250	275	300	325	350	375	425	475	550			
			psi	33	36	40	44	47	51	54	62	69	80			
		10	kg	8000	8500	9000	9500	10000	10600	10900	11800	12500	13600			
		5	lbs	17600	18700	19800	20900	22000	23400	24000	26000	27600	30000			

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

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
26.5-25	Y67	26	-	○	E-3	1730	68.1	700	27.6	778	30.6	732	28.8	44.9	57	105	153	REG	-	22.00-3.0
		16	-	○	L-3	1745	68.7	694	27.3	765	30.1	738	29.1	44.9	57	-	-	-	26.5-25	
		20	○	○																
		24	○	○																
		26	-	○															-	
		28	-	○																
	Y575	16	-	○	L-3	1740	68.5	690	27.2	770	30.3	733	28.9	42.8	54				26.5-25	
		20	○	○																
		24	○	○																
		28	-	○																
	Y545	20	-	○	L-4	1786	70.3	704	27.7	800	31.5	764	30.1	68.4	86				-	
		24																		
		26																		
		32																		
	Y524	20	-	○	L-5	1797	70.7	682	26.9	820	32.3	722	28.4	97.1	122					
		24																		
		26																		
		28																		
		32																		
		36																		
	Y69	28	-	○	L-5S	1798	71.0	690	27.2	798	31.4	731	28.8	86.2	109					
		32																		
		36																		
	Y69K	26	-	○	L-5S	1790	70.5	695	27.4	825	32.5	723	28.5	90.6	114					
		32																		
		36																		
	Y69U	28	-	○	L-5S	1769	70.7	710	28.0	837	33.0	739	29.1	90.8	114					
		32																		
29.5-25	Y67	28	-	○	E-3	1876	73.9	778	30.6	822	32.4	826	32.5	49.6	62	110 120	160 175	REG HR	-	25.00-3.5
		34														120	175	HR		
		22			L-3	1863	73.3	776	30.6	803	31.6	835	32.9	49.6	62	-	-	-		
		28																		
	Y575	22			L-3	1855	73.0	765	30.1	813	32.0	830	32.7	49.1	62					
		28																		
		34																		
	Y545	22			L-4	1900	74.8	785	30.9	847	33.3	842	33.1	73.1	92					
		28																		
	Y524	22			L-5	1908	75.1	774	30.5	868	34.2	825	32.5	110.9	140					
		28																		
26.5-29	Y67	26	-	○	E-3	1834	72.2	691	27.2	829	32.6	723	28.5	40.8	51	125	182	REG	-	22.00-3.0
29.5-29	Y67	28	-	○	E-3	1952	76.9	770	30.3	876	34.5	806	31.7	49.6	62	135	197	REG	-	25.00-3.5
		34														115	168	CP		
		28			L-3	1972	77.6	781	30.7	849	33.4	840	33.1	49.6	62	-	-	-		
	Y67E	28			L-4	2013	79.3	770	30.3	903	35.6	823	32.4	78.3	99					
	Y524	22			L-5	2040	80.3	771	30.4	914	36.0	831	32.7	106.3	134					
		28																		
		34																		
	Y69K	34			L-5S	2019	79.5	782	30.8	938	36.9	820	32.3	107.7	136					
		40																		
33.25-29	Y67	26	-	○	E-3	2080	81.9	849	33.4	924	36.4	873	34.4	45.8	58	145	212	CP	-	27.00-3.5
		32																		

Tire Size	Pattern	Application Max Speed km/h mph	Tire Load Limits at Various Cold Inflation Pressures															
26.5-25	Y67	Earthmover	PR							**(26)**								
			kPa	175	200	225	250	275	300	**325**								
			psi	*25*	*29*	*33*	*36*	*40*	*44*	***47***								
		50	kg	6700	7300	7750	8250	8750	9250	**9500**								
		30	*lbs*	*14750*	*16100*	*17100*	*18200*	*19300*	*20400*	***20900***								
	Y67 Y575 Y545 Y524 Y69 Y69K Y69U	Loader & Dozer	PR	**(16)**		**(20)**	**(24)**	**(26)**	**(28)**	**(32)**	**(36)**							
			kPa	**275**	300	**350**	**400**	**450**	**475**	**550**	**625**							
			psi	***40***	*44*	***51***	***58***	***65***	***69***	***80***	***91***							
		10	kg	**11500**	12150	**13200**	**14000**	**15000**	**15500**	**17000**	**18500**							
		5	*lbs*	***25350***	*26800*	***29100***	***30900***	***33100***	***34200***	***37500***	***40800***							
29.5-25	Y67	Earthmover	PR							**(28)**			**(34)**					
			kPa	175	200	225	250	275	300	**325**	350	375	**400**					
			psi	*25*	*29*	*33*	*36*	*40*	*44*	***47***	*51*	*54*	***58***					
		50	kg	8000	8750	9250	10000	10600	10900	**11500**	12150	12500	**13200**					
		30	*lbs*	*17600*	*19300*	*20400*	*22000*	*23400*	*24000*	***25400***	*26800*	*27600*	***29100***					
	Y67 Y575 Y545 Y524	Loader & Dozer	PR				**(22)**				**(28)**				**(34)**			
			kPa	250	275	300	**325**	350	375	400	**425**	450	475	500	**525**			
			psi	*36*	*40*	*44*	***47***	*51*	*54*	*58*	***62***	*65*	*69*	*73*	***76***			
		10	kg	12850	13600	14500	**15000**	16000	16500	17000	**17500**	18500	19000	19500	**20000**			
		5	*lbs*	*28300*	*30000*	*32000*	***33100***	*35300*	*36400*	*37500*	***38600***	*40800*	*41900*	*43000*	***44100***			
26.5-29	Y67	Earthmover	PR							**(26)**								
			kPa	175	200	225	250	275	300	**325**								
			psi	*25*	*29*	*33*	*36*	*40*	*44*	***47***								
		50	kg	7100	7750	8250	8750	9250	9750	**10300**								
		30	*lbs*	*15700*	*17100*	*18200*	*19300*	*20400*	*21500*	***22700***								
29.5-29	Y67	Earthmover	PR							**(28)**			**(34)**					
			kPa	175	200	225	250	275	300	**325**	350	375	**400**					
			psi	*25*	*29*	*33*	*36*	*40*	*44*	***47***	*51*	*54*	***58***					
		50	kg	8500	9250	10000	10600	11200	11800	**12150**	12850	13200	**14000**					
		30	*lbs*	*18700*	*20400*	*22000*	*23400*	*24700*	*26000*	***26800***	*28300*	*29100*	***30900***					
	Y67 Y67E Y524 Y69K	Loader & Dozer	PR		**(22)**				**(28)**				**(34)**	**(40)**				
			kPa	300	**325**	350	375	400	**425**	450	475	500	**525**	**625**				
			psi	*44*	***47***	*51*	*54*	*58*	***62***	*65*	*69*	*73*	***76***	***91***				
		10	kg	15500	**16000**	17000	17500	18000	**19000**	19500	20000	20600	**21200**	**23600**				
		5	*lbs*	*34200*	***35300***	*37500*	*38600*	*39700*	***41900***	*43000*	*44100*	*45400*	***46700***	***52000***				
33.25-29	Y67	Earthmover	PR					**(26)**		**(32)**								
			kPa	175	200	225	250	**275**	300	**325**								
			psi	*25*	*29*	*33*	*36*	***40***	*44*	***47***								
		50	kg	10300	11200	12150	12850	**13600**	14000	**15000**								
		30	*lbs*	*22700*	*24700*	*26800*	*28300*	***30000***	*30900*	***33100***								

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : E,L,G

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	TMPH	TKPH	Spec	Tube Size	Rim Size Flange Height
29.5-35	Y67	34	-	○	E-3	2120	83.5	776	30.6	965	38.0	819	32.2	39.5	50	170	248	REG	-	25.00-3.5
33.25-35	Y67	32 38	-	○	E-3	2248	88.5	853	33.6	1003	39.5	898	35.4	47.1	59	155 180	226 263	CP REG	-	27.00-3.5
37.25-35	Y67	30 36	-	○	E-3	2390	94.1	960	37.8	1060	41.7	1010	39.8	50.6	64	190 190 225	277 277 328	CP CP REG	-	31.00-4.0
37.5-39	Y67	44 52	-	○	E-3	2515	99.0	967	38.1	1137	44.8	1015	40.0	53.8	68	220 220 264	321 321 385	CP CP REG	-	32.00-4.5
35/65-33	Y545	24 30 36 42 48	-	○	L-4	2083	82.0	902	35.5	952	37.5	925	36.4	62.8	79	-	-	-	-	28.00-3.5
	Y524	24 30 36 42 48			L-5	2075	81.7	900	35.4	952	37.5	933	36.7	96.2	121					
	Y524Z	24 30 36 42			L-5	2065	81.3	906	35.7	956	37.6	935	36.8	96.2	121					
40/65-39	Y524	30 36 56	-	○	L-5	2404	94.6	1025	40.4	1169	46.0	1067	42.0	105.7	133	-	-	-	-	32.00-4.0
45/65-45	Y545	50 58	-	○	L-4	2730	107.5	1150	45.3	1240	48.8	1205	47.4	70.3	89	-	-	-	-	36.00-4.5
	Y524	38 46 50 58			L-5	2740	107.9	1180	46.5	1260	49.6	1230	48.4	115.0	145					
	Y524Z	38 46 50 58			L-5															

Tire Size	Pattern	Application Max Speed km/h mph	Tire Load Limits at Various Cold Inflation Pressures														
29.5-35	Y67	Earthmover	PR										(34)				
			kPa	175	200	225	250	275	300	325	350	375	**400**				
			psi	*25*	*29*	*33*	*36*	*40*	*44*	*47*	*51*	*54*	***58***				
		50	kg	9250	10000	10900	11500	12150	12850	13600	14000	14500	**15000**				
		30	*lbs*	*20400*	*22050*	*24050*	*25400*	*26800*	*28300*	*30000*	*30900*	*32000*	***33100***				
33.25-35	Y67	Earthmover	PR							(32)			(38)				
			kPa	175	200	225	250	275	300	**325**	350	375	**400**				
			psi	*25*	*29*	*33*	*36*	*40*	*44*	***47***	*51*	*54*	***58***				
		50	kg	11200	12150	12850	14000	14500	15500	**16000**	17000	17500	**18000**				
		30	*lbs*	*24700*	*26800*	*28300*	*30900*	*32000*	*34200*	***35300***	*37500*	*38600*	***39700***				
37.25-35	Y67	Earthmover	PR					(30)		(36)							
			kPa	175	200	225	250	**275**	300	**325**							
			psi	*25*	*29*	*33*	*36*	***40***	*44*	***47***							
		50	kg	13600	14500	15500	16500	**17500**	18500	**19500**							
		30	*lbs*	*30000*	*32000*	*34200*	*36400*	***38600***	*40800*	***43000***							
37.5-39	Y67	Earthmover	PR									(44)			(52)		
			kPa	200	225	250	275	300	325	350	375	**400**	425	450	**475**		
			psi	*29*	*33*	*36*	*40*	*44*	*47*	*51*	*54*	***58***	*62*	*65*	***69***		
		50	kg	16000	17500	18500	19500	20600	21200	22400	23000	**24300**	25000	25750	**26500**		
		30	*lbs*	*35300*	*38600*	*40800*	*43000*	*45400*	*46700*	*49400*	*50700*	***53600***	*55100*	*56800*	***58400***		
35/65-33	Y545 Y524 Y524Z	Loader & Dozer	PR	**(24)**				**(30)**			**(36)**	**(42)**	**(48)**				
			kPa	**350**	375	400	425	**450**	475	500	**525**	**625**	**725**				
			psi	***51***	*54*	*58*	*62*	***65***	*69*	*73*	***76***	***91***	***105***				
		10	kg	**19000**	19500	20000	21200	**21800**	22400	23000	**23600**	**26500**	**28000**				
		5	*lbs*	***41900***	*43000*	*44100*	*46700*	***48100***	*49400*	*50700*	***52000***	***58400***	***61700***				
40/65-39	Y524	Loader & Dozer	PR					(30)				(36)			(56)		
			kPa	275	300	325	350	**375**	400	425	450	**475**	550	625	**725**		
			psi	*40*	*44*	*47*	*51*	***54***	*58*	*62*	*65*	***69***	*80*	*91*	***105***		
		10	kg	22400	23600	25000	25750	**27250**	27250	29000	30000	**30750**	33500	35500	**38750**		
		5	*lbs*	*49400*	*52000*	*55100*	*56800*	***60000***	*60000*	*64000*	*66000*	***68000***	*74000*	*78500*	***85500***		
45/65-45	Y545 Y524 Y524Z	Loader & Dozer	PR				**(38)**				**(46)**		**(50)**	**(58)**			
			kPa	350	375	400	**425**	450	475	500	**525**	550	**575**	**675**			
			psi	*51*	*54*	*58*	***62***	*65*	*69*	*73*	***76***	*80*	***83***	***98***			
		10	kg	34500	35500	37500	**38750**	40000	41250	42500	**43750**	45000	**46250**	**50000**			
		5	*lbs*	*76000*	*78500*	*82500*	***85500***	*88000*	*91000*	*93500*	***96500***	*99000*	***102000***	***110000***			

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : C

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	Tube Size	Rim Size Flange Height
7.50-16NHS	Y69	6	○	-	C-1	815	32.1	221	8.7	387	15.2	235	9.3	-	-	7.50-16	6.00GS
9.00-20NHS	Y69	10	○	-	C-1	1019	40.1	264	10.4	473	18.6	289	11.4	-	-	9.00-20	7.00T
11.00-20NHS	Y69	14	○	-	C-1	1095	43.1	310	12.2	487	19.2	344	13.5	-	-	11.00-20	8.00V
14/70-20NHS	Y69	12	○	-	C-1	965	38.0	369	14.5	459	18.1	374	14.7	-	-	14/70-20	11.00TG
15.0-20NHS	Y69	16	○	-	C-1	960	37.8	350	13.8	458	18.0	355	14.0	-	-	15.0-20	9.00V

Tire Size	Pattern	Application Max Speed km/h mph		Tire Load Limits at Various Cold Inflation Pressures														
7.50-16NHS	Y69		PR								(6)							
		Compactor	kPa	240	260	280	300	325	350	375	**400**							
			psi	35	38	41	44	47	51	54	**58**							
		10	kg	1405	1470	1535	1600	1675	1750	1820	**1890**							
		5	lbs	3100	3240	3380	3530	3690	3860	4010	**4170**							
9.00-20NHS	Y69		PR												(10)			
		Compactor	kPa	240	260	280	300	325	350	375	400	425	450	475	500	**525**		
			psi	35	38	41	44	47	51	54	58	62	65	69	73	**76**		
		10	kg	2295	2405	2515	2615	2740	2865	2980	3095	3210	3315	3425	3530	**3630**		
		5	lbs	5060	5300	5540	5760	6040	6320	6570	6820	7080	7310	7550	7780	**8000**		
11.00-20NHS	Y69		PR															(14)
		Compactor	kPa	300	325	350	375	400	425	450	475	500	525	550	575	600	625	**650**
			psi	44	47	51	54	58	62	65	69	73	76	80	83	87	91	**94**
		10	kg	3215	3370	3520	3665	3805	3945	4080	4210	4335	4465	4585	4705	4825	4940	**5055**
		5	lbs	7090	7430	7760	8080	8390	8700	8990	9280	9560	9840	10110	10370	10640	10890	**11140**
14/70-20NHS	Y69		PR										(12)					
		Compactor	kPa	240	260	280	300	325	350	375	400	425	**450**					
			psi	35	38	41	44	47	51	54	58	62	**65**					
		10	kg	2775	2905	3035	3160	3310	3460	3600	3740	3875	**4005**					
		5	lbs	6120	6400	6690	6970	7300	7630	7940	8250	8540	**8830**					
15.0-20NHS	Y69		PR							(16)								
		Compactor	kPa	400	450	500	550	600	650	**700**								
			psi	58	65	73	80	87	94	**102**								
		10	kg	3325	3565	3790	4010	4215	4420	**4615**								
		5	lbs	7330	7860	8360	8840	9290	9740	**10170**								

TRA Code : IND

(kg)

Tire Size	Pattern	Ply Rating	Type T/T	Type T/L	TRA Code	Inflated Dimensions Overall Diameter mm	Overall Diameter inch	Overall Width mm	Overall Width inch	Static Loaded Radius mm	Static Loaded Radius inch	Static Loaded Width mm	Static Loaded Width inch	Groove Depth mm	Groove Depth 1/32	Tube Size	Rim Size Flange Height
11.00-20NHS	Y67	16	○	-	IND-3	1091	43.0	293	11.5	489	19.3	342	13.7	24.9	31	11.00-20	8.00V
		18															
12.00-20NHS	Y67	18	○	-	IND-3	1144	45.0	322	12.7	516	20.3	347	13.7	25.5	32	12.00-20	8.50V
		20															
		22															
12.00-24NHS	Y67	20			IND-3	1240	48.8	318	12.5	558	22.0	350	13.8	26.4	33	11.00/12.00-24	8.50V
		28															
	Y505	20	○	-	IND-3	1240	48.8	318	12.5	570	22.4	348	13.7	28.2	36		
	Y69	18			IND-4	1238	48.7	325	12.8	574	22.6	386	15.2	26.3	33		
		20				1246	49.1	326	12.8	570	22.4	379	14.9	29.7	37		
13.00-24NHS	Y67	18	○	-	IND-3	1290	50.8	352	13.9	606	23.9	370	14.6	27.9	35	13.00-24	9.00V
		20															
14.00-24NHS	Y92	24	○	-	IND-3	1356	53.4	377	14.8	632	24.9	400	15.7	33.5	42	14.00-24/25	10.00W
		28															
	Y67	20	○	-	IND-3	1357	53.4	388	15.3	612	24.1	420	16.5	27.7	35		
		24	○	-													
		28	○	○													T/T:10.00W T/L:10.00VA
	Y505	28	○	○	IND-3	1367	53.8	394	15.5	619	24.4	424	16.7	33.8	43		
	Y69	30	○	-	IND-4	1370	53.9	392	15.4	653	25.7	407	16.0	49.7	58		10.00W
14.00-25NHS	Y67	24	○	○	IND-3	1363	53.7	373	14.7	627	24.7	428	16.9	27.7	35		10.00-1.5

Tire Size	Pattern	Industrial PR	for OFF-THE-ROAD Use I.P.(kPa)	0 km/h (0 mph)	Creep	4 km/h (2.5 mph)	10 km/h (5 mph)	15 km/h (10 mph)	20 km/h (12 mph)	25 km/h (15 mph)	for Smooth Floors & Runways Use I.P.(kPa)	0 km/h (0 mph)	Creep	4 km/h (2.5 mph)	10 km/h (5 mph)	15 km/h (10 mph)	20 km/h (12 mph)	25 km/h (15 mph)
11.00-20NHS	Y67	16	725	7800	6350	5600	4875	4550	4300	4150	870	8800	7800	7050	6600	6350	6200	6100
		18	800	8250	6700	5900	5150	4800	4550	4400	960	9250	8250	7450	6950	6700	6550	6450
12.00-20NHS	Y67	18	750	9300	7550	6650	5800	5400	5100	4950	900	10450	9300	8400	7850	7550	7350	7250
		20	825	9850	8000	7050	6150	5700	5400	5250	990	11050	9850	8900	8300	8000	7800	7700
		22	925	10400	8450	7500	6500	6050	5700	5550	1000	11050	9850	8900	8300	8000	7800	7700
12.00-24NHS	Y67 Y505 Y69	18	750	10400	8450	7500	6500	6050	5700	5550	900	11700	10400	9450	8800	8450	8250	8150
		20	825	11050	8950	7950	6900	6400	6050	5850	990	12400	11050	10000	9300	8950	8750	8650
		28	1000	12400	10100	8900	7750	7200	6800	6600	1000	12400	11050	10000	9300	8950	8750	8650
13.00-24NHS	See Characteristics below ✻																	
14.00-24/25NHS	Y92 Y67 Y505 Y69	20	700	13600	11050	9800	8500	7900	7500	7250	840	15300	13600	12350	11500	11050	10800	10650
		24	850	15200	12350	10950	9500	8850	8350	8100	1000	17100	15200	13800	12850	12350	12050	11900
		28	975	16500	13400	11850	10300	9600	9050	8750	1000	17100	15200	13800	12850	12350	12050	11900
		30	1000	16950	13800	12200	10600	9850	9350	9000	1000	17100	15200	13800	12850	12350	12050	11900

✻ for Smooth Floors & Runways Use

(kg)

Tire Size	Pattern	Industrial PR	I.P.(kPa)	Maximum Load at Various Maximum Speeds: Fork Lift Truck, Load Wheels 40 km/h	Steering Wheels 25 km/h	Steering Wheels 30 km/h	Steering Wheels 35 km/h	Steering Wheels 40 km/h	Industrial Vehicles 10 km/h	Industrial Vehicles 25 km/h	Industrial Vehicles 40 km/h	Industrial Vehicles 50 km/h
13.00-24NHS	Y67	18	750	9020	7215	6885	6630	6435	8775	7020	6045	5460
		20	825	9540	7630	7180	7010	6805	9280	7425	6390	5775

NHS : Not for highway service.

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Bias : Technical Data

TRA Code : IND

(kg)

Tire Size	Pattern	Ply Rating	Type		TRA Code	Inflated Dimensions				Static Loaded Radius		Static Loaded Width		Groove Depth		Tube Size	Rim Size Flange Height
						Overall Diameter		Overall Width									
			T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	mm	1/32		
16.00-25	Y67	28	○	○	IND-3	1490	58.7	448	17.6	668	26.3	488	19.2	34.3	43	16.00-24/25	11.25-2.0
		32	-	○												-	
		36	-	○													
	Y69PS	28	○	○	IND-3	1470	57.9	417	16.4	658	25.9	457	18.0	43.8	55	16.00-24/25	
		32															
	Y523	36	-	○	IND-4	1540	60.6	443	17.4	724	28.5	467	18.4	59.3	75	-	
18.00-25	Y67	32	○	○	IND-3	1620	63.8	514	20.2	722	28.4	551	21.7	38.5	49	18.00-25	13.00-2.5
		36	○	○													
		40	-	○													
	Y523	32	-	○	IND-4	1652	65.0	517	20.4	772	30.4	541	21.3	61.3	77	-	
		36															
		40															
	Y69	36	-	○	IND-4	1650	65.0	530	20.9	748	30.0	557	22.2	58.7	74		
		40															
	Y505	40	-	○	IND-4	1670	65.7	522	20.6	741	29.2	564	22.2	64.0	81		
21.00-25	Y67	36	-	○	IND-3	1755	69.1	597	23.5	772	30.4	639	25.2	40.6	51	-	15.00-3.0
		40															
	Y69	40			IND-4	1779	70.0	601	23.7	798	31.4	640	25.2	56.2	71		
24.00-29	Y67	42	-	○	IND-3	1941	76.4	658	25.9	830	32.7	738	29.1	43.7	55	-	17.00-3.5
18.00-33	Y523	36	-	○	IND-4	1850	72.8	518	20.4	869	34.2	542	21.3	56.2	71	-	13.00-2.5
		40															
	Y523U	40				1861	75.3	519	20.4	874	34.4	545	21.5	67.0	84		
	Y69	40				1868	73.5	514	20.2	843	33.2	565	22.2	58.7	74		
21.00-35	Y67	40	-	○	IND-3	2004	78.9	580	22.8	935	36.8	622	24.5	42.0	53	-	15.00-3.0
	Y69	42			IND-4	2050	80.7	612	24.1	927	36.5	662	26.1	64.1	81		
24.00-35	Y67	42	-	○	IND-3	2140	84.3	672	26.5	952	37.5	726	28.6	48.3	61	-	17.00-3.5
		48															
	Y523	42			IND-4	2170	85.4	673	26.5	960	37.8	743	29.3	64.6	81		
27.00-49	Y523	42	-	○	IND-4	2671	105.2	757	29.8	1170	46.1	862	33.9	71.3	90	-	19.50-3.5
33.00-51	Y523	58	-	○	IND-4	3056	120.3	934	36.8	1414	55.7	983	38.7	82.7	104	-	24.00-5.0
36.00-51	Y523	58	-	○	IND-4	3198	125.9	1040	40.9	1379	54.3	1150	45.3	92.2	116	-	26.00-5.0
		72															
40.00-57	Y523	68	-	○	IND-4	3584	141.1	1143	45.0	1567	61.7	1271	50.0	92.8	117	-	29.00-6.0
		76															

Tire Size	Pattern	Industrial PR	for OFF-THE-ROAD Use								for Smooth Floors & Runways Use							
			I.P.(kPa)	0 km/h (0 mph)	Creep	4 km/h (2.5 mph)	10 km/h (5 mph)	15 km/h (10 mph)	20 km/h (12 mph)	25 km/h (15 mph)	I.P.(kPa)	0 km/h (0 mph)	Creep	4 km/h (2.5 mph)	10 km/h (5 mph)	15 km/h (10 mph)	20 km/h (12 mph)	25 km/h (15 mph)
16.00-25	Y67 Y69PS Y523	28	750	18400	14950	13250	11500	10700	10100	9800	900	20700	18400	16700	15550	14950	14600	14400
		32	875	20000	16250	14400	12500	11650	11000	10650	1000	21850	19450	17600	16400	15800	15450	15200
		36	975	21750	17700	15650	13600	12650	11950	11550	1000	21850	19450	17600	16400	15800	15450	15200
18.00-25	Y67 Y523 Y69 Y505	32	750	24000	19500	17250	15000	13950	13200	12750	900	27000	24000	21750	20250	19500	19050	18750
		36	850	25600	20800	18400	16000	14900	14100	13600	1000	28800	25600	23200	21600	20800	20300	20000
		40	950	27200	22100	19550	17000	15800	14950	14450	1000	28800	25600	23200	21600	20800	20300	20000
21.00-25	Y67 Y69	36	725	30400	24700	21850	19000	17650	16700	16150	870	34200	30400	27550	25650	24700	24150	23750
		40	825	32950	26800	23700	20600	19150	18150	17500	990	37100	32950	29850	27800	26800	26150	25750
24.00-29	Y67	42	750	42400	34450	30500	26500	24650	23300	22550	900	47700	42400	38450	35800	34450	33650	33150
18.00-33	Y523 Y523U Y69	36	850	29600	24050	21300	18500	17200	16300	15750	1000	33300	29600	26850	25000	24050	23500	23150
		40	950	32000	26000	23000	20000	18600	17600	17000	1000	33300	29600	26850	25000	24050	23500	23150
21.00-35	Y67 Y69	40	825	38900	31600	27950	24300	22600	21400	20650	990	43750	38900	35250	32800	31600	30850	30400
		42	850	38900	31600	27950	24300	22600	21400	20650	1000	43750	38900	35250	32800	31600	30850	30400
24.00-35	Y67 Y523	42	750	46400	37700	33350	29000	26950	25500	24650	900	52200	46400	42050	39150	37700	36850	36250
		48	875	50400	40950	36250	31500	29300	27700	26800	1000	55350	49200	44600	41500	40000	39050	38450
27.00-49	Y523	42	675	64000	52000	46000	40000	37200	35200	34000	810	72000	64000	58000	54000	52000	50800	50000
33.00-51	Y523	58	750	98400	79950	70750	61500	57200	54100	52300	900	110700	98400	89200	83050	79950	78100	76900
36.00-51	Y523	58	675	113600	92300	81650	71000	66050	62500	60350	810	127800	113600	102950	95850	92300	90150	88750
		72	850	128000	104000	92000	80000	74400	70400	68000	1000	144000	128000	116000	108000	104000	101600	100000
40.00-57	Y523	68	725	148000	120250	106400	92500	86050	81400	78650	870	166500	148000	134150	124900	120250	117500	115650
		76	800	160000	130000	115000	100000	93000	88000	85000	960	180000	160000	145000	135000	130000	127000	125000

(kg)

Tire Size	Pattern	Ply Rating	Type		TRA Code	Inflated Dimensions				Static Loaded Radius		Static Loaded Width		Groove Depth		Tube Size	Rim Size Flange Height
						Overall Diameter		Overall Width									
			T/T	T/L		mm	inch	mm	inch	mm	inch	mm	inch	mm	1/32		
17.5-25	Y573	36	-	○	IND-3	1362	53.6	442	17.4	613	24.1	456	18.0	14.0	18	-	14.00-1.5
29.5-25	Y67	34	-	○	IND-3	1863	73.3	765	30.1	-	-	-	-	49.6	62	-	25.00-3.5
33.25-35	Y67	44	-	○	IND-3	2278	89.7	854	33.6	990	39.0	923	35.6	47.1	59	-	27.00-3.5

Tire Size	Pattern	Industrial PR	for OFF-THE-ROAD Use								for Smooth Floors & Runways Use							
			I.P.(kPa)	0 km/h (0 mph)	Creep	4 km/h (2.5 mph)	10 km/h (5 mph)	15 km/h (10 mph)	20 km/h (12 mph)	25 km/h (15 mph)	I.P.(kPa)	0 km/h (0 mph)	Creep	4 km/h (2.5 mph)	10 km/h (5 mph)	15 km/h (10 mph)	20 km/h (12 mph)	25 km/h (15 mph)
17.5-25	Y573	36	1000	17900	14550	12900	11200	10400	9850	9500	1000	18550	16500	14950	13900	13400	13100	12900
29.5-25	Y67	34	525	32000	26000	23000	20000	18600	17600	17000	630	36000	32000	29000	27000	26000	25400	25000
33.25-35	Y67	44	600	49200	40000	35350	30750	28600	27050	26150	720	55350	49200	44600	41500	40000	39050	38450

- Type T/T : Tube Type T/L : Tubeless Type
- Specification Code CP : Cut Protected REG : Regular HR : Heat Resistant
  CP-S : Cut Protected-S RE-R : Regular-R HR-H : Heat Resistant-H
  CP-C : Cut Protected-C RE-T : Regular-T HR-V : Heat Resistant-V

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

YOKOHAMA OFF-THE-ROAD TIRES 2

■Appendix(Bias)

Haulage Service (OFF-THE-ROAD for Dump Trucks & Scrapers)

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

Narrow Base Bias Ply Tires

NOTES 1. Figures in parentheses denote ply rating for which bold face loads and inflations are maximum.
2. For 65 km/h (40 mph) maximum speed, the loads must be reduced 15% with no change in inflation pressure.
3. When haul length exceeds 4 km one way, consult your YOKOHAMA service representative.

Wide Base Bias Ply Tires

NOTES 1. Figure in parentheses denote ply rating for which bold face loads and inflations are maximum.
2. For 65 km/h (40 mph) maximum speed, the loads must be reduced 17% with no change in inflation pressure.
3. When haul length exceeds 4 km one way, consult your YOKOHAMA service representative.

Slow Speed Service (OFF-THE-ROAD for Loaders & Dozers)

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

Narrow Base Bias Ply Tires
65 Series Bias Ply Tires
Wide Base Bias Ply Tires

NOTES 1. Figures in parentheses denote ply rating for which bold face loads and inflations are maximum.
2. On front tires for front end loaders, it is permissible to increase inflation pressure up to 15 psi that shown in the table with no increase in load.
3. For tire load limits at various speeds:

Max. Speed	% Load Change From 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%

ETC Bias Ply Tires(10-16.5, 13.5-20, 16.9-24, 18.4-24)

NOTES 1. Figures in parentheses denote ply rating for which load and inflation pressure are maximum.
2. Consult your YOKOHAMA service representative for data concerning front end loaders or shovels used in load and carry service.
3. It is permissible to increase inflation pressure up to 15 psi that shown in table with no increase of load.
4. For tire load limits at various speeds:

Max. Speed	% Load Change From 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%

Tractor and Grader Service (OFF-THE-ROAD for Motor Graders)

40 KPH (25 MPH) Maximum Speed Distance: Unlimited

Narrow Base Bias Ply Tires
Wide Base Bias Ply Tires

NOTES 1. Figures in parentheses denote ply rating for which loads and inflation pressure are maximum.
2. For maintenance work on established highways, inflation pressure may be increased 50% if desired with no increase in load.
3. For tire load limits at various speeds with no increase in inflation pressure:

Max. Speed	% Load Change From Table
40 km/h (25 mph)	No Change
50 km/h (30 mph)	-9%
60 km/h (35 mph)	-18%
65 km/h (40 mph)	-27%

Compactor Vehicle Service (OFF-THE-ROAD for Tire Rollers)

10 KPH (5 MPH) Maximum Speed

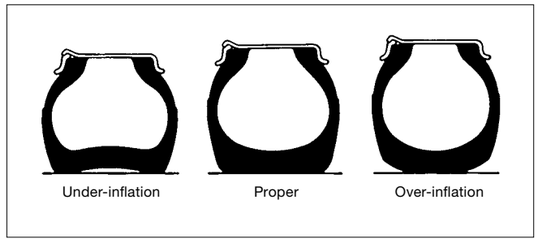
Industrial Service (OFF-THE-ROAD for Smooth Floors & Runways Use)

NOTES 1. Industrial Vehicle
Consists of usage on vehicles such as counterbalanced lift trucks, container handlers, straddle carriers, aircraft tow tractors, log stackers and rough terrain trucks.
2. Smooth Floors and Runways
These are defined as paved or protected operating surfaces which are free of undulations, obstructions or discontinuities.
3. Creep
This is movement of equipment at very slow speed (not over 60 m (200feet) in 30 minutes). During creep motion, loads on the tires are very high and consideration must be given to the type of surface over which the equipment is traveling.
Check maximum air pressure requirements of rims and wheels to ensure ability to accommodate correct air pressure of tire.
For steer wheel loads on lift trucks, multiply the load by 0.8.

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.



Under-inflation

- ☞ Excessive heat generation from increased deflection may cause separation.
- ☞ Excessive tire deflection causes cords to fatigue.
- ☞ Rapid wear due to excessive tread movement against road surface.
- ☞ Sidewalls are more susceptible to cutting and rupture.
- ☞ Radial cracks can form in the upper sidewall.
- ☞ Cracks in the inner liner can occur.

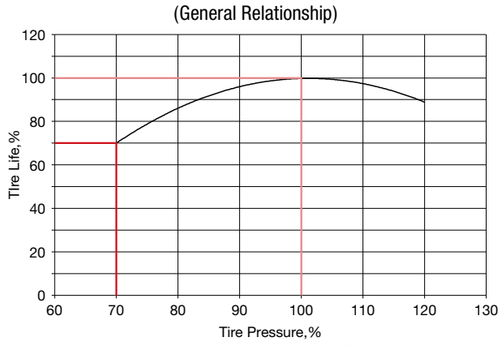
Over-inflation

- ☞ Increased ground contact pressure at centerline results in rapid wear there.
- ☞ Reduced protection of cords against shocks may lead to impact breaks.
- ☞ Excessive pressure is exerted on the beads, increasing the potential for bead burst.
- ☞ Riding comfort deteriorates leading to driver fatigue.
- ☞ Tire slippage due to reduced traction causes wear issues.
- ☞ Tendency for the tire to be cut is increased.

Caution:

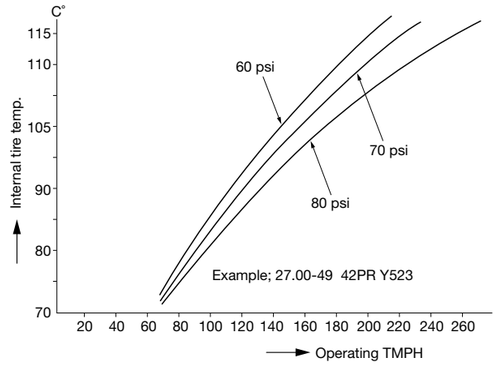
- ☞ In the course of operation, the air pressure rises in correlation to air pressure.
  The amount of increase varies depending on operation.
  This is extremely important in continuous operations.
  If heat generated results in an air pressure rise of 25% in bias tires, the cold inflation pressure should be checked.
  If heat generated results in an air pressure rise of 20% in radial tires, the cold inflation pressure should be checked.
  If cold inflation pressure is accurate, travel speed and/or load must be reduced.
  Otherwise, overheating may cause separations.
  Tires should not be bled to compensate for the increase in pressure.
- ☞ Valves should always be capped. This keeps mud and dust out of the valve core and protects the air seal.

Pressure and Tire Life
(General Relationship)



30% under-inflation reduces the Tire Life by 30%

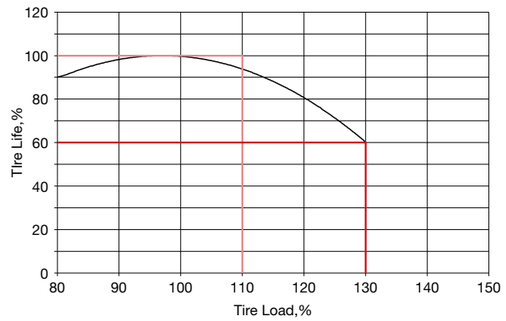
Inflation Pressure and Tire Temperature



Load

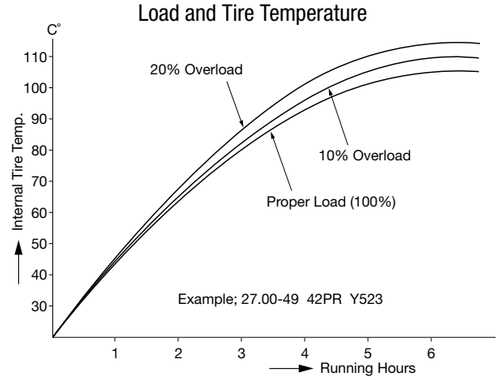
Overloading shortens tire life and increases the chance of early tire failure. For the best tire performance, the maximum recommended load should not be exceeded. If the load exceeds the specified capacity of the tire, a tire with a higher ply rating should be used.

Load and Tire Life



30% overload reduces the Tire Life by 40%

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 sustain. The average sustainable operating speed is limited by the tires' Ton-Kilometer-Per-Hour (TKPH) rating (refer to page 62).

Speed and Load Relation (according to TRA)

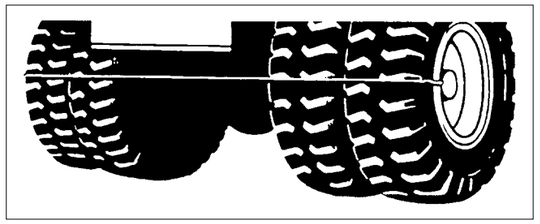
The load capacity of a tire is influenced by the maximum speed of the vehicle as follows:

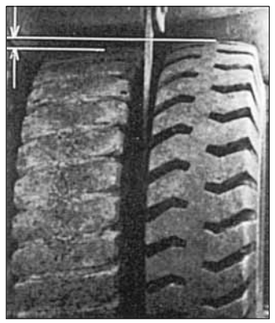
Vehicle	Maximum Speed	Variation In Load Capacity	
		Bias Tire	Radial Tire
Loaders and Dozers	Stationary	160%	160%
	Creep	130%	130%
	2 1/2 mph (4 km/h)	115%	115%
	5 mph (10 km/h)	100%	100%
	10 mph (15 km/h)	87%	87%
	15 mph (25 km/h)	80%	80%

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 heat generation from overloading.
The allowable difference in dual-tire pair diameters is shown in the table blow.





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

	Bias Tolerance				Radial Tolerance			
	Diameter		Circumference		Diameter		Circumference	
Size	mm	in	mm	in	mm	in	mm	in
8.25*20NHS	8	0.3	25	1.0	6	0.2	19	0.7
9.00*20NHS	9	0.4	28	1.1	7	0.3	22	0.9
10.00*20NHS	10	0.4	31	1.2	7	0.3	22	0.9
11.00*20NHS	10	0.4	31	1.2	7	0.3	22	0.9
12.00*20NHS	11	0.4	35	1.4	8	0.3	25	1.0
12.00*24/25NHS	11	0.4	35	1.4	8	0.3	25	1.0
13.00*24/25NHS	12	0.5	38	1.5	9	0.4	28	1.1
14.00*20NHS	13	0.5	41	1.6	9	0.4	28	1.1
14.00*24/25NHS	13	0.5	41	1.6	9	0.4	28	1.1
16.00*25	15	0.6	47	1.9	11	0.4	35	1.4
18.00*25	17	0.7	53	2.1	12	0.5	38	1.5
18.00*33	17	0.7	53	2.1	12	0.5	38	1.5
21.00*25	20	0.8	63	2.5	14	0.6	44	1.7
21.00*35	20	0.8	63	2.5	14	0.6	44	1.7
24.00*35	22	0.9	69	2.7	15	0.6	47	1.9
24.00*49	22	0.9	69	2.7	15	0.6	47	1.9
27.00*49	25	1.0	79	3.1	18	0.7	57	2.2
33.00*51	30	1.2	94	3.7	21	0.8	66	2.6
36.00*51	33	1.3	104	4.1	23	0.9	72	2.8
40.00*57	36	1.4	113	4.4	26	1.0	82	3.2

NOTES: NHS is not for highway service.

Caution :

☞ Radial tires should never be matched with bias tires.
☞ It is recommended to match tires from the same manufacturer.

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.

■Road 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 promptly 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	○	○		○			○		

Tread Separation

Sidewall Cut

Heat Separation

■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 THE YOKOHAMA RUBBER CO., LTD.

■Tire Appearance Check-up

In order to prevent tire troubles, it is helpful to make routine visual check-ups 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.

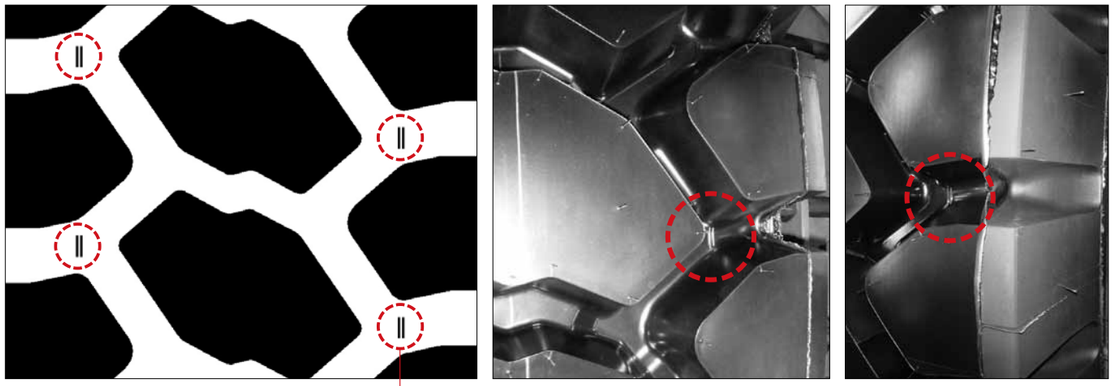
Rim:

☞ Replace if deformation or cracks exist.

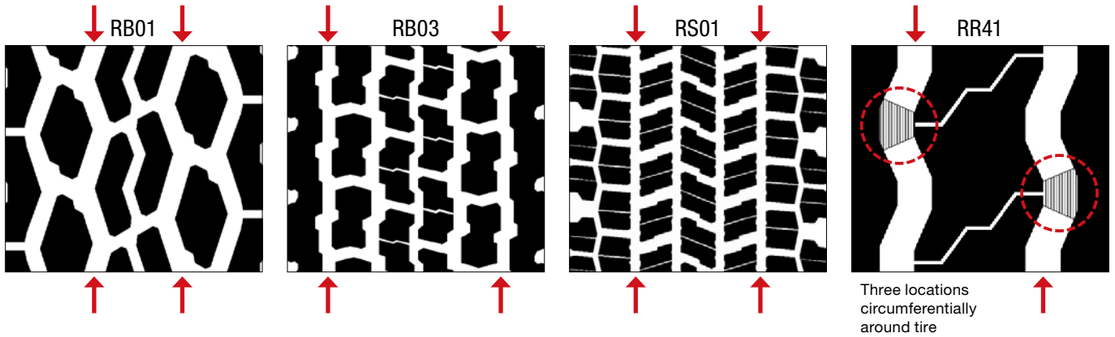
■Measuring Tread Wear

Tread wear can be determined by comparing the remaining groove depth with that of a new tire. There are special marks indicating where the groove depth should be measured for most YOKOHAMA OFF-THE-ROAD TIRES. For rock or traction patterns, the indicators are located one-fourth of the tread width from the shoulders. Rib pattern tires don't have indicators. The tread depth of rib pattern tires should be measured at the locations specified below.
The average of the figures obtained by measuring the groove depths for both the inside and outside of the tire should be used. A depth gauge is used to measure the depth of the grooves as shown:

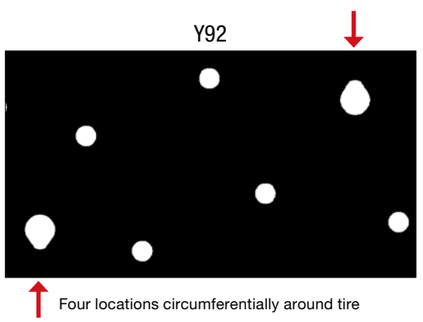
① Normal
Example of tread wear indicators for typical OFF-THE-ROAD TIRES.



② Rib Pattern Tires

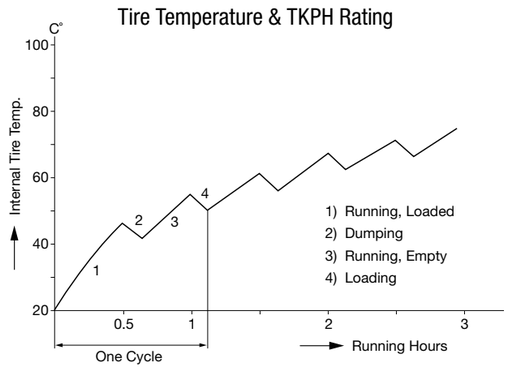


③ Tires with unique tread wear indicator locations



■Ton-Kilometer-Per-Hour (Ton-Mile-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 OFF-THE-ROAD 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 OFF-THE-ROAD TIRES. TKPH is the measure of usage that normally indicates the limits of use under average working conditions.



Operating TKPH

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

Operating TKPH = (average tire load in metric tons) × (average speed in kilometers per hour)

Where,
Average tire load = 1/2 [(load on tire when vehicle is empty) + (load on tire when vehicle is laden)]
Average speed = (round trip distance) × (number of trips per shift) ÷ (total hours of operation per shift*)
* Exclude for calculation between shifts

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

☞ Round trip distance = ___kilometers

☞ 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 ___kilometers/hour

☞ Ambient temperature High ___°C/Average___°C

Use of TKPH Rating

With the formula described above, the operating TKPH required for a particular job can be computed and OFF-THE-ROAD TIRES which satisfy the requirement can be selected. Operating TKPH should always be less than the tire's TKPH rating. The real factor limiting tire usage is heat. TKPH 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 TKPH level. This should be kept in mind when operating TKPH approaches the tire's TKPH rating to prevent heat damage.

TMPH (Ton-Mile-Per-Hour)

Care should be taken when converting from TKPH, 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 (TMPH = TKPH ÷ 1.459).

Adjusting TKPH for Ambient Temperature

Materials, reinforcements and adhesives used in tires are vulnerable to damage from high temperatures which limit the amount and type of usage for tire. This is especially true for OFF-THE-ROAD TIRES for dump trucks and scrapers where high internal temperatures are common, because heat dissipation is hindered by the thick tire constructions. Various conditions also influence the limits of use for OFF-THE-ROAD TIRES. The "Operating TKPH" is the measure of work required from an OFF-THE-ROAD TIRE under specific conditions. The Operating TKPH should not exceed the tire's rated TKPH.

Operating TKPH is adjusted in the following manner by observation and measurement of actual operation.

Adjusted Operating TKPH = Kt × Kg × Operating TKPH
Kt : adjustment coefficient for temperature
Kg : adjustment coefficient for grade

Kt : adjustment coefficient for temperature
The TKPH tire ratings are based on an ambient temperature of 38°C (100°F). The Operating TKPH must be adjusted to compensate for a reduced or increased rate of heat dissipation to the ambient air.

For Bias Tires with maximum yearly temperature exceeding 38°C (100°F):

$$Kt = \frac{77}{77 + (38 - Tc)}$$

Kt = adjustment coefficient for temperature
Tc = maximum yearly temperature in centigrade
Tc = (5 ÷ 9) × (Tf – 32)
Tf = maximum yearly temperature in fahrenheit

For Bias Tires with maximum yearly temperature less than 38°C (100°F):

$$Kt = \frac{77}{77 + \frac{1}{2} \times (38 - Tc)}$$

For Radial Tires with maximum yearly temperature exceeding 38°C (100°F):

$$Kt = \frac{55}{55 + (38 - Tc)}$$

For Radial Tires with maximum yearly temperature less than 38°C (100°F):

$$Kt = \frac{55}{55 + \frac{1}{2} \times (38 - Tc)}$$

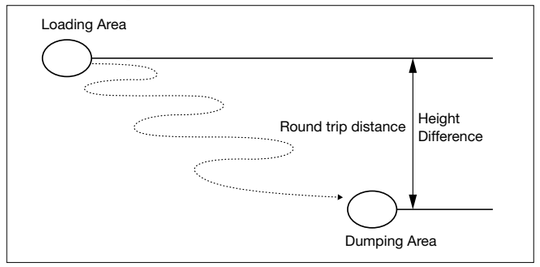
Kg : adjustment coefficient for grade
The grade of a haul road transfers load from one axel to the other of a typical haul truck. Use the chart on the following slide to determine Kg in the case of downhill loaded drive.
Mines should be designed so that the maximum grade does not exceed 10%.

Adjustment Coefficient for Grade

Grade	Front Kg	Rear Kg
-1%	1.01	1.00
-2%	1.02	0.99
-3%	1.02	0.98
-4%	1.03	0.98
-5%	1.04	0.97
-6%	1.05	0.97
-7%	1.06	0.96
-8%	1.06	0.96
-9%	1.07	0.95
-10%	1.08	0.95

–1%: Downhill 1%

How to get grade ?



Grade = Height Difference* ÷ Round trip distance
* Dumping Area Altitude – Loading Area Altitude

How to get the Height difference?

1. Hearing from customer
2. V-Box study
   ☞ Consult THE YOKOHAMA RUBBER CO.,LTD.

TKPH of Steel Breaker Tires

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

■Ton-Kilometer-Per-Hour (Ton-Mile-Per-Hour)

YOKOHAMA OFF-THE-ROAD TIRES Ton-Mile-Per-Hour and Ton-Kilometer-Per-Hour Rating Chart

Specifications			Cut Protected		Regular		Heat Resistant	
Tire Size	Code	Pattern	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH
14.00-24,25	E-3	Y67	65	95	75	109	-	-
16.00-24,25	E-3 E-4	Y67 Y523	85 70	124 102	95 -	139 -	- -	- -
18.00-25	E-3 E-4	Y67 Y523	110 95	160 139	- -	- -	- -	- -
21.00-25	E-3	Y67	-	-	145	212	-	-
20.5-25	E-3	Y67	-	-	-	-	75	109
23.5-25	E-3	Y67	-	-	-	-	100	146
26.5-25	E-3	Y67	-	-	105	153	-	-
29.5-25	E-3	Y67	-	-	110	160	120	175
26.5-29	E-3	Y67	-	-	125	182	-	-
29.5-29	E-3	Y67	115	168	135	197	-	-
33.25-29	E-3	Y67	145	212	-	-	-	-
29.5-35	E-3	Y67	-	-	170	248	-	-
33.25-35	E-3	Y67	155	226	180	263	-	-
37.25-35	E-3	Y67	190	277	225	328	-	-
37.5-39	E-3	Y67	220	321	264	385	-	-

YOKOHAMA OFF-THE-ROAD TIRES Ton-Mile-Per-Hour and Ton-Kilometer-Per-Hour Rating Chart

Specifications			*1 Cut Protected UG		Cut Protected		Regular	
Tire Size	Code	Pattern	TMPH	TKPH	TMPH	TKPH	TMPH	TKPH
14.00R25	E-4	RB41	-	-	-	-	82	119
16.00R25	E-4	RB41	-	-	85	124	110	160
18.00R33	E-4	RB42	-	-	115	168	-	-
	E-4	RL42	-	-	115	168	-	-
24.00R35	E-4	RB42	-	-	190	277	208	304
	E-4	RL42	-	-	190	277	-	-
27.00R49	E-4	RB42	-	-	295	430	367	535
17.5R25	E-3	RB31	-	-	90	131	-	-
	E-3	RL31	-	-	85	124	-	-
20.5R25	E-3	RT31	-	-	95	139	-	-
	E-3	RB31	-	-	105	153	-	-
	E-3	RL31	-	-	93	135	-	-
23.5R25	E-3	RT31	-	-	120	175	-	-
	E-3	RB31	-	-	115	168	-	-
	*2 E-3+	RL31	-	-	100	146	-	-
	E-4	RT41	85	123	95	139	-	-
750/65R25	E-3	RT31	-	-	154	225	-	-
26.5R25	*2 E-3+	RT31	-	-	125	182	-	-
	E-3	RB31	-	-	125	182	-	-
	E-4	RT41	98	143	110	160	-	-
	E-4	RL45	-	-	110	160	-	-
29.5R25	E-3	RB31	-	-	185	270	-	-
	E-4	RT41	125	182	140	204	-	-

*1 For underground use
*2 E-3+, Tread Depth 125% level

YOKOHAMA OFF-THE-ROAD TIRES Ton-Mile-Per-Hour and Ton-Kilometer-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								
	E-4	Y523			105	153								
	E-4	Y523U			100	146								
21.00-35	E-4	Y523			130	190	150	219						
24.00-35	E-4	Y523	120	175	155	226	180	263			220	321		
24.00-49	E-4	Y523			190	277							290	423
27.00-49	E-3	Y67											440	642
	E-4	Y523	180	263	230	336	265	387			310	452	340	496
30.00-51	E-4	Y523	210	306	265	387			340	496			405	591
33.00-51	E-4	Y523	240	350	295	430	350	511					440	642
	E-4	Y567	288	420	354	516	420	613	456	664			528	770
36.00-51	E-3	Y565							500	730			600	875
	E-4	Y523			330	481			430	627				
40.00-57	E-4	Y523					410	598	450	657			540	788
	E-4	Y567			420	613	492	717					648	945

NOTES: Heat Resistant-V spec can be offered to meet certain operating conditions. Consult your YOKOHAMA technical representative.
Figures are subjected to change without prior notice.

■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 TKPH 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 OFF-THE-ROAD 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 50 kph (30 mph)
Wide Base 30 kph (20 mph)

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

$$\text{Speed} = \frac{\text{Tire TKPH}}{\text{Tire Load (M-Ton)}} \times 0.8$$

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 155 (155 m-ton)
2) Tire size: 36.00-51 66PR E-3
3) Temperature: 10°C~38°C (50°F~100°F)
4) Tire load: Empty before starting, load on front tire 29.5 m-ton (32.5 s-ton)
5) Inflation pressure: 515 kPa (75 psi)
6) Maximum speed: 50 kph (30 mph)
7) Average speed:

YOKOHAMA Pattern Code	TRA Code	Tire Spec	Ton-Mileage		Average Speed	
			TMPH	TKPH	MPH	KPH
Y565	E-3	RE-T	500	730	12.31	19.80
		HR-V	600	875	14.77	23.73

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
Y565	E-3	RE-T	16.92	27.22
		HR-V	20.31	32.63

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

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

■Protecting Tires on Vehicle in Highway Drive-Away

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

Narrow Base Earthmover Tires in Drive-Away Service Only

50 KPH (30 MPH) Maximum speed

Tire Size Designation	Tire Load Limits at Various Cold Inflation Pressures																
	Radial Ply																
	kPa	240	275	310	345	380	415	450	485	515	550	585	620	655	690	725	760
	psi	*35*	*40*	*45*	*50*	*55*	*60*	*65*	*70*	*75*	*80*	*85*	*90*	*95*	*100*	*105*	*110*
	Diagonal Ply																
	kPa	170	205	240	275	310	345	380	415	450	485	515	550	585	620	655	690
	psi	*25*	*30*	*35*	*40*	*45*	*50*	*55*	*60*	*65*	*70*	*75*	*80*	*85*	*90*	*95*	*100*
16.00*25	kg	2440	2710	2970	3220	3450	3650	3880	4080	4260	4470	4630	4810	4990	5170	5350	5490
	lbs	*5380*	*5980*	*6550*	*7100*	*7600*	*8050*	*8550*	*9000*	*9400*	*9850*	*10200*	*10600*	*11000*	*11400*	*11800*	*12100*
18.00*25	kg	3150	3520	3860	4150	4450	4720	4990	5260	5530	5760	5990	6210	6440	6670	6890	7120
	lbs	*6950*	*7750*	*8500*	*9150*	*9800*	*10400*	*11000*	*11600*	*12200*	*12700*	*13200*	*13700*	*14200*	*14700*	*15200*	*15700*
21.00*25	kg	4060	4330	4940	5350	5720	6080	6440	6760	7120	7440	7710	8030	8300	8570	8890	9160
	lbs	*8950*	*9550*	*10900*	*11800*	*12600*	*13400*	*14200*	*14900*	*15700*	*16400*	*17000*	*17700*	*18300*	*18900*	*19600*	*20200*
24.00*25	kg	5260	5850	6400	6890	7390	7890	8350	8750	9160	9570	9980	10390	10750	11110	11480	11790
	lbs	*11600*	*12900*	*14100*	*15200*	*16300*	*17400*	*18400*	*19300*	*20200*	*21100*	*22000*	*22900*	*23700*	*24500*	*25300*	*26000*
24.00*29	kg	5620	6260	6850	7390	7940	8440	8940	9390	9840	10250	10700	11110	11520	11880	12290	12660
	lbs	*12400*	*13800*	*15100*	*16300*	*17500*	*18600*	*19700*	*20700*	*21700*	*22600*	*23600*	*24500*	*25400*	*26200*	*27100*	*27900*
18.00*33	kg	3650	4080	4470	4810	5170	5490	5810	6120	6400	6670	6990	7210	7480	7760	7980	8260
	lbs	*8050*	*9000*	*9850*	*10600*	*11400*	*12100*	*12800*	*13500*	*14100*	*14700*	*15400*	*15900*	*16500*	*17100*	*17600*	*18200*
27.00*33	kg	7350	8210	8980	9710	10390	11070	11700	12290	12880	13470	14020	14560	15060	15600	16100	16600
	lbs	*16200*	*18100*	*19800*	*21400*	*22900*	*24400*	*25800*	*27100*	*28400*	*29700*	*30900*	*32100*	*33200*	*34400*	*35500*	*36600*
30.00*33(**)	kg	9070	10070	11020	11930	12790	13610	14380	15100	15830	16560	17240	17870	18550	19140	19780	20370
	lbs	*20000*	*22200*	*24300*	*26300*	*28200*	*30000*	*31700*	*33300*	*34900*	*36500*	*38000*	*39400*	*40900*	*42200*	*43600*	*44900*
21.00*35	kg	4810	5350	5850	6350	6800	7210	7670	8030	8440	8800	9160	9530	9840	10210	10520	10840
	lbs	*10600*	*11800*	*12900*	*14000*	*15000*	*15900*	*16900*	*17700*	*18600*	*19400*	*20200*	*21000*	*21700*	*22500*	*23200*	*23900*
24.00*35	kg	6170	6850	7530	8120	8710	9250	9800	10300	10800	11250	11700	12160	12610	13060	13470	13880
	lbs	*13600*	*15100*	*16600*	*17900*	*19200*	*20400*	*21600*	*22700*	*23800*	*24800*	*25800*	*26800*	*27800*	*28800*	*29700*	*30600*
24.00*43(**)	kg	6890	7670	8390	9070	9710	10300	10890	11480	12020	12560	13060	13560	14060	14560	15010	15470
	lbs	*15200*	*16900*	*18500*	*20000*	*21400*	*22700*	*24000*	*25300*	*26500*	*27700*	*28800*	*29900*	*31000*	*32100*	*33100*	*34100*
18.00*49(**)	kg	4630	5170	5620	6080	6530	6940	7350	7710	8070	8440	8800	9160	9480	9800	10120	10430
	lbs	*10200*	*11400*	*12400*	*13400*	*14400*	*15300*	*16200*	*17000*	*17800*	*18600*	*19400*	*20200*	*20900*	*21600*	*22300*	*23000*
21.00*49(**)	kg	5850	6490	7120	7710	8260	8750	9250	9750	10210	10660	11110	11520	11930	12340	12750	13150
	lbs	*12900*	*14300*	*15700*	*17000*	*18200*	*19300*	*20400*	*21500*	*22500*	*23500*	*24500*	*25400*	*26300*	*27200*	*28100*	*29000*
24.00*49	kg	7390	8210	9030	9750	10430	11110	11750	12340	12930	13520	14060	14610	15150	15650	16150	16650
	lbs	*16300*	*18100*	*19900*	*21500*	*23000*	*24500*	*25900*	*27200*	*28500*	*29800*	*31000*	*32200*	*33400*	*34500*	*35600*	*36700*
27.00*49	kg	9070	10070	11020	11930	12790	13610	14380	15100	15830	16560	17240	17870	18550	19190	19780	20370
	lbs	*20000*	*22200*	*24300*	*26300*	*28200*	*30000*	*31700*	*33300*	*34900*	*36500*	*38000*	*39400*	*40900*	*42300*	*43600*	*44900*
30.00*51	kg	11200	12470	13650	14740	15830	16830	17780	18730	19600	20500	21320	22140	22950	23720	24490	25220
	lbs	*24700*	*27500*	*30100*	*32500*	*34900*	*37100*	*39200*	*41300*	*43200*	*45200*	*47000*	*48800*	*50600*	*52300*	*54000*	*55600*
33.00*51	kg	12970	14470	15830	17100	18330	19500	20590	21680	22730	23720	24720	25630	26580	27440	28350	29260
	lbs	*28600*	*31900*	*34900*	*37700*	*40400*	*43000*	*45400*	*47800*	*50100*	*52300*	*54500*	*56500*	*58600*	*60500*	*62500*	*64500*
36.00*51	kg	15830	17600	19280	20820	22320	23720	25080	26400	27670	28800	30160	31300	32430	33570	34470	35610
	lbs	*34900*	*38800*	*42500*	*45900*	*49200*	*52300*	*55300*	*58200*	*61000*	*63500*	*66500*	*69000*	*71500*	*74000*	*76000*	*78500*
40.00*57	kg	20190	22500	24590	26580	28580	30390	31980	33790	35380	36970	38330	39920	41280	42640	44230	45360
	lbs	*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.

Wide Base Earthmover Tires in Drive-Away Service Only

50 KPH (30 MPH) Maximum speed

Tire Size Designation	Tire Load Limits at Various Cold Inflation Pressures																
	Radial Ply																
	kPa	240	275	310	345	380	415	450	485	515	550	585	620	655	690	725	760
	psi	*35*	*40*	*45*	*50*	*55*	*60*	*65*	*70*	*75*	*80*	*85*	*90*	*95*	*100*	*105*	*110*
	Diagonal Ply																
	kPa	170	205	240	275	310	345	380	415	450	485	515	550	585	620	655	690
	psi	*25*	*30*	*35*	*40*	*45*	*50*	*55*	*60*	*65*	*70*	*75*	*80*	*85*	*90*	*95*	*100*
15.5*25(**)	kg	1700	1890	2060	2230	2390	2540	2690	2840	2970	3080	3220	3360	3470	3580	3700	3810
	lbs	*3740*	*4160*	*4540*	*4920*	*5260*	*5600*	*5920*	*6250*	*6550*	*6800*	*7100*	*7400*	*7650*	*7900*	*8150*	*8400*
17.5*25	kg	2020	2250	2470	2670	2860	3040	3220	3380	3540	3700	3860	3990	4150	4290	4420	4540
	lbs	*4460*	*4960*	*5440*	*5880*	*6300*	*6700*	*7100*	*7450*	*7800*	*8150*	*8500*	*8800*	*9150*	*9450*	*9750*	*10000*
20.5*25	kg	2700	3020	3290	3560	3810	4060	4290	4510	4720	4940	5130	5350	5530	5720	5900	6080
	lbs	*5960*	*6650*	*7250*	*7850*	*8400*	*8950*	*9450*	*9950*	*10400*	*10900*	*11300*	*11800*	*12200*	*12600*	*13000*	*13400*
23.5*25	kg	3450	3830	4200	4540	4850	5170	5490	5760	6030	6310	6580	6800	7080	7300	7530	7760
	lbs	*7600*	*8450*	*9250*	*10000*	*10700*	*11400*	*12100*	*12700*	*13300*	*13900*	*14500*	*15000*	*15600*	*16100*	*16600*	*17100*
26.5*25	kg	4330	4810	5260	5720	6120	6490	6890	7260	7580	7940	8260	8570	8890	9160	9480	9750
	lbs	*9550*	*10600*	*11600*	*12600*	*13500*	*14300*	*15200*	*16000*	*16700*	*17500*	*18200*	*18900*	*19600*	*20200*	*20900*	*21500*
29.5*25	kg	5220	5810	6350	6890	7390	7850	8300	8710	9160	9530	9930	10340	10700	11070	11430	11750
	lbs	*11500*	*12800*	*14000*	*15200*	*16300*	*17300*	*18300*	*19200*	*20200*	*21000*	*21900*	*22800*	*23600*	*24400*	*25200*	*25900*
26.5*29	kg	4630	5170	5620	6080	6530	6940	7350	7710	8120	8480	8800	9160	9480	9800	10120	10430
	lbs	*10200*	*11400*	*12400*	*13400*	*14400*	*15300*	*16200*	*17000*	*17900*	*18700*	*19400*	*20200*	*20900*	*21600*	*22300*	*23000*
29.5*29	kg	5580	6210	6760	7350	7850	8350	8850	9300	9750	10160	10570	10980	11390	11790	12160	12520
	lbs	*12300*	*13700*	*14900*	*16200*	*17300*	*18400*	*19500*	*20500*	*21500*	*22400*	*23300*	*24200*	*25100*	*26000*	*26800*	*27600*
33.25*29(**)	kg	6850	7620	8350	9030	9660	10300	10890	11430	12020	12520	13060	13560	14020	14520	14970	15420
	lbs	*15100*	*16800*	*18400*	*19900*	*21300*	*22700*	*24000*	*25200*	*26500*	*27600*	*28800*	*29900*	*30900*	*32000*	*33000*	*34000*
33.5*33	kg	7480	8350	9120	9840	10570	11250	11880	12470	13110	13650	14240	14790	15330	15830	16330	16830
	lbs	*16500*	*18400*	*20100*	*21700*	*23300*	*24800*	*26200*	*27500*	*28900*	*30100*	*31400*	*32600*	*33800*	*34900*	*36000*	*37100*
37.5*33	kg	8980	10020	10980	11840	12700	13520	14290	15010	15740	16420	17100	17780	18420	19050	19640	20280
	lbs	*19800*	*22100*	*24200*	*26100*	*28000*	*29800*	*31500*	*33100*	*34700*	*36200*	*37700*	*39200*	*40600*	*42000*	*43300*	*44700*
29.5*35	kg	6080	6760	7390	7980	8530	9070	9620	10120	10610	11070	11520	11980	12380	12840	13250	13650
	lbs	*13400*	*14900*	*16300*	*17600*	*18800*	*20000*	*21200*	*22300*	*23400*	*24400*	*25400*	*26400*	*27300*	*28300*	*29200*	*30100*
33.25*35	kg	7440	8260	9070	9800	10480	11160	11790	12430	13020	13560	14150	14700	15200	15740	16240	16740
	lbs	*16400*	*18200*	*20000*	*21600*	*23100*	*24600*	*26000*	*27400*	*28700*	*29900*	*31200*	*32400*	*33500*	*34700*	*35800*	*36900*
37.25*35	kg	8980	9980	10930	11790	12660	13430	14200	14970	15650	16370	17060	17690	18330	18960	19550	20140
	lbs	*19800*	*22000*	*24100*	*26000*	*27900*	*29600*	*31300*	*33000*	*34500*	*36100*	*37600*	*39000*	*40400*	*41800*	*43100*	*44400*
33.5*39(**)	kg	8070	8980	9800	10610	11390	12110	12790	13470	14110	14740	15330	15920	16510	17060	17600	18140
	lbs	*17800*	*19800*	*21600*	*23400*	*25100*	*26700*	*28200*	*29700*	*31100*	*32500*	*33800*	*35100*	*36400*	*37600*	*38800*	*40000*
37.5*39	kg	9660	10750	11750	12700	13610	14520	15330	16150	16920	17650	18370	19100	19780	20460	21090	21730
	lbs	*21300*	*23700*	*25900*	*28000*	*30000*	*32000*	*33800*	*35600*	*37300*	*38900*	*40500*	*42100*	*43600*	*45100*	*46500*	*47900*
37.5*51(**)	kg	10930	12160	13290	14380	15420	16370	17330	18230	19100	19960	20770	21590	22360	23130	23860	24590
	lbs	*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)
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NOTES: Figures are subjected to change without prior notice.

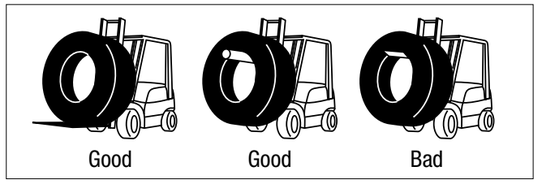
PSI × 0.0703 = kg/cm² POUND × 0.4536 = kg PSI × 6.895 = kPa

■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.

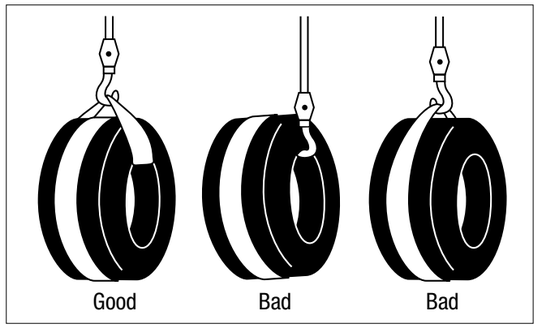
When using a forklift to lift a tire:

☞ 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 hook the tire beads.
☞ Do not use a rope sling.



■Safety Precautions for Demounting

Safety Precautions

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, and 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. This 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.)

■Safety Precautions for Mounting

Mounting

1. Before Mounting

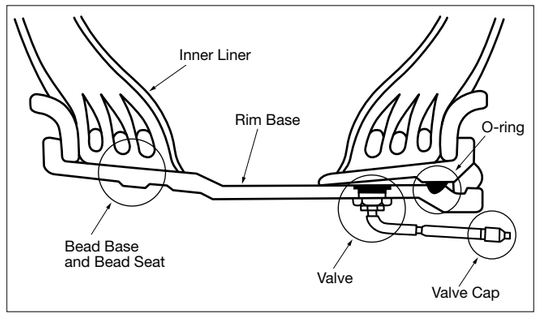
☞ Check rim components for cracks. Replace all cracked, badly worn, damaged and severely rusted components with new parts of the same size and type. When a component is in doubt, replace it. (Parts that are cracked, damaged or excessively corroded are weakened. Bent or repaired parts may not engage properly.)
☞ Do not, under any circumstance, attempt to rework, weld, heat or braze any 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.)
☞ Check type of rim and make sure all parts of such rim are being assembled properly. Follow instruction manual of rim or ask your distributor if you have any doubts.(Mismatched parts may appear to fit, but when the tire is inflated they 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 damage to the tire or wheel components. (Components may have been damaged or dislocated during the time the tire was run flat or seriously under-inflated.)

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 on an inflated on 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.



■Safety Precautions for Operation

Operation

☞ Do not use under-inflated 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.

☞ Do not overload or over-inflate 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.)

☞ Never mount bias tire and radial tire on the same axle. Follow vehicle manufacturer's recommendation.

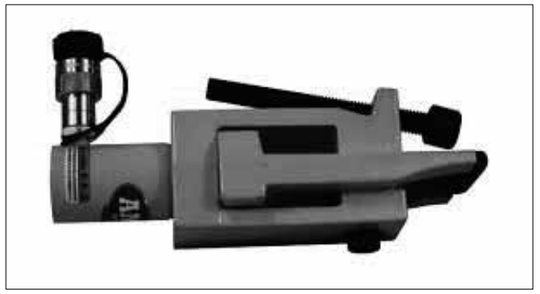
☞ Never use tire under unintended service conditions for the tire. Please consult YOKOHAMA if vehicle operation requires specialized tire fitment.

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.

Hydraulic tire remover (tire push type) in operation



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

Hydraulic tire remover (rim flange push type) in operation

Tire handler

■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 $CaCl_2$	Total Weight (lbs)	Gallons of Water	Lbs of $CaCl_2$	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	73	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	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
18.00-25	96	82	287	971	77	387	1032

*:"R"(Radial Ply) or "-"(Diagonal or Bias Ply)

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 $CaCl_2$	Total Weight (lbs)	Gallons of Water	Lbs of $CaCl_2$	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
750/65R25	149	128	446	1510	120	601	1603
26.5*25	159	136	477	1614	129	643	1716
29.5*25	207	177	618	2090	167	833	2223
26.5-29	174	149	521	1764	141	703	1875
29.5-29	224	192	673	2275	181	907	2419
33.25-29	279	239	837	2832	225	1126	3007
29.5-35	251	215	753	2547	203	1015	2708
33.25-35	319	274	958	3242	258	1292	3447
37.25-35	373	320	1115	3770	302	1510	4030
37.5-39	466	399	1397	4729	377	1885	5028
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

*:"R"(Radial Ply) or "-"(Diagonal or Bias Ply)

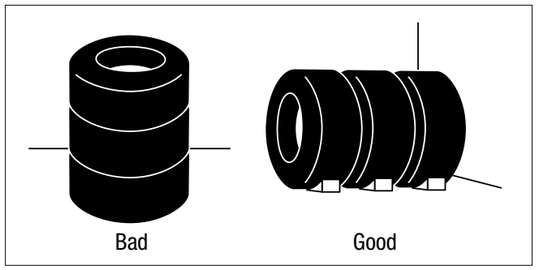
Gallons × 3.7853 = Liters Pounds × 0.4536 = Kilograms

■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 Costs

✎ **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.

■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 tire. For example, a size 13.00-24 and 13.00-25.

Storage of Tubes and Flaps

Tubes 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.

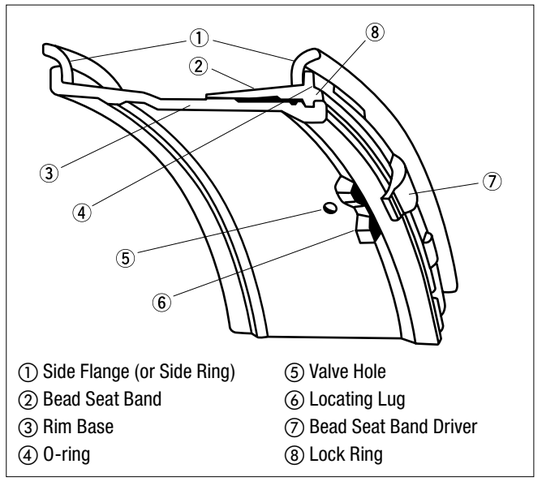
Valves for Tube Type Tires

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.

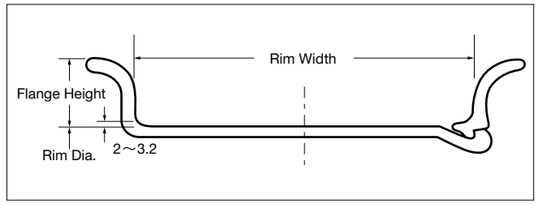
Type of Rims

Tires 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 Rim/5° Flat Base Rim

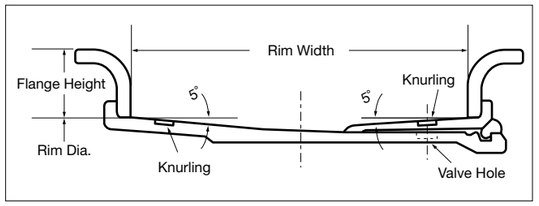


Rim Size		Tire Size	
Flat Base Rim	5° Flat Base Rim	Standard	Alternative
6.50T	6.5	8.25-20	9.00-20
7.00T	7.0	9.00-20	10.00-20
7.50V(VM)	7.5	10.00-20	11.00-20
8.00V	8.0	11.00-20	12.00-20.24
8.50V(VM)	8.5	12.00-20.24	13.00-24
9.00V	9.0	13.00-24	12.00-20.24, 14.00-20.24
10.00WI(W)	—	14.00-20.24, R24	13.00-24

Full Tapered Bead Seat Rims

Most large-wheeled construction machinery employ full tapered bead seat rims. These rims have a 5° taper in the bead seat which strengthens the rim/bead 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 Rim

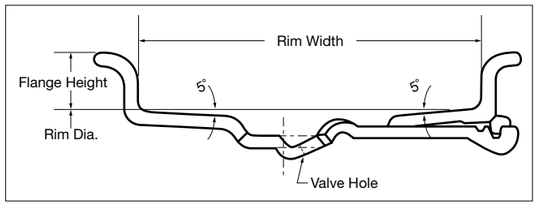


Narrow Base		Wide Base	
Rim Size	Tire Size	Rim Size	Tire Size
8.50	12.00-25, 13.00-25	12.00	15.5-25
10.00	14.00-25	14.00	17.5-25, 17.5R25
11.25	16.00-25, 16.00R25	17.00	20.5-25, 20.5R25
13.00	18.00-25, 33, 18.00R33	19.50	23.5-25, 23.5R25
15.00	21.00-25, 35	22.00	26.5-25, 26.5R25
17.00	24.00-25, 29, 35, 49	25.00	29.5-25, 29, 35, 29.5R25
19.50	27.00-49	27.00	33.25-35
22.00	27.00-33, 30.00-51	28.00	33.5-33, 39, 35/65-33
24.00	33.00-51	31.00	37.25-35
26.00	36.00-51	32.00	37.5-33, 39, 51, 40/65-39
29.00	40.00-57	36.00	45/65-45

Semi-Drop Center Rims (SDC)

This rim has a 5°-inclined bead seat and a depressed center. It is abbreviated as the "SDC" rim. Most SDC rims for OFF-THE-ROAD 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 Rim



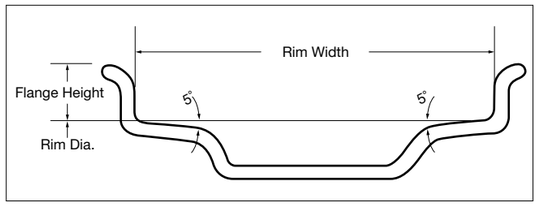
Rim Size	Tire Size
8.00TG	12.00-20, 24
	13.00-24
	14.00-24, 14.00R24
10.00VA	13.00-24
	14.00-24, 14.00R24
	16.00-24

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 Rims (DC)

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 Rim



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 use 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.

Rims, Valves & O-rings 4

■Valves

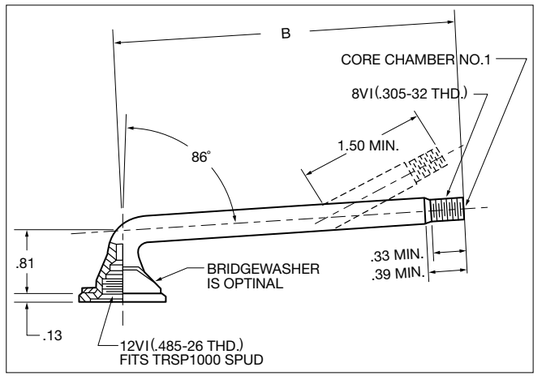
Valves for OFF-THE-ROAD TIRES are of two types, tube or rim valves and are available in three makes: standard bore, large bore and air/water. Tube valves are for tube type tires and rim valves are for tubeless type tires.

Tube Valves

Standard Bore Tube Valves

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.

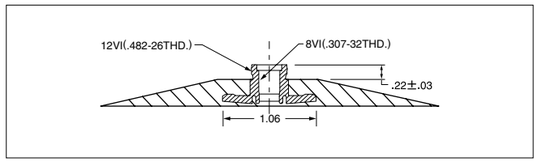
Screw-on Standard Bore Tube Valve



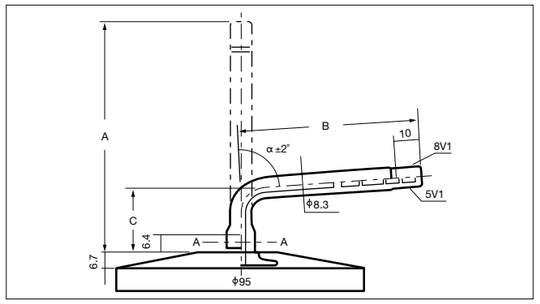
unit inch (mm)

Valve No. / Size	TR1075A	TR1077A	TR1078A	TR1175A	TR1177A	TR1179A
B (mm)	3.0 (76)	4.1 (105)	5.0 (127)	4.5 (115)	3.7 (95)	5.6 (142)

TRSP1000 Spud Air-Liquid Type



Rubber Base Valve



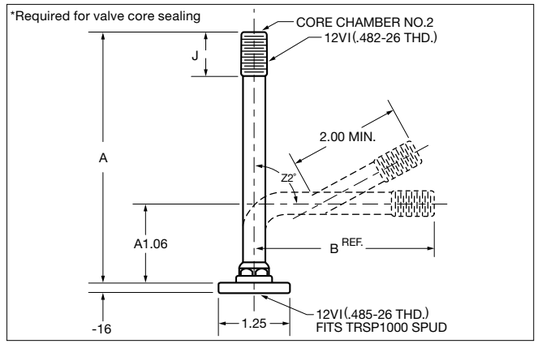
unit inch (mm)

Valve No. / Size	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	86	82	86	82	86

Large Bore Tube Valves

More air is required to fill larger 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.

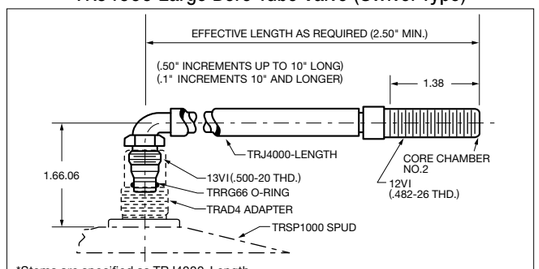
Screw-On Large Bore Convertible Tube Valve



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	—	4.70 (121)	1.18 (30)	0.75 (19)	84

TRJ4000 Large Bore Tube Valve (Swivel Type)

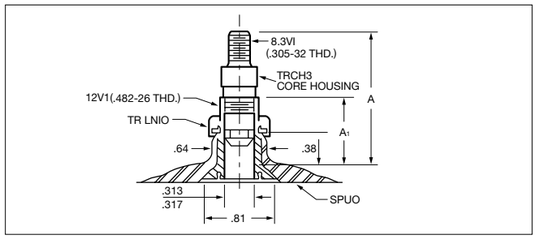


*Stems are specified as TRJ4000-Length.
Example: For an effective length of 9.50", the stem number is TRJ4000-9.50.
Recommended torque at installation: 70-80 inch-pounds.
Valve core: TRC2

Air/Water Tube Valves

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.

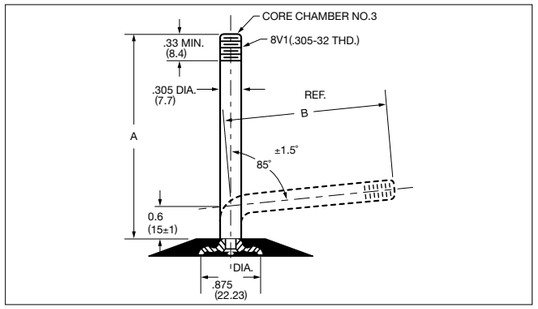
Air-Liquid Type



unit inch (mm)

Valve No.	A1	A
TR218A	0.81 (20.6)	1.63 (41.1)
TR220A	1.19 (30.2)	2.00 (50.7)

Convertible Tube Valve 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)

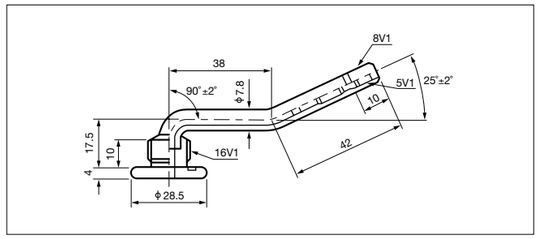
Valve Core: TRCa (short core only)

Rim Valves

Standard Bore Rim Valves

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

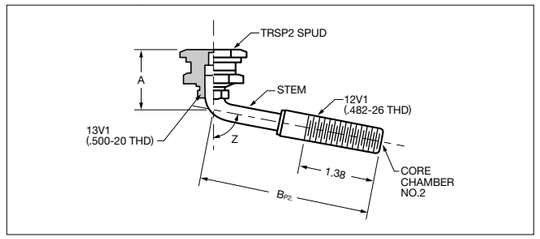
TR503A Dimension



Large Bore Rim Valves

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

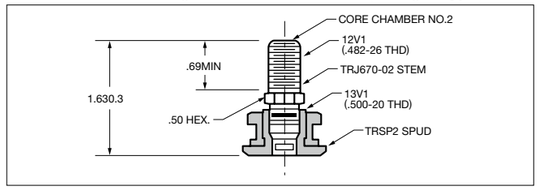
Large Bore Tubless Valve (Swivel Type)



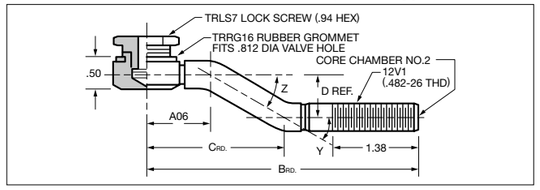
Valve No.	*TR Stem No.	A	B	Zº
TRJ650-03	J650-02	1.08	3.12	80

* Recommended torque at installation: 70-80 inch-pound

TRJ670-03 Large Bore Tubeless Valve (Straight Type)



Large Bore Tubeless Valve (Turret Type)



Valve No.	A	B	C	D	Yº	Zº
TRJ690	1.25	4.69	2.31	0.56	28	28

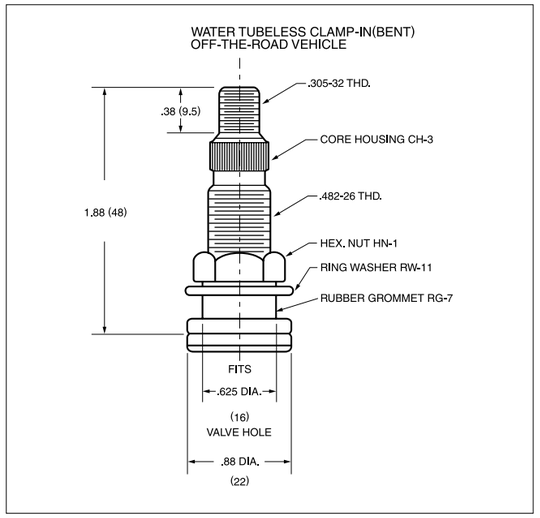
Rims, Valves & O-rings 4

Valves

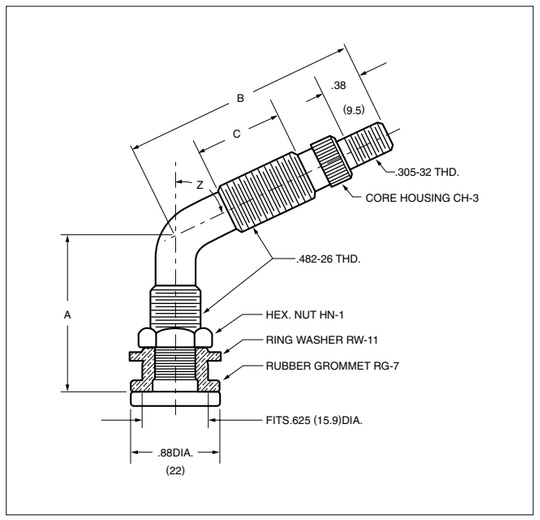
Air/Water Rim Valves

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

TR618A Dimensions



TR621A, TR622A and TR623A Dimensions



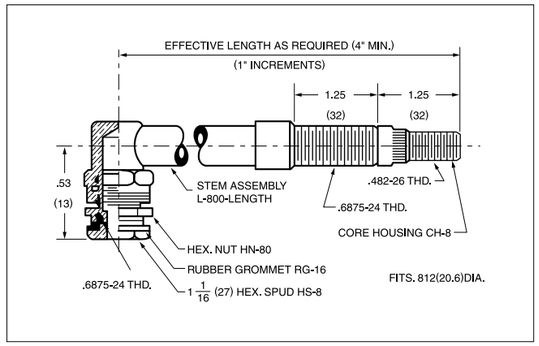
unit inch (mm)

Valve No.	A	B	C	Z
TR621A	1.53 (39)	2.97 (75)	1.59 (40)	65°
TR622A	1.75 (44)	4.53 (115)	1.84 (47)	65°
TR623A	1.53 (39)	2.25 (57)	0.88 (22)	65°

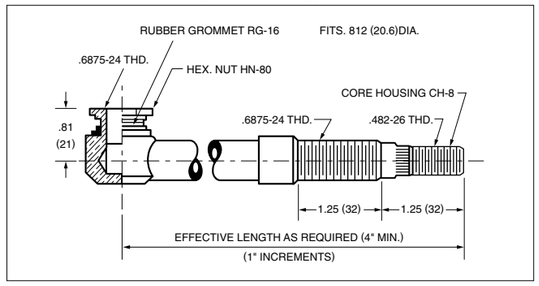
Super Large Bore Rim Valves

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

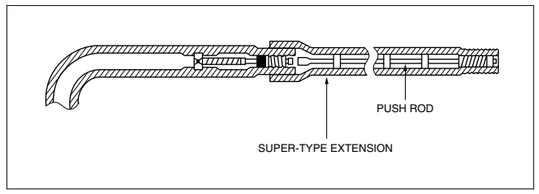
TRL850 Length (Swivel Type) Dimensions



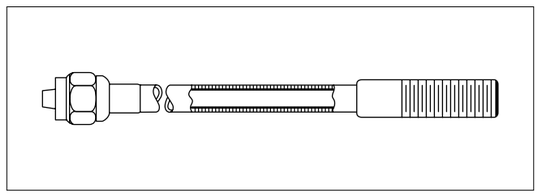
TRL890 Length (Turret Type) Dimensions



Extension



Semi-flexible Extension



unit : mm

Type	Number	Overall Length	Effective Length	Thred Length
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	14.00 and Under 16.00 and Over	Standard Bore Tube Valve Large Bore Tube Valve	Standard Bore Rim Valve Large Bore Rim Valve
FULL TAPERED	14.00 and Under 16.00 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

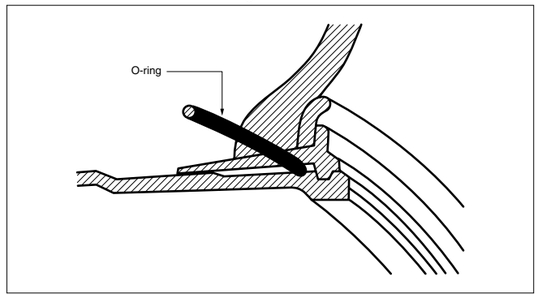
NOTES: Valves for inside dual-pair tire are equipped with a supplemental valve extension to facilitate air inflation. The extension is made of brass which is apt to nicks, scratches and dents. Care is required when (de)mounting, and storage should be in a clean, moisture free area.

Rims, Valves & O-rings 4

■O-rings

Rims for tubeless OFF-THE-ROAD TIRES 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 (use 17.00×25-1.7 rim)				
OR325T	25" TB	16.00-25 and over 20.5-25 (use 17.00×25-2.0 rim) and over	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 bead seat rim)
- 25 → Rim diameter (Bead diameter in inches)
- 3 → Cross section diameter O-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.

☞ Clean 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.

■Combination Tables

OFF-THE-ROAD TIRES, Tube, Flap and O-ring Combination Table

Tire Size	Tube Size	Valve Size		Flap Size	O-ring Size
		Tube Valve	Rim Valve		
12.5/70-16	—	—	TR575,TR415	—	—
10-16.5	10-16.5	TR15	TR575	—	—
17.5/65-20	17.5/65-20	TR218A	TR618A	—	—
14/70-20	14/70-20	TR179A	—	14/70-20	—
13.5-20	13.5-20	TR78A	—	13.5-20	—
15.0-20	15.0-20	TJ179W	—	15.0-20	—
42×17-20	42×17-20	TR179A	—	42×17-20	—
16.9-24	16.9-24	TR218A	TR618A	—	—
18.4-24	18.4-24	TR218A	TR618A	—	—
750/65R25	—	—	TRJ650,TRJ670,TRJ690	—	OR325T
15.5-25	15.5-25	JSJ1175B,JSJ1175	TRJ650,TRJ670,TRJ690	15.5/17.5-25	OR225T
17.5R25	—	—	TRJ650,TRJ670,TRJ690	—	OR225T
17.5-25	17.5-25	JSJ1175B,JSJ1175	TRJ650,TRJ670,TRJ690	15.5/17.5-25	OR225T
20.5R25	—	—	TRJ650,TRJ670,TRJ690	—	OR325T/OR225T
20.5-25	20.5-25	JSJ1175B,JSJ1175	TRJ650,TRJ670,TRJ690	20.5-25	OR325T/OR225T
23.5R25	—	—	TRJ650,TRJ670,TRJ690	—	OR325T
23.5-25	23.5-25	JSJ1175B,JSJ1175	TRJ650,TRJ670,TRJ690	23.5-25	OR325T
26.5-25	26.5-25	JSJ1175	TRJ650,TRJ670,TRJ690	26.5-25	OR325T
29.5-25	—	—	TRJ650,TRJ670,TRJ690	—	OR325T
26.5-29	—	—	TRJ650,TRJ670,TRJ690	—	OR329T
29.5-29	—	—	TRJ650,TRJ670,TRJ690	—	OR329T
33.25-29	—	—	TRJ650,TRJ670,TRJ690	—	OR329T
35/65-33	—	—	TRJ650,TRJ670,TRJ690	—	OR333T
29.5-35	—	—	TRJ650,TRJ670,TRJ690	—	OR335T
33.25-35	—	—	TRJ650,TRJ670,TRJ690	—	OR335T
37.25-35	—	—	TRJ650,TRJ670,TRJ690	—	OR335T
37.5-39	—	—	TRJ650,TRJ670,TRJ690	—	OR339T
40/65-39	—	—	TRJ650,TRJ670,TRJ690	—	OR339T
45/65-45	—	—	TRJ650,TRJ670,TRJ690	—	OR345T
385/95R25	—	—	TRJ650	—	OR225T
445/95R25	—	—	TRJ650,TRJ670,TRJ690	—	OR325T
505/95R25	—	—	TRJ650,TRJ670,TRJ690	—	OR325T

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

OFF-THE-ROAD TIRES, Tube, Flap and O-ring Combination Table

Tire Size	Tube Size	Valve Size		Flap Size	O-ring Size
		Tube Valve	Rim Valve		
9.00-20	9.00-20	TR175A,TR76A	—	8.25/9.00(R)20	—
10.00-20	11.1/10.00(R)20	TR78A,TR76A	—	10.00/11.1(R)20	—
11.00-20	11.00-20	TR78A,TR76A	—	11.00/12.00(R)20	—
12.00-20	12.00-20	TR78A,TR76A	—	11.00/12.00(R)20	—
14.00-20	14.00-20	TR179A,JS179	—	13/80,13.00/14.00/15.0(R)20	—
12.00-24	11.00/12.00(R)24	TR78A,TR77A	TR618A,TR503A	10.00/11.00/12.00-24	—
13.00-24	13.00-24/25	TR77A,JS179A	TR618A,TR503A	13.00/14.00-24/25	OR224TG
14.00R24	14.00(R)24/25	JS179	TR618A	13.00/14.00-24/25	OR224TG
14.00-24	14.00-24/25	TR77A,TR175A,TR179A	TR618A,TR503A	13.00/14.00-24/25	OR224TG
16.00-24	16.00-24/25	JSJ1175B,JSJ1175	TR618A,TR503A	16.00/18.00-24/25	OR224TG
14.00-25	14.00-24/25	TR77A,TR175A,TR179A	TR508,TR650	13.00/14.00-24/25	OR225T
16.00R25	—	—	TRJ650,TRJ670,TRJ690	—	OR325T
16.00-25	16.00-24/25	JSJ1175B,JSJ1175	TRJ650,TRJ670,TRJ690	16.00/18.00-24/25	OR325T
18.00-25	18.00-24/25	JSJ1175B,JSJ1175C	TRJ650,TRJ670,TRJ690	16.00/18.00-24/25	OR325T
21.00-25	21.00-24/25	JSJ1175	TRJ650,TRJ670,TRJ690	21.00-24/25*15.5/17.5-25	OR325T
24.00-25	24.00-25	JSJ1175	TRJ650,TRJ670,TRJ690	20.5/24.00-25	OR325T
24.00-29	—	—	TRJ650,TRJ670,TRJ690	—	OR329T
18.00R33	—	—	TRJ650,TRJ670,TRJ690	—	OR333T
18.00-33	—	—	TRJ650,TRJ670,TRJ690	—	OR333T
21.00-35	—	—	TRJ650,TRJ670,TRJ690	—	OR335T
24.00R35	—	—	TRJ650,TRJ670,TRJ690	—	OR335T
24.00-35	—	—	TRJ650,TRJ670,TRJ690	—	OR335T
24.00-49	—	—	TRJ650,TRJ670,TRJ690	—	OR349T
27.00R49	—	—	TRJ650,TRJ670,TRJ690	—	OR349T
27.00-49	—	—	TRJ650,TRJ670,TRJ690	—	OR349T
30.00-51	—	—	TRJ650,TRJ670,TRJ690	—	OR451T
33.00-51	—	—	TRJ650,TRJ670,TRJ690	—	OR451T
36.00-51	—	—	TRJ650,TRJ670,TRJ690	—	OR451T
40.00-57	—	—	TRL870,TRL850	—	OR457T

The valve sizes for tubes and rims shown in tables(p.84-85)correspond with the conventional standards of TRA,JATMA, etc.

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

Earthmover Data

Formulas and Rules

The following are useful formulas and rules of thumb:

☞ Production, hourly = Load (BCY)/Cycles × Cycles/hr
= Load (BM^3)/Cycles × Cycles/hr

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

☞ Load factor (L.F.) = $\frac{\text{Bank cubic meters } (BM^3)}{\text{Loose cubic meters } (LM^3)}$

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

☞ Load (bank measure) = Loose cubic yards (LCY) × L.F.
= Loose cubic meters (LM^3) × L.F.

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

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

☞ 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
*GVW = Gross Vehicle Weight

☞ Grade resistance factor (GR 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) = Coeffective of traction × Weight on drivers
= Coeffective of traction × (Total weight × % 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 = $\frac{\text{Distance (ft)}}{\text{Speed (ft/min)}}$

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

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

☞ 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 = $\frac{\text{Scraper cycle time}}{\text{Unit hourly production}}$

Earthmover Data

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)
Liter (l or ltr.)	61.02	Cubic inch
Imperial gallon	1.20	US gallon
Kilometer per hour (kph)	0.621	MPH
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 ($kgs./cm^2$)	14.225	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 m^2 = 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 English Unit	by	to Obtain Metric 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
Cubic 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
Foot-pound (ft-lb)	0.1383	Kilogram-meter
Horse 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	21	27	41	52	105	132
2	3	22	28	42	53	110	139
3	4	23	29	43	54	115	145
4	5	24	30	44	55	120	151
5	6	25	32	45	57	125	158
6	8	26	33	46	58	130	164
7	9	27	34	47	59	135	170
8	10	28	35	48	61	140	176
9	11	29	37	49	62	145	183
10	13	30	38	50	63	150	189
11	14	31	39	55	69		
12	15	32	40	60	76		
13	16	33	42	65	82		
14	18	34	43	70	88		
15	19	35	44	75	95		
16	20	36	45	80	101		
17	21	37	47	85	107		
18	23	38	48	90	113		
19	24	39	49	95	120		
20	25	40	50	100	126		

Conversion Tables

Pounds to Kilograms

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

Kilograms to Pounds

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

Miles Per Hour to Kilometers Per Hour

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

Kilometers Per Hour to Miles Per Hour

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

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%

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

Approximate Weight of Materials*

Materials	Lbs per Loose Yd^3	Kg per Loose M^3	Lbs per Bank Yd^3	Kg per Bank M^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 M^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

R: Rock, E: Earth

Materials	Lbs per Loose Yd^3	Kg per Loose M^3	Lbs per Bank Yd^3	Kg per Bank M^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 M^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.