



When the Rubber Hits the Road Part 2 – Tire Sizing and Tire Care

Anyone who has done even a small amount of work on their precious ride will know that the bicycle industry has never developed a global standard for almost anything. That holds true for bicycle tire sizing as well. To make matters worse the size shown on the sidewall isn't necessarily what you actually get. So, how do you determine tire sizes for your bike, and how do you best look after them so that they last long enough for you to forget what you discovered in this article?

One of the main reasons for a lack of standards is that individual countries did their own thing when it came to developing standards. The other issue is that they sort of used whatever came to hand as far as parts were concerned. Lastly, there was never a global organization that brought different interest groups together to agree on anything.

How Many Systems Are There?

Literally dozens would be the answer, but thankfully most of the world has settled on a few, and more importantly it appears as though a standard is finally taking hold.

Currently, you will commonly find tires marked in **Traditional Sizing, Fractional Inch, Decimal Sizes, French Sizes and ISO Sizes.**

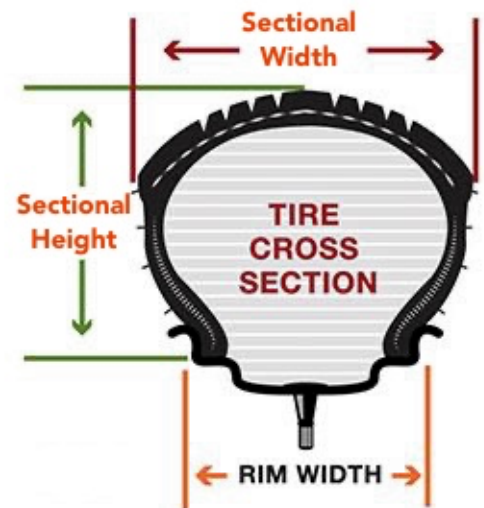
Traditional Sizing simply measured the diameter of the tire and wheel assembly once a tire was mounted and inflated. Simple right? But oh no, the tire manufacturers began playing around with tires of different sectional height that still fits on the same rim size – hence changing the outside diameter. A good example is the 26" tire that achieved popularity during the early days of the Mountain Bike Revolution. The rim itself is not actually 26", but 25 and 5/8 inches and with the range of tire sizes available now for those rims the diameter of the assembly can be as little as 24 and 7/8 inches!

A second set of numbers that follow the "26" are intended to give the sectional width of tire when it is mounted and inflated. However, that too can be misleading as this also depends upon the rim width that the tire is mounted on. To make matters worse, some tire manufacturers mark their tire widths in fractional inches, while others mark their tires in decimal inches. [Sheldon Brown's](#) law of tire sizing states that:

*"If two tires are marked with sizes that are mathematically equal, but one is expressed as a decimal and the other is marked as a fraction, these two tires will **not** be interchangeable".*

To add to this, tire manufacturers flat out lie about their tire sizes, usually making them smaller than stated on the sidewall to make them lighter. Any dyed-in-the-wool cyclist will go for lighter – right?

Thankfully, this chaotic system is going by the wayside.



Fractional	ISO	Applications
36 inch	787 mm	Unicycles, some novelty bicycles
32 inch	686 mm	Unicycles, some novelty bicycles
29 inch	622 mm	This is a marketing term for wide 622 mm ("700C") tires.
28 x 1 1/2	635 mm	English, Dutch, Chinese, Indian Rod-brake <u>roadsters</u> (Also marked F10, F25, 700 B)
	622 mm	(F.13) Rare Canadian designation
28 x 1 5/8 x 1 1/2		635 mm
	Old Swedish designation	
27 x anything <i>except "27 five" and 609 mm Danish</i>	630 mm	Older <u>road bikes</u> .
27 x 1 1/2	609 mm	Rare Danish size
26 x 1 (650 C)	571 mm	Triathlon, time trial, small road bikes. Old Schwinn S-4
26 x 1 1/4	597 mm	Older British sport & <u>club</u> bikes
26 x 1 3/8 (S-6)		<u>Schwinn "lightweights"</u>
26 x 1 3/8 (E.A.3)	590 mm	Most English <u>3-speeds</u> , department-store or juvenile 10 speeds
26 x 1 1/2 (650B)	584 mm	<u>French</u> utility, tandem and loaded-touring bikes, a very few Raleigh (U.S.) & Schwinn mountain bikes.

26 x 1 3/4 (S-7)	571 mm	<u>Schwinn</u> "middleweight" <u>cruisers</u>
26 x 1, 1 1/8		High performance wheels for smaller riders, common on Cannondale bicycles
24 x 1	520 mm	High performance wheels for smaller riders; <u>Terry</u> front
24 x 1 1/8	520 mm or 540 mm!	Caveat emptor. 540mm is common on wheelchairs.
24 x 1 1/4	547 mm	British or Schwinn Juvenile
24 x 1 3/8 (S-5)		<u>Schwinn</u> Juvenile <u>lightweights</u>
24 x 1 3/4 (S7)	520 mm	Schwinn "Middleweights"
24 x 1 3/8 (E-5)	540 mm	British Juvenile, most wheelchairs; common on women's utility bicycles in Japan.
22 x 1 3/8 NL	489 mm	Dutch juvenile
20 x 1 1/8 20 x 1 1/4 20 x 1 3/8	451 mm	Juvenile <u>lightweights</u> , <u>BMX</u> for light riders, some recumbents, some folding bicycles
20 x 1 3/4	419 mm	<u>Schwinn</u> juvenile
20 x 2	438 mm	Swedish
18 x 1 3/8	400 mm	British juvenile
17 x 1 1/4	369 mm	Alex <u>Moulton</u> AM series
16 x 1 3/8	349 mm	Older Moulton; Brompton & other folders, recumbent front, juvenile
16 x 1 3/8	337 mm	Mystery tire

16 x 1 3/8	335 mm	Polish juvenile
16 x 1 3/4	317 mm	<u>Schwinn</u> Juvenile
14 x 1 3/8	298 mm	Moulton mini, etc.
12 1/2 x anything	203 mm	Juvenile, scooters
10 x 2	152 mm	Wheelchair caster
8 x 1 1/4	137 mm	Wheelchair caster

Decimal Sizes are just that. Manufacturers just began quoting tire widths in decimals. But remember the Sheldon Brown rule - 3/4 inch wide may not be the same as .75 inch wide.

Decimal	ISO	Applications
29 inch	622 mm	This is a marketing term for wide 622 mm ("700C") tires.
28 x decimal		Some German tire companies use this non-standard designation for 622 mm ("700C") tires -- violates <u>Brown's law</u> !
"27 five" (meaning 27.5)	584 mm	Marketing term for wide, knobby 584 mm tires. Some <u>Mountain bikes</u>
26 x 1.00 through 5.0	559 mm	Most <u>Mountain bikes</u> , <u>cruisers</u> , <u>fatbikes</u> etc. Old Schwinn designation was S-2
26 x 1.25 (rare)	599 mm	Very old U.S. lightweights
26 x 1.375 (rare)		Very old U.S. lightweights
24 x 1.5-24 x 2.125	507 mm	Juvenile mountain bikes, cruisers
22 x 1.75, 22 x 2.125	457 mm	Juvenile
20 x 1.5-20 x 2.125	406 mm	Most <u>BMX</u> , juvenile, folders, trailers, some <u>recumbents</u>
18 x 1.5	355 mm	<u>Birdy</u> folding bikes
18 x 1.75-18 x 2.125		Juvenile
16 x 1.75-16 x 2.125	305 mm	Juvenile, folders, trailers, Strida, early DaHon, some <u>recumbents</u>

14 x 1.75-14 x 2.125	254 mm	Juvenile
12 1/2 x anything	203 mm	Juvenile, scooters

French Sizes takes the nominal outside diameter of the of the wheel assembly in millimetres and adds a letter behind that number. “A” is narrow (?) and “D” is wide (?). You can see the problems with this system. 700C is a common wheel size for our road bikes. This size was originally intended to take a wide tire, but now accepts tire sizes that can result in an outside diameter of 660 millimetres!

French Size	ISO	Applications
700 A	642 mm	Obsolete
700 B	635 mm	Rod-brake roadsters .
700 C	622 mm	Road bikes, hybrids, "29 inch" MTBs. (28 x 1 1/2 F.13 Canada)
650 A	590 mm	French version of 26 x 1 3/8; Italian high-performance bikes for smaller riders
650 B	584 mm	French utility bikes, tandems, and loaded-touring bikes; some older Raleigh and Schwinn mountain bikes. Also called 27 five. See We have a page about this size.
700 D	583 mm	Oddball size formerly used on some GT models. 650B tire (584 mm) is close enough, maybe with wide rim tape.
650 C	571 mm	Triathlon, time trial, high performance road bikes for smaller riders
600 A	540 mm	European Juvenile road bikes, most wheelchairs
550 A	490 mm	European Juvenile road bikes
500 A	440 mm	European Juvenile, folding
450 A	390 mm	European Juvenile
400 A	340 mm	European Juvenile
350 A	288 mm	European juvenile

You will note that in all the tables the I.S.O. size is also referenced. Finally, we have a system that is irrefutable. Tire manufacturer cannot fudge these figures, or the tire simply will not fit the rim.

Originally developed by the **European Tyre and Rim Technical Organization (E.T.R.T.O)** the **ISO Tire and Rim Sizing System** is taking hold. You will find the sizing on both rims and tires – it's simply a matter of matching the numbers on tires and rims to get a safe fit.

What is the key difference?

The ETRTO number is made up of two numbers. The first is the **inner rim width** as shown in the diagram right. Tires widths (inflated) will only vary minimally depending upon the rim design, gross errors are eliminated.

However, it is the second number that is the most important. It indicates the **bead seating diameter**, and because the bead of the tire is made from steel wire or a non-stretch aramid fibre, the tire will not stretch to fit a wrong size rim, so mounting is impossible. It is, of course, still possible to mount a tire that is too large – but that should be quite apparent.

A good example is the case of a cyclist that currently running 700 X 20C tire with an E.T.R.T.O rim size of 20-622. This cyclist could install a 700 x 38C cyclocross tire which would be designated as a 38-622. The 622 mm bead seat diameter is identical. Of course, clearances between the tire and the forks, seat stays, and chain stays may limit what can be accommodated.

Is there a limit to how wide a tire can be mounted on a rim?

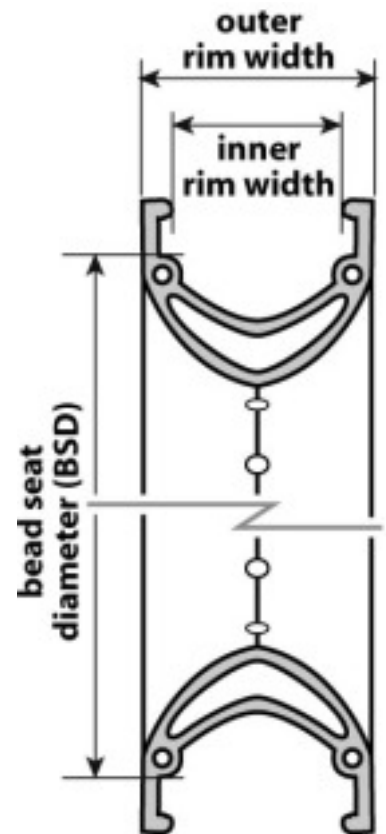
That answer would be yes. Too narrow a tire will expose the rim to damage from striking an object or pothole. Too wide of a tire can cause the hook bead to roll outward and may cause the tire to leave the rim in the case of a sudden deflation.

As a rule, tire width should be between 1.45 to 2.0 times the inner rim width.

Someone must always bend the rules. Mountain bike manufacturers commonly install wheels with unrealistic inner widths for the tires that they are installing. This is done to save weight – what's new.

So what Inner Rim Width works with what tire widths?

The chart on the next page shows safe limits of tire widths that can be used on the which Inner Rim Widths.



Which tire fits safely on which rim? [all dimensions in millimeters]														
	Tire width													
Rim width (interior)	18	20	23	25	28	32	35	37	40	44	47	50	54	57
13	X	X	X	X										
15			X	X	X	X								
17				X	X	X	X	X						
19					X	X	X	X	X	X				
21							X	X	X	X	X	X		
23									X	X	X	X		
25										X	X	X	X	X

Following is the ISO (E.T.R.T.O) Cross Reference Table with the Traditional Sizing Designations. Simply match the ISO Bead Seat Diameter and find the Traditional Tire Designations that can be used. It isn't pretty, but it's the best we can expect currently.

Bead Seat Diameter, mm	Bead Seat Radius, mm	Traditional Designations
787	393.5	36 inch
686	343	32 inch
635	317.5	28 x 1 1/2, 700 B, 28 x 1 5/8 x 1 1/2 (old, Sweden)
630	315	27 x anything except "27 five" and 609 mm

622	311	700 C, 28 x 1 5/8 x 1 1/2 and other pairs of numbers, (but also see 635), 29 inch, 28 x 1 1/2 F.13 Canada
609	304.5	Rare Danish size, 27 x 1 1/2
599	299.5	26 x 1.25, x 1.375 -- old US size
597	298.5	26 x 1 1/4, 26 x 1 3/8 (S-6)
590	295	26 x 1 3/8 (E.A.3), 650 A
584	292	<u>650B, 26 x 1 1/2, "27 five"</u>
583	291.5	700 D -- oddball size made by GT
571	285.5	26 x 1, 26 x 1 3/4, 650 C
559	279.5	26 x 1.00- x 2.125, also fatbike tires up to 5 inches wide
547	273.5	24 x 1 1/4, 24 x 1 3/8 (S-5)
541	270.5	600 A
540	270	24 x 1 1/8, 24 x 1 3/8 (E.5),
520	260	24 x 1, 24 x 1 1/8, 24 x 1 3/4
507	253.5	24 x 1.5- x 2.125
501	250.5	British, 22 x 1 3/8, 22 x 1.00
490	245	550 A
489	244.5	Dutch juvenile 22 x 1 1/8 NL, 22 x 1 3/8 NL
484	242	550 B
457	228.5	22 x 1.75; x 2.125
451	225.5	20 x 1 1/8; x 1 1/4; x 1 3/8

440	220	500 A
438	219	Dutch juvenile, 20 x 1 3/8 NL
428	214	Swedish, 20 x 2
419	209.5	20 x 1 3/4
406	203	20 x 1.5- x 2.125
390	195	450 A
369	184.5	17 x 1 1/4
355	177.5	18 x 1.5- x 2.125
349	174.5	16 x 1 3/8
340	170	400 A
337	168.5	16 x 1 3/8
317	158.5	16 x 1 3/4
305	152.5	16 x 1.75- x 2.125
298	149	14 x 1 3/8, Moulton Mini
288	144	350 A
254	127	14 x 1.75
203	101.5	12 1/2 X anything.
152	76	10 x 2
137	68.5	8 x 1 1/4

How do I take good care of my new tires?

1. Ride your bike as much as possible. Tires are designed with Ultra Violate and Ozone protection that relies on the tire rolling under a load. The process is called blooming. A tire that sits a lot outside will weather check

much more quickly than one that is used regularly. If weather checking gets bad enough the cracks will expose the cord body. The cord body will weaken, and the tire becomes a good candidate for a blow-out.

2. Always check your tire inflation before a ride. **The figure stated on the sidewall of the tire is a maximum pressure - not the recommended tire pressure.** Use an accurate tire gage and set tire pressures according to the total weight being carried by the tire, the road type, and by tire diameter and tire width. Tire pressures will be different between the front and back tire. The back tire carries more weight than the front

Sounds complicated. Well, then a simpler way would be to measure the total height of the tire without any load and inflate the tires so that there is a -15% drop in height when loaded. Still sounds too complicated.

Okay the easiest way is to weigh your bike with everything that you normally have on it including the cycle computer, seat bag and full water bottle(s). Add that to your weight as you would be dressed for cycling, then go to the [Silca Tire Pressure Calculator](#). The Pro version only asks for your email (for marketing purposes naturally) but the standard version works okay as well. My tire pressures (700 x 25C) work out to 84 psi on the front, with 86 psi for the rear tire – much lower than the maximum pressure stated on the sidewall.

3. Avoid potholes and foreign objects on the road. Sounds easy, but in the real world it requires a lot of attention.

4. Although tire manufacturers go to great deal of trouble to prevent UV and Ozone damage, our winters can be especially hard on tires. Since they are not rolling, blooming does not occur. In addition, if they are stored in an outbuilding where there are electric motors (heaters and garage door openers etc) ozone can be a concern. To extend the life of your tires apply a product such as [303 Protectant](#) to the tires. Be sure to clean the tires off when spring rolls around, since 303 can be very slippery. Clean the tread area thoroughly with Isopropyl Alcohol (99%).

5. Rotate your tires back to front / front to back every 6 to 8 hundred kilometres. The back tire will wear faster than the front. This also ensures that the tire with the most tread is on the back where most flats occur.

That's tire sizing and care – go out and ride!

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