



## How To Buy A Baseball Bat

Whether you play Little League baseball or for a college team, buying a bat is a personal decision. New technology has delivered bats that not only enhance performance but also are tailored to an individual player's strengths. It is essential that you select a bat that fits your unique body configuration and skill level, height, weight, and hitting strength.

### 1) Understanding bat material

- Aluminum
- Graphite/Titanium lined
- Wood

### 2) Determine which bat fits your body

- Age
- Height and weight

### 3) Determining the right bat weight

### 4) Understanding bat technology

- Barrel size
- Taper
- Grip



### 5) Bat performance factor (BPF) and league regulations

### 6) Warranty information

## 1) Understanding Bat Materials

The world of bats now offers a large variety of choices in materials. These can be broken into three primary categories: *aluminum*, *graphite/titanium* lined, and *wood*. Each provides its own unique characteristics and advantages for today's players.

### Aluminum

- Aluminum is lighter in weight, which increases control and bat speed. Balls travel farther with aluminum over other metals.
- Despite generally higher costs than other materials, aluminum is durable and not prone to crack or break
- Aluminum bats come in a variety of alloys, each with a different weight
- Generally, lighter aluminum alloys are thinner and more durable. The one thing these have in common is that they are all different combinations of Zinc, Copper, Magnesium and Aluminum. The following is a list of the different alloys and their benefits.
  - 7046: This is the standard aluminum alloy used in most bats
  - CU31/7050: More durable than 7046, due to increased levels of zirconium, magnesium, and copper
  - C405/7055: Increased Zirconium content than 7050, giving higher strength

- C555: 7% stronger than C405, has traces of scandium, which increases strength
- Lighter weight bats also increase the "sweet spot," the hitting zone on the bat's barrel that gives the maximum place to put metal to ball
- Aluminum bats, and those enhanced with other alloys, also come in single-layer or *double-layer* construction
- Double-layer bats offer more durability and power, since the ball rebounds off the bat with more authority
- *Cryogenically treated aluminum*--Alloy is frozen and reheated to provide greater durability, less vibration and 2-4% greater distance

### Graphite/Titanium lined

- Technology has enabled bat makers to use lighter, stronger materials. Graphite and titanium are just two of these.
- Both are usually added to thinner-wall aluminum bats, enabling bats to be lighter and increasing a player's swing speed
- These materials also increase durability and the batter's sweet spot
- Graphite and titanium also help reduce vibration and the sting of *ball shock*, the tingling feeling sent to the hands usually when you miss hitting the ball in the bat's sweet spot

### Wood

- Wood bats offer a classic feel and sound
- Look for a grain that is long and wide, which indicates a tree's age and density
- Wood bats offer more choices in shape and taper that can be customized to a player's swing
- Wood has three big disadvantages:
  - Bats crack and break
  - Reduced sweet spots on the barrel
  - Far less hitting power than metal bats

## 2) Determine Which Bat Fits Your Body

There are some standard rules of thumb in selecting the appropriate bat length. The charts below offer some guidelines based on age and weight and height.

### Age

- Using your age as a guide, use the chart below to determine the bat length that fits your body

Determine Your Bat Length by Age		
Age	Bat length Inches	cm
5-7 years old	24"-26"	61 – 66 cm
8-9 years old	26"-28"	66 – 71.1 cm
10 years old	28"-29"	71.1 – 73.7 cm
11-12 years old	30"-31"	76.2 – 78.7 cm
13-14 years old	31"-32"	78.7 – 81.3 cm
15-16 years old	32"-33"	81.3 – 83.8 cm
17+ years old	32"-34"	81.3 – 86.4 cm

## Height and weight

- These are usually better ways to determine what bat length may work best for you

Determine Your Bat Length by Weight and Height										
	Your height (inches)									
Your weight (pounds)	36-40" 90 - 103 cm	41-44" 104 - 113	45-48" 114 - 123 cm	49-52" 124 - 134 cm	53-56" 135-144 cm	57-60" 145 -154 cm	61-64" 155 - 165 cm	65-68" 165 - 174 cm	69-72" 175 - 184 cm	73"+ 185 cm
	Bat length									
Less than 60 lbs / 27 kg	26" 66 cm	27" 68.6 cm	28" 71.1 cm	29" 73.7 cm	29" 73.7 cm					
61-70 lbs / 27.5-31.8 kg	27" 68.6 cm	27" 68.6 cm	28" 71.1 cm	29" 73.7 cm	30" 76.2 cm	30" 76.2 cm				
71-80 lbs / 32 - 36.3 kg		28" 71.1 cm	28" 71.1 cm	29" 73.7 cm	30" 76.2 cm	30" 76.2 cm	31" 78.7 cm			
81-90 lbs / 36.7 - 40.8 kg		28" 71.1 cm	29" 73.7 cm	29" 73.7 cm	30" 76.2 cm	30"	31" 78.7 cm	32" 81.3 cm		
91-100 lbs / 41.3 - 45.4 kg		28" 71.1 cm	29" 73.7 cm	30" 76.2 cm	30" 76.2 cm	31" 78.7 cm	31" 78.7 cm	32" 81.3 cm		
101-110 lbs / 45.8 - 49.9 kg		29" 73.7 cm	29" 73.7 cm	30" 76.2 cm	30" 76.2 cm	31" 78.7 cm	31" 78.7 cm	32" 81.3 cm		
111-120 lbs / 50.4 - 54.4 kg		29" 73.7 cm	29" 73.7 cm	30" 76.2 cm	30" 76.2 cm	31" 78.7 cm	31" 78.7 cm	32" 81.3 cm		
121-130 lbs / 54.9 - 59 kg		29" 73.7 cm	29" 73.7 cm	30" 76.2 cm	30" 76.2 cm	31" 78.7 cm	32" 81.3 cm	33" 83.8 cm	33" 83.8 cm	
131-140 lbs / 59.4 - 63.5 kg		29" 73.7 cm	30" 76.2 cm	30" 76.2 cm	31" 78.7 cm	31" 78.7 cm	32" 81.3 cm	33" 83.8 cm	33" 83.8 cm	
141-150 lbs / 64 - 68 kg			30" 76.2 cm	30" 76.2 cm	31" 78.7 cm	31" 78.7 cm	32" 81.3 cm	33" 83.8 cm	33" 83.8 cm	
151-160 lbs / 68.5 - 72.5 kg			30" 76.2 cm	31" 78.7 cm	31" 78.7 cm	32" 81.3 cm	32" 81.3 cm	33" 83.8 cm	33" 83.8 cm	33" 83.8 cm
161-170 lbs / 73 - 77 kg				31" 78.7 cm	31" 78.7 cm	32" 81.3 cm	32" 81.3 cm	33" 83.8 cm	33" 83.8 cm	34" 86.4 cm
171-180 lbs / 77.5 - 81.6 kg						32" 81.3 cm	33" 83.8 cm	33" 83.8 cm	34" 86.4 cm	34" 86.4 cm
180+ lbs / 82 kg							33" 83.8 cm	33" 83.8 cm	34" 86.4 cm	34" 86.4 cm

### 3) Determining the Right Bat Weight

- Most bats are also weighted in ounces
- Manufacturers have done a great job in balancing the bat's weight to its length
- Many bats have a *weight-to-length ratio*, often shown as -4, -6, etc.
- This basically means a 34-inch (86.4 cm) bat with a -6 ratio weighs 28 ounces (794 gr).
- Selecting weight really depends on two critical factors--your strength and your hitting style
- It also depends a lot on your personal preference in weight and length, so the following are simply guidelines to follow:
  - Bigger, stronger players generally prefer a heavier bat since they get the benefits of both the heft and swing power
  - Smaller players with less strength should consider a lighter bat to generate a quicker swing
  - Younger players, too, should consider that a lighter bat increases control--great for singles hitters, while also reducing the risk of injury

## 4) Understanding Bat Technology

Bat technology may seem a little confusing but it's not rocket-science. There are three essential elements to a bat: *barrel size, bat taper* and *grip*.

### Barrel size

- This includes both the length of the *barrel*--top part of the bat--and its diameter
- The longer the barrel, generally, the larger the sweet spot for hitting the ball
- As for diameter, the standard is 2 1/2 inches (6.35 cm) but many players prefer a smaller barrel that lightens weight and provides more swing speed

### Taper

- This is the diameter of the bat's handle
- Standard bats are tapered 31/32 (78.7-81.3 cm) of an inch but can be slightly larger or smaller depending on whether you want a lighter or heavier bat
- You may prefer the feel of a bigger bat taper, which can also reduce the sting when a ball isn't struck on the sweet spot
- Some players like a narrower taper for the lighter weight and to rotate their wrists faster when hitting.

### Grip

- The grip is simply the covering that bat manufacturers use on the handle of aluminum bats
- Rubber grips absorb more of the shock
- Leather or synthetic leather gives a tackier feel for a surer grip
- Some bats come with a cushioned grip to decrease the shock even more

## 5) Bat Performance Factor (BPF) and League Regulations

An effort by some of governing bodies in Baseball and Softball (NCAA, NHSF, USSSA, NSA) to regulate the performance of a bat has led to the establishment of a method of measuring how a ball jumps off of a bat compared to how a ball rebounds off of a wall at a controlled speed.

BPF (Bat Performance Factor) is simply the increase in the liveliness of a ball hitting a bat compared to throwing a ball against a solid wall (i.e., 20% faster rebound = a BPF of 1.20).

Beginning with the 2009 season, non-wood bats used in divisions of play Little League (Majors) and below must be printed with a BPF (bat performance factor) rating of 1.15 or less.

Beginning with the 1998 playing season, USSSA and NSA league play must use a bat bearing a permanent marking indicating that the bat does not exceed a 1.20 BPF rating.

The NCAA/NFHS have dictated a "3 Prong" set of rules for bats to be legal for 2000 and beyond.

- The bats can have a diameter no larger than 2 5/8" (6.38 cm)
- The bats can be no lighter than 3 ounces less than the length (i.e. 32 in/29 oz or 81.3 cm / 822 gr)
- The bats can have an exit speed no higher than 97 MPH off the barrel of the bat. The bats must have a "BESR" logo on the barrel of the bat, designating that the bat meets the Ball Exit Speed Requirement

In July of 2003, the ASA changed their performance test method and standard. They refer to their new test as a "high speed test." This method determines the outgoing speed of a ball after an impact at 110 miles per hour. Past tests have had impact speeds of 60 mph. The new standard calls for an outgoing ball speed of no greater than 98 mph. All bats need to pass this test to be used in ASA play from 1/1/2004 and beyond.

- Bats manufactured after passing this new test will have a new "ASA 2004" logo on the barrel.
- Those that pass the standard will be placed on the ASA's website on an ASA 2004 legal bat list.
- Bats on this ASA list will be legal for play whether they have the 2004 logo or not.
- ASA umpires will have a copy of the ASA list and will use that list to determine if a bat is legal for play or not.

## 6) Baseball/Softball Bat FAQ and warranty information

What are the maximum specifications for softball bats?

Length:	34 inches / 86.4 cm
Weight:	38 ounces / 1077 gr
Barrel Diameter:	2 1/4 inches/ 5.7 cm

What are the maximum specifications for Youth League baseball bats?

Length:	33 inches / 83.8 cm
Weight:	No restrictions
Barrel Diameter:	2 1/4 inches/ 5.7 cm

What are the maximum specifications for Adult League baseball bats?

Length :	35 inches / 88.9 cm
Weight :	Aucune restriction
Barrel Diameter:	2 5/8 inches/ 6.7 cm

What are the maximum specifications for Senior League baseball bats?

Length:	35 inches / 88.9 cm
Weight:	No restrictions
Barrel Diameter:	2 3/4 inches/ 7 cm

What is a length-to-weight ratio?

- The difference between the length of the bat (inches) and its weight (ounces)
- Example: A bat that is 33 inches (83.8 cm) long and weighs 30 ounces (850 gr) has a length-to-weight ratio of -3. Every bat of that particular model will have a length-to-weight ratio of -3 (e.g. 32 in/29 oz- 81.3 cm/822 gr - 34 in/31 oz - 86.4 cm/878 gr)

What is the maximum length-to-weight ratio allowable for College or High School Baseball?

- As of 2001, the maximum length-to-weight ratio is -3 for college and high school baseball

Can a Bat be used for Softball and Little League, or Little League and Adult Baseball, or Softball and Adult Baseball?

- No, each bat is specifically made for each sport or level of play. For instance, a Little League Bat cannot be used for Softball. Each bat is labeled on the barrel indicating the sport/level with the weight and length

What is End Loading?

- End Loading is usually found in softball bats. It means there has been some material added to the end of the bat barrel to add weight and create more of an end-balanced bat. The "End Load" is usually a polyurethane material that fills approximately 1" - 4" of the barrel
- There are varying views on performance enhancement -- in general, slow-pitch players like the weight on the end of the bats to help move the sweet spot further out and create more momentum

What is Wall Thickness? Why do some bats say "Ultra-Thin Walls" on the barrel?

- Performance in bats depends on three things, (besides the person swinging the bat)
  - Type of alloy
  - Barrel Dynamics (a combination of Barrel Compression/Trampoline Effect, Handle Flex, and End Loading)
  - Thickness of the bat barrel walls
- Thinner walls mean more "POP" or "Trampoline Effect" off of the bat and thus, better performance. Better quality Aluminum is stronger and lighter, so the manufacturer can make the bat walls thinner.

Are bats sensitive to changes in temperature?

- Aluminum bats, especially higher performance models with thinner walls, should not be used in temperatures below 50 degrees.
- Cold temperatures make the composition of the ball more dense, especially the new "Compacted Core" balls. This puts unusual stress on the bat walls which will result in denting
- Bats may also be sensitive to very hot temperatures and should not be stored in areas that are exposed to high heat, such as car trunks.
- Bat failure due to mis-use in extreme temperatures is not covered by the warranty

Can I try out my new bat at the batting cage?

- You should not use your new bat in the batting cage. Batting cage balls are made of a more dense material than is used in regulation baseball or softball games and will cause denting
- Bat sleeves, such as "Tuff-Sleeve," may be of some help but will not guarantee complete protection
- Bat failure due to use in a batting cage is very obvious and is not covered by the warranty

What is metal fatigue?

- Bat Wall Flexion (allowing the bat walls to flex) is the desirable end result of the "Trampoline Effect," which is utilized by high-performance, thin-walled bats
- Hitting the ball on the same side of the bat each time and in the same spot causes excessive flexing in the one area, and the metal will eventually fail (dent or split)

Rotating the bat on each trip to the plate will help prevent damage due to metal fatigue

1. Know your league's rules.

Do you use wood or metal? How big can the barrel of the bat be? Is there a certain ratio between a bat's weight and its length that must be followed? You can find out all of these answers by consulting your league's commissioner or perhaps your coach. Today, many of the bats even say directly on the barrel where it meets approval (example "Little League Approved".)

2. Step<sup>2</sup>

Set your budget. Going up in cost does not necessarily translate into hits or replace hard work and practice. Technology has allowed bat manufacturers to turn baseball bats into lightweight trampolines. The micro-thin walls of today's upper ended bats produce a trampoline-like effect, while allowing the hitter to produce more of what produces power: bat speed! This does not mean a week of hitting at the park or even a long season is going to sap your bat of its power. However, refrain from using your shiny new investment in batting cages, where the balls are often harder than traditional game baseballs. You can still purchase a high quality bat that meets your needs as a player.

3. Step<sup>3</sup>



Pick up and feel the bat at the store. Unfortunately, there is no full-proof way or scientific method (although attempted) to measure what the right size baseball bat is best for you. There is no spot on your hip where the bat should come up to, and no rule that 9-year-olds have to use a 29-inch bat. It's a feel more than anything, but caution yourself to a bat's supposed feel in the store and its feel when it's the bottom of the seventh and the winning run is in scoring position.

#### 4. Step<sup>4</sup>



Consider the weight. A bat should be light. Bat speed generates power. This holds true for a pitcher as well where arm speed is the main determinant for velocity.

#### 5. Step<sup>5</sup>

Consider the length. In addition to weight, length is equally important. Often young players opt for a long bat because they feel "I can't reach the outside part of the plate." However, a big bat often looks like a telephone pole in the hands of young kids and makes hitting a baseball - the hardest thing to do insports - nearly impossible. Control and comfort is what is most desired when stepping into the batter's box.

#### 6. Step<sup>6</sup>

Grip the bottom part of the handle with just one hand. Using just your fingers (with the exception of your thumb), hold the bat directly in front of you and lift the bat 6-8 times using only your wrist. If you have to bend your arm/elbow in order to lift the bat then it would be in your best interest to select a lighter bat.

#### 7. Step<sup>7</sup>

Buy for this season. There's a prevailing thought out there that a young player should select a bat "he can use for a couple of years." This appears to be a logical suggestion. The problem is that for a young player, hitting a moving object hurled at you is not easy and is often quite frustrating, leading them to quit. Buy for the now to give you the best chance for success. Baseball is tough. It is a sport that allows for athletes to fail 70% of the time-and then be given a huge contract. There are many things in baseball that a batter cannot control, such as what the pitcher is throwing, the umpire, what happens after the ball leaves my bat, etc. However, having the right equipment is one thing you can control.

#### 8. Step<sup>8</sup>

Practice. Remember, selecting a bat that fits you is an important step before getting into the batter's box. However, perfect practice is the only thing to ensure success on the baseball field; a baseball bat is simply a bat, you provide the skill. As one Hall of Famer put it, "A bad carpenter blames his tools."

## Tips & Warnings

- Pros must use wooden bats, but more powerful aluminum or other nonwood bats are preferred in amateur ball.
- Little League bats can't be more than 2 1/4 inches in diameter and 33 inches long.
- The initial cost is higher on a metal bat, but they will easily outlast other products. They don't peel or chip, and their weight and balance remain constant.

Hitting is never easy, but when you bring the bat you like to the plate, you'll feel as if you have a fighting chance!

Before you go to the local sporting goods shop and drop a lot of money on a new bat for junior, read this carefully:

Your child will be far more successful hitting early in their baseball playing careers if you give them a bat that they can be successful with. If you child consistently strikes out because their bat is too heavy, they will lose all confidence at the plate and eventually give up the game. Many kids, and parents alike, think that a heavy bat equates to home runs and all the glory that comes along with it. This is about the furthest thing from the truth in a game situation.

Here's a basic chart that I've used for aluminum bat sizing for young recreational baseball players. All-Star / Travel Ball players can up these recommendations by about 1 ounce, depending on their height, weight and strength. If your child's height and weight are under the 25th percentile for their age, or they are older than 7 and in their rookie season, reduce the weight by 1/2 - 1 ounce .

Age	Oz	Gr	Inches	cm
4-5 y :	12-13.5 oz ("Tee Ball" Bats)	340 – 382 gr		
5-6 y :	13.5-14.5 oz	383 – 411 gr	25-26 Inches	63.5 – 66 cm
7 y :	14.5-16 oz	411 – 453 gr	26-28 Inches	66 – 71.1 cm
8 y :	15.5-17 oz	439.4 – 481 gr	27-29 Inches	68.6 – 73.66 cm
9 y :	17-18 oz	481 – 510 gr	29-30 Inches	73.66 – 76.2 cm
10 y :	18-19.5 oz	510 – 552 gr	29-31 Inches	73.66 – 78.7 cm
11 y :	19-20.5 oz	538.6 – 581.2 gr	30-32 Inches	76.2 – 81.28 cm
12-13 y :	20-22.5 oz	567 – 637.9 gr	31- 32 Inches	78.7 – 81.28 cm

### Testing Bat Weight

The only way to determine if a bat is the right weight for your child is by seeing how they perform against pitched balls. Hitting off a tee or at soft toss balls is not effective because reaction times are greatly exaggerated in those conditions. If you've accidentally bought a bat that is either too heavy or too long, stick it in the bag and wait until they are ready to use in a future season. Not doing so not only impedes your child's ability to be successful, but also hurts their team's ability to win games.