

Choosing A Club To Crush A Clincher:

Picking The Right Bat For 16" Softball

By: [S. Brady Phillips](#)

[CU-31](#) and [C-405](#). Are these the 21st century bombers on the Pentagon's wish list? BPF, end-loaded, and balanced. Are these terms you need to know when discussing investing with your financial planner?

The answer to both of these questions is "no". Knowing what each of the above means helps one accomplish the increasingly complex task of purchasing the right softball bat for you.

Adding to the complexity of this task is that most bat manufacturers focus their research and development dollars on the more lucrative 12" market.

Always in search of an edge I set out to find the answer to the eternal question, "What is the best bat to use in 16" softball?"

The first phase of my research was academic. I asked Stan Natonek, a Physics teacher at [Eisenhower High School](#), Blue Island, IL, to study the difference between hitting a 12" softball vs. a 16".

The Science

According to Stan, the first difference is an obvious one. A 12" softball weighs 6 oz and is harder, with a density of .36 g/cc. A 16" ball weighs 9 oz with a density of .22 g/cc. In essence you are dealing with two variables, difference in weight and difference in density.

In 12" softball the kinetic energy equation of $\frac{1}{2}m \times v^2$ ($\frac{1}{2}$ mass \times velocity squared) dictates that bat speed equals distance. However in 16" the weight of the ball and its pliant consistency absorb a tremendous amount of energy. I'm sure many readers have experienced the phenomenon of swinging "the hell out of" a light bat only to have it feel like a wet noodle upon contact and yielding a weak "Duck Snort". Scientifically speaking, energy is lost through sound when you hit a ball. Energy is also lost through deformation. When you hit a 16" ball you crush or deform it and the ball springs back. A 12" ball also deforms but given its tighter density, it deforms less and springs back quicker. A 16" ball is also "wider" and less aerodynamic in its flight. Hence it is more sensitive to wind conditions and its flight pattern will flatten out near the end of the flight (are you paying attention outfielders?) vs. the nice parabolic curve of a 12" ball or a baseball.

A last point to mention is that the mass of the person hitting the ball is more important in 16" because in any collision you are hitting the ball and the ball is hitting you. Believe it or not you do get driven back slightly (mass \times acceleration equation) upon contact. The bigger your mass, the less your acceleration backwards, therefore more force can go into the ball. With less "kickback" there is less velocity loss. This helps to explain why big guys who seem to swing slower can drive the ball quite far.

To summarize, in 16" ball departure speed and distance is less dependent upon bat speed than in 12". It is more dependent upon the mass of the bat combined with bat speed and the mass of the individual.

As you can see, the above findings pose a bit of a problem. The movement in the bat industry is toward lighter more "flexible" bats that provide more of a "trampoline" effect. This trend is wonderful in the kinetic/static collision world of 12" softball. In caveman lingo, "swing light bat fast, bat give, bat rebound, give trampoline effect, ball go far." This equation is counterproductive in 16". Since a 16" ball is 3 oz heavier and more importantly "gives" more on impact, the technology of today's C-405 featherweight "wonderbat" is lost on the 16" game.

The Manufacturers

The second phase of my research concentrated on contacting the major manufacturers in the industry asking first for their research and recommendations and secondly for samples of their product for independent testing.

As one might predict the response from the bat manufacturers was less than overwhelming. 16" softball has never been given the respect and consideration it deserves, with one notable exception -- the DeBeers Company.

I wrote the following companies and asked for any research data and recommendations as to the best bat for 16" softball. Additionally I asked for a sample of their "best bat" for field-testing. Below is a summary of the responses.

[Louisville Slugger](#) - Rex Bradley responded almost immediately and was wonderfully helpful and cordial. Rex reported that he discussed my questions with the engineers and they determined that a 32 oz bat would be a good "compromise" for the 16" game. The 32 oz bat would be light enough to generate considerable bat speed yet possess enough mass to stand up to the weight of a 16" ball without recoiling upon contact. Rex also discussed the fact that all of the exotic new and expensive alloys would not provide a substantial performance enhancement. Given the softer, momentum-absorbing consistency of a Clincher, the trampoline technology would not be worth the considerable investment. Unfortunately Mr. Bradley's promotional budget did not allow him to send us a bat for testing.

[Wilson Sporting Goods](#) - Charles L. Parish President of Tennessee Sports Co./Wilson Bats sent me an extensive brochure that explained their bat technology and a nice letter that addressed my specific questions. Mr. Parish also recommended a 32 oz bat but contrary to Mr. Bradley, Charles felt that a CU-31 or a C-405 bat might "add a few feet of distance, but it won't have as dramatic an impact as it would on a 12" ball."

[Grover Aluminum](#) - A small company out of Los Angeles California sent a CU-31 30 oz bat along with literature that explained [BPF](#) (Bat Performance Factor) and a curiosity for our results because they deal primarily with the 12" game.

[Power Flite Industries](#) - Another company that focuses on 12" softball was helpful in explaining the different types of aluminum that are used in making bats (see glossary). Power Flite makes its own JA-7 aluminum. In fact, they and [Alcoa](#) are the only makers of aluminum used in softball and baseball bats.

[Steele's Sporting Goods](#) - David Neale Jr. of Steele's sent me a fax in which he indicated that because the 16" ball is softer than a 12" ball Steele's recommends using the hardest alloy available with a thicker walled shell. David explained that a thicker walled bat would "compress" the ball more by not giving. The thinner walled bats are designed to give or flex, hence the trampoline effect desired in 12". According to Steele's the technology of the newest, most expensive alloys is lost, in fact, counterproductive in 16".

[DeBeers](#) - Of all the companies contacted, by far the most helpful and accommodating was DeBeers. I had the opportunity to talk to Bob Campbell at length about the 16" game and he had much to say. DeBeers, along with Grover were the only companies to supply bats for our experiments.

Mr. Campbell explained that in 16" a combination of bat speed and technique, i.e. using the upper, lower body and core will achieve optimal results regardless of the bat one chooses. In essence bat speed is secondary to proper mechanics. Bob, speaking scientifically, correctly noted that kinetic energy is at maximum effectiveness and potential when in a straight line. Bob discusses this and other tips in his video *The Art of Hitting Slow-Pitch Softball*, available at local [Sportmart](#) stores. DeBeers was a pioneer in manufacturing aluminum softball bats. Bob noted that a favorite bat of 16" players was the BatRite, a bat manufactured in Athens, Georgia and made out of swampwood. This bat was the inspiration for the 1510DB, the first of the Clincher line of aluminum bats. Bob maintains that this bat is an oldie but a goody. Like Mr. Neale from Steele's, Bob is unconvinced that the new flexible alloys have any effect in 16". He is convinced that a [7046](#) bat is every bit as good as a C405 bat for the 16" game. In all probability an old, comfortable low-tech bat can perform on a par with today's "wonderbats". Bob recommends a bat weight appropriate to your strength and had some interesting advice regarding using an [end loaded bat](#) vs. a [balanced bat](#) (see glossary). Bob maintains that an end-loaded bat is superior for a pull hitter whereas a balanced bat is recommended for all-field hitters. In terms of recommending a bat, Bob says that the DeBeers Clincher Gold Series is popular among 16" players and comes highly recommended.

[DeMarini](#): I sent Ray DeMarini, company founder and President, a "care package" that included a 16" softball, a hand written letter and a video of me hitting a 16" softball. I sent this additional material in the event Mr. DeMarini was unfamiliar with our game. I also hoped that being a smaller manufacturer who is passionate about his product Ray would give my request more

attention than the larger manufacturers. Obviously Mr. DeMarini feels that the 16" market doesn't warrant his time and attention and chooses to cater to the 12" market.

Easton and Worth - Both were contacted and didn't so much as reply with a "thanks, but no thanks". Their indifference to my request speaks volumes about their companies' lack of respect and commitment to the 16" game let alone the absence of common courtesy in not responding at all.

Testing

The last phase of my research involved testing the bats. My results are shown in [Figure 1](#). The swing speed shown in Column 5 is the average speed that I swung each bat. I swung each bat five times, eliminated the high and low number and averaged the remaining three. Bat speed was measured on a Quick Bat II ([Figure 2](#)) manufactured by Sport Star, Scott Kelley President (800) 421-8325. Deceleration in Column 6 is the speed of the bat after making contact with the 16" ball. The purpose of this column was to show the enormous amount of energy that is absorbed by a 16" ball. Note that the lighter weight bats, although swung faster, lose more speed and are actually traveling slower after impact. The final and perhaps most important column shows ball speed after contact as measured by a radar gun. The radar gun measured the speed of the ball at about 60 feet from the point of contact. Theoretically, the faster the ball was moving, the further it would have traveled. Former major leaguer Dave Griffin, owner and operator of David Griffin's Baseball School in Highland, IN (219) 922-1107, provided the radar gun and testing facility. If you have a son or a daughter who wants a pitching or hitting lesson give Dave a call. He was very gracious, has a nice facility and a talented staff.

Bat Tested	Listed Weight (oz)	Actual Weight (oz)	Material	Swing Speed (mph) ²	Deceleration (mph) ¹	Ball Departure Speed (mph)
Worth Lighthouse Supercell (SSLH)	26	25.69	C-405	108	50	67.5
Louisville Slugger TPS (TPSD3428M)	28	27.9	CU-31	103	53	X
Grover USSSA	30	28.74	CU-31	99	55.5	70.5
Louisville Slugger TPS (TPSD3430M)	30	29.94	CU-31	98	55	72.5
Easton Black Magic	33	32.9	7046	96	55	74
DeBeers C405 (196358)	36	36.08	C-405	86	57	76
DeMarini Ultimate Weapon	38	36.68	CU-31	93	56	75
DeBeers Clincher (1510DB)	36	36.1	7046	86	57	76

Worth PowerCell CU31 (ERC-66)	38	38.05	CU-31	96	57	75
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Figure 1. Test Results ¹Quick Bat in position 1 ²Quick Bat in position 2

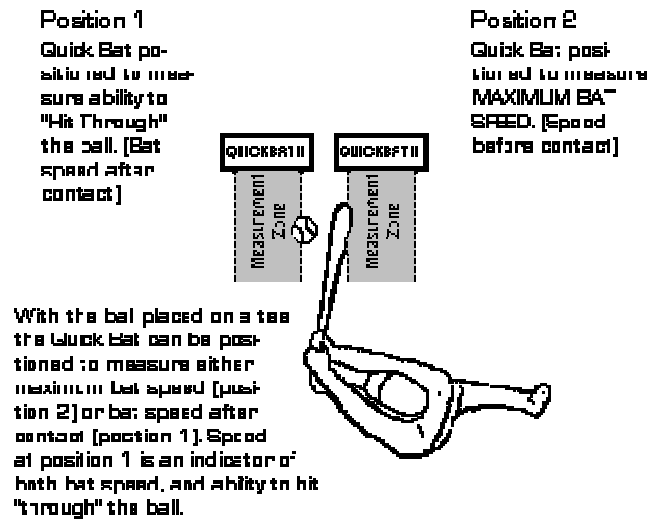


Figure 2. Bat Speed Measurement

Analysis of Data

As a general disclaimer my research was as accurate as my time and budget would allow. As a human being I am not hitting the ball in the same place each time and a robot swinging the bat in the same place at the same speed would have been more valid. With this in mind I still am certain that some important points can be taken from my research.

Point 1: Notice that although my swing speed deteriorated from a 108 mph average with the 26 oz Supercell to an 86 mph average with the 36 oz DeBeers bat, I was actually hitting the ball "harder" (73 mph vs. 67 mph average) with the heavier bat even though my swing was over 20 mph less! In my estimation this is because I was losing much of my speed with the light bat, 50 mph bat speed after contact vs. 55 mph with the heavier bat. From this one would conclude that using a really light bat would not be advisable in 16".

Point 2: Notice that I have boldfaced the research data for the 36 oz bats. The reason for this is that I wanted to see if the material composition of the bat made any difference. As you can see the C-405 DeBeers bat, the CU31 DeMarini and the 7046 DeBeers bat all performed quite similarly. From this one can conclude that the cheaper 7046 alloy performs just as

well and is certainly the better value for the 16" enthusiast.

Point 3: All of the figures are fairly uniform and consistent except for the performance of the 38 oz Worth Powercell. Even at 38 oz I was able to swing the heck out of it at a 96 mph average. At 38 oz I was also able to carry good bat speed after contact but not as dramatic as one would think. Discussing this phenomenon with Stan the answer lies in how the bat is balanced.

Some bats feel heavier based on how the weight is distributed throughout the bat. The Powercell at 38.05 oz "feels" lighter than the DeMarini or the DeBeers 36 oz model.

Point 4: Choice of bat weight should be based on the size, strength and hitting style of the individual. Stronger individuals such as myself can and should handle the heavier bats because we can generate enough speed. Players of slighter build should go slightly lighter but nobody should use a bat less than 32 oz In short, you should use the heaviest bat that you can still generate good speed with. In 12" you work the bat, in 16" make the bat work for you by using its extra mass to drive through the "mushier" ball.

I hope that this article will prove to be as helpful for you as it was fun for me to write. If at some point in time you drive a ball deep in a tournament and see a #18, back to the infield chasing it down at least wave to me so I feel like I helped. Have a great season!

Glossary of Terms

7046HT Alloy : Oldest, thickest and cheapest of the aircraft aluminum's used in the manufacturing of softball bats.

CU-31 Alloy : Very light aerospace alloy for superior thin wall flex resulting in greater ball hitting distance in 12" softball.

C-405 Alloy : Lighter still, and more expensive alloy with most wall flex for greater ball hitting distance in 12" softball.

B P F : Bat Performance Factor is a scientific method of testing bats to limit the

speed of 12" balls coming off softball bats. A softball bat is mounted on a rotating axis that enables the bat to move freely. A softball is shot out of a machine at 88 ft/sec. The ball then hits the bat. The speed of the bat is recorded as the ball strikes the bat. A formula provides the standard that limits how fast the ball can *legally* come off of the bat. The 1997 "A" League standard is 1.20 BPF.

NOTE:

To those who go "both ways", that is play both 12" and 16". If all bats are limited to 1.20 BPF, what separates their products other than price?

Balanced Bat : A bat whose weight is distributed throughout the entire length of the bat.

End Loaded Bat : A bat whose weight is distributed more toward the barrel of the bat.
