What is BPF 1.15 on a baseball bat?

In: Baseball Equipment [Edit categories]

Answer:

BPF1.15 is a lab test for regulating small-barrel baseball bats used by 7-12 yr.-olds in Little League, Cal Ripken League, etc.

The large-barrel youth bats used elsewhere in youth baseball are not regulated by BPF1.15, or by any other bat testing standard.

BPF was originally invented to test slow-pitch softball bats in the mid-1990's.

BPF1.15 places an upper limit on a bat's springiness ("trampoline effect") as compared to that of a rigid wall, which equals BPF 1.00. Wood bats are virtually inelastic, with values of slightly more than 1.00. Small barrel youth bats are not supposed to exceed 1.15.

Validity of BPF1.15: Scientists consider BPF1.15 to be scientifically flawed as a test of a bat's springiness, and virtually useless at accurately predicting ball exit velocity, which is the prime metric of bat performance.

BPF1.15 does NOT measure or predict "how fast the ball exits the bat when hit", as some claim. BPF1.15 test results do not correlate reliably with field batted-ball speed according to Dr. James Sherwood, the head of the top baseball research lab in the U.S. (NY Times, 10/18/08)

Solid wood bats: Lacking a springy barrel, they generate batted-ball speed by clubbing the ball with their concentration of mass in the barrel (also called end-load, and scientifically described as a "higher MOI").

By contrast: Hollow non-wood bats compensate for less (overall) mass and end-load by gaining from: (a) their springiness, i.e., their barrels squish and rebound like a hand-held trampoline; and, (b) their engineered inertial qualities--their lighter overall weight as well as more evenly distributed weight (more balance, less end-load), which allow batters to swing hollow bats faster.

To put a cap on small barrel bat performance, BPF1.15 measures one factor (a), the springiness of hollow bats. BPF1.15 does not, however, take into account the other key factor, (b) the inertial qualities of hollow bats that enable greater swing-speed. BPF1.15 "ignores" swing-speed, and assumes that all types of bats can be swung at the same speed.

Further, in terms of predicting the (a) the springiness of small barrel bats under game conditions, BPF is defective. This is especially true for expensive high-end bats, for the following reasons:

1. BPF1.15 is conducted at an unrealistically low combined-ball-vs.-bat collision speed of 60 mph. High-end bats are designed to squish and spring-back optimally at realistic ball/bat collision speeds (for example, 50 mph pitch/50 mph swing = 100 mph) that occur in real games.

2. BPF1.15 is conducted on new bats that are not yet broken-in. Today's high-end bats--double-wall bats and carbon-fiber composite bats--have multiple walls and/or layers that do not propel the ball optimally until they are broken-in. (By contrast, the ASA softball bat test requires bats to be mechanically broken-in prior to testing.)

3. The BPF test protocol does not call for random compliance testing. There is no assurance that the performance of tested bats is representative of the performance of bats that are actually sold and used

throughout the year.

4. The BPF1.15 lab test data has never been validated through field trials, which scientists consider to be a pre-requisite for legitimate scientific bat regulations.

For the above reasons, the BPF1.15 test does not accurately capture the barrel-springiness of small barrel bats in game conditions.

Until 2004, almost all small barrel baseball bats were relatively-inexpensive ($40-$150) single-wall aluminum bats. These are inherently limited in elasticity--bats get springier as wall-thickness is decreased, but thinner walls compromise durability. This limits single-wall bat designers. As a result, few single-wall bats can come close to testing at the BPF1.15 limit.

But recently-introduced high-end ($150-$250) multi-wall bats--double-walls, and multi-layered carbon-fiber composite models--are significantly springier, test much closer to the limit, and for the reasons cited above can surpass their tested values for elasticity when used in real game conditions.

To purchase a small barrel youth bat that has maximum springiness--and that very possibly will perform beyond the maximum allowable springiness--consumers should spring for an expensive double-wall or carbon-fiber composite bat.

To summarize: BPF1.15 does NOT measure exit velocity in the lab, does not reliably predict field exit velocity, does not account for swing-speed, and is imperfect at measuring and predicting a major contributor to exit velocity: the trampoline effect of modern hollow youth small barrel bats being used in game conditions.

However, in the absence of BPF1.15, it it probable that many multi-wall small-barrel bats would perform even better than they currently perform. By comparison, youth large barrel bats are not subject to any performance regulations.