

Scientific Target Test

By Jon Teater

Rinehart RhinoBlock



Rinehart has become an industry leader in targets. The company's Vice President of Sales and Marketing, James McGovern, started off interested in the test parameters and ended with a reminder that Rinehart targets are exactly what their tag line says – "The Best Archery Targets in the World." The statement is quite loud and James believes they can back it up with their mission of only using the best materials, which results in the best targets. One thing is quite certain about these targets – they are distinct from the competition.

The company was founded in 1999, and since its inception there has been several updates and changes to their designs. The company's popularity originated from their lifelike 3-D targets. To grow and remain relevant to consumers the company expanded their line of products to include smaller portable targets like the Rinehart 18-1. Among the backyard line of targets is the RhinoBlock. Rinehart also offers a similar but larger version of the RhinoBlock, known as the RhinoBlock XL.

The RhinoBlock is a good balance between the company's line of larger and smaller targets. The RhinoBlock possesses Rinehart's core technology known as 'self-healing' foam. In fact, the foam does not just repair itself from surface hits, it can be run over by a heavy duty vehicle and will eventually return to its original state. The target includes patented technology that allows the broad-head-friendly insert to be removed; this feature is a must for those that do a lot of shooting. On two sides of the target are 3D sculpted deer that provide a realistic touch. This feature is perfect for those that need a change-up from the typical shooting dot. The final aspect of this target is the rope handle. The handle is molded into the target and allows for easy handling to and from shooting locations.

The Test

Generally I see very few target tests, which has made developing test parameters a little difficult. With that said, these uncharted territories sparked my interest and I am hopeful these type of tests will help all of us gain a better understanding of targets and the product that is spotlighted in this article. The test methods used and presented in this article are similar in nature to other tests I have done. Moreover, I have considered more recent philosophies on testing archery products as it relates to industry standards.

Product Information

Manufacturer	Rinehart
Model	RhinoBlock
Measured Weight	19.8 lbs
Advertised Dimensions	16"X16"X13"
RhinoBlock MSRP	\$159.99

The test equipment used is as follows: an automated drawing/shooting machine, compound bow (setup at 60 pounds, 29 inches), carbon arrow, AMS fiberglass arrow (with chisel tip point, without outsert), load cell, hydraulic lift and high tensile rope.

The compound bow and arrow combination are measured for velocity during the test and included in this article. In addition, the targets distance from the bow is standardized. The distance from the target is measured by taking the vertical projection of the bows pivot point, to the approximate path of the arrow, and measuring 10 feet (+/- 1 inch) to the front of the target.

The testing is split into three parts, namely: Penetration Test, Arrow Removal Test and Durability Test.

Penetration Test (Hole in Hole)

The purpose of this test is to evaluate the design integrity and "stopping" characteristics of the RhinoBlock. As mentioned, the target is 10 feet away from the compound bow. The fast speeds of the arrow and close distance to the target is an extreme scenario as compared to normal shooting, but this was done with a purpose. The target is close to the bow to assure that the arrow is shot in the same hole as previous. Otherwise, a small change in point of impact will invalidate the results.

Bow Setup and Distance from Target - Penetration Test	Compound Bow	Weight	Draw Length	Arrow Weight	Velocity	Kinetic Energy	Momentum	Distance to Target
		(lbs)	(inches)	(grains)	(fps)*	(lb-ft)		(ft)
		60	29	360	290	67.24	14.88	10

* The rating velocity is measured per ATA/BOW-104-2008

The arrow is measured utilizing ATA Guidelines (ATA/ARR-201-2008). The actual arrow length used in this portion of the test is 29 inches. The arrow is marked 18.625 inches from the leading end of the arrow shaft, which is approximately 64 percent of the total arrow length. The distance from the front of the shaft is not derived arbitrarily. The remaining 10 or so inches of arrow gives an archer enough room to grip the arrow without making contact with the fletching as the arrow is pulled from the target.

The RhinoBlock is mounted to a hydraulic lift table. The table allows the target to be raised and lowered and moved left/right if needed; this permits the bow to remain in a single position. The bow is mounted to a rigid, sophisticated automated shooting machine. The bow is shot multiple times with an identical arrow at the same location until the arrow reaches 18.625 inches of penetration or greater. In some cases, the arrow will exceed the 18.625 inch threshold, which is tallied only if the previous shot did not reach the threshold mark. The test is repeated several times and the results are recorded. The average measurement represents the amount of shots it takes to meet or exceed the threshold marking.

The results illustrate the targets ability to "endure" heavy hits from an arrow at close range. On average, it takes 108 shots placed in the same location to reach 18.625 inches or greater of penetration based on the bow and arrow setup mentioned in this portion of the test.

Arrow Removal Test (Pull Test)

Many of us have probably wondered how much force it takes to remove an arrow from a target. That seems like a difficult feat to accomplish when dealing with many variables. So after much thinking, I developed a test that allows me to measure the amount of force it takes to remove an arrow with some of the mentioned equipment.

An AMS fiberglass arrow is modified by removing the outsert and incorporating a chisel tip only onto the shaft. The modification of the arrow creates a similar profile as compared to a typical hunting or target arrow. The fiberglass arrow is used because it has a stopping device and an AMS safety slide, which allows me to retract the arrow from the target. The fiberglass arrow is significantly heavier than most hunting arrows but do not be put off because of this difference. The typical penetration of the fiberglass arrow into the RhinoBlock is approximately the same as the other hunting arrow used in this test. Any variation in penetration is mostly attributable to the differences in momentum. In addition,

Penetration Test	
Parameter (Shot)	Front of Target
1	107
2	105
3	112
Average Shots	108

tion, the friction coefficients of dry/clean fiberglass and carbon surfaces are very similar; therefore, it is difficult to say those differences create a large disparity between the test arrow and a typical arrow your customer may shoot.

As mentioned, the target is mounted to a heavy duty hydraulic lift table. The bow fires an arrow at the target, and a machine retracts the arrow with use of weight measuring equipment. The bow is shot at various locations on the target, but never in the same hole as previously shot. The force measurements are recorded and averaged.

The results confirm that it takes on average 37.2 pounds of peak force to remove an arrow from the RhinoBlock. The test represents data from 25 shots, and the results are based on the bow and arrow setup mentioned in this segment of the test.

Durability Test

A compound bow is fired at approximately 10 feet away from the target. The bow is shot 25 times and is oriented so the arrow hits within a two inch circle. The target is photographed before and after the bow is shot. The test revealed no pass-throughs. The self-healing foam did its job, and only minor cosmetic damage occurred.

Pros/Cons

Rinehart has designed the RhinoBlock with multiple sides for shooting. The numerous sides, 3D sculpting and various shooting zones create enough options for any shooter to enjoy. When shooting, it is hard not to notice the integrity of the target. The test results prove that the target is comprised of high-density material that can stand up to hard arrow hits. The performance results reveal that it takes over 100 shots placed in the same location to penetrate deeply into the target. The last positive relates to weather resistance. Having seen a RhinoBlock exposed to snow, rain, warm and cold weather, I can tell you that these targets may fade in

Bow Setup and Distance from Target - Arrow Removal	Weight (lbs)	Draw Length (inches)	Arrow Weight (grains)	Velocity (fps) *	Kinetic Energy (lb-ft)	Momentum	Distance to Target (ft)

* The rating velocity is measured per ATA/BOW-104-2008

color but remain unharmed and will continue to be reliable.

There is only one negative I noted when shooting into the RhinoBlock. The amount of force it takes to remove a carbon arrow from the target is more than some will like. The center insert seems denser than the other parts of the target. Hence, it takes more force to remove an arrow from the center portion of the target. Please note that the arrow removal test does not consider shots taken from the center of the target because the insert has a tendency to pull away ever-so slightly from the target.

Overall

Rinehart has won numerous coveted awards in the industry. The awards speak to the quality of product Rinehart manufacturers. Nevertheless, the company continues to strive for perfection. Rinehart's focus on excellence remains tied to designing targets that meet the archer's need. Rinehart's mission on quality and target integrity keeps them at the top of the leader board in the industry. The company's theory is simple - an arrow that effortlessly travels through a target, resulting in damage to either the arrow or fletching can cost the archer dearly. Rinehart's reliable target material is designed to stand the test of time, and is the main selling point for consumers. If consumers want the same material used in the RhinoBlock, but in a different shape or size, they have options - so be cognizant of their needs and of the company's numerous offerings.

Special Thanks: I would like to thank the manufacturer and sponsor who supported this event; without them and their support, this evaluation would never have been possible.

AMS Bowfishing is one of the finest producers of bowfishing gear in the country. The Wisconsin firm offers reels, bows, arrows and accessories, which are all essential to success in the field. The fiberglass arrows proved to be vital in my testing, surviving hundreds of shots without failure. ←

Arrow Removal Test	
Average (lbs) *	37.2

* The average calculation does not consider the highest and lowest measurements

Scorpion Venom™ Archery Lubricants

Archery Lubricants & Coatings for Superior Bow Maintenance

Scorpion Venom Archery
 PO Box 1021, Sayville, NY 11782
www.scorpionvenomarchery.com
 (631) 495-0806 (631) 553-8609

