2009 Compound Hunting Bow Evaluation

By *Anthony Barnum*

www.ArcheryEvolution.com

Introduction:

Welcome to the 2009 Compound Hunting Bow Evaluation. The focus of this event is Hunting Style Compound Bows that highlight the cutting edge of those products currently available in the archery marketplace. The goal is to provide those archers who enjoy hunting with appropriate objective information, as well as some subjective commentary, for aiding in the purchasing process. That being said, this evaluation is by no means conclusive; some tests could not be performed due to limitations in resources, time, or budget. Each archer should assess what is important to him or her and interpret the results accordingly. As always, we recommend that anyone who is in the market for a compound bow shoot as many different makes / models as possible to determine what best suits their individual needs and desires.

The format of this year's evaluation is very similar to 2008, with the only differences being some changes in the test equipment used to conduct the test as well as the inclusion of an additional Bow Segment: Long-Draw models.

Bow Segment	Guidelines	Draw Length	Draw Weight
Flagship Model	Bow that manufacturer feels is the "flagship" of their lineup; generally the most "marketed" bow	**29 ± ¼ in.***	**60 ± 1# peak**
Short-Draw Model	Bow designed specifically for women, youth or short-draw archers; generally has maximum draw length of 27"	**26 ± ¼ in.***	**50 ± 1# peak**
Speed Bow Model	Bow that is designed to provide as much speed and raw power as possible; generally the fastest bow of the lineup	**30 ± ¼ in.***	**70 ± 1# peak**
Long-Draw Model	Bow designed to accommodate those archers with longer than average draw-lengths; must have an available draw-length of 32".	**32 ± ¼ in.***	**70 ± 1# peak**

*** See Figure 1 below for Draw Length measurement guidance: True Draw Length + 1 ¾"**

The 2008 evaluation expanded on our standard Flagship model evaluations by including both Short-Draw and Speed bow models. Subsequently, we received some significant feedback regarding the inclusion of Long-Draw models to accommodate some of the larger statured individuals who enjoy this sport. In an effort to meet this demand, we have provided the participating manufacturers with the option of including an entry in this segment. We hope you enjoy the results and find the information provided to be both useful and helpful in your quest to find the best compound hunting bow for you!

Initial Conditions and Test Categories:

Each participating manufacturer was asked to provide the compound hunting bow that they felt best represented their company and would best suit the following categories:

- **Speed per Inch of Power Stroke**
- **Efficiency**
- **Vibration**
- **Noise Output**

Note: The criteria outlined in this evaluation were deemed to be the important factors to consider for a compound bow. This evaluation in no way represents all areas that are important to archers. Personal experience and preference were used to derive these criteria.

Upon receiving each bow, a thorough craftsmanship / quality examination is conducted straight out of the box. An inspection of the finish and machining is conducted with notes taken on any imperfections that are noticed. The areas of interest for this inspection are as follows:

- **Grip**
- **Riser**
- **Cams**
- **Cable Guard**
- **Limbs / Pockets**
- **Strings / Cables**

After the inspection is complete, a Revere Model 9363 load cell and TotalComp T500E indicator, adapted for use on a Hooter Shooter, are used to determine the peak draw weight, draw length (see Figure 1), Actual Let-Off and Effective Let-Off; brace height is measured to the nearest thousandth of an inch with a set of Mitutoyo Calipers.

Next, a New Archery Products QuikTune 3000 arrow rest is installed and each bow is shot by hand in the “out of box configuration” to baseline the speed of each bow as provided by the manufacturer. The bow is then outfitted with a string loop of BCY #24 D loop rope and speed measurements are repeated both on the shooting machine, which provides an indication of the amount of speed lost by shooting from the Hooter Shooter. After this assessment is made, tuning to Draw Length / Draw Weight specifications is made as follows:

- Draw length is adjusted with modules or integral draw-stops (as applicable).
  - Modification to strings / cables is only used as a last resort with permission from the manufacturer so as to minimize impact to efficiency
- Draw weight is adjusted through modification of the limb bolts
  - If the specified draw weight can not be reached by the particular bow (i.e. draw weight is too low), modification to the string / cable(s) may be necessary

Note: A tolerance was placed on both draw weight and draw length specifications as industry standards on how to measure these two items are ambiguous, at best. For bows that were within these specifications straight out of the box, no modifications were made unless specifically requested by the manufacturer. Where modifications were necessary to bring at least one of these parameters into specifications, it was recommended that both be corrected and set exactly as defined.

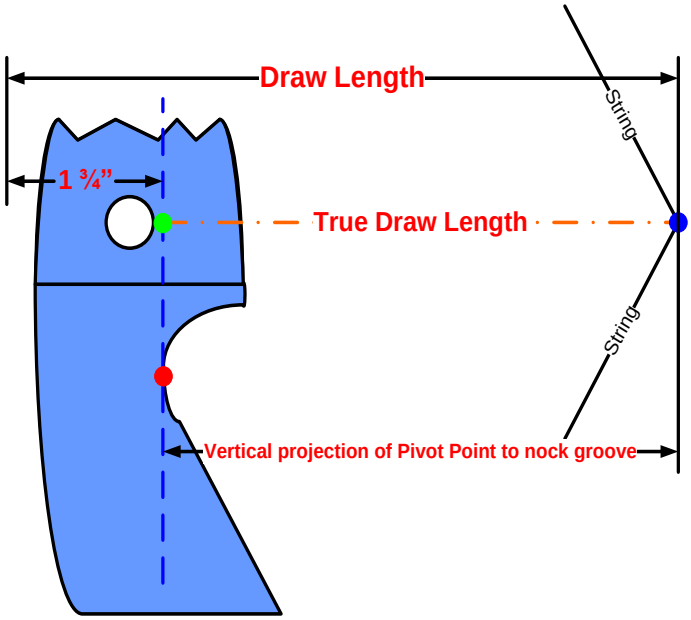


Figure 1 Draw Length Measurement Guide

All modifications requiring a bow press are made with a Last Chance Archery Power press. This press uses an electric motor and screw-drive mechanism to apply pressure to the limb tips of each bow, reducing the amount of stress put on both limbs and risers.

Draw-Force curves are then created to determine the amount of stored energy for use in dynamic efficiency calculations, after which performance testing based on the test categories begins.

For the performance tests, 250 and 300 grain Victory Archery V1 Series VForce 300 HV Arrows, 350 grain Gold Tip Ultralight Series 22 Arrows, 360 grain Carbon Express Maxima Hunter 250 Arrows, 420 grain Easton ST Epic N-Fused 340 Arrows, 450 and 490 grain Gold Tip Pro Hunter 7595 Arrows, and 540 grain Easton XX75 2514 aluminum arrows are utilized. These arrow weights equate to 5, 6, 7, and 9 grains per pound of the specified peak draw weight for all test categories except 70#, where the 540 grain arrow is used in place of a 630 grain arrow. All arrow weights are verified using an Easton Advanced Grain Scale and confirmed with a Coffey Marketing US Reloader Digital Pocket Scale.

A Hooter Shooter is used throughout the performance testing to minimize human induced errors. The Easton Professional Chronograph is used for all speed measurements in conjunction with the Pro-Chrono Digital Chronograph from Competition Electronics for confirmation. The Easton Professional Chronograph was used primarily for its ability to display speeds down to the tenth of a foot per second. Both chronographs consistently provided speed measurement within 1-2 fps of one another.

Each bow is evaluated on the 4 objective criteria outlined below. An addition to this year’s evaluation is the inclusion of Noise Output / Vibration testing with 6 grain per pound arrows while each bow is equipped with a 12 inch, 14 ounce B-Stinger Pro Stabilizer; where applicable, a decrease in Noise Output and Total Vibration is noted in the report.

Test Category	Assessment
Dynamic Efficiency	Provides an indication of the amount of energy output by a bow relative to the energy expended through drawing the bow back. An assessment is made with multiple arrow weights
Speed per inch of Power Stroke	Provides an indication of the amount of speed output by the bow over the distance from the valley to the static brace height position. An assessment is made with multiple arrow weights.
Noise Output	Provides an indication of the noise output characteristics of a bow at the “point blank” range utilizing a series of shots with multiple arrow weights.
Vibration	Provides an indication of the vibration characteristics of a bow during and after shot execution utilizing a series of shots with multiple arrow weights.

Dynamic Efficiency

Objective: The objective of the Dynamic Efficiency test is to provide an assessment of the amount of energy output by a bow relative to the amount of energy expended by drawing the bow back.

Rationale: The purpose of the compound bow is to transfer the energy expended in drawing the bow back (Potential or Stored Energy) into the energy propelling the arrow downrange (Kinetic Energy). Unfortunately, not all of the Potential Energy is turned into Kinetic Energy. There are various reasons for this, but regardless of the cause you are not getting all the energy out of the bow that you have put into it. The reason for testing dynamic efficiency is to determine which bows perform the best in transferring the energy that is "stored" into the energy in motion that is released through the arrow.

Procedure: A Revere Load-Cell, modified to mount on the Hooter Shooter, is used to create Force – Draw and Let Down curves for each bow. The plot information obtained from this setup is then analyzed to obtain the amount of energy expended in drawing the bow back (See "Stored Energy" in Figure 2 below). This value in pound-feet (lb-ft), considered "potential energy" (or stored energy) for this assessment, is then compared with the Kinetic Energy output by the bow during shot execution with 4 different arrow weights. The Kinetic Energy is calculated with the following formula:

$$KE = \frac{ArrowWeight * Velocity^2}{450240}$$

Where "KE" is in pound-feet, "Arrow Weight" is in grains, "Velocity" is in feet per second (fps) and 450240 is a conversion factor that accounts for unit changes between arrow weight (grains) and velocity (fps). The ratio of the Kinetic Energy to the Potential Energy for all arrow weights is assessed.

Example: The speed of a 350 grain arrow out of the 70# BowTech 82nd Airborne was measured to be 341.1 feet per second (fps). The speed of a 540 grain arrow out of the same bow was measured to be 281.4 fps. Using the formula for KE above, we can show that the Kinetic Energy of the 350 grain arrow is 90.4 lb-ft, while the Kinetic Energy of the 540 grain arrow is 94.9 lb-ft. Dividing these two KE values by the Potential Energy (109.1 lb-ft), a dynamic efficiency of 82.9% and 87.0% is achieved, respectively.

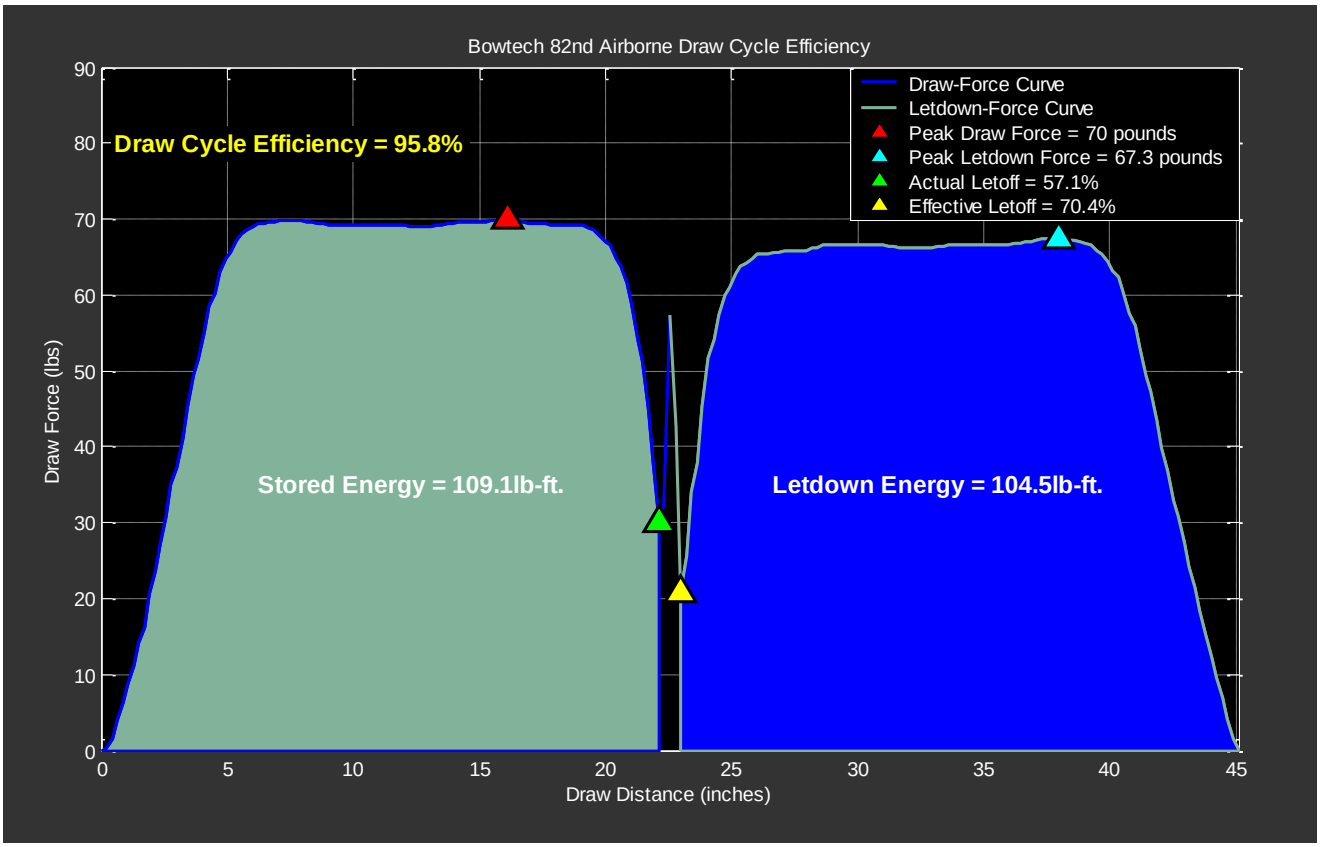


Figure 2 Force-Draw Curve and Letdown Curve

Speed per inch of Power Stroke

Objective: The objective of this section is to determine the speed properties of a bow based on the length of its power stroke at point blank range with 4 different arrow weights.

Rationale: Because there are so many varying configurations in today's compound bows (e.g. low or high brace height, reflex / deflex riser geometry), the amount of speed output by each bow per the inch of its power stroke is a reasonable way to compare each bow on more of an equal playing field.

Procedure: Each bow is mounted to the Hooter Shooter. A series of 5 speed measurements are taken with an Easton Professional Chronograph at a distance of three (3) feet from the throat of the grip for each bow with 4 different arrow weights. These measurements are confirmed with a Competition Electronics Pro-Chrono Chronograph, with the highest and lowest readings removed before averaging the speed per arrow weight. The brace height of each bow is then measured and 1 ¾ inches is added to this measurement. This value is subtracted from the measured draw-length to determine the length of the power stroke. The power stroke value is then divided into the average speed for each of the arrow weights. The average speed per inch of power stroke over all arrow weights is then calculated for use in the overall results.

Assumptions: An assumption is made that the speed per inch of power stroke more accurately characterizes the speed performance of a given bow than just comparing raw speed of each bow without consideration for its configuration. Another assumption is made that the string travel past the brace position during shot execution does not impart any energy on the arrow.

Vibration

Objective: The objective of this section is to determine the noise output properties for each bow at point blank range.

Rationale: A great deal of emphasis is placed on the amount of noise output by compound bows. Today's hunting bows have different noise output characteristics with varying arrow weights. Many hunters use heavier arrows for increased down range kinetic energy, while others use lighter arrows for increased speed. Because of these issues, noise output readings are measured at point blank range for 4 different arrow weights.

Procedure: Each bow is mounted to the Hooter Shooter, after which a PCB Piezotronics microphone is setup at a distance of 36 inches from the throat of the grip of the bow. The Microphone is set at a height of 36 inches, and is offset from the path of the arrow by 6 inches. A series of five (5) shots is executed for 4 different arrow weights from each bow, during which sound output data is captured. This data is then analyzed, after which the highest and lowest readings are removed; the average noise output is calculated for each bow for dB, dBA and dBC weightings.

Assumptions: An assumption associated with this test is that the sample size of three firings per arrow weight is sufficient to correctly characterize the noise output of the bow at point blank range.

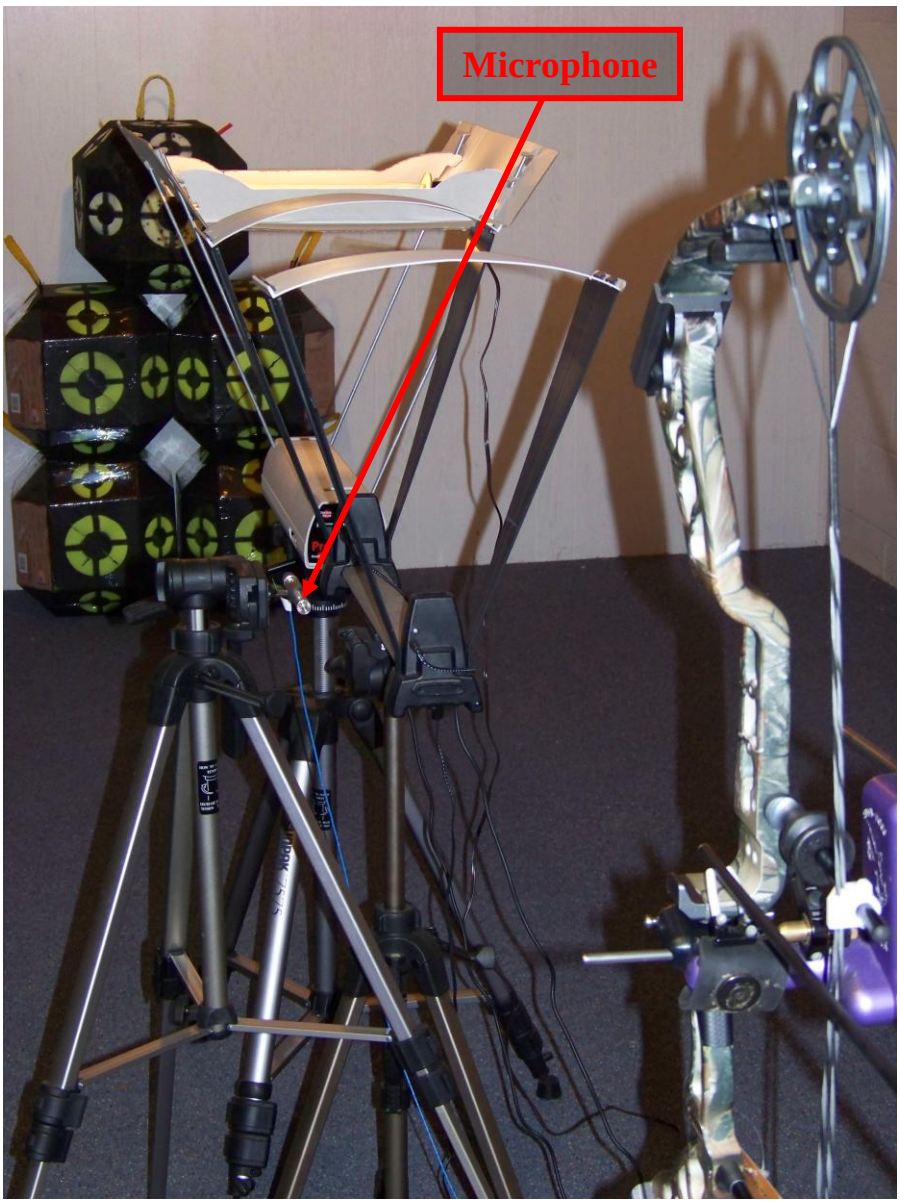


Figure 3 Noise Output Data Collection Setup

Vibration

Equipment Used: National Instruments USB Data Acquisition unit, PCB piezo-electric microphone, Matlab software.

Test Setup: Microphone mounted 36 inches in front of bow at a height of 36 inches, with an offset of 6 inches from the centerline, as shown in Figure 4.

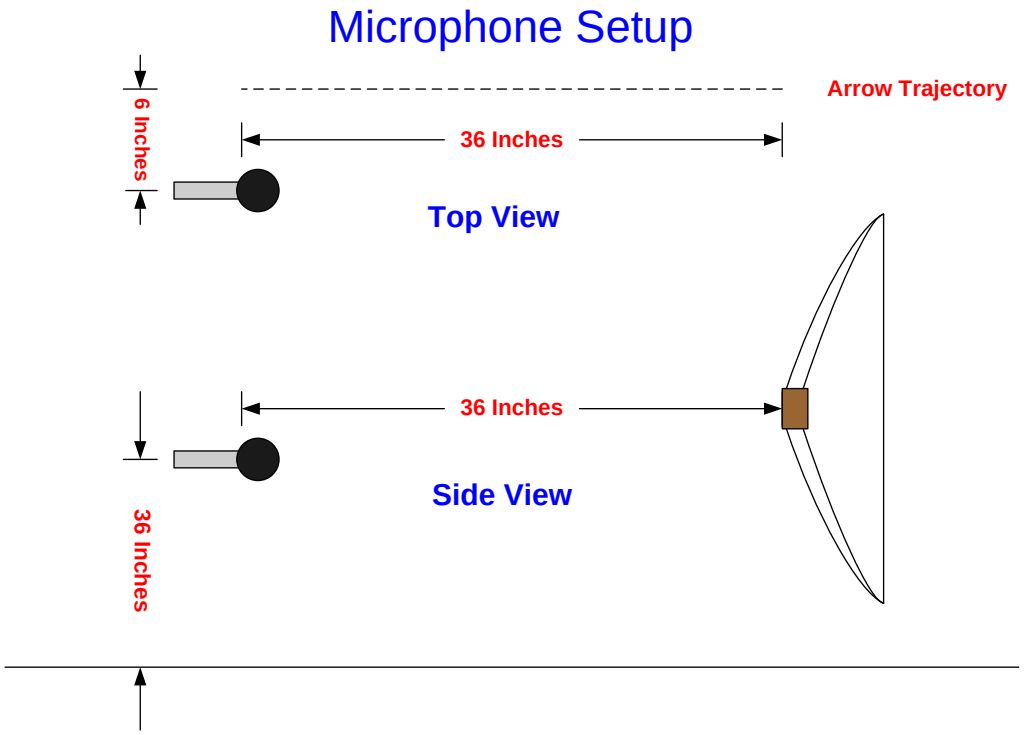
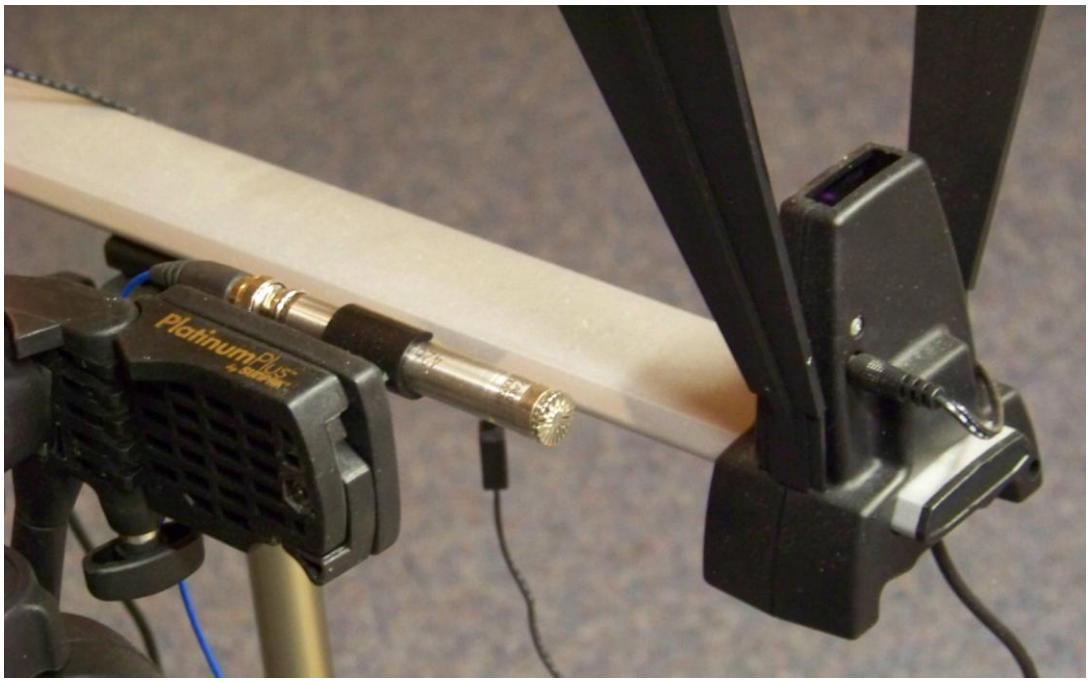


Figure 4 Microphone Setup



Vibration

Objective: The objective of the Vibration Test is to provide an indication of the peak vibration each bow produces under shot execution with four different arrow weights. To most accurately reflect the vibration felt by an archer, the vibration data is collected on the front of the bow's riser opposite the throat of the grip.

Rationale: The less vibration output by a bow and felt by the archer during and after shot execution, the more enjoyable a bow is to shoot, especially during long practice sessions. Our test equipment is highly sensitive; an archer may not be able to distinguish between some of the measured vibration outputs of given bows.

Procedure: A PCB Piezotronics tri-axial accelerometer is attached to each bow on the front of the riser at a point opposite the throat of the grip. A series of 5 shots is taken with 4 different arrow weights, during which vibration data is collected. After data collection is completed, each raw data set is analyzed to determine the maximum Total vibration amplitudes (combination of X, Y, and Z vibration amplitudes; see Figure 6 below). The highest and lowest measurements are removed, after which the average maximum vibration amplitude of the three remaining shots for each arrow weight is calculated.

Assumptions: An assumption is made that the front of the riser of each bow, opposite the throat of the grip is an area that is representative of the amount of vibration an archer can expect to experience.

Vibration

Equipment Used: National Instruments USB Data Acquisition unit, PCB tri-axial accelerometer, Matlab software

Test Setup: Accelerometer mounted opposite the throat of the grip on the front of the riser, with orientation as shown in Figure 6.

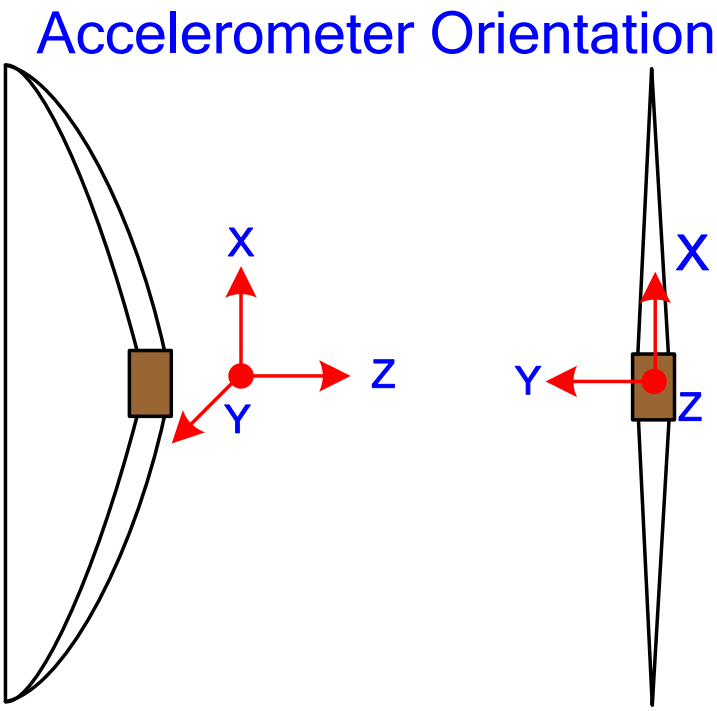
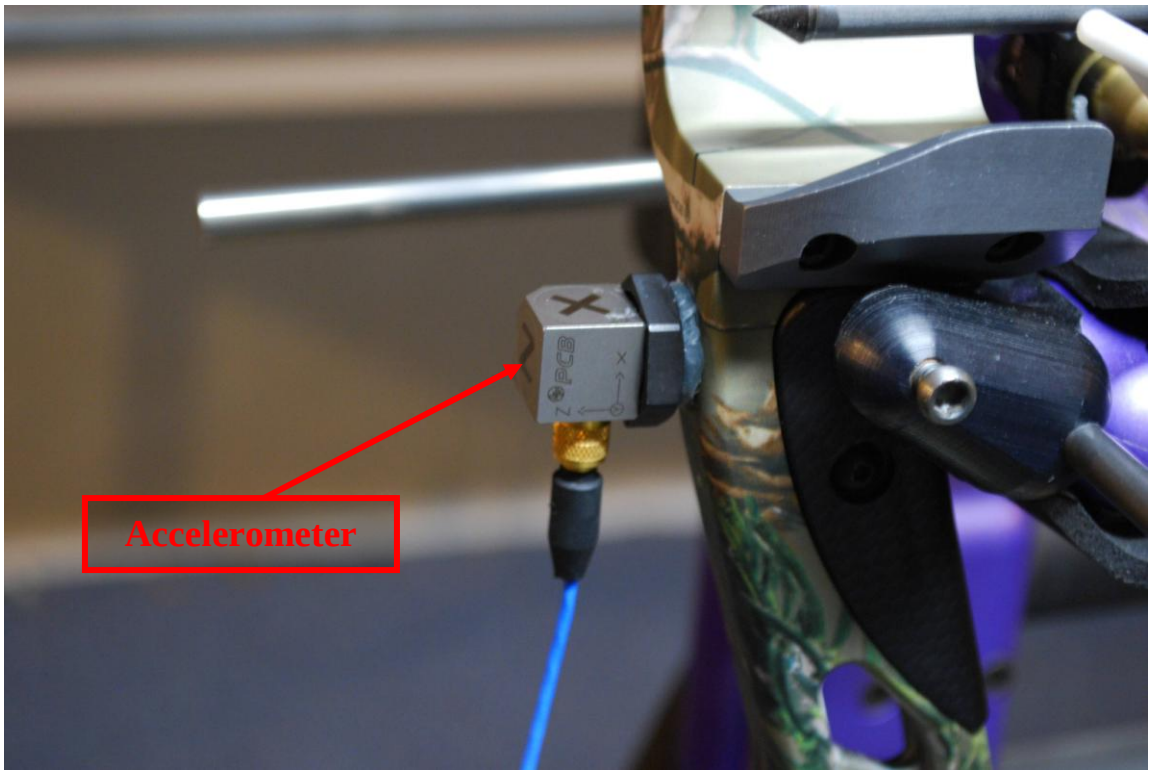


Figure 6 Accelerometer Orientation



2009 Sponsors

We would like to thank the manufacturers and sponsors who provided equipment for this evaluation; without them and their support, this evaluation never would have been possible.

The Stabilizer Company provided a 12 inch B-Stinger Pro stabilizer with a 14 ounce weight for use in the noise output and vibration testing. This adds an element of realism to the testing as many folks add accessories to help dampen vibration and minimize noise output

BCY provided the #24 D-loop rope used on each bow for the test. This rope proved to be consistent, reliable, and easy to use.

Carbon Express provided Maxima Hunter 250 Arrows weighing 360 grains for use throughout testing. These arrows have the built-in weight forward design that helps to provide faster recovery after the shot.

Easton provided ST Epic N-Fused 340 Arrows weighing 420 grains and XX75 2514 aluminum arrows weighing 540 grains for use throughout testing. An Easton Profession Chronograph with Infrared sensing devices was also used to capture speed measurements.

Last Chance Archery provided the Power Press Deluxe, which uses an electric motor mated to a screw drive mechanism to compress the limb tips of just about any bow on the market. This press was extremely helpful in getting the bows fine tuned for the test.

RAM Products provided their micro adjusting bow vise to aid in bow setup and tuning. This bow vise proved to be a valuable tool throughout the test and is easy to setup and use.

Rinehart Targets provided the 18-1 targets used throughout this testing. These targets are extremely durable and boast a 1 year warranty; if you shoot out all 18 sides within 1 year of the purchase, Rinehart will replace the target no questions asked.. They are also extremely easy to pull arrows from, helping to make for a smoother testing process.

Victory Archery provided the V1 Series VForce 400 HV 300 Grain Arrows for use throughout the testing. These arrows proved to have very tight tolerances and were extremely durable.

2009 Compound Hunting Bow Evaluation
Equipment Used / Special Thanks

Equipment Used:

General:

- Hooter Shooter by Spot Hogg
- New Archery Products QuikTune 3000 Arrow Rests
- BCY #24 D loop rope
- Mitituyo Calipers
- Starrett Precision Rule

Force / Weight Measurements:

- Revere Load-Cell / TotalComp Indicator
- Easton Hand-Held Digital Scale
- Easton Advanced Grain Scale
- Coffey Marketing US Reloader Digital Pocket Scale.

Speed Measurements

- Easton Bow Force Mapper Professional Chronograph
- Competition Electronics Pro-Chrono Digital Chronograph

Noise Output Measurements:

- National Instruments USB Data Acquisition unit
- PCB piezo-electric microphone

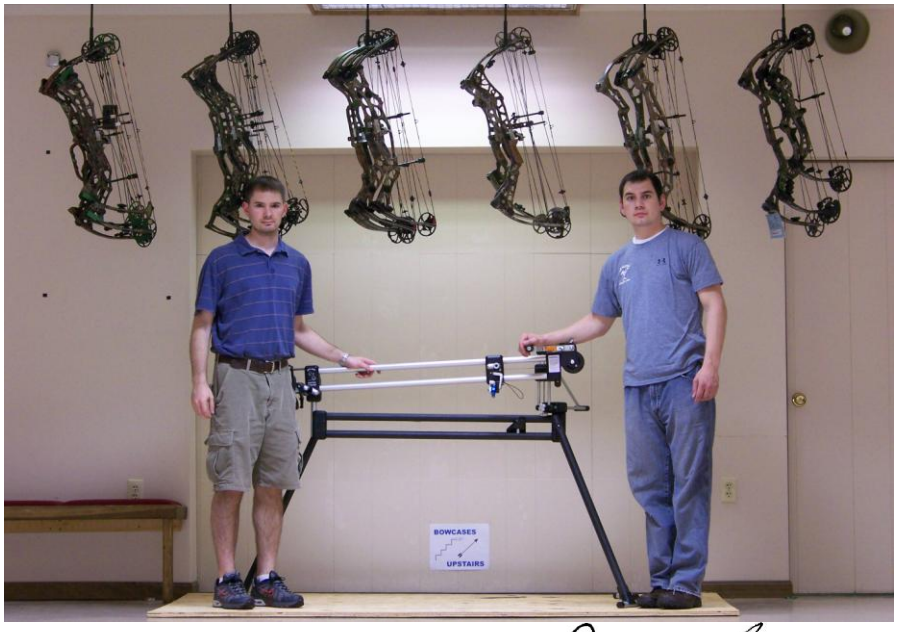
Instruments used for Vibration Test:

- National Instruments USB Data Acquisition unit
- PCB piezo-electric Tri-Axial Accelerometer

Special Thanks:

We would like to thank all of the manufacturers and sponsors who provided bows and test equipment for this evaluation; without them and their support, this evaluation never would have been possible.

Special thanks to Jeff Cole, who was kind enough to take hundreds of pictures throughout this effort.



Anthony Barnum

Jonathan Teater

2009 Compound Hunting Bow Evaluation
Miscellaneous Pictures

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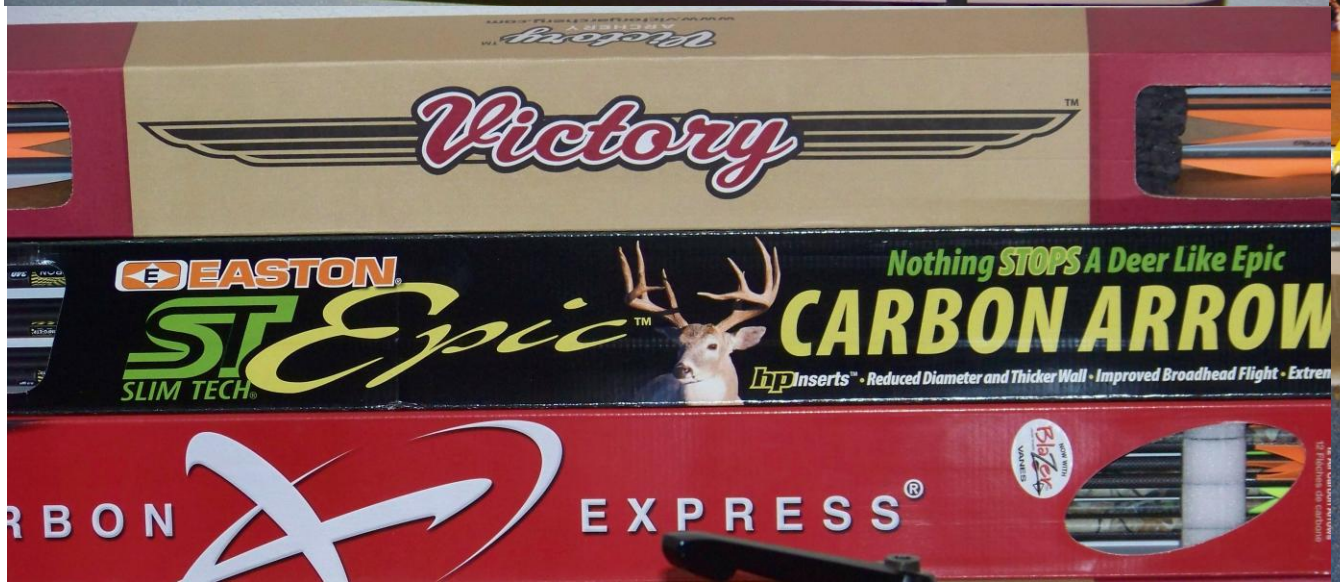

2009 Compound Hunting Bow Evaluation

Anderson Bow Company Crow XL Test Results

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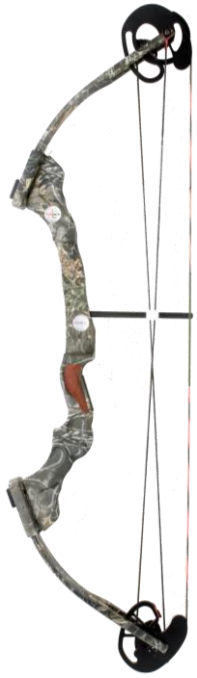
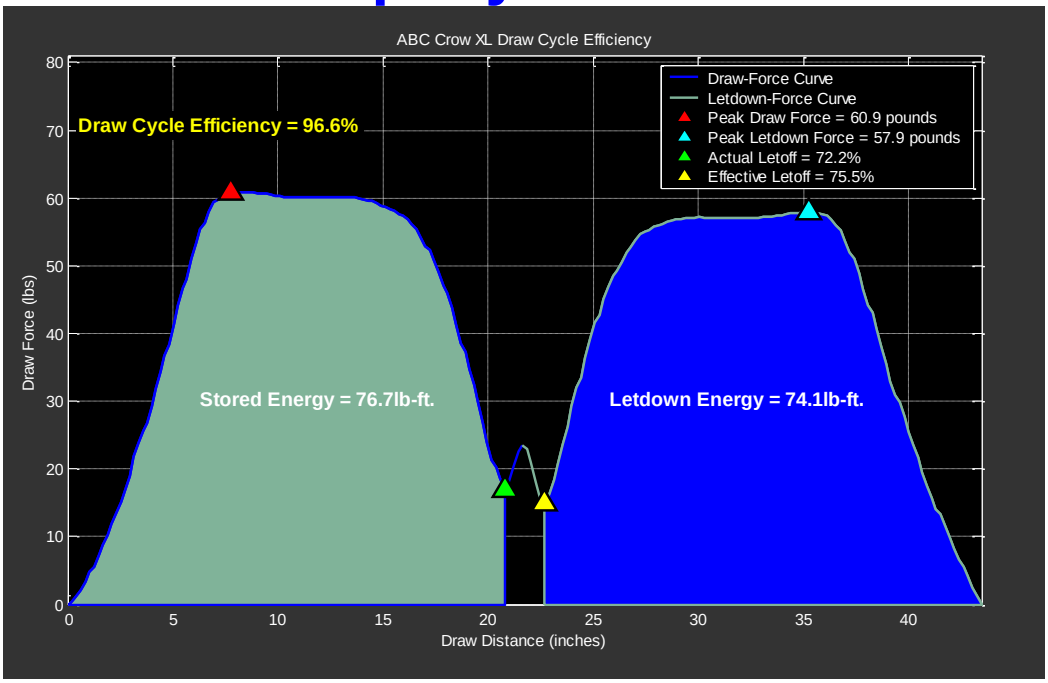
Anderson Bow Company Crow XL





Introduction:

Teaming up with Ed McPherson, who is a veteran in the archery industry, Anderson Bow Company offers three different compound bow models including the Crow, the Crow Ltd., and the Crow XL. The Crow XL is Anderson's flagship offering for the 2009 model year. Modifying the time-tested hybrid cam system design into its own unique cam system called SBDT™ (Statically Balanced, Dynamically Tuned), the Crow XL provides modularly adjustable draw length through the use of an integrated rotating module. Timing marks are also provided on both the top and bottom eccentrics to aid in the tuning process. The back-weighted riser is designed to be in perfect balance at full-draw and prevent the tendency to drop forward. This provides a unique feel both during and after the shot and helps to keep the bow on target. The two piece Cocobolo Wood side plate grip works in conjunction with a leather palm insert to provide a consistent contact point to the bow. Through the combination of proven technology with unique balance concepts, the Crow XL is a solid shooting platform.

Anderson Bow Company Crow XL

Contact Info: Anderson Bow Company

www.andersonbow.com

MSRP:	$799	**Draw Length:**	27"-30" *
Cams:	SBDT™ Hybrid	**Draw Weight:**	40-70*
Limbs:	14" Solid Composite	**Brace Height:**	6 3/8" *
Grip:	Cocobolo Wood / Leather	**Axle to Axle:**	36 1/2" *
Let-off:	75%*	**Mass Weight:**	4.4 ^
String:	BCY 452X		
Damping:	N/A		*Advertised
Finish:	Super Flauge Game camouflage		^Measured

Performance at a Glance (60.9 lbs, 28 15/16"):

Arrow	Speed	K.E.	Momentum
300 Grains	296.7	58.6	12.7
360 Grains	274.9	60.4	14.1
420 Grains	257.9	62.0	15.5
540 Grains	230.0	63.4	17.7

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	77.6%	79.9%	82.0%	83.9%
Speed Per Inch of PS:	14.3	13.2	12.4	11.1
Noise Output (dBA):	95.1	86.3	83.9	81.9
Total Vibration (G):	323.3	205.1	260.4	218.4

The Crow XL sample that was provided to Archery Evolution was measured to have a brace-height of 6.395 inches, while the axle-to-axle length was measured to be 36 9/16 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 28 15/16 inch draw length and peak draw-weight of 60.9 pounds. At these settings, The Crow XL achieved an average speed of 298.7 fps when shot by hand in the out of box configuration with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the Crow XL achieved and average speed of 296.7 fps at these settings. Note that at the time this report was written, the Crow XL was the only bow that was within tolerance of the test specifications. As such, no adjustments were made to the Crow XL and testing commenced without any modifications necessary.

A thorough examination of the finish quality showed a number of imperfections, although none of them would be considered major. Specifically, the riser had many small "pin-prick" areas void of film-dip finish, especially in the recessed areas of the riser near the sight window. These same voids in the camo finish were also found on both the limbs and limb pockets, where sizeable areas were noticed. Other than that, the grip, cable guard, and eccentrics look good and no noticeable machining marks were found. Aesthetically, the Crow XL could be more refined through the use of cut-outs on both the riser and the cams and the use chamfered, filleted or rounded edges. That having been said, the bow balances well in the hand and is quite steady throughout the shot sequence.

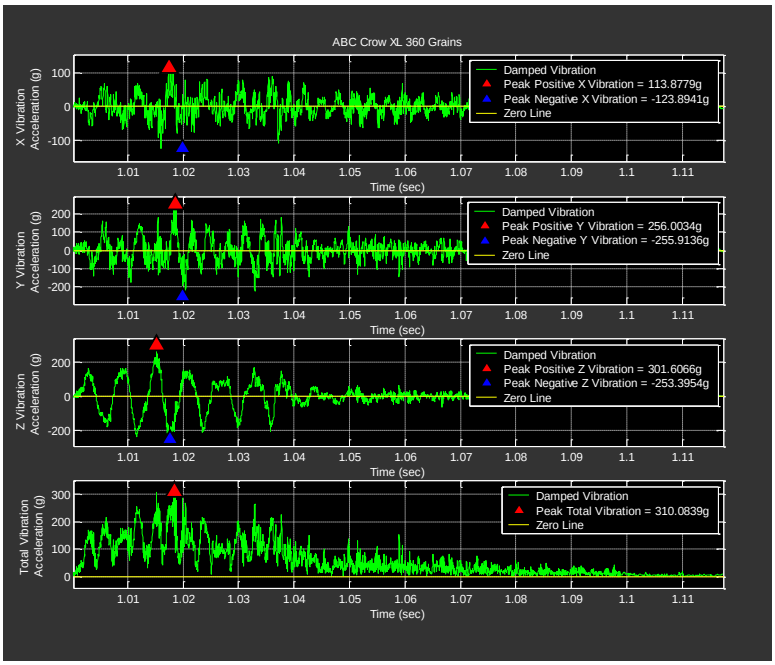
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 12.7
Dynamic Efficiency: 80.8%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	ABC Crow XL							
	Brace Height = 6.395		Draw Weight = 60.9		Draw Length = 28 15/16		Axle-to-Axle = 36 9/16	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	296.9	295	275.0	274	~~258.5~~	258	230.0	230
2	~~296.4~~	295	~~275.5~~	275	258.1	258	~~230.1~~	230
3	296.7	295	~~274.7~~	274	257.8	257	230.0	230
4	296.5	295	275.0	274	257.8	257	230.0	230
5	~~297.2~~	296	274.8	274	~~257.7~~	257	~~229.9~~	229
Avg. Speed	296.7	295	274.9	274	257.9	257	230.0	230
Kinetic Energy	58.6	58.0	60.4	60.0	62.0	61.7	63.4	63.4
Momentum	12.7	12.6	14.1	14.1	15.5	15.4	17.7	17.7
Power Stroke	20.793							
Speed per inch of Power Stroke	14.3	14.2	13.2	13.2	12.4	12.4	11.1	11.1
Avg. Speed per inch of PS	12.7							
Stored Energy	75.6							
Dynamic Efficiency	77.6%	76.7%	79.9%	79.4%	82.0%	81.7%	83.9%	83.9%
Avg. Dynamic Efficiency (BFM)	80.8%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 103.6 g
Negative X-Vibration: -102.7 g

Positive Y-Vibration: 215.5 g
Negative Y-Vibration: -217.8 g

Positive Z-Vibration: 244.5 g
Negative Z-Vibration: -237.6 g

Total Vibration: 276.8 g

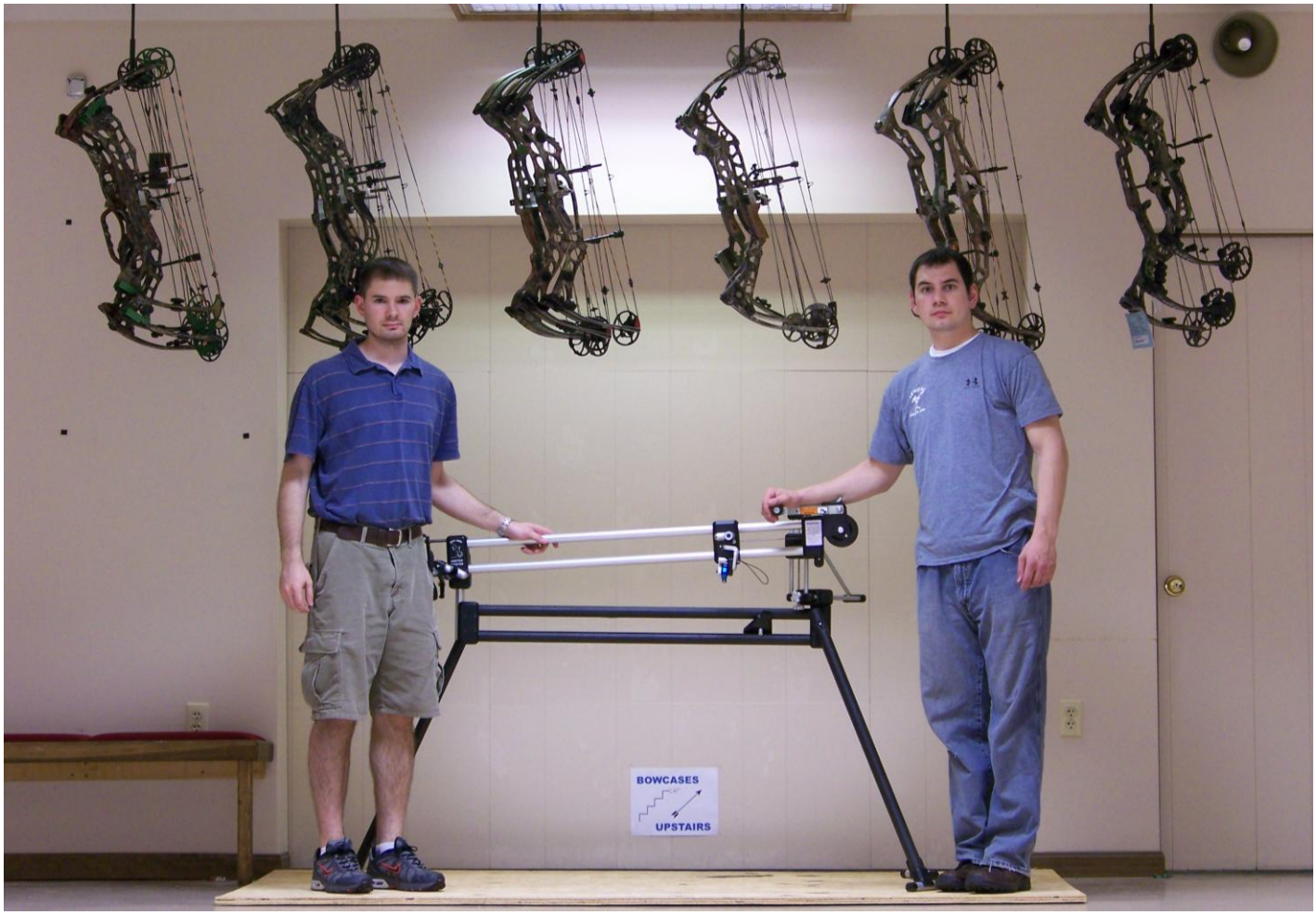
Sound Measurements:

Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 106.8 dB
A-Weighted Sound Output: 86.8 dBA
C-Weighted Sound Output: 97.1 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

Noise & Vibration	ABC Crow XL											
	Brace Height = 6.395				Draw Weight = 60 9/10				Draw Length = 28 15/16			Axle to Axle = 36 9/16
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~110.3~~	~~107.2~~	105.8	102.3	94.8	~~85.3~~	84.4	82.7	101.7	~~96.9~~	95.6	91.9
2	~~112.4~~	108.0	106.4	102.9	~~95.9~~	~~87.8~~	~~84.6~~	~~85.0~~	~~104.1~~	97.8	96.3	~~94.6~~
3	112.1	~~108.5~~	~~105.3~~	~~102.0~~	95.4	86.3	83.9	81.5	103.6	~~98.7~~	~~94.7~~	92.0
4	110.5	107.3	~~106.8~~	~~103.8~~	95.0	86.9	83.3	~~81.3~~	~~101.6~~	97.1	~~96.8~~	93.2
5	110.4	107.8	106.4	102.2	~~93.3~~	85.8	~~82.7~~	81.5	101.7	97.7	96.3	~~91.8~~
Average	111.0	107.7	106.2	102.5	95.1	86.3	83.9	81.9	102.3	97.5	96.1	92.4
Total Average Max	106.8				86.8				97.1			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

APA Innovations Mamba MX2 Test Results

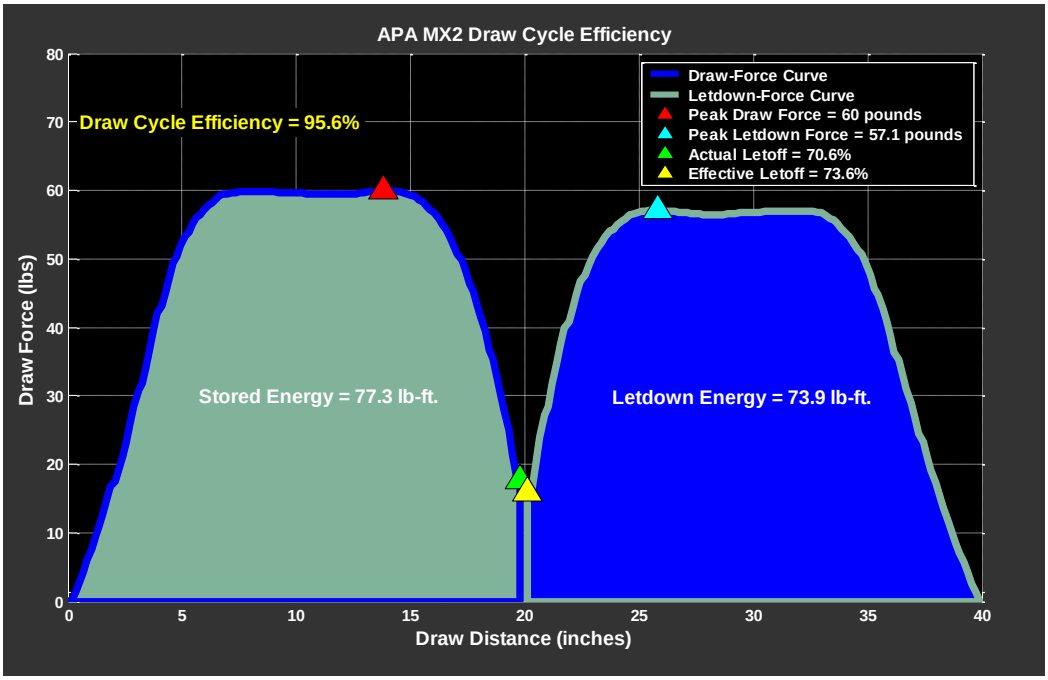
By *Anthony Barnum*

www.ArcheryEvolution.com

APA INNOVATIONS INC

Archery Evolution
www.ArcheryEvolution.com

APA Innovations Mamba MX2



Introduction:

Continuing to raise the bar for usability in the field, APA Innovations' flagship model, the Mamba MX2, offers even more unique design features than last year's Viper, which was laden with versatility. The Xtreme Venom Cam, a new dual cam system utilized by the Mamba MX2, not only employs modularly adjustable draw-length but also includes a new Cam Lock Press system that allows the archer to repair his or her bow in the field. The cam system combines a series of holes machined into the eccentrics with a stainless steel pin to allow the user to lock the bow in a partially drawn position. This stainless steel pin is housed in the Tool Center, which also includes a nock alignment tool, a broadhead wrench, and a carbide blade sharpener. Above the tool center is a front riser bridge that adds rigidity to the riser, helping to prevent torque while undergoing the rigors of the draw cycle. This riser bridge doubles as a convenient carry handle and is complimented by a "fang" that is built into the riser, which provides the means to hang the Mamba MX2 on a nearby branch. All of these features are combined into a powerful shooting package.

APA Innovations Mamba MX2

Contact Info: APA Innovations
www.apaarchery.com

MSRP:	$799.90	**Draw Length:**	26"-31" *
Cams:	Xtreme Venom Cam	**Draw Weight:**	50-80*
Limbs:	14 ½" Composite	**Brace Height:**	7 3/8" *
Grip:	Two-piece laminate	**Axle to Axle:**	32" *
Let-off:	75% *	**Mass Weight:**	4.4 lbs.
String:	Scorpion		
Damping:	Bowjax		*Advertised
Finish:	Vanish Hybrid		

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	306.0	52.4	13.1
360 Grains	283.3	64.1	14.6
420 Grains	264.5	65.2	15.9
540 Grains	235.6	66.5	18.2

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	80.7%	83.0%	84.4%	86.1%
Speed Per Inch of PS:	15.5	14.3	13.4	11.9
Noise Output (dBA):	87.6	87.2	85.9	81.4
Total Vibration (G):	458.7	447.3	383.6	292.6

The Mamba MX2 sample that was provided to Archery Evolution was measured to have a brace-height of 7.460 inches, while the axle-to-axle length was measured to be 32 3/8 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 30 1/8 inch draw length and peak draw-weight of 61.8 pounds. At these settings, the Mamba MX2 achieved an average speed of 320.3 fps when shot by hand in the out of box configuration with a 300 grain arrow. After changing the module to bring the bow down to the specified 29" draw, the peak draw-weight changed to 62.2 pounds; at these settings, the Mamba MX2 achieved an average speed of 314.3 fps when shot by hand with a string loop installed and 312.5 fps when shot from the shooting machine. Per request from APA, a slight adjustment to limb bolts was made to bring the Mamba MX2 down to the peak draw-weight specification of 60.0 pounds.

A thorough examination of the finish quality showed some imperfections. Various "pin-prick" areas void of film dip finish were noticed near several of the riser cut-outs, on the front riser bridge, and on the limb pockets. Only one major blemish was noted on the corner of the lower limb pocket, where bare aluminum was visible. This blemish may have been caused during the shipping process and is only noted from a quality inspection perspective. Otherwise, the grip area, limbs, and cams all looked very good from a finish perspective; the smooth, rounded edges and unique cutouts add to the aesthetic appeal of the MX2

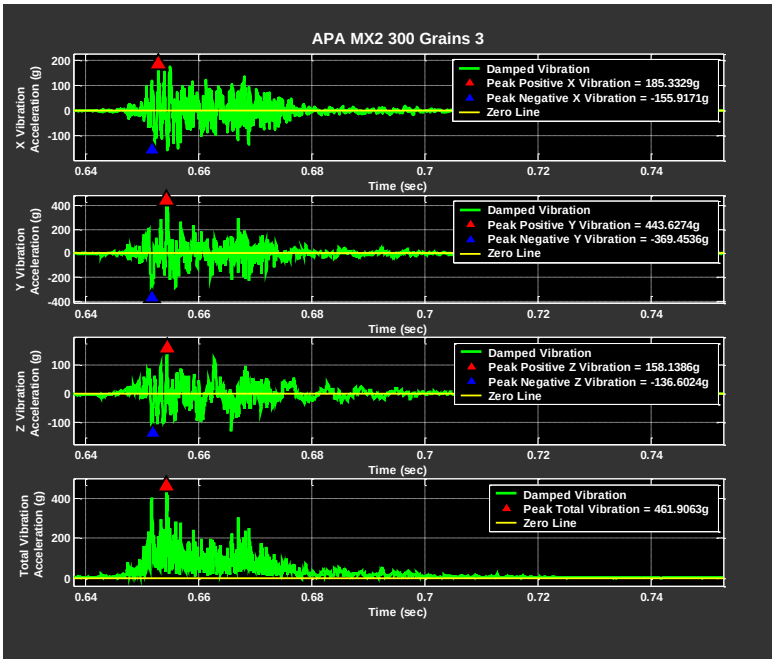
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.8
Dynamic Efficiency: 83.5%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	APA Innovations Mamba MX2							
	Brace Height = 7.460		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 32 3/8	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	306.2	305	283.4	282	~~264.2~~	263	235.6	235
2	306.0	305	283.4	282	264.5	263	235.6	235
3	~~305.8~~	305	~~283.5~~	282	264.6	263	~~235.4~~	235
4	~~306.4~~	305	~~283.0~~	282	~~264.7~~	263	235.5	235
5	305.9	305	283.1	282	264.4	263	~~235.7~~	235
Avg. Speed	306.0	305	283.3	282	264.5	263	235.6	235
Kinetic Energy	62.4	62.0	64.1	63.6	65.2	64.5	66.5	66.2
Momentum	13.1	13.1	14.6	14.5	15.9	15.8	18.2	18.1
Power Stroke	19.790							
Speed per inch of Power Stroke	15.5	15.4	14.3	14.2	13.4	13.3	11.9	11.9
Avg. Speed per inch of PS	13.8							
Stored Energy	77.3							
Dynamic Efficiency	80.7%	80.2%	83.0%	82.2%	84.4%	83.4%	86.1%	85.6%
Avg. Dynamic Efficiency (BFM)	83.5%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 159.9 g
Negative X-Vibration: -152.6 g

Positive Y-Vibration: 333.8 g
Negative Y-Vibration: -367.7 g

Positive Z-Vibration: 128.0 g
Negative Z-Vibration: -139.7 g

Total Vibration: 395.6 g

Sound Measurements:

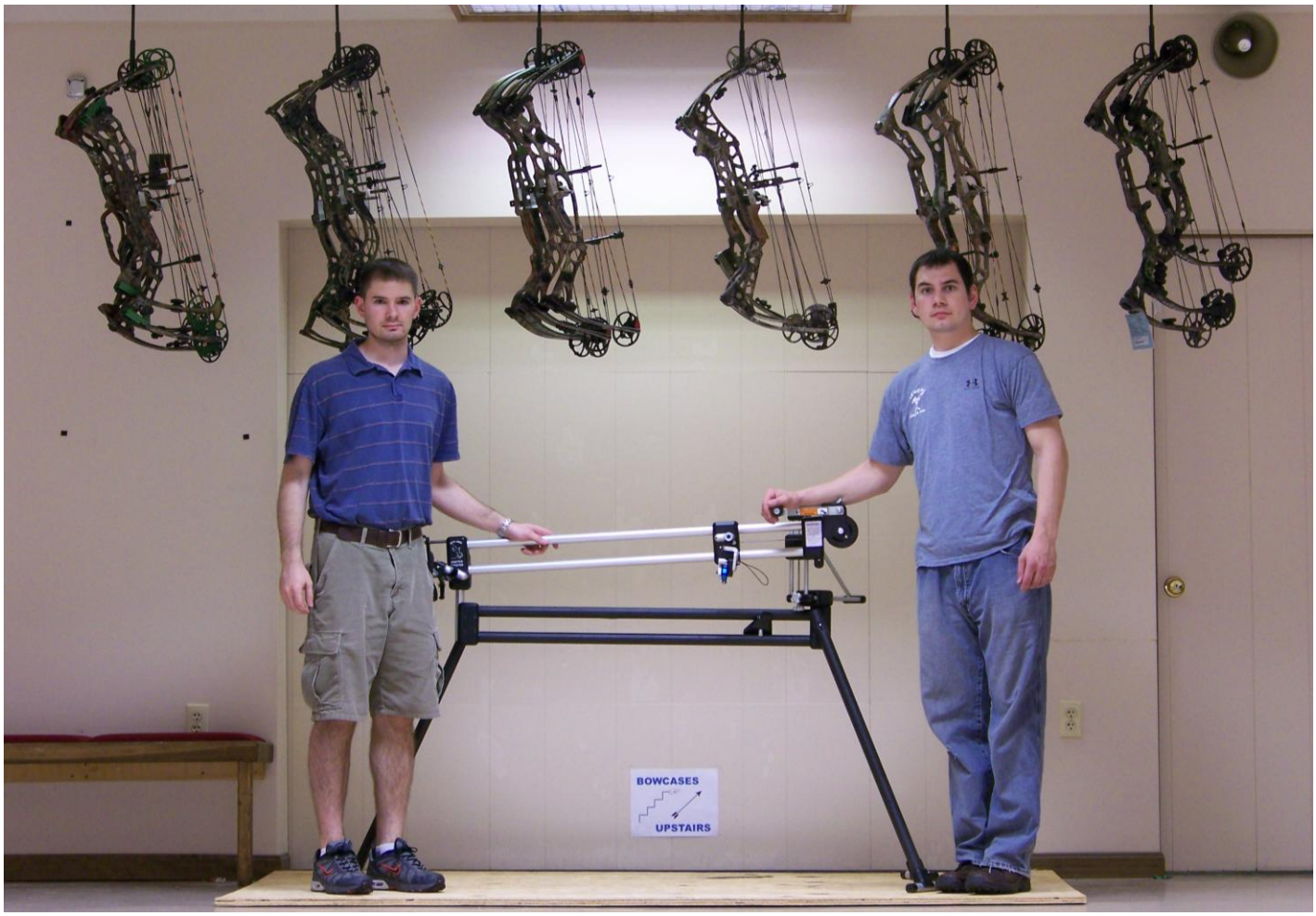
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 104.3 dB
A-Weighted Sound Output: 85.5 dBA
C-Weighted Sound Output: 95.1 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 2.6%

Noise & Vibration	APA Innovations Mamba MX2											
	Brace Height = 7.460			Draw Weight = 60.0			Draw Length = 29			Axle to Axle = 32 3/8		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~106.6~~	~~105.5~~	~~103.2~~	~~104.7~~	~~89.6~~	~~88.0~~	~~86.6~~	~~86.6~~	~~98.8~~	~~94.5~~	~~93.7~~	~~94.3~~
2	~~104.7~~	~~104.1~~	103.7	103.8	87.8	87.3	85.8	81.9	97.0	95.1	~~95.2~~	93.9
3	105.3	105.4	103.7	103.6	88.1	86.8	86.2	81.4	97.5	94.8	95.0	~~93.1~~
4	104.8	104.5	~~104.1~~	103.7	87.0	~~86.3~~	85.7	~~80.3~~	96.1	94.9	94.9	93.2
5	105.0	104.7	103.6	~~103.4~~	~~86.5~~	87.4	~~84.3~~	81.0	~~95.3~~	~~95.2~~	94.8	93.5
Average	105.0	104.9	103.7	103.7	87.6	87.2	85.9	81.4	96.9	95.0	94.9	93.5
Total Average Max	104.3				85.5				95.1			



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Jonathan Teater

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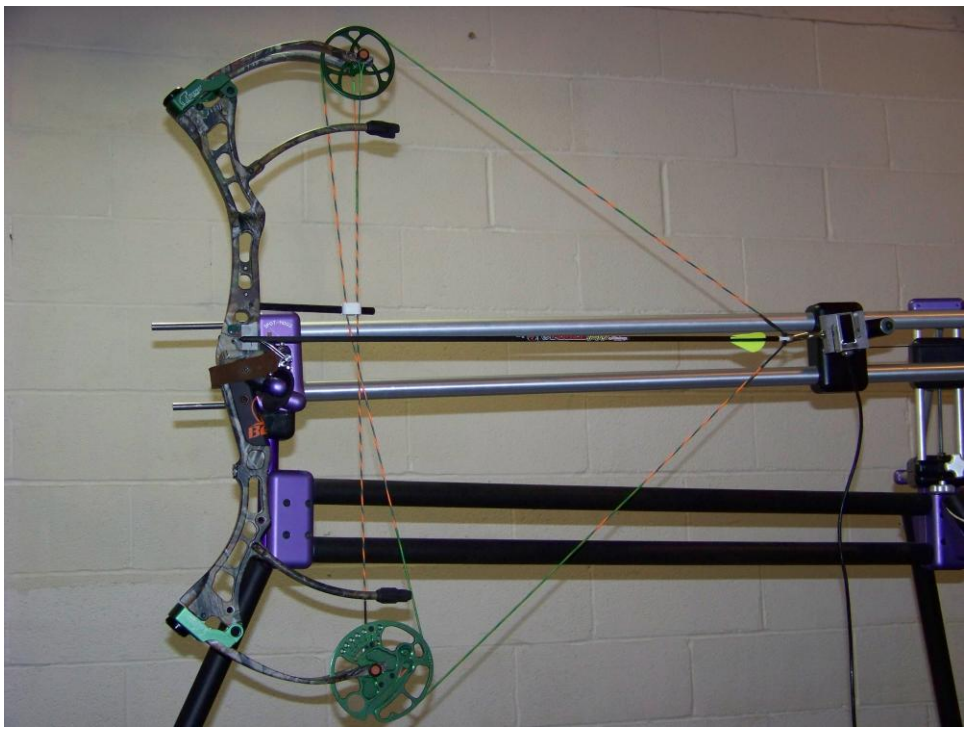
Archery Evolution
www.ArcheryEvolution.com

2009 Compound Hunting Bow Evaluation

Bear The Truth 2 Test Results

By *Anthony Barnum*

www.ArcheryEvolution.com



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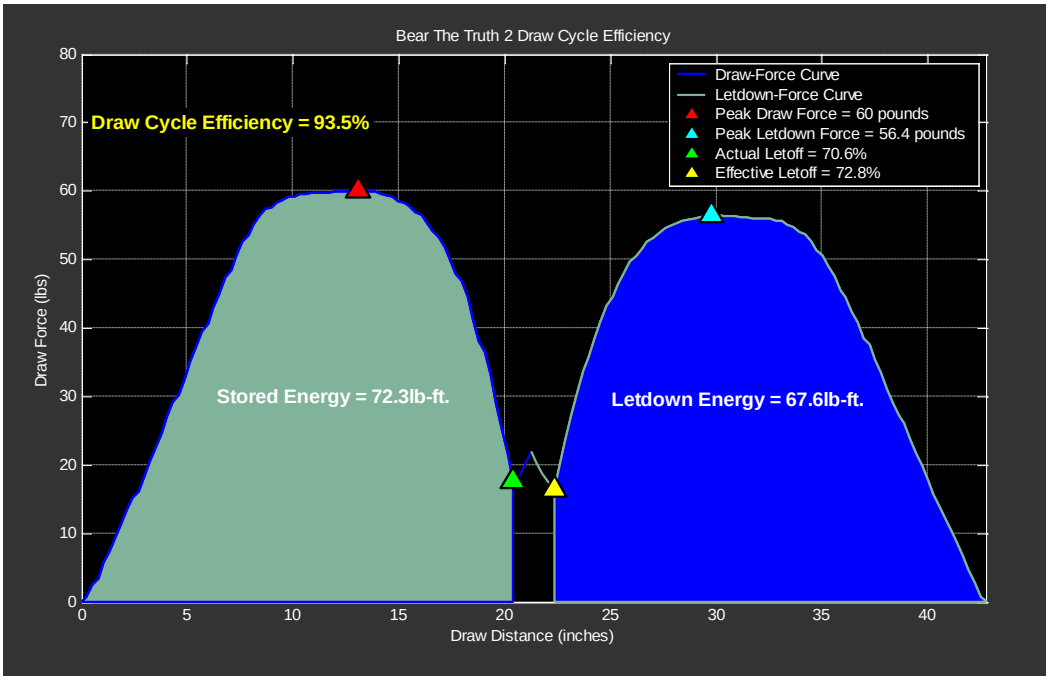
Bear The Truth 2



Introduction:

The Truth 2 is Bear's flagship offering for 2009. Named after the popular hunting shows by Primos, The Truth 2 is the second generation of "The Truth" bow that debuted as a 2007 model. The limbs on this bow are flared toward the axle end, which aids in evenly distributing the stress associated with the bow's draw cycle. The Dual Arc string suppressors are incorporated into the minimally reflexed riser and are included on both the top and bottom portions of the riser to combat excess string vibration.

The Truth 2 sample that was provided to Archery Evolution was measured to have a brace-height of 6 13/16 inches, while the axle-to-axle length was measured to be 33 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 3/8 inch draw length and peak draw-weight of 60.9 pounds. At these settings, The Truth 2 achieved an average speed of 299.5 fps with a 300 grain arrow. A slight adjustment to the limb bolts and adjustment of the string post brought the bow into exact specifications in short order.

A thorough examination of the finish quality showed some imperfections in the finish. Some excess film-dip was noticed in the cutout area where the suppressors attach to the riser. Also, a small area void of film dip finish was noted below the grip as well as multiple "pin-point" areas where film-dip didn't adhere properly. Finally, some minor machining marks were evident on the idler wheel. Note that none of these imperfections seem to have an impact on performance and are noted solely from a quality perspective.

Bear The Truth 2

Contact Info: Bear Archery Products
www.beararcheryproducts.com

MSRP:	$699.99	**Draw Length:**	24"-30" *
Cams:	Perimeter Weighted	**Draw Weight:**	60, 70*
Limbs:	Compression Molded	**Brace Height:**	7" *
Grip:	One-Piece Synthetic	**Axle to Axle:**	33" *
Let-off:	80%*	**Mass Weight:**	3.9 ^
String:	Winner's Choice		
Damping:	Dual Arc String Suppressor		*Advertised
Finish:	Realtree APG HD™		^Measured

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	296.0	58.4	12.7
360 Grains	274.0	60.0	14.1
420 Grains	256.6	61.4	15.4
540 Grains	228.5	62.6	17.6

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	80.7%	83.0%	84.9%	86.6%
Speed Per Inch of PS:	14.5	13.4	12.6	11.2
Noise Output (dBA):	87.6	86.8	82.8	82.0
Total Vibration (G):	162.7	171.7	148.5	114.5

The Truth 2 is outfitted with a synthetic grip, Winner's Choice string and cable, and pivoting limb pockets. The synthetic grip fits well in the hand and the strings / cables were visually appealing in that the fluorescent green serving material is translucent, allowing the consumer to view the separate colors of the green and orange string. The cam system offers a string post which allows the user to make minor adjustments to draw length without the need to change out the module. This feature was leveraged in our test model to bring the bow into spec. There is no mistaking what this bow is or who it is made by as the "Bear" and "The Truth 2" logos can be found in many different places on the bow, including the grip, limbs, and limb pockets. All in all, The Truth 2 offers a unique visual appeal in a nice shooting platform.

Detailed Test Results:

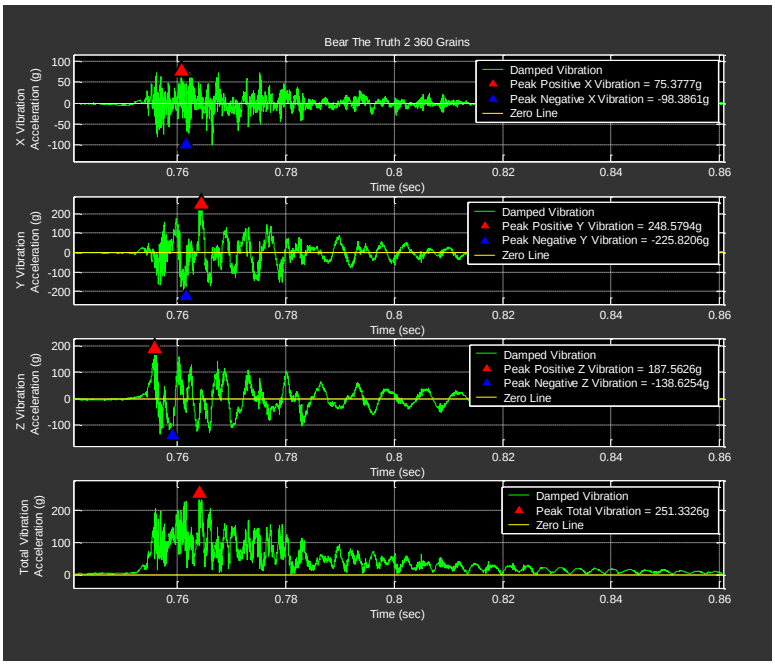
Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 12.9

Dynamic Efficiency: 83.8%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Bear The Truth 2							
	Brace Height = 6.813		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 33	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	~~296.2~~	295	~~273.8~~	273	256.7	256	~~228.4~~	227
2	296.1	295	~~274.3~~	273	256.5	255	228.5	228
3	296.1	295	273.9	273	~~256.8~~	256	228.5	228
4	~~295.8~~	295	273.9	273	256.5	255	228.5	228
5	295.9	295	274.1	273	~~256.4~~	255	~~228.6~~	228
Avg. Speed	296.0	295	274.0	273	256.6	255	228.5	228
Kinetic Energy	58.4	58.0	60.0	59.6	61.4	60.8	62.6	62.3
Momentum	12.7	12.6	14.1	14.0	15.4	15.3	17.6	17.6
Power Stroke	20.438							
Speed per inch of Power Stroke	14.5	14.4	13.4	13.4	12.6	12.5	11.2	11.2
Avg. Speed per inch of PS	12.9							
Stored Energy	72.3							
Dynamic Efficiency	80.7%	80.2%	83.0%	82.4%	84.9%	84.1%	86.6%	86.2%
Avg. Dynamic Efficiency (BFM)	83.8%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 84.4 g
Negative X-Vibration: -93.8 g

Positive Y-Vibration: 216.2 g
Negative Y-Vibration: -219.5 g

Positive Z-Vibration: 170.5 g
Negative Z-Vibration: -140.5 g

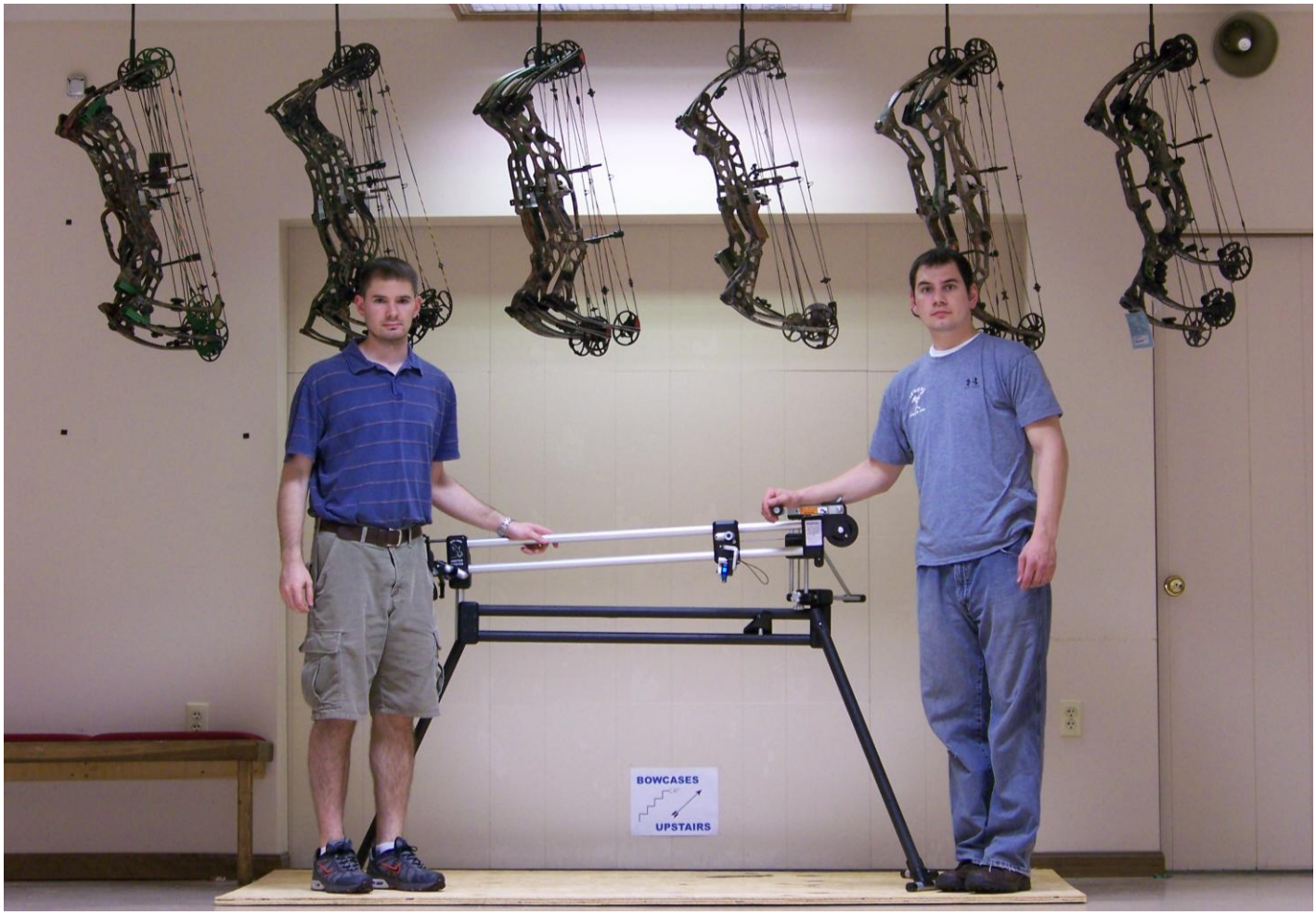
Total Vibration: 238.0 g

Sound Measurements:

Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 102.4 dB
A-Weighted Sound Output: 83.4 dBA
C-Weighted Sound Output: 93.8 dBC

Noise & Vibration	Bear The Truth 2											
	Brace Height = 6.813				Draw Weight = 60				Draw Length = 29			Axle to Axle = 33
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	108.0	102.9	~~98.9~~	99.3	87.7	82.8	79.9	81.7	99.9	95.0	~~90.3~~	90.1
2	~~108.4~~	103.7	99.5	~~99.2~~	~~89.2~~	85.5	81.0	82.2	~~100.2~~	95.6	90.7	~~89.3~~
3	~~106.3~~	~~104.8~~	~~103.5~~	99.7	88.1	~~85.6~~	~~86.5~~	~~81.4~~	~~98.2~~	~~96.7~~	~~95.2~~	89.8
4	106.9	103.3	99.1	~~100.2~~	~~86.1~~	83.1	79.8	~~82.8~~	98.8	95.1	90.8	90.2
5	106.8	~~102.2~~	99.9	99.9	87.5	~~82.4~~	~~79.6~~	82.0	98.7	~~94.0~~	91.3	~~91.9~~
Average	107.2	103.3	99.5	99.6	87.8	83.8	80.2	82.0	99.1	95.2	90.9	90.0
Total Average Max	102.4				83.4				93.8			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

BowTech Admiral Test Results

By *Anthony Barnum*

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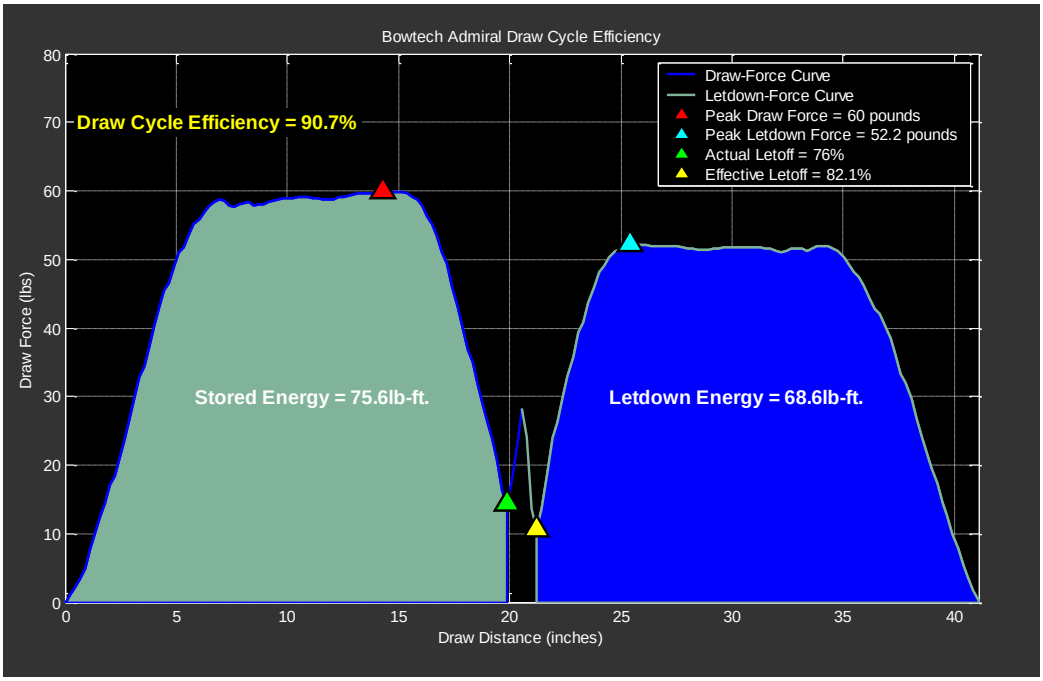
BowTech Admiral



Introduction:

For 2009, BowTech's lineup has seen some major restructuring and additions as only the 82nd Airborne has been carried over from the 2008 model year. The Admiral is BowTech's flagship offering in this new lineup and boasts BowTech's proprietary Center Pivot limb technology and CenterTrac Binary Cam System. The latest version of the CenterTrac Cam System includes a rotating module that allows both the shop owner and end user to adjust the Admiral across the full spectrum of available draw lengths without requiring additional modules or cams. On the Admiral, this allows full adjustment for a 24 inch draw length all the way up to a 30 inch draw length – 6 inches of adjustment built right in! The Center Pivot system utilized on the Admiral has also been modified for 2009. The center pivot strut has been incorporated into the 1-piece riser and hex head bolts are used to secure the limbs and cams onto the bow (e-clips are no longer utilized). Finally, the string suppressor has been moved to the more conventional location below the grip, which should alleviate the site window visibility concerns associated with the ShortStop™ utilized on the 2008 models.

BowTech Admiral

Contact Info: **BowTech Archery**
www.bowtecharchery.com

MSRP:	$829	**Draw Length:**	24"-30" *
Cams:	CenterTrac Binary Cam	**Draw Weight:**	40-70*
Limbs:	Composite Center Pivot	**Brace Height:**	7 1/2" *
Grip:	Laminate two piece	**Axle to Axle:**	31 1/16" *
Let-off:	65%-80%*	**Mass Weight:**	4.2 ^
String:	BCY 452X		
Damping:	InVelvet™, Hush Kit, String Suppressor		*Advertised
Finish:	Realtree Hardwoods Green® HD™		^Measured

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	301.0	60.3	12.9
360 Grains	276.8	61.2	14.2
420 Grains	259.0	62.5	15.5
540 Grains	230.8	63.8	17.8

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	79.8%	81.0%	82.7%	84.4%
Speed Per Inch of PS:	15.2	14.0	13.1	11.6
Noise Output (dBA):	86.4	89.0	82.9	80.4
Total Vibration (G):	104.9	115.0	103.6	86.4

The Admiral sample that was provided to Archery Evolution was measured to have a brace-height of 7.438 inches, while the axle-to-axle length was measured to be 31 ¼ inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 1/4 inch draw length and peak draw-weight of 61.0 pounds. At these settings, The Admiral achieved an average speed of 303.4 fps when shot by hand in the out of box configuration (brass nock installed) with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the Admiral achieved and average speed of 302.3 fps at these settings. Even though the both the draw-length and draw weight were within the test specifications, BowTech requested that the Admiral be set to exactly 60 pounds, 29 inches. A slight adjustment to the integrated draw stop and limb bolts brought the bow into exact specifications in short order.

A thorough examination of the finish quality showed only minor imperfections. A small raised area in the film-dip finish was noted near the top of the upper center pivot strut, while a small line void of film-dip finish was noted in the area of the lower center pivot. Minor fraying was noticed in the serving of the loop end of the string and some machining marks were noticed on the interior portions of the cams. Note that these imperfections do nothing to inhibit the functionality of the bow and are noted strictly for aesthetic purposes. Other than these minor issues, the finish was quite nice and the machining was flawless.

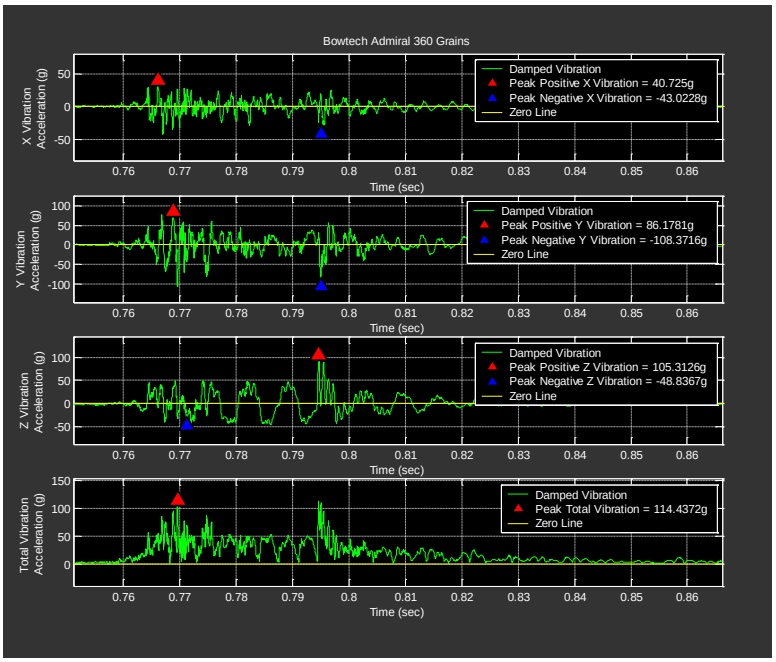
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.4
Dynamic Efficiency: 82.0%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Bowtech Admiral							
	Brace Height = 7.438		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 31 1/4	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	~~300.6~~	300	~~276.9~~	275	~~259.1~~	258	~~230.6~~	230
2	~~301.2~~	300	~~276.6~~	275	258.9	257	230.8	230
3	301.0	300	276.8	275	~~258.8~~	257	~~230.9~~	230
4	~~301.2~~	300	276.8	275	~~259.1~~	258	230.8	230
5	300.7	300	276.8	275	259.0	258	230.7	230
Avg. Speed	301.0	300	276.8	275	259.0	258	230.8	230
Kinetic Energy	60.3	59.9	61.2	60.4	62.5	61.9	63.8	63.4
Momentum	12.9	12.9	14.2	14.1	15.5	15.5	17.8	17.7
Power Stroke	19.813							
Speed per inch of Power Stroke	15.2	15.1	14.0	13.9	13.1	13.0	11.6	11.6
Avg. Speed per inch of PS	13.4							
Stored Energy	75.6							
Dynamic Efficiency	79.8%	79.3%	81.0%	79.9%	82.7%	81.9%	84.4%	83.9%
Avg. Dynamic Efficiency (BFM)	82.0%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 36.6 g
Negative X-Vibration: -44.7 g

Positive Y-Vibration: 80.0 g
Negative Y-Vibration: -94.8 g

Positive Z-Vibration: 92.0 g
Negative Z-Vibration: -54.7 g

Total Vibration: 102.5 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

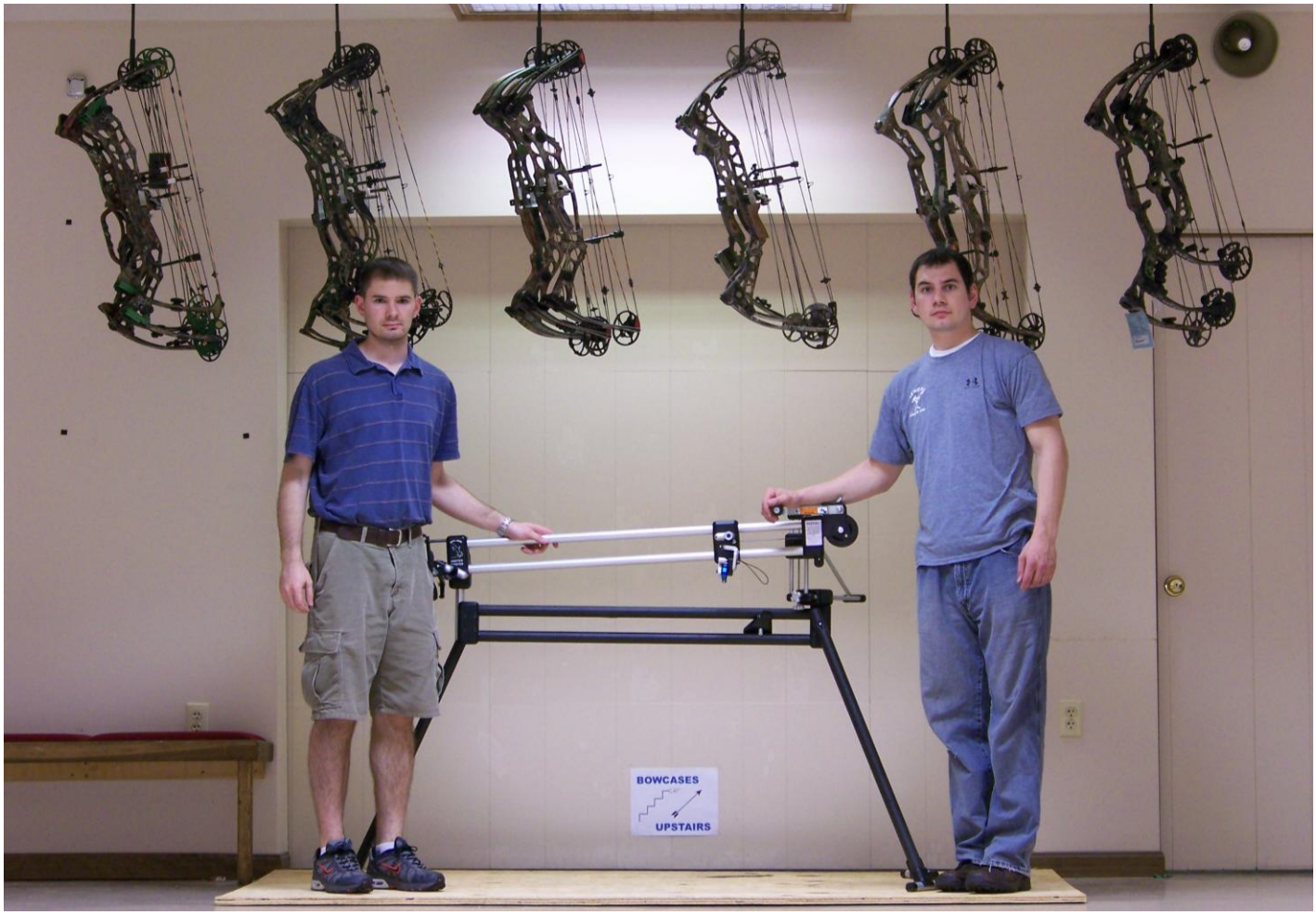
B-Stinger Reduction: 16.5%

Sound Measurements:

Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 102.6 dB
A-Weighted Sound Output: 84.7 dBA
C-Weighted Sound Output: 94.3 dBC

Noise & Vibration	Bowtech Admiral											
	Brace Height = 7.438			Draw Weight = 60			Draw Length = 29			Axle to Axle = 31 1/4		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	105.1	103.7	100.4	~~102.3~~	~~89.0~~	89.3	~~80.8~~	~~79.9~~	97.1	~~94.9~~	~~91.9~~	93.1
2	104.6	103.8	~~102.6~~	100.5	~~84.3~~	89.8	~~84.0~~	80.3	96.5	95.4	~~94.3~~	91.0
3	104.6	~~105.5~~	102.0	102.0	87.0	~~90.3~~	82.9	~~84.1~~	96.6	~~97.4~~	93.9	~~93.2~~
4	~~104.2~~	~~103.1~~	~~100.3~~	~~98.6~~	85.5	88.0	83.1	80.5	~~95.6~~	95.1	92.1	91.1
5	~~105.7~~	104.6	101.2	99.0	86.9	~~87.2~~	82.8	80.5	~~97.6~~	96.5	93.5	~~90.0~~
Average	104.8	104.0	101.2	100.5	86.4	89.0	82.9	80.4	96.7	95.6	93.2	91.7
Total Average Max	102.6				84.7				94.3			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

Darton Pro3500 Test Results

By *Anthony Barnum*

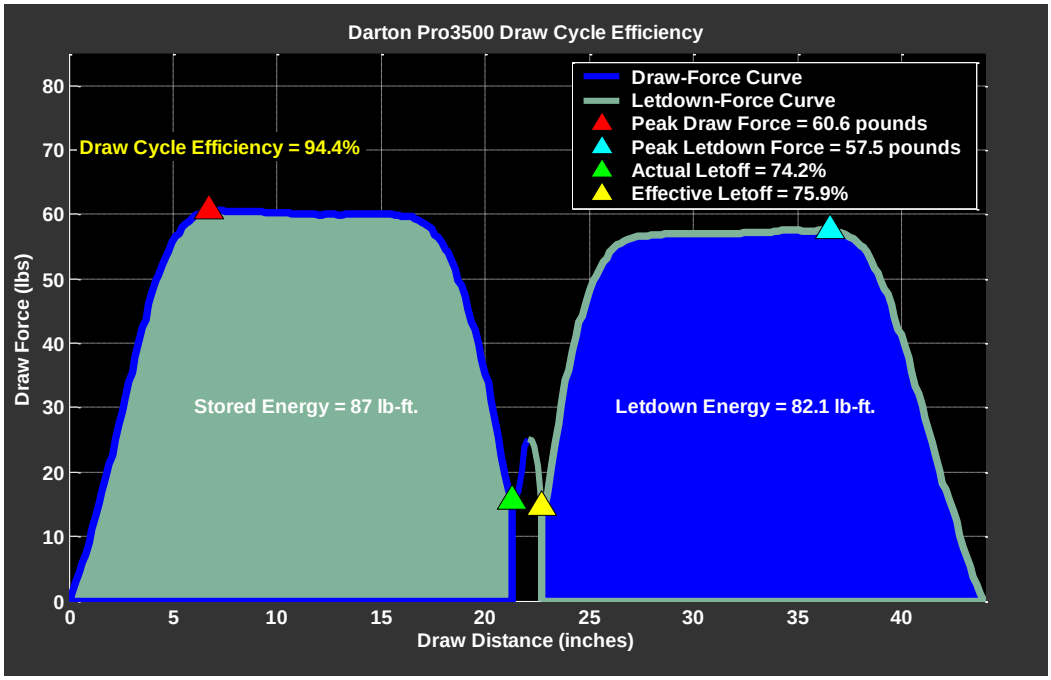
www.ArcheryEvolution.com

BUILT TO HUNT

DARTON

PERFORMANCE ARCHERY GEAR

Darton Pro3500



Introduction:

A mainstay in the archery industry and also one of the principle innovators, Darton Archery offers the Pro3500 as its flagship model for 2009. With advertised IBO speeds in excess of 340 fps, the Pro3500 is also a solid contender in the speed arena, where only a handful of bows rate higher. To produce these types of speeds, Darton employs the new CPS-G2™ 2½ cam system that, when combined with their MACH-1™ laminate limbs, acts as the powerplant for the Pro3500. The eccentrics offer a full 5 inches of modular draw length adjustment and a split harness is also incorporated in this system to help balance the load placed on the limbs, minimizing limb twist. Optional dual string suppressors, one attached to the carbon cable slide and the other mounted at the more conventional location in the rear stabilizer bushing, are also utilized in combination with Sims Limbsavers to help reduce felt recoil and noise output. From a structural perspective, the Pro3500 appears to be over-built; an example of this is the simple, yet effective, pivoting limb pocket system. Even with this, though, the Pro3500 still maintains a respectable mass-weight that was measured to be 4.4 lbs.

Darton Pro3500

Contact Info: **DartonArchery**
www.dartonarchery.com

MSRP:	$867	**Draw Length:**	25"-30" *
Cams:	CPS-G2™ Cam System	**Draw Weight:**	50,60,70*
Limbs:	MACH-1™ Laminate Limb	**Brace Height:**	6" *
Grip:	VibraGrip™ molded grip	**Axle to Axle:**	33 13/16"*
Let-off:	75%*	**Mass Weight:**	4.4 ^
String:	BCY 452X		
Damping:	String Suppressor, Limb Savers		*Advertised
Finish:	Realtree Hardwoods Green HD		^Measured

Performance at a Glance (60.6 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	329.5	72.3	14.1
360 Grains	303.9	73.8	15.6
420 Grains	283.7	75.1	17.0
540 Grains	252.8	76.6	19.5

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	83.1%	84.9%	86.3%	88.1%
Speed Per Inch of PS:	15.5	14.3	13.3	11.9
Noise Output (dBA):	92.2	90.5	88.6	88.3
Total Vibration (G):	196.2	188.5	154.7	142.5

The Pro3500 sample that was provided to Archery Evolution was measured to have a brace-height of 5.990 inches, while the axle-to-axle length was measured to be 33 13/16 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 inch draw length and peak draw-weight of 60.6 pounds. At these settings, the Pro3500 achieved an average speed of 331.6 fps when shot by hand with a 300 grain arrow in the out of box configuration. When shot from the shooting machine with the addition of a string loop, the Pro3500 achieved an average speed of 329.5 fps at these settings. As both draw-weight and draw-length were within the required test tolerances, no adjustments were made to the Pro3500.

Several small machining marks were visible in aluminum string suppressor piece. Also, some small "pin-prick" areas void of film-dip finish were noticed on the riser, particularly near the berger holes and just above the sight window, but the interior portions of the riser cutouts received good coverage and adhesion. The limbs also exhibited some small areas void of camo finish, but the edges were smooth and rounded with no noticeable defects. Some machining marks were noticed in the interior portion of the eccentrics and on the interchangeable modules. Otherwise, the strings and cables exhibited no fraying or serving separation and the anodized finish found on the string suppressors, cams, and limb pockets was quite good. These items are noted solely from a quality control perspective and do not impact performance of the bow, as is indicated by the results for the Pro3500.

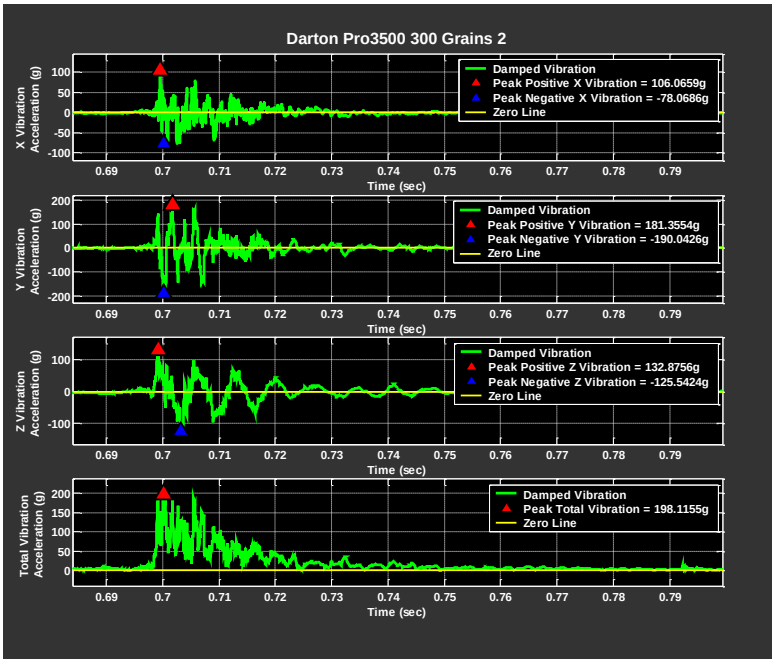
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.8
Dynamic Efficiency: 85.6%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Darton Pro3500							
	Brace Height = 5.990		Draw Weight = 60.6		Draw Length = 29		Axle-to-Axle = 33 13/16	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	329.8	329	~~304.1~~	303	~~283.3~~	283	252.8	252
2	~~329.9~~	329	304.0	303	283.7	283	252.8	252
3	329.2	328	303.9	303	~~283.9~~	283	~~252.9~~	252
4	329.4	328	~~303.5~~	303	283.7	283	~~252.5~~	252
5	~~329.1~~	328	303.9	303	283.8	283	252.8	252
Avg. Speed	329.5	328	303.9	303	283.7	283	252.8	252
Kinetic Energy	72.3	71.8	73.8	73.4	75.1	74.7	76.6	76.1
Momentum	14.1	14.1	15.6	15.6	17.0	17.0	19.5	19.4
Power Stroke	21.260							
Speed per inch of Power Stroke	15.5	15.4	14.3	14.3	13.3	13.3	11.9	11.9
Avg. Speed per inch of PS	13.8							
Stored Energy	87.0							
Dynamic Efficiency	83.1%	82.5%	84.9%	84.3%	86.3%	85.8%	88.1%	87.5%
Avg. Dynamic Efficiency (BFM)	85.6%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 81.4 g
Negative X-Vibration: -75.5 g

Positive Y-Vibration: 158.6 g
Negative Y-Vibration: -162.5 g

Positive Z-Vibration: 120.0 g
Negative Z-Vibration: -119.6 g

Total Vibration: 170.5 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

B-Stinger Reduction: 17.5%

Sound Measurements:

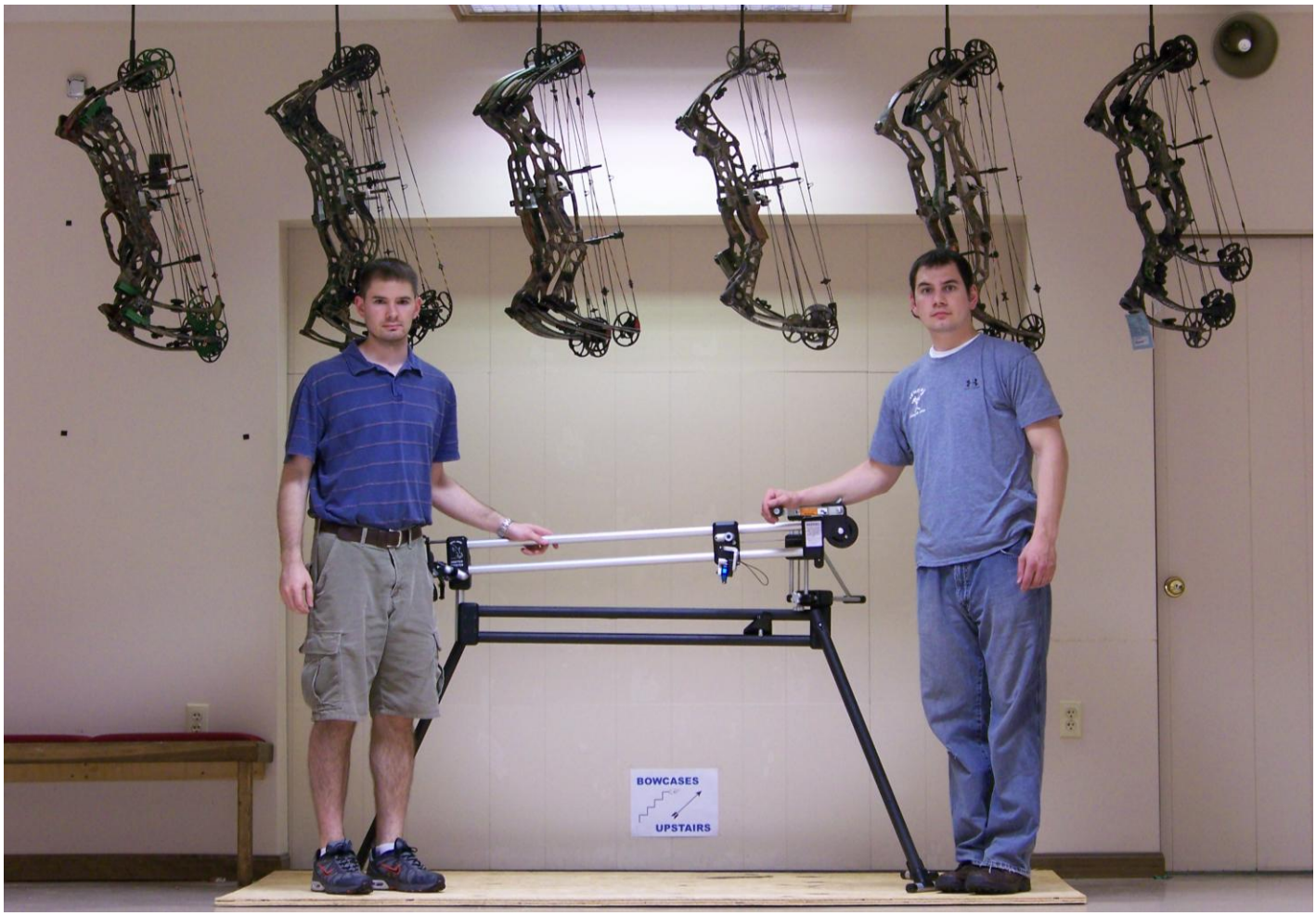
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 107.8 dB
A-Weighted Sound Output: 89.9 dBA
C-Weighted Sound Output: 99.1 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 1.2%

Noise & Vibration	Darton Pro3500											
	Brace Height = 5.990			Draw Weight = 60.6			Draw Length = 29			Axle to Axle = 33 13/16		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	109.2	~~109.9~~	~~107.7~~	~~104.1~~	~~93.4~~	~~89.7~~	~~87.7~~	88.7	100.4	~~101.4~~	~~99.2~~	~~95.5~~
2	109.2	~~108.5~~	108.3	104.8	92.3	91.1	89.0	87.9	100.1	~~100.0~~	99.8	96.1
3	~~109.6~~	108.6	108.4	~~105.2~~	92.0	90.6	89.0	88.4	~~100.7~~	100.1	99.8	~~96.5~~
4	~~109.0~~	108.9	~~108.5~~	105.0	~~91.5~~	~~91.5~~	~~89.3~~	~~89.1~~	~~100.0~~	100.4	~~100.0~~	96.2
5	109.1	109.7	107.7	104.9	92.3	89.9	87.9	~~87.6~~	100.1	101.2	99.2	96.2
Average	109.2	109.1	108.1	104.9	92.2	90.5	88.6	88.3	100.2	100.6	99.6	96.2
Total Average Max	107.8				89.9				99.1			



Anthony Barnum

Jonathan Teater

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Archery Evolution
www.ArcheryEvolution.com

2009 Compound Hunting Bow Evaluation

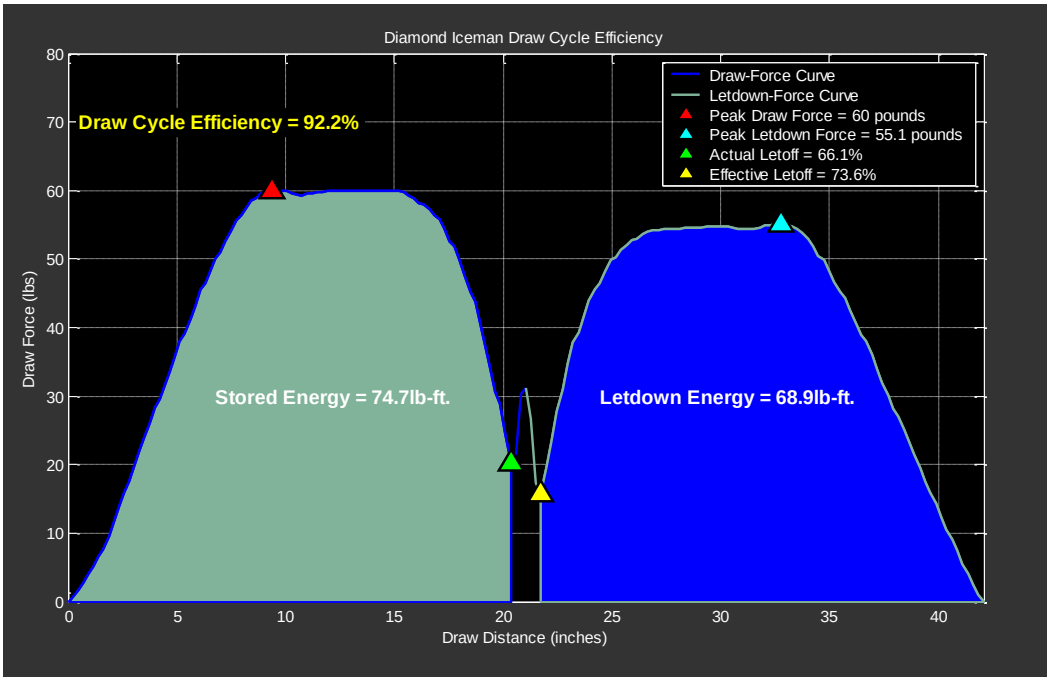
Diamond IceMan Test Results

By *Anthony Barnum*

www.ArcheryEvolution.com

DIAMOND ARCHERY

Diamond IceMan



Introduction:

For the first time ever, Center Pivot riser technology is paired up with a single cam power plant in Diamond Archery's flagship offering for 2009, the IceMan. Utilizing this configuration, which has been used in the BowTech lineup for the past 3 years, provides many benefits to the IceMan, not the least of which is in the vibration / noise category. Like its Bowtech brethren, the IceMan minimizes the use of e-clips for securing limb assembly components in place which is a benefit to the shop-owner and consumer alike. Aside from this riser and limb configuration, the Iceman features a new single cam system that offers great adjustability. Like its cousin, the BowTech Admiral, a rotating module is incorporated to cover the full spectrum of available draw-lengths, 24-30", without the need for replacement modules. This cam system also integrates an adjustable draw-stop, which helps to provide a hard back wall, while also providing timing marks to aid in the tuning process. The streamlined roller-guard assembly and the more conventionally located string suppressor (now attached below the grip) round out the updates to the IceMan.

Diamond IceMan

Contact Info: Diamond Archery

www.diamondarchery.com

MSRP:	$829	**Draw Length:**	24"-30" *
Cams:	Single Cam	**Draw Weight:**	60, 70*
Limbs:	Composite Center Pivot	**Brace Height:**	7 1/8" *
Grip:	Laminate two piece	**Axle to Axle:**	31 1/2" *
Let-off:	65%-80%*	**Mass Weight:**	4.1 ^
String:	BCY 452X		
Damping:	InVelvet™, Hush Kit, String Suppressor		*Advertised
Finish:	Realtree® Hardwoods HD®		^ Measured

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	292.9	57.2	12.6
360 Grains	269.4	58.0	13.9
420 Grains	251.5	59.0	15.1
540 Grains	224.9	60.7	17.4

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	76.5%	77.7%	78.9%	81.2%
Speed Per Inch of PS:	14.4	13.2	12.4	11.1
Noise Output (dBA):	87.3	85.3	84.5	81.0
Total Vibration (G):	130.6	97.5	94.3	82.6

The IceMan sample that was provided to Archery Evolution was measured to have a brace-height of 7.438 inches, while the axle-to-axle length was measured to be 31 ¼ inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 7/32 inch draw length and peak draw-weight of 63.8 pounds. At these settings, The IceMan achieved an average speed of 304.2 fps when shot by hand in the out of box configuration (brass nock installed) with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the IceMan achieved and average speed of 302.5 fps at these settings. Even though the draw-length was within the test specifications, Diamond requested that the IceMan be set to exactly 60 pounds, 29 inches. A slight adjustment to the integrated draw stop and limb bolts brought the bow into exact specifications in short order.

A thorough examination of the finish quality showed only minor imperfections. Minor fraying in the serving around the loop end of the string was noticed and some excess grease on the Center Pivot structures was evident. Some bubbling in the finish on the limbs was felt, as well, and there were minor "pin-point" areas void of film dip finish on the bottom limbs. Other than these items, the finish on the IceMan was quite good and coverage of the interior portion of the riser cut-outs with film-dip finish was excellent.

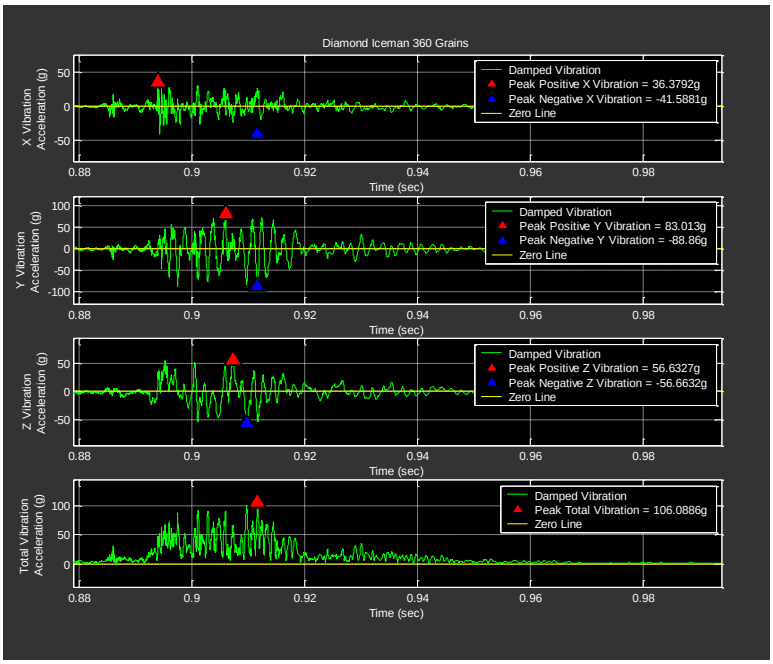
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 12.8
Dynamic Efficiency: 78.6%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Diamond Iceman							
	Brace Height = 6.910		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 31 7/16	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	~~293.2~~	292	269.5	269	251.5	250	224.9	224
2	292.9	292	~~269.6~~	269	~~251.2~~	250	~~224.8~~	224
3	292.9	292	269.4	268	251.5	250	225.0	224
4	~~292.8~~	292	269.4	268	251.4	250	~~225.1~~	224
5	293.0	292	~~269.3~~	268	~~251.6~~	251	224.9	224
Avg. Speed	292.9	292	269.4	268	251.5	250	224.9	224
Kinetic Energy	57.2	56.8	58.0	57.5	59.0	58.3	60.7	60.2
Momentum	12.6	12.5	13.9	13.8	15.1	15.0	17.4	17.3
Power Stroke	20.340							
Speed per inch of Power Stroke	14.4	14.4	13.2	13.2	12.4	12.3	11.1	11.0
Avg. Speed per inch of PS	12.8							
Stored Energy	74.7							
Dynamic Efficiency	76.5%	76.0%	77.7%	77.0%	78.9%	78.0%	81.2%	80.5%
Avg. Dynamic Efficiency (BFM)	78.6%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 34.7 g
Negative X-Vibration: -35.3 g

Positive Y-Vibration: 82.5 g
Negative Y-Vibration: -89.0 g

Positive Z-Vibration: 53.7 g
Negative Z-Vibration: -47.0 g

Total Vibration: 101.3 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

B-Stinger Reduction: 10.4%

Sound Measurements:

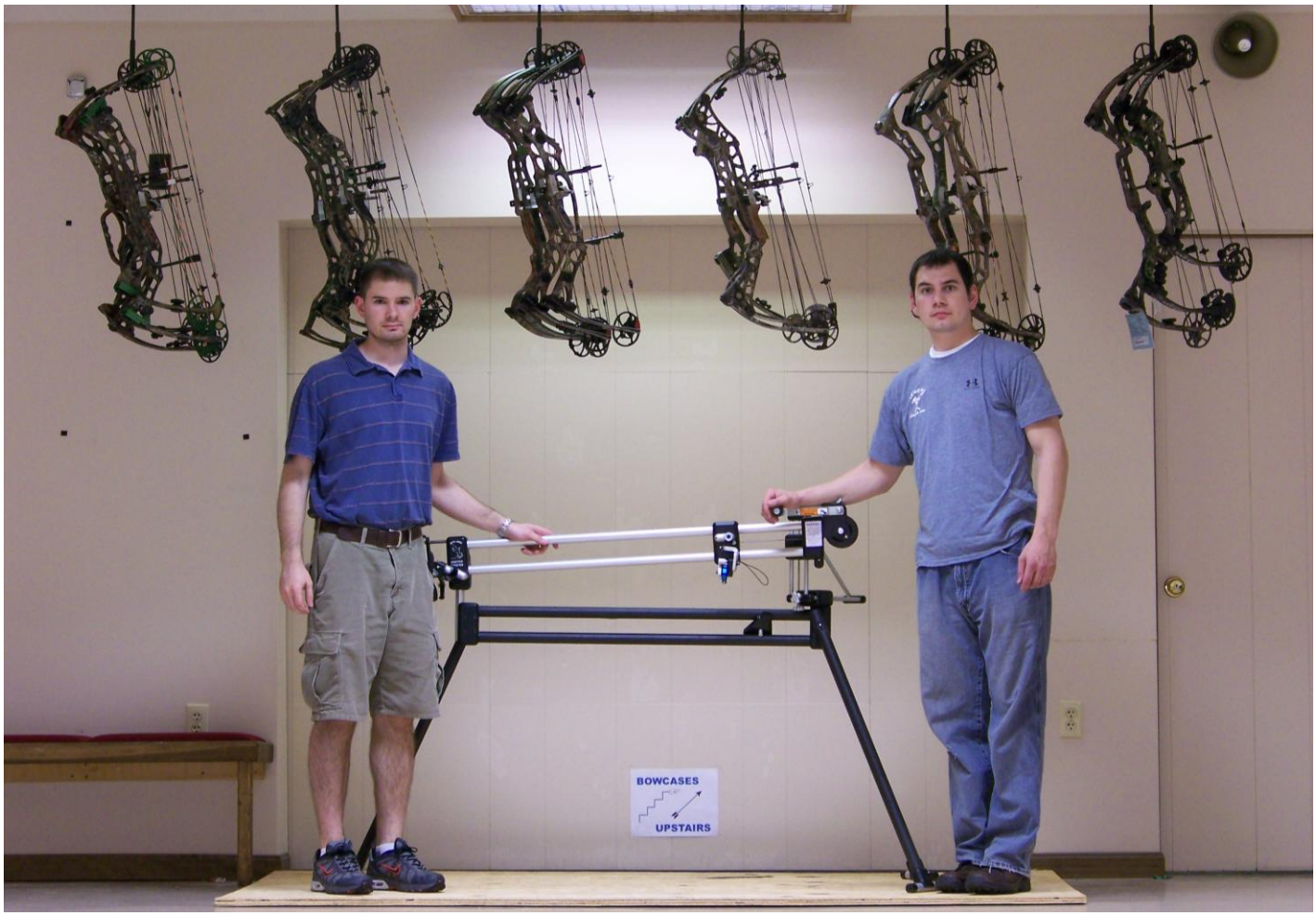
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 101.9 dB
A-Weighted Sound Output: 84.5 dBA
C-Weighted Sound Output: 93.7 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 1.6%

Noise & Vibration	Diamond Iceman											
	Brace Height = 6.910			Draw Weight = 60			Draw Length = 29			Axle to Axle = 31 7/16		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~104.3~~	103.0	100.5	99.2	87.1	85.2	~~85.7~~	79.9	96.2	94.8	92.1	90.4
2	~~106.0~~	102.2	100.7	~~102.2~~	87.6	~~87.1~~	~~84.0~~	82.2	~~98.0~~	94.1	~~91.8~~	~~93.1~~
3	105.2	102.3	100.5	99.7	~~87.9~~	~~82.6~~	84.4	~~82.4~~	97.3	93.5	92.3	92.1
4	104.4	~~104.0~~	~~101.7~~	99.1	87.2	87.0	85.0	~~79.7~~	~~95.5~~	~~95.7~~	~~93.8~~	~~89.5~~
5	105.3	~~101.4~~	~~100.3~~	~~98.5~~	~~85.7~~	83.6	84.2	80.8	97.3	~~93.5~~	92.5	91.0
Average	105.0	102.5	100.6	99.3	87.3	85.3	84.5	81.0	97.0	94.2	92.3	91.2
Total Average Max	101.9				84.5				93.7			



Anthony Barnum

Jonathan Teater

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Archery Evolution
www.ArcheryEvolution.com

2009 Compound Hunting Bow Evaluation

Elite Z28 Test Results

By *Anthony Barnum*

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Elite Archery

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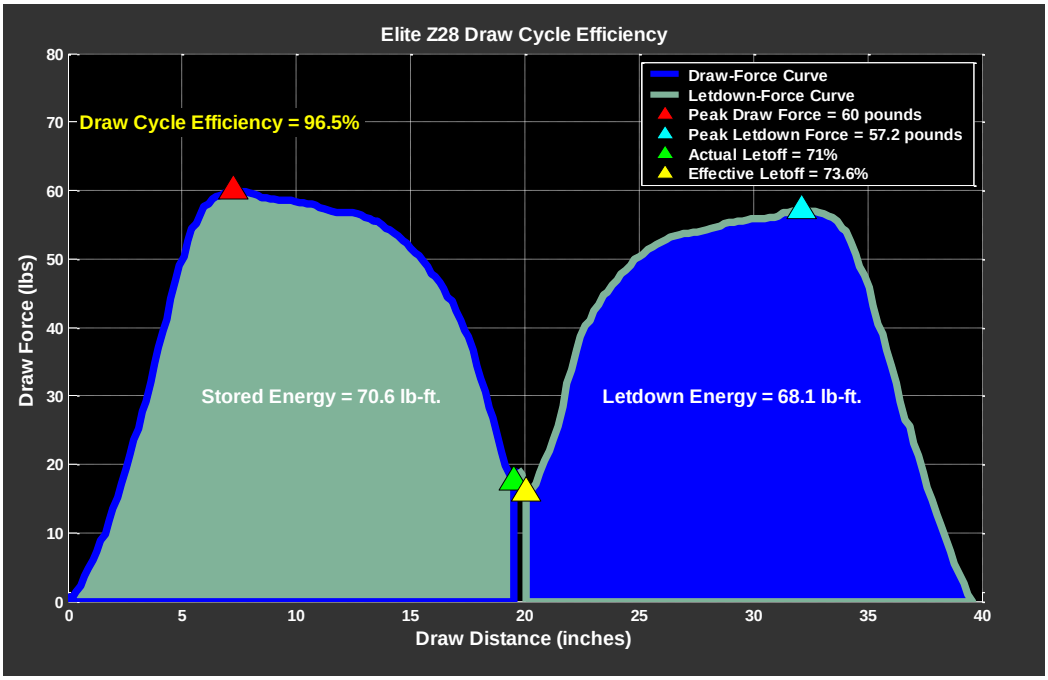
Elite Z28



Introduction:

The Z28 is Elite Archery's flagship offering for 2009. Offering the new Revolution Z Cam system, which is a dual track "binary" style cam that provides a smoother draw cycle than that found in the 2008.5 model, the Z28 boasts advertised speeds in excess of 320 feet per second. This rating is quite good, especially when considering that the Z28 provides a substantial brace height of 7 ¾". The integral draw stops on both cams allow adjustment of the valley to the archer's preferences, while also maintaining a solid back wall at full-draw. The downside to this cam system is that it is draw length specific, meaning that new cams must be purchased and installed to make an adjustment. This is only a negative for resale of the Z28, where it could be harder and more costly to adjust the bow for the buyer. Otherwise, any good pro-shop should ensure that you are setup with appropriate draw length before leaving their facility. The Revolution Z Cam system is paired up with Barnesdale Laminated solid limbs, which are known throughout the industry as some of the finest and most durable limbs on the market. The patent pending E-Suppressor and inclusion of BowJax damping accessories helps to eliminate felt vibration and "shock".

Elite Archery Z28

Contact Info: Elite Archery
www.elitearchery.com

MSRP:	$869	**Draw Length:**	27"-30" *
Cams:	Revolution Z Cam	**Draw Weight:**	60-90*
Limbs:	Laminated Solid Limb	**Brace Height:**	7 ¾" *
Grip:	Laminate two piece	**Axle to Axle:**	32 ½"*
Let-off:	80%*	**Mass Weight:**	4.2 ^
String:	BCY 452X		
Damping:	E Suppressor		*Advertised
Finish:	Realtree AP		^Measured

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	301.0	60.4	12.9
360 Grains	276.9	61.3	14.2
420 Grains	257.7	61.9	15.5
540 Grains	229.0	62.8	17.7

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	85.5%	86.8%	87.7%	89.0%
Speed Per Inch of PS:	15.4	14.2	13.2	11.7
Noise Output (dBA):	88.2	83.7	84.2	82.8
Total Vibration (G):	283.9	290.1	256.0	186.5

The Z28 sample that was provided to Archery Evolution was measured to have a brace-height of 7.725 inches, while the axle-to-axle length was measured to be 32 ½ inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 inch draw length and peak draw-weight of 60.5 pounds. At these settings, the Z28 achieved an average speed of 303.4 fps when shot by hand in the out of box configuration with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the Z28 achieved an average speed of 302.6 fps at these settings. Per request from Elite, a slight adjustment to the limb bolts was made to bring the Z28 down to the exact draw-weight specification of 60.0 pounds.

A thorough examination of the finish quality showed minimal imperfections. In fact, I was hard-pressed to find anything wrong with this bow from a fit and finish perspective. The camo finish on the riser, limb pockets, and limbs was flawless with excellent coverage on the interior portions of the various riser cutouts. There are no sharp edges on this bow as all surfaces are chamfered, filleted or otherwise rounded, which adds a sense of refinement. The limbs and limb pockets appeared to have very tight tolerances as the limbs fit tightly into the pockets with no discernable gaps. Elite goes so far as to finish their string suppressor in matching camo, which further adds to the visual appeal of the bow. There weren't even any machining marks on the interior portion of the eccentrics, which is a trouble area for imperfections. All in all the fit, finish, look and feel of the Z28 is quite impressive.

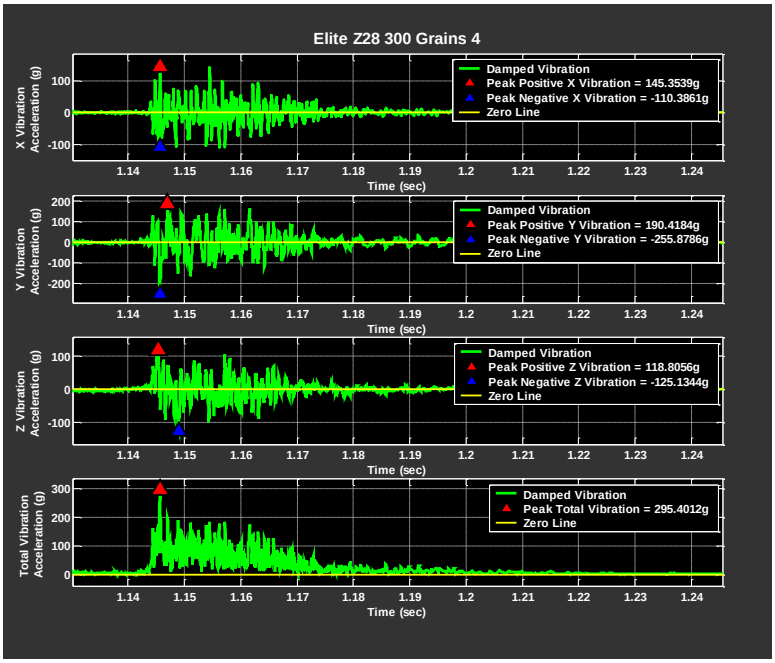
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.6
Dynamic Efficiency: 87.2%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Elite Z28							
	Brace Height = 7.725		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 32 1/2	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	300.9	300	~~277.1~~	276	~~257.4~~	257	228.9	228
2	~~300.8~~	300	276.8	276	257.5	257	~~229.1~~	228
3	301.0	300	276.8	276	~~257.9~~	257	~~228.5~~	228
4	~~301.5~~	300	~~276.7~~	276	257.7	257	229.0	228
5	301.2	300	277.0	276	257.8	257	229.0	228
Avg. Speed	301.0	300	276.9	276	257.7	257	229.0	228
Kinetic Energy	60.4	59.9	61.3	60.9	61.9	61.6	62.8	62.3
Momentum	12.9	12.9	14.2	14.2	15.5	15.4	17.7	17.6
Power Stroke	19.525							
Speed per inch of Power Stroke	15.4	15.4	14.2	14.1	13.2	13.2	11.7	11.7
Avg. Speed per inch of PS	13.6							
Stored Energy	70.6							
Dynamic Efficiency	85.5%	84.9%	86.8%	86.2%	87.7%	87.2%	89.0%	88.3%
Avg. Dynamic Efficiency (BFM)	87.2%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 120.8 g
Negative X-Vibration: -111.0 g

Positive Y-Vibration: 177.1.8 g
Negative Y-Vibration: -223.6 g

Positive Z-Vibration: 106.7.0 g
Negative Z-Vibration: -105.7 g

Total Vibration: 254.1 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

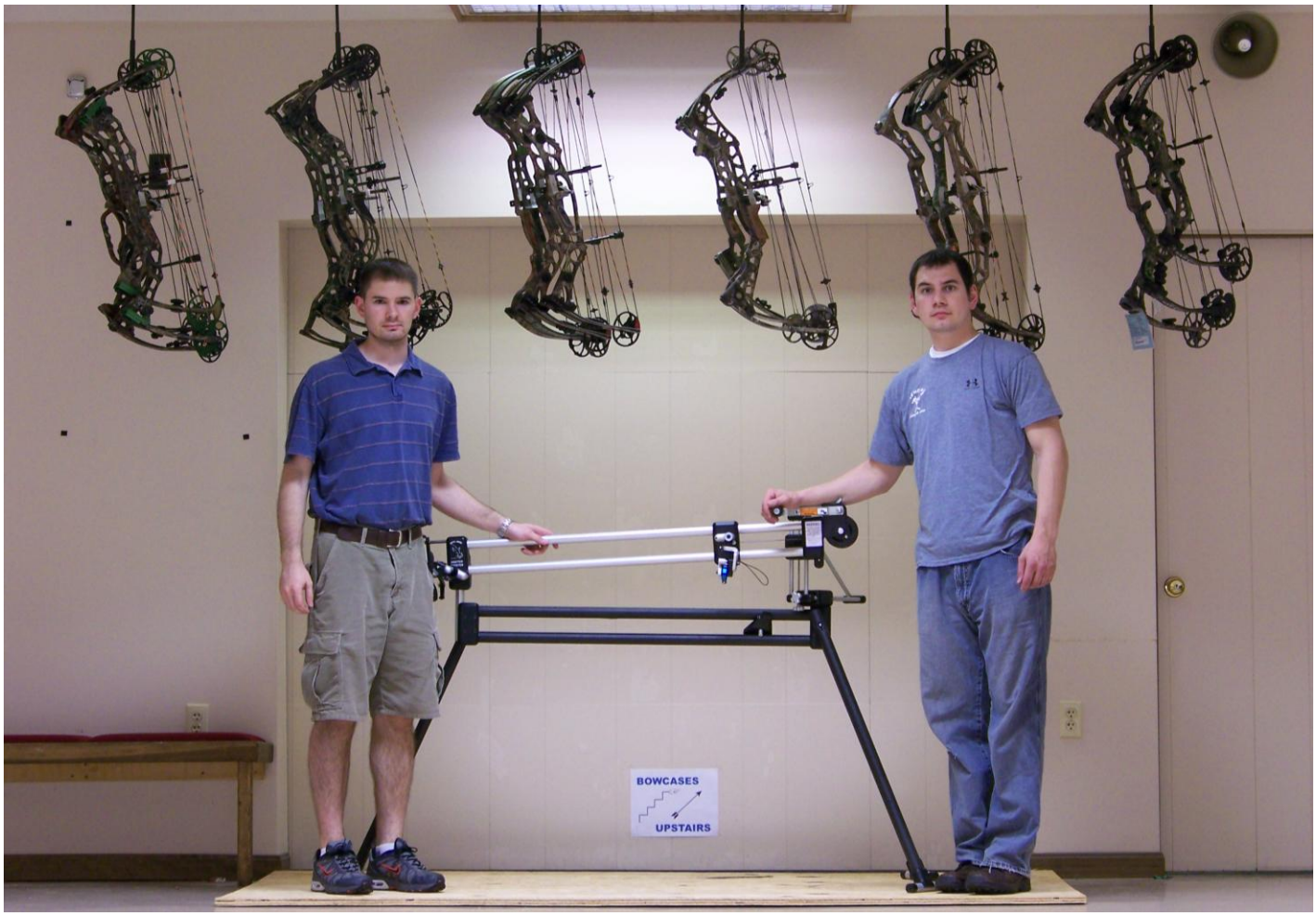
B-Stinger Reduction: 12.4%

Sound Measurements:

Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 103.8 dB
A-Weighted Sound Output: 84.7 dBA
C-Weighted Sound Output: 94.6 dBC

Noise & Vibration	Elite Z28											
	Brace Height = 7.725			Draw Weight = 60.0			Draw Length = 29			Axle to Axle = 32 1/2		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	105.5	104.8	~~102.0~~	~~101.6~~	~~89.0~~	83.7	83.7	82.9	97.5	94.0	94.0	~~91.9~~
2	105.5	~~104.7~~	102.5	102.6	88.6	83.8	85.0	82.5	97.4	~~93.6~~	94.9	92.7
3	~~105.6~~	~~106.2~~	102.2	102.6	88.7	~~84.4~~	~~83.1~~	~~84.6~~	~~97.6~~	~~95.6~~	94.8	92.3
4	~~103.3~~	105.8	102.6	~~102.7~~	~~85.6~~	83.5	83.8	~~82.2~~	~~94.8~~	95.1	~~93.8~~	~~92.9~~
5	104.0	105.7	~~103.9~~	102.0	87.2	~~83.2~~	~~86.1~~	83.1	95.5	95.0	~~95.5~~	92.0
Average	105.0	105.4	102.4	102.4	88.2	83.7	84.2	82.8	96.8	94.7	94.6	92.3
Total Average Max	103.8				84.7				94.6			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

Elite GT500 w/ Cuda Cams Test Results

By *Anthony Barnum*

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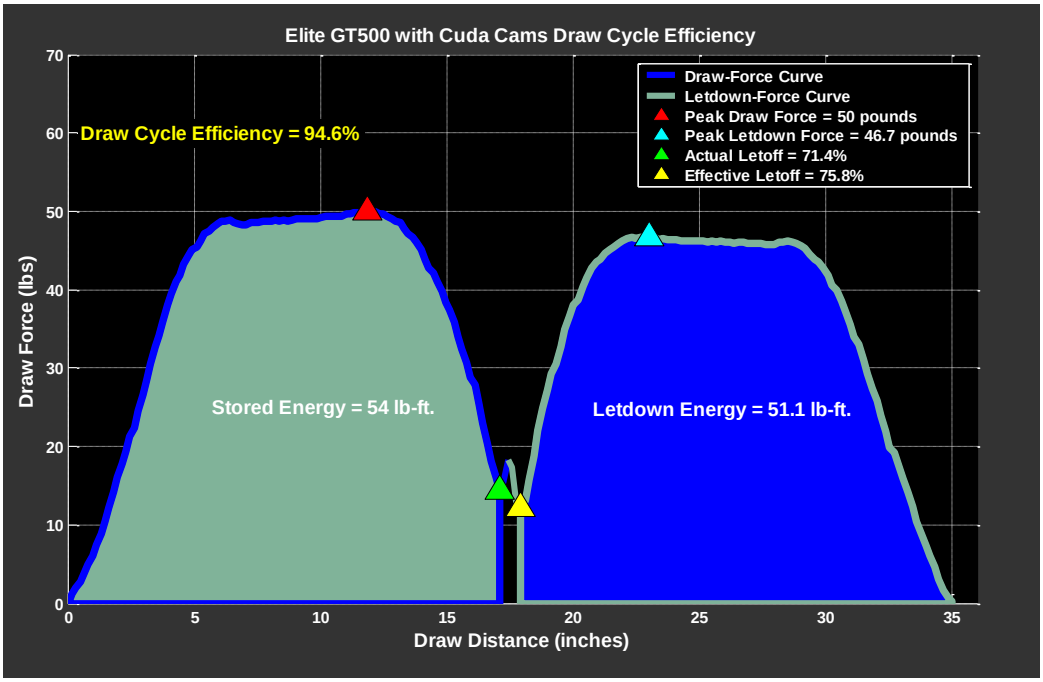
Elite GT500 w/ Cuda Cams



Introduction:

The GT500 w/ Cuda Cams is Elite Archery's short-draw offering for 2009. Built off Elite's speed bow platform, the GT500, this entry utilizes a short-draw dual track "binary" cam system known as Cuda Cams that provides available draw-lengths from 23" to 26 ½" through interchangeable eccentrics. With an advertised speed rating between 290 and 300 fps at only a 26 ½" draw length, the GT500 w/ Cuda cams offers good speed and the versatility to cater to a number of short-draw archers through its substantial peak draw weight range (30-80 lbs). For archers who maintain their own equipment, a bow press may be needed if a change in draw length is required as the cams are draw-length specific. This means that a separate set of eccentrics must be acquired and installed to change draw-length. If properly fitted by a good pro-shop, though, this should not be too much of an issue. Like other Elite bow's, the Cuda Cam system is paired up with Barnesdale Laminated solid limbs, which are known throughout the industry as some of the finest and most durable limbs on the market. The patent pending E-Suppressor and inclusion of BowJax damping accessories helps to eliminate felt vibration and "shock".

Elite Archery GT500 w/ Cuda Cams

Contact Info: Elite Archery
www.elitearchery.com

MSRP:	$869	**Draw Length:**	23"-26½ "*
Cams:	Cuda Cam	**Draw Weight:**	30-80*
Limbs:	Laminated Solid Limb	**Brace Height:**	7 ¼"*
Grip:	Laminate two piece	**Axle to Axle:**	33 ½"*
Let-off:	80%*	**Mass Weight:**	4.1 ^
String:	BCY 452X		
Damping:	E Suppressor		*Advertised
Finish:	Realtree AP		^Measured

Performance at a Glance (50 lbs, 26"):

Arrow	Speed	K.E.	Momentum
250 Grains	281.0	43.8	10.0
300 Grains	260.0	45.0	11.1
350 Grains	242.4	45.7	12.1
450 Grains	215.8	6.5	13.9

Arrow (Grains):	250	300	350	450
Dynamic Efficiency:	81.2%	83.4%	84.5%	86.1%
Speed Per Inch of PS:	16.4	15.2	14.2	12.6
Noise Output (dBA):	86.9	82.2	81.6	81.2
Total Vibration (G):	204.4	211.4	176.1	141.9

The GT500 w/ Cuda Cams sample that was provided to Archery Evolution was measured to have a brace-height of 7.15 inches, while the axle-to-axle length was measured to be 33 ½ inches. The requested 26 inch, 50 pound model was measured straight out of the box to have a 26 inch draw length and peak draw-weight of 52.8 pounds. At these settings, the GT500 w/ Cuda Cams achieved an average speed of 292.1 fps when shot by hand in the out of box configuration with a 250 grain arrow. When shot from the shooting machine with the addition of a string loop, the GT500 w/ Cuda Cams achieved an average speed of 290.7 fps at these settings. Per request from Elite, an adjustment to the limb bolts was made to bring the GT500 w/ Cuda Cams down to the exact draw-weight specification of 50.0 pounds.

Like the other Elite Archery bows tested as part of this evaluation, a thorough examination of the finish quality showed minimal imperfections. A small "nick" was noted in the finish of the string suppressor that appeared to be a result of the wrench used to tighten it into place. A small raised area was noted in the finish on the lower limb pocket, while minor machining marks were noticed on the interior portions of the cams. These items are only noted from a quality assessment perspective and have no impact on the performance of the bow. No noticeable blemishes were found on the limbs and riser, with good coverage noted in all cut-outs. Visually, the GT500 w/ Cuda Cams has appealing lines; the incorporation of rounded surfaces also enhances the appeal. Overall, the fit and finish of the GT500 w/ Cuda Cams is quite good.

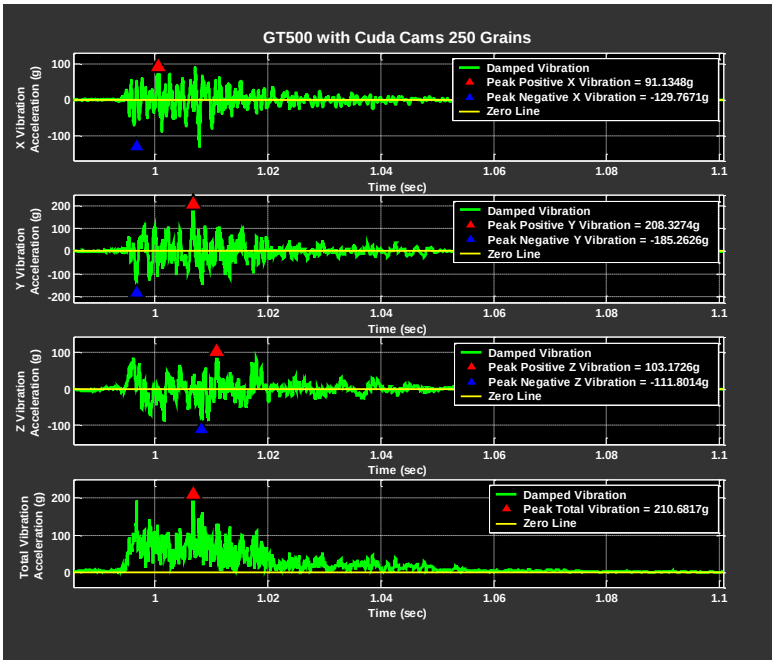
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 14.6
Dynamic Efficiency: 83.8%

Speed Point Blank - 26" ± 1/4", 50# ± 1#	Elite GT500 w/ Cuda Cams							
	Brace Height = 7.150		Draw Weight = 50.0		Draw Length = 26		Axle-to-Axle = 33 1/2	
Grains	250 Grains		300 Grains		350 Grains		450 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	280.9	280	259.9	259	242.4	242	215.8	215
2	~~280.5~~	280	~~259.8~~	259	242.4	242	215.8	215
3	281.2	280	260.1	259	242.4	242	~~215.6~~	215
4	281.0	280	~~260.2~~	259	~~242.6~~	242	215.7	215
5	~~281.3~~	280	260.0	259	~~242.3~~	242	~~215.9~~	215
Avg. Speed	281.0	280	260.0	259	242.4	242	215.8	215
Kinetic Energy	43.8	43.5	45.0	44.7	45.7	45.5	46.5	46.2
Momentum	10.0	10.0	11.1	11.1	12.1	12.1	13.9	13.8
Power Stroke	17.100							
Speed per inch of Power Stroke	16.4	16.4	15.2	15.1	14.2	14.2	12.6	12.6
Avg. Speed per inch of PS	14.6							
Stored Energy	54.0							
Dynamic Efficiency	81.2%	80.6%	83.4%	82.7%	84.5%	84.3%	86.1%	85.5%
Avg. Dynamic Efficiency (BFM)	83.8%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 79.7 g
Negative X-Vibration: -97.0 g

Positive Y-Vibration: 176.5 g
Negative Y-Vibration: -160.6 g

Positive Z-Vibration: 90.7 g
Negative Z-Vibration: -92.0 g

Total Vibration: 183.5 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 300 grain arrow.

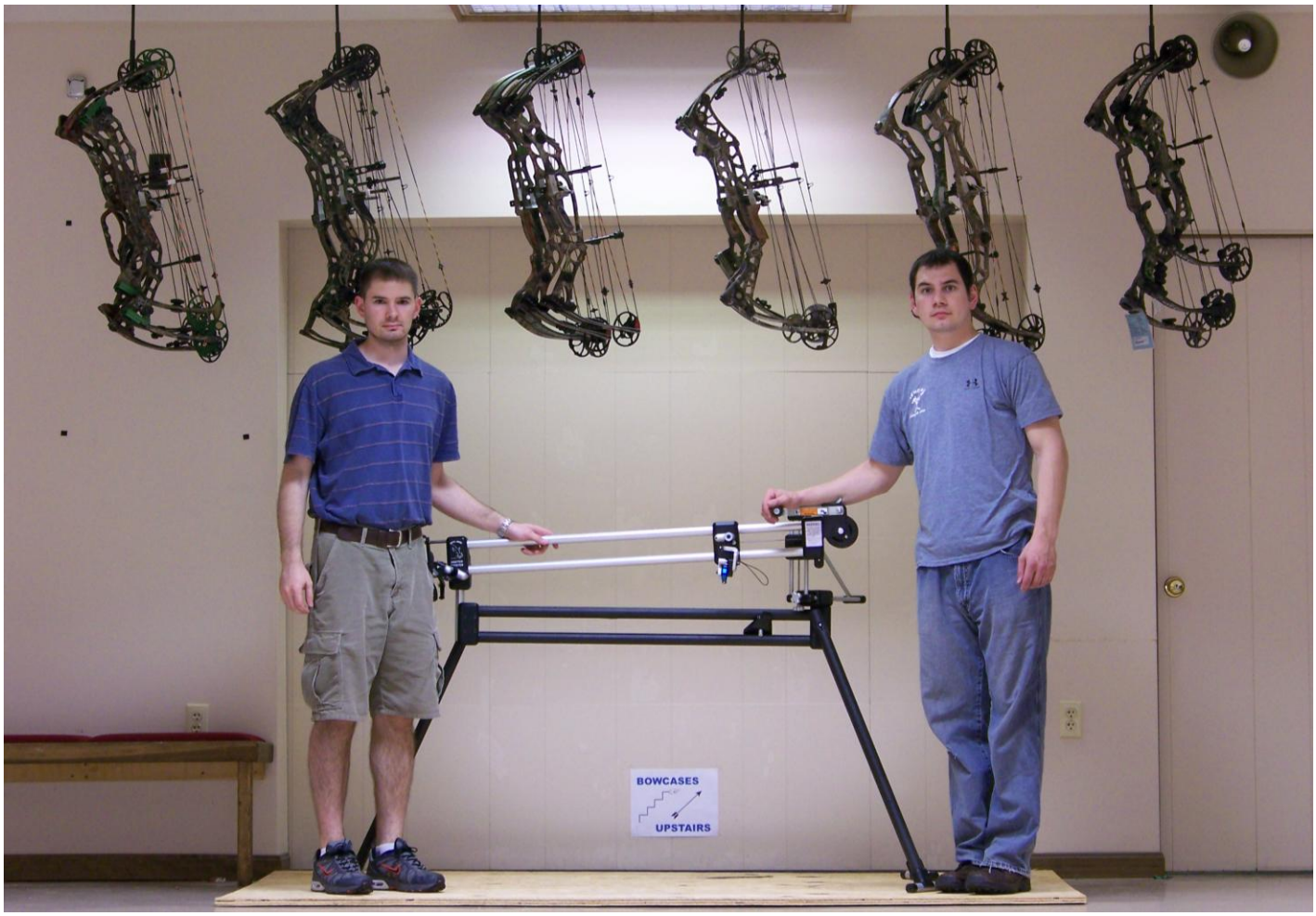
B-Stinger Reduction: 23.6%

Sound Measurements:

Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 101.2 dB
A-Weighted Sound Output: 83.0 dBA
C-Weighted Sound Output: 91.4 dBC

Noise & Vibration	Elite GT500 w/ Cuda Cams											
	Brace Height = 7.150				Draw Weight = 50				Draw Length = 26			Axle to Axle = 33 1/2
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	250 Grains	300 Grains	350 Grains	450 Grains	250 Grains	300 Grains	350 Grains	450 Grains	250 Grains	300 Grains	350 Grains	450 Grains
Measurement	Max				Max				Max			
1	104.5	~~104.2~~	100.3	~~101.5~~	87.6	~~86.9~~	~~80.4~~	82.7	~~96.1~~	~~95.8~~	~~89.0~~	~~92.9~~
2	~~104.7~~	~~102.2~~	99.7	100.2	86.4	85.1	80.5	~~83.6~~	94.5	93.6	90.1	91.8
3	~~102.6~~	102.6	~~100.4~~	97.1	~~88.0~~	80.9	~~83.8~~	81.6	94.0	~~90.2~~	~~91.8~~	87.9
4	103.7	102.7	~~99.6~~	~~96.9~~	~~81.5~~	~~79.5~~	82.0	~~78.7~~	~~92.7~~	90.7	89.6	88.1
5	103.7	102.7	99.8	97.8	86.7	80.6	82.3	79.2	95.2	90.6	90.2	~~86.8~~
Average	104.0	102.6	99.9	98.4	86.9	82.2	81.6	81.2	94.6	91.6	90.0	89.3
Total Average Max	101.2				83.0				91.4			



Anthony Barnum

Jonathan Teater

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Archery Evolution
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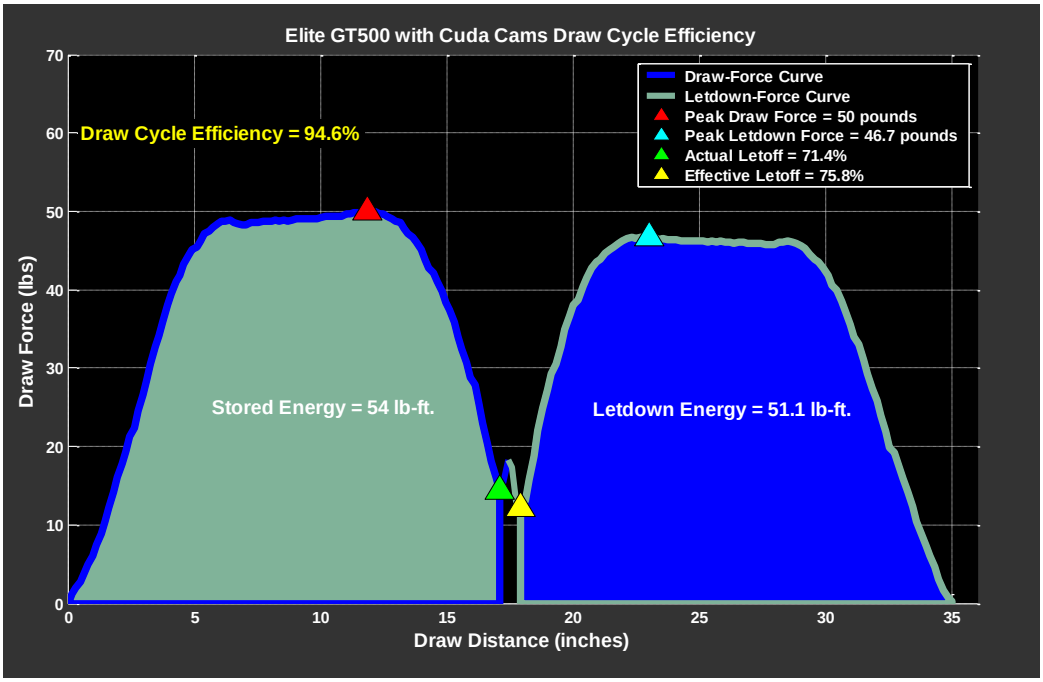


Introduction:

The GT500 w/ Cuda Cams is Elite Archery's short-draw offering for 2009. Built off Elite's speed bow platform, the GT500, this entry utilizes a short-draw dual track "binary" cam system known as Cuda Cams that provides available draw-lengths from 23" to 26 ½" through interchangeable eccentrics. With an advertised speed rating between 290 and 300 fps at only a 26 ½" draw length, the GT500 w/ Cuda cams offers good speed and the versatility to cater to a number of short-draw archers through its substantial peak draw weight range (30-80 lbs). For archers who maintain their own equipment, a bow press may be needed if a change in draw length is required as the cams are draw-length specific. This means that a separate set of eccentrics must be acquired and installed to change draw-length. If properly fitted by a good pro-shop, though, this should not be too much of an issue. Like other Elite bow's, the Cuda Cam system is paired up with Barnesdale Laminated solid limbs, which are known throughout the industry as some of the finest and most durable limbs on the market. The patent pending E-Suppressor and inclusion of BowJax damping accessories helps to eliminate felt vibration and "shock".

Elite Archery GT500 w/ Cuda Cams

Contact Info: Elite Archery
www.elitearchery.com

MSRP:	$869	**Draw Length:**	23"-26½ "*
Cams:	Cuda Cam	**Draw Weight:**	30-80*
Limbs:	Laminated Solid Limb	**Brace Height:**	7 ¼"*
Grip:	Laminate two piece	**Axle to Axle:**	33 ½"*
Let-off:	80%*	**Mass Weight:**	4.1 ^
String:	BCY 452X		
Damping:	E Suppressor		*Advertised
Finish:	Realtree AP		^Measured

Performance at a Glance (50 lbs, 26"):

Arrow	Speed	K.E.	Momentum
250 Grains	281.0	43.8	10.0
300 Grains	260.0	45.0	11.1
350 Grains	242.4	45.7	12.1
450 Grains	215.8	6.5	13.9

Arrow (Grains):	250	300	350	450
Dynamic Efficiency:	81.2%	83.4%	84.5%	86.1%
Speed Per Inch of PS:	16.4	15.2	14.2	12.6
Noise Output (dBA):	86.9	82.2	81.6	81.2
Total Vibration (G):	204.4	211.4	176.1	141.9

The GT500 w/ Cuda Cams sample that was provided to Archery Evolution was measured to have a brace-height of 7.15 inches, while the axle-to-axle length was measured to be 33 ½ inches. The requested 26 inch, 50 pound model was measured straight out of the box to have a 26 inch draw length and peak draw-weight of 52.8 pounds. At these settings, the GT500 w/ Cuda Cams achieved an average speed of 292.1 fps when shot by hand in the out of box configuration with a 250 grain arrow. When shot from the shooting machine with the addition of a string loop, the GT500 w/ Cuda Cams achieved an average speed of 290.7 fps at these settings. Per request from Elite, an adjustment to the limb bolts was made to bring the GT500 w/ Cuda Cams down to the exact draw-weight specification of 50.0 pounds.

Like the other Elite Archery bows tested as part of this evaluation, a thorough examination of the finish quality showed minimal imperfections. A small "nick" was noted in the finish of the string suppressor that appeared to be a result of the wrench used to tighten it into place. A small raised area was noted in the finish on the lower limb pocket, while minor machining marks were noticed on the interior portions of the cams. These items are only noted from a quality assessment perspective and have no impact on the performance of the bow. No noticeable blemishes were found on the limbs and riser, with good coverage noted in all cut-outs. Visually, the GT500 w/ Cuda Cams has appealing lines; the incorporation of rounded surfaces also enhances the appeal. Overall, the fit and finish of the GT500 w/ Cuda Cams is quite good.

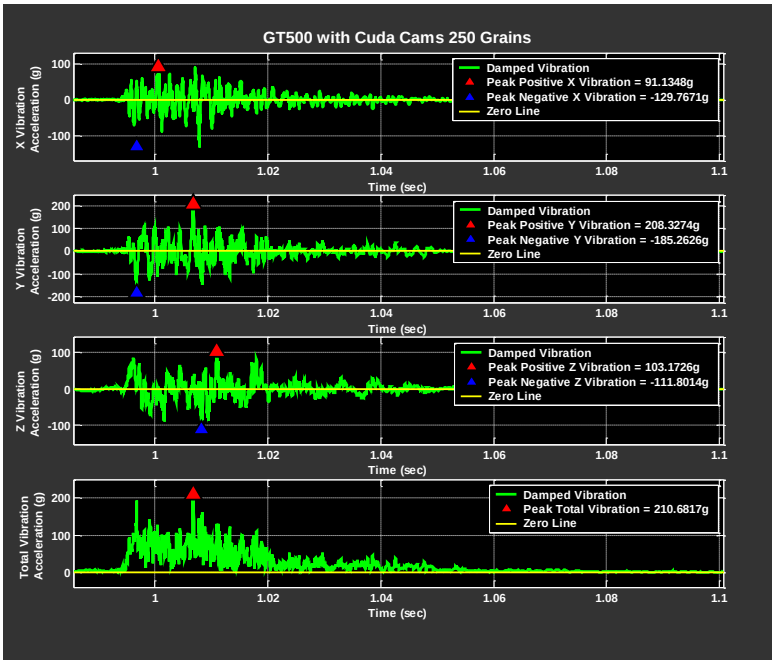
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 14.6
Dynamic Efficiency: 83.8%

Speed Point Blank - 26" ± 1/4", 50# ± 1#	Elite GT500 w/ Cuda Cams							
	Brace Height = 7.150		Draw Weight = 50.0		Draw Length = 26		Axle-to-Axle = 33 1/2	
Grains	250 Grains		300 Grains		350 Grains		450 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	280.9	280	259.9	259	242.4	242	215.8	215
2	~~280.5~~	280	~~259.8~~	259	242.4	242	215.8	215
3	281.2	280	260.1	259	242.4	242	~~215.6~~	215
4	281.0	280	~~260.2~~	259	~~242.6~~	242	215.7	215
5	~~281.3~~	280	260.0	259	~~242.3~~	242	~~215.9~~	215
Avg. Speed	281.0	280	260.0	259	242.4	242	215.8	215
Kinetic Energy	43.8	43.5	45.0	44.7	45.7	45.5	46.5	46.2
Momentum	10.0	10.0	11.1	11.1	12.1	12.1	13.9	13.8
Power Stroke	17.100							
Speed per inch of Power Stroke	16.4	16.4	15.2	15.1	14.2	14.2	12.6	12.6
Avg. Speed per inch of PS	14.6							
Stored Energy	54.0							
Dynamic Efficiency	81.2%	80.6%	83.4%	82.7%	84.5%	84.3%	86.1%	85.5%
Avg. Dynamic Efficiency (BFM)	83.8%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

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Negative X-Vibration: -97.0 g

Positive Y-Vibration: 176.5 g
Negative Y-Vibration: -160.6 g

Positive Z-Vibration: 90.7 g
Negative Z-Vibration: -92.0 g

Total Vibration: 183.5 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 300 grain arrow.

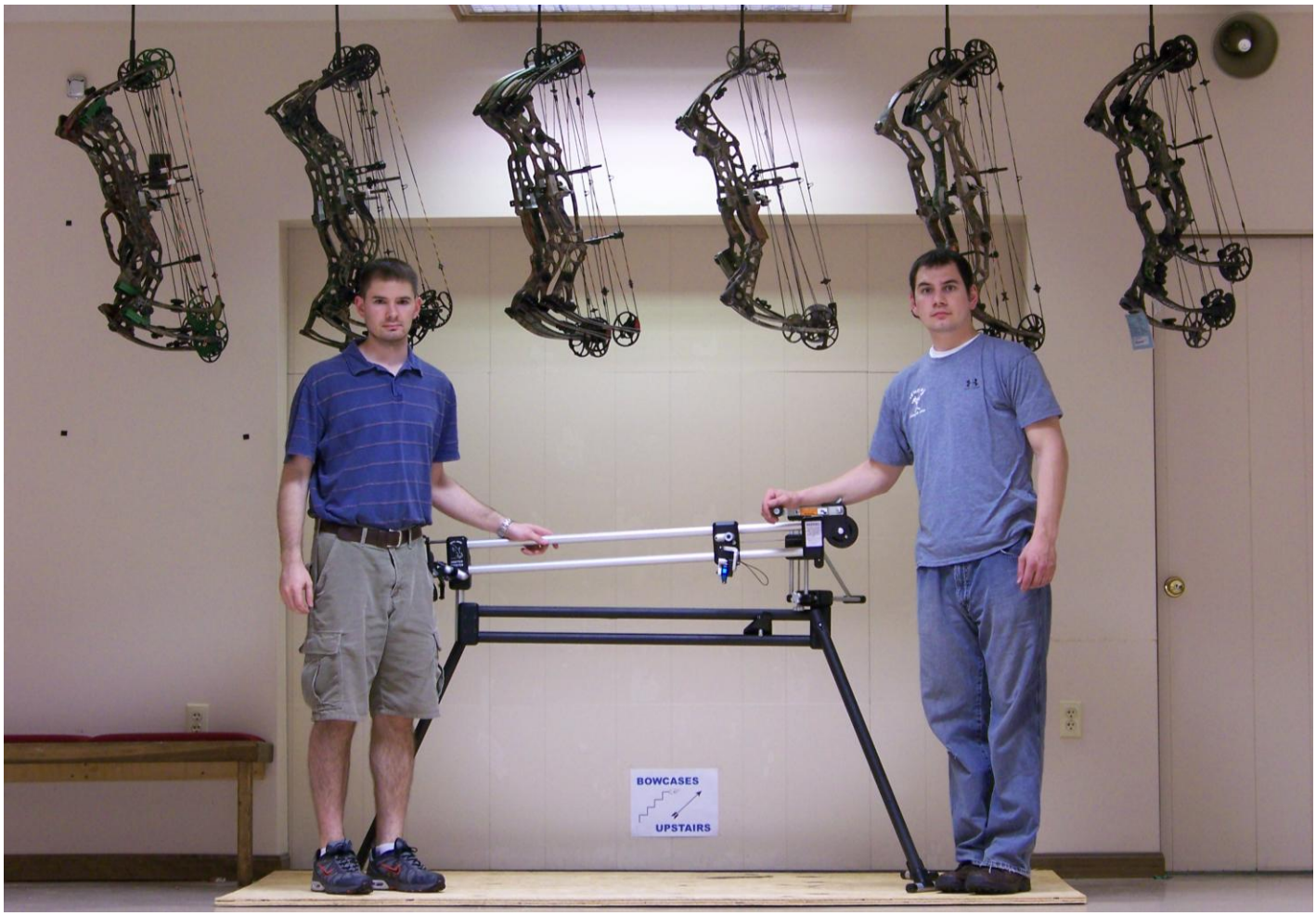
B-Stinger Reduction: 23.6%

Sound Measurements:

Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 101.2 dB
A-Weighted Sound Output: 83.0 dBA
C-Weighted Sound Output: 91.4 dBC

Noise & Vibration	Elite GT500 w/ Cuda Cams											
	Brace Height = 7.150				Draw Weight = 50				Draw Length = 26			Axle to Axle = 33 1/2
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	250 Grains	300 Grains	350 Grains	450 Grains	250 Grains	300 Grains	350 Grains	450 Grains	250 Grains	300 Grains	350 Grains	450 Grains
Measurement	Max				Max				Max			
1	104.5	~~104.2~~	100.3	~~101.5~~	87.6	~~86.9~~	~~80.4~~	82.7	~~96.1~~	~~95.8~~	~~89.0~~	~~92.9~~
2	~~104.7~~	~~102.2~~	99.7	100.2	86.4	85.1	80.5	~~83.6~~	94.5	93.6	90.1	91.8
3	~~102.6~~	102.6	~~100.4~~	97.1	~~88.0~~	80.9	~~83.8~~	81.6	94.0	~~90.2~~	~~91.8~~	87.9
4	103.7	102.7	~~99.6~~	~~96.9~~	~~81.5~~	~~79.5~~	82.0	~~78.7~~	~~92.7~~	90.7	89.6	88.1
5	103.7	102.7	99.8	97.8	86.7	80.6	82.3	79.2	95.2	90.6	90.2	~~86.8~~
Average	104.0	102.6	99.9	98.4	86.9	82.2	81.6	81.2	94.6	91.6	90.0	89.3
Total Average Max	101.2				83.0				91.4			



Anthony Barnum

Jonathan Teater

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Archery Evolution
www.ArcheryEvolution.com

2009 Compound Hunting Bow Evaluation

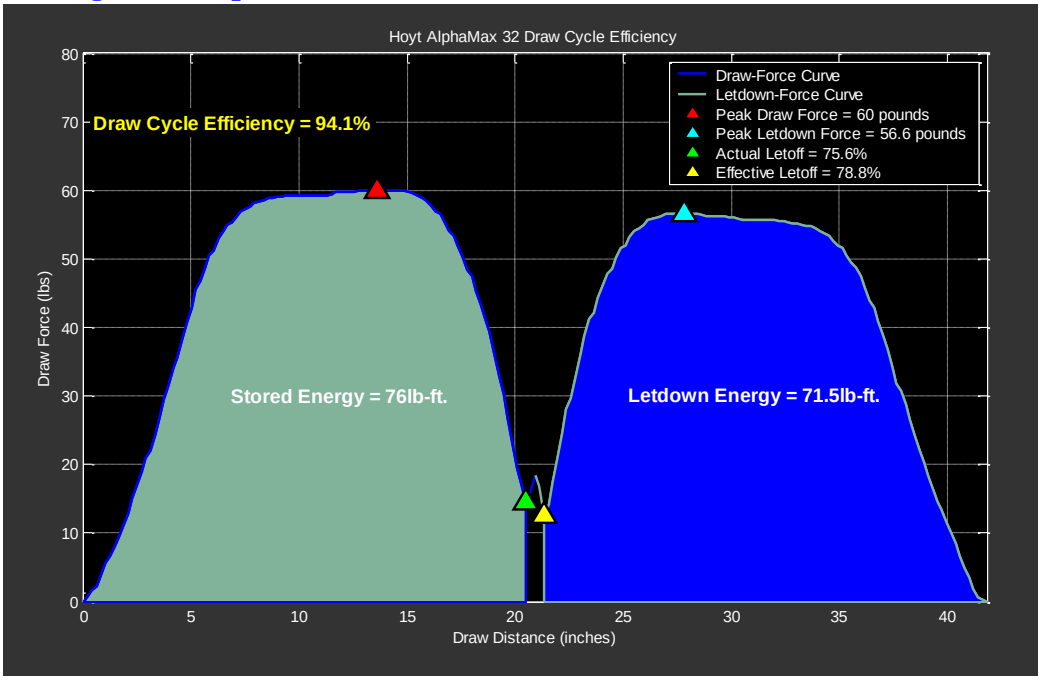
Hoyt AlphaMax 32 Test Results

By *Anthony Barnum*

www.ArcheryEvolution.com

HOYT®

Hoyt AlphaMax 32



Introduction:

For Hoyt's 2009 flagship offering, the AlphaMax 32, some significant changes have been made. These changes come in the form of the new ZT Lock limb pocket system, XTS parallel split limbs, and the XTR Cam & ½ system. The ZT Lock system offers a forked limp pocket, which extends the limb to riser connection point, helping to provide tighter tolerances for attachment of the 5/8" XTS split limbs. The XTR Cam & ½ system provides the ability to make modular adjustments to draw length without the use of a bow press or sacrificing performance; in years past, a complete swap of the cam system was required as draw length specific cams were employed. These updates not only make the AlphaMax 32 more user friendly for both the consumer and the shop owner, but also help to provide a lower overall mass weigh which advertised at 3.9 pounds. Even with these changes, the AlphaMax 32 is immediately recognizable as a Hoyt because the Total Engineering Concept® (aka TEC) riser, StealthShot® string suppressor, Shox damping accessories and Pro-Fit custom grip have been maintained from previous model years.

Hoyt Alphamax 32

Contact Info: Hoyt Archery
www.hoyt.com

MSRP:	$899	**Draw Length:**	23 ½ "-30" *
Cams:	XTR Cam & ½, Z3 Cam & ½	**Draw Weight:**	40-80*
Limbs:	XTS Laminate Split Limb	**Brace Height:**	7" *
Grip:	Pro-fit Custom grip	**Axle to Axle:**	32" *
Let-off:	75%*	**Mass Weight:**	3.9 *
String:	Fuse		
Damping:	String Shox, Alpha Shox, StealthShot®		*Advertised
Finish:	Realtree® APG® HD		^Measured

Performance at a Glance (60 lbs, 29 3/16"):

Arrow	Speed	K.E.	Momentum
300 Grains	305.9	62.3	13.1
360 Grains	282.1	63.6	14.5
420 Grains	262.8	64.4	15.8
540 Grains	234.9	66.1	18.1

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	82.0%	83.7%	84.8%	87.0%
Speed Per Inch of PS:	14.9	13.8	12.8	11.5
Noise Output (dBA):	89.7	88.2	86.5	85.5
Total Vibration (G):	153.7	125.4	123.4	124.1

The AlphaMax 32 sample that was provided to Archery Evolution was measured to have a brace-height of 6.938 inches, while the axle-to-axle length was measured to be 32 7/16 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 3/16 inch draw length and peak draw-weight of 62.9 pounds. At these settings, The AlphaMax 32 achieved an average speed of 317.6 fps when shot by hand in the out of box configuration with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the AlphaMax 32 achieved and average speed of 315.1 fps at these settings. Per Hoyt's request, the AlphaMax 32 was set to exactly 60 pounds peak draw weight through a slight adjustment to the limb bolts.

A thorough examination of the finish quality showed only minor imperfections, most notably on the riser. Specifically, there was a small scrape in the riser near the back fork of the top limb pocket where bear aluminum was noticeable. Also, some very small areas void of camo finish were noticed on the front of the riser near the grip area as well as in the recessed areas near the limb pockets. Finally, some machining marks were noticed on the interior portions of the lower eccentric. Other than these small items, the finish on the AlphaMax 32 was quite nice with great coverage on the interior portions of the riser cutouts. The grainy texture of the finish conveys an additional element of durability and is quite appealing to the touch.

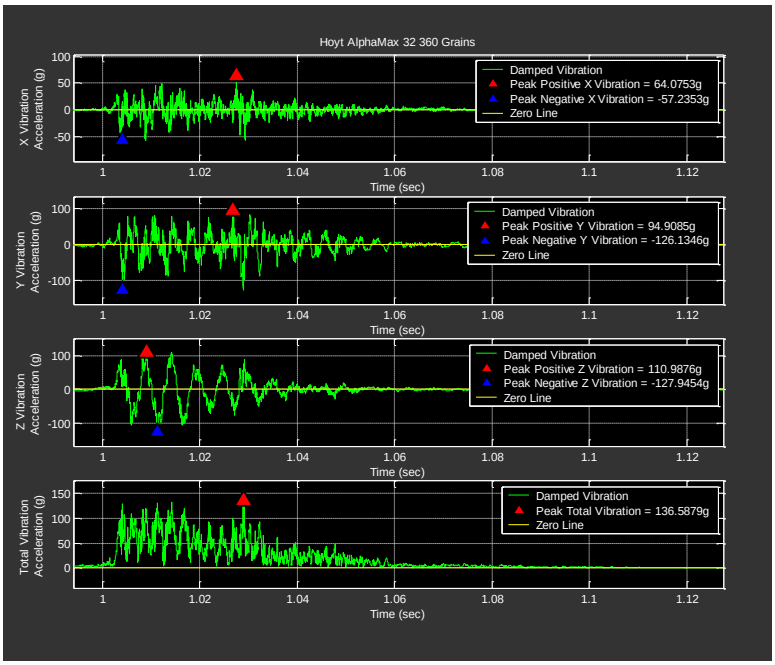
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.2
Dynamic Efficiency: 84.4%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Hoyt AlphaMax 32							
	Brace Height = 6.938		Draw Weight = 60.0		Draw Length = 29 3/16		Axle-to-Axle = 32 7/16	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	~~305.5~~	305	281.9	281	~~262.5~~	262	~~235.2~~	235
2	306.0	305	282.1	282	~~263.0~~	262	235.1	235
3	305.8	305	~~281.8~~	281	262.9	262	~~234.7~~	234
4	~~306.1~~	305	282.2	282	262.8	262	234.8	234
5	305.8	305	~~282.3~~	282	262.8	262	234.8	234
Avg. Speed	305.9	305	282.1	282	262.8	262	234.9	234
Kinetic Energy	62.3	62.0	63.6	63.4	64.4	64.0	66.1	65.8
Momentum	13.1	13.1	14.5	14.5	15.8	15.7	18.1	18.1
Power Stroke	20.500							
Speed per inch of Power Stroke	14.9	14.9	13.8	13.7	12.8	12.8	11.5	11.4
Avg. Speed per inch of PS	13.2							
Stored Energy	76.0							
Dynamic Efficiency	82.0%	81.5%	83.7%	83.4%	84.8%	84.2%	87.0%	86.6%
Avg. Dynamic Efficiency (BFM)	84.4%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 50.0 g
Negative X-Vibration: -51.1 g

Positive Y-Vibration: 103.8 g
Negative Y-Vibration: -108.8 g

Positive Z-Vibration: 104.7 g
Negative Z-Vibration: -120.1 g

Total Vibration: 134.1 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

B-Stinger Reduction: 11.0%

Sound Measurements:

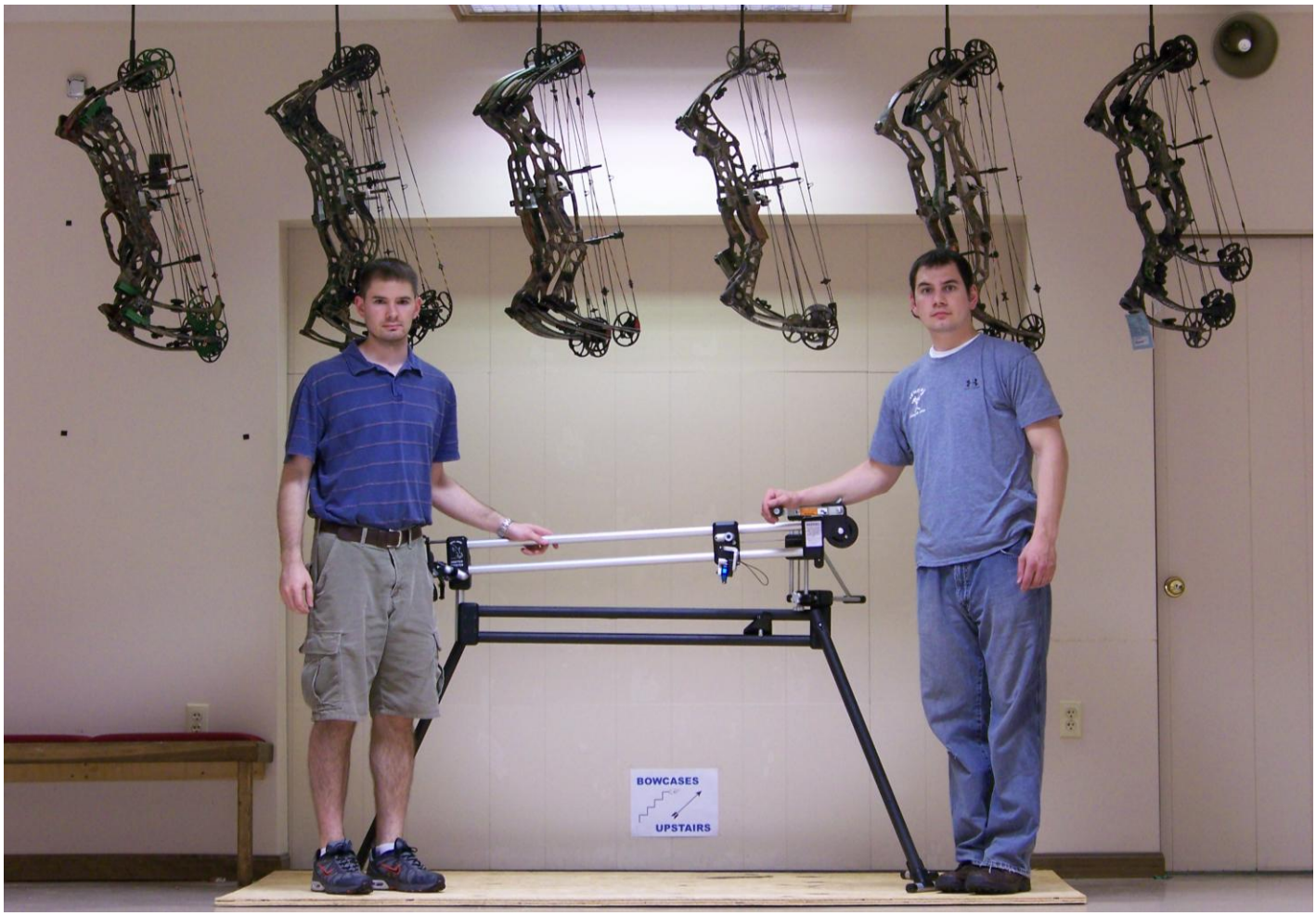
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 105.0 dB
A-Weighted Sound Output: 87.5 dBA
C-Weighted Sound Output: 96.5 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 2.1%

Noise & Vibration	Hoyt AlphaMax 32											
	Brace Height = 6.938			Draw Weight = 60			Draw Length = 29 3/16			Axle to Axle = 32 7/16		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	106.8	106.0	103.8	102.8	~~90.6~~	~~87.8~~	~~84.6~~	85.6	98.8	97.4	~~95.1~~	93.7
2	106.9	106.1	~~103.6~~	102.5	90.3	87.9	85.8	~~84.8~~	98.4	98.0	95.5	93.9
3	107.3	~~106.5~~	104.6	~~102.4~~	88.4	88.6	86.1	84.8	99.0	~~98.1~~	~~96.2~~	~~93.0~~
4	~~106.0~~	~~105.7~~	~~105.7~~	~~103.1~~	~~87.4~~	88.1	~~88.1~~	86.0	~~97.5~~	~~97.3~~	96.1	94.0
5	~~107.9~~	106.0	104.5	102.9	90.4	~~89.7~~	87.5	~~86.8~~	~~99.5~~	97.6	96.1	~~94.1~~
Average	107.0	106.0	104.3	102.7	89.7	88.2	86.5	85.5	98.7	97.7	95.9	93.9
Total Average Max	105.0				87.5				96.5			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

Mathews McPherson Series Monster XLR8
Test Results

By *Anthony Barnum*

www.ArcheryEvolution.com

MCPHERSON SERIES MONSTER™ XLR8

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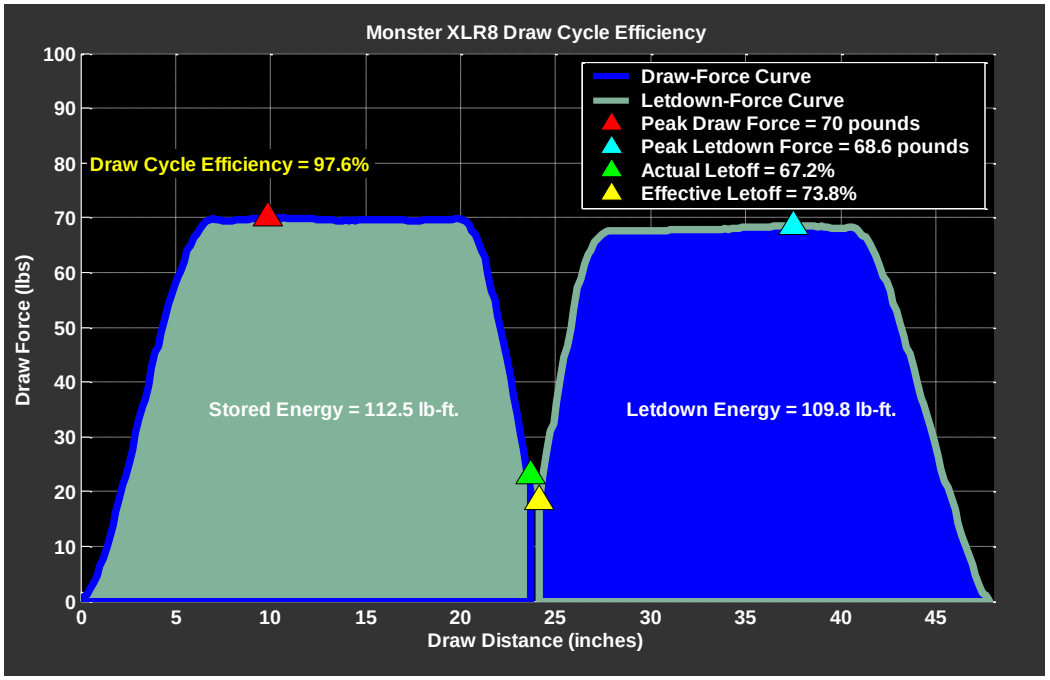
Mathews McPherson Series Monster XLR8



Introduction:

Making a breakthrough into the speed bow market, Mathews has developed a new dual cam system called the Advanced Vectoring System (AVS™). Resurrecting the name of Matt McPherson's first bow company, AVS is incorporated on the McPherson Series line of bows that includes the Monster and the Monster XLR8. Both of these McPherson Series bows provide speeds that plant them firmly in the speed-bow segment, but the Monster XLR8, with its 5 inch brace-height, offers advertised IBO speeds in excess of 360 fps making it the company's speed bow offering for 2009. The AVS system is the basis for this speed and is truly unique in that it provides additional mechanical advantage through a rotating bearing. This bearing provides a cam action that helps to store energy throughout the draw cycle while also acting as a synchronization mechanism to keep the dual cams firmly in time. The modularly adjustable AVS™ cam system is paired with highly preloaded split limbs that utilize a v-lock limb pocket, which ensures proper limb alignment throughout the draw cycle. This setup provides some of the highest efficiency numbers that we've tested to date! The use of String Grubs, a Harmonic Stabilizer and the Dead End String Stop helps to minimize felt vibration and noise, and rounds out the innovations to the bow.

Mathews McPherson Series Monster XLR8

Contact Info: Mathews Inc.
www.mathewsinc.com

MSRP:	$959	**Draw Length:**	25"-30"*
Cams:	AVS™	**Draw Weight:**	40-80*
Limbs:	Quad V-Lock Limbs™	**Brace Height:**	5"*
Grip:	In-Line Grip™	**Axle to Axle:**	33 ½"*
Let-off:	80%*	**Mass Weight:**	4.4*
String:	Zebra Bowstring & Cable		
Damping:	Harmonic Damper/Stabilizer, String Grub, Dead End String Stop		
Finish:	Mathews Lost Camo / Black		*Advertised

Performance at a Glance (70.0 lbs, 30 3/8"):

Arrow	Speed	K.E.	Momentum
350 Grains	355.0	97.4	17.7
420 Grains	327.4	99.9	19.6
490 Grains	304.7	101.0	21.3
540 Grains	291.6	101.9	22.5

Arrow (Grains):	350	420	490	540
Dynamic Efficiency:	87.0%	88.8%	89.8%	90.6%
Speed Per Inch of PS:	15.0	13.8	12.9	12.3
Noise Output (dBA):	91.8	89.9	89.6	88.8
Total Vibration (G):	274.2	228.5	192.7	174.1

The Monster XLR8 sample that was provided to Archery Evolution was measured to have a brace-height of 4.975 inches, while the axle-to-axle length was measured to be 33 19/32 inches. The requested 30 inch, 70 pound model was measured straight out of the box to have a 30 3/8 inch draw length and peak draw-weight of 69.5 pounds. At these settings, the Monster XLR8 achieved an average speed of 356.6 fps when shot by hand in the out of box configuration with a 350 grain arrow. When shot from the shooting machine with the addition of a string loop, the Monster XLR8 achieved an average speed of 353.2 fps at these settings. A slight adjustment to the limb bolts was made to bring the Monster XLR8 up to the exact draw-weight specification of 70.0 pounds. **Note:** Per request from Mathews, the Monster XLR8 was tested in the "out of box" draw-length configuration; no adjustments to draw-length were made.

A thorough examination of the finish quality showed only minimal imperfections. There was a small area where the film dip finish appeared to be worn near the bottom of the riser, and 2 small "pin-prick" areas void of film-dip were noted near the site attachment area on the outside of the bow. The In-Line Grip™ had one small indentation and some machining marks were noted on the Dead End String Stop assembly as well as on the interior portions of the many riser cutouts. Other than these few minor items which do not impact the performance of the bow, the fit, finish, look and feel of the Monster XLR8 is quite good and is on par with what we've come to expect from Mathews.

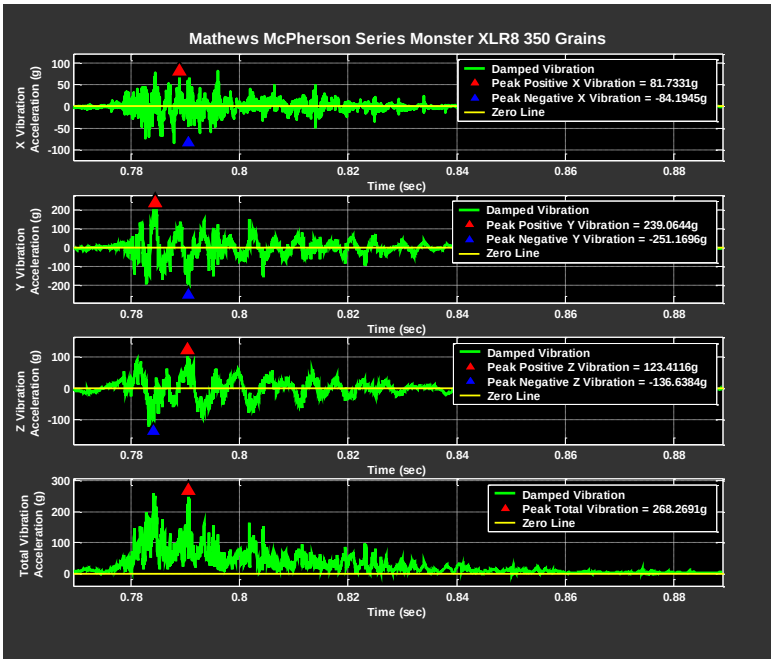
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.5
Dynamic Efficiency: 89.1%

Speed Point Blank - 30" ± 1/4", 70# ± 1#	McPherson Monster XLR8 by Mathews							
	Brace Height = 4.975		Draw Weight = 70.0		Draw Length = 30 3/8		Axle-to-Axle = 33 19/32	
Grains	350 Grains		420 Grains		490 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	355.0	354	327.3	326	~~305.2~~	304	~~291.8~~	291
2	~~354.7~~	354	~~327.6~~	326	~~304.5~~	304	~~291.4~~	291
3	354.9	354	327.5	326	304.6	304	291.6	291
4	355.0	354	~~327.1~~	326	305.0	304	291.5	291
5	~~355.1~~	354	327.4	326	304.6	304	291.7	291
Avg. Speed	355.0	354	327.4	326	304.7	304	291.6	291
Kinetic Energy	97.9	97.4	99.9	99.1	101.0	100.5	101.9	101.5
Momentum	17.7	17.7	19.6	19.6	21.3	21.3	22.5	22.4
Power Stroke	23.650							
Speed per inch of Power Stroke	15.0	15.0	13.8	13.8	12.9	12.9	12.3	12.3
Avg. Speed per inch of PS	13.5							
Stored Energy	112.5							
Dynamic Efficiency	87.0%	86.6%	88.8%	88.1%	89.8%	89.4%	90.6%	90.2%
Avg. Dynamic Efficiency (BFM)	89.1%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 68.7 g
Negative X-Vibration: -74.2 g

Positive Y-Vibration: 207.0 g
Negative Y-Vibration: -194.2 g

Positive Z-Vibration: 95.7 g
Negative Z-Vibration: -107.0 g

Total Vibration: 217.4 g

Sound Measurements:

Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 107.1 dB
A-Weighted Sound Output: 90.0 dBA
C-Weighted Sound Output: 98.4 dBC

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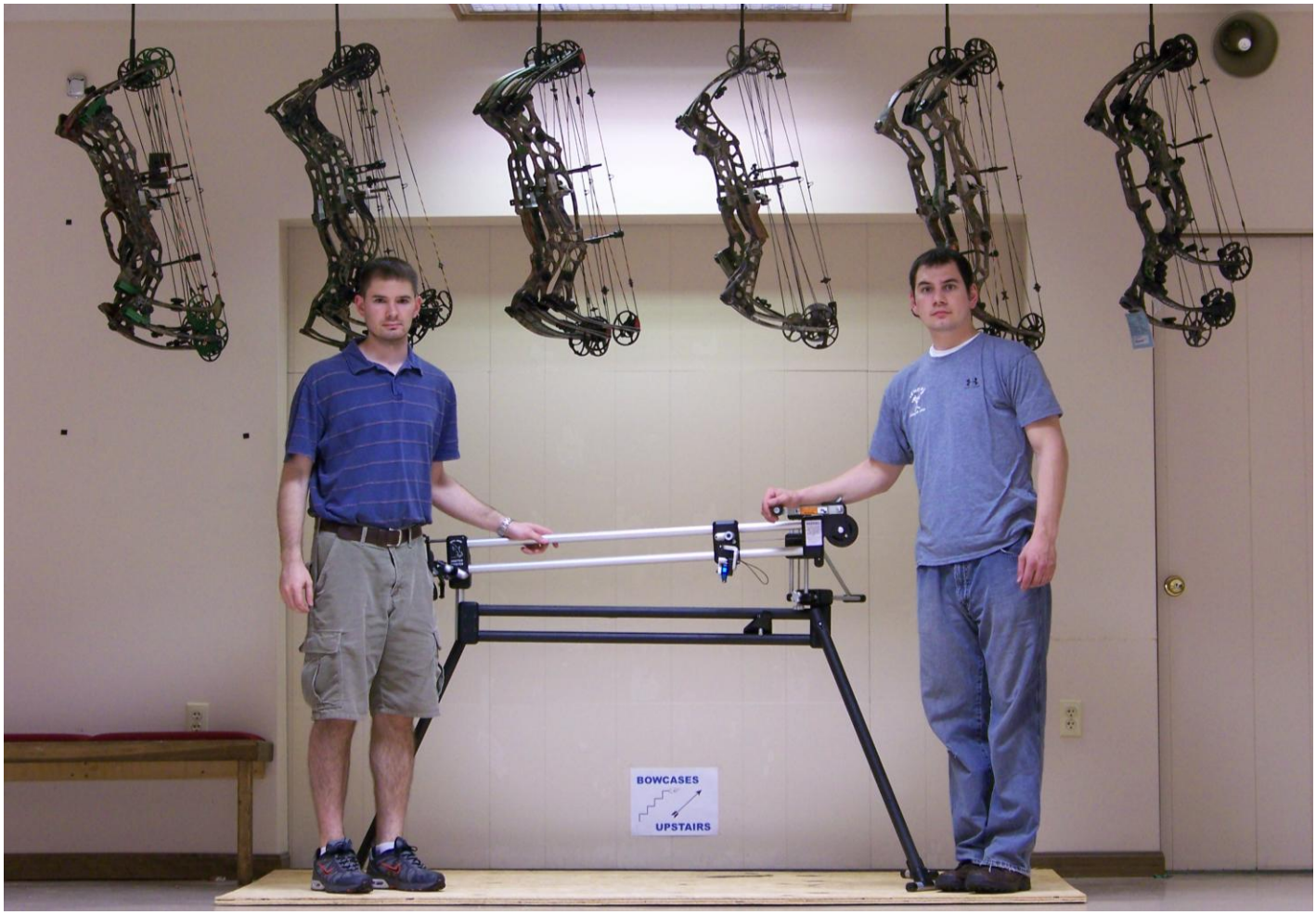
Noise & Vibration	McPherson Monster XLR8 by Mathews											
	Brace Height = 4.975				Draw Weight = 70				Draw Length = 30 3/8			Axle to Axle = 33 19/32
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	350 Grains	420 Grains	490 Grains	540 Grains	350 Grains	420 Grains	490 Grains	540 Grains	350 Grains	420 Grains	490 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~111.3~~	106.6	104.7	105.7	91.9	88.9	~~91.0~~	~~89.6~~	~~102.5~~	~~97.7~~	96.6	97.0
2	~~109.8~~	~~106.4~~	~~106.1~~	~~105.4~~	~~92.8~~	~~88.6~~	89.3	89.4	~~100.7~~	97.8	~~96.9~~	96.7
3	109.8	108.0	105.1	105.4	91.9	90.7	~~89.0~~	~~88.1~~	100.9	~~99.5~~	96.8	~~96.6~~
4	110.5	107.8	106.0	105.7	~~90.4~~	90.0	89.9	88.3	101.7	99.0	96.8	96.8
5	109.8	~~108.2~~	~~104.6~~	~~106.6~~	91.7	~~91.9~~	89.6	88.6	100.9	99.3	~~95.6~~	~~97.0~~
Average	110.1	107.5	105.3	105.6	91.8	89.9	89.6	88.8	101.2	98.7	96.7	96.8
Total Average Max	107.1				90.0				98.4			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

Mathews Reezen 6.5 Test Results

By *Anthony Barnum*

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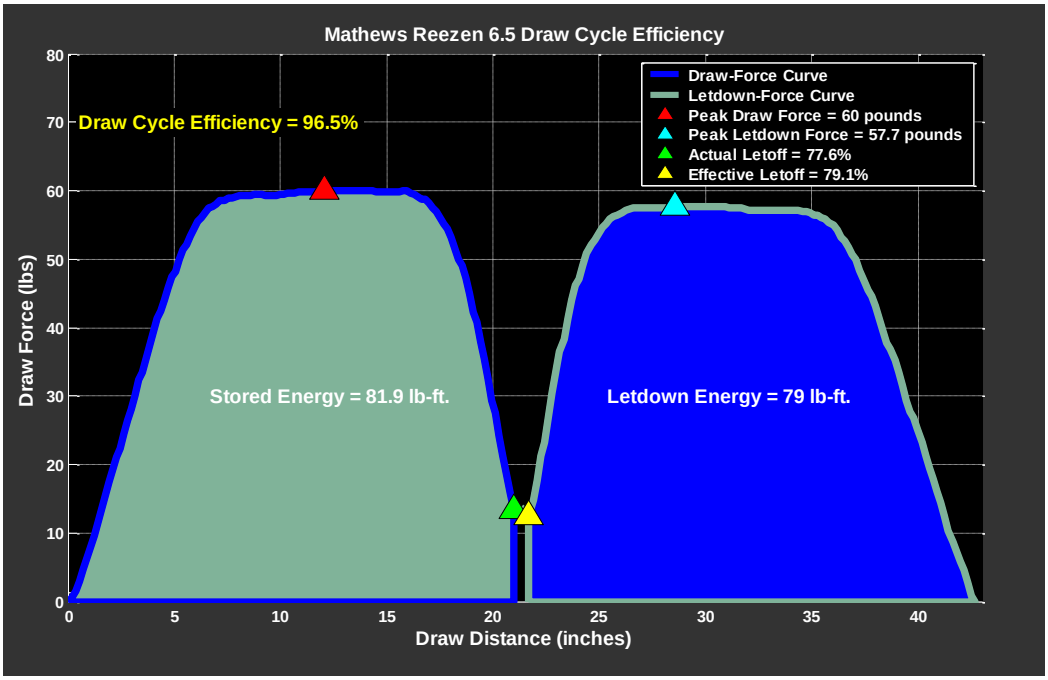
Mathews Reezen 6.5



Introduction:

As one of the perennial powerhouses in the archery industry, expectations are usually set very high for the offerings from Mathews. Mathews' flagship model for 2009, the Reezen 6.5, offers some innovative features that are sure to benefit both the consumer and shop-owner alike. First, the Reezen 6.5 offers advertised speeds of up to 340 fps which is a real benefit for those archers who want fast speeds while maintaining the ease of use found in a single cam system. In fact, the Reezen 6.5 is dubbed as the fastest single-cam bow that Mathews has ever tested. The Reezen 6.5 utilizes new Reezen solo-cam system that, when paired with SE^4 composite slim limbs, results in a substantial amount of stored energy. This new cam system is draw-length specific meaning that a new eccentric is required to adjust draw-length. To help address the amount of time associated with changing out the eccentric, Mathews has developed the Quick Change Axle to replace the standard axle / e-clip combination, which is a benefit for the shop owner. The use of String Grubs and the Harmonic Stabilizer helps to minimize felt vibration and noise, and rounds out the new additions to the bow. The vibration and noise output ratings are quite good for the Reezen 6.5, especially considering the amount of speed it produces.

Mathews Reezen 6.5

Contact Info: **Mathews Inc.**
www.mathewsinc.com

MSRP:	$869	**Draw Length:**	24"-30" *
Cams:	Reezen Cam	**Draw Weight:**	40-70*
Limbs:	SE^4 Composite Slim Limb	**Brace Height:**	6 ½" *
Grip:	In-Line Grip™	**Axle to Axle:**	32"*
Let-off:	80%*	**Mass Weight:**	4.15*
String:	Zebra Bowstring & Cable		
Damping:	Harmonic Damper / Stabilizer, String Grub		*Advertised
Finish:	Mathews Lost Camo		^Measured

Performance at a Glance (60.0 lbs, 29 ¼"):

Arrow	Speed	K.E.	Momentum
300 Grains	317.1	67.0	13.6
360 Grains	293.5	68.9	15.1
420 Grains	275.7	70.9	16.5
540 Grains	245.4	72.2	18.9

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	81.8%	84.1%	86.5%	88.2%
Speed Per Inch of PS:	15.1	14.0	13.1	11.7
Noise Output (dBA):	89.7	88.7	84.7	89.0
Total Vibration (G):	295.0	191.7	183.1	131.2

The Reezen sample that was provided to Archery Evolution was measured to have a brace-height of 6.500 inches, while the axle-to-axle length was measured to be 32 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 ¼ inch draw length and peak draw-weight of 61.8 pounds. At these settings, the Reezen 6.5 achieved an average speed of 324.8 fps when shot by hand in the out of box configuration with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the Reezen 6.5 achieved an average speed of 321.5 fps at these settings. Per request from Mathews, a slight adjustment to the limb bolts was made to bring the Reezen 6.5 down to the exact draw-weight specification of 60.0 pounds.

A thorough examination of the finish quality showed minimal imperfections. There was a small raised area in the Lost Camo finish just below the rear stabilizer bushing and small "pin-prick" areas void of film-dip in the cut-out area near the top of the bow. Otherwise, the riser has nice lines and the extensive cutouts are both aesthetically pleasing and help to reduce overall mass weight of the bow. The machining and anodizing on the roller-guard, sphere-lock limb pockets, limb turrets and cam system was impeccable, while the SE^4 composite slim limbs had smooth, rounded edges with no visible blemishes. There were no noticeable imperfections found on the wooden In-Line Grip™ that, while a bit larger than I prefer, had nice contours that fit smoothly in the hand. All in all the fit, finish, look and feel of the Reezen 6.5 is quite good.

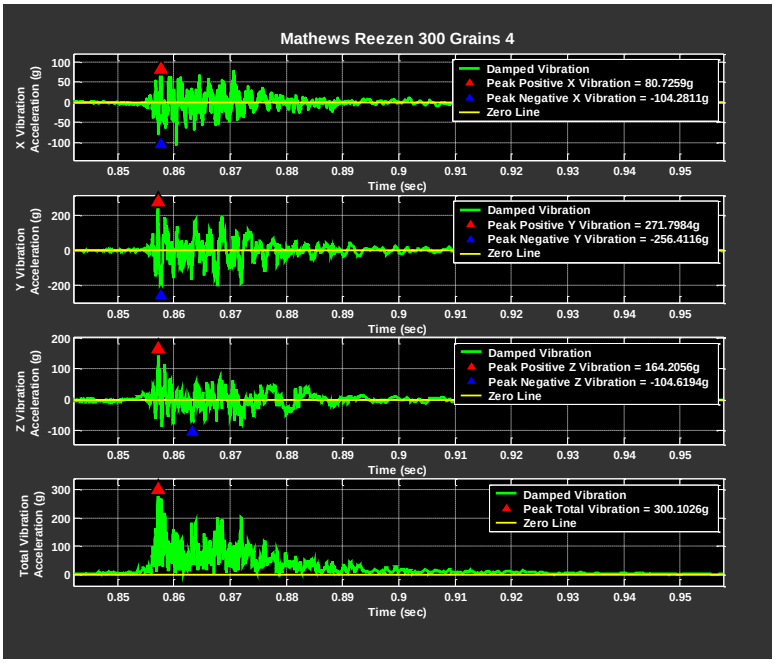
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.5
Dynamic Efficiency: 85.1%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Mathews Reezen 6.5							
	Brace Height = 6.500		Draw Weight = 60.0		Draw Length = 29 1/4		Axle-to-Axle = 32	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	~~317.4~~	316	293.5	293	275.7	275	~~245.6~~	245
2	317.0	316	~~293.2~~	293	275.7	275	245.4	245
3	317.0	316	293.5	293	~~275.8~~	275	245.5	245
4	317.2	316	~~293.7~~	293	~~275.6~~	275	245.4	245
5	~~316.9~~	316	293.6	293	275.7	275	~~245.3~~	245
Avg. Speed	317.1	316	293.5	293	275.7	275	245.4	245
Kinetic Energy	67.0	66.5	68.9	68.6	70.9	70.5	72.2	72.0
Momentum	13.6	13.5	15.1	15.1	16.5	16.5	18.9	18.9
Power Stroke	21.000							
Speed per inch of Power Stroke	15.1	15.0	14.0	14.0	13.1	13.1	11.7	11.7
Avg. Speed per inch of PS	13.5							
Stored Energy	81.9							
Dynamic Efficiency	81.8%	81.2%	84.1%	83.8%	86.5%	86.1%	88.2%	87.9%
Avg. Dynamic Efficiency (BFM)	85.1%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 69.3 g
Negative X-Vibration: -70.6 g

Positive Y-Vibration: 176.8 g
Negative Y-Vibration: -179.5 g

Positive Z-Vibration: 96.9 g
Negative Z-Vibration: -74.6 g

Total Vibration: 200.3 g

Sound Measurements:

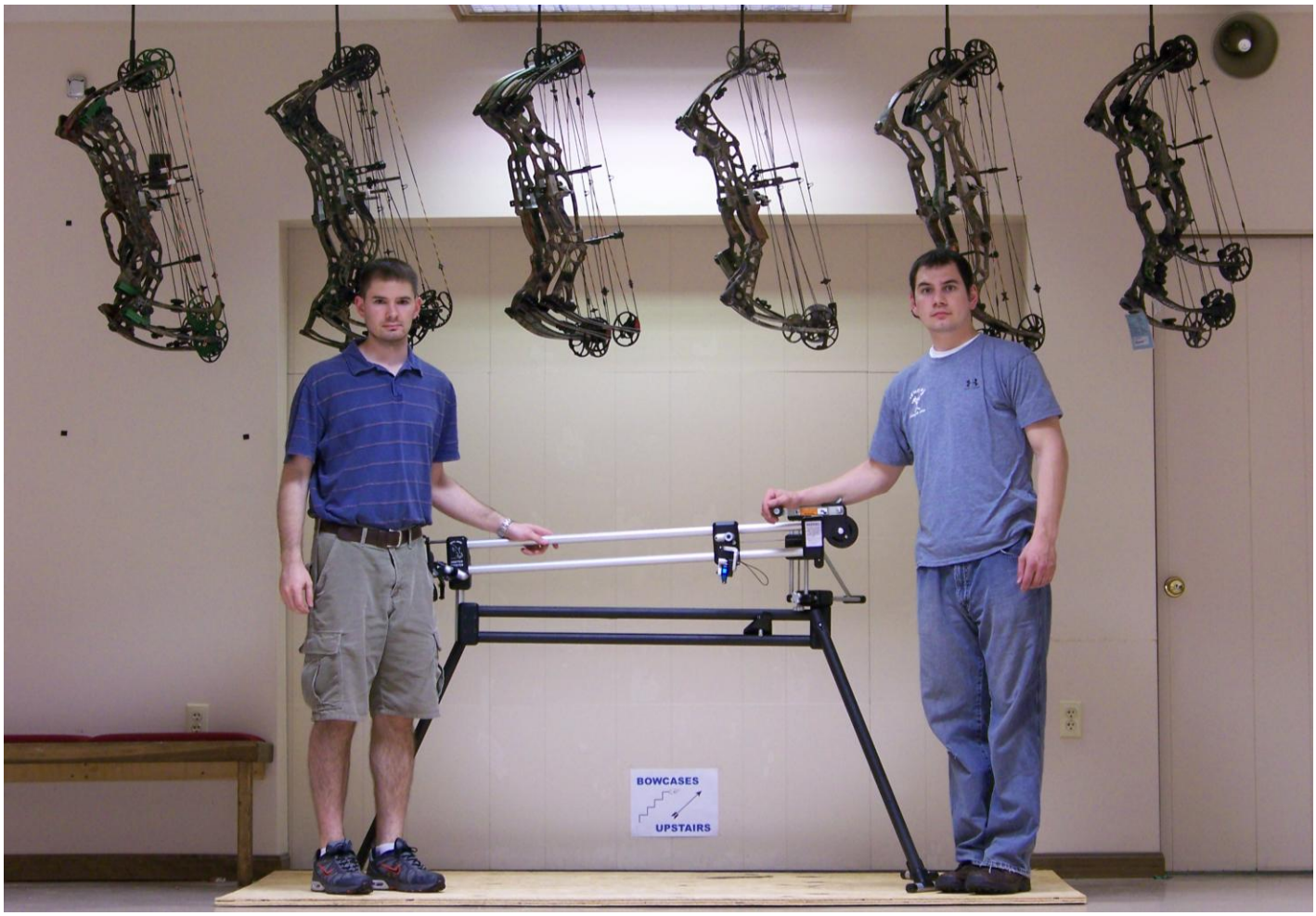
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 104.1 dB
A-Weighted Sound Output: 88.0 dBA
C-Weighted Sound Output: 95.4 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 0.6%

Noise & Vibration	Mathews Reezen 6.5											
	Brace Height = 6.500			Draw Weight = 60.0			Draw Length = 29 1/4			Axle to Axle = 32		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~106.2~~	~~106.0~~	~~100.9~~	~~105.7~~	~~90.7~~	90.1	~~84.1~~	~~90.6~~	98.2	~~97.2~~	91.5	~~96.6~~
2	106.4	103.9	103.7	~~104.3~~	~~88.3~~	88.2	~~87.9~~	~~87.9~~	~~97.2~~	94.9	94.7	~~95.6~~
3	106.4	~~101.0~~	101.4	105.4	89.8	~~84.3~~	84.7	89.9	~~98.3~~	~~91.8~~	~~91.4~~	96.4
4	~~106.8~~	102.2	~~103.9~~	104.7	89.9	~~90.8~~	85.3	88.0	98.2	93.6	~~95.7~~	96.4
5	106.7	101.9	102.2	104.3	89.4	87.8	84.1	89.0	97.8	93.2	94.0	96.1
Average	106.5	102.7	102.4	104.8	89.7	88.7	84.7	89.0	98.1	93.9	93.4	96.3
Total Average Max	104.1				88.0				95.4			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

PSE Bow Madness XL Test Results

By *Anthony Barnum*

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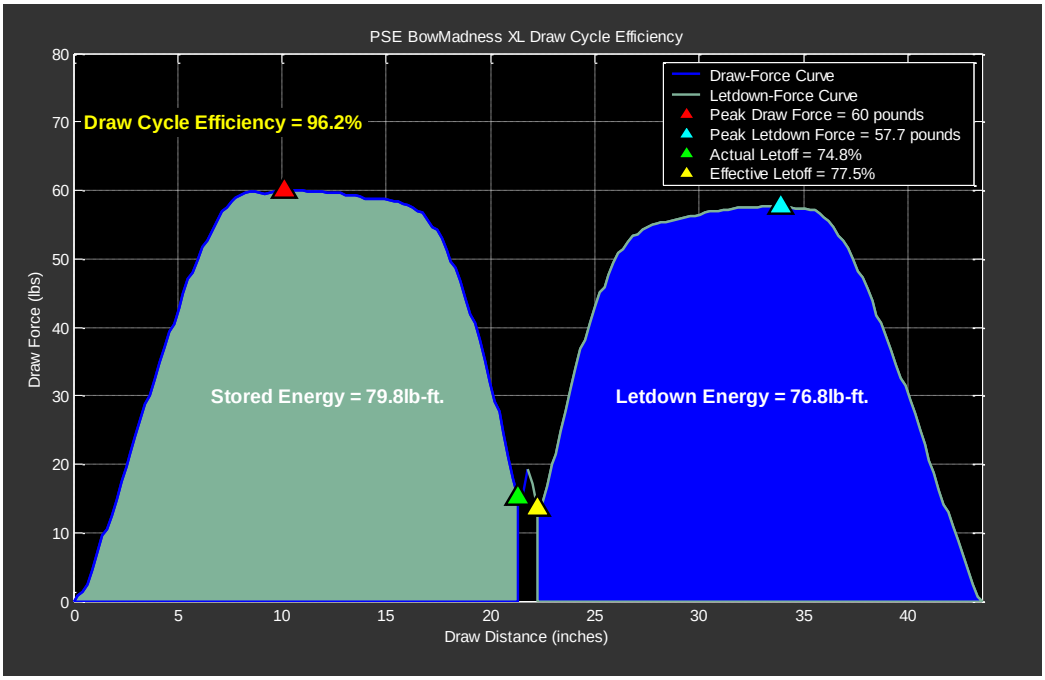
PSE Bow Madness XL



Introduction:

The Bow Madness XL is PSE's flagship offering from the mainline bows for the 2009 model year. Like its brother, the Dream Season, the Bow Madness XL gets its name from a popular hunting show put together by Drury Outdoors. Unlike the Dream Season, though, the Bow Madness XL is outfitted with a smooth drawing, highly efficient MC single cam system that provides a great degree of adjustability. Not only can let-off be adjusted between 65% and 80% without difficulty, but the MC cam also offers 5 inches of draw-length adjustment without the use of a bow press (3 inches of which can be done without requiring any additional module)s. With a bow press, the MC cam system becomes further adjustable as separate posts are provided to adjust draw length ± ½ inch from the standard full inch incremental settings. Other than the cam system, the Bow Madness XL looks and feels much like its X-Force counterparts in PSE's Premier line as the riser and highly preloaded limb configurations are maintained. The addition of the Backstop® string suppressor is also a nice upgrade from the 2008 model bows.

PSE Bow Madness XL

Contact Info: PSE Archery
www.pse-archery.com

MSRP:	$699.99	**Draw Length:**	25"-30" *
Cams:	MC Single Cam	**Draw Weight:**	60, 70*
Limbs:	10 ½" Split Limbs	**Brace Height:**	6 ½" *
Grip:	B.E.S.T. grip	**Axle to Axle:**	36" *
Let-off:	65%, 80%*	**Mass Weight:**	4.0 ^
String:	BCY 8125		
Damping:	Backstop String Suppressor		*Advertised
Finish:	Mossy Oak Treestand		^ Measured

Performance at a Glance (60 lbs, 29 3/8"):

Arrow	Speed	K.E.	Momentum
300 Grains	311.7	64.7	13.4
360 Grains	288.5	66.5	14.8
420 Grains	271.7	68.8	16.3
540 Grains	241.0	69.6	18.6

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	81.1%	83.3%	86.2%	87.0%
Speed Per Inch of PS:	14.6	13.5	12.7	11.3
Noise Output (dBA):	94.7	92.6	87.6	89.9
Total Vibration (G):	184.7	162.3	157.4	140.9

The Bow Madness XL sample that was provided to Archery Evolution was measured to have a brace-height of 6.313 inches, while the axle-to-axle length was measured to be 35 15/16 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 3/8 inch draw length and peak draw-weight of 62.7 pounds. At these settings, The Bow Madness XL achieved an average speed of 320.1 fps when shot by hand in the out of box configuration with a 300 grain arrow. When shot from the shooting machine, the Bow Madness XL achieved an average speed of 317.6 fps at these settings. The Bow Madness XL was set to exactly 60 pounds peak draw weight through a slight adjustment to the limb bolts. **Note:** Per request from PSE, the Bow Madness XL was tested in the "out of box" draw-length configuration; no adjustments to draw-length were made

Some minor imperfections in the finish of the Bow Madness XL were noticed during our inspection. There was some minor serving separation on one of the end loops on the yoke cable, and a machining mark was evident on the Backstop® string suppressor. Some small "pin-prick" areas on the riser void of the Mossy Oak Treestand camo finish were observed, as well, while a minor scrape in the upper limb area was also noted. Other than these small items, the fit and finish of the Bow Madness XL was quite good and, visually, the bow was quite eye-catching. Due to its long axle-to-axle length, you get the impression that the distance from the throat of the grip to the string on the Bow Madness XL is quite small. Yet, it is still quite shootable and maintains and advertised 6 ½" brace height.

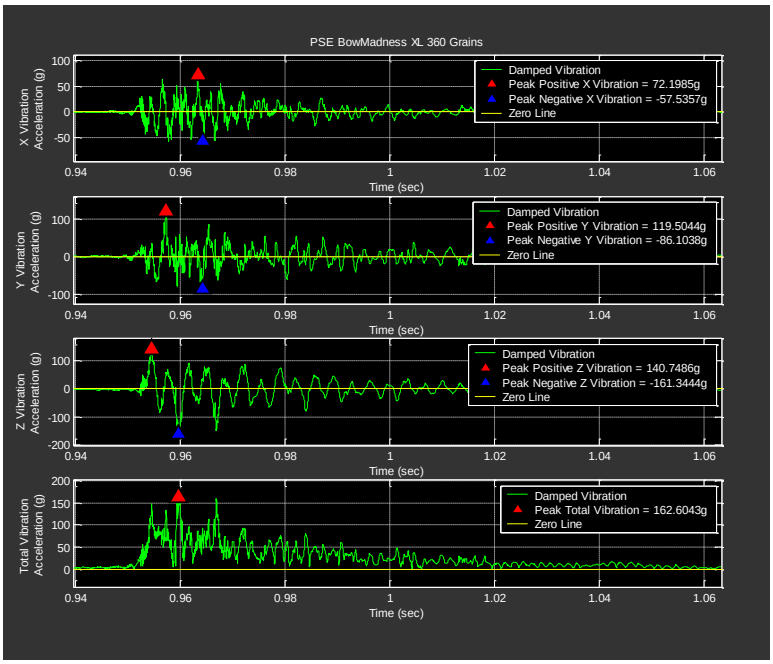
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.1
Dynamic Efficiency: 84.5%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	PSE BowMadness XL							
	Brace Height = 6.313		Draw Weight = 60.0		Draw Length = 29 3/8		Axle-to-Axle = 35 15/16	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	~~312.2~~	311	288.4	288	271.6	271	~~240.8~~	240
2	311.9	311	288.4	288	~~271.4~~	271	~~241.2~~	241
3	311.6	311	288.6	288	271.7	271	240.9	240
4	311.5	311	~~288.7~~	288	271.7	271	241.0	241
5	~~311.3~~	311	~~287.8~~	287	~~271.8~~	271	241.1	241
Avg. Speed	311.7	311	288.5	288	271.7	271	241.0	241
Kinetic Energy	64.7	64.4	66.5	66.3	68.8	68.5	69.6	69.4
Momentum	13.4	13.3	14.8	14.8	16.3	16.3	18.6	18.6
Power Stroke	21.313							
Speed per inch of Power Stroke	14.6	14.6	13.5	13.5	12.7	12.7	11.3	11.3
Avg. Speed per inch of PS	13.1							
Stored Energy	79.8							
Dynamic Efficiency	81.1%	80.7%	83.3%	83.1%	86.2%	85.8%	87.3%	87.0%
Avg. Dynamic Efficiency (BFM)	84.5%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 64.9 g
Negative X-Vibration: -58.8 g

Positive Y-Vibration: 116.4 g
Negative Y-Vibration: -90.2 g

Positive Z-Vibration: 126.6 g
Negative Z-Vibration: -157.8 g

Total Vibration: 161.3 g

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a slight reduction of peak total vibration when measured with a 360 grain arrow.

B-Stinger Reduction: 1.0%

Sound Measurements:

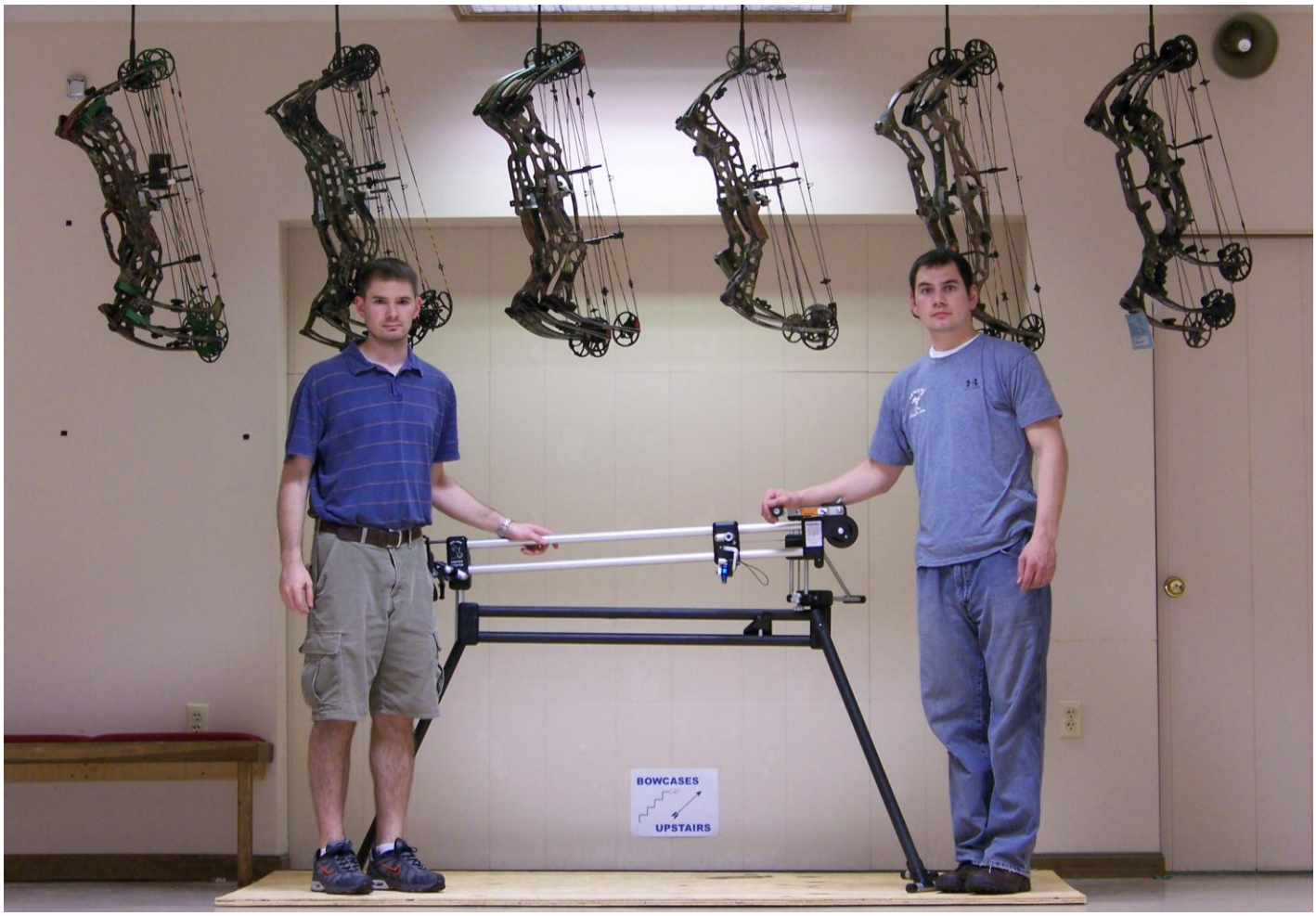
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 107.2 dB
A-Weighted Sound Output: 91.2 dBA
C-Weighted Sound Output: 98.8 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 2.3%

Noise & Vibration	PSE BowMadness XL											
	Brace Height = 6.313			Draw Weight = 60			Draw Length = 29 3/8			Axle to Axle = 35 15/16		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	112.6	~~109.2~~	104.5	~~104.2~~	~~97.0~~	~~94.8~~	87.9	~~85.7~~	104.2	~~101.1~~	95.5	~~94.6~~
2	~~112.1~~	~~106.2~~	103.9	~~105.2~~	94.8	~~91.8~~	~~86.5~~	~~91.1~~	~~103.6~~	~~98.2~~	95.7	~~97.4~~
3	112.7	107.3	103.7	104.9	~~93.8~~	92.7	~~88.5~~	90.4	104.2	99.1	95.5	97.0
4	~~113.4~~	107.4	~~103.5~~	104.9	94.7	92.6	87.2	88.3	~~105.0~~	99.0	~~95.2~~	95.5
5	113.1	106.9	~~104.8~~	105.0	94.6	92.6	87.7	90.9	104.6	98.7	~~96.6~~	97.2
Average	112.8	107.2	104.0	104.9	94.7	92.6	87.6	89.9	104.3	98.9	95.6	96.6
Total Average Max	107.2				91.2				98.8			



Anthony Barnum

Jonathan Teater

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www.ArcheryEvolution.com

2009 Compound Hunting Bow Evaluation

Quest XPB Test Results

By *Anthony Barnum*

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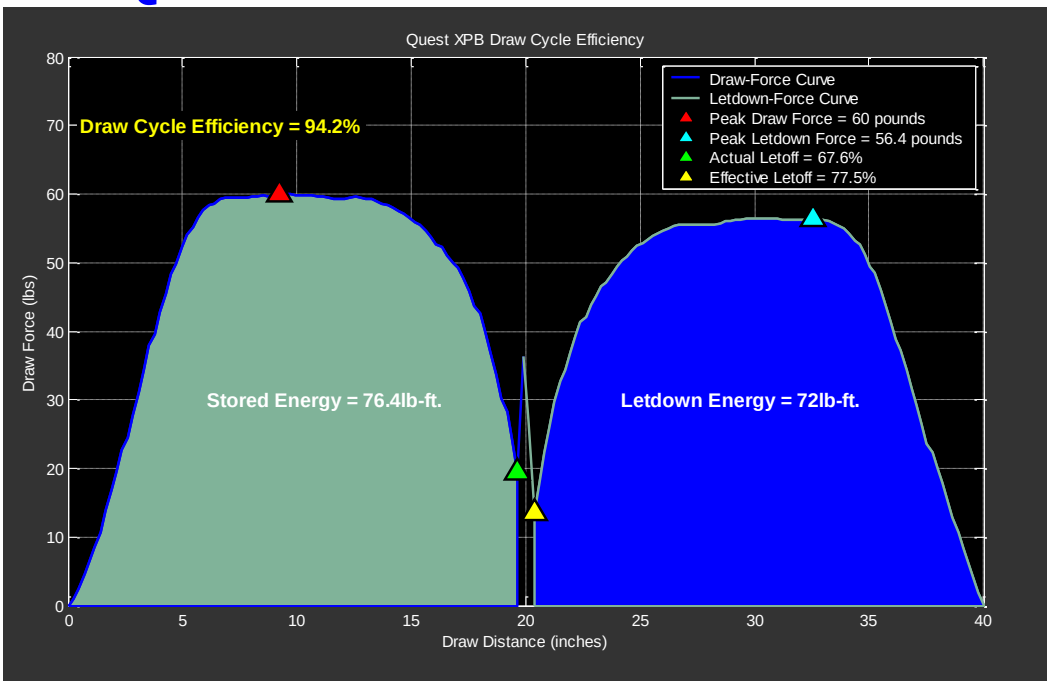
Quest XPB



Introduction:

A relative newcomer to the archery marketplace, Quest offers three different models in their 2009 lineup, with the Quest XPB designated as their flagship offering. Utilizing a Twin Track Binary Cam System, the Instead of using a single cam system found on its brothers, the HPS and QS, the XPB utilizes a Twin Track binary cam system that is licensed from Elite Archery. This cam system offers draw lengths from 27"-30" and provides dual integrated draw stops to fine tune let-off. It is used on conjunction with the patent pending I-Glide Cable System, which replaces a standard cable rod as well as roller-guard assemblies found on some bows, to provide a smooth draw cycle and good speed. The I-Glide Cable System also reduces the number of moving parts as the coated ceramic slides contained within the assembly are stationary at all points of the shot sequence. These features are combined with pivoting limb pockets, a fully adjustable string suppressor, a broadhead guard and BowJax limb silencers, all of which come standard on the XPB, to provide a fine shooting system at a great price.

Quest XPB

Contact Info: Quest Bowhunting

www.questbowhunting.com

MSRP:	$699.99	**Draw Length:**	27"-30" *
Cams:	XPB Binary Cam	**Draw Weight:**	50, 60, 70*
Limbs:	Composite Solid Limb	**Brace Height:**	7 1/2" *
Grip:	Laminate two piece	**Axle to Axle:**	32" *
Let-off:	80%*	**Mass Weight:**	4.0 ^
String:	452X Metrao Precision Strings		
Damping:	BowJax, String Suppressor		*Advertised
Finish:	Realtree® AP®		^Measured

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	306.5	62.6	13.1
360 Grains	281.9	63.5	14.5
420 Grains	263.3	64.6	15.8
540 Grains	234.2	65.8	18.1

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	81.9%	83.1%	84.6%	86.1%
Speed Per Inch of PS:	15.6	14.4	13.4	12.0
Noise Output (dBA):	86.5	87.5	87.4	84.2
Total Vibration (G):	322.2	322.8	336.8	218.0

The XPB sample that was provided to Archery Evolution was measured to have a brace-height of 7.650 inches, while the axle-to-axle length was measured to be 32 3/16 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 1/4 inch draw length and peak draw-weight of 61.4 pounds. At these settings, The XPB achieved an average speed of 311.0 fps when shot by hand in the out of box configuration with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the XPB achieved and average speed of 309.6 fps at these settings. Even though the draw-length was within the test specifications, Quest requested that the XPB be set to exactly 60 pounds, 29 inches and five twists were added to the string per their recommendation.

A thorough examination of the finish quality showed very few imperfections. The only area where any blemishes were noticeable was on the interior portion of the cams; some machining marks were evident in the string track are where the loop end attachment post is located. Other than that, the machining on the XPB was flawless and the Realtree® AP® finish was as good as any I've seen. It is very rare to not have any noticeable blemishes on a riser as the surface area, with all of the cut outs, is quite large. Yet, none were found on the XPB and coverage on the interior portions of the riser was excellent. The camo finish on the limbs mirrored the riser and smooth edges were maintained throughout. Finally, the anodized finish on the limb pockets, cams, string suppressor, and I-Glide cable rod assembly was also impeccable.

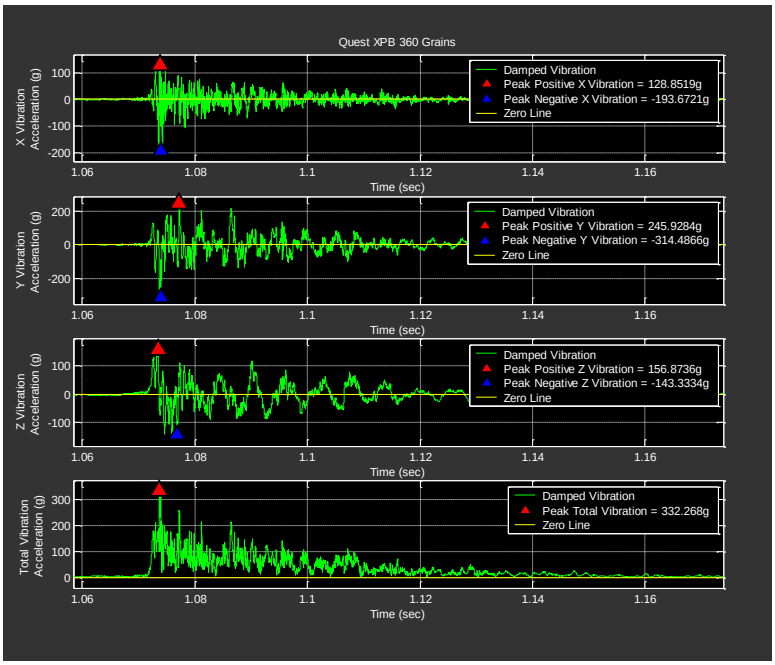
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.9
Dynamic Efficiency: 83.9%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Quest XPB							
	Brace Height = 7.650		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 32 3/16	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	306.6	305	~~281.7~~	281	263.2	263	234.2	233
2	306.3	305	281.9	281	263.2	262	~~234.1~~	233
3	~~306.2~~	305	281.8	281	~~263.1~~	262	234.2	233
4	306.6	305	282.0	281	263.4	262	234.3	233
5	~~306.7~~	305	~~282.1~~	281	~~263.5~~	263	~~234.4~~	233
Avg. Speed	306.5	305	281.9	281	263.3	262	234.2	233
Kinetic Energy	62.6	62.0	63.5	63.1	64.6	64.2	65.8	65.1
Momentum	13.1	13.1	14.5	14.5	15.8	15.7	18.1	18.0
Power Stroke	19.600							
Speed per inch of Power Stroke	15.6	15.6	14.4	14.3	13.4	13.4	12.0	11.9
Avg. Speed per inch of PS	13.9							
Stored Energy	76.4							
Dynamic Efficiency	81.9%	81.1%	83.1%	82.6%	84.6%	84.0%	86.1%	85.2%
Avg. Dynamic Efficiency (BFM)	83.9%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 125.6 g
Negative X-Vibration: -174.3 g

Positive Y-Vibration: 256.1 g
Negative Y-Vibration: -266.4 g

Positive Z-Vibration: 144.2 g
Negative Z-Vibration: -137.4 g

Total Vibration: 300.0 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

B-Stinger Reduction: 19.2%

Sound Measurements:

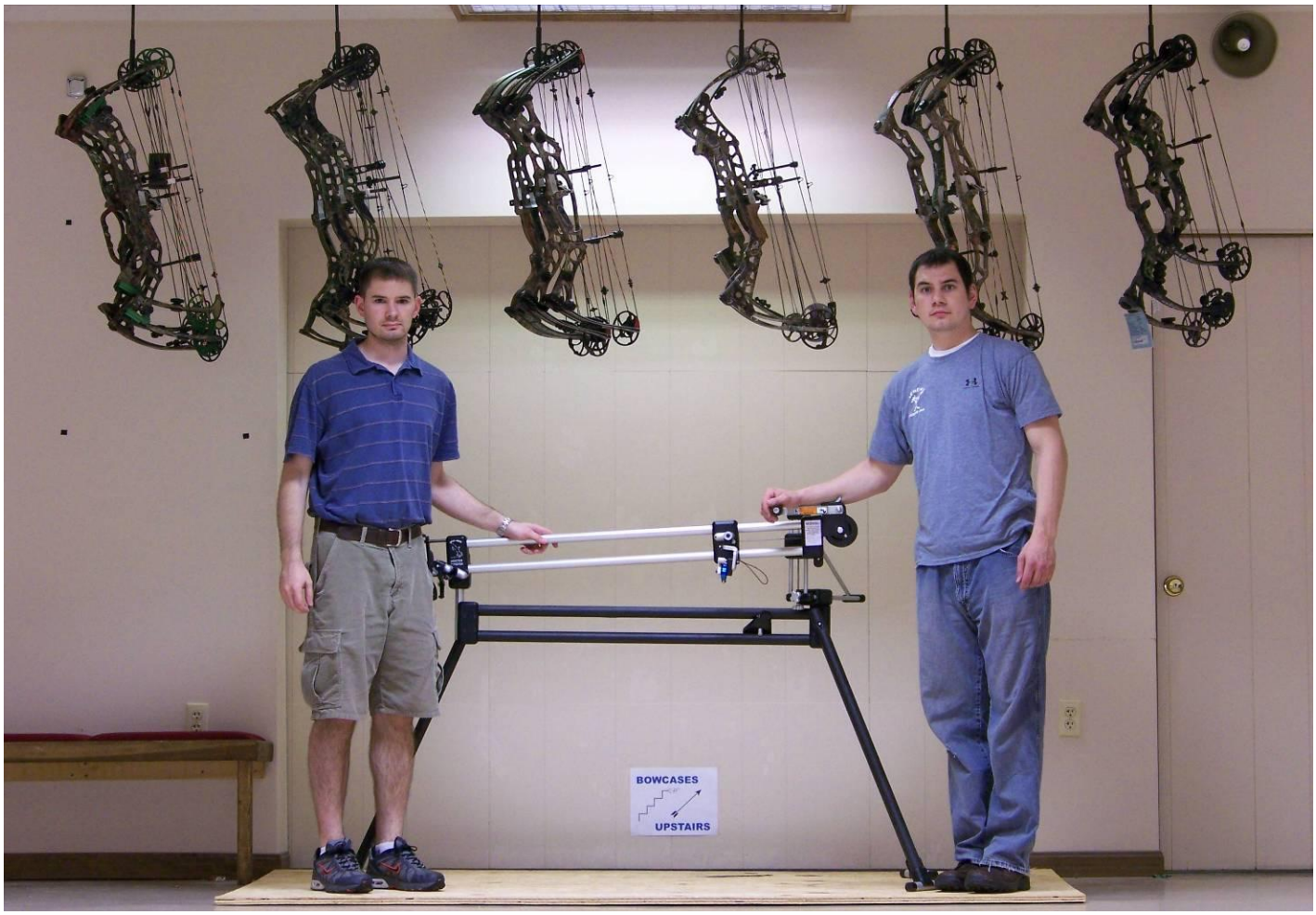
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 104.1 dB
A-Weighted Sound Output: 86.4 dBA
C-Weighted Sound Output: 95.1 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 0.9%

Noise & Vibration	Quest XPB											
	Brace Height = 7.650			Draw Weight = 60			Draw Length = 29			Axle to Axle = 32 3/16		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~106.1~~	105.3	104.0	~~101.9~~	~~90.4~~	~~86.8~~	87.2	83.5	~~98.5~~	95.6	~~94.9~~	~~92.8~~
2	~~104.0~~	~~104.8~~	~~104.2~~	102.2	88.3	~~87.9~~	87.4	~~83.4~~	95.7	~~95.2~~	95.0	93.1
3	105.1	105.3	103.9	102.7	85.8	87.8	~~87.7~~	84.1	95.9	~~96.6~~	~~95.4~~	93.8
4	104.8	~~105.8~~	~~103.3~~	~~104.5~~	85.6	87.2	~~86.7~~	~~88.2~~	96.3	95.8	95.0	~~95.9~~
5	104.2	105.3	103.8	103.2	~~85.5~~	87.6	87.6	84.9	~~95.6~~	95.2	95.3	94.5
Average	104.7	105.3	103.9	102.7	86.5	87.5	87.4	84.2	96.0	95.5	95.1	93.8
Total Average Max	104.1				86.4				95.1			



Anthony Barnum

Jonathan Teater

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2009 Compound Hunting Bow Evaluation

Rytera Alien-X Test Results

By *Anthony Barnum*

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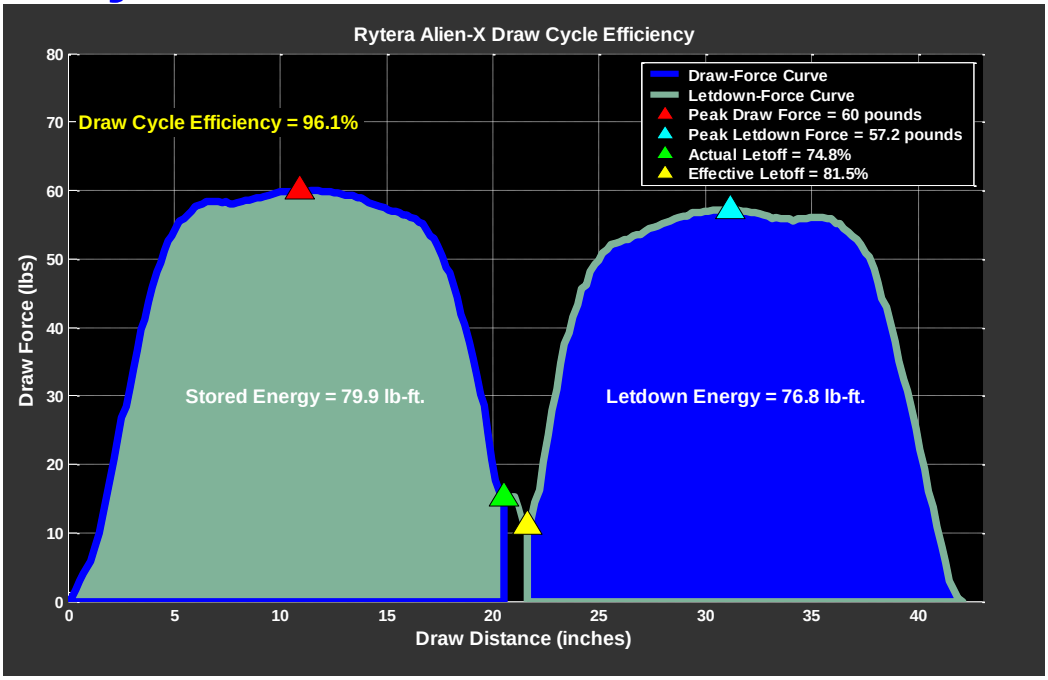


Introduction:

Rytera, the upscale sister company of Martin Archery, offers the Alien-X as its flagship bow for 2009. Combining Martin's time-tested modular riser design with a new eccentric system, the Hybrix Duo Cam, the Alien-X provides modularly adjustable draw length through the use of an integrated rotating module. This cam system is further adjustable through the use of an integrated draw stop, which allows the archer to fine-tune both let-off and valley to fit his or her specific shooting style. The Hybrix Duo Cam system utilizes a roller-guard assembly called the Cable Constraint System, or CCS, in place of the traditional cable guard, to help provide fletching clearance and a smooth feel to the draw cycle. A 2-piece, vented wooden grip acts as the interface between the bow and the archer. This unique setup is wrapped with a leather material and incorporates cut-outs in the grip area to keep mass weight to a minimum while also providing a slim surface to make contact with the bow. The Alien-X is equipped with a V.E.M. silencing arrow shelf, V.E.M. damping modules and an STS string suppressor to help control shock and vibration. The riser consists of machined aluminum components with many cut-outs that, when combined with the cut-outs in the grip area, help achieve an advertised weight of 3.5 pounds. The machine work and bridged structure of this bow is not only functional, it is also quite aesthetically pleasing.

Rytera Alien-X

Contact Info: Rytera

www.rytera.com

MSRP:	$749	**Draw Length:**	26"-30" *
Cams:	Hybrix Duo Cam	**Draw Weight:**	50-70*
Limbs:	5-layer Laminate	**Brace Height:**	7" *
Grip:	Custom Vented Grip	**Axle to Axle:**	31 1/2" *
Let-off:	80%+*	**Mass Weight:**	3.7 ^
String:	BCY 8125		
Damping:	V.E.M, STS		*Advertised
Finish:	NEXT® Camo		^Measured

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	312.6	65.1	13.4
360 Grains	288.3	66.4	14.8
420 Grains	268.9	67.4	16.1
540 Grains	239.4	68.7	18.5

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	81.5%	83.1%	84.4%	86.0%
Speed Per Inch of PS:	15.2	14.1	13.1	11.7
Noise Output (dBA):	95.9	89.4	89.3	88.9
Total Vibration (G):	339.1	345.8	279.8	285.4

The Alien-X sample that was provided to Archery Evolution was measured to have a brace-height of 6.75inches, while the axle-to-axle length was measured to be 31 3/16 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 28 13/16 inch draw length and peak draw-weight of 61.5 pounds. At these settings, the Alien-X achieved an average speed of 320.0 fps when shot by hand in the out of box configuration with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the Alien-X achieved and average speed of 316.2 fps at these settings. Per Rytera's request, minor modifications to the integral draw-stop and limb bolts were made to bring the Alien-X into exact test specifications.

A thorough examination of the finish quality showed a number of imperfections, although none of them would be considered major. Specifically, the riser had many small "pin-prick" areas void of film-dip finish. Some of the interior portions of the riser cut-outs were also lacking in film-dip coverage. Machining marks were noted on the aluminum limb support, the CCS cable guard assembly, as well as the interior portions of the eccentrics. These imperfections are only minor and do not take away from the overall visual appeal of the Alien-X. Other than these few areas, the fit and finish of the Alien-X is quite good with no blemishes noted near the grip, cable guard, and limbs.

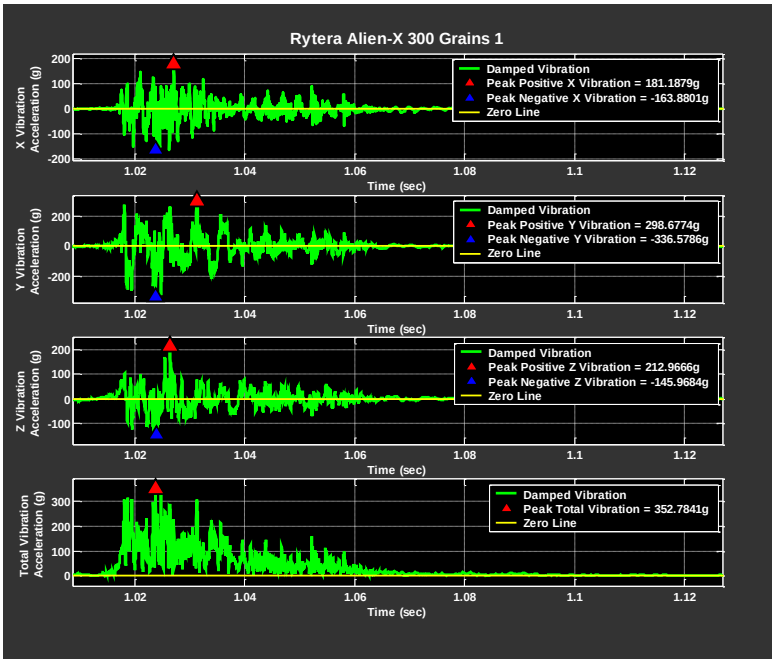
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.5
Dynamic Efficiency: 83.7%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Rytera Alien-X							
	Brace Height = 6.750		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 31 3/16	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	312.6	312	~~287.7~~	287	268.9	268	239.4	239
2	312.6	312	288.3	287	~~268.8~~	268	~~239.3~~	239
3	~~312.4~~	312	288.3	287	268.9	268	239.4	239
4	312.6	312	288.3	287	~~269.0~~	268	~~239.6~~	239
5	~~312.8~~	312	~~288.4~~	287	268.9	268	239.4	239
Avg. Speed	312.6	312	288.3	287	268.9	268	239.4	239
Kinetic Energy	65.1	64.8	66.4	65.8	67.4	67.0	68.7	68.5
Momentum	13.4	13.4	14.8	14.8	16.1	16.1	18.5	18.4
Power Stroke	20.500							
Speed per inch of Power Stroke	15.2	15.2	14.1	14.0	13.1	13.1	11.7	11.7
Avg. Speed per inch of PS	13.5							
Stored Energy	79.9							
Dynamic Efficiency	81.5%	81.1%	83.1%	82.4%	84.4%	83.8%	86.0%	85.7%
Avg. Dynamic Efficiency (BFM)	83.7%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 131.6 g
Negative X-Vibration: -143.0 g

Positive Y-Vibration: 281.7 g
Negative Y-Vibration: -263.0 g

Positive Z-Vibration: 141.8 g
Negative Z-Vibration: -136.7 g

Total Vibration: 312.5 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

B-Stinger Reduction: 12.5%

Sound Measurements:

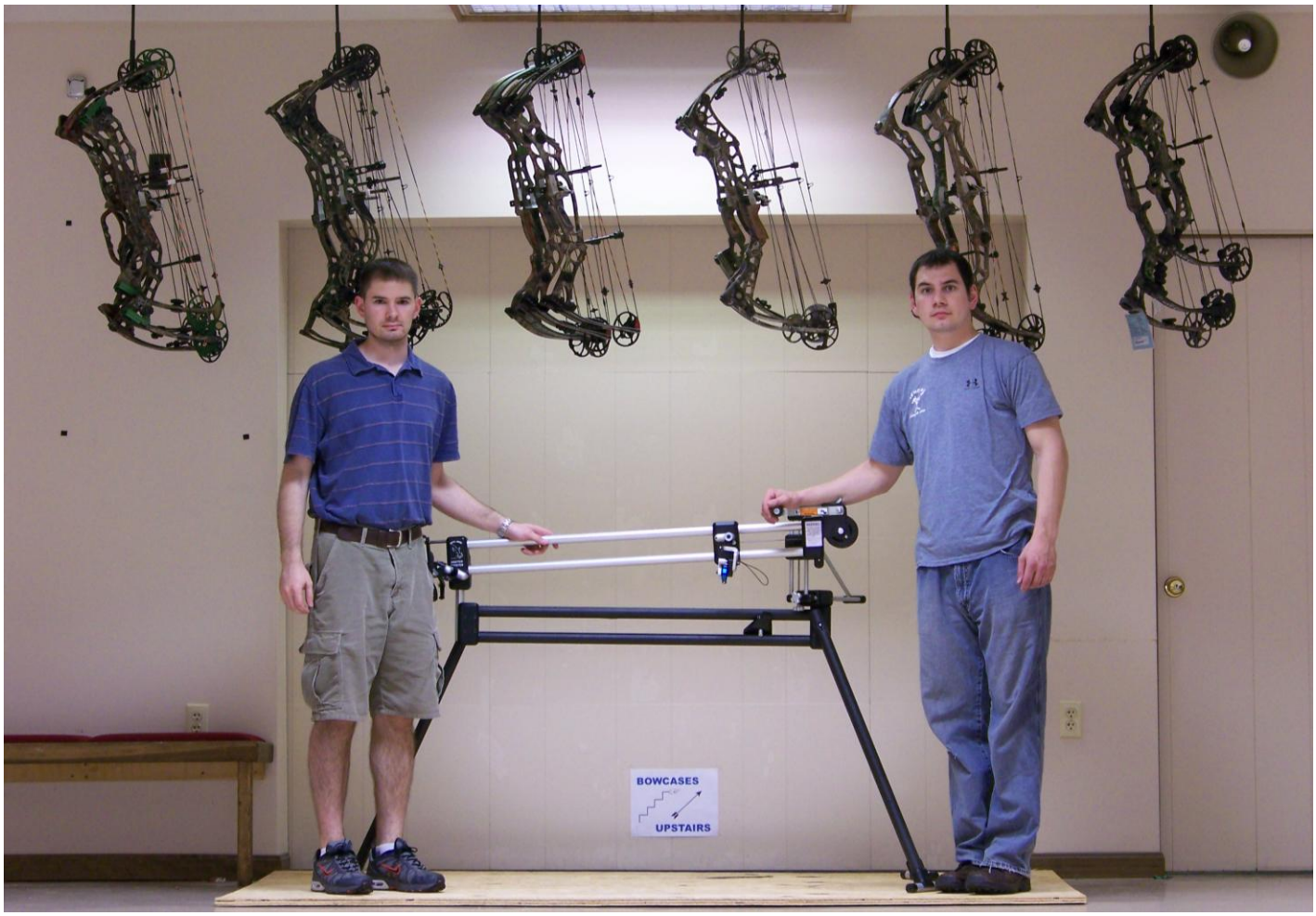
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 107.0 dB
A-Weighted Sound Output: 90.9 dBA
C-Weighted Sound Output: 97.7 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 1.6%

Noise & Vibration	Rytera Alien-X											
	Brace Height = 6.750			Draw Weight = 60			Draw Length = 29			Axle to Axle = 31 3/16		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~109.2~~	~~109.0~~	~~105.5~~	105.8	95.6	88.7	~~88.2~~	~~90.3~~	101.1	~~98.4~~	~~96.0~~	~~99.0~~
2	108.7	~~106.6~~	105.8	104.5	95.8	88.8	~~89.4~~	88.7	100.7	~~95.3~~	96.3	95.5
3	108.4	107.6	107.5	~~103.4~~	~~95.2~~	~~90.9~~	89.3	~~87.4~~	~~101.1~~	97.0	98.3	96.3
4	~~108.4~~	107.6	~~108.1~~	~~105.8~~	~~96.2~~	90.6	89.3	87.6	~~99.9~~	96.4	~~98.9~~	96.5
5	~~108.4~~	108.0	107.0	104.0	~~96.2~~	~~88.4~~	89.3	90.3	~~99.9~~	97.1	97.5	~~95.2~~
Average	108.5	107.7	106.8	104.8	95.9	89.4	89.3	88.9	100.6	96.8	97.4	96.1
Total Average Max	107.0				90.9				97.7			



Anthony Barnum

Jonathan Teater

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Archery Evolution
www.ArcheryEvolution.com

2009 Compound Hunting Bow Evaluation

Ross Carnivore 34 Test Results

By *Anthony Barnum*

www.ArcheryEvolution.com

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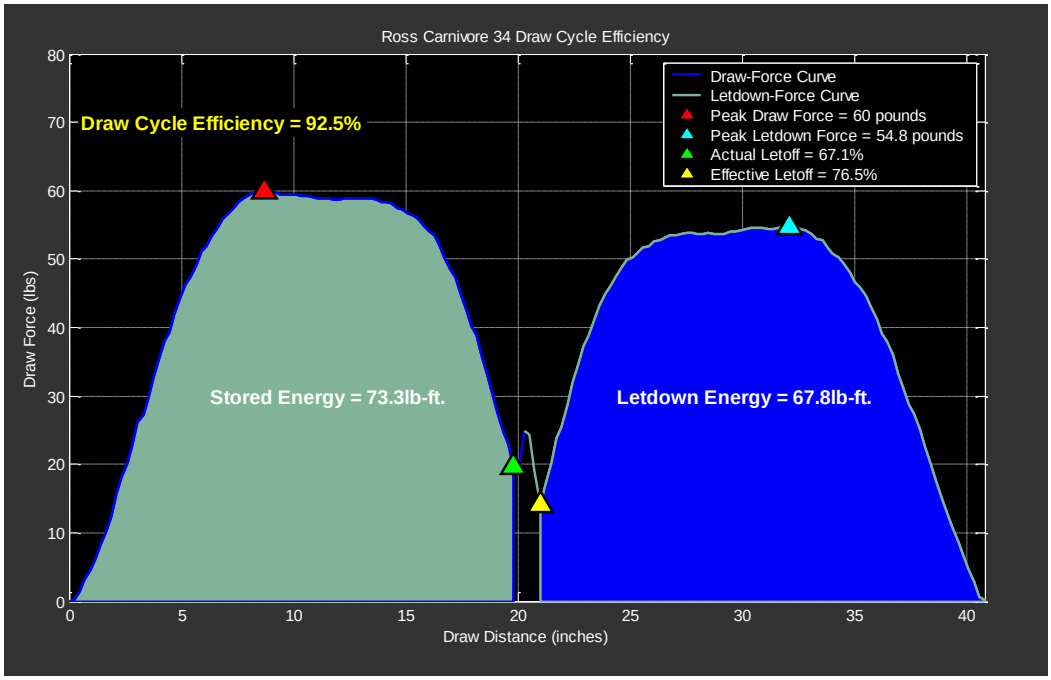
Ross Carnivore 34



Introduction:

As the most recent addition to BowTech's family of brands, the Ross lineup provides an additional outlet for BowTech's R&D team to provide fresh technology. This technology is exemplified in Ross's flagship model, the Carnivore 34, with the addition of the Krank. The Krank is incorporated into a Hybrid cam setup and, for the first time in this type of configuration, provides the ability to tune out any cam lean on both the top and bottom limb. Because the Krank provides a significant mechanical advantage, thicker limbs are required to maintain peak draw weight which Ross says can only help increase durability. Like its BowTech and Diamond counterparts, the Carnivore 34 hybrid cam system also provides a rotating module covering all available draw-lengths without the need for a bow press. It also comes standard with the InVelvet™ finish found in the BowTech and Diamond lines. The Flatline™ damping system, aluminum broadhead guard, and string suppressor come standard on the Carnivore 34 and offer a great value for a bow with an MSRP of $699.

Ross Carnivore 34

Contact Info: Ross Bowhunting

www.huntwithross.com

MSRP:	$699	**Draw Length:**	25"-30" *
Cams:	Hybrid cam w/ The Krank	**Draw Weight:**	50, 60, 70*
Limbs:	Composite solid limb	**Brace Height:**	7 3/8" *
Grip:	One-piece slim line grip	**Axle to Axle:**	34" *
Let-off:	65%-80%*	**Mass Weight:**	4.8 ^
String:	BCY 452X		
Damping:	Flatline™ damping system		*Advertised
Finish:	Realtree® AP® HD		^ Measured

Performance at a Glance (60 lbs, 29"):

Arrow	Speed	K.E.	Momentum
300 Grains	290.1	56.1	12.4
360 Grains	268.2	57.5	13.8
420 Grains	250.7	58.6	15.0
540 Grains	224.2	60.3	17.3

Arrow (Grains):	300	360	420	540
Dynamic Efficiency:	76.5%	78.4%	80.0%	82.2%
Speed Per Inch of PS:	14.6	13.5	12.7	11.3
Noise Output (dBA):	85.1	83.0	82.4	84.2
Total Vibration (G):	363.0	370.5	235.9	267.0

The Carnivore 34 sample that was provided to Archery Evolution was measured to have a brace-height of 7.445 inches, while the axle-to-axle length was measured to be 34 inches. The requested 29 inch, 60 pound model was measured straight out of the box to have a 29 7/32 inch draw length and peak draw-weight of 61.3 pounds. At these settings, The Carnivore 34 achieved an average speed of 295.6 fps when shot by hand in the out of box configuration (brass nock installed) with a 300 grain arrow. When shot from the shooting machine with the addition of a string loop, the Carnivore 34 achieved and average speed of 294.2 fps at these settings. Even though the draw-length was within the test specifications, Ross requested that the Carnivore 34 be set to exactly 60 pounds, 29 inches. A slight adjustment to the integrated draw stop and limb bolts brought the bow into exact specifications in short order.

A thorough examination of the finish quality showed only minor imperfections. Some indentations in the machined aluminum limb pockets were evident, but the grey anodized finish looked excellent with no noticeable imperfections. Various "pin-prick" areas void of film dip finish were also noticed throughout the riser and a more significant blemish with a larger void was noted just above the sight window. Finally, some machining marks were noticeable on the interior portions of the eccentrics. These items are noted strictly for aesthetic purposes as the functionality of the bow is not inhibited in any way. Other than these few items, the Carnivore 34 appeared to be free of any additional cosmetic defects.

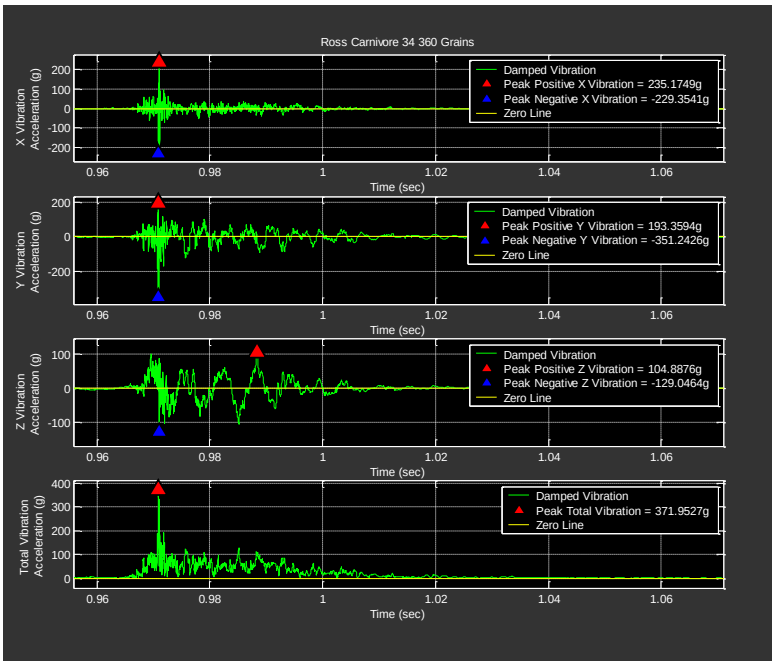
Detailed Test Results:

Speed / Performance Measurements:

Speed measurements were made with 4 different arrow weights to determine the average speed of the bow per inch of Power Stroke. Utilizing the stored energy obtained from the Force-Draw curve, average dynamic efficiency was calculated.

Speed per inch of Power Stroke: 13.0
Dynamic Efficiency: 79.3%

Speed Point Blank - 29" ± 1/4", 60# ± 1#	Ross Carnivore 34							
	Brace Height = 7.445		Draw Weight = 60.0		Draw Length = 29		Axle-to-Axle = 34	
Grains	300 Grains		360 Grains		420 Grains		540 Grains	
Chronograph	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono	BFM	Pro-Chrono
1	290.0	289	268.2	267	250.7	250	~~224.4~~	223
2	~~289.9~~	289	268.2	267	~~250.6~~	250	224.2	223
3	290.2	289	~~268.3~~	267	~~250.9~~	250	224.3	223
4	~~290.6~~	290	268.1	267	250.8	250	224.2	223
5	290.1	289	~~268.0~~	267	250.7	250	~~224.1~~	223
Avg. Speed	290.1	289	268.2	267	250.7	250	224.2	223
Kinetic Energy	56.1	55.6	57.5	57.0	58.6	58.3	60.3	59.6
Momentum	12.4	12.4	13.8	13.7	15.0	15.0	17.3	17.2
Power Stroke	19.805							
Speed per inch of Power Stroke	14.6	14.6	13.5	13.5	12.7	12.6	11.3	11.3
Avg. Speed per inch of PS	13.0							
Stored Energy	73.3							
Dynamic Efficiency	76.5%	75.9%	78.4%	77.7%	80.0%	79.5%	82.2%	81.3%
Avg. Dynamic Efficiency (BFM)	79.3%							



Vibration Measurements:

Vibration measurements were made with 4 different arrow weights to determine the average vibration in 3 dimensions as well as the total average vibration.

Positive X-Vibration: 203.5 g
Negative X-Vibration: -160.6 g

Positive Y-Vibration: 170.0 g
Negative Y-Vibration: -295.7 g

Positive Z-Vibration: 106.1 g
Negative Z-Vibration: -117.2 g

Total Vibration: 309.1 g

The addition of a 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a significant reduction of peak total vibration when measured with a 360 grain arrow.

B-Stinger Reduction: 8.6%

Sound Measurements:

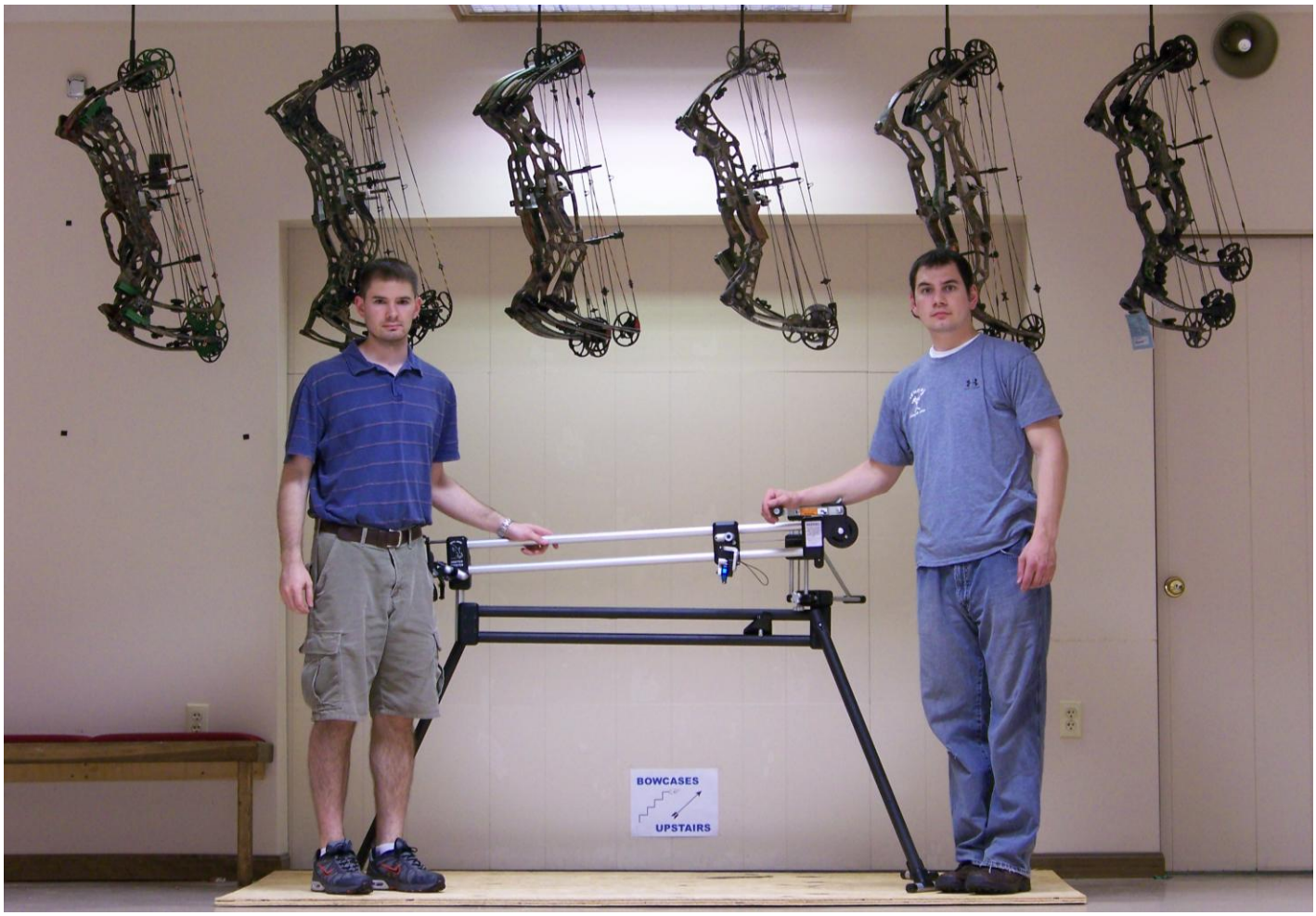
Sound measurements were made with 4 different arrow weights to determine the average sound output, the average A-Weighted sound output (mimicking the human ear) and the average C-Weighted sound output.

Unweighted Sound Output: 101.1 dB
A-Weighted Sound Output: 83.7 dBA
C-Weighted Sound Output: 92.7 dBC

The addition of the 12 inch B-Stinger Pro Stabilizer with a 14 ounce weight yielded a reduction of peak A-weighted sound Output when measured with a 360 grain arrow.

B-Stinger Reduction: 0.6%

Noise & Vibration	Ross Carnivore 34											
	Brace Height = 7.445			Draw Weight = 60			Draw Length = 29			Axle to Axle = 34		
Parameter	Peak Noise Output (dB)				Peak A-Weighted Noise Output (dBA)				Peak C-Weighted Noise Output (dBC)			
Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains	300 Grains	360 Grains	420 Grains	540 Grains
Measurement	Max				Max				Max			
1	~~102.5~~	~~101.8~~	101.3	~~100.2~~	84.8	83.1	~~83.9~~	~~86.8~~	~~94.1~~	93.3	~~93.4~~	~~92.0~~
2	102.0	~~100.8~~	~~102.0~~	99.6	85.4	~~85.8~~	83.5	86.7	93.7	92.6	93.2	91.8
3	102.2	101.8	100.9	100.0	~~85.5~~	~~82.6~~	80.3	82.5	94.1	~~93.5~~	92.8	91.2
4	101.9	101.6	~~100.0~~	100.0	85.3	82.6	~~79.2~~	83.5	~~93.4~~	93.2	92.1	90.7
5	~~101.5~~	100.9	100.7	~~97.5~~	~~82.8~~	83.1	83.3	~~80.1~~	93.4	~~92.3~~	~~91.9~~	~~88.1~~
Average	102.0	101.4	101.0	99.9	85.1	83.0	82.4	84.2	93.7	93.0	92.7	91.2
Total Average Max	101.1				83.7				92.7			



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