

# Crossbow Report: Defender CLS by TenPoint

by Jon Teater

The Defender CLS™ produced by TenPoint is the first crossbow product test of 2010. The Defender CLS went through a standard and regimented performance test. The focus of these types of tests is to determine, for a specified product, the performance characteristics. Additionally, the goal is to provide those archers that enjoy shooting and/or hunting with appropriate objective information, as well as some subjective commentary, for aiding in the purchase process. With that said, this evaluation is by no means conclusive; some tests could not be performed due to limitation in resources, time, or budget. Each archer should assess what is important to him or her and interpret the results within the context of this article. As always, I recommend that anyone who is considering a crossbow, shoot as many different makes/models as possible to determine what best suits their individual needs and desires.



Due to the lack of testing methods/procedures available publically for crossbows, testing guidelines were developed and published in 2009. These testing guidelines were established to help better understand the products that we will be evaluating.

Production Information and Testing:

Introduction:

TenPoint, an Ohio based crossbow manufacturer, has jumped into 2010 with several new products and has enhanced products released in 2009. The Defender CLS is a previously released product that possesses some improved features. This product maintains that ever-present feel of

quality that you come to expect from TenPoint. TenPoint arranges their products in either the TenPoint Series or 6 Point Series lines. Both series establish a slightly different set of core features. The Defender CLS falls under their 6 Point Series product line. The features of the line have core technologies ingrained into each product that are geared to support accuracy, dependability and durability.

The Defender CLS was provided as a package, and consists of the following components: The 3X Pro-View Scope, ACUdraw 50, 4-Arrow HX Quiver, Six-pack of TenPoint aluminum arrows with field points, TenPoint Staff Shooter Field Cap and instructional DVD

The crossbow dimensions/weights measured out of the box:

Defender CLS			
Contact Info	TenPoint <a href="http://www.tenpointcrossbows.com">www.tenpointcrossbows.com</a>		
MSRP (with package- ACUdraw50)	\$999	Finish	Mossy Oak Treestand
String Material	Ultra Cam™ by Brownell	Stock	Verton
Limbs	Pultruded Fiberglass with Laminate		
Performance at a Glance			
Arrow	Speed	K.E.	Momentum
425 Grains	334.3	105.5	20.3
475 Grains	319.6	107.7	21.6
525 Grains	307.1	110.0	23.0

Dimensions							
Model	Axle to Axle	Axle to Axle (full draw)	Powerstroke	Rail*	Overall Length	Mass Weight (including scope)	Mass Weight (without scope)
Defender CLS	21.875"	17.0625"	12.75"	19.5"	37.9375"	9.4 lbs	8.5 lbs

Note: The "Rail" measurements were taken from the front of the rail to the front of the string at the full-draw position

Next, the crossbow went through a thorough inspection to determine any imperfections. The review focused on string/cables, eccentrics, limb and limb pockets, rail, prod, stock, butt plate, trigger housing, trigger and trigger guard. The product had a minor imperfection in the fit and finish category. There were a couple of small nicks in the finish on the limb tips. These blemishes did not hinder the product's performance. Overall, the product was normal in this department.

Thereafter, the product goes through a 100-150 shot cycling to verify functionality. Some minor testing is performed, but the focus is to detect any issues or concerns with the product before starting the actual performance testing. The product performed fine during this portion of testing. One issue was noted, the ACUDraw 50 somehow came unwound after the crossbow was drawn and the clips/string did not fully retract. The ACUDraw 50 case was quickly opened and the string was rewound, not permitting too much of a hiccup in the testing. No other issues were discovered as we completed our shooting.

The crossbow is next evaluated on the five (5) criteria outlined below:

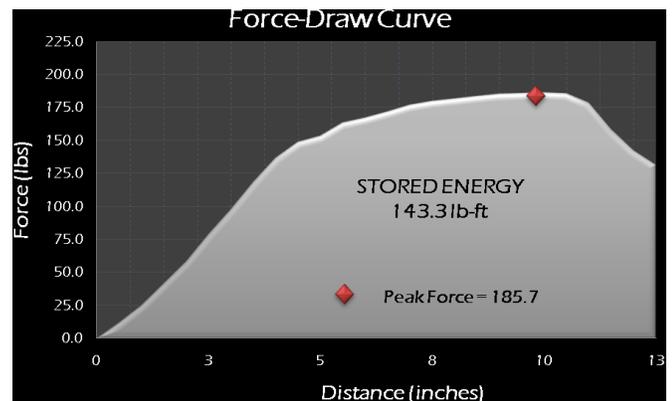
Test Category	Assessment
<b>Dynamic Efficiency</b>	Provides an indication of the amount of energy output by a crossbow relative to the energy expended through drawing the crossbow back. An assessment is made with multiple projectile weights.
<b>Speed per inch of Powerstroke</b>	Provides an indication of the amount of speed output by the crossbow over the distance from the full-draw position to the static brace height position. An assessment is made with multiple projectile weights.
<b>Noise Output</b>	Provides an indication of the noise output characteristics of a bow at the "point blank" range utilizing a series of shots with multiple projectile weights.
<b>Trigger Force</b>	Provides an indication of the amount of force required to discharge a given crossbow.
<b>Precision Test</b>	Provides an indication of how close groups are shot together by shooting from a bench rest or other supportive device.

## Detailed Test Results

### Dynamic Efficiency:

The dynamic efficiency portion of the test utilizes a Revere Load-Cell controlled by a winch device; the load-cell connects to the crossbow with a cocking aid. The crossbow is mounted in a shooting platform that controls any movement that might be experienced as Force-Draw curves are taken. The stored energy obtained from the Force-Draw curve, is used in conjunction with speed measurements to calculate dynamic efficiency.

<b>Peak Force</b>		<b>185.7</b>	<b>lbs</b>
<b>Stored Energy</b>		<b>143.3</b>	<b>lb-ft</b>
<b>Dynamic Efficiency</b>	<b>425 grains</b>	<b>73.6</b>	<b>percent</b>
<b>Dynamic Efficiency</b>	<b>475 grains</b>	<b>75.2</b>	<b>percent</b>
<b>Dynamic Efficiency</b>	<b>525 grains</b>	<b>76.7</b>	<b>percent</b>



## Speed/ Performance Measurements:

shot	Weight (grains)	Chrono 1	Chrono 2	shot	Weight (grains)	Chrono 1	Chrono 2	shot	Weight (grains)	Chrono 1	Chrono 2
1	425	333.9	331	1	475	319.7	317	1	525	307.1	303
2		334.2	331	2		319.6	316	2		307.1	303
3		334.3	330	3		319.5	316	3		307.1	303
4		334.5	331	4		319.6	316	4		306.8	303
5		334.5	331	5		319.4	316	5		307.3	303
avg (fps)		334.3	331	avg (fps)		319.6	316	avg (fps)		307.1	303

## Speed per inch of Powerstroke:

Speed measurements were taken with three (3) different projectile weights to provide an adequate profile of the crossbow's velocity. A 2009 Pact Chronograph XP and a Competition Electronics Pro-Chrono IR are set in tandem to record results. The average speed measurements indicated by the chronographs are divided by the powerstroke to determine the speed per inch of powerstroke.

	Weight	Speed Per Inch of PS
Speed per inch of Powerstroke	425 grains	26.2
	475 grains	25.1
	525 grains	24.1
Powerstroke	12.75	inches

## Noise Output:

Sound measurements were recorded with three (3) different arrow weights to determine the average noise output, the average noise is A-weighted (dB A) (mimics the human ear). A CEL-430 sound level meter is used for this test. As shown in Sound Figure 1 and 2, the Defender CLS was tested with and without the damping components from Bowjacks. The damping components were removed per the manufacturer's direction. The product was tested in both scenarios under the same conditions using the identical test parameters.

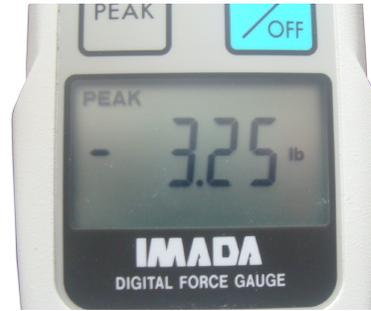
SOUND FIGURE 1: Product with damping components			
Sound Measurements			
Weight (grains)	425	475	525
Parameter	Peak A -Weighted Noise (dBA)		
1	93.8	91.8	90.6
2	93.0	91.9	90.0
3	94.2	91.5	90.2
4	93.5	91.0	89.6
5	92.9	91.2	89.7
6	92.6	91.3	89.4
7	92.8	91.2	89.7
8	92.4	91.1	89.6
9	93.0	91.0	89.8
10	92.8	91.0	89.7
Average	93.1	91.3	89.8
Total Avg Max	91.4		

SOUND FIGURE 2: Product without damping components			
Sound Measurements			
Weight (grains)	425	475	525
Parameter	Peak A -Weighted Noise (dBA)		
1	92.8	91.7	89.8
2	93.6	92.6	91.0
3	94.0	92.2	90.6
4	93.8	92.6	91.1
5	93.9	92.7	91.0
6	93.6	92.3	90.8
7	93.7	92.9	91.0
8	93.8	92.2	90.9
9	93.9	92.7	91.0
10	93.8	92.5	91.1
Average	93.8	92.5	90.9
Total Avg Max	92.4		

Trigger Analysis	
	Trigger Pull (lbs)
1	<del>3.11</del>
2	3.49
3	3.73
4	3.32
5	3.15
6	3.32
7	3.39
8	3.25
9	3.27
10	<del>3.75</del>
11	3.29
12	3.55
13	3.45
Average Trigger Pull (lbs) 3.38	
Distance Traveled (inches) 0.354	

**Trigger Force:**

The Trigger Force measurements were recorded in pounds and averaged. An Imada Digital Force Gauge is used in determining the Trigger Force.



**Precision Measurements:**

Provides an indication of how close groups were shot together when shooting by hand from a bench rest or other supportive device. Extreme spread is the method used to calculate group size.

Projectile Precision						
	Model/Brand	Arrow Weight	Distance (yards)	Spread 1 (inches)	Spread 2 (inches)	Average
Shooting by Hand	Easton Pwr Bolt	446	40	2.100	1.979	2.040
Shooting By Hand	Easton 2219	437	40	1.920	1.929	1.924

**Overview:**

The Defender CLS arrived inside the Bow-Max case (please note this is an optional feature and is not included in the MSRP stated above). The product was well supported in the case and came as a complete package. TenPoint has focused much attention on the completeness of these packages. Their packages have accessories installed, projectiles available and the crossbow is boresighted from the factory. The items mentioned create a ready-to-shoot package, saving precious setup time. The next element of the Defender CLS is its eye-catching look and profile. The aesthetics are undoubtedly pleasing, and the product has a technologically advanced look. The product is engineered with features that are tasteful, and the appearances of various components seem styled in a manner that most consumers will favor. The overall appearance is finished off with Mossy Oak Treestand camouflage, which has been a top choice for many archers over the past year. TenPoint's product innovations are apparent in the 6 Point Series Line and these features, which are incorporated into the Defender CLS, allow for a fruitful shooting experience. Some of the key innovations of the product are the Patented Power Touch Trigger, ACUDraw 50, synthetic cable yokes, dry-fire-inhibitor (DFI) and the one-piece aluminum riser with integrated stirrup.



**The Off-Shoot:**

The product has some remarkable features, so it was difficult to depict areas that needed improvement. However, with the increases in technology over the past few years, designers/manufacturers are gradually incorporating new concepts into their product lines. With that said, TenPoint has actually revealed some major improvements in their 2010 line. TenPoint is designing products to be overall smaller dimensionally, through a

parallel limb design and smaller riser. Although, these technologies are not present in this product, which is understandable, you may see a decrease in shock and vibration with their next generation of TenPoint technology. Another point to mention is the benefits of a smaller design, which are numerous, but seem to gain the most praise by increasing maneuverability. Nevertheless, the Defender CLS is a vast improvement to products available in the past. One major design feature that could be improved, but not necessarily something I disliked about the product, is the slightly loud noise made by the safety as it is disengaged. The last point is only a minor concern, but for safety reasons a robust trigger, adequate safety mechanism and strong engagement mechanism should supersede any concerns of loudness. Another foreseen improvement with this product is decreasing its overall weight. Then again, the product aligns well with the other companies in this category. On the down side of that change, a decrease in material causing a reduction in weight may not permit the vibration to be absorbed or dissipated as well. A final element to mention, the archer needs to be conscious of the relationship of the stirrup and a projectile tipped with a broadhead (mechanical or fixed). There should be adequate clearance, but if an archer is using an extremely obtuse fixed broadhead or a mechanical that is inclined to open prior to shooting there is an opportunity for contact with the stirrup.

#### The Technology:

The Defender CLS has many notable features that were found to be innovative and beneficial as compared to the competition. The product has ergonomics geared for the archer, and the stock and fore-grip allow for much needed comfort. The contoured fore-grip fosters control when shooting, and is located at the center balance point that most consider the optimal location for shooting. The stock also has a raised cheek piece that helps align the archers cheek/face to the telescopic sights. All these features create a well-designed stock that provides a stable platform for accurate shooting.

The next noteworthy feature is the Patented Power Touch Trigger. The force measurements that were recorded are in line with the advertised trigger measurements. The trigger has a very light pull in comparison to some of the competitors' products. The trigger is designed to have a short distance that the weight stacks and reaches a definite breaking point, which is 100% predictable. As shown in the "shot by hand" portion of the testing, this feature aided in shooting some very respectable groups at 40 yards.

The final discussion point for this product focuses on the sound and vibration characteristics. TenPoint asked to have the product tested with and without the Bowjax Noise/Vibration Damping Kit (please note this is an optional feature and is not included in the MSRP stated above). In the past, much of the testing I have done revealed little to no changes in sound characteristics when adding small damping components to compound bows or crossbows. The Bowjacks are located in-between the limbs and incorporated into the rail. However, after agreeing to perform the test requested by TenPoint I was actually amazed to see the sound meter detect a reduction in sound with the dampening kit. Overall, the total reduction was approximately one (1) decibel (weighted dBA), which I felt was a major improvement. In perspective, a decrease of 3 decibels reduces sound by one-half of the power it gives, and an increase by 3 decibels is twice the power it gives. Another aspect noted during this test was the decrease in the overall loudness of the product when shot. The equipment per the weighting filter does not depict this element, but there was a distinguished difference. Additionally, the foremost benefit of the Bowjacks was the decrease in vibration when shooting the Defender CLS. The strategic locations of the Bowjacks allowed the vibration to be damped, and from the shooters perspective there was a reduction in felt shock.

Overall, this product has many advantageous features and innovations. The crossbow exhibits good performance characteristics that will strike a favoring opinion with many consumers.

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

Scorpion Venom Archery Lubricants provided wax, lubricants and crossbow rail lube. The rail lube is stated to have the ability to increase speeds upward to 1-2 fps.

