

Brass Comparison Evaluation

August 2016

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As the Master Instructor at Illinois Reloading Labs, I am often approached by students and shooters who are seeking ways to improve their hand loads. Invariably we end up discussing brass and how different brands can impact group size. There are a number of brass makers in the market today both foreign and domestic. Brands such as Lapua, Nosler, Hornady, Swift, Norma, Remington, Winchester, Federal Lake City, make up the bulk of the market. These companies break down into three basic categories: Standard Commercial, Military and Match. My focus for this comparison is on the category identified as "MATCH BRASS".

Match Brass is considered by most reloaders as separate category due to the perceived higher degree of consistency and uniformity designed into the manufacturing process. This increased precision also results in a higher cost product. But, exactly how do these different brands stack up against each other. Uniformity ultimately contributes to smaller group size due to a more consistent bullet release and pressure curve upon ignition. This is precisely what this month's research project is intended to determine.

Background

Let me begin by stating that this is not a total industry comprehensive comparison of all brands. I would not rule this out for a future project, but for now we will focus on four. But, to ensure value to our students and readers, I have selected a few well-known brands and one NEW-to-market product that I was fortunate enough to receive sample units for to include in this comparison.

Overview of the brass selected:

Lapua brass is well known and respected by match shooters world-wide. Many competitions have been won using Lapua brass. The following are the benefits as advertised by Lapua:

- The base, body and neck of the Lapua cases have been designed to maintain exact tolerances over multiple reloading cycles. Advanced metallurgical research and manufacturing techniques ensure that Lapua cases are leaders in uniformity and quality.
- Lapua cases are the best in the world. The marksmen themselves think this way. The .220 Russian, for example, is the number one choice of the best benchrest shooters all over the world. All our cases are strong and uniformly precise. Lapua cases are manufactured to be reloaded, again and again.

Base

- The Lapua case heads are drawn exceptionally hard for unmatched reloadability and exceptionally long life. The dimensions remain constant and will hold primers tight in their pockets even after many reloadings.

Body

- The brass body section is hard and resilient for unmatched durability. It is easy to extract after firing, whether full sizing or only neck sizing was used in reloading.

Neck

- Strict tolerances in concentricity and wall thickness are used in manufacturing. The neck and shoulder are annealed to withstand repeated reloading.

Nosler Custom Brass has been growing in popularity for sometime within the tactical and match crowd due to their consistency. Here are the benefits that Nosler advertises with their brass.

- Fully prepped, ready to load
- Case mouths are chamfered and deburred
- Nosler Brass is hand-inspected and weight-sorted
- Flash holes are deburred and checked for proper alignment

- Each piece of brass is full length sized and trimmed to proper length

Kinetic Industries is our newcomer. Their Corporate Offices are located at 7887 Fuller Road #104, Eden Prairie MN 55344. They offer both Match Brass and Loaded Ammo. Designed to compete with the well-established brass makers we will see how they stack up. Here are the specs advertised by Kinetic for their Match 308 Win.

Kinetic Industries .308 Casing Specs

- Primer Pocket Diameter: .2080 - .2090
- Head diameter: .4680 - .4720
- Head Thickness: .048 - .054
- Length to Shoulder: 1.634 - .007
- Overall Length: 2.002 - 2.010

Federal Lake City has been a favorite of the High Powder rifle crowd for years. Not advertised as Match per se, but it's been used as such for so long I felt compelled to include it in this comparison. This brass has been once fired, cleaned and compared as best we could. All pieces came from the same lot/box to ensure a proper representation.

Process and Tools

Lapua, Nosler and Kinetic were taken from NEW Sealed packages of 50.

Lake City, was taken from a single box, once fired.

Each piece of brass was precisely weighed on a Sartorius digital scale calibrated to .01 of a grain and separated into .1 grain groups by brand. A count was taken on the number of pieces within each group including identifying the lowest and highest weight pieces. A chart has been provided to show the consistency by weight and range.

Next, each brand was measured on the appropriate tools for case neck concentricity/runout, overall case length, average case neck thickness (thin side and thick side), and headspace measurement. The results of these are provided in the results. I have included both the range of measurement and differences found from low to high.

Since some of the brands evaluated claim they are "ready to load, right out of the box" I have included some observations as to their readiness.

Conclusions

As you will see in the actual findings below, not one brand came out on top in all areas. Here's the outcome.

Nosler – Wins on most consistent by Weight (they DO sort their brass by Wt.) this is proven by our results
Lapua comes in second.

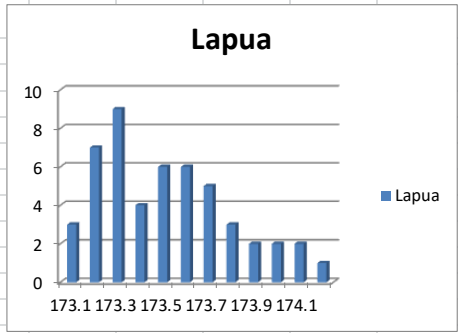
Kinetic – Wins for most consistent Overall Length
Nosler and Lake City come in a close tie for second.

Lapua – Wins for most consistent Neck Thickness
Nosler second place, and Lake City and Kinetic tied for 3rd

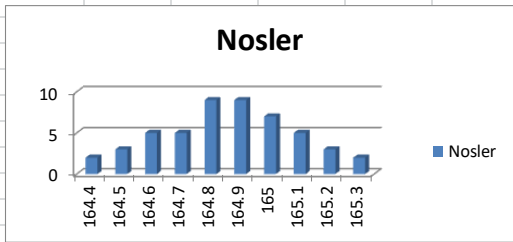
Kinetic – Wins for lowest Neck runout/Concentricity
Lapua and Nosler tied for second

I admit that I'm a very fussy about the condition of my brass prior to loading. With that out of the way, I must take to task all claims that any of these cases are ready to load "out of the box". Case dents, imperfect case mouths, different overall lengths and such preclude any of these from qualifying as ready to load. I would run all of these through a Full Length sizing die to iron out any case mouth variations and trim all to a uniform length and deburr case mouths again before seating.

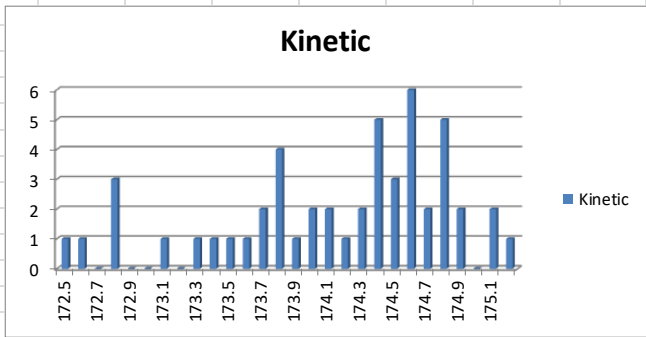
50 Case Batch	Case Wt. Distribution in Grains		
Lapua			
	Min	Max	Delta
Case Wt Range	173.1	174.4	1.3
	Min	Max	Delta
OAL Range	2.005	2.009	0.004
	Min	Max	Delta
Neck Thickness	0.0147	0.015	0.0003
Neck OD	0.335		
Neck Concentricity	0.0035		
Head Space	1.616		



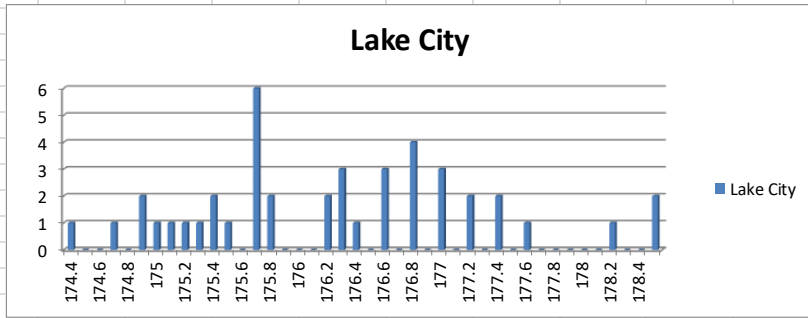
50 Case Batch	Case Wt. Distribution in Grains		
Nosler			
	Min	Max	Delta
Case Wt Range	164.4	165.3	0.9
	Min	Max	Delta
OAL Range	1.997	1.999	0.002
	Min	Max	Delta
Neck Thickness	0.0129	0.0134	0.0005
Neck OD	0.3315		
Neck Concentricity	0.0035		
Head Space	1.613		



50 Case Batch	Case Wt. Distribution in Grains		
Kinetic			
	Min	Max	Delta
Case Wt Range	172.5	175.2	2.7
	Min	Max	Delta
OAL Range	2.003	2.004	0.001
	Min	Max	Delta
Neck Thickness	0.0132	0.0144	0.0012
Neck OD	0.331		
Neck Concentricity	0.0025		
Head Space	1.611		



43 Case Batch	Case Wt. Distribution in Grains		
Lake City			
	Min	Max	Delta
Case Wt Range	174.1	178.5	4.4
	Min	Max	Delta
OAL Range	2.005	2.007	0.002
	Min	Max	Delta
Neck Thickness	0.0141	0.0153	0.0012
Neck OD	0.332		
Neck Concentricity	N/A		
Head Space	1.619		



Performance at the range.

Regardless of the numbers, the most important test for any rifle brass is how it performs when loaded and fired. To compare the four brands, the following test was developed at the Illinois Reloading Lab facility.

- 1) Select 10 of the most consistent cases (using the data above) from within each brands 50 count lot.
- 2) Run each piece through a die that only ensure the neck's ID (Internal Dimensions) were perfectly round
- 3) Each case was loaded with
 - a. Federal 210M (Match Grade) primers
 - b. 46.04 grains of Hodgdon CFE223 (yes we did measure powder to the hundredths of a grain)
- 4) 40 Hornady 168 grain .308 match BT bullets we chosen (with consistent wt and length base to Ogive)
- 5) Each bullet was hand seated to the same exact depth with the Lab's L.E. Wilson Micrometer Seater
- 6) Each completed round was measured for bullet concentricity and corrected (if needed) to .001 or less

Since the intent of the assessment was to show the differences between the brands, no case uniforming, resizing, trimming or deburring was done to any of these cases. We wanted to show how each brand performed "as-is".

The Rifle Used for this test was an enhanced Remington 700 SPS Varmint. 1 in 12 Rt Twist, 26 in, .84" diameter (at the muzzle) barrel. The action sits in a HS Precision stock, Jewel trigger (tuned to 2.5 pounds), David Tubb Speedlock firing pin and spring. Our optics are Leupold Mark 4, 8.5x25 attached to a 20MOA LaRue Tactical quick release 30mm ring/base package. All shots were from a bench rest at 100 laser measured yards. Weather conditions were 85 degrees HOT with high humidity and a 3-6mph right to left quarter value wind. We purposely choose this range due to the real world conditions.

The session started with 2 fouling rounds to allow the rifle to settle in. and carbon up.

Evaluation rounds were fired in 3 shot groups with 1 minute between each shot to allow for barrel cooling.

After each 3 shot group, the rifle was left to cool for 5 minutes before the next brand was fired.

The order of firing was Lapua, Nosler, Kinetic and Lake City. Three, "3 shot" groups were fired from each brand in round robin fashion to eliminate any shooter errors from impacting the results. The best **3 shot group** was chosen (as long as it was consistent with the other two).



Lapua



Nosler



Kinetic



Lake City

Group Sizes were measured using the center of the two furthest bullet holes with a digital Dial Caliper.

Lapua Group Size = .3965 **3rd Place**

Nosler Group Size = .3765 **1st Place**

Kinetic Group Size = .3840 **2nd Place**

Lake City Group Size = 1.0590 **4th Place**

Final Conclusion – The Results are in. When you invest hard earned money on match quality brass you should expect consistency, predictability and small group size. A phrase commonly used by precision marksman is “Speed doesn’t win matches, accuracy does”. So for those of you looking for quality brass, the results of this evaluation may come as a surprise. Street prices for our participants are as follows:

Lapua Box of 100 @ 74.99= \$0.75 per case
Nosler Box of 50 @52.99= \$1.06 per case
Kinetic Box of 100 @55.00= \$0.55 per case
Federal LC Bag of 100 @41.99= \$0.42 per case

Looks like you don’t have to break the piggy bank to get solid performing match brass. Lapua and Nosler come with a premium price and the results are noteworthy. But our newcomer really performed. I have to give credit to the team at Kinetic Industries. The group size difference between first (Nosler) and second place (Kinetic) was a mere .0075 of an inch, but at nearly half the price I have to declare **KINETIC INDUSTRIES the winner in this study**. If Kinetic was able to presort their brass by weight before packaging and watch their neck thickness variance, they would really take the brass industry by storm.

Tied for Second Place are Lapua and Nosler. Both were very consistent in weight and neck thickness. It’s clear why they can command a higher price and are often selected by the most discriminating competitors. Last place is our lowest cost winner and bulk brass provider from Federal Lake City. For general purpose ammo this brass still maintains a minute of angle accuracy. Excellent for hunting and tactical shooting, but not up the level of the Match Brass we used for this study. ..end..

“This independent study was performed by Illinois Reloading Lab’s, the premier US Rifle, Pistol and Shotgun Shell Reloading training facility. Reloading courses are available for all levels - beginner to highly advanced competitors and hunters. Courses and schedules can be found at www.reloadinginstructor.com”