

# ORSA RIFLE AND PISTOL CLUB



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## ANNEALING BASICS – PART 1

*By Mike Glasman*

Part of the journey towards being "Best in Class" as a club is providing understandable and pertinent technical information to help make informed decisions on what is needed to be safe and provide an edge to excel. This month we begin with the first of three articles about the art and science of annealing rifle brass. After reading these articles, you should have a good idea of what happens to rifle brass when it's fired, what annealing is, and how it's done.

*Let's begin with a question: Is it possible to make brass last longer and produce tighter groups?* It may sound too good to be true — after all, we usually expect to give up something to get something else. However, when case necks are annealed, neck splitting is far less likely to occur; and it has been shown that group sizes shrink. With the expense of buying brass and the effort to prep match brass, getting more life out of the brass should appeal to those that have a limited quantity available to them.

*Next Question: What happens to a brass case when it's fired and re-sized?* We know it grows in diameter and length, because it must be re-sized and trimmed. Other unseen things occur due to being stretched and forced back to original size by the re-sizing die. The brass becomes ***work hardened***, loses some ***ductility***, becomes a bit stronger in ***yield strength***, moves closer to its ***ultimate tensile strength***, and ***hardness*** increases slightly. These unseen changes increase the likelihood of neck cracking and case head separation. There can also be inconsistent neck tension when seating bullets. Further, harder brass does not seal as well against the inside of the chamber when the round is fired. Fortunately, ***ductility*** in the neck of the case can be recovered and consistent neck tension can be achieved by annealing. Before going further, keep in mind that ***annealing*** is not a cure-all for splitting or separations in the straight wall section of the case. Proper annealing only affects the neck and a bit of the shoulder of the brass. Do ***NOT*** anneal the case below the shoulder, because the brass is designed and processed to have a minimum strength below the shoulder.

Now, let's define the terms above in bold italics and tie them together to form an in-depth understanding of how the brass case performs and what annealing does.

## ALL THINGS PERRY

Make sure to tune in next month for a special Camp Perry issue, where you can read insights from the shooters, view a small gallery of pictures and see all the scores and highlights of our ORSA shooters.

A small tickler is below.

Way to go Winddogs!!!!

- **Work Hardening:** An increase in the strength of the brass case due to firing and re-sizing. This occurs due to complex changes at the atomic level within the brass. All you need to know is that every time you fire a round it becomes work hardened, becomes a bit stronger, and loses some ductility.
- **Ductility:** The ability of the brass to experience repeated cycles of firing and being re-sized without cracking. When a round is fired, the pressure from inside the case and tension from extraction, expands and stretches the case. When resizing, you compress it back to a size less than what it was when ejected, so it will fit in the chamber and reliably extract next time you use the case. Key point is that each time the case is fired and re-sized, it gets a bit stronger and a bit less ductile — closer to failure. Fortunately brass has the right combination of strength and ductility to allow multiple cycles of use without a significant loss of ductility.
- **Yield Strength:** The strength of the brass associated with the amount of stress imposed on it right up to the point where the brass will spring back to its original size. Beyond that point, the brass needs to be re-sized and trimmed back to specification dimensions. As the brass is work-hardened, the yield strength and hardness of the brass goes up a bit every time — and approaches the ultimate tensile strength at which point failure is experienced.
- **Tensile Strength: (Ultimate Tensile Strength)** The amount of stress the brass can take right before necks crack and caseheads separate. The tensile strength does not change appreciably, and when yield strength (which increases due to work hardening) equals tensile strength, failure occurs.
- **Hardness:** The ability of the brass to resist indentation — or ability to seal against the surface of the rifle chamber. A good seal puts more pressure behind the bullet and less gas in your face and eyes. Cases aren't as blackened and come out a bit cleaner, too. As strength is increased, hardness increases as well.
- **Neck Tension:** The "grip" exerted on the projectile by the brass as measured by the difference in diameter between the case mouth and diameter of the projectile (bullet), and the ability of the brass to maintain position of that projectile during routine handling and when stripped out of the magazine and chambered



## KUDOS

A big kudos goes out this month to you – the readers! Thank you for tuning in each month, providing articles of interest and really coming together as a family to help build each other up and bring us to the common goal of becoming better shooters. Way to go ORSA R and P.

during auto-loading modes. The ability of the brass to maintain that grip on the bullet depends on the strength of the brass in contact with the projectile. So, even if you have the nominal 0.002" difference between the diameter of the bullet and case mouth opening, you don't get proper neck tension if the brass yields excessively (is too weak) to maintain a needed level of tension to keep the bullet in place. So, when the round is stripped out of the magazine, the bullet will edge forward out of the case when the round is rapidly accelerated into the chamber, and slams to a sudden stop in front of an in-battery bolt; the bullet will move forward right at the instant it is chambered. This may create some accuracy issues on the target face, or worse. Bottom line is excessive annealing times and temperatures may produce neck

tensions to be too low to use for magazine-fed ammo. And if annealed beyond a certain point, it is not possible to re-use the brass for much of anything. *This is where the rubber meets the road for what follows with annealing.*

- **Annealing:** For our purposes, annealing and sufficient recovery of ductility (or relaxation of residual stress in the brass) occurs when it attains 750°F **IN THE CASE NECK ABOVE THE SHOULDER** with no discernable hold time - just a second or two is sufficient. This is the first of three stages of annealing, and is called Recovery. Any hotter than 750°F or longer hold times will cause a transition to the next two stages (recrystallization and grain growth) of annealing, which is undesirable. We must stay in the recovery stage and not anneal below where the neck transitions to the shoulder. If recrystallization or grain growth occurs, or you approach 750°F below the shoulder of the case, that case should be discarded.

You now have the basic vocabulary for understanding what happens to a brass case when it's fired and re-sized, and what annealing can do to extend the life of rifle brass and make neck tension more consistent. In part two, we will discuss how to determine annealing temperature.

## EDITOR'S BRIEFING

*By Tracey Johnson*

Here I sit assembling my 8<sup>th</sup> newsletter for ORSA Rifle and Pistol. Another interesting fact to point out is I received my first ORSA renewal notice in the mail this last week. That's right, I'm approaching not only the end of my first year as a member of ORSA, but also my first year as a high-powered rifle competitor. I think that calls for a bit of reflection.

So, about a year ago I was sitting on my couch and this random thought popped into my head that I wanted to join a gun club and shoot action pistol. Yup – action pistol. I had heard about ORSA from a colleague at work (also a member) and proceeded to google the website to find out more about joining. That led me to the IDPA website and long story short, by Monday I was filling out an application and having my friend vouch for me so I could join. I know that all seems a bit crazy (especially maybe for a woman to think), but for those of you who know me, you know how my brain works and this is the norm.

The application and \$150 gets mailed, I receive my notice of acceptance and date to report to orientation and now game on. You now may be asking where high powered rifle came in to all this, and it all boils down to this simple word.... communication. I emailed several club contacts (and I won't mention them), but the only one that got back to me was Alan Strachn. Alan's email copied me to Mike Glasman, and Mike invited me out for a clinic. On October 1, 2016, I shot my very first rifle ever, and I was instantly hooked.

So here is where I want to camp out in my story... the concept of communication. It has been my goal, since being elected to the executive officer position (a story for another edition), to help improve the communication in this club. We have achieved in the last year launching a new website, creating an informative newsletter, and implementing a real-time messaging forum (Slack), where we all can communicate quickly about practices, needs and information. I feel this list of improved communication methods has led to an increase in practice attendance, competition attendance and built bridges with other

### TIP OF THE MONTH

There is one trait common to all champions...the overwhelming and all-consuming desire to succeed. The champion's desire is so great, they will let nothing stand in their way. They find satisfaction in performing to the best of their ability and in mastering their body and mind like no one else has ever done. One of the first steps in helping any athlete perform their best is developing an **optimal nutrition plan**.

Read more at:

[http://www.odcmp.org/0906/default.asp?page=USAMU\\_RANGEDIET](http://www.odcmp.org/0906/default.asp?page=USAMU_RANGEDIET)

clubs like the Polk county team. New inquirers are getting faster responses and being brought into the fold quicker. I would venture to say something else has also happened because of this improved communication and that is we are becoming a team (or as I like to say, family).

Well family, in the next year, the goal to improve communication continues. Some of the things we have in mind include, building a new shooters program, building an education library on the website and increasing awareness of the voluntary needs for this program to bring up the next generation of shooters. I would also like to bring the long range shooters and the pistol participation up. As always, I'm open to and encourage your ideas. I'm certainly no expert in any of this, but I can be the cheer leader for our club. I truly believe this is the best club at ORSA and its members great people. I would like to thank every one of you for your investment in me as a new shooter. I hope to pay it forward, and may you all be blessed 10-fold!

## CAMP PERRY TICKLER

*By Alan Strachn*

"You want how much left wind on the rifle, Coach? Does the sight even move that far?"

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## CONTACT US

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## UPCOMING EVENTS

### August-2017

20-Aug -> Bullseye Pistol Match; ID 9 AM – 2 PM; Robert Carden, [cardenre@aol.com](mailto:cardenre@aol.com)  
26-Aug -> Air Rifle Sniper League ID 10 AM; Dave Arney, [bigarney@gmail.com](mailto:bigarney@gmail.com)

### September-2017

02-Sep -> CMP M1 Carbine ID 8 AM; <http://orsarandp.com/cmp-carbine-matches/>  
02-Sep -> Air Rifle Sniper League ID 10 AM; Dave Arney, [bigarney@gmail.com](mailto:bigarney@gmail.com)  
02-Sep -> ARA Rimfire Benchrest 8 AM; James Carroll, [danaaudio@comcast.net](mailto:danaaudio@comcast.net)  
03-Sep -> ARBA Rimfire Benchrest 8 AM; James Carroll, [danaaudio@comcast.net](mailto:danaaudio@comcast.net)  
03-Sep -> NRA HP 600 x 3 CH 8 AM; Larry Sparks, [larrysparks@chartertn.net](mailto:larrysparks@chartertn.net)  
08-10-Sep -> TN State LR Championships CH 8 AM; <http://orsarandp.com/tennessee-lr-rifle-state-championship/>  
16-Sep -> NRA App HP Match 8 AM; <http://orsarandp.com/2017-nra-approved-high-power-rifle-matches/>  
17-Sep -> Bullseye Pistol Match; ID 9 AM – 2 PM; Robert Carden, [cardenre@aol.com](mailto:cardenre@aol.com)  
17-Sep -> CMP EIC Match CH 8 AM; <http://orsarandp.com/cmp-eic-rifle-match/>  
23-Sep -> Basic Rifle Clinic ID 7 AM; Mike Glasman, [orsatime@gmail.com](mailto:orsatime@gmail.com)  
23-Sep -> Air Rifle Sniper League ID 10 AM; Dave Arney; [bigarney@gmail.com](mailto:bigarney@gmail.com)  
24-Sep -> CMP M1 Garand CH 8 AM; <http://orsarandp.com/cmp-games-gsm-matches/>

### October-2017

01-Oct -> LR Rifle Clinic, CH 8 AM; Larry Sparks; [larrysparks@chartertn.net](mailto:larrysparks@chartertn.net)  
05-08-Oct -> Big Ed's Memorial HP Tournament; <http://orsarandp.com/big-eds-memorial-hp-rifle-tournament/>  
07-Oct -> Air Rifle Sniper League ID 10 AM; Dave Arney, [bigarney@gmail.com](mailto:bigarney@gmail.com)  
07-Oct -> ARBA Rimfire Benchrest 8 AM; James Carroll, [danaaudio@comcast.net](mailto:danaaudio@comcast.net)  
08-Oct -> ARA Rimfire Benchrest 8 AM; James Carroll, [danaaudio@comcast.net](mailto:danaaudio@comcast.net)  
08-Oct -> CMP EIC Match CH 8 AM; <http://orsarandp.com/cmp-eic-rifle-match/>  
15-Oct -> NRA LR Prone Match HP 8 AM; <http://orsarandp.com/nra-lr-prone-matches/>  
15-Oct -> Bullseye Pistol Match; ID 9 AM – 2 PM; Robert Carden, [cardenre@aol.com](mailto:cardenre@aol.com)  
20-22-Oct -> TN Mid-range State Championship CH 7 AM; Larry Sparks, [larrysparks@chartertn.net](mailto:larrysparks@chartertn.net)  
21-Oct -> Smallbore Match ID 8AM; <http://orsarandp.com/prone-match-program/>  
22-Oct -> Mini Palma ID 12 PM; Thomas Colyer [precisionwelding01@comcast.net](mailto:precisionwelding01@comcast.net)  
28-Oct -> CMP GSM Games CH 8 AM; <http://orsarandp.com/cmp-games-gsm-matches/>  
28-Oct -> Air Rifle Sniper League ID 10 AM; Dave Arney, [bigarney@gmail.com](mailto:bigarney@gmail.com)  
29-Oct -> CMP Vintage Sniper Match CH 8 AM; <http://orsarandp.com/cmp-games-vintage-sniper-matches/>

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