**Terminal Bullet Performance** The Accurate Reloading Forums

This topic can be found at: https://forums.accuratereloading.com/eve/forums/a/tpc/f/4711043/m/2861098911

I Bin Therbefor 15 July 2010, 01:12

### **Terminal Bullet Performance**

Pay attention

"A wild and wacky piece of physics known as non-Newtonian fluid mechanics, that is, basically every fluid you've encountered on a day-to-day basis--one where the viscosity is constant. In other words, as you apply more sheer strain to the liquid, the more its sheer stress rises in a predictable way. Forgetting the physics, just think of it as a liquid that reacts pretty much how you'd expect it to.

A non-Newtonian fluid, on the other hand, has no linear relationship between stress and strain--they can vary seemingly at will, or as a third factor comes into play ... like time. There's no constant of viscosity. And this means, in a common sense interpretation, that the liquid won't behave like you expect it to. A non-Newtonian fluid (like cornstarch, Silly Putty, or custard powder, suspended in water) will easily pour from a cup, but if you hit it with a hammer it could explode into a thousand sharp shards--something water would never do. This particular type of non-Newtonian behavior is called shear-thickening."

OK, who knows anything about non-Newtonian fluid mechanics?



buffalo 16 July 2010, 01:03

Back from holiday..

Looking forward to the 577 test Sam/Michael....

16 July 2010, 18:54

Buffalo, 577 soon, while you are on vacation some of us actually have to do work, and I have been covered up, not being able to devote a full day the last few weeks. So Sam and I have been trying to work out a day. Maybe in the next week or two on the 577.

I did finally manage to work in an hour here and there this week to do the 9.3 tests with the solids Sam made a sent a few weeks ago.

But before posting those, lets review 9.3 a bit, especially the Barnes Banded 286 and 250s.





We know that Barnes Banded Solids are normally an excellent performer here and in the field. Even the 250 gr 338 caliber version is superb. But all that we have worked with here have a different nose profile and bigger meplats than the 9.3s have. On average all other Barnes Banded that we have worked with are 65% meplat of caliber, or slightly better depending on the measurement. The 9.3 versions come in at 47% meplat of caliber, which is not enough to stabilize. Even Round Nose solids do as well, or better. As far as I am concerned, the 9.3 Barnes Banded is a poor design. All the rest are superb. Why? Don't have a clue why Barnes would change the nose profile and make such a tiny meplat for the 9.3s.

Michael

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michael458 16 July 2010, 18:57

To further prove this point, lets look at the bullets that  $\operatorname{Sam}\nolimits$  turned out for the test work.

First, the Lineup once again for review





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michael458 16 July 2010, 19:00

The 270 gr Sam 9.3 had anomaly as you can see. One penetrated 59 inches, while the other was 48 inches. The bullet going 59 inches veered off course some and found a void along the sides. I believe 48-50 inches would be normal for this bullet. Also, this nose profile is somewhat different than the rest of the bullets tested???



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michael458 16 July 2010, 19:03

Both the 318 and 270 versions were far too long for the 9.3 B&Ms magazine. Chamber and shooting no issues. Sams 265 gr version was my favorite of the group, fit well in the magazine of the WSM rifle and feed and function was no issue.



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michael458 16 July 2010, 19:05

Last, and Least in many ways, but MORE than MANY is the 230 gr 9.3 Sam. I liked this bullet a lot, light, fast, feed and function, and plenty of good straight penetration, but I only had one sample, but was ample to get an idea anyway.



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michael458 16 July 2010, 19:11

I think this test shows us that MEPLAT SIZE MATTERS! Now some of you are going to remember that many bullets have penetrated deeper than some of these, any of these 9.3's are more than adequate to do anything a 9.3 needs to be doing. Even the light 230 gr bullet. But what you must keep in mind, MEPLAT SIZE MATTERS for sure to stabilize during terminal penetration, but nose profile is important too. In addition when our meplat size starts to get anything over 70% meplat of caliber, our total penetration begins to decrease. So some of these have meplats of over 70% of caliber, but penetration is excellent, and straight, but might have been deeper with a 65%-68% meplat. Not that it matters, as we are talking an inch or two here and there is all. What is most important is that the meplat size be adequate enough to stabilize. A small increase of depth is really of little consequence in the overall scheme of things, in my opinion.

Michae

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Whitworth 16 July 2010, 19:22

quote

Originally posted by michael458: I think this test shows us that MEPLAT SIZE MATTERS!

Michael

⊕ ⊕ ⊕ ⊕ ⊕ Told you so! LOL! ⊕ ⊕ ⊕

Nice work, Michael!

"Ignorance you can correct, you can't fix stupid." JWP

If stupidity hurt, a lot of people would be walking around screaming.

Semper Fidelis

"Building Carpal Tunnel one round at a time"

Clem 16 July 2010, 19:58

This is a good thread.

I'm afraid I'm not getting much work done reading through all of it though.

srose 16 July 2010, 20:04

Excellent work! Glad the bullets performed well. Better than the goofy ones for sure. Sending you another batch of 9.3's and .500's to add to the mix. I'm going to keep you busy for a while! I look forward to your results of the .500 meplat tests. Those should really prove your point!

Sam

srose 16 July 2010, 20:19

Michael,

Just to let you know the nose profiles on the 318's and 265's is a 5 degree angle and the 270's is a 10 degree. The 230 is a bastard file radius.

Sam

srose 16 July 2010, 20:20

Sorry reverse those angles!! I'm dislexic!

michael458 16 July 2010, 21:20

Clem

Glad you are getting something out of the thread. Some good stuff here I think, but yes, lot's of reading to do.

Sam

Keep'em coming, I will keep shooting them as time allows.

The 500 caliber Meplat Tests are loaded and ready. Waiting on me!

Not real sure, but think I like the 10 degree angle best??? But like I said, have not tested enough to know for sure.

Μ

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michael458 16 July 2010, 21:21





Thanks Whit!

М

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michael458 17 July 2010, 23:27

OK here is the next round of test work to be done! This is the "Mother of All Solid Tests". This one tells the story and ends the controversy once and for all, and forever!

Anyone care to speculate on outcome? Not depth of penetration, behavior of bullets??? Will use a 50 B&M with 1:12 Twist Rate! Come on now, what's going to happen???? A prize for the one who is closest to the overall outcome??? Speak up! This is it, THE TEST OF ALL TESTS!







Michael

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17 July 2010, 23:48 buffalo

well. RN and FN <60% meplat will tumble and veer off course. 60%meplat will be stable with 1-12" twist - probably. Guess 60-62" penetration. 65% - 62-64 inch penetration and straight. More than 65% will penetrate straight but less. probably in the 50-60" rannge depending on meplat size - largest meplat penetrate less..

michael458 18 July 2010, 00:08

Buffalo

Good Start. I don't think I mentioned that these are .500 caliber and weigh from 420-435 grs, these are not heavy weights. I asked Sam to make them in this weight range so I could reach a little higher velocity in the 50 B&M. So I doubt very seriously they will make the 60 inch depth. I would think 50s would be high end depth, maybe a little less. But depth does not matter in this test, it's bullet behavior we are after anyway. Which of course you know, and addressed proper too.

Excellent start I think, ok, who else?

Michael

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18 July 2010, 00:11

They all look great loaded up. I'm going to say the 65% will go 66 inches and the 80% 58 inches. Both dead straight. The RN will go 14 to 15 inches and then turn sideways and stop at around 36 inches. This is what the master has taught me!

capoward 18 July 2010, 00:14

quote:

Originally posted by buffalo:

well. RN and FN <60% meplat will tumble and veer off course. 60%meplat will be stable with 1-12" twist - probably. Guess 60-62" penetration. 65% - 62-64 inch penetration and straight. More than 65% will penetrate straight but less. probably in the 50-60" rannge depending on meplat size - largest meplat penetrate less.

The 60% meplat will also veer off course...otherwise I agree with your predictions.



"Life's hard: it's harder if you're stupid"

John Wayne

18 July 2010, 02:58

Good Start guys, keep it up, let's hear from some more, quick lurking and jump in! Now is your chance to show what you "Think You Know". Or, how about what we have learned right here?

Michael

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Bike Rider 18 July 2010, 04:19

0 0 **6 6 6 6** My prediction is that the super top secret 6.5mm ICBM's that are currently in the lab will put them all to shame

Oh zen master you already know the out come. Time to get busy and give us some hard data. Chop,chop.

BR

RIP 18 July 2010, 09:24

I'll play:

RN: 20" straight, then tumbles and veers to stop at 30"

FNs of increasing meplat:

50%: 40" straight and veers to stop at 45' 55%: 45" straight and veers to stop at 50" 60%: 55" straight and veers to stop at 57" 65%: 60" straight and veers to stop at 62"

70%: 60" dead straight to stop

75%: 55" dead straight to stop, permanent wound channel getting bigger

80%: 50" to a dead stop, biggest permanent wound channel and no tumbling.

18 July 2010, 15:55 srose

I think RIP read the instructions. He's probably right on

michael458 18 July 2010, 16:00

Looks like to me Buffalo, Capo, RIP, and Sam have been paying attention to the thread, along with applying known experiences. Bike is to worried about that 6.5 to think of anything else! I suppose there is really no need for me to do the test at all, looks like we already know what the deal is! I am beginning to like those nice shiny cartridges and bullets anyway, maybe I just keep them lined up on the shelf to look at?

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buffalo 18 July 2010, 16:27

quote:

Originally posted by michael458:

Good Start, I don't think I mentioned that these are .500 caliber and weigh from 420-435 grs, these are not heavy weights.

Michael

Micheal - OK I thought they were heavier than that. Then deduct 5 inches from my previous prediction and I think it will be pretty close.. RIP might be spot on as well.. looks sensible.

michael458 18 July 2010, 16:36

What is it just summer vacations or something? Seems we are missing some regular folks from the thread of late. I noticed some time ago Glen has not been around in some time, Dave Bush must be on vacation, Dwright missing in action the last week or so, JWP missing for a long time, and a few more. I figured to see some comments from 465HH on this, since he instigated the meplat tests in a conversation with me a long time ago. Or is this thread just getting plain boring and people are sick of bullets? Maybe everyone has just been busy, seems I have too!

But I don't think I would ever get tired of testing bullets!

Michael

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18 July 2010, 16:41 srose

SHOOT THEM! I'LL make you some more to look at!

michael458 18 July 2010, 16:42

auote:

Originally posted by srose:

SHOOT THEM! I'LL make you some more to look at!



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18 July 2010, 16:57

Prove your point with these and maybe I'll make you a new set that are in the 500 to 600 grain range.

18 July 2010, 17:19

You just rolled us over to page 79! Good lord, that's a lot!

I think not much need for bullets more than 525 or so. I notice that even the 550s at the very end of penetration, last 2 inches, they start to loose stability, and while penetration with the 550s is always 4-6 inches more than the 510-515s, that last 2 inches is not stable. Not that it matters at that depth anyway. Would need a good 1:10 twist to get that last bit of stability I would think.

I bet this on the meplat test, that we will learn for 100% certain the optimum meplat size for stability during terminals. I think anything below 65% is not there. Although I have that 485 gr .500 that is a 60% meplat, it is stable, most of the time. On occasion it loses stability right at the end of penetration, which is slightly less than the 510s.

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416Tanzan 18 July 2010, 17:54

quote:

I am beginning to like those nice shiny cartridges and bullets anyway, maybe I just keep them lined up on the shelf to look at?

Michae

Well, Michael, we know you well enough that if you put the rounds on the shelf to look at, you'll sneek down in the middle of the night to shoot them. And then your wife will have a whole new meaning to 'things that go bump in the night'.

So my predictions

RN: 25" straight, veering and tumbling to 35" 50%: 35" straight veering wide to 43"

55%: 44" straight veering to 50"

60%: 56" straight 65%: 55" straight 70%: 53" straight

75%: 51" straight 80%: 46" straight

I'm queesing that those light bullets will be a little more stable for their meplat because of shortness. So I'm quessing that the 60% will work. We'll see when you shoot them.

+-+-+-+-+-+

"A well-rounded hunting battery might include:

500 AccRel Nyati, 416 Rigby or 416 Ruger, 375Ruger or 338WM, 308 or 270, 243, 223" -- Conserving creation, hunting the harvest.

18 July 2010, 17:54

Michael,

Yes 79 WOW thats a lot of information, all good!

After your meplat test we can make any weight you want to do any further testing if needed. I think you already have it figured out. You will then have the best solid design to make in any caliber. Hope the makers see the light.

Like you I never get bored trying something new. Whats next after this?

Sam

michael458 18 July 2010, 18:06

Oh Tanzan, you know me too well! No way I put those up to just look at! They are going down range, and we all know it. I'd rather look at them in their fired state anyway! HEH!

From your predictions, they are coming in with all of the other guys as for behavior of the bullets. I see everyone is having a little stumble around that 60% meplat--Me too. I am just not very sure about the 60% myself. 65% and up, I think we are all in line and agree on behavior. As well as below that point. Might be right, short might stabilize the 60%?

Sam

I think I would like to do a "Nose Profile" after the meplat test. Does not need to be as extensive as this one. You know that longer, straighter nose profile as opposed to basically the barnes profile. Same meplats, same weight or close. But we won't plan that until we complete the meplat tests. Another nose profile I have is that first orginal .500 at 485 too. But once the meplat test is done, I think a short one depending on the best meplats, with the two different nose profiles.

Other factors are feed and function that I will look at too. Of course these bullets in a double makes no matter, in a bolt, must be considered. There is just going to be a great deal of info to come out of the meplat test, and many considerations to look at.

Michael

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18 July 2010, 18:14

After the solids, one item that is lacking in testing is the velocity needed to 'blow petals'.

I am thinking that the Barnes TTSXs will will need over 3000fps, they seem pretty tough. However, in your medium that is tougher than ballistic gel, that threshhold may only be over 2800 fps.

This may mean testing little antelope calibres like 338 some more. I can't see pushing a .416 at fast enough velocities to reliably blow petals, unless maybe the 300 grain TSX at 2900fps.

So what about the .338 160 TTSX and 185 TTSX at 3500 and 3300 and 3100? Your Ultra can do those impacts at 46 yards. A lot of folk in NA use 338, even .308 and .277 at screaming velocities, but without knowing where the borders are on the non-coms and petal retention.

Until I learn otherwise, I would chose a bullet whose 25 yard impact velocity is below the 'petal shearing threashhold'. Especially when walking where simba and nyati hang out.

For my 416 I would like to verify that the muzzle velocity is petal retentive, 350 TSX at 2700fps, or even 300 at 2900fps.

+-+-+-+-+-+

"A well-rounded hunting battery might include: 500 AccRel Nyati, 416 Rigby or 416 Ruger, 375Ruger or 338WM, 308 or 270, 243, 223" --Conserving creation, hunting the harvest.

18 July 2010, 18:16

Oh no--as for the next test after the meplat test, that is going to be those cup point brass solids you made this past week. That is up next and most important to me. That just has me fascinated at such a tiny change in the meplat dipping in can make such a change in depth of penetration (refer back to the 577 test we did), along with the North Fork 450 gr CPS. In North Forks own words, Limited Penetration Solid, as I recall.

That is next, then we can monkey around with the nose profile. Long and short of it, one might say.

I think I must call Dan this week and get a bullet order going. Looking at the multi bands this morning.

Michael

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18 July 2010, 18:41 srose

Michael.

I forgot those already! Yeah that one will be interesting also

Don't forget that we still have the BIG 577 test also. I'm sure the double gun guys will be interested in that one. Need to make the perfect double safe solid.

michael458 18 July 2010, 18:48

Sam

Yes the 577 for sure. I think in the next week or so if you can work it out to come down then I can get a day. Think about making a plan.

I plan on sneaking an hour or so here and there this week and getting the meplat test done.

Michael

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srose 18 July 2010, 18:51

Michael,

Sounds like a plan. You get done with those meplat tests and I'll get the 577's loaded up. Might shoot a few today for velocity check.

18 July 2010, 18:58 michael458

Tanzar

I have little capability here with high velocity cartridges. Maybe some of the lighter 338s in the Ultra, but didn't we do some of that petal blowing?????

"""Until I learm otherwise, I would chose a bullet whose 25 yard impact velocity is below the 'petal shearing threashhold'. Especially when walking where simba and nyati hang out.

This pretty much used to be my attitude also until I started seeing animal reactions, in particular those big Australian Buffalo, with my 470 copper HP in the 500 MDM blowing the petals, and buffalo folding on the spot! I actually got on the ground with the 500 MDM and the 470 HP, and before the first buffalo I thought I needed to regroup and make that bullet a 500 gr or so, soon as I got back home. After the first buffalo I knew that was not needed at all, this 470 HP of mine was hammering, petals blowing off, solid slug penetrating completely thru, massive trauma inflicted, and I become a big fan of "Blowing Petals" off. The bullets I use in the .500s are not annealed, so at velocity they will blow. Brass will blow at much lower velocity and in an even pattern time after time. Now I can only assume that the brass bullets blowing their petals will inflict that same sort of trauma to animals, but have yet to have a chance to use the brass ones. I will at some point soon. But I have invested pretty heavy in the brass ones, and have a .500 470 gr version in the works now in brass to assure those petals shear.

I think that would be extremely traumatic to old simba, in fact I can seem him leaping straight up in the air now, and hitting the dirt stone cold! Yep, having a vision!

Michael

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