

Thames Valley Guns

Armourers Report

CZ 527 Carbine, 6.5mm Grendel

Introduction

In 2007 I was experimenting with designing and building my own moderators and developing the 7.62x39mm cartridge as a subsonic round when I purchased the CZ527 carbine as a testing platform.

The CZ 527 carbine was available at the time in 7.62x39 and .223 Rem and is a very handy little rifle that CZ describe as a "bush rifle", which has low recoil and is suitable for medium game such as deer and wild boar. Like all CZ products,



the carbine it is well made, functions flawlessly and is accurate by factory gun standards. The principle difference between the CZ527 and the carbine version is the barrel length at 18.5", the CZ527 at 21.87" and the carbine is fitted with barrel mounted iron sights. The carbine was also slightly unusual, as there are very few

commercial rifles chambered for the 7.62x39 cartridge but looking at the CZ website this appears to have changed with both carbine and the standard CZ527 now chambered in this cartridge

Having threaded the muzzle I set about my continuing my sub-sonic and moderator design project but as time passed this project came to an end I decide to put the rifle up for sale. In the United Kingdom the 7.62x39 cartridge is not deer legal as it lacks the foot pound pressure required by UK legislation. Therefore it is only suitable for range use and I was unable to find a buyer. No interest was shown in the rifle at all, so I began to think what to do with the rifle if I decided to keep it. I was into the practical shooting scene at the time and the 7.62x39 was a good intermediate cartridge, so I started to research my options.

Before I go any further it would be beneficial to explain this updated report. This report is focused around the CZ527 Carbine which I purchased in 2007 and has been used as a donor rifle for a range of projects. With hindsight it is that handiness and flexibility of the CZ chassis that has allowed me to develop the rifle and to keep updating this report.

Practical rifle & a 10rd magazine

As an absolute minimum for a practical rifle conversion I required a magazine upgrade to 10 rounds, all other improvements were irrelevant until that specification was met. However



if the magazine conversion was successful then I would consider a muzzle brake, magazine catch extension, tactical bolt handle, a scope with tactical drums and a Mil Dot reticule.

To achieve a ten round capability, two 5rd magazines were welded together and a new main spring manufactured. Once welded the magazine was a little long for my liking, but the single stack design leaves little room for options. The barrel had already been threaded to accept a moderator, so fitting a simple muzzle brake was simple. The trigger is of a European set type and is sufficient for my initial needs; however long term an aftermarket design is available and would suit me better. The receiver has a good metal to woodwork fit straight from the factory, however as the 7.62x39 round is not renowned as a tack driver, bedding might be considered unnecessary.

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The carbine was functioned and range tested but suffered some setbacks. Carbine and muzzle brake functioned well, however the magazine would only function reliably with eight rounds, not ideal for practical shooting in the UK where a ten round capability is a minimum. So it was back to the drawing board for the magazine. After many failed attempts to perfect the magazine and with the main spring being the primary offender I decided to stop the project as the 10rd Holy Grail seemed to be most elusive, however I am sure if I could get some one to manufacture a decent spring and magazine platform it would resolve the problem.

So it was back to square one and what to do with a rifle that was difficult to sell and it was not going to make a successful practical rifle.

6.5mm Grendel

Prior to my trials and tribulations in 2001, Bill Alexander, a UK Armourer went to the US and developed amongst other things the 6.5mm Grendel cartridge whose heritage had evolved from the 7.62x39mm and the 6mm PPC rounds. I had been studying the new round with interest as it was being aimed as a potential replacement for the 5.56mm military round and any successful candidate would not only become a major military calibre but a high flyer on the civilian ammunition market as well.

The Grendel cartridge had an impressive performance with projectile weights ranging from 90gr to 140gr. A 123gr projectile with a velocity of 2600fps is capable of outstanding accuracy at 1200 yds, considerably flatter trajectory and has 50% less felt recoil than the standard 7.62mm NATO round. With chamber pressures at 52000Psi, the 7.62x39 at 51500Psi and sharing the same bolt face, my CZ carbine had potentially a new future

For those who require more details ref the cartridge itself, Alexander arms is the designer/developer and their website for the 6.5mm Grendel is at <http://www.alexanderarms.com/products/65-grendel>

CZ 527 6.5mm Grendel Carbine Conversion

Whilst the Grendel was first unveiled in North Carolina in 2003 it was still a relatively new cartridge in the UK even by 2007. The most obvious conversion was going to be the barrel, so I stripped the rifle down and sent it to the only Gunsmith with Grendel chamber reamers that I was aware of in the UK. Whilst I was informed that this little exercise would take three months, it was nearly six months before I received the rifle back – you need a lot of patience with the British gun industry.

Barrel

The stainless steel replacement barrel has a length of 24", is 1.22" at the chamber and is 0.85" at the muzzle. Twist rate is one in nine, the muzzle is threaded, crowned and is fitted with a thread protector.

At 24" the barrel has a 6" advantage over the old 7.62x39 barrel and as a result 95.8% of the propellant is burnt making it a far more efficient design,



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however whilst the carbine format has now been lost, the extra weight of the new barrel is negligible. The receiver/barrel was bedded, ensuring the barrel is fully floating thereby guaranteeing maximum accuracy.

Trigger

The CZ 527 carbine comes from the factory with a European set trigger. This type of trigger can be released in two ways. Simply pull the trigger and it will release the firing pin, but the trigger pull is fairly heavy and course. The second alternative is to push the trigger forward (set) and the trigger pull is now much lighter and crisper. However I am not a fan of any set type trigger and the CZ trigger is no exception. Whilst the set trigger is lighter the pull is long and you are unsure when the sear will actually release, therefore reducing accuracy.



As a result I purchased a Basix after market trigger and found it to be far superior. The trigger is advertised as a "DIY" design, however you have to fit the new trigger into the current assembly and any foul-ups will make the rifle unsafe. Therefore I would recommend that this job is left to an Armourer/Gunsmith. The new trigger converts the set trigger function into a traditional single pull design which can be reduced to 1.0lb, making the rifle far more accurate and efficient to use.

Receiver

Being a carbine the receiver at just under 7" and is noticeably shorter than your traditional receiver, this is largely dictated by the small ejection port which measures only 2.2". The CZ527 range of rifles are classified as Mini-Mausers actions and therefore there are certain similarities, albeit on a smaller scale to the tradition Mauser. The method of locking is the same but unlike the traditional large frame Mauser there is an absence of a third locking lug recess at the rear of the receiver. Underneath the receiver there is the recoil lug but as the dimensions are fairly small, the master screw secures into the receiver frame. Behind this is the magazine well, the magazine catch spring and behind this the trigger assembly.



The bolt release/bolt stop is a different design to the large Mauser but the operating principle is identical. The 527 carbine safety catch is integral with the receiver and cannot be applied unless the bolt is cocked. Applying the safety catch disengages the cocking piece from the sear and locks the bolt.

Stock

The original stock was not suitable for a heavier aftermarket target barrel and visually it looks poor and out of proportion with the new barrel configuration. Therefore I had three options, CZ make laminate and Kevlar stocks or you can go to an aftermarket manufacture such as H-S precision. I decided on CZ and originally was going to go for their Kevlar model, however I was in for a shock as the UK importer was charging a king's ransom, so I settled on the laminate stock which itself was not cheap.



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Fitting the heavy target barrel/action to the new stock was not to be a straight forward as it initially appeared. Whilst



the laminate CZ stock was designed for a varmint barrel, it still needed to be relieved considerably around the chamber and in the barrel channel to allow it to sit correctly. CZ Mini Mauser actions have a small receiver footprint, therefore pillar bedding is not an really an option in my opinion as there is little room.

To improve the rifles overall handling I added a monopod to the rear QD stud. The aim was not to use it as a monopod but rather to act as a grip and secondly to protect the heel of the butt. In 2017 I removed the front QD stud and fitted a picatinny rail for the forend. The QD stud was fine for fitting a Harris bipod but the new Atlas bipod's are definitely superior and therefore required a rail.

One element of the CZ527 design that really appeals to me is the complete lack of polymer style trigger guard and magazine housings etc that are commonly found today on moderately or even more expensive guns. So far CZ appears to have avoided that downward slope of poor quality and cost cutting. The CZ527 magazine housing is a good all metal design which has a magazine guide, simple but effective magazine catch and supports the receiver solidly within the furniture. If I had one minor criticism it would be aimed at the magazine catch being a little on the short side. I'm sure its fine for hunting but to improve the speed and efficiency of a magazine change, it needs to be extended which is exactly what I have done and as can be seen in the image above.

Bolt Assembly

Whilst the CZ527 is often described a mini Mauser design, I would limit that description to the bolt face, locking lugs, extractor claw, bolt stop and ejector but that is really where the similarities stop. The remainder of the bolt is quite different.

Because of the Mauser style extractor claw, rounds cannot be feed into the chamber singularly by hand as this will



break the extractor and unlike the classic Mauser designs of WWII, the CZ bolt only has two locking lugs located in the bolt head. However whilst the bolt has lost its third safety lug it is apparent that when the bolt handle is fully depressed, the bolt handle is fully engaged in the receiver and should there be a catastrophic failure the bolt handle would act as a safety lug.



The firing pin assembly is completely different to the classic Mauser and as a result the cocking piece contains the sear and is pinned to the firing pin. Stripping the bolt is easy when compared to the old designs, the cocking piece is rotated, it releases the spring tension and the bolt handle can be withdrawn from the bolt body and the firing pin assembly can be removed. Re-assembly is in reverse and the bolt handle is designed so it cannot be fitted the wrong way. The bolt handle is heavily cranked to permit the fitting of a scope and as part of the practical rifle saga when the rifle was in 7.62x39mm, I had the bolt handle fitted with a tactical version as I found the original design unsuitable.

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Scope Rings

As one would expect for a modern rifle, the receiver is machined for scope rings but the dovetail has an unusual width of 16mm, plus has an key way cut into the rear base to prevent scope creep. CZ produce their own rings but you can fit cheaper Millet rings if you wish. My choice originally was to fit CZ's steel 1" medium rings, they are more expensive but in my opinion the build quality is worth the extra pennies. More recently picatinny adaptor rails have appeared on the market which allow the use of picatinny/weaver bases and in this particular case I have replaced the original CZ set with a APEX rail which allow more flexibility with the scope and fitting of the rings.

One other point that is worth mentioning is scopes with long 30mm tubes, not only do they look out of proportion to the small receiver of the rifle but I found installing scopes with 30mm tubes meant mounting the scopes exceptionally high to clear the bolt handle, therefore I found it more practical to utilise scopes with 1" tubes.

Ammunition

The reader must remember, I first wrote this Armourers report in 2007 and the 6.5mm Grendel round was in its early years. Ammunition was a concern, primers and bullets were no problem but brass and dies were a little more difficult to obtain. Brass was only made by Lapua and Alexandra Arms and there was none available within the UK, but this would change over the next couple of months. Brass is expensive with both manufacturers charging just short of a £100 for a hundred cases. Dies are available, with three manufacturers being available; I choose a Redding two die set at approx £75.00, again not cheap but I had considerable experience with these dies and found them to be very good. There where no specific Grendel shell holders that I am aware of within the market place so I used a 7.62x39 model from RCBS as they had the same diameter rim.

It was with the shell holder that I encountered my first problem. The gunsmith had machined and fitted my barrel precisely. When I came to resize the brass, no matter how much I adjusted the dies I could not get the bolt to close. I had one possible solution and that was to stone down the shell holder. Shell holders are hardened so you can't file them, the only option is to stone and you have to do it so the holder remains square. So with great patience I slowly stoned the shell holder. After 60 minutes work, I refitted the holder in the press and resized the brass – it worked, by removing couple of thou, it was sufficient to allow adjustment of the die and for the bolt to close without resistance.



Reloading

At the time of updating this report, the 6.5mm Grendel has become a popular cartridge and as a result it is available as a factory round by a number of manufacturers, PPU, Hornady & wolf but to name a few. However in 2007 and in the UK you had to reload 6.5mm Grendel as there was no factory ammunition and reloading data was limited to one or two manuals.

Vihtavuori have an entry in their 4th edition manual, recommending powders are N130, N530 and N133. As I am a fan of Vihtavuori powder I decided to use N530 together with a Hornady 95gr bullet which I had previously experimented with in the 6.5x55SW. Performance data of this bullet/powder combination is not in print at the time so it was down to me to sort out a suitable combination that would suit the CZ.

When in the design stage, the original military specifications that the Grendel had to conform to where as follows; suitable for an assault rifle mechanism with a range out to 400yds, 800yds for a Sniper rifle and 1000/1200 for a machine gun. My requirements were somewhat more simple with an accurate target engagement between 100 and 600yds. My first reloading exercise proofed very successful with regular 0.75" groups at 100yds. Best load was 27grns of Viht N530 producing an average velocity of 2629fps.

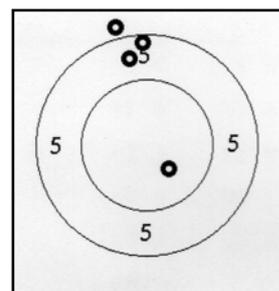
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Since 2007 I have shot the CZ for pleasure and probably shot no more than forty rounds a year. Whilst I enjoyed the rifle and it was extremely accurate, it didn't really fit into any of my shooting disciplines. In 2016 I built a tactical Tikka in .223 specifically to compete in competition, but found it too heavy and as a result struggled to do well in the competition. This provided an excellent opportunity for the CZ and therefore I have fitted a more suitable tactical style scope and started some reloading development to bring me into line with my new requirement.

Whilst the competition will be shot at 200yds I still want a rifle that can happily engage targets to 600yds and beyond. I don't want bullet weights in the region of 140grns as this will convert into excessive recoil energy that is simply a waste and is not required. My .223 ammunition is currently loaded with 70grn Sierra HPBT, therefore I want a round with a bullet weight in the region of 100-110grn. Sierra's 107grn HPBT is readily available and therefore I began some load development which settled on 25 grains of Viht N530, producing an average velocity of 2544fps. My range test at 100yds consistently produced tight groups, together with the odd flyer which I attribute to the "nut behind the bolt". The image to the right was typical of the day results, with an overall group of 38mm with the flyer and the smaller group at 10mm.



Summary

I have a passion for rifles which are different to the typical "off the shelf" models and with hindsight I would have never have guessed that the humble factory CZ527 Carbine would have been transformed into such a capable and



accurate rifle. This transformation has been largely due to the 6.5mm Grendel cartridge and at the time of updating this report, it has become a very popular round. Looking back, the rifle has seen a number of modifications to bring it up to this level and these include, new barrel, basix trigger, laminate stock, bedded action, tactical bolt knob, magazine catch extension, monopod, forend picatinny rail, Atlas bipod, Apex scope rail, Rechnagel rings and Leupold AR 6-18x44 scope.

The CZ weighs 25% less than my .223 Tikka and its aluminium chassis, accuracy is the same as the .223 at shorter ranges and superior at longer distances. After 600yds it simply leaves the .223 in its wake. However for all my positive aspects, the CZ's five round magazine still leaves me in a weak position in the competition where each detail requires ten rounds.

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