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Preface:

Our inspiration for this analysis was the excellent book by Stuart Otteson, "The Bolt Action." We kept a similar format with some deviations. He was concerned mainly with the action/breech/trigger mechanism whereas we are examining the entire rifle, including the stock. We lack some of the detail that he includes, and include some that he does not. When his book was written, in 1976, the commercial offerings were somewhat new (compared to today) and the military rifles like the Mauser and Springfield were more popular in general use. Here in 2015/17, there really haven't been many changes to rifle actions since his review, i.e. the Remington 700 and Winchester model 70. Our goal was to look at one specific rifle to inform shooters of the details, pros, and cons of that rifle as an entity so that they could enhance their user experience or make a purchase decision. Some measurements were difficult to make but are close enough for our purpose here. We do not recommend anyone try to machine TRG parts from our analysis. If the reader notices any errors or omissions, please let us know (Kinetic Research Group, www.krg-ops.com, info@krg-ops.com). This is not intended to be a final document but will be added to as time permits. The reader will note that The TRG-22 rifle is the main focus rather than the larger caliber TRG-42 though we will add this info at a later date.

The text is broken into specific sections.

Rifle Overview:

The TRG rifle from Sako (Finland) is one of the best commercially available rifles in the target/competition/tactical segment. In fact it is the choice of a slew of military and police units worldwide along with being a popular match rifle in the US and abroad. Originally offered in 1989 as the TRG-21/41 series, it has undergone some evolutionary refinements into the TRG-22/42, then a second generation 22/42 in 2013. This was preceded by a split off of a new rifle called the TRG M10 (in 2010) which shares little with the TRG-22/42 apart from the general design concept. The TRG-21/22 are the .308 Win versions of the rifle while the TRG-41/42 are the 300WM and 338LM versions. The difference being a longer action, bolt, and magazine paired with a backbone and forend revised for the longer action and mag. The trigger and buttstock remain the same and even the forend and backbone are basically the same apart from the magwell area and recoil lug position.

The TRG rifles are fairly lightweight, especially for the style of rifle. They are modular, with the buttstock and forend being separate components from the main aluminum backbone. A few companies such as us (Kinetic Research Group, LLC) make bolt-on accessories to boost function and Sako itself offers some items such as muzzle brakes, bipods, etc.

Most important in this field is accuracy, and TRG's are by this point legendary for out-of-box accuracy. High quality barrels combined with good ergonomics and a remarkable trigger yield consistently small shot groups. For those that decide to fit a custom barrel to their TRG, the factory take-off barrels can be sold on the used market for a premium. Those that keep the rifle as-is can expect accuracy capable of winning just about any tactical style match and probably do very well at F-Class.

Though the TRG has always been significantly more expensive than even an upper end hunting rifle like a Sako 85, it was a relative bargain compared to other rifles in that class. The AW and now AX rifles from Accuracy International are nearly twice the cost in some cases. At one time the TRG's were available in the low $2k range while of this writing they are in the low $3k range. This price increase and the improvements to the AE/AT series along with their pricing (upper $3k) puts some pressure on the TRG lineup.

General operation (barreled action):

The TRG action is easily one of the best commercial actions available. It is strong and relatively light, the lockup is robust and the action provides plenty of tenon length for barrel support. The 60 degree bolt is an advantage over the 90 degree systems though it does provide for a slightly harder lift after firing due to less rotation for camming the firing pin back which leads to a steeper cam angle. The bolt movement is slick and working the bolt is easy and fast. It is very easy to disassemble and clean/maintain and allows cartridges with long overall length (OAL) to be used. It has its weak points, most of which were addressed with the 2013 design update. There are now a number of aftermarket scope mounting options to fit the dovetail system as well.

Action and Bolt Assembly:

The TRG action is a hammer forged round body action with flats cut on the sides, top, and shoulders. The action is fairly long for what is generally considered a short action. It has a thick tang and uses three action screws (M6 metric) which is uncommon among modern rifles. There is a 16mm dovetail at the top of the action, (Sako calls this a 17mm dovetail, we're not sure of the reason), and this along with six threaded holes (metric M3.5) and five pockets for small recoil lugs allow mounting of Sako's proprietary scope mounts as well as aftermarket items. The ejection port is oval in shape and relatively small. It is quite difficult to get a finger in to clear a casing or debris that gets into the action and opening up this port on a milling machine is something we'll likely do to our TRG's. Single feeding through the ejection port is possible but the magazine cannot be "topped off" like a typical hunting rifle by inserting rounds through the ejection port.

The action is a closed bridge design and all told, the TRG is arguably one of the strongest commercial actions available. The TRG action does not use a recoil lug attached to the action, rather there is a slot cut into the bottom of the action which fits over a steel lug that is mounted into the stock. There seems to be much less recoil lug bearing area than on other systems such as the Remington 700 but the TRG functions just fine even in .338 Lapua Magnum.

The face of the action tapers in a conical shape which gives a barrel diameter at the face of 1.15" (29.3mm). It is common for shooters to, when having a TRG rebarreled, to have the gunsmith remove material from the action face to get past the conical section. Custom barrels

in the U.S. typically have a 1.25" or 1.2" outer diameter at the action face so this cut provides a better mating surface for the larger diameter barrels.

The magazine well is long and allows a magazine with a lot of internal length. It is not very wide, however, which makes the use of alternate less expensive magazines (like AICS or AW) difficult.

The bolt stop is a one piece item positioned on the right side of the action. This positioning is atypical but does not seem to provide a functional disadvantage or advantage. It is a spring loaded lever that acts that acts upon one of the bolt lugs to keep the bolt in the action, pushing on the rear end of the lever allows the bolt to be removed. The pin holding the bolt stop in and serving as the pivot bears the brunt of any impact between the bolt lug and the stop and it's notorious for breaking. The bolt stop has been upgraded for the 2013 and later TRG's. In spite of the direct contact with the bolt lug, no peening of the lug has appeared in our use so far.

The tenon threads are metric M27x 1.5 and there is ample tenon length at nearly one inch, especially compared to a Remington 700 (around .750”).

The TRG is a three lug action which is a benefit compared to the typical two lug, 90 degree bolt throw actions that are currently ubiquitous. The lug abutments in the action are robust and have a lead-in chamfer cut into them to allow the bolt to cam into place. One of the lug abutments runs the full length of the action while the abutment that also serves as the feedramp is about .25" (6.5mm) thick. The third and final abutment is approximately .38" thick. The bolt lug raceways are broached in, the bolt is not a full diameter bolt. The corners of the raceways have a slight radius to prevent stress risers caused by sharp corners.

At the rear of the action there is a cam cut which actions upon a boss on the bolt body to provide some primary extraction. The cam is unusual in that it is somewhat abrupt. It appears to be broached in and there is no helical aspect to it. Wear patterns show that nearly all the camming action occurs at the edge of the bolt raceway and in one small section the spans the thickness of the action body at that point.

Excess pressure and gas from a ruptured case are vented through a hole in the right side of the action where the bolt face meets the breech face, and two holes in the bolt for any gas that flows through the firing pin hole.

The finish on the actions vary with the model, there is a version with manganese phosphate finish and one with a more blued finish. The actions with the blued finish and shiny bolt seem to run smoother than the phosphate version. The blued version is one of the slickest actions available, almost feeling like the bolt is moving on ball bearings.

The main bolt body is .750" (19mm) in diameter and is one piece as far as we can tell. The three lugs are triangular in shape and are arranged in a triangular pattern. They are conical in shape as well, similar to some benchrest actions, however there is not a corresponding conical cut in the barrel face. There is a generous fillet cut into the bolt at the root of each of the lugs at the sides except where the extractor cut is located. At the rear of the lugs there is a clearance cut to allow for a small fillet at the rear root of each lug. There is also a small chamfer cut on the right rear corner of the lugs to interact with the lug abutment lead-ins cut into the action. The lugs are approximately .380" wide at the root and are about .130" tall, giving a ratio of width to height of nearly 3:1. This is more than adequate to ensure no lug flex occurs. Since the bolt is not full diameter, there is no trouble with a lack of bearing area and only one row of lugs is needed on the TRG.

The extractor is a Sako style extractor of .220" width, encompassing approximately 30% of the case rim. This is not as much as some other military actions but is adequate and extraction has not typically been an issue for the TRG. The ejector is a spring loaded plunger style that is contained in the bolt face. This means the only cut in the bolt head is for the extractor, this cut does undercut two of the lugs somewhat but this is typical of rifles of this era. There are other styles of extractor which allow a more solid bolt head but bolt head failure is almost never seen even on this style of bolt. Ejection has never been a TRG strong suit. The ejector spring is weaker than other rifles and the TRG-42 in .338 Lapua was actually upgraded to two ejectors with the 2013 design revision.

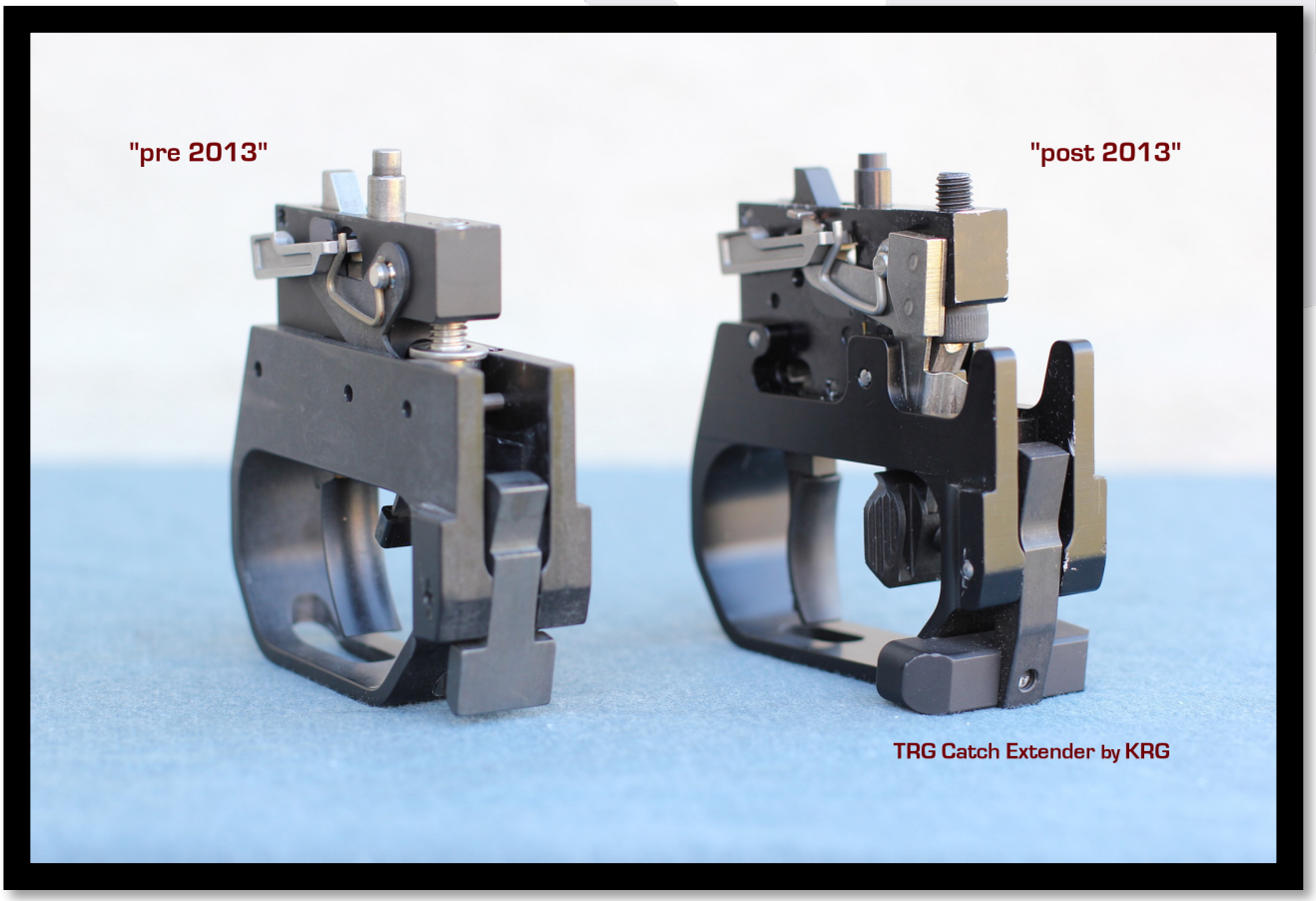
The bolt handle and bolt knob are separate pieces from the main bolt body. The bolt handle is steel and threads into a boss on the bolt body. The boss is positioned so that it gives the straight bolt handle a slight sweep to the rear. This boss has a chamfered corner to interact with the extraction cam cut into the action. The bolt knob is round, made of a polymer of some kind, and is about 1.02" (26mm) in diameter. This size and shape are well suited for a precision long range rifle and allows fast cycling of the bolt without being overly cumbersome. There are a variety of methods used by Sako to attach the knob, some of which have shown failure but we have not seen any issues personally.

The bolt shroud is conical in shape with a flat cut on the top which is then checkered, presumably to cut glare. It is made of two pieces, the main shroud has a small bushing pressed into it that serves as the spring seat for the firing pin spring. The shape is pleasing to the eye and the shroud, being steel, is obviously robust. It's held into the bolt body by a method basically the same as the lugs on a bolt action. There are two lugs on the shroud which line up with raceways in the bolt body and then the shroud is turned to lock it into place, being held there by the tension of the firing pin spring. This arrangement allows quick, tool-less disassembly of the shroud/firing pin assembly and is one of the best ways we've seen.

The TRG firing pin assembly is composed of three machined parts plus the spring. The firing pin itself is a simple turned part with a rounded tip of about .068" (1.7mm) in diameter. The tip is discolored from hardening while the body does not show similar discoloration. It may

be that only the tip is hardened or that the main body is ground post hardening. Either of these is plausible. The firing pin body is inserted into the cocking piece which is much longer than what you would find on a Rem 700, for example. A solid pin holds the two pieces together. The cocking piece has machined into it both the cam surface to interface with the helical cam on the bolt body for re-cocking and the sear engagement notch.

Though the TRG uses an "override" style trigger, the sear notch on the cocking piece is vertical unlike the angled surface on a Rem 700. This minimizes the off axis pressure that exists in the 700 action which was the impetus behind bolt alignment devices like “Borden Bumps” and Short Action Customs’ receiver mod. In the TRG design, the cocking piece bears the force of dry firing, coming to rest on a shoulder inside the bolt which spares the firing pin from abuse. The final piece is the cocking indicator. It is a cylindrical piece with a red painted groove on one end. When the firing pin is cocked, the groove protrudes out the rear of the bolt shroud giving a visual and tactile indicator. The firing pin spring mounts over the indicator and is housed inside the cocking piece.



Trigger, Triggerguard, Magazine Catch assembly:

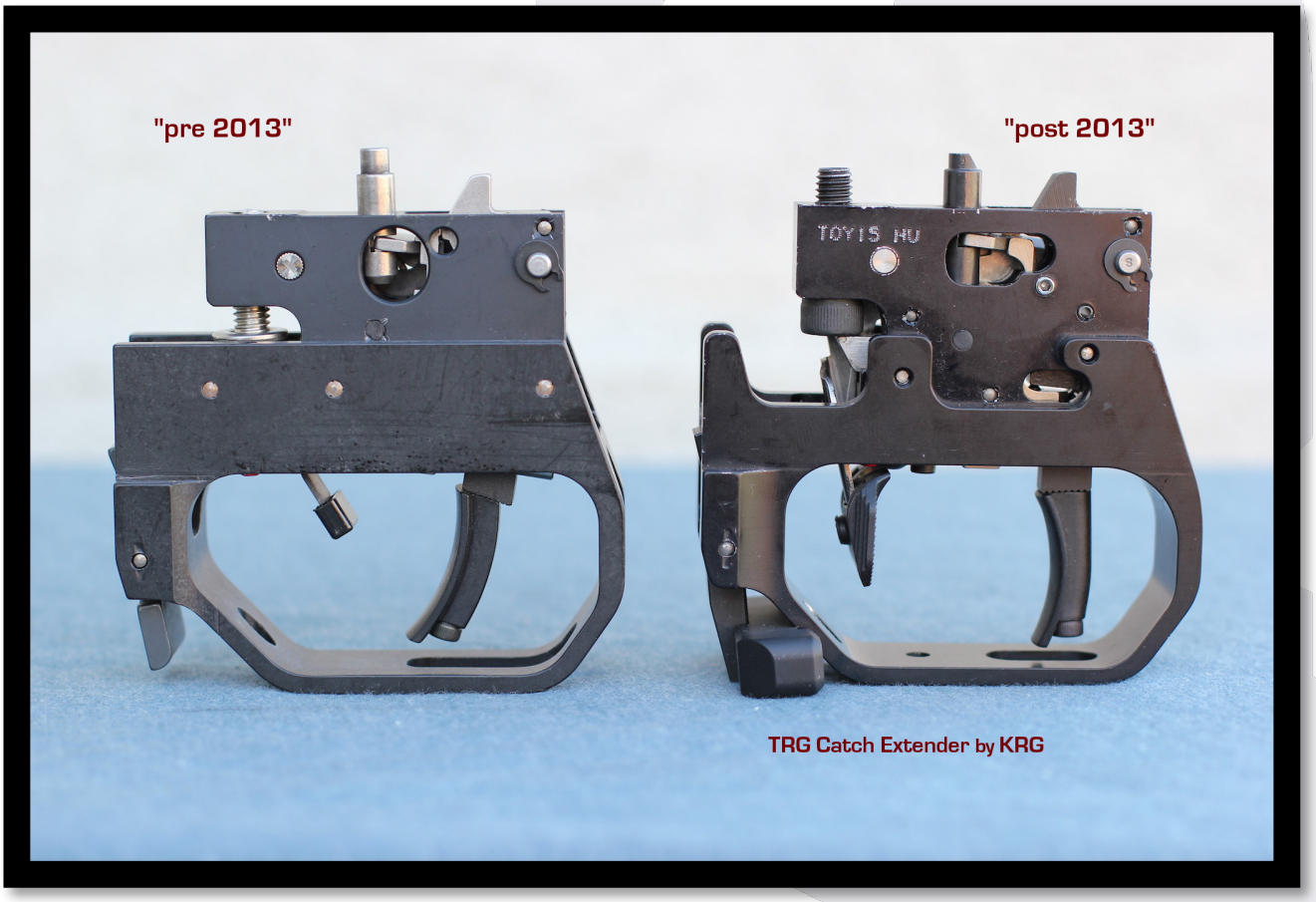
The TRG trigger has long been recognized as one of the finest factory triggers available. It is a two stage trigger with a plethora of adjustments. One interesting thing is that all the Sako/Tikka rifles use generally the same pattern of trigger, so the TRG trigger can be mounted onto a Tikka T3 and several customers have done that with their T3's in a Whiskey-3 Chassis. It

is held onto the action by a single M6 metric screw and is removable for maintenance and cleaning simply by loosening the screw through an access hole in the trigger guard. The barrelled action does not need to be removed from the stock, and with the trigger guard being pinned onto the trigger, there is a large advantage over other production rifles like the Rem 700. It is an override style and a two lever design with a third lever providing for two stage action. Sako claims adjustment range of 2-4lbs for the old version and 2.9-5lbs for the 2013 updated trigger.

The trigger itself acts on an intermediate lever after it completes its first stage of travel. The sear rests on the intermediate lever and when this lever is moved, the firing pin is allowed to "override" the sear, forcing it downwards out of the way. There is a safety feature built in where the trigger itself also presents a contact face for the sear until the trigger is moved rearward. This is a nice benefit designed to prevent the rifle from firing if jarred without the safety in the on position.

The trigger shoe is a separate polymer piece and is adjustable for web distance (closer to or farther from shooting hand) as well as rotation left or right when looking from above and also offset left or right. These three adjustments are controlled by one screw which is accessed from the bottom of the trigger shoe through a slot in the trigger guard. It's a very nice design. Apart from the ergonomic adjustment there are functional adjustments as well. The first and second stage pull weights are adjustable. The first stage pull weight is adjusted by turning a screw at the rear of the trigger. This requires removing the trigger from the action. The second stage pull weight is adjusted by turning a screw just in front of the trigger which is accessed through the same slot in the bottom of the trigger guard as the shoe adjustments. The Achilles Heel of the TRG trigger is in this area. Some users have adjusted the screws too far in or out and this causes some permanent change in the trigger and causes it to not function properly. We have had one trigger go down in this manner and the only fix is to return it to Sako/Beretta. The 2013 design update addressed this issue. Now both stages are adjusted as one instead of independently, and the pull weight range has been increased to 2.9-5.1lbs. A travel-limiting screw was added to make sure the prior issues don't reoccur.

The safety is an unconventional design in that the safety lever resides inside of the trigger guard. It has a little plastic touch pad and is pushed forward for fire and rearward for safe. Some excitable types may be quick to criticize, pointing that you shouldn't have anything inside the trigger guard save the trigger. On a bolt gun that is made with tactical use in mind this is a non-issue. Military marksman do not use the safety, generally speaking, we're all taught in sniper school to jam an earplug behind the safety to keep it in the forward position. The safety mechanism itself is a very good design. When activated, a round steel plunger protrudes up through a hole in the action and bolt. This plunger blocks firing pin travel and locks the bolt in the closed position. Simultaneously, a steel bar moves into place preventing the intermediate lever from moving and releasing the sear. The trigger itself will move through the first stage but that is it. For the 2013 update, there is a new plastic touch pad on the selector that is wider and does not require a finger in the trigger guard to actuate it.



The trigger guard is a unique design, being directly pinned to the trigger rather than screwed onto the stock as part of a floorplate assembly. It is made of machined plastic, similar to Delrin (or Delrin exactly) and has holes to access the trigger screws. It houses the magazine catch and also captures the trigger mounting screw so that it doesn't get lost. The mag catch is steel and has a small paddle at the bottom to press to release the magazine. This paddle is very low profile and could be improved which is why we introduced our "Catch Extender" years ago which makes it much easier to release the mag.

The mag catch does not grab a protrusion on the magazine, rather it fits into a slot cut into the magazine to hold it in the proper position. The mag catch design could be better. It uses a coil compression spring to provide the tension on the mag catch which pivots about a center pin. The spring is designed more for linear movement while the tip of the mag catch travels in an arc. Due to space constraints, the strength of the spring is not great. With our Catch Extender we send along a reinforcing spring to bump up the spring force for those shooting the .338 magnums in order to keep the mag from dropping under recoil. AI rifles have a better design and use a torsion spring which is quite strong. All in all the system works but could be better.

Magazine:

The TRG magazine is probably the most well made magazine in a commercial rifle and it provides smooth feeding. It has a sturdy steel body and has handy nubs on the sides and a lip at the front to help pull it out of the rifle. The internal overall length (OAL) for the TRG-22 mag is generous at 2.96" (75mm). This is more than an AICS magazine with the internal spacer and just about the same as the AICS mag with the spacer removed. The TRG-42 mags are near CIP length for the internal OAL allowed, at 3.75" (95.3mm). Unlike other magazines, the baseplate on the TRG mag does not come off; it is made from the sides of the mag body folded under and then tack welded. The mag can still be disassembled; however, the follower and spring come out through the top of the mag. The follower is a polymer of some kind and the spring is a flat wire spring of the style common to bolt action rifles.

The rounds are held in a double stack configuration that transitions to a single, center feed. This design allows for a compact magazine that, while holding the same 10 rounds for the TRG-22, is nearly 2" shorter than an AICS mag and is more in line with the double stack/double feed AI AW magazine (now AX). Interestingly, there is no taper to the magazine from front to rear. It is a rectangle (when viewed from above). This allows the TRG-22 and TRG-42 to have the same width of magazine well, while the TRG-42 is just a longer version. Producing the forend becomes easier with this type of arrangement compared to the AICS which has a wide/short/tapered .308 magazine and a skinny/long/less tapered magnum magazine.

The TRG-42 mags hold 7 rounds for the 300WM and 5 rounds for the .338LM. Rather than having a nub protruding to the rear to be caught by the magazine catch, the TRG has a rectangular slot cut into the rear of the mag, as mentioned above. While the TRG mags are good, they are not perfect. We have had a TRG-42 mag quit working randomly, and one of our TRG-22 mags only holds 9 rounds. They are also quite expensive, retail was over $240 each at one point though you can find them on sale from time to time for under $200. This high magazine cost prompted us to offer our conversion kit which allowed the TRG to take the ~$75 AICS mags.

Barrel:

According to a Sako engineer, the TRG barrels are made right in the same batch of barrels as the "heavy" profile barrels for the other Sako/Tikka rifles. However, the TRG barrels are selected from the best in the batch after testing. The Tikka target/heavy barrel rifles have a very strong reputation for accuracy and the TRG goes beyond that. The authors would venture to say that there are not many shooters out there who can actually outperform the rifle for accuracy in this style of shooting. Benchrest is a whole different game and not a legitimate comparison.

The TRG barrels have a rather modest contour compared to what is currently popular. The barrel starts out at 1.16" (29.5mm) at the action face and only holds this diameter for about a third of an inch before beginning to taper down to .875" (22.2mm) at about 6.5" (165mm) from the action face. It holds this diameter to the muzzle, which is threaded M18x1 metric and has a nice thread protector. The metric thread is large enough to be turned down to a 5/8-24 thread if desired without even re-crowning the muzzle. The TRG-22 barrel weighs 4.2 lbs in the 26" length version. This contour is just about ideal for a precision rifle in our opinion.

The TRG is incredibly accurate without having shots start walking due to the barrel heating. Also offered for the TRG-22 is a 20" barrel (both in 11 twist), while the TRG-42's get

20" or 27 1/8" barrels. Sako lists the 300WM barrel as an 11 twist and has the .338 LM barrel listed as both 10 and 12 twist. Oddly, the older manual lists a 10 twist while the updated manual lists a 12 twist. This seems to be opposite of the rifles themselves. The older 338 rifles came with a 12 twist that was not suitable for the long 300 grain bullets starting to appear on the market and was then updated to a 10 twist. Sako's website and sales literature show a 10 twist for the .338. All barrels are hammer forged and are 4 groove. They are not chrome lined as is sometimes claimed by various people. This mistake is likely due to the appearance of the barrel caused by the finish process, especially on the manganese phosphate version. There is a slot cut into the barrel behind the muzzle threads, this is for adding a front sight.

Chassis/Stock Assembly:

Overview:

The TRG stock is probably the most comfortable stock available on a production rifle to date. It is a chassis type system, meaning that it has a "backbone" component that all the other components bolt onto. Typically in a rifle chassis the backbone is aluminum and the other components are either aluminum or polymer and the TRG fits this description. It uses a different design than the chassis developed by AI and is lighter and more comfortable as a result. There is an aluminum backbone and the forend is attached and the buttstock is a separate piece and bolts on as well. There are some ergonomic adjustments but not at the level seen on a chassis today such as our Whiskey-3 or the AI AXCS (right side folder). The TRG

can be had in a fixed or folding configuration but the folding stock is wildly expensive ($2750 retail for just the rear folding half). There have been some stock failures which are discussed below but generally it's a fairly durable stock.

Backbone:

The TRG stock is a chassis style because it has a main frame, or backbone, to which other components are attached. The TRG backbone is an aluminum extrusion just over 18" in length. It travels from the rear where the buttstock mates up to it clear to the front of the forend, providing a very stiff base for the rifle, even with a large lightening pocket cut in toward the front. The top half contains the bedding surface while the lower half has a T-slot built into it. The buttstock, forend mounting blocks, magazine well adjustment block, and TRG bipod all fit into this T-slot at various points.

The bedding system is a round channel which matches, more or less, the bottom of the TRG action. It is created as part of the extrusion process, not machined in after the fact, as far as we can tell. The TRG rifles are excellent performers so there doesn't appear to be any adverse affects from this style of bedding. However, it is plain to see from the marks left by the action that the radius in the backbone does not match the diameter of the action perfectly. The most contact is along the bottom of the action and towards the front. We switched to a V-style bedding system when we made our AICS conversion kit. An accuracy fiend or benchrest shooter might see some slight performance gain with a skim bed of the action to the chassis but that's difficult to say as the TRG is well capable of sub 1/2 MOA precision.

A cut in the backbone serves as the top part of the magazine well. An aluminum block the same as those used to hold the forend on rides in the T-slot and is secured at the front of the magazine well serving two purposes. It can be moved forward and rearward (with hex wrench), thus helping to set the size of the magazine well (or tension on the magazine is another way to look at it). It also has an angles surface that guides the magazine into place, like the jet funnel on a competition pistol but only on the front side of the magazine well.

Just forward of the magazine well there is a recoil lug set into the backbone. This is a small steel block that is epoxied into a slot in the aluminum. There's not a surplus of lug contact with the action, especially compared to the oversize lug on a Remington 700. This has caused some doubters but the system works just fine even for .338LM. No peening or distortion of the lug or action is observed. Factory Tikka T3 rifles use an aluminum lug and do get beat up by the high recoil energy calibers but the TRG does not suffer this defect.

Cut into the backbone at the front are several mounting holes. These permit the mounting of the Sako ITRS rail (optional) and the barrel channel mounted sling loop that comes standard on the TRG. On the lower side of the backbone at the front there is a small steel plate bolted in. This serves as a latching surface for the TRG bipod. The bipod has a spring loaded steel latch that clips into place to hold the bipod into the T-slot. Without the steel plate bolted to the backbone, the latch would wear on the aluminum over time.

The barrel channel is formed during the extrusion process, just as the bedding surface, so essentially there is the same clearance as the diameter of the action all the way to the front of the forend. Theoretically a shooter could put a monster 1.25" straight cylinder barrel on if he wanted (which we discourage), the only thing getting in the way would be the factory sling mount that bolts into the barrel channel. This sling mount, the Sako bipod, and the Sako ITRS rail become unusable with barrels contours much larger than the factory version.

Forend:

The forend has a nice feel in the hand, it's wide enough without being too wide to fit in the hand like an F-class forend. It is made of cast polyurethane and it's wider than a hunting style forend at 2.33". It is not bolted directly onto the aluminum backbone. Rather, it bolts onto two small aluminum blocks that ride in a "T" channel in the backbone. This design does allow the forend to be moved slightly which adjusts the size of the magazine well but really is one of the poorer ways of mounting a forend we've seen. There is a potential for the forend to slide under recoil. Sako deals with this by making the screw that goes from the forend to the aluminum mount block extra long so that it protrudes up into a hole in the backbone which acts like a recoil lug holding the forend in place. To be fair, the TRG designers may not have expected or desired a bipod to be used that attached to the forend and transmitted force to the forend during firing. The Sako bipod would not add any sliding force to the forend as it clips into the backbone directly.

The bottom of the forend is angled, sloping down toward the rear/magazine. This was/is a common trait of older style target rifles so that the shooter could adjust the elevation of the rifle by moving the rifle forward or rearward on the rest. With the current ubiquitous use of bipods, this is not as much of a benefit but can still be useful when doing positional shooting from a barrier, for example. There is an Anschutz rail built into the bottom of the forend which again hearkens back to the age of high power style shooting which is still around for now. The rear part of the forend makes up part of the magazine well. This rear part dips down to actually fully enclose the magazine (apart from the bottom) which allows shooting in the standing position with the support hand positioned on the forend/magazine. Relief cuts at the very rear of the forend and also at the centerline of the magazine well aid access to the magazine to change it out. There is not a lead-in chamfer to the magwell (like a pistol jet funnel) but inserting a magazine is not an issue, probably due to the top of the magazine being angled so much.

The downsides to the forend are as follows: There are limited mounting points on the forend. Basically it will take something that mounts into an Anschutz rail and that's it. Not many accessories are made to fit an Anschutz rail these days. Naturally this has provided us with opportunities to enhance the platform.

The forend itself is too tall. Sako makes a nice bipod that fits into the slot at the front of the backbone. This is an excellent option but expensive, and people like to use other bipods. If you mount one on the bottom of the forend, the distance from the bipod pivot point (for a bipod that cants) to the bore axis of the rifle is excessive. Both Accushot and us make solutions to this problem in the form of a “Spigot Mount”. Next, the forend covers the front action screw. The rear two action screws can be accessed from the bottom of the rifle (the middle one after removing the trigger) but to take the barrelled action out, the forend must be removed to get to the final front action screw. We drilled an access hole in one of our TRG's that we frequently take apart. Finally, the rear portion of the forend that forms the magazine well is a weak area. Looking from above, the forend has two ears that go around the magazine. It's similar to a tuning fork. We've heard from a few shooters that broke their forend there. These breaks were most likely due to a dropped rifle and the forend is unlikely to just break on its own or due to recoil.

Buttstock:

The TRG comes standard with a fixed buttstock but a folding version is also available which will be discussed later. The fixed buttstock is separate from the forend and slides into the rear of the "T" slot in the backbone. The buttstock is made mostly of polyurethane cast over an aluminum skeleton. The skeleton provides strength while keeping the stock light and allows for good ergonomics. Two screws hold the buttstock on, both are M6 metric. One is the screw that also acts as the rear action screw. By loosening one and removing the action screw, the whole buttstock can be slid right off. It's very slick.

The grip is comfortable with a nice palm swell and plenty of room for a same-side-thumb grip. On an AI type of system which has a large aluminum section (buttstock support spar) running directly under the action all the way to the buttpad, there is not as much room for the shooting hand. Essentially this is the difference between having the buttstock support spar at the top of the buttstock like an AI or at the bottom of the buttstock like the traditional McMillan/Manners style tactical stocks. The TRG is like the latter. It could use a little more clearance for the meaty part of the shooting hand (at the base of the thumb), but other than that the grip shape is hard to fault. The grip is symmetrical from left to right it can be used by a lefty shooter just the same as a righty.

The cheekpiece has a profile similar to a bishop's hat but is quite comfortable. It is symmetrical as well and be adjusted laterally (with a hex wrench). It can be adjusted vertically with spacers that are not included. There is a relief cut at the front for the bolt handle to travel rearward and the bolt can be removed easily with the cheekpiece in the standard (lowest/no spacers) position. The underside of the cheekpiece has a little bonus storage area where the optional rear sight will fit. The cheekpiece is made of cast polyurethane as well and is held on by one M6 screw which does the job just fine.

At the bottom of the buttstock there is a large cut-out for the support hand. The shooter can hook his support hand and pull it into his shoulder. This is a nice feature; however, it leaves little area for the buttstock to ride on a rear bag. Most shooters trying for high precision these days are using a rear bag or monopod though the support hand can serve as a field expedient rest.

Built into the rear of the buttstock are QD cups on both sides of the stock. Threaded into these cups are loops for an HK snaphook type of setup. If you unthread the loops/rings then you will expose the QD cup. They are not rotation-limited, meaning that any sling mounted will be able to rotate 360 degrees.

The length of pull (LOP) is tool- adjustable with spacers and is around 13.5" from the factory (depending on where the trigger is set). The buttpad can be tilted various ways, raised/lowered, and be offset to the right or left (cast). This is not common in a factory offering, in fact there may not be another factory rifle with a buttpad that can swivel left or right (as seen from above) or have the cast adjusted. The newest AI rifles with the right side folders can tilt the buttpad right or left as seen from the rear. All of these adjustments on the TRG require a hex wrench just like the cheekpiece.

An injection molded piece provides most of the adjustment in what is really a clever system. When looking from the rear, the buttpad can be tilted right or left about 5 degrees each way. This is done just by loosening the two screws that hold on the buttpad.

There is approximately .25" of cast adjust each way. Cast means shifting of the buttpad off to the left or right side of the rifle. It's more common in shotguns but is useful in perfecting the fit of the stock to the shooter with a scoped rifle. The cast and the buttpad tilt are the same mechanism, essentially, so you can't use them simultaneously. For example, a buttpad tilt of 5 degrees would leave no more adjustment for the cast, and a full cast of .25" would leave no more travel to tilt the buttpad.
There is approximately 2.4" of height adjustability in the buttpad. This is a large amount. About half of that travel is up from the neutral position and this is the adjustment that will suit most prone shooters. With the buttpad in the highest position, the top portion will be in line with the rifle bore. This is good for recoil management but not great for getting a cleaning rod down the bore. To lower the buttpad actually requires removing the buttpad to get at the fastener holding the injection molded housing in place so most shooters will most likely choose a buttpad height that allows them to get the rod down the bore.
When looking from above, the buttpad can be angled to the left or right approximately 10 degrees each way. This is done by loosening the same screw that controls the buttpad height (buttpad must first be removed to access the screw). This adjustment can be useful to help set the buttpad into the shoulder pocket.
The buttpad itself is thin and fairly hard. It is not very comfortable but on the TRG-22 it's not terrible. On the .338LM the shooter will most definitely want to use a muzzle brake to help tame recoil. The buttpad was changed for the 2013 design update to a more recoil-absorbing material.
The downsides to the buttstock are minimal. It could use tool-less adjustments for both the cheekpiece and LOP. Its main competition are the AX (more expensive) and AT (similar pricing) rifles from AI. The newer AX rifles have full tool-less adjustments while the AT uses tools and spacers. The TRG folder does add tool-less adjustments but you tack on over $2k to the price which is absurd. There have been some breakages reported. In every case we've seen it was in the upper wrist area of the buttstock, basically where you'd put your thumb in a same-side-thumb grip. It's difficult to say the cause although this is near the point where it mounts to the backbone so the area is likely one of the most stressed. It could use a little more clearance for the shooting hand (base of thumb area) and it could use a lot more surface to engage a rear bag as well as some mounting points for a rail or monopod on the underside.

2013 Design update:

In 2013, Sako updated the TRG-22/42 design with a few improvements. The model names did not change. The changes, as far as we can find, are as follows:

-Improved recoil pad material and thickness

-New trigger which is more resilient to user adjustment/over adjustment, has a wider safety lever, and has a stronger material for the trigger guard (aluminum vs. Delrin). Sako claims improved drop safety with the new trigger. The new trigger is more complicated and seems only adjustable for first stage pull. In feel it is inferior to the previous trigger.

-The method used to attach the bolt handle was improved.

-The TRG-42 received double ejectors to improve ejection (a TRG weak point).

Sako and aftermarket accessories: There are a host of non Sako accessories for the TRG series. Many of these are items that we make. Here is a non-exhaustive list of accessories:

-Scope rails-various mfg including Badger Ordnance, Warne, and Near Precision
-One piece scope mounts from Spuhr and Near
-TRG specific bipod from Elite Iron
-KRG items:
    -Folding rear buttstock
    -Enhanced magazine catch
    -INVR (night vision rail)
    -Action wrench for barrel changes
    -Spigot Mount
    -Ambi QD sling mount for front (rear Sako stock has QD cup already)
    -Barrel change kits

General pros/cons:

Pros:

-Supremely accurate, can outshoot most shooters and is easily accurate enough for many kinds of matches apart from benchrest
-Light weight for this style of rifle
-Pre-2013 versions had one of the best triggers ever supplied on a factory rifle
-Superb ergonomics, head and shoulders above competition
-Pleasing aesthetic lines
-3 lug bolt gives a short bolt throw plus the bolt cycles ultra smoothly

Cons:

-Cast polyurethane parts don't have the durability of the utilitarian AI parts
-No tool-less adjustments (on non folding version) and the spacers for adjusting LOP and cheek are $$
-Basically one chambering for each action size (.308 and .338LM)
-Barrel is not user replaceable, must be gunsmith fitted in the traditional manner
-Lack of replacement parts support/exorbitantly expensive parts from Beretta
-Design concept a little behind modern advancements toward modularity, configurability, etc., e.g. it uses an Anschutz rail on the bottom of the forend for accessories mounting rather than a Picatinny, Mlok, or even Keymod interface.

Specifications <u>(all are approximate):</u>

Operating:

Extraction: set back- .07"
leverage- 10.5 to 1
bolt handle travel- .76"
bolt handle length- 2.81"

Chambering: cam forward- .10"
leverage- 9 to 1
bolt handle travel- .90"
Cock on opening: 1.96" bolt handle travel
Bolt Rotation- 60°

Ignition:

Firing pin travel: at impact- .16"
dry fired- .22"
Firing pin spring specs:
free length- 2.74"
# of active coils- 20
wire diameter- .051
outer diameter- .32"
rate (k)- 25 lb/in, 4.4 N/mm

Firing pin spring compression:
total compression at cock- 1.2"
force at cock- 30lb, 134 N
opening bolt- .20"
closing bolt- .02"
leverage- 9.8 to 1
bolt handle travel opening- 1.96"
Lock time: 2.17 ms (calculated)
Impact velocity: 17.2 ft/sec, 5.2 m/s
Impact energy: 104 in/oz, .737 J
Firing pin tip and hole diameter: .068", 1.73mm / .0715", 1.81mm

Receiver:
Overall length- 8.207", 20.8cm (TRG-22)
Length/height of ejection port- 2.83" / .512"
Ring diameter- 1.378", 35mm
Barrel/receiver threads- M27 x 1.5
Tenon length- .99", 25.1mm
Recoil lug bearing area- .059 in^2

Action screws- 2x M6 x 12mm, 1x M6 x 30mm

Bolt:
# of lugs- 3 (symmetrical)
Lug shear area- .622 in^2
Lug bearing area- .097 in^2
Bolt diameter- .746", 18.95mm (TRG-22)
Lug diameter- .986", 25mm
Bolt face recess- .105", 2.67mm
Extractor- Sako style
Extractor cut width- .220", 5.58mm
Ejector- spring loaded plunger, (2 ea on 2013+ TRG-42)
Bolt travel- 3.91" TRG-22, 4.63" TRG-4

Barrel:
Case protrusion from barrel face (go gauge)- .134", 3.4mm
Lengths: 20", 26" (TRG-22), 20", 27 1/8" (TRG-42)
Twists: 11" (TRG-22 and 42 in 300WM), 10" (TRG-42 338LM)(12" twist on older TRG-42)

Trigger:
Pull weight range- 2-4lb (old generation), 2.9-5.1lb ('13 revision)
Length of pull (to buttpad)- 13 3/8"-14 1/8"

Magazine:
Length (internal)- 2.96", 75mm (TRG-22)
3.75", 95.3mm (TRG-42)
Capacity- 10 (TRG-22), 7/5 (TRG-42 300WM/338LM)

Weights (TRG-22, 26" barrel, w/ empty magazine):
Action body- 18.7oz, 530g
Barrel- 67oz, 1.9kg TRG-22
Bolt assembly- 12.9oz, 365g
Firing pin- 1.84oz, 52.05g
Trigger- 4.7oz, 133.2
Magazine- 5.8oz, 164.4g
Backbone- 14.4oz, 402.2g
Forend- 13.6oz, 385.6g
Buttstock- 32.9oz, 932.7g
Total stock- 62.2oz, 1763.3g
Total rifle- 171.3oz (10.7lb), 4.86kg