

# Bedding a Rifle With MatchGrade Bedding Compound

By Nathan Foster

## Instructions for MatchGrade Bedding Compound

### About MatchGrade Bedding Compound

MatchGrade bedding compound is a product that has been specifically designed and tested by Terminal Ballistics Research Ltd in conjunction with a leading New Zealand epoxy resin manufacturer.

You will need:

- MatchGrade bedding compound part A and B
- MatchGrade release agent
- Masking tape.
- Insulation tape
- Cling film (lunch wrap) or newspaper
- Craft knife
- Dremmel or end grinder or chisels
- Plasticine (supplied)
- A drinking straw (very important)
- Degreaser (household citrus based cleaner will suffice if necessary)
- Headless bolts (bolt stock) either 1/4" UNF or M6 depending on rifle
- Clean up rags
- Sand paper, 120gr, 180gr, 240gr and 320gr.
- Drill and drill bits- either M7 or 9/32 bits.
- Bungee cords (strips of tire inner tube will suffice)

### Mixing instructions for MatchGrade bedding compound

Pour part B into part A, mix well.

### Clean up

Use citrus based cleaners or brake cleaner / degreaser type sprays. Hoppes is a good solvent for metal work.

## 1. Stock Preparation

Before doing anything, scribe a pencil line on the action and barrel, along the intersection of the metal work and top line of the stock. This will establish the correct height the action needs to sit at during bedding.

Remove the scope and strip the rifle down into basic components. Put all of the smaller metal parts (floor plate, bolts etc) into a plastic container. Remove the trigger unit from the rifle action to prevent compound from entering the unit. Note: the trigger housing of Ruger rifles cannot be removed and must be worked around (cover with plastercine).

For beginners (or for experienced operators working on new rifle designs), it pays to take photos of the internal gun stock before starting any prep work. This will help later when grinding out the cured compound, you can refer to the photos to see what the stock internals should look like during grinding. If you do not have photos, you may find some photos at the bottom of this article.

The gun stock now needs to be masked to protect it during the work process. It is best to use a layer of cling film or newspaper under the masking tape to minimize the amount of masking tape that actually contacts the stock. On wood stocks, the cling film helps to prevent the stock finish from being destroyed when the tape is lifted. On synthetic stocks, the cling film saves the mess associated with tape residues.

The next step is to rough up and key into the stock work so that the compound has both a good adhesion to the stock as well as a good build up of compound rather than a fine but weak shim. If bedding a plastic gun stock, the entire forend should be keyed and prepped for MatchGrade Synthetic Stock Stabilizer. This should be done as an intermediate step prior to bedding. Do not try to avoid the stabilizing step. Stabilize the forend and any skeletal voids within the action- then commence bedding. Stabilizing is a simple one hour job.

**When prepping the stock, leave a sliver of parent material unground at the tang to be used as a height reference.** You will use plastercine in the barrel channel to set the height of the bedding at the front.

Use either a rotary burr (Dremmel/air tools/ die grinder) or chisel to remove stock material in the area of the action and tang. Some of the barrel channel will have to be roughed up but a decision needs to be made on just how far into the barrel channel will be the optimum distance for bedding. On plastic stocks, remove some stock material, then use a hot wire (blow torch/ gas cooker) to key the stock for optimum adhesion of the compound.

To decide the optimum distance for barrel bedding:

- For target weight barrels, put the bolt into the rifle action (even better if the scope is still attached) and determine the balance point. Hold the action in one hand and hold the barrel with the crooked index finger of the other hand. Slide the barrel along the index finger to determine its balance point. Once established mark this area of the barrel with masking tape and transfer this measurement to the stock.
- For sporting barrels that feature a parallel area at the beginning of the barrel, bed to the end of the parallel.
- On sporting barrels that lack a parallel, bed for a distance of (approximately) 1". Accuracy can also be enhanced slightly by masking the sides of the barrel in a diagonal fashion.



### *Masking Taped gun stock*

On wooden gun stocks, the user has two factors to consider. If the bedding job is to be absolutely discreet, great care will need to be taken during the removal of wood along the top edges of the action and barrel channel. Care must also be taken with brittle woods which chip easily during shaping. Unfortunately, the more the discreet the job is to be, the weaker the product will be at the top edges due to the poor concentration of compound in these areas. My own preference is for a tough, field practical job that will also resist moisture associated stock warping.

With Synthetic stocks including the Hogue, it is absolutely imperative to key into the sidewalls. After removing stock material, burn the side walls with a hot knife/hot wire. This will give the compound both a mechanical lock and full adhesion where oils have been burnt out of the plastic. Further more, the top edges of the Hogue stock should show a good gap of around 1.5 to 2mm ( 60 to 80 thou) for optimum strength of compound.

Another consideration is front and rear 9F&R) versus full length (FL) bedding. If the rifle is to be bedded front and rear, there is no need to remove stock material within the magazine well area.



*Air grinding a synthetic stock. On synthetic stocks, be sure to key into the side walls of the stock to create a 'mechanical' lock. The forend of this stock (Hogue) is also being prepped for MatchGrade Synthetic Stock Stabilizer.*



*The prepped tang. In this example, I am prepping the tang of a Hogue stock that was factory fitted to an M1500 Howa rifle. This model stock lacks a good bedding contact area at the tang so I have placed a piece of foam (dotted line) out to a more practical distance and will fill this entire area. I will need to be careful that the finished result does not interfere with the trigger unit once it is re-fitted.*

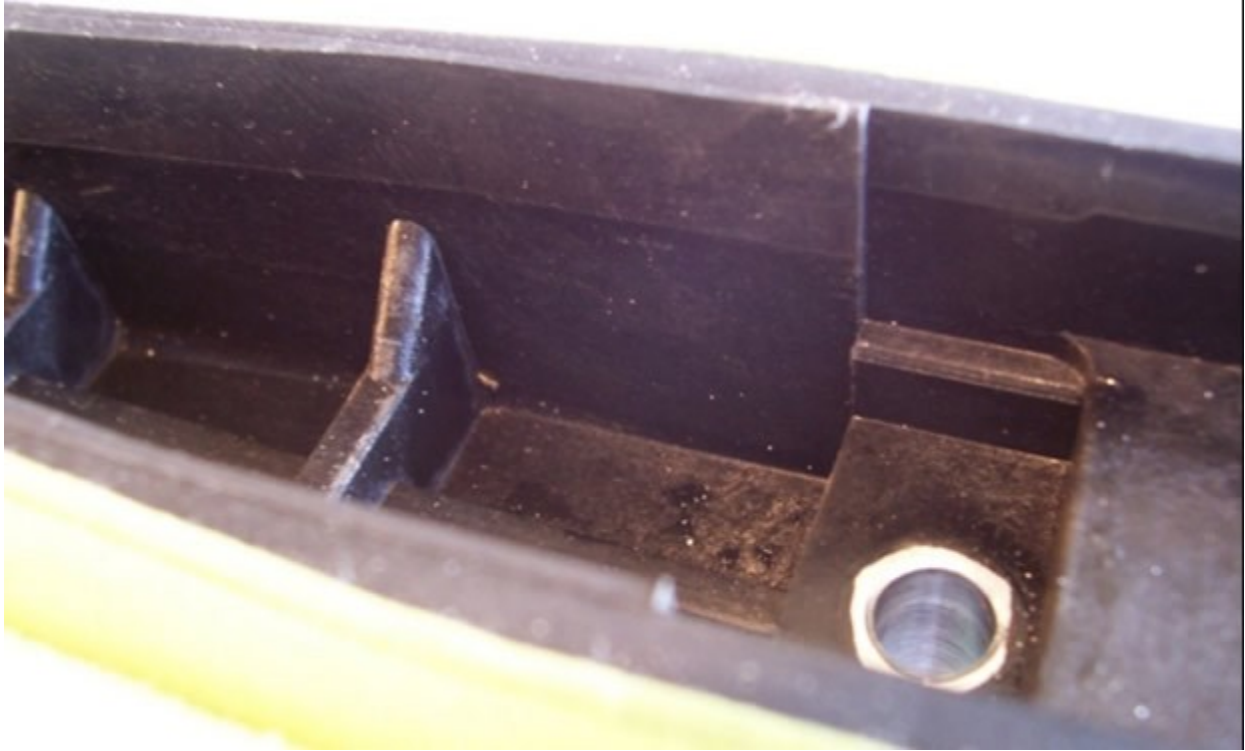


*Check for clearance between the stock side wall and action metal. On wood stocks, a tighter fit is more discreet but lacks strength at the top edges and is not actually a great deal more aesthetically pleasing than a 'bedding border'.*





## *Bedding border on wood blue Howa/Weatherby*



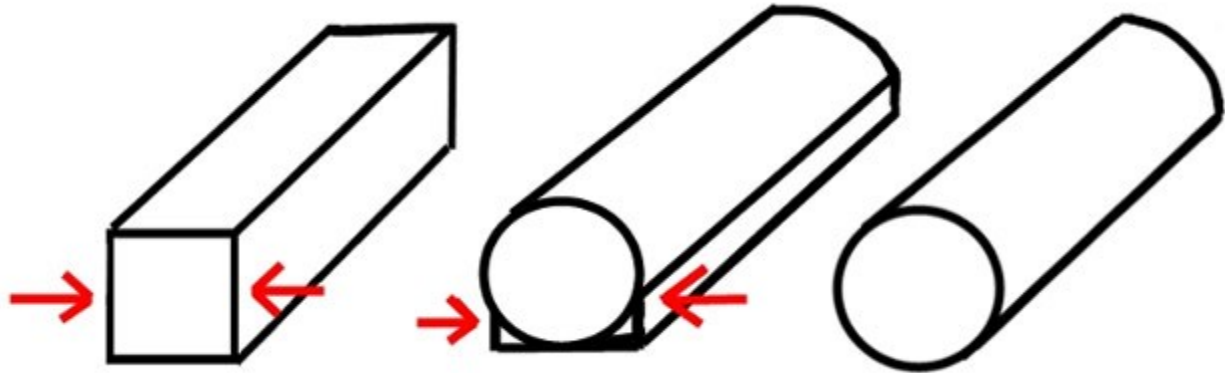
*The Hogue stock (without aluminum chassis) is the most difficult of all synthetic stocks to bed. In the picture above, a seam can be seen (running left/right). Below the seam, the stock is made of plastic but above the seam, the stock is entirely constructed of soft rubber. The rubber needs to be heavily keyed and for those who want the ultimate strength, small patches of carbon fiber or fiberglass mat should be inserted against the side wall when the bedding compound is applied.*

## **2. Barreled action preparation**

While the goal of bedding is to create a mirror image of the barreled action, it is imperative that certain areas of the rifle action are relieved (no contact with the bedding). This prevents the action from becoming pinched or 'hung up' in the bedding. If the action does become pinched, random harmonic vibrations will totally destroy accuracy.

The areas that need relieving are the front, sides and bottom of the recoil lug. Also the rear most face of the tang and any parallel wall metal on the action. These areas should be relieved with insulation tape or masking tape. Insulation tape is preferable as it does not bind with the compound and makes breaking the action out of the stock easier.

Sako rifles have an essentially square action. If the walls of this action are relieved with insulation tape or masking tape, the action will be a sloppy fit later on. Instead, on the Sako type action, the side walls should be given a heavy coating of release agent.



*Above are the three basic types of rifle action. The red arrows show the parallel walls that must be treated with due consideration. The square shape on the left depicts the shape of the Sako action. The middle shape depicts both the Howa and Winchester M70 actions while on the right is the Remington M700 action. This last action is the easiest to obtain accuracy with as it does not have any parallel side wall metal.*





*Howa wood blue rifle being prepared for bedding. Electrical tape is used for relieving, plastercine is used to plug the mag well (this rifle was full length bedded). The black release agent has been applied to the action and can be seen on the electrical tape.*





*On the above Sako, I have used electrical tape to block the mag well rather than plastercine. This method can be useful on front/rear bedding jobs as opposed to full length action bedding.*



*Ruger action prep. Note how trigger cannot be removed. Plastercine can be used to block the trigger unit along with release agent.*



*Above: A Tikka T3 ready for full length bedding, the ali lug is wedged in place, metal to metal contact at the front face only. Use electrical tape to relieve the top (bottom as seen here) and rear face of the lug. Use two pot 5 minute epoxy to lock the lug in place- requires great care. Make sure no 5 minute epoxy seeps onto the front face of the lug.*

The Tikka T3, Sako A7 and Savage Axis have a floating aluminum recoil lug which needs special attention during bedding. The front face of the recoil (facing the forend) is the only surface that should contact the action, other faces must be relieved. To ensure that the fit is correct, the top of the lug should be masked off and the rear of the lug should be masked off, trimming the insulation tape to suit. Following this, the lug needs to be glued to the action, being careful to make sure no glue dribbles onto the front face. Use a two pot 5 minute epoxy to secure the lug to the action. Once the bedding job is complete, the fine glue bond will break during removal of the action from the stock, leaving the lug in the stock where it needs to be.

Once the relief areas have been taped, the magazine well should be either be taped off (front/rear bedding job) or blocked with plastercine (full length bedding job) to prevent leakage into this area. The trigger inlet of the action should also be taped off.

The headless bolts should now be masked to a thickness that allows them to **easily pass through** the holes in the stock. It is very important that you get this right. If the taped bolts are a neat fit, the bolts will bind in the holes in the stock as compound seeps into the holes. This will prevent you from being able to set the action down into the mortice! If there is too much of a gap, the compound will leach out through the holes. About a .5mm/20 thou gap is good (a bit of wriggle room). Make sure that the taping is neat where the bolts fit into the rifle action, not bunched up as it meets the action. Japanese and European rifles normally utilize metric M6 bolts. On American rifles, use standard ¼ inch UNF headless bolts.

It is important that the user has some means to unscrew the bolts at the end of the job. Cutting slots in the top of the bolts so that a screw driver can be applied later is very useful. Button head hex bolts can also be ground down to suit. It is important to check that when the bolts are screwed into the action, the masking tape on the bolts is flush with the action leaving no room for the bedding compound to key into the bolt threads (see pictures).

### **3. Bringing the barreled action and stock together.**

Once the action is taped up and ready to go, a final fitting is required to check stock fit. At this point, we need to fit plastercine dams in the stock to prevent the bedding compound from migrating away from where it is needed. The front plastercine dam in the barrel channel can be used to set the height that the action will sit during bedding. Most rifle actions are height critical so it is important to get the height right, especially if a lot of stock material was removed during preparation.



*Fitting the dams. In the above job, I am mid way through forming the dams. Following this, the barreled action is checked for fit. On this rifle, I am performing a front and rear bedding job (no bedding through the mag well). You can see the gap in the mag well where I will allow the compound to seep down. It pays to clean up this seepage immediately after setting the action into the mortice.*



*This Howa/Weatherby wooden stock is being prepared for full length bedding. I have also glued pillars in place. Note that I have also made masking tape skirts along the side of the action to aid clean up. I'll pull and throw these skirts away after the action is put into the mortice.*

Fit the dams and shape the barrel dam to a nice concentric mold. Please note: **The height of the barrel dam will determine how high high the action sits. The front dam is your height reference point** (By leaving a sliver of stock material unground at the tang, you will have a rear height reference point).

If working with long heavy barreled rifles (free floated), it can pay to make a small plastercine mold at the forend tip to help take the weight of the barrel to alleviate any potential stress. However, be careful to ensure that the tip mold does not interfere with the height of the barrel channel dam. If the barrel is not currently free floated and utilizes pressure point pads, these pads can be left in place until the bedding is finished, free floating the barrel as a final job.



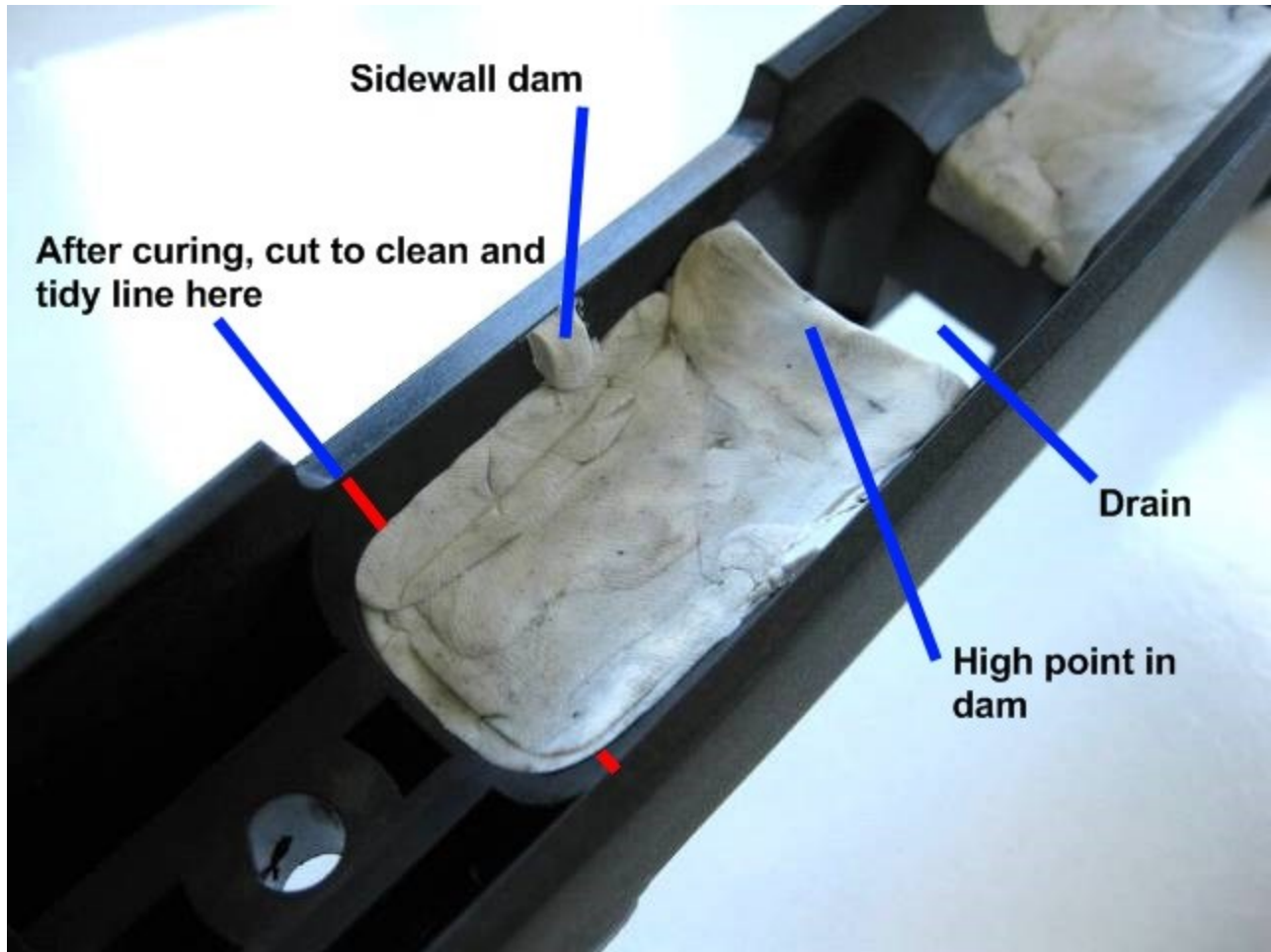


*Above, my plastercine dam is in place and formed to the barrel. As a last measure, I have applied a second foam dam over the plastercine dam. This allows me to pour compound to a high level without having to worry about the compound flowing forwards. I guide the headless screws into the stock, push the action down till it is just touching the foam dam, pull the foam dam (make sure the masking tape has a 'fast' tear tab), then push the action down to its final resting point in a slow steady motion.*

If possible, use a second temporary foam dam (or even a rolled tissue dam) over the front plastercine dam. See pictures for guidance.

You will need to decide whether you wish to perform a front and rear bedding job or full length bedding job. In most instance, it is best to perform full length bedding if possible. But there are times when full length bedding is extremely difficult to achieve and immensely stressful. If bedding the Hogue stock, I recommend front and rear bedding. Most folk will also find F&R bedding an easier option when bedding Mauser rifles. The Ruger M77 needs to be F&R bedded due to the non-removable trigger unit. The Remington M700 and Tikka T3 are generally straight forwards to bed, whether utilizing F&R or FL bedding. But as suggested, if a Hogue stock is employed, F&R bedding is recommended due to the more difficult nature of the rubber top line.





*Close up of plastercine application for front and rear bedding. Please note that this example stock has not been prepped and needs to be stabilized first (see skeletal voids).*



*Full view of M700 stock (example) with tang dam.*

If F&R bedding, you will need to create a drain hole in the magazine well plastercine dam, as shown in the labelled picture. You will also need to create a high point at the rear of the plastercine dam to prevent seepage, as well as small sidewall dams. Once the action is set down into the mortice, it is imperative that all mag well seepage is cleaned up, by reaching up from underneath and cleaning with a solvent and tissue or cotton buds.

If performing a full length bedding job, the entire mag well will need to be dammed.



An M700 stock prepped for full length bedding.

Once you have your dams in place, you will need to coat the plasticine with a lubricating wax to prevent it from lifting out of the stock during trial fittings. Lee case lube is the best lube for this use. Trial fit the rifle and check that the action and end of the barrel sink to the correct depth. Each time the barreled action is removed, the Plasticine in the barrel channel can be re-arranged for the best (aesthetic) fit.

Finally, and this is very important, take a drinking straw, cut two pieces of around 2" in length to be used as dams to stop the compound running out of the king screw holes in the stock. Apply enough masking tape around each piece of straw so that the straws sit gently in the screw/pillar holes. The fit needs to be loose enough to ensure the straws can be easily pushed through the stock by the headless guide bolts when the action is put into the mortice (users can simply pull out the straws from underneath, as the action is pushed down into the mortice). It pays to tape the top of the straws to stop the headless screws entering the straws and becoming jammed.

Once the action to stock fit has been checked, coat the action and barrel with release agent. Apply the agent with either a small piece of foam. Dab the release on to the metal work,

rather than painting it. You will probably find that you apply too much when you first try your hand at this. By continuing to use a dabbing motion, you will see the compound gradually even out to a fine layer. Be sure to apply agent to the guide bolts as well. The release agent needs approximately 20 minutes to dry hard however in warmer weather, this time is reduced considerably and can be made to dry quickly using a heat gun. One quick tip- to make an action extremely slippery, after the release agent has set, dust the action with powdered graphite and buff the graphite using a very soft artist brush or your wife's blusher brush. She will think you are a true romantic if you buy her a new one before using the old one.

Finally it is time to mix and apply the compound. If possible, utilize two people. Your wife will want to be involved anyway, now that you have proven your romantic prowess. Add part B to part A and mix well but not so vigorously as to create lots of air bubbles. The compound can be strafed with a heat gun to help remove mixed in air bubbles but be careful not to go overboard with heat and set the compound off. The stock needs to be in some form of a rest at this stage. Use either vice or if working in the house, a small cardboard box with v shaped cuts at each end to serve as a rifle rest. Ensure that the compound is worked and forced into keyed areas and or drilled holes. It is critical at this stage that all plasticine dams are in place and able to perform their function, preventing compound from running out of the magazine, trigger well and stock forend channel.

When pouring the compound, collapse the container so that the mouth of the container has a fold in it, allowing the compound to be poured in a thin, continuous drizzle. Allow the compound to migrate slowly into recesses. Once the pour is complete, you can strafe the compound again with a heat gun. Normal working time is around 20 minutes if the compound is not hot, so take your time. If you make the mistake of applying too much heat, the compound will begin to cure in 10 minutes. Without any heat, in winter conditions, it can take over an hour for the compound to begin to tack off. If any surplus compound remains in the pot, paint this onto the tang of the action, forming a neat layer without any air gaps around the fitted headless screw.

Once the compound has settled and air bubbles mixed into compound surfaced, it is time to set the barreled action into the stock.



Push the action down very slowly into the mortice. When the action is a half inch or less off the compound, you may give the compound a final short hard burst of heat from a heat gun if you prefer, then slowly continue downwards. If you have made a second foam dam over your plastercine dam (as pictured), pull the foam dam when the barrel contacts the foam. Again, continue down slowly. Once the action is down into the mortice, keep a thumb on the rear of the receiver (where the rear scope mount would sit). **Do not alter pressure.** If you have a helper, they can clean off some of the surplus compound from the sides of the stock, then fit bungees. If your wife is helping, she may (if she is patient enough) wish to read these instructions before you have even poured the compound to double check your prep work. Women have an excellent eye for detail so do not underestimate the potential of a female accomplice!

Do not use G-clamps or other 'severe' devices which may stress the action. The action should simply be bungied in place, first at the rear (again- rear scope ring point), then the front. Make sure the bungees do not interfere with the headless screws. Once the bungees are in place, continue cleaning the action. Also, make sure the action has gone down to its correct height.

Once the barreled action is set in place, clean up the surplus compound that has overflowed from the stock. While doing this, leave a small bead of compound along the top edge of the action and barrel. Failure to leave some surplus compound on the top edge may allow suck back to occur during the curing stages. By the same token, if the bead is too large (high) it may trap the action in place, so make sure the bead is small. At the tang, remove all compound, do not leave a bead otherwise the action will be trapped in place. At the ejection port on M700 rifles and similar type actions, do not leave a bead as this is another trap point.





### *Inner tube bungee*

Note: for those who prefer a stiff mix as opposed to the more commonly preferred runny consistency, the compound can be warmed by placing the mixing bowl on a hot water bottle. At high temperatures, the compound will begin to stiffen dramatically at around 20 minutes at 40-60 degrees. Obviously, the compound should be checked every few minutes to determine optimum consistency. The Ruger M77 cannot be easily full length bedded due to the protruding trigger housing. Front/rear bedding is recommended for this rifle. During front/rear bedding, it can pay to leave the compound to stiffen before application or alternatively, lay the compound, then leave to stiffen.

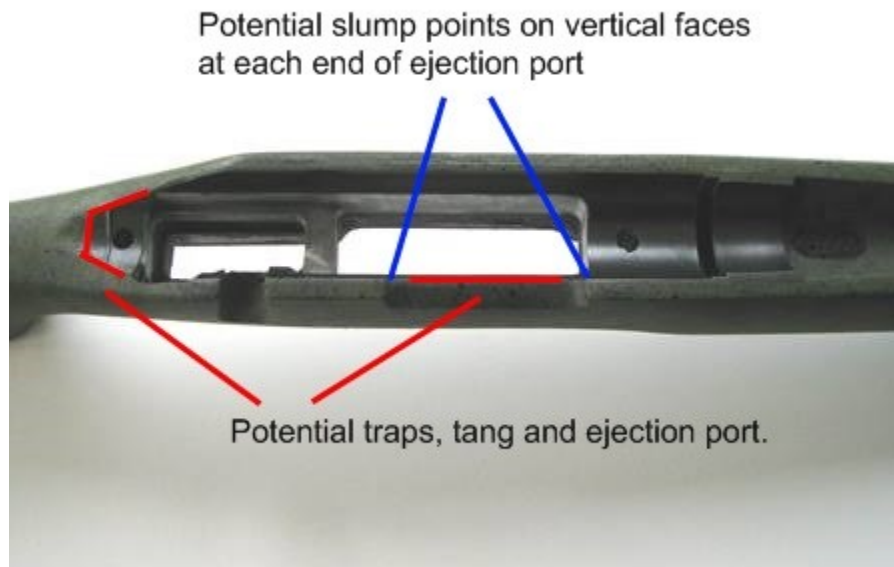
## **4. Curing**

A heat lamp over the rifle is ideal for curing however hot water bottles or even 1.5 litre coke bottles filled with hot water can be placed under or around and over the rifle. If using hot water bottles, wrap the rifle up in its blanket to retain heat. Hot water bottles and blankets are fantastic for curing.

During the first 10 to 20 minutes of curing with heat, the compound will soften and any air bubbles that have been inadvertently mixed into the compound. MatchGrade features a chemical air release agent within the compound which, combined with heat, helps dissipate air bubbling from the critical bedding surfaces. However, if a large amount of air has been forced into the job via human error during mixing or pouring, air bubbles may occur within the job.

After 10 minutes of post heat, check the rifle to see if the compound has migrated anywhere that

it should not migrate. Check the tang again, check the ejection port is not trapped, check each end of the ejection port on M700 rifles for slumping that may need rebuilding. Check all beads, trim surplus compound. Once you are happy that the compound is tacking off and that no further migration will occur, leave the job to fully cure.



With the trimming complete, the job must now be left to post cure for at least 48 hours. During this time, hot water bottles should be swapped once cooled. The ideal post cure temperature for this compound is 40 degrees C for at least 48 hours however fluctuations in heat as the hot water bottles cool are acceptable. If the job is pulled too early, the mixture will be hard but brittle. The same will occur in cooler weather if the job is left for 48 hours but without heat curing. Once the compound reaches full cure, it will be both hard and tough.

## 5. Finishing the job

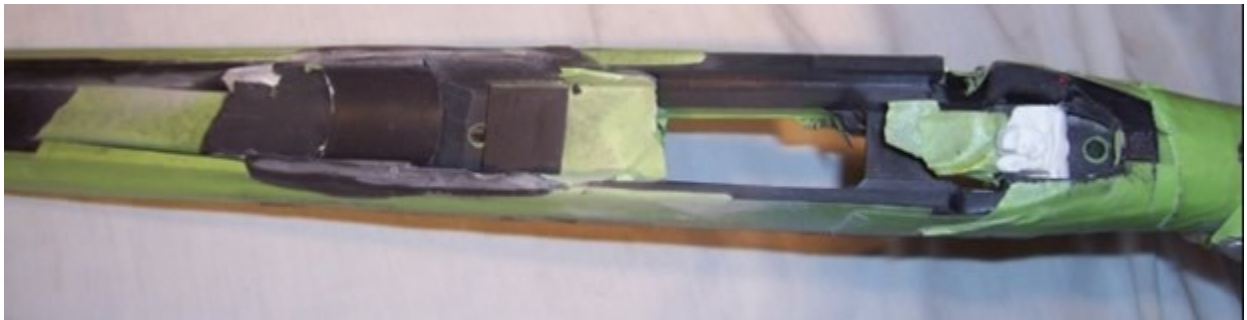
Once the bedding achieves full cure, remove all tape that is binding the stock and barreled action together. Remove the action bolts. Apply two or three layers of masking tape to the underside of the barrel.

Check again that no beads of compound have trapped the action. If a trap has occurred, the bead must be very carefully chiseled off while taking care not to mark the metalwork of the barreled action.

With the rifle upside down, hold the stock forend in one hand and strike the barrel (protected with masking tape) with a rubber mallet until the job begins to break out. Next, carefully wriggle the two pieces apart until fully separated. If a rubber mallet is not available, the parts can be separated by hand however the work is much harder and will require a good deal of brute strength.



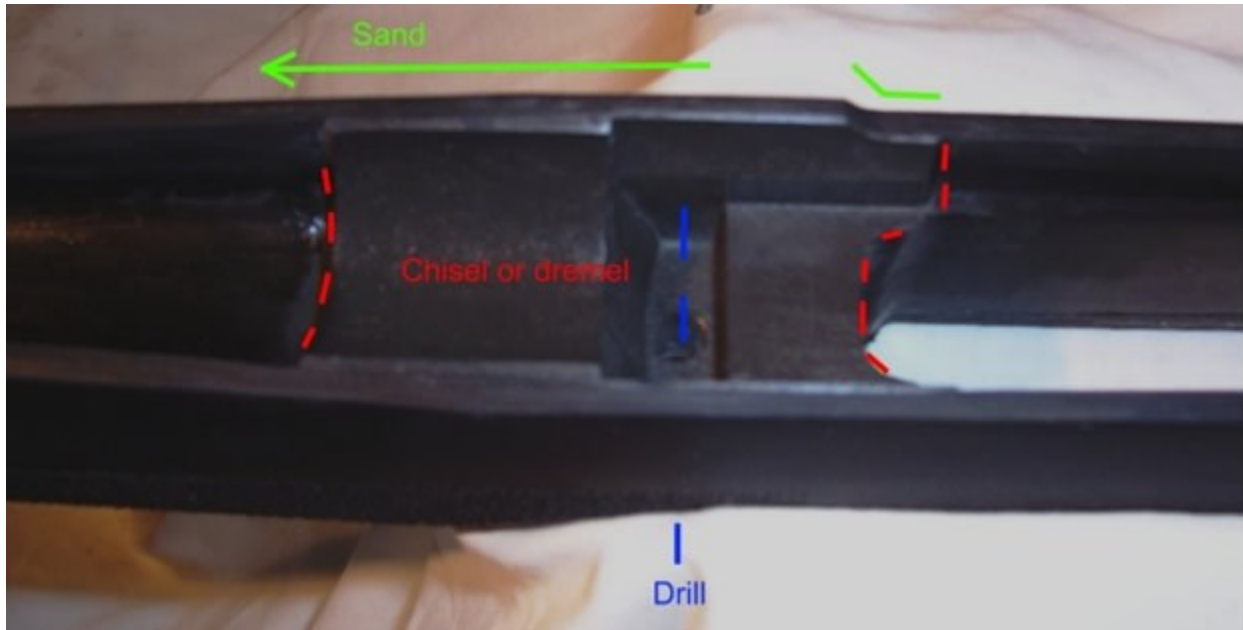
*Breaking the job out*



*Initial view of bedding*

The stock can now be cleaned up and finished. Use a sanding block and sandpaper to true up the top of the barrel/action channel. Use a chisel or Dremmel to trim and shape internal run offs. You will also need to drill out the holes in the stock so that the action screws have plenty of play.

During the clean up, check for any masking tape debris or bedding compound burrs that could upset accuracy. It is always best to use a craft knife to scratch all corners, especially at the tang. Raised stampings (factory stamped letters and numbers in the metal work) that appear in the bedding should also be scraped flush. The breech face imprint should also be either scraped or chiseled as this area requires relieving.



### *Finishing work*



*Scraping away the breech face bedding (Hogue stock). This area is just a thin line, about 3mm (120 thou) wide. In the picture above, I am scraping from the top of the stock channel, right around to the opposite top edge. The line can be seen due to its slightly lighter shade from my previous pass with the chisel.*

When the job is complete, very lightly grease the metal work of the barreled action but not the trigger unit which should be treated with light grade oil. Assemble the rifle but when doing so, carefully observe the fit. If the fit is too tight, the rifle will produce fliers or stringing during shooting. In essence, the two parts should simply 'fit like a glove'.

Another check that needs to be done is at the forend. Screw the action bolts (also known as action screws or machine screws) up tight and then loosen the front bolt a turn to see if the stock forend separates from the barrel. If any movement can be seen between the forend and barrel as this bolt is unscrewed, the action is under stress and needs further relieving. That said, the magazine box may also be pinched and out of alignment and should be the first check point in this instance.

Many rifle designs including Remington, older Sako's, Ruger and the Howa action can suffer from a pinched magazine during re-assembly. Check to make sure the mag box can be wriggled after assembly with the floor plate released. Pinched magazines are normally easily rectified by re-fitting and re-assembling. That said, in some instances, a crush fit occurs to incorrect bedding height. In other instances, the fit is simply poor as received from the factory. You will need to decide whether re-bedding is called for or whether metal should be removed from the magazine box loosen the fit.

Also check that the trigger does not interfere with the trigger guard, this is as important as magazine fit. A crush fit will destroy rifle accuracy. On M700 rifles for example, the bottom of the safety lever on Timney triggers, can become crushed against the trigger guard. Dremmeling a small divot in the trigger guard can correct this. Be equally careful of rifles that have just had a trigger design upgrade from the manufacturer.

With painted fiberglass stocks, you may discover that the top line of the stock needs re-painting where compound has been sanded and where sanding has gone through protective masking/electrical tape. If your stock needs a touch up paint, do not panic. Flat G10 enamel paints auto body paints can be used to touch up the top line and as this is a low wear area, enamel lasts very well. If a superior strength is required, use an epoxy auto body paint. Auto body paint shops can easily mix small amounts of paint to match your stock. With wooden and laminate stocks, use 'teak oil' to seal sanded surfaces.

Finally, the barrel channel of the stock must be checked to ensure that the barrel is free floating. Pressure point bedding at the forend should always be avoided unless a stress fault is occurring within the barrel.

Congratulations, you have now bedded your rifle. When re-fitting your scope bases and rings, please take care to check that the bases are epoxied in place and that the rings are properly aligned. Sometimes there is a height difference between the front and rear rings which can stress optics, the scope internals eventually failing. Providing the action is true and sound, the final variables of accuracy will include bore condition and temper, ammunition variables, reliable optics and finally shooting technique. I wish you all the best.

Good shooting!





*The end result. Remington M700 full length bedding*