

Annealing Made Perfect



MARK II

OPERATORS MANUAL

PLEASE READ THOROUGHLY

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Pukekohe 2120,
Auckland, New Zealand

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CAUTION

- Read and understand this manual before operation.
- For use with brass ammunition cartridge cases only.
- Do not attempt to anneal loaded or primed cases. Injury and/or damage could result.
- Annealed cartridges are hot! Exercise caution when removing them from the shell holder.
- Do not place liquids on or near annealer. Spillage could cause a short circuit.
- Ensure correct program before starting. An incorrect case in too high a program can melt the brass.
- Cases should never come out of the annealer glowing red. If one does, stop annealing and check the head stamp of the case. It will be either the wrong brand for the program setting, or alternatively, a different lot of number from the samples tested for our Settings Page. If it is a different lot number, samples should be sent to us for correct calibration.
- Do not obstruct air vents. These are vital for cooling.
- Use in a well ventilated room. Any residues on the neck and shoulder of the brass will be burnt off.
- No user serviceable parts inside. Do not attempt to open the annealer. It uses very high voltages and currents. Warranty will be voided if tampered with.

GENERAL WARNING

Reloading should be performed only by trained adults.

It is always recommended that eye and ear protection be utilised when reloading and shooting. Check cases before reloading. Discard split or damaged cases.

Since reloading is beyond our control, we disclaim all liability for any damage that may result from reloading or the use of this product.

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WELCOME

Congratulations on your purchase of an ANNEALING MADE PERFECT annealing system. We are confident you will have as many hours of satisfaction using this machine as we have had creating it. ANNEALING MADE PERFECT has been designed from the ground up as a system which eliminates human error and the need for re-calibration between cartridges, giving you the confidence of accurate, repeatable results every time.

The Annealing Made Perfect annealer is ready to use right out of the box with no assembly required. NOTE: When installing the four feet, do not over-tighten. finger-tight is sufficient.

No tools are necessary for operation except for cartridge specific shell holders (not provided) to insert the cartridges into the machine. When using the annealer ensure it is on a level surface free from dust or debris, preferably in a cool, dry and well ventilated room. Do not use in direct hot sunlight.

Use only the power cable supplied with the unit. Plug it into the power socket on the rear of the annealer and turn on using the red switch on power cable socket. Also supplied is a USB cable. When future software updates are available, this can be plugged into the port on the left hand side of the annealer to connect with a computer.

The annealer has preloaded programs for each cartridge and care must be taken to ensure the correct program is used to prevent damage to cartridges and or property. The annealer is designed for **BRASS CARTRIDGES ONLY**. Nickel plated brass cases are fine.

All program/pilot combinations can be found on our website:
www.ampannealing.com/settings

USING THE INTERFACE



After turning the Annealer on the MODE SELECT screen will be shown. To navigate through selections use the blue + and – buttons to cycle through the options and the START button to enter a mode.



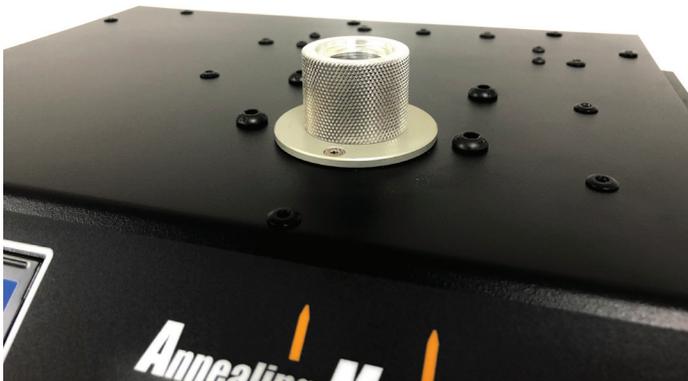
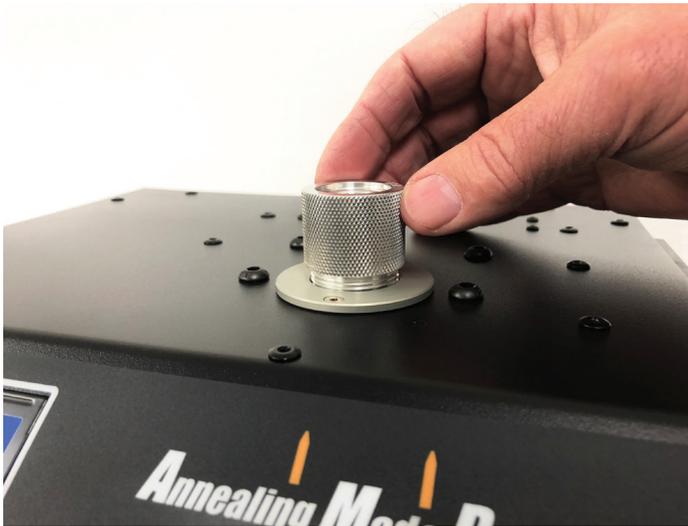
At any time you can go back by pressing and holding down the – button and then pressing the START button. Once you have selected your desired mode the + and – buttons allow you to cycle through AZTEC or AMP MATE modes and cycle through programs in the STANDARD mode.

Holding down either button will quickly scroll through STANDARD mode programs in the desired direction. Mark II owners should always use AZTEC mode.

When pressing START and annealing a case for the first time on a new setting the program lock will activate Program lock, preventing the setting from changing during the annealing session. A * will appear on the screen. Pressing and holding the + button until the * goes away will remove the lock.

SELECTING THE PILOT

When selecting the correct pilot to use for any cartridge, refer to the ‘Settings and Pilots’ page on the website, where the correct pilots for all cartridges are listed. Some pilots can be used for multiple cartridges. Insert the correct aluminium pilot into the boss on the machine until it has bottomed out. Do not over tighten. Take care to avoid cross threading the pilot when inserting as damage to the boss plate female thread may result.



SHELL HOLDER GRIP

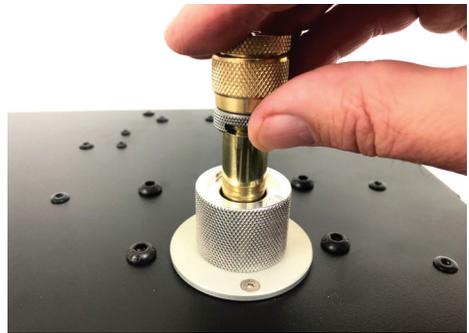
Your cartridge specific shell holder is used to insert the cartridges into the machine. A custom brass grip for standard shell holders is provided with each annealer. This attaches to the shell holder to make it more comfortable to use. Insert the shell holder lug end into the grip and tighten the collet. The 50 BMG pilot grip is threaded and insulated to prevent heating. It is sold separately.



Shell holders not supplied. All common brands of standard shell holders as used in reloading presses will fit into the brass grip. We get the best results with Redding EZ feed, in particular if using the AMP MATE auto feeder.

USING THE MACHINE

With the correct pilot fitted, and the correct AZTEC RUN code loaded in the machine annealing can now commence. Place a cartridge into the shell holder/grip combination and insert the cartridge into the pilot. Make sure the face of the shell holder is mated square to the face of the pilot.



Press the start button to anneal. The button will illuminate red during heating and will turn off when finished.



Placing the thumb over the gap in the shell holder during insertion and removal prevents the case falling out during use.



Once the annealing cycle has ended, remove the case promptly from the machine and into your chosen heat proof tray.



Take care to remove the cases from the annealer vertically.

We have found that most cases will simply fall out of the shell holder and into the cooling tray with gravity, however some cases tend to stick more. We therefore recommend removing the cases from the shell holder by using the edge of your cooling tray to push the cartridge out of the shell holder as shown. Redding E-Z Feed shell holders give the smoothest results.

Always remove each annealed case from the shell holder promptly. The longer a hot case is left in the shell holder the more heat can migrate to the brass grip. With normal cycling the shell holder grip should remain comfortable to use for hundreds of cases. Note: the 50-Cal. brass shell holder grip is insulated to prevent undue heat migration from the annealed cases.

Take care not to touch the steel shell holder itself. That will get reasonably hot after 30 or 40 cases.

For best results let annealed cases cool down without assistance. Quenching in water is not necessary.

CASES WILL BE HOT. Take care when handling annealed cases.

OPERATING MODES

AZTEC:

BASIC OPERATION AND SELECTING A FUNCTION

AZTEC is self-prompting and very simple to use with minimal technical expertise. The start-up display will show:

MODE SELECT

< AZTEC >

For all selections the cursor is controlled by the (-) and (+) buttons. To select the desired mode (AZTEC, AMP MATE SETUP or STANDARD), move the cursor so that the desired mode is pulsing then press (START).

To go back a screen or to exit a mode press and hold the (-) Button and then press (START)

Selecting STANDARD will activate the original software with the original programs.

Selecting AMP MATE SETUP will allow you to adjust parameters within the AMP MATE if you have one connected.

If you have selected AZTEC, firstly “Patent Pending” will show, and then the following options: ANALYSE, and RUN. Use the +/- buttons to scroll to your choice, then press Start to select.

ANALYSE MODE

Select Analyse mode from the AZTEC menu.

The display will show “SELECT PILOT”, with three zeros and the suffix ‘A’ by default. Insert the correct pilot into the annealer.

CHECK THE AZTEC SETTINGS PAGE FOR WHICH PILOT & ANALYSE CODE TO USE FOR YOUR CASE!

Note: The actual pilots remain the same as for our standard programs. Those same pilots have been assigned a three-digit AZTEC Analyse code with a single letter suffix. This code instructs the annealer as to which cartridge it is analysing. Some of our pilots have a B prefix engraved on the top such as B29 for 300 Win Mag. Please ignore that B. It just stands for “belted” and has no relevance to the AZTEC codes.

To enter the Analyse code, use the (-) and (+) buttons to change the value and the (START) button to enter it.

If at any time you make an incorrect entry, just hold down – and then press Start at the same time. This will take you back to the main menu. Start again.

For example, Pilot #11 should be entered as: 011 (Letter)

Once the correct Analyse code is entered, the display will show “ANALYSE” this means it is ready to go. Insert your sacrificial case into the annealer and press (START). The annealer will start heating the case. You will hear the annealer running and then stop.

Do not remove the case until the red Start light goes out.

Take care when removing the case from the annealer as it will be **VERY** hot. Make sure you have a suitable heat proof tray to deposit it in. It is also useful to have a pair of pliers handy. The case will have heated right up to melting point. Depending on the case shape, occasionally they can stick a little in the pilot.

Note: ANALYSE mode will not harm your annealer. Make sure to remove the case after the red light goes out and eject it from the shell holder. Otherwise heat will transfer to the brass shell holder grip, which may become uncomfortably hot.

Once the red Start light goes out the display will show a four-digit Code number, and “USE” will be pulsing. WRITE THIS NUMBER DOWN IN THE LOG BOOK AT THE BACK OF THIS MANUAL.

Note: the annealing code generated is specific to the brand, lot number and neck wall dimensions of the sacrificial case. If you wish to anneal a different brand or lot number of the same cartridge, you must analyse another case for that batch i.e. Lapua 308W will be different from Remington 308W.

The annealing RUN code will not be stored to memory in the annealer. If you wish to carry straight on with annealing a batch of cases, select “USE”. Now “RUN” will be displayed with the code. Beside the code will be a **0** and the * program lock. See “Advanced functions” for an explanation.

Insert the first case and press Start to activate “RUN”, and your first case will be annealed. This display will remain for the annealing session. Anneal each case by pressing Start.

If you are starting a new annealing session and already know the code for your cases, there is no need to sacrifice another case. Just select RUN from the starting menu. Then insert the correct pilot, enter your RUN code and start annealing.

SELECTING THE SACRIFICIAL CASE

It is important that the sacrificial case is representative of the cases you are going to anneal. The two most significant factors are neck wall thickness and case weight. If cases have been accurately neck turned that makes the task simple. If not, use a ball micrometer to check neck wall thicknesses. We suggest checking say ten cases and selecting an average representative.

There is some debate about the merits of sorting cases by weight for competition shooting. We can't comment on the benefits or otherwise on downrange accuracy, but we have found that case weight affects the correct annealing setting more often than not. We always sort customer samples for case weight as part of our laboratory procedure when calibrating standard program settings. You don't need the most sophisticated scales for this task. We use a simple digital scale accurate to 0.1 gr. We are not looking for tiny variations. We treat anything over 0.5 gr. as potentially significant. Two grains or more will frequently affect the annealing outcome. For hunting cases the difference is inconsequential. For competition, every bit matters.

Provided the brass is generally of good quality, there will be minimal variation in annealing across a whole batch if the best median case is selected as the sacrifice. With match quality turned and sorted brass there should be virtually no annealed variation.

The sacrificial case should be fire formed and unsized. That is when cases should be annealed in the reloading cycle. There can be minor but significant differences in the code which AZTEC will allocate between sized and unsized cases.

We have found no difference in the code allocation using clean or dirty cases. We have also found that trim to length dimensions (within reason) have no effect on the code allocation.

ADVANCED FUNCTIONS

As mentioned in “**Analysis mode**”, after a sacrificial case is analysed and USE is entered, the display will show RUN with a **0** and the * program lock to the right. The **0** gives the user that ability to customise their annealing even further.

To access the **0**, firstly the * program lock must be opened. Just hold down the + button for two seconds and the * will disappear. Now the +/- buttons can be used to select up to six incremental adjustments up or down. + = more power = softer. These adjustments have been calibrated to give the same annealed hardness (HV) increments regardless of the cartridge. This means that the HV value per step is the same for say a 22 Hornet or a 338 Lapua Magnum. Each step represents approx. 2.5 HV, so that four steps will give approx. 10 HV up or down.

We always recommend that the ANALYSE generated code is used, because in our opinion it gives the optimal neck and shoulder annealed hardness. We do understand however that many reloaders will appreciate the ability to experiment.

STANDARD:

The Standard mode option has been retained in the Mark II annealer. However, users should always use AZTEC, as it will give the most accurate setting for any particular cartridge/brand/lot # and neck wall thickness.

MY CARTRIDGE IS NOT LISTED?

With AZTEC mode, the only time you would need to send samples to us is if the cartridge or Wildcat is completely new to our system. Then we need samples to set the correct AZTEC pilot code for that cartridge. Once that has been done, AZTEC will handle all variations of that cartridge, such as different brands or neck wall thickness. Contact us by email for instructions.

WHEN TO ANNEAL?

What is the correct sequence - anneal/resize or resize/anneal?

Always anneal fire formed cases before sizing.

Our settings target an annealed neck hardness consistent with virgin brass, (some cartridges are a little higher or lower). Because the process anneals both the neck and shoulder, die conformity will be correct when resizing.

Note: we have found that the target annealed hardness is reached reliably regardless of the starting hardness i.e. it doesn't matter if it starts at 20% harder or even 70% harder, it will still come back to the same hardness.

We find that the best results are obtained with this sequence:

- De-prime - optional depending on your cleaning sequence)
- Clean - tumble or ultrasonic etc. – again optional. Cleaning won't affect annealing
- Anneal
- Lube - this is vital even with nitrided dies. (Imperial wax or spray such as Hornady One Shot) – note: Dry media graphite tends not to adhere well to annealed cases. We do not recommend its use.
- Resize - after annealing, **THE SIZING DIE MAY NEED TO BE ADJUSTED** for both shoulder bump and neck OD to account for zero spring back. See FAQ 3, 5 and 6.
- De-priming can be done as part of the resizing process.
- For more detail, see our Annealing Under the Microscope articles.

There is a wealth of information available on our website. Go to the “Research” tab, then “Our Research”.

TAKE NOTE

Cosmetics: The appearance of different cases will vary after annealing. Some cases will show distinct annealing discoloration at the neck and shoulder, while other cases will show virtually no signs of being annealed. This is not limited to any particular brands. Do not mistake appearance for successful annealing. Some cases which appear heavily discoloured may not actually be fully annealed. Our settings are reached by extensive and accurate testing of the annealed hardness.

Thermal protection: In common with any induction heater, with extended use, the output inductor will gradually heat up. Multiple fans are installed in our annealer to keep the circuitry and inductor cool. After 40 - 50 cases have been annealed, the top of the unit behind the pilot will start to feel warm to the touch. This is normal.

In the rare event that the output inductor should reach 190F/90C (inside the annealer), a thermal cut out will activate to protect the unit. If that occurs, leave the annealer turned on so the fans continue cooling. It will automatically reset after 30 minutes, once cooling is complete.

The ability of the annealer to run for the extended time depends partly on the ambient room temperature. Avoid using in direct hot sunlight or high temperature conditions. A room temperature of 70°F/20°F or below ideal.

Our Mark II annealer should run virtually indefinitely on programs 1 – 126 or AZTEC codes in the 0000 series (codes starting with a zero). When starting an annealing session, the fans run at 55% power. This is to minimise fan noise. An internal temperature monitor triggers full fan power if required. This trigger point depends on the ambient temperature and program level being used. For high power applications, full fan power usually starts after 50 – 150 annealing cycles. For Standard programs less than 50, or for cartridges using a comparable AZTEC code, the fans should remain on 55% power continuously.

Standard programs 127 – 200, and AZTEC codes in the 1000, 2000 and 4000 series are designed for very heavy duty annealing for cases in the WSSM family and 50 BMG. They will cycle continuously for 100 annealing cycles before automatically entering a “cool down” phase. This lasts for only 10 minutes, and then resets to allow another 100 annealing cycles.

TROUBLESHOOTING

For full support in any areas regarding how to use and maintain this machine and for any problems, questions and feedback please do not hesitate in contacting support.

Contact us - There are NO user serviceable parts within the machine. Do NOT attempt to remove ANY screws.

Dropped Cases: If a cartridge falls out of the shell holder and into the machine, simply turn off the power at the back of the machine, remove the pilot and retrieve the cartridge. If already annealed, it will be HOT. For extremely short cartridges, a pair of long nosed pliers can be used to retrieve them. Dropping a hot case will not damage the annealer. Note: our Mark II annealers feature a ceramic insert at the bottom of the inductor. No damage at all will result from dropping a hot case.

Machine won't turn on: Check that the power cable is firmly pushed into the power socket and check the fuse located in the power socket for serviceability. Take care to replace the fuse with the correct type (10A, 240V AC, 5mm x 20mm, F (speed), Ceramic) if needed. If the fuse is serviceable and the machine still won't turn on contact support.

Faster than normal cut out: If the machine begins to reach thermal cut out faster than normal, check the air intake filter is clean and not obstructed as this can prevent air from cooling the inductor. The filter is located on the right side of the machine and can be removed/replaced by using a flat head screwdriver to lift the plastic cover off the outer housing by inserting it into the slots and levering outward. When not in use, we suggest placing the provided dust cover over the machine.

Cartridge over heated: Except for sacrificial cases in AZTEC mode, cases should never come out of the annealer glowing red. If one does, stop annealing and check the head stamp of the case. It will be either the wrong brand for the program setting, or alternatively, a different lot number from the samples tested for our Standard Settings Page. If it is a different lot number, samples should be analysed in AZTEC mode.

Pay particular attention to the neck wall thickness of the cartridge as this greatly effects the end result. If you are unsure of which program to use for a given cartridge contact support.

Machine operates but no heat: Ensure you have the correct program and pilot installed for the cartridge being annealed. If the above is correct and there is still no heat clean the inside of the inductor well. See below in Care and Maintenance. If the display screen shows **FREQ DET ERROR** then the inductor well should definitely be cleaned. **Never use steel wool** to clean cases. If any ferrous material such as steel wool fragments accumulate, it will adversely affect the magnetics of the inductor.

No annealing marks on cartridge: Please refer to the TAKE NOTE section in the previous section in the manual regarding cosmetics of annealed cartridges.

Cartridges difficult to remove from shell holder: Refer to the previous section of the manual titled TAKE NOTE it is recommended to wipe the cartridge against the lip of the cooling tray to remove cartridges instead of using fingers as cartridges will be hot.

CARE AND MAINTENANCE

From time to time, debris can accumulate in the inductor air gap well. This can be removed by using a moistened Q tip or similar. A short spray of isopropyl alcohol down the inductor well before cleaning is helpful. Ensure the annealer is cool and unplugged before cleaning.

STAINLESS STEEL MEDIA TUMBLING!!

If you are using stainless steel media for case tumbling, you must be certain to remove **all media** from cases before annealing. If any media dislodges inside the annealer inductor well, it will be heated to a very high temperature during the annealing cycle. The MARK II annealer incorporates a ceramic insert which protects the inductor from SS media contamination as well as dropped cases which are hot.

The dome head machine screws used on the top and back of the annealer are blued mild steel. In damp environments, these can rust. We suggest wiping with a little gun oil periodically. The rivet heads are fine.

After use, we suggest leaving the annealer to run for five minutes before turning off. This will allow the fans to cool the annealer down and expel any condensation.

We also recommend to clean the fan filters regularly to prevent build up of dust which can reduce the fans effectiveness. The covers are held on by clips and can be removed with a flat screw driver.

After cool down, place the supplied dust cover over the annealer.

FCC REGULATION

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to part 15 of the FCC Rules and as a consumer ISM device pursuant to part 18 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Using this equipment in accordance with the user's guide will ensure safe, reliable and long lasting performance.

Changes or modifications to the equipment not expressly approved by equipment manufacturer will void the user's authority to operate the equipment.

AZTEC LOG BOOK

Cartridge	Brand	Lot #	Case prep notes	AZTEC Run code

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Cartridge	Brand	Lot #	Case prep notes	AZTEC Run code

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