

Thank you for purchasing an Evenheat heat treating oven. At Evenheat we like tools that work and work well. Not just in the tools we use but in the tools we make. Quality doesn't just happen. It takes an understanding of what you want and how to accomplish it. It takes a good eye, patience and ability. In other words: craftsmanship. We understand this and it's how we build. Evenheat is the Knife Makers Brand.



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## Cautions & Safety

Read and understand this installation and operating manual as well as the controls manual before operating your heat treat oven. If you have any questions please contact Evenheat Kiln at 989-856-2281 or at evenheat-kiln.com.

Heat Treat Ovens are as safe as any other electrical appliance when used under normal and proper operating conditions. To create and maintain this safe environment observe all safety precautions.

### Warning Symbol Descriptions

Warning symbols are used throughout this manual. These symbols alert the operator to certain hazards and important information. Pictured below are symbols used along with a description of each.



The Exclamation Point alerts you to particular cautions, hazards and information.



The Lightning Bolt alerts you to specific information regarding the risk of electric shock. Electric shock may result in injury or death.



The Heat Waves alert you to specific information regarding the risk of burn injury.

### Emergency Shut Off Provision



The ovens power supply connection (plug/receptacle, breaker or disconnect) acts as the emergency electrical power shut off. Access to these devices should be unobstructed and safe at all times.

All electrical installations for direct wired models (those without a plug/receptacle connection) must include a power disconnect near the oven and that is easily accessible and safe for emergency power shutoff.

### Electrical Safety



A licensed electrician should be used for all electrical installation and service. All applicable local, state and federal electrical codes must be followed.

Use correct voltage, wire size and fuse or breakers. Oven electrical requirements are located on the oven control panel nameplate. Make sure all electrical connections are tight. Avoid using aluminum wire.

Always use the proper electrical receptacle. Never alter the ovens cordset or cordset plug. Alterations can be dangerous. Alterations will void any warranties along with nullifying any Listing Agency markings.



Evenheat recommends that a voltage check be performed before placing the oven into service, ideally before actual purchase. Operating voltage varies, with common operating voltages being 208V and 240V. The ovens operating voltage (printed on the ovens nameplate) must match the applied voltage (actual electrical service voltage). If it does not, do not install or operate the oven as potential electrical and fire hazards exist. Contact Evenheat for guidance in such cases.

The oven must be properly grounded.



Unplug or disconnect the oven from the electrical service before accessing the chamber for servicing or vacuuming. Do not attempt to touch or replace the heating elements while the oven is plugged in or connected to the electrical service. Electric shock may result in serious injury or death.

Never, ever use an extension cord to operate an oven.

### Oven Location Safety



Do not place or use oven on combustible surface.

The oven should be permanently positioned – it should not be considered mobile.

The surface on which the oven is placed shall be capable of safely supporting the combined weight of the oven, oven load and if the oven is located on the floor, any operating personnel.

Observe all building, fire and safety codes when installing the oven.

Do not install the oven closer than 12" (31cm) from combustible wall surface or object or 36" from any ceiling surface with the door in the opened and closed positions as well as along its travel path.

Install in a covered, well ventilated area. Do not place the oven in any structure resembling a carport or screened-in porch. Avoid areas that are subject to outdoors weather.

Never place the oven in a small, enclosed area such as a closet, cabinet or very small room. The room in which the oven is placed into service shall be capable of safely dissipating all heat produced by the oven.

Never install an oven outside. Avoid moisture.

It is the user's responsibility to be knowledgeable regarding any and all contaminants, produced by the ware during firing, and take steps to properly and legally contain and dispose of these contaminants.

It is the user's responsibility to provide ventilation capable of removing all gases, fumes and other airborne contaminants produced by the ware during firing safely from work the area and building structure.



Do not store flammable or combustible products near or in the same room the oven such as gasoline, paint, aerosol cans, paper, curtains, plastics, etc. Better yet, store these items in another separate structure designed for this purpose.

Position the power supply cables, power supply conduit, controller cables, pyrometer thermocouple leads and other materials in such a way as not to create a tripping or tangling hazard.

The area around the oven should be free of obstructions that interfere with the proper and safe operation of the oven.

Never place anything under or above the oven for storage. Absolutely nothing should be propped against the oven.

### Oven Use Safety



The surface of the oven is hot and burn injuries are possible. Keep all children and unsupervised personnel away. Always wear protective clothing, gloves and eyewear when operating and handling a hot oven.



You must throw the oven's power switch to the OFF position before accessing the oven chamber. Do not access the oven chamber if the oven's power switch is at the ON position. Under no circumstances should you touch the heating elements with your body or any other devices like tools or ware. Electrical shock may result in serious injury or death.



Use care when accessing or looking into a hot oven. High heat escapes quickly and burn injury may result. When accessing or looking into a hot oven, approach slowly and wear protective clothing and gloves designed to withstand high heat and eyewear capable of filtering Infrared and Ultraviolet light.

Protective clothing should be worn when operating the oven and includes, but is not limited to, cotton clothing, heat resistant gloves and eyewear capable of filtering Infrared and Ultraviolet light.



Do not heat salts or cyanide. **Gases produced are TOXIC.** Serious injury or death may result.

Do not operate the oven over the maximum temperature rating printed on the nameplate.

Never fire an oven unattended beyond its anticipated firing time.

Do not operate the oven with the door open.

Never allow the power cord to touch the oven. If the power cord, plug or receptacle becomes damaged discontinue use and replace immediately.

It is recommended that a fire extinguisher, capable of dousing an electrical fire, be accessible in the event of fire. Smoke detectors within the oven room are also recommended.

Keep the oven door closed when not in use.



It is the user's responsibility to have knowledge of the material intended to be heat treated/fired. If you are unsure as to the safety of firing a particular material contact your materials supplier for guidance before doing so. If you remain unsure as to the safety of firing a particular material do not do it. Firing hazards include materials that explode or produce toxic gases. Finished ware hazards include materials containing lead. Materials containing lead should not be used for articles intended for food use.

Fire all materials according to the material manufacturer's instructions. Improper firing may result in damage to the oven or material.

Do not use the oven to prepare food, heat a living space, dry clothes or ice laden articles or use as a storage devise. The oven is designed for one purpose and one purpose only: the heat treating of metals.

An oven will remain very hot long after the firing is complete. All safety recommendations should be followed, even with the oven unpowered, to avoid any burn injuries. Keep children and other unauthorized personnel away.

When firing is complete, and during periods of non-use, remove power from the oven by unplugging or by throwing the disconnect or breakers to the OFF position.

### Oven Maintenance Safety



Disconnect electrical power from the oven before performing any oven maintenance. Failure to disconnect the electrical power supply may result in electrical shock which can cause serious injury or death.

Replace any worn, damaged or defective parts immediately with Evenheat Kiln replacement parts only. Discontinue oven use until parts are replaced.



When vacuuming the oven use only HEPA filters on the vacuum. Prolonged expose to brick dust and other refractory materials can cause lung injury.

Inspect all electrical service connections periodically for wear.

Periodically check chamber jacket clamps for tightness. Tighten as necessary.

### Intended Use

Evenheat Ovens are a controlled heat source designed for the sole purpose of heat treating metals. Do not use the oven for anything other than this intended purpose. It is the operators responsibility to determine the suitability and safety of any material to be heated or heat treated. *Many materials are unsafe to heat such as various salts and cyanide which emit toxic gases when heated.* Please contact your materials supplier for guidance in the materials response to elevated temperature, suitability and required safety precautions. If you are not completely sure as to the safety of heating a particular material, don't do it.

### Oven Location and Placement

Before unpacking and setup of your heat treat oven you will need to make sure your oven location is adequate for unobstructed and safe operation.

The metal heat treating process almost always involves the removal of very hot metal from the oven during the heat treating process. To keep this process as safe as possible Evenheat recommends that the oven be placed on a work surface that positions the door at roughly waist to chest level. The goal here is to offer a simple and natural arm movement for chamber access. We would discourage placing the oven at a lower or higher level as these positions tend to complicate physical movement.

Your location should allow you room to move freely. You'll be handling some very hot material and the last thing you need is a restricted space. So, give yourself some room!



Your work surface (surface on which the oven is placed) and floor surrounding your work surface should be constructed of a non-combustible material. Do not place the oven on a combustible work surface. While overall oven safety in the event of failure is important, the more likely event may be that very hot material being transferred to or from the oven may be accidentally dropped. If combustible material is present in either the work surface or floor surrounding your work surface this would constitute of a fire hazard.

Your oven should be placed no closer than 12" from any wall or 36" from any ceiling surface. These distances should be maintained throughout the travel path of the oven door as well as with the door in its fully closed and fully opened positions. All flammable and combustible materials should be removed from the oven area.

While it's not absolutely necessary that walls and other structures be non-combustible we do like the idea of using some type of concrete based sheeting on these areas. This material is readily available at most home improvement stores.

The oven location must be strong enough to support the weight of the oven, personnel as well as ware to be fired. Please note again that the surface on which the oven is placed should be made of a non-combustible material.

Your heat treat oven is equipped with power supply cable fitted with a molded-on plug. A corresponding receptacle should be located near the oven's setup location. The position of the receptacle should be such that the ovens' plug easily reaches and plugs without strain. Stretching the cable to plug it in can cause receptacle failure, avoid this. The power supply cable must also be positioned in such a way as to avoid a tripping or tangling hazard.

## Electrical Requirements

Evenheat Knife Ovens are powered electrically. It is recommended that the oven be operated from a dedicated circuit. That is, the oven should be the only device being operated from the circuit. It is also recommended that all electrical installations be performed by a licensed electrician.

Model	Voltage	Amperage	Watts	Minimum Wire Size	Breaker/Fuse	Electrical Receptacle
Artisan 688	120V	12A	1440W	12AWG	15A	NEMA 5-15R

*Use copper wire only, do not use aluminum wire. Wire size is a minimum and is intended for runs less than 40 feet. Wire and breaker/fuse sizes are for reference only. Electrical installation must comply with all local codes.*

## Temperature Controls

Our ovens are equipped with either our Set-Pro or Rampmaster temperature controls. Separate operating instructions have been included with your oven. All of our electronic temperature controls are designed & manufactured exclusively for Evenheat by Bartlett Instrument Co. in Iowa, USA.



*Scan this QR code to view instructional programming videos for both the Evenheat Set-Pro and Rampmaster controls.*

*You will also find these instructional videos and manuals on our web site [www.evenheat-kiln.com](http://www.evenheat-kiln.com)*

The Artisan 688 is equipped with our "Swing View" control feature. The Swing View allows you to position the controller at a comfortable viewing and programming angle. Simply loosen the thumbscrews, rotate the control to the desired position and re-tighten. It's very cool!

## Thermocouple

The thermocouple is the temperature sensor and is located in the back wall of the oven. The thermocouple is a rugged component that can take some abuse but try to avoid hitting it if you can. The thermocouple works best if it's not crowded against your work. Give it as much room as practically possible. Avoid blocking the thermocouple from the sides, particularly both sides at once.

If thermocouple replacement is necessary replace only with a TYPE K thermocouple which is available from Evenheat. Replacing it with any thermocouple type other than TYPE K will introduce an error into the temperature reading. So, TYPE K only.

## Swing Out Door

Working in the heat is fun, trying to avoid it isn't. Doors that swing down throw off massive amounts of heat just below the chamber entrance. Our side hinged doors swing out to the left to keep the heat away for more cool and comfortable use. The handle on our swing out door is conveniently located at the front of the door, not hidden along the side.

## Control Power Switch

The power switch located on the oven control panel applies power to the temperature controls. When the oven is not in use we recommend throwing this power switch to the OFF position.

## Heating Elements

The heating elements are embedded into the oven walls and produce all the heat within the oven. The heating elements will be energized with electrical power during use. While they are embedded within the fiber walls, and are generally inaccessible, do not attempt to touch the heating elements at any time with anything while the oven is plugged in. Doing so presents an electrical shock hazard.

## Insulating Fiber

The oven chamber and door are constructed of a refractory fiber. Both the chamber and door have been surface hardened and do provide some resistance against abrasion. It is however possible to damage the fiber with rough use. If you use reasonable care during use you'll have no problem. If you start throwing stuff around expect to see some wear & tear.

## Lid Vent and Vent Plug

The oven is equipped with a vent hole machined into the ceiling. Generally, venting is not necessary unless performing such operations as lost wax casting. When venting is not necessary we suggest plugging the vent hole with the included vent plug.

## "Hard Floor"

Your oven is supplied with a refractory shelf that is to be used as a "hard floor". The "Hard Floor" serves two purposes: it helps to regulate heat rise to avoid temperature overshoot, particularly at low temperatures and takes the brunt of mild abuse of work and fixtures such as torque plates used in Mokume production.

## Initial Use

We recommend operating the oven empty before attempting any heat treating operations. This serves a few purposes: It allows you to become familiar with the controls, it allows the elements to develop a protective oxide coating and it introduces you to accessing the chamber under high heat conditions.

Close the oven door and program and run your controls for a rate of 1000°/hour to 1800°F and hold for 10 minutes. See the included controls operating instructions for details. As the oven is heating you'll notice a clicking sound along with an increasing chamber temperature. The clicking sound comes from the control relay as it turns the heating element on and off.

Once the oven has reached temperature and finishes holding it will go to the Idle or Standby condition (depending on control). The control is no longer running the program and is off. This would be a great time access the oven chamber and learn what high temperature is going to look and feel like during actual use. Before accessing the oven, throw the control power switch to the OFF position (0).



**Before you access the chamber we need to go over some rules!! High heat will escape very quickly. Keep your body well away from the chamber, particularly your face. We also recommend that you wear loose fitting cotton clothing, wear eye protection capable of filtering Ultraviolet and Infrared light and tie all hair back. Always approach the chamber slowly.**

Ready? Stand back and extend your left hand to the door latch, rotate the latch and slowly open the oven door. Feel that rush of heat? We weren't kidding when we said it escapes quickly. This is the environment you will be working in.

## Loading the Oven



Before loading (or unloading) the oven, throw the power switch to the OFF position. This is a question of safety. Contact with electrically charged heating elements may result in serious injury or death.

There are those who load their blades in the oven cold and those who prefer to load the oven once it has reached temperature. We prefer loading the oven cold for a few reasons. Placement of your materials is much easier and more comfortable in a cold oven as opposed to one that's hot. We also tend to like the idea of the work coming up to temperature with the chamber. Having said that, there are many who prefer to load a hot oven. In either case, the oven power switch should be in the OFF position when loading.

As mentioned earlier in this manual we do recommend the use of the refractory shelf as the "hard floor". This helps to regulate heat and extend the life of the fiber floor. It is also easily replaceable.

If you are heat treating blades we recommend using our MK1 or MK2 blade fixtures. These types of fixtures hold the blades vertically. Vertical placement is necessary to bathe the blade in heat which helps to prevent warping. You can load the blade fixture that is already placed in the oven or you may load the blade fixture on the bench and move it to the oven. We prefer placing the blade fixture into the oven and then loading the blades. We recommend placing your blades no closer than 1-1/2" from the heating elements. Use of our blade fixtures will place your blades at the proper distance and we do recommend their use. Once the blades are properly loaded and positioned close the oven door. You are now free to throw the power switch the ON position and perform your heat treating operation.

When placing any material into the oven avoid making contact with the heating elements and thermocouple.

## Running the Oven

Once your work is loaded and the oven door has been closed it is now time to run the heat treating process. Your oven is supplied with either the Set-Pro or Rampmaster controls. A separate operators manual has been included with your oven describing the use of these controls. The operators manuals for these controls can also be found on our web site [www.evenheat-kiln.com](http://www.evenheat-kiln.com).

We have included heat treating data starting on [page 8](#) of this manual. This particular data has been supplied to us by various sources. There are many other sources out there that deal not only with the actual temperatures and times but techniques and procedures as well. We encourage to seek this information.

## Entering the Chamber While Hot

Generally speaking you will not enter the oven chamber while the heat treating program is in process. You will, however, enter the oven chamber at the very end of the process which means the chamber can be very hot (up to 2200°F).



Before entering the oven throw the power switch to the OFF position. Contact with electrically charged heating elements may result in serious injury or death.



Operate the latching action of the door handle and slowly open the oven door. Approach the oven slowly, high heat escapes quickly. Use tongs to remove the blades for quenching.

Once all blades are removed shut the oven door. This helps to retain heat in the fire brick for any subsequent tempering processes.

## Periods of Non-Use

Throw the oven power switch to the OFF position when the oven is not in use. Keep the oven door closed as well. You're free to leave your hard floor and any blade fixtures in the oven at all times.

Don't store anything on or around the oven.

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## Heat Treat Data

The following heat treat data is taken from many sources and may or may not give you exactly what you're looking for. Such is the nature of the beast. We suggest using this data more as a starting and reference point from which to build your heat treating experience. You are encouraged to seek out more specific data and procedural information regarding your specific metal. Such information is available from your steel suppliers and manufacturers as well as published books and, of course, the internet.

## Observations and Tips

There are two schools of thought on when to load blades in the oven: cold oven or hot oven. People do both. If it makes no difference to you we would choose loading cold. We tend to like the idea of the blade responding to temperature changes over a longer period of time. That being said, the choice is yours. We do suggest using some type of fixture to hold knife blades vertical to prevent warping regardless of loading procedure. We do offer such blade fixtures.

While our temperature controls do allow you to control the rate of heating it is generally accepted that the rate (°F/hour) of heating can be As Fast As Possible. To achieve As Fast As Possible with our Rampmaster control simply choose a rate of 9999. To achieve As Fast As Possible with our Set-Pro control simply choose a rate of Full.

A vast majority of heat treating firings are simple up to temperature, hold for a period of time and then shut off sort of things. In the world of controls this type of firing is referred to as a 1 segment firing. As you program either the Set-Pro or Rampmaster controls they ask how many SEGS you want to use. The simple answer is 1. In the event that your heat treating program requires more than 1 segment, you're welcome to do so.

As we just noted, most heat treat programs are 1 segment affairs. The data in the following tables are all 1 segment programs. Our tables are set-up in the order in which you will program the controls: number of segments first, then rate, then temperature then hold time.

Before removing any of your work from the oven throw the power switch to the off position. Safety first and we thank you!

Complete Heat Treating generally involves both hardening and tempering (drawing). Harden first then Temper. These are two separate processes and require different temperatures and different hold times. The following tables are labeled as Hardening and Tempering.

Hardening is a one-time firing process. It's usually never repeated on the same piece unless you screw up and need to take another shot at it.

Tempering is often a repeated process. That is, your steel may require you to perform the tempering operation more than one time. It's not always the case but you will see in the following tables that some steels require up to 3 tempering firings.

How to quench or quickly cool your metals once at harden temperature? Air Quench? Oil quench? Plate Quench? Other? It's up to you and your needs. We would tell you to be careful when pulling the metal for quenching. Opening the oven allows heat to escape quickly, do so carefully and move slowly to the chamber to avoid burns. You don't need any more scars.

**Heat Treating Data for Hardening** – Special Thanks to Texas Knifemakers Supply for this data

The following data was provided by Texas Knifemakers Supply. Keep in mind that this is what works for Texas Knifemakers Supply. Remember, this data should be viewed as a starting and reference point on which to build your experience.

Texas Knifemakers Supply also adds the following helpful information: These figures are based on 3/16" thick material and should be altered to the thickness of the material being treated. (I.E. 1/8" thick material should be 8 to 10 minutes and 1/4" material should be near 20 minutes). The rule of thumb is 1 hour per inch of thickness.

You will note on the table that we have shown information in the order in which you will program your Set-Pro or Rampmaster control: Number of segments first, rate used to reach temperature, the hardening temperature and the amount of hold time at the hardening temperature.

<b>HARDENING</b> Special Thanks to Texas Knifemakers Supply for this data				
Steel Type	Number of Segments Used in Program	Rate to Reach Hardening Temperature	Hardening Temperature	Hold Time at Temperature
D2 Tool Steel	1	9999 or Full	1880°F	15 minutes
D2 Tool Steel Springs and Rockers	1	9999 or Full	1880°F	15 minutes
154CM S.S.	1	9999 or Full	1900°F	15 minutes
154CM S.S. Springs and Rockers	1	9999 or Full	1900°F	15 minutes
440C S.S.	1	9999 or Full	1880°F	15 minutes
440C S.S. Springs and Rockers	1	9999 or Full	1880°F	15 minutes
CPM 440V S.S. (S60V)	1	9999 or Full	1950°F	30 minutes
CPM 440V S.S. (S60V) Springs and Rockers	1	9999 or Full	1950°F	30 minutes
ATS-34 S.S.	1	9999 or Full	1900°F	15 minutes
ATS-34 S.S. Springs and Rockers	1	9999 or Full	1900°F	15 minutes
Vascoware & Cru-ware	1	9999 or Full	1950°F	30 minutes
Boye Dendritic S.S.	1	9999 or Full	1880°F	30 minutes
440A S.S.	1	9999 or Full	1880°F	15 minutes
CMP420V	1	9999 or Full	2150°F	10 minutes

**Heat Treating Data for Tempering** – Special Thanks to Texas Knifemakers Supply for this data

The following data was provided by Texas Knifemakers Supply. Keep in mind that this is what works for Texas Knifemakers Supply and relates directly to the hardening data they provided. Remember, this data should be viewed as a starting and reference point on which to build your experience.

You will note on the table that we have shown information in the order in which you will program your Set-Pro or Rampmaster control: Number of segments first, rate used to reach temperature, the tempering temperature and the amount of hold time at the tempering temperature.

<b>TEMPERING</b> Special Thanks to Texas Knifemakers Supply for this data					
Steel Type	To Achieve Rockwell Hardness	Number of Segments Used in Program	Rate to Reach Hardening Temperature	Tempering Temperature	Hold Time at Temperature
D2 Tool Steel	58 RC	1	9999 or Full	500°F	2 hours – 2 times
D2 Tool Steel Springs and Rockers	43 to 45 RC	1	9999 or Full	1200°F	2 hours – 1 time
154CM S.S.	58 RC	1	9999 or Full	400°F	2 hours – 2 times
154CM S.S.	61 RC	1	9999 or Full	275°F	2 hours – 2 times
154CM S.S. Springs and Rockers	43 to 45 RC	1	9999 or Full	1200°F	2 hours – 1 time
440C S.S.	58 RC	1	9999 or Full	225°F	2 hours – 1 time
440C S.S. Springs and Rockers	43 to 45 RC	1	9999 or Full	1100°F	2 hours – 1 time
CPM 440V S.S. (S60V)	58 RC	1	9999 or Full	300°F	2 hours – 2 times
CPM 440V S.S. (S60V) Springs and Rockers	43 to 45 RC	1	9999 or Full	1100°F	2 hours – 1 time
ATS-34 S.S.	58 RC	1	9999 or Full	400°F	2 hours – 1 time
ATS-34 S.S.	61 RC	1	9999 or Full	275°F	2 hours – 1 time
ATS-34 S.S. Springs and Rockers	43 to 45 RC	1	9999 or Full	1200°F	2 hours – 2 times
Vascoaware & Cru-ware		1	9999 or Full	1000°F	2 hours – 3 times
Boye Dendritic S.S.		1	9999 or Full	400°F	1 hour – 2 times
440A S.S.		1	9999 or Full	212°F	2 hours – 1 time
CMP420V		1	9999 or Full	400°F	2 hours – 2 times

**Heat Treating Data for Hardening** – Special Thanks to Ranger Original for this data

The following data was provided by Ranger Original. Keep in mind that the following data is what works for Ranger Original. Remember, this data should be viewed as a starting and reference point on which to build your experience.

Rob Ridley of Ranger Original supplied us with heat treat data that we have put into table form. However, his text struck us as quite instructional so we have chosen to include it as well.

**154CM, CPM154, ATS34**

All three of these heat treat the same. After a full speed ramp up to temperature, they soak 45 minutes to an hour in the Evenheat Oven at 1950°F. Then they get placed – still in the foil – spine down – then flat - on a 1” aluminum plate. The second aluminum plate is placed on top and pressure is applied. We used to use weights for the pressure, but now we use clamps. You are looking for good firm contact. If you are thinking hydraulics you are thinking WAY too much pressure. After 2 minutes (or less) they will be hand cool, and ready to remove from the foil for cryogenics. They don’t have to go straight into cryo, but aim for something less than an hour from plate quenching. We use liquid nitrogen for cryo but dry ice in acetone will also do. The household freezer is no use at all. They probably only need a couple hours in cryo, but we leave them overnight.

The next morning, they will be in the range of RHC 63+. After warming to room temperature, they get tempered. We temper twice at 500°F for two hours each time – to get about RHC 61. You can experiment for other hardness's but 61 is a very good target for these steels.

**CPMS30V**

Same wrap – same temperature (1950°F) - same soak time – same plate quench – same cryo as 154CM above. This steel gets double tempered at 400°F for about RHC 60

**440C**

Same wrap – Harden at 1900°F and only about 15 minutes at temperature – then plate quench and cryo as above. Hardness out of cryo will be about 61. Temper (twice for 2 hours) at 275°F for RHC 60 – 325°F for RHC 59 – and 375°F for an excellent RHC 57-58.

<b>HARDENING</b> Special Thanks to Ranger Original for this data				
Steel Type	Number of Segments Used in Program	Rate to Reach Hardening Temperature	Hardening Temperature	Hold Time at Temperature
154CM	1	9999 or Full	1950°F	45 to 60 minutes
CPM154	1	9999 or Full	1950°F	45 to 60 minutes
ATS34	1	9999 or Full	1950°F	45 to 60 minutes
CPMS30V	1	9999 or Full	1950°F	45 to 60 minutes
440C	1	9999 or Full	1900°F	15 minutes

**Heat Treating Data for Tempering** – Special Thanks to Ranger Original for this data

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Same wrap – same temperature (1950°F) - same soak time – same plate quench – same cryo as 154CM above. This steel gets double tempered at 400°F for about RHC 60

**440C**

Same wrap – Harden at 1900°F and only about 15 minutes at temperature – then plate quench and cryo as above. Hardness out of cryo will be about 61. Temper (twice for 2 hours) at 275°F for RHC 60 – 325°F for RHC 59 – and 375°F for an excellent RHC 57-58.

<b>TEMPERING</b> Special Thanks to Ranger Original					
Steel Type	To Achieve Rockwell Hardness	Number of Segments Used in Program	Rate to Reach Hardening Temperature	Tempering Temperature	Hold Time at Temperature
154CM	61 RC	1	9999 or Full	500°F	2 hours – 2 times
CPM154	61 RC	1	9999 or Full	500°F	2 hours – 2 times
ATS34	61 RC	1	9999 or Full	500°F	2 hours – 2 times
CPMS30V	60 RC	1	9999 or Full	400°F	2 hours – 2 times
440C	60 RC	1	9999 or Full	275°F	2 hours – 2 times
440C	59 RC	1	9999 or Full	325°F	2 hours – 2 times
440C	57-58 RC	1	9999 or Full	375°F	2 hours – 2 times

## Heating Elements

The heating elements we install in our knife ovens are made of a special alloy that promotes long life and element retention. Under normal operating conditions you should easily get 10+ years of life. Normal operating conditions means you avoid getting debris on the elements, you don't go beyond the 2200F and you don't smoke up the chamber.

As the heating elements are embedded within the fiber chamber there are no maintenance procedures required. In the event of the heating element becoming exposed through fiber loss please contact Evenheat for proper fiber repair material.

## Thermocouple

The thermocouple is your temperature sensor. It's located in the back wall of the oven. Our standard thermocouple is known as a Type K. The term "Type K" refers to the type of alloys used to manufacture the thermocouple. We've chosen a gauge that is small enough to respond quickly to temperatures yet not so small that it's delicate. It's a good match with our controls.

The thermocouple itself needs no maintenance other than replacement if it fails. Failure of the thermocouple is seen as an error message on the controls.

The thermocouple must be replaced with another Type K thermocouple. There are many "Types" out there but only a Type K will work properly. Using a different "Type" will introduce an error into the temperature reading and that's not a good thing. For best results replace your thermocouple with an original Evenheat thermocouple.

To replace the thermocouple first unplug the oven and allow it to return to room temperature.

The thermocouple is part of an assembly that is located in the back wall of the oven. To access the thermocouple, remove the back/bottom panel of the oven and locate the thermocouple assembly on the back wall of the oven.

Remove the 2 screws that fasten the assembly to the oven and pull it from the oven.

Loosen the 2 screws that fasten the thermocouple to the oval shaped block and remove the thermocouple. The damaged thermocouple is now free and can be disposed of.

Attach the replacement thermocouple to the oval shaped block being mindful to place the red thermocouple lead to the red thermocouple lead wire. Tighten the screws fairly snug. If you hook it up backwards, don't worry, you won't hurt anything, the controller just won't work.

Insert the thermocouple into the oven and re-fasten the thermocouple assembly to the back wall.

Re-attach the back/bottom panel to the oven.

## Control Relay

The control relay is the switch that turns the heating element on and off on command from the control electronics. It's an electromechanical style which means it's literally a moving, mechanical device. You'll actually hear it clicking on and off as the oven is operating, particularly while holding at some temperature. Our oven designs tend to run no more than 50% of the relays maximum current. This is a fairly conservative approach which extends relay life. However, given the constant cycling of on and off the relay we don't expect that it will last forever.

There is no maintenance to be performed on the relay other than replacement in the event of failure. Failure is usually seen as the oven not heating up along with no clicking sound.

## Set-Pro & RampMaster Controls

Both of our Set-Pro and Rampmaster controls are maintenance free.

## Insulating Fiber

The insulating fiber while strong, can be damaged with rough handling. Generally speaking, damage that is small or minor may be ignored. Any fiber damage that affects performance should be repaired. If you need to repair any fiber please contact us for assistance and preferred repair methods.

### **Control Fuse**

The electronic controls are protected with a control fuse located in a fuseholder on the backside of the oven. The fuse is rated at 250V/250mA, slo-blo. If replacement is necessary, replace only with a fuse of the same rating.

### **Cleaning**

There is no real need to clean the oven other than to remove any accumulated debris from the floor. A gentle vacuuming with a soft brush is perfect. Unplug the oven before vacuuming.

The oven jacket is powder coated and requires no real maintenance or cleaning.

### **Blade Fixtures**

Evenheat manufactures a line of blade fixtures designed specifically to hold your blades vertically and securely. They're well designed and provide ample space for foil inflation while being absolutely stable. If you're heating treating knives you'll definitely want to use fixtures such as these. Please visit our web site for details, [www.evenheat-kiln.com](http://www.evenheat-kiln.com).

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LIMITED KNIFE OVEN WARRANTY

Evenheat Kiln, Inc. guarantees to the original purchaser that for a period of two full years from the date of purchase the oven will be free of defects in workmanship and materials when used under normal and proper operating conditions. Evenheat will replace or repair any defective part as specified below.

**FOR THE WARRANTY TO BE EFFECTIVE THE PURCHASE MUST:**

Provide written proof of date of purchase. (Warranty card sent in at time of purchase.)

Notify the Evenheat Distributor/Dealer from whom the oven was purchased, within 10 days after defect has been discovered.

Make oven immediately available for inspection.

**FOR WARRANTY REPAIRS:**

Warranty repairs should be handled through the Distributor/Dealer from whom the oven was purchased, who will arrange for any repairs or replacement of parts under the terms of this warranty upon receipt of the oven (or defective part). Otherwise the defective part may be returned (postage prepaid) to Evenheat Kiln, Inc. P.O. Box 300 6949 Legion Drive Caseville, MI 48725. If, after factory examination, the original part is found to be defective, a new or repaired part will be shipped prepaid by Evenheat Kiln, Inc.

If the entire oven is to be returned to the factory, all transportation costs will be borne by the purchaser. The purchaser should notify Evenheat Kiln, Inc. (989) 856-2281 prior to shipping. Evenheat will help advise the best shipping method and if it is necessary to return the entire oven or only certain parts. Warranty work will be performed within 30 days after defective part is returned to the factory.

Evenheat Kiln, Inc. reserves the right, at its option, to replace the entire oven or any part of it in order to fulfill its obligation under this warranty.

**THIS WARRANTY DOES NOT COVER:**

Freight damage, ovens altered in any way, abuse or neglect, moisture, improper storage or installation.

Ovens over fired (reaching temperature higher than melting point of ware inside oven) regardless of cause.

Ovens operated on incorrect voltage.

Improper electrical installation.

Knife Blade furniture or ware other than Evenheat made.

Ovens used for salt firing.

Ovens used for purposes other than the firing of heat treating various metals.

Ovens operated in excess of the temperature on the rating plate.

Damage to Property or personal injury that may occur from ovens that are fired on or near wood floors or combustibles.

Damage to property or personal injury that may occur from improper ventilation of the work area and building structure.

This warranty is in lieu of all other warranties, expressed, or implied.

Evenheat Kiln, Inc. neither assumes nor authorizes any Distributor/Dealer, Retailer or employee to assume for it any other obligations or liabilities in connection with Evenheat Kilns.

This warranty is limited as specified above and excludes incidental or consequential damages. Some states or providences do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.