Central Virginia Blacksmith Guild

Ammo Can Forge

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http://www.solvarr.com/projects/ammo-can-forge
https://ronreil.abana.org/design1.shtml

Ammo Can Forge

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[Also refer to photos following the written instructions]

Burner Assembly (Ron Reil design)

- Mark the center of the 1/8" x 4" gas nozzle pipe nipple. Center punch the nipple at the mark.
- Carefully drill a hole at the center punch mark with a #60 (0.0400" diameter) drill bit. Drill through one side of the nipple only. Be sure that the hole is drilled exactly along the lengthwise centerline of the nipple.
- Mark the nipple exactly opposite from the hole. A simple way to determine the opposite side is to lay the nipple on a piece of sandpaper on a flat surface with the hole UP. Lightly scrub the nipple on the sandpaper to make a mark on the bottom of the nipple.
- Grind or file flat spots on the opposite sides of the 1 ½" x ¾" pipe reducer. Center punch both sides ½" down from the top lip.
- Drill a 13/32" diameter hole on each side at the center punch marks. These holes need to be exactly opposite and through the center opening of the 1 ½" opening of the reducer.
- Center punch and drill two holes using a #25 wire gage (0.1495" diameter tap drill for #10-24 threaded hole) drill bit. Drill from the top lip of the 1 ½" opening of the reducer down into the 13/32" holes previously drilled.
- Tap the holes with a #10-24 threads per inch tap and tap handle. Use a drop of tapping fluid.
- Cut the threads off one end of a ¾" x 8" pipe nipple. Clean the cut edges and file a small bevel on the inside of the cut end. This will be the burner tube.
- Assemble the burner –
    - Screw the ¾" burner tube firmly into the 1 ½" x ¾" reducer. Doesn't need to be too tight, just good & snug.
    - Slide the stainless steel flare onto the ¾" burner tube and snug the setscrews lightly. The flare should extend beyond the cut end of the burner tube about 1 ¼" – 1 3/8". This will be adjusted later when the burner is tuned.
    - Assemble the 1/8" x 4" gas nozzle tube through the 13/32" holes in the reducer with a 1/8" pipe cap, a 1/8"FPT x ¼"MPT bushing, and two #10-24 setscrews. Use paste pipe thread sealant (NOT Teflon tape).
    - Assemble the shut-off valve and ¼"MPT x 3/8" flare tube fitting and install the valve onto the gas nozzle tube assembly. Use paste pipe thread sealant on all joints (excepr the flare fitting end).
    - **Note:** The #60 wire gage hole in the gas nozzle tube must be centered in the ¾" reducer opening and must be pointed exactly down the center of the ¾" burner tube (use the mark made earlier on the opposite side of the 1/8" gas nozzle tube for reference). Also, orient the handle of the shut-off valve upward in line with the mark on the 1/8" gas nozzle tube.
- The burner is ready for test firing and tuning –
    - Clamp the burner tube in a vise in a safe location and pointed in a safe direction.
    - Connect the regulator & hose assembly to the burner and propane tank.
    - Close the shut-off valve.
    - Back off the pressure regulator knob until it is loose.
    - Open the propane tank valve all the way until it stops (back seated).
    - Adjust the regulator knob until the pressure gage indicates about 3-5 psi.
    - Test all connections under pressure with soapy water before attempting to fire the burner. Tighten connections as required to eliminate any leakage.

(Test Firing and Tuning the Burner (continued)

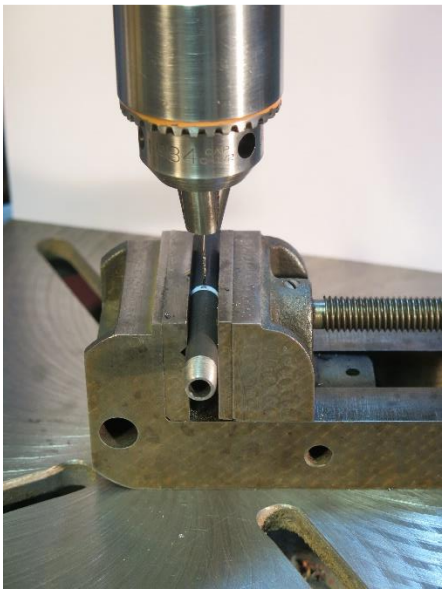
- Ignite the burner by slowly opening the shut-off valve while holding a lighted lighter at the forge opening. **CAUTION!** Be sure your hand and body are NOT in line with the burner opening.

- Once the flame is established, observe the blue cone in the center of the flame. If it appears offset to one side, adjust the position of the gas nozzle tube to ensure the gas nozzle hole is centered and pointed directly down the ¾" burner tube. Tighten setscrews securely. **Note:** Small adjustments make a big difference. Make small movements. **Also Note:** Be prepared to quickly close the shut-off valve if the flame extinguishes. Allow time for the propane fumes to clear before repeating the lighting process.
- Loosen the flare setscrews slightly and slide the flare up and down the burner tube until the optimum blue cone in the center of the flame is observed. Tighten the setscrews firmly.
- Shut off the propane tank valve completely. Allow the flame to burn out, then back off the regulator knob until it is loose. Allow the assembly to cool. Disconnect the propane hose from the burner assembly.

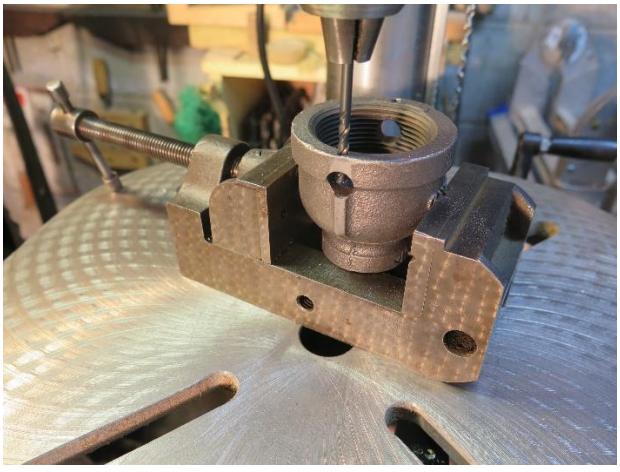
Tools for Burner Assembly

Ruler
White pencil or paint marker
V-block
Center punch
Hammer
#60 Wire Gage drill bit
Sandpaper
13/32" drill bit
Tapping fluid (EZ-Tap or TAP-Ease)
#25 Wire Gage drill bit
10-24NC thread tap
Tap handle
3/32" Allen wrench
1/8" Allen wrench
Large round file
Channelock pliers or small pipe wrench
Pipe thread sealant (paste type, NOT Teflon tape)
9/16" Wrench
Adjustable wrench
Soap/water mixture with small paint brush
Long-neck lighter or long fireplace matches or a candle

Photos – Burner Assembly




Sharpie

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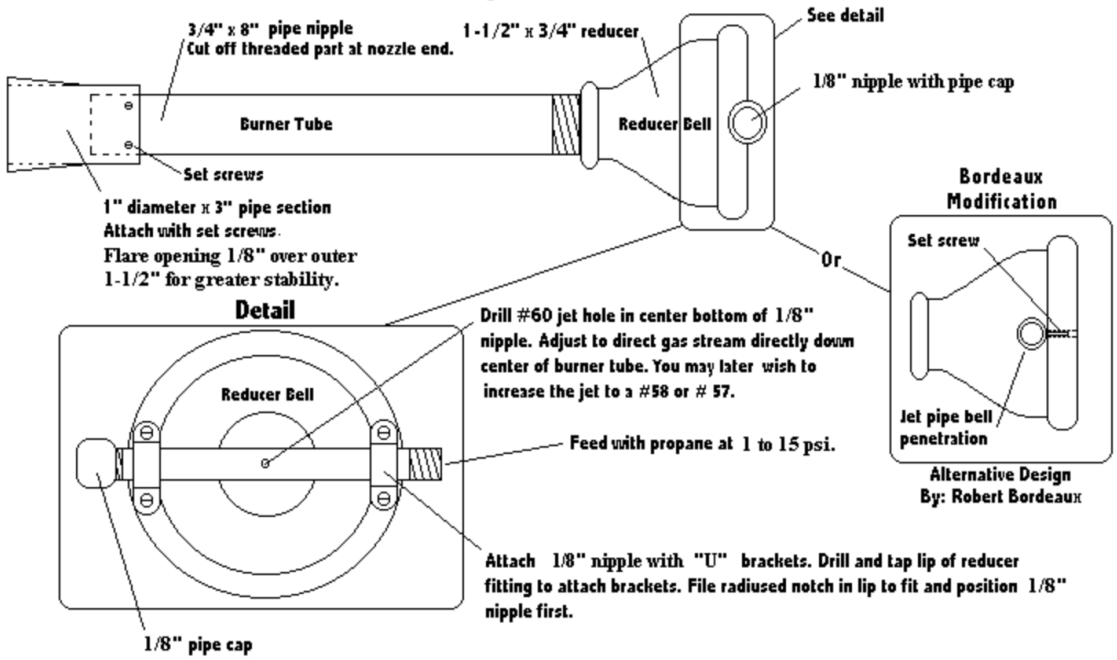
Ron Reil's Propane Burner Modification



This burner design is an improved version of the design commonly used in propane forges that was produced by "Vullo, Cook", and others. This design employs a flared nozzle transition to reduce the gas stream velocity below the flame burn velocity, thus allowing a stable flame at the mouth of the burner. With the additional 1/8" flare, no greater, this burner will sustain flame outside of the forge using gas pressures as high as 54 psi in tests I conducted. Without the sleeve, the burner will not burn outside of a confined heated space. **Drawing is not to scale.**

Design modification by: Ron Reil 02/08/98
This design was inspired by the work of others, including "Russ Vullo and Derry Cook".
E-Mail: ron@reil1.net

[Also refer to photos following the written instructions]

Propane Regulator and Hose Assembly

- Remove the ¼” pipe plug from the side of the regulator and install the pressure gage in the hole using paste thread sealant (NOT Teflon tape).
- Install the ¼”MPT fitting on the hose into the regulator outlet using thread sealant.

Tools for Regulator and Hose Assembly

9/16” Wrench
Pipe thread sealant (paste type, NOT Teflon tape)

Photos – Regulator and Hose Assembly

[Also refer to photos following the written instructions]

Forge Body

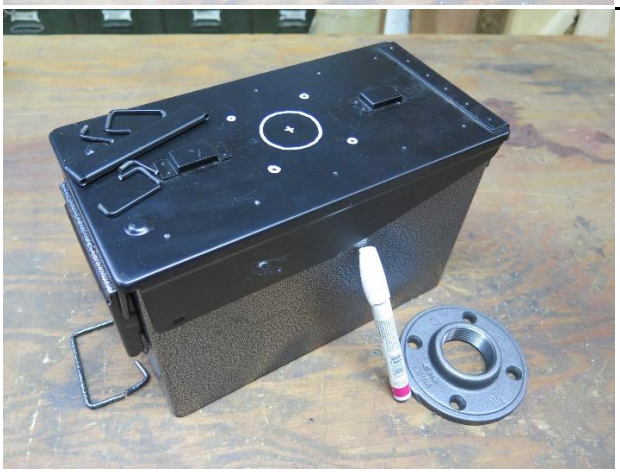
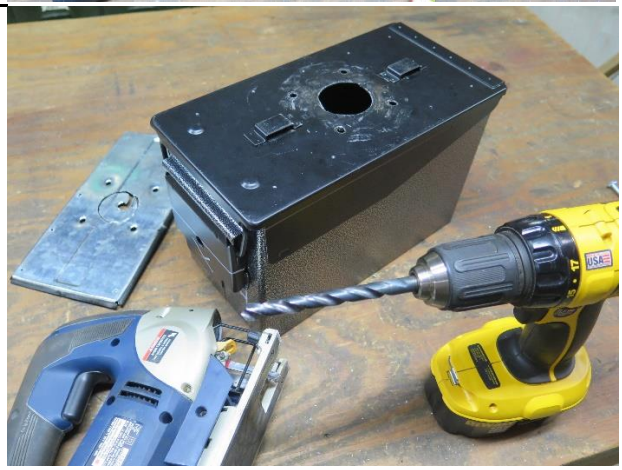
- Remove top handle & end handle from ammo can.
- Mark top of ammo can for floor flange bolt holes & burner hole. Center punch hole centers.
- Drill 17/64" holes through lid of ammo can at bolt hole locations.
- Drill 3/8" hole at burner center punch location if using jig saw to cut burner hole.
- Drill ¼" hole at burner center punch location if using 2" diameter hole saw to cut burner hole.
- Cut out burner hole. [*Note: If the thin liner inside the lid comes out, discard it, but save the gasket intact*].
- Bolt the floor flange in place with ¼" bolts/washers/nuts.
- Mark openings in the ends of the ammo can–
    - Latch End –
        - 2" up from bottom of ammo can
        - 2" tall opening
        - 3 ½" wide opening (leave 1" from each side of ammo can)
        - Cut off latch handle level with top of opening
    - Hinge End –
        - 2" up from bottom of ammo can
        - 3 ¾" tall opening
        - 3 ½" wide opening (leave 1" from each side of ammo can)
- Cut openings using angle grinder with wafer cut-off disk or jig saw..
- File or sand rough edges of openings.

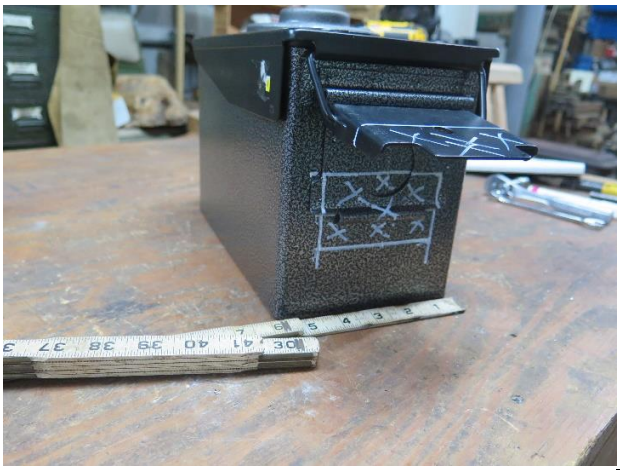
Tools for Forge Body

Safety glasses
Gloves
Ear protection
Bolt cutter
Pliers
Drill or drill press
17/64" drill bit
3/8" drill bit
¼" drill bit
Jig saw with metal cutting blade
2" diameter metal cutting hole saw
7/16" wrench
Ruler
White paint marker
Angle grinder with wafer cut-off disk
Flat file
Sandpaper
Silicone sealant (if required to reattach the rubber gasket)

Photos – Forge Body








[Also refer to photos following the written instructions]

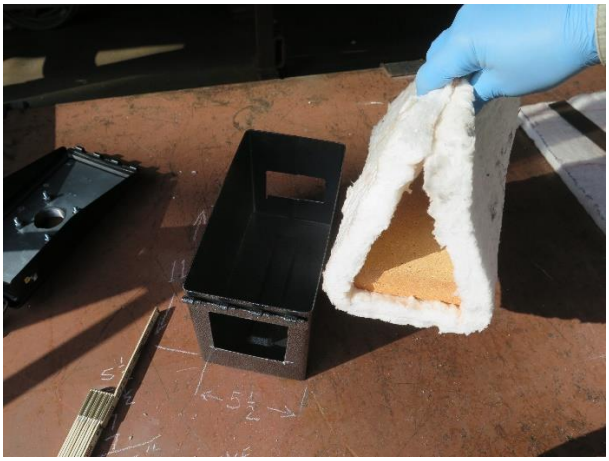
Lining the Forge with Ceramic Wool Insulation

- **CAUTION!** Wear a dust mask, safety glasses, and rubber gloves when handling the ceramic wool. Hazardous fine particles and dust will be created and remain airborne for a long time. The microscopic particles from the wool can be a skin irritant.
- Remove lid from ammo can.
- Cut ceramic wool 11" wide x 22 ½" long (save the scrap piece of wool)
- Place brick in center of ceramic wool (long dimension of the brick parallel with the 11" dimension of the ceramic wool).
- Fold the ends of the ceramic wool together. Lift and push the wool with the brick inside it down firmly into the floor of the ammo can. Center the brick end to end inside the ammo can.
- Push the wool gently to the sides of the ammo can and fold to meet at the top of the ammo can. The joint should be together (you can chink any gaps or tears with small pieces of wool later).
- Install the lid onto the ammo can and latch it (if the gasket is loose because the thin metal liner inside the lid came out when cutting the burner hole, you can glue it in place with silicone adhesive).
- Cut strips from the scrap piece of wool saved from step 2 above. Fill the gaps at the ends of the brick and at the end of the ammo can on the latch end.
- Cut a hole in the wool for the burner nozzle –
    - Use the tubular cutter by placing a gloved hand flat against the inside top of the wool. Gently rotate & push/cut a circular plug out of the wool.
    - - Or – Carefully, use a sharp, thin knife to pierce the wool while supporting it with a gloved hand from inside.

Tools for Lining with Ceramic Wool Insulation

Particulate dust face mask
Safety glasses
Rubber gloves
Felt tip marker
Framing square
Ruler
Large scissors
Tubular cutter tool
Slender-bladed knife

Photos – Lining the Forge with Ceramic Wool Insulation

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5 1/2

[Also refer to photos following the written instructions]

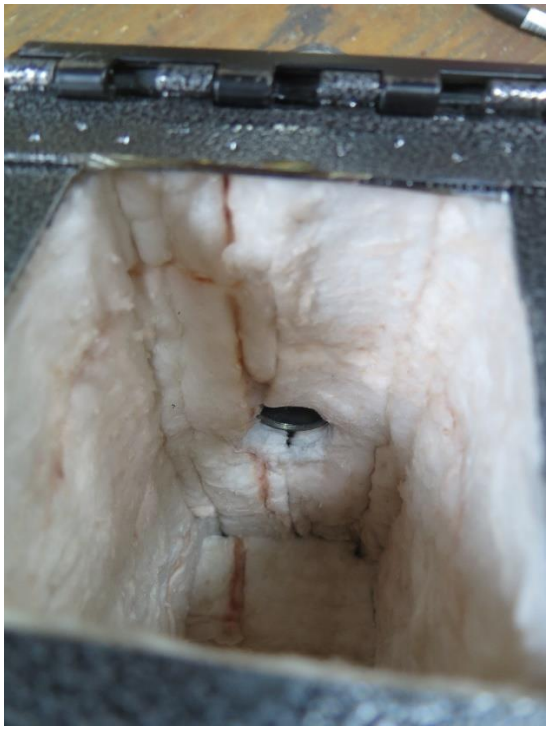
Dry Fit and Test Fire

- Cut the threads off one end of a 1 ½" x 8" pipe nipple. This will be the burner support tube. File or sand sharp burrs from the cut end of the nipple.
- Using a #6 tap drill size (0.2040" diameter for ¼"-20 thread per inch threaded hole). Drill three equally spaced holes around the circumference of the burner support tube about 1" from the top end. Thread the holes with a ¼"-20NC tap.
- Screw the burner support pipe into the floor flange on top of the forge body (it doesn't need to be tight – just good & snug).
- Place the burner assembly into the support tube. The end of the burner flare should be recessed in the wool insulation ¼"-3/8" (the burner flare should NOT protrude beyond the ceramic wool insulation).
- Install three ¼" bolts in the tapped holes in the burner support tube and lightly tighten them against the burner tube to align it and keep it at the correct position in the support tube.
- Connect the regulator & hose assembly to the burner and propane tank.
    - Close the shut-off valve.
    - Back off the pressure regulator knob until it is loose.
    - Open the propane tank valve all the way until it stops (back seated).
    - Adjust the regulator knob until the pressure gage indicates about 3-5 psi.
- Test all connections under pressure with soapy water before attempting to fire the forge. Tighten connections as required to eliminate any leakage.
- Ignite the burner by slowly opening the shut-off valve while holding a lighted lighter at the forge opening. **CAUTION!** Be sure your hand and body are NOT in line with the forge opening.

Tools for Dry Fit & Test Fire

Safety Glasses
Cut-off saw
Round file
Sandpaper
#6 Drill bit (tap drill size for ¼"-20NC thread)
¼"-20NC tap & tapping handle
Tapping fluid (EZTap or TapEASE)
Channelock pliers
7/16" wrench
Soap/water mixture & small paint brush
Long-neck lighter or long fireplace matches or a candle

Photos – Dry Fit & Test Fire



[Also refer to photos following the written instructions]

Rigidizer and IR Reflective Coating Inside the Forge Body

- **CAUTION!** Wear a dust mask, safety glasses, and rubber gloves when handling the ceramic wool and powdered high temperature refractory mortar. Hazardous fine particles and dust will be created and remain airborne for a long time. Dust particles from the mortar can be a skin irritant.
- Lightly spray the interior of the forge with water to moisturize the ceramic wool so it won't dry the high temperature refractory mortar (Satanite) and to minimize creating fine dust from the wool while applying the mortar.
- Thoroughly mix the powdered mortar with water until it is a paste about the consistency of mayonnaise or a little thinner.
- Using a brush, apply the mortar to the exposed ceramic wool in the interior of the forge -
    - A gentile daub and spread method, without disturbing the wool as much as possible, works best. If the mortar is too thick, thin it with a little water.
    - Be sure to cover all the wool and edges of the metal openings.
    - Apply mortar on the inside of the burner opening. This may be done by reaching into the forge with a dab of mortar on a gloved finger.
    - It is not necessary to coat the brick.
- Allow the mortar to dry at least 24 hours.
- After initial drying -
    - Install the burner assembly, connect the propane regulator and hose assembly and attach it to the propane tank [be sure to test connections with soapy water].
    - Gently fire the forge with a low flame to complete drying and cure the mortar for about 3-5 minutes.
    - Shut off the fire and allow the forge to cool somewhat.
    - Repeat gently firing the forge a couple more times, increasing the length of time firing each cycle.
    - Allow the forge to cool completely.
    - Shut off the propane, disconnect the hose, and remove the burner.
- Apply a second coat of mortar -
    - Spray the surfaces with water.
    - Be sure all voids, cracks, and areas missed on the first coat are covered.
    - The second coat can be mixed slightly thinner than the first coat to ensure filling small openings.
    - Cover the entire interior as before.
    - It is not necessary to coat the brick.
- Follow the same drying and firing procedure that was used for the first coat.
- Apply the Infrared (IR) reflective coating. We will be using a product, HYB-UV. Another commonly used IR reflective product is ITC-100. This coating will reflect a significant portion of the infrared radiation from the hot forge interior resulting in more efficient heating of the metal in the forge. –
    - Spray the surfaces with water,
    - Cover the entire interior as before.
    - This time, coat the brick also.
- Follow the same drying and firing procedure that was used for the refractory mortar.

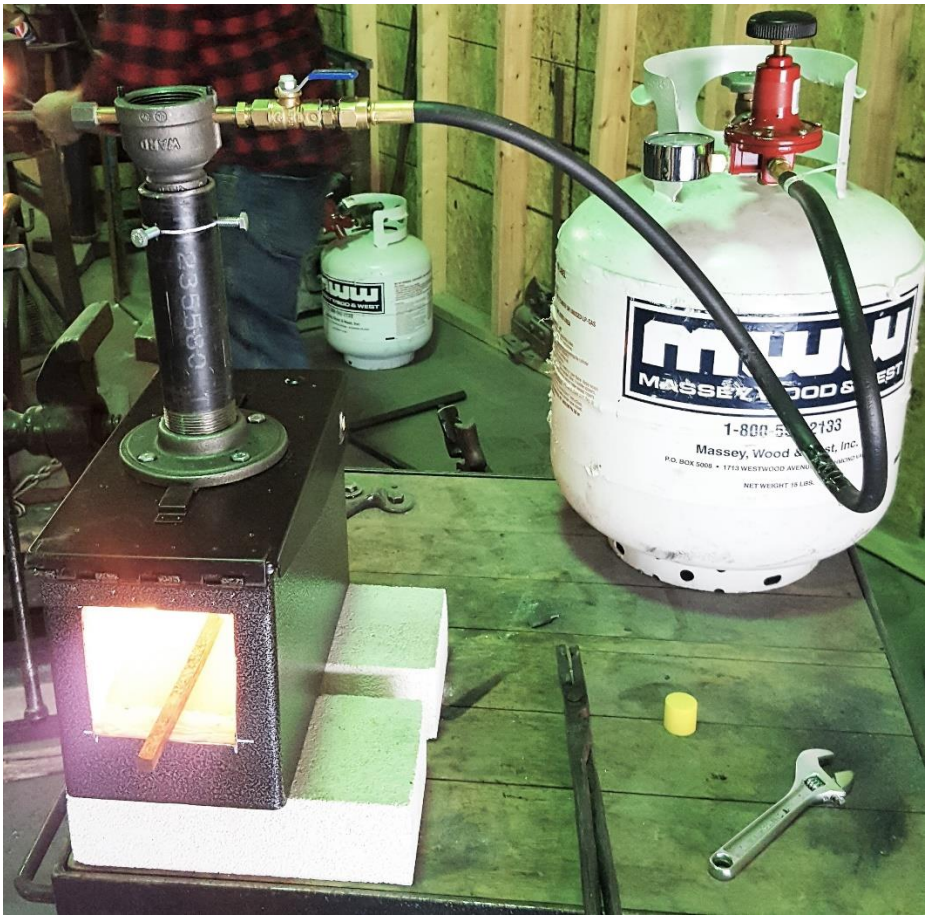
Tools for Rigidizer & IR Reflective Coatings

Safety glasses
Dust Mask
Rubber gloves
Spray bottle with water
Container for mixing mortar
Stirring paddle
Paint brush
A flashlight is helpful

Photos – Rigidizer & IR Reflective Coatings




Congratulations! Your Ammo Can Forge is now ready for use.



Appendices

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CVBG Ammo Can Forge Materials List

Propane Forge Building Class - Materials List					
Banton-Smith Center for Metal Arts					
Class Date: 4/15/2018					
		4/6/2018/2018			
	Description	Forge Element	Quantity Reqd.	Lowest Cost Source	Part No./SKU/Item No.
Burner Materials (Based on Ron Reil Burner with drilled gas orifice hole):					
	1 1/2" x 3/4" Ductile iron pipe reducer	Air inlet/Mixing chamber	1	McMaster-Carr	44605K438
	3/4" x 8" Black iron pipe, sch 40	Burner Tube	1	McMaster-Carr	44615K461
	1" dia x 3" long stainless steel flare	Burner flare for flame stability	1	Zoeller Forge	
	3/16" x 3/8" Socket head setscrews	Locking screws for gas jet tube	2	Fastenal	
	1/8" x 4" Iron pipe nipple, Sch 40	Gas jet tube	1	McMaster-Carr	44615K461
	1/8" iron pipe cap	Cap for gas jet tube	1	McMaster-Carr	
Gas Supply:					
	0-30 psi High Pressure propane regulator includes propane tank connector	Gas pressure regulator	1	Agri-Supply	64484
	Flexible propane hose w/ 1/4" mpt x 3/8" flare connectors (36" long)	Gas hose	1	Agri-Supply	36018
	3/8 MFL X 1/4 MPT Half Union, brass	Adapter, hose to shut-off valve	1	Agri-Supply	85601
	1/4" Quarter turn ball valve, WOG	Gas shut-off valve	1	Home Depot	116-2-14-EB
	1/8" FPT x 1/4" MPT bushing, brass	Bushing, gas jet tube to shut-off valve	1	Lowe's	Item # 748376 Model # BF-738NL
	0-40 psi propane pressure gage	Regulator output pressure indication	1	Amazon	20L40
Forge Body:					
	Ammo can, 7" w x 8" h x 12" l	Forge body	1	Tractor Supply	1262316
	1" thick ceramic wool insulation	Forge insulation blanket	2.5 sq ft	Jim Hotinger	donation
	1 1/4" thick x 9" long x 4 1/2" wide 2700 degree hard fire brick	Forge floor	1 brick	Home Depot	1002077409
	1 1/2" x 8" long black iron pipe nipple	Burner support tube	1	Lowe's	
	1/4"-20NC x 1" long bolts	Positioning/Locking screws for burner tube	3	Amazon	
	1 1/4" iron pipe floor flange	Flange for burner support tube	1	Amazon	
	1/4" NC x 1" long bolts w/ nuts & washers	Bolts for burner support tube flange	4	Amazon	
	Rigidizer for ceramic wool & forge liner	Satanite (or equal) high temp refractory morta	1/2-1 lb	High Temperature Tools	
	I-R reflective coating	HYB-UV or ITS-100 or equivalent	1/2 pint	Hybrid Burners	
Tools:					
	#60 Wire gage drill bit	For drilling gas nozzle hole	1	McMaster-Carr	3033A276
	#25 Wire gage drill bit	Tap drill for gas nozzle setscrews	1	McMaster-Carr	3416A199
	10-24 Thread tap	For tapping gas nozzle setscrew holes	1	McMaster-Carr	2522AG71
	#6 Wire Gage drill bit	Tap drill for 1/4"-20 burner support tube bolts	1	McMaster-Carr	2901A177
	1/4"-20NC Thread Tap	1/4" bolt thread tap for burner support tube	1	McMaster-Carr	26955A43

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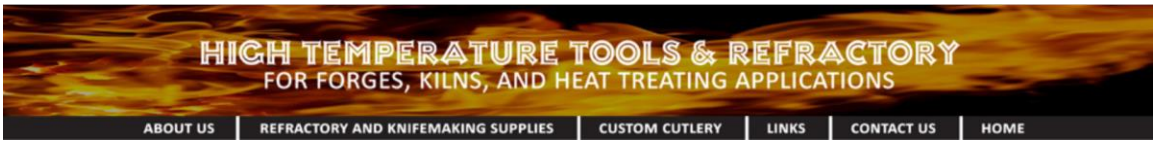
The following items were excerpted from the web sites noted and is provided for additional information concerning forge construction:

Information from http://www.hightemptools.com/supplies.html



Inswool questions

How thick should I line my forge with Inswool?

The more insulation you have in your forge the better, to a certain degree. A 1" layer is generally enough for most forges, however, adding 2" and even 3" can significantly increase the efficiency of your forge. A more efficient forge uses less fuel and costs less in operating costs. The tradeoff is you have higher initial lining costs. A limiting factor is the size of your forge shell. You do not want to make your forge chamber too small such that the burner flame impinges directly on the work piece if possible, be sure to leave enough room for proper burner positioning.

Do I need to coat the fibers in the Inswool with anything?

Yes, Once you have the Inswool liner in place, you will need to top-coat it with Satanite and/or ITC-100 to protect the liner as well as stabilize the fibers in the ceramic fiber blanket once the forge is in use. Inswool does not present any dangers to the user when lining the forge, other than an irritant much like fiberglass. However, upon heating to temperatures above about 1600 degrees F, free silicates can form that you do not want to breathe. Top-coating the fiber with Satanite and/or ITC-100 seals the Inswool and keeps everything in place. If at any point you poke a hole in the Satanite/ITC-100 top-coating, you'll want to patch the hole with some more Satanite. Also, at some point in the future when you reline your forge, be sure to wear a respirator, gloves, and long sleeve shirt and try to directly dump the lining into an empty trash bag and seal it off. The dangers probably aren't as great as that last sentence may sound, but it's always better to err on the side of safety.

You should topcoat the Inswool with something like Satanite or ITC-100, or you could use a rigidizer such as InsTuff. We generally recommend a basecoat of 1/4" of Satanite and then a topcoat of ITC-100. This provides a more robust coating with the added efficiency obtained from the use of ITC-100. Generally, for most forges, a five pound bag of Satanite and a half pint of ITC-100 is sufficient.

More info coming soon!

Satanite questions

How do I mix and apply the Satanite?

Mix the Satanite to a thick paste...just keep adding water slowly until you get a pasty consistency that you can paint on with a paintbrush....roughly the consistency of sour cream. Spray the ceramic fiber insulation down using water with a hand sprayer to wet it lightly. Next, apply the Satanite to the wool using a paintbrush, covering all exposed wool surfaces. To cure it, you want to dry it slowly. First, let the forge sit for a few hours minimum to air dry a little, then fire up the forge just briefly and shut it down. Do this several times, allowing it to cool down in between and increasing the on-time with each subsequent cycle. You'll see water vapor evaporating the first few times you do this. Finally, fire it up and bring it up to full temp to fully cure it. You will probably want to apply at least two coats of Satanite in this manner...it's a little time consuming (do it over a couple of day period) but makes for a more robust coating. a 1/4" layer is a good thickness to shoot for. If you are going to apply ITC-100 over top of the Satanite, be sure to fully cure the Satanite first.

Can I use Satanite for clay coating my blades to produce a hamon?

Yes, Satanite and APG #36 are two of the most commonly used "clays" used in the U.S.A. for clay coating knife blades.

What else can I use Satanite for?

You can apply a thin wash of Satanite over your entire blades to aid in keeping scaling to a minimum while heat treating.

ITC-100 questions

How do I mix and apply ITC-100?

For ITC-100, the manufacturer recommends to mix it 2:1, so if you have a pint, mix it with a half pint of water. My experience, indicates that mixing it a little thinner is just as good if you are using Satanite as a basecoat first. Since you're using the Satanite as a protective coating, the ITC-100 doesn't need to serve this function. Mix it thin, and apply the coats evenly. Applying several thin coats is better than applying a single thick coat. You'll likely have some left over for future patching. Apply the ITC-100 over the Satanite only after the Satanite is fully cured. You can use ITC-100 alone without first applying Satanite, you will just need to use more of this material.

I purchased my ITC-100 a while ago and haven't used it yet. It is starting to dry out, is this a problem?

While most refractory materials come in dry form, ITC-100 comes partially pre-mixed in a clay consistency. If your ITC-100 is starting to dry out you can store it in an air tight container if you like. Just add water to get it back to its original consistency.

How much area will ITC-100 cover in a forge?

ITC-100 will cover 6 to 12 square feet per pint, or 3 to 6 square feet per half pint. If you apply a basecoat of Satanite to your forge first, you can get by with the larger number for square feet coverage. An additional benefit to doing this with Satanite first, is that Satanite is cheap and by building up a 1/4" layer of Satanite over you Inswool liner before applying the ITC-100 your forge will be more robust.

Note: Hybrid Burners, http://www.hybridburners.com/new-ordering.html, sells a product, HYB-UV, which claims to be nearly as good and efficient as ITC-100 and costs less - -

HYB-UV - Infrared reflective coating: Reflects up to 98% of the IR heat energy that strikes it and radiates it back into your forge or furnace.HYB-UV is equivalent to an extra inch of Kaowool in your forge lining, and can save you up to 30% in fuel costs. Most gas forges will not forge-weld without this chamber coating .....$25.00 per pint. (Ships FREE when ordering one or more burners, otherwise see Shipping & Handling note below.)

Soft Firebrick questions

How do I make a single brick forge?

Take a look at the Forge Gallery pages for some examples of how to construct single and two brick forges:

http://ForgeGallery.EllisCustomKnifeworks.com

How can I cut the soft firebricks?

The soft insulating firebricks are very soft. You can cut them using a hacksaw blade easily. They can also be drilled with a metal cutting drill bit or even a wood boring bit!

Are soft firebricks resistant to flux?

No, soft insulating firebricks are not flux resistant. If you are going to use soft firebricks in a forge that you intend to do forge welding in you will need to use other measures to ensure protection against damage from flux. We carry a couple of different solutions to this problem: Hard firebricks, Bubble Alumina, Mizzou.

Hard Firebrick questions

Are the hard firebricks flux resistant?

Yes, they are to a certain degree. They work well in the bottom of horizontal forges to add some flux protection, however, they should be viewed as a consumable item in that they will eventually need to be replaced.

How can I cut the hard firebricks?

A masonry blade in a chop saw will work.

Warning:
HYB-UV contains,
Sodium Silicate

Refractory use

Water glass is a useful binder of solids, such as vermiculite and perlite. When blended with the aforementioned lightweight aggregates, water glass can be used to make hard, high-temperature insulation boards used for refractories, passive fire protection and high temperature insulations, such as moulded pipe insulation applications. When mixed with finely divided mineral powders, such as vermiculite dust (which is common scrap from the exfoliation process), one can produce high temperature adhesives. The intumescence disappears in the presence of finely divided mineral dust, whereby the waterglass becomes a mere matrix. Waterglass is inexpensive and abundantly available, which makes its use popular in many refractory applications.

Substance Name	CAS#	EC#(EINECS No.)
Silicic acid, sodium salt	1344-09-8	239-981-7
disodium metasilicate	6834-92-0	229-912-9
Sodium silicate	15859-24-2	215-687-4

Silica

The chemical compound silicon dioxide, also known as silica (from the Latin silex), is an oxide of silicon with the chemical formula SiO2. It has been known for its hardness since antiquity. Silica is most commonly found in nature as sand or quartz, as well as in the cell walls of diatoms.[1][2]

Silica is manufactured in several forms including fused quartz, crystal, fumed silica (or pyrogenic silica, trademarked Aerosil or Cab-O-Sil), colloidal silica, silica gel, and aerogel.

Silica is used primarily in the production of glass for windows, drinking glasses, beverage bottles, and many other uses. The majority of optical fibers for telecommunications are also made from silica. It is a primary raw material for many whiteware ceramics such as earthenware, stoneware, porcelain, as well as industrial Portland cement.

Silica is a common additive in the production of foods, where it is used primarily as a flow agent in powdered foods, or to absorb water in hygroscopic applications. It is the primary component of diatomaceous earth which has many uses ranging from filtration to insect control. It is also the primary component of rice husk ash which is used, for example, in filtration and cement manufacturing.

Use in place of ITC-100
Use Gloves and eye protection.
Particulate Respirator
Mix w/water 60/40 to 50/50
Dampen area to be applied
dab on with a brush
can be sprayed on with a hand held sandblast gun
<http://www.google.com/search?q=sandblast%20gun&ie=utf-8&oe=utf-8>
Also you can coat sst nozzle before installing burner, not a must just can't hurt.

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