

Gryphonbrewing.com.au

HERMIT HX

Heat exchange build guide

READ ME: DISCLAIMER: This project involves the use of electrical parts that use 240v. All work involving 240V must be undertaken by a licensed electrical tradesperson.

WARNING: 240v will kill you!

Never work on an appliance that is plugged into 240V power supply.

Gryphon Brewing takes no responsibility for injury or death to any person or damage to property resulting from this guideline project build.

If you don't agree to these terms above, do not proceed any further.

Draft V2
20/03/2012

1. What is this?

A HERMS heat exchanger can be used to indirectly heat wort during the mash to maintain temperature or even raise the temperature of the mash to perform a stepped temperature mash. This guide includes the instructions to build a budget HERMS heat exchanger.

2. Parts List



Figure 1 Parts from the Bunning's plumbing section.

1 x 9323714048160 DWV PVC adaptor female iron 40mm 56690

1 x 225 mm long piece of 100m DWV PVC pipe DWV1001, (1 meter \$9.00)

1 x 9323714041116 DWV PVC cap 100mm coupling ACC 46380

1 x 9323714041123 DWV PVC cap 100mm threaded access ACC 4630

1 x Push on end cap for base to close of HX bottom 46650

PVC glue (also from the plumbing section) and a tube of silicon sealant.

1 x \$9.00 Homemaker non corded kettle from Kmart, you will need an IEC end plug (computer type)

Or 1 x Woolworths corded kettle \$14.00, comes with cord.

3. Tools

1 x 40mm hole saw. Borrow one as expensive.

1 x 12mm drill bit. Borrow one as expensive

Heat gun or something to heat tube.

A saw

4. Housing Build Process

4.1.

Cut the tube to approx 235mm (Figure 2) and mark up from bottom 55-60mm for the 40mm element hole. Sandpaper both ends so you get good glue bonding. Don't drill hole yet!



Figure 2

4.2. Glue end cap to the bottom you marked 55mm from and glue threaded top cap to top of tube (Figure 3). Leave 24 hours for the glue to dry, don't rush the glue otherwise it will leak. Trust me I know.



Figure 3

4.3.

While glue on the main body is drying prepare the rest of the parts .

Start with the holes in the screw on lid.

Tape the coil end tubes so they are parallel, position on the inside of the lid so the coil body is located on the central axis of the lid, mark and drill the 12mm holes (Figure 4) .

Don't worry if the holes are tight or the coil is slightly off centre as this will become loose after the first couple of brews.

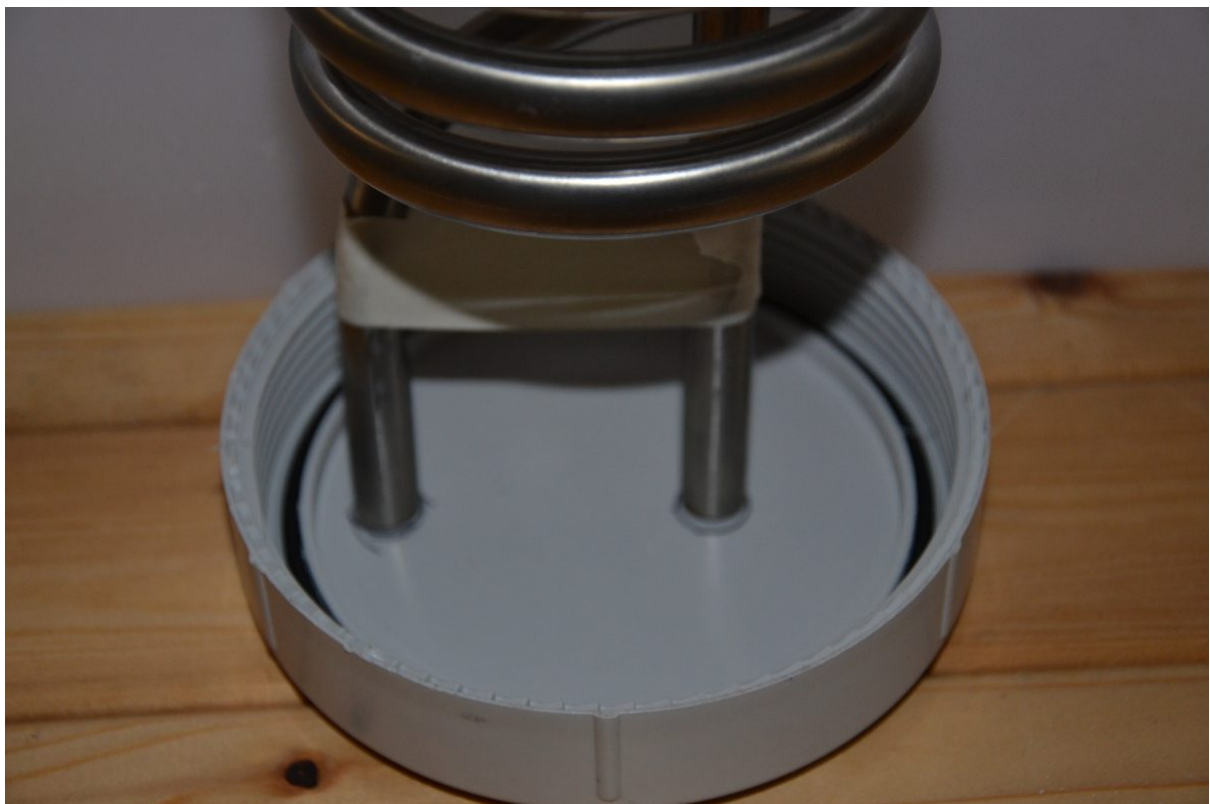


Figure 4 Lid not shown with vent hole.

WARNING: Don't forget to drill a 5mm vent hole in the lid to prevent pressure build up.



Figure 5

5. Kettle Disassembly

5.1.

Break down your kettle till you have the following:

Element, silicon seal and IEC power pin adaptor with light attached.



Figure 6

5.2.

Pull out the red light wires, they will come away clean, fill up the wire holes with silicon when you silicon inside the HX body. **Do not cut wires as this will leave live wires exposed.**

6. Electrical Socket Assembly

6.1.

Cut away the top section of the IEC adaptor till you are left with a circular adaptor as shown in (Figure 7).

6.2.

Next, get the 40mm fitting ready (Figure 7) by drilling a 6-10 mm drain hole 17 mm back from the fluted end (Figure 7).

This will allow any water that may spill into the electrical plug area to drain away.



Figure 7

6.3.

Cut down the black element male IEC part till it fits inside the 40mm fitting (Figure 8).

Don't silicon yet!

Remove adaptor from 40mm fitting and put both parts to one side.

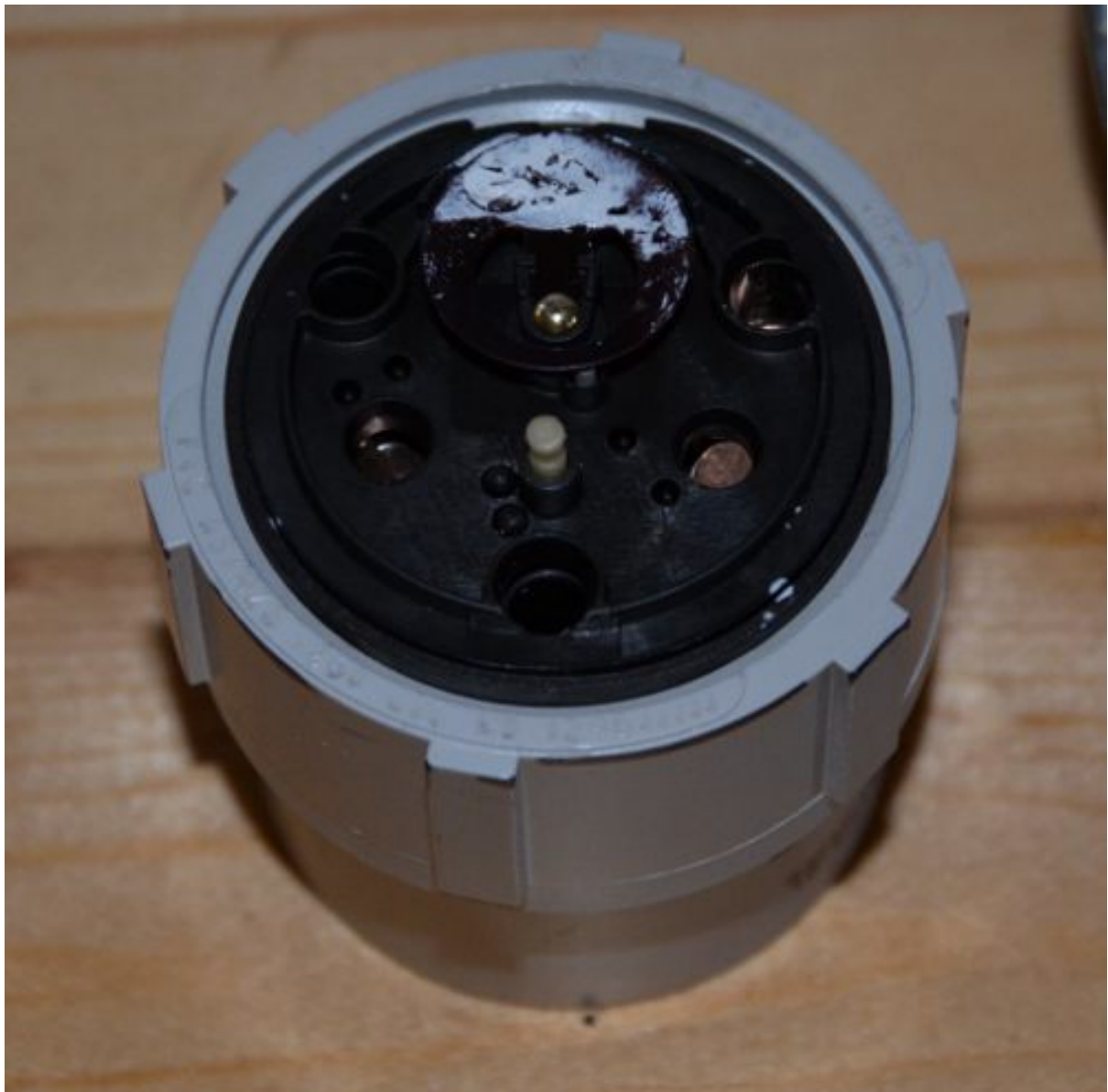


Figure 8

7. Preparation of HX Coil housing for assembly

7.1.

The glue should now have had 24hours to set. Apply silicon sealant to the inside the body tube around where the end cap is glued. Make sure you do this now as once the element goes in its impossible.

Fill the holes from the red wires in the IEC socket with silicon sealant.

7.2.

Tricky bit - Involves heating tube and piece of wood and a bit of patience!



Figure 9

Using a heat gun or other heat source, gently apply heat to the main body. Don't burn and bubble the PVC. When the heat is right the PVC will turn a slightly tan colour.

7.3.

Get your pre-prepared piece of timber (Figure 9) and firmly push down over the section where you intend to make your 40mm element hole.

This may take several attempts, go slow, don't burn the PVC, you want a nice flat section (Figure 10).



Figure 10

I found using wood on the outside and flat metal on the inside gave me good flat results.

8. Assemble HX

8.1.

When the PVC is cool, file or sandpaper the flattened section as flat as possible, inside and out. If it leaks this is where it will be.

8.2.

Try the silicon element seal in for size (Figure 11). If it looks ok try the element from the inside of HX body.

If the silicon seal fits well, put some silicon sealant in the groove of the element seal and put it and the heating element in position. Use the three screws to tighten up (Figure 12).

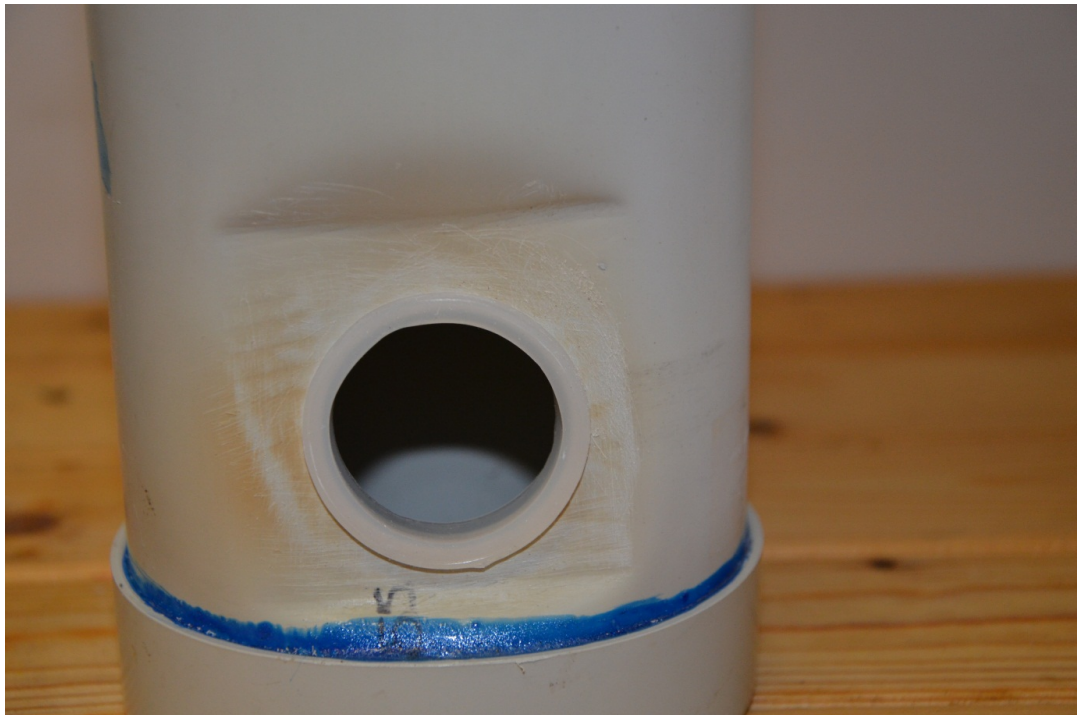


Figure 11 Seal looks like good fit.



Figure 12

8.3.

Now apply some silicon sealant around the black element male IEC part and push the 40mm fitting over the IEC adaptor part (Figure 13). Don't fill your drilled drain hole!

Be sure to affix the entire heat exchanger onto a large heavy base with silicon sealant to make the HX more stable.



The tube is designed to hold 2L of water only. Before giving your HERMIT HX a test run fill it with water and leave for 24Hours and check for leaks in particular around the electrical plug section.

If it leaks don't use it, find and resolve leak first.

Figure 13

9. History

This is a draft document and any suggestions or improvement are appreciated.

Contact: gryphonbrewing@iprimus.com.au

| Version | Date | Changes |
|----------|------------|-------------------------------------|
| Draft V1 | 19/03/2012 | Initial Draft |
| Draft V2 | 20/03/2012 | Grammatical and formatting changes. |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

10. Parts Checklist

| Quantity | Bunnings Part Number | Description | |
|----------|----------------------|--|--|
| 1 | 9323714048160 | DWV PVC adaptor female iron 40mm 56690 | |
| 1 | | 225 mm long piece of 100m DWV PVC pipe DWV1001 | |
| 1 | 9323714041116 | DWV PVC cap 100mm coupling ACC 46380 | |
| 1 | 9323714041123 | DWV PVC cap 100mm threaded access ACC 4630 | |
| 1 | | Push on end cap for base to close of HX bottom 46650 | |
| 1 | | PVC glue | |
| 1 | | Tube of silicon sealant | |
| 1 | | Kmart Homemaker or Woolworths kettle with cord. | |