

## Installing a Diesel Fireplace



By Patrick Cornelius Whitby 42 Gaia hull #332



We wanted cold weather sailing capability and independence from shore power for winter living at the dock. Over 200 usable gallons of diesel are already in three tanks. The Whitby 42 is already setup for the installation with an area ready for the chimney.

There are several companies in the game. I found the Dickinson Newport optimum for our needs. The 6" vaporizing oil burner/superheat/vortex generators is a very clever design resulting in a compact, efficient producer of a **dry** comfortable heat. A heat exchanger further enhances the thermodynamic benefits greatly.

## Heatex Hot Air Exchangers \$216



Note: The output is nearly to the floor. The hot air pipe goes through the forward closet where the foul weather gear is dried out and kept warm.

Dickinson Marine Coquitlam BC Canada V3K 5B1

[www.dickinsonmarine.com](http://www.dickinsonmarine.com) [info@dickinsonmarine.com](mailto:info@dickinsonmarine.com) T: 800 659 9768

<http://www.dickinsonmarine.com/heatersmain.html> Prices are much higher here but the technical support is wonderful. The manual and specification sheet are available here.

Don Parry is most helpful. [dmfgdp@telus.net](mailto:dmfgdp@telus.net)

The Newport Diesel Boat Heater/Fireplace is a bulkhead mounted diesel fireplace. It should be mounted as low as possible on the bulkhead to provide excellent, dry, comfortable heat convection, to provide good natural draft and to reduce through deck stack temperatures.

- Heat output is 6,500 BTUs low and 16,250 BTUs high
- Optional water heating coils available for 10 to 15 gallon water heaters.
- Produces a dry, pleasant heat and one can cook on the top. I had a soft steel plate made that fits on top for cooking
- Keeps central saloon nice and toasty. With the Main hatch open the fully enclosed bimini is shirtsleeves with no fog on the plastic windows.
- 3" diameter chimney accessories required, Heat Exchanger highly recommended
- Fuel consumption ranges from 1.29 to 3.20 gallons for a 24 hour period.
- W: 10.5" x D: 10.75" x H: 19.5" Flue Size: 3"

The Fireplace runs about \$692 itself. One has to buy a myriad of other items. Get ready for a scavenger hunt. These costs are ballpark:

Defender, Go2Marine, and others have many of these items.

One turn water heating loop ... \$105.

A fuel filter .... \$62.

Low pressure fuel pump ... \$90.

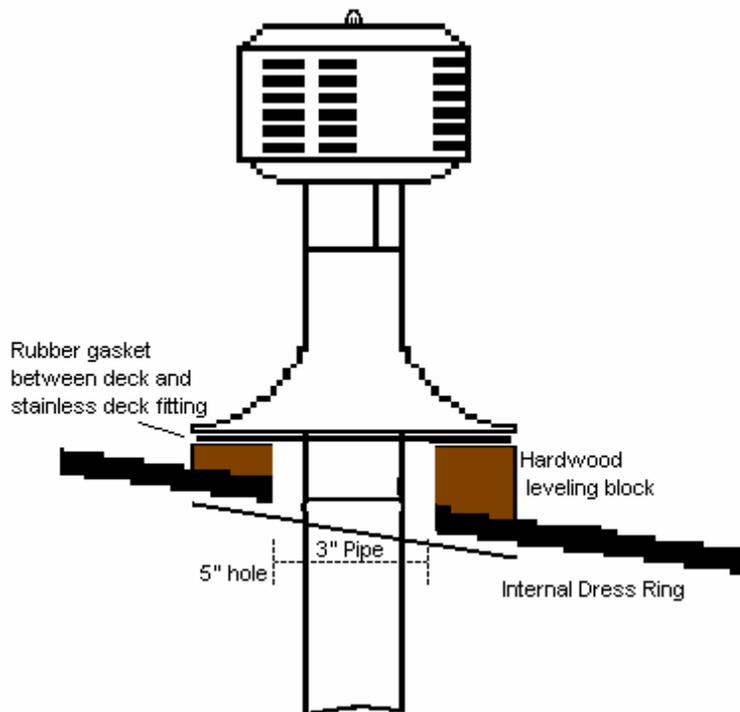
Round cap "mushroom" chimney ... \$75

Thru deck flue fitting ... \$57

Three inch stainless flue pipe ...\$30  
Two 45 deg elbows for flue ...\$32 x 2  
Sheet of Stainless Steel, standoffs/screws ...\$100  
Fuel hose, fittings, valves, copper tubing, compression fittings ...\$150  
Pex water tubing, quick connect "Shark Bit" fittings ...\$100  
Hot Water circulation pump (Laing) ... \$100  
Circuit breakers, wiring, ...\$100

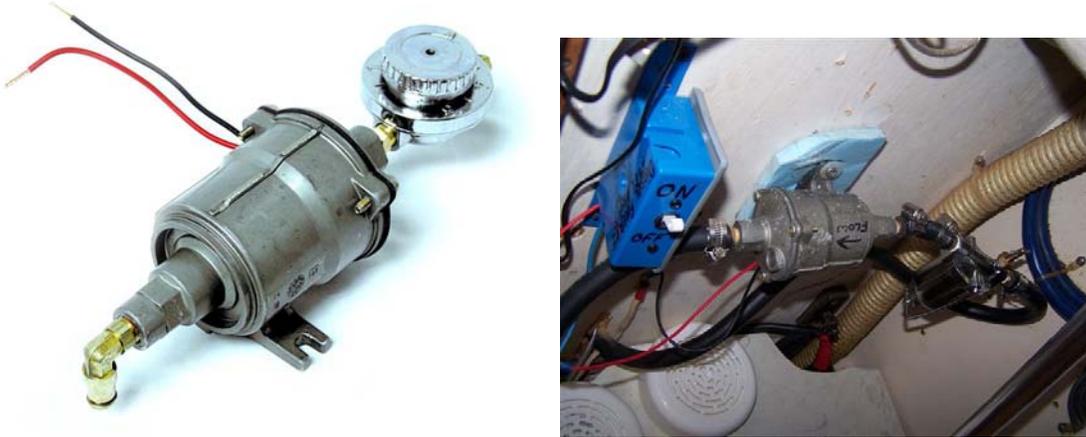
I did not use the Barometric Damper because the Heat Exchanger precludes it.  
It is not necessary **IF** one gets the fireplace as low as possible. Once the flue is warm a good draft is present and one can control the fuel air ratio with technique.

Cutting the 5 inch diameter hole in my beautiful Gaia was traumatic and very hard to do. It takes a very good hole saw, a good powerful drill and patience. One must clean out each layer as the hole deepens. The hull is amazingly thick there. Whitby already prepared the area for this. No need for a leveling block. No need to worry about balsa coring etc. I simply coated the inner cut surface with West System to seal it and make it smooth. The thru deck hardware holds the 3 in diameter stainless pipe centered in the 5 in hole.



I connected the Main or Center fuel tank with black fuel hose to a cut off valve, the filter, and then to the Walbro fuel pump. A dedicated circuit breaker controls the pump. It has a piston held by a spring. A solenoid pulls against the spring to pump the fuel in bursts. The pump ticks. It will tick fast until the set pressure is obtained. Flow is tiny. A tick

every few seconds is normal. On a quiet night one can notice this tick but normally one does not.



This feeds the fireplace metering valve. This is a very clever design too. A tiny amount of fuel is metered into the combustion chamber. A “SuperHeater” sits in the liquid diesel fuel. It brings heat down to the liquid to vaporize it. (note: a match will go out if thrown into liquid diesel) The diesel vapors are mixed in a very elegant fashion with the proper amount of air. Vortex generators and three stages of air holes at particular angles and sizes create just the right fuel/air ratio. Finally, this mixture reaches the Burner Ring. Burning occurs there. A bright lemon yellow flame is optimum. Any flame below the ring is not good. An orange or red flame with black tips is bad too. (see operating tips below)

The Fireplace metering valve has Safety Features. **Still, it can NOT be left unattended.**

1. On Flame Out, oil will not accumulate past a depth of 5/8<sup>th</sup> inches. This oil **must** be removed from the pot before the heater is lit again or the heater will dangerously overheat.
2. A high temperature fuse is incorporated into the oil metering valve. This fuse will melt if the valve knob reaches a temperature of 165 degrees F. This will shut-off the flow of oil into the burner.

The heart of the combustion chamber or AirFlow Burner is a “Superheater” and Burner Ring. The 2” round disc sitting 2” above the bottom of the burner is to deflect the hot rising vapor up the sides of the burner pulling in the primary air needed to mix with the fuel.



### **Draft Assist Fan**

It is controlled by the brass knob on the lower right side. During start up, at higher settings or during windy conditions, use the combustion assist fan to artificially boost the draft. When warm, it operates without the use of the fan.

### **Installation Check-List for a Natural Draft Oil Heater**

A permanent 3" diameter fresh air vent is a **must** to provide the heater with the air it needs to operate properly. A Carbon Monoxide detector is a good idea too. Have a minimum of 4 feet of exhaust stack. Keep heater as low as possible. The first 12" of exhaust pipe from the heater/stove is going straight up without any elbows.

The overflow return from the valve is going to an overflow container.



I have never seen this fill up.

If using a fuel-pump at 4 psi to pump oil from the main tank recommend mounting it at the same vertical height as the oil level in the Fireplace valve.

There must be a 2" space around the fireplace and 6" away from any combustibles.

Insulate the wall or objects around the heater/stove with at least ¼" insulation and a sheet of stainless steel on ½" standoffs or ¼" insulation with ceramic tile.

The Metering valve must in line with the boat's keel on sailboats.

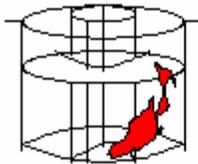
The exhaust cap must be clear of any obstructions that create unusual air movement. Put a guard around it too. The Genoa sheets can get caught there.

## **Lighting Instructions**

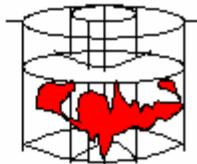
**Please read and study in detail BEFORE attempting.**

This is a bit of an ART and SCIENCE...remember... the Goal is a bright lemon yellow flame ...all above the ring.

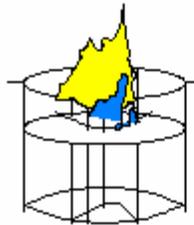
Lighting (Primed)



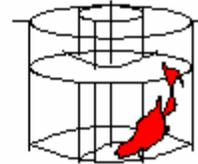
Preheating



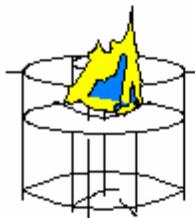
Fuel Vaporizing



Priming Fuel  
Burned



Low Fire (Turn oil valve back on to 1 setting before fire goes out)



The first time the oil-metering valve is turned on it will take 5-10 minutes for the fuel lines to fill and oil to appear in the bottom of the burner. In the beginning you will want to see approximately 2 tablespoons of oil accumulate in the bottom of the pot before lighting. You will soon come to know how long the valve should be open to accomplish this. The burning characteristics of the flame during lighting are as follows:

After start up and after a couple of minutes have passed, the flame should be lemon yellow, perhaps with some blue. Dirty orange colors or visible soot or smoke indicate an inefficient burn. The fan should be turned on or up to add more air in this situation or the valve turned down.

The flames should also be entirely burning above the top burner ring. Flame beneath the burner ring indicates an inefficient burn and will contribute to carbon build-up. The fan should be turned off or down in this situation or the valve should be turned up.

Alternatively, this may indicate the barometric damper needs adjustment

## **Warnings**

- \_ Do not light a hot burner
- \_ Do not light a flooded burner
- \_ Do not use gasoline or other highly flammable material to light the burner.

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Tips on page 23 of MANUAL are **essential to deeply understand**.

## **Operating Tips**

Every time the position of the knob on the oil metering valve is moved (fuel), the air will need adjusting in order to have the correct fuel to air mixture. This will:

- 1 Keep the burner, combustion chamber, flue pipe, and your deck **clean**
- 2 Keep the draft strong against down drafts
- 3 Keep the correct heat in the correct part of the combustion chamber

On the lower settings the burner needs less air. To reduce the air, adjust the barometric damper open wider (pg-6), turn off the fan, and add more fuel even if you do not want the heat. It is better to make too much heat and dissipate it than to run the burner too lean (flames in the burner) as this will result in hard carbon build up and soot. The burner was designed to burn a certain amount of fuel on low and if less fuel is burned (flames below the ring), the burner will not burn clean.

Turning up the valve in small increments will help the draft catch up with the fuel increases, and this keeps a good fuel to air mixture, and that helps in reducing soot. When on medium to higher settings when the flames are looking orange with black tips, turn the fan on, but use the lowest fan speeds and increase air slowly until the flames start to turn yellow and are more vibrant. If you turn the fan on too much air will burn off all the fuel and the flames will end up below the top burner ring.

After the heater is well heated and cabin temperature is reaching comfort, the valve body and the fuel in it will start to warm and the heater will start to burn hotter. An adjustment will have to be made to turn down the fuel to the lowest setting so that the burner will have all the flames above the ring and not the setting on the valve. The number will only be used as a reference so you now know how low you can go and still have a clean burn. This is very noticeable when the fuel is in a very cold temperature.

When using the fan keep in mind that low settings require little or **no air**.

On the medium settings very little air or still none depending on if you have a longer chimney. The higher settings need air to keep the flames yellow but as the heater gets hotter the fan air can be reduced as the chimney will start to pull more air on its own.

While lighting the burner you can leave the superheater in the heater, give it a twist back and forth to clear the oil inlet, then throw the lighted tissue in. The tissue will land on the

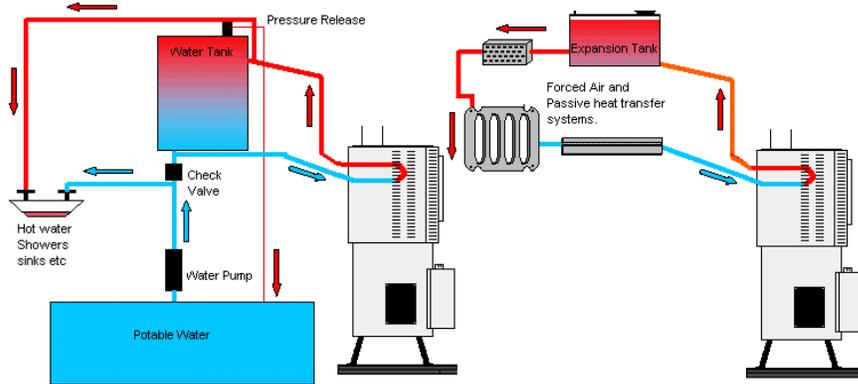
disc that is 2" above the bottom of the burner and will need to be pushed into the fuel underneath. The auger that came with the heater is a good tool for this and keeps your hands cleaner.

## Hot Water Coil Option

The heater can be equipped with a one turn hot water heating coil. This optional item should be installed at time of manufacture but can be retrofitted later.

Specifications - Coil 5/8th ins O.D. stainless steel tubing

One Turn heats - 10-15 gallon tank



I use a circulation pump (Laing) to constantly flow the water through this loop in the Fireplace. My 12 gallon water tank is warm in the morning, for a nice hot shower, even in the winter. PEX white tubing with push on "Shark Bite" connectors made the plumbing easy. I replaced as much of the old grey tubing (polycarbonate?) as possible. It will fail. Some of the grey connectors already had. They create leaks and make the water pump cycle. The "Shark Bites" make winterizing easy too. Disconnecting and taking the water heater out of the circuit is easy.



[www.dickinsonmarine.com/video.html](http://www.dickinsonmarine.com/video.html)

Video Overview ....good to watch.