



# How to Clean the Heat Exchanger

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## **WARNING**

*Rural Energy Enterprises, Inc. does not accept liability for the improper use of this information. Installation, service, and maintenance of heating equipment should be performed by a qualified technician. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life.*

### **Applies to models Oil Miser 148, 180 and Toyotomi BS36UFF:**

1. Unplug, drain, and uninstall water heater (if dielectric unions have not been installed, now is a good time to install them).
2. Remove front cover.
3. Unplug the lamp circuit board from the main circuit board (marked "remote controller on MCB) and remove the top panel of the unit. Be gentle with the lamp circuit board/temperature selector knob. Place the top panel in a place where it will not fall over or be damaged. Do not place the panel with the temperature selector knob down.
4. Remove burner (refer to technical document entitled "Burner Service" for detailed instructions for removing the burner). At this point, the unit should look like this (OM-180 pictured).



5. Remove (1) screw in horizontal bracket.



6. Remove (2) screws from heat exchanger bracket.



7. Remove the screws that attach the "L" shaped side and back panel, and remove the side/back panel.



8. Remove the (2) screws that attach the combustion air intake elbow, and remove the elbow.



9. Remove the three screws/8mm nuts that attach the heat exchanger cover. In some models, the gap around this cover may be sealed with a high-temperature silicone. Use a utility knife to cut the silicone, allowing the cover to be removed.



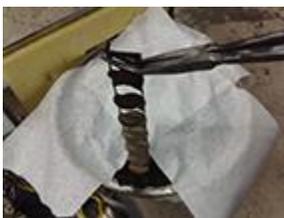
10. 1Wrap your shop-vac hose with rags/newspaper , insert into the burner throat, and turn the shop-vac on. This will keep the work area and your breathing air cleaner. Use of an N95 dust filter mask and gloves is recommended.



11. Remove the heat exchanger cover. Be careful to avoid damaging the insulator (also known as the insulation bonnet, inside the heat exchanger cover).



12. Cover the heat exchanger with newspaper or paper towels to increase suction in the tube you are working on. Securely grip the top of one of the baffles and use a gentle twisting and up/down motion to remove it. Longnose bent pliers work well for this.



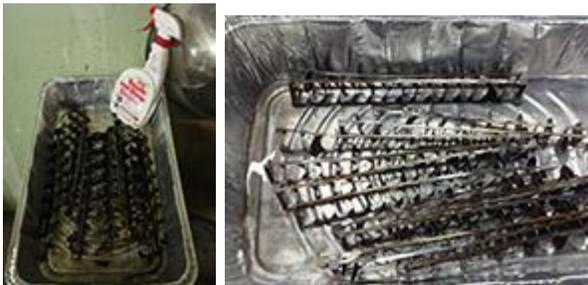
If any of the baffle plates break, or if the baffle is twisted severely, it will need to be replaced. (OM-180 Type A, Part# 20476723, Types B,C,D, Part# 20476743, BS36UFF & OM-148 Part# 20476423)



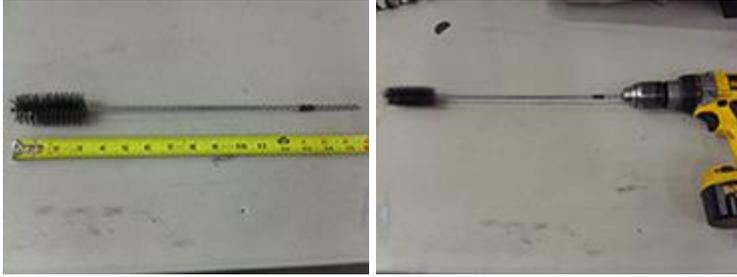
13. After removing the baffle, plug the tube with a wad of paper. This will maintain suction in the remaining tubes. Continue removing baffles



14. Spray the baffles with Speedy White (22oz. bottle Part# SW, or 1-gallon bottle Part# SW-GALLON) and rinse with hot water to remove soot buildup. Allow the baffles to dry completely before re-firing the unit.



15. To clean the heat exchanger tubes, R.E.E. recommends using a stainless-steel heat exchanger brush (Part# MIL84210). Cut the brush to make it approximately 16" long. Measure 13" from the tip and mark the spot by applying a few wraps of electrical tape. Insert the wire brush into a variable speed cordless drill/driver. When brushing the tubes, ensure that you do not insert the brush past your tape mark. The insulating pad in the bottom of the heat exchanger is not replaceable, so, if it is damaged, the entire heat exchanger must be replaced.



16. With your paper plugs still in place, use Speedy White and paper towels to clean the top of the heat exchanger. The paper plugs will help prevent any liquid from running down the tubes onto the insulating pad at the bottom of the heat exchanger. Again, do not damage this pad, or the entire heat exchanger must be replaced.



17. With the wire brush attached and your shop-vac still running, set the drill to the LOWEST SPEED, remove ONE paper plug, and insert the brush into the heat exchanger tube, brushing it until clean. Removing one paper plug at a time is a good way to prevent skipping a tube. Repeat this process for all remaining tubes. Using the low speed setting will lengthen the life of the brush and minimize the amount of carbon that is thrown into the air.



18. Carefully remove the insulator from the heat exchanger cover. Use your shop-vac's round brush attachment to gently vacuum the excess soot from the insulator and cover. Try not to remove a lot of the insulator material when doing this. If the insulator gets too thin, it will not function properly and will need to be replaced. (Part# 20476350) Dispose of the old heat exchanger gasket (indicated by arrow below). This gasket should be replaced every time the heat exchanger is cleaned. (Part# 20476393)



19. Remove the muffler from the heat exchanger cover. The muffler gasket should be replaced every time the heat exchanger is cleaned. (Part# 20476793)



20. Clean the heat exchanger cover and muffler with Speedy White and allow to dry completely before reassembling the unit. You do not want the new gaskets getting wet.

21. Reinstall the baffles by gently tapping them back into the tubes. Take care to avoid bending them. Damaged baffles must be replaced



22. Install the new heat exchanger gasket. Notice that the cross section is rectangle shaped. The gasket should lay flat, as pictured below.



23. Put the heat exchanger cover and muffler back together, using a new muffler gasket. The muffler will only go back on one way, with the seam of the exhaust toward the back of the unit. Place the insulator back into the cover. Flip the cover right-side up, line up the screw holes, and gently place the cover/insulator back in place on top of the heat exchanger. Replace and tighten the screws/nuts that hold the cover down.



On the BS36UFF and the OM-148, the gap between the lip of the heat exchanger and the cover (indicated by arrow above) should be sealed with a high temperature (500 degrees F) silicone sealant.

24. Remove your shop-vac from the heat exchanger. Using the brush attachment, very carefully vacuum inside the heat exchanger. Do not damage the insulating pad.
25. Reassemble and reinstall the unit. Be sure to check electrode adjustment (see technical document entitled “Burner Service”), replace the fuel nozzle (BS36UFF Part# 20476426, OM-148 & OM-180 Part# 20476626), and check the fuel pump pressure. This requires a “T” fitting (Part# 20476489) and a glycerin-filled pressure gauge (Part# 10005089). If you do not have the required “T” and pressure gauge, call (907)868-7952 to order them, or order in your usual manner. The pressure gauge is installed on the fuel line between the fuel pump and the burner, as pictured below left. Fuel pump pressure is adjusted with a flathead screwdriver as pictured below right.



Fuel pump pressure should be set to the following values:

<b>BS36UFF</b>	<b>Type A</b>	Lot# N07	95.3 PSI
		Lot# N08	99.6 PSI
	<b>Type B</b>	Lot# O02 ~ P01	114 PSI
		Lot# P04 ~	107 PSI

26. Test fire unit and perform a smoke test (zero smoke).