

# wvo firings

by Jesse Jones

Waste vegetable oil (WVO) can be used in kiln firings as a sustainable and renewable alternative to petroleum-based fuels. An effective delivery system is relatively simple to make with common materials.

A wide variety of fuels have been used to fire pottery kilns over the millennia. From wood, dung, and coal to natural gas, the choice of fuel has been widely based on availability, ease of use, and environmental impact. A relative newcomer, waste vegetable oil (WVO), has shown great promise as a supplementary fuel in the firing process. WVO provides a sustainable and renewable alternative to petroleum-based fuels. At Pleasant Hill Pottery (Pleasant Hill, Oregon), I use WVO in three of the four wood-fired kilns as part of the regular firing schedule. Two of these kilns were built specifically to utilize WVO and one was retrofitted.

The delivery system is similar to that described by John Britt in his April 2003 article in *Ceramics Monthly* detailing the many benefits of firing with WVO. The system allows oil to be gravity-fed from a reservoir through a piped distribution system to each burner. Multiple burners can be fed from one reservoir. I use ½ I.D. (inside diameter) galvanized pipe and WOG (rated for water, oil, and gas) ball valves to control flow.

WVO has been most commonly introduced into kilns via stair-step burners made of mild steel. This system, while effective, degrades rather quickly in the high temperatures of the firebox. I have developed and refined burners made of castable that resist degradation. The burners are relatively simple to make using common materials. I create a wooden form (inside

dimension (W×H×L) of 4¼×2¼×16 inches). I then use a bandsaw to make a “negative” of the trough out of 2-inch-thick pink Styrofoam insulation. The Styrofoam is screwed to the bottom of the wooden form. Castable is mixed and poured/pressed into the forms. After curing, the formwork is stripped away. Some types of castable require or recommend firing the cast items prior to use. Plans for the forms are available on the Pleasant Hill Pottery website.

I have designed the burners to fit into 4½×2½-inch opening, the end area of a common firebrick. This sizing allows existing kilns to be retrofitted with castable WVO burners with little to no modification to the brickwork. Many kilns have pre-existing brick-sized openings (to allow for salt or soda introduction or side stoking) that may also be suitable for adding the burners. A typical 16-inch-long burner placed through a 9-inch-thick kiln wall will extend about 4-inch into the firebox with the remaining 3 inches left outside the kiln. These dimensions can be changed to fit specific kilns. When designing new kilns, brick knockouts should be added to allow for potential future WVO use.

The burners can be installed mid-firing, and removed prior to shutdown or left in place. An oil burner placed lower in the kiln can become covered in coals if firing with wood (rendering it ineffective). By placing the burner higher in the kiln wall, the oil can “waterfall” down and volatilize more quickly and efficiently before landing in the firebox. A parallel system for water introduction (as described by Britt) can also be accommodated by these burners and helps volatilize the WVO.





1 Wood-soda kiln with distribution manifold installed. 2 Gravity feed system into distribution manifold. 3 Close-up of WVO feeding into the kiln. 4 Burners being used. 5 Burner form with foam trough insert. 6 Finished castable burners. 7 Distribution manifold for wood-soda kiln.

We use between 5 and 20 gallons of WVO per firing, but could use much more if we burned less wood. We usually use the oil between cones 8–13, although it could be used at lower temperatures.

The benefits of using WVO include the ability to change and/or maintain the kiln atmosphere, the ability to release heat rapidly, and the ability to reach top temperature easily with minimal fly ash (if firing with wood). We are planning further experimentation in the use of WVO for reduction cooling at Pleasant Hill Pottery.

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Subscribers can read John Britt's article, *Firing With Vegetable Oil*, from the April 2003 issue of *Ceramics Monthly* at <http://ceramicartsdaily.org/ceramics-monthly/subscriber-extras>.

