

Recommended machinery, equipment, supplies and materials for small scale ceramic Filter Production (800-1000 filters a month)

	<p style="text-align: center;">MANUAL HYDRAULIC PRESS</p> <p>The press can be fabricated on site or sourced through Potters for Peace (PFP). Once the press is in place and materials prepared, the production of prototypes can begin immediately. More presses can be copied and improved on once the filter factory is generating income. Later, up-upgrades to electric/hydraulic can be done. PFP can supply plans for construction.</p> <p>A 15-20 ton manual hydraulic TRUCK JACK is required and can usually be bought locally.</p> <p>A spare jack, HYDRAULIC FLUID, and OIL for lubrication should be handy at all times.</p> <p>The press will work 6-8 hours a day.</p>
	<p>A two piece aluminum MOLD is the only specialized component of the press.</p> <p>PFP can have these made in Managua and shipped to the site.</p> <p>At least 50 round flat sheet metal PLATES are required to be placed in the bottom of the female mold, to eject the filter after the pressing process is complete.</p>
	<p>Small HAMMERMILL with interchangeable sieves.</p> <p>Powered by a 2-3 hp or more electric motor (Electric motor makes less noise than an internal combustion motor.)</p> <p>All clay and possibly the burn out material will be milled.</p> <p>You will not use the hammer mill daily.</p>



MORTAR MIXER

In a mortar mixer the blades rotate in the barrel.

Because cement mortar is more liquid than the filter mix (which is more dense and “sticky”), the RPM normally used for cement mixes is too fast for our purposes and must be changed to work at 40-50 RPM.

If these cannot be found in the local market, we can provide plans for its construction.

A dough mixer can also be adapted for this use.

The mixer will work from 6-8 hours a day.



OPTIONAL:

A **PUG MILL** to better standardize the damp mix.

To date only the factory in Ghana uses one.

To work 6-8 hours a day.



IMPORTANT!

POTTERS

A filter production facility at an existing pottery could start up with a minimum of two potters and contract more as sales increase. Potters have experience working with clay, so can resolve problems much more quickly than workers with no previous clay experience.

At the very least, one skilled potter should be part of the workshop team.



A tested and proven source of **CLAY**.

An ideal source is re-cycled industrial unfired brick (background), hammer milled and sieved.

SCREENS to sieve clay and burn-out material.
The one in the picture is hung from the roof and can be managed by one person.



DRY BURN-OUT MATERIALS

These materials are mixed with the clay and later burn out in the firing, leaving behind the small pores that trap the bacteria in water.

This picture shows sawdust drying in the sun; then it is sieved through a kitchen strainer.


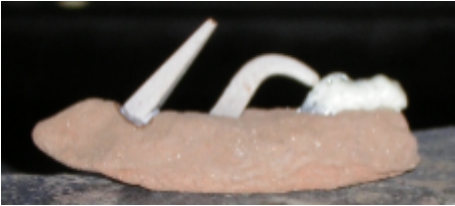


Depending on the country, other materials can also be used, such as milled rice husks, coffee husks, millet husks, dried and milled peanut shells, etc.



COLLOIDAL SILVER

Can be purchased in powdered form and sent DHL or FedEx from:

Ivania: i-ascaso@laboratorios-argenol.com
LABORATORIOS ARGENOL S.L.
Autovía de Logroño km 74, Polígono Europa 2
naves 1-11, 50.011 ,Zaragoza (Spain)
Tel: + 34 976 336266
Fax: + 34 976 533659
<http://www.laboratorios-argenol.com/>

	<p>A large enough KILN.</p> <p>PFP recommends the use of a “Mani kiln”, built on site by the PFP consultant. The Mani kiln is a fuel efficient downdraft design built using local materials (it requires about 1500 bricks to construct). Most are fired with wood, but some have been fired with oil, propane or sawdust.</p> <p>They can hold 40-60 filters at a time and be fired in a normal workday.</p> <p>Smaller kiln sizes can be use for prototypes, but will increase the costs of the filter.</p> <p>The kiln will be used about 4 times a week, for 8-12 hours at a time.</p>
	<p>PYROMETRIC CONES are required to help assure that the correct temperature is attained.</p> <p>Three batteries of 3 cones each are placed in the kiln at different heights.</p> <p>These will be used in all firings in conjunction with a FIRING CHART.</p> <p>In some cases, these cones must be either imported or brought in by the sponsoring organization.</p>
	<p>PYROMETER is used to help manage the rise of temperature in the kiln.</p> <p>A model with two terminals and of the better brand like FLUKE is recommended (it will last much longer).</p> <p>The pyrometer will be used in all the firings for 8-12 hours at a time.</p>
	<p>THERMOCOUPLES form part of the pyrometer used to monitor the rise of temperature in the kiln.</p> <p>Two with protective sleeves and wire are needed.</p> <p>Both are used in every firing.</p>



Enough **SHELVING** to store 1000 filters, which the workshop will fill in less than a month.

If budget permits, steel shelving is preferred. Make sure that the placement and removal of the damp and freshly pressed filter can be carried out with care in a comfortable manner.

Used daily

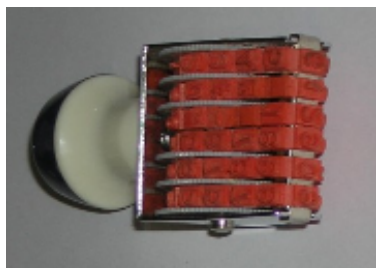


SOAKING TANK

Can be a very large plastic tank, or made from cement.

Large enough to hold 30 to 50 filters, for a period of no shorter than 4 hours, to conduct the filtration rate tests.

Carried out daily



A small **STAMP** to mark each filter with its own serial number. It is recommended that once sold, the name, address and community of the end user is registered for future follow-up exercises.

Used daily



FILTER IDENTIFICATION STAMP

Each workshop should brand its product with its own stamp.

These are pressed into the filter while still soft, and can be made of metal, rubber, plaster, etc.

Used daily



Five gallon Plastic **RECEPTACLES**, with silk screened instructions on the front that can be easily read by all.

Note: the “normal” lids made for the 5 gallon plastic receptacle will not fit once the filter is in place (due to the size of the filter’s “lip”).

When buying plastic receptacles by bulk, assure that you can also get an **OVERSIZED LID** (usually from another model) that will cover the filtering element once installed.



Terra cotta or high fired **RECEPTACLES** can also be made. In a few countries, they can actually be purchased for less than plastic ones, and will generate income for other potters.

Benefits: Studies show that many families prefer the ceramic vessels because they keep the water cooler than plastic.

Down side: They are heavy and fragile to transport.

Note: Ceramic receptacles must also be treated with colloidal silver.



PLASTIC FAUCETS (SPIGOTS)

such as the one in the picture last longer than the spring type.

The threaded part must be long enough to use two washers and a placement nut.

Buying in bulk will reduce the price by more than 50%.

Some countries have a local production of faucets; if not locally available, we have an inexpensive Chinese source.



MEASURING DEVICE

Simple device designed to measure the filtration rate of filters, fabricated on site.



PACKING MATERIAL

for the finished filtering element is required due to the elements' fragility.



PLASTIC BAGS

Used for mold release when pressing the filter; and for final packing for distribution.



HACH Presence/Absence tests

Catalog number 2610696.

For preliminary water testing at the community's water source, and then once it is filtered. We recommend that laboratory tests also be taken periodically.

Purchase on line: [/www.hach.com](http://www.hach.com)

	<p style="text-align: center;">IMPORTANT!</p> <p style="text-align: center;">PROMOTION AND MARKETING</p> <p>AN EXAMPLE: RDI/Cambodia uses a small van that visits local markets to show entertaining videos on how the filter functions and how to care for the filter, along with other hygiene messages like hand-washing. The videos are oriented to children and adults alike.</p>
	<p style="text-align: center;">IMPORTANT!</p> <p>Very good INSTRUCTIONS, in the local language, on how to use and care for the filter and its components. PFP can provide a model in Corel Draw that can be adapted, but we recommend that original ones better fit local communities and cultures.</p> <p>Contact professional rural health promoters with experience in popular education and in the preparation of health instructional material to help with this task.</p> <p>These will be displayed on the side of each receptacle, above the spigot.</p>
<p style="text-align: center;">Training Manual for Trainers and Promoters in the Use, Maintenance, and Monitoring of Potters for Peace Colloidal Silver Impregnated Ceramic Water Filter</p>	<p style="text-align: center;">IMPORTANT!</p> <p style="text-align: center;">TRAINING MANUAL</p> <p>Includes monitoring and follow-up instructions, and how to gather statistical data in the field. Available from PFP in English and Spanish.</p>
	<p style="text-align: center;">INSTRUCTIONAL MATERIALS</p> <p>Community instructional flip charts, videos, and Power Point Presentations for potential customers, targeted groups, and end-users.</p> <p>CDs with studies and other information for potential interns and researchers.</p>

