

# Comparison of Primitive Survival Heat Input Type Water Distillers

(3 April 05)

The following table shows a detailed comparison of the considerations and capabilities of different types of tested primitive survival heat input type of constructible water distillers. See [http://home1.gte.net/mikelob/Distiller\\_compairson.htm](http://home1.gte.net/mikelob/Distiller_compairson.htm)

Each line item in the comparison table is given a word description and a number rating from 0 to 9 with 9 being very desirable and possible in a primitive environment and 0 being of little use or not possible in a primitive environment.

For this report open fire could include a flame from a gas burner or a wood burning cooking stove or a controlled open flame wood fire. In some cases if an open flame is used and for example a pressure cooker has a handle that will burn then this will need to be taken off or allowed to burn off. It is understood that a pot will need to be held above an open flame with some sort of support if a wood burning open flame is used.

No attention or weighting was used to determine the availability of open fire or electricity in a primitive environment. Both were assumed to be equally difficult to obtain.

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<b>Comparison of primitive types of Water distillers:</b>														
Factors being compared:	Electric J-Sputter-Pole		Open Fire J-Sputter-Pole		Heavy Duty Pots & Pie-Pan		Light Duty Pots & Pie-Pan		Pressure cooker & Straight Heat Exchanger		Pressure cooker & Coil Heat Exchanger		Steamer and closed pipe	
<b>Amount of attention needed during operation</b>	Low, can let it run un-attended most of the time	8	Medium, Some attention at regular intervals.	6	Medium, need attention at regular intervals	5	Medium, needs attention at regular intervals	5	Medium, Some attention at regular intervals.	7	High, needs constant attention	3	High, needs constant attention	2
<b>Amount of water produced Oz/minute</b>	1.2	9	0.4	4	0.9	7	0.9	7	0.8	6	0.87	6	0.09	1
<b>Cold start up time (minutes)</b>	4	8	6	6	15	3	15	3	15	3	15	3	10	4
<b>Auto shut off if un-attended</b>	Yes	9	No	0	No	0	No	0	No	0	No	0	No	0
<b>Availability of parts after PS</b>	Low	1	Low	1	High	8	High	8	Low	2	Medium	5	High	7
<b>Availability of parts before PS</b>	High	8	High	8	High	9	High	9	High	8	High	9	High	9
<b>Type of operation</b>	Continuous	9	Continuous	7	Batch	5	Batch	5	Continuous	8	Batch	4	Batch	3
<b>Approximate cost to build</b>	\$127	2	\$83	3	\$30	5	\$20	5	\$74	4	\$50	4	\$15	5
<b>Operation Dangers</b>	Low	8	Low	7	Medium	4	Medium	4	Low	7	Medium	5	Medium	5
<b>Durability</b>	High	8	High	7	Medium to Low	4	Low	2	Medium to high	6	Medium to Low	5	Low	3
<b>Frequency of servicing</b>	Low	8	Low	8	Medium	6	Medium	4	Medium	7	High	4	Medium	5
<b>Portability</b>	Medium	5	Medium	6	High	8	High	9	Low	3	Low	3	Medium	5
<b>Skill level needed to construct:</b>	Medium	5	Medium	6	Low	7	Low	7	Medium	4	Medium	5	Low	7
<b>Skill level needed to operate</b>	Low	7	Low	8	Low	8	Low	8	Low	6	Low	6	Low	6
<b>Time to construct</b>	Medium	4	Medium	5	Low	7	Low	7	Medium	4	Medium	5	Low	8
<b>Type of heat source it will work with.</b>	Electric	4	Open Fire	6	Electric, Open fire	8	Electric, Open fire	8	Electric, Open fire	7	Electric, Open fire	7	Electric, Open fire	6
<b>Watts or heat used</b>	1500		High amount		1750		1750		1750		1750		1750	
<b>Efficiency output/(heat input)</b>	High	9	Low	3	High	7	High	7	High	7	High	7	Low	1
		112		91		101		98		89		81		77
<b>Primitive Survival Desirableness Rating</b>		1		4		2		3		5		6		7

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## Rating Results Summarized

- 1) The Electric J-Spatter-Pole has a definite advantage when electricity is available in its efficient use of heat to produce a high amount of distilled output water. It is durable and designed to operate nearly continuously with an automatic high temperature cut off in the event the cooling water stops flowing. See <http://home1.gte.net/mikelob/Jpole-10.jpg> Parts should be procured before the PS if you plan to use this approach.



- 2) & 3) The Light and Heavy Duty Pots & Pie-Pan water distiller has the advantage of portability and ease of construction. They both produce a relatively high amount of output and have flexibility as to the source of heat. Safely emptying the hot cooling pot at the end of each batch (about every 40 min) is the only danger to the using this approach. See <http://home1.gte.net/mikelob/WDL-2.jpg>

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- 4) The Fire J-Spatter-Pole water distiller is a durable nearly indestructible unit that can be used with an open fire. It is not that efficient in its use of heat to produce distilled water, but will produce distilled water with minimal danger. One just needs to produce a fire and keep it going. If more output water is needed then more units or more surface area exposed to fire can be constructed. See <http://home1.gte.net/mikelob/JFpole-8.jpg>.

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- 5) Pressure cooker and straight pipe heat exchanger type of water distiller has the advantage of being able to mix more air and potentially releasing more hydrocarbons from the replenish water than any of the above four approaches. A bit more difficult to keep the replenish flow rate adjusted during operation than the other. <http://home1.gte.net/mikelob/Exch-full-Inso.JPG>

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- 6) When the parts are available after a PS this sort of approach will work. It tends to be a batch operation that needs close attention and potential continuous maintenance.

[http://home1.gte.net/mikelob/Coil\\_Exchange.JPG](http://home1.gte.net/mikelob/Coil_Exchange.JPG)

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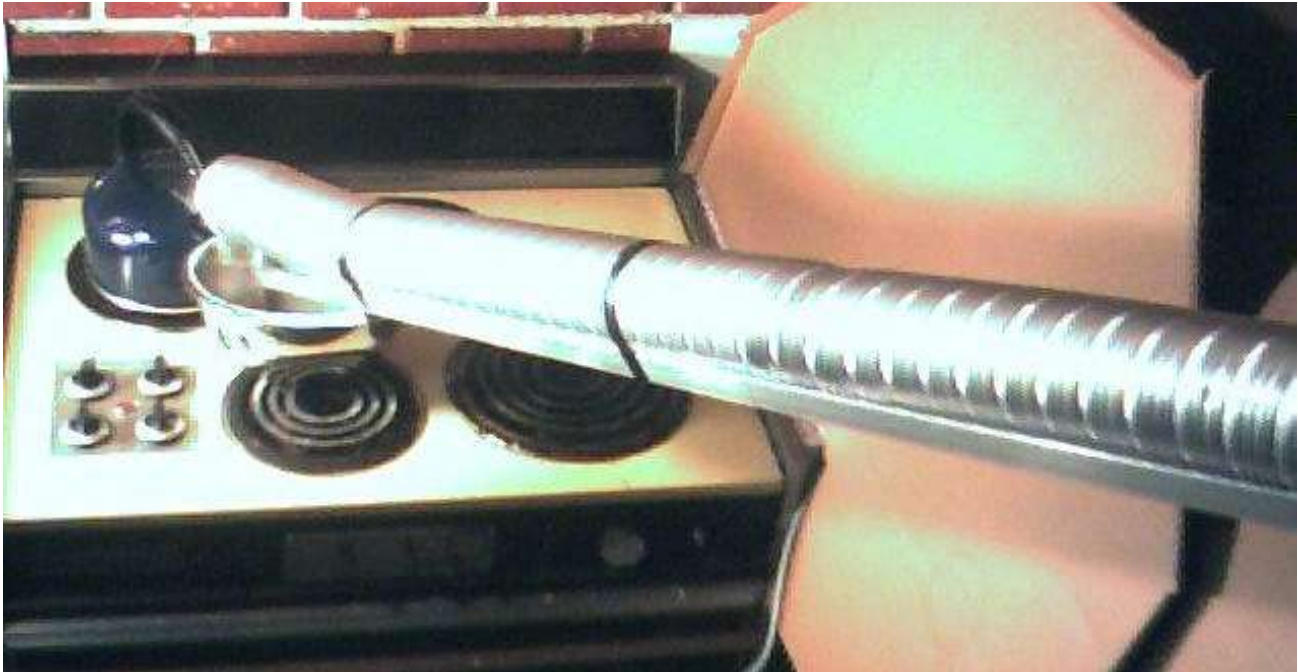


- 7) Availability of parts after a PS may force one to look at constructing some version of this sort of approach. One needs lots of space and air cooled surface area to make this approach work

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efficiently. Open flame fire can cause ash and hot dry air to interfere with the collection of clean distilled water. <http://home1.gte.net/mikelob/3inch-Ducting.JPG>



Recommendation: One should pick several types from the above list and collect up the parts before needing it. It is recommended to build and test several of these before the PS. At the very minimum have the parts available so that it can be constructed when needed.

I think the best current minimum plan would be to build or purchase the parts for the Electric J-Sputter-Pole and the Heavy Duty Pots & Pie-Pan water distiller before the PS. This would give the possibility of backpack camping and home based water distillation. The Electric J-Sputter-Pole can easily be converted to the Open Fire J-Sputter-Pole if needed. This approach gives maximum flexibility and keeps efficiency high.

Note: In designing, building, and tested each of the above units, the relative ratings are my opinion only. It is possible that a highly inventive person with the right parts could take the concept of number 7 on the list and improve the performance and usability to the point that it becomes number 1. Don't take my current words as the last words on this subject.