

Thermal Cooker Ideas

(1/11/2017)

Most thermal cookers work by slowing down the cooling process after one brings the contents up to cooking temperature. Some use a container with in a container that use a vacuum to slow down the cooling process such as the 7 quart Tayama TXM-70CFZ show below. Most of this type report to stay warm for up to 6 hours. The food is transferred to these containers after reaching cooking temperature.



Others use a blanket material with insulation between the inner and outer layer, as shown below. They are called a “Wonderbag” slow cooker. They clam to keep cooking up to 12 hrs after putting it in the bag. Both cost about the same between \$50-100.

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In the past hay or straw was used as the insulation and this form of cooking was by using a Haybox. See the following <https://en.wikipedia.org/wiki/Haybox>

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A **hay box**, **straw box**, **fireless cooker**, **insulation cooker**, **wonder oven** or **retained-heat cooker** is a cooker that utilizes the heat of the food being cooked to complete the cooking process. Food items to be cooked are heated to boiling point, and then insulated. Over a period of time, the food items cook by the heat captured in the insulated container. Generally, it takes three times the normal cooking time to cook food in a hay box

Ideas for after the PS

With a little imagination one could make something that would work out of common materials at hand. Old blankets with shipping box type packing used as insulation or cardboard between layers should work as long as the packing material is not too close to the heat to melt. A box [cardboard or wood or etc or bag (plastic or cloth or burlap or etc)] with dried grass or weeds (or formal insulation like fiber glass or foam) in it should work. The better the insulation properties the longer it will cook.

If one has electricity available then a low wattage heat source can be added like light bulbs that could also keep it cooking longer. Slow cooking should not be underestimated. It is reported to make meats tender. It has been shown that cooking still takes place down to 60 degrees C or 140 degrees F. Some beans should be cooked at boiling temperature for about 10 minutes before shifting to a lower temperature. For more info see

https://en.wikipedia.org/wiki/Thermal_cooking

Tool Steel Color vs Temperature

2000°F	Bright yellow	1093°C
1200°F	Dull red	649°C
1100°F	Slight red	593°C
1000°F	Very slight red, mostly grey	538°C
0800°F	Dark grey	427°C

So that if one included a hot plate under the pot and wished to heat it up to cooking temperature then, what temperature should the insulation need to withstand? Most hot plates get to slightly red so this would be a temperature of 1100 degree F or about 600 degree C. If one really wants to be safe then look for insulation around 2000 degree F or 1000 degree C.

Some examples are welding blankets that will go up to 1800 degree F, or Ceramic Fiber Insulation Blanket For Wood Stoves. Most Ceramic Insulation will with stand up to 2200 degree F. The following is a table of common insulation and what it will withstand.

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Insulation Material	Temperature Range			
	Low		High	
	(°C)	(°F)	(°C)	(°F)
Calcium Silicate	-18	0	650	1200
Cellular Glass	-260	-450	480	900
Elastomeric foam	-55	-70	120	250
Fiberglass	-30	-20	540	1000
Mineral Wool, Ceramic fiber			1200	2200
Mineral Wool, Glass	0	32	250	480
Mineral Wool, Stone	0	32	760	1400
Phenolic foam			150	300
Polyisocyanurate, polyiso	-180	-290	150	300
Polystyrene	-50	-60	75	165
Polyurethane	-210	-350	120	250
Vermiculite	-272	-459	760	1400

It might work to put several layers of aluminum foil around where the hot plat and bottom of the pot sits. Once one is away from the hot plate then lower temperature insulation like normal cotton blankets should work. Cotton will self-ignite at roughly 400 degrees C (some 760 deg F), but can sustain a flame at much lower temperatures, somewhere around 200-210 deg C. Tend to stay away from using synthetic fibers they may melt at a low temperature. Should do testing on what is available at the time of need. This is where one of the hand-held non-contact "Infrared Thermometer" temperature measuring devices works good. Harbor Freight tools and eBay sells several types of units. Can be used to measure the hotplate temperature and during the testing of the insulation material.