Zeer Pot: Electricity-Free Refrigerator / Emergency Refrigeration

Like **The Zeer Pot: Evaporation Cooling Explained**

When I talk to people about solar power and the benefits of it during a black out, one of the first questions I get asked is "How much solar power would I need to run my fridge". Well, I'll tell you what, running a fridge takes a lot of power and the reality of your fridge running on solar when things go sideways is both expensive and has a low return on your investment. If you have an **emergency generator**, you're in luck. However, eventually you will run out of fuel. With that said there are things in the fridge that need to stay cool. Those essentials include things that are hard to go without and need to be kept cold. The major one is medicine. Many medicines need to be kept cool in order to be effective. Also, fresh food obviously last longer when it is cooled. So, what do I do with a fridge full of medicine and food starting to rot. Simple, you make a zeer pot.

Zeer Pot - Electricity Free Cooling

So what the heck is that!?!?!? The zeer pot is a simple method for cooling items that are placed in the pot. It consists of two pots that are clay or terracotta. One pot is larger than the other. The small pot is placed in the larger with a layer of sand poured between them. The sand is then watered. Once the water in the sand starts to evaporate,

the inner pot cools while the outer pot draws heat away from itself. Items placed inside will become cooled as the water evaporates. Let's have a look at the construction of a zeer pot to clarify the concept.

First, you need two pots. They need to be non-glazed so the water can absorb into the pot. A glazed pot doesn't work so well with evaporation cooling. One pot will be larger than the other so that sand can be poured under and around the smaller pot. Next, you need some sand. Any type will do. A couple of corks are also a good idea to plug the holes in the pots. You don't want the sand and water to poor out of the bottom of the pots. Add some water to the mix and you have everything you need. Here's how you make it.

Materials needed to make a Zeer pot

Start with the larger pot and plug a cork into the hole from the inside out. This is so you don't push the cork out once the sand is poured in. Next, pop a cork into the smaller pots drain hole from the outside in. This is so sand does not push its way into the cooling chamber.

Cork the holes in the Zeer pot

Now, pour some sand into the larger pot and coat the bottom of the pot. You should place enough sand in the bottom so that the small pot, once placed inside the larger pot, is level with the rim. Basically, shore up the pots so that the tops are level.

Put enough sand at the bottom of the larger pot so the top of the smaller pot will sit level with the top of the larger pot

Level the tops of the two pots

Next, place the smaller pot inside the larger and fill the space between them with sand. Fill it to the top and give the pots a little tap on the ground to settle the sand. Add more sand as needed.

Add sand, filling in the gap between the two pots

Once the two pots and the sand are all leveled out, add water. SLOWLY pour water

into the sand. Be sure to water all around the pot and not just into one area. Again, pour the water SLOWLY. You don't want to flush out the sand by pouring it too fast. Let the sand absorb the water. Also, this is very important, do not overfill the pot with water. If you have ever heard of the term "soil liquefaction" you will experience it first hand if you add too much water. The sand will turn into soup and the inner pot will start to float. We don't want that.

SLOWLY pour water into the sand pit

After your pot is filled up, place your items inside to be cooled. Lastly, you can take a pot lid or plate and cover the top. Be sure not to cover the sand or the evaporation will not take place. Just enough to close the top of the inner pot to keep the cold air in.

Place items into your electricity free cooler

I used a plate topped off with wet sand for additional cooling

Next, place a wet towel over the top of the unit. This will keep the top cool from evaporation and the wet sand can still evaporate through the towel. I am trying a new technique for the lid where I place some wet sand in the dish cover and see if that increases cooling and efficiency. Place the pot in direct sun and keep an eye on the moisture level,

adding water as needed.

Towel cover for even more cooling

That's pretty much it. This idea has been around for centuries but has recently come back into the public eye. A while back in Africa, a very clever guy decided he was tired of his countrymen selling fruits and vegetables at market that rotted so quickly in the hot sun. He cranked out a ton of zeer pots and sold them for peanuts. The grocers now extended the life of their produce by a significant margin. Here is a chart comparing how much longer the zeer pot can keep things fresh:

Food	**Unrefrigerated shelf life**	**Shelf life with zeer**
Carrots	4 days	20 days
Eggplant	1-2 days	21 days
Guava	2 days	20 days
Meat	<1 day	~14 days
Okra	4 days	17 days
Rocket	1 day	5 days
Tomatoes	2 days	20 days

Here is the bummer part about a zeer pot. In sub-Saharan Africa, the humidity is very low. This means things evaporate a lot faster. This also means that the zeer pot will get much cooler. If the air is humid, the zeer almost doesn't work at all as evaporation in humid climates is very slow. I did a few test runs last summer with the zeer pot and had results that didn't blow my skirt up. It cooled about 14 degrees from the ambient temperature. Obviously the concept works as it did cool but, as I live so close to the ocean, the area is very humid. This humidity is what caused the pot to not work so well. Now, if I was in the desert or even inland a few dozen miles, the pot would work great. There are reports of the pot cooling between 38-40 degrees Fahrenheit. Interesting that the hotter and dryer it is the cooler it gets inside the pot. Amazing.

Thermometer reading 14° cooler inside the pot

No matter where you live or how well the pot works does not change the fact that it does work. When the power goes out and the fridge has warmed and the ice has melted, the zeer pot might be your last resort. Having a cold drink is a luxury but having your limited food last longer because it is cool is critical. Even more important is keeping vital medications cool in order to retain their effectiveness. Besides, building one for under twenty bucks is pretty cool (pun intended) and a lot less expensive than keeping an **emergency generator** around. Heck, you really don't need to pay for it as the materials needed are usually around the house. A couple of old terracotta pots and some sand are not hard to come by.

Stay cool.

~ Adam, Modern Bushman