

Building_A_Home_Freezer_2004.txt

TECHNICAL ARTICLE
BUILDING A HOME FREEZER
by Dick Hershain

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Although freezing of foods is of little interest in a nuclear war survival scenario, the ability to preserve fish and game or to buy food when it is cheap for use when it is dear can be useful to the survivalist who anticipates at least the sporadic availability of electricity.

The Theory: During the drought of 1988, the newspapers were filled with articles about farmers being forced to slaughter their breeding animals as they became unable to feed them. Looking at the likely consequences of these actions it occurred to me that this would result in depressed meat prices for the current year and increased prices in the next year as the decimated herds were rebuilt. In fact, we are only now seeing retail prices return to the levels of 1988. As a survivalist, it seemed the wise course to stock up at the low prices and use that meat during the coming shortage. This dictated the need for one or more food freezers. It was just my innate cheapness that decided me on building my own.

Many years ago, a correspondent to the Mother Earth News asked that publication how to convert a refrigerator to a freezer. Their editors explained why it was not practical and could be dangerous. I looked into the problem from the question of why a refrigerator does not freeze? Follow my reasoning.

Mechanical refrigerators will tend to reach the temperature at which their refrigerant gas evaporates. Because of convection, you would expect the coldest part of a refrigerator to be the bottom. How quickly a refrigerator gets cold depends on how fast the liquefied refrigerant is pumped into the evaporator (freezer compartment), how big (in cubic feet) the cooled volume is, and of course if the door is open.

Since the freezer compartment on modern refrigerators is adequate to freeze meat and maintain frozen foods and ice cream hard frozen, the refrigerant gas must reach a low enough temperature. The only reason that a refrigerator does not freeze hard to its bottom is that heat leaks through the poorly insulated sidewalls about as fast as the pump can remove it. Adding insulation to the refrigerator's walls and door will allow the temperature to drop

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until the entire cabinet is at the freezer temperature.

The Plan: My plan was to use a discarded refrigerator. Although there are discarded refrigerators at the curb on occasional trash days, I used some of my own discards, as the owner of several rental apartments, I occasionally have to replace a refrigerator. In my experience, refrigerators seldom fail mechanically. Usually they are discarded because of broken plastic parts, doors that no longer seal, or stains and odors that cannot be removed. (In my neighborhood, they are also discarded when they are the wrong color or when a new bell or whistle is offered.)

To insulate the refrigerator, I settled on styro-foam. My first conversion was a 4.5 cubic foot apartment size. It took less than one 4 x 8 foot sheet. My second conversion was a 6.5 cubic foot refrigerator. It took almost exactly one sheet. The styrofoam added one inch of insulation all around and cost about \$5 per freezer.

The Execution: One of the first considerations to be made when building a freezer is to make sure that the cold air from the evaporator can circulate well in the cabinet. For this reason you should discard the drip tray under the freezer, remove the freezer door and remove any other drawers or crispers. Also, when you install the insulation, do not insulate higher than about three inches below the freezer compartment. Running the insulation up higher interferes with the circulation of cold air from the top and sides of the old freezer compartment. To install the insulation, cut pieces for the left and right sides the depth of the cabinet and 1/8 inch higher than the distance between the shelves. Place the insulation on the shelves and tip it up against the sidewalls. Compression by the shelf above and below will hold the styrofoam in place. The top shelf insulation, because it does not extend to the freezer, will be secured only by the rear panel. Cut the rear panel as high as the side panels and 1/8 inch wider than the space between them. Then force it into position to help secure the side panels. It will be necessary to cut holes for the light and the temperature controls. The thermostat is part of the evaporator and is already properly positioned.

You should have enough scrap left to insulate the door. On the units I converted, I cut two pieces high enough to wedge between each set of storage trays. Most refrigerators have a tension adjustment on the door latch. Tighten this so that the door gasket is pulled extratight.

Testing Your Handywork: After completing each freezer I tested it. The tests consisted in placing a zippered plastic bag of water on each shelf and a refrigerator thermometer on the center shelf. After about two hours with the control set on normal the thermometer read 25Á F and all of the water had turned to ice. With the control set to cold, the thermometer read 5Á. Forty eight hours after pulling the plug, the ice had not melted.

Some Better Ideas: I have used the two freezers for almost two years now (though one was emptied and shut off for a while to save electricity). They are adequate for their intended purpose though I'm thinking of adding more insulation to one of them. A second inch of styrofoam should reduce the power consumption and extend the storage time with the power shut off.

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As with any refrigerator or freezer, these units will work better and take longer to thaw if they are kept full. Fill any extra space with plastic or cardboard milk containers filled with water. The containers of ice also work well in a picnic chest in the summer.

Attaching cardboard covers to the front of each shelf with duct tape so that they hang down reduces the amount of warm air that must be chilled after the door is opened.

I only open the freezer about once a week and transfer what I'll need to the refrigerator. Also, everything that goes into it is wrapped in plastic. You may want to cover the styrofoam with Contact- to make cleaning easier especially if you store items that could stain.

The freezer would cool down faster with a muffin fan attached to the bottom of the evaporator. You could plug the fan into the light socket and cut off the pushbutton so the circuit stays on when the door is closed.

Some glue-on foam weatherstripping around the door in addition to the factory door seal would probably improve the seal.

Temporary Freezer: A temporary freezer can be created when you suddenly come into a mess of fish or if your neighbor gives you some venison. A double or triple walled cardboard box on the bottom shelf of a refrigerator will maintain freezing temperatures until the windfall is consumed. Then you can discard the box.

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