Freeze-Proof Cattle Waterers Made From Big Fuel Tanks

Clyde McCoy made two dandy 2,500-gal. freeze proof cattle waterers by cutting a 5,000-gal. fuel tank in half and burying the two halves "standing up" in the ground.

"This is a great way to have a large volume of water available in an energy friendly way," he says. "Because of the volume of water and the fact that the tanks are sunk 6 ft. deep in the ground, the warmer ground temperatures under the waterers keeps the water fom freezing. A small sump pump also circulates the water from top to bottom."

For $500, McCoy bought a 17-ft. long, 5,000-gal. underground fuel tank (reclaimed from a service station), and cut it in half. Each resulting 3/16-in. steel walled tank is 8 ft., 6 in. tall and 8 ft. in dia..

He wrapped the outside of each tank with 3-in. Styrofoam insulation and covered that with 3/8-in. thick rubber conveyor belting to protect it from both the cattle and underground rodents. Stainless steel banding holds everything on.

For each tank, (in different locations on his farm) he used a backhoe to dig a 6-ft. deep, 12 by 12-ft. sq. hole on virgin ground. At the bottom, he poured a 5 1/2-in. thick, 8-ft. sq. cement base pad.

McCoy lowered the tanks into the recessed ground with a picker truck he hired, and back-filled around them. They sit about 30 in. above ground.

McCoy then welded a spoked frame from 2 by 3-in. angle iron to support a plywood cover for the tank. He also made a protective lip for around the outside edge of the tank from 4 by 4-in. angle iron.

The tank lid has six 14-in. dia. drinker holes cut around its circumference, and a solid section that lifts up for access to the pump and float. He says that two cows can drink comfortably from each hole.

In each drinker hole, he installed a re-bar safety cage "basket" to protect calves from getting knocked into the holes.

McCoy allowed a year after installing the tank for the ground to settle, and then poured a 6-in. thick, 8-ft. concrete pad around the tank. Next to the tank, he placed a 1-ft. deep, 6-in. thick, octagonal concrete step to prevent loitering animals from backing up to the tank and defecating.

He tried placing 14-in. dia. rubber feed tubs, with several 3/8-in. holes drilled in the sides (a half-inch from bottom) in the drinker holes for the purpose of catching debris. Although this did work to keep the water cleaner, McCoy concluded that the cows could push them out of position more than he liked. Instead, he plans to use 20-in. tractor tubes for more flexibility to collect trash.

His 3/4-in. water line fills the tank at 10 to 12 gal. per min. He figures he has a 350-gal. reserve of water to easily handle a large influx of thirsty cows.

McCoy's system handles his 300 cow-herd with ease, and in winter, the water remains open at temperatures as cold as 0º F (with no wind factor). In more frigid conditions, he hooks up a sump pump to circulate the water. Even if an inch of ice has already formed, he just breaks it, and in no time at all, the circulating water thaws it. He says it can get 40º below F and no ice will form when the sump pump is running.

McCoy says the tank-troughs cost him $1,200 each to build, plus $1,500 each for concrete and labor. He saves about $250 in energy costs per winter per tank, because they replace three conventional 100-head bowls.

"The electricity for the pump is supplied through a center pole, which I'd like to use as a light pole in the future. I'd also like to insulate the lids. My goal is to make these tanks so efficient that they will remain open down to 20º below F without needing water circulation," he says. "I'd like to make four more of these tanks in various pastures in the future."

McCoy made two 2,500-gal. freeze-proof cattle waterers by cutting a 5,000-gal. fuel tank in half and burying the two halves "standing up" in the ground.

Tank has six 14-in. dia. drinker holes cut around its circumference.

Fish And Veggies Grow Together In Solar-Powered Greenhouse

Mark Ostrye is an air force pilot who has fought in combat. Although his job continues to keep him very busy, he has developed a system in his spare time for producing a year-round supply of both vegetables and fish. And he does it all without increasing his utility bill.

His self-contained system combines aquaculture (fish farming) with hydroponics (growing plants without soil). The plants clean the water for the fish, and the fish provide nutrients for the plants through their waste excretions. The sun supplies all the power needed through photovoltaic solar panels that power water air pumps, air circulation, and fish aeration.

Ostrye came up with this system as a way to economically produce healthy, organic food for himself and others. He calls it "aquaponics".

According to Ostrye, the system uses 90 percent less water and produces 40 percent more produce in a given space.

His family gets to enjoy a year-round harvest of tomatoes, cucumbers, lettuces, parsley, basil, and fish.

The system consists of one 500-gal. fish tank and two 4 by 8-ft. grow beds. Other units can be added as needed to increase production.

"All of the energy to run the pumps, air circulation, and fish tank aeration come from two 75-watt, 12-volt PV (photovoltaic) panels," Ostrye says. "The system has the capacity to operate independent of any grid power for four to five completely overcast/cloudy days, and this is sufficient for most locations. After that, the battery bank of four 6-volt, golf cart-type deep cycle batteries would need to be recharged."

Ostrye uses a 12-volt RV-type Shurflow pump to circulate water from the fish tank to the hydroponic plant stands. A 12-volt, thermostatically controlled vent/fan provides air circulation.

The fish are fed automatically with a non-electric $2 feeder made from a five gallon bucket. No feeding labor is required, plus Ostrye says a study from Langston University reports a 72 percent increase in fish growth rates if feed is always available.

The only other need for electricity is to pump the water from the fish tank to the grow beds. For this, he uses a specialized solar-powered 12-volt pump that operates via a timer and automatically provides the needed water to the grow beds at various times throughout the day.

In winter, two valves are repositioned and water returning to the fish tanks is pumped through a south facing 3 by 6-ft. solar hot water panel made with black copper pipe before it returns to the fish tank. This increases the water temperature for the fish and creates a "heat sink" for the greenhouse.

"The focus of this project was directed at creating the simplest way to grow multiple vegetable types aquaponically, year round, with little or no need for power besides what the system itself would provide," Ostrye says, noting that there are just two moving parts in the entire greenhouse. "And with tomato and cucumber plants bumping off the ceiling in February, it's certainly been far more rewarding and provided better results than any conventional gardening I've ever attempted."

Ostrye has put together an illustrated manual called The Aquaponic/Photovoltaic Family Food Production. It's available for $49.95 (plus $3.00 S&H).

You can also learn more about aquaponics at: www.aquaponics.com.

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Beds For Baby Pigs Made From Crop Residue

It was April Fool's Day 2004, when Darryl Metcalfe's veterinarian diagnosed scours in a litter of pigs and wondered out loud why someone hadn't invented a one-time use, biodegradable mat.

Metcalfe jumped on the idea right away. He contacted his friend, Tony Schmitt, an experienced ag business entrepreneur and marketer.

With 5 1/2 million sows in the U.S., Schmitt recognized the potential. He immediately started the patent process and began looking for a manufacturer. After making about 80 calls, he connected with a company in his own state - Mat, Inc. in Floodwood, Minn. The company manufactures wood and corn fiber mulch to create hydroseeding mats that are used along highways, as well as other biodegradable wood and corn byproduct mats. Owners and workers at Mat, Inc. were excited about developing a new product.

About 200 trials and nine months later, Compost-A-Mat was born. Mat, Inc. supervisor Mike Clark mixed various resins and biocomponents to come up with a durable, inexpensive product. The mats last 10-14 days - enough time to allow pigs to get a healthy start in the farrowing pen. The mat weighs about 2 pounds and measures 30 by 36-in. by about 1/4-in. thick. Metcalfe and Schmitt expect to have stronger and larger mats on the market soon for nursery and wean-to-finish areas. New mats are used for each batch of pigs. Made of at least 50 percent corn byproducts plus wood byproducts, the mulch is heated to eliminate bacteria. It is roller pressed, cut to size and stacked on pallets for shipment.

Rubber mats have been standard for years, but producers know that despite washing between litters, bacteria builds up after time, which can spread disease from litter to litter.

Mats retail for $2.35 apiece for pallet quantities (400 per pallet). Once discarded, the mats decompose in about two weeks.

Metcalfe and Schmitt created USA Solutions to market and sell Compost-A-Mat. They plan to sell directly to large operators as well as find agriculture business owners to be dealers for the mats.

Contact: FARM SHOW Followup, USA Solutions, P.O. Box 303, Waite Park, Minn. 56387 (ph 320 250-7687; email: buyit@cloudnet.com).

Designed for baby pigs, the one-time use mats are less than 1/4 in. thick and weigh about 2 lbs. Mats last 10 to 14 days, enough time to allow pigs to get a healthy start in the farrowing pen.