



Reaping the benefit of the ethanol boom

PLASTICS IN AGRICULTURE

by Larry Geer and Dean Majkrzak

For manufacturers of plastic products and their distributors, there are many opportunities for plastics in agriculture applications. Perhaps the most visible and one of the most common are rotomolded tanks. As one travels the rural countryside, rotomolded tanks are often seen being used by ranchers and farmers. These tanks hold pesticides and herbicides which are applied to the crops that feed America and the world. Some also hold water for livestock watering or for small scale irrigation purposes.

Agriculture has branched out into the business of energy. Biofuel production continues to expand across the nation with 95 processing plants across the United States producing more than 3.9 billion gallons of ethanol in 2005. That is a 139 percent increase from the year 2000. Ethanol projections for 2006 are at 5 billion gallons. Ethanol is made from corn, sugar cane, sugar beets, grain sorghum, wheat, barley and potatoes.

The main consumption of ethanol is for displacement of fossil fuels as the United States tries to reduce its depend-

ence on foreign oil. You may see fuel products like E10 percent unleaded, E85 ethanol, e-diesel or biodiesel at your local gas station. There is also an E85 avgas fuel (aviation fuel) which is just starting to be used in aviation. The consumption of these products for the use of manufacturing ethanol will continue to have a positive economic impact on rural America and throughout the nation. Thirteen percent of the U.S. corn production or 1.43 billion bushels of corn were used in the production of ethanol in 2005. Biodiesel is another product that is made from soybeans and is also increasing in production as a renewable fuel.

Did you know?

In 1908, Henry Ford produced the Model T. As a flexible fuel vehicle, it could run on ethanol, gasoline or a combination of the two.

Bill Gates is throwing \$84 million into one ethanol producer and Sir Richard Branson is planning to spend \$400 million.

Ethanol is manufactured in two basic

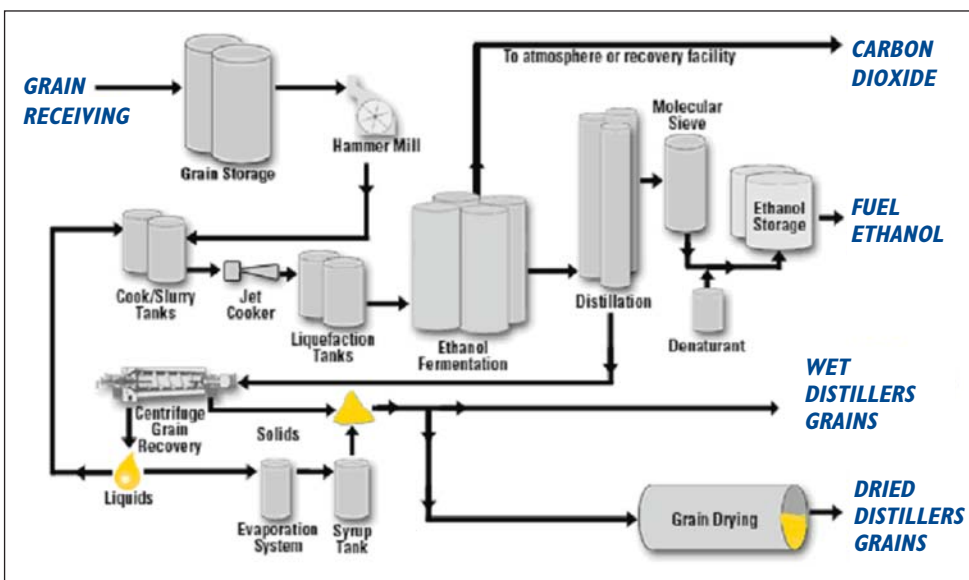
ways: wet mill, and the most common, dry mill processing.

Perhaps the most unique biofuels in facilities in the United States are the E3-Biofuels, of Mead, Nebraska. This start-up facility incorporates a closed-loop system where cattle manure's methane gas is used to fire the boilers that runs the plant.

The two main bi-products from the manufacturing of ethanol are cattle feed and carbon dioxide (CO₂). Other bi-products can be applied to farm fields as fertilizers for crop production. Here are other ethanol derived bi-products:

- Carbon dioxide (CO₂): carbonated beverages, dry ice manufacturing, flash freeze meats, paper mill production, oil production and other food processing.
- Alcohol related products: vodka, hair spray, mouthwash, aftershave, cologne, perfume, deodorants, lotions, hand sanitizers, soaps and shampoos.
- Medicines: cough suppressants, decongestants, iodine solutions, antibiotics, vaccines, tablets, pills and vitamins.
- Solvent related products: paints, lacquer and explosives.
- Food: vinegar, yeast, liquors and iced tea.

ETHANOL PRODUCTION: THE DRY MILL PROCESS



Are there plastics in ethanol plants? YES!

These manufacturing facilities use their share of plastics in their production process. PVC, CPVC, HDPE, polypropylene, PVDF, fiberglass and plastic-lined steel piping, fittings and valves are common where large amounts of water are used in the manufacturing process. In some plants reverse osmosis (RO) water is used and large fiberglass storage tanks are used to hold the RO water until it is used in the process. The RO machines that produce the RO water use a large amount of plastic products.

On the production side, rotomolded tanks are found holding chemicals used for the mix tanks, liquefaction process, saccharification process, boiler, cooling tower and clean in place (CIP) process.

Also found are plastic tubing, valves and compression fittings used for chemical metering and transfer pumps used to adjust pH of the cooking tanks, waste water and process lines. There are quite a few corrosive atmospheric environments to be found in all ethanol plants where fiberglass grating, handrail, catwalks, ladders and corrosion resistant piping hangers are used.

“There are opportunities for all manufacturers and distributors of plastic products to share in the ethanol boom.”

Corrosive chemicals can be a large problem for a lot of these plants. Plastics offer a greater degree of chemical resistance to the corrosive environments found in these facilities. Plastics are a more economic alternative and much safer than metals in these corrosive environments. Chemical attacks on metal piping systems and tanks can cost these facilities large dollars in downtime and safety related injuries. In some operations, large PVC and/or CPVC ventilation is used to vent the mill and feed house process in the steep tanks. This is where acids are added to the corn, along with water, and hot corrosive gases rise to the top of the mixing vessel and are vented off used PVC or CPVC large diameter fabricated ventilation systems.

Sometimes CPVC or plastic-lined steel piping systems are used in the thick syrup transportation lines after the centrifuge grain recovery to the syrup holding tanks. This allows for better cleaning of those lines which are only used intermittently. These lines are also exposed to chemical attack during the CIP process.

Where is ethanol headed?

There are 97 existing ethanol refineries in the United States pumping at maximum capacity. Nine are expanding and an additional 35 plants are currently under construction. But there's one problem: there's simply no way they can keep up with the surging demand for this alternative fuel. By federal mandate, the country must use 7.5 billion gallons of renewable fuels by the year 2012, up from an estimated 5 billion gallons this year. And lawmakers in Washington, D.C., are contemplating an even higher target: 15 billion gallons. The *Wall Street Journal* predicts that U.S. ethanol demand will likely increase by at least 50 percent this

year alone. At a rate of 35 new ethanol plants per year by 2012, it's likely that 210 new plants would be added in the United States alone.

Patricia Woertz, CEO and president of Archer Daniels Midland (ADM) said in a recent conference on ethanol, “It is not a question of whether a sustainable market for biofuels exists but rather how big that market will become.” Driving the demand are more than 5 million trucks and cars that are currently on the road in the United States today that are E85 capable, with plans to add more than one million more flex fuel vehicles (FFV) to the road in 2007.

Today there are 170,000 gas stations throughout the United States and 1,000 carry E85 ethanol at their pumps. There are plans to increase the number of gas stations carrying E85 to 2,000 stations in 2007. Wal-mart has agreed to start selling E85 at 383 of its retail locations in 2007. The U.S. government grants up to \$30,000 to businesses and station owners who want to add E85 to their pumps. E85 ethanol's cost today are approximately the same as unleaded, but when gas prices went to over \$3 a gallon at the start of 2006, E85 was \$1 less a gallon.

The Clean Air Act is the major driver for auto manufacturers to increase the number of FFV on the road today. Auto manufacturers are offering cash incentives to consumers who purchase these vehicles over the standard gas models.

Conclusion

There is large growth and incentives available from the farmer all the way to the consumer to use ethanol, which will also help keep our country beautiful and help the U.S. economy. A typical 40 million gallon ethanol plant creates 32 full-time jobs and generates an additional \$1.2 million in tax revenue for a community. There are opportunities for all manufacturers and distributors of plastic products to share in the ethanol boom. ■

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MYTH #5: DISTRIBUTORS JUST MAKE THE PRODUCTS END UP COSTING MORE.

You don't really believe that, do you? A distributor's products are usually cheaper when you look at the whole picture. The actual cost of a product is determined by price AND service. Distributors can offer you both.



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