



FUEL ALCOHOL

FUEL ALCOHOL: SAFETY

Safety in the production of alcohol fuel is as important as it is in any other farming operation. In general, ethanol demands the same respect and care that gasoline and diesel fuel require. In addition, due to its high volatility, ethanol and even gasohol have unique storage and handling problems. Storage should be either in underground tanks or tanks in a shady, cool place to minimize losses from in-tank vaporization. Vents need to be free and open. Fuel tank cap venting is especially critical due to the potential pressure levels from the vaporizing alcohol. Fuel caps need to be removed carefully to prevent the alcohol or gasohol from erupting or spurting out due to the pressure buildup. This tendency is much more pronounced during warm or hot days, and with tractors with mid- or above-engine mounted fuel tanks.

There are a number of codes that should be referred to in the building of a distillation plant, most notably the flammable liquids code, the lightning protection code, the electrical code, and the life safety code.

Fire extinguishers should be considered, such as a dry chemical extinguisher of the Class ABC or Class BC. Naturally, all drive shafts of equipment need to be properly shielded and good ventilation provided. If steam boilers are employed, safety valves need to be inspected regularly for corrosion and malfunctions. Steam can be extremely dangerous and great care should be taken in assembling fittings and gaskets. In addition, to prevent contact burns insulate all delivery lines.

Since ethanol vapors are heavier than air, they will tend to concentrate in low areas. Thus, if electrical pumps are used, they should be fully enclosed, explosion-proof motors. Better yet, use hydraulic pump drives with the main hydraulic pump and reservoir physically isolated from the ethanol storage tanks, distillation columns, and condenser. Never use metal grinders, cutting torches, welders, etc., around equipment containing ethanol. Tanks should be flushed and well-vented prior to performing any of these operations. This is especially true for fermentation tanks, beer wells, or stillage tanks which may contain carbon dioxide concentrations that could lead to suffocation.

During process operations if acids or bases are used, extreme care should be employed. Never breathe the fumes from concentrated acids or bases. Mix or dilute acids and bases slowly to prevent boiling. Select proper materials to store or transport acids and bases. Always use eye protectors and if the eyes are exposed to acids or bases, immediately flush with copious quantities of water.

The potential distiller, distributor, and user should remember that alcohol is being employed as a fuel, the same as gasoline or diesel fuel, and thus, should receive the same respect. One last note, ethanol as produced by the small-scale farm still is not the same as the ethanol produced by the drinking alcohol distillers or even the backwoods moonshiner. Due to the construction materials and the simplified distillation, fuel-grade ethanol is just that—fuel. Human consumption leads to a terrible headache (due to

the fusel oils) or to something worse (due to contamination by the still).

References

Schnieder, R. "Ethanol Production and Utiliza-

tion for Fuel." Cooperative Extension Service, University of Nebraska-Lincoln, October 1979.

"Fuel from Farms," DOE-SERI/SP-451-519, February 1980.

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