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From: John Ekhtiar

Subject: E85 Fuel Ethanol

To Whom It May Concern:

The use and storage of E85 fuel (85% Ethanol/15% gasoline) is becoming popular. This memo is to briefly describe Convault warranty and introduce you to some special requirements for storing, handling and dispensing of E85.

We offer the standard Convault limited warranty for storing E85 ethanol fuel. Please note that a provision of Convault limited warranty is that water in the tank is regularly monitored and removed from the tank. The warranty will be invalidated if this provision is not met.

The US Department of Energy has prepared a **Guidebook for Handling, Storing, & Dispensing Fuel Ethanol**, which contains very useful information. It is necessary for you to become familiar with these requirements. Special dispensing equipment and accessories are required on the tanks storing E85. When ordering equipment and accessories, inform your supplier that the equipment will be used for E85 storage, dispensing and handling.

The following is a summary of some of the points covered in the Guidebook, which is a very useful document. The book mentions Convault by name as one of the three AST manufacturers. You might also visit the National Ethanol Vehicle Coalition website at [www.e85fuel.com](http://www.e85fuel.com), which contains a lot of useful information about E85:

#### **Summary of E85 Ethanol Fuel Guidebook**

**Flammability.** At low temperature (32 °F), E85 vapor is more flammable than gasoline. (Page 7)

**Quality Assurance.** The hydrocarbon content of the fuel ethanol, Reid vapor pressure, water content and acidity should be checked every 1-2 months. (page 10).

**Material Compatibility.** Certain materials commonly used with gasoline are totally incompatible with alcohols. When these material come in contact with ethanol, they may dissolve in the fuel and damage engine parts. Watch for the following materials/conditions (page 11):

- Presence of particulate materials and unwashed gum may plug filters or damage engines.
- Dissimilar materials that come in contact with the fuel should not be coupled.
- Zinc, brass, lead, and aluminum are some of the metals that are known to become degraded by contact with ethanol.
- Non-metallic materials that degrade when in contact with ethanol include natural rubber, polyurethane, cork gasket material, leather, polyester-bordered fiberglass laminate, polyvinyl chloride (PVC), polyamides and methyl-methacrylate plastics.
- **Non-metallic** materials that **have been successfully** used with fuel ethanol include Buna-N, Neoprene (**Convault bearing pads**), polyethylene (**Convault poly**), nylon, Polypropylene, nitrile, Viton (**Convault drain valve washer**) and Teflon.

**E85 Storage.** E85 can be stored in aboveground and underground installations (page 12).

**Fire Codes.** Fuel ethanol falls under the same handling and storing requirement as gasoline within the provisions of NFPA 30 and 30A. (page 12).

**General Dispensing Equipment.** Avoid any components made from zinc, brass, lead, aluminum, or other soft metals. The fuel might cause leaching from soft metals, contaminating the vehicle's fuel system and potentially resulting in poor vehicle performance.

**In-line Filters.** A one-micron, inline filter is recommended for fuel ethanol dispensing equipment. (page 12).

**Dispenser Hoses.** For a Phase II vapor recovery system, a Goodyear Maxxim coaxial hose with stainless steel fitting has performed well. (page 12).

**Nozzles.** Aluminum nozzles should not be used with E85 and nozzles used with any aluminum alloy should be used with caution. (page 13)

**Piping.** Do not use conventional zinc-plated steel piping for fuel ethanol. (page 30).

**Pipe Thread Sealant.** Use Teflon tape or Teflon-based pipe thread compound. (page 13).

**Dispensers.** The Tokheim dispenser model No. 785 RC or No. 7552 (with a No. 898 piston-type meter) and two different-sized dispensers produced by Gasboy, model No. 9152 (1/3 hp) and 9153 (3/4 hp), are some of the dispensers that have been successfully used. The dispenser must use iron, un-plated steel or stainless steel in the fuel path. (page 13).

**Fuel Transport and Delivery.** The fuel provider should blend the fuel ethanol as E85 before distribution, either in the terminal tank or on the transport truck. (page 14).

**Handling Fuel Ethanol.** If refueling station is used less often than once a week, recycle the fuel contained in the hose between the nozzle and the filter. If E85 is in contact with the hose material for a long period of time, the hose may degrade and become a source of decontamination that cannot be trapped by the filter. (page 15)

**Electrical Conductivity.** The electrical conductivity of fuel ethanol is a measure of the fuel's quality. High conductivity is a sign of corrosiveness of the fuel and may indicate the presence of metal in the fuel, which could be the result of material or equipment degradation. (page 16).

**Safety.** Exposure to fuel ethanol can occur by breathing its vapors (inhalation), getting it on the skin or in the eyes (skin absorption) or accidentally swallowing it (ingestion). The symptoms of exposure to fuel ethanol may appear immediately as dullness of memory and concentration, impaired motor coordination and drowsiness, stupor and finally coma. (page 17).

**Specific gravity.** Specific gravity of E85 is 0.78, of gasoline 0.72 to 0.78 and of pure ethanol is 0.794.

If you have any questions, please do not hesitate to contact me.