

## Use of Liquid Oxygen for the Transportation of Live Catfish

Catfish are transported and sold live to processing plants or to live fish markets. Live markets include fee fishing operations and live fish stores that are generally concentrated in large urban areas. Such stores cater mostly to ethnic groups that buy live food fish. Liquid Oxygen is the most cost effective method of keeping large numbers of fish alive while transporting them in trucks. This is particularly true when transporting large fish such as market size catfish (1.5 to 3 lbs each) over long distances. The Oxygen is stored as a liquid in a dewar (tank) which may hold 4,500 cubic feet of oxygen and weigh close to 800 lbs. The liquid oxygen converts to a gas once it is injected into the transport water via air-stones or diffusion hoses. Regulators and flow meters are used to distribute and monitor the flow of liquid oxygen to the transport tanks.

Liquid oxygen allows the transport of 3 to 4, or more pounds of food size catfish per gallon of hauling water. Live haul tank loading rates depend on many factors such as the duration of time the fish spend in the tanks, the size and condition of the fish, water temperature and chemistry, and the outside air temperature. Depending on the weight and number of the catfish transported, the volume of the fish may take up to one third to one half of the total volume of the tank. Bottled oxygen gas, compressed air, or water agitators are typically used to haul smaller loads of fish for shorter durations. These may be used as a supplemental or a backup system for trucks carrying liquid oxygen.

Fish transport tanks are constructed of either aluminum or fiberglass material which is approximately  $\frac{1}{4}$  inch thick. A fish transport tank may hold 100 to 800 gallons of water depending on its size. The tanks are equipped with top lids for loading and large drains and chutes for off loading live fish. Ideally, cool (50-60°F) oxygenated well water is used to fill transport tanks. The use of insulated tanks is critical for fish that are transported long distances. Non-chlorinated ice may be added to the tanks during hot weather to keep the transport water cool. This reduces fish metabolism and increases the amount of dissolved oxygen the water can hold. Rock salt may also be added at a rate of 2 to 6 lbs per 100 gallons of hauling water to reduce fish stress.

A medium size fish transport truck using liquid oxygen can carry 6,000 to 12,000 lbs of market size catfish for 6 to 8 hours. Fish hauling trucks may range from a  $\frac{3}{4}$  ton pick up truck which can transport 100 gallons of water weighing 834 lbs to a tractor trailer that can haul 5,000 gallons weighing 41,700 lbs.

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