

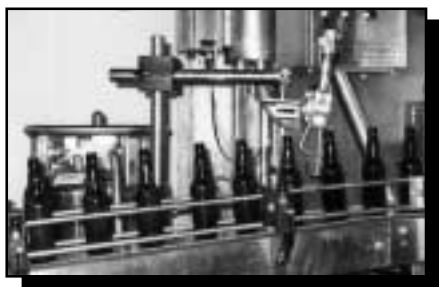
SPECIAL

A LINWELD Specialty Gas Division Newsletter

Spring 2003

CUSTOMER PROFILE: **"Flying Dog" has Gone Rabid with Foaming Desires**

In the ballpark neighborhood of downtown Denver, where you can hear the cheers of the baseball crowd and smell the steaming hot dogs, stands the home of the Flying Dog Brewery LLC. In 1990, the Flying Dog Brewery opened in Aspen, Colorado and became the first and only brewery in Aspen in over 100 years. It was also one of the first brewpubs in the Rocky Mountain Region. Shortly thereafter, the Flying Dog began bottling "Doggie Style" and won "The Best Pale Ale in America" at the Great American Beer Festival. By 1994 the Flying Dog out-brewed its facility in Aspen and moved to Denver to open at the Broadway Brewery. This facility allowed for national distribution and expanded the brewing capacity by nearly three fold from its Aspen origins. Over the next few years brews like "Road Dog", "Old Scratch Lager", "Snake Dog", "Tire Bite", and "K-9 Cruiser" were successfully introduced into the market. In 2000 Broadway Brewing closed and the Flying Dog Brewery opened in a newly renovated facility at 2401 Blake Street, its current location. This move, once again, met the mass demand of brewing the Flying Dog Litter of Ales by providing a 50% expansion



The filling and bottling process at the Flying Dog Brewery. Liquid nitrogen is introduced into each empty bottle utilizing a liquid nitrogen delivery system developed by VBS Industries

over the next three years. In 2001, after months of research, the Flying Dog introduced another excellent brew, "In Heat Wheat Hefeweizen". The Flying Dog Brewery produces eight different varieties of ale, and ships in refrigerated trucks to distributors in 29 different states. Since no preservatives are added to the ale, the Flying Dog, like most microbreweries, recommends keeping it below 50 degrees Fahrenheit.

According to Elis Owens, Blood Hound and Director of Quality Assurance at the Flying Dog Brewery, they package 20,000 cases of bottled brew each month and produce another 25% of the total volume in kegs. Those numbers make the Flying Dog Brewery the fourth largest microbrewery in Colorado and number forty-one among all breweries, in terms of volume sales, in the United States.

The Flying Dog Brewery incorporates a unique process to their bottling operation. In the filling cycle, a drop of LINWELD's liquid nitrogen is introduced into each empty bottle prior to filling. According to Owens, "the liquid nitrogen vaporizes and eliminates oxygen from the bottle during the filling process, leaving the O₂ content less than 100 parts per billion". Oxygen content is important, the lower the better. Owens says, "the nitrogen does not affect the taste but the purge and blanket stabilizes the flavor and gives us a longer shelf life". The Flying Dog Brewery places a "Best Before Date" on each bottle based on 120 days from the day the ale is bottled. The bottle line is a fascinating process to watch as 85 bottles per minute are filled, capped, and labeled. It takes each bottle about 20 seconds to go through the entire filling cycle.



Elis Owens (center) Director of Quality Assurance at the Flying Dog Brewery proudly shows Dale Wang (left) and Shannon Lind (right) of LINWELD the brewing process.

Owens continues, "The quality of our ale is continually monitored at each step of the brewing and packaging process. The brewing cycle requires a minimum of 17 days from start to finish, but quality does not end at the brewery. For the best taste, our brew should be served with a 2.45% to 2.60% CO₂ to liquid content. If the CO₂ content is more the ale will be too foamy, if it's less it will be too flat. With Flying Dog ale from kegs you can get the correct CO₂ concentration by using straight CO₂ or a blend of CO₂ / Nitrogen for dispensing, but never use straight nitrogen or air."

An ideal mixed gas is LINWELD's FoodPro™ FG415. It is a 25% CO₂ / 75% Nitrogen blend and you can push ale a long distance from the keg to the dispenser. The blended gas permits higher pressures and pushes the ale faster without adding an excess of CO₂. The rate of dispensing is very important when a pub is full of thirsty customers.

For more information about the Flying Dog Brewery go to their web site at www.flyingdogales.com. LINWELD is proud of our working relationship with the Flying Dog Brewery and our association with the Food and Beverage Industry.

...a note from the president.



According to experts, food science is defined as understanding the nature and composition of food materials and how they behave under a variety of conditions. Food technology is the application of this science.

Major universities and colleges have large departments dedicated exclusively to food science and technology. Private industry invests huge sums annually improving their products and providing society with high quality, safe, wholesome, nutritious, and attractive foods. The goal is endless as consumers request enhanced and more convenient food products. The ideal food would have a timeless shelf life, be very easy to prepare, look and taste delicious.

LINWELD is proud of our contribution and relationship with others in this large and increasing arena of food science and technology. Our goal is to provide the highest quality products and best technical assistance available to the food and beverage industry.

Charles F. Canterberry
President, LINWELD

CO2 Safety Systems

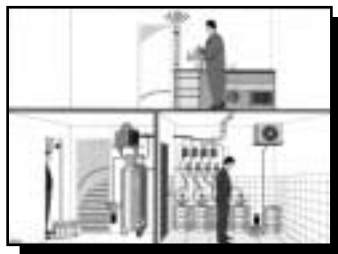
Attention all carbon dioxide users. LINWELD offers an MVE Carbon Dioxide Safety System that provides accurate monitoring of CO2 levels to insure the safety of your working environment. The unit is designed to detect increases in CO2 gas concentrations.

Carbon Dioxide is a colorless, odorless, slightly acid gas, which normally comprises 0.04% (400 ppm) of the air we breathe. However, CO2 gas does not support life and in concentrations above 3% has suffocating effects causing symptoms such as headache, sweating, rapid breathing, increased heart rate, shortness of breath or dizziness. Air containing as little as 2.5% CO2 will extinguish a burning candle. Air having CO2 concentrations higher than 5% can cause unconsciousness or death within a few minutes. CO2 concentrations above 20% can cause death within a few seconds. CO2 gas is heavier than air, so high concentrations will be found in lower spaces of confined areas or in basements posing a risk of suffocation to anyone in those areas.

The MVE CO2 detection system is a precision instrument comprised of one central display unit and up to four sensor

units each using microelectronic components. The central unit supplies power to the sensor units. The system also provides visible and audible indication of CO2 levels and temperature at the remote sensor locations. The remote sensors use an infrared sensor for detecting CO2. An integrated temperature sensor can also be activated to monitor temperature at the sensor's location. This is a plus when monitors are placed in cool-rooms where beverages are stored for dispensing.

LINWELD recommends the use of CO2 gas monitoring equipment where CO2 systems are in use. For more information on the MVE Carbon Dioxide Safety System contact your LINWELD representative or call your nearest LINWELD store.



A typical Carbon Dioxide Safety System installed to insure the safety of the working environment.

The LINWELD family was shaken this fall by the unexpected death of one of its own. Jim Stevick, a Specialty Gas Sales Representative in Kansas City, Missouri, was killed on September 20, 2002, when a tire came off a tractor-trailer and crashed into his vehicle as he traveled to work.

Jim was a science teacher at Liberty High School for 33 years, retiring in 1999 as head of its Department of Science. After retirement, he joined LINWELD and contributed his knowledge and expertise to the Specialty Gas Department. Jim was an avid tennis player and a devoted life-long learner and teacher. Friends and colleagues have described Jim as a generous person and an extraordinary teacher.

Jim is survived by his wife, Gaye, a French teacher at Liberty High School. He also left behind his son and daughter-in-law, Scott and Stephanie Stevick; two grandsons, Keilyn and Daegan; his mother Wilma; and a sister, two brothers, and their families. In memory of Jim, the James D. Stevick Teacher Scholarship has been established in care of Pony Express Bank in Liberty.

We continue to miss Jim's character, passion, and commitment and acknowledge the void created by this loss.



FOODPRO™

Food Grade Gases by LINWELD

Providing Gases to the Food and Beverage Industry

Did you know that the Food and Beverage Industry is a huge consumer of pure gases and specially designed gas blends? Everyone is familiar with carbon dioxide and the fizz it creates in soda pop and other beverages. The desire for carbonated beverages was the beginning of a long and lasting relationship between food & beverage products and gases. Over the years this relationship has grown and developed into a sophisticated science that continues to improve the quality of our lives.

In addition to carbonating and dispensing beverages for the beverage industry, large quantities of cold CO₂ (-109° F) or even colder liquid nitrogen (-320° F) are used to provide refrigeration to the food industry. The refrigeration application may be chilling food products or individual quick freezing (IQF). Mechanical refrigeration systems typically take 3 to 4 times longer to provide the same refrigerating capacity as cryogenic fluids. Cryogenic food freezing tunnels are used to freeze everything from meat cuts, fish fillets, poultry products, seafood, appetizers, ice cream, bakery products, hamburger patties, pizzas, ethnic foods and ready to eat meals. This process is so popular that LINWELD constructed a permanent research and development laboratory for food products. The laboratory includes a continuous process cryogenic freezing tunnel. Customers can experiment with their unique food products and actually run samples determining production rates and unit costs. After the food is processed it may require transportation under a controlled temperature. Once again, cold gases can provide the refrigeration.

Food products typically begin to degrade immediately on contact with air. This is a result of physical, enzymatic, microbiological, and

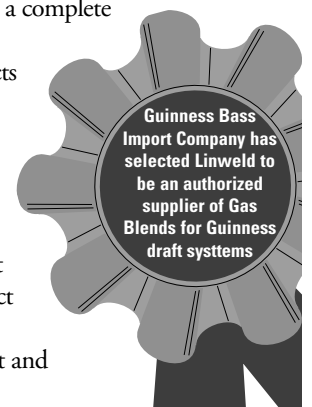
biochemical deterioration. These spoilage mechanisms can be retarded through the use of modified atmosphere packaging (MAP). MAP is replacing the air in the packaging process with the ideal atmosphere for that particular food product. This ideal atmosphere will normally provide an extended shelf life of 2 to 5 times that of an air environment. It will also preserve taste, color, aroma, flavor, and freshness, as well as appearance and texture. Another plus for MAP is the elimination of other, less friendly preservatives. The gases that are commonly used for modified atmosphere packaging are carbon dioxide, nitrogen, and oxygen. Carbon dioxide has a very powerful inhibitory effect on the growth of spoilage bacteria and molds, especially in the absence of oxygen. That is why pure carbon dioxide or carbon dioxide in combination with nitrogen is a major gas used in MAP applications. Nitrogen is used to displace the air and replace oxygen from the package. This prevents the oxidation of pigments, flavorings and fatty acids. Oxygen is usually an undesirable element in most MAP applications. However, oxygen is added as a major component in some gas mixtures. It is used in particular for maintaining the red color of meat. It can also prevent the proliferation of strictly anaerobic organisms in fresh fish. Argon is becoming a popular MAP gas, replacing nitrogen in the use of protecting and dispensing wine. Argon is considerably heavier than nitrogen so it does a better job of protecting fine wine. LINWELD has worked with several food processors developing the ideal atmosphere for their application. This can become a proprietary ingredient for their process. Modified atmospheres are available as pure gases or gas mixtures in gas cylinders or from a bulk supply. Several gas cylinders can be



connected together through the use of a gas manifold. This increases the supply volume available and provides a continuous and uninterrupted gas flow. If the volume warrants bulk supply, the gases can be blended to the desired concentrations and appropriate tolerances on site. This is done by utilizing gas mixers specifically designed for modified atmosphere food packaging. In all cases, the gas blend can then be piped directly to the food packaging equipment.

LINWELD assists the food and beverage industry in a wide variety of additional applications. Oxygenation of water for fish farms allow for the breeding, hatching, and rearing of fish in higher than normal fish densities. Oxygenation is also used to safely transport live fish. Purging and blanketing food products, both liquids and solids, with an inert gas can eliminate damage and provide shelter from future harm. This is especially significant when bulk foodstuff is stored. Pressurizing flexible packaging like plastic bottles with nitrogen will allow the container to remain rigid and not crush. Pressurizing cans containing non-carbonated beverages will support the can and not permit it to deform. Thinner lighter-weight packaging material can be used reducing the overall cost of packaging. Meat processors can use gas mixtures for stunning animals prior to slaughter. This reduces stress and improves the animal's condition and ultimately, the quality of the meat. Carbon dioxide at higher concentrations can be used to eliminate insects present in dry food products, without the use of toxic chemical pesticides. Some other gases like anhydrous ammonia, n-butane, and propane play a major role in reducing the fat content from meat and meat byproducts.

LINWELD offers services and FoodPro™, a complete family of food grade gas products for the food and beverage industry. If you have questions regarding a food application don't hesitate to contact LINWELD for technical support and quality products.



LINWELD