Packaging a carbonated product into either glass, aluminum bottles, aluminum cans or pet containers requires a specialized piece of equipment called a counter pressure filler. In order to transfer a carbonated beverage from a vessel where it is stored, into a container, the container must first be sealed upon then pressurized. In its simplest configuration a counter pressure filler charges the container with CO2 (counter pressure) to the same pressure as the vessel in which the product resides, then fills it with product, then the counter pressure is relieved (allowed to escape to the atmosphere in a controlled manner) then the container is closed (capped or crowned). Filling in open air or into an unsealed container is not a proper method of filling a carbonated product.
because of the propensity for dissolved oxygen pickup and CO2 loss.

There are a number of different configurations of counter pressure filler. A very basic one is made up of a combination of hoses and manually operated valves which allow the operator to seal on the container, counter pressure the container, fill the container, vent the counter pressure to atmosphere and unseal the container.

The next more elaborate type is the table top filler (see figure 1). This counter pressure filler only requires the operator to insert the container or containers and actuate a switch whereupon the valve(s) descends upon the container(s) charges the container(s) with CO2, fills the container(s), vents the container(s) to atmosphere and unseals and ascends.

After the basic tabletop counter pressure filler there is the automatic in-line (see figures 2 thru 5) and rotary counter pressure fillers. The in-line configuration is simpler than the rotary configuration but is limited in the number of containers it is practical to fill per cycle. The rotary is a much more complex filler (and a more expensive filler) but it can fill many containers at very high speeds. Basically, the rotary configuration allows for time sharing. That is by growing the circumference of the filler to accommodate the number of valves required per revolution in order to achieve a certain speed each container has an equal time to go through its cycle. In this manner speeds of 4000 cans per minute are routinely achieved with these fillers. However, the cost of these fillers can be in the millions of dollars each.
Most modern day counter pressure fillers have been enhanced to include double pre-evacuation. Most carbonated beverages are negatively affected by oxygen. If there is oxygen present in these beverages it will, in a very short time, at the very least, change the flavor profile of that beverage and at most cause the beverage to go bad. Double pre-evacuation is a process whereby oxygen is removed from the container to prevent this from happening. This process removes 99.9% of the oxygen present in the container when it enters the filler.

Double pre-evacuation is the process of evacuating the air from the container to be filled with a product, prior to filling the container. There are two components to this. The first is air pickup during the fill process. The second is headspace air. Both of these must be dealt with. The first is addressed with double pre-evacuation. Basically, the container is sealed, evacuated, charged with an inert gas, evacuated a second time then charged with an inert gas a second time then filled. The result of all this is to remove 99.99% of the air in the container at the start of the cycle. This process protects the product placed into the container from the effects of oxidation. The second is addressed in one of two ways. For a carbonated beverage, the product should be foaming when the package is crowned (or capped). For a non-carbonated beverage the headspace air should be evacuated just prior to corking or capping. Oxidation can harm the product at a minimum by severely impacting its flavor profile and at a maximum by destroying it entirely, making it unfit for human consumption. The effects of oxidation can occur quickly, in as little as a week or two. Oxidation affects carbonated and still products equally and the results are generally bad. The oxidation of tea beverages such as tea and green tea and alcoholic beverages such as beer, wine and sparkling liquor progresses with the passage of time after their production, so that their flavor gradually deteriorates.
This is mainly due to oxygen entering these beverages in the process of their production. In the case of beer, for instance, if only an extremely small amount of oxygen enters the beer during its production process, the oxygen molecules are partially reduced by electrons transferred from metal (Fe, Cu) ions existing in the beer in its preserved state so that active oxygen is produced. The active oxygen oxidizes a variety of ingredients in the beer, such as isohumulone and alcohols, and generates aldehydes, which is the cause of aging odor, thereby deteriorating the flavor.

There are other methods of removing air from a container. There is nitrogen or carbon dioxide sparging and there is the liquid nitrogen drop. Both of these methods remove some of the air from the container but since it does this in the atmosphere, air is free to return and it does. The only way to remove 99.99% of the air from a container and be sure it remains removed is double pre-evacuation of a sealed container. If you want great shelf life for your product, double pre-evacuation is the only way to get it.

As stated previously, there are basically two configurations of counter pressure filler. A rotary configuration and an in-line configuration and each has its benefits and its shortfalls. The rotary filler in general is faster primarily because of the large number of valves. However, there are costs associated with this speed. The first cost is the fact that when something goes wrong a large number of containers are lost because the machine cannot be stopped immediately. It must be brought to a stop through a number of revolutions resulting in the loss of those bottles filling at the time. Another cost associated with the rotary filler is the fact that its time
functions (pre-evacuation, CO2 charge, snift) are all based upon hard cams and an ideal speed. In other words, there is only one speed that a rotary travels that has the correct operating times. At every other speed, the times are different. Another cost is complexity. The rotary is by its very nature a much more complex (and expensive) machine. Another cost is associated with its higher speed. In order to operate a rotary at its optimum speed (obviously, there is no point in getting a rotary and then running it slowly, this would defeat the whole purpose of getting a rotary in the first place) a great deal of support must be provided. This support can be in the form of automated equipment such as un-casers, single filers, case packers and automatic palletizers (at great additional expense) or it can be in the form of labor (a great deal of it but only when operating the filler). There is another benefit to the rotary filler. The time between filling and capping or crowning is very short.

The in-line filler (see figures 2 thru 5) is limited in the number of valves it can accommodate. This limits its speed. There is also a time delay between filling and capping or crowning. This is only important for those fillers without double pre-evacuation and a fobber or CO2 flush for those products sensitive to oxidation. A little explanation is in order here. Double pre-evacuation assures extremely low dissolved oxygen pickup in the product and a fobber and a CO2 flush assures that the headspace air is expelled prior to capping and assures “capping on foam”. The two together assure that each bottle of product will have maximum shelf life without oxidation affecting the flavor profile. The benefits of an in-line are its simplicity (low cost) and its flexibility. It can be made to accommodate a large range of container types and sizes. It can be made expandable by adding valves as the need arises. Another benefit is its
adjustability of function times such as pre-evacuation, CO2 charge, snift. These times once set, repeat time after time after time. This means that the machine operates with all function times set at optimum, permanently. And if there is a reason to change one or more of the function times, this can be accomplished while the machine is operating. However, that’s not all. There are functions which can be added to an in-line which cannot be added to a rotary such as a pre-snift pause. Sometimes it is necessary to run product that is not at the optimum operating temperature. When this happens the product often wants to foam over causing “short fills”. A pause prior to snifting will often calm the product and prevent this foaming. And if something should go wrong, an in-line can be stopped at any time during a cycle with very little lost product.

There are some subtleties involved in carbonated filling. The product temperature should be as close to freezing as possible but should not be freezing. The CO2 flow rate should be capable of very high volume or a buffer tank should be installed between the CO2 source and the filler surge tank.

CARBONATED PRODUCT TRANSFER METHODS

There are basically two methods for transferring a carbonated product from one vessel to another (from bright tank to filler surge tank). The first method is to use
a higher CO2 pressure in the source vessel. When this method is used a two way (on/off) solenoid valve must be installed at the receiving vessel in order to stop the flow when a pre-determined volume or a pre-determined level has been achieved. There is one exception to this rule which I will cover later.

The second method is by pumping. If product agitation is a consideration, then the type of pump is important. A sanitary, open impeller, centrifugal is the pump of choice. Under no circumstances use a double diaphragm pump as this tends to oscillate the product in the hose causing a great deal of agitation and causing the CO2 to come out of solution. When a pump is used as the transfer method, a check valve must be installed at the receiving vessel in order to prevent the product from backing up into the source vessel when the pump is turned off.

Now we'll discuss the exception to the need for a two way valve on the receiving vessel when pushing the product with CO2 is the transfer method. If the receiving vessel is fitted with a set of float valves such that the high float is connected to a source of CO2 such that when the float is at the high level it allows full flow of CO2 and when it is at the low level it shuts off the flow; and the low float vents CO2 when it goes low. In addition product is connected to this receiving vessel at a fixed pressure in the source vessel. The way this works is when the low float goes low, in effect calling for product, CO2 is vented off lowering the overall pressure in the receiving vessel below the pressure in the source vessel causing product to flow into the receiving vessel. This condition continues until the high float goes high, calling for product flow to stop. When the high float goes high it opens a valve to the CO2 source which pressurizes the receiving vessel to an equal pressure to the source vessel thus cutting off product flow. This process is continuously repeated to automatically maintain the proper product level (between limits) in the receiving vessel.
CO2 CALCULATIONS

Let's take a typical 12 oz bottle. For the purposes of charging with a gas, the bottle is actually 13 oz and the charge time is typically 1 sec.

A 1 sec charge time of 13 oz @ 30 psi = 780 oz/min = .815 cfm /60=.0136 cfs @30psi, converting to standard temperature & pressure (30+14.7=44.7/14.7) = 3.04 /(299.8/274.8 (1.091)) = 2.79*.0136 cfs @ std temp & press =.0379 scfs*60 = 2.28 scfm *60 =136.8 scfh*.1234=16.88#/hr. This is the instantaneous rate of flow for one second for one 12 oz bottle. 16.88#/hr X 6 = 101.28#/hr X 2 = 202.56#/hr

This flow rate requirement can be reduced by installing a 3cuft buffer tank or 2 half bbl kegs

Reference Calculation Output

CO2 Requirement 17#/Hr/valve 102#/Hr for a six valve machine *2=204#/hr Supply = (say) 15#/hr/.1234 121.55scfh/60min 2.025 scfm/60sec .0338 scfs *12 secs is .405 cf - REQUIREMENT -

Cuft/hr 17/.1234= 137.763
Cuft/min 137.763/60= 2.296
Cuft/sec 2.296/60= 0.038
Cuft/sec for 6 valves .038*6= 0.23
REQUIREMENT -
Cuft/hr $102/.1234= 826.580$
Cuft/min $826.58/60= 13.776$
Cuft/sec $13.776/60= 0.230$

SUPPLY -
#'s/hr/$.1234= cf/hr 50/.1234= 405.186$
Cf/hr/60=cf/min $405.186/60= 6.753$
Cf/min/60=cf/sec $6.753/60= 0.113$

Amt deliv by buffer tank 1st time $.230-.113= 0.117$
Amt buff tank depleted $3-.117= 2.883$
Expansion ratio $.117/2.883= 0.041$
Pressure drop $.041*30= 1.230$
Residual pressure $30-1.23= 28.770$

Amt deliv by buffer tank 2nd time $.230-.226= 0.004$
Amt buff tank depleted $2.883-.004= 2.879$
Expansion ratio $.004/2.879= 0.001$
Pressure drop $.001*28.77= 0.029$
Residual pressure $28.77-.029= 28.741$
Recovery time in secs (30-28.741)/.113= 11.142

CAPACITY OF CO2 SOURCES WITH A VAPORIZER:

A Charter Industries Carbo Max dura cylinder (1000 HF) is capable of supplying up to 60#/hr of continuous use for up to 12 hrs. However, at this high rate a vaporizer is necessary to warm the CO2 to a usable temperature. The Carbo Max series is only capable of delivering vapor.

A Charter Industries Perma Cylinder (2000) is capable of supplying up to 125#/hr of continuous use for up to 12 hrs. However, at this high rate a vaporizer is necessary to warm the CO2 to a usable temperature. The Perma Cyl is capable of supplying either vapor or liquid. When used to supply liquid CO2 in conjunction with a vaporizer, the output of the Perma Cyl is doubled. Thus a much smaller Perma Cyl such as the 1000 HP which has a peak flow rate of either vapor or liquid (12 hrs continuous) of 60#/hr when supplying liquid in conjunction with a vaporizer the vapor output can be up to 120#/hr.
VACUUM CALCULATIONS FOR EVACUATION
AND THE DIFFERENCE BETWEEN A LIQUID RING
VACUUM PUMP AND A VENTURI VACUUM PUMP

Q=V x Ln (P1/P2)

Where:

Q = Total amount of air to be removed

V = Volume of reservoir plus connecting pipe in cuft

P1 = Initial absolute pressure in Torr (mmHg A)
P2 = Required absolute pressure in Torr

Ln = Natural logarithm

Let’s use six 12oz bottles as our volume which in this case would equal 6x13oz=78oz = .081 cuft

Atmospheric pressure in Torr is 760
25” of Vacuum = 120 Torr
760/120=6.333
Ln 6.333=1.846
1.846 x .081 = .149 cuft/min

We want to evacuate the bottles in 1 sec therefore we multiply by 60
.149 x 60 = 8.97 cuft / min

Basically we need a vacuum pump capable of approximately 10 ACFM

Most single stage, liquid ring vacuum pumps with a 1-1/2 HP motor are capable of 10 ACFM.

As the following specifications plainly show a venturi vacuum pump is less capable than a liquid ring vacuum pump but since cost is always a consideration, the venturi pump is better than no pump at all.

<table>
<thead>
<tr>
<th>Model #</th>
<th>Air Consumption (SCFM) @ 80 PSI</th>
<th>Vacuum Flow (SCFM) VS. Vacuum Level (&quot;Hg) @ 80 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP8 0-200 H</td>
<td>7.80</td>
<td>0&quot; 3&quot; 6&quot; 9&quot; 12&quot; 15&quot; 18&quot; 21&quot; 24&quot; 27&quot; 28&quot;</td>
</tr>
<tr>
<td>VP8 0-250 H</td>
<td>12.50</td>
<td>0&quot; 3&quot; 6&quot; 9&quot; 12&quot; 15&quot; 18&quot; 21&quot; 24&quot; 27&quot; 28&quot;</td>
</tr>
<tr>
<td>VP9 0-300 H</td>
<td>22.00</td>
<td>0&quot; 3&quot; 6&quot; 9&quot; 12&quot; 15&quot; 18&quot; 21&quot; 24&quot; 27&quot; 28&quot;</td>
</tr>
<tr>
<td>VP9</td>
<td>H</td>
<td>0-350 H</td>
</tr>
<tr>
<td>-----</td>
<td>---</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>28.00</td>
<td>28.00</td>
</tr>
</tbody>
</table>

THE DIFFERENCES BETWEEN CAN & BOTTLE FILLING
The main differences between can and bottle filling is the fact that a can does not have a neck as does a bottle and the bottle has the strength to withstand evacuation. The neck of a bottle allows the carbonated product to gently cascade down into the bottle with very little agitation. The strength of the bottle allows double pre-evacuation to occur at high vacuum levels making it very efficient. However, there is a way of evacuating a can, albeit with a lower vacuum level, by pressuring the can with carbon dioxide at the same time as the evacuation is taking place. The pressurized carbon dioxide provides support for the thin walled can while the vacuum evacuates the combination of air and carbon dioxide.

The fact that a can does not have a neck means that it cannot be filled with a typical short tube filler. Instead, a special short tube can filler valve is used which causes the product to cascade down the sides of the can.

There is another difference between the can and bottle. The size of the opening. With a bottle, foam filling the neck of the bottle and extending slightly from the mouth prevents air from re-entering the bottle. A can, on the other hand, has a much bigger opening and the foam cannot be depended upon to prevent air from re-entering prior to seaming. What is required in this instance is a carbon dioxide flush or a vacuum environment during the seaming process.
The manufacture of a carbonated soft drink includes a source of clean water, whatever flavor elements are used to establish the flavor profile, sugar or other sweeteners and any coloring agents and preservatives that are intended to be added. All of these elements are added together in a stainless steel vessel fitted with a mixer and mixed. This stainless steel vessel must also be capable of being pressurized to at least 15 pounds per square inch (psi) and of being cooled via a cold room or a jacket which wraps around the periphery of the vessel starting from the bottom and going partway up the tank walls and a glycol chiller. A carbonating stone assembled within the bottom of the stainless steel vessel and a source of carbon dioxide will also be required. After mixing the recipe, the mixture is cooled to about 34 degrees and the vessel pressurized to 15 psi after which carbon dioxide is bubbled in via the carbonating stone connection. Depending upon the volume of liquid in the tank carbonating to 3 to 3.5 volumes will take anywhere from two hours to overnight.

There is a second method whereby the product is pre-mixed in a non-pressure vessel then pumped through a heat exchanger where it is cooled to 34 deg F by a glycol chiller, then passed through a point carbonator (or two point carbonators depending upon the number of volumes of CO2 necessary) then into a surge tank. A point carbonator is a device which inserts CO2 into the product as it flows through it.
Both of the above scenarios are termed “Batch” processes. In the world of Coke and Pepsi the mixing and carbonating steps are carried out automatically in a “continuous flow” process utilizing very sophisticated (and expensive) equipment. The next step for the first two scenarios above is packaging the product into either glass or pet containers.

**BOTTLE AND CAN RINSING**

(SEE FIGURE 9)

Rinsing (see figure 10) the container prior to filling is important for a number of reasons. During storage of bottles and cans cardboard dust and other airborne particles will often settle into the containers. In addition, various types of vermin can readily find their way into but not out of your containers. Lastly, some of the airborne particles can be contaminants of one type or another. Rinsing with a mild chlorinated solution such as most cities’ water is a good safety measure. PPM manufactures a number of rinsers ranging from a simple table top to an automatic in-line to a twist rinser. The automatic in-line is adjustable for different size bottles and cans. The twist rinser requires different twists for different sized bottles and requires an elevated and inclined twist for cans.
CIP stands for clean in place. Basically, it is a procedure for cleaning and sanitizing a filler.
without taking it apart. This is accomplished by exposing all the wetted parts (all the parts that the product touches) first to Hot water (180 deg F) rinse for 15 minutes then a Hot Caustic (160 deg F) 2% to 3% Solution, wash for 30 minutes. Then Hot water (180 deg F discharge temperature) sterilize for 30 minutes after achieving the required discharge temperature. (Or sterilize by using a Stabilized Chlorine Dioxide activated by Phosphoric Acid (19 parts Chlorine Dioxide to 1 part Phosphoric Acid) by filling the entire filling system with the solution and leaving it in for at least 40 minutes. If CIP is done the day before then the sanitizing solution should be left in the machine until ready for filling when it should be drained, rinsed and chilled with cold water prior to bringing in the product.) Return the filler to its normal state for filling, being careful to sanitize all reconnections. Cold water rinse in preparation for filling. When the filler has achieved the necessary cold temperature prior to bringing in product implement the purge which will dump the tank and hoses of water.
"Flash" pasteurization is a process that brings the product up to a certain temperature very quickly and then cools it very quickly. It is based on the idea you don't need to "cook" a product for a long time in order to successfully kill the organisms. Rather, if you just expose the organism briefly to its worst heat, it will die and the product flavor won't change significantly.

The trouble with "flash" pasteurization is that it is intended to achieve a "5-log kill step." If for some reason, the product heats unevenly OR the equipment doesn't work right OR the strain of organisms is more heat resistant OR the product...
has different levels of acidity, sweetness, etc. Flash pasteurization is more likely to end up with contamination than other forms of pasteurization, specifically because the margin for error is smaller. Likewise, though FDA is trying to validate different methods of pasteurization and organism reduction, the reality is that these new methods of pathogen-reduction are not necessarily all backed by unbiased government science with the organism in the product that is being made.

In addition to the above, flash pasteurization requires aseptic filling. This is a much more stringent (and expensive) method requiring a sterile environment for the entire fill process.

**High-Level Disinfection with Hot Water Pasteurization**

Pasteurization is a process that destroys microorganisms in a liquid medium by application of heat. Louis Pasteur first applied this process to wine making to prevent microbial spoilage, and pasteurization is currently used for the preservation of milk and many other food products. Pasteurizing temperatures in the range of 55–75°C will destroy all vegetative bacteria of significance in human disease, as well as many fungi and viruses.

The **PPM Batch Pasteurizer** is capable of a programmed thermal ramp where the temperature change per unit time is programmed and also a dwell time at a specific pasteurization temperature is programmed. This flexibility in conjunction with a dense spray assembly assures complete pasteurization of each and every batch.

The bottles or jars are fed in on the powered conveyor filling the unit to capacity. Thereupon, the
doors are closed and the process begins. Heated water is sprayed over the containers heating them evenly and thoroughly. The containers temperature is ramped up at a rate which is safe for the glass containers. When the pasteurization temperature is reached, this temperature is maintained for the duration of the dwell time after which the containers are cooled at a rate which is also safe for glass. When the final chilled temperature is reached the machine shuts down and is ready for unloading. The same powered conveyor feeds the bottles or jars out. After unloading is complete the unit is ready for another batch.

The **PPM Tunnel Pasteurizer** is made up of a number of modules (zones) each with its own pump, spray assembly, heat exchanger and temperature controller. The speed of the conveyor belt in conjunction with the heated spray assemblies determines the rate of heating of the containers. The temperature ramps up within each zone and also from zone to zone until the pasteurization temperature is reached. It then maintains this temperature for the proper dwell time after which the cooling cycle begins. All of this happens on a continuous basis as the containers are moving through the pasteurizer on the conveyor belt. The tunnel pasteurizer has the greater potential for speed between the batch pasteurizer and the tunnel pasteurizer.
Cold glue labelling has definite advantages over pressure sensitive (see figure 9) when it comes to cold, wet bottles although there are glues for pressure sensitive labels which permit application on cold, wet bottles. In general, however, cold glue works better with cold, wet bottles and the labels are less expensive to purchase. That’s the only advantages I know of for cold glue labelling. That’s the upside. The down side is the cost of the labeler at two to four to ten times that of pressure sensitive, the preparation before and cleanup afterwards and the fact that you have to deal with pre-cut labels which may or may not be precisely cut (If they’re not, the machine will feed multiple labels at times causing havoc with your labelling).

Ok, let’s deal with the “cold, wet bottle” issue. By labelling before filling the bottles are not cold and wet. As for the cost difference. By purchasing in quantity the unit price can be brought closer to that of cold glue labels. And the difference that remains must be weighed against the man hours of preparation and cleanup (especially cleanup) of the cold glue labeller. The basic pressure sensitive
labeler is easier to operate than its cold glue counterpart and it’s ready whenever it has labels on it and the labels adhere better. Cold glue labels are easy to get off. Pressure sensitive labels are not. In fact they’re almost impossible to get off short of scraping them off.

So, let’s summarize. The pressure sensitive labeler is less expensive to purchase, easier to operate and a lot less messy. Yes, the labels cost more but you will have less man hours of preparation and cleanup and more up time with the pressure sensitive labeler. This should more than make up for the difference in cost per label.

5) Oh yes, there is something else. The pressure sensitive labels are generally much better looking.

They have much greater eye appeal and give the product a much more qualitative look. It’s my humble opinion that pressure sensitive labelling is a much better choice all the way around.

BOTTLING BUDDY
(see figures 4 & 5)

The Bottling Buddy Series must be configured to accommodate a particular size bottle, ie 12 oz longneck. That means the valves are spaced apart by the equivalent of one bottle diameter. If a different bottle size is required the valves must be moved to the spacing of that particular bottle diameter.
Once the valves are properly set, the bottles feed in on the back conveyor where they are counted. When the proper count is reached the indexing mechanism moves the bottles to the table between the back and front conveyors where the valves descend and seal upon them. The pre-evacuation and fill cycle begin then.

While that set of bottles is being filled, another set is feeding in to be ready to be indexed as soon as the fill cycle is completed. In that manner there is no waiting for the next set of bottles to feed into position.

**BOTTLING BUDDY CHANGEOVER FROM ONE BOTTLE SIZE TO ANOTHER OR FROM BOTTLE TO CAN**

On the Bottling Buddy the valves are mounted on a slotted platen with two bolts per valve. This allows them to be moved left and right by loosening the bolts and moving the valves or it allows them to be replaced by can valves in the same manner (when removing and replacing valves air lines with push to connect air fittings and hoses with hose clamps must also be removed and reconnected). Each valve can be adjusted vertically by moving two shaft collars (by loosening a bolt, moving the shaft collar and tightening the bolt) mounted on the double ended shaft of the valve actuating cylinder. Once an operator has gained familiarity with the machine this process can be carried out within two to three hours for a six valve machine.

**BOTTLING BUDDY CAN & BOTTLE FILLER OPERATION**

The bottles or cans are “dumped” onto the infeed table (see figure 8) where they are single filed onto
the labeler. If they are bottles, they are labeled. If they are cans they merely feed through. The bottles or cans then feed into the rinser where they are rinsed after which they enter the filler/crowner/seamer. If they are bottles they are filled and crowned and bypass the seamer on the way to the out feed table. If they are cans they are filled and seamed bypassing the crowner and then feed out onto the outfeed table. If tunnel pasteurization is a consideration, the tunnel pasteurizer must follow the filler/closer. The tunnel pasteurizer will feed onto the outfeed/accumulation table. At this point the bottles or cans can be manually loaded into trays and placed onto the shrink wrapper after which they are manually palletized.

**THE BOTTLING BUDDY JR**

(see figure 2)

The **Bottling Buddy Jr** is essentially the same as the **Bottling Buddy** except it is not modular and is limited to six valves and one crowner or seamer or both. It is our most economical automatic filler.

**SHRINK WRAPPING**

In order to do shrink wrapping I presume the cans or bottles will be placed into trays. This requires a tray packer which can be done automatically or by hand. We manufacture a drop packer which will accommodate cases or trays and both bottles and cans. Once the cans or bottles are in the tray the
filled tray is conveyed to the shrink wrapper. After the shrink wrapper the trays are palletized either automatically or by hand.

Figure 1 TABLETOP FILLER
Figure 2 BOTTLING BUDDY JR BOTTLE FILLER/CROWNER

Figure 3 EPIC XT
Figure 4 BOTTLING BUDDY BOT/CAN FILLER 1

Figure 5 BOTTLING BUDDY FILLER/CROWNER 1
Figure 6 5 LITER CAN FILLER/BUNGER

Figure 7 ROTARY INFEED/OUTFEED TABLE
Figure 8 PRESSURE SENSITIVE LABELER

Figure 9 AUTOMATIC RINSER
Figure 10 SIX ZONE TUNNEL PASTEURIZER

Figure 11 SIX ZONE TUNNEL PASTEURIZER
Figure 12 SIX ZONE TUNNEL PASTEURIZER