

## INTRODUCTION

The following manual is intended to provide you, the Melrose sales representative, a familiarity with some of the terms used in soft drink plants and provide a general understanding of what goes on in a soft-drink operation. The last section contains a general set of procedures and product recommendations for cleaning the various areas and equipment in soft drink plants.

A review of this manual and the additional material available through Melrose technical services on bottle washing and chain lubrication should enable you to make effective sales calls on a soft drink bottling/canning operation, including specific product recommendations and proposals when necessary.

Additional information and assistance is always available through the Food Division for more details on specific problem areas which may be encountered.

There are approximately 2000 plants throughout North America engaged in the bottling and/or canning of soft drinks. The license or legal right to produce a certain brand is essentially owned by the parent company (i.e. Coca-Cola, Pepsi-Cola, Seven-Up, etc). The parent company also specifies the sales and distribution territory for each of the individual "franchise" plants. The license to produce a parent company's brand is contingent upon the fact that the individual plant is able to meet established product specifications and certain standards of sanitation and Good Manufacturing Practices as outlined by both the parent company and provincial/federal health regulatory agencies.

In some cases, a number of bottling plants may be owned by a large corporation. These corporations may be exclusively involved in soft drink manufacturing or hold business interests in a variety of industries and own/operate these plants as a way of diversifying their interests.

Melrose Chemicals has contracts and discount arrangements with some of these multi-plant corporations based on volume purchasing. If you need to know which specific plant in your area is part of a large chain and if a contractual arrangement exists, the Food Division would be able to provide this information.

Generally speaking, soft drink parent companies outline standard procedures and guidelines for sanitation, housekeeping, and bottle washing. They **do not** specify chemical suppliers or individual supplier's products.

As a Melrose representative, you can offer a soft drink facility products for all phases of their operation. These areas include:

I. Production Related Products.

1. Chain lubrication.
2. Bottle washing compounds.
3. Lubricants for production equipment.

II. Cleaning and Sanitising.

1. CIP cleaners and sanitisers - internal cleaning and sanitising of production equipment.
2. General Cleaning - external cleaning of production equipment, floors, walls, etc.

III. Boiler water and Cooling Tower water treatment.

## **PROCESSING PRODUCTION**

The production of a soft drink begins with the preparation or "batching" of a thick, high-solids syrup. This syrup is made in a stainless steel tank by the blending of a flavoured concentrate containing various artificial and natural flavours (the concentrate is manufactured by and purchased from the parent company by the individual bottlers), sodium benzoate (preservative), sugar, and treated water. This syrup is checked by plant quality control for conformance to established parent company standards and then pumped to the proportioner in the filling area. At the proportioner, the syrup and treated water pass through pre-set orifices at a constant rate of flow and are blended at a ratio of approximately 1 part syrup to 5 parts treated water. The product is then pumped to the chiller/carbonator to produce the final soft drink of the proper carbonation and fed to the can or bottle filler. During the carbonating process the soft drink is chilled to approximately 2 - 5°C to prevent foaming during the filling process.

Returnable bottles to be filled are usually hand fed by the case onto a conveyor which carries the cases of empty bottles to the uncaser. The uncaser removes the bottles from the cases and places them onto the empty bottle conveyor. From the uncaser, the conveyor carries the bottles to the bottlewasher where they are immersed in a 3-5% hot caustic solution for a specified time period and rinsed with fresh water prior to their discharge from the bottlewasher. Prior to entering the filler, the bottles are inspected either visually by employees or electronically by a light scanner to insure no foreign objects or debris are left in the bottle. (Non-returnable bottles and cans pass through a rinser which consists of a series of cold water sprays. These sprays remove loose dust and debris from the inside and outside of the containers).

The individual bottles are then filled, discharged from the filler, and conveyed to the capper/closure machine where a crimp cap or twist-off type closure is applied. The containers are then date coded and then pass through the bottle warmer. The warm

water sprays inside the warmer bring the temperature of the product to approximate room temperature. (The purpose of the warmer is to avoid excessive condensation which would form on the container's exterior if they were allowed to gradually warm to room temperature. Any condensation on the container's exterior would cause problems for the rest of the packaging involved, including label application and fibre carton packaging).

After the bottles are discharged from the warmer they are conveyed to the labeller and then to the case packer where the filled bottles are re-packaged into cases. The cases of product travel to the palletiser which automatically stacks and arranges the cases on a pallet for storage and shipping.

## **CONVEYOR LUBRICATION**

The application of a conveyor lube serves two basic functions: 1) lubricity, and 2) cleaning.

Lubricity is required on conveyors to reduce friction wear on the conveyors, and to reduce drag on the drive motors. Without proper lubrication, maintenance costs and downtime become prohibitive. Electric drive motors tend to burn out more frequently and amperage to run the drive motors is greater, increasing operating costs. Without proper lubrication, chains tend to stretch. The slack has to be taken up or links removed so that the chains do not jump off the sprockets, causing bigger problems. Inadequately lubricated bottle conveyor chains cause bottles to move along in a jerky manner, tip over, and break. This is particularly troublesome in areas approaching filling and casing equipment for the obvious reasons. Improperly lubricated case conveyors can cause stacks to tip over, and loss of product results.

The cleaning function of a conveyor lubricant is important for the aesthetic sanitation reasons: to prevent undesirable odours from product build-up and to keep the containers clean en route to the customer. Properly applied conveyor lubricant is the most efficient and effective way to maintain conveyors in a clean condition.

The proper product selection is dependent upon several factors including water hardness, type of conveyors, type of containers being produced, etc. In addition, the choice of system equipment for the lube's application can be equally important.

## **BOTTLE WASHING**

Bottle washing can pose a major sanitation problem in soft drink plants and often represents the largest chemical dollar expenditure in a soft drink operation. Proper

product selection and proper machine function are essential in order that a thoroughly cleaned bottle is produced prior to filling.

An understanding of the bottle washing process, common terms, and ingredient make-up of compounds is necessary to effectively make product recommendations to any account.

## **GLOSSARY OF COMMON SOFT DRINK PLANT TERMS**

**Treated Water or Beverage Water** - Water which has had various impurities removed by treatment with lime coagulation, and super-chlorination in a retention type water treatment system. This system is operated and maintained at the soft drink plant. This water is used in the making of syrup and during the bottling/canning of the soft drink.

**Syrup** - A thick, high-solids liquid consisting of sodium benzoate, sugar, treated water, and various flavourings. The syrup preparation is the initial step in the making of a soft drink and provides the final product with its distinct flavour and colour.

**Syrup Room** - The area of a soft drink plant in which the syrup is stored or prepared ("batched").

**Syrup Batch Tank** - Stainless steel tanks ranging in size from 500 litres to 20,000 litres. The syrup is prepared ("mixed" or "batched") and/or stored in these tanks.

**Syrup Transfer Line** - A stainless steel line through which the syrup is pumped to the filling area.

**Proportioner** - Equipment which prepares the final soft drink by blending the syrup and treated water at a specific ratio. (i.e. 1 part syrup to 5 parts treated water; 1:5).

**Carbo-Cooler** - Equipment which carbonates and cools the soft drink (2 - 5°C) just prior to filling.

**CO<sub>2</sub>** - Carbon dioxide gas which gives a soft drink its carbonation via the carbo-cooler.

**Filler Room** - The enclosed area of a bottling line which contains the filler, capper, proportioner, and carbocooler.

**Packaging Area** - The area of a bottling line which consists of all equipment other than that which is contained in the filler room. (i.e. labeller, case packer).

**Bottle Warmer (Can Warmer)** - Equipment on a bottling line containing sets of warm

water sprays. The individual containers (bottles or cans) pass through the warmer after filling for the purpose of bringing them to room temperature.

**HFCS** - An abbreviation for High Fructose Corn Syrup which is a liquid sweetener used by some bottlers in the making of the soft drink syrup. This ingredient is often received and stored in bulk by the bottlers.

**Invert - Or medium invert sugar** - A liquid sugar used by some bottlers as the sweetening ingredient in the preparation of the syrup.

**NR's or non-returnables - ("one-ways")** -. Glass bottles which are non-deposit in the trade and are not returned to the soft drink plant for washing and re-filling. (i.e. They are not sent through the bottlewasher).

**Returnables** - Bottles which require a deposit in the trade. They are returned to soft drink plants to be washed and refined.

**Bottlewasher - ("soaker")** - A large machine located just prior to the filler on a bottling line containing a hot alkaline (caustic) solution. Returnable bottles pass through, soaking in this solution for the purpose of being thoroughly cleaned. Prior to their exit from the bottlewasher the bottles are completely rinsed with water to remove any residual caustic.

## **SOFT DRINK PLANT CLEANING AND SANITIZING PROCEDURES**

### **INTERNAL CLEANING**

Syrup Transfer Lines, Proportioner, Carbo Cooler, Filler.

Products:

Concentration:

Cleaners:

Oxyclean  
or  
A-420

1 to 125 **at the filler.**

Sanitiser:

CL-18

10 grams per 9 litres water **at the filler.**

1. Decrease carbo cooler CO<sub>2</sub> pressure to absolute minimum and flush lines and

equipment with water to remove syrup and product residue.

2. Prepare solution of cleaner at 1 to 25 in clean syrup tank. Product will be diluted by residual water in lines and equipment, giving a final dilution of 1 to 125 at the filler. Pump cleaning solution through all equipment, making sure all equipment is flooded and let cleaning solution remain in this equipment a minimum of 10 minutes.
3. Flood filler with cleaning solution according to manufacturer's instructions.
4. Run empty bottles under all filler valves; allow bottles to completely fill with solution. Flush and back flush all filler valves and snift valves.
5. Drain cleaning solution from all lines and equipment and flush thoroughly with water.
6. Prepare chlorine solution of CL-18, insuring that you have 100 ppm chlorine at the filler.
7. Pump the CL-18 sanitizing solution through all lines and equipment in the same manner as done with the cleaning solution, making sure that all equipment is exposed to the sanitizing solution for a minimum of 10 minutes.
8. Flush system completely with fresh water, insuring that all traces of chlorine are removed by testing with ortho-toluidine solution.

## **EXTERNAL CLEANING AND SANITATION**

Filler, Carbo Cooler, Proportioner, Seamer, Capper, and Rinsers

Products - Chlorinall G, Pro-Clean  
Equipment - FoamMaster 890 or 865

The primary equipment listed above should be cleaned with a chlorinated-alkaline cleaner four days a week, and on the fifth day with acid material.

Procedure-Chlorinated Alkaline Cleaning 4 days/week)

### 1. Mixing Instructions

- A. Select the mixing tip that will give a 1 to 40 dilution (Orange with model 890 and green with model 865).
- B. Adjust the water and air pressure until a dry clinging foam is produced.

## 2. Using Instructions

- A. The foam should be sprayed over all the primary equipment, making sure all areas are completely covered.
- B. Let the foam stand on the equipment for approximate 10 minutes and then rinse thoroughly.

### Procedure -Acid Cleaning (1 day/week)

An acid cleaner should be used once a week to remove inorganic salts and mineral deposits from the stainless steel equipment. Pro-Clean may be used for this application which, in addition to brightening the stainless steel surfaces, provides a final sanitising rinse.

## 1. Mixing Instructions

- A. Select the mixing tip that will give a 1 to 40 dilution (Orange with model 890 and green with model 865).
- B. Adjust the water and air pressure until a dry clinging foam is produced.

## 2. Using Instructions

Follow the same instructions as outlined in Step 2 above, using the Pro-Clean foam.

# **SYRUP ROOM**

## **INTERNAL CLEANING AND SANITATION**

Products - Oxyclean or A-420, CL-18

- 1. Pre-flush system with hot water.
- 2. Circulate a solution of warm water (50 - 55°C) and Oxyclean or A-420 at 10 ml per litre water for 10-15 minutes and drain.
- 3. Circulate a hot water solution for 10-15 minutes and drain.
- 4. Circulate a solution of CL-18 at 10 gram per 9 litres of water (100 ppm chlorine) for 10 minutes and drain.
- 5. Flush system completely with water and test for absence of chlorine using ortho-

toluidine solution.

## **FLOOR CLEANING**

### **Concrete Floors**

Products - General Clean or Refloor

Equipment - Automatic Floor Scrubber, Drum Proportioner

The cleaning of all concrete floors in production and warehouse areas should be done using General Clean at 1:40 or Refloor at 1:200. A Melrose drum proportioner should be used to fill the floor scrubbers. This drum proportioner is mounted on the drum and assures an accurate concentration.

### **Red Quarry Tile Floors**

Product - General Clean "F", D-600, Polysolv A or Pro-Clean

Equipment - Pressure washer or FoamMaster, drum proportioner.

Red quarry tile floors should be cleaned daily with General Clean "F" at a 1 to 40 dilution. General Clean "F" can be foamed on with a FoamMaster unit or applied with high pressure through a pressure washer. After applying the General Clean "F", the floor should be rinsed thoroughly with water.

D-600 may be applied at 2 ml per litre of water (200 ppm quat) using a drum proportioner if a sanitizing rinse is desired. Periodically, it will be necessary to acid clean the red quarry tile to remove the build-up of inorganic salts and mineral deposits from the water supply. This build-up will cause a "white film" to form on the tiles. This can be removed by using Polysolv A at 1:10 or approximately 100 ml per litre of water. This solution should be allowed to stand on the tile for approximately 10 to 15 minutes, scrubbed with a hand scrubber, and then rinsed thoroughly with cold water.

## **BOTTLE/CAN WARMER TREATMENT**

Products - Protecto 7480, Protecto 7210, Carbo-Strip

Equipment - Dosatron (Optional)

The two major operational concerns with a bottle or can warmer are microbiological control and rust/corrosion prevention.

### **Microbiological Control**

Soft drink product is introduced into the warmer from being present on the exterior of containers after filling and from ruptured and damaged containers from the filler entering the warmer. This introduction of product becomes a food source for microorganisms. In addition, the temperatures found-in a bottle/can warmer provide an ideal condition for their accelerated growth. As these bacteria, fungi, and yeast organisms increase in numbers, they produce slime which, in addition to creating a sanitation problem, can cause a variety of operational problems.

Treatment: The Melrose product Protecto 7480 is recommended for preventing the uncontrolled growth of these organisms. Protecto 7480 should be added at the rate of 2 ml per litre of water (200 ppm biocidal quat) daily following the end of production. The circulating pumps of the warmer should be left on 10-15 minutes to insure the distribution of the Protecto 7480 throughout the unit. Protecto 7480 is non-foaming polymer quat.

### **Corrosion Control**

In addition to the control of microorganisms, the prevention of rust and corrosion is also a major concern. The same soft drink product which serves as a food source for microorganisms also lowers the pH of the water in the warmer. The lowering of the pH in conjunction with the elevated temperature of the water contribute to corrosion of the unit.

Treatment: For corrosion control, Protecto 7210 should be added at the rate of 1 litre per 500 litres of the initial water charge in the warmer. Following startup, sufficient Protecto 7210 should be added to maintain 30 - 60 ppm phosphate.

Both Protecto 7480 and Protecto 7210 may be manually slug fed or automatically fed with a Dosatron.

## **CLEANING OF WARMER - BOIL-OUT**

Periodically, even with a good treatment program, it is necessary to thoroughly flush out and clean the bottle/can warmer. Melrose' Carbo-Strip is a non-foaming, inhibited alkaline cleaner specifically designed for this application. The circulation of this Carbo-Strip throughout the warmer for cleaning is known as "boilout". A procedure for the boil-out of a bottle/can warmer is listed below.

### **BOIL-OUT PROCEDURE**

1. After the completion of the production run, drain the system and flush with a high pressure hose to remove as much debris, etc., as possible.
2. Fill system with water.

3. Add Carbo-Strip at 20 ml per litre of water in the warmer.
4. Heat this solution to 70°-80°C and circulate for 1.5 - 2.0 hours.
5. Drain the warmer.
6. Manually clean any parts or areas as needed with a 2% Carbo-Strip solution.
7. Thoroughly rinse warmer with water until the pH of the rinsed solution is the same as the incoming water.

## **BOTTLE WASHING**

F-8400 - A highly caustic, free-flowing powdered compound. In addition to high caustic alkalinity, F-8400 contains organic, as well as inorganic, sequestrants for control of hard water and scale build-up on coils and bottle holders.

Concentration: For each percent of caustic soda required, delete the last two digits of tank capacity as a fast method of computing charge of F-8400, multiply this figure for each percent of caustic required.

Example: For causticity of 3% in a 1,000 litre tank. 10 kg. for 1%;  $3\% \times 10 = 30$  kg. charge of F-8400

F-8420 - Highly caustic, liquid product for bottle washing. F-8420 contains organic, as well as inorganic, sequestrants for control of hard water and scale build-up on coils and bottle holders.

Concentration: For each percent of caustic soda required, add 15.0 litres of F-8420 per 1,000 litres of tank capacity.

Example: 6,000 litre tank - 5% causticity desired  
 $15.0 \times 5 = 75$  litres F-8420/1,000 litres.  
 $6 \times 75 = 450$  litres F-8420

ALKA CLEAN ADDITIVE - A liquid additive for caustic bottle washing which combines the action of highly stable sequestrants, wetting agents, and soil dispersants.

Concentration: Concentrations of ALKA CLEAN ADDITIVE required are dependent upon water hardness, soil load, and the extent of metallic contamination from labels.

### Suggested Concentrations:

Add 1 to 3 litres of ALKA CLEAN ADDITIVE to every 1000 litres of bottle wash solution with a strength of 1.5 to 3% caustic soda.

Protecto 2850 - A solution of polyacrylates that can be used to control water scale and corrosion in the rinse section of a bottlewasher.

Concentration: 15 - 150 ml of PROTECTO 2850 per 1000 litres of warm water.

## **INSECT CONTROL**

Products - Super Fog, Super Cidol  
Equipment - Fogmaster, Hudson Sprayer

### **Flying Insects**

To control flying insects, Super Fog should be used through a Melrose Fogmaster. Super Fog is acceptable for use in food plants when used as directed. See the technical data sheet for instructions.

### **Crawling Insects**

Super Cidol should be applied in those areas where crawling insects are a problem. Super Cidol should be applied with a HUDSON SPRAYER (low pressure sprayer) along walls, baseboards, under sinks, etc., all areas where these types of insects breed. The residual action will keep the pest away, but it should be used at least once a month or as needed. Again, the technical data sheet provides proper instructions.

## **BOILER TREATMENT**

Products - Protecto 7062, 7210, 7250 and 7202 or Protecto 7214 and 7228 for a combination product.

Equipment - Dosing pump

Concentration - Dependent upon: boiler horsepower, water hardness, raw water M alkalinity, condensate return.

## Objectives of Boiler Treatment

1. Maintain boiler efficiency by preventing scale deposit and sludge prevention.
2. Prevent corrosion and pitting by removing nearly all carbon dioxide and other corrosion supporting, dissolved gases.
3. Prevent steam contamination by killing the foam built up by solids. Foam, if present, will go to the steam header and contaminate the steam.

All off the above is accomplished by Protecto 7214 or 7228 as combination products or by Protecto 7062, 7210, and 7250.

## Condensate Line Treatment

Concentration - Feed enough Protecto 7202 to maintain a pH of 8.5 in the condensate return lines.

Protecto 7202 travels with the steam and neutralizes the normally acid nature of the condensate being returned to the boiler.

## **Descaling if Needed**

Detartreur is recommended to descale boilers prior to use of Protecto products.

Boiler water log sheet will be posted and workers trained in its use.

The boiler treatment service report will be filled out by our representative when the normal production service report is completed on a bimonthly basis.

## **OIL FIRED BOILERS**

### **FUEL OIL ADDITIVE**

Product - Melrose Fuel Aid for No2 or 4 fuel oils or Magoly for No 6 or residual oils  
Dose - 1 litre per 1,000 litres of fuel initial down to 1 litre per 5000 litres on a continuous basis

Melrose Fuel Aid and Magoly are oil sludge conditioner and combustion catalyst for oil-fired boilers. It improves combustion by lowering the burning point of sulphur, vanadium and the heavy components of oil (asphaltenes).

Reduces maintenance costs and promotes trouble-free operation by emulsifying and dispersing sludge to keep strainers, filters, and burner tips clean.

## **COOLING TOWERS**

Products - Protecto 7702, 7451 and 7461

Equipment - Dosing pump

Concentration - depending on the tonnage of the system and quality of feedwater.

Objectives of cooling tower treatment

1. Control scale and corrosion.
2. Maximise the heat-exchange efficiency by eliminating all foulant substances.
3. Algae control.

Cooling tower log sheet will be posted and workers trained in its use.

The cooling tower treatment service report will be filled out by our representative when the normal production service report is completed on a bimonthly basis.

## **LOADING DOCK**

Products - Deamy, Harvest time deodorant and insecticide

Equipment - Pressure washer, Pulse II distributor

The loading dock is not only the entrance to all materials that come into the plant, but also a major pathway to dirt, insects and bacteria.

The dock should be swept and thoroughly cleaned at least once a week. Using the Pressure washer, the entire dock and surrounding area should be sprayed with Deamy (1:250) and then rinsed.

On the trash compactor, a Pulse II distributor unit should be installed to automatically dispense Harvest time deodorant and insecticide. These products will control insects and odour.

## **RESTROOMS**

Products - Deamy, Sanifect, L'Executive

Equipment - Pressure washer, hand soap dispenser

Restrooms should be cleaned on a daily basis. Where adequate draining is available, Deamy at 4 ml per litre of water should be sprayed on and rinsed after 10 minutes with a pressure washer. If drainage is not available, the procedure can be done with mop and pail.

Sinks, toilets and urinals should be cleaned daily with Sanifect. An applicator comes with the product.

To protect employees from carrying bacteria from the restroom to the production area, L'Executive antiseptic hand cleaner should be used for cleaning hands.

Handsoap dispensers can be easily mounted on walls where needed.