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D100 Karayolu Yanı Bayındır Köyü No:195 Eskipazar/KARABÜK*

KAYIN NATURAL MINERAL WATER

WORK FLOW CHART AND PROCESS SUMMARIES

1. NATURAL MINERALIZED WATER BOTTLING ACTIVITY

1.1 Raw Material Purchase Activity

Bottling of Mineral Water are made with Plastic bottle, Plastic foil and 19 Le Pc Bottle.

Raw materials used in production;

- Pet bottle Preform (PET)
- Pet Foil (PET)
- Cap (PE)
- Label
- Shrink Nylon (PE)
- Cardboard

1.2 Production Activity

Preforms received from the suppliers are heated in the blowing machines and inflated with molds at high pressure (20-30 bar air) and transferred to the filling machine through the stars/conveyor line. The pet bottles filled in the filling machines are capped and conveyed to labeling machines. Date of filling, date of expiry, serial and lot number are printed on the labeled bottles by means of laser encoding machines. After this point, the bottles are conveyed to shrink machines and they are packed at the desired numbers. Obtained parcels are stacked on the pallets by placing a cardboard separator between the units with a palletizer. Pallets are consigned to the warehouse for shipment.

2. PROCESS SUMMARIES AND WORK FLOW CHARTS

2.1 PC Bottle and 19 Liters Pet Bottle Unit

In an approximately 1800 m² indoor space;

2.1.1 PC Bottle Filling Unit:

This unit involves; recycled PC (Poly Carbon) pet bottle washing, filling and capping machine, safety strap insertion machine, safety tape heat tunnel, date encoding machine, conveyors and exterior washing machine. The filling capacity of the machine is 1200 bottles/hours and the filling is performed by washing in four different forms. The unit's mode of operation is described below.

- 1- In the exterior washing process, the exterior and base of 19 Le PC bottles are washed with pressurized and hot water by means of brushes.
- 2- In the prewashing process, pressurized water is supplied in two steps in order to wash the interior of PC bottles.
- 3- In the washing process, appropriate non-foaming and easily rinsable detergent is automatically dosed into the tank with the temperature between 55-70 °C and interiors and exteriors of PC bottlers are washed with pressurized water.
- 4- In the final washing phase, rinsing and hygiene are ensured by means of washing interiors and exteriors of the PC bottlers in two steps with the water found in this tank that is added disinfectant.
- 5- Finally, PC bottles are prepared for filling after being rinsed and drained.
- 6- After the washing process is completed, PC bottles are delivered from the machine after being filled and capped.
- 7- Filled bottles are subjected to date printing machine by means of conveyors and dates of filling, expiry and serial numbers are printed on the cap.
- 8- The safety strap is attached and the bottles are palletized after being subjected to final Radiograph check.
- 9- Palletized Pc bottles are conveyed to the stock yard.

2.1.2 19 Le Pet Bottle Filling Unit:

The 19 liter PET bottle blowing machine has the capacity of 450 bottles per hour and is located in the same area as the Pc Bottle filling machine. Mode of operation;

- 1- The preforms are subjected to heating in the heat tunnel of the blowing machine. The heated preforms are transformed into bottles through high pressure (22-30 bar) in the mold.
- 2- The pet bottles extracted from the blowing machine are delivered to the filling machine through the conveyor. In the filling machine, bottles are filled and capped after being subjected to agitation and rinsing processes.
- 3- The handle is attached.
- 4- The safety strap is attached by means of the machine and it is ensured that the strap wraps the bottle cap by means of heat tunnel.
- 5- The sticker label is affixed on the bottle by the label-printing machine.

- 6- Date and serial numbers are printed on the bottle.
- 7- They are transported by conveyors and sorted on the pallets and shipped to warehouse.

2.2 PET Bottle Production Unit

PET bottle blowing unit which is located in approximately 3600 m² indoor space, is composed of three different lines however this unit has similar mode of operation with filling unit. These lines are called Kronos, Macro and Glass. Maximum capacities and products that could be manufactured while machine capacities vary depending on the product type (capacity decreases as bottle volume increases);

Kronos line:

0,33 L	:	45.000 bottles/hour
0.5 L	:	45.000 bottles/hour
1,5 L	:	26.500 bottles/hour

Macro line:

5 L	:	5.000 bottles/hour
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Glass line:

180 ml	:	12,000 pcs/hour
200 ml	:	12,000 pcs/hour
225 ml	:	12,000 pcs/hour
250 ml	:	12,000 pcs/hour

Abovementioned filling can be carried out. Since the capacities of the lines are the same as the capacity of the blowing machines, the lines are also referred to by the name of the blowing machines. In the lines, product changes are carried out by means of changing the molds.

2.2.1. Pet Bottle Production Line

- 1- The preforms are heated in the blowing machines and transformed into bottles after being inflated at high pressures (20-30 bar).
- 2- Extracted bottles are transported to the filling machines by the stars or conveyors (5 L). In the line of Kronos, the bottles are directly filled and capped; in the Macro line, the bottles are filled and capped after Agitation process. The bottles that are filled in the machines are transported by conveyors.
- 3- The product is labeled with Hot Melt by means of label printing machines.
- 4- Date of filling, the date of expiry, serial number and batch no are printed on the bottle by means of laser/ink jet.
- 5- The desired water according to the product type is transformed into a parcel by shrink machine with shrink nylon.
- 6- In the palletizer machine, the bottles are palletized by using separator cardboard and conveyed to the warehouse after being wrapped with stretch.

2.2.2. Glass Filling Line

- 1- Pet foils are heated between plates and sent to the area where the molds are located, and a glass is formed in the desired volume and this glass is filled and wrapped with foil.
- 2- Filled glasses are picked up by the robot holders and placed in the cardboard parcels.
- 3- Parcels are transported by conveyor and transferred to the warehouse after being palletized and wrapped with stretch.

3 Water Treatment and Quality Control Unit

3.3.1 Water Tank:

Water received from the Source through distribution pipeline, is transferred to 2-chamber ceramic covered tanks in the volume of 300 m³. The water is transferred to water treatment chamber by means of pumps.

3.3.2 Filtration:

The water received from the source is sent by pumps and subjected to 3μ, 0.65μ, and 0.45μ filters with the capacity of 90 m³/hour and taken into ozonisation tanks (reaction tanks).

3.3.3 Ozonisation:

Ozone; is generated through oxygen (O₂) fission as a result transmitting the dry air or oxygen over electrical current (under high voltage) under indoor space (O₃). Since the generated ozone has an unstable form, it is transformed into oxygen again following a fission process. Therefore, it is important to generate ozone in the place where it will be used.

Generated ozone; is transferred to rust-free reaction tank with a capacity of 3.5 m³ and mixed with the water taken from the tank by means of venturi and supplied to the water inside the tank through the diffusers at the bottom of tank, thus ozonizing is ensured. After being ozonized in the reaction tanks, the water is transferred to filling lines.

3.3.4 Laboratory:

Regarding the water to be filled, the parameters specified in Article 39 of "Regulation on natural Mineral Waters" and ozone values are considered. Measurements are carried out by using Spectrophotometer, which is used to determine the parameters of water and also ready test kits of Hack Company. In addition, the parameters related to the Ph meter and Conductivity meter are also considered. The microorganisms specified in the Regulation are determined in 22 °C and 37 °C drying-ovens by means of planting with the help of Sartorius planting set. The equipment used is disinfected with a sterilizer.

The shipment is allowed when the results of the analyzes are positive.

3.3.5 Quality Control:

The compliance of raw materials (Preform, cap, handle, shrink, Pc Bottle, label, ...) procured from the supplier with the Procurement Technical Specifications is inspected.

Noncompliant products are not accepted and returned to the supplier. In addition, the physical properties of the package (such as cap, shrink, pallet) are checked as well.

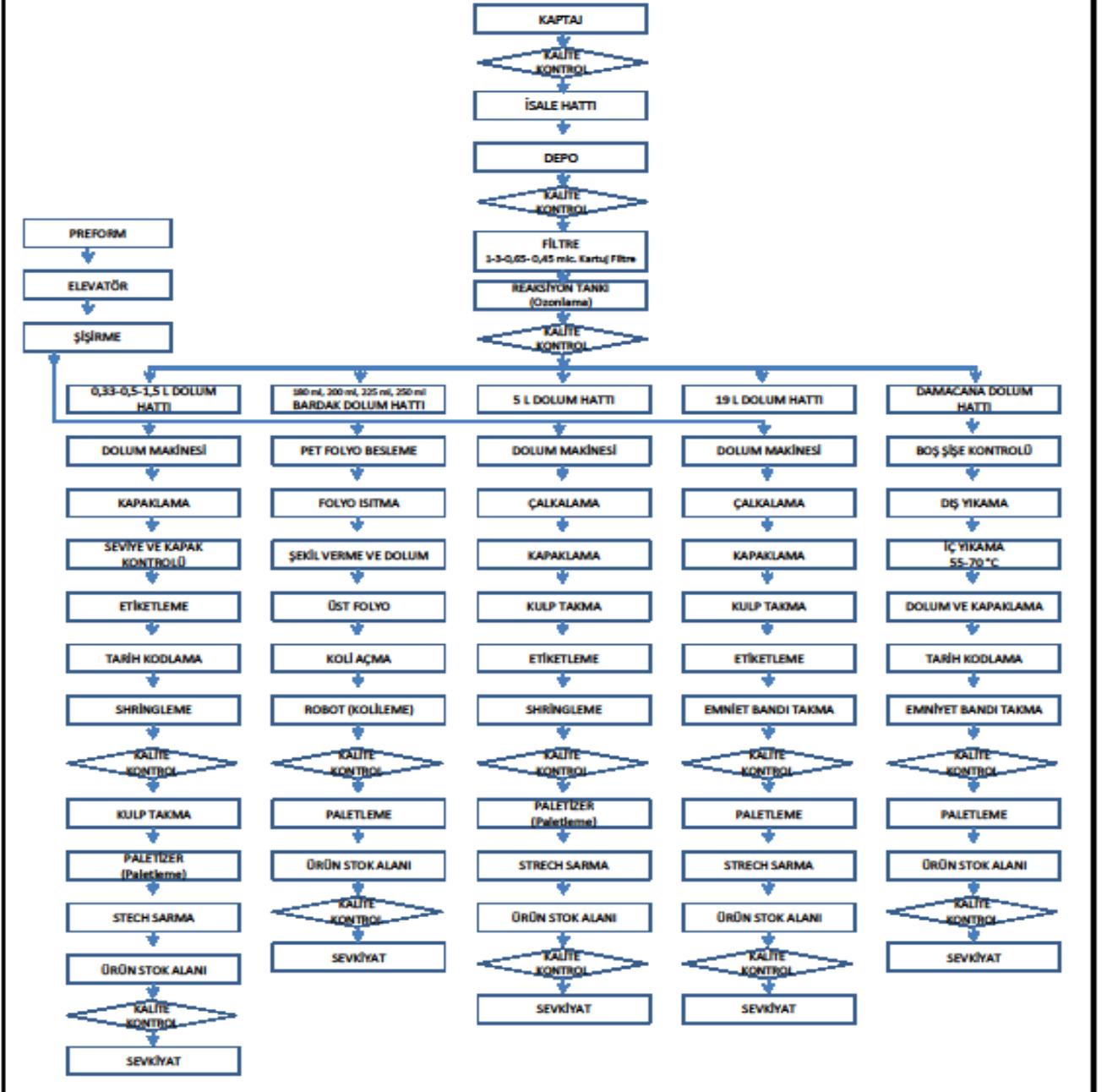
3.4 Product and Raw Material Stock Yard:

Products which are transferred to the warehouse after being manufactured in approximately 1800 m² indoor space, are kept in the warehouse until shipment date.

There are raw materials such as label, cap, shrink and preform in approximately 1000 m² indoor space. Raw materials are transferred to the production area in case of need.

3.5 FLOW CHART OF PET BOTTLES AND PC BOTTLES

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4. PROCESS DEFINITION (PROCESS DEFINITION OF PET and PC BOTTLE WATER FILLING)

4.1 CATCHMENT(Water Resource)

The Catchment is found in Karakışla location of Bulduk Village and all hygienic measures are taken for the reliability of the water. The Catchment is closed and involves a microbiological air filtration, it is cleaned at specific frequencies, sanitized with Oxonia active, and records regarding these processes are kept.

4.2 SUPPLY PIPE

The water line after the spring is about 3.5 km long and reaches to the facility with its own gravity. Supply Pipe is furnished with PE100 pipeline and there is no break pressure tank on the line.

4.3 STORAGE

2 water tanks with the capacity of 150 tons that are covered with tiles are regularly inspected on a daily basis in terms of Hygiene. When necessary, the tanks are cleaned and sanitized and the records regarding these processes are kept.

4.4 FILTRATION

Possible foreign substances that may remain in the water are retained by membrane filtration method. (Filtration system: 3 - 0,65 and 0.45 μ membrane filters are used). Maintenance, cleaning of the filters and sanitization with Oxonia Active are performed at regular frequencies and the records regarding these processes are kept.

4.5 OZONIZING IN REACTION TANK

Ozonizing process is applied to the water coming into the facility at the determined limits with automated dosage system in the water treatment chamber. Ozonized water is transferred to filling machines with the help of single stage stainless steel pumps.

4.6 PACKAGING MATERIAL ACCEPTANCE

Preform that is the raw material of Pet, polycarbonate bottle, cap, label, safety strap, shrink packaging material are accepted to the facility after checking the compliance with Specifications on Procurement from Approved Supplier and the certificates involving the product reliability information from the companies with "MANUFACTURING CERTIFICATE for the Materials in Contact with Food".

4.7 STORAGE OF PACKAGING MATERIALS

Packing materials received from approved suppliers are stocked in the package warehouse in accordance with hygienic conditions in a palletized, smooth and non-dusting manner. Temperature and humidity controls, cleaning and hygiene controls of stocking areas where materials are stored are monitored during hygiene inspections.

4.8 PREFORM BLOWING PROCESS

Purchased preforms are placed into blowing molds which are heated in adjusted blowing machines after having a process set at varying temperatures according to desired bottle form and stretched in the vertical axis by means of stretch tension bar and at the same time inflated with hygienically clean high pressure blowing air. The quality of the inflated pet is checked and if there is a malfunction, the system is paused and

necessary process settings are carried out. The inflated pets are transferred to the relevant machine through air conveyor.

4.9 ADMISSION OF RETURNED PC BOTTLES

Polycarbonates used by the customer are sent to the facility for the purpose of filling. Polycarbonates are used in the market by turns for maximum 50-60 times. After this period, the returned polycarbonates are carefully controlled as they lose the polycarbonate characteristics and pose a risk for product reliability, and those that are not suitable for use are destroyed. Samples are taken from the returned PCs and microbiological planting is performed so that it would not pose a risk in terms of product reliability.

4.10 RECYCLING PC BOTTLE CONTROL

Polycarbonates received from the market are checked by the manufacturing staff for the availability of foreign substances and polycarbonate, and these substances are removed or destroyed.

4.11 EXTERIOR WASHING OF THE PC BOTTLES

PC bottles returned from the dealerships are cleansed from external dirt in four-chamber washing tank one of which is heated washing tank in exterior washing machine and transferred to pc bottle machine.

4.12 WASHING AND SANITIZATION PROCESSES OF PC BOTTLES

New pc bottles and the ones returned from the market are primarily washed under chemical substance temperature (MIP-CIP) 55-70 ° C in the automated washing and filling machine. Later, they are sanitized with disinfectant (ozonide perform) and rinsed. It is ensured that there is no chemical substance and the records regarding this process is kept.

4.13 FILLING PROCESS

Pets and Pc bottles are filled in fully automated filling machines. There are 1 PC Bottle and 3 pet filling devices available. 5 and 19 liter pet bottles are filled after agitation process. Other pet bottles and glasses are filled directly.

4.14 CAPPING

Open areas are covered with plexy glass against physical and biological contamination in the capping device and these areas are automatically covered under hygienic conditions.

4.15 LABELLING OF PC BOTTLES AND PETS

All Pet bottles filled with water are labeled in automated machines and polycarbonate bottles are labeled manually.

4.16 DATE ENCODING

Date of filling, batch/serial numbers are automatically printed on the side of pet bottles and on the top of PC bottle caps.

4.17 INSERTION OF SAFETY STRAP ON PC BOTTLES AND 10 LE PET BOTTLES

Safety straps are inserted on the cap of PC bottles and non-recyclable pets (19 le pets) following the filling process in order to enable that consumer are the first to open the bottles.

4.18 GLASS PET FOIL

Pet foils that are received in roll form are filled after being heated in the machines and molded depending on the desired volume and they are placed in the carboard parcels by means of robot units after attaching the upper foil.

4.19 SHRINKING

Filled Pet Bottles are applied with shrinking in automated device; 0.33, 0.50 Liter bottles and 1.5 Liter bottles in 6 or 12 boxes and 5 Liter bottles are applied with shrinking in 4 sets.

4.20 PALLETIZING

Pet bottles applied with shrinking are arranged in pallets by the automated machine and transferred to the stock yard after being stretched.

4.21 DESPATCH TO THE WAREHOUSE AND WAITING PERIOD

The packaged water bottles that are shipped to the product warehouse are stored on pallets in sun-free environment under hygienic conditions. The products are kept in stand for 72 hours until results of the microbiological analyzes of the stored products are obtained.

4.22 PRODUCT SHIPMENT

Once the results are positive, the products are loaded to vehicles and shipped to the dealers or warehouses.