Boretech China Make, Pet Bottles Recycling Line Ref Id SM4325

(Details-Specification mentioned hereunder are for indicative purpose only)

DESIGN DATA

1.1 Capacity

- PET bottles input : **1,500** kg/h

- Dry PET flakes output : **~1,200** kg/h or depends on raw material composition

1.2 About Input Material

1.2.1 Material Description

The capacity of this recycling line is designed for baled material. If loose material were fed, the capacity will decrease accordingly.

- **Minimal Bale Size** **:** 700 x 800 x 700 mm
- **Maximum Bale Size** **:** 1200 x 1400 x 1200 mm
- **Bale Density** **:** 150~350 kg/m^3

1.2.2 Composition of PET Bottle Bale

Description	Characteristic
PET Containers	One-way bottles
Colors Fraction	PET bottles should be pre-sorted by color. If the percentage of color bottles is higher than 30%, we suggest customer to install the automatic color bottle sorting machine to achieve efficiency.
Base Cups	Included, if any, and should be PP or PE plastic.
Labels (shrunk or glued)	The production line is designed for removing label mechanically. All type of labels will be removed by mechanical action. It includes paper, BOPP, PET, PVC, etc.
Caps	PP, HDPE
Caps seals	EVA, PP (floatable material) PVC or rubber seals are not separable.
Glue	Hot melt, water borne.
Contamination	Mixed with the bottles could be present contaminations coming from the collection and storage of the post-consumer bottles or made by consumer. These contaminations include mud, sand, soil, glass, organics, paper, residual liquid, etc. Total contamination content should not exceed 10%.
Total Non-PET Containers	Non-PET containers max 2% of which
PVC Container	0.5 -1% max
Polyolefins Container	3 % max. It will only affect the output volume but not quality of end product.

Wrong PET Colors and Opaque	1-2% max
Glass and Ceramic (metals excluded)	0.5 -1% max
Magnetic Metals	0.5 - 1% max
Aluminum and Non Magnetic Metals	0.5 - 1% max All kind of metal will be separated before crushing

1.3 Expected Quality Criteria of Final Product

Description	Characteristic
Intrinsic Viscosity	0.71 ~ 0.78 dl/g depend on bottle's I.V.
Bulk density (min./avg./max.)	400/500/600 kg/m^3
Flake Size - Fraction ≤ 1 mm - Fraction ≥ 12 mm	1 ~ 12 mm < 1 % < 5 %
Humidity	≤ 1.5%
PE,PP	≤ 20 ppm
Paper	≤ 20 ppm
Glues/Hot melts	≤ 20 ppm
Organics	≤ 20 ppm
Metals	≤ 20 ppm*
In-organics	≤ 20 ppm
PVC	≤ 30 ppm*
Total impurity	≤ 100 ppm

* It depends on the efficiency of manual sorting section and input material quality.

2. PROCESS DESCRIPTION

2.1 Functional Section and Machinery

A. De-baling & Bottle Prewashing Section

After the PET bottle bales are placed on the feeding belt conveyer, the baling wire should be cut and removed manually. The bottle bale will be loosed by powerful rolling paddles. And then all bottles

will be conveyed to next machine. Under powerful stirring, the continuous bottle washing machine which combined the power functions of machinery, chemistry and heat energy will separate and remove over 90% impurities (including environment polluted substances and labels, but thermal shrinkage PVC labels excluded). Afterwards process equipment will be protected properly due to purified bottle bodies. Especially the crusher will less suffer because of those hard solid substances were removed.

Bale Breaker

Function	: Break the bales into loosen bottles for following processes.
Length of feeding belt conveyer	: 5000 mm
Width of feeding belt conveyer	: 1200 mm
Power	: 17.2 kW
The feeding speed is adjustable.	

Bottle Prewashing Machine (patented)

Function	: Wash the surface of bottles, to remove sand, oil, mud and other contaminations. To make the PVC bottles turn milky for easier sorting.
Diameter	: 1800 mm
Length	: approx. 12000 mm
Power	: 15 kW
The feeding speed is adjustable.	

B. Label Separating Section

There are many types of label used for covering bottles. Most labels will be removed in bottle prewashing process except the PVC labels which is formed by thermal shrinkage. The PVC label scrapping machine is used to tear PVC labels and other plastic labels, and broken labels will be separated from the PET bottles by pneumatic power in Label blower.

Metal Detector

Function	: To detect the metal and send signal to the control panel for stopping the belt conveyer.
Origin	: Germany

PVC Label Scrapping Machine

Function	: Tear the PVC and other plastic labels.
No. of Blades	: 80 pcs

No. of Screws	: 285 pcs
Diameter of Rotor	: 800 mm
Power	: 30 kW

The rubbing blades and screws are welded with high speed steel.

Label Blower

Function	: Separate the labels and light membrane from bottles by pneumatic power.
Diameter of Rotor	: 2000 mm
Power	: 3.75 kW

The pneumatic force is adjustable by changing frequency of electrical fan.

C. Bottle Sorting Section

This section is final separation before the bottles crushed; to sort those very few left other substances (such as Non-PET bottles, color bottles, a few label's ashes, metal, garbage, etc). In those areas where recycled bottles are very simplification (over 75% is single material and color) or at relativity lower labor cost areas, suggested using manual sorting. Otherwise, automatic sorting machine can be installed.

Sorting Belt Conveyer

Function	: to remove the metal mixed in the bottles by manual sorting.
Length	: 10000 mm or to be defined by actual layout
Width	: 1000 mm
Power	: 1.5 kW

D. Wet Crushing Section

This Section is specially designed for crushing PET bottles, which have following characteristics: input smoothly and output stably, low power consumption, low noise and vibration, strong structure, low maintenance cost. It's designed by a wet grinding way. If need to 24hour non-stop running, one more crusher is necessary for standby.

Crusher

Function	: Crush the bottles into flakes with indicated size.
Diameter of Rotor	: 700 mm
Width of Crushing Room	: 1000 mm
Rotary Blade	: 16 pcs
Fixed Blade	: 6 pcs
Blade Material	: Carbon steel body and high speed steel welded.

Power : 75 kW

Working with water can wash the flakes and cool the machine itself. The life time of crusher will become longer.

E. Flotation & Friction Washing Section

The crushed flakes are mixed with Polyolefins material; this section is using the gravity difference of PET(~1.3) and Polyolefins(~0.9), and water (gravity 1) as a media to let PET sink and Polyolefins float on the water. This effective will make PET more purified, and collected Polyolefins flakes can be sold as by-product.

With chemical, friction and heat power, the glue will be entirely separated from flakes. The horizontal centrifugal dryer will remove the glue, mud from the flakes. Since the flakes are washed with caustic soda and other alkali detergent, fresh water is needed to rinse flakes.

Hot-Washing Machine

Function	: Flakes are stored in the tank mixed with hot water and chemical. The rotary paddles make the flakes rub with each other to remove the dirt on the surface such as glue, mud and oil.
Diameter	: 1800 mm
Material	: Stainless Steel
Power	: 12.25 kW

Horizontal Centrifugal Dryer

Function	: Remove the moisture, fine powder, glue and other contaminations by centrifugal power.
Diameter of Rotor	: 600 mm
Screen Mesh	: 2 mm
Material	: Stainless Steel
Power	: 18.5 kW

Rinsing Machine

Function	: Remove the chemical on the surface of the flakes as well as residual suspended substances by fresh water.
Diameter	: 1500 mm
Material	: Stainless Steel
Power	: 5.5 kW

F. Drying, Mixing & Packing Section

Go through the centrifuge and thermal dryer equipment, the moisture content shall less than 1.5%. The mixing silo is to blend and store flakes. Mixing takes place through an internal screw.
And packing equipment includes a collector tank. And an optional filling station is useful for getting higher packing density by reciprocation.

Heat Exchanger

Function	: Transfer the heat from the steam to the air.

Blower

Function	: Convey the flakes to the storage silo by pneumatic force.
Power	: 11 kW

G. Process Water and Chemical Solution Circulation Section

Our formula of detergent has following characteristics; power rinse effectiveness, low bubbles, low residue, easy treatment of wasted water, etc. Detergent functioned in a closed circulation system, which equipped self-clean system that maintaining the detergent consistency for keeping the rinse efficiency. For ensure the sufficiency of rinsing, the clean water used in the washing section can be circulated, and this function will achieve the water consumption to a most economic condition.

Solution Circulation Tank

Function	: Collect the recycled chemical water and fresh chemical water.
Volume	: 10 m^3

Vibration Screen

Function	: Remove the contaminations such as label, caps, pulps, sand which are discharged from the bottle prewashing machine.
Diameter	: 1000 mm
Power	: 1.5 kW

Deposit Tank

Function	: Deposit the sand and mud.
Volume	: 2.3 m^3

Chemical Mixing Tank

Function	: Prepare the chemical

Volume	: 1 m^3

Buffer Tank

Function	: Store the chemical water.
Volume	: 3.8 m^3

EQUIPMENT LIST

S/N	Model No.	Name	Qty.	Unit Power	Remark
A	**De-baling & Washing Unit**				
1	JB-1200	Baler Breaker	1	17.2	
2	LS-300S	Screw Conveyer	1	6	
3	XDL-1800	Washing Machine	1	15	
4		Operating Platform	1		Drawing by seller Made by buyer
B	**PVC Label Removing Unit**				
1	LS-300S	Screw Conveyer	1	6	
2	DS-1000	Belt Conveyer	1	1.5	
3		Metal Detector	1		Made in German
4	DS-600	Belt Conveyer	1	0.75	
5		Sorting Platform	1		Drawing by seller Made by buyer
6	TB-800	PVC Label Scraping machine	1	30	
7	LS-300S	Screw Conveyer	1	6	
8	CB-1800	Label Remover	1	3.75	
C	**Bottle Sorting Unit**				
1	LS-300S	Screw Conveyer	1	6	
2	DS-1000	Belt Conveyer	1	1.5	
3		Sorting Platform	1		Drawing by seller Made by buyer

4	DS-600	Belt Conveyer	1	0.75	
D	**Wet Grinding Unit**				
1	AGB700*1000	Crusher	2	150	Made in Taiwan
2	LS-300	Screw Conveyer	1	1.5	Stainless Steel
3	LS-300	Screw Conveyer	1	4	Stainless Steel
E	**Floating & friction Washing Unit**				
1	TS-600	Horizontal Dryer	1	18.5	Stainless Steel
2	RX-1800	Friction Washing Machine	1	12.25	Stainless Steel
3	LS-300	Screw Conveyer	1	4	Stainless Steel
4	TS-600	Horizontal Dryer	1	18.5	Stainless Steel
5	PX-1500	Rinsing Machine	2	11	Stainless Steel
6	LS-300	Screw Conveyer	2	8	Stainless Steel
F	**Drying & Packing Unit**				
1	TS-800	Horizontal Dryer	1	18.5	Stainless Steel
2		Heat Exchanger	1		
3		Blower	1	11	
4		Hopper	1		Stainless Steel
G	**Electrical Control System and others**				
1		Electric Control System	1set		
2		Process Water & Chemical Recycling System	1set	10	
3		Connection Parts(chutes, cyclones, pipes and tanks)	1set		
4		Blade Sharpener	1	1.5	

PROCESS MACHINES WITH CONNECTED POWER LOAD

NO	Name	Amount	Motor power	Relay	Input	Output	Remarks
M1	Belt Conveyer1#	1	1.5KW	KA1	10.0,10.1	Q0.0	Inverter
M2	Debaling Machine1#	1	7.5KW	KA2	10.2	Q0.1	
M3	Debaling Machine2#	1	7.5KW	KA3	10.3	Q0.2	
M4	Belt Conveyor	1	2.2 KW	This all motor control by a separate panel interlocking with PLC panel			
M5	Screw Conveyor	1	1.1KW				
M6	Circulation Washing Pump #1	1	2.2KW				
M7	Washing Machine	1	7.5KW				
M8	Rotating Tromel	1	7.5KW				
M9	Washing Machine Vibration	1	2.2KW				
M10	Double Screw Conveyer2#A	1	4KW	KA4	10.4	Q0.3	
M11	Double Screw Conveyer2#B	1	4KW	KA4	10.4	Q0.3	
M12	Sorting Belt Coveyer1#	1	2.2KW		-	Q0.4	Inverter
m13-1	Belt Conveyer 2#		1.5KW	KA5	11.0	Q0.5	
M13-2		1		KA6	11.0	Q0.6	
M14	PVC Label Scrapping Machine	1	30KW	KA14-1,2,3	12.1	Q2.0	

M15	Double Screw Conveyer 3#A	1	4KW	KA7	11.1	Q0.7	
M16	Double Screw Conveyer 3#B	1	4KW	KA8	11.2	Q1.0	
M17	Label Blower Machine	1	3KW	KA9	11.3	Q1.1	
M18	Label Blower Fan	1	0.75KW	KA10	-	Q1.2	Inverter
M19	Double Screw Conveyer 4#A	1	4KW	KA11	11.5	Q1.3	
M21	Double Screw Conveyer 4#B	1	4KW	KA12	11.6	Q1.4	
M22	Sorting Belt Coveyer 2#	1	2.2KW	KA13	11.7	Q1.5	Inverter
M23-1	R/F Belt Conveyer 5#	1	1.5KW	KA37	17.1	-	
M23-2				KA38		-	
M24	Crusher 1#	1	75KW	KA15-1,2,3	12.2	Q2.3,Q2.2	
M25	Crusher 2#	1	75KW	KA36	17.0	-	
M26	Bottom Screw Conveyer Of Crusher	1	1.5KW	KA39	17.2	-	
M27	Output Screw Conveyer Of Crusher	1	4KW	KA17	12.4	Q2.5	
M28	Horizontal Dryer 1#	1	18.5KW	KA18-1,2,3	12.5	Q3.0	
M29	Hot Washing Machine	1	7.5KW	KA19	12.6	Q3.1	
M30	Flotation Separator Pump	1	2.2KW	KA31	14.3	Q5.3	
M31	Output PE Screw	6	5*0.25KW	KA20	12.7	Q3.2	
M32	Output Screw Conveyer	1	4KW	KA21	13.0	Q3.3	Inverter
M33	Horizontal Dryer 2#	1	18.5KW	KA22-1,2,3	13.2	Q3.4	

M34	Hot Rinsing Washing Machine-1	1	5.5KW	KA23	6.2	Q3.7	
M35	Output Screw Conveyer	1	4KW	KA24	12.4	Q4.0	Inverter
M36	Rinsing Machine Pump	1	2.2KW	KA32	14.4	Q5.4	
M37	Rinsing Washing Machine-2			KA25	13.5	Q4.1	
M38	Output Screw Conveyer			KA26	13.6	Q4.2	Inverter
M39	Rinsing Machine Pump			KA33	14.5	Q5.5	
M40	Horizontal Dryer 3#	1	18.5KW	KA27-1,2,3	13.7	Q4.3,Q4.5	
M41	Z Model Input Fan	1	18.5KW	KA28-1,2,3	14.0	Q5.0,Q4.6	
M42	Z Model 5.5KW Fan	1	5.5KW	KA41	17.4	-	Inverter
M43	Z Dry 2.2KW Fan	1	2.2KW	KA42	17.5	-	Inverter
M44	Z Model Output Fan	1	18.5KW	KA40	17.3	-	
M46	Over size & fines separation vibro screen	1	2.2 kw	KA30	14.2	Q5.2	
M47	Hydraulic Pump 1#	1	0.75KW	KA16	12.3	Q2.4	
M48	Hydraulic Pump 2#	1	0.75KW	KA29	14.1	Q5.1	

UTILITIES AND SPARE LIST

List of Equipments	
	UNIT
Machinery	
Borotech Recycling Plant	1SET
Air Compressor	1 NO
Vibrator	2 NOS
Chimaney	1 NO
Boiler (THERMOPACK 10 LAC KCAL)	1 SET
Hand Palat Truck	1 NO
Oven	1 NO
Electronic Weighing Scale 1MT CAPACITY	1 NO
Electronic Weighing Scale 100 KGS CAPACITY	1 NO
Electronic Weighing Scale 200 KGS CAPACITY	1 NO
Electronic Weighing Scale 1Kgs CAPACITY	1 NO
Electronic Weighing Scale 10mg Essae Make	1 No
FORK LIFTS	1 NO
SPARE ROTOR FOR CENTRIFUGAL DRYER	1 NO
SPARE 12.5 MM GRINDER MESH (MS)	12 NOS
SPARE CENTRIFUGAL DRYER MESH (MS)	2 NOS
SPARE CENTRIFUGAL DRYER MESH (SS)	1 NO
SPARE NYLON CASTING WHEEL FOR PREWASH UNIT	6 NO
SPARE MS SCREW CONVEYOR FOR DOUBLE SCREW CONVYROR	6 NO
NECK SPERATION MACHINE (NECK SEPARATE FROM WASH PET FLAKES)	1 NO
SPARE GEAR BOX FOR DOUBLE SCREW CONVEYOR	1 NO
380 KV DG SET	1 NO