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Launch of CSD Bottling Equipment Market

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Pic-1 On July 6, 2004, Mr. Zhang Songming (Left), the chairman of the board of Tech-Long is shaking hands with Mr. John Slosar (Right), CEO of Hong Kong Swire Coca-cola on the opening ceremony for the No.8 production line on the 4th floor of the production site in Guangdong Swire Coca-cola

Pic-2 Mr. John Slosar, CEO of Hong Kong Swire Coca-cola and Mr. Fei Zhixiu, general manager of Guangdong Swire Coca-cola are hosting the opening ceremony for the No.8 production line.

Pic-3 Honorable guests from Coca-cola system are present at the opening ceremony.



Tech-Long has become the first Chinese manufacturer cooperating with Coca-cola

A milestone in Chinese beverage packing industry



July 6, 2004 has witnessed the start operation of PET CSD bottling production line in Guangdong Swire Coca-cola Beverage Co. Ltd. This is the No.8 production line of Guangdong Swire Coca-cola and is supplied by Tech-Long. The opening ceremony was held in the workshop of Guangdong Swire Coca-cola. The start button was pressed down jointly by John Slosar, CEO of Hong Kong Swire Coca-cola, and Fei Zhixiu, GM of Guangdong Swire Coca-cola. This event is of great significance, signifying that production lines made by Tech-Long have possessed the capability to compete with those made by overseas manufacturers, and that the expertise as well as service provide by Tech-Long has been recognized by Coca-cola, the world beverage giant.

As the best known beverage company in China, Guangdong Swire Coca-cola has always set a very high standard for the quality of the bottling production lines. All of them are supplied by manufacturers from the United States or Germany before cooperation with is established with Tech-Long. The velocity of flow of the

bottling valve developed jointly with the World Packaging Company in the United States has reached 200ml/s, making the production line a highly efficient one. The line has met the requirements for quality control of Coca-cola on aspects including net bottling capacity, carbon dioxide saturation capacity, capping torque and CPK value test for sugar content. Tech-Long has become the first Chinese CSD bottling production line supplier for Guangdong Swire Coca-cola, and has accelerated the beverage giant's process of localization of equipment procurement.

The ceremony was also attended by the following honorable guests: Cai Zhiyong and Wang Guocai, manager of Technical Department of Hong Kong Swire Coca-cola, Zhang Songming, chairman of the board of Tech-Long Group, Wang Zhong, vice-president of Tech-Long Group, Kong Xiangjie, sales director of China Region of Tech-Long Group, as well as specialists and representatives from other bottling factories of Coca-cola.

A Bright Prospect In Time To Come

*The successful installation of the first CSD
bottling production line by Tech-Long*

July 6, 2004 is a day to be remembered for long by all Tech-Long people. The first CSD bottling production line launched into production in Guangdong Swire Coca-cola on that day.

As the first Chinese supplier of high-speed PET bottling production lines for the international beverage industry, we are proud of ourselves while looking back on the days gone by.

I. Beginning

Coca-cola entered China market in the eighties. Ever since then, it had been trying to implement the policy of localization in raw materials and packing materials procurement. However, due to the gap existing between the packing technology know-how in China and that of overseas manufacturers, the implementation of this policy seems not so optimistic. To become a strategic partner for the global beverage giant has been the dream of many Chinese packing enterprises.

In year 2002, with its high-speed bottling equipment (with capacity reaching 1200 buckets/per hour), Tech-Long established cooperation with Hong Kong Swire Coca-cola for the first time. A year later, equipment made by Tech-Long was sold to four factories of Coca-cola in Hong Kong, Guangdong, Shanghai and Hangzhou. In May of the same year, Tech-Long was invited to "Seminar on Quality Control and Supply Chain" sponsored by Coca-cola, signifying that the products of Tech-Long had gained initial recognition from Coca-cola.

As time went on, Coca-cola had a better understanding of the expertise and service provided by Tech-Long and started to show intense interest in this company. In late October, 2003, John Slosar, CEO of Hong Kong Swire Coca-cola came to visit the headquarter of Tech-Long in Guangzhou and scheduled a meeting with Zhang Songming, chairman of the board of Tech-Long. By then, the intent of cooperation on high-speed CSD bottling production line was raised by both parties.

CSD bottling technology is a brand new subject for Tech-Long. However, Tech-Long decided to meet this challenge. Once this project was started, the Sales Department of Tech-Long started collecting necessary business information. Zhang Sheng, our project

manger, frequently traveled between Guangzhou and Hong Kong, discussing details of the contract with Coca-cola, trying to have a thorough understanding of the standard and idea of designing from our client. Just not long before, Tech-Long had signed an agreement on technical cooperation with World Packing Company (WPC), which possesses rich experience in the field of CSD bottling. This had laid a solid foundation for the research and development for our Coca-cola project.

In December, 2003, a contract was signed between Tech-Long and Hong Kong Swire Coca-cola for Tech-Long to supply a PET CSD bottling production line (360BPM, 1.25L). In January, 2004, the Agreement of Strategic Partnership was signed between Tech-Long and Hong Kong Swire Coca-cola. It was a good start for the year.

II. Breakthrough

Wu Changhua, the director of Tech-Long Research Institute, Chen Wenjie, the engineer of Tech-Long and Inde Soor, engineer of WPC had been involved in the R & D of the first PET CSD bottling machine and had played an important part in it.

Chen Wenjie has rich experience in the designing of three-in-one system. During the process of project development with Inde Soor, he had mastered the main points of design for PET CSD bottling within a short period of time and had led the team through the CSD project.

As early as August, 2003, the CSD project team has started the designing of bottling assembly. By November, the main part designing had been completed. At the end of the development for CSD bottling machine, the first order of Coca-cola came. To meet Coca-cola's requirement in product quality and



lead time, the CSD project team had completed the designing for the main part of CSD bottling machine by December. It took only four months from the date of cooperation between Tech-Long and WPC, to the accomplishment of the development of the first PET CSD bottling machine.

New materials and new techniques have been employed in the PET CSD bottling machine, which have greatly increased the performance of the machine. Large number of imported components is employed in key assemblies to ensure reliability, such as spring and sealing components. The lift cylinder adopts the most concise structure and so it is maintenance-free. The test running for the PET CSD bottling machine was completed successfully. Customers' requirements have been totally met in the test, including withstanding test, precision and valve velocity of flow.

III. Cooperation

The lead time is April, 2004. Frequently the MRP Department and the Production Department had been waiting for the blueprint to come out from the Research Institute. This is the first high-speed CSD bottling machine (600BPM, 0.5L) of Tech-Long. It varies greatly with the previous three-in-one bottling machine. This is a great challenge for the CSD project team because the precision requirement for components is higher and the materials and techniques employed are unfamiliar to Tech-Long. The hardest part of manufacturing is the bottling and the round cylinder. The diameter of the cylinder is 3.015 meters. During the spring of 2004, everyone in the MRP Department and the Production Department has given up the holidays to catch up with the production schedule. The Quality Control Department had implemented strict control on incoming materials inspection and in-process inspection as well as finished product inspection. For the 316 and 316L stainless steel employed in special components, sample was sent to the national authority for further test. All outsourcing and procuring components had passed test and the progress of the manufacturing was ensured.

In February, 2004, the three-in-one machine came into the installing stage. Meng Huitang, who possesses the qualification as high-level locksmith and years of experience, was responsible for the assembling. Led by Meng Huitang, the assembling team had been working continuously for two months without even one holiday. Apart from the efforts made by Tech-Long, Hong Kong Swire Coca-cola had offered their assistance to Tech-Long, keeping to the principle in the Agreement of Strategic Partnership. When the imported mixing machine was not delivered to Tech-Long on time, Wang Guocai from Hong Kong Swire Coca-cola, together the Sanrui Fluid Equipment Company, reconstructed a high-performance mixing machine within 30 days. Wang Guocai had been providing on-site instructions from the very beginning of installation of the bottling production line in



The first CSD bottling machine made by Tech-Long is running at workshop.

Guangdong Swire Coca-cola. During the whole process of manufacturing and debugging, Cai Zhiyong from Hong Kong Swire Coca-cola made frequent phone calls to Tech-Long to learn about the situation, and had ever been to the workshop of Tech-Long and the site of installing at mid-nights to solve problems coming up. So much has been done by them for a common goal. Tech-Long people are deeply impressed by their dedication to work.

In April, the CSD bottling production line came into the stage of installing and debugging. On April 15, the installing team arrived at the site of installing. Project manager Zhang Sheng, engineer Ai Yunhua, Tao Liaoting worked side by side on the site. Only two weeks later, the equipment hoisting, positioning, installing, piping and cabling were completed. This is a new type of equipment and the size is large, problems kept coming up during the process of installing. To better meet requirements from our



of Guangdong Swire Coca-cola

client, Tech-Long people worked night and day despite of all those difficulties. From May 3 on, Inde from WPC joined the debugging team to work shoulder to shoulder with Tech-Long people, until the completion of the trial production. Inde had contributed his knowledge and experience about CSD principle and the techniques in debugging to the Tech-Long engineers. This has provided the Tech-Long engineers with a very good opportunity to obtain experience in equipment debugging. Inde had helped Tech-Long achieve a good start.

IV. Harvest

From May 3 when the installing of the production line was completed, to May 13 when the first 1.25 PET bottle of Coca-cola had come off the production line, it took only 10 days. The production line proved to be successful on

aspects such as designing principle, material application and manufacturing techniques. After operation for a period of time, by June 6, the trial production in the Tech-Long production line had achieved initial recognition from the top management of Coca-cola. From the arrival of the Tech-Long production line to the end of trial production, it took 28 days. !

The designing started in August, 2003, and the production started on July 6, 2004, the No. 8 production line of Guangdong Swire Coca-cola is the first CSD bottling production line developed, manufactured and debugged by Tech-Long. The process took less than one year, but normally it would take five years. Tech-Long has become the first Chinese PET CSD bottling equipment supplier for Coca-cola, and this had changed the Chinese beverage packing industry. At time of fast growing of the beverage packing industry, one enterprise can stand out from the competitors by understanding customer needs, meeting challenge and by taking the opportunity of development.

Tech-Long CSD Bottling Equipment

Elevating Customer Value Through Technological Enhancement

Quality is life. Bearing this mind, Tech-Long has been stressing the importance of R & D, and has been dedicated to improvement of product quality, providing customers with all-rounded services, creating value for our customers.

CSD bottling equipment is a new product developed by Tech-Long at the end of 2003. Presently it has been launched to the market.

CSD is abbreviated for Carbonated Soft Drink. During the developing process of Tech-Long CSD bottling equipment, advantages from products made by renowned companies abroad had been integrated in the equipment, and actual application condition in China had been taken into consideration. By integrating technical innovation into the production line, it is in the leading position in China.

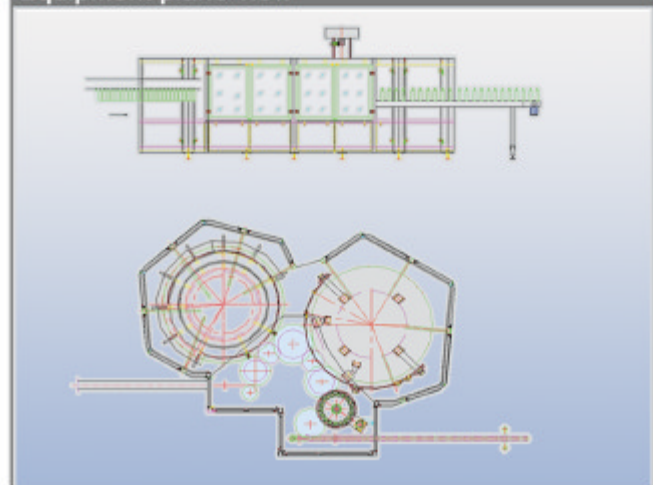
The CSD bottling machine can be knocked down to three parts and so it's convenient for transportation. The height of the bottle conveying chain is adjustable. First, the empty bottles go through the air passage. Then they are transferred to the bottle washing machine, the bottling machine, the capping machine and finally come off the production line via bottle conveying chain. Bottle conveying screws are unnecessary during the bottling operation. Alarming devices are installed at several places to indicate bottle blocking, bottle absence, cap absence and overloading, so as to shoot troubles occurring during the bottling process. The production is reliable, highly automatic and convenient for operation. It has a reasonable technical procedure, conforming to sanitation conditions set up by national standard, ensuring absolute safety and sanitation for the bottling operation. This production line is applicable to bottling for various types of soft drink including water, hot bottling and carbonated.

At present three models of CSD bottling machines are available, and the maximum production capacity is 36000 bottles/per hour.

Technical parameter for three-in-one CSD bottling machine

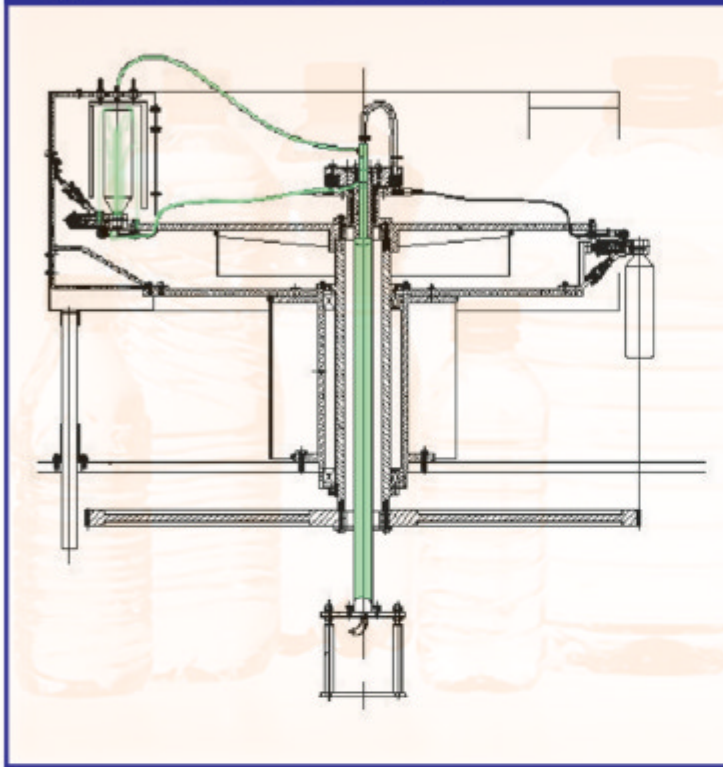
型号 TYPE	DQS12	DQS18	DQS18A
冲洗头数 Rinsing spindle (PCS)	40	72	80
灌装头数 Filling spindle (PCS)	40	72	80
旋盖头数 Capping(PCS)	12	18	18
设备外形尺寸 Dimension(L/W/H,mm)	3900×3150×2820	6752×5238×3015	7905×5595×3015
生产能力(500ml) Output(BPH)	18,000	27,000	36,000
生产能力(1250ml) Output(BPH)	8,000	14,000	16,000
设备重量 Weight(T)	7	11	14
电源电压 Voltage	380V/50Hz	380V/50Hz	380V/50Hz
总功率(装机容量) Total power(KW)	8.5	16	16
压缩空气压力(MPa) Compressed air pressure	0.6~0.8	0.6~0.8	0.6~0.8
压缩空气消耗量(m ³ /min) Compressed air capacity	0.2	0.3	0.35
CO ₂ 压力 CO ₂ pressure(Mpa)	0.7		
CO ₂ 耗量 CO ₂ consumption	0.12	0.18	0.2
冲洗进水压力 Rinsing pressure(Mpa)	0.25~0.3		
灌装桶内压力 Tank pressure(Mpa)	0.25		
灌装进水压力 Water pressure(Mpa)	0.3		
灌装进水温度 Water temperature(°C)	2~3		
灌装方式 Filling code	等压灌装 counter-pressure filling		

Equipment plane view

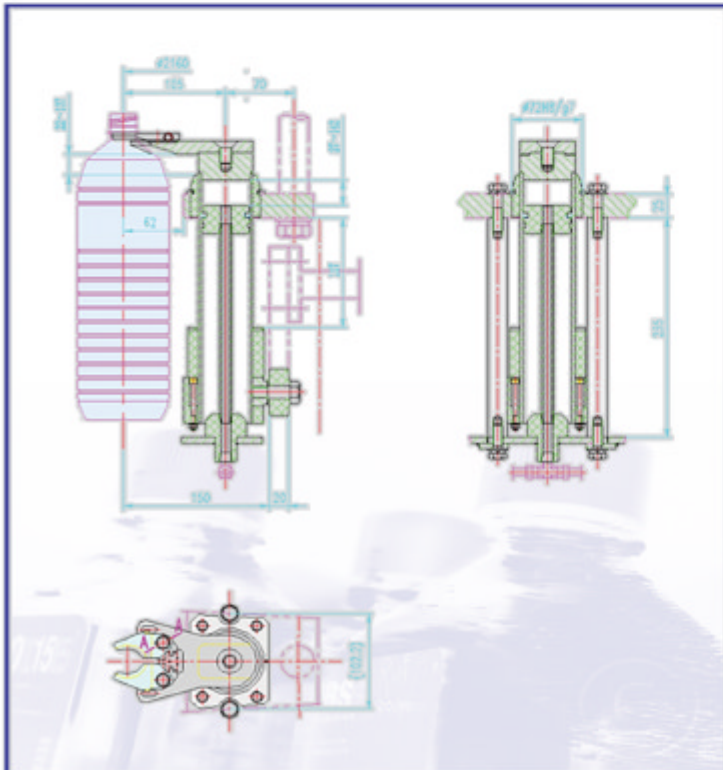


The conveying process is completed through the bottle clamp, convenient for switching between different shapes of bottles, ensuring safety and sanitation.

Diagrammatic sketch for bottle rinsing



The filling container moves along with the rising and falling of the cylinder, thus the filling process is completed.



The Working Procedure of CSD Bottle Equipment

Bottle loading



上瓶输送带 Bottle loading conveyor belt



达意隆集团 TECH-LONG GROUP



Air conveyor



风送道 Air conveyor



达意隆集团 TECH-LONG GROUP



Bottle rinsing and filling



汽水三合一灌装线 Carbonated filling bq15a-3000



达意隆集团 TECH-LONG GROUP



Capping



汽水三合一灌装线：投盖 Copper



达意隆集团 TECH-LONG GROUP



Bottle warming



温瓶机（冷空隧道）Warmer (Casing tunnel)



达意隆集团 TECH-LONG GROUP



Packing

后包装设备



达意隆集团 TECH-LONG GROUP



How much Do You Know About "CSD"?



What's CSD?

CSD is a kind of drink with carbon dioxide filled in under certain conditions, falling into the category of soft drink (non-alcoholic drink). Soft drink refers to beverage products with content of grain alcohol less than 0.5% (m/v), not including those containing carbon dioxide which is generated from fermenting.

What are the types of CSD?

According to classification criteria for soft drinks in China, it can be put into the following five categories: Fruit juice, fruit flavor, cola, low-calorie and uncategorized.

Soft drink of fruit juice type contains certain amount of authentic fruit juice (not less than 2.5%), including orange juice, pineapple juice or mixed fruit juice. This kind of drink contains nutritious elements besides the color, smell and taste of fruits because of the fruit juice added. Some of them contain small amount of fruit flesh. This kind of soft drink is very popular, especially among youngsters due to their natural flavor.

Soft drink of fruit flavor type mainly contains edible essence, while the content of original fruit juice is less than 2.5%. They have bright color and are cheap in price, with a great variety. The combination of edible essence and coloring agent is enormous and so various flavors of soft drink are available in the market. This category has the largest quantity.

Soft drink of cola type contains caramel coloring, cola essence, flavor of kola nut or fruit, as well as fruit flavor extender. This kind of soft drink has tender smell and pure flavor. It is favored by many people because of the unique taste and the caffeine contained. Some famous brands such as Coca-cola, Pepsi-cola and Future Cola have taken up most of the market share.

Soft drink of low-calorie type refers to carbonated soft drink or soda water by using sweetener to replace partial or total of the sugar in the drink, with calorie less than 75kJ/100ml. Some other soft drinks contain vegetable oil extract and are capable of making up the electrolyte

and energy loss after sports, such as ginger juice soft drink. They are suitable for people engaged in sports activities or physical labor.

What's the function of carbon dioxide in carbonated soft drink?

Carbon dioxide is one of the important ingredients in carbonated soft drink. The foaming and stimulating flavor is the result of carbon dioxide. During the processing, under low temperature and high pressure, more carbon dioxide is dissolved in the liquid. When the drink is served, the carbon dioxide will be gasified due to the rise of temperature, resulting in stimulation and taking off heat from the body. That's why people can have the feeling of coolness.

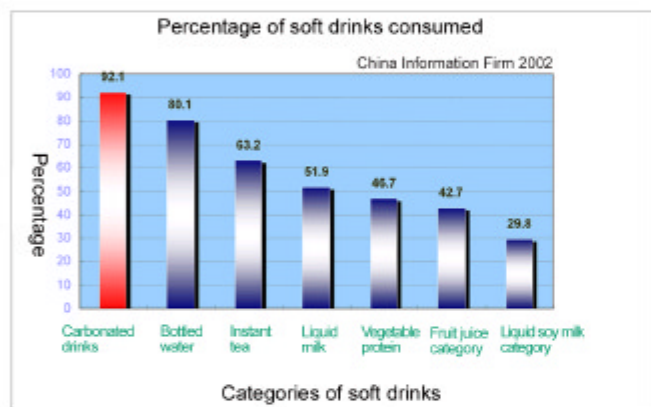
The first function of carbon dioxide is to improve the flavor of the drink, and to adjust the PH value in the drink. The second function of carbon dioxide is antiseptis. Carbonic acid can reduce the PH value, so the microorganism cannot survive except for acid-tolerant bacteria. Furthermore, the existence of carbon dioxide in the container can create an anoxic environment, making aerobic bacteria unable to survive. The existence of carbon dioxide can also maintain certain level of pressure, the drink is extended. Therefore the content of carbon dioxide in carbonated soft drink has been regarded as a critical index in the beverage industry, which destroys the condition of growing for



microorganism. Due to the carbon dioxide, the guarantee period of Carbon dioxide can also create an acidity environment to result in stimulating taste as well as the special foaming. However, if carbon dioxide overflows from the drink during the process of production or transportation, the products will be considered disqualified. This is an issue shall not be overlooked by drink producers.

The market share of CSD among all categories of drink

At present, due to impact from non-carbonated soft drink, the market share of carbonated soft drink has decreased to certain level. However, it still has a good prospect.



The sales volume of carbonated soft drink in China in May, 2004

According to statistics conducted by National Commercial Information Center on major retail stores in China, the sales volume of carbonated soft drink in May, 2004 is RMB26.905 million, having a 17.4% increase.

In May, the top ten brands have taken up 93.6% of the market share, a 1.6% increase compared with that in April. Nine out of ten top brands have remained in the position of top ten in May.

- 1st : Coca-cola
(28.56% of the market share)
- 2nd : Pepsi-cola
- 3rd : Sprite
- 4th : Fanta
- 5th : Future series
- 6th : Mirinda
- 7th : Jianlibao
(Increase by two grades in this month)
- 8th : Seven up (Unchanged)
- 9th : Smart (Decreased)
- 10th : Kang Shifu (Replacing Red Bull as one of Top Ten)

PEOPLE

Great contribution made by Shao Youjian

-- Our gratitude to Shao Youjian of Hong Kong Swire Coca-cola

August 13, 2004 is another day to be remembered forever by Tech-Long people. Following the installation of PET CSD bottling production line in Guangdong Swire Coca-cola, which has launched into production, Hong Kong Swire Coca-cola placed an order with Tec-Long for a set of PET fully automatic rotating high-speed bottle blowing machine, which is to be installed in Shatin Factory of Hong Kong Swire Coca-cola. The Shatin Factory produces 500-1500 ml PET carbonated drinks and bottles of seven specifications.

The success is the result of three years' efforts made by Tech-Long people. However, we cannot do without the help from Shao Youjian, the bottle blowing specialist from Hong Kong Swire Coca-cola.

Shao Youjian possesses more than two decades' experience in the field of machinery and more than one decade's experience in fully automatic bottle blowing machine.

He has a good sense of humor and has established good relationship with people in Tech-Long.

During the process of developing RJM 10, the second generation fully automatic bottle blowing machine, Shao Youjian had raised more than 60 suggestions for improvement by observing on-site operation and by integrating his own experience in this field. As a result, the production efficiency of the machine has been increased from 1000 bottles/per cabinet to 1200 bottles/per cabinet, the level of noise generated by the machine is decreased and the stability has been greatly improved. During the process of machine testing, he followed up the whole process from the beginning to the end, and would not ignore any minor problem. His expertise and his dedication have made Tech-Long people have a better understanding of PET bottling technology and manufacturing techniques. The technology of Tech-Long is upgraded. This has led to the cooperation with Coca-cola. Tech-Long would like to express our gratitude towards Shao Youjian.

From Glass To PET

Trend of beer Bottling



The total production volume of beer in China has increased from 600 thousand tones in year 1978 to 22.728 million tons to date, listing number two in the world, having a difference of 1 million tons compared with the largest producer, the United States. The rapid development of the beer brewage industry has presented excellent opportunity for the beer bottling industry.

Nowadays, people are starting to complain about those heavy glass bottles. Accidents of exploded beer bottles are reported frequently. Beverage can is popular among consumers for its lightness, but the market potential for beverage can is limited due to the high cost of aluminum in China. Therefore, the demand for a new type of beer bottling seems quite urgent.

To meet this demand, many countries are trying to develop a new type beer bottling. A kind of plastics bottles to replace glass bottles has been developed.

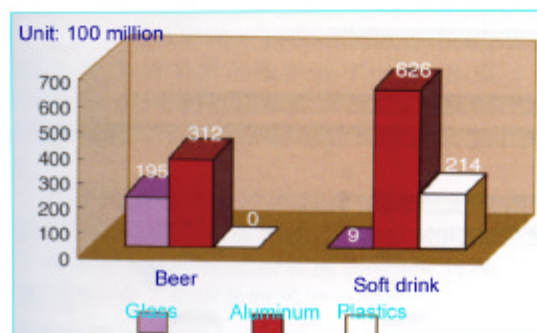
The advantages of this kind of plastics bottles include: lightweight, high-tensile, toughness, not easily broken and available in various sizes and shapes. Beer is quite different from normal carbonated drinks for its easy oxidation. So it has a strict requirement for the obstructing performance on the containers. Increasing the obstructing performance of the bottles while maintaining the cost at an acceptable level has become a critical factor in development and manufacturing of plastics beer bottles.

There are several solutions for the manufacturing of plastics beer bottles. The first is to produce single-layer bottle by using 100% PEN. The second is to produce

multi-layer bottles with good obstructing performance. That's to create EVOH or PEN filling in PET material with application of multi-layer plastics molding techniques. This solution does not have much room in material selection, and it is restricted by environmental regulations on waste material recycling. The third solution is to apply coating on PET, but this encounters great difficulty and is not environment-friendly. The forth solution is application of mixed material. Presently all major PET equipment manufacturers are devoted to developing techniques for plastic bar bottles production. The advantages of PET beer bottles include the following:

1. Compared with glass bottle, PET bottle with the same capacity is 30% lighter in weight. Thus, cost of transportation is reduced and it is convenient for consumer handling.

Bottle by using 100% PEN. The second is to produce



From the above chart we can see that containers for beer possess the greatest potential compared with the well-developed market for beverage and bottled water

It is light weighted, not easily broken, safe, convenient for handling and available in all shapes. 3. High efficiency in recycling, low-cost and environment-friendly. 4. Repeated application of bottle cap to enable consumers to keep the remaining amount of beer in bottle. 5. Compared with beer contained in beverage can, beer contained in PET bottle have a fresher taste. 6. Compared with glass bottle and beverage can, PET bottle is easy for hand-holding. 7. Compared with beverage can, PET bottle has a top grade look, more like glass bottle, and so can meet consumers' demand in personality and high class. On the other hand, the cost for PET beer bottle is higher due to the application of coating inside the bottle to prevent beer deterioration. For this reason, it is impossible for PET bottles to totally replace glass bottles in beer bottling in a short term. However, with the increased awareness for environment protection, emergence of restricting policy for packing material, together with the maturation and prevalence of the PET obstructing techniques, the cost of PET beer bottling will become acceptable someday.

China is a large producer of beer. This has given great potential to the development of PET bottles. In annual meetings of plastics packing held in recent years, technical exchange activities have been organized to encourage enterprises in the development of PET bottles. Beer is different from other carbonated drink. The taste of beer will change with even small amount of oxygen mixed in the bottle, while the leakage of CO₂ from the bottles will reduce the amount of foaming. Therefore the requirement for obstructing performance of the bottle is higher so as to maintain freshness of the beer and extend the tie period of storage. In China, pasteurization is employed in the production of 95% of the beer. This method post a requirement

for the bottles: capable of enduring temperature of 620-670. The above-mentioned aspects have become the bottleneck for the development of plastic beer bottles.

According to forecast within the packing circle, with the development of PET modifying technology, there will be a breakthrough in the obstructing performance in PET bottles. The growth rate is expected to be 20% in the coming 10 years.

According to non-complete statistics, the percentage of beer bottling among the European PET bottling market has increased from 0.4% in 1997 to 1.9% in 2003. By year 2005, the PET materials used in plastic bottles in the world will be over 1 million tons. The North America will become the largest market for PET bottles in the world. In 1999, the consuming amount of PET bottles in USA is only 50 million pieces, and it has increased to 150 million pieces by year 2000, increasing by 200%. By year 2001, it has increased to 300 million pieces, increasing by 400%. According to estimate by specialists, by year 2005 and 2010, the consuming amount of beer in USA will be 23.8 million tons and 24 million tons respectively, among which beer with PET bottling will be increased, reaching 250 thousand tons.

In the Asian-Pacific area, the quantity will reach 235 thousand tons. By year 2007, amount of PET material used for beer bottling will reach 840 thousand tons, taking up 3.7% of the market share. By year 2002, the production volume of beverage in China has been nearly 23.84 million tons, with an annual growth rate of 20%. This is a bright prospect.

Source: China Security Information Net, Consuming Magazine

A brief introduction of PET



Macau Beer

The launch of PET fresh-keeping beer bottles in the market by ZhongFu Company in Zhuhai has increased the technical level of beer storage. It also proves helpful in the sales and promotion of beer products and in the improvement of safety for beer production process.

PET was developed in 1948 cooperatively by ICI Company in UK and Du Pont in USA. It is applied in fiber production industry and is made through polycondensation between PTA and MEG, with the chemical name being PET. PET film and PET bottles were developed in 1952 and 1969 respectively, and so the market of PET was expanded.

PET is the polyester developed at the earliest time, with the largest production volume and with most extensive application. PET has more application and has become the resin used in plastics packing with the fastest growth in consumption due to the advantages of film and containers made from this material such as high strength, transparency and air tightness. PET has been widely used in bottling for beverage, Oolong tea, black tea and mineral water due to its features such as stable performance, safety, not reacting with contents of packing, no smell caused to beverage and being recyclable. PET has taken up more than 70% of the market share for bottle beverage, and has taken up more than 57.4% of the carbonated market in China. The application of PET has gone through three major stages: carbonated drink packing, mineral water packing and tea drink packing.

However, the application of PET in beer bottling is restricted due to its performance in gas obstructing. The requirement for beer bottling is the most stringent one among all categories of beverage, which includes the following aspects. Firstly, the strength of pressure resistance shall be able to obstruct the leakage of CO₂ under high pressure and the infiltration of oxygen. Secondly, the heat resistance property shall enable it to endure the high temperature for pasteurization. Thirdly, the shock resistance property shall be able to endure the shock impact occurred during the process of production, transportation and sales. Therefore, the increase of gas obstructing performance for PET bottling for beer is the direction of research and development. There is great potential for the brand new application of high obstructing performance PET, so some of the large companies are beginning to invest in the research to solve this problem from aspects such as raw material, equipment, production techniques and property modification of PET material.

Ever since the application of plastic bottling, the packing machinery has gone through rapid development. The market for bottle blowing machinery has been increasing, and fully automatic PET bottle blowing machine has been applied extensively in the packing industry.



An Insight Into The Fully Automatic PET Bottle Blowing Machine

—The history of fully automatic PET bottle blowing technology

At the beginning of the nineties, most of the large PET blow molding factories used imported machines, mainly from Japan or Italy. While most of the small factories used semi-automatic PET bottle blowing machines. Most of the small factories were located in Huangyan, Zhejiang Province. Imported PET bottle blowing machines were made by manufacturers which have gone through decades of development, possessing well-developed technology but with a higher price. Semi-automatic PET bottle blowing machines apply low-pressure air in the production process. Bottles made by those machines have poor flexibility and are much heavier.

From the nineties to date, large bottling factories still use imported high-speed PET blow molding machines, mostly bottle blowing machines of two-step rotating type, such as SIDEL made in France, KRONES made in Germany. Those imported machines have a higher operation speed, a more stable performance and a higher price. Small factories use improved semi-automatic bottle blowing machines, which employ compressed air, have a better molding quality than before, but poor automation. Some of the bottle blowing machine manufacturers with strong technical competence have successfully developed

fully automatic rotating bottle blowing machines, which are capable of making light-weighted bottles. In the highly competitive market, machines with higher performance-price ratio tend to be able to occupy a larger market share. With the rapid development of fully automatic PET bottle blowing technology in China, the Chinese manufacturers are competing with overseas manufacturers in medium-high end products.

—Models of fully automatic PET bottle blowing machines

The fully automatic PET bottle blowing machines can be divided into two categories according to the bottling techniques: One-step method and two-step method.

If all processes including injecting, stretching and blowing are completed within one machine, we call it a one-step bottle blowing machine. Japanese company Qingmugu, Nissei ASB and Italian company SIPA are manufacturers of machines of this type.

Nissei ASB Company is the pioneer in the field of bottle blowing machines. It has thirty years' experience in this field and has made many breakthroughs in manufacturing of mineral water bottles, hot-bottling bottles for tea drink, edible oil bottles, medicine bottles and cosmetics product

Diagrammatic sketch for the working process within the cabinet of the fully automatic bottle blowing machine



1. Initial state
2. State after stretching and the first blowing
3. State after the second blowing
4. State under high pressure
5. State of shaping

bottles. The one-step bottle blowing machines developed by Nissei ASB Company are applied in bottling for medicines and cosmetics products because the conventional two-step bottle blowing technique involves too many processes and may easily generate pollution to products.

When the bottling is done with a two-step bottle blowing machine, the process of plastics injecting is separated with the stretching and blowing process in two separate machines.

First, pet bottle is made by plastic injecting machine. Then the pet bottle at room temperature is heated, stretched and blown to shape of a bottle. This is done on another set of machine. Sidel Company in France and SIG Company in Swiss are major manufacturers of two-step rotating bottle blowing machines.

Sidel Company in France is the outstanding manufacturer of two-step rotating bottle blowing machines. With more than twenty years experience, Sidel has become the manufacturer taking up the largest market share. Nearly 70% of plastics bottles in the world are made by Sidel machines. In June, 2003, 53000BPH high-speed rotating two-step bottle blowing machine developed by Sidel was launched to the market. That was another breakthrough in the bottle blowing technology.

The advantages of one-step technique include no need for pollution-generating process and low power consumption, while the disadvantages include heavy investment, high cost for change of bottle model, long production time and low production efficiency. The advantages of two-step technique include small amount of investment, low cost for change of bottle model, short production time and high production efficiency, while the disadvantage include high power consumption. The two-step technique is suitable for blowing thermal plastics hollow containers using PET, PP and PC material and is extensively applied in production of plastics containers such as drink bottles, mineral water bottles, medicine bottles, cosmetics product bottles and oil bottles.

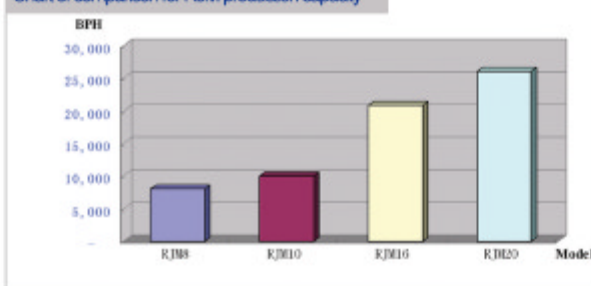
--The present situation of bottle blowing factories in China

With more than one decade's development, the PET bottling industry of China has been divided into two categories: professional bottle blowing enterprises and beverage making enterprises. The professional PET bottle blowing enterprises are represented by Zhuhai Zhongfu and Shanghai Zijiang. They supply bottling for Coca-cola and Pepsi-cola. Beverage

making enterprises are making enterprises are represented by Wahaha, Robust and Kang Shifu, who have purchased PET bottling



Chart of comparison for RJM production capacity



equipment of their own and do the PET bottling for their beverage products.

With the development of beverage packing industry and bottle blowing technology, in October, 2002 Tech-Long Group had successfully developed RJM 8 fully automatic rotating bottle blowing machine. This is the first model of its kind, developed by employing the latest bottle blowing technology in the world. It has wide application in bottling for beverage, foodstuff, cosmetics products, oils and medicines.

Following by that, Tech-Long had launched 3 models RJM 10, RJM 16 and RJM 20 into the market. The production capacity of model RJM 20 is 24000 bottles/per hour, over ten times increase in the efficiency compared with conventional machines. Two-step bottle blowing technique is employed in machine of this model, pet bottle sorting and loading are completed automatically, independent infrared heating is available, and the temperature is adjusted automatically. The bottles finally come into shape through high-pressure blowing and bottles come off the production line by using robotic arms. The types of containers available include PET bottles of round, square, and oval shapes, PET bottle of special shapes, hot bottling bottles, pasteurization bottles, cold bottling PET asepsis bottles, wide-mouth bottles and other ordered containers.

Tech-Long can also supply our customers with mould for plastics injecting of various specifications as well as bottle blowing and capping moulds of various shapes. Tech-Long is not only an equipment supplier but also a reliable partner. Apart from installing and debugging for our customers, we provide our customers with technical consultancy, technical training as well as comprehensive after-sales service. All those are aiming to bring satisfactory return for investment of our customers.

On August 13, 2004, Tech-Long signed a contract with Hong Kong Swire Coca-cola for purchasing a RJM 10 fully automatic rotating bottle blowing machine. It is going to be installed in the Shatin factory of Hong Kong Swire Coca-cola at the end of this year. This is a symbol that the bottle blowing technology of Tech-Long is recognized by Coca-cola following the carbonated soft drink bottling production line, and Tech-Long fully automatic bottle blowing machines have reached the highest level in China.



Tech-Long & Coca-cola

MILESTONES

- In March, 2002, Tech-Long supplied Shanghai Shenmei Coca-cola with a bottled water production line with capacity of 18000 bottles/per hour and five gallon production line with capacity of 900 bottles/per hour. This is the first-time cooperation with the largest bottling factory of Coca-cola in China.
- In May, 2002, Tech-Long supplied Guangdong Swire Coca-cola and Hangzhou Zhongcui Coca-cola with two sets of water treatment equipment.
- In May, 2002, the top management of Tech-Long was invited to "Seminar on Quality Control and Supply Chain" sponsored by Coca-cola in Hangzhou.
- In August, 2002, Tech-Long supplied the Shatin Factory of Hong Kong Swire Coca-cola with five-gallon barreled water production line with capacity of 1200 bottles/per hour, the most efficient production line in Asia at that time, together with the water treatment system. The partnership with Coca-cola was further strengthened.
- In October, 2003, Tech-Long supplied Tianjin Coca-cola with five-gallon barreled water production line with capacity of 900 bottles/per hour, together with the water treatment system.
- In November, 2003, John Slosar, CEO of Coca-cola came to visit headquarter of Tech-Long in Guangzhou.
- In December, 2003, the Agreement of Strategic Partnership was signed between Tech-Long and Hong Kong Swire Coca-cola. Tech-Long became the first strategic partner of Coca-cola.
- In December, 2003, Guangdong Swire Coca-cola ordered the first 30000BPH PET CSD bottling production line with Tech-Long.
- In February, 2004, Hangzhou Zhongcui Foodstuff Company ordered the second 30000BPH PET CSD bottling production line with Tech-Long.
- On July 6, 2004, the first CSF bottling production line was put into production in Guangdong Swire Coca-cola. This production line was named "No.8 production line of Guangdong Swire Coca-cola ". John Slosar, CEO of Coca-cola attended the opening ceremony in Guangzhou. This event signified that the products of Tech-Long are completely accepted by Coca-cola.
- On August 13, 2004, Tech-Long and Hong Kong Swire Coca-cola signed a contract for purchasing RJM 10 fully automatic rotating PET bottle blowing machine.

Industry Dynamics

Seminar on development of tea drinks and vegetable drinks held in Shenzhen

On June 17, 2004, Seminar on development of tea drink and vegetable drink was held in Wuzhou Guesthouse in Shenzhen. The seminar was sponsored by China Beverage Industrial Association and supported by Shenzhen Shenbaohua Foodstuff Co., Ltd. About 145 representatives from 94 institutions were present at the seminar.

Professor Zhao Yali, secretary of the association made a speech on Development of Beverage Facilitated by Technology, Standard and Market, explaining that the development of tea drink, vegetable drink and coffee drink were facilitated by the rich cultural connotation. Zhao Yali also pointed out the problems faced by these three categories of drinks, believing that coordinated operation of technology, standard and market is the correct direction for the healthy development of these three categories of drinks.

Source: China Beverage Industry Association Net

The development of European plastics packing for foodstuff is quickened

By year 2007, the sale volume of packing plastics for foodstuff and beverage in Europe will increase from USD 4.91 billion in year 2000 to USD 7.15 billion, with an annual growth rate of 5.5%.

With the improvement of plastics performance on hardness, heat resistance and toughness, conventional packing method with paper, glass and metal in the European foodstuff and beverage industry is gradually replaced by plastics packing method. The polypropylene packing market is expected to have the rapidest growth, among which thermal polypropylene packing will increase by 10.7%, transparent polypropylene packing will increase by 9.5%, PET comes second, with an annual growth rate of 9.2%. Foam polystyrene and soft PVC are expected to have the smallest increase, and it is likely that they will not increase. France is the country with the largest user of plastics packing for the foodstuff and beverage industry (18.7%), Italy comes second (18%), and Germany comes the third (17.2%).

Source: Magazine of Packing for Exported Commodities

China International Beer & Beverage Manufacturing Technology Exhibition is to be held in September in Beijing

China International Beer & Beverage Manufacturing Technology Exhibition is considered the leading event in the Asian beer and beverage industry. The 2004 event is scheduled to be opened from September 6-10 in China International Exhibition Center in Beijing.

By then, more than 500 exhibitors from all over the world, including manufacturers and suppliers, will be gathering at the exhibition. The scope of exhibition includes: machinery and installing services, operation equipment, measuring and controlling systems, energy management, beverage supplying equipment, sterilizing equipment, lab equipment, processing materials, labeling and packing materials, accessories, industrial security, resource recycling and environmental equipment, production materials and additives, beer and beverage. The exhibits come from Belgium, Czech, China (including Hong Kong and Taiwan), Denmark, France, Netherlands, Singapore, Sweden, Switzerland, Britain and the United States. From the varieties of exhibits and level, the exhibition will be the top among all past events.

Source: Consumer Daily

The beer packing industry in China will go strong

The production turnover of Chinese beer industry has increased substantially in the last two decades. So has the beer and beverage packing industry. PET bottle blowing technology, spray code machines and the latest packing machinery suitable for beverage and beer packing are very popular in the market. Products made by famous manufacturers enjoy good reputation among large enterprise, such as Baode of Germany, KHS of Germany, Kosme (China), Kronos of Germany, Sacni of Italy, Techgen Machinery, Elecster and Pall Filter.

Source: Trends of Economy and Trade

China Beverage Industry Association: The 14th IFU Conference in 2005 will be held

China Beverage Industry Association has announced that the 14th IFU conference in 2005 will be held in Beijing. The International Fruit Juice Manufacturer Association (abbreviated as IFU) was set up in 1949, with 73 members around 34 countries, including professional association from different countries, importers, exporters, equipment and raw material suppliers, wholesales as well as relevant parties interested in this industry. The objective of this association is to facilitate the production and sales of fruit juice and vegetable juice.

China Beverage Industry Association became a member of IFU in 2003 and had been taking an active part in activities organized by IFU. In October 2003, the IFU organizing committee was set up to prepare for this conference.

Source: China Foodstuff Daily

Forecast for the packing industry in 2005

By year 2005, South Africa will become the country with the fastest growth rate in the packing industry. The growth rate for the Brazilian packing industry will reach 18%, and the growth rate for the Argentinean packing industry will reach 14%, following Brazil. This great potential of growth has overrun that in Japan and the United States, the current leaders in the market, with growth rate of 1.43% and 2.02% respectively.

The cigarette packing industry is estimated to become the market with the highest growth rate. By 2004, it will reach 9%. However, in western countries, more and more people are beginning to realize the health problems caused by smoking and the smoking population has been decreasing. The cigarette producers are beginning to take aim at the East European market and the developing countries in Asia.

The foodstuff and beverage packing market keep growing. The growth rate for beverage packing market will increase to 7% in 2004 from 0.7% in 2002. As for packing material, paper is still the prior option, taking up 40.5% of all categories of materials.

Source: China Machinery Information Net

The price for the beverage packing material PET will increase substantially

Compared with last year, the price of PET, which takes up half of the production cost for beverage products, has increased by 30%. Presently, the rise and fall of PET material is imposing great influence in this industry. Due to the substantial increase in the price of petrochemical products, the unit price has increased from RMB 7500 to RMB 14000.

According to the beverage giants Coca-cola, Kang Shifu, President and Jianlibao, the cost for plastics bottles, labels and caps has increased by 40%. This will cause the increase in production cost and will affect the revenue of this industry.

Considering this highly competitive beverage market, the beverage enterprises will not lower price of their products. They will implement the policy of cost control in the company so as to survive in the market.

Source: Nangfang City Daily

San Miguel Group will become top ten among Asian foodstuff and beverage enterprises

San Miguel Group from Philippine announced that they were determined to become top ten among Asian foodstuff and beverage enterprises. San Miguel now is seeking cooperation with Nestle Group and the Japanese company Kirin.

In the first quarter of this year, the revenue of San Miguel Group is 1740 million piaster (about USD 31.35 million). The revenue in last year is 1340 million piaster (about USD 24.14 million), among which beverage is the main source of revenue growth.

Source: Consumer Magazine