

Drinking Water in PET Bottles



In recent years PET bottles (Polyethyleneterephthalat) have largely become accepted in the beverage packaging market for. The reasons for this success are the beneficial features of this material, such as low weight, break resistance, reusability, cost effectiveness and easy application.

The production of big bottles however, like drinking water containers for offices, is still rather infrequent for PET despite the advantages. ADS intends to change this situation by introducing a new blow molding machine especially designed for the production of large PET bottles (up to 5 gallons).

ADS - Experts in Blow Molding PET Preforms

For more than 35 years ADS has developed and manufactured machines for the production of PET bottles, which are used for packaging fluids like water, cola and oil. The company originally started out with production of extrusion blow molding machines (PVC, PP, PE). In 1990 ADS developed a series of machines for blowing PET preforms, in order to live up to the demands of the current market and the newest developments in the area of plastics. These blow molding machines now represent the main expertise of ADS. The company is a globally active business with its headquarters near Paris and also manufactures machines for the production of bottles with complex shapes. The know-how of ADS enabled well-known brands like Evian, Aix and Coca Cola to bring many innovative types of bottles to market. Some of these innovations were decorated with awards by the packaging industry.

Stretch Bow Molding Technology

ADS uses a cold cycle blow procedure suited for high cadence machines for the production of PET bottles. This procedure produces a bottle in only two steps: heating and stretch blowing. The raw material used in ADS blow molding machines is a unfinished product, a so-called preform. After the injection molding in an external machine, a PET molding blank is formed that looks like a thick (2 to 4 mm) and short (100mm for a 1 l bottle) test tube with a screw thread on the top end for the cap.

These preforms are first heated to the so-called glass transition temperature (an interval between 90° and 125°C), in order to achieve a soft and flexible state. The settings for the heating depend on the type of the preforms (weight, color, PET quality) and play an important part in the production process. A regular and accurate heat distribution is a prerequisite for proper stretching of the material. The preform is fed over

Left: "La Carafe", developed in partnership with the EVIAN group

Right: TyNant bottle, voted the most beautiful bottle worldwide in 2002 and awarded the "Oscar de L'emballage 2002"



the neck (screw thread) into the blow mold, where it is mounted. After this first step, a metallic stick stretches the preform. In addition, pressurized air is blown into it at 5 to 9 bar. The pressure is gradually increased to 40 bar until the end of the blowing molding process. The material is thereby pressed against the contours of the cold blow mold, where it cools off. The newly created bottle is then ejected from the blow mold.

An Effective, Low-Cost Automation System

The new G81 machine is intended to be used specifically for blow molding of large PET bottles. It excels thanks to its compact and linear structure, its reliability during operation and its high performance. The G81 can produce between 300 and 600 bottles per hour, depending on their format and weight. Bottles that can contain up to 5 gallons are possible.

The automation system of the G81 is particularly powerful and flexible. This system led to a strong decrease of the total costs. ADS decided on a Power Panel based B&R solution, because it unifies visualization, control and operation into a single system.

Up to now ADS used classical controllers and HMIs. The procedure used in the G81, especially the short reaction times required to control the stretch blow molding, made a high-performance automation solution necessary. It consists of a B&R Power Panel 41 with 5.7" Touch Screen and function keys, which controls the entire application program. Remote X67 I/Os as well as the pneumatic valves and an infrared lamp controller for heating and the preforms are connected via field bus.

Fabrice Bernard, Head of Automation at ADS, reports that the decision to choose B&R as partner was well-




Fabrice Bernard
Head of Automation
ADS

"We have been able to lower the total material costs even further, thanks to B&R's Power Panel solution."

considered and that the targets of low cost effectiveness as well as higher performance were met beyond all expectations. "We have been able to lower the material costs even more, due to B&R's Power Panel solution. In addition, the extensive range of remote IP67 I/Os has enabled us to reduce the switching cabinet size to a minimum. All in- and outputs are mounted directly on the machine. The time required for switching cabinet installation has therefore decreased by 15 hours. We have also saved lots of space, because of the integrated controller in the Power Panel," explains Mr. Bernard.

ADS managed to develop the G81's automation system in record time, thanks to B&R Automation Studio and standard programming languages (instruction list, ladder diagram, structured text). Each automation task could be coded into the most suitable programming language

"Programming the visualization, control

and drives was carried out with a single software tool. This concept allows us to quickly and easily implement B&R's solution," adds Mr. Bernard. This solution is ready for future developments, because B&R's proven software compatibility allows application programs to be reused with other ADS blow molding machines. 

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The G81 from ADS is a real alternative to polycarbonate, which takes a leading position in the market place of large plastic bottles.

