



ASB
Form Your Vision

ASB + HSW

HSW

Molding System for PET 5 U.S. Gallon Water Bottle Manufacturing



Returnable, Very Large PET Bottles

Pushing back the limits of PET manufacturing.

ASB's double-blow heat-set technology can expand the usage of PET to the molding of very large returnable & refillable water containers

Nissei ASB has been working in the field of hot fillable container manufacturing for over 20 years, mainly for narrow necked containers for tea and juices. Now we have used our vast experience in heat-set molding technology to develop a process where very large containers such as 5 US gallon returnable & refillable water bottles can be heat-set molded to enable long service life without excessive shrinkage while using industry standard washing temperatures.

There are two steps in the process – primary bottle molding and heat-set blow molding.

■ Primary Bottle Molding – ASB-650EXHS / ASB-650EXHD

The primary bottle is molded on one of our dedicated large bottle machines, utilizing the standard 1-step injection stretch blow molding process that ASB introduced to the industry over 30 years ago.

Although performance will be improved by using a PET grade suitable for hot filling applications, it is not necessary to use any premium grades having special formulation or additives. This is partly due to the conditioning (2nd) station having the ability to apply additional cooling to the preform, thus avoiding excessive crystallization.

Containers can be molded either direct from the ASB-650 machine or may be stored and processed later.

■ Heat-Set Molding – HSW

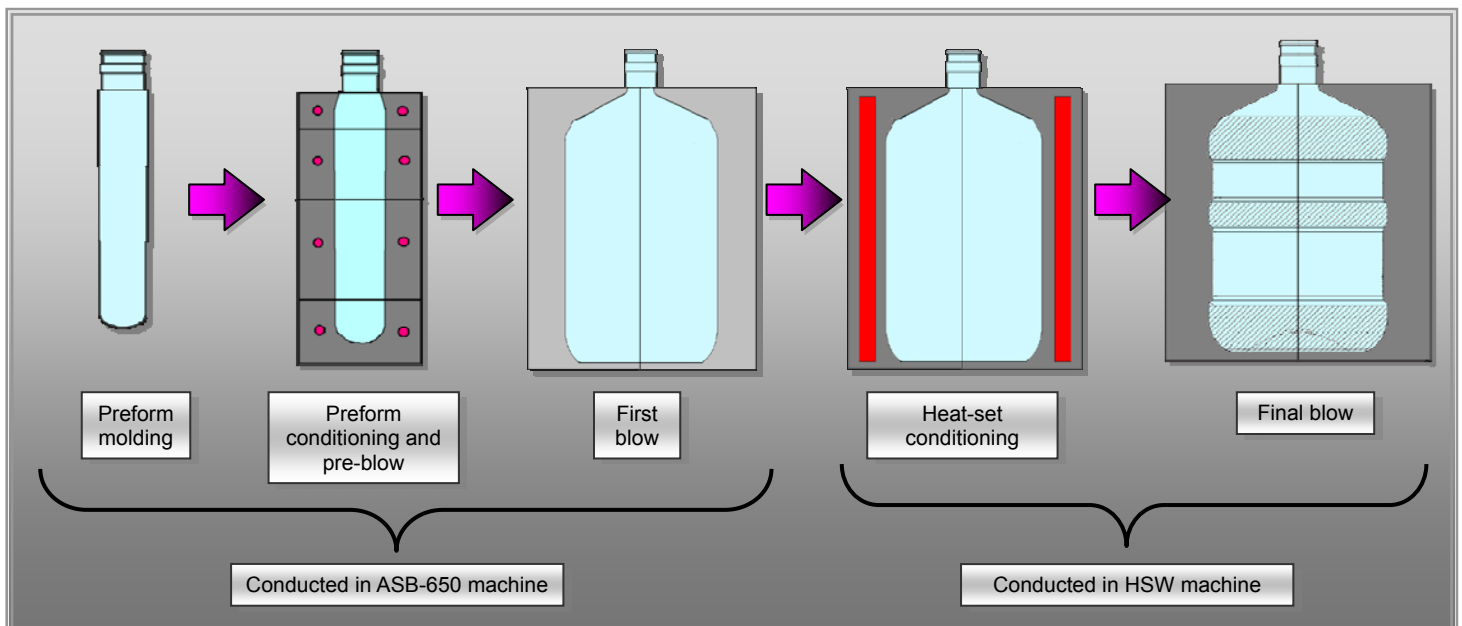
The HSW machine is very simple in concept. It takes pre-molded bottles and applies heat conditioning to the body of the bottle, then transfers them to the final mold where the finished shape is formed. Temperatures of the two molds are approximately 160°C and 100°C respectively. The first mold is primarily heated electrically with certain zones being controlled by oil conditioning. The second mold is conditioned by oil from a mold temperature controller.

Containers are then rapidly moved to the second blow mold where the shrunken container is blown out to the final container shape into a blow mold heated by MTC units to around 100°C. The temperature of the second mold allows the crystal growth to continue and stress relieving reduces the tendency of the container to shrink after molding.

The sample bottles exhibited at the K2010 exhibition were molded with the following properties;

Weight	-	700g
Thread Dia.	-	63mm
Capacity	-	19 liters
Washing Temp.	-	up to 70 °C
Production	-	110bph (projected target).

Bottles molded by this method will exhibit enhanced resistance to washing temperatures, while maintaining high levels of clarity.

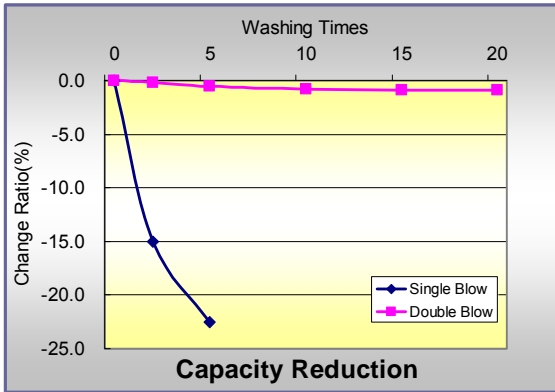


- Steps in the double blow heat-set process leading to high heat resistance and good clarity.

■ Advantages of Double Blow

The double blow process plays to the strengths of PET. Initial stretch-blow molding of the bottle at regular stretch ratios ensures excellent material distribution.

The heat conditioning phase allows a very controlled growth of crystal within the material which enables the maximum heat resistance in the finished container while maintaining good clarity. At the same time, the act of allowing the oriented molecules to relax ensures that stress is released which would otherwise cause excessive shrinkage in the finished container



at washing time. The test results speak for themselves. Comparing double blown containers against single blown equivalent containers we see very low levels of shrinkage in the double blown version even after 20 washing cycles at 70°C.

HSW machine for PET 5 U.S. gallon returnable water bottle production



The single blown bottles on the other hand exhibit strong shrinkage and are unusable after just one or two washes at this temperature.

■ PET vs. PC

Compared to PET, Polycarbonate has far higher heat resistance with excellent impact and scratch making it highly suitable for the 5 U.S. gallon water bottle market. However, PET has the potential to beat PC in many key areas;

- PET is dramatically cheaper than PC, typically about 1/3 of the cost.
- PET recycling infrastructure is more highly advanced in most countries.
- PET does not contain Bisphenol A, a chemical present in PC that may be linked to problems of human fertility.
- Greater variety of shapes can be molded in PET.
- Basic molding of PET is easier with better control of wall thickness.

Now, with the added benefits from double blow heat-set molding, the 5 U.S. gallon PET bottle is able to offer technical performance closely matching those of PC without suffering the disadvantages of PC.

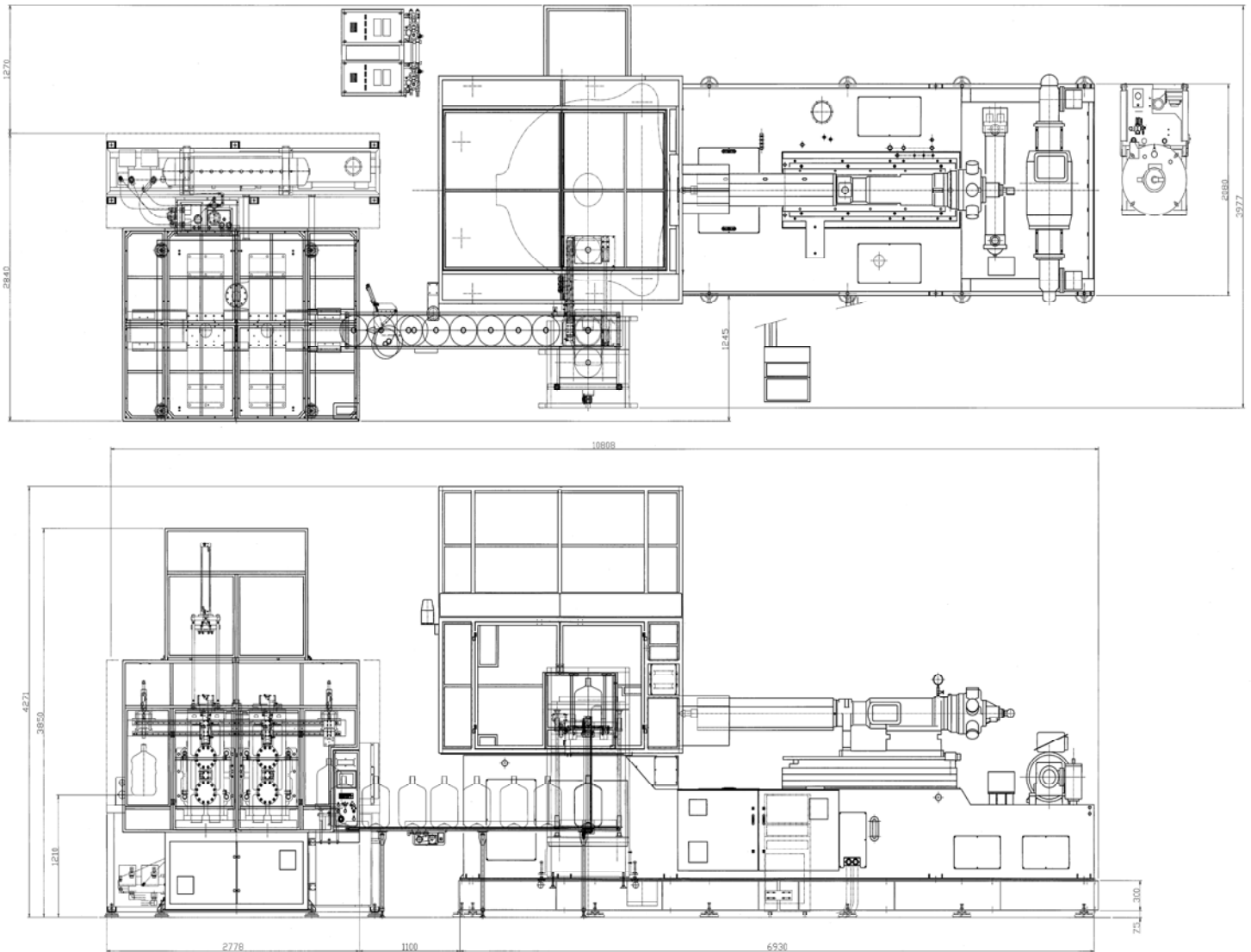
■ HSW Specifications

Products	Unit	
Cavity	No.	1 x 2
Capacity	L	11.4 ~ 20
Max. Neck Diameter	E (mm)	60
Max. Body Diameter	BD (mm)	300
Container Height	HB (mm)	400 ~ 575

• All figures are subject to container configuration

Machine	Unit	
Driving Power (Rated)	kW	16
Heater Capacity (Rated)	kW	12 ^{*1}
Oil Reservoir	L	85
Machine Size (L x W x H)	mm	3000 x 2840 x 3790
Machine Weight (ex. mold.)	ton	9

• Specifications are subject to change without any obligation on the part of the manufacturer
*1 – Depends on container specification



- Sample layout of ASB650EXHS + HSW Series for PET 5 U.S. gallon bottle production (for reference only)

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