

BPHEs making PET bottles

- *SIPA S.p.A. Italy*



The soft drinks industry was the main driving force behind the development of the polyethylene terephthalate (PET) bottle. Before 1960, almost all carbonated soft drinks were packaged in small returnable glass bottles. These have now been almost completely replaced with PET bottles, which are light, robust and reusable.

PET bottles can be produced in a one-or two-step process. The Italian company SIPA offers its customers both technologies to accommodate specific plastic packaging needs. SIPA's technology integrates the injection press with the preform blowing process, enabling the bottles to be obtained directly from plastic resin in a single machine. Oil in the hydraulic equipment used in the process must be cooled, and this is an ideal application for SWEP's compact brazed heat exchangers (BPHEs).

Customer website: www.sipa.it

The problem

The process is divided into two parts: injection pressing and preform blowing. During the pressing stage where the plastic powder is melted to form a preform, hydraulic oil is used in order to open and close the presses. The hydraulic oil becomes hot and must be cooled. Since the bottles are used for beverages, hygiene standards appropriate for foods are essential. The manufacturing environment is therefore disinfected, which makes it aggressive towards steel heat exchangers.

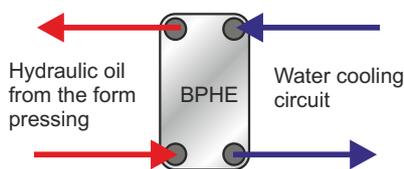
The solution

SWEP BPHEs were selected because they combined high performance with the compactness required for this application. SWEP BPHEs also have an uncomplicated exterior and simple connectors, which makes it easier to protect the unit with paint in the aggressive manufacturing environment encountered in this application.

Shell-and-tube (S&T) heat exchangers have been used in the past, but they performed inadequately and were considered too large.

System description

The hydraulic oil from the pressing stage of the PET bottle process is cooled in a rugged SWEP BPHE. A B45 model is typically used, but of course the size of the heat exchanger required depends on the size of the bottle-producing unit and the quality of the cooling water (its temperature, flow rate, etc.) provided for the system.

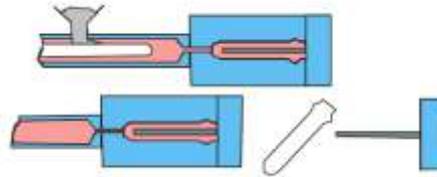


The hydraulic oil is cooled in a BPHE with water on the secondary side.

Benefits

In this solution, SWEP BPHEs offer:

- Compactness that is essential to the application
- Ruggedness for reliability and minimal maintenance
- External simplicity to facilitate protection in an aggressive environment
- High performance for low running costs



Molten PET is injected into the injection cavity and cooled rapidly to form a "preform".



Left: Preforms made from pressed plastic powder.

Right: An installed B45 BPHE.

Application data

BPHE type	B45x40/50/60 (depending on which machine)
Water temperatures (in/out)	30/35 °C
Hot oil (ISO VG 46) temperatures (in/out)	47/41 °C
Oil flow	2.7 kg/s
Water flow	1.5 kg/s
Maximum pressure drop on the oil side	150 kPa
Maximum pressure drop on the water side	50 kPa