

BPHEs making chocolate

- *IRCA S.r.l. Italy*



Throughout the world, much attention has been paid to pneumatic transport (transport by air flowing through pipes) with its many possibilities and advantages. For example, transporting materials such as powdered foods or chemicals pneumatically helps prevent physicochemical changes in the materials during transport. Pneumatic transport also increases the wear resistance and hence the durability of the factory equipment.

IRCA is one of the leading Italian manufacturers of semi-finished products for pastry and baking. They start their process with raw materials such as sugar, cocoa powder, milk powder, etc., which are mixed in the appropriate proportions to make chocolate for subsequent processing. IRCA uses pneumatic transport systems, and compact brazed heat exchangers (BPHEs) from SWEP play a vital role in keeping them flowing smoothly by keeping the air cool.

Customer website: www.irca-srl.it

The problem

Previously, IRCA's cocoa powder, milk powder and sugar were transported by a screw system. However, seasonal variations in powder quality sometimes caused the screws to become clogged. A pneumatic system was introduced, but there were still problems because the air temperature sometimes rose above the melting point of the cocoa butter in the cocoa powder. In the summer, the transporting air (which is taken from outdoors) must be cooled to ensure its temperature does not exceed 32°C.

The solution

Rugged and efficient SWEP BPHEs are used to cool the air for the pneumatic transport system, which operates at relatively low pressure. A given mass of air occupies a large volume under these conditions, so two BPHEs are used in parallel to keep port velocities acceptably low.

Although two BPHEs are used, their compactness ensures that the overall size of the solution remains small.

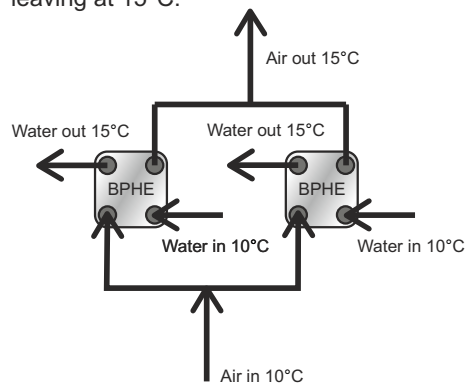


The two B60s installed at IRCA, covered with cocoa dust.

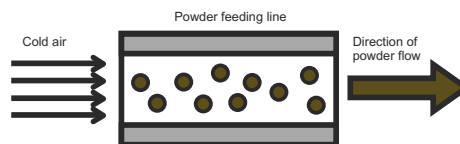
System description

Air is taken from outdoors and filtered to 99.9% purity before entering two B60x30 BPHEs. The cooled air then flows through the feed lines, transporting the cocoa powder.

The BPHEs are installed in parallel so that only half (435 kg/h) the total air flow passes through each. The temperature of the air entering the heat exchangers varies with weather and season. The system was designed for a worst-case scenario (see application data) with inlet air at 60°C and outlet air at 15°C. The secondary flow is water entering the BPHEs at 10°C and leaving at 15°C.



Two B60x30 in parallel cooling the air for the pneumatic transport system.



Pneumatic transport of cocoa powder in the feed line.

Benefits

In this solution, SWEP BPHEs offer:

- Compactness enabling a parallel configuration in a small space
- High turbulence ensures efficiency and minimal cleaning
- Ruggedness and simplicity for minimal maintenance and good hygiene.

Application data

BPHE type	2 B60x30 in parallel
Water temperatures (°C)	10 to 15°C
Air design temperatures	60 to 15°C
Air flow	870kg/h
Maximum pressure drop on water side	5 bar
Maximum pressure drop on air side	0.5 bar