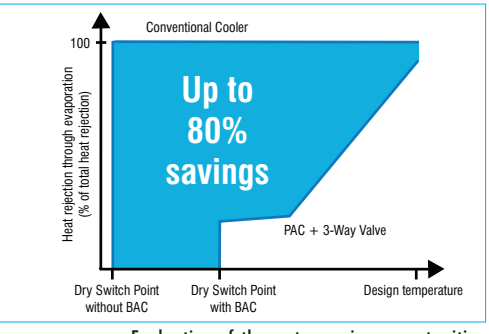
Project report
Robert Bosch – Czechia
Customized solutions to meet environmental needs

In the Czech Republic, 'Robert Bosch - Č. Budějovice' produces various components for the automotive industry such as fuel systems and cylinder covers. For Bosch, both sustainable products and environmentally friendly production facilities are key aspects of their corporate brand image. The ISO 14001 standard helps Bosch to minimize the environmental impact of its operations. For a new plastic moulding facility, Bosch required the most efficient cooling equipment with minimum water consumption and an indoor installation. Together with the customer BAC analyzed and profoundly evaluated the site conditions and requirements. As a result BAC proposed the HFL hybrid closed circuit cooling tower as the best solution to satisfy Bosch's needs.

High thermal efficiency through closed circuit evaporative cooling

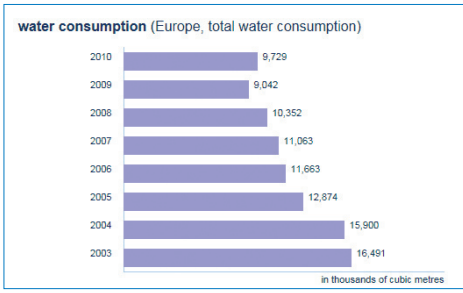
Bosch aim is to cut carbon dioxide emissions at all manufacturing sites worldwide. This requires energy efficient machinery and production processes. The best solution to achieve **low process temperatures** during peak load operation is using evaporative cooling. The high thermal efficiency of evaporative cooling directly benefits the environment by minimizing the use of electrical energy. Moreover to guarantee a sustainable solution, the water to be cooled is in a closed loop and thus remains **clean** and cannot become contaminated by exposure to the air.

Reduce water consumption



Evaluation of the water saving opportunities

Another environmental objective of Bosch is reducing the water consumption in their production facilities. BAC's hybrid closed circuit cooling tower combines **air cooled** and **evaporative cooling** technology in one product. It provides low cooling temperatures, high process efficiency and guarantees water savings throughout the year, even during summer design operation. The patented **intelligent flow control system** regulates when and how much evaporative cooling is needed. This results up to **80% overall water savings** compared to traditional closed circuit cooling towers.



Over the last 15 years BAC provided several HXI water saving hybrid closed circuit cooling towers which helped Bosch to reach their ambitious water saving targets. In less then 10 years Bosch already managed to reduce its water usage by more than 40 % while the company grew with 15 % to 186.600 employees in Europe alone. Baltimore Aircoil will again contribute to these impressive water savings with the HFL.

Hybrid water saving technology has another ecological and financial benefit, it **reduces the amount of chemicals** to be used in the needed water treatment and requires less water sewage.

Indoor installation

The HFL towers are perfectly housable indoors thanks to **centrifugal fans** allowing intake or discharge ductwork. Bosch already knew and used BAC's intelligent water saving flow control system in HXI cooling towers, so the HFL was the perfect alternative solution for this indoor application.

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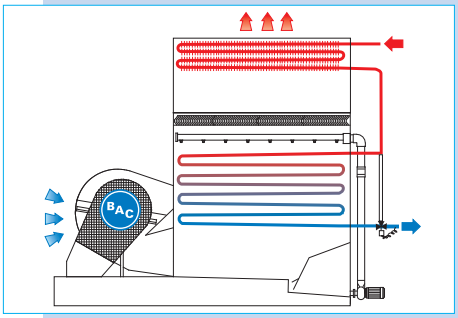
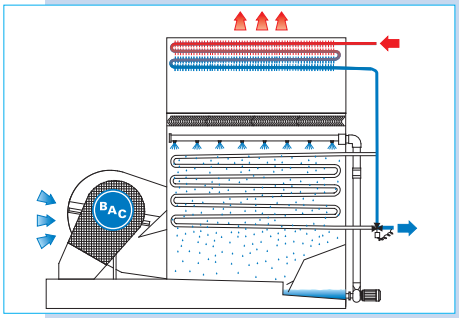
HOW DOES THE WATER SAVING HFL WORK ?



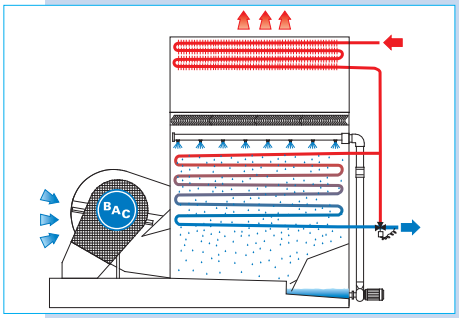
Dry operating mode

The spray water pump is turned off and the modulating flow control valve remains fully open. The fluid to be cooled is fed from the finned coil to the prime surface coil and is cooled by the dry air.



Adiabatic operating mode

The fluid to be cooled completely by-passes the wet prime surface coil. No heat is rejected from this coil and the recirculating spray water merely serves to saturate and adiabatically pre-cool the incoming outside air using virtually no water.



Combined wet-dry operating mode

The fluid to be cooled is first fed to the finned discharge coil, where it is pre-cooled by the discharge air. Subsequently the fluid is fed to the prime surface coil, which is wetted by the spray system. At reduced heat load and/or ambient temperatures the modulating flow control valve, which is controlled by the design fluid outlet temperature, modulates the flow through the wet prime surface coil, hence minimizing the water consumption.

OTHER HFL BENEFITS

Plume reduction

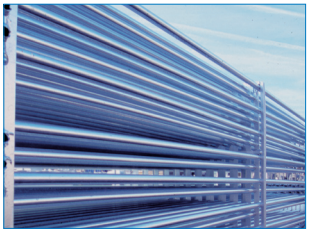
An additional advantage of BAC's hybrid water saving technology is the reduction of plume. Even though plume is harmless, in certain applications it is considered a hindrance.

Auto-drain sump

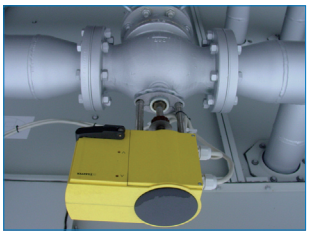
The HFL incorporates a unique auto-drain sump design. During dry operation all water will drain from the dry sump into the wet sump, which is shielded from the air stream and protected from freezing by heaters. The wet sump is accessible even when the fan system is in operation. It can be drained and cleaned easily.

LOW ENVIRONMENTAL
IMPACT PRODUCT

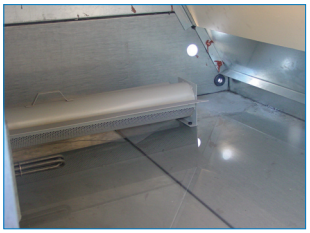
Dry finned discharge coil



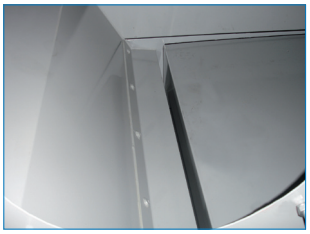
Wet prime surface coil



Flow control valve



Separate internal cold water basin



Sloping dry sump

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