

Case study

Smart Cooling Modernization with R290 at Hermann Hauff GmbH & Co. KG

Reduced CO₂ emissions, electricity and water consumption in injection molding



Photo credit: Hermann Hauff GmbH & Co. KG

By modernizing its cooling system, Hermann Hauff GmbH & Co. KG has achieved annual savings of around 300,000 kWh of electricity, 110 tons of CO₂ emissions, and 1,000 m³ of drinking water. The company, a producer of precision plastic injection-molded parts for industries ranging from household appliances and consumer goods to automotive, medical, and precision engineering, upgraded its Pforzheim plant with six water-cooled compact chillers using the natural refrigerant R290. The system is regulated via an MSR control system for demand-based cooling and energy optimization, while waste heat from production machines is reused for building heating. Installed during ongoing production, the solution ensures high operational reliability and full transparency through real-time monitoring.

Key information

Client: Hermann Hauff GmbH & Co. KG, Germany

Supplier: Frank Schlittenhardt GmbH, SECON GmbH

Type of facility: Precision plastic injection molding and mold making

Refrigerant: R290 (Propane)

System start-up: 2025

Requirements

The modernization project aimed to replace aging cooling technology with a future-proof, climate-friendly solution. The new system needed to be highly energy-efficient while ensuring reliable 24/7 operation across three shifts, even during hot summer months. Integration into building management and MSR systems was required for central control, automated fault reporting, and transparent real-time monitoring of energy flows. Beyond cooling, the solution was expected to reduce electricity and water consumption, safeguard production through redundant system components, and make full use of available waste heat for building heating. Long-term operation and serviceability were equally important, calling for a modular, expandable, and maintenance-friendly design.

Solution

The modernization of the cooling technology was completed in 2024/2025 during ongoing production, with commissioning in March 2025. At its core, the new system consists of two groups of three FXP compact chillers manufactured by Secon GmbH, each operating with the natural refrigerant R290 (propane). The chillers are supported by air-cooled dry coolers that provide free cooling above +9°C for tool cooling and +24.5°C for hydraulic cooling, completely eliminating the need for compression cooling in these conditions and reducing water consumption by around 1,000 m³ annually. Frank Schlittenhardt GmbH was responsible for the system concept, planning, and integration into the building automation, including ventilation, fire protection flaps, and the heat pump. The MSR system dynamically regulates power demand, switches automatically between heat sources, and provides seamless monitoring with real-time data, status reports, and fault messages — ensuring maximum operational safety even in unmanned shifts.

To further improve efficiency, the existing heat pump was optimized for higher source temperatures and is now primarily used on production-free days. During regular operation, waste heat from compressed air compressors is utilized for building heating, automatically managed by the MSR system. The entire installation is redundantly configured with frost-proof cooling media to secure continuous production under extreme conditions. With a seasonal efficiency (SEPR) of 32.57, the plant achieves an outstanding performance level, generating on average 32.57 kW of cooling per 1 kW of electricity annually.

Key benefits and features

- **Energy savings:** approx. 300,000 kWh/year, lowering operation costs by roughly 11%
- **CO₂ savings:** approx. 110 t/year
- **Water savings:** approx. 1,000 m³/year thanks to the switch from spray-water-based to air-cooled recooling.
- **Operational safety:** MSR-controlled monitoring
- **Flexibility:** Modular design, transferable to other industrial applications

Technical data

Cooling capacity: Tool cooling 3 × 85 kW, hydraulic cooling 3 × 80 k

Refrigerant charge: 2,5 kg R290 per refrigeration unit

Evaporation temperature: Approx. +9,5°C tool, +24°C hydraulics

Condensing temperature: Depending on outside temperature / operating conditions

Main components:

- Water-cooled compact chillers with R290, operated with reciprocating compressors, regulated by inverters: Tool cooling 3 x compact chillers, type FXP160-995.S-I-ST (manufacturer: Secon GmbH)
- Hydraulic cooling 3 x compact chillers, type FXP80-565.S-I-ST (manufacturer: Secon GmbH)
- 4 screw compressors with two refrigeration dryers generate around 1.238 million m³ of compressed air: 3 ALMIG Variable 24 and 1 ALMIG V75

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