STEMKE COOLING

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Refrigerant Cooling in detail

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Our refrigerant cooling system ensures consistently optimal temperature control for your injection molding tools.
It allows for precise, fast, and reliable temperature control of mold cores, ribs, and even the smallest areas with a diameter of less than 8 mm, achieving the desired mold and demolding temperature.
With our tool-specific temperature control system, we reduce the cycle time of the injection molding process by an average of up to 30 percent. Additionally, the steady temperature distribution in your injection molding tool has a positive impact on your quality and productivity.

Cost savings in production
Reduction of cycle times by an average of 30%

Increased productivity
Individual consulting and tool design adaptations

Environmentally friendly and safe
Refrigerant flows in a closed system

Improved injection molding quality
Cooling of mold cores, ribs, and smallest areas down to 2 mm in diameter or wall thickness

Prevention of hotspots
Ensures uniform temperature distribution in the injection molding tool

How It Works
The Refrigeration Cycle

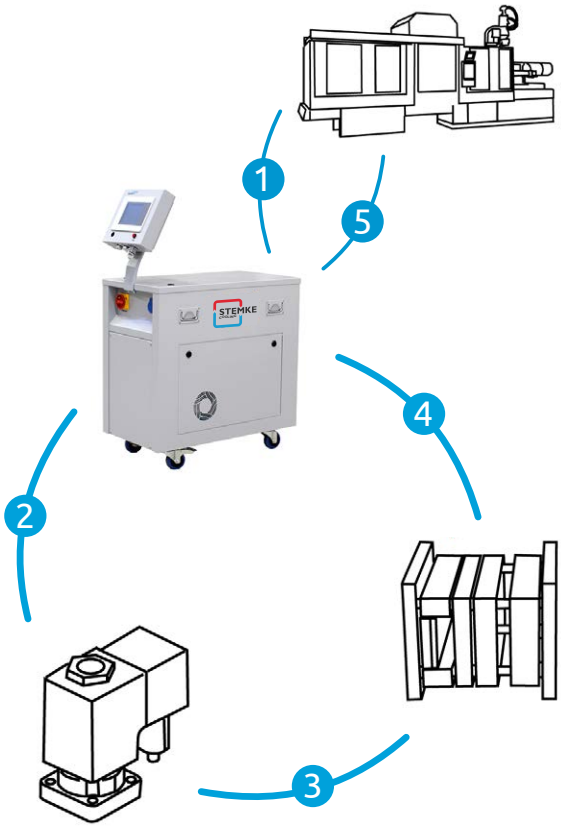
1. The refrigerant in its liquid state is transported from the cooling unit (temperature control unit) to the tool via a pipe or hose connection.

2. At the designated cooling point, the refrigerant expands within a specially designed expansion chamber, releasing "cold energy."

3. The now gaseous refrigerant absorbs heat energy from its surrounding, a process known as refrigerant saturation. The saturated refrigerant gas is then returned to the cooling unit.

4. Inside the compressor, the gaseous refrigerant is compressed, absorbing additional heat energy.

5. The hot refrigerant gas passes through a heat exchanger, which cools and condenses it back into a liquid state.

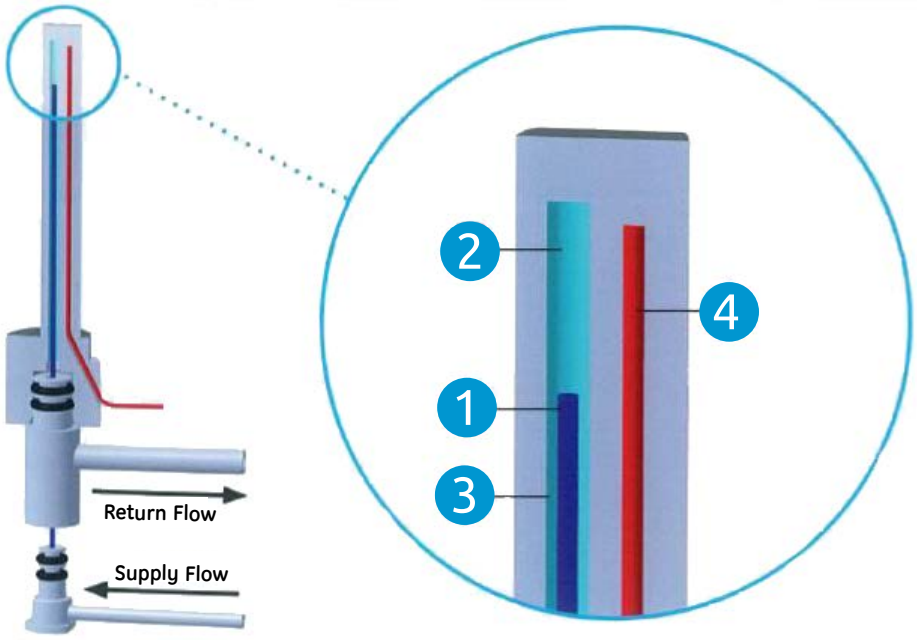


This refrigeration cycle operates securely and efficiently within a closed, loss-free system.

Temperature sensors are integrated into the cooled areas of the injection molding tool. Positioned as close as possible to the expansion point, they continuously transmit real-time temperature data to the control unit.
When the liquid plastic is injected into the mold, temperature rises rapidly. As soon as the set mold temperature is exceeded, the control unit sends pulsed regulation signals to the solenoid valves. Refrigerant is then injected into the cooling zones in pulses, where it expands and absorbs heat energy from the hotspots during this phase transition.
This pulse-controlled refrigerant injection continues until the target demolding temperature is reached, allowing the part to be ejected.

With STEMKE Cooling, you get a highly reliable and cost-effective solution for mold temperature control. Even in critical hotspot areas, the mold temperature is always maintained within the optimal range.
STEMKE Cooling is ideal for both new tool designs and retrofitting existing injection molding tools that are already in use.

Principle Sketches



1

Capillary Tube
Liquid refrigerant enters the mold core via a capillary tube or borehole.

2

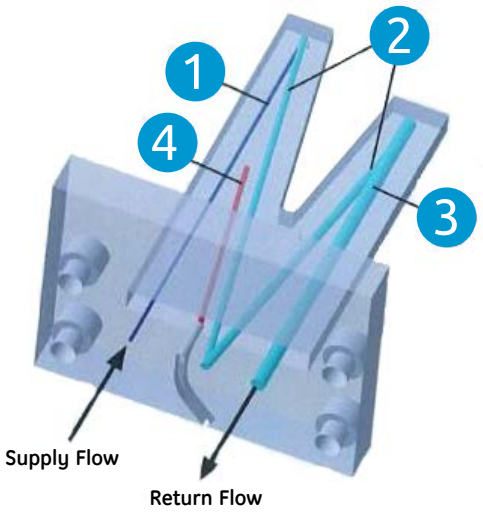
Expansion Chamber
Within the dedicated expansion chamber, the refrigerant absorbs large amounts of heat energy from its surroundings, creating localized cooling in the injection mold.

3

Return Flow
The gaseous refrigerant is transported back into the refrigeration cycle via a dedicated borehole.

4

Temperature Sensor
The temperature sensor measures the actual temperature of the contour pin and transmits the value to the impulse control system. The required amount of refrigerant is regulated by a solenoid valve based on the target temperature.



Cooling Units
Overview of Available Models

We offer various performance classes for our mold temperature control solution:

Cooling units	SCG 1.9	SCG 4.0	SCG 8.9
Refrigeration capacity Q at t0 = -10°C	1.9 kW	4.0 kW	8.9 kW
Refrigerant type	R448A	R448A	R448A
Refrigerant fill volume	3 kg (4.16 t CO2-Aq.)	5 kg (6.94 t CO2-Aq.)	10 kg (13.87 t CO2-Aq.)
Dimensions (W x H x D)	410 x 770 x 773 mm	410 x 770 x 773 mm	605 x 830 x 1130 mm
Control interface	SPS via touch display	SPS via touch display	SPS via touch display
Number of regulation circuits	4 - 36	4 - 36	4 - 36

SCG 8.9

SCG 1.9 | SCG 4.0

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Are you interested? We would be happy to explain our STEMKE technology to you in person.

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