COOLINGCARE

Cooling efficiency loss:

OLD PROBLEM, NEW SOLUTION

The concept of mold channel cleaning is not new. Over the years the plastics industry has seen numerous descaling devices, both simple and more sophisticated ones. Regardless of their design complexity, these machines rely on the principle of pumping a chemically active solution of high concentration by means of a centrifugal or diaphragm pump of various efficiency.

Unlike conventional cleaning methods, the essence of the patented Coolingcare method is based on the cavitation phenomenon, which allows us to speed up the process even several times compared to traditional methods, while making it safer.

In Coolingcare devices, feed pumps are only used to cyclically fill the channels with active solution, while the process of removing scale and rust deposits is mainly carried out by means of cavitation generators, responsible for the rapid compression and expansion of the liquid in the channel.

With the frequency of several cycles per second, cavitation generators pump the solution into channels alternately in both directions, creating the phenomenon of a hydraulic hammer, which is accompanied by the formation of millions of cavitation bubbles.

The collapse of these bubbles near the surface of the channel generates microscopic shock waves and high-velocity liquid jets, which have the effect of mechanical , scouring' of its surface and breaking off rust and scale deposits.

Cavitation cleaning and cleaning with conventional rotary or diaphragm pumps can be compared to drilling with a hammer drill or regular drill.

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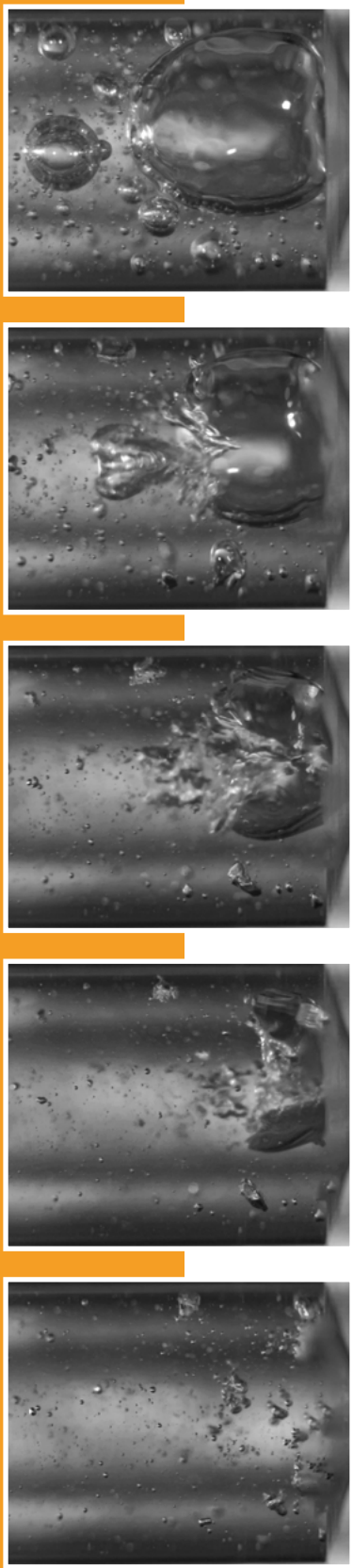


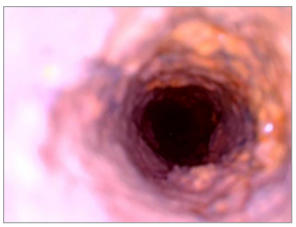
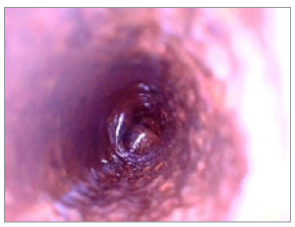
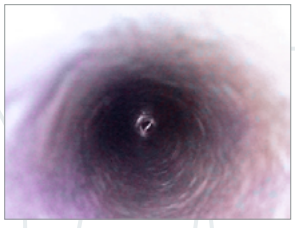
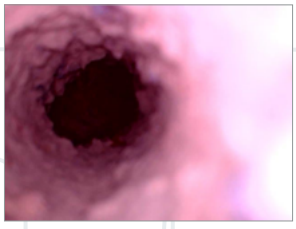
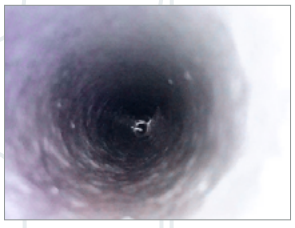
THE PROCESS OF CAVITATION BUBBLE FORMATION AND COLLAPSE CAPTURED BY A CAMERA RECORDING AT 38,000 FRAMES PER SECOND.

ADVANTAGES OF COOLINGCARE CAVITATION CLEANING:

- A non-contact, non-abrasive process that allows you to clean intricate, hard-to-reach areas without having to disassemble the tool.
- Eliminates the need for highly concentrated aggressive cleaning solutions. The mechanical action of cavitation increases the cleaning power of mild solutions.
- The cavitation phenomenon is generated in a controlled and repeatable manner. Cavitation bubbles and shockwaves appear especially in places of greater flow resistance, i.e. where the flow is blocked by scale and rust deposits.

All the above make the cleaning process much shorter, safer for the tool and incomparably more effective than traditional methods.

The results of the endoscopic camera examination of the condition of the channel surface before and after cleaning are presented below. The Coolingcare cavitation cleaning method was compared to a conventional one using a diaphragm pump with a capacity of 50L/min. In both cases, a solution based on organic acids with a concentration of 10% was used. The predetermined cleaning time was 8 hours.

CAVITATION CLEANING		CLASSIC METHOD
	before cleaning	
	after 2hrs of cleaning	
Thanks to the intelligent operating mode, the device automatically determined that the channel is clean and finished the process after 2 hours.	after 8hrs of cleaning	

CP

CP Series - compact, affordable machines perfect for plants with small number of molds.

CP devices are based around the same cleaning technology as the higher-end Coolincare models. This allows for effective cleaning of the walls of the cooling channels from scale and rust. The machines require only compressed air to run. Due to its size, they an ideal for service work in the field. It will also work great in plants where a small number of molds is used.

CP series highlights:

- Single section unit with the functions of cleaning, airblow, pressure & blockage tests
- Cavitation based cleaning technology from higher-end models
- Powered with compressed air only
- Available with and without a tank

CM

CMS

The CM series of machines are universal, configurable units that can be equipped with virtually all necessary functions depending on the user's requirements. The proposed pump capacities allow users to choose the optimal device adapted to the size of the molds and manifolds connecting the cooling channels. All models have the function of automatic change of the flow direction. The cleaning tank can be equipped with a 6kW heating module, which significantly increases the efficiency of cleaning and speeds up the process.

The design of the machines enables connection of additional, external tanks for neutralization purposes. Measurements of the flow rate are carried out in a continuous mode, which allows for a quick assessment of the cleaning progress. CM device operates in a semi-automatic mode, and the whole operation is supervised by the PLC CS 101 controller with a 7-inch touch screen known from the CS2 model. After finishing the process, the device displays a report with information about the cleaning progress, which can be exported via Wi-Fi. CM machines are produced in versions with one, two, four and six sections.

CMS unit was designed as an extension module of CM machines. It is a single section machine that can be connected to CM unit to enable the rinsing and conservation functions. It can also be used as a simple standalone cleaning device.

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CS

The CS2 machine is the entry series designed for users with the highest demands. It is equipped with all the necessary functions known from the flagship CA machines, except for the mold database and the possibility of communication via OPC UA.

CS2 has a very accurate diagnostic system with the possibility of calibration in the range of up to 35L/min. The measurement of the flow rate is carried out using an independent hydraulic circuit, thanks to which there is no possibility of mixing the cleaning and diagnostic liquids.

Intuitive and user-friendly software with built-in tutorials allows for very quick onboarding of staff without lengthy initial training. In addition, a number of sensors monitoring the operation of the device ensure the safety of operation.

CA

CA series is an autonomous, most advanced system in the Coolingcare family available in two- and six-circuit versions.

It allows operators to monitor and maintain full control of mold cooling efficiency. The effects of work are saved in the machine's database. Thanks to the OPC UA protocol, it is possible to integrate the device with the company's ERP system.

A patented cleaning method using the phenomenon of controlled cavitation combined with independent sections of pumps and generators for each cleaning section makes CA machines among the most efficient units available on the market.

The operation of the device is fully automatic and monitored by a number of sensors ensuring the safety and stability of the process. An intelligent algorithm analyzes the contamination of the channels and allows the process to be completed before the appointed time.

The CA series is equipped with a self-diagnosis function for quick verification of the consumable parts of the device.

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Comparison of **COOLINGCARE** device functionalities and parameters

	CP CASE	CP1	CP2	CM4	CM6	CS2	CA2	CA6
Operating mode	manual		semiautomatic	semiautomatic		semiautomatic	automatic	
Power	compressed air		230 V AC	230 V AC / 3x400V AC (option)		3x400V AC	3x400V AC	
Control/touch screen	pneumatic		3,5"	7"		7"	10"	
Number of cleaning sections	1		2	4	6	2	2	6
Cleaning media tank	-	80L		120L		80L	100L	
Diagnostic media tank	-		yes (DUO option)	option (CMS module)		25L	55L	
Diaphragm pumps (l/min)	25			70 (125 as option)		25	2x25	4x25
Cavitation generator (max. 12 strokes per second)	1		2	optional, 7th cleaning section with caviation generator		2	2	6
Inflow heater	-			6kW (option)		6kW	6kW	
Suction filter	-	yes		yes		yes	yes	
Return filter	-	yes		yes		yes	yes	
CLEANING								
Hydromechanical, hybrid cleaning process based on the cavitation phenomenon	yes			-		yes	yes	
The cleaning process is based on a single, pulsating feed of the cleaning liquid	-			yes		-	-	
Flow reversal	manual			automatic		semiautomatic	manual	
Autonomous cleaning mode until stable reference flow is reached	-			-		-	yes	
The cleaning time of each channel is defined independently. The process lasts as long as necessary.	-			-		-	yes	
Channel airblow after cleaning,	manual			manual		manual	automatic	
Export of mold cleaning results to external devices	-			yes		yes	yes	
Record of mold cleaning history in the machine's database	-			-		-	yes	
DIAGNOSTICS								
Pressure test for leakage identification	yes			yes		yes	yes	
Blockage test for clogging identification	yes			yes		yes	yes	
Mold diagnostics with unmanned, automatic transition to cleaning	-			-		-	yes	
Measurement of the flow rate with the possibility of comparison to predefined results saved in the database	-			-		-	yes	
Additional, real-time flow measurement during cleaning	-		yes	yes		-	yes	
Drying channels with compressed air after diagnostics	-			yes		yes	yes	
MAINTENANCE								
Channel rinsing with external water supply	-	yes		yes		yes	yes	

	CP CASE	CP1	CP2	CM4	CM6	CS2	CA2	CA6
Neutralization of cleaning agent residues in the channels after cleaning	option (CMS module)			option (CMS module)		yes	yes	
Possibility of additional protection of channels with a corrosion inhibitor	option (CMS module)			option (CMS module)		yes	yes	
ADDITIONAL FUNCTIONS								
Tank filling and emptying	-			yes		yes	yes	
Modular design allowing for easy replacement of components	yes			yes		yes	yes	
Monitoring of suction filter clogging level	-			-		yes	yes	
Calibration of parameters and work algorithms	-			-		-	yes	
Record of operating hours for individual pumps and pulsators	-			-		yes	yes	
Record of cleanign agent operating hours	-			-		yes	yes	
Remote software updates	-			-		-	yes	
Creation of user accounts with different levels of access to machine functions	-			-		-	yes	
Software available in different language versions	-			yes		yes	yes	
Built-in drain valve for emergency emptying of tanks	-	yes		yes		yes	yes	
Compressed air source efficiency control	-			-		yes	yes	
Measurement of ph and conductivity of the cleaning solution	manual			manual		manual	manual	
OPC UA module	-			-		-	yes	
SAFETY								
A set of sensors and algorithms ensuring stable & safe operation	-			-		-	yes	
Leakage detection system	-			-		yes	yes	
Solution level measurement in the tank	-			-		yes	yes	
Liquid temperature control combined with automatic heater activation/deactivation	-			yes (with heating module option)		yes	yes	
Heating element damage control	-			yes (with heating module option)		yes	yes	
Identification of faulty phase connection	-			yes (with heating module option)		yes	yes	
Control of the continuity of the liquid flow through the heater system	-			yes (with heating module option)		yes	yes	
Additional protection against tank damage and leakage	-			-		-	yes	
Moisture detection in pneumatic system	-			-		yes	yes	
SERVICE								
Modular design allowing for easy replacement of components	yes			yes		yes	yes	
Remote assessment of the cause of device failure	-			-		-	yes	
Evaluation of the correct operation of the filter clogging sensors	-			-		yes	yes	

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