www.lethiguel.com

catalogue

JET COOLING SOLUTIONS
EUROGUSS 2018

Quality Thermal Solutions
Lethiguel

who are we?

Lethiguel is a French high-tech brand.

The company conceives, manufactures and supplies cooling and heating solutions to the light metal casting industry.

A team of 35 is fully dedicated to supporting and supplying challenging companies in a demanding market.

Follow us on LinkedIn

WELCOME TO A WORLD OF **COOLING SOLUTIONS**

Jet cooling will optimize your casting quality and cycle time, meaning performance and quality for innovative companies. This technology was originally developed and patented by Ahresty Japan. As his close and historical partner, Lethiguel not only distributes Ahresty's systems on selecting markets, but has also developed its own range of closed-circuits machines.

SUMMARY

Evolution

Lethiguel was founded in 1976 by Michel **Le**vacher and Marcel **Thi**ercelin, for the initial purpose of selling German crucibles (Tie**gel**) to French foundries. You may notice the missing **U**, that was added to ease French pronunciation.

founded in 1976

External growth operations: in 2003, buy-out of Fitec Company, German numerical control machine-tools trading for machining and grinding industry. In 2007, buy-out of HiFast, immersion heater manufacturing company. The year 2010 sees a major turning point for Lethiguel with the relocation of productive, administrative and commercial functions in a new building. The company then settles down in Lozanne, west of Lyon.

In 2013, Lethiguel GmbH is set-up in Frankfurt, Germany, followed in 2015 by Lethiguel Inc. North America. Finally, in 2016 whilst the company celebrates its 40 years anniversary, Lethiguel Japan is launched in Nagoya, which brings the staff to 30 employees.

Lethiguel started as a heating and cooling solutions manufacturer. With our growing experience and knowledge of the industry, we are today proudly taking a step to another level, as a global integrator and partner for the die-casting industry. In 2018, Lethiguel supplies clients in 35 countries, thanks to an efficient and reliable supply-chain.

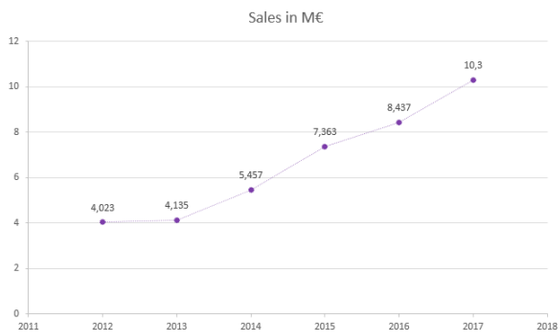
Key Figures

Lethiguel is a family-owned business, driven by a will of durability and a strong trust in its teams and business model. The company is independant on all levels:

- Financial control led by will of durability
- Sustainable customer relations
- Autonomous decision making and adaptability
- New products and openness to solutions.

As an expert in non-ferrous alloys temperature control, Lethiguel improves innovative solutions to back up demanding and efficiency-oriented clients. Therefore, the company is currently based in Europe (France and Germany), North-America (Canada) and Asia (Japan).

In addition, an international network of qualified sales agents and authorized resellers is dedicated to supporting and supplying our clients with the right solutions.



Savoir-faire

Lethiguel provides global solutions: holding furnace engineering, immersion heating simulation, manufacturing, distribution and jet cooling implementation. High added-value systems that ensure foundries will optimize energy consumption, quality of critical parts, productivity and safety. A highly skilled team and four processes orchestrated by the quality manager are the driving forces of our Quality Management System. Not only Lethiguel's QMS is a certification that recognizes a functional quality department, its main purpose is regulating our innovation and growth to ensure flexibility and reliability to our clients and stakeholders.

TÜVRheinland CERTIFIED

vision

Our responsibility:

- Commitment to our clients: our customers include the leading names in foundry and automotive industries worldwide. We believe it is our responsibility to exceed customer expectations by supporting and training their operational teams, and also by offering our expertise anytime, anywhere on the globe.
- Commitment to our teams: we believe it is our responsibility to put each team member in a position to act proactively and relevantly, for the benefits of our stakeholders. For that purpose, emphasis is put on top-down and bottom-up communication as well as training, so that everyone can find interest in working every day for an SME operating in a developing industry.

Michel Levacher
Founder and Chairman

Our goal is to become a benchmark and leader in conception and sales of electrical heating and temperature control technology for non-ferrous alloys. We are proudly doing our job every day, honouring ethical standards that are conditional in being part of Lethiguel's team:

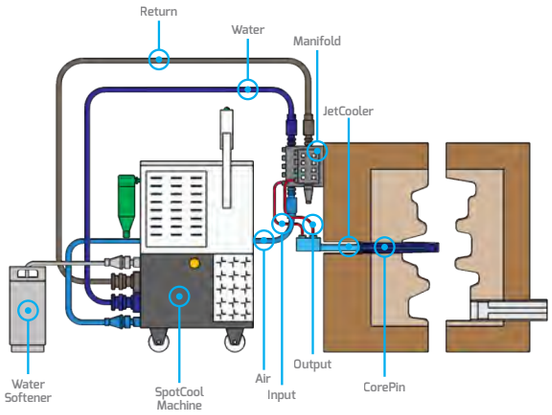
- We demonstrate integrity, transparency and team spirit
- We improve quality in a continuous way, with due regard to environment and employee safety
- We encourage innovation at all level, but also autonomy, flexibility, adaptation, and absolute fulfilment of commitments.

Guillaume Levacher
President

Jet Cooling is a technology that is dedicated to handling hotspots. Thanks to high pressure capacity and sequential cooling, it enables leveling the die temperature and removing any hot area by reaching core pins and inserts, preventing porosity and shrinkage problems.

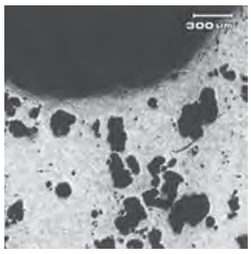
Operation

A hydraulic unit ensures the circulation of pressurized cooling water (from 3 to 20 bars) for a given period of time in the circuits of small diameter injectors (Ø from 0,5 to 5 mm) inserted in the specific core pins.
At the end of the cooling period, a pneumatic distributor injects air in the injector's circuits and purges it. In this way, the cycle can be carried out in full safety without presence of water inside the circuits.
The cooling cycle is synchronized by adjustable temporizations with the die casting machine.

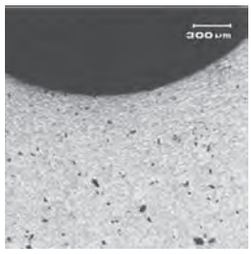


Casting without use of jet cooling technology : porosity occurs near thread

Casting when using jet cooling technology: decreased porosity



Chill zone without use of jet cooling technology



Chill zone with use of jet cooling technology for 10 seconds

In 2004, Lethiguel acted as a pioneer when the company decided to design and sell the first closed-loop jet cooling machine, equipped with its now-famous core-pin breakage control. At the time, jet cooling was a very confidential technology, however already strongly established in eastern-Asia foundries.
Lethiguel foresaw this high-added value system would soon have to become a standard in worldwide HPDC foundries. Why?

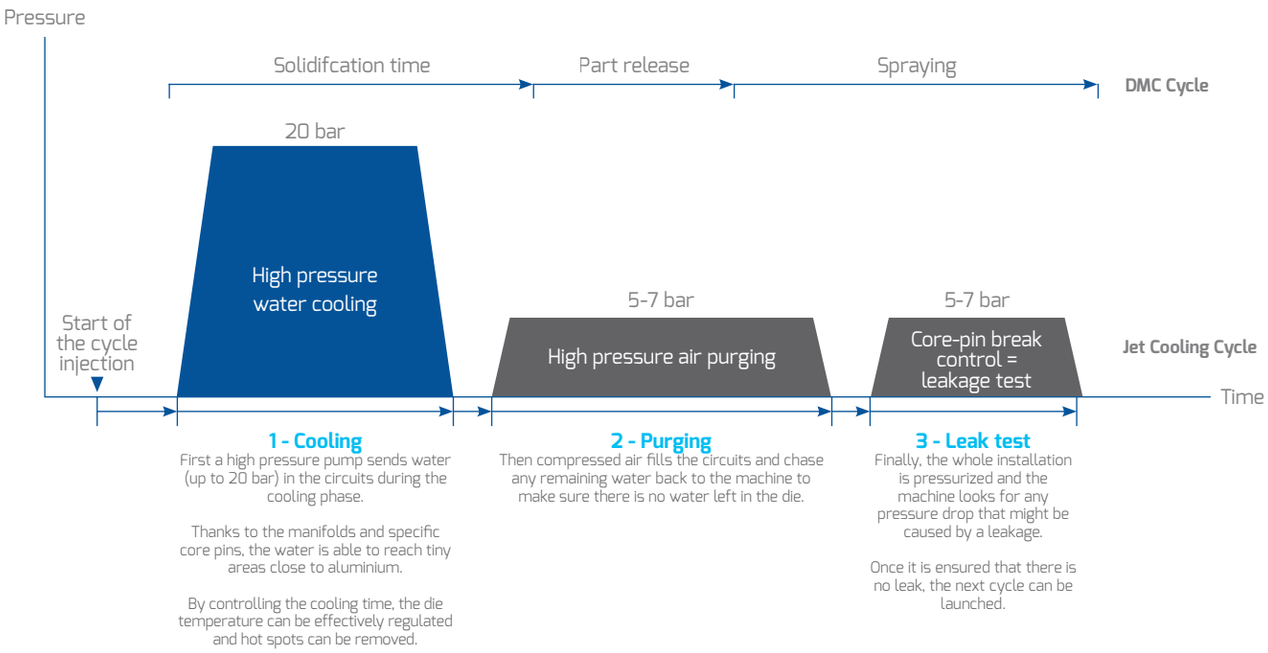
- Structural growth of automotive market
- Quick evolution of HPDC processes
- Shift of complex parts towards HPDC
- Increased expectations in terms of quality
- Increased pressure of competitiveness

Lethiguel's understanding of the market leads to the development of a new range of machines in 2018:

- Cooling down more hot spots
- Ensuring better quality and meeting higher standards
- Improving in-depth expertise of die thermal process
- 100% adapted to foundries requirements

LETHIGUEL
INVENTOR AND LEADING EDGE OF CLOSED-LOOP JET COOLING

Jet Cooling cycle time



1 - Cooling
First a high pressure pump sends water (up to 20 bar) in the circuits during the cooling phase.

Thanks to the manifolds and specific core pins, the water is able to reach tiny areas close to aluminium.

By controlling the cooling time, the die temperature can be effectively regulated and hot spots can be removed.

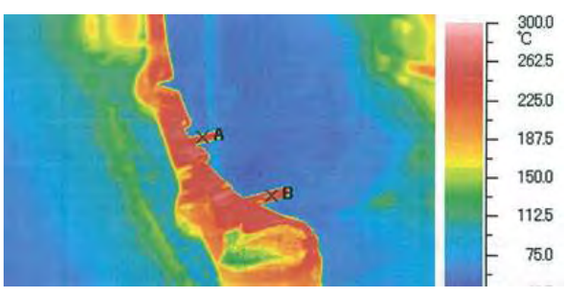
2 - Purging
Then compressed air fills the circuits and chase any remaining water back to the machine to make sure there is no water left in the die.

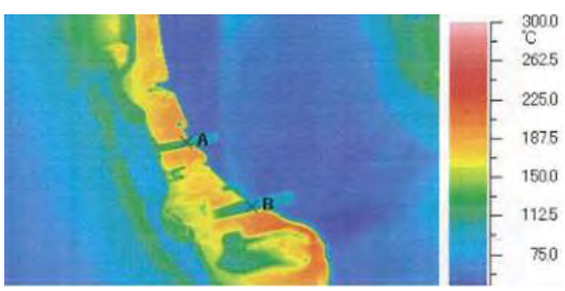
3 - Leak test
Finally, the whole installation is pressurized and the machine looks for any pressure drop that might be caused by a leakage.

Once it is ensured that there is no leak, the next cycle can be launched.

Case study: Cooling hot spots of a crank case

The use of thermal cameras allow us to point out the efficiency of the cooling on the core pins A and B. These pictures are taken before the spray-cooling phase.
The consequence is a 150°C saving on the core pins. Furthermore, all the zone around the core pins equipped with jet cooling also benefits from the cooling impact, this impact being of 70°C.
In this case, the cooling times lasts 10 to 15 seconds.





Benefits

The thermal fatigue of non-ferrous metal die-casting dies becomes more severe at higher operating service temperatures, reducing die life significantly. Consequently, to extend die life, die design has to address efficient cooling methods. Jet cooling can be used to solve most of thermal related issues in non-ferrous die-casting.

- Decreased cycle time
- Scrap reduction
- Porosity and shrinkage reduction
- Enhanced durability of die elements

Jet Cooling technology allows

- Complex castings geometry
- Drastic cost reduction

4 circuits

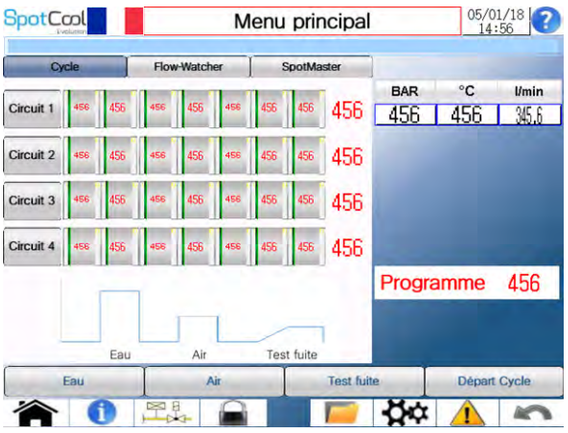
30L/min

Average of 20 core pins

Screen size 7''

3 Measurement points

SpotCool _Classic



SpotCool Classic is THE reference in terms of field expertise, with 10 years of customer experience and feedback. It is robust, it is reliable, and it is very competitive. This machine offers a basic and efficient level of equipment, and is ideal for a punctual or specific need not exceeding 20 core pins. It features our famous core-pin breakage control, it measures HP pump outlet pressure and water T°, and is compatible with our range of accessories.

SpotCool Classic, the icon!

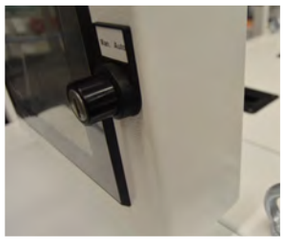
4 circuits

48L/min

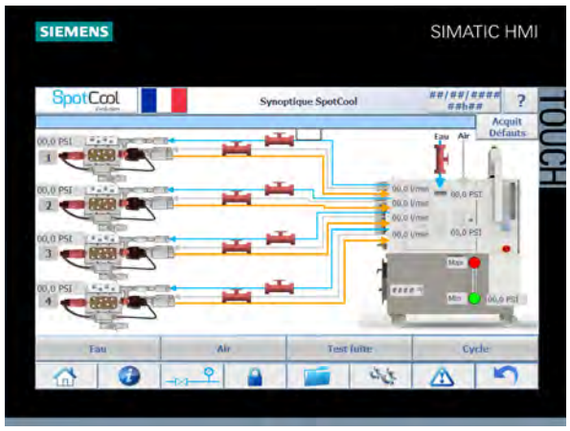
Average of 32 core pins

Screen size 9”

15 Measurement points



SpotCool _Evolution



SpotCool Evolution is Lethiguel’s answer to market and technology’s latest transformations. This machine integrates the very essence of innovation in M2M (machine-to-machine) communication, with DCM data transmission of eight measuring points, including flow-rate and pressure for each circuit, supply air and HP pump inlet pressure, water conductivity, filter inlet/ outlet pressure.
Thorough analysis of this information brings on machine learning, leading the SpotCool Evolution to safety optimization as well as clever understanding and management of productivity/ quality balance.

SpotCool Evolution: the smart!

8 circuits

100L/min

Average of 64 core pins

Screen size 9''

23 Measurement points

SpotCool _ Performance

Never seen before! SpotCool Performance features eight circuits, allowing to potentially cool down 64 pins. This machine was specially designed for big dies, structural and/or complex parts. The DCM installation will benefit from a great flexibility in terms of core pins distribution. The number of manifolds allows an appreciable precision in the cooling circuits' partition, as well as a better distribution of cooling power.

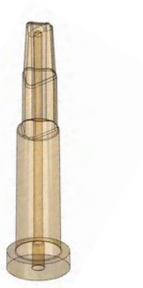
- Drastic reduction of scrap level
- Quality of parts enhanced

SpotCool Performance integrates every single feature of SpotCool Evolution in terms of communications and measuring points while offering double the capacity of pin cooling.

SpotCool Performance: the champion

	SpotCool _Classic	SpotCool _Evolution	SpotCool _Performance
Frequence	50 or 60 Hz		
Power	AC380-480V 3phase		
Max Power Consumption	2,5 kW	3,7 kW	5,5 kW
Cooling Circuits	4 independant circuits	4 independant circuits	8 independant circuits
Available Flow Rate	30L/min	48L/min	100L/min
Cooling control	high pressure intermittent cooling		
Cooling water Discharge Pressure	20 bar		
Average Number of Core Pins	20*	32*	64*
Water tank	60L	120L	200L
Water Filling	Automatic water filling	Automatic water filling + manual water inlet	Automatic water filling + manual water inlet
Water source conductivity	20µs/cm		
Integrated filters	Pump		
Air consumption	Max 500NL/min		
Supplied Air Pressure	5-7 bar		
Air Purge Pressure	5-7 bar		
Connections location	All connections to the side	All connections at the rear	All connections at the rear
Water supply connection Ø	3/4'' external		
Water discharge connection Ø	M22 x 1,5 x 1/4'' IG & M22 x 1,5 x 1/2'' AG		
Water cooling connection Ø	3/8'' external		
Return	NW 13 x 3/4'' butterfly bolt		
Air supply connection Ø	1/2'' internal		
Air discharge connection Ø	Quick connector NW 7,2 male 3/8'' IG		
Start signal	Contact point signal		
Operation method	Touch screen		
Control pannel	Mitsubishi*		
Screen dimensions	7'' screen	9'' screen	9'' screen
Software	Classic software	New software	New software
Measurements points	HP Pump outlet pressure		
	HP Pump inlet pressure		
	Water temperature		
		Flow-rate for each circuit	Flow-rate for each circuit
		Pressure for each circuit	Pressure for each circuit
		Supply air pressure	Supply air pressure
		Filter inlet and outlet pressure	Filter inlet and outlet pressure
		Water conductivity	Water conductivity
Design	Classic Design	New Design	New Design
Handling		Easy handling (strong wheels, handles, eyebolts)	Easy handling (strong wheels, handles, eyebolts)
Weight	170kg	280kg	320kg
Dimensions	1000*650*1300 mm	1230prof * 640largeur *1730hauteur mm	1300prof * 740 largeur *1850 hauteur mm
Features	Inverter		
	Lamp		
	Circuit selection on screen		
		Opening for washing the tank	Opening for washing the tank
		Detection of filter fouling	Detection of filter fouling
		Electrical socket (230V)	Electrical socket (230V)
		Auto/Manual switch	Auto/Manual switch

As jet cooling's effectiveness relies on its ability to reach the die's hot spots, core pins must be properly designed and manufactured. Lethiguel provides state of the art core pins, with a large panel of surface treatment that will ensure the best lifespan possible.



Surface Treatment	
Gas nitrided (Gray)	- Hardened surface of steel - General duty - Low cost
«Cascoat» TiN (gold	- PCVD process, oxidation temperature 500°C - Protection against soldering and erosion - Mid Cost
TD-VC (Gray)	- Thermal diffusion process - Vanadium carbide coating - Mid Cost
PCVD-TlAiN (Black)	- Oxidation temperature 700°C - Best protection against soldering and erosion - Higher cost
P20 (Violet)	- Better anti-oxidation property, temperature over 700°C - Multi layer film and good adhe siveness - Higher Cost

Designation	Treatment method	Chemistry	Treatment temperature (°C)	Heat resistance temperature (°C)	Coating hardness (HV)	Coating thickness (µm)	Wear resistance	Heat resistance	Seize resistance	Erosion resistance	Corrosion resistance	Adhesion	Mold releasability	Fatigue resistance	Oil film retention capability	Deformation
Cascoat	PCVD	TiN	550	600	2000~2400	2~4	✓		✓	✓		✓				
TiAlN	PCVD	TiAlN	550	800	2300~3000	2~4	✓	✓	✓	✓		✓				
TiAlSiCNO	PCVD	TiAlSiCNO	550	900	2300~5000	5	✓	✓	✓	✓		✓	✓			
CrN	PVD	CrN	500	700	1800~2200	2~3	✓	✓			✓					
TiN	PVD	TiN	550	550	1800~2200	2~4	✓									
TiAlN	PVD	TiAlN	550	800	2800~3300	2~4	✓	✓								
LUMENA	PVD	TiAlN	500	900	3400	10	✓	✓	✓	✓						
ALCRONA	PVD	AlCrN	500	1100	3200	6	✓	✓								
SX-H	PVD	TiSiN	500	1300	3600	3,5~4,5	✓	✓								
TD	Carbide corting	VC	1000	500	3200	10	✓		✓		✓	✓				✓
Gas nitrided	Gas nitrocarbur-izing	Nitriding compound	550	500	800~1200	-								✓		
Sursulf	Sulphonitriding	Sulphonitrid-ing compound + Nitriding compound	565	500	800~1200	-	✓		✓					✓	✓	

Alpha pin

Alpha pin (or long-life pin) can be used as replacement for pins which are breakable due to casting schrinkage. It is effective for dispersing concentrated stress on the stepped part of the pin. Tests have shown an average double life span compared to standard core pin, which means time lost for pin replacement is reduced, and trouble occurring when a pin breaks in the die is also minimized.

AHRESTY
TECHNO
SERVICE
CORPORATION

JC-KRM

réf: JCKRM-06-L760-E250-J510-M1.8 - **1 piece**
Jet Cooler with revolving head

JC-HSR

réf: JCHSR-06-L760-E250-J510-M1.8 - **1 piece**
Jet Cooler with isolating revolving head
Allows replacement of needle without removing jet cooler from die!

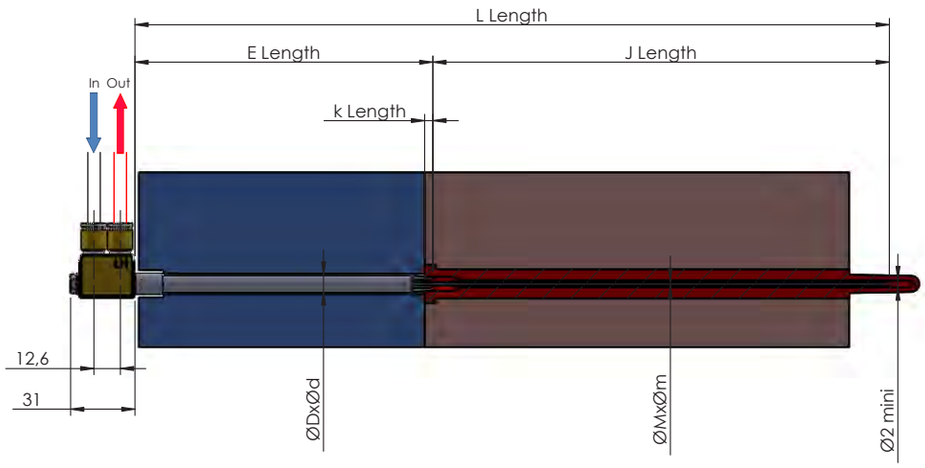
Couplers

réf: AH-CO-A6-01MS-OF
10 pieces
Round quick connector for Jet Cooler, for Ø6 fluorine tube

réf: AH-CO-A4-02MOF
10 pieces
Tube coupler, steel ring, for Ø4 fluorine tube

O-ring

réf: AH-CO-P7 - **100 pieces**
O-ring for Jet Cooler

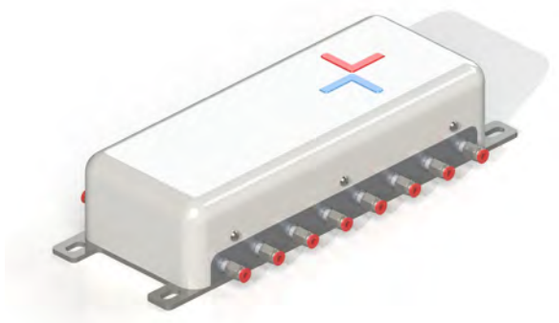


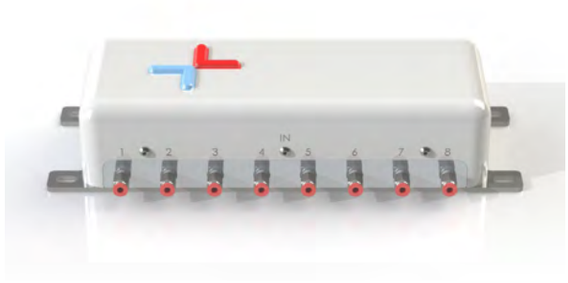
Isolated revolving jet cooler

New JC-HST and JC-HSR allow to pull out the tube to flexible direction, due to respective rotating heads. These JC can be attached to a die with connecting tubes, and because the base of the head comes in a semicircular shape, installation pitch is narrowed. Both types are available in Ø4, 6, 8 and 10mm, and maximum length of 1000mm.

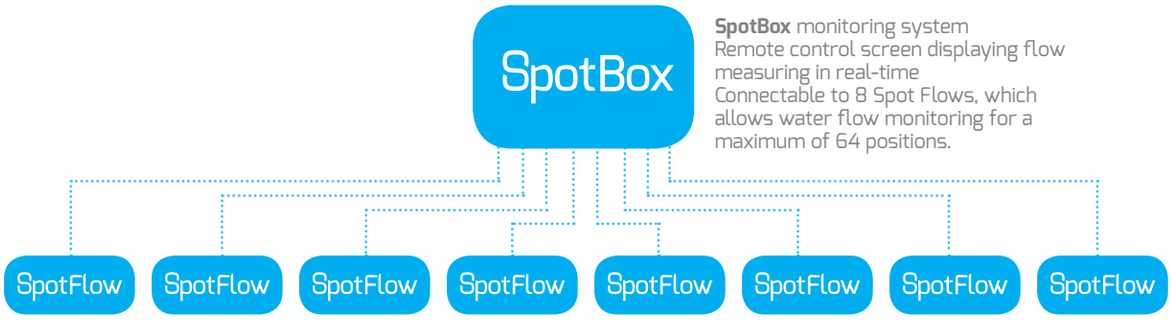
FlowMaster system will help you move from preventive to predictive maintenance

The good performance of a Jet Cooling system greatly depends on the flow rate of water, which is injected in the small diameter cooling channels. Managing and ensuring the right amount of water flow, for every cooling position, allows to continuously maintain an optimal cooling effect, and therefore enhance the level of productivity and castings' quality.
Thanks to its long experience in Jet Cooling technology, Lethiguel has specifically developed a FlowMaster system to enable the Jet Cooling users to precisely monitor the flow condition, in real-time, and for every cooling position.
In this way, preventive maintenance becomes easier and highly predictive, thereby saving valuable resources for the die-casters, and allowing high productivity.





Principal scheme of FlowMaster solution



SpotBox monitoring system
Remote control screen displaying flow measuring in real-time
Connectable to 8 Spot Flows, which allows water flow monitoring for a maximum of 64 positions.

SpotFlow measuring system
8 flow sensoring devices embedded in a foundry-proof casing, allowing measurement of water flows ranging from 0,5L to 10L per minute, in 8 independent Jet Cooling circuits.

The FlowMaster system can be used as a stand-alone product.

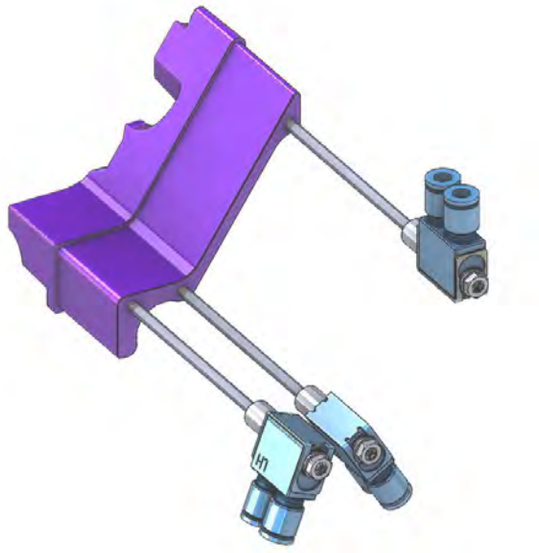
SpotCool Evolution and SpotCool Performance can be connected to the FlowMaster via a Profinet* interphase.

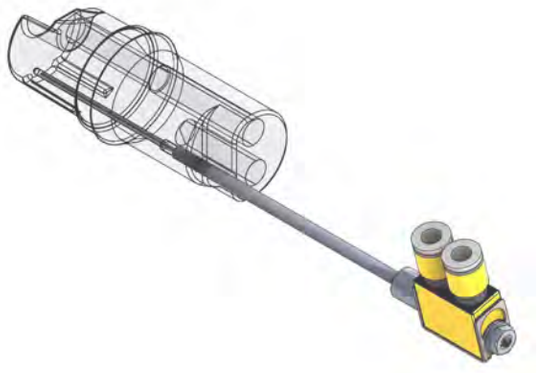
FlowMaster : the future

SpotBox specifications :

- Specific program allowing real-time water flow monitoring, with visual graphics and precise volume measurement
- Possible to set up a "0 Km" nominal value, for every independent position, in order to define the optimal flow setpoint
- Possible to program 2 different sets of alarms, for every position (either in Liter/minute, or as a % of a nominal value)
- Possible to save up to 99 different flow patterns, for the 64 independent positions (enabling to save preset values corresponding to different dies or parts).

**Note: the profinet interface is currently available on a Siemens configuration.*





Being the first company to ever have imported Jet Cooling technology in the European market, Lethiguel has built a strong know-how regarding thermal processes in non-ferrous die-casting, and has been offering turnkey solutions for over forty years now. Our engineering office works side by side with our customers to develop the right solution for the right application. As historical inventor of closed circuit jet cooling, we use our great understanding of the cooling process to improve and optimize any casting application. Being a close partner of Ahresty Techno Service Corporation, our manufacturing team has been trained in Japan, to ensure that we meet with the quality requirement any Jet Cooling application requires.

OUR TEAM IS YOURS **CHALLENGE US !**

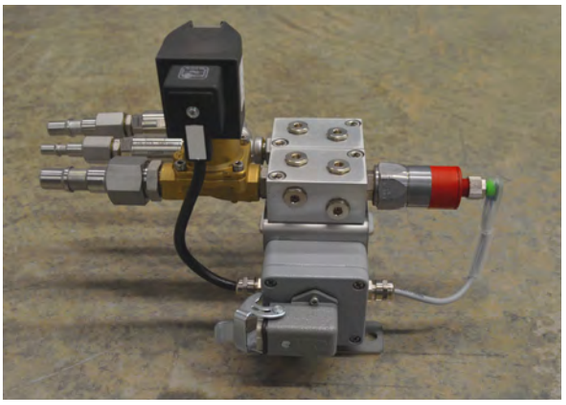
MANIFOLDS AND SPARE PARTS

RP8

réf: RP8-CPB-VC - **1 piece**
8 entries, Core Pin Breakage, Visual Control

réf: RP8-CPB-VC4.2 - **1 piece**
8 entries, Core Pin Breakage, Visual Control, mounted with Ø4 couplers

réf: RP8-CPB-VC6.4 - **1 piece**
8 entries, Core Pin Breakage, Visual Control, mounted with Ø6 couplers



RP4

réf: RP4-CPB-VC - **1 piece**
4 entries, Core Pin Breakage, Visual Control

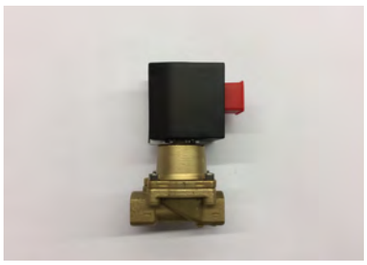
réf: RP4-CPB-VC4.2 - **1 piece**
4 entries, Core Pin Breakage, Visual Control, mounted with Ø4 couplers

réf: RP4-CPB-VC6.4 - **1 piece**
4 entries, Core Pin Breakage, Visual Control, mounted with Ø6 couplers

Pressure Switch

réf: RP-P3-M12 - **1 piece**
Pressure Switch, 3 bar, G1/4» M12 Connector

réf: RP-2130150 - **1 piece**
LED cable for Pressure Switch M12



Solenoid Valve

réf: RP-EV - **1 piece**
Solenoid Valve for manifold

Couplers

réf: AH-CO-A6-01MOF - **10 pieces**
Tube coupler, steel ring, for Ø6 fluorine tube

réf: AH-CO-A4-02MOF - **10 pieces**
Tube coupler, steel ring, for Ø4 fluorine tube

réf: AH-CO-A6-01MLOF - **10 pieces**
Tube coupler, steel ring, Elbow type, for Ø6 fluorine tube

réf: AH-CO-A4-01MLOF - **10 pieces**
Tube coupler, steel ring, Elbow type, for Ø4 fluorine tube

WATER QUALITY

Water Softening

réf: TK-022000 - **1 piece**
Water Softener INOX R 3/4», 2000L

réf: TK-100017 - **1 piece**
Spare resine bag for Water Softener

réf: TK-041690 - **2 pieces**
Hoses 1,5m R 3/4»

Conductivity measurement

réf: TK-041805 - **1 piece**
Conductivimeter C330, including: measuring cell, PVC T coupling, 2x1,5m hoses R3/4»

réf: TK-140153 - **1 piece**
PVC T for conductivimeter C330

réf: TK-160229 - **1 piece**
Measuring cell for conductivimeter C330

réf: TK-041690 - **2 pieces**
Hoses 1,5m R 3/4»

HOSES

Fluorine Tube

réf: AH-CO-TB-064-RD - **20m**
Fluorine resine tube (max 250°C), Outer Dia.Ø6, Inner Dia. Ø4, Red

réf: AH-CO-TB-042-RD - **20m**
Fluorine resine tube (max 250°C), Outer Dia.Ø4, Inner Dia. Ø2, Red

réf: AH-CO-TB-064-BK - **20m**
Fluorine resine tube (max 250°C), Outer Dia.Ø6, Inner Dia. Ø4, Black

réf: AH-CO-TB-042-BK - **20m**
Water Softner INOX R 3/4», 2000L

réf: JC-COUPETUBE-FLUOR - **1 piece**
Fluorine resine tube cutter

Stainless Steel Tube

réf: CIH-FF1/8_N_1 - **1 piece**
Stainless steel hose, Black couplers, 1m

réf: CIH-FF1/8_N_2 - **1 piece**
Stainless steel hose, Black couplers, 2m

réf: CIH-FF1/8_R_1 - **1 piece**
Stainless steel hose, Red couplers, 1m

réf: CIH-FF1/8_R_2 - **1 piece**
Stainless steel hose, Red couplers, 2m

Numbers that matter

125 000

The average number of kilometers traveled per month by the sales team

1

The number of round-trip from the Earth to the Moon flown by an export Sales Engineer in 18 months

80

The number of training hours that are necessary to acquire adequate skills for jet cooler manufacturing

21

The number of flags ready to be hoisted to welcome our customers and suppliers

142

The average number of time zones crossed every year by a Sales Engineer

48

The number in tons of goods handled by the Logistics Service in a year

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