



MICROGEL RSY Synchronised Microgel™

Microgel SYNCRO is the new FRIGEL technology created to revolutionise the thermoregulation method in technical injection moulding.

The Microgel SYNCRO technology allows for a significant reduction in cycle time (up to 35%) by guaranteeing the optimisation of production and product quality.

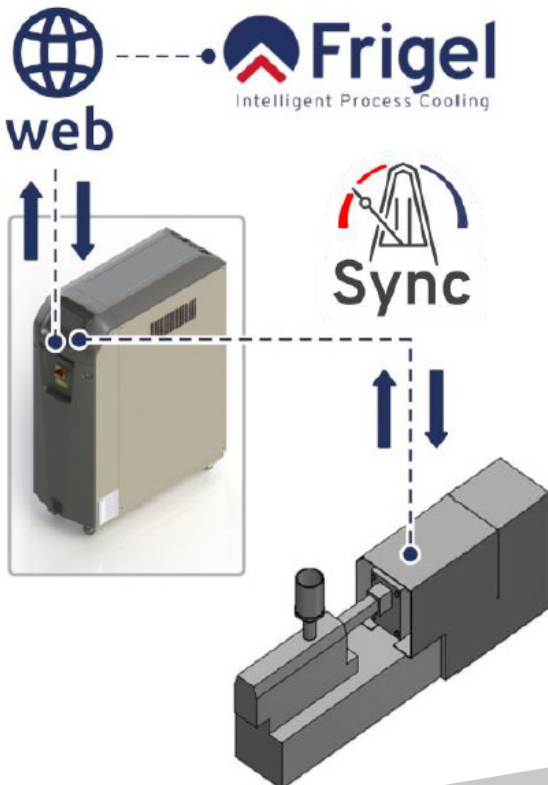
The new thermoregulation principle is based on the concept of synchronisation of the SYNCRO Microgel with the plastic material transformation machine during the various moulding phases.

Innovative functional features:

- Digital synchronisation with the press to find the best compromise between part quality and cycle time.
- Variable flow control according to the cycle phases to reduce the cooling time of the moulded component.
- Possibility to memorise the thermoregulation configurations for each mould (recipes).
- Real-time analysis of specific energy consumption (kWh / kg).
- Possibility of remote connection via Netgel MiND for supervision (status and alarms) and parameter setting.

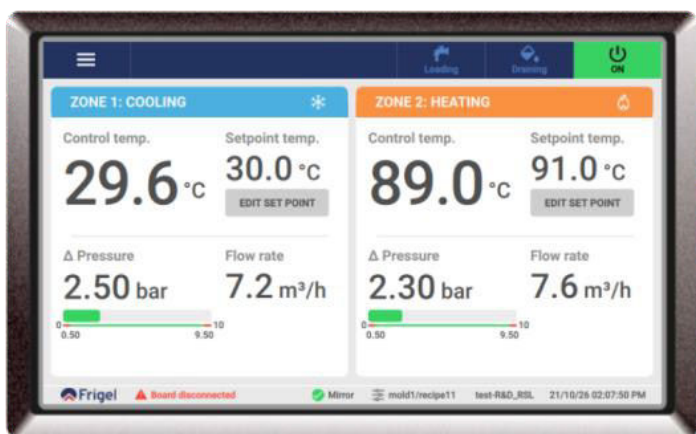


The new concept of thermoregulation synchronised with the process



Main Advantages:

- Increased production up to 50% with drastic reduction to cooling time.
- Better product quality in terms of dimensional consistency, structural characteristics, and aesthetic finish due to a better filling of the mould.
- Affordable investment & high return on investment.
- Easy to configure and use with simple work recipes stored for each mould.
- No modifications required to the mould.
- Intelligent use of energy consumption; reduced injection pressure, lower consumption of hot runners and lower closing force.



MAIN USER DASHBOARD

- Fast information on zones working mode (cooling, heating, stand-by).
- Information on unit performance (temperatures, pressures, flow rates).
- Metric or imperial measurement system selectable.



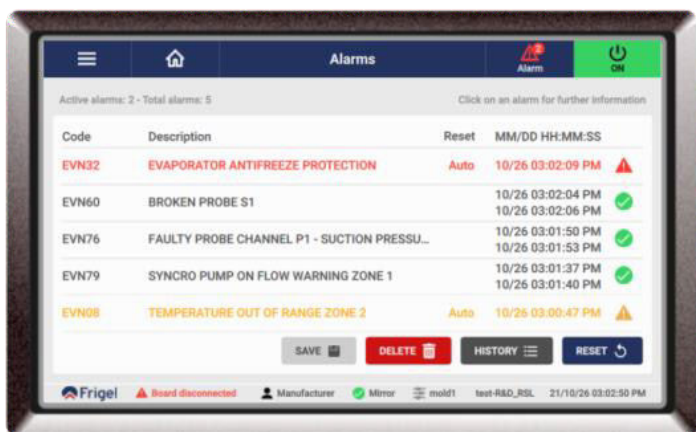
CHILLER SYNOPTIC SCREEN

- Principle scheme of the unit with 3D drawing of the main important components.
- List of probe names and values read or calculated.
- Real-time status of the component.



SYNCRO RECIPES

- List of all the parameters that distinguish the operation of the Syncro mode.
- Saving and quick selection of specific configurations for each mould.



PERFORMANCE SCREEN

- Real-time and historical process performance.
- Quick overview of the trend in energy consumption and the kWh/kg coefficient.

PRINCIPLE CHARACTERISTICS

REFRIGERATION EQUIPMENT

- Scroll compressors
- Stainless steel brazed plate evaporator and condenser
- Barostatic valve for continuous control of the condensing pressure
- Pressure and temperature sensors for circuit control
- R410A Ecological refrigerant

WATER DISTRIBUTION EQUIPMENT

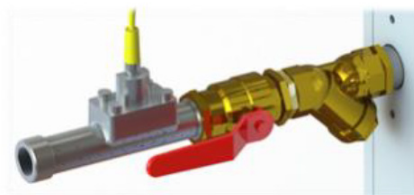
- VFD process pumps
- Flow meters on process pumps
- Designed to provide pressure and flow to the process
- Pumps with special high-performance mechanical seals in terms of flow rate and durability
- Temperature control system with modulating valve for each zone, for precise temperature control
- Insulated stainless steel buffer tank
- Valves included on each hydraulic connection
- Y filters on process return water inlet
- Solid state relay for heaters control

ELECTRICAL AND CONTROL EQUIPMENT

- Microprocessor controller developed according to Frigel specifications
- Control panel with 7" touch screen display (HMI)
- Complete monitoring of the refrigeration and hydraulic circuit
- Proportional-integral control logic for temperature control
- Procedures for loading and emptying the mould circuit
- Standard acoustic alarm
- Remote start/stop function
- Wattmeter for measuring electrical consumption and performance KPI (kWh/kg)

FRAME

- Made of folded metal sheet and painted with epoxy powder
- Removable panels
- Compact design and fitted with casters
- Front handle for quick movement



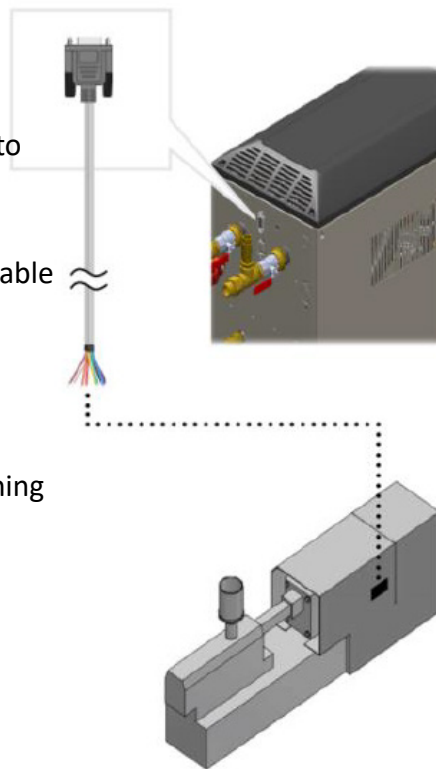
OPTIONS & ACCESSORIES

SERIAL INTERFACE

Several serial interfaces are available to connect the Microgel RSD/RSM to plastic processing machines:

- Current-Loop with 2 DB9 connectors on the machine and 10-meter cable
- RS485 with 2 DB9 connectors on the machine and 10-meter cable
- Canbus with 2 DB9 connectors on the machine and 10-meter cable
- Profibus with 2 DB9 connectors

Note: Free Voltage Contact as standard (terminal block connection, warning alarm and lockout alarm).



MIRROR HMI REMOTE PANEL

A touch screen is available to connect to the **Microgel RSY** for remote display control:



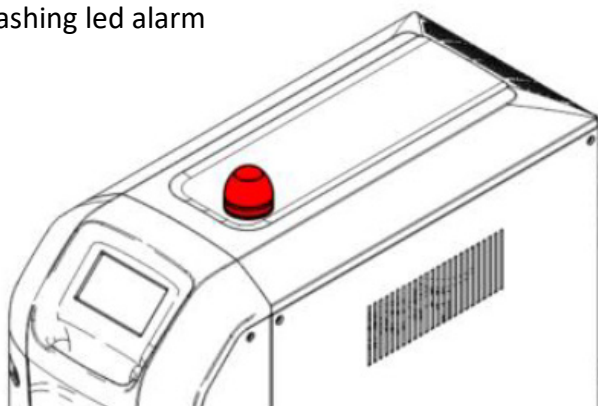
DIRECT CONNECTION

CONNECTION THROUGH ACCESS POINT

VISUAL ALARMS

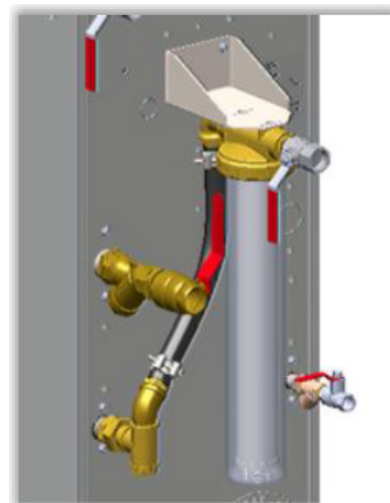
In addition to the acoustic alarm fitted as standard, a visual alarm is also available on request:

- Red flashing led alarm



FILTER

Optional cartridge filter on cooling water inlet in alternative to standard provided "Y" filters.



Microgel RS Syncro								
Model			50	80	100	145	180	210
Power supply voltage and frequency			400V±10%/3/50Hz					
Cooling Capacity (R410A) (**)	15°C/25°C(*)	kW	16.3	20.9	26.5	35.6	47.2	56.9
	10°C/35°C	kW	12.3	15.8	20.8	28.0	35.9	43.4
Cooling Zones	qty		2	2	2	2	2	2
Heating Capacity	kW per zone		6	9	9	12	12	12
Cooling Medium			Water					
Cooling System			Direct					
Max Set Point Temperature	°C		90					
Min Set Point Temperature (no glycol)	°C		8					
Min Set Point (with glycol) (***)	°C		-5					
Min Cond. Water Temperature	°C		15					
Max Cond. Water Temperature	°C		40					
Control Valve	Type		Motorised modulating valve					
Refrigerant Circuit(s)	qty		1					
Compressor	Type		Scroll					
	Capacity Control		ON/OFF (0-100%)					
	qty		1					
	Motor frequency		50					
	Nominal Power	HP	4.5	6	7.5	10	13	15
Condenser	Type		Brazen plate					
	Nominal Flow	m³/h	1.5	2.0	5.1	6.8	8.7	10.5
	Minimum ΔP	bar	1.5	1.5	1.5	1.5	1.5	1.5
Evaporator	Type		Brazen plate					
HP Process Pump	Type		Centrifugal					
	qty		2					
	kW		1.5	1.5	2.2	2.2	2.2	4.0
	HP		2	2	3.0	3.0	3.0	5.4
	Full Load Ampere	A	4.5	4.5	4.7	6.4	6.4	8.7
	Motor Poles		2					
	min	m³/h	1.20	1.20	2.40	1.20	1.20	6.00
	max		4.80	9.00	9.00	12.60	12.60	22.00
	min	bar	4.74	3.65	4.40	3.95	3.95	3.80
	max		5.32	5.32	5.90	5.40	5.40	5.35
Evaporator Pump	Type		Centrifugal					
	kW		0.45	0.45	0.45	0.45	0.45	0.45
	HP		0.6	0.6	0.6	0.6	0.6	1.01
	Motor Poles		2					
Tank	Material		Stainless Steel					
	Volume	L	23	23	23	70	70	70
Flow Meter	Type		Vortex					
	Material		Stainless Steel					
Process Water Connections	Type		GAS (ISO 228)					
	In/Out		1" F (DN25)	1¼" F (DN32)	1½" F (DN32)	1½" F (DN40)	1½" F (DN40)	2" F (DN50)
Condenser Water Connections	Type		GAS (ISO 228)					
	In/Out		1" F (DN25)	1" F (DN25)	1" F (DN25)	1½" F (DN40)	1½" F (DN40)	1½" F (DN40)
Expansion Valve	Type		Mechanical					

TECHNICAL DATA: RSY - 50Hz

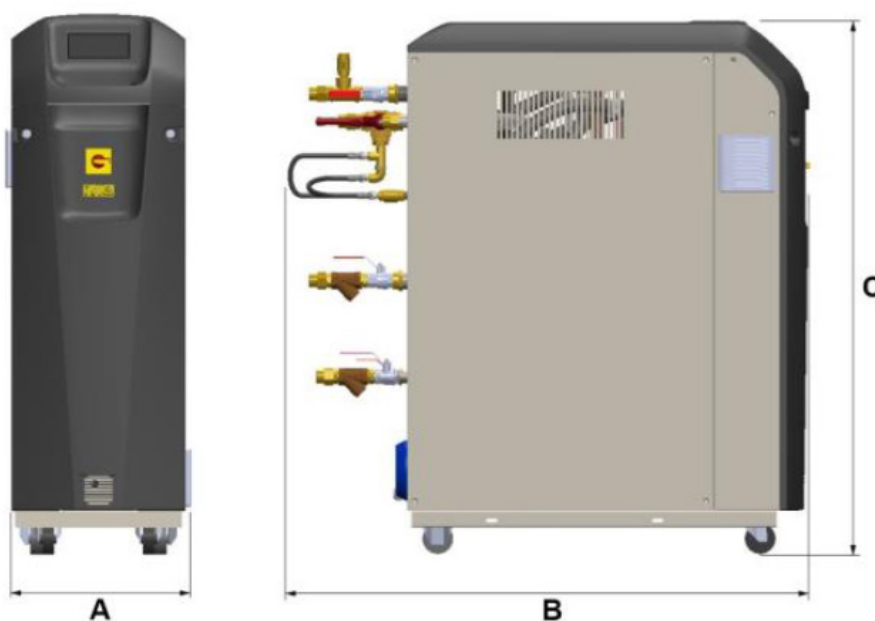
Microgel RS Syncro								
Model			50	80	100	145	180	210
Unit Full Load Ampere (FLA) (Maximum value not reached during standard operation)	Process Pump	A	37.0	38.5	50.7	66.6	70.7	79.2
Unit Power (Maximum value not reached during standard operation)	Process Pump	kW	22.2	23.3	31.6	41.9	44.2	48.1
Power Supply Cable	Process Pump	Sez.	FG7(O)R-4G 10mm ²	FG7(O)R-4G 16mm ²	FG7(O)R-4G 16mm ²	FG7(O)R-4G 25mm ²	FG7(O)R-4G 25mm ²	FG7(O)R-4G 25mm ²
Sound Level	dB(A) 10m		48.8	48.8	54.7	54.7	55.9	55.3
Compressed Air	min. 4 - max. 7.5 bar		No					
Refrigerant Charge (R410A) (***)	kg		1.44	1.65	1.85	2.11	2.52	3.10
Net Weight (****)	kg		216	220	353	359	389	420
Operating Weight (R410A) (*****)	kg		217.4	221.7	354.9	361.11	391.52	423.1

- (*) Nominal Cooling capacity (water to process/condenser inlet water °C)
- (**) Process Water $\Delta P = 2^{\circ}\text{C}$
- (***) With required verification of the refrigeration circuit by Frigel
- (****) approximative
- (*****) RSY HP pump, without flow meter
- (*****) Not considering the water in pipes and in exchangers
- Add glycol if set point < min set point allowable without glycol.
- Pumps rated for up to 35% of glycol. If not, contact the manufacturer.
- Available supply voltage: 400V $\pm 10\%$ /3/50Hz; 460V $\pm 10\%$ /3/60Hz; 380V $\pm 10\%$ /3/60Hz; 200-220 $\pm 10\%$ /3/50-60Hz.
- On request: UL electrical panel for 60Hz versions.
- Not suitable for DI water.
- Altitude limit: 1000 m a.s.l.
- Max water working pressure: 8 bar.

TECHNICAL DIMENSION DATA

Machine Dimensions							
Model		50	80	100	145	180	210
A	mm	477	477	477	614	614	614
B	mm	1.390	1.390	1.390	1.970	1.970	1.970
C	mm	1.390	1.390	1.390	1.631	1.631	1.631

Dimensions refer to units in basic configuration, without added options.



TECHNICAL DATA: RSY - 60Hz

MICROGEL RSY - Synchronised Microgel™

Microgel RS Syncro								
Model			50	80	100	145	180	210
Power supply voltage and frequency			460V±10%/3/60Hz					
Cooling Capacity (R410A) (**)	15°C/25°C(*)	kW	15.3	22.2	25.9	33.4	43.8	57
	10°C/35°C	kW	11.6	17.1	19.5	26.1	34.3	43.7
Cooling Zones	qty		2	2	2	2	2	2
Heating Capacity	kW per zone		6	9	9	12	12	12
Cooling Medium			Water					
Cooling System			Direct					
Max Set Point Temperature	°C		90					
Min Set Point Temperature (no glycol)	°C		8					
Min Set Point (with glycol) (***)	°C		-5					
Min Cond. Water Temperature	°C		15					
Max Cond. Water Temperature	°C		40					
Control Valve	Type		Motorised modulating valve					
Refrigerant Circuit(s)	qty		1					
Compressor	Type		Scroll					
	Capacity Control		ON/OFF (0-100%)					
	qty		1					
	Motor frequency		60					
	Nominal Power	HP	4.5	6	7.5	10	13	15
Condenser	Type		Brazen plate					
	Nominal Flow	m³/h	1.5	2	5.1	6.8	8.7	10.5
	Minimum ΔP	bar	1.5	1.5	1.5	1.5	1.5	1.5
Evaporator	Type		Brazen plate					
HP Process Pump	Type		Centrifugal					
	qty		2					
	kW		1.5	2.2	2.2	3	3	4
	HP		2	3	3	4	4	5.4
	Full Load Ampere	A	4.1	4.1	4.1	5.6	5.6	7.6
	Motor Poles		2					
	min	m³/h	1.20	2.40	2.40	3.60	3.60	6.00
	max		6.00	9.60	9.60	15.00	15.00	24.00
	min	bar	4.37	4.54	4.54	4.35	4.35	3.66
	max		5.87	6.05	6.05	6.00	6.00	5.15
Evaporator Pump	Type		Centrifugal					
	kW		0.45					
	HP		0.6					
	Motor Poles		2					
Tank	Material		Stainless Steel					
	Volume	L	23	23	23	70	70	70
Flow Meter	Type		Vortex					
	Material		Stainless Steel					
Process Water Connections	Type		NPT					
	In/Out		1" M (DN25)	1½" M (DN32)	1¼" M (DN32)	1½" M (DN40)	1½" M (DN40)	2" M (DN50)
Condenser Water Connections	Type		NPT					
	In/Out		1" M (DN25)	1" M (DN25)	1" M (DN25)	1½" M (DN40)	1½" M (DN40)	1½" M (DN40)
Expansion Valve	Type		Mechanical					

TECHNICAL DATA: RSY - 60Hz

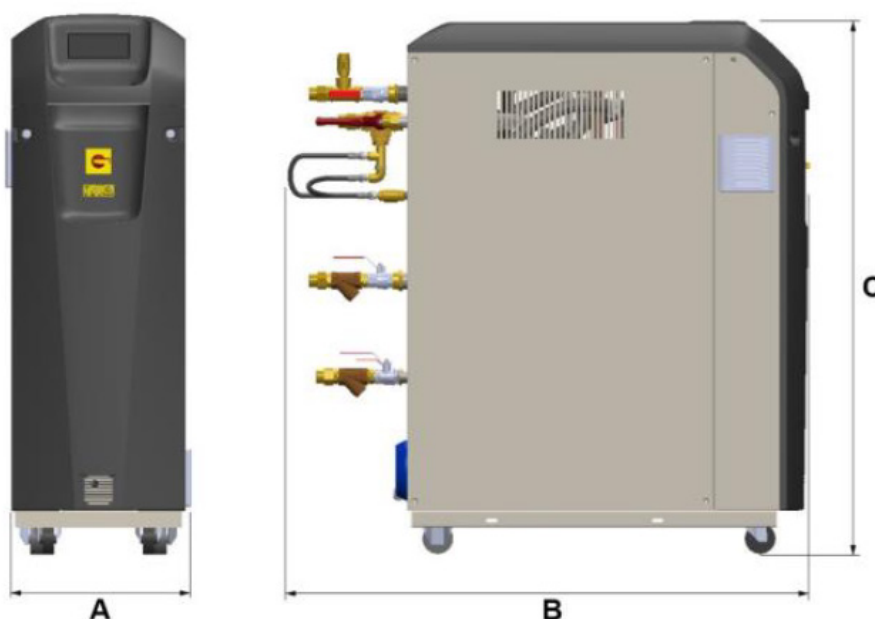
Microgel RS Syncro								
Model			50	80	100	145	180	210
Unit Full Load Ampere (FLA) (Maximum value not reached during standard operation)	Process Pump	A	31.2	34.1	42.8	59.4	64.1	72.3
Unit Power (Maximum value not reached during standard operation)	Process Pump	kW	22.1	24.0	30.7	43.1	46.5	50.6
Power Supply Cable	Process Pump	Sez.	FG7(O)R-4G 6mm ²	FG7(O)R-4G 16mm ²	FG7(O)R-4G 16mm ²	FG7(O)R-4G 16mm ²	FG7(O)R-4G 16mm ²	FG7(O)R-4G 25mm ²
Sound Level	dB(A) 10m		53.9	53.9	54.2	56.8	56.8	56.8
Compressed Air	min. 4 - max. 7.5 bar		No					
Refrigerant Charge	kg		1.4	1.7	1.9	2.1	2.5	3.1
Net Weight (****)	kg		217.0	257.0	363.0	369.0	399.0	430.0
Operating Weight	kg		218.4	258.7	364.9	371.1	401.5	433.1

- (*) Nominal Cooling capacity (water to process/condenser inlet water °C)
- (**) Process Water $\Delta P = 2^{\circ}\text{C}$
- (***) With required verification of the refrigeration circuit by Frigel
- (****) approximative
- (*****) RSY HP pump, without flow meter
- Add glycol if set point < min set point allowable without glycol.
- Pumps rated for up to 35% of glycol. If not, contact the manufacturer.
- Available supply voltage: 400V $\pm 10\%$ /3/50Hz; 460V $\pm 10\%$ /3/60Hz; 380V $\pm 10\%$ /3/60Hz; 200-220 $\pm 10\%$ /3/50-60Hz.
- On request: UL electrical panel for 60Hz versions.
- Not suitable for DI water.
- Altitude limit: 1000 m a.s.l.
- Max water working pressure: 8 bar.

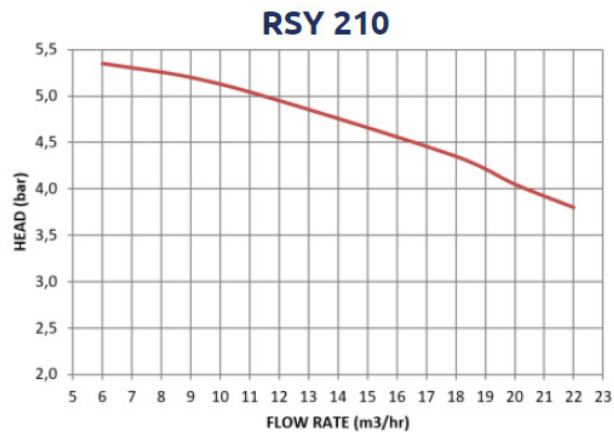
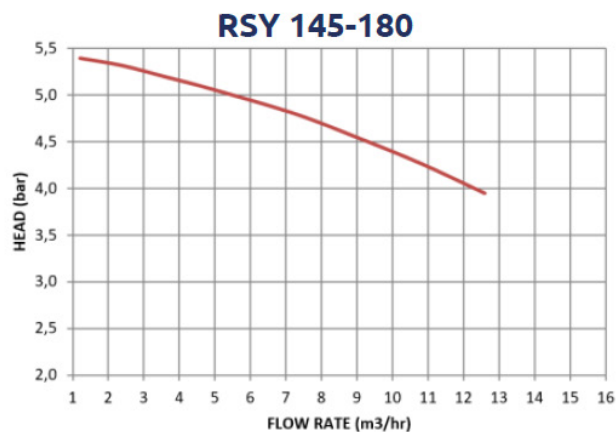
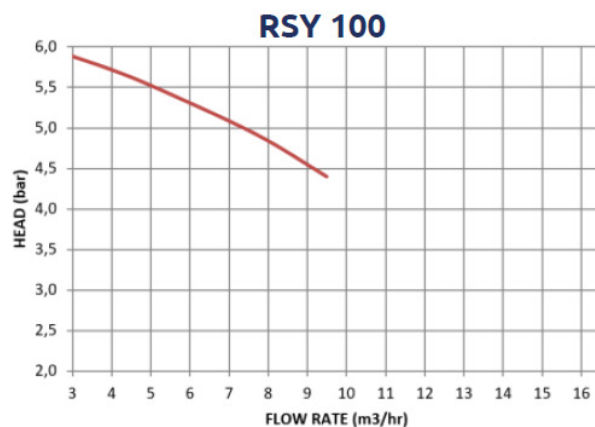
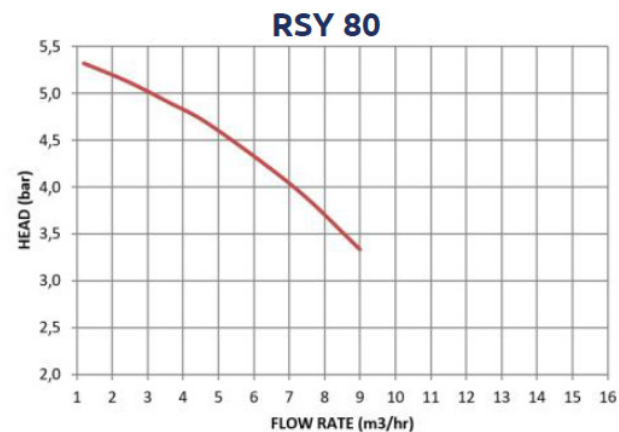
TECHNICAL DIMENSION DATA

Machine Dimensions							
Model		50	80	100	145	180	210
A	mm	477	477	477	614	614	614
B	mm	1.390	1.390	1.390	2.030	2.030	2.030
C	mm	1.390	1.390	1.390	1.631	1.631	1.631

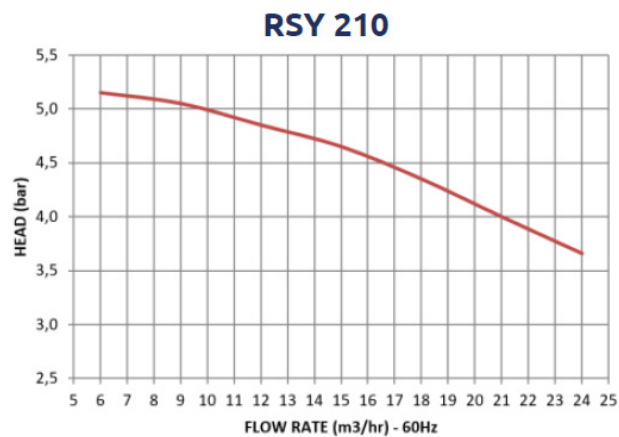
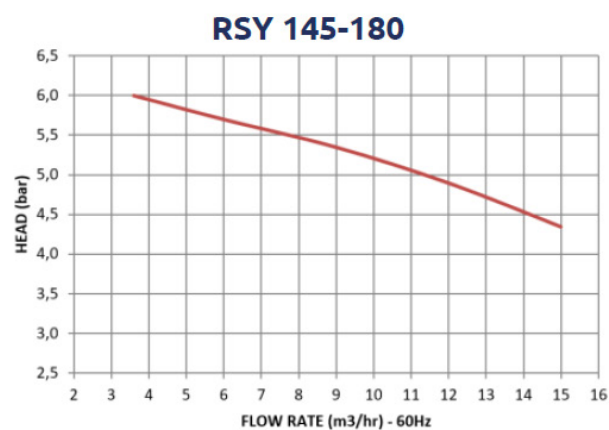
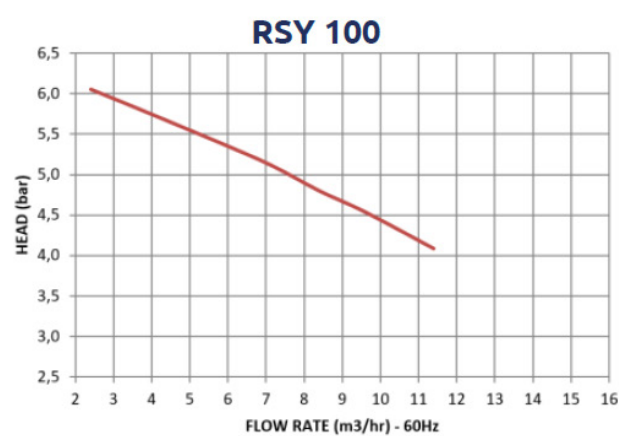
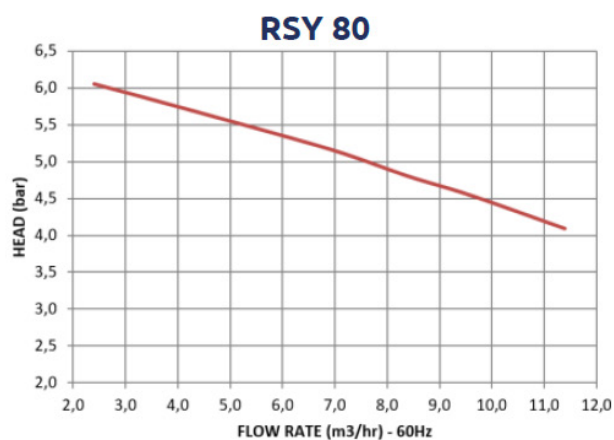
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PROCESS PUMP CURVES - 50Hz

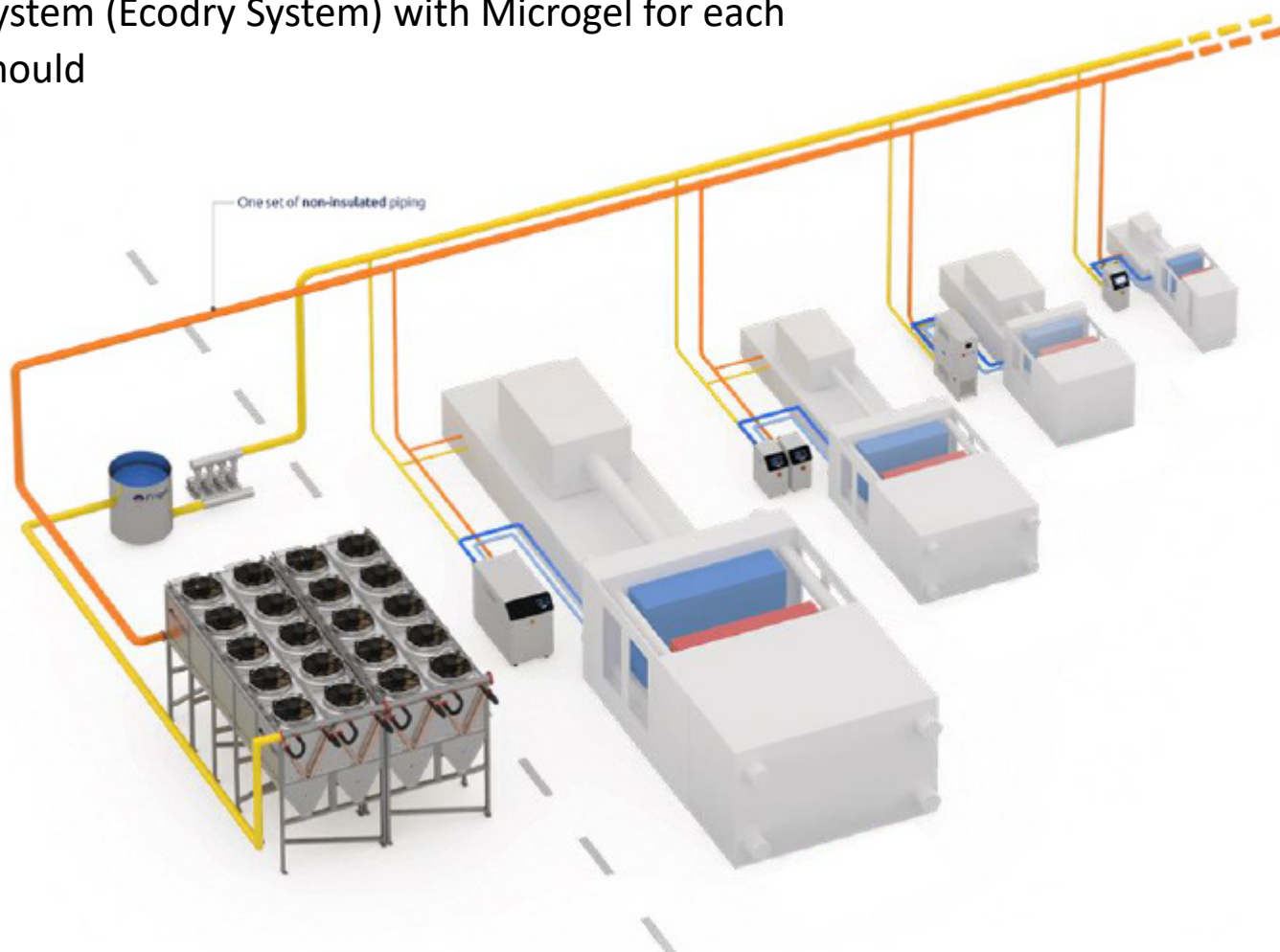


PROCESS PUMP CURVES - 60Hz



CONNECTION EXAMPLE

Typical scheme of an injection moulding cooling system (Ecodry System) with Microgel for each mould



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