



FL300



FL601



FL1201
FL1703

Recirculating Coolers FL Series

compact models with up to 1.7 kW cooling capacity which can be placed under lab benches

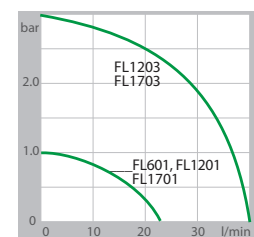
The FL models featured on this page are equipped for a wide range of cooling applications and can be placed under lab benches

- Easy filling from top
- Level indicator (all models), pressure indicator (from FL1201 upwards)
- Large expansion volume
- Immersion pumps, suitable for continuous operation
- Permissible temperature in return line 80 °C
- Recessed grips and wheels for easy transport
- Low liquid level protection with optical and audible alarm
- Suitable for water, water-glycol mixture, *Thermal* bath fluid
- Overload protection for pump motor and compressor

Removable venting grid
with drain port at back



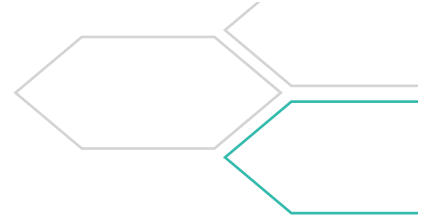
Pump Capacity
Bath fluid: water



JULABO Order No.	JULABO Model	Working temp. range °C	Temp. stab. °C	Cooling capacity kW					Pump capacity		Filling volume liters	Dimensions W x L x H cm
				20	10	0	-10	-20 °C	Flow rate / Pressure l/min bar			
9 660 003	FL300	-20 ... 40	±0.5	0.3	0.25	0.2	0.15	0.1	15	0.35	3 ... 4.5	25 x 50 x 60
9 661 006	FL601	-20 ... 40	±0.5	0.6	0.5	0.4	0.33	0.2	23	1.0	5.5 ... 8	32 x 50 x 60
9 661 012	FL1201	-20 ... 40	±0.5	1.2	1.0	0.9	0.6	0.3	23	1.0	12 ... 17	50 x 76 x 64
9 663 012	FL1203	-20 ... 40	±0.5	1.2	0.9	0.8	0.5	0.2	40	0.5 - 3.0	12 ... 17	50 x 76 x 64
9 661 017	FL1701	-20 ... 40	±0.5	1.7	1.5	1.1	0.85	0.4	23	1.0	12 ... 17	50 x 76 x 64
9 663 017	FL1703	-20 ... 40	±0.5	1.7	1.4	1.0	0.75	0.3	40	0.5 - 3.0	12 ... 17	50 x 76 x 64

water-cooled models

9 671 017	FLW1701	-20 ... 40	±0.5	1.7	1.5	1.1	0.85	0.4	23	1.0	12 ... 17	50 x 76 x 64
9 673 017	FLW1703	-20 ... 40	±0.5	1.7	1.4	1.0	0.75	0.3	40	0.5 - 3.0	12 ... 17	50 x 76 x 64



Applications

- Rotary evaporators
- Autoclaves
- Reaction vessels
- Soxhlet installations
- Distillation apparatus
- Vacuum systems
- Gas chromatographs
- Spectrometers
- Semiconductor industry
- Dosing and gluing techniques
- Diffusion pumps
- Mass spectrometers
- SEM

Recirculating Coolers FL Series

Tower version, high-performance models with up to 4.0 kW cooling capacity

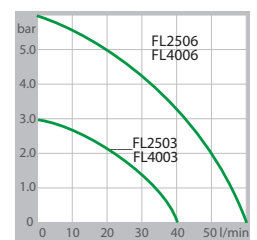
The FL models shown on this page feature cooling capacities up to 4 kW, powerful circulating pumps and integrated bath tanks with filling volumes up to 30 liters.

- Powerful circulating pumps up to 60 l/min; 6 bar
- Adjustable bypass for pump pressure
- Wheels for easy transport
- Early warning function to indicate need for condenser cleaning
- Overload protection for pump motor and compressor
- Stainless steel bath tanks
- *BlackBox* function for online diagnosis

Pressure indicator
from model FL1201 upwards



Pump capacity
Bath fluid: water



JULABO Order No.	JULABO Model	Working temp. range °C	Temp. stab. °C	Cooling capacity kW				Pump capacity		Filling volume liters	Dimensions W x L x H cm
				20	10	0	-20 °C	Flow rate / Pressure l/min bar			
9 663 025	FL2503	-20 ... 40	±0.5	2.5	1.5	1.2	0.55	40	0.5 - 3.0	24 ... 30	60 x 76 x 115
9 666 025	FL2506	-15 ... 40	±0.5	2.5	1.0	0.3	--	60	0.5 - 6.0	24 ... 30	60 x 76 x 115
9 663 040	FL4003	-20 ... 40	±0.5	4.0	2.4	1.5	0.65	40	0.5 - 3.0	24 ... 30	60 x 76 x 115
9 666 040	FL4006	-20 ... 40	±0.5	4.0	1.9	0.9	0.05	60	0.5 - 6.0	24 ... 30	60 x 76 x 115

water-cooled models

9 673 025	FLW2503	-20 ... 40	±0.5	2.7	1.7	1.3	0.55	40	0.5 - 3.0	24 ... 30	60 x 76 x 115
9 676 025	FLW2506	-15 ... 40	±0.5	2.5	1.0	0.3	--	60	0.5 - 6.0	24 ... 30	60 x 76 x 115
9 673 040	FLW4003	-20 ... 40	±0.5	4.3	2.5	1.6	0.65	40	0.5 - 3.0	24 ... 30	60 x 76 x 115
9 676 040	FLW4006	-20 ... 40	±0.5	4.0	1.9	0.9	0.05	60	0.5 - 6.0	24 ... 30	60 x 76 x 115

Included with each unit: 2 barbed fittings for tubing 3/4" inner dia. on models FL/FLW2503 and FL/FLW4003 (pump connections G 3/4" male)
2 barbed fittings for tubing 1" inner dia. on models FL/FLW2506 and FL/FLW4006 (pump connections G 1 1/4")



FL7006 bis FLW11006

Applications

- Electron microscopes
- Lasers
- Mills and kneaders
- Pilot plants
- Miniplants
- Plastic industry
- Drying of gases
- General industry

NEW, up to 20 kW!

Recirculating Coolers FL Series

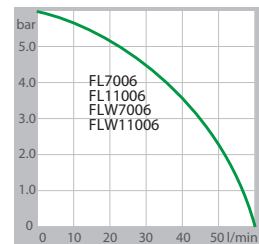
powerful models

The FL models on this page are designed to remove process heat from large systems and applications. Their pumps and compressor are particularly powerful.

- Cooling capacities of up to 20 kW
- For demanding applications in process industry
- High power reserves for all applications
- Low water consumption for all water-cooled FLW models
- Overload protection for pump motor and compressor

Pump capacity

Bath fluid: water



JULABO Order No.	JULABO Model	Working temperature range °C	Temp. stab. °C	Cooling capacity kW				Pump capacity Flow rate / Pressure		Filling volume liters	Dimensions W x L x H cm
				20	0	-10	-20 °C	l/min	bar		
9 666 070	FL7006	-20 ... 40	±0.5	7.0	5.5	3.0	1.7	60	0.5 - 6.0	39... 47	78 x 85 x 148
9 666 110	FL11006	-20 ... 40	±0.5	11.0	7.5	5.0	3.0	60	0.5 - 6.0	39... 47	78 x 85 x 148
9 666 200	FL20006	-20 ... 40	±0.5	20.0	8.5	4.0	1.5	80	0.8 - 6.0	17... 40	95 x 115 x 161
water-cooled models											
9 676 070	FLW7006	-20 ... 40	±0.5	7.4	6.0	3.1	1.7	60	0.5 - 6.0	39... 47	78 x 85 x 148
9 676 110	FLW11006	-20 ... 40	±0.5	11.5	8.0	5.1	3.0	60	0.5 - 6.0	39... 47	78 x 85 x 148
9 676 200	FLW20006	-20 ... 40	±0.5	20.0	8.5	4.0	1.5	80	0.8 - 6.0	17... 40	95 x 115 x 161

Included with each unit: 2 barbed fittings for tubing 1" inner dia. (pump connections G 1 1/4")

Recirculating Cooler FC Series



FC600S



FC1600T

Recirculating Coolers FC Series

for heating and cooling

The FC models on this page feature high temperature stability as well as integrated heaters.

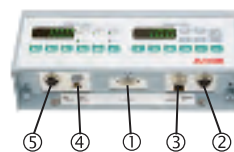
- Temperature stability ± 0.2 °C
- Integrated heater
- Expanded working temperature range to 80 °C
- Two LED temperature displays
- Adjustable inlet/outlet temperature ratio
- Liquid level indicator (sight glass)
- Connections for RS232, standby and alarm

FC1200T, FC1600T, FCW2500T

- Connection for external Pt100 sensor
- Analog connections for programming and temperature recorder

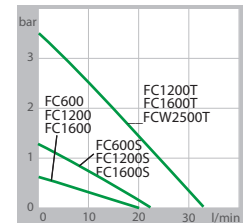
Digital/analog connections

- ① RS232 Interface
- ② Standby input
- ③ Alarm output



Pump capacity

Bath fluid: water



FC1200T, FC1600T, FCW2500T provide additionally:

- ④ External Pt100 sensor
- ⑤ External programming, temperature recorder

JULABO Order No.	JULABO Model	Working temperature range °C	Temp. stab. °C	Heat cap. kW	Cooling capacity kW					Pump capacity Flow rate / Press. l/min bar		Pressure indicator bar	Filling volume liters	Dimensions W x L x H cm
					20	10	5	-10	-20 °C					
9 600 060	FC600	-20 ... 80	± 0.2	1.2	0.6	0.47	0.4	0.21	--	20	0.5	--	6 ... 8	35 x 54 x 49
9 600 063	FC600S	-10 ... 80	± 0.2	1.2	0.5	0.37	0.3	0.1	--	22	1.2	--	6 ... 8	35 x 54 x 49
9 600 120	FC1200	-20 ... 80	± 0.2	1.2	1.3	0.95	0.75	0.37	--	20	0.5	0 ... 2.5	8 ... 11	46 x 61 x 49
9 600 123	FC1200S	-15 ... 80	± 0.2	1.2	1.2	0.85	0.65	0.26	--	22	1.2	0 ... 2.5	8 ... 11	46 x 61 x 49
9 600 160	FC1600	-20 ... 80	± 0.2	1.2	1.65	1.25	1.0	0.47	--	20	0.5	0 ... 2.5	8 ... 11	46 x 61 x 49
9 600 163	FC1600S	-15 ... 80	± 0.2	1.2	1.55	1.15	0.9	0.36	--	22	1.2	0 ... 2.5	8 ... 11	46 x 61 x 49
9 600 126	FC1200T	-10 ... 80	± 0.2	1.2	1.1	0.75	0.55	0.15	--	28	3.5	0 ... 4.0	8 ... 11	46 x 61 x 49
9 600 166	FC1600T	-15 ... 80	± 0.2	1.2	1.45	1.05	0.8	0.25	--	28	3.5	0 ... 4.0	8 ... 11	46 x 61 x 49

water-cooled models

9 601 256	FCW2500T	-25 ... 80	± 0.2	1.2	2.5	2.0	1.8	0.8	0.25	28	3.5	0 ... 4.0	8 ... 11	46 x 61 x 49
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SC2500a
SC2500w

Applications

- Semiconductor industry:
 - Etching tools
 - Stainless steel chucks
 - PVD
 - Sputtering
 - Wet benches
- Packaging industry
- Plastic industry
- Dosing and gluing techniques
- Jacketed reaction vessels
- Kilo labs, pilot plants

Recirculating Coolers SemiChill Series

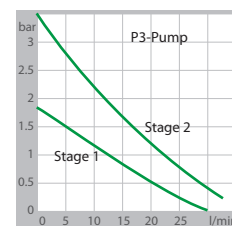
for demanding industrial applications, for example in the semiconductor industry

SemiChill recirculating coolers prove to be extremely reliable during continuous operation and under rough environmental conditions. All wetted parts are made of stainless steel or high grade plastic. The modular concept allows for customized configuration according to your requirements.

- 5 models for individual customization
- High cooling and pump capacities
- Optional integrated heater with a heating capacity up to 12 kW
- Gasket-free immersion pumps, maintenance free and electronically adjustable
- Pressure and filling level indicators
- Sealed filling port (70 mm dia.)
- Overload protection for pump motor and compressor

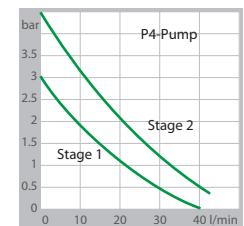
Pump capacity P3

Bath fluid: water



Pump capacity P4

Bath fluid: water





JULABO Order No.	JULABO Model	Working ¹⁾ temperature range °C	Temp. stab. °C	Cooling capacity kW			Pump type / Pump capacity	Filling volume liters	Dimensions W x L x H cm
				20	0	-10 °C			
	SC2500a	-20 ... 80	±0.1	2.5	1.5	0.9		21 ... 33	49 x 62 x 105
see	SC2500w	-20 ... 80	±0.1	2.5	1.5	0.9	see	21 ... 33	49 x 62 x 105
order information	SC5000a	-20 ... 130	±0.1	5.0	2.5	1.2	order information	43 ... 60	59 x 67 x 112
on following pages	SC5000w	-20 ... 130	±0.1	5.0	2.5	1.2	on following pages	43 ... 60	59 x 67 x 112
	SC10000w	-20 ... 130	±0.1	10.0	5.0	2.5		43 ... 60	59 x 67 x 112

Models designated ‚a‘ = ventilation air cooling; ‚w‘ = water cooling

Pump connections: NPT 3/4" male

¹⁾ Maximum working temperature range (Working temperature range, Standard: 5 ... 35 °C)

Configuration Options

Keypad and control electronics	Eco	Professional
Optional features		
MULTI-DISPLAY (LED) temperature indication	•	
VFD Comfort-Display with simultaneous indication of 3 values		•
Keypad, splash-proof	•	•
PID temperature control	•	•
3-point calibration	•	•
Pump capacity adjustable in stages	•	•
RS232 interface	•	•
'Stakei' connections for power supply (e.g. for shut-off valve)	•	•
Early warning system for low level, high and low temperature limits	•	•
High temperature cut-off adjustable via display	•	•
Low liquid level protection with cut-off function	•	•
Classification III (DIN 12876-1)	•	•
Online diagnosis via integrated Black Box	•	•
Connector for external Pt100 sensor for measuring and controlling the external system		•
Integrated programmer with real time clock for 1x10 program steps		•
Quantitative resistivity measurement and display, range 0.5...5 MΩ/cm		•
Flow measurement and status display (factory pre-set limit value)		•
Options for Professional electronics		
Scalable analog interfaces (standby input, 2 x alarm output)	--	Option
RS485 Interface	--	Option

Further options for working temperature, pump capacity and heaters

Type	Working temperature ranges				Circulating pumps		Heaters			
	Standard 5...35 °C	Low Temp -20...35 °C	Low/High Temp I -20...80 °C	Low/High Temp II -20...130 °C	P3 33 l/min 3.5 bar	P4 43 l/min 4.3 bar	H0 no Heater	H1 1 kW	H5 5 kW	H12 12 kW
SC2500a SC2500w	✓	Option	Option	--	✓	--	✓	Option	--	--
SC5000a, SC5000w SC10000w	✓	Option	Option	Option	✓	Option ¹⁾	✓	--	Option	Option

✓ This feature is included in base model ¹⁾ Cooling capacity reduces by 0.2 kW

Filter housings

Please specify filter option when placing an order. Filter housings cannot be retrofitted. Housings are mounted on the right side.

- D1** DI-filter housing, plastic (to 35 °C), incl. cartridge
- D2** DI-filter housing, stainless steel (to 90 °C), incl. cartridge
- M1** Micro-filter housing, plastic (to 35 °C), w/o cartridge
- M2** Micro-filter housing, stainless steel (to 130 °C), w/o cartridge

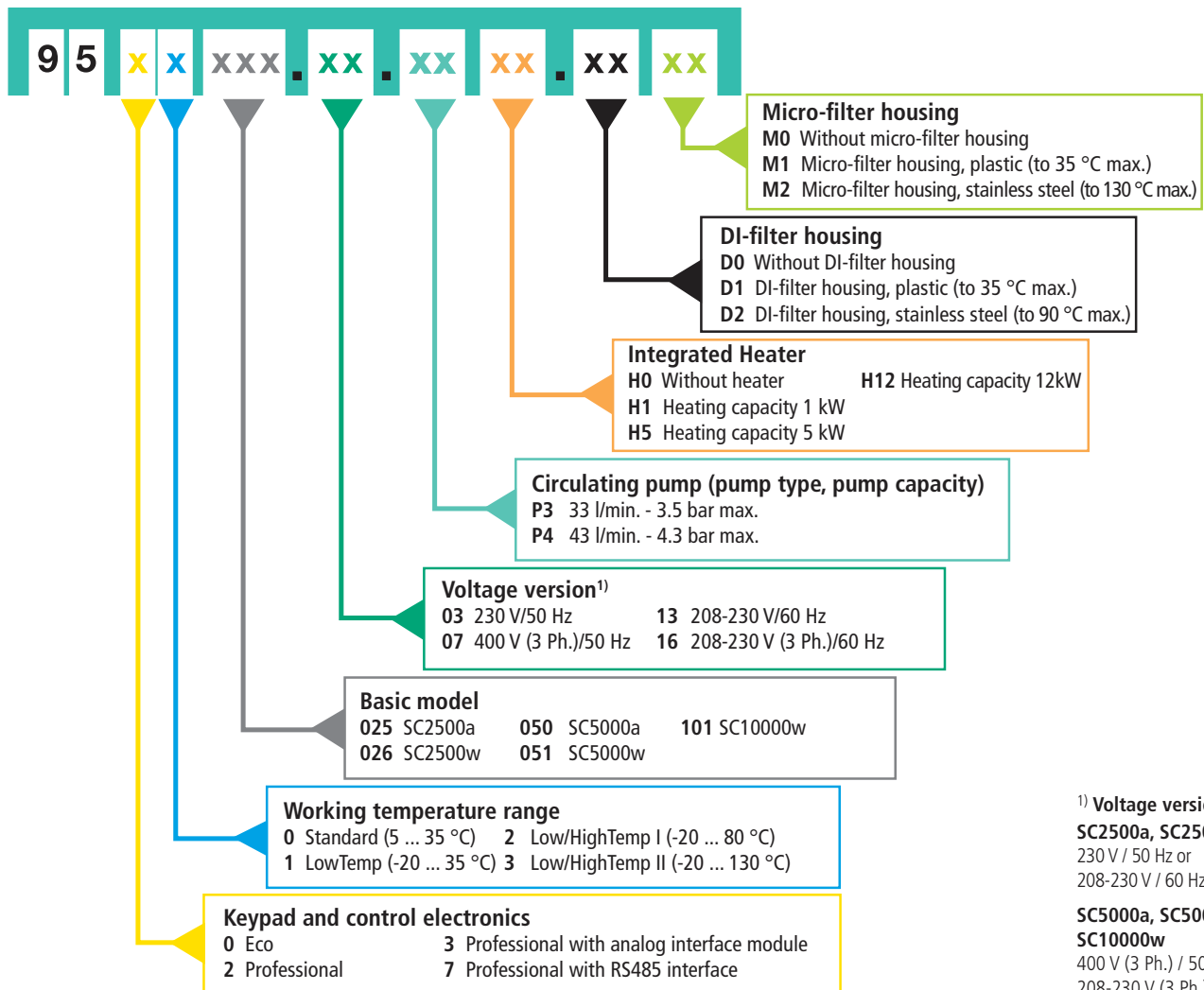
Filter housings for DI-filter and micro-filter (optional)





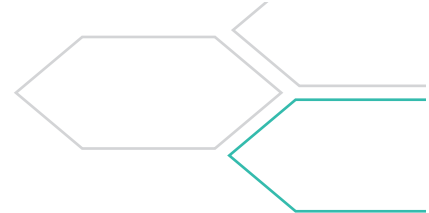
Order Information

Combine one of the five base models with the options of your choice. Please use the following order information to create your order number. Example for model SC5000a: 9 5 2 1 050 07 P3 H0 D0 M1



¹⁾ **Voltage version**
SC2500a, SC2500w
 230 V / 50 Hz or
 208-230 V / 60 Hz
SC5000a, SC5000w,
SC10000w
 400 V (3 Ph.) / 50 Hz or
 208-230 V (3 Ph.) / 60 Hz

Compact Recirculating Coolers



| AWC100



| F200

Applications

- Cooling of Peltier elements, particularly for analytical devices and CCD cameras
- Polarimeters, refractometers
- Electrophoresis chambers
- Condensers for glass installations
- Calorimeters
- Rotary evaporators

Compact Recirculating Coolers

compact and budget-priced models for applications requiring little cooling performance

The models AWC100 and F200 have a small footprint and are cost-saving.

Air-to-Water Recirculating Cooler AWC100 for applications near ambient temperature

- Circulating water is cooled by air ventilation
- Constant pump performance
- Energy saving without compressor
- Cooling performance adjustable in 2 stages
- Level indicator

Recirculating Cooler F200 for applications below ambient temperature

- Adjustable setpoint
- Constant cooling and pump performance
- Level indicator

JULABO Order No.	JULABO Model	Working temp. range °C	Temp. stability °C	Cooling capacity ¹⁾			Pump capacity		Filling volume liters	Dimensions W x L x H cm
				W	10	5 °C	Flow rate /	Pressure		
9 630 100	AWC100	20 ... 40	--	400	220	120	2.9	0.2	0.9	20 x 34 x 30
				550	300	180				
9 620 020	F200	5 ... 40	±3	200	180	130	8	0.12	3.0	19 x 35 x 41

¹⁾ AWC100: cooling capacity varies with the temperature difference between return line temperature and ambient temperature.

Included with each unit:

AWC100: 2 each barbed fittings for tubing 8 and 10 mm inner dia. (pump connections M10x1 female)

F200: Pump connections for tubing 10 mm inner dia.

User Benefits and helpful **Tips**



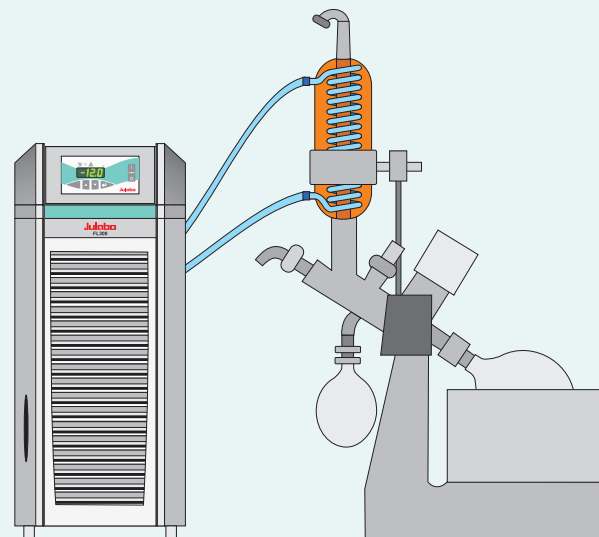
Cooling with Recirculating Coolers

Precious tap water is still being used for many cooling applications. Besides environmental aspects, there are additional draw-backs:

- Low efficiency - uncontrollable tap water temperature
- High costs for water and waste water
- Solvents are dangerous for staff and environment

Benefits of JULABO Recirculating Coolers:

- High condensation efficiency
- Working temperature accurately adjustable
- Constant and reliable cooling flow rate of circulating pump
- Waste water does not contain hazardous substances
- Simultaneous connection of several external systems



Cost Saving (example calculation)

Cooling of rotary evaporators is a typical application of recirculating coolers. An average 3 liter rotary evaporator uses approximately 230000 liters of cooling water per year. This corresponds to an annual water consumption of a family of four! The following example calculates the cooling of two rotary evaporators:

Application parameters

Cooling water inlet:	15 °C
Cooling water outlet:	17 °C
Water flow rates:	4 liters per minute

Cooling water costs

4 liters per minute	= 240 liters per hour
Operating time per year	= 240 days x 8 hours
Consumption per year	= 461 m ³
Costs per m ³	= 4.80 € *
Costs per year	= 2212.80 €

* Average prices in Germany, March 2009

Calculation of cooling capacity

P	= $\Delta T * c * m/t$
ΔT	= 2 °C (temperature difference)
c	= 4.18 kJ/kg*K (specific heat capacity for water)
m/t	= 0.066 l/sec (water flow rate)

Required cooling capacity: 560 watts.

Operating costs for a recirculating cooler (FL601)

Power consumption	= 1.05 kW
Operating time per year	= 240 days x 8 hours
Consumption per year	= 2016 kWh
Costs per kWh	= 0.20 € *
Costs per year	= 403.20 €

This adds up to **cost savings of € 1809.60 per year.**

Amortization period: 2 years!

Reduce your costs while contributing to our environment.