

MIRAI Cold 15 T

MIRAI Cold 15 T operates in a closed cycle configuration with air working indirectly inside of the refrigeration system. Closed cycle machines are most commonly used for process cooling applications such as freeze-drying, gas liquification, and solvent recovery.

ADDITIONAL HEAT EXCHANGER

Our closed cycle machines are supplied with an additional heat exchanger. With use of industry-standard heat transfer fluids, MIRAI Cold machines are the ideal plug & play refrigeration solution for new systems as well as for retrofits.

AIR CYCLE TECHNOLOGY

The technology is based on the heating capability of air (R729) during compression and cooling down during the expansion process. Repetition of compression and expansion cycles allows to reach and maintain ultra-low temperatures down to -110 °C.



MAIN ADVANTAGES



AIR AS REFRIGERANT

- 0 GWP, 0 ODP, and 0 TFA
- Environmentally friendly
- Refrigerant free of charge



OIL FREE

- No oil in the system
- Reduced maintenance costs
- Reduced operation costs



SAFE SOLUTION

- No chemically active substances
- No risk of fire or explosion
- Low system pressure



TEMPERATURE STABILITY

- Frequency inverter allows maintaining 0.5 K accuracy
- Temperature uniformity



OPERATING STABILITY

- Stable continuous operation
- Stable loads on cooling water and power grid



LEGISLATIVE COMPLIANCE

- Compliance with all international standards / regulations
- No special safety requirements



ENERGY EFFICIENCY

- Energy recovery
- Automatic RPM control



REDUCED OPERATING COSTS

- Long equipment lifecycle
- Low maintenance

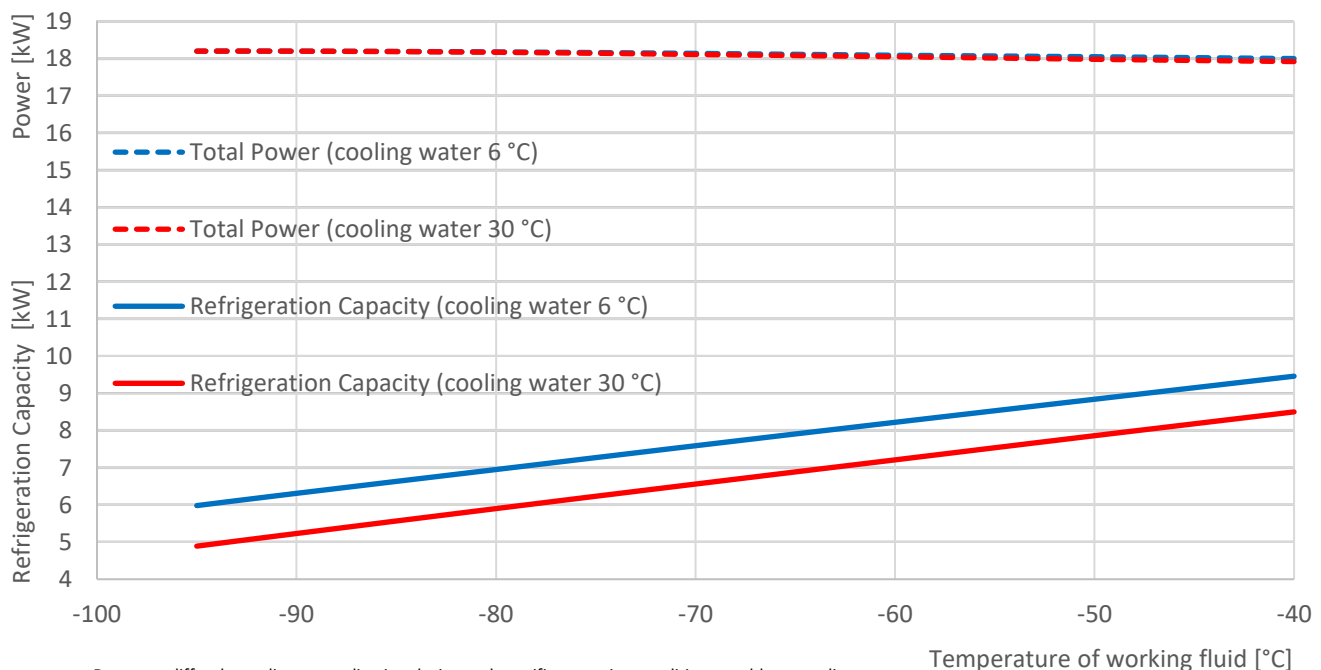


NO VIBRATION OR NOISE

- Turbo-compressor design reduces noise and vibrations

TECHNICAL DATA

MIRAI Cold 15 T (MC 15 C/W/T) - Refrigeration Capacity & Power



Data may differ depending on application design and specific operation conditions unable to predict.

TECHNICAL SPECIFICATIONS

TEMPERATURE RANGE	from -40 °C to -110 °C	
MAINTAINED HEAT TRANSFER FLUID TEMPERATURE*	from -40 °C to -95 °C*	
REFRIGERATION CAPACITY	Up to 9.5 kW	
REFRIGERANT	Natural Air (R729)	
COMPRESSOR	Mirai Turbo-Compressor (water-cooled)	
MAXIMUM ROTATION SPEED	85 000 rpm	
RATED MOTOR POWER	15 kW	
MAXIMUM OPERATING PRESSURE	5.5 bar	
POWER SUPPLY	3 PE+N, 400 V, 50 Hz	
NOMINAL CURRENT	36 A	
CONNECTION SIZE COOLING WATER in out	DN15 DN15	
COOLING WATER MASS FLOW RATE	from 1 500 to 4 000 kg/h (for water temp. from +6 °C to +30 °C)	
COOLING WATER PRESSURE DROP	110 kPa	
CONNECTION SIZE HEAT TRANSFER FLUID in out	DN40 DN40	
OIL MASS FLOW RATE (for heat transfer fluid ΔT in /out 5K)	nominal 2 620 kg/h	
OIL PRESSURE DROP	no more than 25 kPa	
NOISE LEVEL	70 dB	
CONTROL PANEL	7" color touch screen display, data record, temperature control	
CONTROL SYSTEM	KEB system compatible with digital communication protocols ProfiNET, EtherCAT, EtherNET/IP, and Powerlink	
SAFETY PROTECTION	High pressure protection, water supply cut-off protection, over-current protection, sequential and phase failure protection, high temperature protection, sensor failure protection	
PIPING MATERIAL	Stainless steel	
CASE MATERIAL	Steel	
MACHINE DIMENSIONS (L x W x H)	109 x 145 x 179 cm (\pm 1.5 cm)	
MACHINE WEIGHT	830 kg	
TECHNICAL REQUIREMENTS FOR OPERATION	Ambient temperature limits in mechanical room +5 °C to +35 °C	
	Connection to air compressor, pressure 3-8 bar, cat. 2	
	Connection with a cooling water circuit, pressure 3 barg	
	Cooling water mass flow min 1 500 kg/h	
OPTIONAL ACCESSORIES	System pressurization unit providing the required air quality and pressure installed inside MIRAI Cold	
	Remote monitoring system	
STANDARD MAINTENANCE PLAN (for each repeating cycle of operating hours)	Every day	Visual inspection, check of alarms and alerts
	On demand by machine Mandatory 9 000 h	Electrical cabinet air filter cartridge replacement
	Recommended 9 000 h or once a year Mandatory 18 000 h	Visual checks of electrical cabinet, machine parameters, torques, grounding, HED transporter chain, filters, etc.
	36 000 h	Electrical cabinet cooling fan replacement
	90 000 h	General inspection

* range for recommended heat transfer fluids Fragoltherm X-T9-A and DOW Syltherm XLT
(possible to use other heat transfer fluids upon request when approved)

CERTIFICATION

MIRAI Cold 15 T is CE certified by respected European certification organization. CE certification covers:

- **Pressure equipment directive (PED) 2017/68/EU**, Module A2 Certificate
- **Electromagnetic compatibility directive (EMC) Directive 2014/30/EU** Certificate
- **Low voltage directive (LVD) 2014/35/EU** Certificate
- **Machinery directive (MD) 2006/42/EC**

DIMENSIONS AND CONNECTIONS OF THE MACHINE

