

## MIRAI COLD 10 CWT

**MIRAI Cold 10 CWT** - operates in a closed cycle configuration with air working indirectly inside of the refrigeration system. Closed cycle machines are most used for process cooling applications such as:

- » process cooling
- » chemical industry
- » freeze-drying

## 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 -160°C.

## MAIN ADVANTAGES



### OPERATING STABILITY

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



### REDUCED OPERATING COSTS

- Long equipment lifecycle
- Low maintenance



### AIR AS REFRIGERANT

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



### TEMPERATURE STABILITY

- Frequency inverter allows maintaining 0.5 K accuracy



### NO VIBRATION OR NOISE

- Turbo-compressor design reduces noise and vibrations



### OIL-FREE

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



### ENERGY EFFICIENCY

- Energy recovery
- Automatic RPM control



### SAFE SOLUTION

- No chemically active substances
- No risk of fire or explosion



### LEGISLATIVE COMPLIANCE

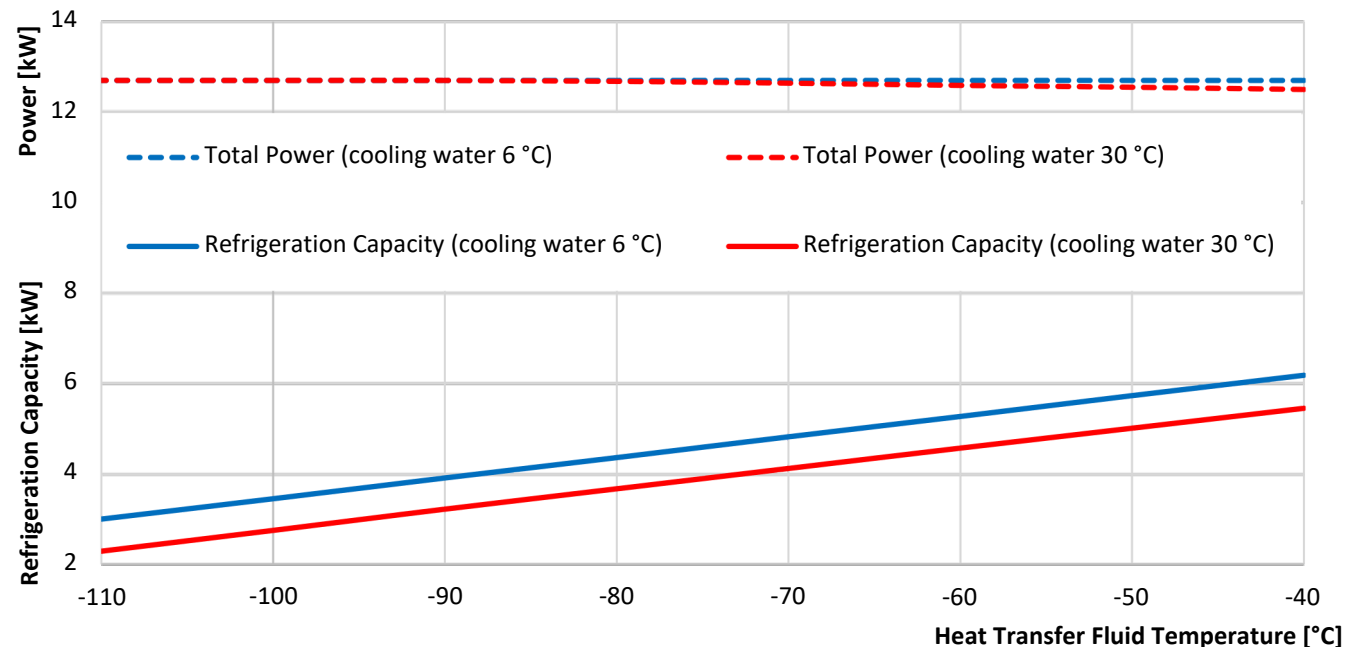
- Compliance with all international standards / regulations
- No special safety requirements



## COOLING CAPACITY

Cooling capacity of MC 10 C/W/T , at an inlet water temperature of 6°C and 30°C

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



## TECHNICAL SPECIFICATIONS

### AIR CYCLE

TEMPERATURE RANGE	from -40°C to -120°C
MAXIMUM NOMINAL REFRIGERATION CAPACITY	6 kW*
REFRIGERANT	Natural Air (R729)
COMPRESSOR	Mirai Turbo-Compressor (water-cooled)
MAXIMUM ROTATION SPEED	82 000 rpm
RATED MOTOR POWER	10 kW
MAXIMUM COMPRESSOR OUTLET PRESSURE	3 bar

### COOLING WATER

COOLING WATER MASS FLOW RATE	from 1000 to 4000 kg/h
COOLING WATER TEMPERATURE RANGE	from +6°C to +30°C**
MAXIMUM PRESSURE DROP ON WATER SIDE BETWEEN CM INLET AND OUTLET AT NOMINAL WATER FLOW 2350 kg/h	0.8 bar
MAXIMUM ALLOWED PRESSURE ON WATER INLET	10 bar
CONNECTION SIZE MACHINE COOLING IN   OUT	DN15   DN15

### GENERAL TECHNICAL SPECIFICATION

ACOUSTIC SOUND PRESSURE, AT A DISTANCE OF 1 M FROM <b>CM</b>	Maximum 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, another protocols are on request.
SAFETY PROTECTION	High pressure protection, water supply cut-off protection, over-current protection, high and low temperature protection, sensor failure protection
PIPING MATERIAL	Stainless steel
CASE MATERIAL	Steel
MACHINE (L x W x H)	109 x 145 x 179 cm (± 1.5 cm)
MACHINE WEIGHT	830 kg (± 20 kg)
TECHNICAL REQUIREMENTS FOR OPERATION	Ambient temperature limits in mechanical room +5°C to +35°C.
OPTIONAL ACCESSORIES	Remote monitoring system and Remote access system

### POWER REQUIRMENTS

POWER SUPPLY	~3 PE+N, 400 V, 50 Hz
NOMINAL CURRENT	28 A
MAXIMUM CURRENT	63 A
TOTAL POWER	13.5 kW

### HEAT TRANSFER FLUID

MAINTAINED HTF TEMPERATURE***	from -40 °C to -110 °C***
CONNECTION SIZE HTF IN   OUT	DN40   DN40
MAXIMUM ALLOWED PRESSURE ON HTF INLET	10 bar

Performance is nominal and individual units may vary. The efficiency of each refrigeration unit will depend on the specific operating conditions.

\* At set temp -40°C and cooling water temp. +6°C

\*\* approximate temperature (in cases of separate connection of the cooling liquid to the electrical cabinet), which should not be below the dew point at the air temperature at the installation site of the electrical cabinet, in order to avoid the appearance of condensation on the cooling surfaces

\*\*\* range depends on heat transfer fluid (HTF)

**CM** – Cooling machine



DIMENSIONS

