



ALCHEMIST SERIES

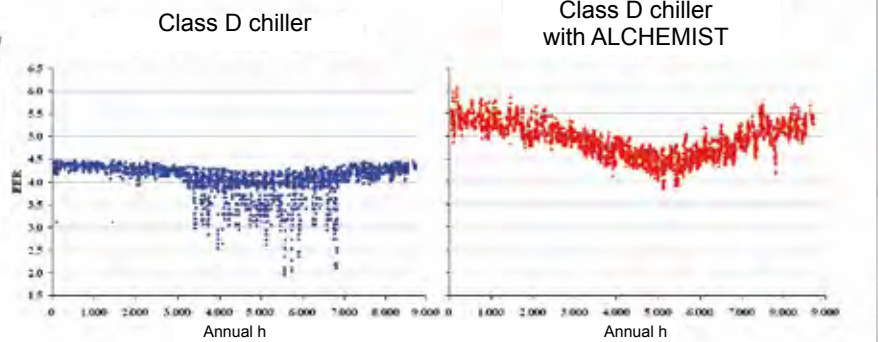
Adiabatic subcooler



A **PATENTED**, simple and compact product, designed to **increase chillers' power and seasonal energy efficiency**, specifically for retrofitting. **Alchemist** has been developed by MITA cooling technologies for **commercial refrigeration** (food-storage), a particular and demanding sector, focused on efficiency and reliability. Thanks to the great results obtained in transcritical CO₂

plants and in installations with traditional refrigerants, MITA suggests an Alchemist version for the **HVAC sector**. The obtainable results with the MITA cooling technologies subcooler are **from a D class efficiency chiller** (average seasonal) **to a A class**, as a **new installation**.

THE NEW ALCHEMIST SERIES

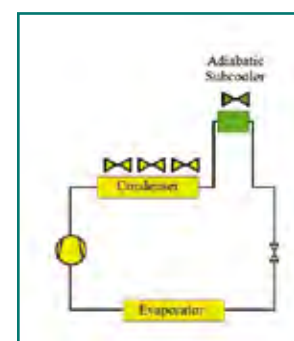


ADIABATIC SUBCOOLING

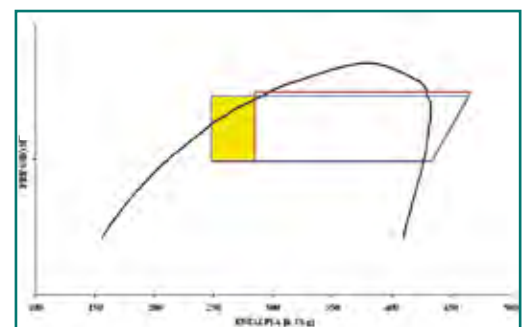
Alchemist combines the **adiabatic cooling** physical principle, together with **the refrigerant fluid subcooling**.

The adiabatic cooling consists in air temperature reduction through humidification. **Adiabatically treated air subcools the liquid** coming from chiller condenser circulating inside the machine's coils.

Alchemist is a plug & play product that, in comparison with other evaporative/adiabatic solutions used for increasing efficiency, **maintains the existing chiller configuration and plant layout**.



Plug & Play



Cooling effect

MAIN ADVANTAGES

From 20 to 45% (on annual base) **energy savings** compared to a D class dry system

EER average seasonal close to a new **class A** chiller

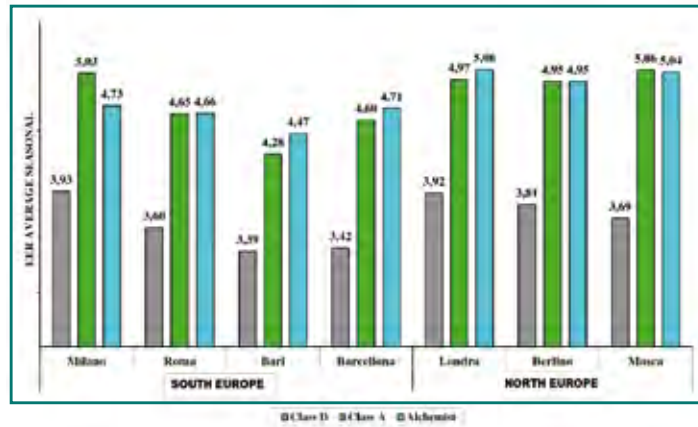
High savings **€/MWh** of produced frigorific energy

Plug & Play solution, with integrated control system

Easy and simple access for maintenance

Compact design, **modularity** and easy installation

EC Plug fan technology



Alchemist in a refrigeration system

WHERE TO USE ALCHEMIST

HFC frigorific circuits **retrofitting**

In combination with **new HFC or HFO chillers**

Transcritical plants with CO₂

OPERATION



The **PATENTED Alchemist Series** is fully automated and managed by an operator panel integrated with the possibility of **remote management**: just set the subcooling

temperature you wish to obtain and the system will self-adjust optimising energy and water consumption. There are **two operating ways**: dry and adiabatic.

Dry operation: external air is drawn in and conveyed onto the finned coils. **The humidification process is deactivated**, no water is present, the humidifier pack is dry and the pump circuit is disconnected.

The subcooling readings by temperature probes modulate fan speed **to optimise power consumption.**



Adiabatic operation: external air is drawn in and passed through the humidifier pack (protected inside the machine). The adiabatically cooled air (therefore at a lower temperature than the external air) is conveyed to the finned coils thus **increasing the frigorific fluid subcooling.**

The subcooling readings by temperature probes modulate fan speed and adiabatic cycles to **minimise power/ water consumption.**

SPECIFICATIONS

- ◆ **Support structure** made of press-folded galvanized metal sheets and subsequently protected by a RAL 7016 epoxy paint cycle.
- ◆ **Heat exchange coil** arranged inside the cooler (protected by a PVC panel), made of copper pipes and aluminium fins. Angle between coil, diameter of pipes, thickness and pitch of fins are designed to offer the best heat exchange performance with reduced fluid and airflow pressure drops.
- ◆ **Flocked PVC humidifier pack.** The geometric configuration allows the use of untreated water. The particular flocked pack design, as opposed to other types of adiabatic packs, requires spraying only for short periods at long intervals of time: this minimizes the power used by the pump and optimises water consumption. The adiabatic pack is easily accessible and removable for cleaning.

- ◆ **Temperature probes** for measuring external air, refrigerant, humidified air temperature inside the machine.
- ◆ **Aluminium air Inlet grille** (removable in an easy way), for the adiabatic section protection: avoiding direct penetration of light and water splashes during the wetting cycles.
- ◆ **EC Plug Fan**
- ◆ **Immersion spraying / draining pump** in stainless steel AISI 304, complete with IP X8 electric motor. Fitted inside the cooler, easily accessible for inspections and maintenance.
- ◆ **Servocontrolled solenoid valves** for the management

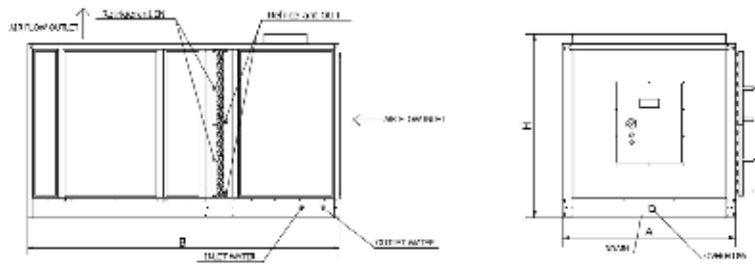
of the total replacement of the wetting water by emptying the gutters.

- ◆ **Command and control panel** of the various functions of the cooler, with the possibility of data transmission via MODBUS TCP/IP.
- ◆ **Wetting water collection gutters** in stainless steel AISI 304. Accessible and cleanable, fitted with drainage connection and reintegration.



A patented, simple and compact product** to increase chillers' power and seasonal energy efficiency, **specifically for retrofitting.

POWER, DIMENSIONS & WEIGHTS



Model	Installed power (kW)	Power consumption (kW)	Unit dimensions (AxH) (mm)	Unit length (B) (mm)	Empty weight (kg)	Operating weight (kg)
Alchemist HFC 95	1,1	0,67	1150x1250	2350	483	603
Alchemist HFC 110	1,25	0,79	1300x1400	2600	513	653
Alchemist HFC 120	2,8	0,90	1400x1500	2980	533	693
Alchemist HFC 140	2,8	1,54	1600x1800	2980	574	734
Alchemist HFC 160	2,8	2,60	1800x1900	2980	618	778

Model	Air flow (m³/h)	Refrigerant fluid flow R410a (kg/hr)	Refrigerant fluid flow R134a (kg/hr)	Inlet sound level (dBA)
Alchemist HFC 95	6498	2800	4000	54
Alchemist HFC 110	8712	4200	6000	52
Alchemist HFC 120	10368	4900	7000	52
Alchemist HFC 140	14112	6300	9000	58
Alchemist HFC 160	18432	7700	11000	64

FLOWS & SOUND LEVELS

Valid conditions for: External air T 35°, Humidity 50%,
ΔT 15°C, ΔTsub 18°C. Non-binding data.

Calculated in accordance
with ISO 13374

HYDRAULIC CONNECTIONS

Model	Hydraulic connections (in)		
	Alchemist HFC 95	1"	1/2"
Alchemist HFC 110	1"	1/2"	2"
Alchemist HFC 120	1"	1/2"	2"
Alchemist HFC 140	1"	1/2"	2"
Alchemist HFC 160	1"	1/2"	2"



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