

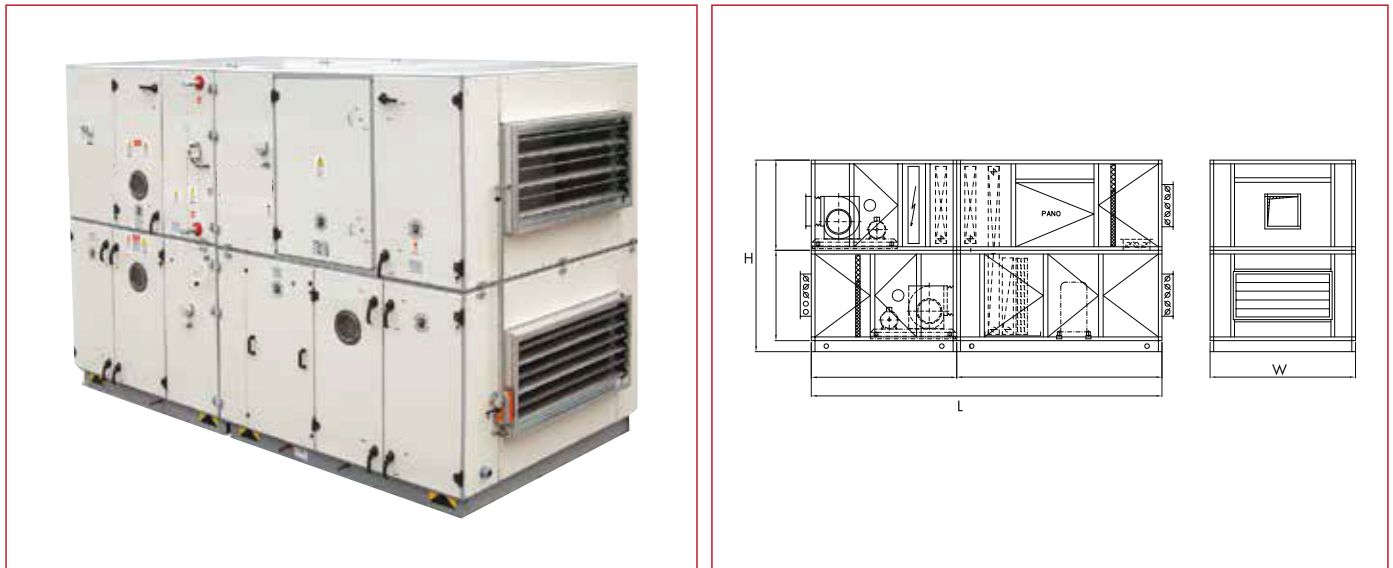


GPOOL

**Pool Dehumidification
Air Handling Units**

www.gmcair.com

Pool Dehumidification Air Handling Units - GPOOL



Dehumidifying air handling units are used in indoor swimming pools to provide desired temperatures according to dehumidification and seasonal conditions. (28C pool water temperature, 30C indoor temperature 50-55% RH humidity value) 50m² to 500m² surface for indoor swimming pools are produced in 8 different types and capacity.

Indoor swimming pools, drying processes and special air conditioning units developed for dehumidification and air conditioning by bringing them to the desired level. It consists of Aspirator, Ventilator, Heat recovery battery, direct expansion, cooling battery, hot water heater battery or electric heater parts. Hermetic scroll compressor is used to provide dehumidification and cooling cycle gradually. Device; has an electronic control system specially designed for the dehumidification cycle. Thanks to this control system, the pool area is automatically brought to the desired conditions with summer, "winter night" and "winter day" options. The system is designed to receive and exhaust fresh air. The device is delivered as a package and on the electric control panel.

Technical Specifications

TYPE		GPOOL-05	GPOOL-7.5	GPOOL-10	GPOOL-15	GPOOL-20	GPOOL-30	GPOOL-40	GPOOL-50	ALP MINI
Indoor Pool Surface Area	m ²	50	75	100	150	200	250	300	500	20
Dehumidification Capacity*	Kg/h	11	15	20	32	43	53	65	106	4
Dehumidification Capacity**	Kg/h	22	33	43	55	69	88	116	200	-
Heating Capacity (90 / 70 Hot Water)***	kW	22	27	47	54	80	103	123	200	-
Electric heater capacity / Number of steps	kW	15-2	15-2	30-2	45-3	45-3	60-3	60-3	75-3	-
Air Flow	m ³ /h	3000	4000	6000	7500	8500	11000	14500	24200	1400
Pressure Loss	Pa	300	300	300	300	300	300	300	300	
Total Power	kW/h	9	11	13	19	24	31	39	69	2,68
Total Power Including Resistance	kW/h	24	26	43	64	69	91	99	144	-
Dimensions (mm)	L	3830	3830	3830	3830	4135	4135	4135	4135	1695
	W	1325	1325	1630	1630	1630	1935	1935	2240	350
	H	1540	1540	2150	2150	2150	2150	2760	3370	780
Weight	Kg	1700	1800	2100	2230	2280	2350	2850	3700	120

- *30°C %50-55 Rh The amount of moisture taken in the recirculated air conditions under the conditions of Heat Pump efficiency is not included. The outside air was taken.
- **+5°C Out temperatur%30 Fresh air mix and Heat Pump dehumidification capacity are included.
- *** After the condenser 40°C %20 Rh is the heater capacity at the air inlet temperature.

Technical Specifications

1- BODY

- The air handling unit is EUROVENT certified and tested according to EN 1751: 1988, DIN 1946 Part 4: 2008, DIN EN ISO 5167 Standards.
- * Max Deflection for Body Mechanical Strength according to EN 1886: Positive and negative pressure according to EN 1886 D1 (M) Maximum leakage for -400 Pascal: L2, Filter Bypass Leakage: F9, Thermal Conductivity Resistance: T3, Heat Bridge: TB3 class.
 - * The inner and outer sheets of the body panels are made of dipped galvanized steel and the outer sheet is made of RAL9002 polyester powder coated.
 - * All panels and doors are double skinned and the thickness of the sheet is; min outer sheet Metal is 1mm, inner sheet metal is 0.8mm.
 - * All body internal surfaces are completely smooth, smooth, suitable for washing and wiping cleanings and no welded joints are made.
 - * 50mm thick rockwool is used as insulation material between inner sheet metal and outer sheet metal.
 - * The installation and disassembly of the power plant panels are completely external.

2- COOLING COIL - EVAPORATOR

The Coil, which works as a direct expansion, is designed to cool the air passing over it to the dew point and allow it to condense. The coil consists of copper pipe-aluminum gold anodized wings and the coil cassette is protected against chlorine by epoxy paint and it is provided to have a long life.

3- CONDENSER (AIR COOLED)

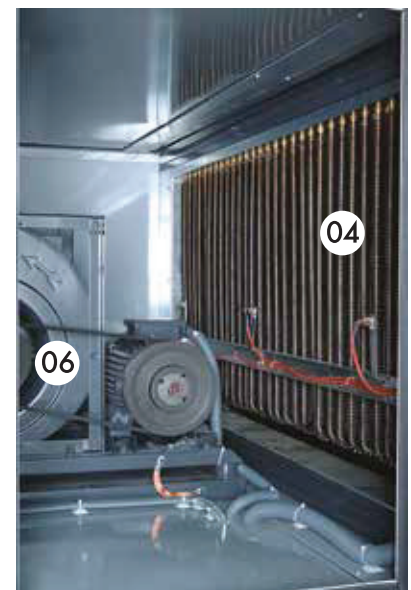
The coil consists of copper tube-aluminum gold anodized wings and the coil cassette is protected against chlorine by epoxy paint and it is provided to have a long life. It is designed for drying the dehumidified mixture air and has high heat permeability. The refrigerant condenses in this coil.

4- HEATER BATTERY

The coil, which works as a standard in 90/70 °C hot water regime, consists of copper pipe-aluminum gold anodized wings and the coil cassette is protected against chlorine by epoxy paint and it is provided to have a long life. The freezing thermostat provides protection against freezing of the heating coil in winter. Optionally, it can be produced in superheated water and steam.

Electric Heater:

Seasonal passes and central heating system is activated automatically and gradually. Electric heater control is done in 1-2 or 3 stages according to the capacity. If the temperature on the electric heater exceeds 60 °C, the built-in safety thermostat resists. This feature of the device is a precaution against engine burnout, and when the fans are activated, the excess temperature is thrown out in a way that does not damage the system.



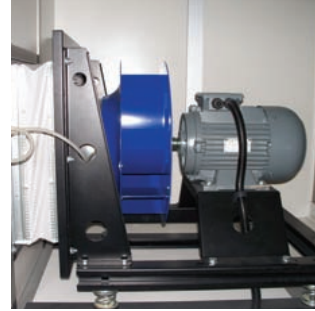
5- HEAT RECOVERY COIL

The coil, which works on the principle of Heat - Pump, is designed to be fully closed and heat transfer gas is charged into it. By evaporation and condensation of the gas, pre-condensation of the hot and humid air sucked from the space is ensured while the heat is transferred to fresh air. The battery consists of copper pipe - aluminum gold anodized wings and the battery cassette is coated with epoxy paint against chlorine and protected for long life.



6- VANTILATOR

Centrifugal fans with double suction front inclined densities have been selected to provide necessary air flow and external static pressure. The fan and motor group with belt pulley assembly is placed on the base in such a way that it operates silently and safely and is mounted on the body with vibration absorbers. It is protected against chlorine by painting with epoxy paint.



7- REFRIGERATING COMPRESSOR

High efficiency silent scroll hermetic compressors are used with R407C and R410A gas. Safe operation of the system has been ensured with valve sets, crankcase heater and vibration absorbers, Low - High pressure presostats, Liquid freezing thermostats, Sight Glass, Drier and Liquid Valve. The compressors are protected with overcurrent relays and the required mains electricity is 400 V / 3 Phase / 50 Hz.



8 - AIR FILTER

In the G4 Class, a standard cassette filter is used and has a large dust holding capacity at 1.5 - 2 m / sec air velocities. Optionally, fresh air inlet F7 or F8 class final filter can be placed.



9 - ELECTRIC AND AUTOMATION PANEL (DDC+MCC)

The PC03 microprocessor adjusts the ambient humidity, temperature and fresh air to suit the needs of the system for short - night / short - day and summer operation. Optionally, the RS485 card can be connected to the building automation system with Modbus Protocol or additional control screen up to 150 mt.

option is available. In addition, freezing thermostat in the air flow system, differential pressure switches (filter dirty and belt broken), high blowing air limit thermostat, damper servomotors connected to the automatic control panel provides regular operation of the system.

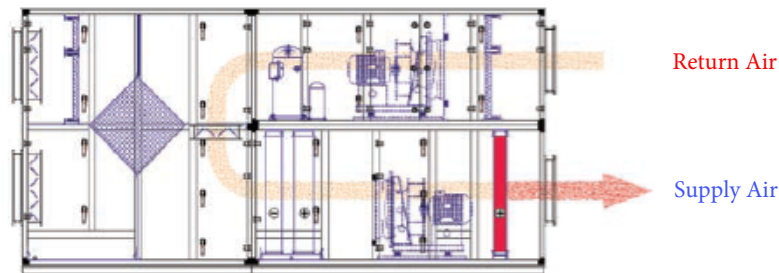


OPERATION MODE

Microprocessor on the unit, inside and outside air as the weather decides to interpret and automatically makes the transition mode

NIGHT OPERATION MODE (Not The Application Program Dehumidifying)

In this work program, dehumidification compressors are off, in this program, by-pass damper %100 open, %100 of exhaust and fresh air damper is closed. (if necessary, you can make a certain amount off fresh air mixture)
Makes tampature control unit, when necessary, take a relatively recent warmer. Exhaust fan and supply fan runs at minimum speed.

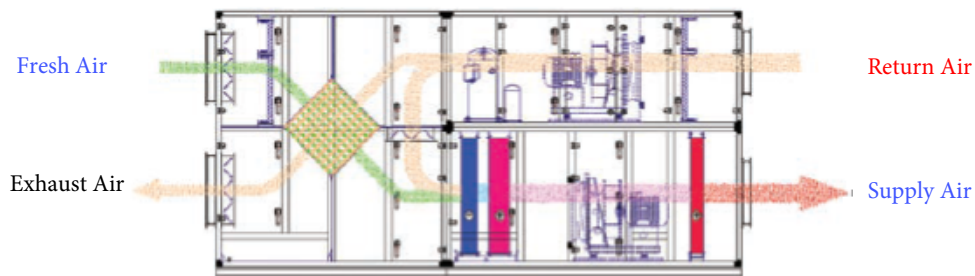


NIGHT OPERATION MODE (Applied Dehumidifying Program)

In this work program, dehumidification process are controlled. According to the dehumidification needed for the compressor is engaged. In this program, by-pass damper, exhaust and fresh air as a mixture of proportional control of damper makes entalpy. Mixing rate microprocessor automated decision making entalpy account positions, and dampers. When is the last time the heater should be proportional. Exhaust fan and the supply fan runs at minimum speed.

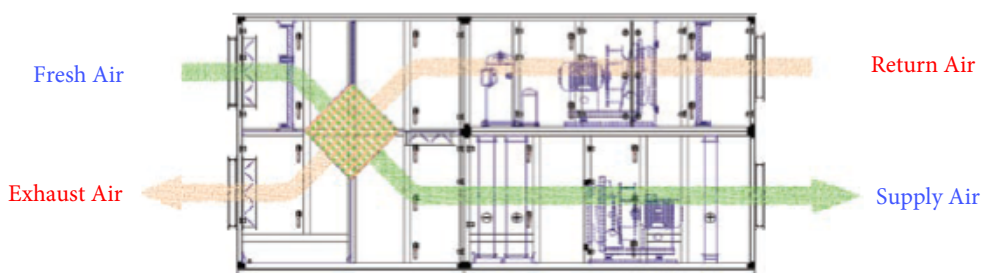
DAY TIME OPERATION MODE (Applied Dehumidifying Program)

In this work program, dehumidification process are controlled. According to the dehumidification needed for the compressor is engaged. In this program, by-pass damper, exhaust and fresh air as a mixture of proportional control of damper makes entalpy. Mixing rate microprocessor automated decision making entalpy account positions, and dampers. When is the last time the heater should be proportional. Exhaust fan and the supply fan runs at maximum speed.



DAY TIME OPERATION MODE (Not The Application Program Dehumidifying) "Seasons Pass" on

In this work program, according to conditions in the outside air conditions, the more favorable period (entalpy control) is applied. In this program %100 by-pass closed damper , exhaust and fresh air damper is %100 open position. Exhaust fan and supply fan runs at maximum speed.



The evaporation rate is calculated as follows:

Day Time Operation (Occupied)

$$W = \frac{[0.118 + (0.01995 \times a \times PB - PL)] \times A}{1.333} \text{ (kg/hr)}$$

Night Time Operation (Unoccupied)

$$W = \frac{[-0.059 + (0.0105 \times PB - PL)] \times A}{1.333} \text{ (kg/hr)}$$

- A = Pool surface area (m²)
- PB = Saturated vapour pressure at water temperature (mbar)
- PL = Partial vapour pressure at air temperature (mbar)
- a = Activity factor, normally
 - 0.5 - for public pools
 - 0.4- for hotel pools
 - 0.3- for private pools

Example;

Public swimming pool hall

Pool size : 20 x 10 m A = 200 m²
 Water temperature : 28°C PB = 37.8 mbar
 Air temperature : 30°C (60% RH) PL = 25.4 mbar
 Moisture content, pool hall air. Xi = 16.2 g/kg

Daytime operation:

Evaporation p

$$W = \frac{[0.118 + (0.01995 \times 0.5 \times 37.8 - 25.4)] \times 200}{1.333} = 42,16 \text{ kg/h}$$

Practical calculation

Pool surface area multiplied by 0.21 when you open the resulting evaporation can be estimated

$$W = 0,21 \times A \qquad W = 0,21 \times 200 = 42 \text{ kg/h}$$

Night-time operation:

Evaporation

$$W = \frac{[-0.059 + (0.0105 \times 37.8 - 25.4)] \times 200}{1.333} = 7,73 \text{ kg/h}$$

Daytime operation:

The volume of fresh air required to deal with the evaporation rate can be calculated as follows:

$$V = \frac{W}{(Xi - Xu) \times 1.175} \text{ (m}^3\text{/h)}$$

- W = evaporation (g/h)
- Xu = absolute moisture content, outside air (g/kg)
- Xi = absolute moisture content, internal air (g/kg)
- 1.175 = air density (kg/m³)

The absolute moisture content of the outside air (Xu) varies with the season from a maximum of 11-12 g/kg in the summer to 2-3 g/kg in the winter.

In practice Xu can be set at 11.6 g/kg, a figure which will only be exceeded for approx. 2% of the year.

$$V = \frac{42160}{(16.2 - 11.6) \times 1.175} = 7800 \text{ m}^3\text{/h}$$

With a required air change of 7800 m³/h, GPOOL-20 will be a suitable choice.

Practical calculation

Pool surface area multiplied by 39 is needed for the air exchange can be calculated approximately

$$W = 39 \times A \qquad W = 39 \times 200 = 7800 \text{ kg/h}$$

Night-time operation:

At night there is no need for fresh air to be supplied for operation of the swimming pool hall, and the plant will then run purely as a recirculation unit. Evaporation is 7,73 kg/h at night, much lower than in the day.



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