

Techno-Pool

Swimming Pool
Air Handling Units

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smart solutions for HVAC

Crystal-Clear Comfort

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Swimming Pool Air Handling Units

Overview

Techno-Pool units are engineered by our **R&D** department in eight models to serve indoor pools with water-surface areas from 64 to 505 m². Purpose-built for pool dehumidification, each unit includes a factory-integrated automation panel for true plug-and-play commissioning—reducing installation time, simplifying operation, and helping contain lifecycle costs.

System Configuration

Techno-Pool is a packaged solution comprising three core sections:

- **Fan** — Distributes conditioned air uniformly back to the pool hall. Available in three configurations: belt-driven, plug fan, and EC plug fan.
- **Heat Recovery** — Recovers thermal energy from the airstream to enhance overall efficiency and stabilize indoor conditions.
- **Dehumidification** — Controls humidity to protect finishes and improve comfort.

Dehumidification Methods

- **Heat-recovery dehumidification** — Utilizes the integrated heat-recovery section to reduce moisture while conserving energy.
- **Mechanical-cooling dehumidification** — Employs a direct-expansion circuit using R407C refrigerant. The refrigeration assembly includes high-performance scroll compressors, condenser, evaporator, expansion valve, filter-drier, solenoid valve, suction accumulator, and liquid receiver.

Key Advantages

- **Right-sized portfolio:** Eight models covering 64–505 m² pool surfaces.
- **Plug-and-play controls:** Factory-mounted automation panel for rapid start-up and straightforward operation.
- **Operational efficiency:** Integrated heat recovery and optimized fan options help reduce energy consumption.
- **Risk mitigation:** Stable humidity control limits condensation and protects building materials.

Typical Applications

Hospitality pools, municipal and recreational facilities, wellness/spa centers, and high-end residential installations seeking dependable, low-touch humidity management.



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Technical Specifications

MODEL		TP-33-PHR- APF-NR-WH	TP-45-PHR- APF-NR-WH	TP-65-PHR- APF-NR-WH	TP-84-PHR- APF-NR-WH	TP-125-PHR- APF-NR-WH	TP-155-PHR- APF-NR-WH	TP-215-PHR- APF-NR-WH	TP-255-PHR- APF-NR-WH
Dehumidifier Cap.	kg/h	18,6	26,5	35,6	47,7	74,2	99,2	127,7	150,5
Air Flow	m ² /h	3350	4500	6500	8400	12500	15500	21500	25500
Pool Surface	m ²	64	89	122	165	245	306	425	505
Cooling Cap.	kW	21,1	30,7	40,2	54,5	83	110,4	72,1 x 2	82,7 x 2
Heating Cap.	kW	37,4	49,6	64,1	84,3	129,3	159,3	229,7	266,5
External Pressure (Return)	Pa	350	350	350	350	350	350	350	350
External Pressure (Supply)	Pa	350	350	350	350	350	350	350	350
Supply motor power	kW	1.5 kW/3000 rpm /3P/380V/50Hz	2.2 kW/3000 rpm /3P/380V/50Hz	3.0 kW/3000 rpm /3P/380V/50Hz	4 kW/3000 rpm /3P/380V/50Hz	7.5 kW/3000 rpm /3P/380V/50Hz	11 kW/3000 rpm /3P/380V/50Hz	15 kW/3000 rpm /3P/380V/50Hz	15 kW/3000 rpm /3P/380V/50Hz
Exhaust motor power	kW	1.5 kW/3000 rpm /3P/380V/50Hz	2.2 kW/3000 rpm /3P/380V/50Hz	3.0 kW/3000 rpm /3P/380V/50Hz	4 kW/3000 rpm /3P/380V/50Hz	7.5 kW/3000 rpm /3P/380V/50Hz	11 kW/3000 rpm /3P/380V/50Hz	15 kW/3000 rpm /3P/380V/50Hz	15 kW/3000 rpm /3P/380V/50Hz
Compressor	kW	7,04	9,94	12,32	16,81	25,06	16,81x2	25,06x2	25,06x2
Total Power	kW	10,04	14,32	18,32	24,8	34,6	55,6	80,12	80,12
Filter		G4/G4	G4/G4	G4/G4	G4/G4	G4/G4	G4/G4	G4/G4	G4/G4
Refrigerant		R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Compressor type (circuits number)		Scroll - 1	Scroll - 1	Scroll - 1	Scroll - 1	Scroll - 1	Scroll - 2	Scroll - 2	Scroll - 2
Fan type / Quantity		Plug - 2	Plug - 2	Plug - 2	Plug - 2	Plug - 2	Plug - 2	Plug - 2	Plug - 2

Dimension Table

Length	mm	4725	4775	4878	4997	5053	5781	6017	6538
Width	mm	915	915	1221	1374	1833	1833	2292	2292
Height	mm	1584	1890	1890	2196	2196	2052	2808	3114
Heating Coil Connections (In/Out)	mm	26.9	33.2	33,2	42,2	48,3	48,3	60,3	60,3
Drain Pan Outlet Diameter	mm	33	33	33	33	33	33	33	33
Weight	Kg	1350	1500	1700	2000	2500	2900	3850	4800

Features

Profiles	50 x 50 x 2 mm Painted aluminium profile
Panels	50 mm
Sheet Material	Outer skin: 0,8 mm painted galvanize / Inner skin: 0,8 mm
Insulation	50 mm 70 kg/m ³ Density of rockwool
Fan Type	304 quality 1,5 mm
Automation Type	Plug and Play
Base Type	2,5 mm painted galvanize
Coil	Painted Galvanize
Internal Base System	Painted Galvanize
Coil Features	Dx: Hydrophilic coated, Condenser, Heating coil and HRU: Epoxy coated
EN 1886 Technical Specifications	D1, L1, TB3, T3, F9

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Components

Evaporator

Techno-Pool units utilize high-efficiency direct expansion exchangers to ensure effective dehumidification of return air. The evaporators are designed with a hydrophilic coating for enhanced performance, while the epoxy-coated body provides durable protection and long-lasting reliability.



Drain System

Due to high condensation levels, Techno-Pool units are equipped with a safe, efficient, and fast drain system for water discharge. The stainless steel drain pan, designed by **Technogen's** R&D department, collects condensate at a single point and ensures immediate discharge. A siphon is standard in all **Techno-Pool** units, enabling reliable connection to the drainage network.



Condenser

In the cooling process, the refrigerant gas evaporates as it absorbs heat from the air, then condenses back into liquid form within the condenser, ensuring efficient and reliable operation.

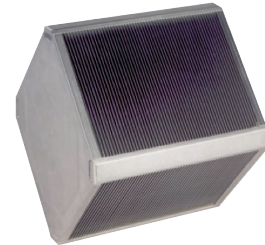
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Accessories

Heat recovery

Techno-Pool units are equipped with high-efficiency plate-type heat exchangers, designed to maximize energy recovery. By capturing energy from the dehumidified return air, the system conditions the inlet air from the condenser and evaporator, ensuring optimum operating performance with reduced energy consumption.



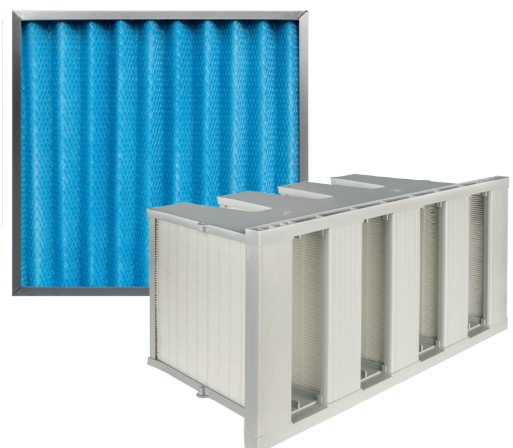
Fan / Motor

Techno-Pool units offer flexibility with three fan application options: traditional belt-driven fans, high-performance plug fans, and energy-efficient EC plug fans. This range ensures the right solution for varying operational needs and efficiency requirements.



Filter

Every **Techno-Pool** unit comes equipped with durable G4 panel filters on both fresh air and return air inlets, ensuring reliable basic filtration. For enhanced air quality, optional high-efficiency bag filters are available in M5, M6, F7, F8, and F9 classes, providing flexible solutions to meet specific project requirements.



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Automation

Automation

Every **Techno-Pool** unit is equipped with a state-of-the-art automation control system, designed by **Technogen** to provide seamless operation. With all scenarios pre-defined, the units are truly plug-and-play: once duct, drain, and power connections are completed, start-up is fast and effortless.

Intelligent Operating Scenarios

Winter (Night) – Dehumidification On

- During low-usage hours, the unit operates with 100% fresh air while the cooling coil actively dehumidifies the environment.

Winter (Night) – Dehumidification Off

- When the pool is not in use, the unit continues with 100% fresh air. Dehumidification remains off, but the heating function is active to maintain comfort.

Winter (Day) – Dehumidification On

- During peak pool usage, the unit runs at full capacity with 75% fresh air and 25% return air. The cooling coil ensures effective dehumidification, while the heater engages when needed.

Summer Mode

- When outdoor and indoor temperatures are similar, the system operates with 100% fresh air. The cooling coil remains inactive, and the heater operates only if required.

Key Automation Components

- Advanced humidity and temperature sensors
- Differential pressure monitoring
- Frequency converters for energy-efficient fan control
- Proportional damper motors for precise air regulation
- Compressor safety with low/high pressure controls
- MCC and DDC boards for reliable automation management



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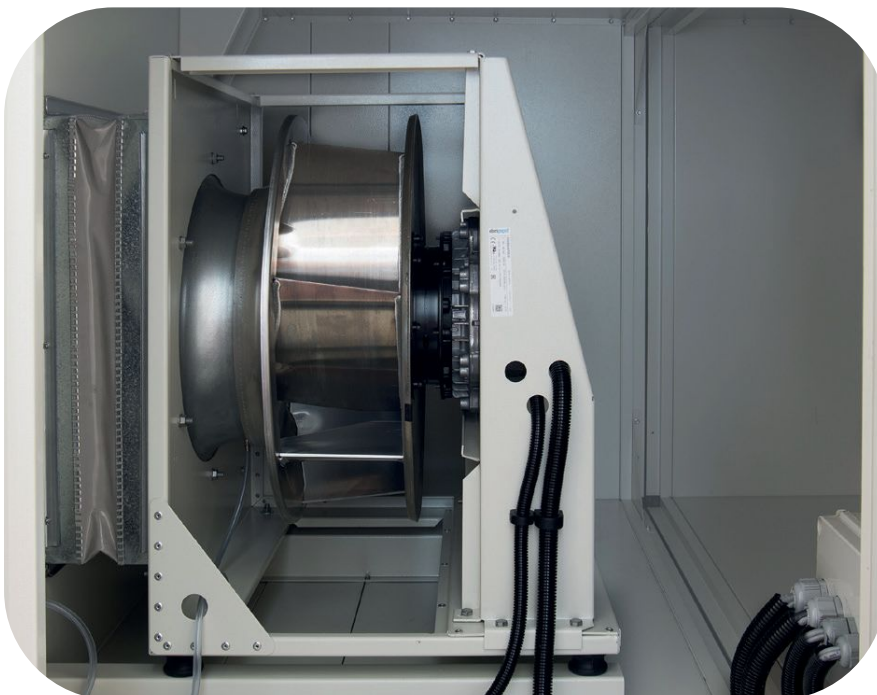
Automation

Automation System

The **Techno-Pool** automation card is a specially designed control solution for managing critical functions of Techno-Pool units.

Key Features:

- **Fan Control:** Operates both blowing and suction fans.
- **Cooling Chamber Safety:** Ensures safe and reliable operation of the cooling chamber.
- **Damper Control:** Manages the unit's damper mechanism with precision.
- **Constant Airflow Regulation:** Maintains a stable and efficient fan flow rate.
- **Remote Control Capability:** Control panel can be installed up to 200 meters away from the unit.
- **Weekly Programming:** Enables programmable scheduling for fully automated operation.
- **Filter Monitoring:** Integrated filter dirtiness alarm for proactive maintenance.
- **System Feedback:** Provides clear operation and fault signals for easy monitoring and diagnostics.

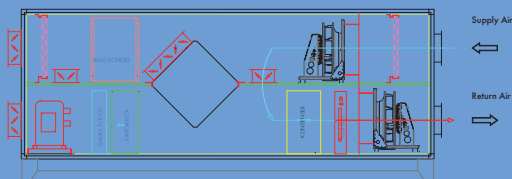


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Automation

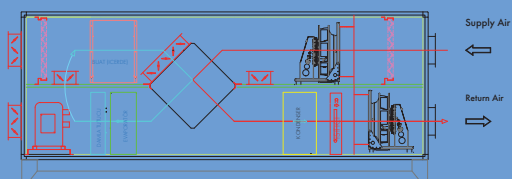
SCENARIOS WITH PLATE TYPE HEAT RECOVERY

WINTER(NIGHT) - DEHUMIDIFICATION ON



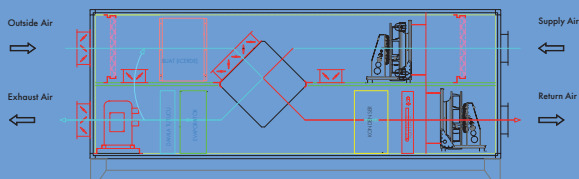
Compressor	OFF
Heat Recovery	OFF
Suction Fan	OFF
Supply Fan	ON
Fresh Air	%0
After Heater	ON

WINTER(NIGHT) - DEHUMIDIFICATION ON



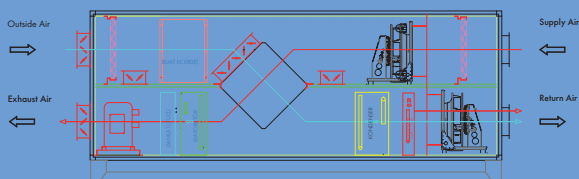
Compressor	OFF
Heat Recovery	OFF
Suction Fan	ON
Supply Fan	ON
Fresh Air	(%)0
After Heater	ON

WINTER(DAY) - DEHUMIDIFICATION ON



Compressor	ON
Heat Recovery	ON
Suction Fan	ON
Supply Fan	ON
Fresh Air	(%)25
After Heater	If Needed

SUMMER – DEHUMIDIFICATION OFF



Compressor	OFF
Heat Recovery	ON
Suction Fan	ON
Supply Fan	ON
Fresh Air	(%)100
After Heater	If Needed

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Project Designing

Unit Design & Dehumidification Calculation

Techno-Pool units are designed in accordance with VDI 2089 : Part 1 standards.

Dehumidification values are calculated based on the pool surface area and indoor design conditions.

Dehumidification Formula:

$$W = e \times S \times (P_{max} - P_{set}) \text{ [g/h]}$$

- **W:** Water vapor released into the air (grams per hour), i.e. the dehumidification requirement.
- **S:** Pool water surface area (m²).
- **P_{max}:** Saturation vapor pressure at the water temperature (mbar).
- **P_{set}:** Partial vapor pressure at the design indoor air condition (mbar).
- **e:** Usage coefficient (dimensionless), depends on how the pool is used.

Pool Usage Coefficient	Pool Type	g / (m ² x h x mbar)
0.5	P1	Indoor pools
5	P2	Non-used pools
15	P3	Pools with number of users low to medium
20	P4	Pools with number of users medium to high
28	P5	Recreation pools or waterparks
35	P6	Pools with artificial waves and water-slides

Calculation for a Residence Pool

Pool Surface: (m²)

Water Temperature: (°C)

Indoor Temperature: (°C)

Relative Humidity of Pool Area: (% RH)

Pool Type

☐ P1
 ☐ P2
 ☒ P3
 ☐ P4
 ☐ P5
 ☐ P6

Project Design

Using the Mollier diagram, the following conditions are determined:

At 28 °C and 100% relative humidity, the vapor pressure of air is **37.78 mbar**.

At 30 °C and 60% relative humidity, the vapor pressure of air is **25.45 mbar**.

For a residential pool, the **evaporation coefficient (e)** is taken as 15.
The evaporation rate from the pool surface is then calculated as:

$$W = e \times S \times (P_{max} - P_{set}) \text{ [g/h]}$$

$$W = 15 \times 100 \times (37.78 - 25.45) = 18,495 \text{ g/h} \approx 18.5 \text{ L/h}$$

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