Product Catalogue

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HNS Pool Dehumidification Unit

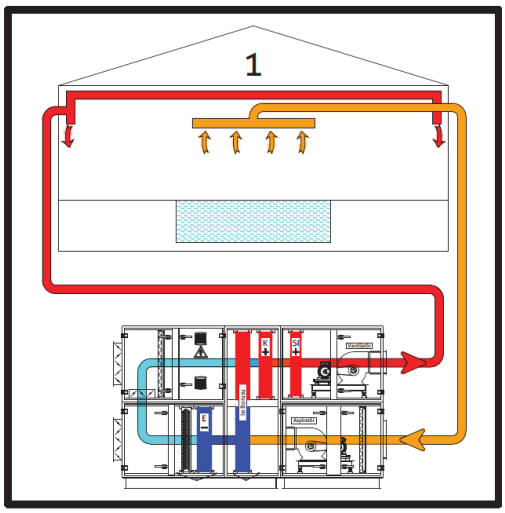
General Features

If the partial pressure of the water vapor in the ambient air is lower than the saturation pressure, evaporation occurs on the surface of the pool water. In indoor swimming pools, large amounts of water evaporate continuously. As a result, the amount of moisture in the air rises to an undesirable level. Due to the high humidity in the air, perspiration occurs on windows and walls, causing corrosion and fungus formation on building components. In addition to the destruction of building components, it also causes discomfort such as decreased blood circulation and decreased sports capacity in humans. Humidity in indoor swimming pools should be between 40% and 64% according to VDI 2089/1.

As a result, it is possible to eliminate these negative effects by dehumidification, that is to keep the humidity values under comfort conditions.

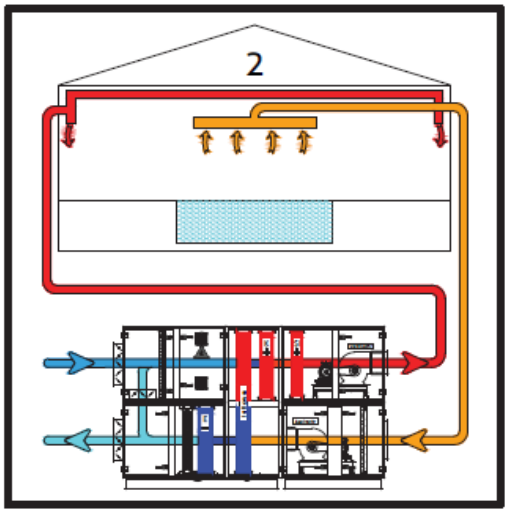
- *Fantürk HNS series Pool Dehumidification Units are modular type and have double skin panels.*
- *The panels used are 50mm thick and are produced by using stone wool insulation material.*
- *Outer surfaces are coated in RAL 9002 color as standard and galvanized sheet is used in inner surfaces.*
- *The case of the device forms a strong structure with specially designed electrostatic coated aluminum profiles and plastic corner fittings. EPDM based gaskets are used for sealing.*
- *Nowadays, heat-pipe type heat recovery units are used for energy efficiency which is very important.*
- *The fan-motor group is selected in the most efficient way considering the air flow and total static pressure. Fans can be selected with forward curved blades, backward curved blades and can be driven with belt-pulley or plug types according to the intended use and desired design criteria. Fans are approved with performance tests. The motors are IP55 class as standard and comply with CE norms.*
- *Dampers used in dehumidifications units are manufactured using aluminum profile, aluminum wing and plastic based gears. The gears are outside of the air flow.*

Scenarios



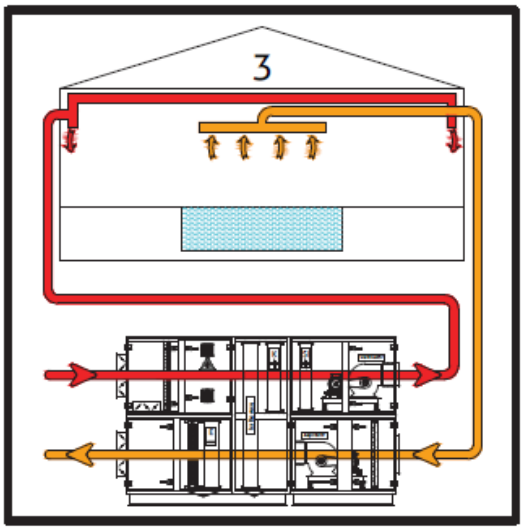
Scenario 1: Winter – Night

It is generally preferred during winter time during night hours. Fresh air and exhaust dampers are closed as there are no users in the pool. The mixing damper is fully opened. It works with 100% indoor air. The compressor operates and the refrigerant performs its dehumidification task. The temperature of the air cooled to get moisture is increased by keeping the humidity rate constant while passing over the condenser.



Scenario 2: Winter – Day

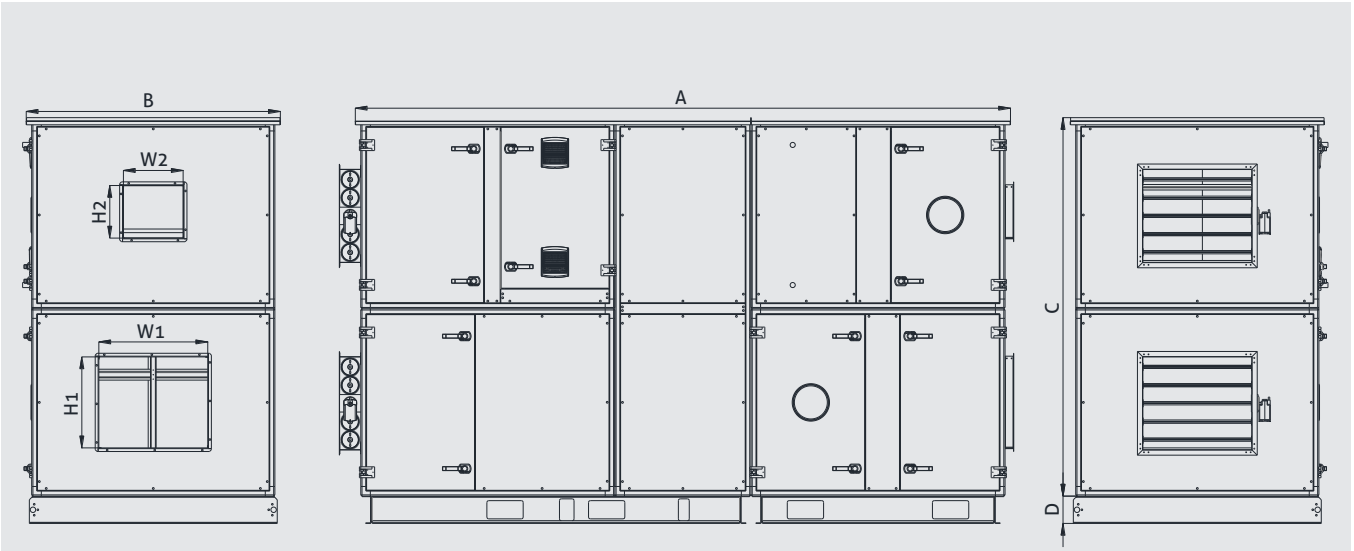
It is generally preferred for daytime hours when the pool is actively used in winter when the outside temperature is low. As the suction air passes through the heat pipe, it leaves some of the heat on it. The compressor operates and the refrigerant performs the dehumidification task. For energy economy, some exhaust air is mixed with fresh air. The heat accumulated in the heat pipe is recovered. The heater coil brings the reduced blowing temperature after dehumidification to the comfort level.



Scenario 3 : Summer

It is generally preferred for situations where the outdoor temperature is higher than the indoor temperature. In such applications, the heat pipe and compressor are deactivated. The humidity is kept constant with 100% fresh air.

Technical Specifications



MODEL		HNS-3000	HNS-4500	HNS-6000	HNS-7500	HNS-9000	HNS-12000	HNS-15000	HNS-18000	HNS-21000	HNS-24000
*Dehumidification Capacity	[kg/h]	20	30	40	50	60	80	100	120	140	160
Flow Rate	[m³/h]	3000	4500	6000	7500	9000	12000	15000	18000	21000	24000
Vantilator Pressure	[Pa]	300	300	300	300	300	300	300	300	300	300
Aspirator Pressure	[Pa]	300	300	300	300	300	300	300	300	300	300
Vantilator Motor	[kW-rpm]	1,1-3000	1,5-3000	2,2-1500	3-1500	4-1500	5,5-1500	5,5-1000	7,5-1000	7,5-1000	7,5-1000
Aspirator Motor	[kW-rpm]	1,1-3000	1,5-3000	2,2-1500	3-1500	4-1500	5,5-1500	5,5-1000	7,5-1000	7,5-1000	7,5-1000
Cooling Capacity	[kW]	14,5	24,5	34	37,9	49	67,8	79,5	94,7	114,7	145,6
Heater Water Coil Capacity (90/70°C)	[kW]	26	36	50,5	63	77,1	102	127	152	176	210
Compressor Power	[kW]	4,75	5,22	7,05	7,76	10,25	14,1	17,8	20,46	23,5	30,7
**Total Motor Power	[kW]	7,45	9,75	12,75	15,3	20,5	27,7	30,65	38,05	40,5	48,7
A	[mm]	2910	2910	3000	3210	3210	3510	3510	3510	4665	4665
B	[mm]	1090	1040	1350	1660	1660	1980	2280	2280	2290	2290
C	[mm]	1460	1460	2060	2080	2080	2110	2700	2700	2730	2730
D	[mm]	150	150	150	150	150	150	150	150	150	150
Inlet from Pool-side W1xH1	[mm]	600x300	600x400	600x500	900x600	900x600	900x600	1100x700	1100x700	1100x700	1100x700
Outlet to Pool-side W2xH2	[mm]	600x300	600x400	600x500	900x600	900x600	900x600	1100x700	1100x700	1100x700	505x505

- * Designed according to VDI 2089. (Room conditions are based on 30 ° C DB, 50% RH and + 5 ° C evaporation.)
- ** Electric heater is not included.

Construction of Pool Dehumidification Unit

Specially produced aluminum profiles and panels are used in Dehumidificiation Units.

Electrostatic coated aluminum profiles are resistant to corrosion. Profiles are combined with specially designed plastic corners to each other.

The panels are manufactured in standard sizes, with double skins and rock wool, glass wool or polyurethane are used as insulation material between them. The panel thickness is 50 mm or 60 mm. The outer skin of the panels is made of RAL 9002 color coated with protective polyfilm as standard and the inner skins are made of galvanized, stainless or coated steel.
Skin thickness is in 0.8 - 1.2 mm range. The panels are detachable from the outside. Inner surface of dehumidification unit is designed to be completely flat. The panels are mounted directly to the profile with drill-ended screws. EPDM based sealings are adhered between the panels and profiles.

Service doors with sealing are mounted in the necessary places of the air handling unit. According to request and application, service doors can be produced with sight glass. Depending on the size of the device, the base of the Dehumidification Unit can be in one piece or divided on the basis of cells. Air handling units are manufactured on a base of 100 mm for low pressures and 150 mm for high pressures. There are lifting holes in the base for easy transportation. For outdoor devices, the device is protected from external weather condition with a specially designed roof.

Easy Installation and Transportation with Original Modular Design...

Fanturk branded HNS series Pool Dehumidification Units are manufactured to be modular with a unique design. The device consists of three different cells. This unique design facilitates transportation and assembly. Optionally, the device can be delivered in a single structure or cell by cell or disassembled and can be assembled on the construction site. It is capable of being connected to each other by special connection elements in cell connection. Special EPDM seals are used to seal the joint surfaces.

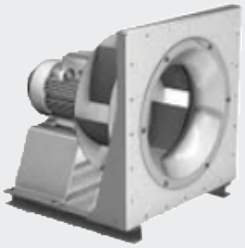
Equipments

Rotor & Motor

Various fan types are available in each section in accordance with air flow and total pressure drop. Statically and dynamically balanced fans in accordance with international standards can be forward-curved, back-curved or airfoil blades depending on the intended use and customer requirements. Fan-motor group is selected considering high efficiency, low noise level and minimum energy consumption depending on air flow and total static pressure. In order to prevent vibration, the fan-motor group is connected to the device with spring insulators.

Standard bushed, fixed diameter pulleys are used as standard in our devices and it is possible to use variable diameter pulleys as an option. SPZ, SPA, SPB and SPC belt types are available. The belt is tensioned by a special mechanism.

The fan cell has a service door with safety guard for service and maintenance. In special cases, plug type fans are used and the motor is directly coupled.



The motors are IP55 protection class as standard and comply with CE norms. The motors are single speed as standard and double speed motors can be used as an option. A frequency converter for motor speed control is available as an accessory.

Heater – Cooler Equipments

Heating and cooling operations are carried out with coils. The coil pipes can be copper or steel, blades can be aluminum, copper, steel, epoxy coated aluminum or epoxy coated copper. The collectors are made of copper. The coil cassette is made of galvanized steel sheets. The test pressure is 20 bar. Designed to be easily removed for maintenance. Special by-pass sheets allow air to pass only through the coil surface. Air and refrigerant are designed as reverse flow for high efficiency. In hot and cold water coils, the water inlet is from the bottom and the water outlet is from the top. In the cooling coils, the surface area of the serpentine is efficiently used thanks to the condensation pan installed in the panel. Condensate pan is made of stainless steel with double slope. After cooling coil, a drift eliminator made of PVC material is used to keep the condensed water in the air. A rubber rosette is installed on the pipe to prevent air leakage and possible condensation between the heater and cooling coil water inlet-outlet pipes and the panel sheet.

Compressor

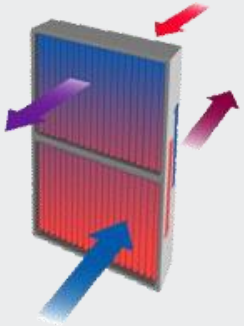
Scroll type compressors are used in HNS series Pool Dehumidification Units. All equipment used is protected against high temperatures and currents. R407C is used as refrigerant.

Equipments

Filters

G4 filter is used in inlet and outlet line in dehumidification units. The cross-sectional dimensioning is carried out in accordance with international standards, taking into account the filtration surface area. Filters are cassette type and can be easily installed and removed. Air leaks are prevented by suitable designs. The filter cells have a service door for maintenance and replacement. Optionally manometer, lightning and sight glass can be used.

Heat Recovery Unit



Energy efficiency is of great importance nowadays. For this reason, heat-pipe type heat recovery unit is preferred in HNS series Pool Dehumidification Units. In this way, while efficiency is increasing, energy consumption and operating costs are reduced to minimum levels.

In the heat-pipe type heat recovery units which has a compact structure, heat transfer is occurs by the phase difference due to the temperature difference of the exhaust and fresh air in the closed circuit. No additional equipment is required. There is no mixing of fresh air and exhaust air. Easy to clean and maintain. They are preferred because of their long service life. Heat pipes can be manufactured as corrosion resistant.. The surface area of the heat recovery unit is efficiently used thanks to the condensation pan installed in the panel. Condensate pan is made of stainless steel with double slope.

Control Panel

Pool dehumidification units are the systems that take the moisture on it by cooling and reheating the air with the compressor structure. Pool dehumidification units are used for dehumidification in the pools of hotels, schools and private pools. The HV-DHMC-1-M controller is designed for the control of compressor dehumidification units. It is possible to control and monitor with building management systems.

The controller features

- *Connection to building management systems (Modbus-RTU)*
- *Fault entries*
- *Enthalpy*
- *Weekly Schedule (Optional)*
- *Keylock*

Practical Capacity Calculation

The following formula can be used to practically calculate the amount of evaporation that will occur on the surface of the pool. Please refer to the tables below for the coefficients in the formula.

Wp = (Fa x A x k)/1,5

- *Wp: Evaporation Amount (kg/h)*
- *A: Pool Surface Area (m²)*
- *Fa: Activity Factor*
- *k: Evaporation Coefficient*

Air Temperature (°C)	Relative Humidity (%)																	
	50	55	60	50	55	60	50	55	60	50	55	60	50	55	60	50	55	60
20	0,410	0,384	0,353	0,492	0,465	0,434	0,573	0,548	0,516	0,654	0,629	0,597	0,788	0,762	0,731	0,923	0,897	0,866
21	0,396	0,362	0,330	0,477	0,444	0,413	0,560	0,525	0,494	0,641	0,606	0,575	0,774	0,740	0,710	0,908	0,875	0,843
22	0,374	0,341	0,308	0,456	0,422	0,390	0,537	0,503	0,471	0,618	0,584	0,552	0,753	0,719	0,687	0,887	0,852	0,821
23	0,353	0,318	0,287	0,434	0,399	0,368	0,516	0,480	0,449	0,597	0,563	0,531	0,731	0,696	0,665	0,864	0,830	0,798
24	0,330	0,296	0,264	0,413	0,378	0,345	0,494	0,459	0,426	0,575	0,540	0,509	0,710	0,674	0,642	0,843	0,809	0,776
25	0,309	0,275	0,242	0,390	0,356	0,323	0,473	0,437	0,405	0,554	0,518	0,486	0,687	0,653	0,620	0,821	0,786	0,755
26	0,287	0,252	0,219	0,369	0,333	0,300	0,450	0,414	0,383	0,531	0,497	0,464	0,666	0,630	0,597	0,800	0,764	0,732
27	0,266	0,230	0,197	0,347	0,312	0,279	0,429	0,393	0,360	0,510	0,474	0,441	0,644	0,608	0,576	0,777	0,743	0,710
28	0,243	0,209	0,176	0,326	0,290	0,257	0,407	0,371	0,338	0,488	0,452	0,419	0,623	0,587	0,554	0,756	0,720	0,687
29	0,222	0,186	0,146	0,303	0,267	0,227	0,386	0,350	0,308	0,467	0,431	0,390	0,600	0,564	0,524	0,735	0,698	0,657
30	0,201	0,164	0,107	0,282	0,246	0,189	0,363	0,327	0,270	0,444	0,408	0,351	0,579	0,542	0,486	0,713	0,677	0,620
Water Temperature (°C)	24			26			28			30			32			34		

(k) Table of Evaporation Coefficient

Pool Type	Activity Factor (Fa)
Pools Out of Working Hours	0,50
Residential Pools	0,50
Floor Pools	0,65
Therapy Pools	0,65
Hotel Pools	0,80
Public Pools	1,00
Hot Springs Pools	1,00
Wavy Pools	1,50

(Fa) Table of Activity Factor

Pool Type	Air Temp. (°C)	Water Temp. (°C)	Relative Humidity (%)
Treatment Pools	29 – 32	29 – 32	50 – 60
Therapy Pools	27 – 29	29 – 35	50 – 60
Hotel Pools	28 – 29	28 – 30	50 – 60
Hot Springs Pools	27 – 29	36 – 40	50 – 60
Entertainment Pools	24 – 29	24 – 29	50 – 60
Competition Pools	26 – 29	24 – 28	50 – 60
Diving Pools	27 – 29	27 – 32	50 – 60

Table of Confor Conditions

Sample of Capacity Calculation

The surface area of a hotel pool is 55 m² with an ambient temperature of 28 ° C and a relative humidity of 50%, and a pool water temperature of 30 ° C. What is the amount of evaporation from this pool?

According to the given values (k) k = 0.488 is determined from the Evaporation Coefficient Table.

Fa = 0.8 is determined from Usage Factor Table.

Wp = (0.8 x 55 x 0.488) / 1.5 = ***14.31*** *kg / h*

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