Warm water heater battery for rectangular duct connection.

Casing made of galvanised sheet steel, flanges on both sides to fit the Helios rectangular fan range.
Air heater with Al fins, with staggered copper ducting.
Operating temp. $t_{max.}$ 120 °C.
Operating pressure max. 8 bar.
Water pipes with male thread.
Equipped with water and air outlets.

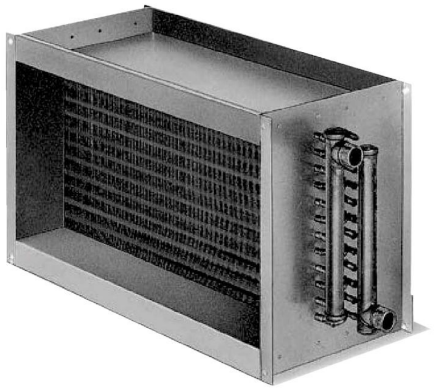
Installation

The heater must be installed downstream of the fan. If installing it before the fan, make sure that the air flow temperature at the fan does not exceed the fan's max. temperature.
To protect the heater from dirt and to prevent it from being clogged (reducing air flow and heat output) we recommend the use of the air filter KLF.
A rectangular duct with a length of at least 1 metre must be installed between fan and heater in order to ensure a balanced air flow. An air bleed valve and a water drain valve must be provided for releasing air and water from the unit.
Attention: Frost protection must be provided on-site.

Selection

The effective temperature increase depends on the variables: Air flow volume, heater output and flow temperature.
This can be determined using the following diagrams (steps ⓐ – ⓒ).
The heater outputs are also specified in the table below for some volume parameters.
When selecting a fan (volume determination), the pressure loss of the heater battery must be considered (section ⓓ), which is shown in the diagrams.

WHR Duct



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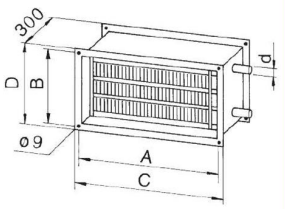
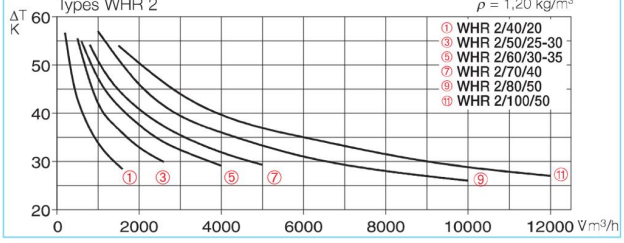
Temperature control system WHS HE — 432

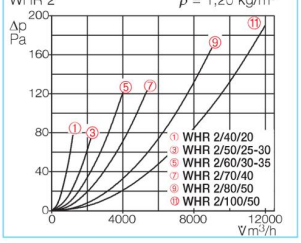
Dim. in mm see table



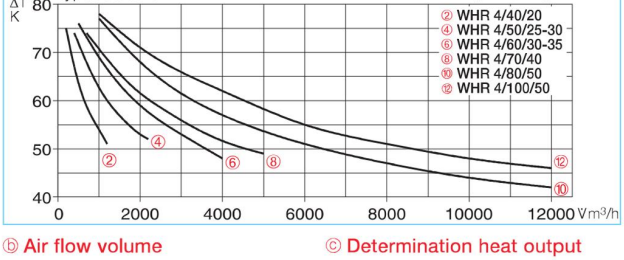
ⓐ – ⓒ Temperature increase - Air flow volume PWW 70 °/50 °C
Types WHR 2 — ρ = 1,20 kg/m³



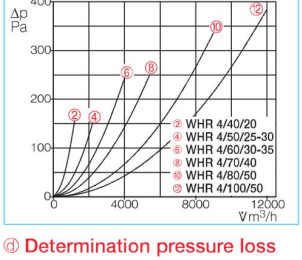
ⓓ Pressure loss - Air flow volume
WHR 2 — ρ = 1,20 kg/m³



ⓐ – ⓒ Temperature increase - Air flow volume PWW 70 °/50 °C
Types WHR 4 — ρ = 1,20 kg/m³



ⓓ Pressure loss - Air flow volume
WHR 4 — ρ = 1,20 kg/m³



ⓐ Temperature increase

Definition: $\Delta T = \vartheta_i - \vartheta_a$ [K]
ΔT: Air temperature difference [K]
ϑ_i: Air temp., outlet air heater [°C]
ϑ_a: Air temp., inlet air heater [°C]

ⓑ Air flow volume

Shown on the performance curve whereby the total resistance of the system and heater pressure loss (section ⓐ) must be considered.

ⓒ Determination heat output

$$Q_H = \frac{\dot{V} \cdot \Delta T \cdot c_{PL} \cdot \rho_L}{3600} \text{ [kW]}$$

V̇: Air flow volume [m³/h]
ΔT: Air temperature difference [K]
c_{PL}: Specific heat capacity of the air (1.0) [KJ/kg K]
ρ_L: Air density (1.2) [kg/m³]

ⓓ Determination pressure loss

The pressure loss in relation to air flow volume is shown in the diagrams above for the respective heater battery.

Type	Ref. no.	fits fan nominal size	Air data: Heat output		Air data: ΔT Air		Air data: at V̇	Water data[1]: pressure loss	Water data[1]: at water flow rate	Dimensions: A	B	C	D	Connection d* [3]	Weight approx.	Suitable temperature control system: Type	Ref. no.
		cm	kW[1]	kW[2]	K[1]	K[2]	m³/h	Δp_w kPa	l/h	mm	mm	mm	mm	Ø"	kg		
WHR 2/40/20	8782	40/20	14	7,7	32	18	1200	10	610	420	220	450	250	3/4	7.0	**WHS HE**	8319
WHR 4/40/20	8783	40/20	22	12,6	51	29	1200	7	980	420	220	450	250	3/4	7.3	**WHS HE**	8319
WHR 2/50/25-30	8784	50/25-30	24	14	33	18	2200	7	1050	520	270/320	550	350	3/4	9.3	**WHS HE**	8319
WHR 4/50/25-30	8785	50/25-30	38	21	52	28	2200	5	1680	520	270/320	550	350	1	11.1	**WHS HE**	8319
WHR 2/60/30-35	8786	60/30-35	32	18	34	19	2600	8	1420	620	320/370	650	400	3/4	11.2	**WHS HE**	8319
WHR 4/60/30-35	8787	60/30-35	51	30	55	32	2600	7	2270	620	320/370	650	400	1	14.0	**WHS HE**[4]	8319
WHR 2/70/40	8788	70/40	50	28	30	17	4500	6	2200	720	420	750	450	1	17.0	**WHS HE**	8319
WHR 4/70/40	8789	70/40	81	44	50	27	4500	4	3570	720	420	750	450	1	17.0	—	—
WHR 2/80/50	8795	80/50	82	46	28	16	8000	11	3630	820	520	850	550	1	15.0	—	—
WHR 4/80/50	8796	80/50	138	80	48	28	8000	15	6110	820	520	850	550	1	20.0	—	—
WHR 2/100/50	8797	100/50	104	59	29	18	10000	19	4630	1020	520	1050	550	1	18.0	—	—
WHR 4/100/50	8798	100/50	172	99	48	28	10000	14	7640	1020	520	1050	550	1	24.0	—	—

The values apply for supply air temp. 0 °C and flow/return temperatures: [1] 90/70 °C, [2] 60/40 °C [3] 3/4"= 19.05 mm, 1"= 25.4 mm, male thread [4] for reduced heat output to approx. 2200 l/h

Warm water heater battery for installation in ducting.

Casing made of galvanised sheet steel, fits the Helios rectangular fan range. Spigots have double lip rubber seals on both sides to fit the nominal duct size. Air heater with Al fins moulded to copper ducting.
Operating temp. $t_{max.}$ 100 °C.
Operating pressure max. 8 bar.
Water connection pipe with male thread. Two inspection openings on water connection side for easy cleaning. With drain/vent valve.

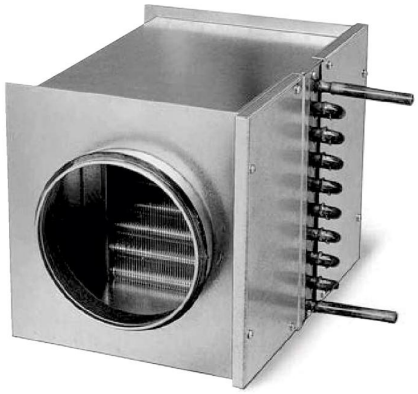
Installation

The heater must be installed downstream of the fan. If installing it before the fan, make sure that the air flow temperature at the fan does not exceed the fan's max. temperature.
To protect the heater from dirt and to prevent it from being clogged, we recommend the use of the air filter KLF.
A circular duct with a length of at least 1 metre must be installed between fan and heater in order to ensure a balanced air flow. An air bleed valve and a water drain valve must be provided for releasing air and water from the unit.
Attention: Frost protection must be provided on-site.

Selection

The effective temperature increase depends on the variables: Air flow volume, heater output and flow temperature.
This can be determined using the following diagrams (steps ⓐ–ⓒ).
The heater outputs are also specified in the table below for some volume parameters.
When selecting a fan (volume determination), the pressure loss of the heater battery must be considered (section ⓓ), which is shown in the diagrams.

WHR Duct



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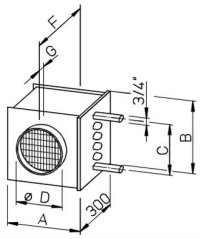
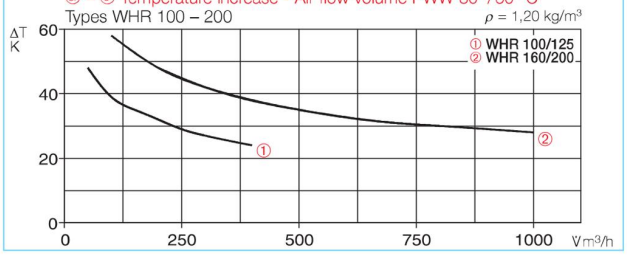
Temperature control systems
WHST, WHS HE 431 on

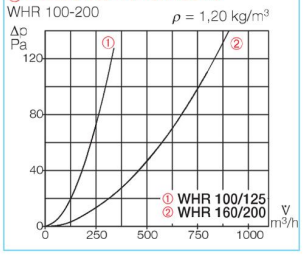
Dim. in mm see tables



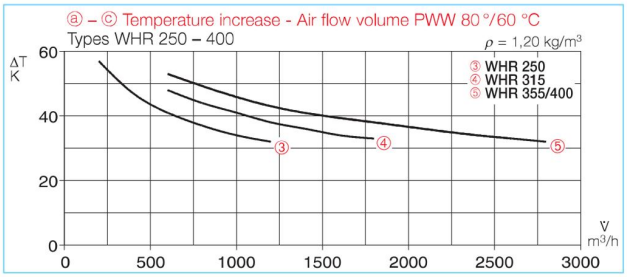
ⓐ – ⓒ Temperature increase - Air flow volume PWW 80 °/60 °C
Types WHR 100 – 200 ρ = 1,20 kg/m³



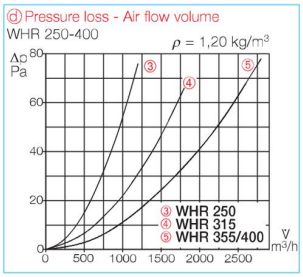
ⓓ Pressure loss - Air flow volume
WHR 100-200 ρ = 1,20 kg/m³



ⓐ – ⓒ Temperature increase - Air flow volume PWW 80 °/60 °C
Types WHR 250 – 400 ρ = 1,20 kg/m³



ⓓ Pressure loss - Air flow volume
WHR 250-400 ρ = 1,20 kg/m³



ⓐ Temperature increase

Definition: $\Delta T = \vartheta_i - \vartheta_a$ [K]
ΔT: Air temperature difference [K]
ϑ_i: Air temp., outlet air heater [°C]
ϑ_a: Air temp., inlet air heater [°C]

ⓑ Air flow volume

Shown on the performance curve whereby the total resistance of the system and heater pressure loss (section ⓓ) must be considered.

ⓒ Determination heat output

$$Q_H = \frac{\dot{V} \cdot \Delta T \cdot c_{PL} \cdot \rho_L}{3600} \text{ [kW]}$$

V: Air flow volume [m³/h]
ΔT: Air temperature difference [K]
c_{PL}: Specific heat capacity of the air (1.0) [KJ/kg K]
ρ_L: Air density (1.2) [kg/m³]

ⓓ Determination pressure loss

The pressure loss in relation to air flow volume is shown in the diagrams above for the respective heater battery.

Type	Ref. no.	fits duct diameters	Air data: Heat output		Air data: ΔT Air		Air data: at V	Water data[1]: Pressure loss	Water data[1]: at water flow rate	Dimensions: A	B	C	Ø D	G	F	Connection d" [3]	Weight approx.	suitable temperature control system: Type	Ref. no.
		Ø mm	kW[1]	kW[2]	K[1]	K[2]	m³/h	Δp_w kPa	l/h	mm	mm	mm	mm	mm	mm	Ø"	kg		
WHR 100	9479	100	1.9	0.9	35	17	150	1	84	161	180	140	100	45	387	3/4	3.2	**WHST 300 T38**[4]	8817
WHR 125	9480	125	2.6	1.1	29	13	250	2	115	161	180	140	125	45	387	3/4	3.2	**WHST 300 T38**[4]	8817
WHR 160	9481	160	5,5	3.1	38	22	400	11	245	236	255	215	160	45	387	3/4	4.9	**WHST 300 T38**[4]	8817
WHR 200	9482	200	7.2	4.1	33	19	600	17	317	236	255	215	200	45	387	3/4	4.9	**WHST 300 T38**[4]	8817
WHR 250	9483	250	10.7	6	37	21	800	8	470	311	330	290	250	65	427	3/4	6.9	**WHS HE**	8319
WHR 315	9484	315	18.3	10.4	36.2	21	1400	9	810	396	405	365	315	56	410	3/4	9.0	**WHS HE**	8319
WHR 355	8790	355	24.5	14	38	21.6	1800	9	1080	461	480	420	355	56	410	3/4	12.5	**WHS HE**	8319
WHR 400	9524	400	26.2	15	36	21	2000	11	1060	461	480	420	400	66	430	3/4	12.5	**WHS HE**	8319

The values apply for supply air temp. 0 °C and flow/return temperatures: [1] 90/70 °C [2] 60/40 °C [3] 3/4"= 19.05 mm, 1"= 25.4 mm, male thread [4] alternative WHST 300 T50, see page 137 (Ref. no. 8820)