Plastic plate heat exchanger

Applications

POLYBLOC is the right choice for highly corrosive pollutants. Plate heat exchangers in exhaust systems for brine baths, electroplating shops and laboratories are generally made from PP. For particularly corrosive media (such as chromic acid) the heat exchanger can also be made from PVC.

The design has been specifically matched to the use of PP and PVC. Particular attention was paid to controlling the high expansion coefficient typical of plastics in connection with the asymmetrical temperature profiles that occur inside plate heat exchangers.
Failure to observe this problem leads to substantial leakage between air streams as individual plates buckle.

Although this guarantees trouble-free operation of the heat exchanger over many years, the following points should nevertheless be considered:

Temperature resistance

Suitable steps must be taken to ensure POLYBLOC PP plate heat exchangers are not subjected to temperatures above 90 °C (PVC 60 °C), not even temporarily.
This also applies to the cleaning process.

Corrosion characteristics

POLYBLOC PP plate heat exchangers must not be exposed to any pollutants other than those advised at the time of order. The suitability of the plastic must be checked for each individual application.

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Installation and operating information

Installation information

1. When installing the heat exchanger inside a ventilation unit, the HE plates must always be vertical. This permits good drainage of the condensate and prevents an excessively increased pressure drop due to condensate formation on the air side. It also prevents the weight of the condensate that forms in the grooves and on the protrusions from compressing the exchanger.
   Arranging the plates horizontally is not permitted.

2. When handling the exchanger during installation, ensure that the folded edge is not subjected to outward loads (away from the heat exchanger block). Otherwise there is a risk that the gasket will tear off.

3. The internal leakage rates between the air streams are very low. When installing the heat exchanger in a ventilation unit enclosure, pay particular attention to air tightness. This means that the ventilation unit bulkheads on all 4 exchanger elbows must be sealed using suitable materials and methods.
   Please note: The heat exchanger application limits (temperature, pollutants, differential pressures) should be observed.
   The seal between the heat exchanger and the wall of the ventilation unit must be strong enough to withstand any possible deflection due to internal excess pressure on this wall. No tensile strain must be exerted on the lateral end of the heat exchanger. This means that the wall of the ventilation unit must not be secured to parts of the plastic frame.

4. In the case of poisonous substances in the exhaust air, the supply air fan inside the heat exchanger must generate a higher pressure (at least 100 Pa) than that on the exhaust air side. This prevents contaminated air reaching the supply air stream in the case of a leak. When stopping the fans, the exhaust air fan must be stopped first. The supply air fan is then stopped after a short delay. When starting the system, the supply air fan must start first, followed by the exhaust air fan. Safe operation must be ensured by means of suitable control in the event of a fan failure.

5. Arrange the fans so that no pressure differential greater than 2000 Pa can be created inside the plastic heat exchanger.

6. Never operate pressurised fan connectors with the commonly used discharge speed nor blow directly onto the intake side of the heat exchanger. The air eddies cause movement of the heat exchanger components, which in turn can result in damage from material fatigue. Furthermore, this has a detrimental effect on heat exchanger performance. Fit a short diffuser (stable perforated panel with four spacers) at the pressurised connector.

7. The air streams must not contain any substances that will corrode polypropylene and polyurethane (sealants), even if watery condensate occurs simultaneously.

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Operating information

1. Preferably clean the heat exchanger with hot water (up to 80 °C, max. pressure 3 bar), using a mild detergent and a manually guided hose. **Never use high pressure cleaners.** Also, never use mechanical cleaning apparatus (such as screwdrivers or brushes) for cleaning the heat exchanger.

2. Inside the customer's enclosure on site, provide a full lenght pan underneath the exchanger (return air / exhaust air and outdoor air / supply air section) made from suitable material. This must be equipped with sufficiently large drain outlets (also for cleaning purposes). Provide these with appropriate traps. If required, also fit drip separators.

3. Provide an outdoor air bypass in order to protect the heat exchanger from icing up. Size the reheater coil sufficiently large, to compensate the bypass operation with cold outdoor air. The bypass damper can be made from alumnium if it is located in the outdoor air. If certain criteria demand a bypass damper in the return air stream, such dampers must be made from stainless steel or plastic.

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Tender documentation for POLYBLOC plastic plate heat exchangers

- **Installation type W** (no bypass or damper)
- **Installation type WBY for ventilation units** (with bypass and damper)

Polypropylene plate heat exchanger, suitable for air handling and air conditioning systems with highly corrosive air streams. Made from deepdrawn
polypropylene plates, structurally optimized for low pressure drop and high transfer rates. Corona-treated surface for improved transfer rate in the case of condensation. Original material thickness: 0.7 mm. A flexible PU sealant is used to seal between individual plates. Plates are connected by means of interlocking joints and secured using ultrasound welding. The gasket is totally enclosed inside a groove. Permissible differential pressure inside the exchanger: 2000 Pa.

Block casing made from 20 mm polypropylene plates, with plastic/ stainless steel composite corner profiles. These are reinforced with fully encapsulated stainless steel profiles.

Block casing made from 20 mm polypropylene plates, with plastic composite corner profiles. These are reinforced with fully encapsulated stainless steel profiles. With integral bypass enclosure and aluminium bypass damper. Bypass damper also available on request in stainless steel or plastic.

Type „N“

- Plastic heat exchanger available in an N enclosure with bypass and bypass damper.
- Also available with an automatic cleaning facility.

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Plastic heat exchanger enclosure versions

Type „D“

- Plastic heat exchanger in enclosure, for flow rates from 1000 to 40,000 m3/h.

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