

Development of a Sorption Assisted Air Conditioning System Driven by an Evacuated Tube Solar Air Collector

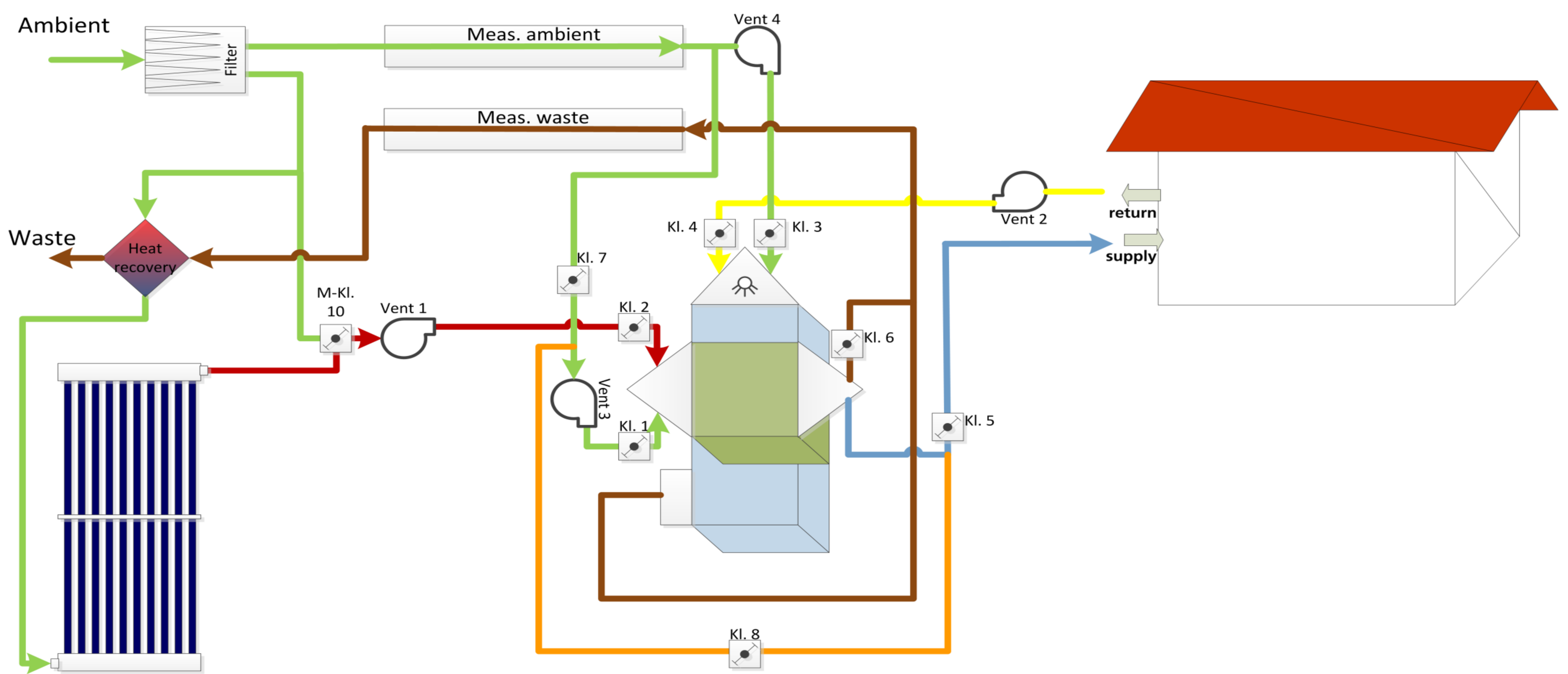
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DEMONSTRATION SYSTEM - SCHEME



DEMONSTRATION SYSTEM - FEATURES

System layout:

- Supply air flow 400 kg/h max
- Process air T > 100 C

Sunstorm Collector:

- 18.5 m²
- horiz. orientation

Heat exchanger:

- 400 mm cubic
- 5.3 kg Silica gel
- Coating by epoxy resin

- Optional: heating mode in winter season

Measurement accuracy:

- Temperature sensors Class B
- Humidity sensors, inaccur. < 3% RH
- Mass flow +/- 12 kg/h, 3% @ 400 kg/h



Upgrades Sep./Oct. 2013:

- airwasol TST collector
- Heat exchanger with ISE coating
- Integration of heat recovery
- Implementation of electr. power monitoring

DEMONSTRATION SYSTEM - PERFORMANCE

Control strategy:

Timer based, 40/7/40 min Desorption/Precooling/Adsorption

Performance:

- Process air T follows irradiation course of the day
- Heat supply sufficient 10am–5pm

Results (ads. phase):

- Dehumidification 4.4 g/kg
- Cooling power 2 kW
 - 1.25 kW latent/dehumidification
 - 0.75 kW sensible
- COP 0.65

Details to optimize:

- Pressure drop collector → higher flow rate for desorption
- Pipe diameter and insulation
- Auto-control of cycle duration and switching

Data July 22, 2013:

