Equilibrium in Technology

Main benefits
- Highly efficient thermal energy transfer (heat and cold)
- Transfer of humidity together with thermal energy
- Low tendency towards rotor freezing
- Low installation width in air-handling units

Rotary regenerative heat exchangers work on the principle of accumulating the energy (heat, humidity) contained in exhaust air into a slowly rotating heat exchanger rotor (aluminum foil) and the subsequent transfer of that energy into supply air. With the rotor rotating, each individual part of it gets into the stream of exhaust and then supply air.

The KASTT heat exchangers are designed with the aim to reach the maximum efficiency in heat and humidity recovery - up to 90%, which contributes to lower contamination of the environment.

The biggest possible diameter of the exchanger rotor, of up to 5 m, represents approx. 150000 m³/h of nominal air volume.
Exchanger rotor
The rotor is alternately wound from straight and wavy layers of aluminum foil. The resulting matrix is able to guarantee an optimum air flow and transfer heat or humidity at the highest efficiency possible.

Rotor types

- **Contactless sealing - felt**
  is wound from aluminum foil and primarily used for thermal energy transfer.

- **Contact sealing - brush**
  This type of sealing is particularly intended for BASIC design.

- **Special sealing - labyrinth**
  For rotary heat exchangers with requirement for the highest quality of inner environment. The patented KASTT labyrinth sealing considerably reduces overall rotor untightness. With maximum untightness of less than 1.5% of air volume, this is the most efficient sealing of heat exchangers in the market.

For more details on special KaSTT zeolite layer, see the separate product data sheet.

Winding composition and geometry

- **Winding geometry** depends on the wave height, wave length and aluminum foil thickness.

  - Wave height is selected so that the heat recuperation is the most efficient both in terms of transfer of energies as well as in terms of pressure loss. The wave height selection also depends on the purpose and location of heat exchanger use.

  - At customer’s request, we are able to manufacture a rotor for the winding width of 200 mm, with wave height from 1.4 to 2.0 mm.

  | winding width [mm] | 200 |
  | wave height [mm] | 1.4 | 1.6 | 1.9 |
  | foil thickness [mm] | 0.06 | 0.07 | 0.077 |

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Rotor design

- **Rotor types**
  - Condensation rotor
    - is wound from aluminum foil and primarily used for thermal energy transfer.
  - Hygroscopic rotor
    - is wound from aluminum foil with a special hygroscopic layer (silica gel, zeolite) allowing the transfer of heat together with humidity with an efficiency of up to 90%.

- **Enthalpy**
  - One layer of aluminum foil is coated with a hygroscopic layer. Based on the required efficiency of humidity transfer, the combination of straight and wavy layer of aluminum foil is used.

- **Sorption**
  - Both layers of aluminum foil are coated with a hygroscopic layer (the highest possible efficiency of humidity transfer).

- **Epoxy rotor**
  - is wound from aluminum foil treated with an epoxy layer. This option is suitable for aggressive environments.

  | winding width [mm] | 200 |
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- **Engagement efficiency**
  - Higher engagement efficiency is achieved with lower pressure loss.

- **Engagement efficiency**
  - Lower engagement efficiency is achieved with higher pressure loss.

For more details on special KaSTT zeolite layer, see the separate product data sheet.

Sealing options

- **Contactless sealing - felt**
  - This type of sealing is particularly intended for frame design of rotary heat exchangers.

- **Contact sealing - brush**
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- **Special sealing - labyrinth**
  - For rotary heat exchangers with requirement for the highest quality of inner environment. The patented KASTT labyrinth sealing considerably reduces overall rotor untightness. With maximum untightness of less than 1.5% of air volume, this is the most efficient sealing of heat exchangers in the market.

For more details on KASTT labyrinth sealing, see the separate product data sheet.

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Rinsing chamber
- Minimizes contamination of supply air by contaminants from exhaust air due to exchanger rotor rotation (so called carry-over effect).
- Is a wedge-shaped sheet metal part that forms - in the dividing plane of RHE - cut off between the supply and exhaust channel.
- Displaces a part of supply air to exhaust air.

Rotary heat exchanger drive
The drive consists of electrical motor with gear, pulley and belt. KASTT rotary heat exchangers may be fitted with standard AC motors, special AC motors or advanced step-motors controlled by their own dedicated control unit.

For more details on drives, controls and regulation of KASTT rotary heat exchangers, see the separate product data sheet.

Design software
The design of RHE is based on multiple parameters:
Amount of air, its temperature and humidity, air flow rate, winding wave height, rotor diameter, rotor speed, fan position and layout.

KASTT rotary heat exchangers have been continuously developed. This is why we are also regularly updating our own design software. The software allows fast and easy design of rotary heat exchanger with the required parameters, dimensions and specifications. The software has been regularly tested and certified by Eurovent and TÜV SÜD.

Should you be interested in KASTT design software or technical support, please, send us an e-mail to: info@kastt.cz