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2. HEAT RECOVERY WHEEL: Thermotech Enterprises TC-Series Thermowheel
 - 2.1. The structural frame and casing shall be designed and manufactured so as to allow a maximum rotor deflection of 1/32 inch, as measured at the outer radius, during maximum rated airflow condition.
 - 2.2. All sheet metal shall be reinforced as required to provide a solid mounting surface of the peripheral and radial seals in order to maintain a minimum of 3/4 inch fixed distance between the rotor surface and any sheet metal or steel parts.
 - 2.3. A purge section shall be provided to eliminate transfer of exhaust air into the supply air, and shall be field adjustable.
 - 2.4. External tapered roller bearings with double setscrew locking collars shall be provided and sized for a minimum L-10 life of 1,000,000 hours of operation and shall be changeable without a complete disassembly of the rotor. Shaft journals shall be machined to proper tolerance as specified by the bearing manufacturer. Shaft shall be machined as to provide a shoulder against the bearings for a positive locked position to eliminate any lateral movement of the rotor due to axial bearing loads. Grease fittings shall be easily accessible.
 - 2.5. The spokes shall be made of extruded aluminum to limit deflection of the rotor to 1/32 inch for the maximum rated airflow.
 - 2.6. The rims shall be made of a one-piece aluminum section. For rotor sizes above 29 inch radius the rim shall have guide flanges to continuously support the outer media edges to provide additional support and maintain the rotor flatness.
 - 2.7. The rotor media shall be provided in segments. Each media segment shall be machined to fit in the spoke system and the outside rim. Each segment of media shall be compressed evenly during the assembly process without causing any angular deformation and resulting misfits between the spokes and media parts, and to provide a wheel with a flatness of +/- 1/32 inch.
 - 2.8. **The heat transfer media** shall be the industry standard of 200 mm. in depth. Non-standard depths shall be unacceptable. The heat transfer media shall be made out of corrugated aluminum foil with a high surface area per volume and laminar flow to assure that no fouling occurs on the internal heat transfer surface. Dry particles up to 900 microns shall pass freely through the media. This material shall be supplied with a "Balanced Sieve" (4Å or 3Å Molecular Sieve) hygroscopic solid desiccant coating for selective adsorption of water vapor and equal sensible and latent heat transfer. The media shall have a flame spread of 0 and a smoke developed of 5 or less when rated in accordance with ASTM E84-09. All edges shall have an anti-corrosion epoxy coating.
 - 2.9. **The sensible only transfer media** shall be the industry standard of 200 mm. in width. Non-standard widths shall be unacceptable. The media shall be made out of corrugated aluminum foil with a high surface area per volume and laminar flow to assure that no fouling occurs on the internal heat transfer surface. Dry particles up to 900 microns shall pass freely through the media. This material shall be supplied with an anti-corrosion epoxy coating for sensible heat transfer. All edges shall have an anti-corrosion epoxy coating.

- 2.10. **The passive dehumidification media** shall be the industry standard of 200 mm. in depth. Non-standard depths shall be unacceptable. The heat transfer media shall be made of corrugated fiberglass with a high surface area per volume and laminar flow to assure that no fouling occurs on the internal transfer surface. Dry particles up to 900 microns shall pass freely through the media. This material shall be supplied with a "Balanced Sieve" hygroscopic solid desiccant coating for selective adsorption of water vapor and heat transfer. The media shall have a flame spread of 0 and a smoke developed of 5 or less when rated in accordance with ASTM E84-09.
- 2.11. Rotor media shall be tested in accordance with ASHRAE Standard 84-91 and ARI Standard 1060-05 by a qualified independent testing laboratory. Testing shall confirm published performance and document that the desiccant material does not transfer pollutants typically encountered in the indoor air environment. The reports shall be provided upon request.
- 2.12. The seals shall be of a maintenance free non-contact type with a 4-pass labyrinth "turbine" for optimum performance and designed to eliminate wear and excessive drag. The seals shall be adjustable and set to within 0.05 inch of the rotor surface and shall be bolted to the frame with stainless steel hardware to eliminate seal movement. The seal system shall withstand a pressure difference up to 12 in. W.C.
- 2.13. The drive system shall be gravity tensioned and shall use two standard B-section V-belts. The speed reducer shall be grease lubricated, maintenance free with a flexible Love-Joy input coupling for easy motor separation and for absorption of any shock or vibration. The drive system shall be easily accessible and visible for inspection and maintenance and have a minimum life expectancy expectance of 50,000 hours. For rotor sizes below 30" radius the motor and speed reducer may be combined into one unit to conserve space. A single belt system shall also be allowed.
- 2.14. **The speed control system shall be a variable frequency inverter** operating a standard inverter rated AC motor, capable of operating the rotor from 1/4 rpm to 20 rpm or to whatever is required for the type of media used. It shall integrate with the temperature control system to provide the required supply air temperature.
- 2.15. **The temperature controller** shall monitor entering and leaving temperatures for the exhaust and supply air. Adjustable set points shall be for the heating mode discharge temperature, summer/winter change over and for wheel frost control. For multiple rotors in a common air stream each rotor shall provide temperature outputs to the controller in order to get an accurate average discharge temperature.
- 2.16. **The enthalpy controller** shall monitor temperatures for entering and leaving airstreams in the exhaust and supply air. Humidity shall be monitored for the entering airstreams in the exhaust and supply air. Summer/winter change over will be controlled by comparing enthalpy. The heating mode discharge temperature will have an adjustable set point. Wheel frost control will be dynamic, using sensible and latent data.
- 2.17. **The rotation detector** shall be accomplished through the temperature controller. A proximity sensor and target shall provide the contact for the controller used to provide RPM readout and wheel stoppage alarm contacts.
- 2.18. The entire rotor and wheel assembly shall require only limited maintenance of biannual greasing of the main bearings and inspection of the drive system.
- 2.19. **A standard 10-year material and labor warranty** shall be provided covering all materials supplied and installed by the wheel manufacturer.