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2. HEAT RECOVERY WHEEL: Thermotech Enterprises TF- Series Wheel

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 ¾ inch fixed distance between the rotor surface and any sheet metal or steel parts. There shall be no special requirement to provide any casing side access for future rotor removal and/or service. All such service work shall be possible to perform from inside the duct at the face of the rotor casing.

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 set screw 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 with an “I” beam shape to limit deflection of the rotor to 1/32 inch for the maximum rated airflow. Spoke surfaces to be serrated for increased friction and air turbulence across the seals.

2.6. The rim joint shall connect the spoke ends and the rim ends together in such a way that the heat transfer media can be installed under field conditions without any media deformation or misfits causing future problems. The rim joints shall provide a gradual compression of each section by independently applying increased tension of the rim bolts without the use of any special tools or devices.

2.7. The rims shall be made of two extruded aluminum sections -- one inner rim and one outer rim with grooves for the twin “V” belts, and guide flanges for securing the media. The two sections shall be welded together to form a tubular structure for improved strength in order to maintain an accurate radius and rotor roundness during the manufacturing process.

2.8. The rotor media shall be provided in segments to allow for field erection or replacement of one section of media at a time without side access. No external pullers or other special tooling shall be required for field assembly or replacement. The media shall be machined to fit in between a primary and secondary spoke and a guiding flange of the outside rim. Each media segment shall be compressed independently of all other segments during manufacturing without causing any angular deformation and resulting misfits between the spokes and media parts. The results shall be a wheel with a flatness of +/- 1/32 inch. No adhesive or silicone shall be necessary to secure the media in place.

2.9. The enthalpy 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” (4A or 3A 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.

2.10. 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. 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 1060-01 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 must 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 that must ride in a groove in the rotor rim to eliminate any side-to-side movements and slippage. 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 of 90,000 hours.

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 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.

2.17. The entire rotor and wheel assembly shall require only limited maintenance of biannual greasing of the main bearings and inspection of the drive system.

2.18. A standard 10-year material and labor warranty shall be provided covering all materials supplied and installed.