



# HI-PANEX series Heat Wheel Specification Guide



## Hi-Panex Guide Specification

### Green-Save® Hi-PANEX - ENERGY RECOVERY WHEELS

#### PART 1 - GENERAL DESCRIPTION

- A. Provide and install an energy recovery wheel mounted in a cassette with seals and drive system as an assembled unit per the schedules and plans.
- B. Submit manufacturer's data indicating capacity, dimensions, weight, and compliance with specifications.
- C. Manufacturer: SG America / Seibu Giken America, Inc.,  
Telephone: (484) 709-2093;  
email: [Sales@SGAmerica.com](mailto:Sales@SGAmerica.com);  
web site: [www.SGAMERICA.com](http://www.SGAMERICA.com).

#### PART 2 - PRODUCTS

##### 2.1 ENERGY RECOVERY WHEELS

- A. General: Energy recovery wheels shall be desiccant coated rotary air-to-air heat exchangers meeting the performance as listed in equipment schedules.
- B. Flame and Smoke Test and Rating: Energy Recovery Wheels shall have a flame-spread rating of 25 or less and smoke-developed rating of 50 or less as tested in accordance with ASTM E84.
- C. Energy recovery wheel construction:
  - 1. Energy recovery wheels shall be manufactured of corrugated aluminum treated for corrosion resistance and shall include a ion exchange resin desiccant to adsorb and transfer humidity in the vapor phase while avoiding adsorption and transfer of typical ambient non-water vapor molecules.
  - 2. The aluminum element and desiccant shall be treated with an EPA registered bacteriostatic agent capable of inhibiting growth or reproduction of bacteria on the wheel. Wheels shall be capable of cleaning by soft brush, vacuum-cleaner or low-pressure compressed air.
  - 3. Wheel surfaces shall be smooth to provide consistent seal gap between the wheel face and the cassette seal ring for the multi-pass seal.
  - 4. Wheels of more than 60 inches in diameter shall be of segmented construction with the wound element cut into pie shapes which are bolted together to form the wheel. Each pie shaped element shall be held in place by a structural encasement formed of corrosion resistant coated steel which surrounds the cut



pie segments. Pies sections shall not require tuning or threaded tie-rods to adjust for out of roundness of the wheel.

Wheel size	Segmented	Segments
500, 700, 900, 1100, 1300	No	0
1500, 1700, 1900, 2150	Yes	4
2300, 2400, 2600, 2750	Yes	6
2900, 3100, 3200, 3300, 3500, 3750, 3900, 4100, 4200	Yes	8
4500	Yes	12

5. The encased pie segments shall be bolted to the hub, to each other and to the periphery rim. Each joint shall be sealed with high grade weather resistant low vapor emitting caulking to prevent air from bypassing the element.

D. The cassette of the rotary heat exchanger shall have a built-in adjustable purge section providing a minimum cross contamination of exhaust air to the supply air. The purge angle and purge air volume shall be determined by the manufacturer considering the air face velocity, the wheel rotational speed and the differential air pressure between the entering outside air and the entering exhaust air streams at the respective wheel face. (See the air handling unit schedule for the value of the differential air pressure or use 3.0 inches w.c. for design purposes)

E. The cassette frame shall be constructed of 11 gauge heavy wall welded tube to ensure rigidity and stability. Galvanized block-off and casing side panels shall be included to form as unitized cassette. Side panels shall be removable to provide access to the wheel for future replacement. Removable motor compartment access panels shall be provided.

Cassettes for sizes 2150 and smaller shall be factory assembled mechanically tested and shipped as one piece.

Cassettes for sizes 2400 and larger shall be shipped in spit sections after factory assembly and mechanical testing. The bottom frame shall include the drive motor, drive belt and, half of the wheel pre-assembled to the hub. The hub shall be shaft/bearing mounted to the frame. The top frame shall include the other half of the wheel pre-assembled and suspended within the frame. Both sections shall include shipping restraints to be removed at the time of field assembly. Double ball bearing rollers shall be mounted on the frame to run against the wheel flange in order to maintain the seal gap and prevent wheel deflection against differential air pressure between the supply air and the exhaust air tunnels of up to 10 inches w.c.

F. Purge: The cassette shall be complete with an adjustable built-in purge section to limit carry-over of exhaust air to the supply air stream to 0.04% when operated under design conditions. The purge plate shall be mounted to a pivot and locked into position by secure fasteners for quick field adjustment. A multi-pass seal shall be installed on the swing arm similar to the seals described below. (Please see purge swing arm field adjustment instructions to ensure it is installed in a manner consistent with the factory warranty.)



Rotation of the wheel shall be in the direction from the return air through the purge to the supply air side.

G. Seals: The supply and exhaust air stream shall be isolated from each other by means of adjustable multi-pass seals secured to the cassette panels and air separator tube. Multi-pass seals shall consist of a non-contact four or eight finger labyrinth seal. The selection of the seal shall be based on the differential pressure between the supply air plenum and the return plenum as measured in proximity to the wheel face. Multi-pass seals shall be installed with a 2 mm gap between the seal and the wheel flange.

H. Connections: The cassette casing shall include blank turned-in flanges to permit field attachment to air handler bulkheads. The heat wheel cassette shall be securely attached to the floor or raised section and the AHU bulkheads.

I. Corrosion resistant coating: All non-galvanized metal parts exposed to the air streams shall be painted with one coat of primer and one coat of corrosion resistant paint.

K. Wheel support and bearings: The energy recovery wheel shall be shaft mounted and supported by externally mounted pillow block ball bearings supported by the cassette frame. The pillow block bearings shall be provided with a grease fitting. The pillow block bearings shall be mounted to allow convenient service and replacement without the removal of the energy recovery wheel from the cassette.

L. Wheel drive system: The wheel shall be driven by a V-belt installed around the outside of the wheel. A gear motor, pulley and belt tensioner shall be installed and sized to drive the wheel through its complete speed range (1/4-20 rpm) for all seasons and speed control sequences. The gear-motor shall be VFD-rated for variable speed operation. The gear-motor is to be rated for 460/3/60 (480/3/60) power supply. The gear-motor shall be factory mounted in the bottom section of the cassette. The removable gear-motor service access cover shall be mounted in the Return Air section of the cassette.

M. Markings: The manufacturer shall include decals or other markings to indicate the direction of rotation.

N. Controls: The control of wheel rotational speed is to be by the use of a variable frequency drive (VFD) rated for the full rpm range of the wheel and the full load amps of the gearmotor. The VFD shall be supplied by the BMS/BAS controls vendor. An external disconnect switch shall be installed near the VFD per local and national electrical codes by others. The wheel speed shall be modulated in response to a signal from air stream temperature sensors mounted in the air ducts. The temperature sensors shall be supplied by the BMS/BAS controls vendor. The speed controller shall be energized by a remote signal from the owner's BMS/BAS. The controller shall include local manual set point adjustments for Economizer mode and Frost Point control. The controller shall automatically select summer or winter mode by rules based programming.

O. Option: Rotation Failure Detector: Unit shall be furnished with a factory mounted normally open (N/O) rotation detection device with pig-tail connection for field wiring to the controls. When the rotation failure detector is provided, the controller shall include local



indication of a rotation fault and a fault relay to an external alarm device (BMS/BAS) in the event the wheel stops turning due to failure of the drive belt or gear-motor.

P. Submittal: The manufacturer shall submit one electronic set on PDF format or (1) printed sets of dimensional drawings, performance charts or technical data sheets, and Installation & Operation manuals for approval. The performance data shall demonstrate conformance to the specified performance as listed in the equipment schedules.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install energy recovery wheels within the air handling unit where shown in the unit drawings in accordance with equipment manufacturer's written instructions and in accordance with recognized industry best practices to ensure that units comply with the job requirements.

B. The installing contractor shall hand rotate the energy recovery wheel 10-15 rotations per month to prevent damage to bearings during the building construction phase. Rotation shall be recorded to verify compliance.

C. In the case of a large split cassette, the wheel manufacturer shall provide field supervision and instruction of the assembly of the first cassette to be assembled at the job site. The installing contractor shall assemble remaining cassettes.

D. The installing contractor shall check the multi-pass seals for proper setting per manufacturer's instructions.

E. The electrical contractor shall check and verify the rotation of wheel for proper performance of the purge section.

F. The controls contractor shall input the temperature control points at the local control panel as required by the sequence of operation indicated in control section.

G. Coordinate with other work, including installation of block off panels, electrical and controls as necessary

H. The purge swing arm assembly must be adjusted and secured per the manufacturer's instructions, failure to do so voids the factory warranty.

### 3.2 TESTING

A. The contractor shall start up and operate equipment to demonstrate capacity and compliance with requirements. The contractor shall coordinate with the manufacturer any corrective field work to correct malfunctioning units, and then retest to demonstrate compliance. Any damage to the recovery wheels/cassettes as a result of failure to follow the manufacturer's installation instructions will void the limited factory warranty included in the submittal document.