

# I3 ENERGY RECOVERY WHEEL

**Great energy recovery;  
lowest fan operating costs**



Featuring a solid, industrial construction with aluminum media and backed by our unique 5 years full parts and labor warranty, the I3 energy recovery wheel have no equal when it comes to outstanding reliability and affordable prices.

A leader when it comes to its AHRI1060 certified energy recovery performances, the I3 energy recovery wheel is offered with the choice of 3 angstrom molecular sieve desiccant, high performance polymer desiccant or no desiccant for sensible only applications.

The I3 energy recovery wheel is also the only wheel on the market featuring the revolutionary Airloop™ (patent pending) labyrinth seal technology for the lowest air handling unit fan operating costs on the market. With a proven air loss reduction of over 20% compared to other certified manufacturers, the I3 energy recovery wheel will pay for itself with just the resulting AHU operating cost reductions and turn good savings into great savings.

## ► Features and benefits

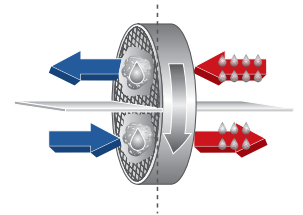
- Heavy duty, 100% redesigned construction
- Standard 5 years full parts and labor warranty
- Fast payback due to great sensible and latent effectiveness
- Available with 3 angstrom molecular sieve (MS3A) or polymer (HSP) desiccant
- Equipped with the best seal on the market (Airloop™) for the lowest AHU fan operating costs and cross leakage levels
- AHRI certified performances; Bears the AHRI Standard 1060-2011 certified seal
- Segmented design and serviceable frame for ease of maintenance
- Bactericide desiccant; will not promote the growth of mold or bacteria
- Meets NFPA 90A and 90B, tested under UL Standard 723

## ► Options

- Purge section
- Variable frequency drive (VFD)
- Sensible only wheels
- Epoxy coating on frame
- Epoxy coating on media
- I3R field installation models

## Operating Principle:

The I3 energy recovery wheel offers great energy recovery both in summer and winter modes. In summer times, the wheel will greatly reduce the sensible (heat) and latent (moisture) energies leading to significant cooling and dehumidification cost reductions. Following the same principle, during winter months, the wheel will recover both the heat and moisture from the return air stream and add it to the cold outdoor air for great heating and humidification savings.



## Dimensional data (in/mm)

Diameter	Width (W)	Height (H)	Depth (D)	Weight (lb/kg)
48/1219	58/1473	58/1473	16/406	720/327.3
54/1372	64/1626	64/1626	16/406	790/359.1
62/1575	72/1829	72/1829	16/406	910/413.6
70/1778	80/2032	80/2032	16/406	1080/490.9
78/1981	88/2235	88/2235	16/406	1230/559.1
88/2235	95/2413	95/2413	17/432	1400/636.4
96/2438	103/2616	103/2616	17/432	1560/709.1
108/2743	115/2921	115/2921	17/432	1800/818.2
120/3048	127/3226	127/3226	17/432	2080/945.5



setting the  
standard  
for **energy  
recovery**

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# INNERGY TECH I3 ENERGY RECOVERY WHEEL SPECIFICATIONS

## Specifications:

### 1. General specifications:

- A. Furnish and install the I3 energy recovery wheel, to be manufactured by Innergy tech Inc.
- B. The energy recovery wheel must be manufactured in North America.
- C. The energy recovery wheel shall transfer both sensible and latent energies between outgoing and incoming air streams in a counter flow arrangement.
- D. The energy recovery wheel shall be labeled for rotation direction and airflows (Outdoor air, Supplied air, Return Air & Exhaust air).
- E. The energy recovery wheel manufacturer must have at least ten (10) years of experience in the manufacturing of energy recovery components.
- F. The energy recovery wheel shall carry a full parts and labor 5 years warranty from the date of shipment. An optional 10 years warranty shall be available as a separate option.

### 2. Quality Assurance

- A. The wheel shall bear the AHRI 1060 certified label. Wheels tested in independent laboratories, whether according to AHRI Standard 1060 or not, are not acceptable unless actually certified by AHRI. Wheel manufacturer membership in AHRI is not an acceptable substitute for AHRI certified performance.
- B. The energy recovery wheel shall be a UR recognized component and bear the UR label.
- C. The energy recovery wheel shall comply with the requirements of UL723. The media shall have a flame spread of less than 25 and a smoke developed of less than 50 when rated in accordance with ASTM E87.
- D. The energy recovery wheel shall comply with the IBC Certification and OSHPD Seismic Qualifications.
- E. The manufacturer's quality procedures shall be ISO 9001-2008 certified.

### 3. Performances (Effectiveness, Pressure drop, EATR & OACF)

- A. Sensible, latent and total effectiveness along with pressure drop, EATR and OACF ratings, shall be clearly documented in the AHRI 1060 Certified Product Directory (<http://www.ahridirectory.org/ahridirectory>).
- B. The energy recovery wheel, without purge, shall achieve an EATR rating of 0% (no cross-leakage) at 5" WC pressure differential. The result shall be clearly shown in the AHRI 1060 directory.
- C. To reduce fan operating costs, the energy recovery wheel shall not exceed an OACF of 1.15 for rotors of up to 70" (1778mm) and 1.08 for rotors of up to 120" (3048mm) at 5" WC pressure differential when no purge is used. The results shall be clearly shown in the AHRI 1060 directory.

### 4. Rotor Media & desiccant

- A. The rotor media shall be made of 2 mils minimum thickness aluminum. The media shall be coated to prohibit corrosion and shall be suitable for

seacoast application. Non-metallic substrates made from paper, plastic, synthetic or glass fiber media are not acceptable.

- B. Except for sensible only wheels, all surfaces shall be coated with a non-migrating desiccant specifically developed for water transfer in vapor phase. Etched or oxidized surfaces are not acceptable.
- C. Desiccant must be a polymer hygroscopic or 3 angstroms molecular sieve (3A).
- D. Desiccant shall be bactericide and non-corrosive.
- E. The rotor shall be constructed of equal width, alternate layers of corrugated and flat aluminum sheet material to create a flat and smooth surface and insure laminar flow thus preventing any dust or particles accumulation inside the rotor.
- F. Corrugation pattern shall be of closed triangular shape to prevent any cross-leakage between airstreams. Open type corrugations or embossments, since they increase fan operating costs, are not acceptable.
- G. Dry particles up to 800 microns shall freely pass through the media to minimize air pressure drops and pre-filtering requirements.

### 5. Seals

- A. The rotor shall be supplied with AirLoop™ labyrinth seals facing the media, polymer contact seal along the depth of the wheel and "S" type labyrinth seal along the wheel's periphery. Wheel using less effective seals like brush seals or standard 4 pass labyrinth seals are not acceptable.
- B. The AirLoop™ labyrinth seals shall be installed with no gap between the seal and media. Labyrinth seals that require an installation gap or seals that will damage the media if they come in contact with it are not acceptable.
- C. All seals shall be designed to withstand pressure differentials of up to 10" WC.
- D. The AirLoop™ labyrinth seals shall be factory adjusted. Field adjustments shall be possible using common tools.



# INNERGY TECH I3 ENERGY RECOVERY WHEEL SPECIFICATIONS

## 6. Bearings and center shaft

- A. The rotor shall be supported by two pillow block bearings which can be maintained or replaced without removal of the rotor from its casing or the media from its spoke system. Inboard type bearings are not acceptable. Grease fittings shall be easily accessible.
- B. Bearings shall be rated for a minimum L10 life of 220,000 hours.
- C. The center shaft shall be machined as to provide a shoulder against the bearing and prevent any axial movement of the rotor.
- D. The center shaft shall use black oxide and oil coating to prevent rust. Center shafts using oil only are not acceptable.

## 7. Purge & Cassette Assembly

- A. The unit shall be provided with a factory set & field adjustable purge section to prevent any cross-leakage (0% EATR) starting for pressure differentials as low as 0.5"WC.
- B. The rotor shall be provided with a structural frame which limits the deflection of the rotor due to air pressure drops to less than 1/32".
- C. The framing shall be made of a heavy-duty welded tubular steel assembly.
- D. Framing shall be primed with a rust inhibitor phenolic primer and painted with a high durability synthetic industrial paint.
- E. The cover panels shall be made of galvanized steel (minimum thickness of 1/16") to prevent corrosion.
- F. When the top/bottom & side plate option is selected, the cassette shall be equipped with removable cover panels for side service access to the motor assembly.
- G. For easier parts inspection and maintenance, all major components (motor assembly, driving belt, seals) shall be easily accessible from at least one side of the wheel within the airstream. The components shall not require the removal of sheet metal for a visual inspection. Wheels with face plates on both sides are not acceptable.
- H. The wheel shall be supplied with removable corner bracings (bolted) for easy replacement of media sections from both faces of the wheel if ever required.

## 8. Rotor assembly

- A. Rotor spoke system shall be of segmented design to allow for field erection or replacement of one section at a time without requiring side access. Wheels up to 62" in diameter shall be made of 4 sections and wheels larger than 62" shall be made of 8 sections.
- B. The rotor spoke system shall be made of strong aluminum material providing the structural integrity required at design pressure differentials.
- C. The rotor hub shall be made of machined, extruded aluminum (no welding), for reduced tolerance and increased stiffness.
- D. All rotor parts shall be made of aluminum or stainless steel. Galvanized steel parts are not acceptable.

## 9. Drive system

- A. The rotor shall be perimeter driven with a multilink V-belt made of high-tech polyurethane/polyester composite material for easier installation and replacement.
- B. V-belt shall be easily adjustable without the use of tools.
- C. The belt shall be tensioned with a heavy duty belt tensioner. Gravity tensioned assemblies are not acceptable.
- D. An A/C inverter duty motor shall drive the rotor. E. The wheel shall be supplied with a speed reducer resulting in a rotation speed of 20RPM without the use of a VFD. Wheels with rotation speed higher than 20RPM are not acceptable due to increased fan energy consumption.
- F. Speed reducer and belt tensioner shall be permanently lubricated and maintenance free.

## 10. Controls

- A. The variable frequency drive (VFD) controller shall support full economiser and frost protection modes with the use of four temperature sensors located in all four air tunnels (Outdoor air, Supplied air, Return air & Exhaust air).
- B. Frost control: VFD to modulate wheel speed in order to maintain the exhaust temperature above set point (default: 34°F, adjustable).
- C. Economiser mode: When outdoor air temperature is below the return air temperature, the VFD shall modulate wheel speed in order to prevent the supply temperature from exceeding set point (default: 60°F, adjustable).
- D. Outdoor air and return sensors shall be factory installed by the energy recovery wheel manufacturer. Supply and exhaust sensors shall be field installed as far from the wheel as possible but before the fans (for draw-through configurations) to ensure a good average temperature reading.
- E. The drive system shall allow for a turndown ratio of 80:1 (20 rpm to 1/4 rpm).
- F. The VFD shall be supplied with a NEMA 1 enclosure (NEMA 4 optional).
- G. The VFD standard communication protocol shall be: S-422/485 MEMO-BUS/Modbus at 115.2 kbps (BACnet™ optional).
- H. VFD to be supplied with LCD display screen for easy monitoring of VFD parameters, inputs and outputs.
- I. Communication Capabilities: VFD software to enable building automation system (BAS) to monitor temperatures, control discharge set point, wheel rotation speed and display alarms.

## 11. Options

- A. Physical induction rotor detection (stand alone module or part of the VFD controller).
- B. Top, bottom and side galvanized sheet metal (frame).
- C. High resistance 2-parts epoxy paint (frame tubular assembly)
- D. High resistance 2-parts epoxy paint on both faces of the media.
- E. I3R models for wheels requiring field installation.

