

# Innergy tech is proud to present its **NEW I4 ENERGY RECOVERY WHEEL**



With a quality and innovative design, this unit achieves higher performances in the most compact casing. Manufactured of 100% aluminum, this lighter frame with over 30% weight reduction has never been this easy to integrate in a HVAC system. Equipped with the best seals on the market, the patented AirLoop seal and the enhanced S-perimeter seal ensures the lowest air lost rate. This proven technology reduces operating costs and increases energy recovery to its fullest potential.

In addition, the active matrix technology provides 3 performance level to always ensure the best ratio between effectiveness and pressure drops. Whether total energy recovery is needed (enthalpy - MS3A) or heat only recovery (sensible - epoxy), Innergytech has got you covered. We continue to offer high quality and reliable products with AHRI 1060 certified performances and standard 5-year full parts and labor warranty. In shorts, the I4 innovative design and quality materials creates a product like no other at a great price.

## ► FEATURES AND BENEFITS

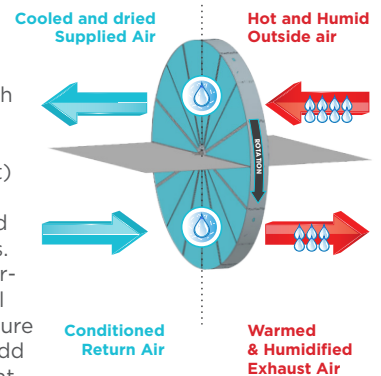
- Enhanced performances
- Best seals on the market (Patented AirLoop & S-perimeter seal)
- 100% aluminum frame and stainless-steel shaft
- Greatly reduced frame dimensions
- Active Matrix Technology (3 performance levels)
- MS3A desiccant (Enthalpy) or Epoxy coated (Sensible)
- Over 30% weight reduction
- Standard 5 years full parts and labor warranty (10 years also available)
- Meets all codes and standards (AHRI 1060 certified, UL1995 & AATCC30)

## ► OPTIONS

- Purge section
- Variable frequency drive (VFD)
- Sensible only wheels
- Epoxy coating on frame
- Epoxy coating on media
- I4R field installation models

## Operating Principle:

The I4 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

Diameter in (mm)	Width & height in (mm)	Depth in (mm)	Av. Weight LB (Kg)
48 (1219)	52 (1321)	17 (432)	300 (136)
54 (1372)	58 (1473)	17 (432)	350 (159)
62 (1575)	66 (1676)	17 (432)	400 (181)
70 (1778)	74 (1880)	18 (457)	500 (227)
78 (1981)	82 (2083)	18 (457)	650 (295)
88 (2235)	92 (2337)	18 (457)	750 (340)
96 (2438)	100 (2540)	20 (508)	1000 (454)
108 (2743)	112 (2845)	20 (508)	1200 (544)
120 (3048)	124 (3150)	20 (508)	1400 (635)



setting the  
standard  
for **energy  
recovery**

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# I4 SPECIFICATIONS

## ENERGY RECOVERY WHEEL

### 1. GENERAL SPECIFICATIONS:

- 1.1. Furnish and install the I4 energy recovery wheel, to be manufactured by Innergy tech Inc.
- 1.2. The energy recovery wheel shall transfer both sensible and latent energies between outgoing and incoming air streams in a counter flow arrangement.
- 1.3. The energy recovery wheel shall be labeled for rotation direction and airflows (Outdoor air, Supplied air, Return Air & Exhaust air).
- 1.4. The energy recovery wheel must be manufactured in North America.
- 1.5. The energy recovery wheel manufacturer must have at least ten (10) years of experience in the manufacturing of energy recovery components.

### 2. QUALITY ASSURANCE SPECIFICATIONS:

- 2.1. General: The manufacturer's quality system shall be ISO 9001-2015 certified. The manufacturer to provide valid certificate upon request.
- 2.2. Performance: The energy recovery wheel shall bear the AHRI 1060 Certified Product Seal. 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 product.
- 2.3. Fire resistance: In accordance with UL1995 standard, the energy recovery wheel media shall have a flame spread index (FSI) of less than 25 and a smoke developed index (SDI) of less than 50 when rated in accordance with UL 723 by an accredited laboratory. I4 wheel media tested with success by UL Laboratories (FSI = 0, SDI = 5). Wheels only tested "in accordance to" UL723 shall be unacceptable.
- 2.4. Bacteria & mold resistance: The wheel media shall not promote the growth of mold or bacteria and must have successfully passed AATCC30-2013 testing procedures.
- 2.5. Electrical: The energy recovery wheel shall be a UL Recognized component and bears the UR label. In accordance with UL1995 standard, all electrical components and wires shall be UL Recognized.
- 2.6. Warranty: The energy recovery wheel shall carry a full parts and labor warranty of at least 5 years. An optional 10 years warranty shall be available as a separate option. Wheels with less than 5 years warranty shall not be acceptable.

### 3. PERFORMANCE SPECIFICATIONS:

- 3.1. Schedule compliance: Supplied air temperatures shall be no higher (cooling mode) or lower (heating mode) than the scheduled values. Supply and return pressure drops shall be no higher than the scheduled values.
- 3.2. Effectiveness: Sensible, latent and total effectiveness along with pressure drops shall be clearly documented in the AHRI 1060 Certified Product Directory (<http://www.ahridirectory.org>).
- 3.3. Cross-leakage (EATR): The energy recovery wheel, using an adequate purge angle, shall achieve an EATR rating of 0% (no cross-leakage) starting from positive 1" WC pressure differential.
- 3.4. Fan operating cost (OACF): 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.

### 4. PRODUCT SPECIFICATIONS:

- 4.1. Rotor Media & desiccant:
  - 4.1.1. 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 applications. Non-metallic substrates made from paper, plastic, synthetic or glass fiber media are not acceptable.
  - 4.1.2. Media coating:
    - 4.1.2.1. Enthalpy wheels: All surfaces shall be coated with a non-migrating 3 angstroms molecular sieve (MS3A) desiccant specifically developed for water transfer in vapor phase. Etched or oxidized surfaces are not acceptable.
    - 4.1.2.2. Sensible wheels: All surfaces shall be coated with a UV resistant epoxy coating for increased corrosion resistance. Bare aluminum wheels shall not be acceptable.
  - 4.1.3. 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 (OACF), are not acceptable.
  - 4.1.4. Media shall be optimized for minimum pre-filtering requirements and pressure drops. It shall allow dry particles of diameters of up to 1390 microns (high performance matrix), 1750 microns (standard matrix) or 2475 microns (low pressure matrix) to freely pass through it. Wheels with media that will require shorter cleaning intervals due to smaller openings shall be unacceptable.
- 4.2. Seals:
  - 4.2.1. 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. Wheels using less effective seals like brush seals or standard 4 pass labyrinth seals are not acceptable.
  - 4.2.2. 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.
  - 4.2.3. All seals shall be designed to withstand pressure differentials of up to 12"WC and shall have been tested for up to 20"WC pressure differential with no mechanical failure of the seal assembly.
  - 4.2.4. The AirLoop™ labyrinth seals shall be factory adjusted. Field adjustments shall be possible using common tools.
  - 4.2.5. Seals shall be held in place using adjustable aluminum brackets and ProCorr™ coated hardware.
- 4.3. Bearings and center shaft:
  - 4.3.1. 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.
  - 4.3.2. Bearings shall be rated for a minimum L10 life of minimum 500,000 hours for standard wheel operation.



# I4 SPECIFICATIONS

## ENERGY RECOVERY WHEEL

- 4.3.2. Bearings shall be rated for a minimum L10 life of minimum 500,000 hours for standard wheel operation.
- 4.3.3. The center shaft shall be machined as to provide a shoulder against the bearing and prevent any axial movement of the rotor.
- 4.3.4. The center shaft shall be made of 300 series stainless steel to prevent corrosion. Center shafts that must be protected with oil or a coating like black oxide for corrosion resistance are not acceptable.
- 4.4. Purge & Cassette Assembly:
- 4.4.1. The rotor shall be provided with a structural frame which limits the deflection due to air pressure drops to less than 1/32".
- 4.4.2. The framing shall be made of 6000 series aluminum for increased corrosion resistance and high strength. As an option, a high quality 2-part epoxy coating shall be available.
- 4.4.3. The cover panels shall be made of aluminum alloy (minimum thickness of 1/16") to prevent corrosion.
- 4.4.4. 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.
- 4.4.5. Wheels up to 70" in diameter shall be supplied with removable corner bracings for easy replacement of media sections from the face of the wheel if ever required. Larger models shall be serviceable using common tools.
- 4.5. Rotor assembly
- 4.5.1. 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 70" in diameter shall be made of 4 sections and wheels larger than 70" shall be made of 8 sections.
- 4.5.2. The rotor spoke system shall be made of strong aluminum extrusions providing the structural integrity required at design pressure differentials & pressure drops.
- 4.5.3. The rotor hub shall be made of machined, extruded aluminum (no welding), for reduced tolerance and increased stiffness.
- 4.5.4. All rotor parts shall be made of aluminum or stainless steel. Galvanized steel parts are not acceptable.
- 4.6. Drive system
- 4.6.1. The rotor shall be perimeter driven with a multi-link V-belt made of high-tech polyurethane/polyester composite material for easier installation and replacement.
- 4.6.2. The belt shall be tensioned with a heavy duty belt tensioner. Gravity tensioned assemblies are not acceptable.
- 4.6.3. 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 carryover cross leakage.
- 4.6.4. Speed reducer and belt tensioner shall be permanently lubricated and maintenance free.
- 4.6.5. The A/C motor shall have a service factor (SF) of at least 2.6. Motor assemblies with lower SF shall not be acceptable.
- 4.7. Controls (optional)
- 4.7.1. 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).
- 4.7.2. Frost control: VFD to modulate wheel speed in order to maintain the exhaust temperature above set point (default: 34°F, adjustable).
- 4.7.3. 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).
- 4.7.4. All sensors to be pre-assembled on wheel by the wheel manufacturer and linked to a single junction box with a quick connect AMP/MOLEX type connector. Matching connector to be supplied with 50 feet of wire for quick and easy connection at the VFD terminal.
- 4.7.5. The drive system shall allow for a turndown ratio of 80:1 (20 rpm to 9 rpm).
- 4.7.6. The VFD shall be supplied with a NEMA 1 enclosure (NEMA 4, 3R or 3R with heater for outdoor installations optional).
- 4.7.7. The VFD standard communication protocol shall be: S-422/485 MEMOBUS/Modbus at 115.2 kbps (BACnet™ or Lonworks™ optional).
- 4.7.8. VFD to be supplied with LCD display screen for easy monitoring of VFD parameters, inputs and outputs.
- 4.7.9. Communication Capabilities: VFD software to enable building automation system (BAS) to monitor temperatures, control discharge set point, wheel rotation speed and display alarms.
- 4.8. Options
- 4.8.1. Full frost control and economiser VFD controller with 4 temperature sensors pre-installed on wheel.
- 4.8.2. 4 temperature sensors pre-installed on wheel and linked to a single junction box (sensors only, VFD by others).
- 4.8.3. Physical induction rotor detection (standalone module or part of the VFD controller).
- 4.8.4. Top, bottom and sides aluminum panels (frame).
- 4.8.5. Permanently greased bearings.
- 4.8.6. High resistance 2 part epoxy paint (frame tubular assembly).
- 4.8.7. High resistance 2-parts epoxy coating on both side of media (edges).
- 4.8.8. Motor quick connect at junction box (AMP/MOLEX 4 Pos. 0.25").

