

HEAT EXCHANGERS – AIR SIDE

SUMMARY

1. This section includes heat recovery systems with energy recovery wheels and runaround coil systems.

DESIGN & INSTALLATION

1. Heat Recovery Systems:
 - a. Must provide a 10 year payback or better.
 - b. A risk assessment shall be completed to determine if an energy recovery wheel can be used on a project.
 - c. Energy recovery wheels are not permitted in the following locations:
 - BSL-3 spaces.
 - Locations where chemical fumes could be present in the airstream.
 - Animal Facilities.
 - Use of energy recovery wheels is not allowable where cross contamination is an issue.
 - d. Energy recovery wheels are typically allowable for Office spaces.
2. Design
 - a. Maximum capacity of a single Heat Exchanger (HX) shall be no more than 50,000 cfm.
 - b. Fans
 - Air foil or backward Inclined fans. See also HVAC Fan's section.
 - Plenum fans are acceptable alternate to centrifugal fans.
 - Plenum fans shall be direct drive per HVAC Fan's guideline section.
 - Fan arrays are acceptable in HXs.
 - Utilize the most energy efficient fan option within the manufacturer's line for the unit size.
 - Schedule the diameter of the wheel to be utilized.
 - c. Provide volumetric air balance between supply and exhaust fan with DDC controls.
 - d. Limit inlet, discharge and casing radiated noise with maximum NC values in occupied spaces of NC35.
 - e. Casing, coils, fans, condensate shall comply with Air Handling Units guideline.
 - f. All heat recovery coils or Run-around coils that serve Air Handling Units shall have:
 - Pleated pre-filters
 - Final Filters

- g. Honeycomb, air to air, plate heat exchangers are not allowable. These types of heat exchangers catch debris and clog over time.
 - h. Runaround systems
 - Use of ethylene glycol is not permitted and an anti-freeze agent. Propylene glycol shall be used where needed.
 - Piping design shall locate flanges/unions and service valves to allow removing the coil by removing a minimal amount of piping.
 - Coils shall meet requirements of AHU section.
 - i. Humidifiers shall comply with Humidifiers guideline.
3. Layout
- a. Shall be arranged to facilitate HX maintenance including heat exchanger and coil cleaning and replacement along with the normal air filter replacement.
 - b. Where coil connection sizes are smaller/larger than the line sizes associated with the system piping, a reducer/increaser shall be installed immediately at the coil flanges to adapt to the indicated line size.
 - c. All specialties and service valves associated with the coil piping shall be line size, and not coil connection size.
 - d. On the drawings indicate the required service clearance, including energy recovery wheel and coil replacement pull space, filter replacement pull space, fan/motor replacement pull space, and access to an inspection doors and maintenance points.
 - e. Door swings shall be indicated on drawings for clearance coordination.
 - f. The designer shall locate the equipment such that it can be replaced at the end of its life without removing building structural components. (i.e. provide area ways, louvers, removable panels, doors, etc.)
4. Related Sections
- a. DDC Controls
 - b. HVAC Fans – Non-Laboratory
 - c. Air Filtration
 - d. Air Handling Units

EQUIPMENT AND PRODUCT REQUIREMENTS

1. Approved Manufacturers: (*in order of preference*)
 - a. SEMCO
2. HX wheels shall have the following minimum characteristics:
 - a. Aluminum substrate and support system
 - b. Modular Media sections
 - c. 3 Angstrom molecular sieve desiccant

- d. External pillow block bearings
 - e. Non-wearing seals
 - f. Tested in accordance with ASHRAE 84
 - g. Maximum pressure drop of 0.7" wg.
 - h. Airstreams must be filtered prior to entering wheel.
 - i. Ensure outside air is pressurized and greater than the exhaust air.
 - j. Upstream and downstream access for inspection and cleaning.
3. Units shall have the following minimum characteristics:
- a. Double wall, insulated, galvanized steel.
 - b. HX Casing shall be foam injected with a thermal insulation value to prevent condensation on the exterior surface of the unit. Minimum insulation values shall also meet the latest energy code requirements.
 - c. Internally seismic isolated fans
 - d. Coils
 - 1/2" diameter x .020" wall thickness copper tubes and .0075" aluminum or copper fins spaced not closer than 10 per Inch
 - Chilled water coils shall not be less than 6 rows and not more than 8.
 - Water coil connections are copper or brass.
 - Stacked coils shall have Independent coil frames
 - Preheat coils shall be integral face and bypass or contain glycol solution.
 - Heating coil control valves shall have their actuators mounted on 45°-90° angle to avoid overheating.
 - e. Stainless steel cooling coil casing
 - f. Stainless steel drain pans, IAQ double pitched with intermediate drain pans for stacked cooling coils
 - g. Extended lube lines through the unit casing
 - h. Hinged access doors with quarter tum handles
 - Doors shall open against pressure in the casing.
 - Door handles shall be heavy duty and operable from both outside and inside of unit.
 - i. NEMA premium efficiency motor, inverter rated motor for use with VSD.
 - ECM motors are not acceptable.
 - j. Variable frequency drives provided for the wheel with the units shall be controlled by the building DDC system. These shall not be controlled by the internal controls on the equipment.
 - k. NEMA starters, if furnished with unit.

- l. Marine lights with 1 hour timer switch In units larger than 15,000 cfm
- m. Stainless steel fan shafts in units larger than 15,000 cfm
- n. Provide differential pressure magnahelic gauges and sensors for each filter and/or coil section(s).
- o. All 120v wiring shall be in conduit, MC cable or seal tight.
- p. Units that have supply and/or return fan motor(s) of 25 HP or greater that utilize V belt drive systems shall utilize PolyChain Belts from Gates.

END OF SECTION