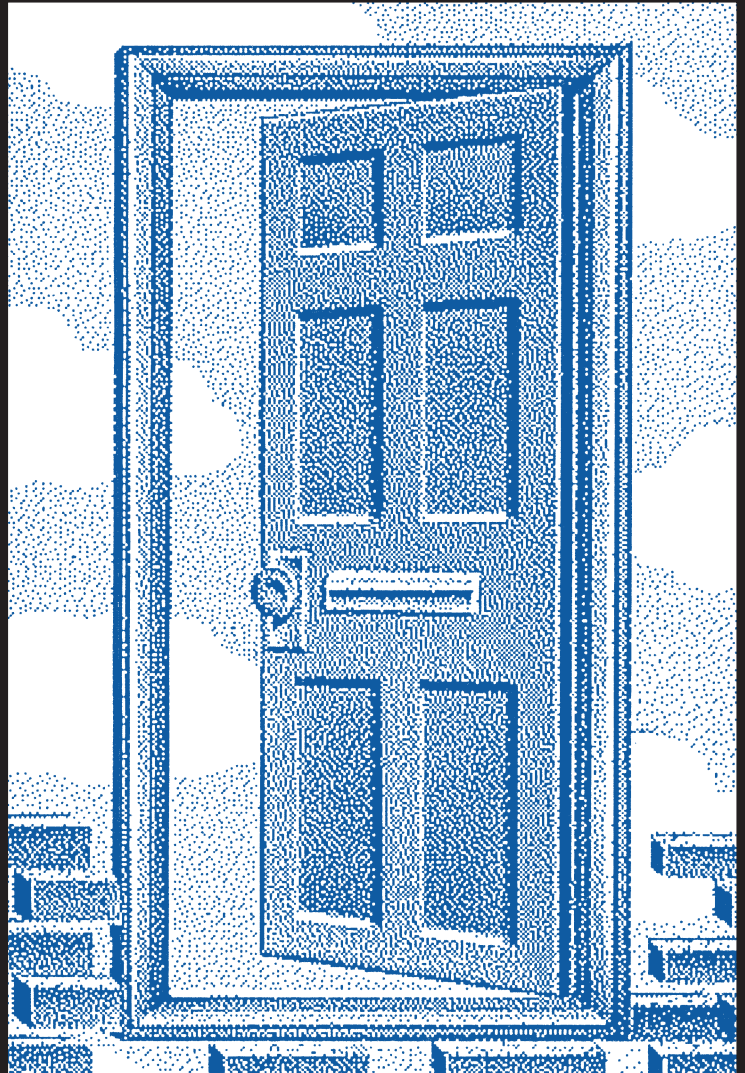


**A REVOLUTIONARY  
NEW TECHNOLOGY  
LEADING THE WAY  
IN PROVIDING  
HEALTHY  
INDOOR  
AIR QUALITY**



**A breath of  
fresh air in energy  
management and  
environmental  
quality.**



REVERSE FLOW® Technology

[www.reverse-flow.com](http://www.reverse-flow.com)

# Indoor Air Quality Assured with 85% Heat Recovery Guaranteed Puts You Out Front in Energy Management

## SO HOW DOES THE REVERSE FLOW® SYSTEM WORK?

**FIRST AND FOREMOST WE ARE NOT:** ~~A cross flow!~~  
~~And we are not a heat wheel!~~

Our patented technology is both simple and extremely effective. As air is exhausted from a building or process, our two positional damper directs the flow of air through one of two banks of aluminum plates whose surface area has been maximized to capture energy from the exhausted air stream. At the same time, outdoor air is being drawn through the opposite heat exchanger "Cassette" bank, returning the previously stored energy to the space.

As our damper changes position, (standard cycle is 70 seconds) the entire system now works in reverse flow. Outdoor air is now drawn through the newly energized cassette bank where the captured energy is released, returning it to the incoming air stream. The modular design with minimal pressure drop allows ultimate flexibility as both a new installation or a retrofit utilizing existing fans. Our unique design also allows for high temperature heat recovery (450°F) generated from manufacturing processes. This enables **applications in industrial facilities, commercial office buildings, institutional settings, like schools and colleges** – wherever fresh air and cost consciousness are at a premium. With only one moving part, no required filters, a self-cleaning feature and a minimum life expectancy of 20 years, bkm represents one of the most cost effective, environmentally sound opportunities in energy management today!

### Reverse Flow® Systems

All our standard energy recovery units come complete with all the necessary components avoiding the costly add-on upgrades most often required by others.

As a retrofit installation, we can be easily utilized because our unique modular construction methods enable us to fit in tight spaces.

Discover the way to deliver sustainable energy recovery that makes sense and has, a life expectancy double that of our competitors.

### Compare "This is not a Twelve month decision"

While the Reverse Flow® Technology's first cost is comparable with all other energy recovery devices, it occupies a category all by itself when considering the "ownership costs" associated with energy recovery. Most people agree that energy recovery is a "good thing". But only look at the manufacturer's claimed percentage of efficiency and purchase price. It's equally important to look at the associated life cycle costs which can be many times the initial investment.

As consultants, our challenge is to determine the true cost of energy which continues long after commissioning of the project. To the right is a listing of all the issues that need to be accounted for when entering into a true investigation of energy recovery.

**Pressure Drop** – What impact in cost does the recovery system

place on the entire HVAC system?

**Energy (kWh)** – Does the energy recovery unit itself use energy to save energy?

**Maintenance (filters, belts, labor etc.)** – What is the yearly cost to keep the system working to specified promised performance and warranty levels?

**Latent Recovery** – What impact does moisture recovery have on winter Humidification?

**Effectiveness Difference** – What is required to achieve the units "up to" rating and cost to maintain it for its useful life versus a guaranteed winter 90% (+/- 5) summer 80% (+/- 5)?

**Freeze Up (bypass or pre-heat)** – What is the cost of lost energy recovery because of bypass or additional costs due to the required pre-heat to keep from freezing?

**Life Expectancy** – What is the value when you have been engineered to last twice as long?

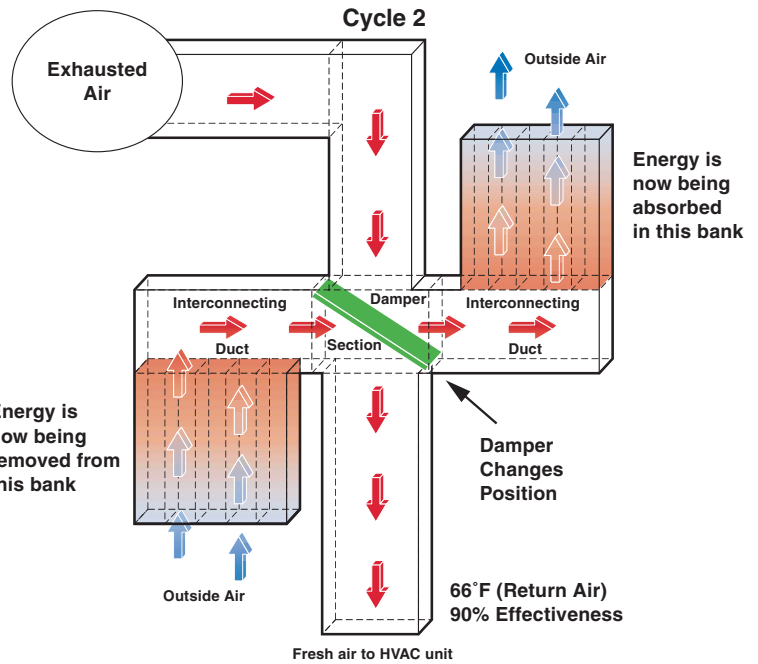
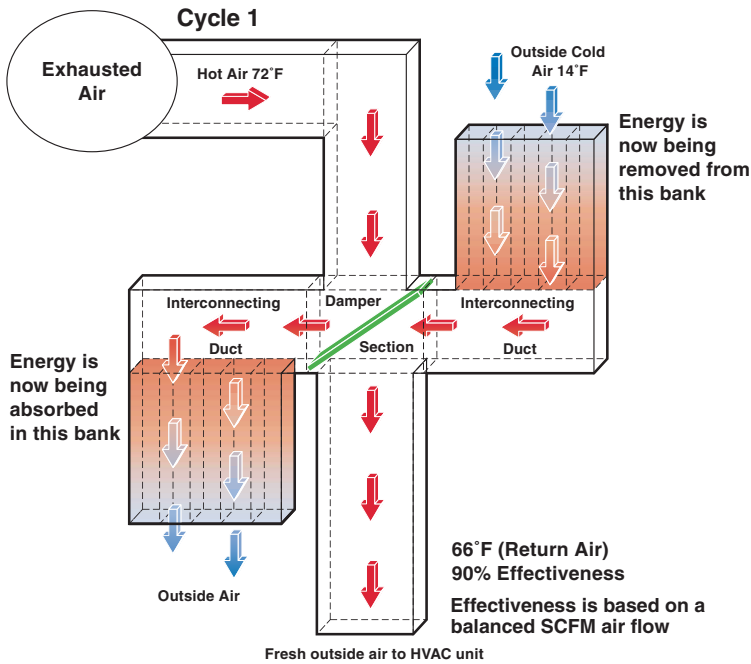
**Indirect Evaporative Cooling** – What is the value of using nature to cool the environment?

*We would welcome the opportunity to run a comparison on any project to show the "true" savings.*

## bkm Reverse Flow® Technology

- GUARANTEED sensible temperature output effectiveness of more than 90% winter time/ 80% summer time! (+ or - 5%)
- SELF-CLEANING – cleaning every 5 years is too often!
- MINIMUM MAINTENANCE!
- Uses existing fans thanks to MINIMAL PRESSURE DROP!
- Air flow damper is ONLY MOVING PART!
- NO FREEZING to -40°F thanks to reverse flow methodology!
- ADJUSTABLE moisture recovery!
- SENSIBLE and LATENT energy recovery!
- Easy-to-build-in ADIABATIC COOLING SYSTEM ADDS NO HUMIDITY in warm weather!
- 33 models, from 400 CFM to 30,000 CFM. Custom models to any specifications.
- Complete series of CONTROL DEVICES available!
- MODULAR DESIGN ideal for NEW and RETROFIT APPLICATIONS!
- INTERIOR and EXTERIOR units available!
- LIFE EXPECTANCY of at least 20 YEARS

**PLAN VIEW OF Z CONFIGURATION OPTION SHOWN**  
**Damper changes every 70 seconds in approximately 2 seconds.**



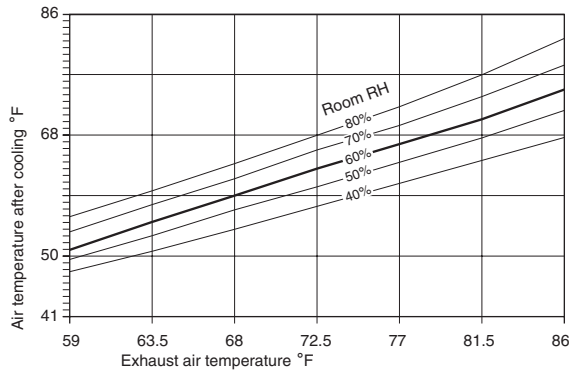
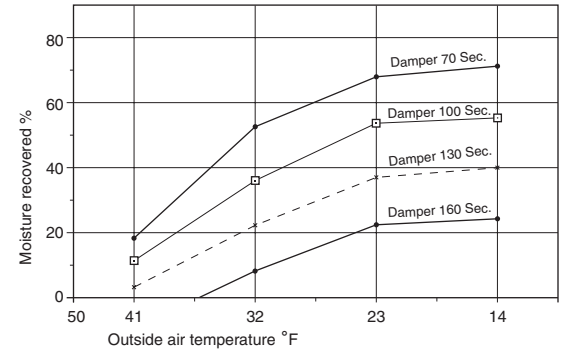
### Latent Energy Recovery

In colder months, heated indoor conditioned exhaust air passes over our previously cooled plates, condensation forms due to the temperature variances. When the system Reverse Flows® this moisture is recaptured and returned to the conditioned space. The dryer the outside incoming air is, the greater the latent recovery will be.

This system greatly reduces the need to humidify during the colder months.

### Dehumidification

By simply changing the timing phases on our single two position damper, we can control the amount of unwanted moisture retention as in a swimming pool environment



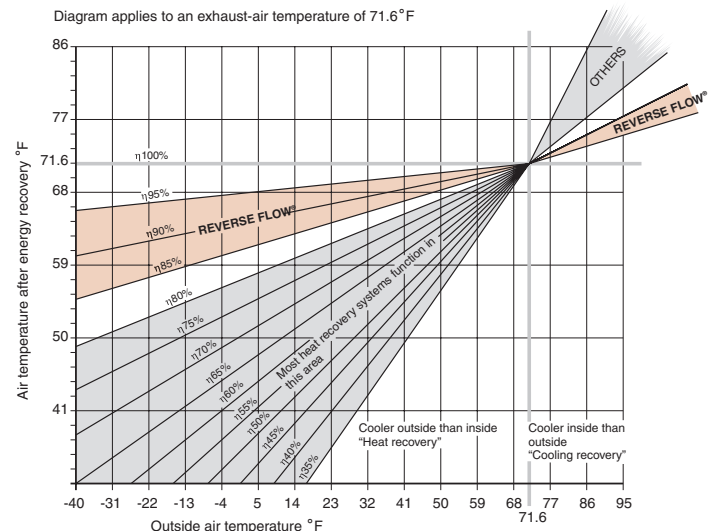
### Adiabatic Cooling Option

Many engineers have touted the benefits of evaporative cooling to reduce energy consumption. bkm offers an adiabatic solution to take advantage of the principles of indirect evaporative cooling. As our damper changes, the exhaust stream is sprayed with conditioned water and 40 seconds before the end of the cycle the spray is stopped and the remaining moisture is “blown” out. The results of this water purge are cooler and dry plates that are able to reduce the incoming supply air temperature without adding unwanted moisture back to the space. Evaporative cooling can substantially reduce the requirement for mechanical refrigeration resulting in lower operating, maintenance, and equipment costs.

### Guaranteed “sustainable” Sensible temperature output effectiveness of more than 80% Summer, 90% Winter. (+ - 5%)

With our stationary design, Reverse Flow® and our plate technology we are able to oversize our energy absorbing cassette units to greatly enhance our ability to recapture the waste energy.

Because of the depth of our cassette units, 38” in all, a gradual energy transfer takes place assuring an even energy dissipation into the incoming air stream, making for an extremely consistent return air temperature.





Awarded to the  
University of Ottawa  
for its Reverse Flow®  
installations



Regional  
1st Place  
ASHRAE  
Award

## REVERSE FLOW® in a Class by Itself

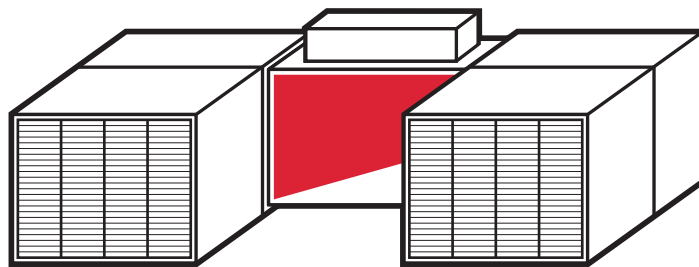
OTTAWA, ONTARIO – After installation of a plate-type, air-to-air heat recovery system cut energy costs and maintenance time in an auditorium, the University of Ottawa here has installed six more units over the last three years to reduce total energy use by 2 million kilowatt hours (kwh) and provide annual savings of \$62,000.

The system features a package of aluminum plates that take energy from the outgoing exhaust air. Air quality is maximized because the units are able to provide 100% fresh air.

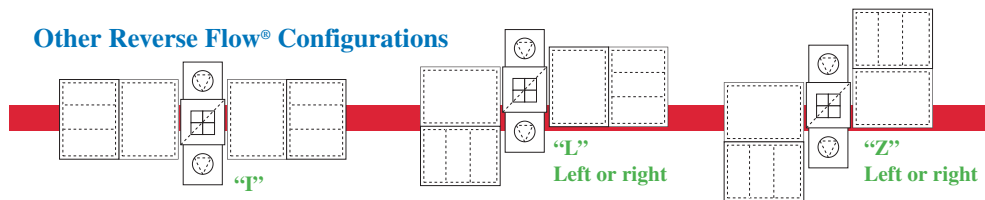
“I think this technology is a good example of sustainable development,” explains Pierre de Gagne, University Energy & Environment Engineer. “In addition to being highly efficient, it is simple and economic to use, and can last for generations.”

– ENERGY USERS NEWS

## Sample Reverse Flow® Configuration



### Other Reverse Flow® Configurations



## REVERSE FLOW® PACKAGED UNITS

The systems are ordered specifically to your project at hand. Our support staff is available to assist you through the planning, designing and application phases to assure the most cost-effective utilization of our energy recovery technology.

**1. New Construction** – If it is pre-determined that energy recovery will be incorporated within a new building design with a central exhaust/supply point, the system can incorporate the appropriate fans required to compensate for the system pressure drop losses and required CFM flow. The unit can be delivered with the fans encased within the energy recovery ventilator and are readily accessible by maintenance doors. The fans are sized to the provided specifications when ordered, and delivered ready for installation. Reverse Flow® will also allow you to place the required fans anywhere within the HVAC system and not within the recovery structure itself in situations where rooftop weight, outdoor environmental needs or other unique conditions arise.

**2. Retrofit Of A Existing System** – The system, because of its ability to be sized to the exact exhaust air stream will have a maximum of a 1/2 inch pressure drop added to the system. This capability allows the engineer the ability, if appropriate, to use the existing system fans in the design if capacity allows. Once again, if there is a need for additional CFM flow the system can be delivered with the appropriate booster fans incorporated within the system to make up for the added 1/2 pressure drop or designed with new full system fans in situations where the old fans will be discarded.

**In Conclusion** – Whatever the application, bkm has the energy recovery technology for your particular project. The old concerns of the past, excessive maintenance, low efficiency, energy recovery sustainability and winter core freeze up, just to mention a few, have become non-issues when deciding to use Reverse Flow®.



## MODULARITY OF DESIGN

Because the Reverse Flow® system is built around the individual cassette module, we have the ability to customize and provide energy recovery specific to the exhausted air, while achieving less than a 1/2" pressure drop, if required, versus competitive technologies utilizing a four size fits all methodology, with greatly varying efficiency ranges and pressure drops totally dependent upon the CFM flowing through it.

Due to the modular design, this system is ideal for both new and retrofit applications. It can be installed where other systems can't because of our ability to work in tight space requirements.



REVERSE FLOW® Technology

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## COMPLETELY ADJUSTABLE ENERGY RECOVERY

By simply changing the timing phases on our single two position damper, we can control the amount of unwanted moisture retention as in a swimming pool environment or recapture exhausted moisture in the colder months, returning it to your facility. We are also able to control the sensible output when total energy recovery is unwelcome. With damper in a fixed position, we then are in an economizer mode, taking advantage of the ambient outdoor temperature.

