Innovation, Quality and Value - The Munters Standard

Manufacturers today are dealing with rapidly escalating energy costs and commitments to consumers to reduce their environmental impact. Munters helps manufacturers meet this challenge with its line of Des Champs premium quality energy-recovery, precision air-conditioning, and mechanical dehumidification equipment. Constant innovation is necessary to meet the changing requirements of our customers. With our dedicated research and development team, Munters is committed to designing and manufacturing products that allow users to save energy with environmentally friendly technology.

Packaged Heat Recovery Systems

Micro-Z®

The Micro-Z line of standard packaged air-to-air, energy recovery units are designed for light duty industrial applications. Units are available in three standard models with five different size options depending on the model. They are designed to handle airflows between 600 SCFM and 5,000 SCFM at a nominal energy-recovery efficiency of 60%. The Micro-Z model offers single wall construction with heating only options. The Micro-ZS model features double wall construction with heating and cooling options. For applications that require double wall construction with no heating or cooling options, the Micro-ZSS model provides a very compact, lightweight, and affordable solution. All units deliver fresh outdoor air for ventilation through a high-efficiency Z-Duct aluminum heat exchanger that provides significant energy savings throughout the year.

X-Pack™

The X-Pack line of custom packaged air-to-air, energy recovery units is designed to provide ventilation air for industrial applications while minimizing operating costs. The aluminum cross-flow air-to-air heat exchanger used by the X-Pack serves to reduce loads on heating and cooling systems. X-Pack energy recovery technology extracts heat or cooling energy from the outgoing exhaust air and transfers that energy to the incoming fresh air. Units with capacities from 500 SCFM to 40,000 SCFM are available to provide the most efficient and cost effective solution to meet your needs.

E-Z-Aire ®

The E-Z-Aire line of completely standard packaged energy recovery units offers an economic alternative for very light duty applications. Units feature single wall construction and a high-efficiency aluminum air-to-air heat exchanger that transfers energy from the exhaust air to an equal amount of fresh outdoor air. Unit capacities range from 600 SCFM to 4,000 SCFM with nominal 0.50” W.C. external static pressure. Available in two series, each series has five models that offer 70% to 85% sensible energy recovery effectiveness.

MZP

The MZP line of custom packaged air-to-air energy recovery systems can be used for any industrial application with exhaust air and a need for outdoor air. Units feature an aluminum Z-DUCT plate-type, energy-saving heat exchanger. Its heavy-duty double wall construction ensures years of trouble free operation. Systems with capacities from 1,000 SCFM to 25,000 SCFM are available.

PV

The PV line of custom packaged air-to-air energy recovery systems are designed to provide the most efficient solutions for industrial energy recovery needs. Available with a choice between energy-saving Z-Duct plate-type, heat pipe or rotary heat exchangers; systems are designed to best meet the demands of the project requirements. This product line offers unmatched flexibility in design with versatile unit configurations and capacities ranging from 500 SCFM to 100,000 SCFM.
Heat Exchangers

Plate Heat Exchangers
Plate heat exchangers are the most maintenance free and long lasting of the air-to-air heat exchangers. Used for dusty or dirty applications, they have integral online cleaning systems, drains, and cleanout panels that provide for low maintenance carefree operation. To protect against frost and ice buildup during winter operation, standard options include the traversing defrost mechanism, the most energy efficient frost control system on the market. Double wall insulated construction is available for higher temperature applications, with a maximum temperature of 400°F. There are six basic models of plate heat exchangers; five counter-flow Z-DUCT® models and one cross-flow model. The heat exchangers are available as either modular (stand-alone) versions or for integration into a packaged energy recovery system, complete with fans, filters, etc..

Rotary Heat Exchanger
Rotary heat exchangers are designed to provide either sensible or total energy exchange between two airstreams. These unique heat exchangers are constructed of corrugated aluminum media with passages through which the air flows. The heat exchanger continuously rotates in a plane perpendicular to the airflow allowing the transfer of energy between the airstreams via the aluminum media. Latent energy transfer between the airstreams is accomplished through the addition of a desiccant coating to the base aluminum material.

Heat Pipe Heat Exchanger
Heat pipe heat exchangers provide sensible heat transfer between two airstreams using a counter-flow configuration. These compact heat exchangers consist of rows of integrally finned aluminum tubes that are evacuated then partially filled with refrigerant. All tubes are individually sealed using a Schrader fitting; this provides the ability to evacuate and recharge the tubes in the field should a change in environmental policies necessitate a change in the refrigerant used. Heat transfer across a heat pipe heat exchanger is a continuous process whereby the warmer side acts as an evaporator and the colder side as a condenser with a sealed center partition to prevent cross contamination between the two airstreams.

Evaporative Cooling Systems

Model EPX
The model EPX Indirect Evaporative Cooler uses a high-efficiency, air-to-air heat exchanger to introduce 100% outdoor air while reducing cooling-load tonnage. The EPX uses a corrosion-resistant polymer tube heat exchanger to produce dry, cool air without using refrigeration. The heat exchanger core incorporates unique, horizontal tubes, with water flowing outside and down over the tubes, counter-flow to a scavenger ambient air stream or return air stream. The supply or process air flows through the tubes and is sensibly cooled (no moisture is added). A special surface-wetting exterior-finish promotes enhanced evaporation for maximum efficiency. A unique finned interior design enhances turbulence for increased energy transfer. In many cases, on a design summer dry bulb day, the EPX can lower the supply air temperature by 30°F or more.

OASIS™
OASIS is the sensible alternative to conventional air-conditioning equipment and the ultimate air-conditioning unit for dry climates. Indirect evaporative cooling and direct evaporative cooling are packaged with optional DX or chilled-water for maximum cooling efficiency. In dry climates, the OASIS system provides the desired cooling during most of the year without refrigeration. As the regional zones become drier and the buildings require more outside air, the OASIS becomes more attractive as an option for cooling versus standard air conditioning techniques. OASIS is applied in much the same manner as a conventional recirculated air system, but with much lower operating costs, especially during peak electrical demand.
Modular Outdoor Air Conditioning Systems

The Modular Outdoor Air Conditioning System (MOACS) is available in six pre-engineered models for energy recovery and humidity control in industrial applications. These modular-type packaged units range from 1,000 SCFM to 11,000 SCFM, and are suited for all climates, applications, and budgets. Unit options include: heat pipe heat exchangers; rotary heat exchangers; DX or chilled water coil sections; 2” or 4” anti-microbial filters; integral or remote condensing units; indirect fired gas, electric, hot water, or steam heating modules; and utility modules for field-installed components. The condensing units feature an EER of 11.0 and multiple compressors to ensure optimum capacity control without the need for energy-wasting hot-gas bypass. All units are equipped with a programmable DDC controller.

CompleVent®

CompleVent units provide ventilation and dehumidification using heat pipe and rotary heat exchangers to reduce loads on heating and cooling systems. Five different models with standard one inch double wall construction, lightweight compact designs, and capacities ranging from 500 SCFM to 11,000 SCFM, make the CompleVent an economical alternative to the heavier duty MOACS product line. Unit options include: DX or chilled water coil sections; 2” anti-microbial filters; integral or remote condensing units; DDC controls; and electric, hot water, or steam heating sections.

Wringer®

The Wringer Series of packaged mechanical dehumidification units are designed to supply clean process air at a specific flow and moisture level. These units incorporate a heat exchanger to reduce the energy required to dehumidify the air. Wringers are normally employed when the supply air dew point requirement is above 40°F. Wringers use approximately 30% less energy than conventional dehumidification systems and provide free reheat. Wringers can incorporate integral refrigeration or utilize chilled water for dehumidification. Options such as auxiliary heating, special filtration, and DDC controls are available.

Wringer Plus®

Offering all of the benefits and features of the Wringer, the Wringer Plus goes a step further, reducing winter heating and summer mechanical cooling requirements through efficient recovery of energy from exhaust air. Wringer Plus units efficiently dehumidify outdoor air for processing, clean room and storage areas. Designed to deliver filtered, dehumidified outdoor air while allowing pressure in the space to be controlled (using the system’s exhaust/relief fan) — all while minimizing heating and cooling requirements through efficient air-to-air energy exchange — the Wringer Plus provides the ultimate economical dehumidification solution in humid climates.

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Des Champs Energy Recovery Products


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Introduction

Des Champs has led the industry in the design and manufacture of industrial heat exchangers and heat recovery packages since 1974.

With over 400,000 square feet of manufacturing space and large engineering staff, Des Champs has the support to meet the challenges of today’s most demanding heat recovery applications. Continuous development and testing of innovative heat recovery products, and over 100,000 successful installations, give us the leading edge over the competition.

Des Champs understands its customers needs and offers engineered solutions to meet specific requirements. Custom designs may include multiple airflow configurations, variable plate spacing, and attaining desired heat exchanger effectiveness and pressure differentials while maintaining specific size.

Following are ten examples that demonstrate our capabilities. They represent a small sampling of applications for our products. We would like the opportunity to discuss your specific industrial requirements. Contact us or visit our website for information on gas-to-gas heat exchangers, integrated heat recovery packages, or complete turnkey solutions.
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Crawford Equipment & Engineering Company of Orlando, Florida offers a complete line of services related to industrial process heating equipment, including design, fabrication, and sales. With their diverse capabilities, they regularly find uses for Des Champs air-to-air heat exchangers in their designs. The company recently installed a unique two-stage system for a well-known automotive parts manufacturer at a plant in Mexico that fabricates headlight lenses.

One of the processes in the plant involves applying a chrome coating to the lenses. A thermal oxidizer incinerates isopropyl alcohol and the butyl acetate fumes that result. A Des Champs model S81CF Thermo-Z heat exchanger recovers heat from the incinerator’s exhaust at 1400°F, so it can be used to preheat inlet effluent air from 123°F to 1180°F. In doing this, the heat exchanger operates at an almost-unheard-of efficiency of 83%.

In the second stage, also supplied by Des Champs, a water coil in the exhaust stream uses 365°F air coming out of the heat exchanger to heat a water-glycol mix from 160°F to 190°F. The water then flows to a cleanroom in the plant, where a forced air fan blows ambient air across a second coil, heating the air from 70°F to 180°F. This hot air goes to a flash-off zone, where it cures a sprayed-on clear coat and solvent applied to the lenses. Using waste heat from the thermal oxidizer to heat water in this fashion eliminates the need for a boiler.
A Recirculating Heater Yields Clean Process Heat

Following a national trend, a southeastern pharmaceutical manufacturer produces transdermal patches in a big way. The self-adhesive patches apply directly to the skin for time-release of medicine. To meet consumer demand for them, the company recently added a second production line at a plant it recently built.

In the manufacturing process, a coating machine applies medication to the patch in layers, and then hot air cures the medicine. Needing a system to supply heat for curing, the company turned to Plymouth, Michigan-based Durr Environmental, a manufacturer of air pollution control systems that had previously supplied equipment for the facility. Des Champs supplied the VariMax™ system, an indirect-fired recirculating gas heater. A burner in the combustion chamber generates heat, and the combustion products recirculate by means of a fan, rather than flowing straight up a stack.

Indirect firing involves transferring heat from one airstream to another while keeping them separate. As Yves Pszenica, project manager at Durr Environmental, explains, “The customer didn’t want combustion byproducts in their process air.” Because an air-to-air plate heat exchanger provides an ideal means of heat transfer, Durr specified two Des Champs Thermo-Z models. A larger primary heat exchanger in the recirculating box uses exhaust air at 875ºF to heat outside air from 40ºF to 410ºF for the curing process. And a secondary heat exchanger uses bleed air from the exhaust to preheat inlet combustion air, saving fuel.

In the past, indirect heaters have suffered from low efficiency and high fuel consumption when compared to direct-fired burners. But combining the Des Champs heat exchangers with the recirculating burner yielded an efficiency of over 90%, nearly equaling that of direct-fired heaters.
A major international pharmaceutical company manufactures prescription medications and specializes in cancer care products. Their production process is sensitive to moisture because in several phases, the drugs are in hydroscopic form, meaning they absorb moisture. This can lead to problems such as difficulty in forming drugs into tablets.

To maintain proper humidity levels in its manufacturing environment, the company installed an air handling unit several years ago with a desiccant wheel for dehumidification. When the desiccant becomes saturated with moisture, they run hot air through it to regenerate the medium.

To save energy, they placed a Des Champs model S7506 Z-Duct air-to-air heat exchanger downstream of the desiccant wheel to recover heat from the discharge during the regeneration cycle. The captured heat is then used to heat outside air coming into the air handler. This reduces the amount of steam required for heating space in winter and the fuel needed at the plant’s gas-fired boiler. As a result, the heat exchanger paid for itself shortly after the air handling unit went into operation.
When engineers at a large manufacturing company designed a second production line for a plant that produces micron-sized glass beads, they found that the baghouse used in the process could not handle air flow from the new line. Des Champs solved the problem by supplying an air-to-air heat exchanger in the gas stream prior to the baghouse.

Like a huge vacuum cleaner, the baghouse filters contaminated air with a series of bags that trap dirt as the air flows through them. The problem is, air comes from the process at 900°F – hot enough to burn the bags – and it must be cooled to 250°F. Previously, with the existing line, outside air was mixed with the hot air to cool it. A second line doing this would have resulted in exceeding the baghouse capacity.

Instead, the company installed a Des Champs model S81CF Thermo-Z heat exchanger to indirectly cool the gas from both production lines before it enters the baghouse. Having outside air and process air flow through opposite sides of the heat exchanger cools the process air, and because the airstreams don’t mix, no volume is added to it. Removing the outside air component from the flow allows the baghouse to serve both lines.
At a large midwestern printing plant, solvents used in ink from presses generate harmful vapors. Two regenerative thermal oxidizers, with a combined 70,000 CFM exhaust, incinerate the VOCs. But rather than let all that heat go to waste up a stack, the company wisely uses it to heat its facility.

Two Des Champs Series 81 Thermo-Z air-to-air heat exchangers, one on each incinerator, capture exhaust heat and use it to heat outside air for plant makeup air in winter. Each heat exchanger is actually part of a complete packaged heat recovery system that also includes supply and exhaust fans, dampers, and filters.

Under design conditions, the systems heat air from -10°F to 130°F using 250°F exhaust from one incinerator and 350°F exhaust from the other. Combined, they can transfer over 10,400,000 BTUs per hour. In the package heat recovery system manufactured by Des Champs, the temperature to the space is controlled to a consistent 130°F by modulating the hot gas flow through the heat exchanger.
TransCanada Pipelines pumps natural gas through underground pipelines from production facilities in western Canada to consumers in eastern Canada and midwestern U.S. states. Gas generators (themselves powered by natural gas) drive power turbines, which in turn drive compressors that compress natural gas to transmit it across the country.

Pipeline engineers learned long ago that these gas generators run more efficiently with their inlet air above 70ºF. “Once you hit cold weather, you lose efficiency,” says Marie Standing, senior mechanical engineer with TransCanada. To remedy this, they installed an air-to-air heat exchanger on a turbine exhaust at the Compressor Station in Saskatchewan. The heat exchanger recovered heat from the turbine exhaust and used it to preheat a portion of the inlet air to 385ºF. This in turn mixed with the remaining cold inlet air to bring the entire inlet airstream up to 75ºF, allowing the turbine to gain hundreds of horsepower.

However, TransCanada also learned that because the turbines ramp up quickly to an operating temperature of over 1000ºF, turbine operation created a severe environment for heat exchangers. They originally used a heat exchanger from another manufacturer, but it failed after only three months of operation.

Standing says the quick ramp-up is inherent in turbine operation and hard to control, and in addition, TransCanada couldn’t reduce the startup rate because it would have held back operations on each startup. In response, Des Champs designed a special heat exchanger, actually a modified model S81XF Thermo-Z, that accommodates rapid thermal expansion. A heat exchanger that can withstand such severe conditions is uncommon in the industry.

TransCanada now uses the heat exchanger for three to five months out of the year, and as Standing says, “It may not sound like much, but when you add up the number of days, it’s quite a bit.” With the success of this trial, the company plans to add a heat exchanger to other compressor station turbines.
Giving Customers Greater Efficiency

Few companies know as much about efficiency as American Hydrotherm Corporation of Bay Shore, New York. The company designs and fabricates high-temperature thermal liquid systems and heaters that use thermal oil as a process heating medium rather than steam to achieve higher temperatures. The units see extensive use in the chemical industry for processes such as production of plastics.

As evidence of its efficiency awareness, American Hydrotherm has specified Des Champs air-to-air heat exchangers in its liquid heaters since the early 1980s. According to Tony Ledic, vice president of American Hydrotherm, “We specify a heat exchanger whenever the customer requests increased efficiency.”

In a recent application, a specialty chemical manufacturer installed one of American Hydrotherm’s dual gas-fired thermal liquid heaters equipped with a Des Champs model S81CF Thermo-Z heat exchanger in a chemical reactor process. With the Thermo-Z, they capture heat from the flue gases coming out of the liquid heater’s exhaust at 680°F and use it to preheat combustion air going into the heater at 365°F. The heat exchanger increases the efficiency of the heater by 10%, saving the customer an equivalent amount in fuel.

This application was unique in that Des Champs designed the heat exchanger as an integral part of the exhaust structure so it would support a 3000-pound stack. A round flange on the outlet of the heat exchanger allows for a convenient bolt-on connection with the stack.
Treating contaminated soil poses a tremendous challenge for environmental specialists, but TerraTherm, an environmental services company in The Woodlands, Texas, has risen to the occasion by introducing a system that takes advantage of a Des Champs air-to-air heat exchanger.

TerraTherm is an affiliate of Shell Technology Ventures, which develops commercial applications for concepts resulting from Shell Oil Company’s research. Shell developed a portable soil abatement system mounted on a trailer, and Terra Therm markets it. Employing so-called In Situ Thermal Desorption (ISTD) technology, the system remediates a broad range of organic compounds such as PCBs, pesticides, petroleum wastes, and chlorinated solvents, all without excavating the soil.

At the heart of the process lies a heat source consisting of thermal blankets placed on the ground for surface soil remediation and thermal wells bored for zones extending up to several hundred feet deep. Heating elements in the blankets or wells heat the soil, causing the contaminants to vaporize. A vacuum system then draws the vapors from the ground.

The heat in the soil destroys most of the contaminants, and the rest go to a vapor treatment system. In this, a thermal oxidizer incinerates 90% of the volatile organic compounds (VOCs), and the remaining 10% pass through an activated carbon adsorption process. To work effectively, adsorption requires lower temperatures than the 1600ºF in the incinerator exhaust gas. A Des Champs model S81CF Thermo-Z heat exchanger indirectly cools the exhaust to 230ºF using outside air.

With tens of thousands of contaminated sites in the U.S., TerraTherm sees a significant potential for the ISTD system and has begun limited production to meet the demand. Eventually, the company envisions several dozen units operating around the country.

Cleaning up a Dirty Environment
Gasmac Incorporated of Ontario, Canada manufactures painting systems used in industrial plants, and the company specifies Des Champs air-to-air heat exchangers as a regular feature on its lines.

In a recent application demonstrating the effectiveness of the heat exchangers, Gasmac built and installed a new paint line for a steel processing plant in Slovakia to coat one side of steel sheeting with a decorative finish. The coating requires curing in an oven, and because the process uses solvent-based paint, the plant needed to incinerate fumes emanating during curing.

Gasmac devised a system that uses a natural-gas-powered burner both to heat the oven and incinerate fumes coming out of it. A Des Champs model S81CF Thermo-Z heat exchanger captures exhaust heat at 1400°F to preheat ambient air to 1200°F at the inlet for combustion.

Using this arrangement allowed Gasmac to specify a smaller burner than would otherwise have been required, reducing fuel consumption by 85%. The system also allows more control of the oven temperature and, most importantly, saves fuel for the steel company.
DuPont has found many applications for its high-performance Hytrel polymer and has had to expand its production capacity to keep up with increasing demand. At its Cooper River plant in Charleston, South Carolina, the global chemical and plastics giant recently built a Hytrel production facility that uses a Des Champs Wringer® dehumidification system for drying.

DuPont sells Hytrel in the form of pellets as a raw material to OEMs, who then fabricate it into a multitude of consumer products. Mostly for the automotive industry, these range from constant-velocity joint boots to covers for air bags. Hytrel works well for parts like this because of its superior cold-weather properties.

In its production process, DuPont goes to great lengths to dry the pellets to achieve the highest quality. To do this, they run fresh, hot air through them, and to dry the air, they use a roof-mounted Wringer dehumidification system made by Des Champs.

The Wringer condenses moisture out of the air by cooling it with mechanical refrigeration to a dew point of 45°F. And beyond that, outside air and cool air from the refrigeration coil pass through opposite sides of a counter-flow air-to-air heat exchanger. Heat recovery takes place to precool the warm air coming in (94°F is used as the summer design condition) to 67°F, and it reheats the cool air back up to 83°F for drying. This reduces the tonnage of the equipment required for cooling and dehumidification, and it saves energy as well.
Des Champs Energy Recovery Products

**Rotary Heat Exchangers**
Des Champs rotary heat exchangers offer both total energy and sensible energy recovery rotary air-to-air heat exchangers. At the heart of these extremely effective heat exchangers is a rotating honeycomb matrix. For total energy recovery, a highly selective molecular sieve desiccant is permanently bonded to an aluminum substrate. The total energy recovery rotor typically recovers 75% to 85% of both the temperature and moisture contained in the exhaust air. This recovered energy is transferred to pre-cool and pre-dehumidify outdoor air in the winter, thus reducing air conditioning loads in the summer and heating and humidification loads in the winter.

**Heat Pipe Heat Exchangers**
Des Champs’ standard individually charged, all aluminum, integral fin and 1-inch I.D. large diameter tube heat pipe heat exchangers provide sensible energy recovery, or serve as a wrap around precool/reheater to a cooling coil for augmented dehumidification. In typical counterflow energy recovery applications, the heat pipe assembly recovers 60% to 70% of the temperature contained in the exhaust air. This recovered energy is transferred to pre-cool outdoor air in the summer and to pre-heat air in the winter.

**High Temperature Heat Exchangers**
Des Champs leads the industry in the application, design and manufacture of industrial heat exchangers. Our product line includes the Thermo-Z® plate heat exchanger and the Thermo-T™ shell and tube heat exchanger. They recover up to 85% waste heat from energy consuming processes in applications up to 1600°F. They are fully welded units and guaranteed to have a maximum leakage rate of .01%. All units are custom designed to meet the specific requirements for the application. Design flexibility includes multiple airflow configurations, special materials of construction, variable tube size/spacing, and variable plate thickness/spacing. Options include insulation, expansion joints, access doors, waterwash system, or integration into a complete skid mounted system including filters, fans motors, controls, etc.