Capture Waste Heat with Ultra-High Efficiency

A by-product of many industrial processes is high temperature air. Recovery and re-direction of the heat saves fuel, increases energy efficiency and reduces costs. The following are just a few examples of the many applications for which heat exchangers, integrated heat recovery packages and complete turnkey systems have provided valuable solutions for customers.

A Recirculating Heater Yields Clean Process Heat

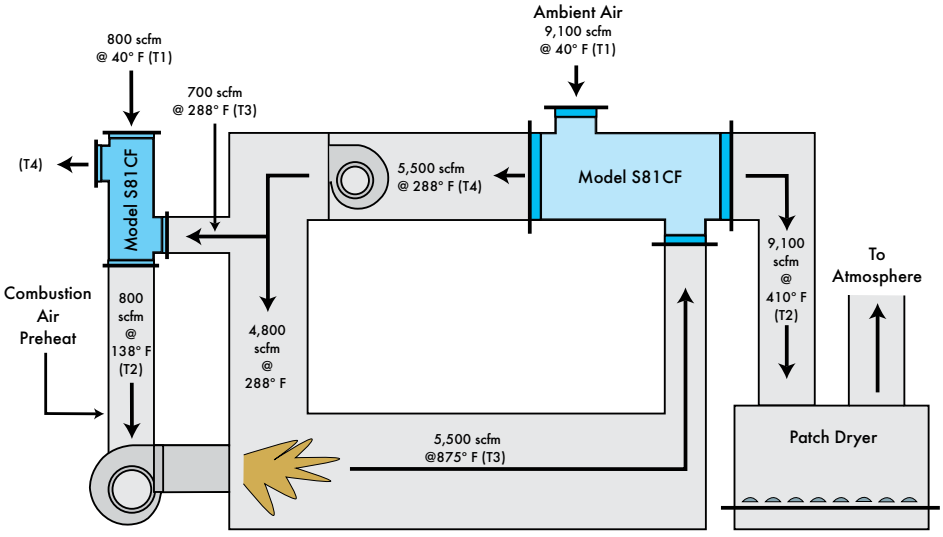
Following a national trend, a southeastern pharmaceutical manufacturer produces transdermal patches on a large scale. The self-adhesive patches apply directly to the skin for a controlled time-release of medicine. To meet consumer demand, the company recently added a second production line at a recently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

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. Munters supplied the VariMax® IFRG (Indirect-Fired Recirculating Gas) 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.

Energy is transferred to the process indirectly through an air-to-air heat exchanger. 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 Munters Thermo-Z® models. A larger primary heat exchanger in the recirculating box uses combusted gases at 875°F to heat outside air from 40°F to 410°F for the curing process. A secondary heat exchanger uses air from the system 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 Munters heat exchangers with the recirculating burner yielded an efficiency of over 90%, nearly equaling that of direct-fired heaters. Efficiencies of up to 95% are possible with the addition of the optional combustion air pre-heater. In addition, the IFRG offers turn down ratios of 40 to 1 for tight temperature control.

VariMax® Indirect-fired recirculating gas heater supplies heat for the curing process at a pharmaceutical manufacturer.

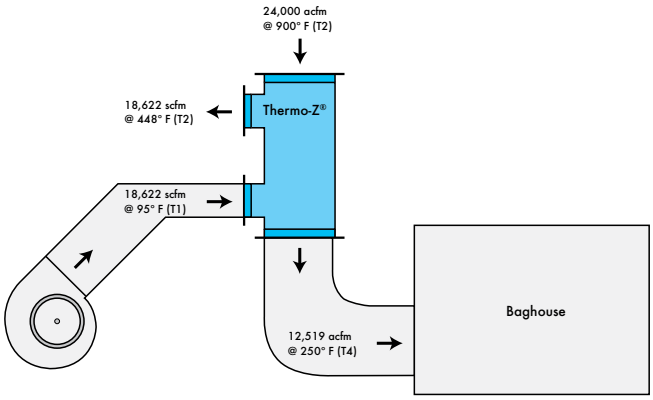


Eliminating Need for a Second Baghouse

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. The problem was solved 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 traps dirt as the air flows through them. 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 which significantly increased the air flow to the baghouse. Adding a second line with the same approach would have resulted in exceeding the baghouse capacity.

Instead, the company installed a Munters 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 do not mix, no volume is added to the process air stream. Removing the outside air component from the process streams allows the baghouse to serve both lines. In addition, the customer also utilized the cooling air stream for building makeup heat during winter months.



Thermo-Z® heat exchanger indirectly cools gas from two production lines before entering a baghouse.

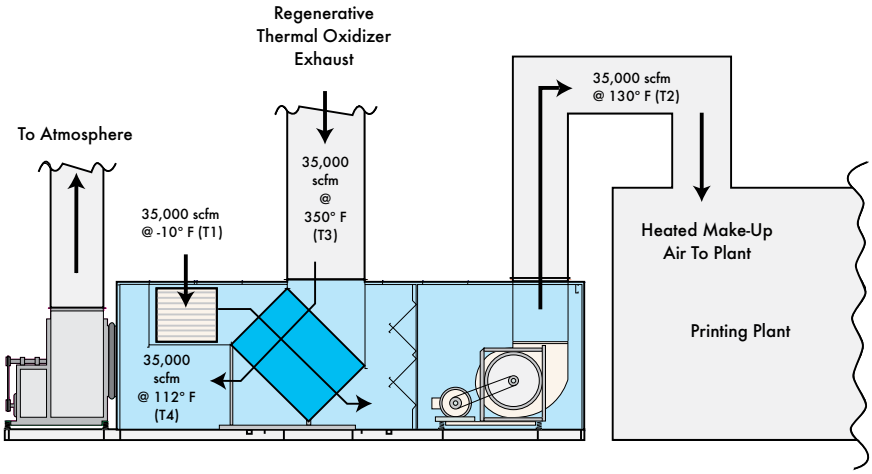
Free Building Heat from an Incinerator

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

Under design conditions, the systems heat outdoor 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 packaged heat recovery system manufactured by Munters, the temperature to the space is controlled to a consistent 130°F by modulating the hot gas flow through the heat exchanger.

A complete packaged heat recovery system utilizing Thermo-Z® air-to-air heat exchangers to capture exhaust heat.



Indirect Heater Systems assist Tier 1 Automotive OEM

A Tier 1 automotive supplier (OEM) needed five indirect heater systems for new paint lines in their North American automotive plant. The OEM required high efficiency, industrial grade, indirect heater systems, designed to handle large airflow volumes with low-pressure drops. Additionally, the customer required the indirect heaters to be factory mounted in insulated sections that were designed for easy field removal of the heaters for inspections and maintenance. The solution was to use Munters VariMax® OTH (Once-Through Heater) indirect gas heaters.

VariMax® OTH units are all welded drum and tube indirect gas heaters for industrial applications with minimum 300 grade stainless materials of construction. They are designed to provide temperature rises of up to 150°F per pass through the heater with exit temperatures as high as 600°F. Minimum OTH efficiencies of 80% are achieved by a true 3-pass counter-flow design. The heater allows operation without an induced draft exhaust fan on applications with up to 0.5" W.C. external static pressure on the exhaust stack, minimizing the cost and complexity of the overall system.

The OTH units for the automotive OEM utilized industrial grade Maxon Ovenpak burners, which are capable of operating with natural gas or propane. A fully welded insulated box was designed to accommodate the unit and allow it to be field removable for inspections and cleaning. The customer had large airflow rates that would have caused excessive pressure drops. This was handled by the incorporation of an integral bypass section inside the insulated box which also significantly reduced operating costs while still meeting the heating requirements.

To provide for easy setup, the system included test ports and gauges to allow for easy flow verification and field setup. Munters designed a system that allowed for the easiest possible field installation by providing a single inlet and outlet connection, integral bypass section, adequate test ports and gauges, and even weld-nuts on the flanges to allow for easier duct connections in the field.

VariMax® OTH

Printing Press Scores Energy Savings

A Wisconsin printer using flexographic printing equipment was experiencing air balance problems in the printing plant. Problems included drafts and high energy bills associated with negative building pressure. Rather than simply addressing the air deficit with a traditional gas fired makeup unit, an approach was formulated to capture energy from the printer exhaust air stream while simultaneously solving the negative building pressure issue.

The Problem

The printing industry uses diverse technologies to produce a wide variety of printed materials such as magazines and product labels. From lithography and flexography to screen printing, the many different printing processes share some common production and environmental challenges. Among these are the wise use of energy, maintenance of good indoor air quality, and year-round control of temperature and humidity in the facility.

In the Wisconsin plant, the web presses required approximately 23,000 CFM of air to dry the ink on the printed material. Previously, air from the plant was drawn into the presses, warmed by electric heaters in the presses to about 160°F, and exhausted to the outside. Pulling air from inside the plant without providing make-up air caused the negative building pressures which lead to drafts and excessive heating bills. Furthermore, this wasted energy could have easily been captured to help increase production and profits.

The Solution

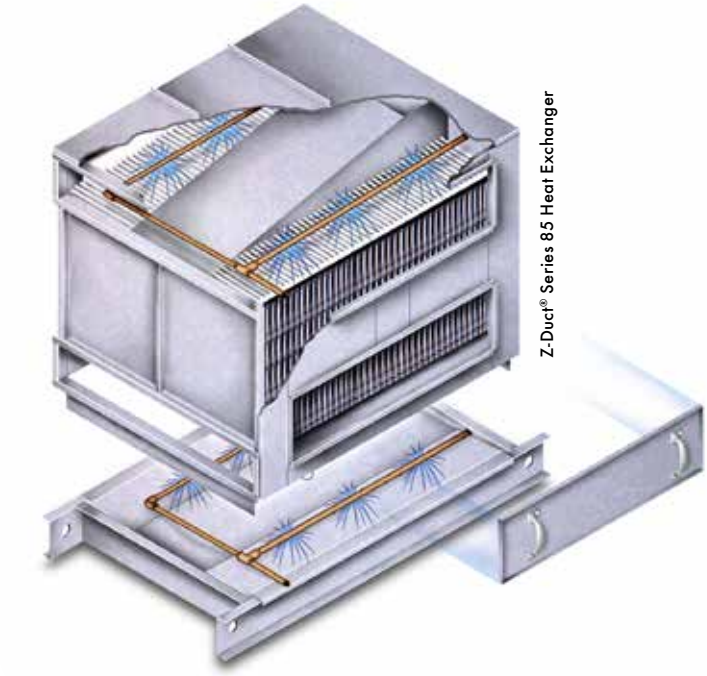
Energy recovery technology like air-to-air heat exchangers has been used in the printing industry to improve the overall performance of production by reclaiming otherwise wasted energy.

There were many benefits to using the Munters energy recovery system at the Wisconsin plant. Most importantly, the negative pressure issue in the plant was eliminated. Gas-fired heaters that were needed to maintain temperatures in the plant were shut down, reducing fuel consumption and plant maintenance costs.

A major part of the energy savings stems from the fact that the electric heaters in the press do not have to operate as frequently. On a typical winter day, the heat recovery system raises the 32°F outside air to 98°F and this preconditioned air is supplied directly to the presses. Much of the heating of the outside air had been done with expensive electricity.

Over $80,000 of annual energy savings for the printing plant easily justified the use of Munters air-to-air heat exchanger. The decision to add energy recovery equipment also provided environmental benefits and a more efficient utilization of resources.

Series 85 Heat Exchanger – Precise humidity control and heat recovery systems for printing plants can help achieve annual energy savings of over $80,000 per year.



Z-Duct® Series 85 Heat Exchanger

Fan Manufacturer Saves Energy and Increases Production with Heat Exchanger

During a thorough survey of a fan manufacturer's production facility, an opportunity was discovered to reclaim 350°F air from the plant's powder coating curing oven. By reclaiming the heat in the paint curing proccess, the company would not only save significantly on energy consumption, but they would also improve their overall production time.

The fan manufacturer had two finishing lines using six burners per line to cure the powder coated fan parts inside an 80-foot curing oven.

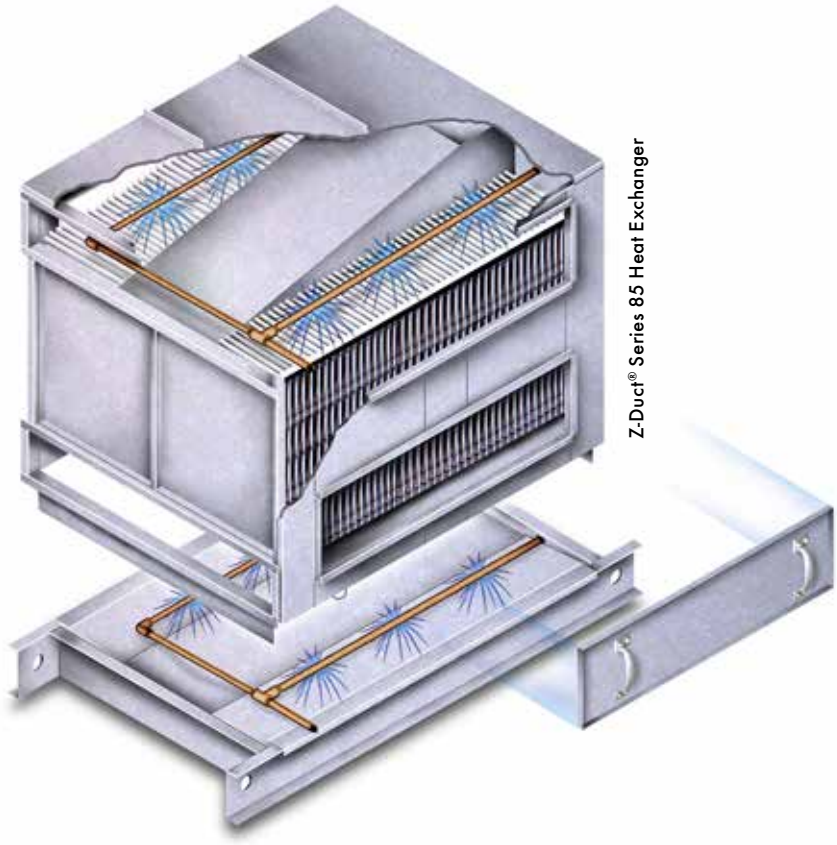
During the curing process, 100% make-up air was being taken from the plant at 70°F and heated up to 350°F in order to replace the exhaust volume of the oven. This heating process consumed an excess amount of energy, so Munters installed two Z-Duct® Series 85 heat exchangers to capture the otherwise wasted 350°F exhaust air and use it to pre-heat the make-up air. Because of the efficiency of the air-to-air heat exchangers, the facility no longer needed to use plant air, and could use outside air as their make-up air source.

In the wintertime, 10°F make-up air is being heated up to 230°F and introduced into the open ends of the drying tunnel to recover 64% of the previous waste energy.

The benefits of installing Z-Duct Series 85 systems were realized immediately. Now that the air coming into the oven was warmer, the drying process required less curing time. The incoming air now heated and cured the product in the first 20 feet as opposed to it previously needing to travel to 60 feet on the line to heat up. This allowed the manufacturer to reduce the number of burners required from six to three, resulting in a 25% production increase. Also, because plant air was no longer pulled in for the operation, the make-up air requirements for the building were reduced, stabilizing the building pressure and reducing the cost of plant heating in the winter.

With these energy saving benefits and production increase, the manufacturer achieved a payback in less than 6 months.

Z-Duct® heat exchanger installed at fan manufacturer facility



Z-Duct® Series 85 Heat Exchanger

IFRG Heater Provides Custom Solution for Creamery

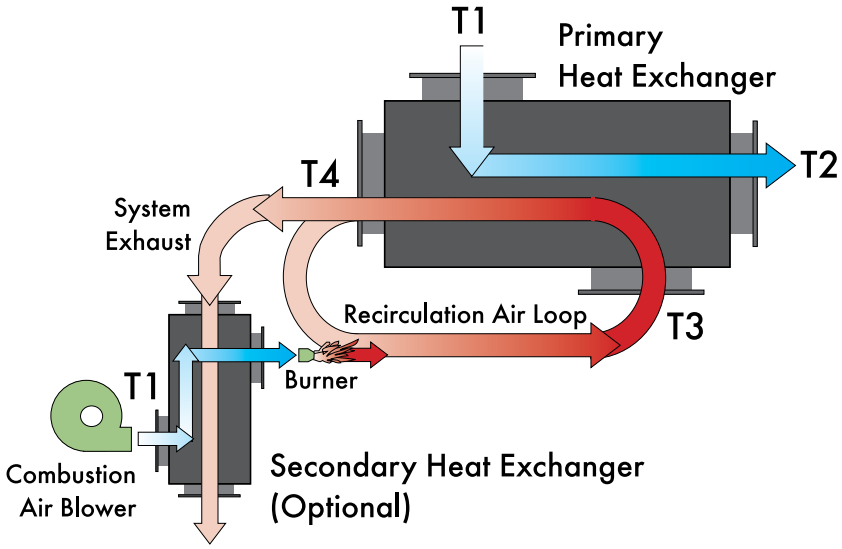
A creamery located in the Midwest required a replacement heater for one of their spray drying systems that processes powdered milk. In addition, as a dairy industry application, the replacement unit was required to be manufactured in accordance with USDA guidelines.

The previous system was no longer effective causing the creamery to encounter nearly 20% downtime. Also, the existing heater was installed in such a way that it traversed two stories of the building. The customer wanted to locate the heater on a single story with the same footprint as the previous equipment. Consequently, the installation site had very tight dimensional constraints.

The creamery chose a custom-manufactured Munters VariMax IFRG (Indirect-Fired Recirculating Gas) heater, built in accordance to USDA standards, to replace their inefficient and oversized heater. In order to fit the heater in the allotted space on a single floor, Munters' engineers worked with the OEM from the quote stage through the engineering phase to avoid existing piping, duct work, columns, walls, etc. A custom exhaust interface supplied by Munters enabled the customer to utilize their existing exhaust stack from the previous heater, ensuring a smooth installation.

The design condition at the installation site was extremely low, -20°F. The VariMax IFRG provided 8MMBH to the process, heating 17,000 CFM from -20°F to 415°F. Since installing the new heater, the creamery is experiencing less downtime and greater profitability.

VariMax® IFRG installation in creamery facility



About Munters

Munters is a global designer and manufacturer of industrial heat exchangers and heat recovery packages. Continuous development and testing of innovative heat recovery products, extensive application knowledge and over 100,000 successful installations has enabled us to meet even the most demanding heat recovery applications.

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