

THE HOTLINE

Current news and information from Cambridge Engineering, Inc.

The Performance Leader In Industrial Space Heating & Make-Up Air
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"Dishonest gain will never last, so why take the risk?" Proverbs 21:6

40TH ANNIVERSARY OF LEADERSHIP in Direct Gas-Fired Air Heating

Since 1963, Cambridge Engineering has been the Performance Leader in Industrial Space Heating and Make-Up Air. Being the best at reducing operating costs and improving indoor air quality have made Cambridge technologies very popular, heating over one billion square feet in recent years.

The History of Cambridge Direct Gas-Fired Heater Technology

1960's - Cambridge pioneered the concept of using energy efficient direct gas-fired air heaters for industrial space heating and air curtain applications. Previously, only indirect gas-fired heaters had been used. The first Cambridge product was called a Thermal Curtain. This direct gas-fired, high velocity air curtain was mounted over loading dock doors in factories and soon evolved into a combination air curtain, make-up air and space heater. One efficient system with three important heating/ventilating benefits.

1970's - Cambridge developed the first blow-thru type burner specifically engineered for industrial space heating applications. It permitted a more compact heater package and solved the problem of keeping the blower motor and other internal components cool for longer service life. Energy shortages during the 1970's created a real need for energy efficient direct gas-fired heaters. However, lack of a certification standard for this equipment made it hard for engineers to know how and when to safely use it.

1980's - Cambridge initiated a new American National Standard Institute (ANSI) standard for direct gas-fired air heaters making the use of this equipment widely acceptable. Higher gas prices made energy efficiency more important. Conventional low temperature rise



Cambridge Engineering, Inc. - Chesterfield, Missouri

added too much air to the building. Cambridge developed a new high performance burner that could safely and cleanly provide up to a 160°F temperature rise/discharge air temperature. This was a major industry development because Cambridge heaters now provided maximum BTU output with the high efficiency of direct gas-fired burning (no flue losses), while using a minimum of outside air (30% to 50% less blower air). This high temperature design also eliminated the need for recirculating (80/20) type heaters that re-heat potentially contaminated air and have higher operating costs.

1990's - Non-recirculating, energy efficient Cambridge heaters helped fight rising utility costs and problems with indoor air quality. Cambridge completed a major plant expansion after surviving the St. Louis flood of 1993. The new S-Series Space Heater and M-Series Make-Up Air Heater product lines were introduced along with more effective temperature control systems.

2000 and Beyond - Cambridge again is at the forefront of harmonizing and implementing new ANSI standards for both U.S. and Canadian applications. New standards are implemented to differentiate non-recirculating and recirculating type designs. Cambridge is the first manufacturer certified to the new Z83.4 standard for non-recirculating equipment. The Cambridge Building Study Program is introduced. This service, provided at no cost to the contractor or building owner, verifies heater performance by data logging actual building temperatures and documenting utility bills.

www.cambridge-eng.com



From the President

Save Energy NOW and in the Future!

Energy efficiency is in the news again

due to the big increase in natural gas prices this year that will continue to rise and likely set historic records next winter. Most industry experts agree the era of very low gas prices is

of natural gas to heat a factory or warehouse steadily increase more than 6-fold since the 1960's, quadruple during the 2000 heating season and recently spike 500% due to unexpected cold weather that sapped 2003 natural gas supplies. So, you might have gotten by with your present system in past years with warmer winters and lower gas prices, but this past heating season was a costly one for inefficient heating systems.

The good news is that you can save 40% to 60% per year on your combined gas, electric, operating and maintenance costs by installing a new Cambridge high temperature rise direct fired heating system. If you are building a new facility, you really won't have to pay extra to get a more energy efficient Cambridge heater. The energy efficiency is designed into each and every high temperature rise S-Series space heater. For an existing building heated with an old boiler system, unit heaters, indirect gas-fired air turnover units or even infrared heaters, the payback for installing a new Cambridge heating system can be only a few years, if not shorter as energy prices continue to rise.

Give us a call. We are ready and able to evaluate your needs for saving energy now and in the future.

Jack Kramer, President
behind us. However they all agree that energy management starts with the selection and use of energy efficient building systems. That means don't let the lowest bidder determine what's important to you when it comes to saving energy. So if you are putting up a new facility, expanding an existing one, rehabbing an old building or replacing a worn out heating/ventilating system, let Cambridge show you how to start saving energy this year and in years to come!

During our 40 year history, Cambridge has helped many companies minimize space heating costs which only adds to the bottom line. We have seen the cost

Space Heating Comparison Case Study

Recirculation Heater

vs.

Cambridge Space Heater

A large 40,000 cfm direct gas-fired recirculation heater, rated 3,850 MBH with continuously running 20 HP motor and night setback was used to heat a 45,000-ft² warehouse facility in upstate New York.

A smaller 11,000 cfm Cambridge space heating system, needed only 1,800 MBH to heat a similar 50,000-ft² warehouse in upstate New York. The more efficient Cambridge system ran 3 HP motors intermittently.



- Temperatures inside the building fluctuated $\pm 10^{\circ}\text{F}$
- Utility bills confirm operating costs at \$0.47/ft² (\$0.28 gas + \$0.19 electric)
- **They would have saved \$15,000 a year with a Cambridge Space Heating System at \$0.13/ft²**

- Building temperatures fluctuated only $\pm 5^{\circ}\text{F}$
- Based on identical heating degree days, the operating cost for this warehouse was only \$0.13/ft² (\$0.12 gas + \$0.01 electric)
- **That is a 72% savings in utility bills**

Return the enclosed postage paid postcard to request copies of this and other documented case studies comparing similar buildings heated with Cambridge Space Heaters and Recirculation Heaters.

Why Other Heaters are NOT “Just Like Cambridge”

*“To recirculate or not to recirculate”
that is the question.*

Direct gas-fired air heating equipment is classified as being either “recirculating” or “non-recirculating”. It’s important to understand the difference when specifying or buying a direct gas-fired heating system for space heating or make-up air applications. Beginning this year, each type is now tested and certified to separate safety standards reflecting the fundamental differences between these two concepts for direct gas-fired heating.

Non-Recirculating Heaters heat 100% outside air. Cambridge manufactures only non-recirculating heating equipment. Our M-Series design is used for make-up air applications and our S-Series design is used for space heating applications.

Recirculating Heaters can heat up to 80% inside air that is re-circulated through the heater and mixed with at least 20% outside air. This is also often called a “pressurized” heating system because its control system will bring in enough outside air to maintain a fixed positive static pressure in the building.

Two common misconceptions are that recirculating heaters are more energy efficient because they heat less outside air and non-recirculating heaters are just make-up air heaters that help improve indoor air quality. So after 40 years in the business, why does Cambridge only manufacture non-recirculating heating equipment? The answer is simple. We believe they are safer, better and more energy efficient.

Here are the facts:

ENERGY EFFICIENCY

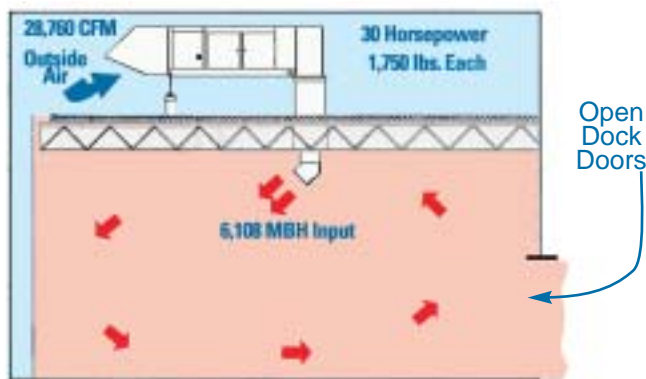
Ok; so how can a Cambridge, high temperature rise, S-Series Space heater that heats 100% outside air, be more energy efficient than a comparable re-circulating space heater that only heats 20% outside air? It just doesn’t seem logical. **The answer lies in a number of “logical” assumptions that are just not true.**

100% is more than 20%: Not always! 20% of a really big number is more than 100% of a small number. Also, the total amount of heated outside air is a function of how often the system operates. So when it takes a big, 120,000 cfm 80/20 recirculating system to deliver enough BTUs to heat a building, at least 24,000 cfm of outside air is always being heated. When that same building is heated with much smaller, Cambridge S-Series space heaters that only require 28,000 cfm, the non-recirculating Cambridge system actually heats significantly less outside air. That’s because it uses intermittent thermostat operation of individual heaters for zone temperature control. Cambridge heaters are typically on only 30% of the time compared to a big recirculating system that is continuously running.

Recirculating heaters never heat 100% outside air: Not true! Just one open dock door or a leaky building will drive an 80/20 system with pressure modulation controls to heat 100% outside air in order to maintain building pressurization. For example, a 10’x10’ door opening at .01” static pressure produces about 400 ft./min of positive air pressure, or 40,000 cfm for just one door opening!

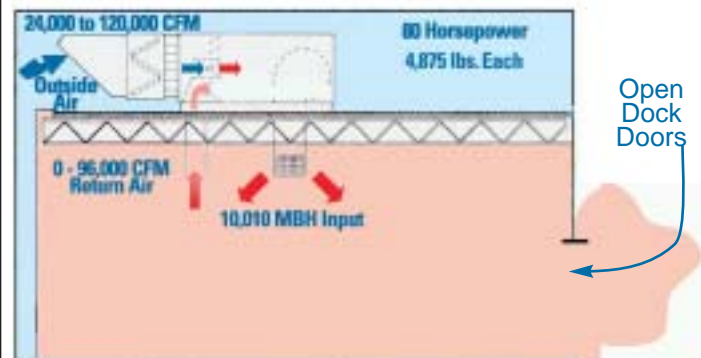
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Cambridge S-Series “Blow-Thru” Space Heaters



- Intermittent operation.
- Designed to neutralize infiltration without excessive pressurization. Amount of outside air being introduced is typically less than or equal to air leakage of building.
- Improved IAQ by introducing 100% fresh air.
- More energy efficient heating system.

80/20 Recirculation Heater Pressurization System



- Continuous operation.
- When doors open, heaters try to maintain building pressure by bringing in outside air. The additional air is forced out thru the open doors, wasting energy.
- Potential IAQ problems from re-heating contaminated indoor air.
- Requires more MBH and larger horsepower motors.

Why Other Heaters are NOT “Just Like Cambridge”

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Recirculating heaters use same amount of electricity as non-recirculating space heaters:

Definitely not true! With all the emphasis on high gas prices, it is easy to overlook the electric operating costs of these big heaters. Recirculating systems typically must turn the air in a building 1½ to 2½ times per hour to reduce stratification, requiring its large horsepower blower motors to run continuously. This significantly increases electrical operating costs compared to Cambridge S-Series heaters that use much smaller horsepower motors that run intermittently to meet the building’s true space heating needs.

Recirculating heaters have high temperature rise capabilities: *Again not true!* Only the non-recirculating, Cambridge S-Series Space Heater design is certified to the new standards for a maximum 160°F temperature rise/discharge temperature rating. In comparison, 48.9°F is the maximum equivalent temperature rise now permitted for an 80/20 recirculating heating system. The heater’s max temperature rating is crucial for space heating applications. Higher temperature ratings translate into a better Btu/cfm ratio, smaller units, lower horsepower motors and the need to heat less outside air. The dramatically lower temperature rise capability of recirculating heaters means they must use a larger volume of warm air to heat the building. In other words, lower temperature ratings result in more energy used for space heating applications.

NEW ANSI SAFETY STANDARDS

The American National Standards Institute (ANSI) recently revised their Z83 standards that apply to industrial direct gas-fired air heating equipment to reflect the differences between these two heating concepts. ETL, CSA and others test and certify equipment to these safety standards. Cambridge was the first manufacturer of direct gas-fired heating equipment to be certified to the industry’s new, harmonized US/Canadian Standard ANSI Z83.4/CSA 3.7 that now applies to non-recirculating equipment. Our energy efficient S-Series Space Heaters and M-Series Make-Up Air Heaters use 100% fresh air and do not recirculate or re-heat potentially contaminated indoor air.

A new, more stringent ANSI Standard Z83.18 for recirculating direct gas-fired air heaters just went into effect January 1, 2003. It now requires manufacturers





of this equipment to use new, more complicated control systems to assure adequate indoor air quality (IAQ). The new control systems reduce heater discharge temperature as the percentage of re-circulated room air is increased. That’s right, due to safety concerns, the allowable temperature rise (heat output) is a function of how much re-circulated air is used regardless of how much heat is required in the building.

Manufacturers of direct gas-fired recirculating heaters promote their technology as IAQ friendly. Many code officials and engineers do not agree. In fact the ANSI Standard Z83.18 for recirculating heaters was not adopted in Canada due to concerns about safety and IAQ. It is also important to note that the nature and use of a building may change from its original intended use. Recirculation may be acceptable for the original application but not at all acceptable when the building’s use changes. The days of 80/20 systems may be numbered, as many engineers in the U.S. now limit allowable recirculation to only 60%, making it a 60/40 system.

WHY DOES CAMBRIDGE ONLY OFFER NON-RECIRCULATING HEATERS?

The recirculating air-heating concept tries to take the original direct gas-fired make-up air heater design and modify it to be more energy efficient for both make-up air and space heating applications. The result is that it can be used to do both tasks but does neither of them the best. We know this from our own experience. Cambridge was the first to offer a recirculation design for space heating applications during the 1960’s. However, the introduction of our more advanced, high temperature rise technology for non-recirculating space heaters meant there was no longer a reason to offer the less energy efficient recirculating design with its inherent safety and IAQ concerns.

Use the enclosed Reply Card to:

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