



THE HOTLINE

Current news and information from Cambridge Engineering, Inc.

The Performance Leader In Industrial Space Heating & Make-Up Air
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Every young man who listens to me and obeys my instructions will be given wisdom & good sense." Proverbs 2:1-2

Genuine Cambridge "Nothing Else Like It!"

Being the best at saving energy, reducing operating costs and improving indoor air quality has made Cambridge technologies very popular. Other manufacturers now describe their heater as being "Just Like Cambridge". Don't believe it!

Here are 10 reasons why there is nothing else like a Genuine Cambridge Heater.

1. Experience: Cambridge was the first to pioneer the concept of using direct gas-fired heaters for space heating applications over 40 years ago. In recent years, Cambridge has heated thousands of buildings and over one billion square feet.

2. Patented Cambridge Burners: Unlike our competition, Cambridge designs and manufactures its own patented high efficiency burners. You can't get the high performance of a Cambridge Burner unless you have a Cambridge Heater.

3. Blow-Thru™ Space Heater: The patented Cambridge Burner, combined with Blow-Thru™ technology outperforms every other direct gas-fired heater on the market. This means a higher Btu/cfm ratio and lower operating costs.

4. 160°F Certified Heater: Despite misleading claims by our competitors, Cambridge is still the only manufacturer certified to ANSI Standard Z83.4 with a heater that will take 0°F inlet air and heat it through a 160°F temperature rise to achieve a max discharge temperature of 160°F. The max 160°F rating for both temperature rise and outlet temperature is crucial for

space heating applications. It translates into a smaller, more energy efficient heater that uses a lower horsepower motor and most important of all, will heat a building using less outside air.

5. When the Cost of Energy Matters: High temperature rise, Blow-Thru™ Space Heaters are 40% to 70% more energy efficient than all other types of indirect and direct gas-fired systems used to heat/ventilate large commercial and industrial buildings.

6. Indoor Air Quality (IAQ): Cambridge heaters use 100% fresh air to improve IAQ. There are no IAQ problems from re-heating and partial incineration of indoor air as with gas-fired equipment certified to ANSI Standard Z83.18 for recirculating type heaters.

7. Lower Installation Costs: Smaller, lightweight, pre-piped and pre-wired Cambridge heaters are available with five mounting options, including the popular "thru-wall" design for easier installation.

8. Reliability: Cambridge heaters require little maintenance and are built to last. The motor and other critical components are located in the cool air stream for extended life. All units include the rugged Cambridge burner with a 5-year warranty. The complete heater has a full 2-year warranty.

9. Best Customer Support: Cambridge has factory-trained sales/service representatives throughout North America who provide: heating and ventilating system design assistance, building heat loads, operating cost analysis, factory start-up and field service support.

10. We Have the Proof: Saying it and doing it are two different things. We back up our claims with documented proof, including a growing list of over 300 onsite building studies and customer testimonials.



From the CEO

"Cambridge has a new president with a familiar face"



Jack Kramer, CEO

What a year! In fact it was the best year in our history. Now, I am pleased to pass the torch to John, who will accelerate the pace and put Cambridge even further ahead of the pack.

Looking back on it, I'm a very blessed man. Cambridge provided me the opportunity to fulfill the American Dream. With a few thousand dollars, no background in this industry, and too young to know any better, my brother and I started Cambridge Engineering in 1963. The early years were tough because we were pretty much alone in the direct gas-fired heating business. So, by necessity, we became and continue to be the leader in product development and application know-how. We have seen competitors come and go in our industry. Cambridge has gone through some tough times too – such as the '93 flood, but we have always found adversity to be a teacher in disguise.

I attribute our continued success to two things. First, I'm proud to say we have always had a great team of hard workers and risk takers. As a family owned and operated business, we know that Cambridge employees are the company's greatest asset.

Second, it's our goal to constantly exceed customer expectations in terms of innovative technology and providing superior customer service.

This past January, I gave John the presidential reins, and have tried to stay out of his way. As CEO, I'm not retired, but keeping my hand in other subsidiaries of the Company.

As I told our employees, John has earned his stripes while working at Cambridge the past 15 years. His experience in field service and as a salesman in the 1990's, taught him invaluable lessons. He was instrumental in turning things around several years ago as VP of Sales, and reaped the dividends having guided us to a record performance last year.

John's "can do" attitude, passion for quality and desire to make every department even more effective will bear much fruit during the next Cambridge generation. I will be proud to see him carry the Cambridge torch to new heights.



John Kramer, Jr.,
President

Comparison Study - Cambridge Space Heaters vs. Infrared Heaters

Ohio Warehouse #1



- 150,00 ft² x 27' high
- R-15 Roof / R-12 walls

Cambridge Heating System

- (2) Cambridge Space Heaters
- Thru-Wall Mounting
- 2,912 MBH Total
- 13,880 CFM Total
- ± 5°F indoor temperature variation

Ohio Warehouse #2



- 100,00 ft² x 28' high
- R-15 Roof / R-12 walls

Infrared (Radiant) Heating System

- (24) Infrared Tube Heaters
- Suspended mounting at 22'
- 4,200 MBH Total
- No ventilation with outside air
- ± 8.5°F indoor temperature variation

Results: The infrared system used 50% more gas per sq. ft. of floor space, provided no ventilation and had a higher indoor temperature variation.

If **Warehouse #2** had installed a high efficiency **Cambridge system** they could have saved



Gas Cost	Annual Savings
\$.50 / therm	\$ 6,000
.75 / therm	10,000
1.00 / therm	13,000



Cambridge Space Heaters versus Infrared Heaters

Heating an insulated building with large open spaces doesn't sound very difficult. However doing it effectively at the lowest total cost is now a bigger challenge due to rising energy costs and growing concerns about indoor air quality.



Question: What type of heater is normally best for large warehouses, manufacturing plants, automobile dealership service areas, aircraft hangers, boat storage, indoor recreational facilities and other large commercial and industrial buildings?

Answer: A direct gas-fired, high efficiency, Cambridge Blow-Thru™ Space Heater. If that answer is a surprise because others have told you a gas-fired infrared (radiant) heater is always the best choice, then look at the comparison shown below.

Cambridge Space Heaters vs. Infrared			
SELECTION FACTORS:	CAMBRIDGE	INFRARED	
1. Most energy efficient	Yes	No	
2. Lowest operating cost	Yes	No	
3. Lowest first installed cost (facilities over 25,000 sq. ft.)	Yes	No	
4. Lowest maintenance cost	Yes	No	
5. Improves indoor air quality	Yes	No	
6. Can help eliminate negative air pressure problems	Yes	No	
7. Provides uniform indoor building temperatures	Yes	No	
8. Addresses cold drafts through dock doors	Yes	No	
9. Maximizes use of ceiling and warehouse racking space	Yes	No	
10. No interference with plant layout	Yes	No	

Energy Efficiency

Infrared heating is promoted as being more energy efficient than forced air heating. The comparison study on page 2 confirms this is not always true. Building studies and customer testimonials document 40% to 70% energy savings for Cambridge Space Heaters versus all types of industrial heating systems, including infrared heaters as shown below:

Other Types of Industrial Heating Systems	Energy Savings with Cambridge Space Heater
Indirect Gas-Fired Systems	
Boilers	40% to 70%
Unit Heaters	30% to 50%
Air Turnover	25% to 50%
Infrared (Radiant) - Tube Style	15% to 40%
Draw-Thru Direct Gas-Fired Systems	
Make-Up Air (MUA)	20% to 50%
Recirculation (Pressurization)	20% to 50%

Many different types of radiant heaters are available. Low intensity, tube style infrared systems are the most common choice to heat large open spaces in commercial and industrial buildings. This design burns gas inside a long tube, radiating heat from the hot tube surface. A polished reflector directs radiant heat to the floor.

Published seasonal infrared heating efficiency is 80% to 92%, based on moderate tube length and mounting heights 15 to 18 feet above the floor. Shorter tube lengths, higher mounting heights, dirty reflectors and negative air pressure problems reduce operating efficiency below 70%.

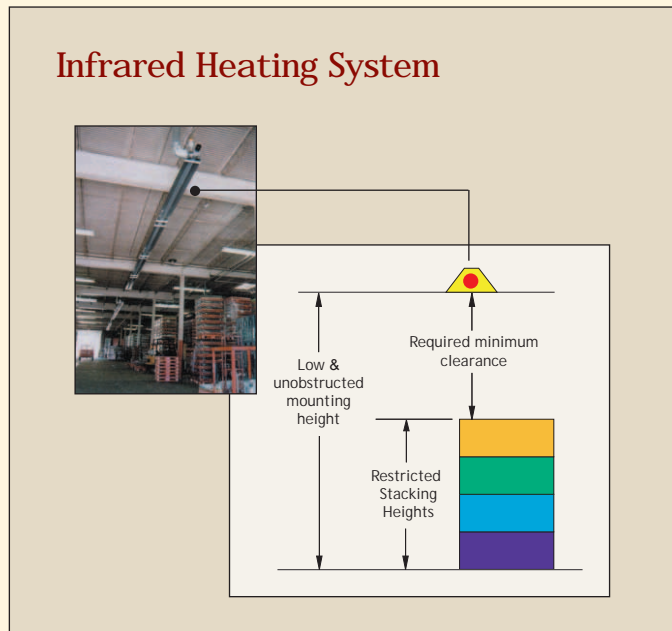
Indirect gas-fired heating equipment like infrared heaters, unit heaters and air turnover systems require some method of heat transfer, such as a heat exchanger or radiant tubes, which lower overall efficiency. A flue is also required to vent products of combustion (and heat) outside the building. Claims of higher energy efficiency for infrared heaters are based on comparisons with unit heaters or other indirect gas-fired air heating equipment and with low temperature rise, draw-thru direct gas-fired heating equipment.

Today, the high temperature rise, direct gas-fired Cambridge Blow-Thru™ Space Heater is recognized as the most energy efficient way to heat large insulated buildings that require some form of ventilation.

Total Cost of Ownership

The total cost to heat a building includes “first installed costs”, “operating costs” and “impact costs”. First installed cost for small buildings that require only a few infrared heaters is relatively low. However infrared heaters have the highest first installed cost of any industrial heating system for larger buildings due to the high number of gas burners, extensive gas pipe runs and the many flue stacks (roof penetrations) required for large facilities.

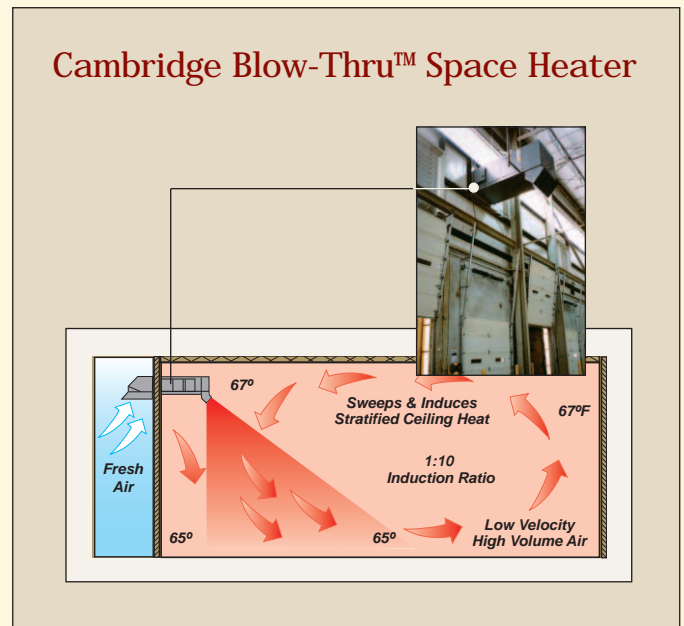
High gas bills, maintenance of numerous gas burners, cleaning dirty reflectors and expensive spare parts for proprietary systems make infrared heaters expensive to operate. More energy efficient, Cambridge heaters use less gas and are virtually maintenance free because the Blow-Thru™ design keeps critical components out of the hot air stream.



Infrared heaters must be mounted close to the floor to maintain their efficiency. However they cannot be installed too close to any object that either blocks the path of its radiant heat or could possibly reach a combustible temperature. These mounting restrictions create impact costs for the building owner or tenant. Examples include: lost vertical racking space for storage, interference with overhead cranes, relocation of tall equipment and objects suspended from the ceiling. Cambridge Space heaters can be mounted thru-the wall, on the roof, under the roof and along inside or outside walls to maximize the building's floor and vertical racking space.

Ventilation and Indoor Air Quality

Infrared systems provide spot heat but don't provide forced air movement or ventilation to improve indoor air quality (IAQ). When an exhaust system is used, a building heated with just infrared can be starved for make-up air. This creates IAQ and negative air pressure problems. Either a constant path of cold air drafts results when dock doors open or the exhaust system is rendered ineffective when the building is closed up tight. Dock door air curtains that reduce air infiltration/cold drafts and make-up air heating systems are often added to buildings with infrared heaters to solve these problems. However, for most applications, the best solution is to eliminate the use of infrared heaters, air curtains and make-up air units by just using intermittently controlled, Cambridge Blow-Thru™ Space Heaters. They will heat just the right amount of fresh outside air required to address the building's air infiltration, make-up air and space heating needs.



In conclusion, heating and ventilating an insulated building with a large open space is not so simple after all. Many selection factors must be considered before determining the best and lowest total cost heating system that will both minimize energy costs and address concerns about indoor air quality. Cambridge Engineering has over 40 years experience heating large commercial and industrial buildings from 10,000 to over three million square feet. Our current Blow-Thru™ Space Heater Technology is the direct result of that unique experience. So if you have a commercial, industrial or warehouse space heating application over 10,000 sq. ft., give us a call before you specify or purchase infrared or any other type of industrial space heating equipment.