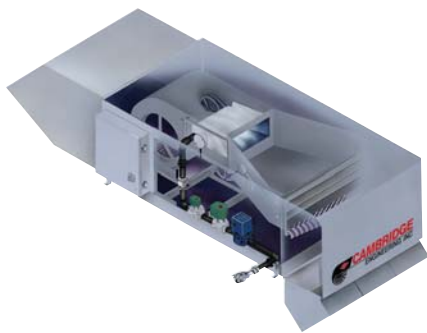


Blow-Thru™ Technology Saves Energy And Reduces Heating Costs

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Heating insulated metal buildings, with large open spaces, may not seem difficult. However, doing it effectively and providing the lowest total cost of ownership is now a bigger challenge due to rising energy costs and growing concerns about indoor air quality. So what type of heater is best for these commercial and industrial applications? The answer is a direct gas-fired, high efficiency, Blow-Thru™ space heater.



Cutaway view of a Cambridge direct gas-fired heater with Blow-Thru™ burner design.

It seems like every heater manufacturer has jumped on the bandwagon promoting energy efficiency. Who do you believe? Does anyone have documented proof of actual energy savings versus all other types of heating systems?

Direct gas-fired space heaters with high temperature rise, Blow-Thru™ technology have been used to heat thousands of buildings and over a billion sq. ft. in recent years. Today, this technology is recognized as the best and most energy efficient way to heat large insulated metal

buildings that require some form of ventilation. Typical applications include warehouses, manufacturing facilities, assembly plants, car dealerships and service areas, aircraft hangars, boat storage and indoor sports facilities. Building studies and customer testimonials document 40% to 70% energy savings versus all other types of indirect and direct gas-fired heating systems, as shown in TABLE 1.

Table 1
Energy Savings with Blow-Thru™ Space Heater

Other Industrial Heating Systems	Energy Savings with Blow-Thru™ Space Heaters
Indirect Gas-Fired Systems	
Boilers	40% to 70%
Unit Heaters	30% to 50%
Air Turnover Systems	25% to 50%
Infrared (Radiant)	15% to 40%
Direct Gas-Fired Systems	
Make-Up Air (MUA)	20% to 50%
Recirculation (pressurization)	20% to 50%

DIRECT vs. INDIRECT GAS-FIRED HEATING SYSTEMS

Energy Efficiency:

- Direct gas-fired air heating has gained popularity because there is no wasted energy. 100% of the heat goes into the building.

- Indirect gas-fired heating equipment, like boilers, unit heaters, air turnover and even tube-style infrared heaters require some method of heat transfer, such as a heat exchanger or radiant tubes, which lowers overall energy efficiency. A flue is also required to vent products of combustion (and heat) outside the building.

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Testimonials



"We used unit heaters and infrared heaters in other sections of our air museum. They interfered with aircraft displays and we could not always get the heat where we wanted it. A more effective and efficient technology was needed to heat our new 20,000 sq. ft. B-29 bomber exhibit. The answer was a Cambridge direct gas-fired space heater installed thru-the wall of our metal building. We are very pleased with the results "

Mike Speciale – Executive Director - New England Air Museum at Bradley International Airport

"Our company does design and layout work for all types of warehouse facilities. Over 40 years of experience has convinced me that Cambridge direct gas-fired, Blow-Thru™ space heaters now offer the most economical form of warehouse heating. No heat exchangers to waste heat. No holes in the roof for flues. I've cut heating costs in half with these heaters. Believe me it works."



Bob Goldwasser - President - R.A. Goldwasser, LLC

Indoor Air Quality (IAQ):

- Direct gas-fired heaters utilize outside air to provide ventilation, improve IAQ and help eliminate negative air pressure problems.

- Indirect gas-fired heating systems that just recirculate inside air can create IAQ problems and negative air pressure in buildings. Then the ventilation system becomes ineffective when the facility is closed up tight, flue gas can back draft into the building or a constant path of incoming cold air is created when windows/doors are opened. Negative air pressure problems both reduce IAQ and increase energy costs.

Indoor Humidity And Condensation Problems:

Many sources can create excessive moisture in a building. When improperly applied, either indirect or direct gas-fired heaters can be part of the problem, or, when properly applied, either heating system can be part of the solution. Unfortunately, direct gas-fired heaters are often blamed for excessive humidity problems by some contractors/engineers that don't understand the technology. Improperly applied heaters can cause problems if the facility is not vented to avoid over pressurization for very tight buildings. Cambridge Engineering has conducted actual building studies showing the same humidity levels for both non-recirculating direct gas-fired heaters and indirect gas-fired heaters (including the air turnover/thermo-rotating type). These studies confirm both heating systems react the same way to the effects of outdoor temperature/humidity.

Table 2
Direct Gas-Fired Heater Types

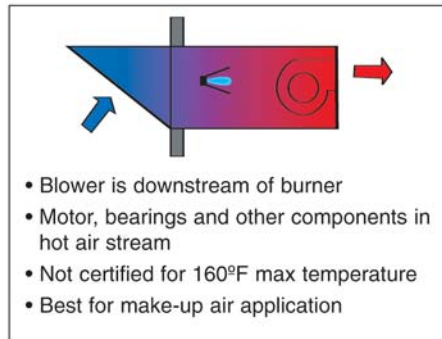
Features/Benefits	Space Heater	MUA Heater	Recirc Heater
1. Blow-Thru™ design	Yes	No	No
2. Draw-thru design	No	Yes	Yes
3. Highest BTU/cfm ratio	Yes	No	No
4. Highest temperature rise	Yes	No	No
5. Most energy efficient	Yes	No	No
6. Best for space heating	Yes	No	No
7. Best for heating make-up air	No	Yes	No
8. Recirculates indoor air	No	No	Yes
9. Certified for use in Canada	Yes	Yes	No
10. ANSI safety standard	Z83.4	Z83.4	Z83.18

DIRECT GAS-FIRED HEATERS:

Not all direct gas-fired air heaters are alike. In fact, three different types are used in metal buildings as summarized in TABLE 2.

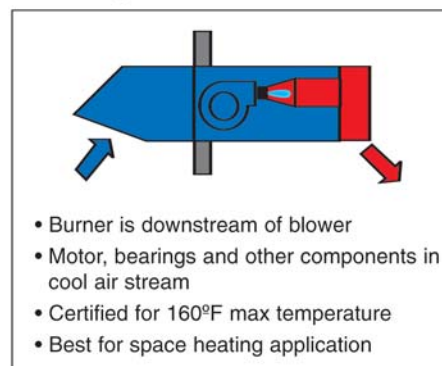
- Conventional direct gas-fired heaters use a low temperature rise, draw-thru design where the blower is downstream of the burner. This older technology is used for both make-up air (MUA) and recirculation heater (Pressurization) type designs.

Draw-Thru Heater



- Blow-Thru™ Space Heaters have the burner downstream of the blower. This more advanced technology provides superior comfort levels and improved IAQ with the least amount of energy usage. The Cambridge S-Series design uses a patented burner to achieve the highest BTU/CFM ratio and the industry's highest temperature rise/discharge temperature rating of 160°F. This crucial maximum rating results in smaller, but more powerful heating units. This translates into lower horsepower motors, less required outside air to heat a building and much lower energy costs. Locating the blower upstream of the burner also increases service life and heater reliability by keeping critical components out of the hot air stream.

Cambridge Blow-Thru™ Heater



Testimonial



"We are the largest privately held flat-rolled steel service center network in the U.S. I have been specifying and using Cambridge direct gas-fired space heaters for the past 12 years to heat metal buildings that range from 50,000 to 500,000 sq. ft. I like the high temperature rise, Blow-Thru™ heaters because they seem to dry the air and prevent high humidity problems. In fact we have been replacing our unit heater and air turnover heating systems with these heaters to save floor space, improve indoor air quality, reduce energy costs and prevent flash rust problems on our steel products."
Gene Hubbard – Chief Engineer - Heidtman Steel

For more information on direct gas-fired heating and Blow-Thru™ space heaters, contact:

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