

Energy Stewardship Save Energy, Reduce Air Pollution, Increase Profits

By Ken Williams

Energy Stewardship is an important political and social issue. It means reducing the energy a building consumes to provide a safe and productive environment. Using energy efficient and environmentally friendly heating/ventilating

equipment is an easy way to make a big impact in this area. Energy stewardship does not need to come at a premium. Using direct gas-fired space heating equipment is one way to save energy, reduce air pollution and increase profits while doing it.

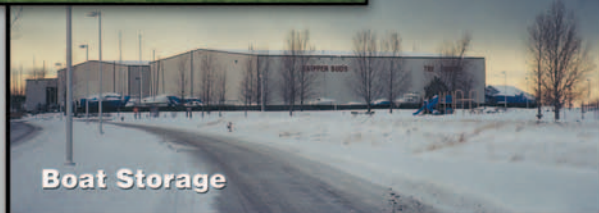
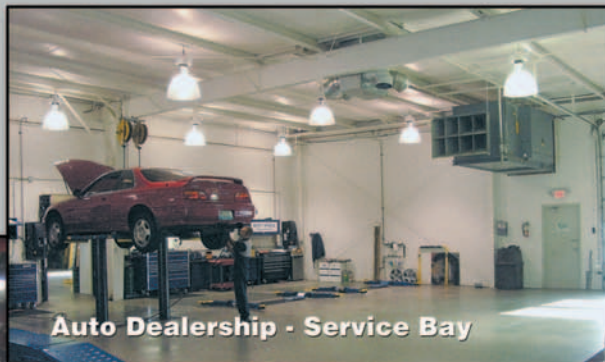
Direct Gas-Fired Space Heaters

Direct gas-fired heaters with high temperature rise, Blow-Thru® technology have been used to heat thousands of metal buildings. It is recognized as the most energy efficient way to heat insulated buildings that require ventilation. Typical applications include warehouses, assembly areas, boat storage facilities, aircraft hangars, car dealership service bay areas and indoor sports facilities.

Indirect gas-fired space heating equipment, like boilers, unit heaters, air turnover equipment and even tube-style infrared heaters require some method of heat transfer, such as a heat exchanger or radiant tubes, which lower energy efficiency. A flue is also required to vent products of combustion (and heat) outside the building. High performance, direct-fired heaters have gained popularity because there is no wasted energy. 100% of the available heat is delivered to the space because there are no flue or heat exchanger losses.

Not all direct-fired air heaters are alike. Three different types are used to heat/ventilate metal buildings as summarized in TABLE 1. Blow-Thru® Heaters have the burner downstream of the blower. This advanced technology provides superior comfort levels and improved indoor air quality with the least amount of energy usage. The Blow-Thru®

Typical Direct Gas-Fired Heater Applications



**Table 1
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

design offers a higher BTU/CFM ratio and is available with the highest temperature rise/discharge temperature rating of 160°F. This crucial maximum rating results in smaller, but more powerful heating units. It also translates into lower horsepower motors, less outside air required to heat a building and lower energy costs. Conventional direct gas-fired air 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 recirc heater (80/20 pressurization) type designs.

Save Energy

The energy used to heat a building is a function of many variables. The heater's combustion efficiency is one important factor but of equal importance is how the heating system is installed and used. For many commercial buildings, it must provide both space heat and temper the building's air infiltration and/or outside make-up air used for ventilation. For example, an infrared heater is an energy efficient way to spot heat people in a small workspace. However, mounting heights above 18 feet, air stratification, creating negative air problems and cranking up the thermostat to compensate for cold drafts will dramatically increase the energy used by an infrared heating system. Properly applied Blow-Thru® Space Heaters can achieve 40% to 70% energy savings versus both indirect-fired heating systems and draw-thru type direct-fired heaters as summarized in TABLE 2.

TABLE 2
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 70%
Infrared (Radiant)	15% to 40%
Direct Gas-Fired Systems	
Make-Up Air (MUA)	20% to 50%
Recirculation (pressurization)	20% to 50%

Reduce Air Pollution

Energy savings also means a corresponding reduction in carbon dioxide (CO₂) and other greenhouse gases that cause global warming. Burning 100 cubic feet of natural gas (1 therm of energy) creates 12 pounds of CO₂. To put this in perspective, consider a 50,000 sq. ft. boat storage facility with a 37 ft. high ceiling in Chicago, IL. This metal building heated with indirect-fired unit heaters will burn 1.5 million cubic feet of natural gas per year (15,000 therms) and put 88 tons of CO₂ in the atmosphere. The use of Blow-Thru® Space Heaters to heat/ventilate the same building can reduce energy usage by 50% and prevent 44 tons of CO₂ from going into the atmosphere each year. That's the same as planting 132 new trees each year or taking 8 cars off the road.

Increase Profits

Developers and building owners understand the total cost to heat a building includes "first installed costs", "operating costs" and "impact costs". Blow-Thru® Technology is used to heat buildings from 5,000 to over 3 million square feet. Often the cost to purchase and install direct-fired Blow-Thru® Heaters is lower than using less efficient indirect-fired heating systems.

Energy efficient, Blow-Thru® Heaters use less gas and are virtually maintenance free so operating costs are low. That 50,000 sq. ft. boat storage facility in Chicago with unit heaters has an operating cost of \$.30/sq. ft. (at \$1.00/therm). Blow-Thru® Heaters using 50% less fuel means an operating cost of only \$.15/sq. ft. with annual savings (increased profits) of \$7500, or \$75,000 over ten years. Developers are now promoting "high performance", energy efficient buildings with direct-fired Blow-Thru® Space Heaters for just this reason.

Impact costs are more difficult to quantify. However, infrared heaters and air recirculating type-heating systems that do not provide enough fresh outside air to assure good IAQ or prevent

negative air problems will adversely impact the everyday use of a building. Non-recirculating, Blow-Thru® Space heaters are equipped to deal with these problems because they use 100% fresh outside air.

Conclusion

So why doesn't everyone use direct gas-fired Blow-Thru® technology to heat/ventilate metal buildings used as warehouses, boat storage facilities, aircraft hangars, automobile service areas and indoor sports facilities? Maybe it's because old habits are hard to break, like not conserving our planet's natural resources and polluting the atmosphere. No matter the reason, it's never too late to consider energy stewardship as a way to save energy, reduce air pollution and oh yeah, increase your profits while doing it.

Cambridge Engineering is an active member of the U.S Green Building Council (USGBC).



Energy efficient, Genuine Cambridge® direct gas-fired heating equipment can comply with the requirements of ANSI/ASHRAE/IESNA Standard 90.1-2204



Cambridge Engineering, Inc.
760 Long Road Crossing Dr.
Chesterfield, MO 63005
Phone: 800-899-1989
Fax: 636-530-6133
www.cambridge-eng.com