Gas Fired Infrared Radiant Heaters

The 'Green' Building Movement and LEED® v.3.0 Application Guidelines

This White Paper presents the proven ecological benefits and LEED® application guidelines of infrared heaters. Data provided by industry research and a LEED® Accredited Professional (AP).

A Detroit Radiant Products Company **White Paper**

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Introduction

The green building movement is gaining tremendous momentum on a national front, and is exemplified by the rising costs of energy. But what exactly does building green mean? 'Green' is a general term that can describe a wide range of practices such as energy savings, water conservation, recycling, sustainable site development, and the list goes on. In fact, LEED®, the benchmark rating system for green building, has seven (7) different categories used to evaluate a green project. Although all of these categories are considered green, arguably one such item carries a greater impact on the environment than all others combined; energy conservation. This is evident through the credit distribution scheme for LEED-NC v.3.0 (New Construction).

Proven Infrared Savings

Reduced fuel requirements of radiant heaters allow them to be installed with a rated input of **80 to 85%** of the total calculated heat loss. *ASHRAE HVAC Systems and Equipment.*

"Additional energy savings of **25% to 30%** were associated with operation of the two-stage infrared system…" *ASHRAE Technical Paper 4643.*

"…for total building heating... complete [radiant heating] systems... produce a most effective and efficient means of utilizing energy for space heating." *ASHRAE Systems Handbook.*

"...annual fuel savings as high as **50%**." *ASHRAE Systems Handbook Chapter 15.*

Two-stage technology has a proven **35%** less cycles and an additional **12%** fuel savings over single-stage operation. *Braneida Study October 1993.*

Why Infrared is 'Green'

When attempting LEED® certification, heating with infrared appliances is an excellent choice for a number of reasons. Primarily, infrared heating is a proven means to reduce energy consumption. The amount of energy savings incurred will strongly contribute to improving the project's overall performance rating. Another key feature in infrared heating is its modular design. Zoning with multiple units allow for a high level of individual comfort controls for the building's occupants. Additionally, when heating the occupants with infrared technology, the thermal comfort is greatly improved over traditional forced air units. All of these items in conjunction with one another greatly contribute to the LEED® certification process. Lastly, gas fired infrared heaters burn clean thus putting off low harmful emissions.

***NOTE**: Products are not reviewed or certified under the LEED® rating system. LEED® credit requirements cover the performance of materials in aggregate, not the performance of individual products or brands. Any product that claims to be "LEED® APPROVED" is erroneous, and should be reported to the USGBC. For further information, please visit* www.usgbc.gov.

Applicable Definitions and References

LEED®: An acronym that stands for "Leadership in Energy and Environmental Design". This is a third party certification program for design, construction, and operation of high performance green buildings. Visit www.usgbc.org/LEED.

LEED® AP: An accredited professional who has demonstrated a thorough understanding of green building practices, principles of green, and the LEED® Rating System through a standardized test. Consult with LEED-AP when planning to build an energy efficient, green building. Visit www.gbci.org.

ASHRAE: An acronym that stands for "American Society of Heating, Refrigeration, and Air-conditioning Engineers". A technical society to advance the arts and sciences of heating, ventilation, air conditioning, and refrigeration. Visit www.ashrae.org.

USGBC: An acronym that stands for "US Green Building Council", a non-profit trade organization that oversees the LEED® Certification program. Visit www.usgbc.org.

LEED® Credits

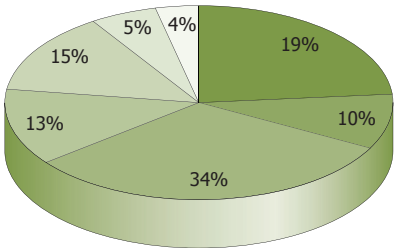
Based on LEED® for new construction.

Contributes up to 22* pts.

- Reduced fuel consumption rates up to 50%. (**EA Credit 1**)
- Reduced electrical energy consumption. (**EA Credit 1**)
- Increased thermal comfort levels by design in the space. (**EQ Credit 7.1**)
- Improved individualized comfort zones through modular design. (**EQ Credit 6.2**)
- Exemplary performance in energy conservation. (**ID Credit 1**)
- Consulting a LEED® AP can potentially earn an additional credit. (**ID Credit 2**)

**Out of 110 total points. See adjacent chart for point breakdown and infrared contribution.*

LEED® Points Breakdown



Four Levels of Certification	
Certified	40-49 pts.
Silver	50-59 pts.
Gold	60-79 pts.
Platinum	80+ pts.

When implementing the LEED® NC (v.3.0) process, there are seven credit categories in which up to 110 total points are earned. The application of infrared heaters can contribute up to 22 points in three of the qualifying categories.

Qualifying Credit Categories when Using Infrared Heaters

Category Code	Category Point Total	
SS	21	19% Sustainable Sites
WE	11	10% Water Efficiency
EA	37	34% Energy & Atmosphere (up to 19 points)
MR	14	13% Materials and Resources
EQ	17	15% Indoor Environmental Quality (up to 2 points)
ID	6	5% Innovation and Design (up to 1 point)
RP	4	4% Regional Priority

Energy & Atmosphere (EA) - Category point total=37 points.
Establishes energy efficiency and system performance, optimizes energy efficiency, supports ozone protection protocols and encourages renewable/alternate energy sources.

Indoor Environmental Quality (EQ) - Category point total=17 points.
Establishes minimum indoor environmental quality performance to prevent the development of indoor environmental quality problems in buildings.

Innovation & Design (ID) - Category point total=6 points.
Project teams are encouraged to apply for innovation credits if the energy consumption of non-regulated systems are also reduced. One point can be credited if at least one project team participant is a LEED® Accredited Professional (AP).

'Green' Characteristics of Infrared Heaters

TOPIC	
Energy Savings	Heating with gas fired infrared heating appliances have proven fuel savings over traditional forced air systems. Documented cases have confirmed a savings of up to 50%.
Rebates	Numerous gas companies recognize the energy savings associated with infrared heaters and encourage the installations by offering rebates of up to $500 for each installed unit. Check with your local supplier.
Tax Credits	The Energy Act of 2005 allows commercial buildings a tax credit of up to $1.80 per sq. ft. for buildings that demonstrate a total energy savings greater than 50% of an established baseline. Infrared heating can help to achieve an overall energy efficient building. LEED® Platinum certification automatically qualifies.
Emissions	Reducing the energy consumption of your heating appliance will reduce the amount of CO_2 released into the atmosphere. Furthermore, infrared heaters are low emitters of other noxious gases such as NO_x, Carbon Monoxide and VOC's.
Air Quality	Infrared heaters do not use air currents to transfer the heat. This will help minimize the exposure of hazardous particles, chemical pollutants, and cross-contamination of regularly occupied areas.
Thermal Comfort	Individual zone controls increase the thermal comfort for all occupants. Heat energy stored within ambient objects rather than the air improves the heater's energy efficiency.
Advanced Technology	Features such as two-stage technology, black coated emitter tubes, highly polished reflector material, and an advanced burner design all contribute to increasing the heater's energy efficiency.

Tips to Reduce Energy Consumption

Energy Star - Install an Energy Star rated programmable controller and have an automatic setback during times of zero occupancy. Typical applications can recover from a setback within 20 minutes.

Two-Stage - Utilize two-stage technology in your heating appliances. This will lower annual fuel consumption, reduce greenhouse gas production, and increase comfort levels in the space.

Controls - Utilize advanced control options. Today's climate control technology provides an excellent means to directly monitor and improve your building's overall efficiency and can also allow for individualized zoning. Consider using programmable thermostats, locking guards, remote sensors and in some cases, advanced DDC controls.

Insulation - Evaluate the soundness of your structure. Air leaks, poor or missing insulation, and degraded weather-stripping increases the amount of energy needed to maintain a constant temperature. Adding additional insulation will help to maximize your building's energy efficiency.

Maintenance & Cleaning - Clean and maintain your current units. Dust and debris can accumulate on the reflector and internal components, inhibiting the overall efficiency of the unit. Routine maintenance can help to keep your unit running at its optimal efficiency.

Replace Older Units - Replace older units with a more efficient one. The advancement of technology has yielded more efficient heating appliances. Also, as older units wear down, the efficiency may decay, thus requiring more energy consumption to heat a desired area.

Educate - Inform staff of the high costs associated with poor energy management practices. Discourage leaving dock doors open for extended periods of time. Also, instruct staff members that setting back the thermostat by just 2°F can save up to 6% on your heating costs.

Barriers - Seal off any areas where excessive air leaks are present. Isolate unoccupied areas with partitions. Areas that contain excessive air leaks can increase fuel consumption.

Rebates - Get rewarded! A wide array of government, state and local gas companies offer initiatives in the form of rebates and tax credits to encourage energy savings and green building. Conduct an energy audit and then contact your local gas providers to determine eligibility.

Did You Know...
Source D.O.E.

...that 30% of a building's total energy is used inefficiently or unnecessarily?

...that 20 billion dollars could be saved annually if the energy efficiency of all commercial buildings improved by 10%?

...that improving the energy efficiency of commercial and industrial buildings by 10% can significantly reduce greenhouse gas emissions?

Summary

There are many dimensions of being 'green' as evidenced through the LEED® rating system. Gas fired infrared heating appliances are a great contributor to several credit categories; most notably energy savings. By actively saving energy resources, infrared heaters increase a building's overall efficiency ratio, reduce the output of greenhouse gases, and increase comfort levels in the building. Do your part and own an energy efficient building!