

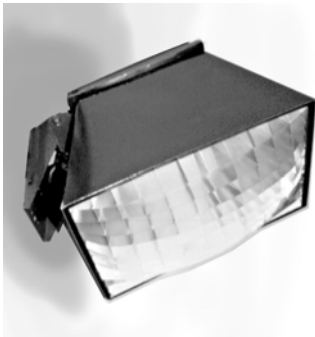
## Reducing Heating Costs with HotZone<sup>®</sup> Infrared Heaters

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During the heating season, how do you increase human comfort while lowering total energy costs? While these two goals appear incompatible—and in fact are given conventional heating methods—focused infrared heating with Schaefer's HotZone<sup>®</sup> heaters, enables a heating strategy that attains both these objectives.

### Infrared Heating

Human thermal comfort is a function of ambient air temperature, the cooling effect of air movement and the amount of infrared, or radiant, energy shining on and being absorbed by your skin and clothes. When the sun emerges from behind a cloud, you immediately feel warmer due to the increase in radiant energy received from the sun, although there is little or no change in the surrounding ambient air temperature. This is because infrared energy, which travels at the speed of light, elevates the temperature of solid objects when it is absorbed, but does not heat the air through which it travels. The absorbed energy is eventually re-radiated or lost convectively, thus also heating the object's surroundings.



### HotZone<sup>™</sup> Heaters

Schaefer's HotZone<sup>®</sup> heaters are high intensity electric- or gas-powered infrared heaters that are fitted with a patented, lobster eye inspired IRLens<sup>™</sup> that focuses the infrared energy generated by the heater into a narrow beam. With the lens, between 3x and 5x as much infrared heat is directed to the target area to be heated and the heaters can be installed a long distance from the target compared to similar powered infrared heaters without lenses.

### Energy Saving Strategies

There are two significant strategies to reduce energy costs with HotZone<sup>®</sup> high intensity infrared spot heaters from Schaefer.

#### Strategy I

Replace existing conventional (unfocused) infrared heaters (for new construction or retrofits) with HotZone<sup>®</sup> high intensity infrared spot heaters. HotZone<sup>®</sup> spot heaters deliver 3 to 5 times the energy to the target compared to unfocused infrared heaters. Replacing other manufacturers' infrared heaters with HotZone<sup>®</sup> heaters from Radiant Optics significantly reduces the operating cost of your infrared heating solution, when spot heating is the right answer.

## Strategy 2

Implement spot comfort heating using HotZone® heaters from Schaefer. This a more fundamental strategy that can lead to energy savings significantly greater than those produced by Strategy I. In order to keep building occupants comfortable and minimize energy costs, we suggest - as an operating principle - that you substitute infrared spot comfort heat for convective comfort heat, wherever practicable, throughout your facility.

### Lower Ambient Temperatures

Heat losses and therefore heating costs vary directly with heating degree-days (HDD) (the sum of the average daily temperature difference between inside and outside temperatures over the heating season). A quick review of the HDD tables for locations throughout the country reveals that lowering thermostat settings even a few degrees produces very substantial savings (Table 1). In Chicago, for example, lowering the setting from 65° to 60° F reduces the number of Heating Degree Days by 20 percent. In San Francisco, the same change reduces the number of heating degree days by 50 percent. Lowering the temperature more than 5° F produces even greater savings.

**Table 1: Heating Degree Days for Selected US Cities**

	<b>Seattle</b>	<b>Spokane</b>	<b>Portland</b>	<b>San Francisco</b>
HDD at 65°F	4,691	6,842	4,522	3,005
HDD at 60°F	3,229	5,406	3,152	1,516
% Reduction	31%	21%	30%	50%
	<b>Salt Lake City</b>	<b>Denver</b>	<b>San Bernardino</b>	<b>San Diego</b>
HDD at 65°F	5,765	6,050	1,719	1,256
HDD at 60°F	4,534	4,743	920	486
% Reduction	21%	21%	46%	61%
	<b>Tucson</b>	<b>Chicago</b>	<b>Kansas City</b>	<b>New York City</b>
HDD at 65°F	1,687	5,753	5,393	4,809
HDD at 60°F	975	4,615	4,281	3,690
% Reduction	42%	20%	21%	23%

### Spot Comfort Heating

For those locations in your building where the new, lower ambient temperature is uncomfortable for customers or employees, the situation can be remedied with the addition of focused infrared heat in specific locations using HotZone® high intensity infrared spot heaters from Schaefer. The operating cost of the spot heaters is typically only 10 to 40 percent of the savings from lowering the building's overall ambient temperature, leaving a net saving of 60 to 90 percent of the original savings.

### Real World Examples

Organizations as diverse as Home Depot, Costco and DHL have embraced the strategy of comfort spot heating for their checkout and package sorting areas. The focus of their heating strategy has changed from heating the building to heating people. Everyone is now comfortable but indoor air temperature has been reduced and total heating costs have been lowered.

### Conclusion

HotZone<sup>®</sup> heaters equipped with the patented IRLens<sup>™</sup> deliver 3x to 5x the amount of infrared energy to the target as equivalent power, unfocused infrared heaters. Replacing other manufacturer's infrared heaters and/or reducing the ambient temperature of a building and providing spot comfort heat with HotZone<sup>®</sup> high infrared spot heaters from Schaefer, will make your customers and employees extremely comfortable and significantly lower your heating costs.