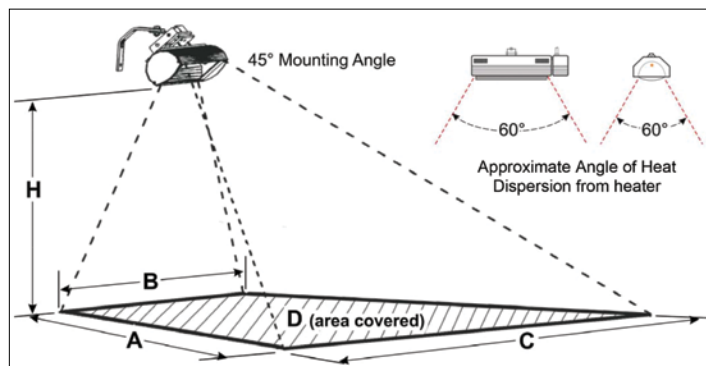


### TECHNICAL SERVICE BULLETIN

## How to size SunWarmth™ CIR heaters to heat a space

The size and quantity of heaters (the amount of heat input) required for comfort in an area is affected by several factors.

- › The chilling effect of air movement in an area (outside or inside) requires additional heat input, so provide wind breaks wherever possible.
- › Any area heated outdoors is “spot heat.”
- › “Spot heating” comfort is most effective if people are heated from at least two sides.
- › When “spot heating” only part of a cold indoor area, factor the activity level of the people: seated at rest, hard physical labor, etc.
- › Space heaters uniformly around the perimeter (and if required, in the center or throughout the area) to provide sufficient heat density to accomplish the desired temperature rise.
- › Heating the space in an entire structure requires an accurate heat loss calculation and is beyond the scope of this TSB. Contact Stiebel Eltron for assistance.



#### Mounting and Coverage Information

Model	Wattage	H Mounting height	Dimensions of area heated				E Average heat density
			A Length heated	B Width heated close to heater	C Width heated far from heater	D Size of heated area	
CIR 150-1 I, CIR 150-1 O	1500 W	Minimum: 7' (2.1 m)	8' 10" (2.7 m)	8' 6" (2.6 m)	16' 1" (4.9 m)	108 ft <sup>2</sup> (10.1 m <sup>2</sup> )	13.9 W/ft <sup>2</sup> (148.5 W/m <sup>2</sup> )
		Maximum: 8' (2.4 m)	9' 10" (3.0 m)	9' 2" (2.8 m)	18' 1" (5.5 m)	133 ft <sup>2</sup> (12.4 m <sup>2</sup> )	11.3 W/ft <sup>2</sup> (121.0 W/m <sup>2</sup> )
CIR 200-2 O	2000 W	Minimum: 8' (2.4 m)	9' 10" (3.0 m)	9' 2" (2.8 m)	18' 1" (5.5 m)	133 ft <sup>2</sup> (12.4 m <sup>2</sup> )	15.0 W/ft <sup>2</sup> (161.3 W/m <sup>2</sup> )
		Maximum: 9' (2.7 m)	11' 2" (3.4 m)	9' 10" (3.0 m)	20' (6.1 m)	165 ft <sup>2</sup> (15.3 m <sup>2</sup> )	12.1 W/ft <sup>2</sup> (130.7 W/m <sup>2</sup> )
CIR 400-2 O	4000 W	Minimum: 10' (3.0 m)	11' 10" (3.6 m)	11' 2" (3.4 m)	23' (7.0 m)	205 ft <sup>2</sup> (19.0 m <sup>2</sup> )	19.5 W/ft <sup>2</sup> (210.5 W/m <sup>2</sup> )
		Maximum: 11' 6" (3.5 m)	13' 5" (4.1 m)	14' 1" (4.3 m)	27' 7" (8.4 m)	275 ft <sup>2</sup> (25.4 m <sup>2</sup> )	14.5 W/ft <sup>2</sup> (157.5 W/m <sup>2</sup> )

To calculate the number of heaters required for an area, determine the size of the area and the amount of heat input required to achieve a comfortable temperature in the space. Here is a checklist for the calculations.

- › In what seasons is comfort required and what is the outside design temperature?
- › What temperature rise is desired for comfort? (10°, 15°, 20°, 25°?)
- › Calculate the required input to get the desired average temperature rise using Table 1 to determine Heat Density Per Degree.
- › Use this formula to calculate the amount of heater wattage required for the space:  
**Input = Site Length × Site Width × Temperature Rise × Heat Density per Degree**
- › **Example:**
  - Outdoor patio: 30 feet long by 10 feet wide
  - Desired temperature rise: 20°F (area average)
  - 30 × 10 × 20 × 2 = 12,000 Watts total input required
- › Use the total wattage required to determine the number of heaters needed, making sure placement follows the guidelines for safety and comfort.

**Table 1**  
Input Required per Area per Degree Comfort Temperature Rise

	Heat density per °F W/(ft <sup>2</sup> )/°F	Heat density per °C W/(m <sup>2</sup> )/°C
<b>Outdoor heating</b> (up to 10 mph wind)	2	40
<b>Indoor spot heating</b> (protected area, low air movement)	0.75	14