SSHC, INC.

ENERJOY RADIANT PEOPLEHEATER®

PERIMETER RADIANT HEATING

MAXIMUM COMFORT AND CONTROL IN HEATING

Commercial Perimeter Radiant Heating Makes Sense

In the review of commercial building heating and cooling requirements, focus centers on determining design heat loss and occupied cooling load. By briefly walking through a typical case analysis, it is easy to see why ENERJOY® Solid State Radiant Heating Modules should be the obvious heating choice.

The first figure traditionally examined is the design heat loss, which is the heat loss under conditions of an empty building with absolutely no contributory heat gains under design (worst case) conditions. Normally, in one way or another, this heat loss must be demonstrated to be met for local building code purposes.

In the real world, heat from people, lighting, computers, etc. routinely supply 50% *or more* of the heat needed during the most severe weather. When the outdoor temperature is above 30'F (virtually 70% of the time even in northern climates), heating from people, lights, and power, supplies too much heat. As the following analysis illustrates, *cooling* a commercial building is the problem. Commercial buildings heat themselves. Supplementary heating is all that is required. The unfortunate fact is that most commercial buildings have grossly oversized heating plants that waste enormous amounts of energy and money.

Description Of Assumptions

The case analysis we are examining is the top floor of a commercial office building. The floor area is 10,000 FT^2. The top floor zone was chosen because for this particular building it has the highest heat loss rate per square foot of occupied floor space. In the winter we are maintaining 70°F indoor temperature at O°F outdoor temperature, 15 mph wind. In the summer we are maintaining 78°F indoor temperature at 95°F dry bulb, 77°F wet bulb, 7½ mph wind. The building is located in Westport, Connecticut, which has approximately 5,800 annual degree days. We are assuming 100 people will be occupying the space and that lighting and power heat gains will be about 3 watts per square foot. Fresh air is being introduced mechanically at approximately 7½ CFM per person.

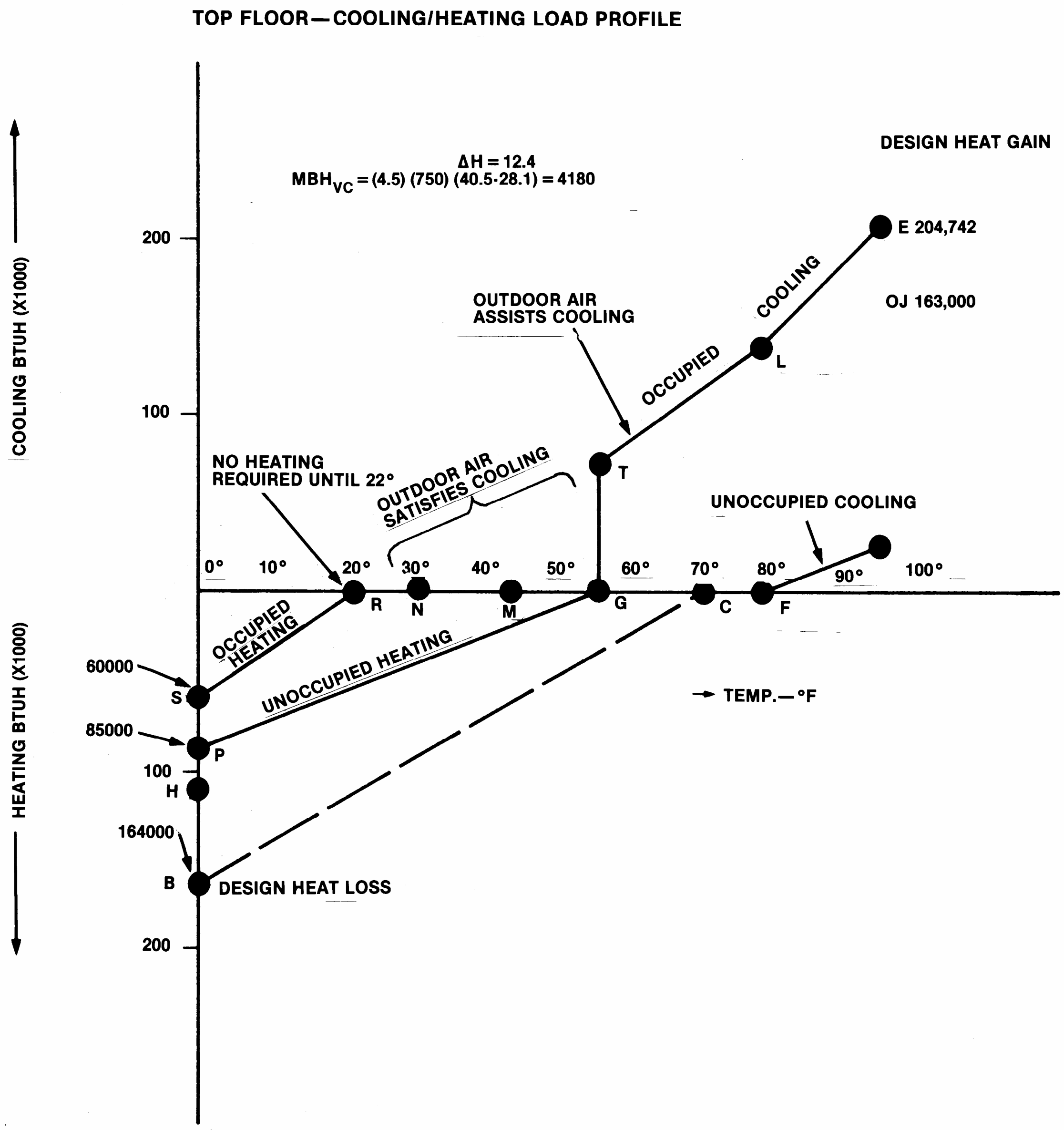
Basic Analysis

We constructed a heating/cooling load profile (Figure 1) for the 10,000 FT^2 space, which relates graphically the various heating and cooling demands for every temperature between O°F and 95°F for both occupied and unoccupied cycles. Line S-R is the Occupied Heating Line, Line P-G is the Unoccupied Heating Line, Line T-L-E is the Cooling Line. Heating BTUH's are read on the vertical axis below temperature scale. Cooling BTUH's are read from the vertical axis above the temperature scale.

The load profile can be used to analyze many things. However, for this discussion we are focusing on heating the building at O°F. The broken line B-C represents the heating load requirement considering the skin losses and fresh air requirements, but no credits are taken for people or lighting. It intersects the heating BTUH axis at point B (164,000 BTUH). This value will be the number that is typically used to size the heating equipment for building permit purposes. It is the number most heat loss calculation procedures will produce. It works out to be 16.9 BTUH FT^2, typical for today's well insulated building. Moving up the heating axis, the next important value we come to is point P, the unoccupied heating requirement of 85,000 BTUH on a O°F day. Here we are allowing the building temperature to float down to 55°F (point G)-, the mechanical fresh air systems are assumed to be turned off. This load is slightly less than ½ the calculated design heat loss value.

Finally, moving further up the heating axis, we come to point S the occupied heating requirement at O°F, including the fresh air load, but also allowing for heating contributions from people, lights, and power. It's value of 60,000 BTUH, a little more than 1/3 the value usually used to size heating equipment. Surprised? Follow along the Occupied Heating Line until you come to Point R. Read 22°F on the Temperature Scale. Point R represents the temperature where this building no longer needs air conditioning, but *begins* (emphasis on begins) to need heating. This building actually requires air conditioning down to 22°F, when it is fully occupied!

Figure 1



Conclusion

When working through the above analysis one must remember that it represents ideal situation, and assumes a heating and air conditioning system that can take advantage of the internal heat loads.

Enerjoy heating Modules located on the perimeter of the building can be part of a system designed to closely approximate the ideal situation. A central air conditioning system, typically a variable air volume system, handles the cooling for the interior zones and supplies tempered fresh air to the perimeter at all times. The radiant modules supply heat only where it is needed, and when it is needed. There can be as many thermostats as there are people or offices, if so desired. Operating costs will be low, because as Figure 1 reveals, very little heat is required to begin with. No monster boilers maintaining steam or water temperature occupying floor space sending dollars up the chimney; no oversized gas fired roof tops radiating heat to everything but the inside of the building.

Enerjoy radiant modules represent an optimum approach to heating commercial office space: low first cost, efficient use of energy, flexible zoning and easy adaptation to changing office arrangement and floor plans.