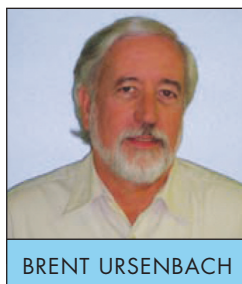


MECHANICAL CODE DISCUSSION

Internal Loads— Impact on Load Calculation



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As we continue the discussion on the Manual J, D and S code requirements for proper residential HVAC design, this issue will focus on internal loads. The sensible (heat) and latent (moisture) loads produced within a home directly impact the total cooling load. Manual J defines **Internal Loads** as *the sensible and latent loads generated by occupants, appliances, lights and plants*.

Considering the heat and moisture we add to a home by living in the structure, obviously we must account for these loads in the sizing of the air conditioner, but should we also include in the heating load, possibly reducing the furnace size? Answering this with another question; what time of day do we have the maximum heat loss, the coldest time of the day? Early morning, just before sun rise, when we typically generate the smallest internal load. No, we do not subtract internal heat gain from the heat loss calculation.

APPLIANCE LOADS

Manual J, Section 22, Internal Load Procedures provides two options to calculate the **appliance** loads. First is *Default Appliance Loads*, where general estimates are made. Summarizing several items:

- **Kitchen – refrigerator, range with hood**
1200 Btuh
- **Kitchen – refrigerator, range, dishwasher, vented dryer, clothes**

washer

2400 Btuh

- **Adjustment – no range hood, cooking, washing late afternoon**
+850 Btuh
- **Adjustment – large family using TV, Audio, computers, laundry**
+1400 Btuh

supply and exhaust airflow rates.

The second option is *Custom Internal Loads Estimate*, where each appliance used in the home is listed with Btuh produced by continuous use **and** the percent used per hour. Example:

- **Coffee maker – brewing**
Sensible Btuh – 1331
Latent Btuh – 717
% use/hr. 0.25
- **Coffee maker – warmer**
Sensible Btuh – 155
Latent Btuh – 84
% use/hr. 0.50
- **Refrigerator – 16 cubic feet**
Sensible Btuh – 1000
% use/hr. 1.00

As it's impossible to guess the type, number and usage of appliance in a home, the default method is typically the quickest, and safest method. Simply make a decision, adding reasonable appliance loads, based on the size of the house and number of laundry rooms.

OCCUPANT LOADS

It's recommended to count the number of bedrooms +1 for the number of

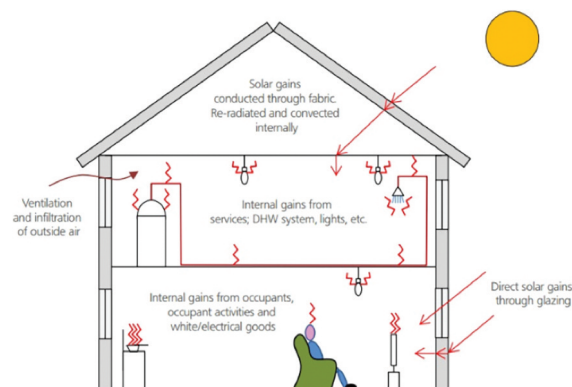
occupants. If you know it's a large family, count two for every bedroom. Do NOT add 25 people because there may be a big group on Thanksgiving – open a window. For homes where the homeowner regularly entertains with large groups, recommend a mini-split to pickup that occasional bump in the load, or a separate system or zone.

Load per occupant:

- 230 Btuh Sensible
- 200 Btuh Latent

OTHER INTERNAL LOADS

- Large numbers of plants – latent load



- Steam rooms and saunas
- Heat pump water heaters – (do not install inside the home)
- Craft or workshop rooms with heat producing equipment

Take the time to review this section in Manual J for additional direction, and resist exaggerating internal loads.

Please respond with comments or questions. bursenbach@gmail.com ■