HEATING LOAD CALCULATION INSTRUCTIONS

To accurately size a furnace, we must determine the heat loss of a structure. In most cases, we only need the whole house load, which is a simplified procedure from the detailed Manual J procedure. To determine the whole-house load, follow these steps and document your details on the Heating Load Calculation sheet.

Ideally, you should match the component description and determine loads that will reflect post-weatherization conditions, not pre-weatherization conditions.

Using Manual J: Residential Load Calculation book:

1. Determine the winter outdoor design temperature for your area using Table 1, and list this number at Design Temp:

2. Use an indoor design temp of 70 degrees and determine your design temp difference: 70 deg minus outdoor design temp = Temp Difference. Use the corresponding Heating Load Calculation sheet for your design temp difference (60, 65 or 70).

3. Use Table 2 for Sections A through F: For walls, floors, ceilings, windows and doors:

- Determine Construction # by selecting component description (first column) that most accurately describes the component. Insert number and letter under Construction #, 10-A for a hollow core door, etc.
- Use the Heat Transfer Multiplier (HTM) for the closest temp difference category to your actual temp difference, 60, 65 or 70 degrees.
- Measure the component and insert the area under Total Area. When all areas have been determined, subtract areas B and C (windows and doors) from A (gross wall area) to find D (net wall area).
- Multiply HTM times Total Area for B, C, D, E and F to determine the heat loss for each component (BTU/H Loss)

4. For G: Infiltration, use the projected post-Wx blower door CFM50 reading and divide by a factor found in the infiltration table on the back side of the calculation sheet factoring for building height (one to three stories) and for shielding (1-none, 2-light,3-moderate, 4-heavy and 5-very heavy) to

determine the approximate natural CFM. Heat loss due to infiltration by using the following formula: natural CFM X 1.1 X Temp Difference.
Example: 1800 CFM50 2-Story house with Moderate shielding, 65 Deg F Temp Difference:
1800 CFM50/ 10.4= 173 CFM natural X 1.1 X 70 = 12,370 btu's/hr heat loss

5. Section H: Sub Total Loss. Add up all the BTU/H Loss to this point.

6. Section I: Ducts. We need to account for heat loss through ducts. There are 42 pages of duct loss multipliers that can be used, but for simplification, we will use the ones most frequently encountered in Wx. Based on the type of duct system (trunk & branch, radial), the square footage of floor space (500 sq ft increments) and the location of the ducts (1-vented attic or kneewall space, 2-unconditioned basement or crawl space, 3-garage or open crawl, 4-slab), select a 'Heat Loss Factor' for the duct system. Then, based on the insulation value on the ducts, use the appropriate 'scaler' to bump up or bump down the 'heat loss factor' Ducts are assumed sealed with mastic and supply air temperatures are assumed 120 deg F. Example: A trunk & Branch duct system is located in a basement with an R-2 insulation. The house measures 1500 sq ft.

SUB TOTAL HEAT LOSS 43,567 BTUh

Heat Loss Factor		Scaler		Multiplier		
.10	x	1.74	=	.17 x 43,567	=	7,406 BTUh

7. Add Sub Total and Duct Loss to arrive at J: Total BTU/H Loss-Entire House. This is the total heat loss at the outdoor design temp and the minimum output needed from the new furnace.