Primary and Secondary Source Heat Systems

Primary source heat uses a combustion chamber or coil in the air system to provide either hot or cold air as needed. Secondary source heat provides a totally separate heat source to the skin, usually in the form of fin tube, radiant panels, or convertors. Secondary source heat is always better. If the engineer will allow "exposure" wiring, it not only allows you to put the heat at the skin where it belongs, but lets you cool or heat adjacent offices. It can be more expensive. Thermal terminals can be applied to either.

In the case of secondary, an end switch can be installed on the terminal when the damper is closed signaling that cooling is not required. The end switch is activated. This, then, turns on the secondary heat source. No relay or transformer is required. On these systems when unitary heating and cooling is employed, the temperature control contract is literally zero dollars.

On primary systems, a thermal terminal if available, will not only provide VAV cooling but will also sense hot air in the duct, take control from the cooling thermostat, and bring the unit to an adjustable constant volume hot air flow. This then gives individual room control on cooling and exposure zone control on heating. Because of high body and lighting, cooling loads in office buildings, and better wall construction, little heating is actually needed. Therefore, in my opinion, heating zone control is at best a luxury.

Also for primary heat systems, a convertible terminal is available. This is made in the form of a slot diffuser located in the ceiling over the window. It contains a heating sensing unit that will project hot air down the wall, but direct cooling on to the ceiling. This addresses one of the major problems in primary source heating jobs.

Some competitors are offering a so called "three bulb unit" to provide VAV heating and cooling on primary heat systems. In my mind, this adds to the problem. Knowing that stratification at low flow rates cause short circuiting and eventual unit shutdown, they control heating at about 90 degrees at the ceiling. They assume a 20 degree stratification gradient and thus will have 70 degrees at the desk. Stratification is affected adversely by high ceilings, slab on grade, high heating temperature differentials, low flow rates, bad wall construction and cold climates. With desk temperatures at 70 degrees, I have seen ceilings as high at 95-100 degrees and as low as 73 degrees. The three bulb unit cannot handle this variance, and will create a substantial desk top temperature variance, and in extreme cases, unit shutdown.

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