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Understanding Under Floor Air Distribution

August 24, 2015 - Green Buildings

Under Floor Air Distribution (UFAD) systems are gaining traction as an alternative to the traditional overhead ducted systems. As sustainable design features become regularly incorporated into the building design, UFAD is being utilized for its energy efficiency attributes and enhanced thermal comfort. The U.S. Department of Energy estimates that a UFAD system can result in 20-30% total energy savings in comparison to overhead HVAC systems.

UFAD systems use the underfloor plenum beneath a raised floor to provide conditioned air through floor diffusers directly into the occupied zone. The conditioned air is delivered at a warmer temperature, 63-65°F vs. 55°F for overhead systems, resulting in higher HVAC equipment efficiency. The supply air relies on natural convection and buoyancy forces, instead of mixing, for the heat transfer mechanism and to remove contaminants. The air is supplied with lower overall pressure drops, allowing the fans to conserve energy, thus reducing the fan horsepower and contributing to substantial energy savings. This comprehensive set of energy saving features are making UFAD systems an attractive option.

Additionally, the diffusers are designed for manual adjustments, allowing the occupant to maintain maximum control over the system. Traditional HVAC systems have an average thermal comfort satisfaction of 80%, whereas UFAD can satisfy 100% due to the personal controls. The diffusers can also be easily relocated to accommodate an evolving space.

UFAD should also be considered when designing a LEED certified building or WELL certified building. The system can help achieve various credits in the Energy & Atmosphere and Indoor Environmental Quality categories for LEED and is an Optimization in the AIR concept of WELL.

Upon introduction in the early 1990s, UFAD has undergone significant improvements and evolved into a reliable, sustainable, and occupant preferred alternative to the traditional overhead systems. Although the system may not be the preferred choice for every building, it should be considered when designing for office spaces, libraries, casinos, schools, and similar building uses. As a building engineering consulting firm, we are seeing a significant increase in the number of projects incorporating UFAD. The energy efficient design in combination with the occupant satisfaction makes UFAD an appealing option for both owners and occupants alike, and the environmental benefits are a bonus on top of it all. For these reasons, UFAD is definitely becoming the "new fad" in green building design.

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