Salesforce Tower HVAC System

Hines Conceptual Construction and WSP Group have patented a custom HVAC air conditioning system for Salesforce Tower that has been carefully constructed to take maximum advantage of the unique weather in the San Francisco Bay Area.

San Francisco's weather is particularly mild and provides substantial hours within the year for free cooling using outside air instead of mechanical cooling. This is achieved when the ambient outside air is below that of the internal space temperature by supplying increased amounts of outside air. This system takes advantage of that mild weather and brings in fresh air to cool the building without consuming the significant energy otherwise used to condition air to the appropriate temperatures. Providing outside air has an additional benefit: fresh air increases occupant well-being and productivity through higher indoor air quality.

Another unique feature of this system is that it has been designed to have a heating economizer. This is happens by utilizing the return air, which is typically at 77 degrees, running it through a heating coil thereby raising its temperature to 85 degrees to address heating needs of the building. Buildings within San Francisco often have a need for heating and or cooling at the same time, depending on which direction the building is facing. Northern facing facades will get little to no solar load and thus will need heating more frequently than Southern facing facades that receive a lot of direct and indirect solar radiation and require cooling. The typical tenant floor has been designed to include two mechanical rooms so that the systems can better serve the building load profile. The exterior loads on the building are variable while the internal loads are relatively stable. This system takes advantage of the warmer return air by utilizing it for heating the building as necessary.

Each unit has three or four overhead zones which provide heating or cooling via overhead ductwork to supply conditioned air to the exterior to address envelope load only. Each zone can react to its specific facade's needs (cooling or heating). The interior of the tenant space is conditioned using a highly efficient under floor air delivery system that allows the supply air temperature to be supplied at 65 degrees. This is different than typical overhead air handling systems that supply air at 55 degrees. Supplying air at 65 degrees allows air to be served from the floor level, minimizes mixing within the occupied zone, and directly cools the occupant for better thermal comfort. Floor mounted floor diffusers are adjustable by the tenants so that they have the control to either open or close the diffuser depending on their individual needs.

Supplying air at 65 degrees also allows for more hours within the year that free cooling (economizer) can be achieved using outside air as the cooling medium rather than mechanical cooling via chilled water.

In summary the main benefits of this custom HVAC system design for the Salesforce Tower are as follows:

1. Improved thermal comfort by providing personal comfort control
2. Improved ventilation efficiency and indoor air quality
3. Higher indoor air quality improves occupant satisfaction and increased productivity
4. Substantial energy savings from utilizing free cooling and heating
5. Reduced lifecycle building costs
6. Improved flexibility in providing and maintaining building services
7. Flexibility for interior space change – power, data and air can be reconfigured easily as these systems are part of the raised floor
8. Little or no noise from air distribution from the under-floor system due to air supply at low velocity
9. Increased floor to floor height with the 12" raised floor allows for more vision glass and higher levels of natural day-lighting of the space