

## STACK EFFECT

All high-rise buildings have stack effect during the winter season. Stack effect is the rush of outside air experienced when entering the building. These effects may or may not be present in the interior spaces and vestibules due to the time of year, type of building systems, the construction of the building interior walls, building openings and architectural configuration.

Some factors that can influence stack effect in a ground floor space that opens directly to the outside are:

- The temperature outside: The colder it gets the more stack effect a building will have. The hot air rises to the top of the building and the cold air enters the bottom levels through infiltration to replace this air.
- The pressure of the space with respect to the outside and the surrounding inside spaces: This is the relative positive or negative pressure with respect to the outside.
- The amount of outside air and total supply air being supplied to the space and surrounding spaces.
- How well are the spaces adjacent surrounding walls sealed off from the rest of the building?
- Whether or not there are full height sealed walls around the vestibule.
- The sealing of the doors to the outside and the doors to the surrounding spaces.
- The location of the entrance with respect to the rest of the building.
- Door openings from the space to the rest of the building (especially building lobbies and passenger elevators). Building and elevator lobbies are paths for air to move throughout the rest of the building.

Some Mechanical and Architectural techniques that can be provided to combat stack effect are:

- Installation of a revolving door.
- A vestibule to create a pressure break.
- The installation of an air curtain in the entrance vestibule to provide a pressure break.
- Make sure that a door does not open directly from the outside to an occupied area.
- Pressurization of the entry vestibule (introduction of outside air).
- Pressurization of the spaces surrounding the entrance vestibule.
- Adequate heating to the vestibule to offset the infiltration load.
- We review the location of doors and openings to surrounding spaces, other tenancies and the building lobby to ensure that the doors or openings can be closed off during winter to help combat stack effect.

Every project requires a unique solution, which may be a combination of the techniques identified. Close attention to this issue at the critical stages of the project will assure a successful installation.