

These application notes are for general guidance and information only. Users will need to undertake independent analysis for specific sites.

Summary

Outside air will infiltrate into a building through openings in the building envelope. Since outside air may need to be heated or cooled regardless of source, infiltration often imposes a significant load on the heating and cooling system. The total energy consumption is increased to overcome this additional load. Sustainable Energy Authority Victoria state "Infiltration is a more significant energy waste problem than is generally recognized. Many buildings have above average infiltration due to lack of detailing and draughtproofing."

In multi-story buildings, there are proportionally fewer outside doors and less roof space but the problem can be accentuated by the "stack" effect and more care must be taken with entrances.

The following guidelines should be observed to reduce infiltration, regardless of building height or configuration.

Windows

- Replace broken or cracked window panes.
- Ensure that all operable windows operate correctly. Rectify or replace all faulty mechanisms.
- Rehang misaligned sashes.
- Replace worn or broken weather strips or seals around operable windows. If possible, install weather seals where none existed previously.
- Caulk around window frames if cracks are evident.
- Consider posting a small sign next to each operable window instructing occupants not to open window while the building is being heated or cooled or install a solenoid switch to shut down the system.

Doors

- Replace any worn or broken weather seals.
- Install weather seals where none exist.
- Rehang misaligned doors.
- Caulk around door frames.
- Inspect all automatic door closers regularly to ensure they are functioning properly. Consider adjustment to enable faster closing.
- To maintain internal conditions, add door closers to all doors that lead to the exterior or unconditioned spaces.
- Take special care of air infiltration at lift landing doors and fire stair doors to avoid facilitating the "stack effect".
- Inspect seals on roller shutters and other overhead doors. Repair, replace or install as necessary.
- If the building has a loading dock but no door, consider installation of a motorised roller shutter to enable easier opening and closing.

- Consider placing small signs adjacent to doors that give access to exterior or unconditioned spaces, and adjacent to entry and delivery doors. Ensure that personnel are instructed on their use.
- Where practical, consider the introduction of an air lock at the front entry of a building and equip it with automatic, weather sealed doors.
- Where air locks or revolving doors are not practicable, consideration could be given to the use of air curtains as a means of maintaining the desired conditions. Care must be taken as the economic performance and viability of air curtains is somewhat questionable.
- In locations where strong winds occur for long periods, consider the construction of screens to protect the entry doors from direct prevailing winds.

Exterior Envelope

- Caulk, gasket or otherwise seal all exterior joints such as those between floor and wall or wall and roof, and between adjacent wall panels.
- Particular care should be taken where insulation is applied to the underside of the roof deck. Check that ceiling space is well sealed from the outside.
- Seal all service openings such as core holes and around services such as pipes, ducts and outside air openings.
- Where practical, cover evaporative cooling units when not in use or close the inlet registers.

References:

IHEA/VHA. Energy conservation guidelines. Vol 1. Design and management checklist for existing buildings. 1984.

Sustainable Energy Authority Victoria. Building energy brief for commercial and public buildings. 2003