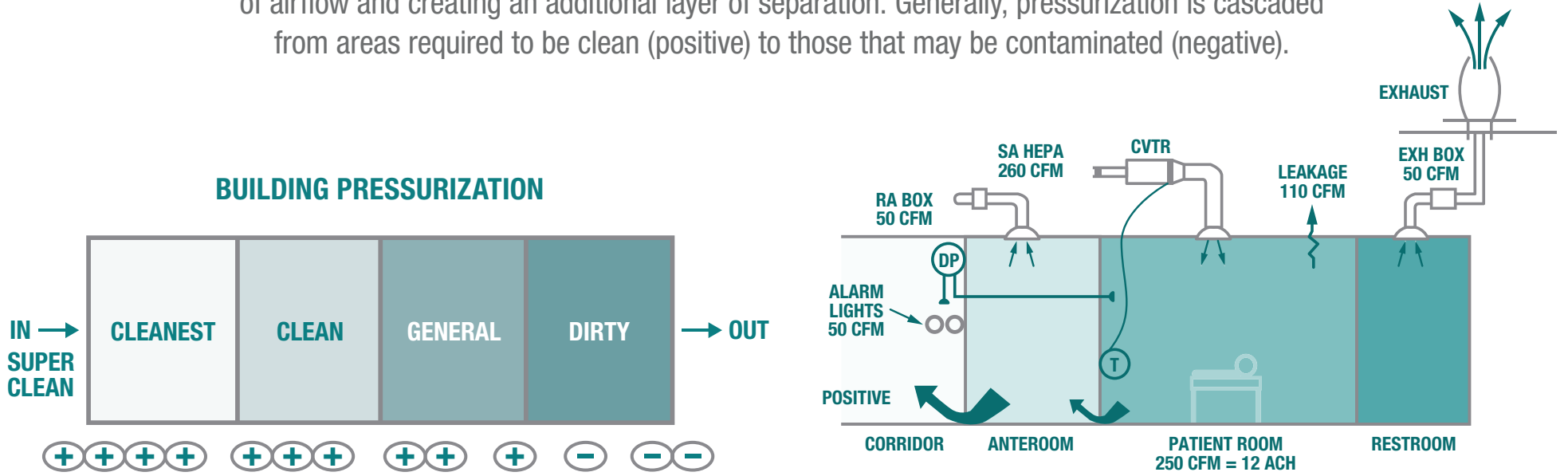


# Ceiling Airflow Containment and Control

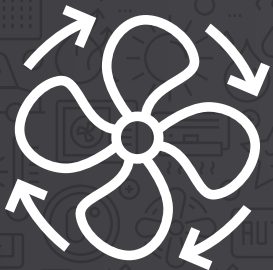
The movement of air within a space for the purpose of heating, cooling, and ventilation is fundamental to the design of modern buildings.

## Awareness of how air moves within and between spaces is increasing as designs look to improve indoor air quality and create healthier spaces

Pressurization in a building is useful because it gives designers a way of controlling the direction of airflow and creating an additional layer of separation. Generally, pressurization is cascaded from areas required to be clean (positive) to those that may be contaminated (negative).



## Ceilings represent the largest surface area to address air leakage



With heightened awareness around the spread of infectious disease, the right ceiling tile with an integral seal can help reduce air leakage at the ceiling plane.



## Summary of flow rates and pressure differences per ceiling tile type

### AIRBORNE INFECTION ISOLATION ROOM

CEILING TILE TYPE	HVAC NET FLOW (CFM)	PARASITIC LEAKAGE THROUGH CEILING PLANE	PRESSURE DIFFERENCE BETWEEN SPACES (PSF)
STANDARD PANELS	-65	-38	-0.056
AIRASSURE™ PANELS	-55	-8	-0.058
AIRASSURE PANELS WITH CLIPS	-55	-5	-0.06

Results show that as the ceiling is made tighter, the flow rate through the ceiling tiles reduces.

### ADJACENT ROOM WITH DUCTED SUPPLY & DUCTLESS RETURN

CEILING TILE TYPE	HVAC NET FLOW (CFM)	AIRFLOW THROUGH CEILING TILES PER ROOM (CFM)	AIRFLOW THROUGH RETURN DUCT PER ROOM (CFM)
STANDARD PANELS	0	-61	-136
AIRASSURE PANELS	0	-7	-189
AIRASSURE PANELS WITH CLIPS	0	-5	-191

Even without pressurization, results show that ceiling leakage decreases with tighter ceiling tiles.

### PROTECTIVE ENVIRONMENT ROOM

CEILING TILE TYPE	HVAC NET FLOW (CFM)	PARASITIC LEAKAGE THROUGH CEILING PLANE	PRESSURE DIFFERENCE TO ADJACENT ROOM (PSF)
STANDARD PANELS	65	-71	-0.058
AIRASSURE PANELS	55	-12	-0.06
AIRASSURE PANELS WITH CLIPS	50	-8	-0.054

The flows required to maintain pressurization are reduced with the tighter ceiling (by 15cfm).

With AirAssure™ ceiling tiles, leakage is greatly reduced, thus the airflow required to pressurize the space or maintain pressure differential is reduced. Using tighter fitting ceiling tiles gives the designer and operator **more control** and allows for spaces to function more easily in line with their intent.

## Reducing parasitic leakage reduces the risk of contaminants being drawn back into the occupied zone

**63cfm**      **10-15cfm**      **40%**

REDUCTION IN PARASITIC LEAKAGE WITH AIRASSURE™ CEILINGS

AIR SAVED WITH AIRASSURE CEILINGS

INCREASED AIRFLOW TO RETURNS

UP TO THESE LEVELS, DEPENDENT ON SPECIFIC SCENARIO

Overall, using tighter-fitting ceiling tiles with reliable, manufacturer applied gaskets give the designer more control and allows for spaces to function more easily in line with their intent. There is also the added benefit of using less energy and potentially smaller HVAC systems to serve the same purpose.

Source: RWDI/Songbird Life Science, "Ceiling Airflow Containment and Control," Michael Carl, M.A.Sc, P.Eng, Duncan Phillips, Ph.D, P.Eng, Greg Thompson, M.A.Sc, Chuzi Ikpe, M.Eng. For more information about Armstrong solutions to create healthier spaces or to read the full white paper, visit [armstrongceilings.com/healthyspaces](http://armstrongceilings.com/healthyspaces).