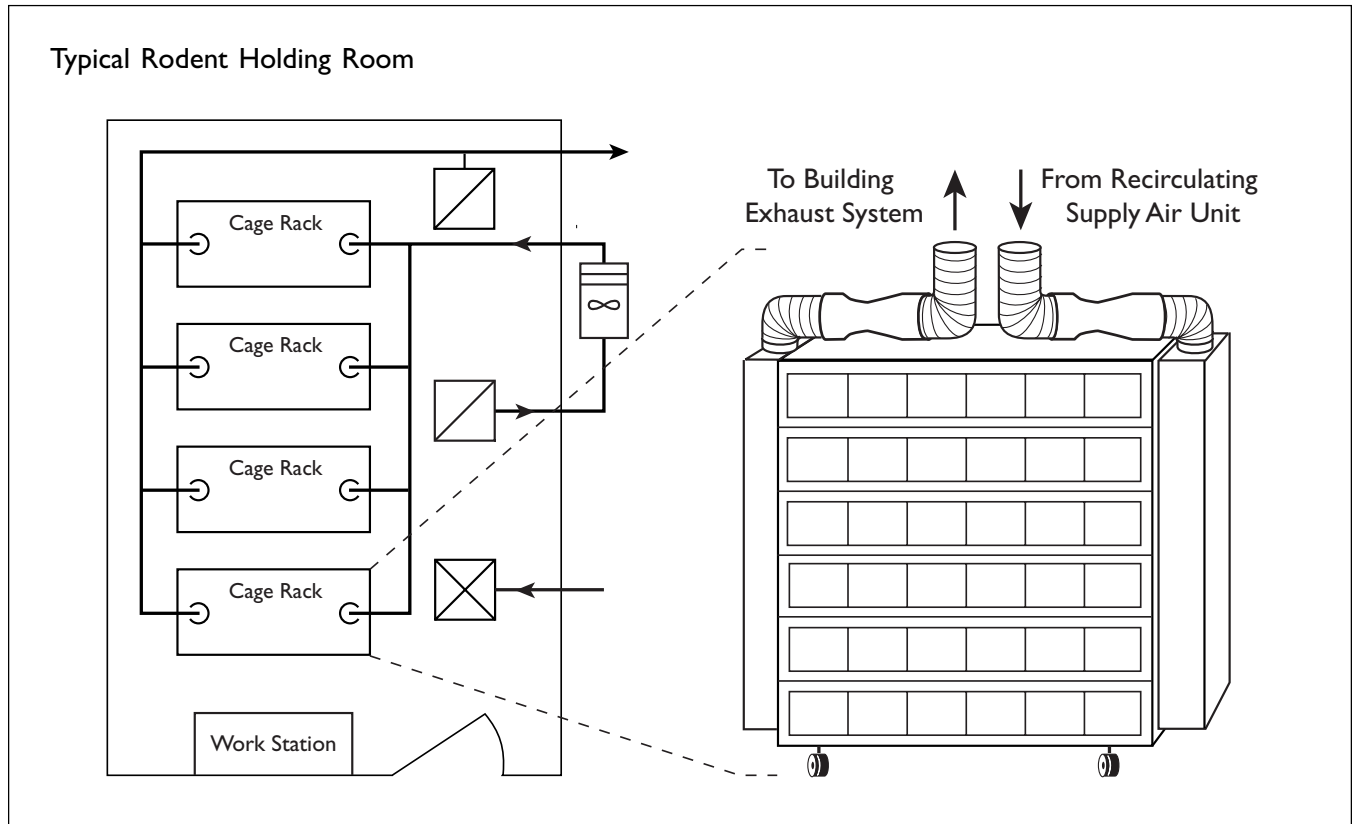


Connecting Ventilated Cage Racks to Building Systems

Reducing Odors and Airborne Allergens in Rodent Holding Rooms



Benefits of Self-balancing, Pressure Independent Valves

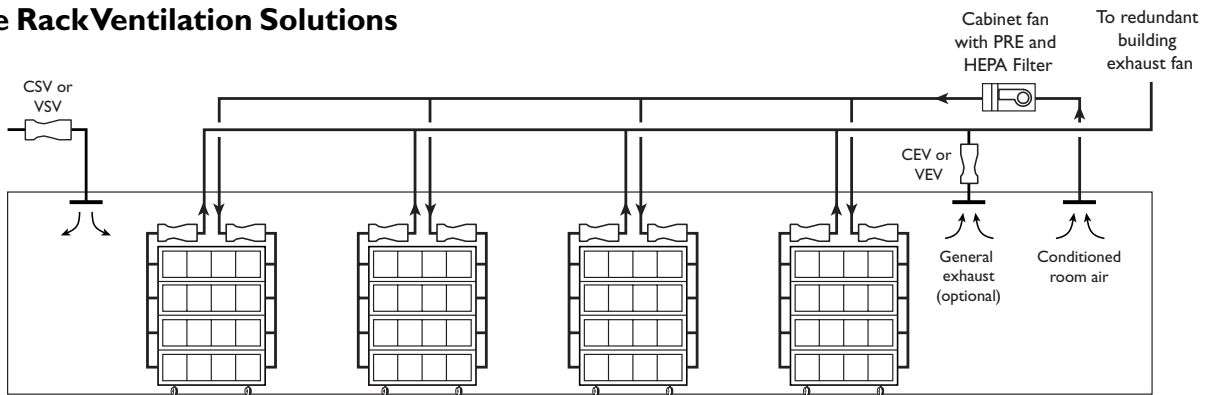
Compared to racks with fans:

- ◆ Saves money
 - First cost of fans
 - Operating cost of fans
 - Eliminates heat load of fans
 - Exhausts animal heat load out of building
 - Allows for lower air change rate in room
 - No cords, outlets or emergency power required
 - Streamlines work flow (no fans to remove)
- ◆ Safer, healthier environment
 - Exhausts odor and airborne allergens out of building
 - Reduced noise and vibration
- ◆ Eliminates thimbles and capture hoods that:
 - use room air (excess energy)
 - require cumbersome balancing

Compared to blade dampers, boxes or flow measuring devices:

- ◆ Saves money
 - No recalibration
 - No rebalancing
 - No preventative maintenance
 - No power or pneumatics required
 - Costly emergency power not required
- ◆ Safer – high performance pressure independence
 - Instantaneously maintains correct flows
 - Much more reliable and accurate
 - Not affected by dust, dander, hair
 - Repeatable, accurate performance
 - Increased stability protects animals and personnel

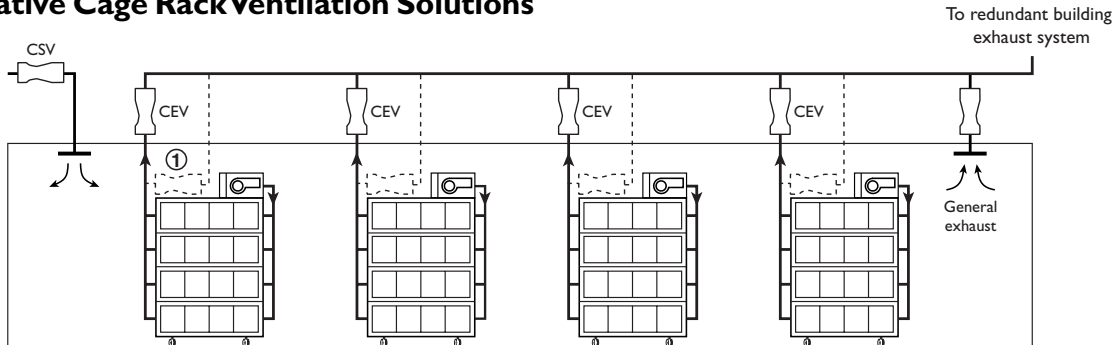
Cage Rack Ventilation Solutions



The Ultimate Flow Control Solution

- ◆ Automatically maintains rack and room flows when rack(s) are removed from duct
- ◆ Saves energy
 - Air change rate in room can be reduced
- ◆ Provides simple feedback to building management and environmental monitoring systems
- ◆ Eliminates rack supply and exhaust fans
 - Reduces equipment and operation cost
 - Reduces noise and vibration (improved animal environment)
 - Reduces heat load in holding room
 - Reduces work load when moving racks

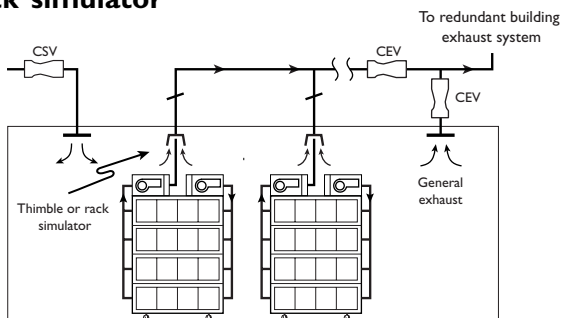
Alternative Cage Rack Ventilation Solutions



Alternative 1: Rack Supply Fans, House Exhaust

- ① Venturi Valve can be located either in interstitial space (above ceiling) or mounted on or near racks

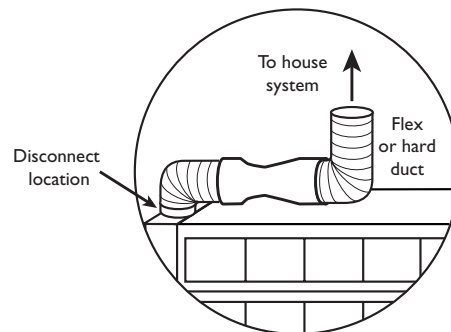
Individual supply fans with thimble or rack simulator



Alternative 2: Rack Supply and Exhaust Fans

- ◆ Allows for disconnection of racks from system without affecting flows of remaining racks on manifold
- ◆ Disadvantages with this approach:
 - Cost of exhaust fan and its operation
 - Exhaust fan noise, vibration, heat load
 - Limits the ability to reduce air change rate to lowest minimum possible

Rack Disconnection and Mounting Detail



- Room and remaining rack flows not affected by disconnection of rack(s)
- Valve mounted in interstitial space, on rack or supported in room

Legend

CEV	Constant exhaust valve	VEV	Variable exhaust valve
CSV	Constant supply valve	VSV	Variable supply valve