

# Ventilation Tactics: Horizontal vs Vertical

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**Ventilation** is a process of ongoing exchange of the atmosphere inside a structure with that which is outside. Effective ventilation dramatically assists in the attack, control and extinguishment of a structure fire.

## **Objectives for Ventilation**

1. **Vent for life** is used to assist in the immediate rescue of victims by removing heat and smoke to provide fresh air for breathing and improve visibility.  
*Action:* Cut over stairways and hallways.
2. **Vent for fire** allows attack teams to enter and operate within a structure.  
*Action:* Vent windows ahead of the nozzle and near the fire.
3. **Vent for Safety** is used when conditions prevent immediate entry.  
*Action:* Compartment ventilation from the exterior.

## **Horizontal vs Vertical Ventilation factors to consider**

1. Size of the fire
2. Location of the fire
3. Construction of the building
4. Effects of weather (wind, humidity, convection currents)
5. Possible victim locations

**Horizontal Ventilation** enables air flow to discharge dangerous gases, smoke and heat.

## **Horizontal Ventilation Advantages:**

- Quick to implement
- Can be effective on a single family dwelling up to 1600 sq. feet
- Effective with winds 25 mph or less
- Effective up to 25 floors in a high rise building

**Natural Ventilation** takes advantage of convection currents and wind. This is accomplished by opening doors, windows, and skylights. Effectiveness is limited depending on the proximity of the ventilation opening, number and size of openings, direction of wind and humidity.

**Note:** Removing screens off windows can increase efficiency by 50%.

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**Mechanical Ventilation** can dramatically assist natural ventilation by utilizing blowers, hose lines and ventilation systems. This will allow exit through pre-selected or controlled openings, assist in overcoming the effects of humidity, reduce the time necessary to ventilate and allows the use of ventilation openings remote from the contaminants to be removed.

**Positive Pressure Ventilation (PPV)** utilizes ventilators to force air into a structure releasing heat and smoke in a quick controlled manner.

Ventilators move 30% more air when left in place.

## **Decision factors for PPV:**

1. Life hazard
2. Location and extent of the fire
3. The availability of hose lines
4. The degree of confinement
5. Environmental factors in the vicinity of the fan
6. Available equipment

**Vertical Ventilation** takes place by opening the roof with cuts or existing roof openings. If it's unsafe to put firefighters on the roof, it's unsafe for firefighters to enter the structure. Keep in mind that lightweight roofs fail in as little as 8-10 minutes. Think defensive cuts on lightweight roofs. Identify roof construction and make a 45 degree inspection cut.

## **Decision Factors for Vertical Ventilation:**

1. Know the warning signs of an unsafe roof (melting asphalt or spongy)
2. Read the roof. Firewalls, ventilators, skylights, vent pipes, sagging, or bubbling.
3. Must be a coordinated effort with fire attack crews
4. Have hose lines in place
5. Adequate personnel on the roof (minimum 2 for a single family home and 3 for a commercial structure).
6. Two escape routes with ladders
7. Necessary tools and equipment
8. Identify differences between light weight and conventional. Do not cut over lightweight construction. Cut over the fire as close as possible.
9. Plan your cuts according to the roof construction.

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### Advantages of Vertical Ventilation:

- Releases heat, smoke and gases
- Minimizes the change of flashover
- Reduces the potential for backdraft
- Aids firefighters in locating victims
- Helps firefighters locate the seat of the fire

### Roof Type Examples:

