



## Hyattsville Volunteer Fire Department Training

### Positive Pressure Ventilation (PPV) Concepts

# HYATTSVILLE volunteers

## Tempest Blower and Safety

- Carefully read the Operation and Maintenance Manual before attempting to operate, service or disassemble any part of your ®*TEMPEST POWER BLOWER*.
- **Never** operate the unit when mentally or physically fatigued.
- Stay away from rotating parts; avoid wearing loose jackets, shirts, and ties. Keep hands and feet away from the blower.
- Keep all unauthorized personnel at a safe distance from the blower.





## Tempest Blower and Safety

- Keep all guards in place. **Never** make repairs while the unit is running. **Never** operate if any guard or grill is not in place.
- Always wear eye protection. Loose debris can be picked up in the air stream and flown in the air.
- Hearing protection is required. Motor and air noise may exceed safe DB levels.





## Tempest Blower and Safety

- Gasoline is extremely flammable and is explosive under certain conditions. To prevent fire hazards, do not place flammable objects close to the engine.
- Do not overfill the fuel tank. After refueling, make sure the tank cap is closed properly and secured. If any fuel is spilled, make sure the area is dry before starting the engine.
- **Never** operate gasoline-powered blowers in an enclosed or confined area. Exhaust contains poisonous carbon monoxide gas; exposure may Cause loss of consciousness and may lead death.





## Tempest Blower and Safety

- Oil: 10W-30
- Fuel: 86 Octane or higher



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## Tempest Blower Operation-Start

- Set the fuel valve in the **“ON”** position.
- Set the stop switch to the **“ON”** position.
- Set (if equipped) the choke lever to the **“CLOSED”** or **“STARTING”** position.
- Set the throttle lever to the **“STARTING”** position.
- Grasp the starter handle, take up the slack, and pull the rope briskly. Let the rope return slowly. Repeat as necessary until the engine starts. Do not over pull the rope.





## Tempest Blower Operation-Start

- If equipped with a choke, move the choke lever to the  $\frac{1}{2}$  position until the engine runs smoothly and then to the open or off position.
- Move the throttle to the desired speed.
- **NOTE:** Some blowers may tend to “walk” if the throttle is not in the full position.



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## Tempest Blower Operation-Stop

- Move the throttle to the “IDLE” position.
- Move throttle lever to the “OFF” position unless equipped with a stop switch. If a stop switch is provided, turn the switch to the “OFF” position.
- If equipped with a choke, move the choke lever to the ½ position until the engine runs smoothly and then to the open or off position.
- Move the throttle to the desired speed.
- **NOTE:** Some blowers may tend to “walk” if the throttle is not in the full position.





## Positive Pressure (PPV) Concepts

- PPV relies on two principles,
  - (1) a cone shaped air pattern, and
  - (2) pressure. To accomplish Positive Pressure Ventilation, the blower is placed on the outside of the structure. It is positioned so that the cone shaped air pattern created by the blower completely seals the entrance opening (*Figure 5.1*). When this seal is achieved, the air pressure is increased quality at all points inside the structure.

## PPV Concepts

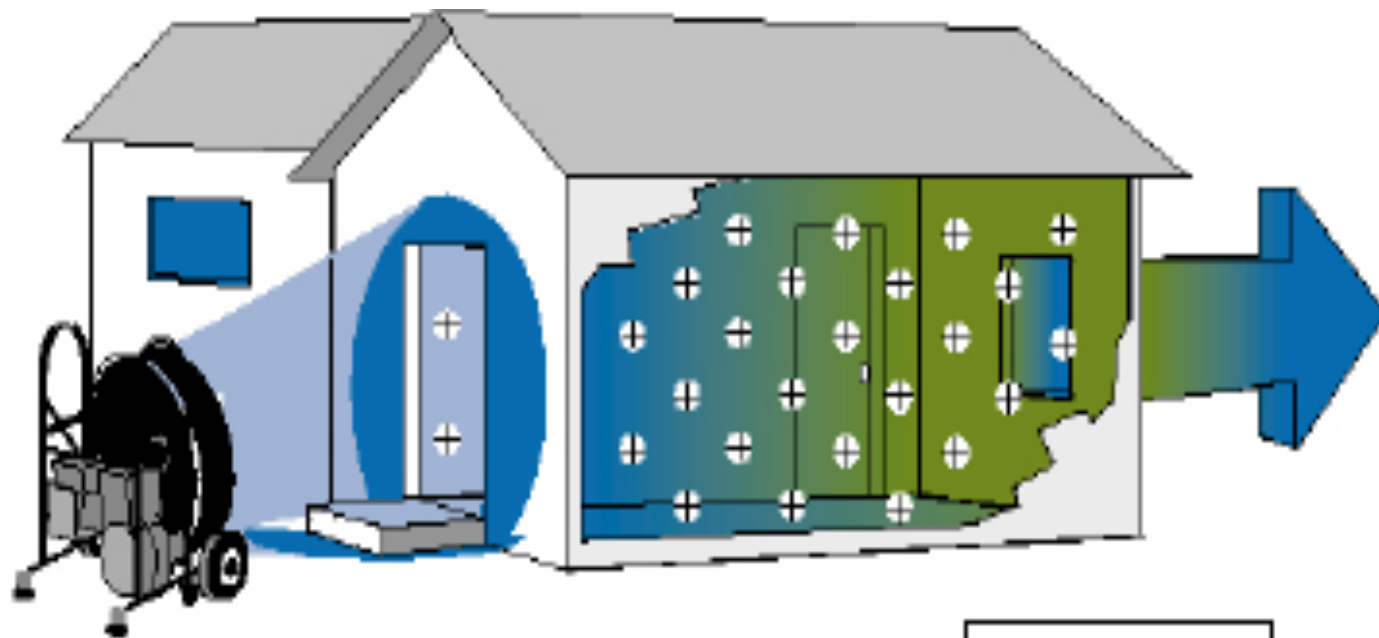


Figure 5.1



## PPV Concepts

- When an exhaust opening is created, all of the interior air moves in one mass towards it.
- The result is fast, efficient ventilation of the entire structure.
- As with any new technique, Positive Pressure ventilation requires training and education in order to be implemented properly and safely.



## PPV Concepts: In-line Multiple Blowers

- The use of more than one blower can dramatically increase airflow (volume) and reduce the time necessary to complete a ventilation operation.
- For standard entrance openings (that is, door openings of three feet by six and one-half feet), **maximum effectiveness is achieved by placing two blowers "in-line"** with each other.
- As in (*Figure 5.1*), blower A is positioned about two feet from the entrance opening. This ensures that all of the pressurized air from the blower enters the building, yet allows sufficient room for personnel to enter and exit the building.



## PPV Concepts: In-line Multiple Blowers

- Blower B is then positioned behind blower A.
- The proper location for blower B is determined by the distance necessary to cover the entrance opening with pressurized air.
- Blower B covers the entrance opening with pressurized air and increases the capacity of blower A by approximately ten percent.



## PPV Concepts: Side by Side-Multiple Blowers

- For standard entrance openings, multiple blowers in a parallel (side-by-side) configuration are less effective than multiple blowers in an in-line configuration.
- However, for large entrance openings, multiple blowers in a parallel configuration (*Figure 5.3*) should be used due to their combined ability to cover the larger opening with pressurized air.
- The size of the opening dictates the numbers of blowers necessary to cover the opening with combined cones of pressurized air.

## PPV Concepts: Side by Side-Multiple Blowers

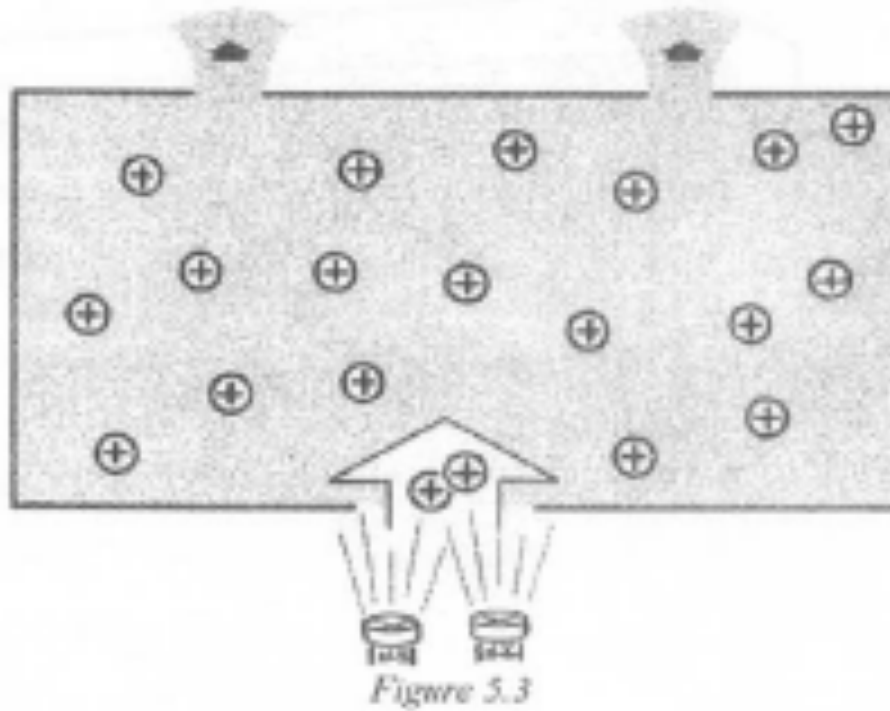


Figure 5.3



## PPV Concepts: Large Openings

- Remember that some openings (such as loading dock doors) can be reduced in size by partially closing the door to reduce the size of the entrance opening that must be covered by pressurized air.
- Depending on the number of blowers that are available, large areas may be effectively ventilated by using a combination of parallel (proper coverage of the opening) and in-line (increased volume) blowers.



## PPV Concepts

- Due to the size of the "cone" of air issued from a blower, small blowers need to be moved back from entrance openings while larger blowers should be placed closer to entrance openings to properly cover the opening with pressurized air.
- By tilting blowers back about 17° maximum, the entrance opening may be more effectively covered with the cone of air. All Tempest Blowers have "tilt-back" features to facilitate operation.
- However, if a blower cannot be tilted opening with pressurized air, move it as far back as possible from the entrance opening. This technique can be used effectively on raised porches to achieve a seal.



## PPV Concepts: Blower HP

- A single blower powered by 1/3 HP to 4 HP electric motor or gas engine is most effective when utilized with exhaust openings that are three-fourths or slightly less than the size of the entrance opening.
- A single blower powered by 5 HP, 5.5 HP, or 6.5 HP engine is most effective when utilized with exhaust opening that is the same size or slightly larger than the size of the entrance opening.



## PPV Concepts: Blower HP

- A single blower powered by 10 HP or 13 HP engine is most effective when utilized with exhaust opening that is about one and one-half the size of the entrance opening.
- Multiple blowers powered by 5 HP or larger engines in parallel or series configurations are most effective when utilized with exhaust openings that are approximately twice the size of the entrance opening.



## PPV Concepts: Exhaust

- If a gasoline-powered blower is being utilized and a gasoline-exhaust odor is noticeable inside the building or area to be ventilated, this is an indication that the building's exhaust opening is not large enough. The gasoline-exhaust odor should disappear by increasing the size of the building's exhaust opening (opening another window, door, etc.)



## Practical Session

- Demonstrate the Safety Guidelines
- Demonstrate starting and placing the fan in service
- Demonstrate shutting the fan down and making the fan ready for the next use.