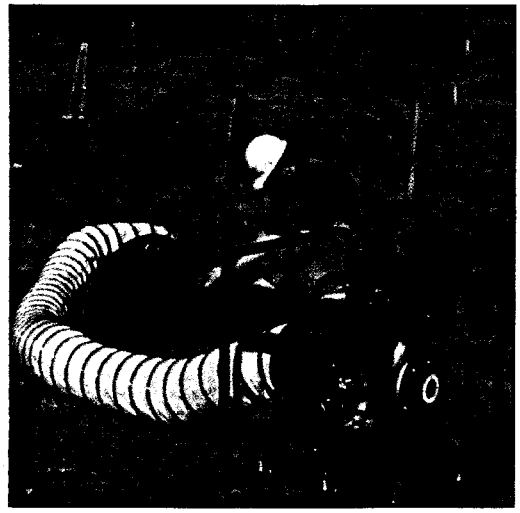

General Equipment Co.

USING VENTILATION BLOWERS IN CONFINED SPACES

Blowers can minimize the dangers while boosting productivity 25 percent or more.

Sixty to 100 people die each year because of improper ventilation in confined spaces. At least 6,000 more workers are injured, according to "The OSHA Warning," a construction safety newsletter. The sad truth is if individuals would only follow the proper procedures and adhere to OSHA regulations when making confined space entries, this number could be drastically reduced.

According to 29 CFR 1910.146, three criteria determine a confined space. First, the space is large enough and configured so that a person can bodily enter and perform assigned work. Second, the space has limited or restricted means for entry or exit. And finally, the space is not designed for continuous occupancy by work personnel.

Ventilation blowers are an integral part of a proper confined space entry. Too often, workers believe that by using a gas monitor they can eliminate the need for a ventilation blower. The problem is, by the time the monitor goes off, there is already a problem. Monitors provide valuable information but do nothing to prevent the atmospheric conditions from deteriorating.

Blowers, on the other hand, provide fresh air on a continuous basis, maintain the atmosphere at acceptable oxygen levels, and provide an avenue for the evacuation of contaminated air. We recommend that, whenever possible, blowers should run continuously. Obviously, workers will not enter a confined space until the oxygen level is within acceptable limits. With continuous ventilation, the oxygen level and atmospheric conditions will be maintained at safe levels with only minor fluctuations.

In addition to minimizing the danger of an emergency, blowers offer increased productivity. If air recirculates frequently, temperatures are lowered and then stabilized and employees are more comfortable. It is easier to breathe, so workers take fewer work breaks and work faster. A job may be completed as much as 25 percent faster, and the higher productivity has a direct effect on bottom-line costs. It is necessary to remember that other processes, such as welding, may affect the atmospheric conditions and in turn require extra blowers.

How Blowers Work

Blowers draw in air from one area, compress it, and direct it into a confined space under a resulting static pressure and cubic feet per minute (CFM) delivery rate. Blowers operate in one of two ways: by forced ventilation or by suction draft. The more popular method is to provide fresh air to the confined space (forced ventilation). In doing so, the atmosphere is diluted and the contaminated air is forced out.

Duct position is critical. Directing the output toward a wall provides for more even air distribution and develops a good circulation pattern. Properly circulating the air minimizes the potential for hazardous gases to locate in corners. When air is drawn out of a confined space, the area lacks circulation, severely limiting the effectiveness of removing contaminated atmospheres from the corners. In addition, air removed from a confined space must be replaced. The contaminated air that is removed will generally be replaced by the air right around the opening of the space. Because no circulation pattern exists, what often occurs is the blower will remove that air again, rather than drawing the contaminated air from the corners.

Before selecting a blower, answer these questions:

1. Is the space hazardous or non-hazardous? If the space contains hazardous atmospheres as defined by the National Electrical Code or offers the potential for explosion, equipment designed for hazardous locations must be used. Basically, the differences between hazardous and non-hazardous equipment are spark-proof construction and the ability to dissipate static electricity properly. Hazardous location equipment is designed to control the potential for a random spark igniting an explosion. Unless clearly marked, no blower is designed to operate in a combustible area or to transport hazardous gases.

2. What is the size and configuration of the space? A large space naturally requires a larger blower. And if a space contains several obstructions, airflow will be restricted, requiring greater blower capacities.

3. How much duct is needed? The configuration of the confined space will often dictate the required length of duct. Duct length also affects the performance of the blower. The minimum safe duct diameter is 8 inches and maximum recommended duct length is 25 feet. If the space requires the use of a longer duct, use a higher horsepower blower with a large diameter duct.

Most confined spaces require a minimum of two bends in the duct to maximize circulation, yet every bend decreases airflow. Purchasers should check whether certified airflow delivery rates are given for two 90-degree bends.

In addition, tears in the duct or an accumulation of dirt will reduce performance.

4. What kind of power source is required? A confined space often has only one option for power. Blowers are available with gasoline, pneumatic, or AC and DC electrical power options.

5. What is the available budget? Money is a factor in any purchasing decision. Generally speaking, less expensive blowers offer lower performance because of smaller size, and less available horsepower.

When these questions have been answered, and needs have been assessed, operators can make an informed purchase. There are essentially three main differences in blowers—price, power source, and CFM delivery.

Understanding CFM

In the most basic terms, CFM delivery is a measurement of the amount of air being pushed into the area. It provides insight into the capacity of the blower.

Published delivery rates should be certified by independent laboratories according to established test procedures. Don't be afraid to get copies of the test reports for insurance purposes. It is not uncommon for insurance companies or contractors to be interested in seeing the test reports. If a manufacturer has nothing to hide, it will be more than willing to share the reports.

Common sense and simple math indicate that a larger confined space area requires a higher CFM delivery rate. While 1910.146 does not specify how many times the air must be recirculated per hour, many states have regulations addressing this concern. For example, Minnesota's state OSHA regulations require that air be exchanged a minimum of six times per hour. If a blower's capacity is 1,000 CFM, simple math says it delivers 60,000 CFM per hour. If a confined space is 10,000 cubic feet in size, the blower should be sufficient to exchange the air six times per hour. However, this assumes the blower is running at 100 percent efficiency. Workers must be aware of factors that will affect the blower's performance.

Operators are often unsure of the size or number of blowers to purchase, and in states with no OSHA department regulations there is little guidance. I hesitate to suggest a number of times air should be exchanged; each situation must be evaluated individually. If supervisors would not be comfortable going into a confined space with the ventilation they have in place, they should not expect workers to make an entry. Common sense is the best gauge.

The overall increase in awareness of occupational safety has been dramatic in the last decade, but there is still room for improvement. People are still dying in confined space accidents. OHS

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