

Using Portable Spot Air Conditioners in Industrial Applications

Cooling People, Processes and Equipment

In today's highly competitive manufacturing sector, companies are constantly looking for new ways to increase productivity.

Overheating of people, processes or equipment can result in lower productivity levels.

The Problem: Lower Productivity Due to Overheating

Even when a manufacturing plant or other industrial facility has an efficient, large-capacity central air conditioning system, some areas may still be subject to high ambient temperatures. Employee productivity in these hot spots can drop substantially, and in some cases, OSHA violations may occur.

Similarly, when products exiting a hot manufacturing process take too long to cool off, product quality and cycle times can suffer, resulting in lower output.

High ambient temperatures can also affect the performance of heat-sensitive equipment, another potential source of reduced productivity.

The Traditional Solution: Electric Fans or Evaporative Coolers

Often these types of localized heat-management problems are addressed by electric fans or portable evaporative coolers, also called swamp coolers. Both of these methods, however, have serious drawbacks.

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Fans are relatively inexpensive and easy to use, but in many cases they do not provide adequate cooling. Doors or windows are sometimes opened to bring in outside air, although this is not always a reliable solution. Cross-ventilating doors or windows are not available in every situation, and even when they are available, leaving them open can create a security problem. Also, the outside air may not be consistently cool enough for the intended application.

Another disadvantage of fans is that they can pick up and blow dust, grit or other foreign matter through the air, contributing to possible eye injuries.

Evaporative coolers, on the other hand, usually have sufficient cooling capacity, but they do not perform well in humid climates. More importantly, they add significant amounts of moisture to the air, which can be detrimental to a wide variety of applications, as well as a cause of shorter equipment life due to corrosion. The excess moisture can also condense on the floor in front of the cooler, creating a slip-fall hazard.

In addition, evaporative coolers require special care to prevent mold buildup, and lack filter systems to protect them from becoming clogged with the dust or other airborne particles found in many industrial environments.

Commercial portable spot air conditioners were specifically developed for industrial applications.

The New Solution: Commercial Portable Spot Air Conditioners

Fortunately, the introduction of a relatively new class of commercial portable spot air conditioners, also called spot coolers, offers an efficient and cost-effective alternative to both electric fans and evaporative coolers. This type of air conditioner was specifically developed to meet the needs of industrial applications.

Air-Cooled Vs. Water-Cooled—and Portable Vs. Ceiling-Mount

Spot air conditioners are available in air-cooled and water-cooled models. Water-cooled air conditioners are more efficient than air-cooled ones, but they require a continuous water supply that makes them less flexible than air-cooled units. Also, few models are available in large enough capacities for most industrial applications.

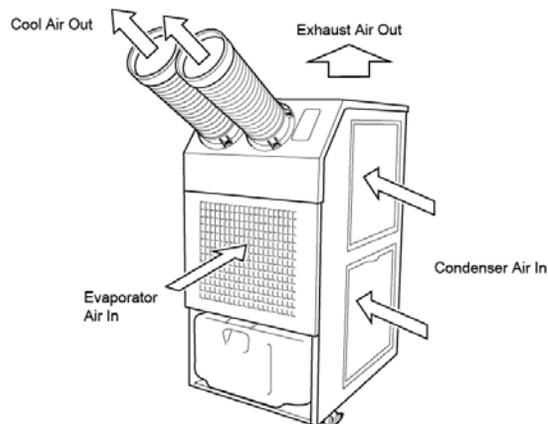
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Spot air conditioners are also available in portable or ceiling-mount configurations. Most portable units can be mounted above a facility work area if needed, but dedicated ceiling-mount models have special features that make them more suitable for server-room or office applications, not industrial ones.

For the purposes of this paper, the terms “spot air conditioners” or “spot coolers,” which are used interchangeably, refer only to air-cooled portable systems.

How Portable Spot Air Conditioners Work

Portable spot air conditioners are compact, self-contained units that combine a compressor, condenser and evaporator in a single cabinet. Refrigerant flows through copper tubing from the compressor to the condenser and then to the evaporator.



Portable spot air conditioners are compact, self-contained units.

A fan blows over the evaporator, pushing out cold air, while a second fan blows over the condenser, pushing out hot exhaust air. In many industrial installations, the exhaust air is allowed to dissipate into the ambient air. In others, a flexible or semirigid duct can be attached to the top of the unit to direct the exhaust air upward toward the ceiling or, if there is a drop ceiling, into the crawl space above it.

Most models are ruggedly built and have multiple air filters to prevent dust or grit from entering the unit, allowing safe, reliable operation in harsh conditions.

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In addition to cooling, spot air conditioners are very efficient at simultaneously removing excess moisture from the air. The moisture collects either in a drain pan that is emptied by means of a gravity-fed tube, or a condensation tank that can be emptied manually or automatically via a pump.

Benefits of Portable Spot Air Conditioners

The benefits of portable spot air conditioners include:

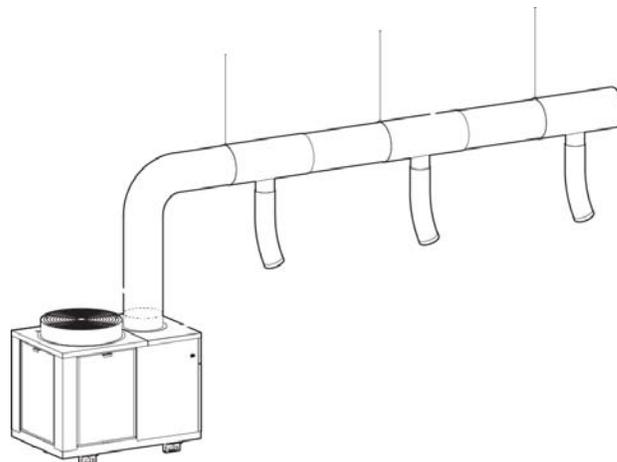
- Quick, easy installation
- Compact size
- Cost-effective—cool only areas that need it
- Flexible and customizable
- Easy to move whenever requirements change

Portable spot air conditioners are quick and easy to install, and have a high degree of flexibility.

The most important benefit of portable spot air conditioners is their quick and easy installation. In most cases, installation consists of no more than rolling a unit in and positioning the exhaust and cold-air ducts. The compact size of the units facilitates integration with other equipment and saves valuable floor space.

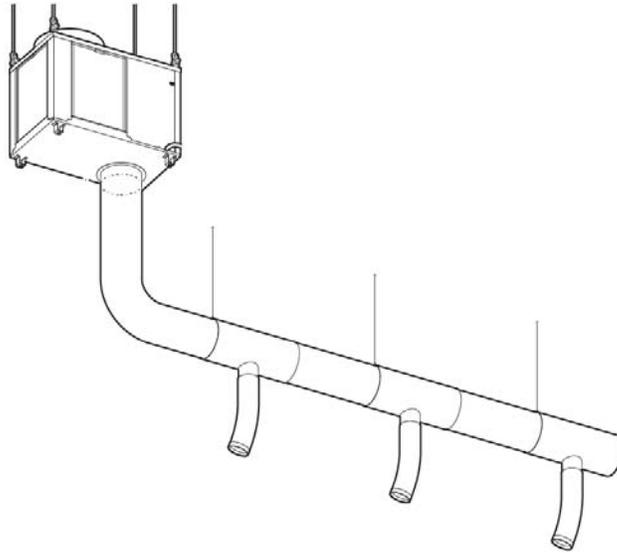
Another important benefit of portable spot air conditioners is their flexibility. Whenever needs change, such as when a production line is reconfigured, a unit's airflow can be redirected simply by repositioning the cold-air duct, or the unit itself can be quickly and easily moved to a different location.

Depending on the model, the cold-air duct can be up to 80 feet long, allowing easy installation on crowded factory floors, or remote cooling of difficult-to-reach areas.



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Some models have two cold-air ducts. Other models have single cold-air ducts that can be split into two, or configured with as many as eight T-section drops, one every 10 feet, to efficiently deliver cooling only to the areas that need it.



Models are also available with eyebolts that allow easy overhead mounting.

Portable spot air conditioners are used to increase productivity in a wide variety of industrial applications.

Where Portable Spot Air Conditioners Are Used

Portable spot air conditioners are used in a wide variety of industrial applications. Examples include:

Production and assembly lines, warehouses, foundries, etc.: Bringing cool, refrigerated air directly to hot spots can keep employees comfortable and reduce the risk of heat exhaustion without having to shift workers around, thereby increasing productivity.

Manufacturing processes: Products such as food or plastics can be cooled down faster after they leave a heat-related process, substantially reducing cycle times.

Spot cooling, which simultaneously removes moisture from the air, can also prevent product defects caused by warping and condensation due to excess heat and humidity.

Heat-sensitive equipment: Equipment such as computers or PLCs and control panels used with CNC machines can be kept

from overheating, thus preventing hardware slowdowns or failures and ensuring long-term reliability.

What to Look for in a Portable Spot Air Conditioner

When choosing a portable air conditioner for an industrial application, here are some important things to look for:

Fully enclosed fan motors and a hermetically sealed refrigeration unit ensure long-term, reliable performance.

Quality of manufacturing: In any industrial application, an air conditioner must first of all be reliable. Look for a system that is built to the highest quality standards.

Specifically, check to see if the fan motors are fully enclosed in protective housings to prevent dust from building up. Dust that accumulates on the motors can absorb moisture, leading to corrosion or electrical shorts.

Another important area to pay attention to is the refrigeration unit itself. Is it hermetically sealed, or does it have service valves, which are prone to leaks? Also, are the refrigerant pipes connected by reducers and expanders, or by pinching and brazing?

Pinching and brazing restricts the flow of the refrigerant, reducing cooling efficiency and long-term performance. In addition, the connections created using this method are weaker and more subject to vibration-caused stress cracks and subsequent leakage.

Also, examine the casters for their durability. Are they securely attached to the frame by a mounting plate and heavy-duty bolts, or only by the caster stem? The stem is a weak point that can bend and cause a caster to malfunction if it goes over a rough or uneven surface.

Next, look at the sheet-metal panels to see if they have stress-relief notches at the bends. Also, are the panels attached to the frame at load-bearing points by machine screws and weld nuts, or by lighter-duty sheet-metal screws? Is the weight of the fan housing supported by a sturdy interior frame, or only by a lighter cover panel?

Finally, check the drain pan to see if it is fully insulated, not just powder-coated. This ensures that moisture will not come

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into contact with the metal surface of the pan, protecting it from corrosion and possible leaks.

Such quality-oriented details are telling indicators of high-quality equipment that is designed and manufactured with long-term reliability in mind.

Comprehensive warranty: Most industry warranties limit their coverage for labor to a shorter period than parts, which can be costly to the user. The highest-quality manufacturers cover both parts and labor for the entire length of the warranty, in some cases up to three years.

The best manufacturers also offer a true manufacturer's warranty, not supplemental coverage from a third party.

Look for an established manufacturer who will stand behind their product.

Established manufacturer: Look for a company that has established itself for many years in the industry and stands out as a leading manufacturer of air-conditioning equipment. This is a good sign that the company will be around to support their equipment well into the future.

Also look for a company with a broad distribution base and a large number of dealers who will support and service their equipment throughout North America and globally, no matter where the units may be installed.

MovinCool Spot Air Conditioners

MovinCool is a brand of DENSO Corporation. As one of the world's principal suppliers of advanced automotive technology, systems and components, DENSO is also the world's largest manufacturer of spot air conditioners.

In the 1980s, DENSO pioneered the concept of workspace spot cooling to meet its own factory needs in Japan. Since then, the MovinCool line of spot air conditioners has been extended to accommodate many different applications, which today include:

- Industrial
- IT server rooms and data centers
- Healthcare
- Outdoor events
- Offices and schools
- Moisture removal

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Within the air-conditioning industry, MovinCool enjoys a reputation for highest quality, highest reliability and longest equipment life.

This enviable standing is a result of MovinCool's origins in the intensely competitive automotive sector. Because MovinCool is manufactured by DENSO, every component in a MovinCool spot air conditioner must meet the company's rigorous quality criteria. The DENSO Design Standard for spot air conditioners consists of 50 different tests, including a three-axis vibration test, exposure to extremely hot and cold temperatures in a thermal shock chamber and exposure to eight different types of dust particulates.

With such attention to quality and reliability, it should not be surprising that dealers who specialize in spot air conditioners—and who stand to lose significant profit if they have to replace a unit once it is installed—consistently say they prefer MovinCool above all other brands.

For more information, visit MovinCool's website at www.movincool.com.