

# PORTABLE AIR CONDITIONING SPOT COOLERS CHILLERS

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How often have you needed an immediate solution to a heat or humidity problem in a CRITICAL area?

Here's our solution. Our full line of self contained portable air conditioners and dehumidifiers are uniquely designed systems which allows installation in minutes to cool down hot spots and eliminate high humidity.

Our portable air conditioners/dehumidifiers include supply and return air ducts made of flexible materials for quick easy installation.

Here are just a few possible applications:

## **ELECTRONICS**

- Computers - networks, servers, racks
- Internet service providers
- Telecom Equipment
- Telephone Communication

## **HEALTHCARE**

- Hospitals
- Laboratories
- Outpatient Facilities
- Imaging Centers

## **OUTDOOR EVENTS**

- Sporting Events - Motor sports, Golf, Tennis
- Hospitality Suites
- Entertainment - Art Festivals, Movie Sets, Concerts
- System Replacement

## **INDUSTRIAL**

- Manufacturing
- Assembly
- Process Cooling - Plastics, Welding, Baking
- Warehouses - Shipping/Receiving
- Restoration

## **FACILITIES MANAGEMENT**

- Contingency Management
- After Hours and Weekend Hours
- Supplemental Cooling
- Maintenance
- System Replacement

We stock and supply a large variety of portable air handlers, backward inclined blowers, and portable air circulators.

Additionally, we engineer solutions to meet the specific needs of each application.

**Ameri-Temp Ltd.** is your one stop source for all your temporary, air conditioning and ventilation equipment. Call us regarding your **RENTAL**, **LEASE** or **PURCHASE** options.



# What is Spot Cooling?

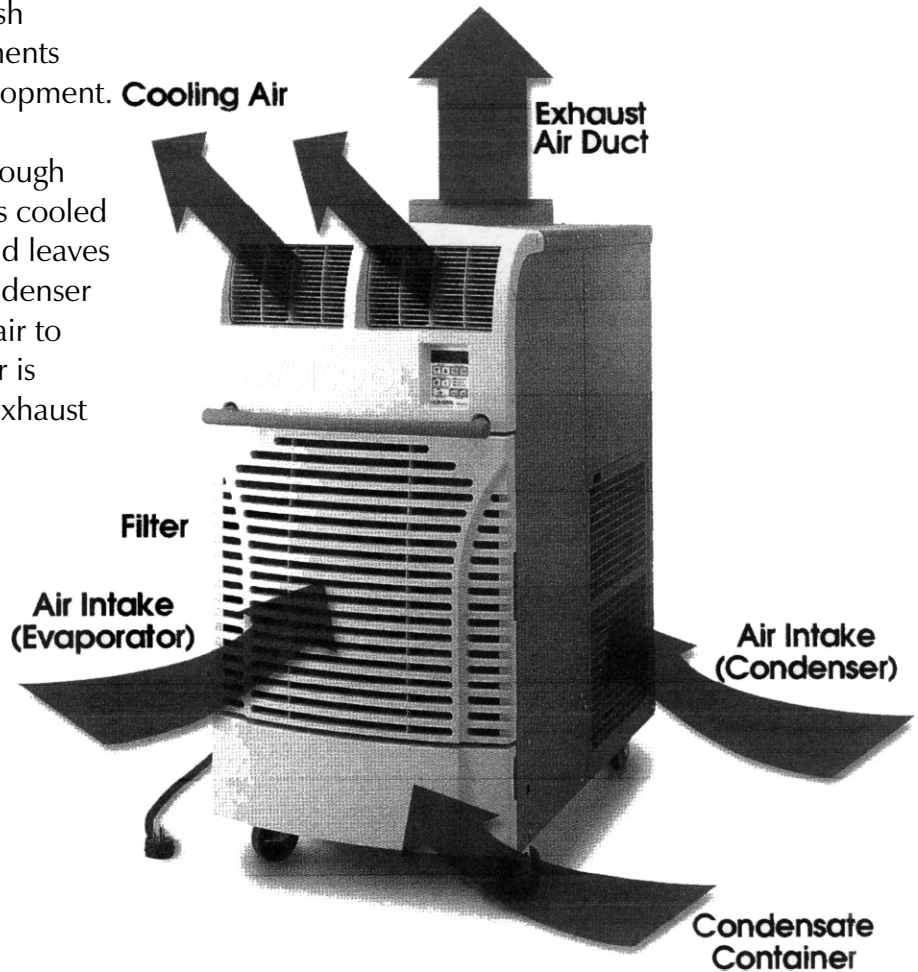
Energy costs continue to climb while, at the same time, utilities are frequently unable to provide all of the electricity that industry needs. When these circumstances are combined with the urgent need to control capital expenses, the case for spot cooling becomes very strong.

For many industries and companies, in a wide variety of applications, spot coolers are the answer to controlling both energy use and capital expenses.

Quite simply, spot cooling is a method of cooling overheated areas within a larger area, as opposed to providing general cooling by means of a remote centrally controlled air conditioning system. In operation, spot cooling is an extremely efficient means of cooling people, processes, and equipment because it directs a localized stream of cool air exactly where it is needed.

The concept of spot cooling is not a new idea, but the use of spot coolers to accomplish localized cooling within work environments and equipment rooms is a recent development. **Cooling Air**

Room air or ambient air is drawn in through the evaporator intake in front. The air is cooled as it passes over the evaporator coils and leaves through the cool air discharge. The condenser intake on the side of the unit draws in air to cool the condenser coils. This warm air is then discharged out of the condenser exhaust on top.



**Ameri Temp Ltd.**

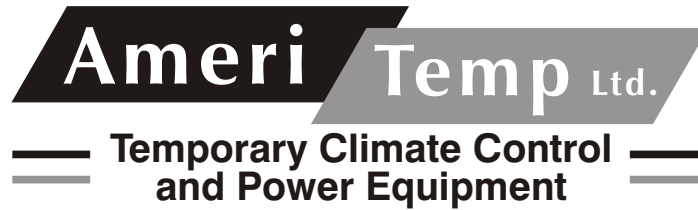
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# Basic Principles of Air Conditioning

It is not necessary to be an air-conditioning expert to use portable cooling but understanding the basics of air conditioning will certainly help you understand how portable cooling works. This section highlights some of the basic principles of air conditioning for those who would benefit from additional knowledge in this area.

## Principles of Cooling

### Heat Transfer

Heat is a form of energy. Every object on earth has some heat energy. The less heat an object has, the colder we say it is. Cooling is the process of transferring heat from one object to another. When an air-conditioning system cools, it is actually removing heat and transferring it somewhere else. This is evident when you turn on a portable cooling unit and place one hand in front of the cold air nozzle and the other over the warm air exhaust.

## Sensible and Latent Heat

There are two forms of heat energy: sensible heat and latent heat.

*Sensible heat* is the form of heat energy which is most commonly understood because it is sensed by touch or measured directly with a thermometer. When weather reporters say it will be 90 degrees, they are usually referring to sensible heat.

*Latent heat*, on the other hand, cannot be sensed by touch or measured with a regular thermometer. Latent heat causes an object to change state. For example, when enough latent heat is removed from water vapor (steam or humidity), it condenses into water (liquid).

If more latent heat is removed from the water (liquid), it will eventually freeze. This process is reversed when latent heat is added.

## Change of State

An object that changes from a solid to a liquid or liquid to vapor is referred to as a change of state. When an object changes state, it transfers heat rapidly.

## Humidity

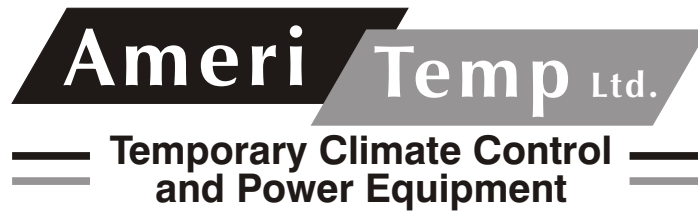
The moisture in the air is called humidity. The ability of air to hold moisture directly relates to its temperature. The warmer air is, the more moisture it is capable of holding. Relative humidity is the percentage of moisture in the air compared to the amount of moisture it can hold. A moisture content of 70°F air with 50% relative humidity is lower than 80°F air with 50% relative humidity.

When the humidity is low, sweat evaporates from your body more quickly. This allows you to cool off faster. High humidity conditions do not allow sweat to evaporate as well because the air is at its maximum capacity.

Humidity is also a form of latent heat. If the air has more humidity, it also has more latent heat.

## Refrigerant

Refrigerants are substances used by air conditioners to transfer heat and create a cooling effect. Air-conditioning systems use specially formulated refrigerants designed to change state at specific temperatures providing optimum cooling.



# Basic Principles of Air Conditioning

## Common Types of Air-Conditioning Systems

There are many types of air conditioners specifically designed for different types of applications. Listed below are some of the more common systems and their applications.

### **Water-Cooled and Air-Cooled Systems**

The difference between a water-cooled air conditioner and an air-cooled system is in how the heat is removed from the condenser. Water-cooled systems flow water over the refrigerant inside, and air-cooled systems blow air across the condenser to remove heat.

### **Chiller Systems**

These systems cool by pumping a liquid over evaporator coils to provide cooling. These units are used for large buildings and to provide direct internal cooling to special types of equipment.

### **Split System (Central Air Conditioning)**

The components of this system are separated in two different locations. The evaporator is located inside and provides cooling through a central air duct. The compressor and condenser are located outside. This system is most commonly used for residential applications.

### **Ductless Split System**

The components of this system are separated. The condenser is located outside and is connected to single or multiple evaporator units inside. These evaporator units are connected to the condenser unit by small flexible hoses and do not use a central air duct. This system is used for residential and light commercial buildings.

### **Packaged System**

All components are package together in one enclosure (e.g., window unit, rooftop unit, spot cooler).

### **Rooftop System**

This is a packaged system that mounts on the roof and connects directly to central ducting. It is typically used for medium to small office buildings and commercial buildings.

### **Window Air Conditioner**

This is a small packaged unit designed to fit in a window, primarily for residential use.

### **Evaporative Coolers**

These coolers do not use a refrigerant system but cool by evaporating water into the air. The units vary greatly in size and are used for anything from residential use to large industrial buildings. They work best in dry climates.

## Basic Principles of Air Conditioning

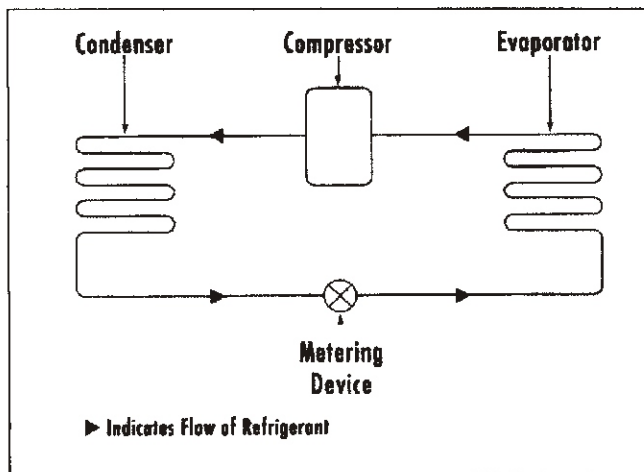
Portables use a refrigerant called R-22 or HCFC-22. HCFC stands for hydrochlorofluorocarbon. This is currently the most common refrigerant used by air-conditioning systems.

### Refrigerant Phase-Out

Many of the current forms of refrigerants used today are being phased out based on concern for depletion of the ozone layer. Portables use R-22, which has been deemed acceptable for use by the EPA until the year 2010. By that time, an ozone-friendly refrigerant that can be easily substituted for R-22 will be readily available.

### Air-Conditioning Systems

The system by which air conditioners provide cooling is called the Refrigerant Cycle. This system has four major components common to all air-conditioning systems (see figure below).



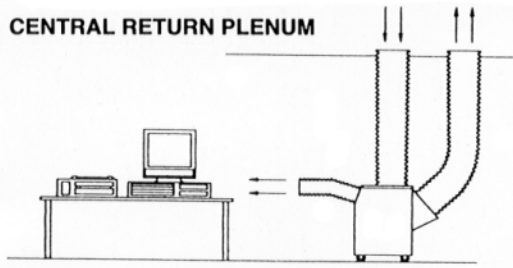
These components and their basic functions are listed below.

1. **Compressor**- Refrigerant is drawn from the evaporator and pumped to the condenser by the compressor. The compressor also pressurizes the refrigerant vapor so that it will change state (condense) readily.
2. **Condenser**- The high-pressure refrigerant vapor releases heat through the condenser coils as it condenses into liquid refrigerant.
3. **Metering Device** (capillary tube, txv valve) - The metering device restricts the flow of liquid refrigerant from the condenser to the evaporator. As refrigerant passes through the metering device, its pressure decreases, making it easier to vaporize.
4. **Evaporator** - The low-pressure liquid refrigerant absorbs heat as it vaporizes in the evaporator coils.

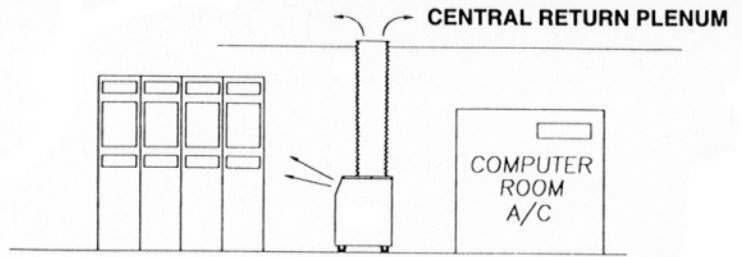
The process described above is the Refrigerant System or Refrigerant Cycle. It is the system on which virtually all modern Air-Conditioning and refrigeration is based.

# SPOT COOLING

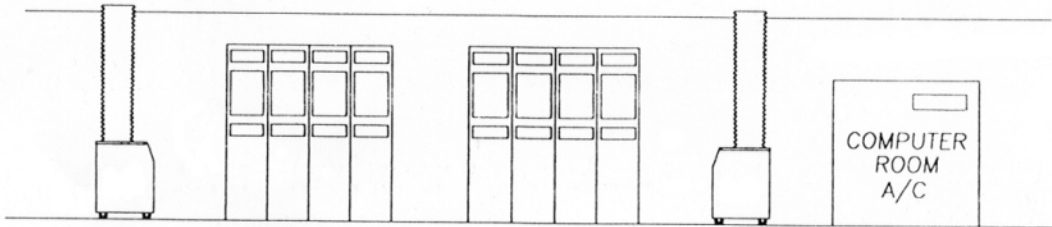
## Typical Applications



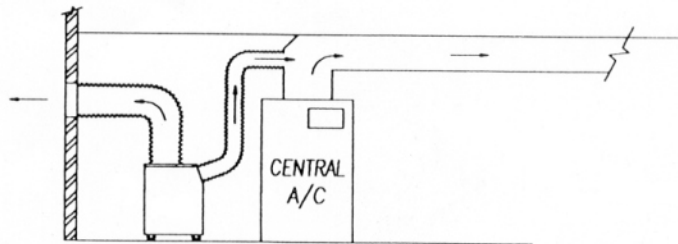
**PC COOLING WITH OPTIONAL  
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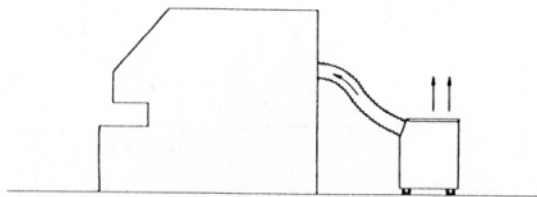
**SUPPLEMENTAL COOLING**



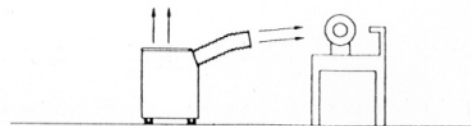
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