

All About Electric Duct Heaters

[Electric duct heaters](#) are stand-alone heating units which are designed for installation within air handling systems. Some of these heaters are a fundamental part of a number of other equipment; for instance, some may be directly attached to heat pumps, variable air volume terminals, or fans. On the other hand, some can be used as full heating units that are mounted upon air ducts.

Applications of Electric Duct Heaters

Electric duct heaters are used for a number of applications, including the following:

- Heating large volumes of air in commercial buildings
- Heating systems on public transportation, ships, and more

Types of Duct Heaters

There are four ways in which air can be heated, and that is through:

- Open coil heaters,
- Strip heaters,
- Tubular heaters; and
- Quartz heaters

Open Coil Heaters

Open coil heaters are ideal for conditions where the air velocity is below 80 feet per minute. Higher velocities would lead to the coils coming in contact with each other, which would cause them to short out. Due to the fast response time and low mass of these types of heaters, a phase angle SCR is recommended instead of zero-cross fired SCR.

Strip and Tubular Heaters

Strip and tubular heaters come in numerous types of shapes and are utilized to create hot air. They are typically used in ovens and for comfort heaters. If the required temperature is less than 500 degrees F, finned-tubular & strip heaters can be used. For higher temperatures of up to 1200 degrees F, an electric duct heater of this type without fins is ideal.

Quartz Heaters

Quartz heaters are able to withstand an input pressure of 10 PSI and can operate up till 1500 degree F. These types of heaters are used in medical packaging industry, heat shrinking, drying, bending plastics, adhesive curing, and deflashing molded parts.

The air pressure, volume, and velocity are the three main factors used when determining the right type of electric duct heater for a particular application.

How They Work

Electric duct heaters work by heating up the passing air. Due to the fact that unfiltered air might contain grease, dirt, or water, it is particularly important that the air is passed over the heating element even after the heater has been switched off. A time delay relay is often utilized for this purpose. This is even more important for open coil heaters.

Calculating Power Requirement

The power requirement can be calculated as follows:

1. Multiply the standard cubic feet/min (SCFM) by temperature difference
2. Divide this figure by 3000

The formula described above is as follows:

$$\text{kW} = \frac{(\text{SCFM} \times \text{Change in T})}{3000}$$

For example, if you need to heat up 150 cubic-feet of air in one minute to 100 degree F, you would need an electric duct heater capable of 5kW.

[Electric duct heaters](#) are designed in all kinds of sizes and types that cater for specific applications. This is why it is crucial to fully understand the requirements before selecting a particular heater.