

Infrared vs. Convection Curing

Many manufacturers face the challenge of product piling up around their painting department, waiting to cure. After all, depending on the paint being used, it can take anywhere from a few minutes to a few hours to achieve the degree of curing required for the product to move to the next step of your manufacturing process.

One of the best ways to help reduce a bottleneck due to slow throughput in your painting process is to reduce the time it takes to cure your paint.

Typical methods for speeding up the curing process include Infrared curing and convection heat. Both options have their pros and cons, which we will review so you can better determine which might be right for your application.

Convection Curing

For a variety of reasons, convection heat is one of the most common methods of curing coatings. Convection heating involves elevating the temperature of the ambient air surrounding a product in order to speed up curing. Solvent-based coatings' cure time can often be reduced by 25 percent or more using convection heat.



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One of the primary benefits of convection heating is the opportunity for a low-cost initial investment. Paint booths can be purchased with an elevated heat option for curing, making the overall cost very reasonable. Similarly, convection curing ovens typically can be purchased at a lower initial cost than infrared ovens.

An additional benefit of convection heat is that it will work with a large variety of coatings—as a general rule of thumb, though, you should check with your coating representative to make sure it's a viable option.

A final benefit of convection heat, in comparison with infrared, is that convection will work with a greater variety of product shapes.

Infrared Curing

Infrared curing involves infrared waves penetrating through the coating and curing throughout. For this to happen most efficiently, the infrared waves should have a direct line to the surface that you are trying to cure. That's why infrared curing is best for flat surfaces: If your product has a lot of angular, round, or non-flat surfaces, this method can present challenges.

The largest benefit of infrared curing is how much faster it can cure a coating as compared with convection curing. This is due to the temperature elevations associated with infrared curing. Depending on the wavelength of infrared being used, temperatures can be elevated in seconds up to a few thousand degrees. The end result is a rapid curing time.

In addition to rapid curing, infrared can also have a lower operating cost. In the convection method, a lot of energy is used to elevate and maintain temperature in a paint booth or oven. This results in higher operating costs. Since infrared uses energy waves to elevate temperature, curing begins almost immediately and very little energy is wasted in the curing process.

An additional benefit of infrared curing is that it can be used to spot cure. Since infrared curing uses energy waves, you can purchase infrared panels that allow for curing targeted areas. This can be a useful application for spot repair work when you want to accelerate the curing time.

Infrared curing, though, can be used on fewer types of coatings than convection. This is largely because it depends on the infrared waves to be able to pass through the coating and reflect off the substrate causing heat elevation of the coating.



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No matter which technology you are leaning toward, it is always recommended to have a coating baked using that method as a “trial run” prior to deciding on an equipment investment.

If a coating has certain properties, like being excessively reflective, the infrared waves may not effectively penetrate the coating and may not cure the coating well. Additionally, certain substrates will absorb

infrared waves, reducing the reflection of the wave back through the coating, which can significantly reduce the curing effectiveness of infrared.

Due to the potential challenges of coatings, substrate materials, and product configurations you should always have your product tested to see if infrared curing can potentially work for you. In fact, no matter which technology you are leaning toward, it is always recommended to have a coating baked using that method as a “trial run” prior to deciding on an equipment investment to determine if you can improve production time.

Making a Decision

Before you decide which tool might be ideal for you, it is smart to coordinate with your coating representative to verify whether convection or infrared curing will work, evaluate the production improvement potential of either solution, and evaluate the cost differences in initial investment and operating costs.

Ultimately, convection and infrared curing both have good uses. Which method will work well for your application will depend on the substrate of your products, the coating you apply, the amount you want to invest, and your production priorities.