

Medium Wave Electronic Convection Cure Oven

PSI Medium Wave Infrared Quartz / Electric Convection – Process / Batch Type Oven

Finishing trends in today's market demand flexibility to offer short runs just in time of custom finishes. Traditional solvent based lacquers, stains, sealers and topcoats, plural component resins and catalyst, are most commonly cured with convection type ovens. A combination of ambient and heated air flow is used to flash solvents and cure the finish material based on finishing schedules as provided by the material supplier and proven by testing. Environmental regulations and

consumer trends call for water based finish materials, paints and enamels. While convection curing works on water based finish materials, infrared curing technology, combined with air flow, improves quality of cured finish and hardness in less time. PSI's medium wave infrared quartz / electric convection – process / batch type oven allows the flexibility to cure various type finish materials in either a process or batch type oven operation.

Process Mode

During the process mode, either IR or Electric Convection, or a combination there of, may be used for curing. The oven has a slider bed belt conveyor that allows parts to be loaded and conveyed through two curing zones within the oven proper. The conveyor is variable speed to adjust amount of time parts are exposed to curing mediums within the oven proper and the intensity of the emitters is adjustable with SCR controls. Likewise the circulation fans that create convection via duct heaters are controlled by variable frequency drives. Zone 1 could be set up such that electric convection and air flow perform final flashing of solvent out of finish, followed by a

combination of infrared quartz and electric convection for final cure in Zone 2. Zone 1 could be set up such that infrared quartz at higher intensity raises substrate temperature quickly while Zone 2 infrared quartz at medium intensity maintains the substrate temperature for required amount of time. The combinations of curing mediums must be determined based on various factors, including substrate, finish material ambient plant conditions, etc. Testing is required to develop recipes for recommended oven settings for optimal quality of cured finish.

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Batch Mode

During the batch mode, either IR or Electric Convection, or a combination there of, may be used for curing. The oven is provided with entrance and exit doors which can be closed during batch mode once the conveyor is used to load the oven proper with parts. A batch timer is provided to manually enter the required time of cure cycle. Ambient air flow followed by heated air flow can serve as flash and cure of finishing material. Infrared can be used stand alone or combined with Electric Convection to hasten and improve quality of cured finish. Groups of parts with common finish, dining room chairs for instance, can be batched for production demand and

quality control. Air flow is controlled by means of manually adjustable slide gates located throughout the oven proper on circulated air distribution plenums. Electric Convection Heated Air Temperature is controlled by means of manual adjustment and digital display of heated air temperature circulated around parts. Infrared Sensors are directed at reference holding frames in which various substrates with different finishes can be placed to account for substrate and finish absorption rates. Again, testing is required to develop the best curing solution for various finish materials and substrates.

Conveyor Operation

The conveyor speed is controlled by a variable frequency drive. The maximum conveyor speed is 30 FP at 30# per foot of belt loading. Given each zone is approximately 15'-0" long, the conveyor speed may be set at lower speeds to provide traditional flash and cure times of 10 to 15 minutes with convection only. Faster conveyor speed may be used with combinations if infrared halogen and convection for more pigmented

paints and enamels or higher solid content finishes. Only testing will determine the optimal conveyor speed settings for each curing solution given substrate and finishing material. Seasonal affects, changing ambient conditions within the plant environment, may also require consideration as the oven operation provides the flexibility to make adjustments.

