Bubble Free & Energy Saving

CONVECTION CURING OVEN

ECO99C

ECO99C, TTnS patented (PAT. 10-0550606)

The fully automated, electric-powered, convection curing oven has truly completed the conformal coating application which is capable of the bubble-free and transparent coating films in the inline mass production.

Murray Percival

TTnS

AMS ADVANCED MECHATRONICS SOLUTIONS, INC

AUTOMATION, SMT & LEAN MANUFACTURING

▲ PHOTO ECO99C Curing Oven System

Specifically, the ideas of selective convection curing provided with TTnS an exclusive coating workcell of TCM45A accomplishes excellences in saving heating energy and reduction working-space requirement that results user and environment-friendly. Existing magazine and PCBA handlers can be used, as it is, for the performance of this new coating solution.

TTnS Exclusive,

the oven system basically runs at magazine basis and selective convection heating processed where the magazine of coating-works stacked repeats a cyclic moving as programmed. And it is mostly useful for curing solvent based materials such acrylic, epoxy, urethane resin and rubber.

Under the unique selective heating circumstances and/or with the reinforced system design eligible for US/Europe safety standards, precise SCR-control and wide-vision of advanced Touch program, ECO99C has accomplished a bubble-free solution, minimal 50% energy & working space savings in the fully automated continuous coating processes.

ECO99C CURING OVEN, FEATURES & BENEFITS

Electric-powered, Convection Heating Selectively

ECO99C is fully automated, electric-powered convection, selective heating oven which controls the temperature precisely and proportionally by SCR unit within a range of +/-2.5℃ tolerance.

The recycling hot air flow of 20CMM makes three equally divided hot-air-turbulent-streams which are due to +8 (turnovers/minute) and selectively wrapping around the magazine limit in the curing process inside the oven. The system intentionally neglects heating of the rest space of the oven except just around magazine. Doing so, it remarkably reduces energy consumption more than 50% and substantially improves solvent flash-off. The oven runs at +99degC highest as necessary.

▲ Selective Curing Oven

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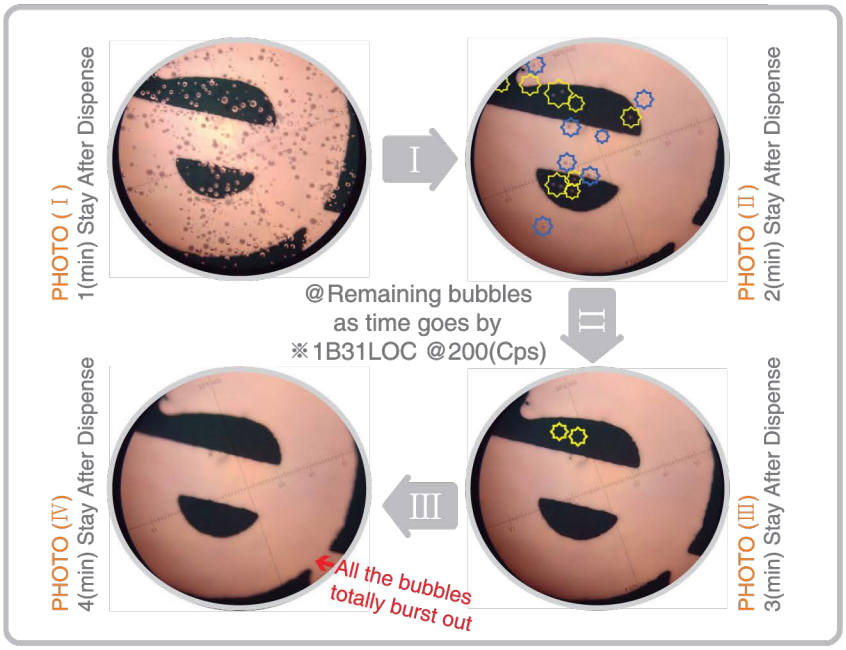
Magazine-base Curing creates Bubble-free Solution

ECO99C, A fully automated, electric-powered convection, selective curing oven has truly resolved the long-troubled issue, bubbles residue on the PCBA coating films, by achieving transparent coating films successfully at no sacrifice in actual throughput (UPH).

Basic Ideas of the System

According to a central control signal, the magazine fully stacked with coating-works moves into the curing oven and makes cyclic pitch movements on RS40 chain conveyor by aids of encoder. The following empty magazine performs the coating-work stacking one by one until it is entirely filled up then repeat the movement same way as ahead magazine. This mechanism actually effects a continuous production as well as securing solvent flash interval while the magazine completes stacking prior to oven.



▲ PHOTO Bubbles form on PCBA

Better Working Conditions, User & Environment Friendly

ECO99C has been developed focused on,

1. Easy operation/maintenance,
2. Compact design for lower capital investments/running cost
3. High performance in the system self-diagnosis for safety issue

The system operator can direct the oven running by an aid of wide-vision Touch-screen placed on the electrical control cabinet. After electric power hook-up, the system operator may download new parameters as desired and also select necessary commands out of main Menu in the system. The system can monitor and display all the operational status real time by an aid of self diagnosis.

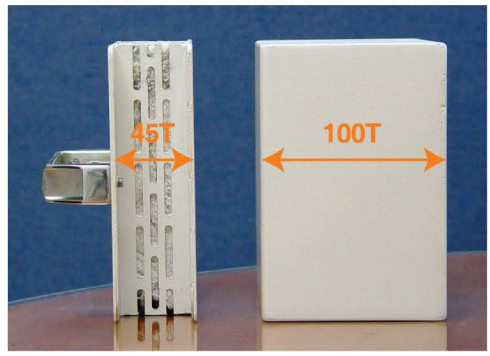
- More than 50% energy & working space savings with a ubble-free solution completes ECO99C user and environment friendly.
- Dust/VOC eliminating carbon filter keeps the cycling air clean and reduced VOC.
- Selective hot air curing ensures high performance of solvent flash and homogeneous temperature.

▲ Electrical Control Display Panel

Free Knocked-down Structures with Advanced Insulation-panel

The entire skeleton of ECO99C is fabricated with knocked-down aluminum profiles and very slim of 45(mm) thick ceramic insulation panels that TTnS exclusive designed. This panel guarantees minimal heat transfer loss despite it is just half thick compared to conventional one thanks to multi-holed panel ribs that is heat-transfer resistant.

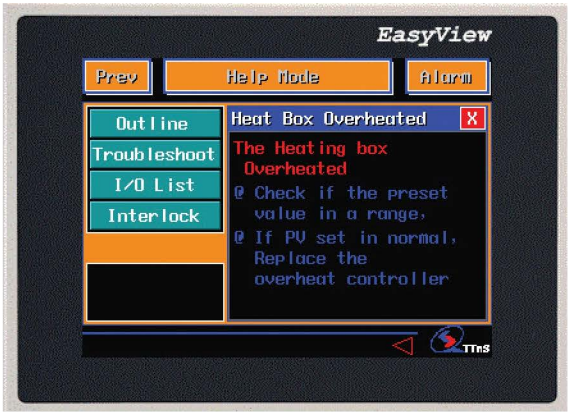
Assuming the same running conditions
Comparison of oven insulation panels



▲ TTnS 45T / Conventional 100T

Safety Interlock of the System

ECO99C Convection curing oven has been developed with the philosophy of the system safety is top priority. While the system is running, the faults detecting for safety has to be in full scale action accordingly all the time. Once it comes any system error or unexpected accident, ECO99C displays the error message and appropriate troubleshooting simultaneously on the system windows along with buzzer and control tower blinking.



▲ System error message / Troubleshooting

- System overheating preventive, Error
- System temperature control, Error
- System temperature display, Error
- System conveyor-run, Error
- System conveyor-display, Error
- System circulation fan-run, Error
- System VOC ventilation, Error
- System carbon-filter pressure, Error
- Air-seal fan-run, Error
- Magazine positioning, Error
- Turntable communication, Error
- System runtime, Error
- System primary e-power, Error

ECO99C Curing Oven System, Primary utilities

- **Primary Power Supply :** 220(VAC) x 3Ø x 50/60(Hz) x 32(Ampere) max.
- **Primary Compressed Air :** minimum 60(psi) at Ø6 hose, DCA
- **Fume Vent Stack :** Ø100 at one place @3(CMM)x10(mmWC)
- **Noise Level :** <72dBA
- **System Weight in Shipment :** 600(Kg)
- **Space Requirement :** 1,100(D) x 1,750(H) x 2,400(W)mm

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