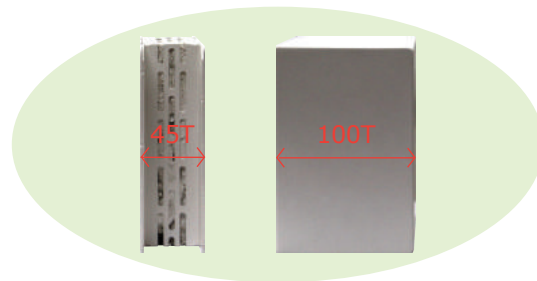


IV. Free Knocked-down Structures with Advanced Insulation Panel

The entire skeleton of ECO99C is fabricated with knocked-down aluminum profiles and very slim 45(mm) thick ceramic insulation panels that TTnS exclusively designed.

This panel guarantees minimal heat loss despite it is just half thick compared to conventional one thanks to multi-holed panel ribs that is heat-transfer resistant.

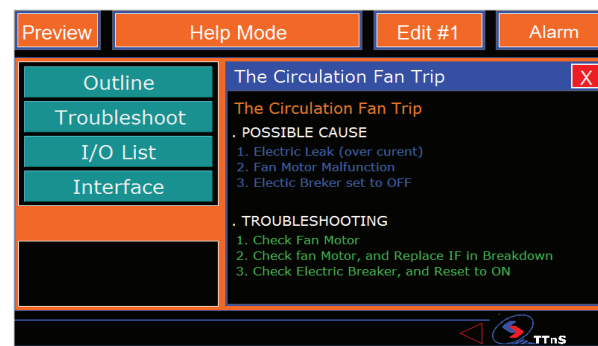


▲PHOTO TTnS STD 45T / Conventional 100T

V. Safety Interlock of the Systems

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 all the time accordingly. Once it comes to any system error or unexpected accident, ECO99C displays the error message and appropriate troubleshooting at the same time on the system windows along with buzzer and control tower blinking.

- System DC Control Power Fail_Interlock
- System Communication Error_Interlock
- System Fume(VOC) Vent Fail_Interlock
- System AC Filter Blockage_Interlock
- System Heating Module Fail_Interlock
- System Conveyor-Run Fail_Interlock
- System Circulation Fan Fail_Interlock
- System Temp. Deviation Error_Interlock
- System Run Timeout Error_Interlock
- System Air Seal Fan Error_Interlock
- System Safety-Relay Fail_Interlock_CE
- Light Curtain Detect_Interlock_option



▲PHOTO

Systems Error Message / Troubleshooting

VI. ECO99C(ECO99C_120) Curing Oven, Primary Utilities

- Primary E-powerSupply: 380(VAC)x3(phase)x5(wires)x60/50(Hz)x10-15(kWh)
- Primary Compressed Air: min.75(psi) one point Ø6mm Air-hose/DCA(option)
- Fume(VOC) Vent Stack: Ø125mm(5") one point @5(CMM)x15(mmAQ)
- Noise Level in Operation: $\delta \leq 72\text{dBA}$
- NET System Weight: NET 840(kgf)_ECO99C / NET 1,040(kgf)_ECO99C_120
- Workspace Requirement: 1,150(D)x1,750(H)x2,500(W)mm_ECO99C
1,250(D)x1,800(H)x3,000(W)mm_ECO99C_120

▼TTnS Con-Coating Systems Line-up



SL Corp. / Automotive
•PCB Load – Invert – Coating WorkCell – PCB Unload – Curing Oven – TR Conv.
(KL-900Y) (KIV-420Y) (TCM45A) (KU90-900Y) (ECO99C) (TRC-200)



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■ Bubble – Free & Energy Saving

CONVECTION CURING OVEN ECO99C



▲ECO99C_120
FOCUSED CURING

▲ECO99C
CONVECTION CURING OVEN

ECO99C, TTnS patented (PAT. 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.

티티앤에스주식회사 / TTnS Inc.





▲PHOTO
ECO99C Curing Oven

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.

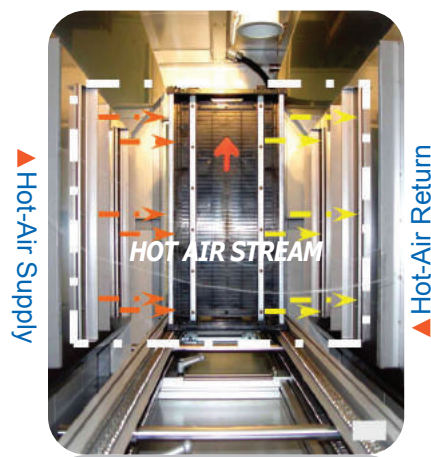
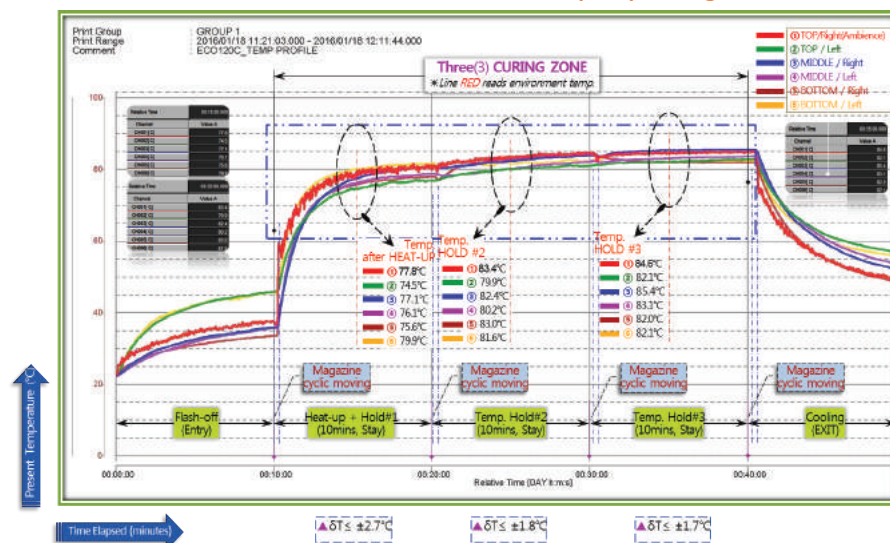
ECO99C Curing Oven, Features & Benefits

I. Electric-powered, Convection Focused Heating

ECO99C is fully automated, electric-powered convection, focused heating oven which controls the temperature precisely and proportionally by SCR unit within a range $\pm 2.5^{\circ}\text{C}$ 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 $+99^{\circ}\text{degC}$ highest as necessary.

TEMPERATURE PROFILE

▼ECO99C_120 @80°Cx30(min) curing



▲PHOTO
ECO99C Focused Curing

ECO99C series Cure Oven, (PAT. 0550606)

Specifically, the ideas of focused convection curing, provided with TTnS exclusive coating workcell of TCM45A, accomplishes excellences in saving energy consumption and reduces workspace requirement that results user and environment-friendly. Existing magazines and PCA handlers can be used, as it is, for the performance of this new concept of coating/curing solution.

Coating Solution with A Package of Value

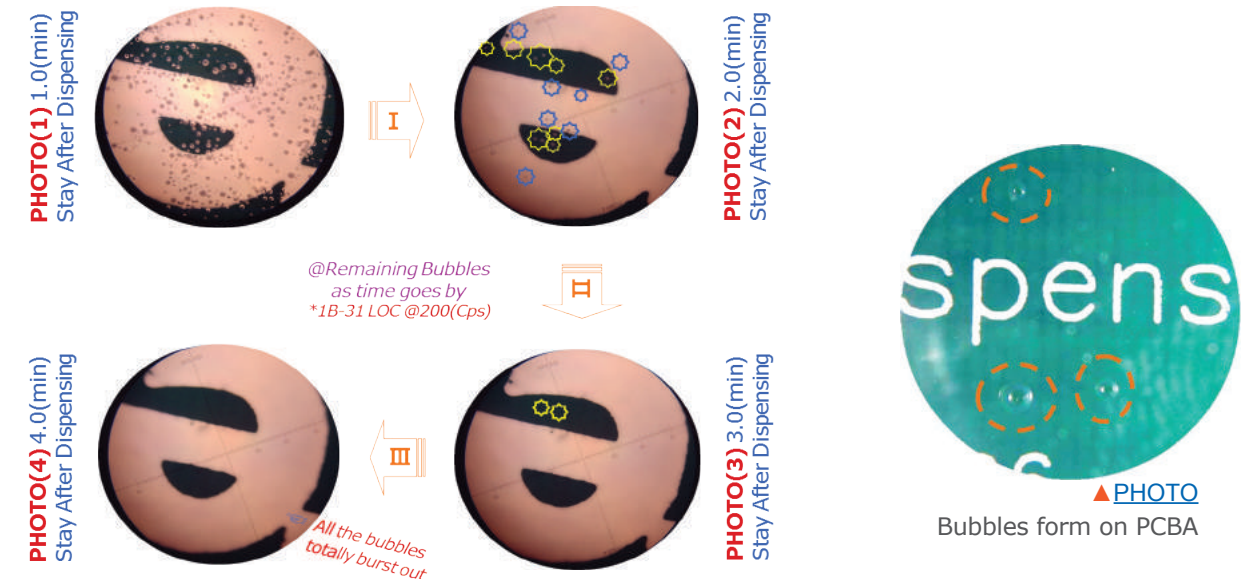
UV Curable, Versatile Coating WorkCell

II. 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 Burst / Time Functional

III. 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 aids of wide-vision Touch-screen placed on the electrical control cabinet. After E-power hook-up, the system operator may download new parameters as desire and also select necessary command from main menu in the system. The system can monitor and display all the operational status realtime by aids of self-diagnosis.



▲PHOTO Electric Control Display PANEL

- More than 50% energy & workspace savings with the bubble-free solution complete ECO99C user-environment friendly
- Dust(VOC) eliminating carbon filters keep the cycling air clean and fresh
- Focused hot air curing ensures high-performance of solvent flash off and homogeneous temperature profile