



bubble-free, Convection Curing Oven

model: [ECO99C](#)



▲ PHOTO [ECO99C](#) Curing Oven System

TTnS Inc. have clearly resolved the long-troubled bubble issue in the conformal coatings for printed circuit board with successful transparent film builds at no sacrifice in actual throughput (UPH).

[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. 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.

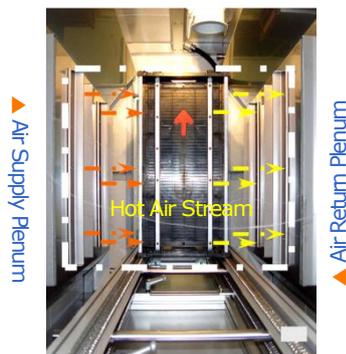
Under the unique selective heating circumstances and/or with the reinforced system design eligible for US/Europe safety standards, precise SCR-control and wide-vision of advanced Touch program, [ECO99C](#) has accomplished a bubble-free solution, minimal 50% energy & working space savings in the fully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

◆ [ECO99C](#) Curing Oven, Features & Benefits

I. 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°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 +99degC highest as necessary.



▲ Selective Curing Oven



▲ PHOTO [ECO99C](#) (front-view)

Bubble-free & Energy Saving

Conformal Coating Solutions

II. Magazine-base Curing creates Bubble-free Solution

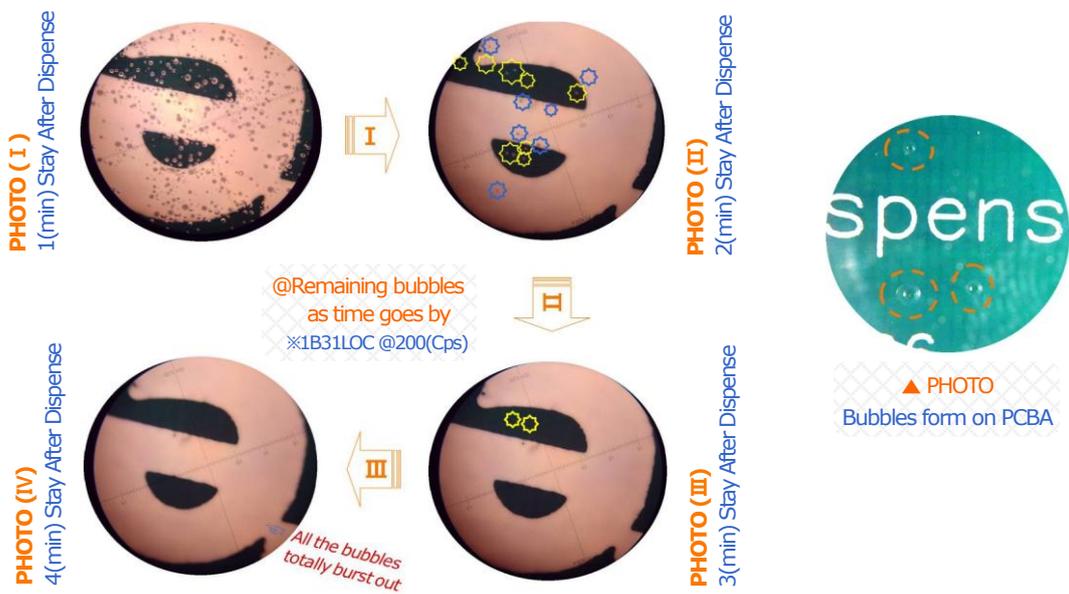
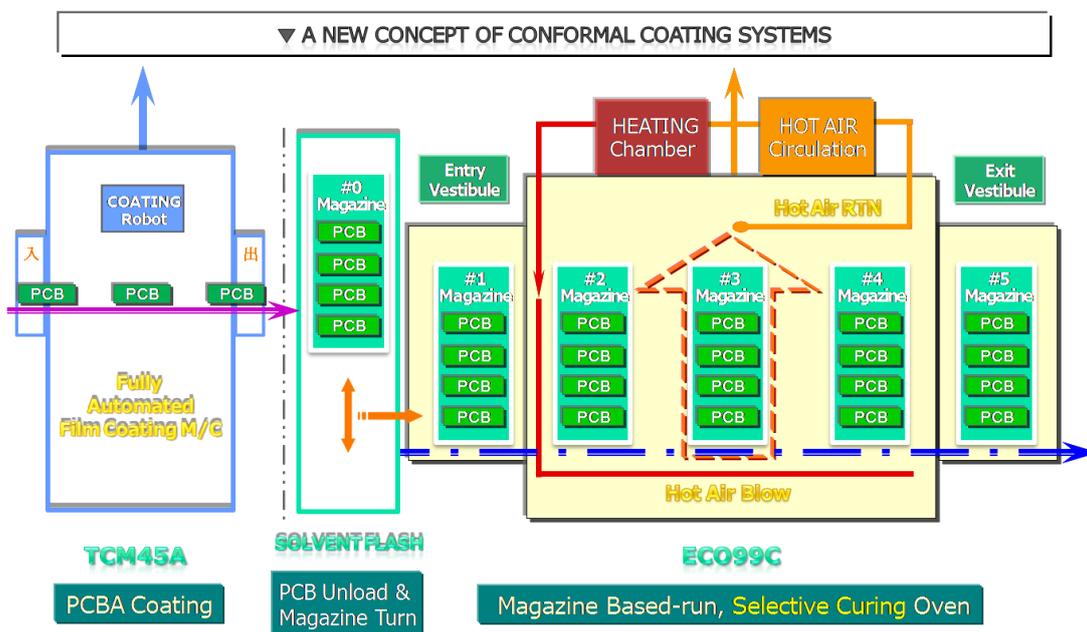
ECO99C,

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.

※Refer to below schematic drawing for Typical bubble-free coating process



Bubble-free & Energy Saving

Conformal Coating Solutions

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 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.



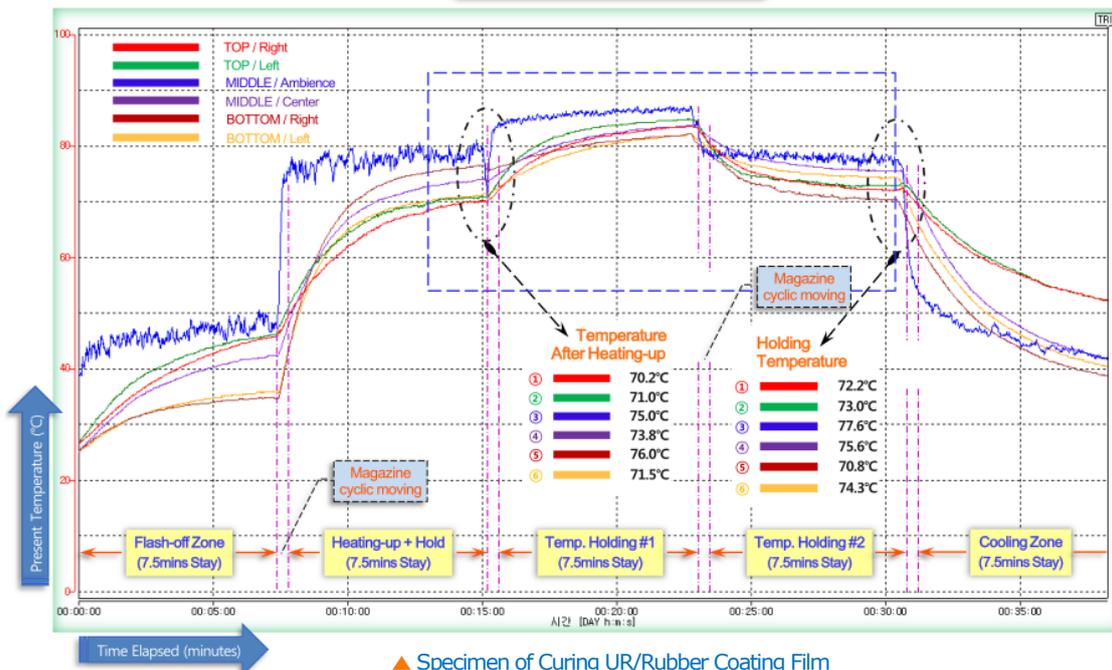
▲ Electrical Control Display Panel

- More than 50% energy & working space savings with a bubble-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.

[ECO99C related moving image / click](#)

- Date of DEMO : Dec. 30, 2010
- Curing Condition : 80°Cx15(mins)
- Magazine Cycle-Time : 7.5(mins)
- Flash-Time Secured : Min 7.5 - Max 15(mins)

ECO99C CONVECTION OVEN • TEMPERATURE PROFILE

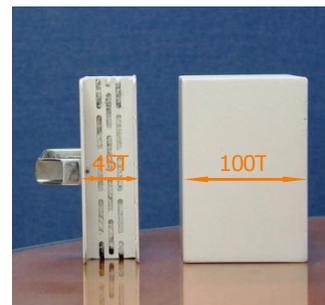


▲ Specimen of Curing UR/Rubber Coating Film

IV. 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

V. 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

VI. After-sales service and Technical support

Presently, TnS and its business networks worldwide are negotiating with customers for business talks with TnS coating solutions in more than ten major countries all over the world.

All the coating systems and devices originated from TnS Inc. shall be provided with a package of value and field proven quality under one year warranty after sale.

EUROPE

- ▼ *multi-components GmbH in Germany / Distributor (central Europe)*
- ▼ *WIN-TEK s.r.l. in Italy / Distributor (southern Europe)*
- ▼ *ALTUS Group Ltd. in UK / Distributor (northern Europe)*
- ▼ *Danutek Kft. in Hungary / Distributor (eastern Europe)*
- ▼ *Global Engineering in Russia / Sales Rep.*
- ▼ *Assempol in Poland / Sales Rep.*

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AMERICAS

- ▼ **PAA (Precision Automation & Assembly)** in New England USA / Sales Rep.
- ▼ **TRC (Technical Resources Corporation)** in Florida USA / Sales Rep.
- ▼ **Southwest Systems Technology Inc.** in Texas & Louisiana USA / Sales Rep.
- ▼ **LaPa Enterprises** in Northern California USA / Sales Rep.
- ▼ **Comtree Inc.** in Canada / Sales Rep.
- ▼ **AMS Inc.** in Mexico & Brazil / Distributor
- *Main role of AMS Inc. in San Diego USA will be limited to All Technical Supports over the Americas.

• **TTnS Representative, New England USA**

- Sales Rep. *exclusive*: **PAA (Precision Automation & Assembly)**



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• **TTnS Representative, Florida USA**



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- <http://www.lapaent.com>
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- * Main role of AMS Inc. in San Diego USA will be limited to All Technical Supports over the Americas.

ASIA

- ▶ *TTnS HQ (Headquarters) / TTnS SG (Singapore Branch)*
- ▶ *BENE Global Ltd. in Republic of Korea / Local Sales Rep.*
- ▶ *Meltonic Automatic Equipment Ltd. in Shanghai China / Sales Rep.*
- ▶ *International Marketing Corp. in Mumbai India / Sales Rep.*
- ▶ *DKR Ltd. in Israel / Sales Rep.*

• **TTnS Inc. (Headquarters)**



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- <http://www.ttns-group.com> (www.yttns.com)
- Contact: Mr. Liew Toh-Nam/Director, Marketing in SEA / *e-mail: tnliew@ttns-group.com

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- Sales Rep. *nonexclusive*: **BENE Global Ltd.**
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- Fax: +82-50-5300-2783
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VII. 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

※Refer to TTnS coating systems Layout
in the above Data Room