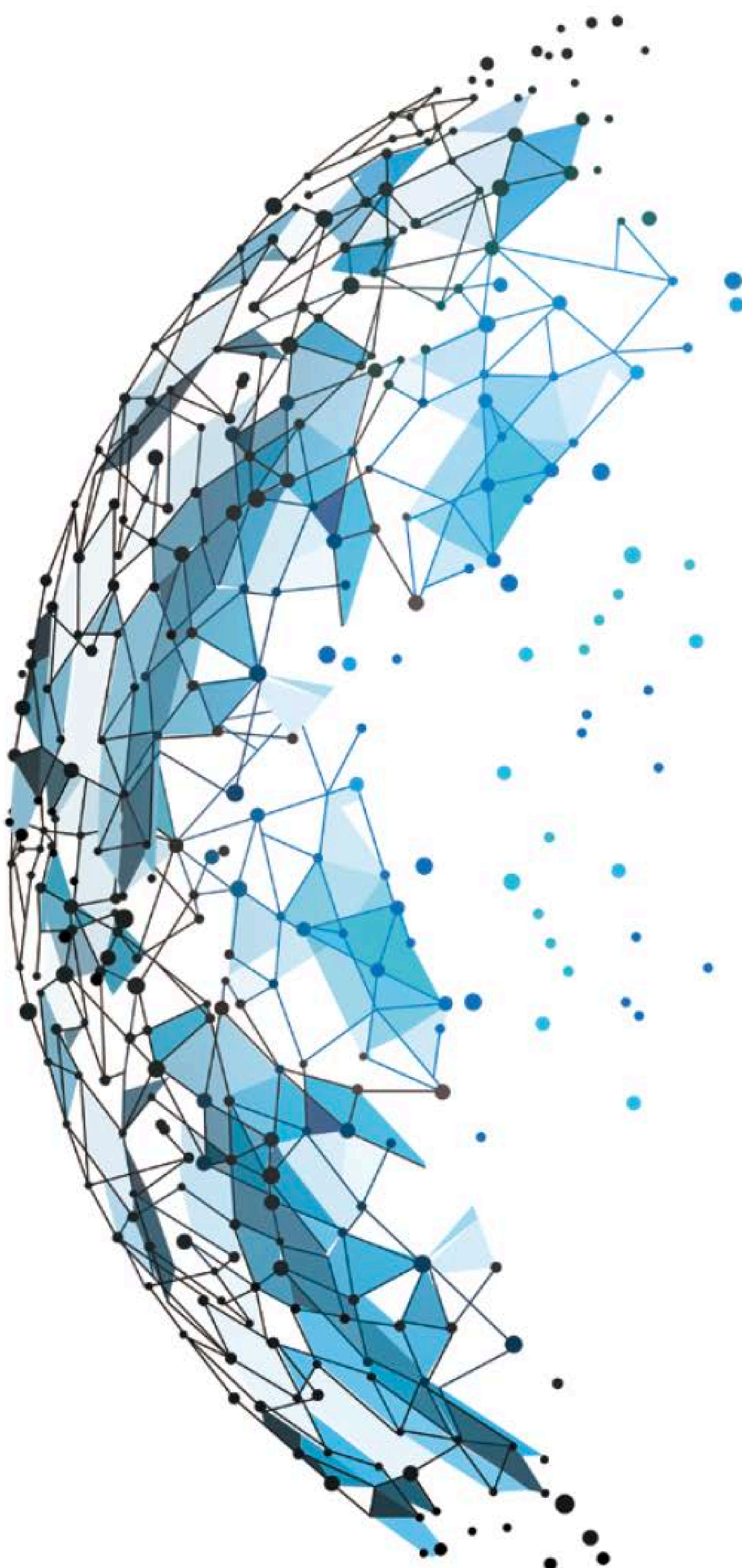

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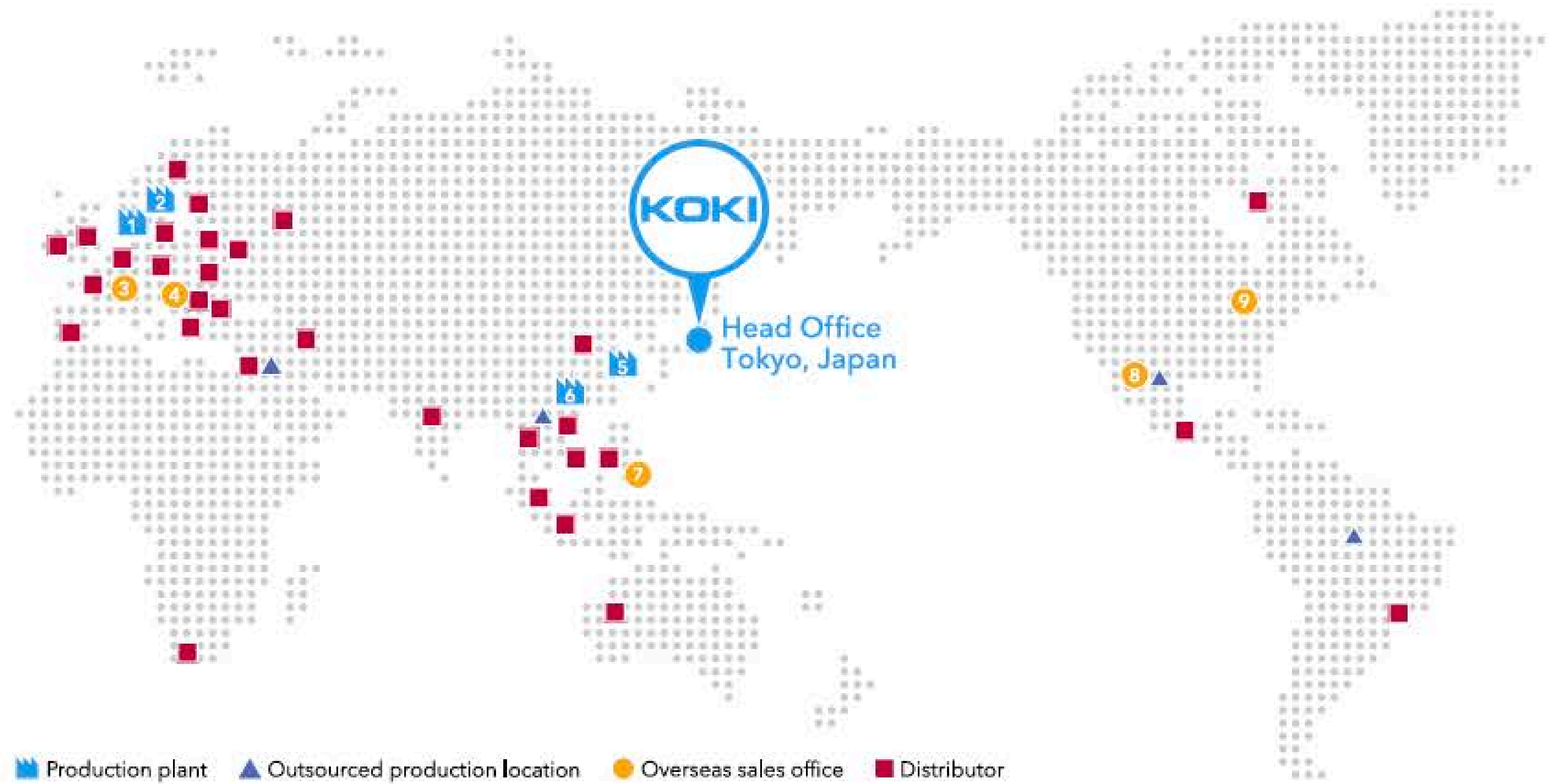
COMPANY LIMITED

Evolving Joining Technology with You

NEW PRODUCTS DIGEST

Global Network



Production plant ▲ Outsourced production location ● Overseas sales office ■ Distributor

Europe

1 Denmark 2 Poland
3 Germany 4 Hungary
Italy / Norway /Sweden / Finland / Poland / Bulgaria / Russia / Czech / Lithuania / Ukraine / Slovakia / Austria / Slovenia / Belgium / Netherlands / Luxembourg / France / Spain / Portugal / Romania / Switzerland / U.K. / Ireland / Turkey / Belarus / Serbia / Brugalia

KOKI Europe A/S

KOKI EUROPE Sp. z o.o.

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Asia

5 Korea 6 China
7 Philippines
Taiwan / Hong Kong / Thailand / Vietnam / Indonesia / Singapore / Malaysia / India

KOKI Korea Co., Ltd

Americas

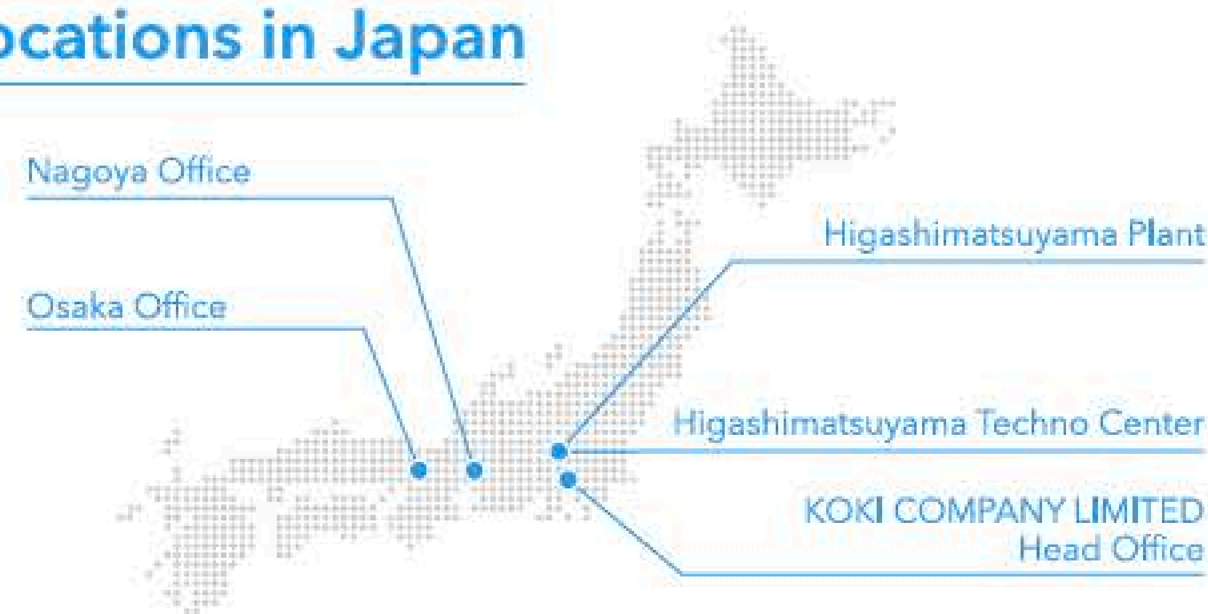
8 9 U.S.A.
Canada / Mexico / Brazil

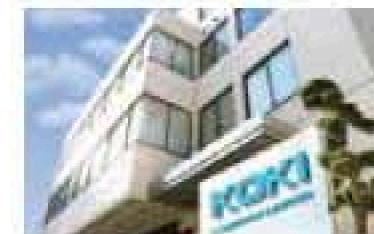
KOKI Electronic Materials (Suzhou) Co., Ltd.

Oceania

Australia

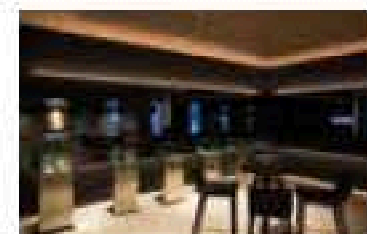
Locations in Japan




KOKI COMPANY LIMITED Head Office

Higashimatsuyama Plant

Higashimatsuyama Techno Center


Higashimatsuyama Techno Center Showroom

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Activator Technologies

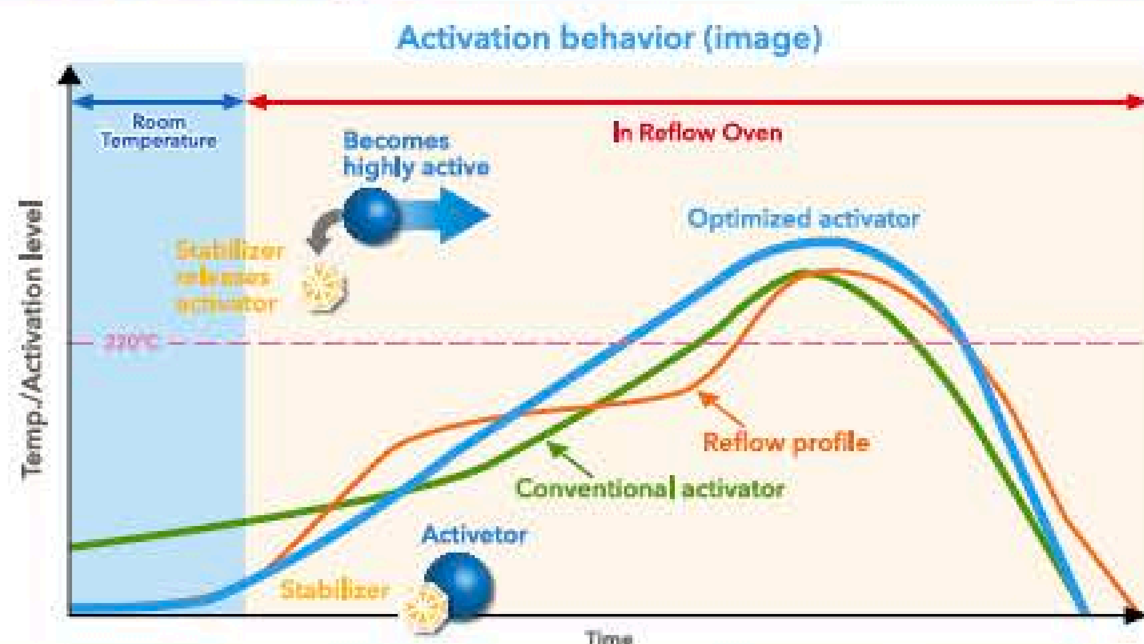
Activation Behavior (image)

Conventional activator

Some consumed at storage, the wetting power of conventional activator weakens during reflow.
Meanwhile, some other activator remain active even after the reflow and influence electrical reliability.

Optimized activator

Designed to inhibit reaction between activator and powder as low as possible during storage and even during pre-heating, optimized activator exerts maximum strength during the time above liquidus.



Powerful & Robust Wetting

Conventional activator system

Relatively large volume of organic acids are formulated for good wetting.

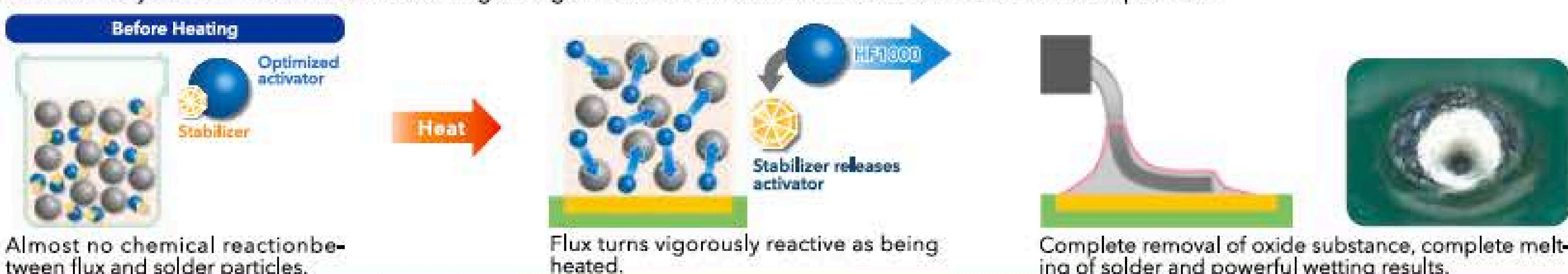
During storage, reactionbetween activator and oxide metal from solder powder continues to takes place.

Consumed activation strength during storage disables prevention / reduction of oxide film formed by re-oxidation.

Leaves unmolten solder particles, poor wetting.

Optimized activator system

Adopted activator system almost non-reactive during storage and also its volume is much less than conventional product.



Almost no chemical reactionbetween flux and solder particles.

Flux turns vigorously reactive as being heated.

Complete removal of oxide substance, complete melting of solder and powerful wetting results.

Low Voiding & Low Flux Splattering

Conventional activator system

Outgassing of solvent occurs till it completely evaporates. The flux slowly starts to activate and reduces the oxides.

Most of liquefied flux and flux gases are discharged from molten solder. Some spots on the metallization are left unsoldered due to presence of oxide.

After outgassing, some flux is remained in the solder. This flux causes more voids due to oxidation reduction reaction with remaining oxides.

Optimized activator system

Outgassing of solvent occurs till its complete evaporation. Flux activates at early stage which actively reduces majority of the oxides and also effectively prevents re-oxidation.

Removal of oxides during pre-heating enhances quick wetting to the metallization of component and pad. Therefore, effectively discharging the flux gas. No flux residue remains in the molten solder.

Rapid discharge of flux gas ensures almost no remaining flux in the molten solder. This effectively prevents continuous outgassing and ensures reduction of voids in the solder joint.

S3X58-HF1000 (Sn 3.0Ag 0.5Cu) Type4

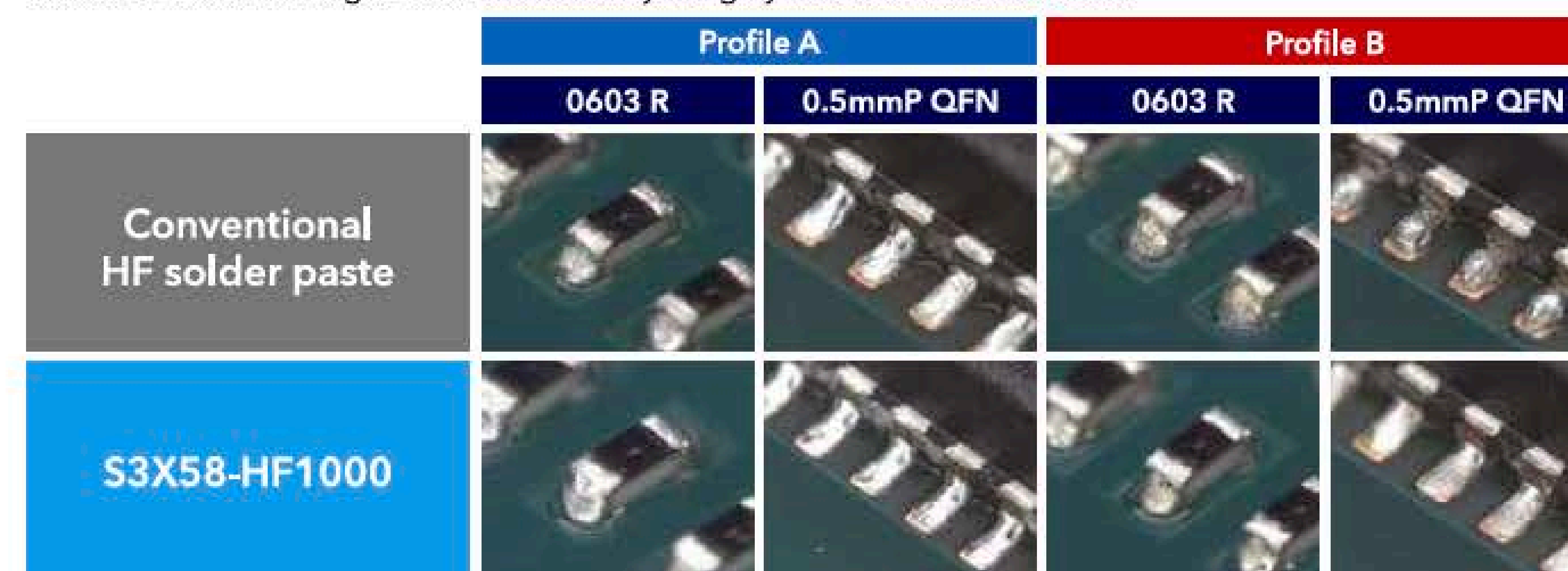
True Halogen-Free High Performance Lead Free Solder Paste

NEW! Halogen Free HF

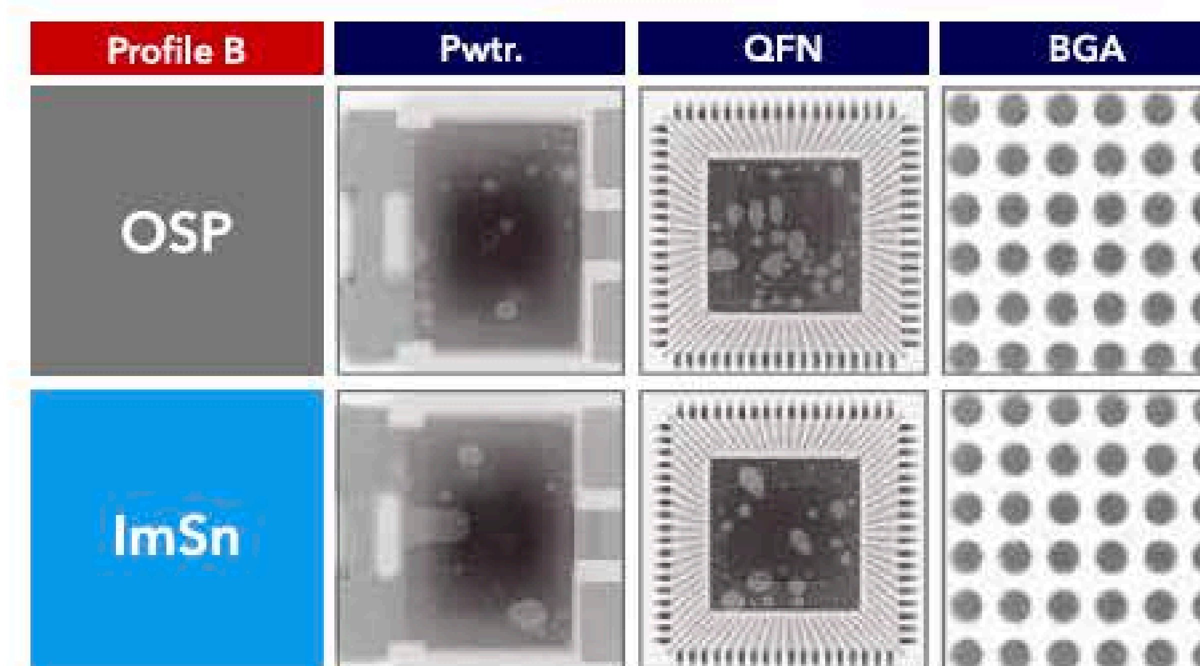
- Halogen Free (ROL0) according to IPC J-STD-004B
- Powerful wetting and low voiding
- Long stencil idle time (Print-to-Pause) > 1 hr.

Improved WETTING Characteristic & Voiding Behavior

S3X58-HF1000 is halogen free formulation yet highly active and heat resistant.

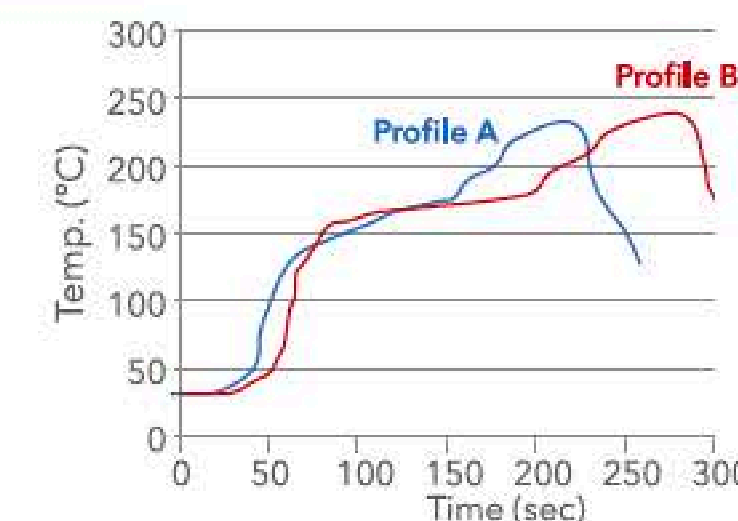


Test Method
- PCB: KOKI test board
- Surface treatment: OSP
- Stencil Thickness: 0.12 mm (Laser)
- Evaluation Pad Number: 0603R, 0.5mmP QFN
- Reflow profile:As shown below



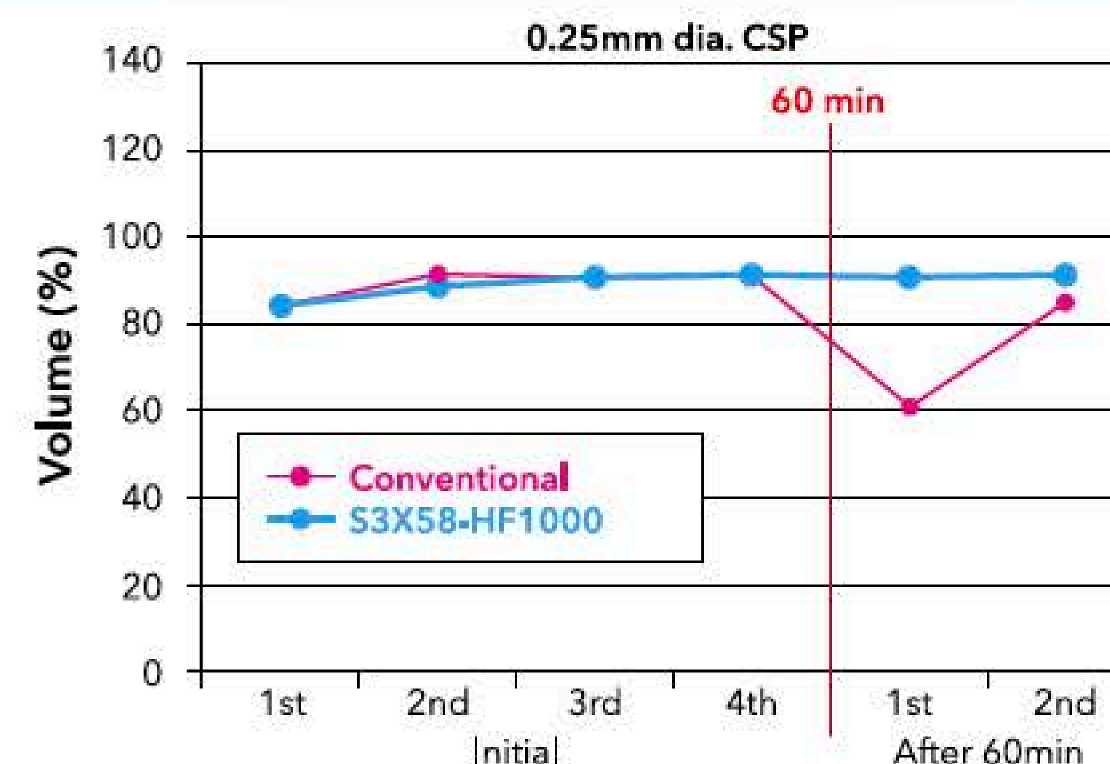
Test Method
- PCB : KOKI test board
- Surface treatment : OSP, ENIG, Ag
- Stencil Thickness : 0.12 mm (Laser)

Designed to be low voiding regardless of a type of components.



	Profile A	Profile B
150~190°C	90sec	130sec

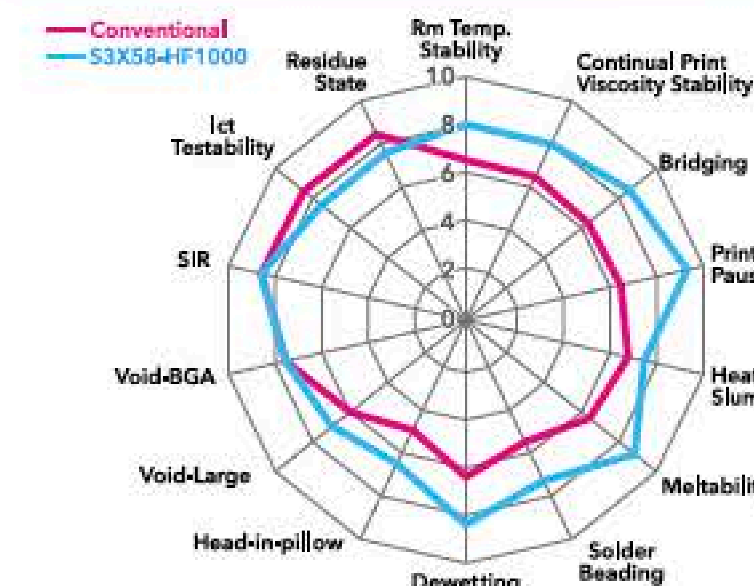
Print-to-Pause



- Printer:Model YVP-XgYAMAHA Motor
- Stencil Thickness: 0.12 mm (Laser)
- Squeegee: Metal squeegee
- Print Speed: 40 mm/ sec.
- Print Pressure: 60 N
- Test Pad Size: 0.25, 0.30 mmφCSP
- Print Ambient: 25±1°C, 50±10%RH

Ensures excellent print-to-pause property and almost no deterioration in stencil release even in case it is left abandoned for 60 min.

Comparison



Product name	S3X58-HF1000
Alloy Composition	Sn 3.0Ag 0.5Cu
Melting Point (°C)	217 - 219
Particle Size (μm)	20 - 38
Halide Content (%)	0
Flux Type	ROL0 (IPC J-STD-004B)
Flux Content (%)	12
Viscosity(Pa.s)	220
Shelf Life (<10°C)	6 months

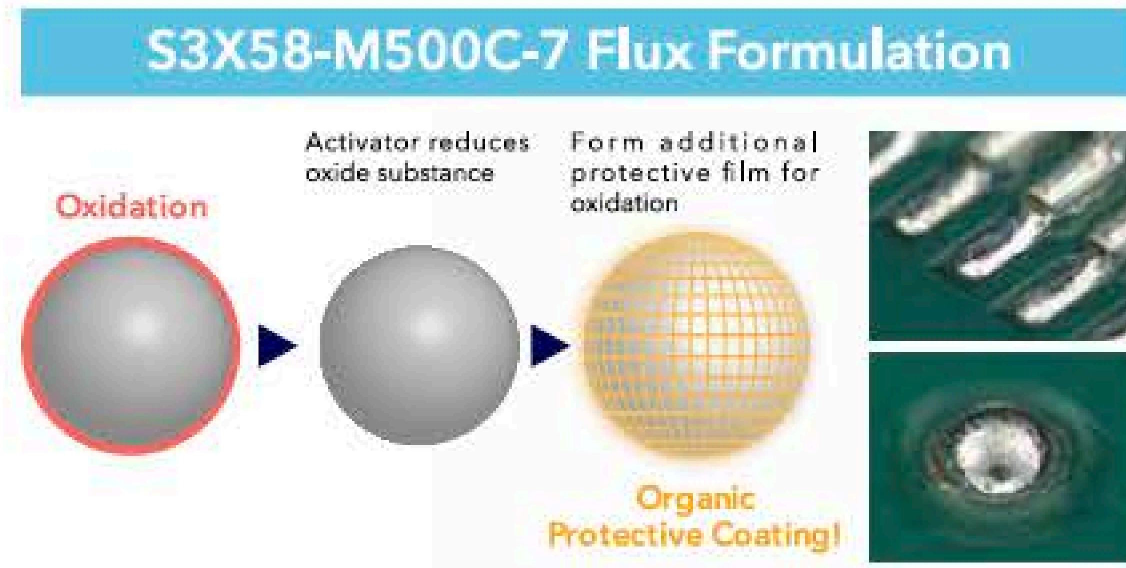
S3X58-M500C-7 (Sn 3.0Ag 0.5Cu) Type4

Upgraded Powerful Wetting General Purpose Solder Paste

- Powerful and consistent wetting / spreading to oxidized metal surface
- Extended tack time ensures wide process window
- Low voiding and anti-HiP flux formulation

Conventional Flux Formulation

S3X58-M500C-7 Flux Formulation



S3X58-M500C-7
After removal of oxide film at pre-heating stage, a new protective film formed on the surface of solder particles effectively prevent re-oxidation during remaining heating process and realizes powerful wetting/melting.

Solder Spreading Property

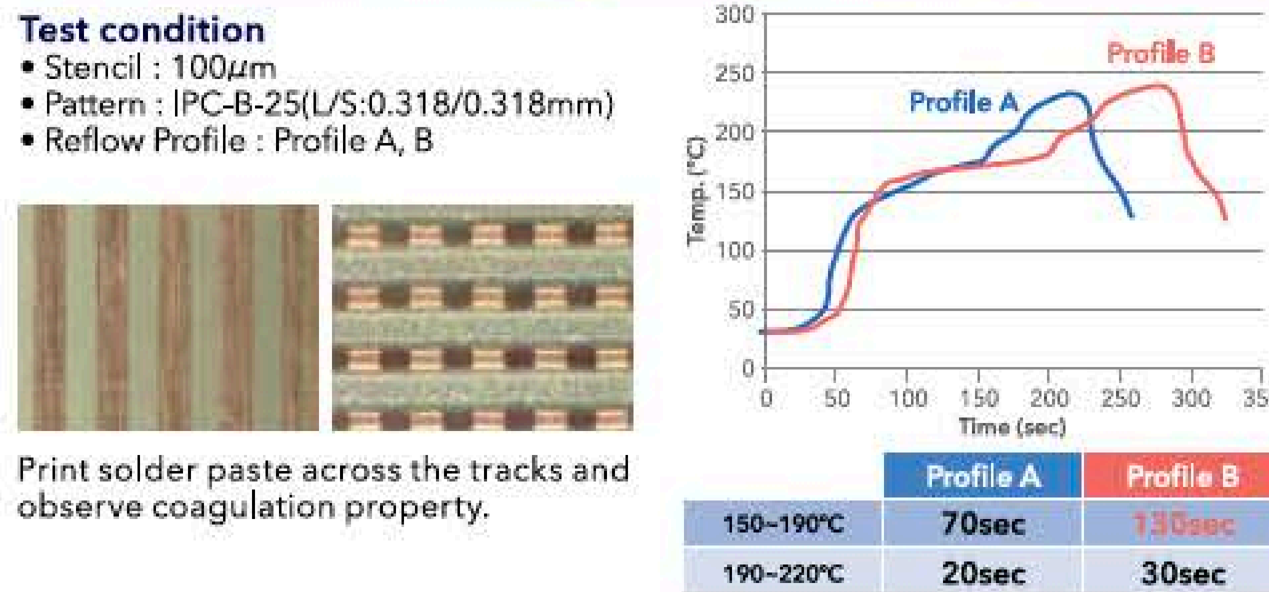
Test condition
- Stencil : 200µm / 6.5mmφ aperture
- Heat source : Convection reflow
- Pre-conditioning : 150°C for 16Hr
- Reflow : Air

After continual print, pause 45 min. or 60 min. and resume printing and observe print volume

S3X58-M500C-7 secures good solder spreading even on the oxidized Ni,Cu, and ImSn plates.

Solder Coagulation Property

Test condition
- Stencil : 100µm
- Pattern : IPC-B-25(L/S:0.318/0.318mm)
- Reflow Profile : Profile A, B

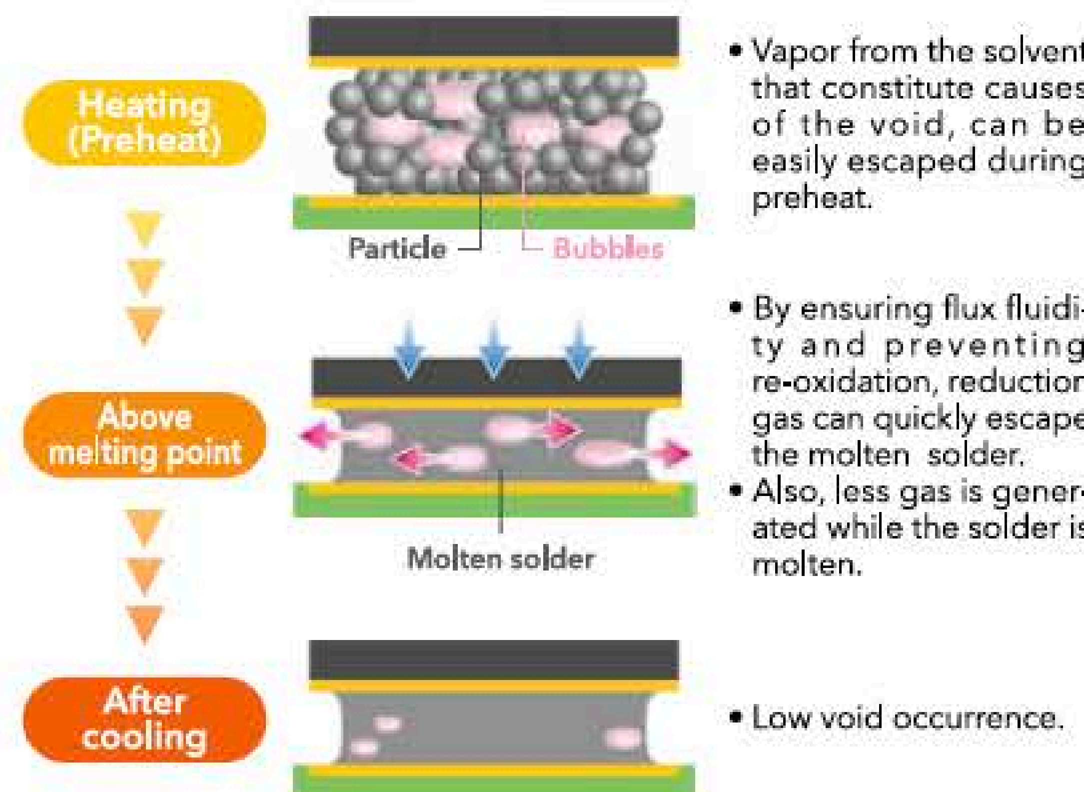


Print solder paste across the tracks and observe coagulation property.

	Profile A	Profile B
150~190°C	70sec	130sec
190~220°C	20sec	30sec

Excellent coagulation property of S3X58-M500C-7 ensures quality solder joints thereby eliminating mid-chip solder balling.

Low-Void Technology



- Vapor from the solvent that constitute causes of the void, can be easily escaped during preheat.
- By ensuring flux fluidity and preventing re-oxidation, reduction gas can quickly escape the molten solder.
- Also, less gas is generated while the solder is molten.
- Low void occurrence.

Pwtr | 6330R (2512) | 2012R (0805) | BGA | QFN | LGA

Product name	S3X58-M500C-7
Alloy Composition (%)	Sn 3.0Ag 0.5Cu
Melting Point (°C)	217 - 219
Particle Size (µm)	20 - 38
Halide Content (%)	0
Flux Type	ROL0 (IPC J-STD-004)
Flux Content (%)	11.8
Viscosity(Pa.s)	200
Shelf Life (<10°C)	6 months

S3X58-G803 (Sn 3.0Ag 0.5Cu) Type4

Ultra Low Void Lead Free Solder Paste

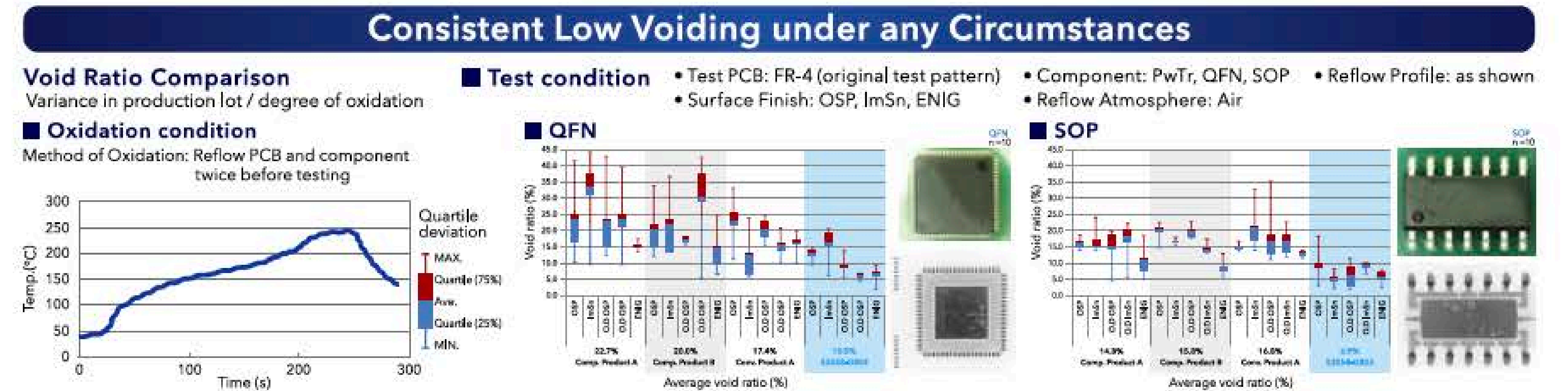
- Newly adopted activator technique ensures stable and ultra low voiding regardless of component type and reflow profiles.
- Highly heat resistant activator effectively prevents Head-in-Pillow phenomenon

Consistent Low Voiding under any Circumstances

Void Ratio Comparison
Variance in production lot / degree of oxidation

Test condition
- Test PCB: FR-4 (original test pattern)
- Surface Finish: OSP, ImSn, ENIG
- Component: PwTr, QFN, SOP
- Reflow Atmosphere: Air
- Reflow Profile: as shown

Oxidation condition
Method of Oxidation: Reflow PCB and component twice before testing

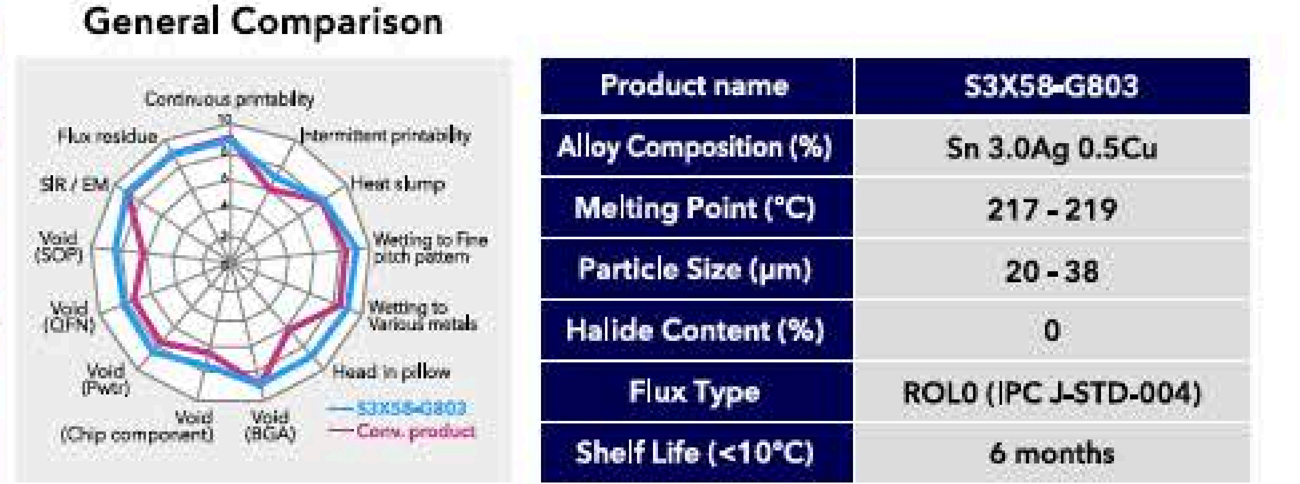


Excellent Soldering Quality

Solderability: Oxidized PCB
Reflow PCB and mount 0603 chip component onto the PCB.
- Metal Stencil: 120µm thick
- Surface finish: OSP, ImSn
- Oxidizing treatment: Reflow 2 times
- Pad size: 0.25mm dia.
- Component: 0603R (Sn plated)
- Heating method: Hot air convection
- Test atmosphere: Air atmosphere

0.25mm dia. | 0603R | OSP | ImSn

General Comparison



Product name	S3X58-G803
Alloy Composition (%)	Sn 3.0Ag 0.5Cu
Melting Point (°C)	217 - 219
Particle Size (µm)	20 - 38
Halide Content (%)	0
Flux Type	ROL0 (IPC J-STD-004)
Shelf Life (<10°C)	6 months

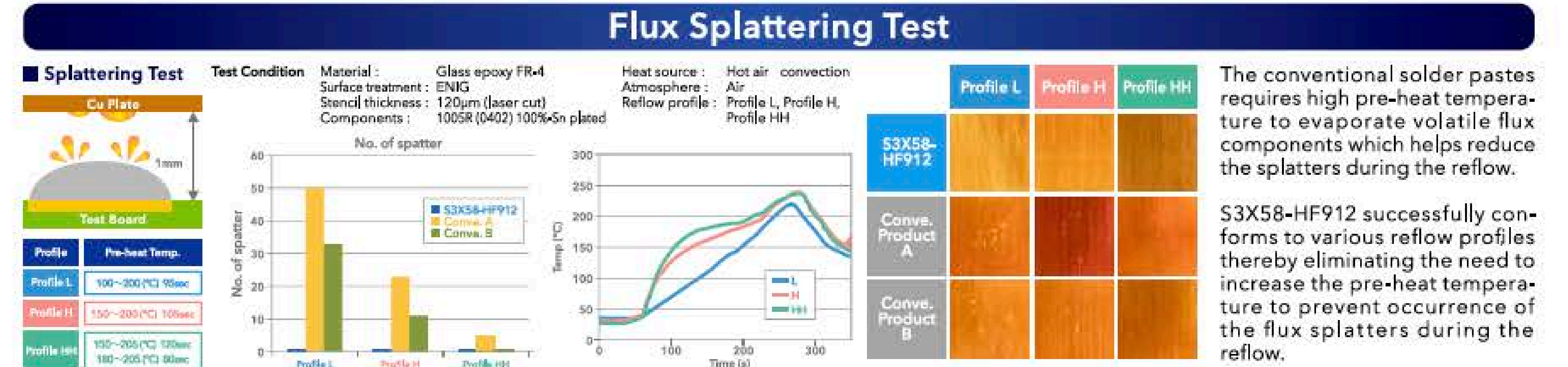
S3X58-HF912 (Sn 3.0Ag 0.5Cu) Type4

Super Low Splattering Solder Paste Recommendable for Sensors and Camera Modules for ADAS Applications

Halogen Free HF

- Specially adopted flux chemistry helps reduce solder / flux splattering
- Does not require special reflow profile optimization
- Halogen free chemistry, ROL0 according to IPC J-STD-004A

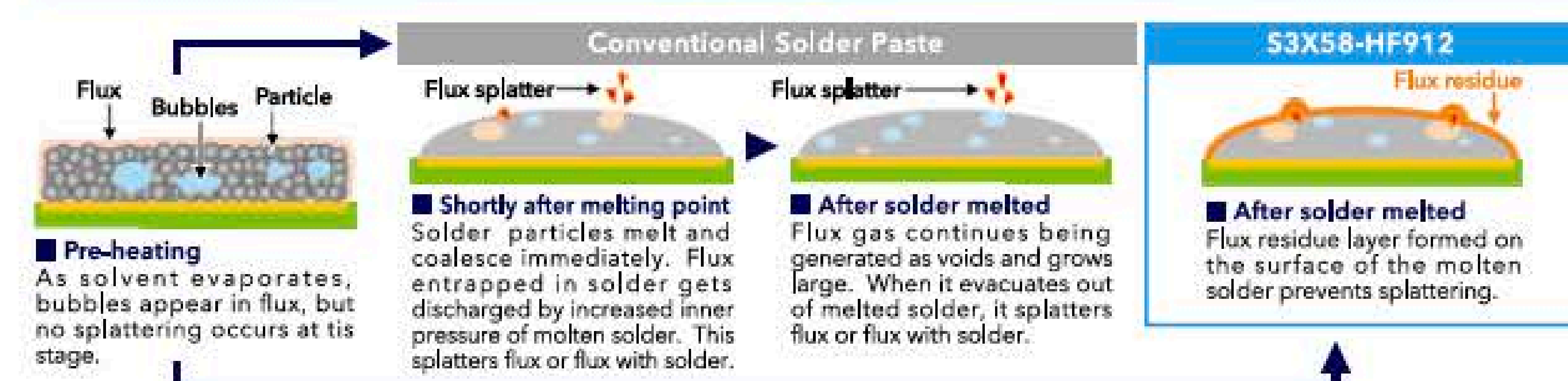
Flux Splattering Test



The conventional solder pastes requires high pre-heat temperature to evaporate volatile flux components which helps reduce the splatters during the reflow.

S3X58-HF912 successfully conforms to various reflow profiles thereby eliminating the need to increase the pre-heat temperature to prevent occurrence of the flux splatters during the reflow.

Capping Effect



Product name	S3X58-HF912
Alloy Composition (%)	Sn 3.0Ag 0.5Cu
Melting Point (°C)	217 - 219
Particle Size (µm)	20 - 38
Halide Content (%)	0
Flux Type	ROL0 (IPC J-STD-004A)
Flux Content (%)	11.5
Viscosity (Pa.s)	190
Shelf Life (<10°C)	6 months

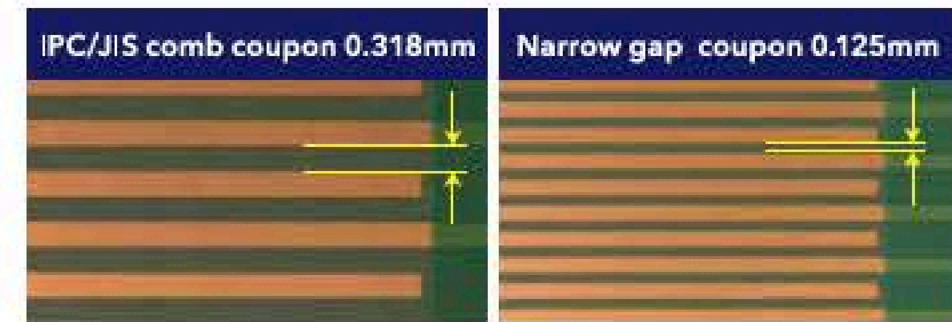
S3X58-HF900N (Sn 3.0Ag 0.5Cu) Type4

Super High Reliability Halogen-Free Solder Paste

- Adopting the new activator technology
- Designed to be extremely high reliable SIR/EM in super fine pitch
- Ensures good solderability under N_2 reflow

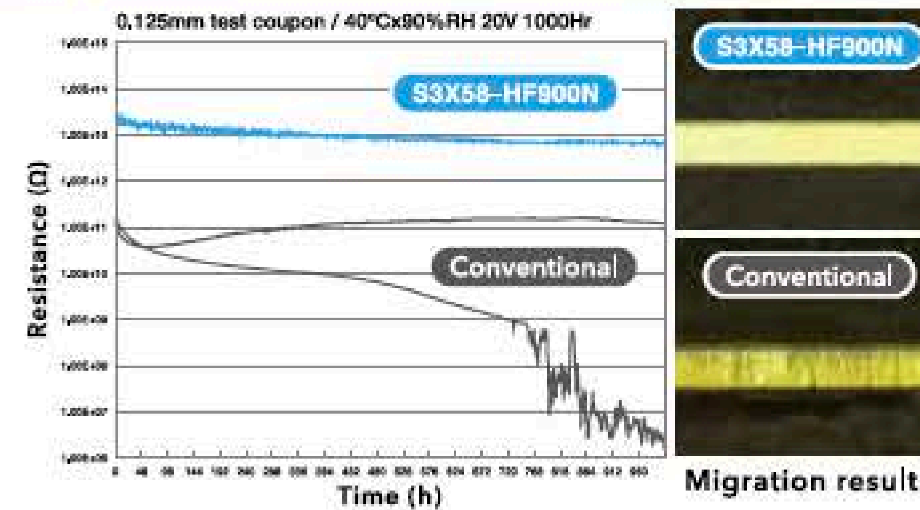
Reliability Challenges in Narrow Gap Patterns

When testing insulation reliability and flux residues, a 0.317mm gap comb coupon is normally used for both JIS and IPC standards. However, more and more customers are recently requesting a narrower gap test coupon.



Notable Result in Narrow Gap SIR Test
(0.125mm gap)

S3X58-HF900N retains high SIR with no ionic migration observed after a 1000 hour applied voltage environment test.



S3X58-HF900N

Conventional

Migration results.

New Technology Achieves High SIR

Analysis of Sn Content (metallic ion) in Flux Residue

1. Extract flux residue between the sample electrodes.
2. Make a qualitative and quantitative analysis in mass concentration (%) of the extracted flux residue using SEM-EDX.

Very Low Metallic Ions in Flux Residue

Flux residue contains very low metallic ions, which contributes to high SIR.

Product name	S3X58-HF900N
Alloy Composition (%)	Sn 3.0Ag 0.5Cu
Melting Point (°C)	217 - 219
Particle Size (μm)	20 - 38
Halide Content (%)	0
Flux Type	ROL0 (IPC J-STD-004B)
Flux Content (%)	11.0
Viscosity (Pa.s)	220
Shelf Life (<10°C)	6 months

S3X58-M650-7 (Sn 3.0Ag 0.5Cu) Type4

Halogen-Free Pin Testable Solder Paste

- Specially designed flux for improved performance on In-Circuit Testing
- No-clean / cleanable flux formulation
- Halogen free chemistry, ROL0 according to IPC J-STD-004B

Inhibits Flux Residue Attachment

Flux residue of conventional solder paste tends to deposit over the solder joint, and could lead to erroneous readings in ICT evaluation even when the assembly itself is flawless.
S3X58-M650-7, on the other hand does all the work that a conventional flux is supposed to do but most importantly prevents the buildup thick and sticky flux residue over the solder joint, which helps the testing probe to get the accurate readings thus improving the first pass yield.

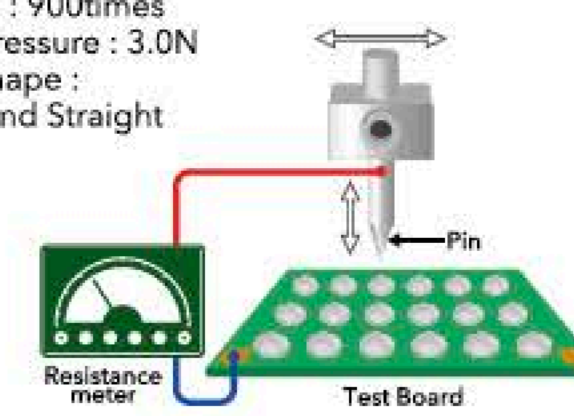
Figure 1. Example of ICT inspection failure

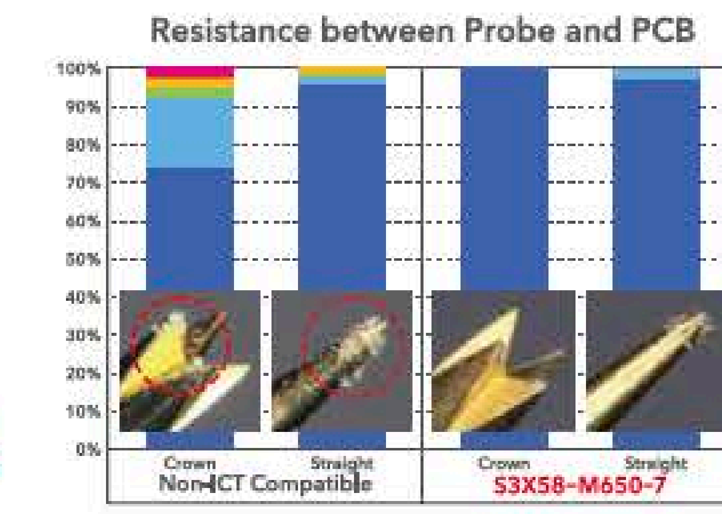
Drastic improvement of Pin Testability

Securing contact between the testing probe and the solder joint,S3X58-M650-7 gives consistently high measurement accuracy in ICT evaluation.

Comparison of pin testability

- Board : FR-4
- Surface treatment : OSP
- #of tests : 900times
- Probe pressure : 3.0N
- Probe shape : Crown and Straight





Product name	S3X58-M650-7
Alloy composition (%)	Sn 3.0Ag 0.5Cu
Melting point (°C)	217 - 219
Particle size (μm)	20 - 38
Viscosity (Pa.s)	200
Flux content (%)	11.5
Halide content (%)	0
Flux type	ROL0 (IPC J-STD-004B)
Shelf Life (<10°C)	6 months

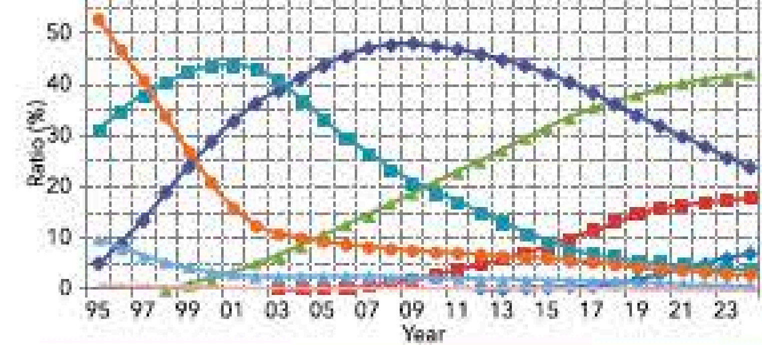
S3X811-M500-6 (Sn 3.0Ag 0.5Cu) Type6

Super Fine Particle Solder Paste for 03015 / 0201 Chip

- Superb print characteristics with 03015 and 0201 metric pattern
- Stable meltability performance based on flux and activator design
- Halogen free chemistry (F + Br + Cl + I: < 500ppm), ROL0 according to IPC J-STD-004B

Application of 0201/03015 Components and Future Projection

Trend of Ceramic Capacitor Sizes
Source : JEITA "Electronic Component Technology Road-map toward 2024

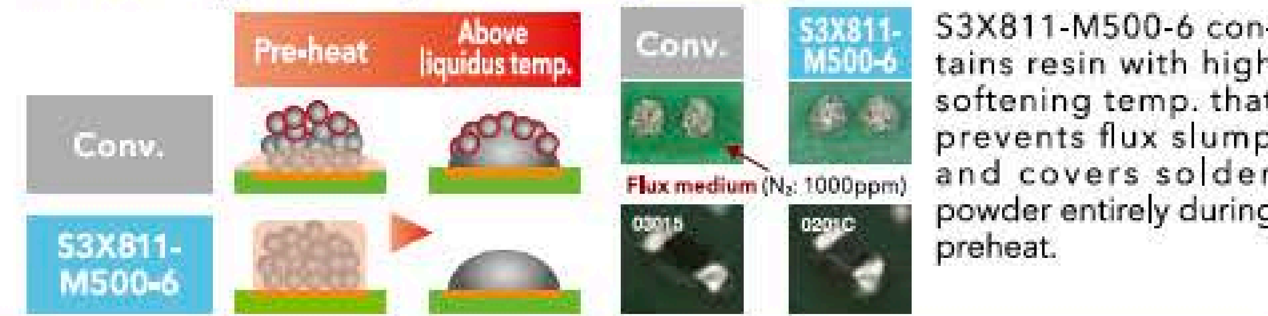


Miniaturization of electric device is expected to accelerate and the demand for micro size components is projected to increase.

Improved Meltability at Fine-Pitch Pads

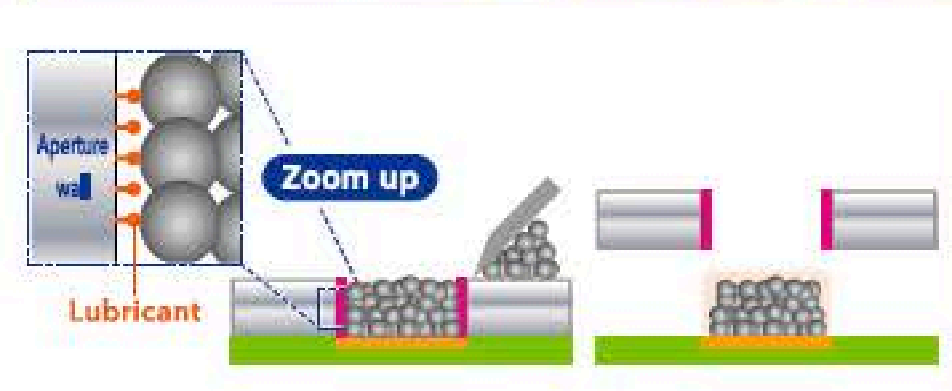
S3X811-M500-6 maintains good meltability at fine-pitch pads by adjusting its flux fluidity to inhibit solder powder from being oxidized. Consistent fine-pitch printability and intermittent printability are ensured.

Preventing solder powder degradation



S3X811-M500-6 contains resin with high softening temp. that prevents flux slump and covers solder powder entirely during preheat.

Improving Fine-Pitch Printability



Conv. | S3X811-M500-6

Test pad: 0201 pads
Aperture size: 100 x 80μm
Metal stencil: 50μm

Lubricant is coordinated at the aperture walls to reduce the friction between solder paste and aperture walls. Subsequently, solder paste is pulled to the pads.

Product name	S3X811-M500-6
Alloy Composition (%)	Sn 3.0Ag 0.5Cu
Melting Point (°C)	217 - 219
Particle Size (μm)	5 - 20
Halide Content (%)	0
Flux Type	ROL0 (IPC-JSTD-004B)
Viscosity (Pa.s)	200
Shelf Life (<10°C)	6 months

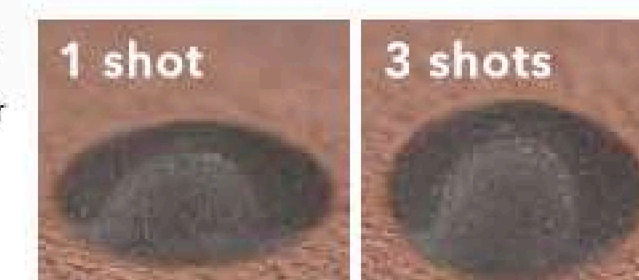
S3X70-E150DN (Sn 3.0Ag 0.7Cu) Type 5, 6

Solder Paste for Jet Dispensing

- High-speed non-contact dispensing drastically reduces takt time
- Unique flux technology enables dispensing in super fine size
- Applicable to maskless lithography, 3D packaging, and many more

SOLDER JET® Musashi Engineering Inc.

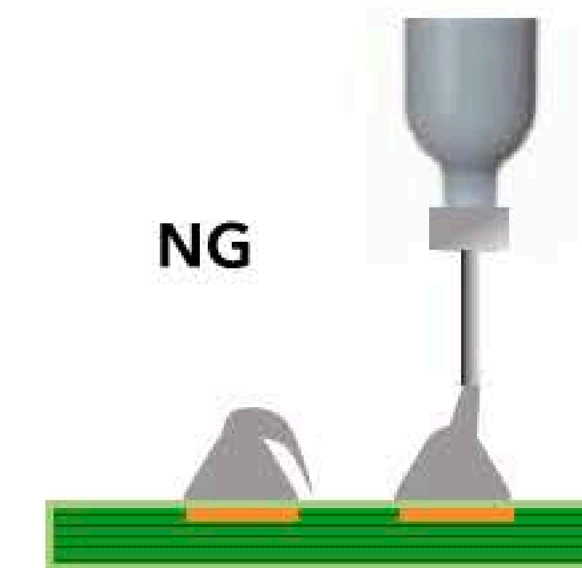
Dispense volume is stable.
No occurred solder spattering after 3-time dispensing.



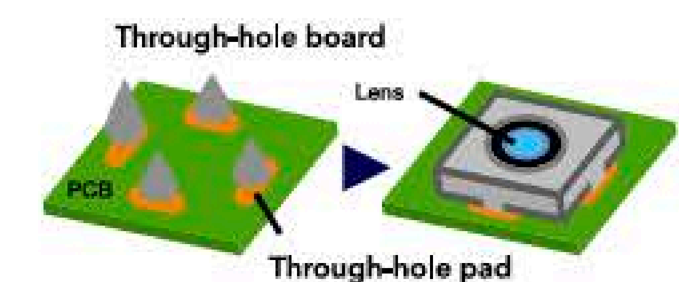
Non-contact application of solder paste allows repeated deposition to one specific spot. Amount of solder paste is adjustable according to the size of components, thus securing high reliability at the solder joint.

Stable Solder Paste Shape

Configuration of dispensed solder paste is stable all the way through in jet dispensing, as the process does not involve a nozzle which is responsible for causing bridges and spikes.



Through-hole soldering, addition of extra solder



Product name	S3X70-E150DN
Alloy Composition (%)	Sn 3.0Ag 0.5Cu
Melting Point (°C)	217 - 219
Particle size (μm)	2 - 10
Viscosity (Pa.s)	50
Flux content (%)	15
Halide content (%)	0
Flux Type	ROL0 (IPC J-STD-004A)
Available particle size	10-25μm 5-20μm
Shelf Life (<10°C)	3 months

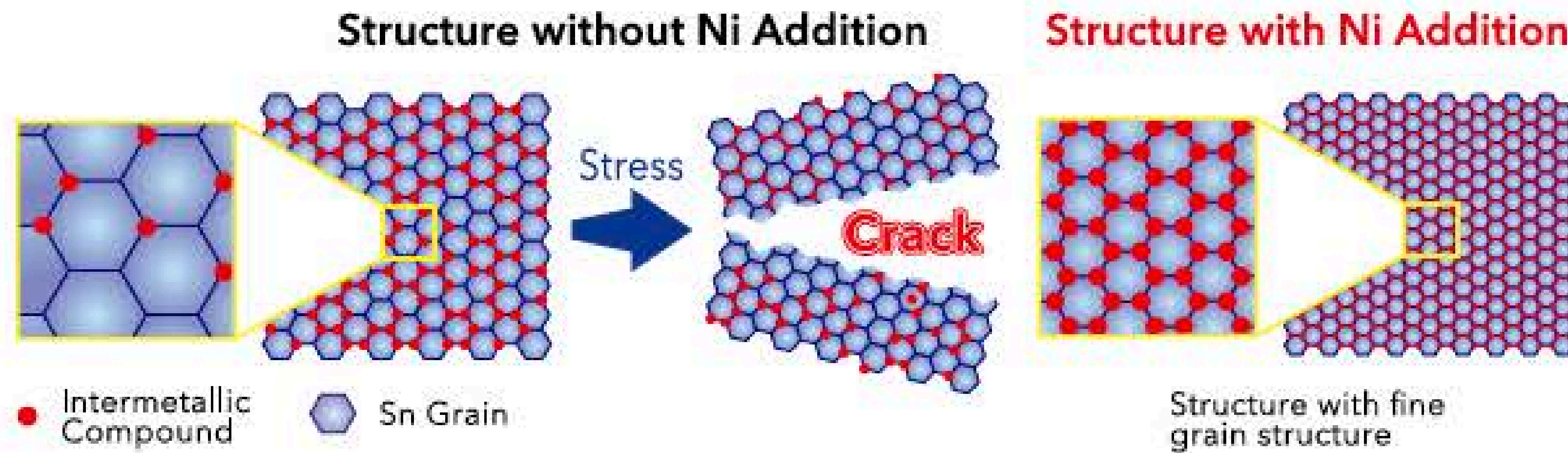
Versatile Alloy Availability by Fully Utilizing Modifying Elements

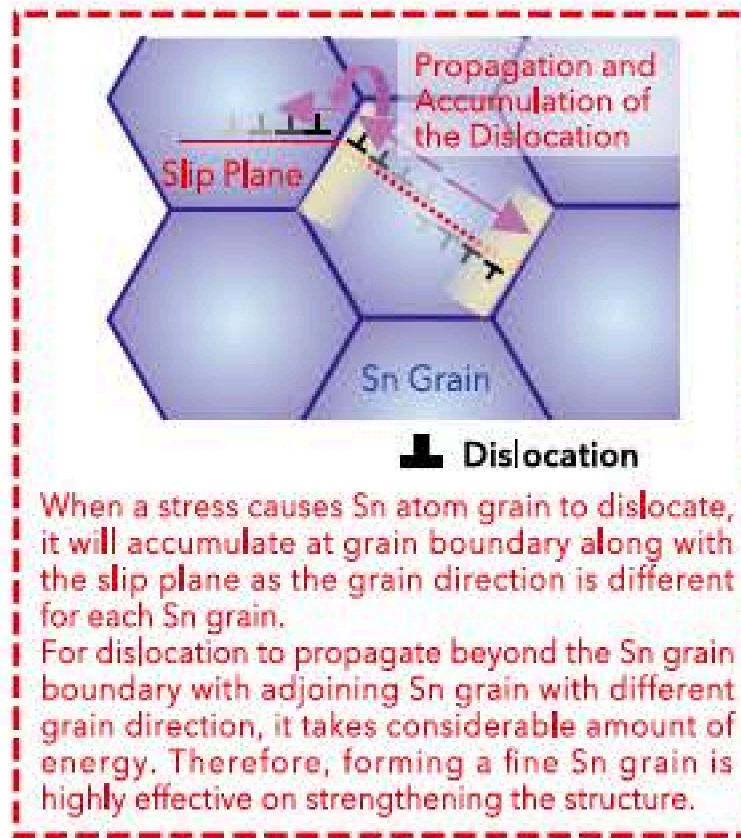
Alloy Technology

Precipitation Strengthening

Precipitation Strengthening by Ni (Inhibiting Sn grain from growing)

Intermetallic compounds which contains Ni finely precipitates upon cooling and prevents Sn grain from growing. As a result, a fine crystalline structure can be obtained. Such structures are stable in both thermal and aging process. These structures also delay plastic deformation which causes crack, by inhibiting the dislocation incurred by a stress within Sn grain from propagating beyond the grain boundary.





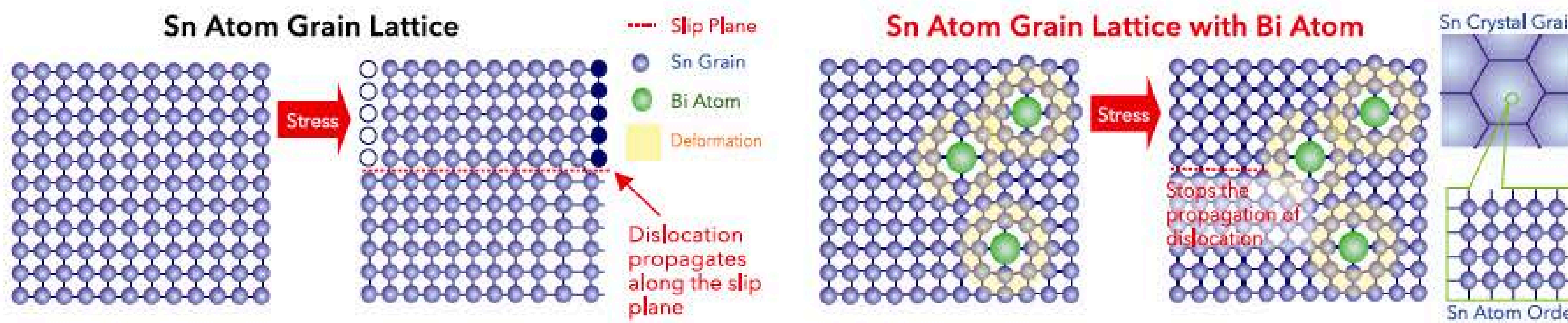
When a stress causes Sn atom grain to dislocate, it will accumulate at grain boundary along with the slip plane as the grain direction is different for each Sn grain.

For dislocation to propagate beyond the Sn grain boundary with adjoining Sn grain with different grain direction, it takes considerable amount of energy. Therefore, forming a fine Sn grain is highly effective on strengthening the structure.

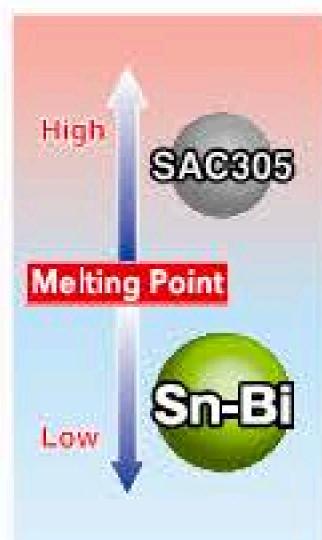
Solid Solution Strengthening

Forming Sn Solid Solution by Bi

Bi have larger atomic radius so it replaces the Sn atom and deform sthe grain lattice. If the grain lattice is in an orderly manner, dislocation of Sn atom will propagate along the slip plane. On contrary, Bi atoms in Sn structure produces grain structure deformation and inhibits the propagation of dislocation.



Alloys' Positioning



Alloy Name		SAC305(Ref)	S1XBIG	SB6NX	TB
Alloy Composition (%)	Sn	Bal.	Bal.	Bal.	Bal.
	Ag	3.0	1.1	3.5	—
	Cu	0.5	0.7	0.8	—
	Bi	—	1.8	0.5	58.0
	Ni	—	Additive	—	—
	In	—	—	6.0	—

SB6N58-HF350 (Sn 3.5Ag 0.5Bi 6.0In) Type 4
SB6NX58-HF350 (Sn 3.5Ag 0.5Bi 6.0In 0.8Cu) Patented by Panasonic Type 4

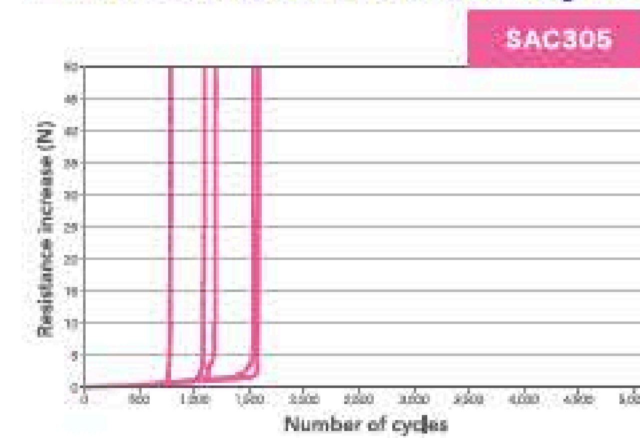
True Halogen-Free Solder Paste with High Reliability Solder Alloy

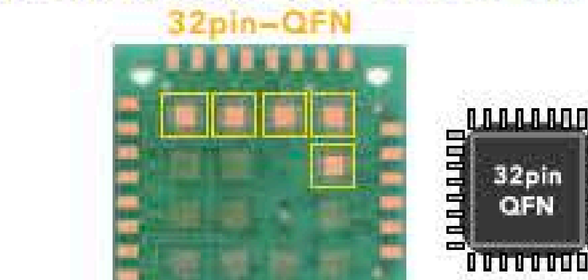
NEW!

- Superior crack resistance in thermal fatigue cycling
- Halogen free (ROL0) by IPC J-STD-004B

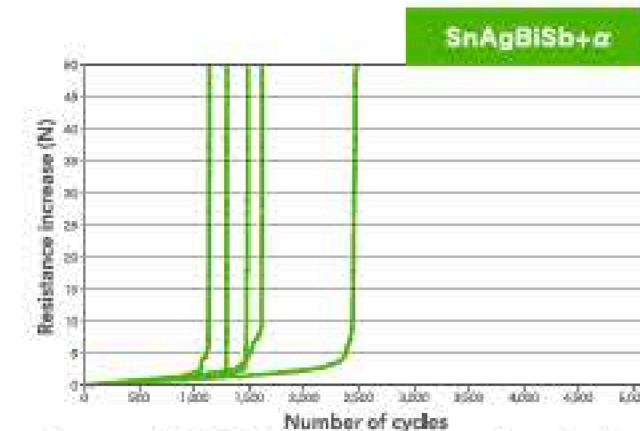
Excellent Reliability Qualifies for Automotive Applications

Electrical Reliability Duration Test (-40/+150°C)

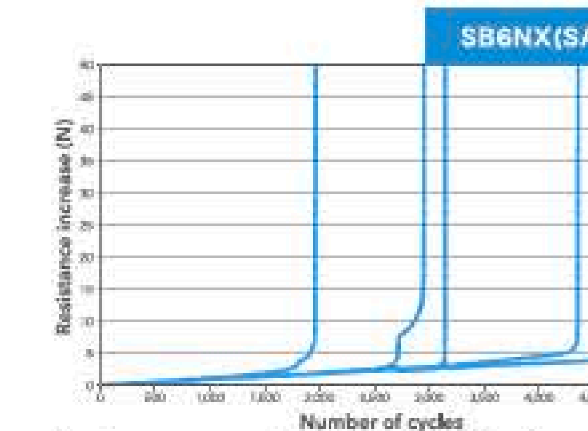




After 750 to 1600 cycles, conductivity failure occurred with all 5 QFN components using SAC305 alloy.

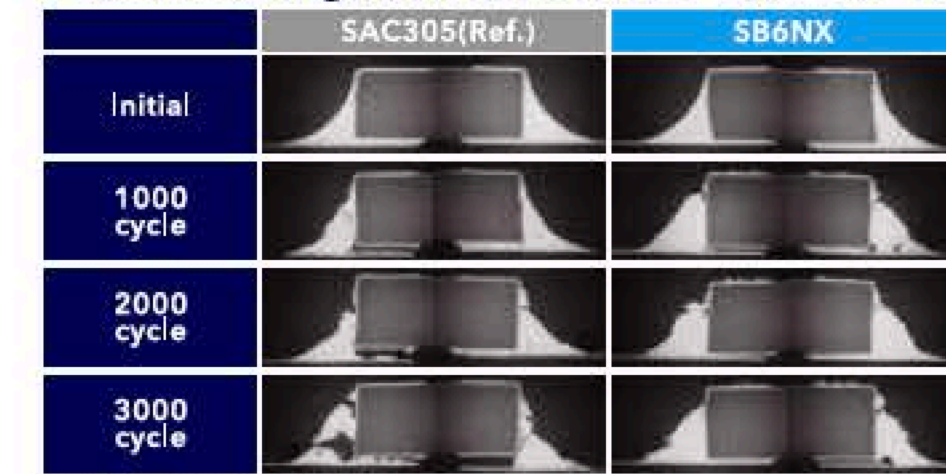


Around 1300 cycles, conductivity failure occurred with almost all QFN components using Sn Ag Bi Sb+α alloy.

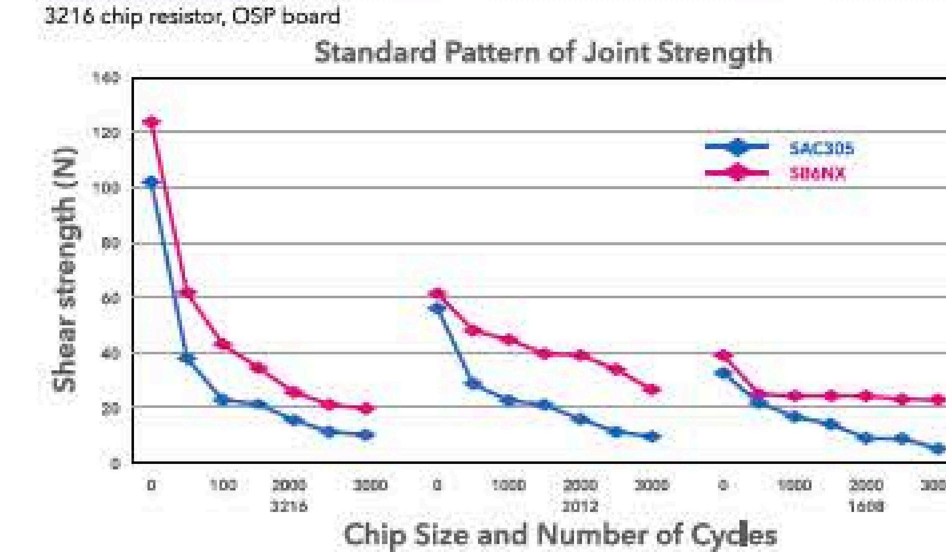


In the case of using SB6NX alloy, all 5 QFN components survived 2000 cycles, With some even went over 5000 cycles.

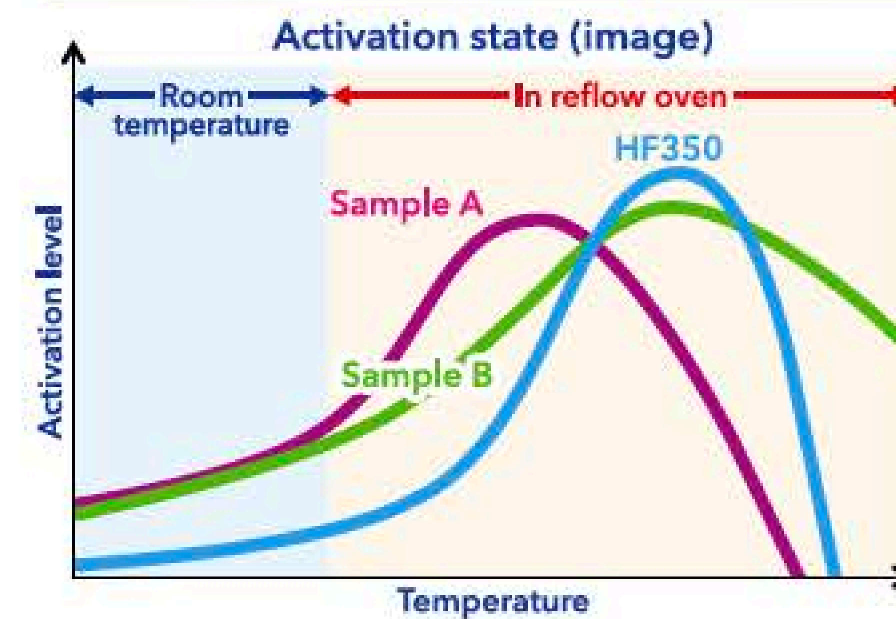
Joint strength, cross section (-40/+150°C)



3216 chip resistor, OSP board



Activator Technique Enables Viscosity Stability, Powerful Wetting and High SIR



Halogen Free sample A

A certain amount of activation strength is consumed during the storage / before the reflow. This decreases the wetting power during the reflow.

Halogen free sample B

Some of the activation weakens before the reflow, but some even remain active after the reflow which greatly degrades the electrical reliability.

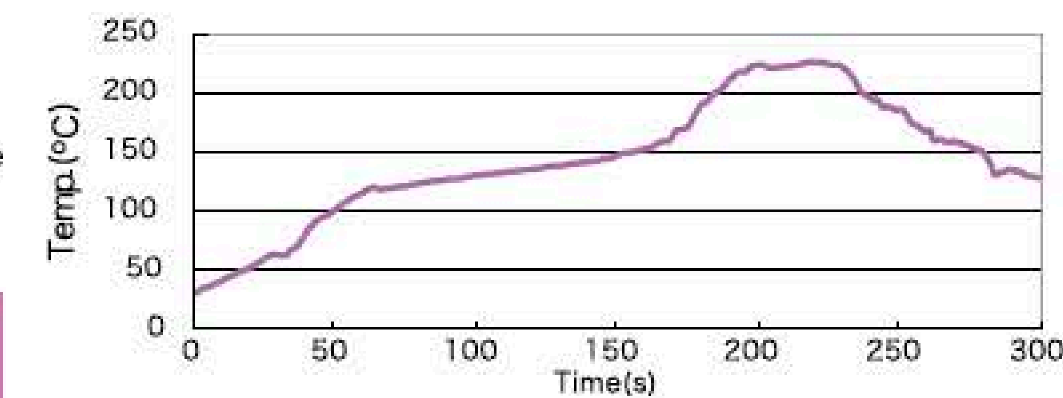
HF350

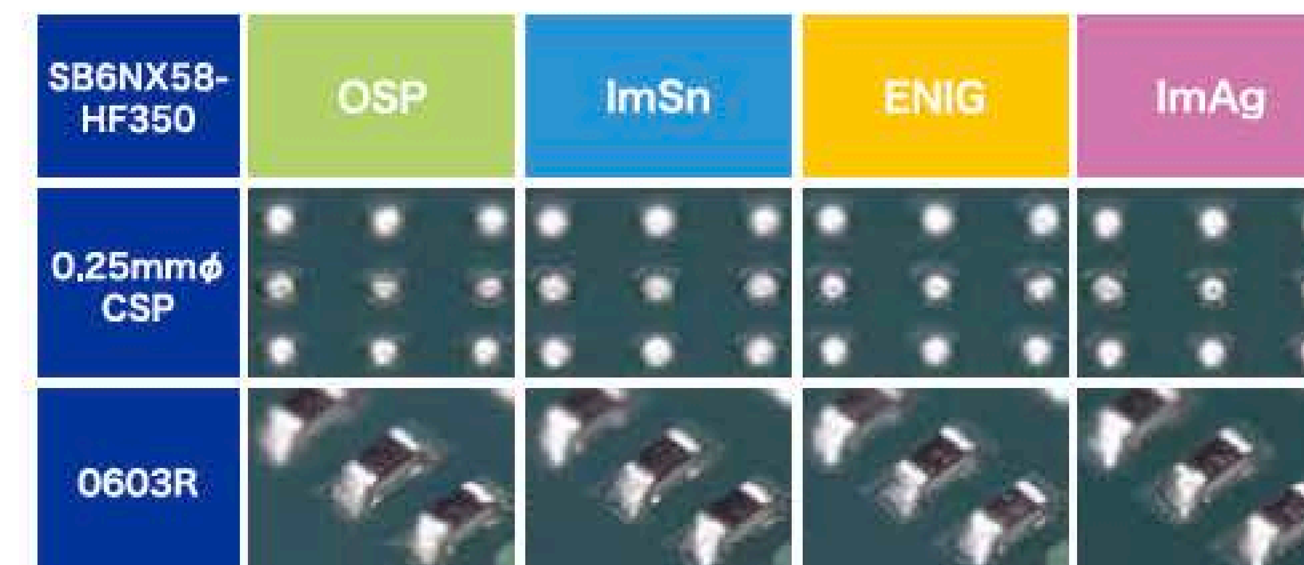
Newly developed activator technique is designed to inhibit reaction as low as possible during storage and even during pre-heating stage, but exerts maximum activation strength during the time above liquidus..

Good Meltability and Wetting with Various Surface Finishes

Test conditions

- Material : Glass epoxy FR-4
- Surface treatment : OSP, ImSn, ENIG, ImAg
- Stencil thickness : 120μm (laser cut)
- Pad size : 0.25mm diameter
- Component: 0603R
- Heat source : Hot air convection
- Reflow profile : Refer to reflow profile on the right





Product name	SB6N58-HF350	SB6NX58-HF350
Alloy Composition (%)	Sn 3.5Ag 0.5Bi 6.0In	Sn 3.5Ag 0.5Bi 6.0In 0.8Cu
Melting Point (°C)	202 - 210	202 - 204
Particle Size (μm)	20 - 38	
Halide Content (%)	0	
Flux Type	ROL0 (IPC J-STD-004B)	
Shelf Life (<10°C)	6 months	

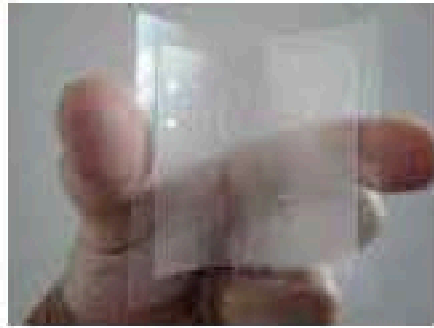
TB48/T4AB58-M742 (Sn 58.0Bi / Sn 57.0Bi 1.0Ag) Type3, 4

Low Melt Point Solder Paste for PET FCB Application

- Low melt point soldering to be comapatible with heat-sensitive electrical components and substrates
- Specially designed flux to improve processing at lower peak temperatures and less TAL
- Transparent flux residue does not affect LED's color tone

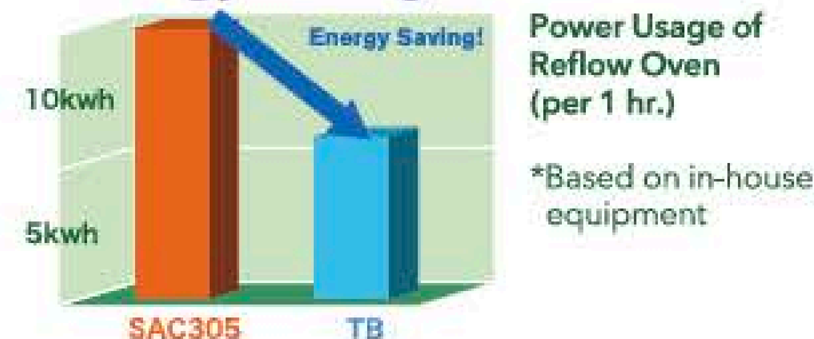
Advantages of Sn-Bi solder of low melting point

Applicable to PET FPC soldering



Having low melting temperature, TB48/TAB58-M742 is suitable for soldering electronic devices with low heat tolerance such as LED, lenses (fragile components), etc.

Energy Saving



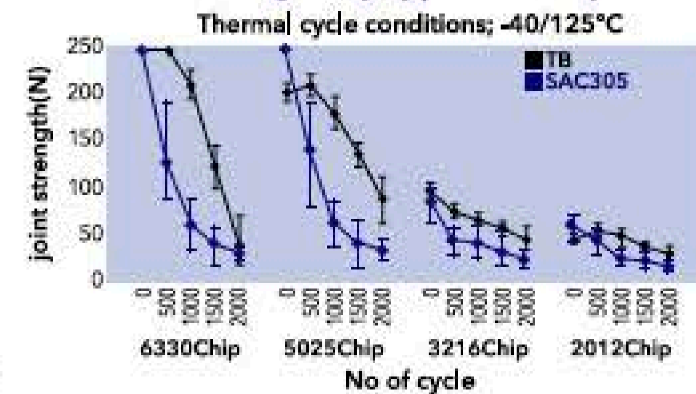
Power Usage of Reflow Oven (per 1 hr.)

*Based on in-house equipment

TB name is based on Tin-Bismuth alloy composition. Its melting point is at 138°C, which is about 80°C lower than SAC305 solder alloy (217°C). This makes TB suitable for soldering electronic devices with low heat tolerances such as LEDs, lenses (fragile components) etc. Also, by lowering the reflow temperature, energy usage is reduced to help lowering green house gas emission.

Excellent Joint Reliability

Shear strength by type of component

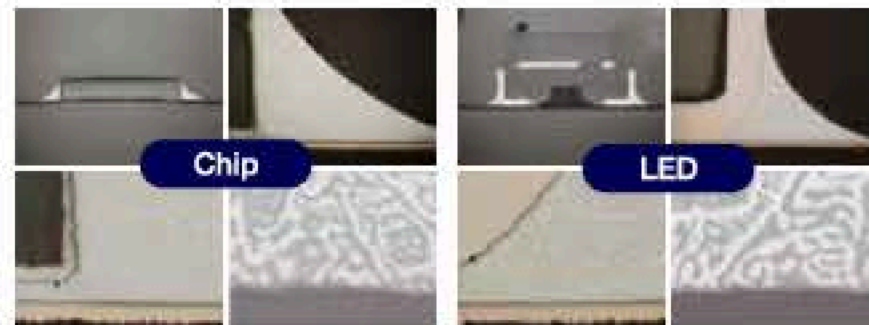


Test board: FR4
Thermal cycling: -40/+125°C, 30 min.
Stencil thickness: 120μm
Base board: Cu
Surface treatment: OSP
Test board thickness: 1.6mm

Product name	TB48-M742	T4AB58-M742
Alloy composition (%)	Sn 58.0Bi	Sn 57.6Bi 0.4Ag
Melting point (°C)	138	138 - 140
Particle size(μm)	20 - 45	20 - 38
Halide content (%)	0	
Viscosity (Pa.s)	190	
Shelf Life (<10°C)	6 months	

Cross-section of Soldered PET Substrate

Component size: 3216 chip resistor, 3.5 x 3.5mm LED
Stencil thickness: 150μm
Print speed: 50mm / sec.
Print pressure: 50N



JU-110-2

SVHC Compliant General Purpose SMT Adhesive

NEW!

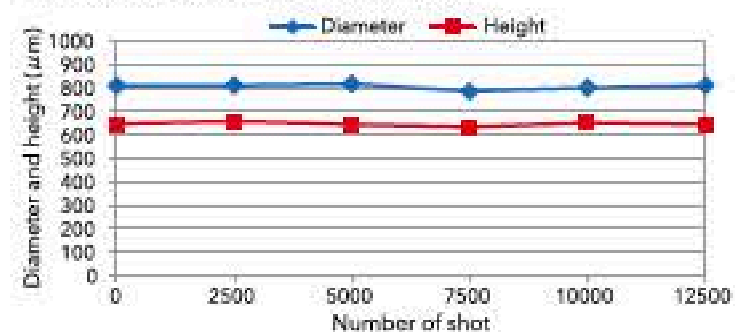
- Significantly reduced the content of SVHC material.
- Ensured dispense and adhesive performances.
- Excellent in storage stability.

Dispensability: Continuous & 0402 (1005) Chip

Continuous dispensability

Test condition

- Needle : 22G Single needle (15mmL, 0.41mmΦ inner dia.)
- Pressure : 350kPa • Pressure time : 200msec
- Stand-off : 400μm • Dispense temp. : 30°C
- Dispense pitch : X, Y 1.6mm each



12,500 shots

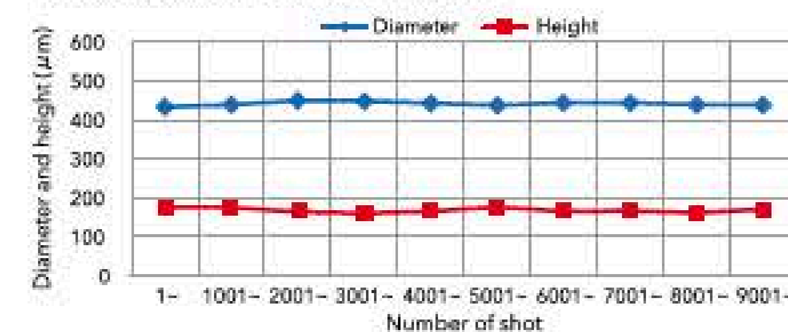
X20

X50

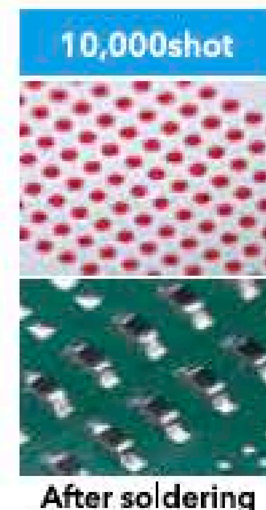
0402 (1005) Chip

Test condition

- Needle : 0.20mm dia. precision needle (Tapered)
- Pressure : 120kPa • Pressure time : 70msec
- Stand-off : 150μm • Dispense temp. : 30°C
- Dispense pitch : X, Y 0.7mm each



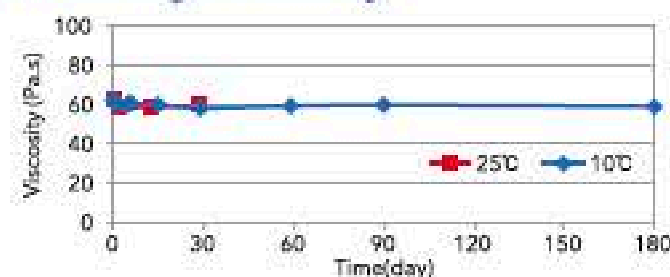
10,000shot



After soldering

Ensures Stable Viscosity

Storage stability



	JU-110-2	Conventional
Initial viscosity (Pa.s)	57.1	56.1
50°C×12hrs (Pa.s)	60.5	Not measurable

Product name	JU-110-2
Composition	Epoxy resin
Specific Gravity	1.25
Viscosity (Pa.s 20°C)	60
Curing condition	120°C, 90sec. 130°C, 60sec.
Shelf Life (<10°C)	6 months

JS-EU-03

Super Low Residue High Reliability Wave Soldering Flux

- Maintains high reliability (>$10^8\Omega$) in dewing test condition
- Demonstrates excellent wetting on oxidized PCB
- Leaves very little residue for good appearance and ICT compatibility

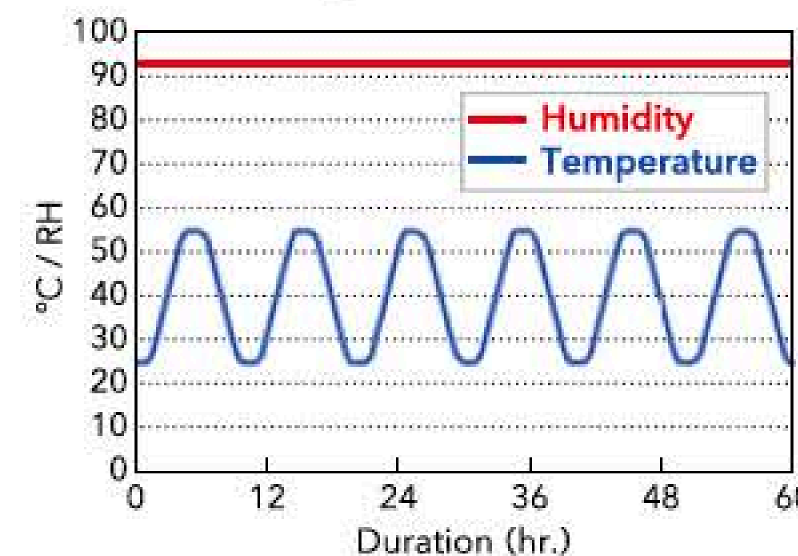
Mechanism of Reliability Performance

By adding special resin and special resin compound, JS-EU-03 successfully maintains high electrical reliability in not only at high temperature/ high humidity environment but also at a dewing condition without a drip-proof agent or desiccant.

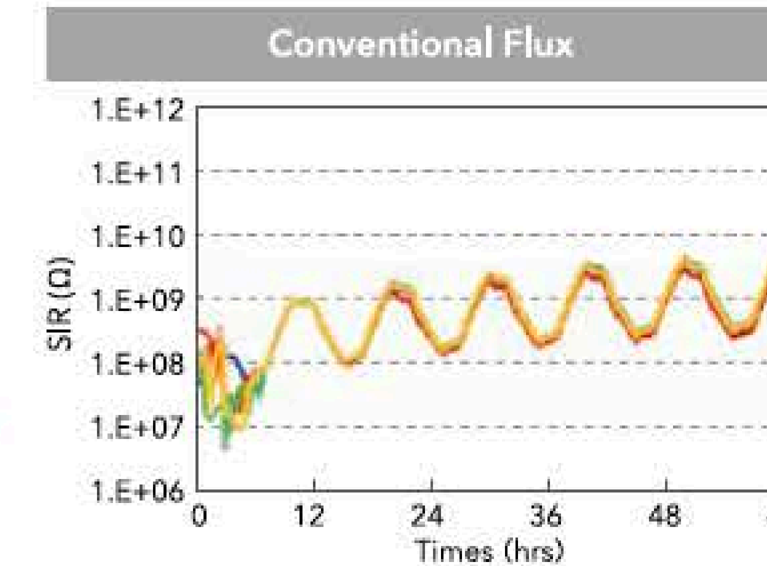
Superior Electrical Reliability

Dew Cycle Test

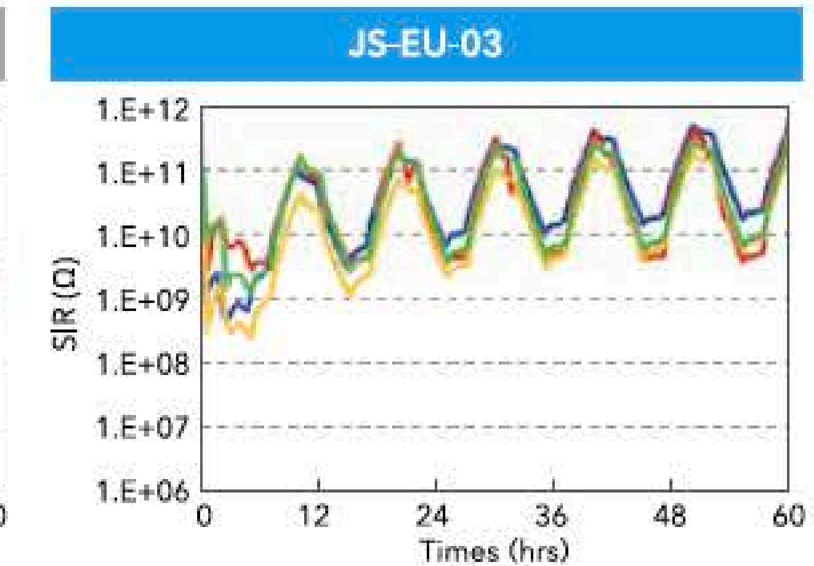
Test environment :
25~55°C x 93±2%RH for 60 hours (6cycle)
Flux application volume :
Solid content equivalent of film thickness1.2μm
Comb pattern PCB :
IPC-B-25 (Width: 0.318mm Distance: 0.318mm)
Bias voltage : DC50V
Measurement voltage : DC50V

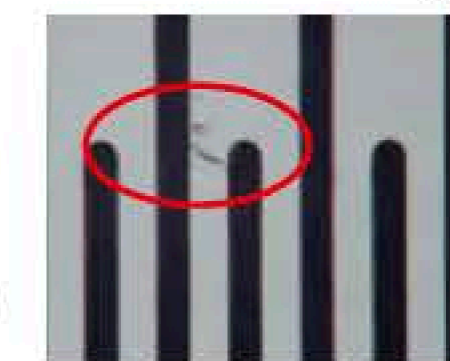


Conventional Flux



JS-EU-03



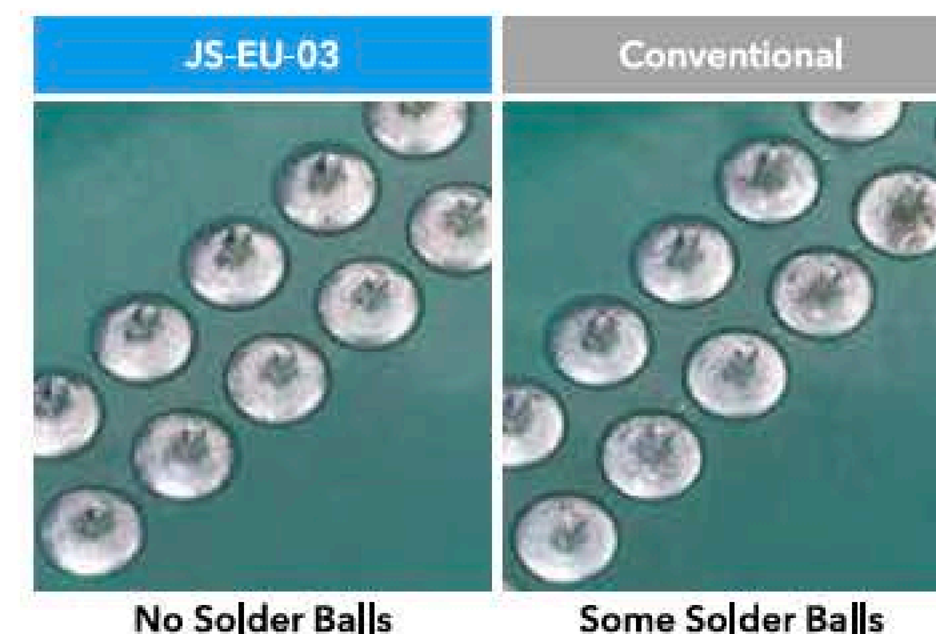


Occurrence of Electro-migration

No occurrence of Electro-migration. Stable insulation resistance transition

Superior Solderability

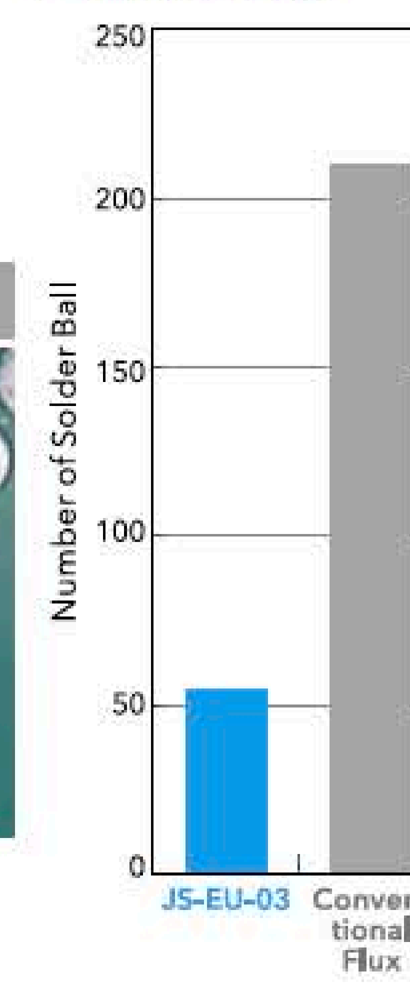
Soldering conditions
· Solder temp. : 250°C
· Pre-heat temp. : 110°C (PCB topside)
· C/V speed : 1.2m/min
· Flux volume : 10μl / cm²
· Test board : PCB-B
· Test number : n=5



No Solder Balls

Some Solder Balls

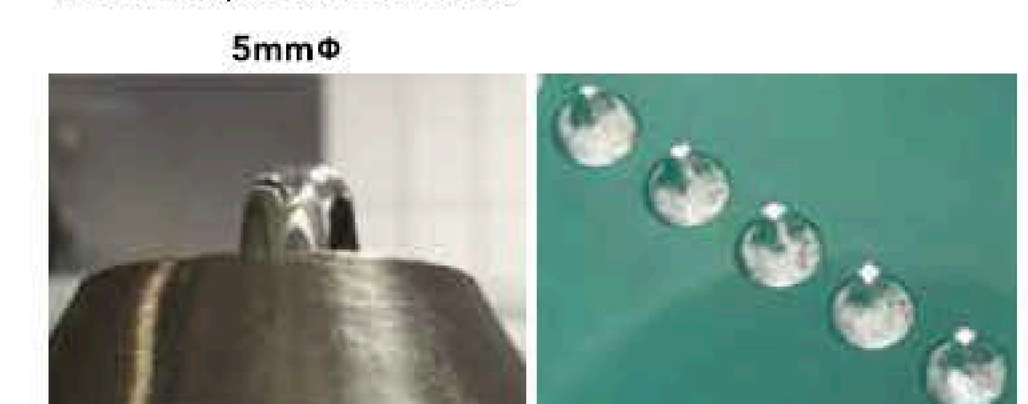
Solder Ball



Selective Soldering

Soldering conditions
·Solder temp. : 280°C
·N_2 temp. : 350°C
·Nozzle shape : Showed below
·Nozzle speed : 3.0mm/sec
·Test board : PCB-A(t=1.6mm)

5mmΦ



Product name	JS-EU-03
Flux Type	ORL0
Specific Gravity (at 20°C)	0.798
Solid Content (%)	4.0
Copper Plate Corrosion	L (IPC)
Migration Test	Pass

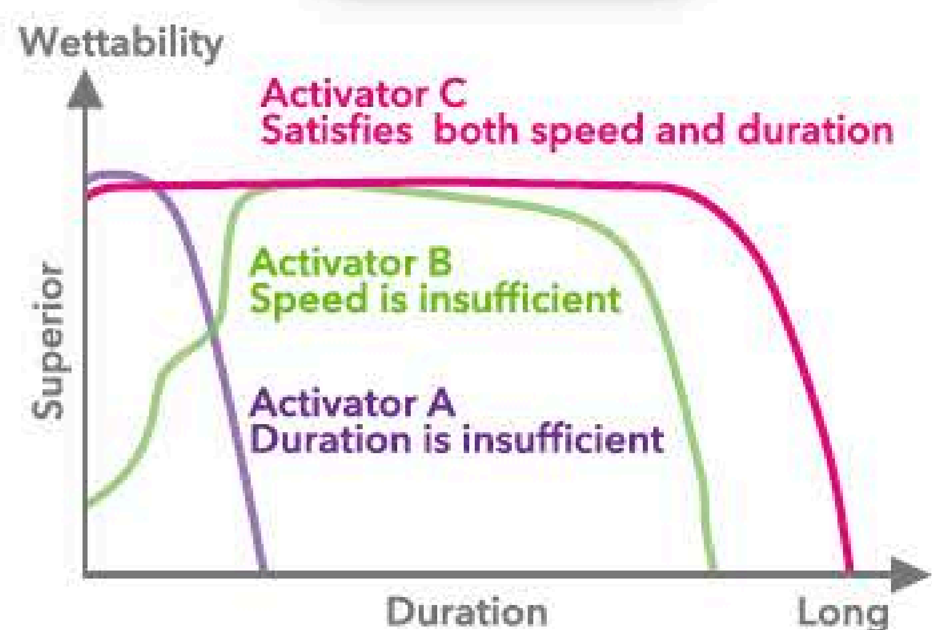
72M series S3X (Sn 3.0Ag 0.5Cu) / S03X7Ca (Sn 0.3Ag 0.7Cu 0.04Co + α) / SB6N (Sn 3.5Ag 0.5Bi 6.0In)

Flux Cored Wire Solder for Multiple Soldering Applications

- Reduces the volume of flux residue after the soldering
- Maintains good wettability despite reduced flux content
- Achieves both powerful wettability and electrical reliability

Multiple Application

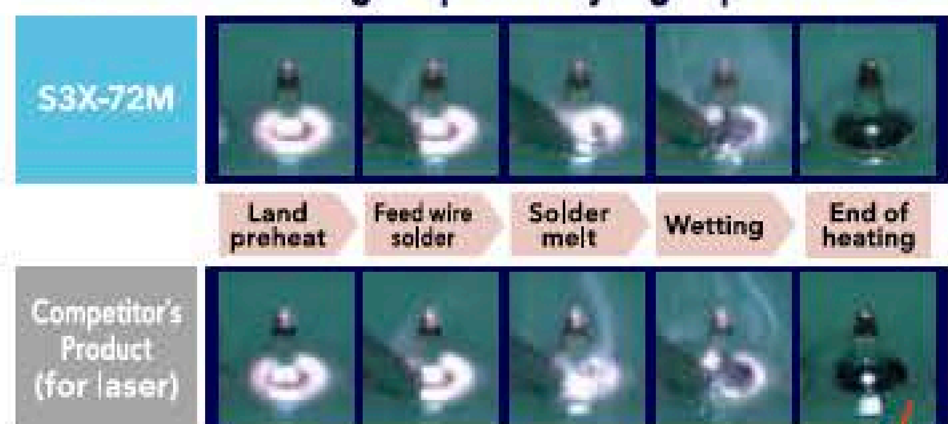
Various Benefits in One Product



Activators in 72M series flux cored wire solder have been selected based on a careful investigation. As per the investigation, Activator C which can perform maximum activator duration and wettability. As a result, KOKI could develop an all-round wire solder compatible with manual, automated and laser soldering.

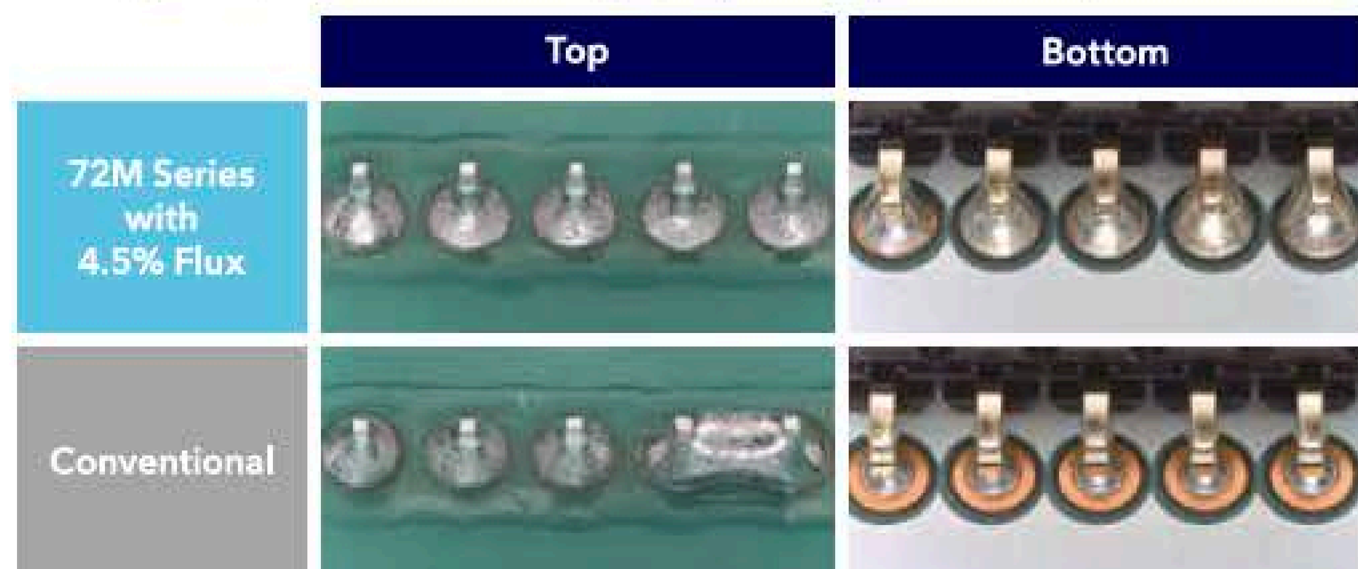
Melting Behavior in Laser Soldering

Connector Soldering: Captured by high speed camera

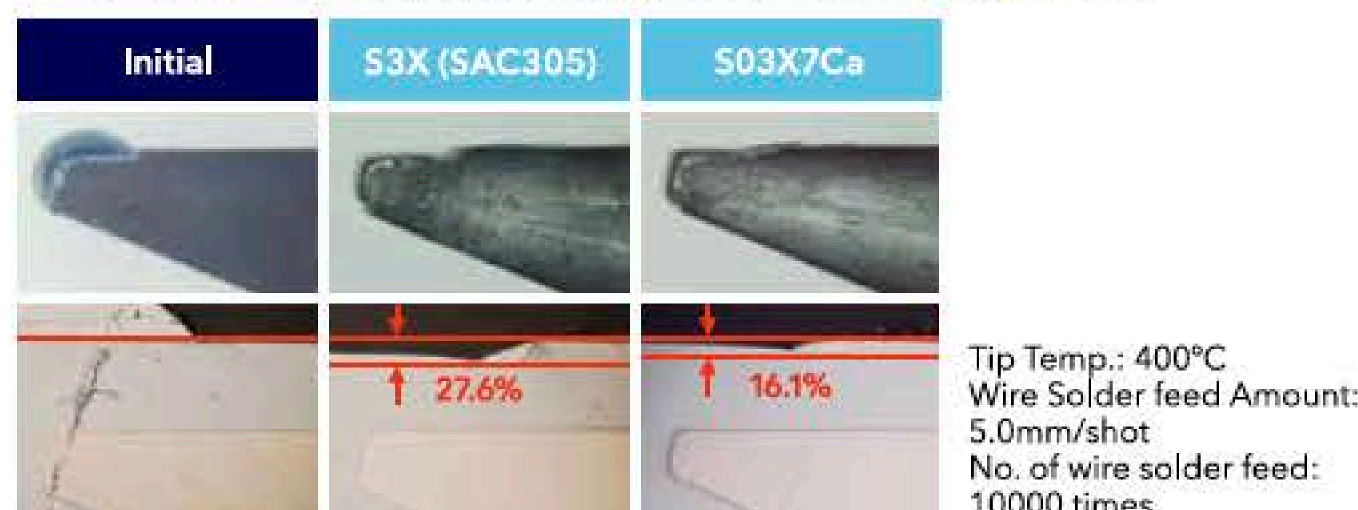


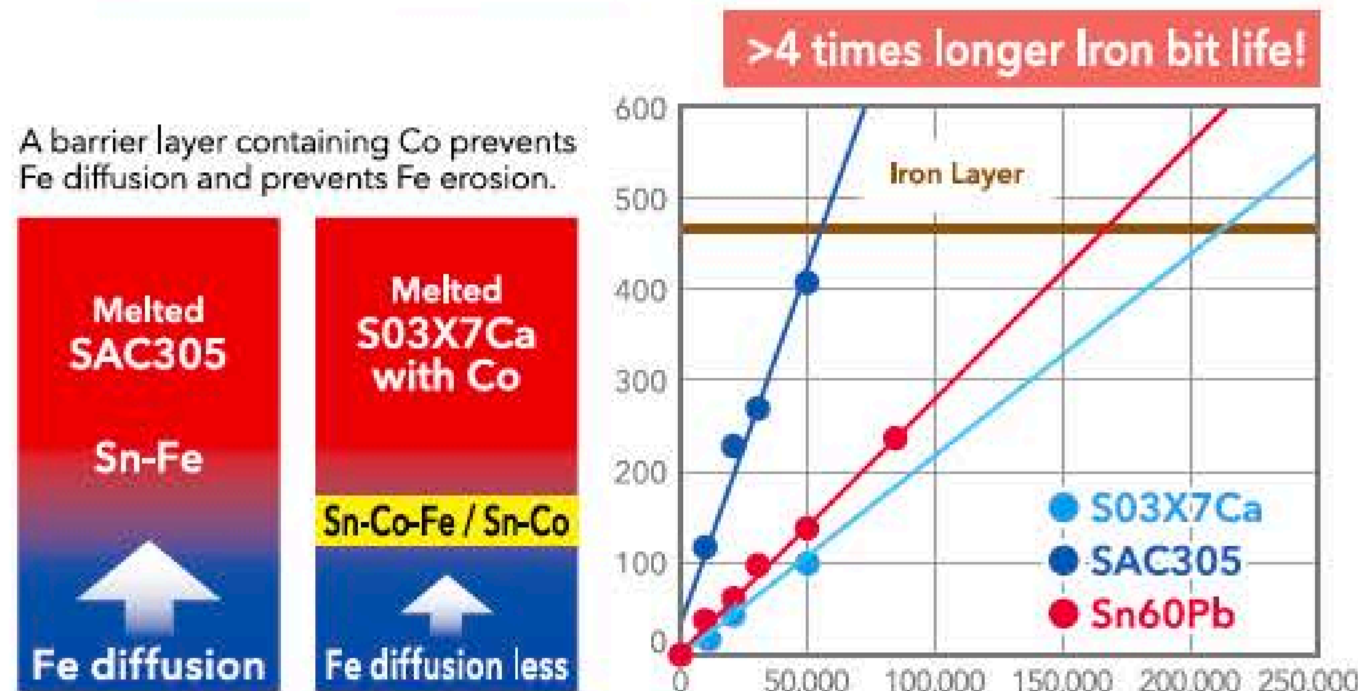
Both wire solders can provide good soldering; however, competitor's product shows charred substance in flux residue.

High Speed Soldering (Tip Temp. 380°C)



Low-Ag Solder Alloy with Tip Erosion Prevention S03X7Ca-72M (Sn 0.3Ag 0.7Cu 0.04Co+α)





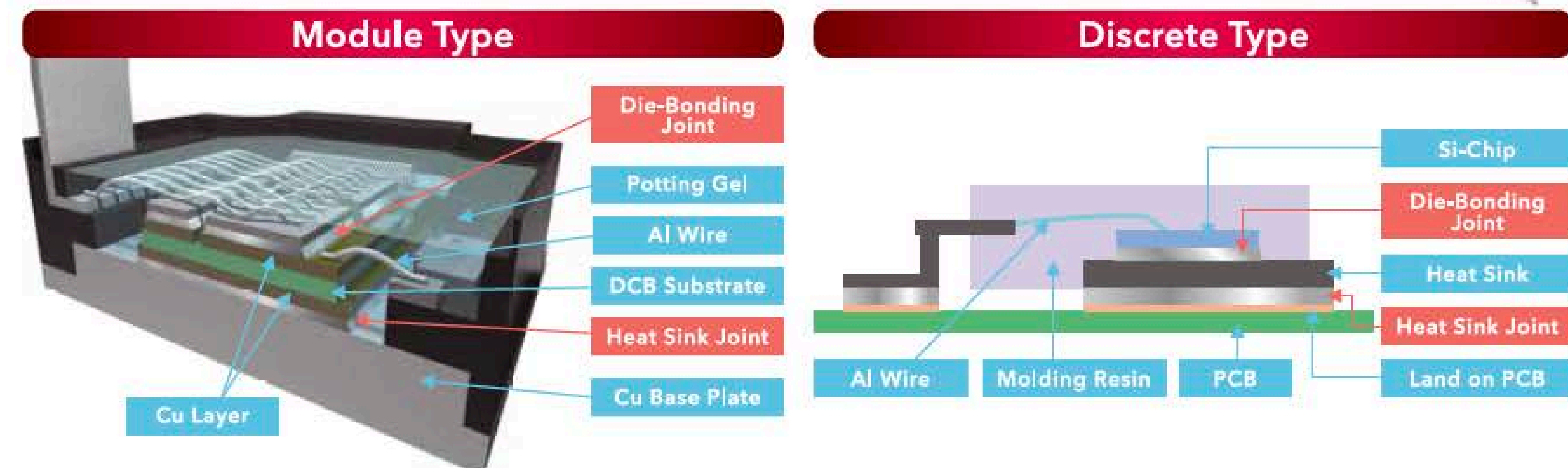
Product name	S3X-72M	S03X7Ca-72M	S01X7Ca-72M	SB6N-72M
Alloy Composition (%)	Sn 3.0Ag 0.5Cu	Sn 0.3Ag 0.7Cu 0.04Co +α	Sn 0.1Ag 0.7Cu 0.04Co +α	Sn 3.5Ag 0.5Bi 6.0In
Melting Point (°C)	217-219	217-227	217-227	202-210
Flux Content (%)	3.2 / 4.5		3.2	
Insulation Resistance (Ω)	$> 1\times10^{9}$			
Flux Type	ROL0 (IPC J-STD-004)			
Shelf Life	3 years			

POWER DEVICE APPLICATION **E12 series** For IGBT or Power MOSFET joining

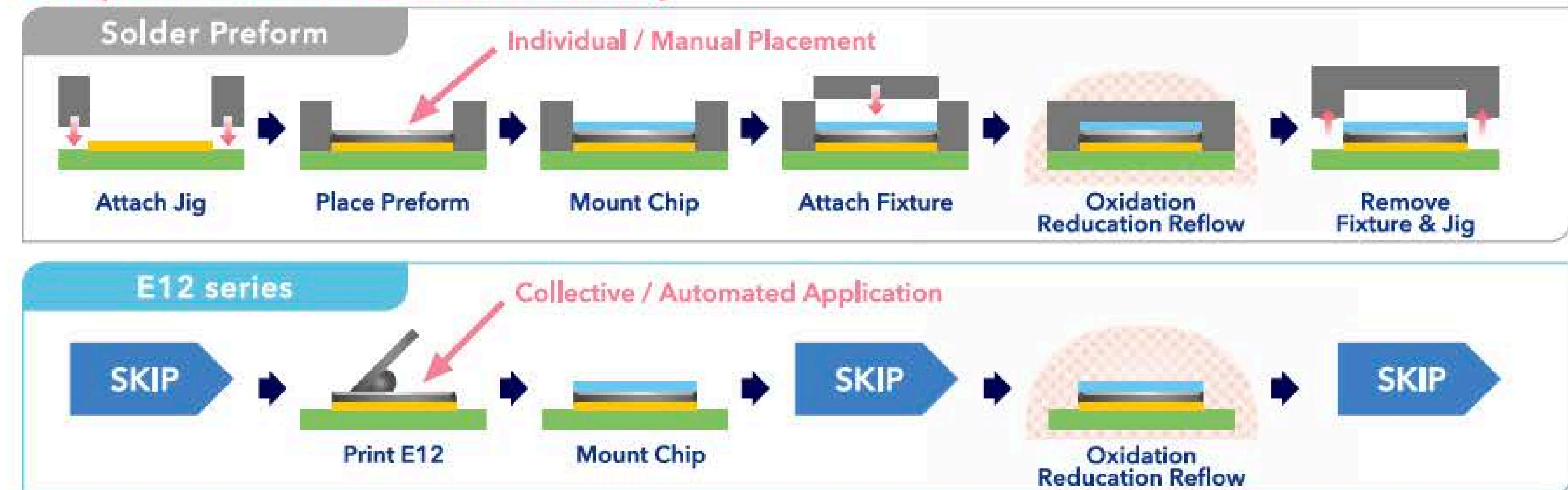
Solder Paste for Oxidation-reduction Vacuum Reflow Process

JP. PAT.

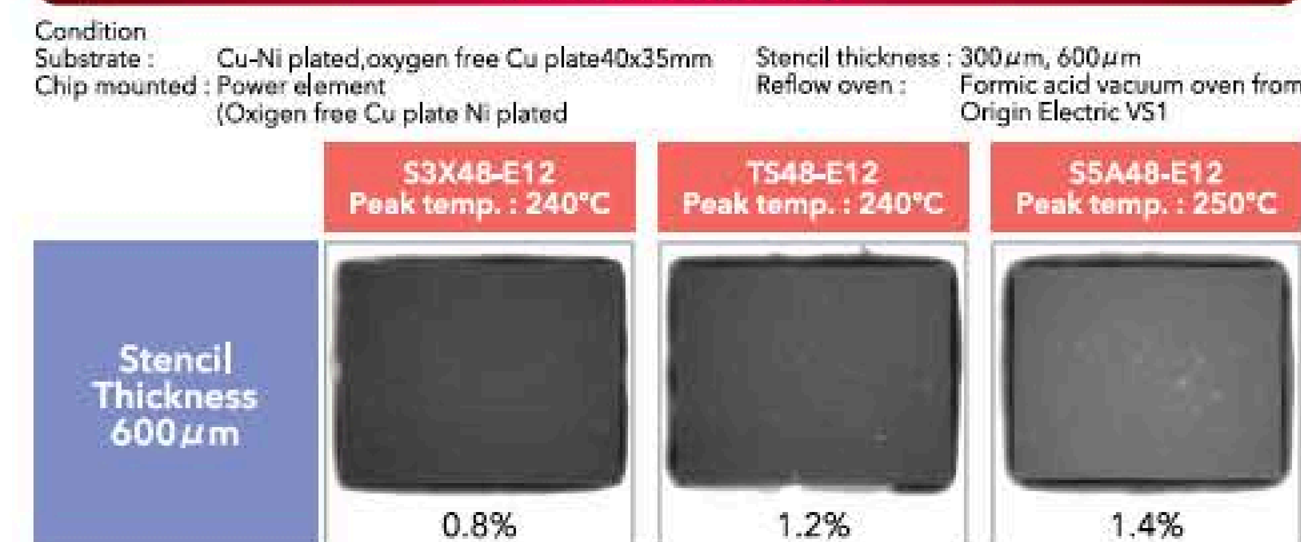
- Ensures quality soldering and super low voiding comparable with solder pre-form
- Halogen free flux chemistry (Br + Cl <1500ppm)
- Various solder alloys are applicable, Sn3.0Ag0.5Cu, Sn5Sb, etc.



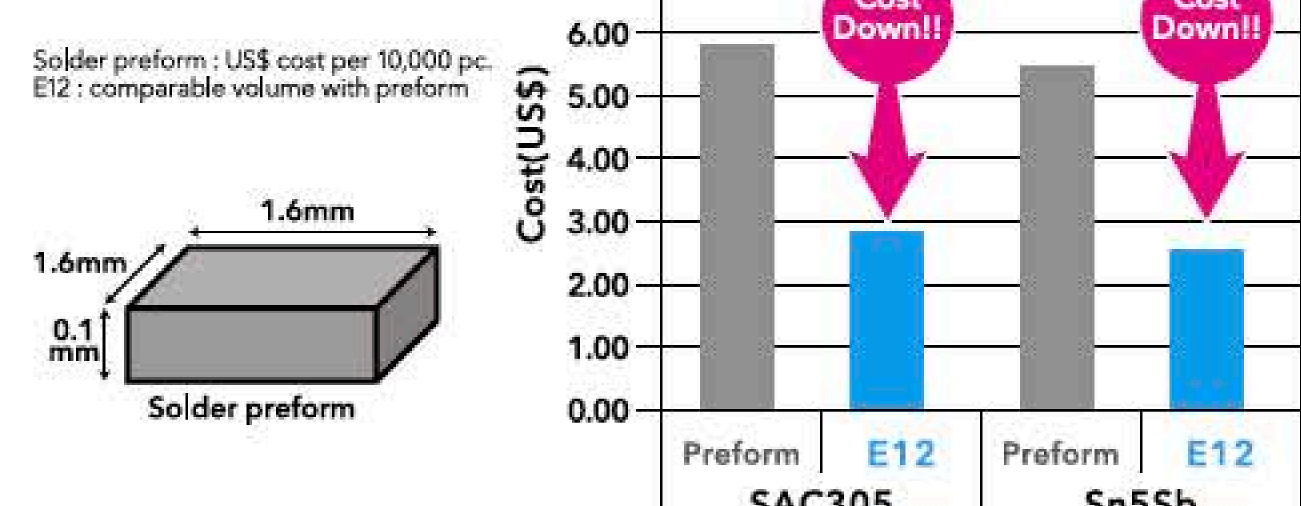
Improvement in Production Efficiency



Void Property



Save in Material Cost



Visual Observation

E12 series ensures stable and consistent soldering performance with ultra low voiding and low splattering even on a large joint area which commonly requires a thick stencil specially for a power device application.

Product name	S3X48-E12	TS48-E12	SSA48-E12
Alloy Composition (%)	Sn 3.0Ag 0.5Cu	Sn 3.5Ag	Sn 5Sb
Melting Point (°C)	217-219	221	238-241
Halide Content (%)	0		
Shelf Life (<10°C)	3 months		

KOKI

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