



FLUX

SOLDER RESIST

SOLDER PASTE

FA SYSTEMS

田村制作所认真倾听顾客的声音,进行新 产品开发,  
目的是提供能够将顾客挑战产品创新的梦想变为现实的电子化学材料。

Tamura Corporation has considered what customers ask and developed new products to shape the future of customers

1	田村制作所的电子化学事业历史 The history of the electronic chemicals business of Tamura corporation
2	Substrate Material & FA
3	
4	优良的降低空洞效果、和优良的印刷性 用于Fine pitch flip-chip的Bump形成用锡膏 LFSOLDER MPB Series Excellent void reduction effect and good printability Pb free solderpaste for solder bumping process at fine pitch flip-chip ● 狭隣接印刷性和上锡性良好 CC実装对应无铅锡膏 GD501G-CPJ03-NH Solder paste for CC assembly in narrow pitch with excellent printability and solderability
5	适用于半导体PKG基板 水溶性预焊剂 SOLDERITE WPF-207 Semiconductor PKG substrate for Water-soluble pre-flux ● 抑制掉球和变形Bump, 润湿性良好 用于安装微细锡球的植球助焊剂 SOLDERITE BF-51 Reduce Missing-Bump occurrence, excellent wettability Bond flux for micro solder ball mounting process
6	减少空洞的产生和空洞面积的缩小 降低空洞面积锡膏 TLF204-205-HF Reduction in the creation of voids and the size of voids
7	采用合金方案确保接合可靠性 全新的高耐热性无铅合金 SOLDER ALLOY #287 Secure joint reliability by using solder alloy New high heat resistance Pb-free solder alloy
8	减少空洞的产生和空洞面积的缩小 降低空洞面积锡膏 TLF287-205-HF Reduction in the creation of voids and the size of voids
9	到部品端面的爬锡效果优良、在喷锡基板上的扩展效果优良、抑制BGA未熔融的发生 重视润湿性的锡膏 重视润湿的锡膏 TLF204-199 Good wettability to the part / Good wettability to tin plating / Inhibition of HIP High Wettability Solder Paste
10	通过多样化的产品阵容, 解决客户的各种问题。 一般贴装用无铅焊膏 LFSOLDER TLF-204 Series Solve all kinds of quality matters with our wide range of products Pb-free solder paste for SMT
11	
12	通过多样化的产品阵容, 解决客户的各种问题。 用循环锡制作的无铅锡膏 LFSOLDER TLF-204F-GT02-NH-R Solve all kinds of quality matters with our wide range of products Pb-free solder paste for SMT
13	用于细微线路板的模板印刷 MINI LED 对应细微印刷无铅焊膏 LFSOLDER TLF-204G-HFW Series For stencil-printing on fine patterns Pb-free solder paste for fine pitch printing
14	耐热性低的零部件·基板也可适用, 具有环保性, 还可降低成本的 低温接合材料 SUPER ARZERITE SAM10-401-27 Applicable to low heat resistance components and/or substrates Eco-friendly product Process cost reduction. Low temperature joining material SAM10-401-27 ● 通过替代ACF、连接器的接续来降低成本 SnBi类异方向导电性接合材料 SAM32-401E-13 SnBi-Solder type anisotropic conductive paste /Alternative to ACF/connectors
15	通过非接触式、无掩膜方式向各种类型的基板提供焊锡 对应喷射方式的无铅(Pb)锡膏 LFSOLDER JDS Series For solder paste deposit by non-contact/ stencil-less process Jettable Pb-free solder paste
16	抑制因快速加热而产生的锡珠 对应局部加热无铅锡膏 LFSOLDER LSM Series Less solder ball occurrence with rapid heating Pb free Solder paste for rapid local heating
17	在保持原有助焊剂的作业性基础上, 减少基板、托盘的残留附着量 无铅通用型液状助焊剂 LEAD FREERITE EC-19S-11 Less flux residue cohesion and as good workability as conventional soldering flux Pb-free soldering flux for general use
18	黑色阻焊油墨 ABSOLIGHT APB-200 Series / DSR-8000S18 Series Black color photo imageable solder resist
19	适用于在严酷环境下要求具备可靠性的车载基板 高耐热高可靠性阻焊剂 FINEDEL DSR-2200 ACR Series Solder Resist for automotive application with outstanding reliability even in harsh environments ● 曝光液态显影型 阻焊剂 Photo-imageable liquid solder resist for general rigid substrates
20	感光性覆盖膜 PAF,APB-800 Series(液状 Liquid type)/TPL-800 Series(干膜 Film type) Photo-imageable coverlay coat
21	FPC用 高耐热性液态阻焊剂 PAF/APB-280 Series Liquid photo imageable solder resist with high heat resistance for FPC
22	对应DI曝光 FPC用黑色液状阻焊油墨 ABSOLIGHT APB-300 Series Black absorbing materials for FPC
23	适用于显示屏的阻焊油墨 REFLIGHT RPW Series TPL-300 Series Solder resist for display applications.
24	高品质热风回流炉 TNV Ver.III series High quality reflow soldering system

# 电子化学事业始于一滴偶然

Electronic Chemicals business started by "Serendipity" from an accidental DROPLET.

## 1956.03 田村制作所的“SOLDERITE®·助焊剂”诞生!

一名研究员在使用松脂进行绝缘材料实验的时候，一滴熔化的焊锡恰好掉落在了实验台上散乱的铜板上……。滴落下来的焊锡眼看着就扩散到了整个铜片上。对此感到惊讶的研究员拿起铜片后，发现掉落在实验绝缘材料上的这滴焊锡十分整齐地扩散开来。这个偶然的发现正是现在在日本国内拥有最高市场份额的田村制作所产品——“SOLDERITE®·助焊剂”的诞生秘闻，也是田村制作所开展贴装·印刷电路板相关事业的最初篇章。

## IN MARCH 1956 TAMURA “SOLDERITE®” FLUX IS BORN!

A scientist was researching Insulating resin using rosin.  
A drop of molten solder accidentally fell on to some copper boards that were scattered on the test bench. The solder immediately spread over the whole surface of the copper board. The scientist picked up the copper board and realised that the solder had spread over the Insulating resin that was scattered on the copper board. This accidental discovery was the birth story of Tamura's market leading "SOLDERITE®" Flux, and formed the start of the history of Tamura's assembly and printed circuit board chemical business.

## 化学和 SOLDERITE®·助焊剂

创始人田村得松会长经常谈到：“我们无法估量在研究化学的过程中会发生什么，这非常有趣，同时也蕴含着赚大钱的机会”。对于这个划时代的新产品，为了体现“正确的焊接”、“可靠性高的焊接”的助焊剂这层含义，会长亲自将其命名为“可保证正确（Right）焊接（Soldering）的助焊剂（Flux）”。

出自《千载的基石 田村得松翁传》

## CHEMISTRY AND “SOLDERITE®” FLUX

「Mr. Tokumatsu Tamura, the founder of the company and former chairman, often said "When struggling with Chemistry, we have often found that there is always a chance for interesting and lucrative discoveries." He named this first breakthrough product, "SOLDERITE® FLUX," because it guarantees the "right soldering" and "highly reliable results."

From his Biography "Senzai-no-Soseki, Tamura-Tokumatsu-Ou-Den"



## 今后微小焊料凸点技术的路线图

Roadmap for micro-bumping

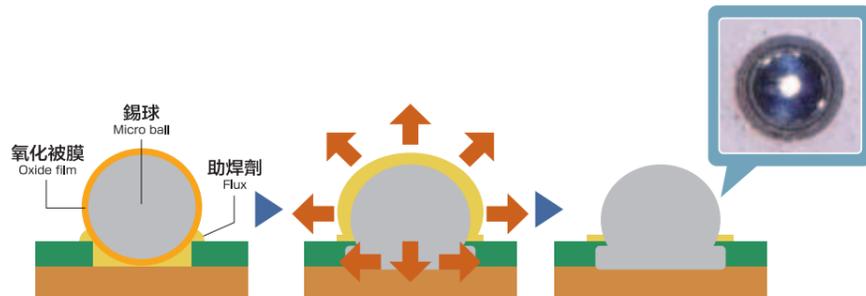
从市场动向考察焊料凸点技术的路线图 Road map for micro bumping

工艺 Process	Pitch size		
	~130 $\mu$ m	130~80 $\mu$ m	80~30 $\mu$ m
钢网印刷 Metal mask print	Type8 锡膏 Solder paste MPB 系列 MPB series		
Micro Ball 装载 Micro ball load	植球助焊剂 Bond flux BF-51		
干膜印刷 Dry film print	干膜工艺专用锡膏 DFP 系列 DFP series (<60 $\mu$ mP under development 开发中)		

## 用于安装微细锡球的植球助焊剂

Bond flux for micro solder ball mounting process

SOLDERITE BF-51



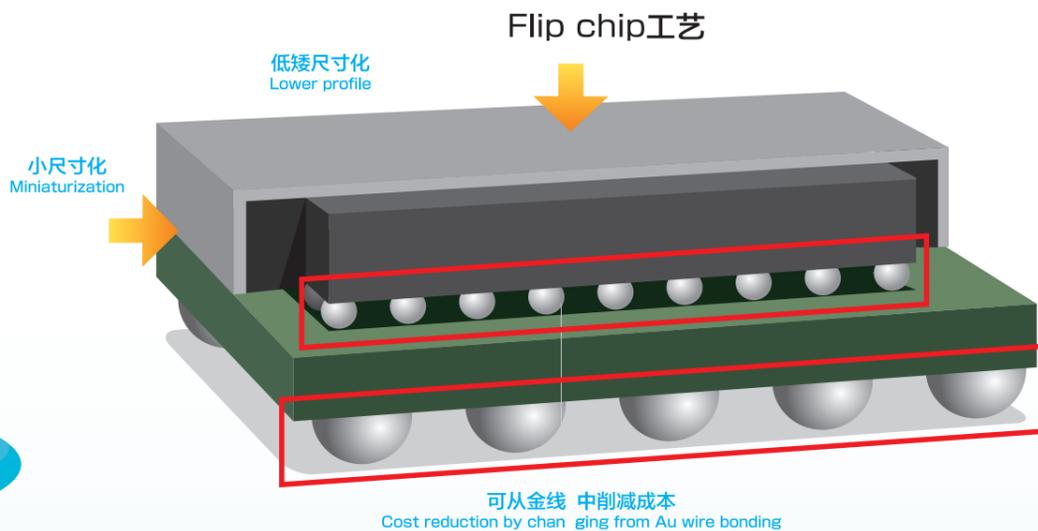
因为强化了锡球表面氧化覆盖膜去除性，从而提高了焊锡润湿性和焊接性  
Strengthening the activity of the flux, improving the wettability and the removal of oxidation film on the surface of the solder ball

可以预期将会减少掉球和变形Bump。  
It can be expected to reduce the occurrence of missing bump and deformed bump.

## 用于Fine pitch flip-chip的Bump形成用锡膏

solder bumping process at fine pitch flip-chip

LFSOLDER MPB Series



## 对应半导体市场

For Substrate

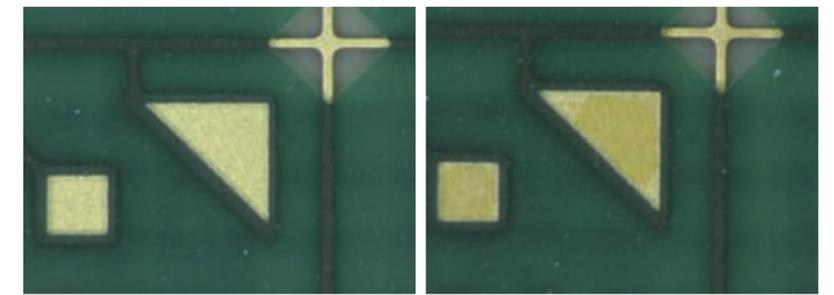
TNV version III



## 水溶性预焊剂

Water-soluble pre-flux

SOLDERITE WPF-207



化金部位无变色  
No Discoloration on gold pating

化金部位有有变色  
Discoloration on gold pating

## 预涂敷用无铅锡膏

Pg-free solder paste for Pre-coating

LFSOLDER LF-204-301S Series

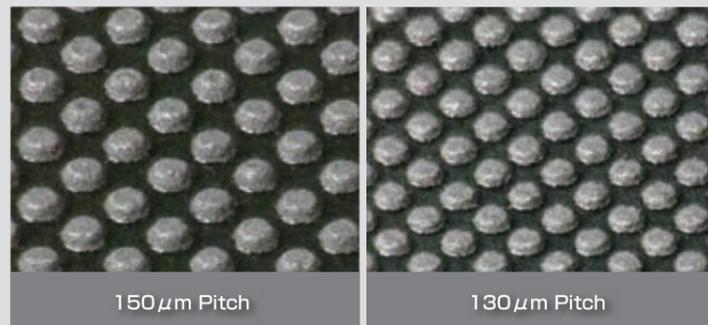
## BGA基底层 (外侧：球形贴装面)

BGA substrate Outer side

焊锡涂膜  
Coating



印刷后  
After printing



# 优良的降低空洞效果、和优良的印刷性 用于Fine pitch flip-chip的Bump形成用锡膏

Excellent void reduction effect and good printability Pb free solderpaste for solder bumping process at fine pitch flip-chip



## LFSOLDER MPB Series

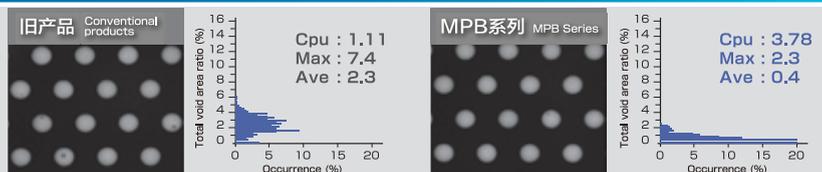
从引线键合到倒装芯片均可运用 Wire-bonding to flip-chip



通过细微粉末实现良好的印刷性 Excellent printability by fine solder powder and modified flux



降低空洞 Void reduction



今后微小焊料凸点技术的路线图 Roadmap for micro-bumping

从市场动向考察焊料凸点技术的路线图 Road map for micro bumping

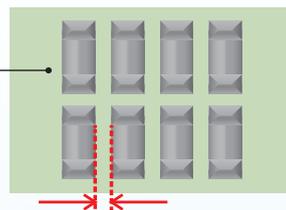
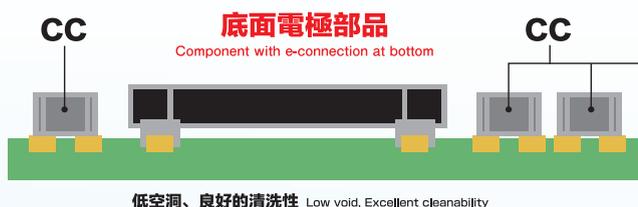
工艺 Process	Pitch size	~130 μm	Pitch size	130~80 μm	Pitch size	80~30 μm
钢网印刷 Metal mask print	Type8 锡膏 Solder paste MPB 系列 MPB series					
Micro Ball 装载 Micro ball load	植球助焊剂 Bond flux BF-51					
干膜印刷 Dry film print	干膜工艺专用锡膏 DFP 系列 DFP series (<60 μmP under development 开发中)					

# 狭隣接印刷性和上锡性良好 CC実装对应无卤锡膏

Solder paste for CC assembly in narrow pitch with excellent printability and solderability



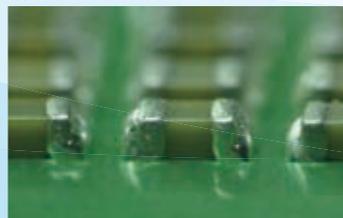
## GD501G-CPJ03-NH



狭隣接印刷性和上锡性良好

Excellent printability and solderability

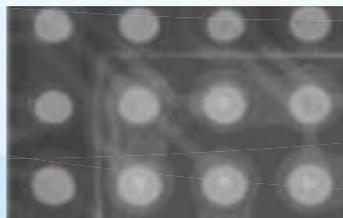
0402CC実装後外觀 Appearance observation of 0402CC



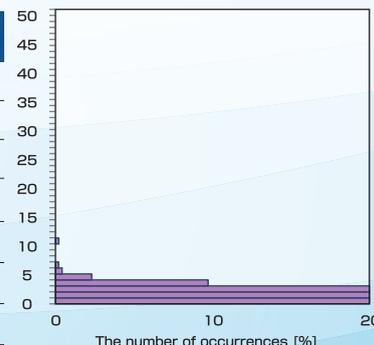
電極下Void少

Low void under pad

X-ray Void (部品下) (Under component)



項目 Items	GD501G-CPJ03-NH
CC to CC Gap [μm]	$\geq 100$
合金 Alloy	Sn/5Sb
粉末粒径 [μm] powder particle [μm]	Type6
粘度 [Pa·s] Viscosity	300
Ti [-]	0.62
Flux 含有量 [%] Flux containment [%]	12.3
无有意添加 No intentional addition	0



# 适用于半导体PKG基板 水溶性预焊剂

Semiconductor PKG substrate for Water-soluble pre-flux

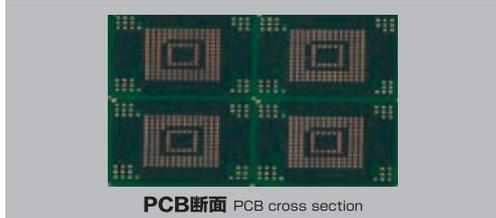


## SOLDERITE WPF-207

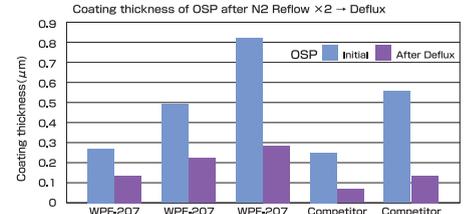
### 特点 Features

- 对微小焊盘的被膜性良好  
Good coating properties for tiny pads
- 适合半导体PKG基板的处理  
it is suitable for the processing of semiconductor PKG substrates.
- 能防止镀金部变色  
Prevents discoloration of gold plating

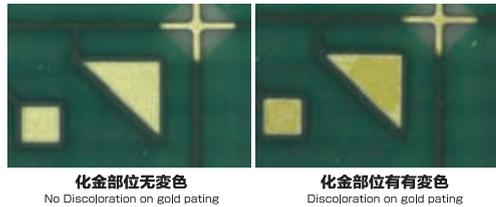
形成被膜的状态 State of forming a coating



回流焊清洗后的被膜厚度 The thickness of the film after reflow cleaning



防止镀金变色 Prevents discoloration of gold plating



	WPF-207 (μm)			Competitor (μm)	
Initial	0.27	0.49	0.82	0.25	0.55
After Deflux	0.14	0.22	0.28	0.07	0.13

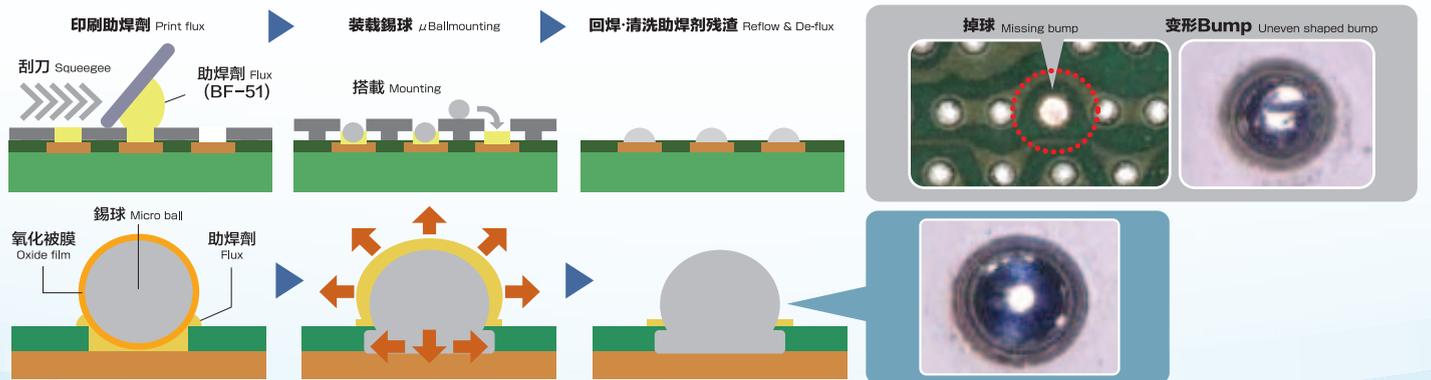
Products	SOLDERITE WPF-207		Products	SOLDERITE WPF-207	
外观 Product appearance	透明液状 Clear and liquid		被膜厚度 Coating thickness	0.20 ~ 0.40 μm	
规格 Standard	比重 (20℃) Specific gravity	1.01 + 0.01	化金部位的变色 Color change in the gold plating area	无变色 No Discoloration	
	pH	3.20 + 0.10	Cu离子 度管理苑 Cu ion degree	< 5 ppm	
	酸值 Acidity	30 + 5	特性 Characteristic		

# 抑制掉球和变形Bump，润湿性良好 用于安装微细锡球的植球助焊剂

Reduce Missing-Bump occurrence, excellent wettability Bond flux for micro solder ball mounting process



## SOLDERITE BF-51



因为强化了锡球表面氧化覆盖膜去除性，从而提高了焊锡润湿性和焊接性  
Strengthening the activity of the flux, improving the wettability and the removal of oxidation film on the surface of the solder ball

可以预期将会减少掉球和变形Bump。  
It can be expected to reduce the occurrence of missing bump and deformed bump.

	BF-51	BF-31	试验方法 Test method
使用方法 The way to use	刮刀印刷 Printing process	转写 Transferring process	
粘度 (Pa · s) Viscosity	120	27	JIS Z 3284
酸价 Acid Value	131	109	JIS Z 3197
卤素含量 (%) Halide contains	0.10以下	0.0	JIS Z 3197

# 减少空洞的产生和空洞面积的缩小 降低空洞面积锡膏

Reduction in the creation of voids and the size of voids



## TLF204-205-HF

### 特長 Features

#### ● 降低发生空洞的面积

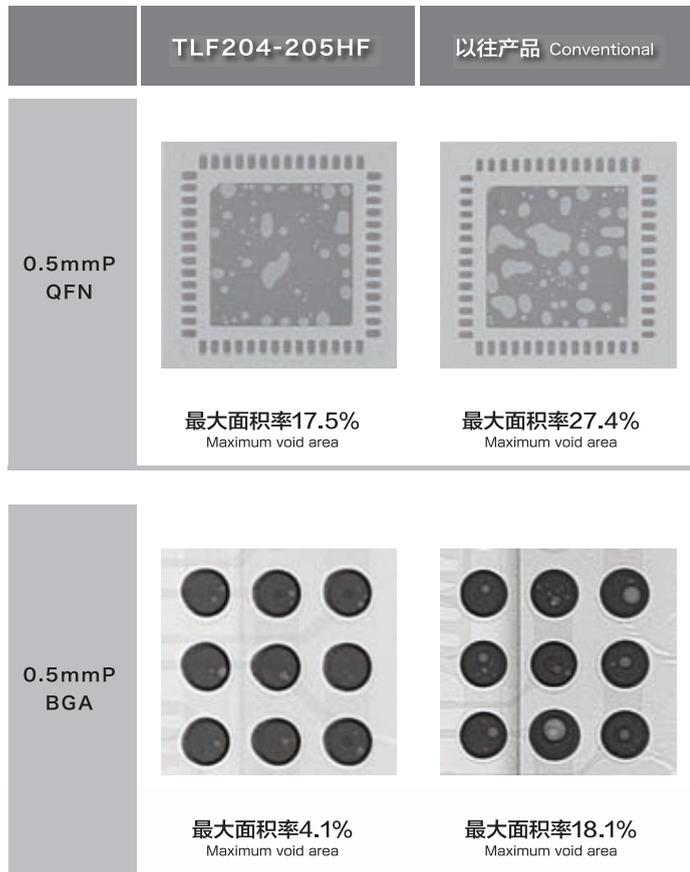
Decrease the area of each void generated

#### ● 各种部品·基板上抑制空洞

Reduction of voids on various parts and substrates

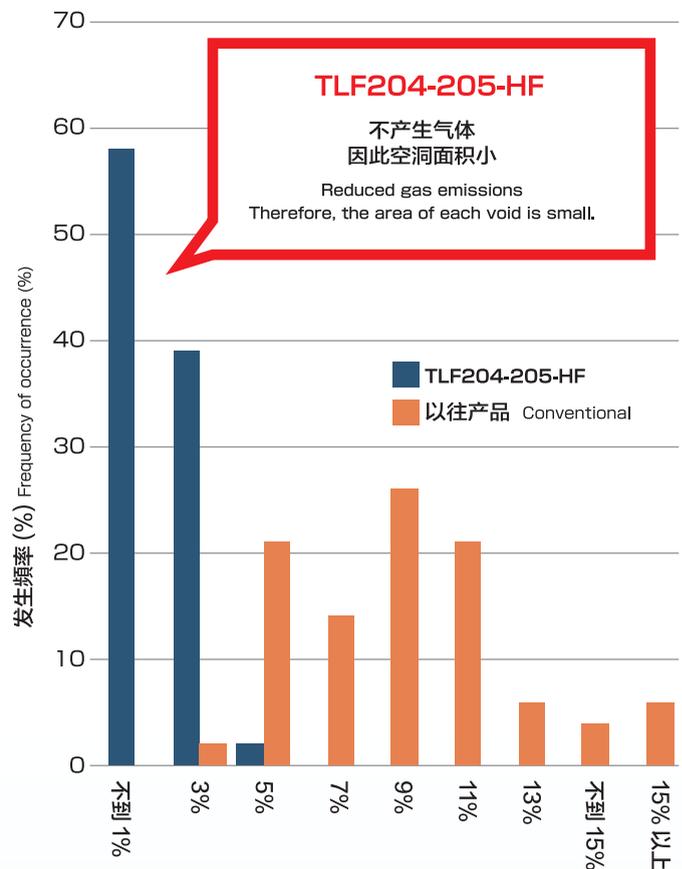
### 空洞产生状态比较

Observation of void generation

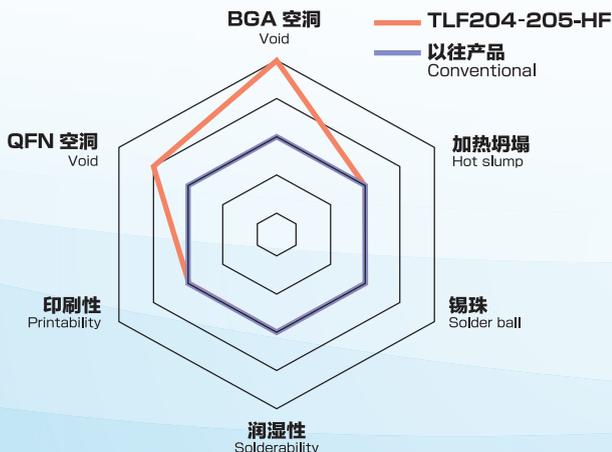


### BGA空洞 (发生各个空洞的面积分布)

Distribution of area of each void



空洞面积率 (%) Void area ratio (%)



項目 items	TLF204-205-HF	评价条件 Test Condition
合金成分 Alloy composition	Sn/3.0Ag/0.5Cu	-
熔融温度 Melting temperature	216 - 220°C	DSC
锡粉尺寸 Particle size	Type 4	J-STD-005A 2.2.14.2 Laser diffraction
粘度 Viscosity	190Pa · s	JIS Z 3284(2014)
助焊剂含量 Flux content	11.1%	JIS Z 3197(2012)
助焊剂分类 Flux type	ROLO	J-STD-004C

# 采用合金方案确保接合可靠性 全新的高耐热性无铅合金

Secure joint reliability by using solder alloy New high heat resistance Pb-free solder alloy

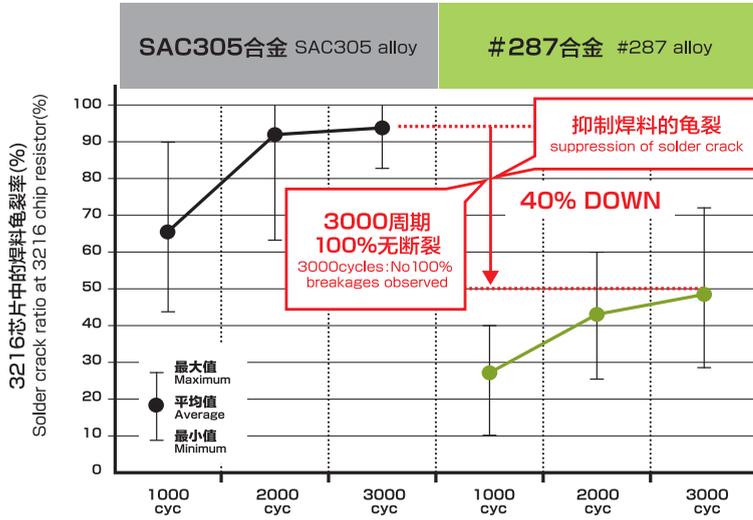


## SOLDER ALLOY #287

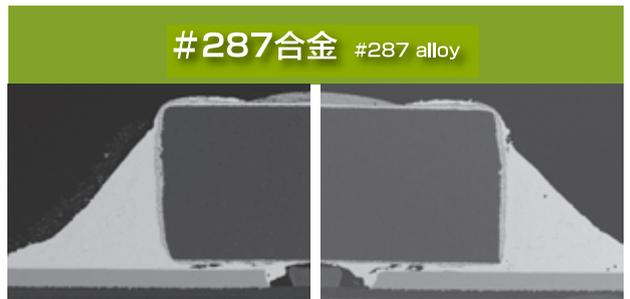
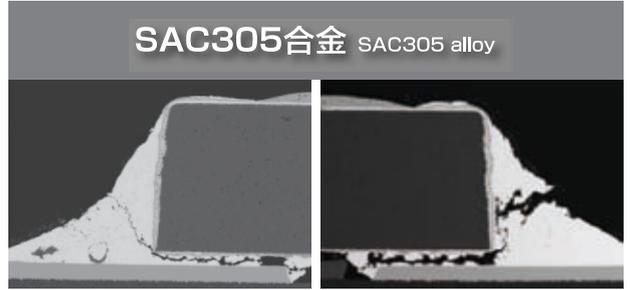
### 在热循环周期中抑制焊料的龟裂产生 Suppress cracks in solder fillet during thermal cycles

#### ● 降低焊料的龟裂

Reduction of crack ratio in solder fillet



-40 ⇌ 125°C 中焊料龟裂率的变化  
Crack ratio change at -40 ⇌ 125°C



### 抑制合金中结晶方位的偏离 Suppress crystal disorientation in solder fillet

-40 ⇌ 125°C (各 30 分钟) 30 min each

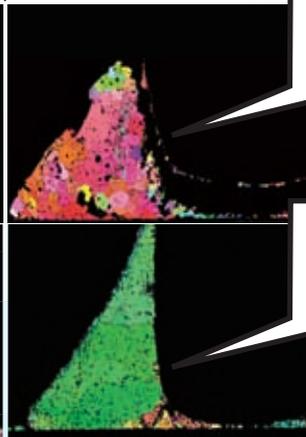
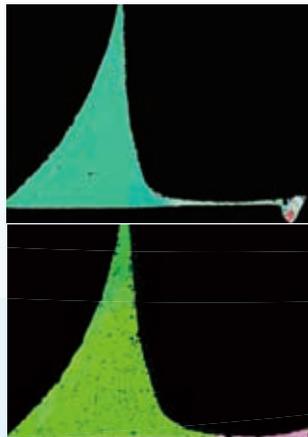
观察片料: 2012芯片式电容器  
2012 chip capacitor

EBSD 的解析结果 EBSD analysis result

SAC305合金 SAC305 alloy  
观察倍率200倍  
Magnification x 200

初期 Initial

3000 cyc



SAC305合金  
组织变化较大  
Huge crystal orientation  
change in SAC305

#287合金  
合金组织变化较少  
Less orientation  
change in #287

#287合金 #287 alloy  
观察倍率200倍  
Magnification x 200

\*记载的数据为本公司实验的结果, 不保证在客户方的实验结果  
\* The data mentioned above was tested by our test methods, which does not guarantee your test results

采用合金方案确保接合可靠性

# 全新的高耐热性无铅合金 #287

Secure joint reliability by using solder alloy New high heat resistance Pb-free solder alloy

减少空洞的产生和空洞面积的缩小

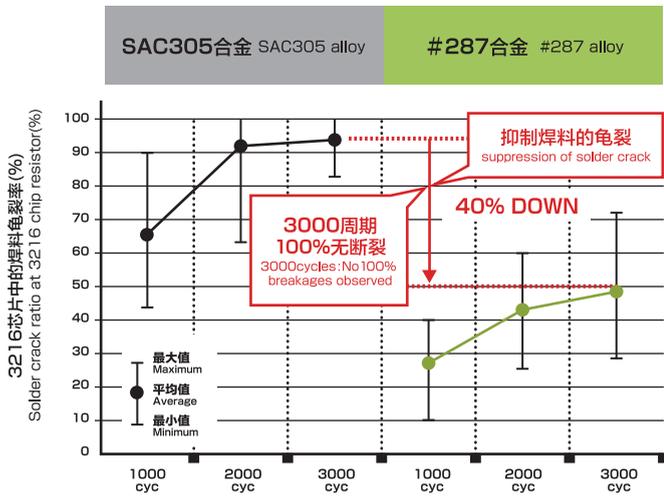
## 降低空洞面积锡膏 TLF287-205-HF

Reduction in the creation of voids and the size of voids

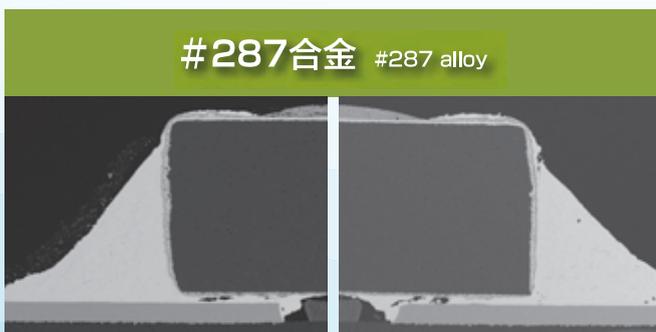
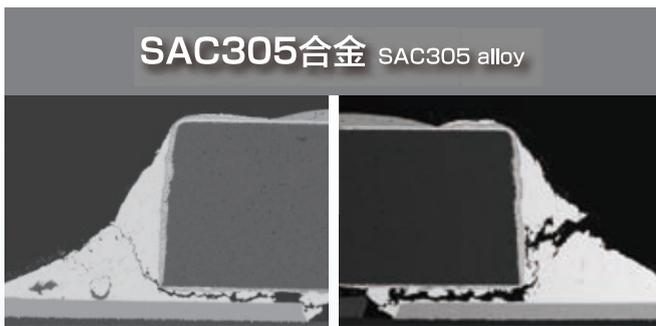
### 特長 Features

#### ● 降低焊料的龟裂

Reduction of crack ratio in solder fillet



-40 ⇄ 125°C 中焊料龟裂率的变化  
Crack ratio change at -40 ⇄ 125°C



#### ● 降低发生空洞的面积

Decrease the area of each void generated

以往产品

总空洞面积率: 平均21%  
Total Void area: Average 21%  
最大空洞面积率: 平均4%  
MAX Void area: Average 4%

降低空洞面积

新製品  
TLF-287-205-HF

总空洞面积率 : 平均12% (43%改善)  
Total Void area: Average 12%  
最大空洞面积率: 平均2% (50%改善)  
Total Void area: Average 2%

項目 items	TLF287-205-HF	评价条件 Test Condition
合金成分 Alloy composition	Sn/Ag3.0/Cu0.7/Bi4.5/Sb5.0 system	-
熔融温度 Melting temperature	209-226	DSC
锡粉尺寸 Particle size	Type 4	J-STD-005A 2.2.14.2
粘度 Viscosity	175 Pa · s	JIS Z 3284(2014)
助焊剂含有量 Flux content	11.1%	JIS Z 3197(2012)
助焊剂分类 Flux type	ROLO	J-STD-004C

到部品端面的爬锡效果优良、在喷锡基板上的扩展效果优良、抑制BGA未熔融的发生 重视润湿性的锡膏



# 重视润湿的锡膏

Good wettability to the part / Good wettability to tin plating / Inhibition of HIP  
High Wettability Solder Paste

## TLF204-199

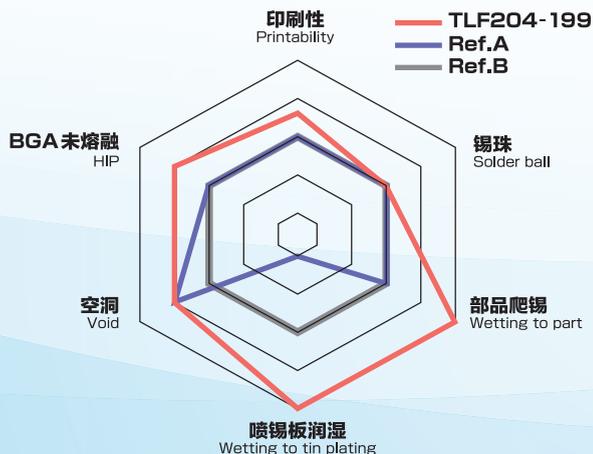
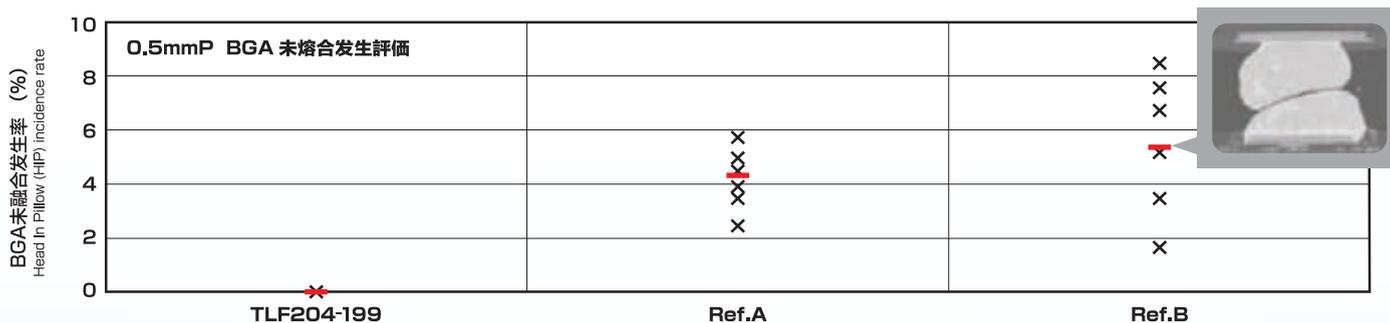
### 特点 Features

- 到部品端面的爬锡效果优良  
The solder climb to the end face of the part is good
- 在喷锡基板上的扩展效果优良  
Good expansion on tin plating substrate
- 抵制BGA未熔融的发生  
Inhibition of HIP occurrence

### TLF204-199 锡膏可以解决各种润湿性相关的课题

TLF204-199 can solve various problems related to the wetting of solder pastes

	TLF204-199	Ref.A	Ref.B
<b>0.5mmP QFP 铜端面爬锡</b> Wetting to the copper end face	<p>爬锡很好 Good wetting</p>	<p>爬锡不好 Poor wetting</p>	<p>爬锡不好 Poor wetting</p>
<b>0.5mmP QFN Pad 喷锡板润湿扩展</b> Wettability to tin plating	<p>润湿很好 Good wetting</p>	<p>出现了不润湿 Poor wetting</p>	<p>出现了不润湿 Poor wetting</p>



項目 (Items)	TLF204-199	评价条件 (Test Condition)
合金成分 (Alloy composition)	Sn/3.0Ag/0.5Cu	-
熔融温度 (Melting temperature)	216 - 220°C	DSC
锡粉尺寸 (Particle size)	Type 4	J-STD-005A Laser diffraction 2.2.14.2
粘度 (Viscosity)	185Pa · s	JIS Z 3284(2014)
助焊剂含量 (Flux content)	12.1%	JIS Z 3197(2012)
助焊剂类型 (Flux type)	ROL1	J-STD-004C

通过多样化的产品阵容，解决客户的各种问题。

# 一般贴装用无铅(Pb)焊膏

Solve all kinds of quality matters with our wide range of products Pb-free solder paste for SMT



## LFSOLDER TLF-204 Series

### TLF204-GT01-200 减少空洞

[Feature] Void reduction

合金组成 Alloy composition	粉末粒径 Particle size	助焊剂类型 Flux type	粘度 Viscosity	助焊剂含量 Flux content
Sn/3.0Ag/0.5Cu	Type4	ROLO /	200 Pa·s	11.3 %

各种特性评价条件 Each characteristics test conditions  
 粉末粒径: 激光衍射法, 助焊剂型: IPC J-STD-004  
 Particle size: LASER diffraction method, Flux type: IPC J-STD-004  
 粘度: JIS Z 3284, 助焊剂含量: JIS Z 3197  
 Viscosity: JIS Z 3284, Flux content: JIS Z 3197

#### <减少空洞①>

通过加热X射线观察装置，对QFN底面电极的空洞进行观察  
 <Void reduction①> Void observation under QFN electrode by heated X-ray observation device

回流焊环境: 大气、基板表面处理: Cu/OSP  
 评价零部件: 0.5mmP QFN(镀锡)  
 Reflow condition: Air, PCB surface treatment: Cu/OSP  
 Evaluation components: 0.5mm pitch QFN (Sn plating)

	印刷后 After print	150°C	220°C	245°C (印刷后) Peak temp.
TLF-204-GT01-200				
以往产品 Conventional product				

采用了从焊锡熔化开始(约220°C)直到峰值期间排出空洞的配比设计，相比以往产品可实现大幅度的空洞降低。

By designing the ingredients so that voids are discharged from the start of solder melting (about 220°C) to the peak temperature, we have been able to significantly reduce voids compared to conventional products.

#### <减少空洞②>

通过X底面电极的空洞进行观察  
 <Void reduction②> Void observation under bottom electrode by X-ray observation device

回流焊环境: 大气、基板表面处理: Cu/OSP  
 评价零部件: 0.5mmP QFN(镀锡)  
 功率晶体管(镀锡)

Reflow conditions: Air, PCB surface treatments: Cu/OSP  
 Evaluation components: 0.5mm pitch QFN (Sn plating)  
 Power transistor (Sn plating)

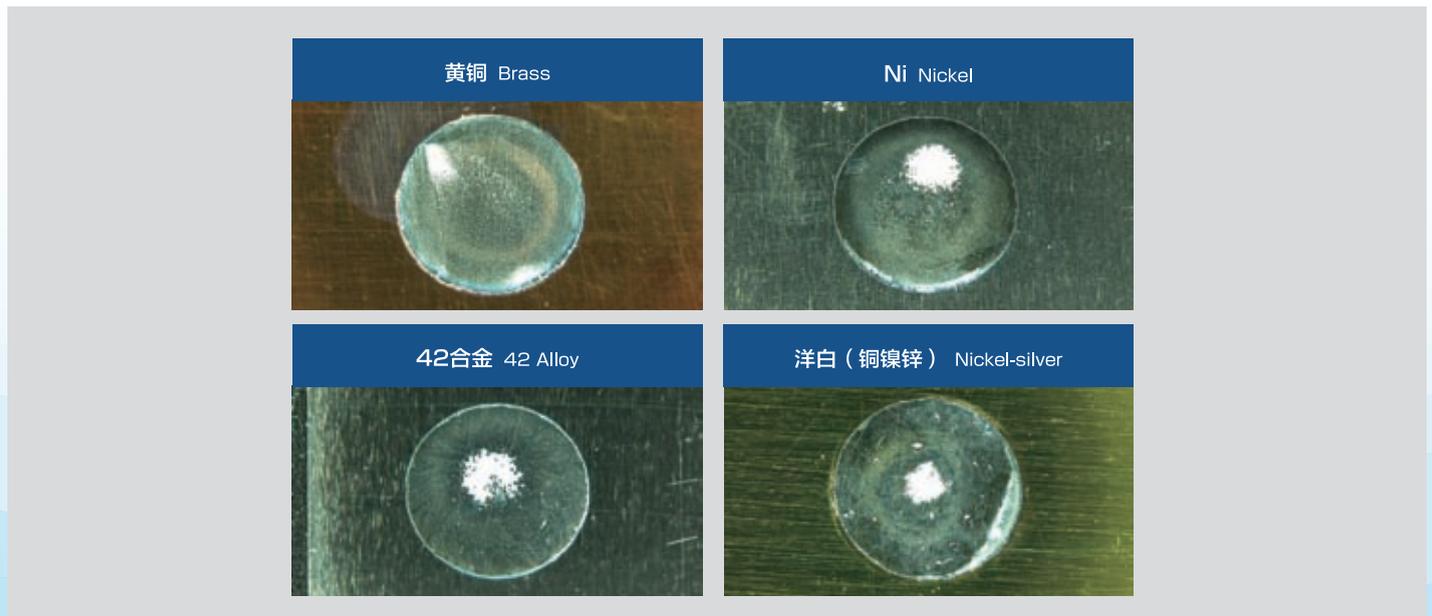
	QFN	功率晶体管 Power transistor
TLF-204-GT01-200	 空洞面积率 Voids area ratio <b>2.2%</b>	 空洞面积率 Voids area ratio <b>3.4%</b>
以往产品 Conventional product	 空洞面积率 Voids area ratio <b>25.0%</b>	 空洞面积率 Voids area ratio <b>25.5%</b>

相比以往产品，各个零部件的空洞均大幅度降低。

Compared to conventional products, voids are significantly reduced for each components

### 润湿不良对策: TLF-204-191 对于所有零部件材质具有优秀的润湿性

Measure to solder wetting defects Excellent wettability on various metals



通过多样化的产品阵容，解决客户的各种问题。

# 一般贴装用无铅(Pb)焊膏

Solve all kinds of quality matters with our wide range of products Pb-free solder paste for SMT



## LFSOLDER TLF-204 Series

### TLF-204-171AK 【特点】减少BGA未融合的发生，对引线端面提供良好的爬锡性

TLF-204-171AK [Feature] Reduce BGA HiP/HoP occurrence, excellent wettability for leads edge surface

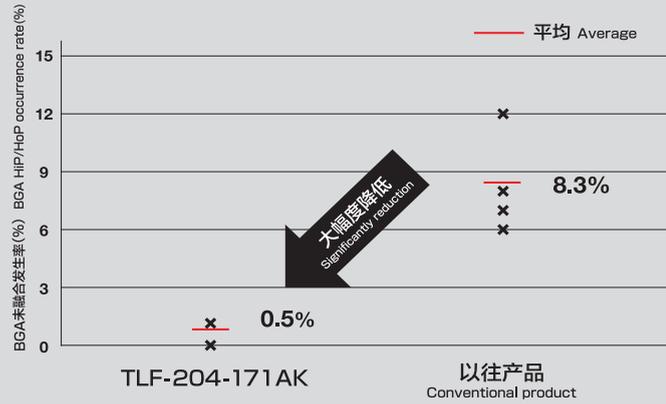
合金组成 Alloy composition	粉末粒径 Particle size	助焊剂型 Flux type	粘度 Viscosity	助焊剂含量 Flux content
Sn/3.0Ag/0.5Cu	Type4	ROL0	170 Pa·s	11.5 %

各种特性评价条件 Each characteristics test conditions  
 粉末粒径：激光衍射法、助焊剂型：IPC J-STD-004  
 Particle size : LASER diffraction method, Flux type : IPC J-STD-004  
 粘度：JIS Z 3284、助焊剂含量：JIS Z 3197  
 Viscosity : JIS Z 3284, Flux content : JIS Z 3197

#### <减少BGA未融合的发生>

采用0.5mm P BGA对BGA未融合进行评估  
 HiP/HoP test for 0.5mm pitch BGA

膜厚：0.10mmt、回流焊环境：大气 Stencil thickness :0.1mm, Reflow condition :Air  
 评价零部件：0.5mmP BGA (85°C85%RH 24hr加热劣化处理, 228Pin)、N=4  
 Evaluation components:0.5mm pitch BGA (85°C85%RH 24hr Heat degradation treatment, 228pins), N=4



相比以往产品，BGA未融合的发生数量大幅度降低。  
 Significantly reduce the occurrence rate of BGA HiP/HoP compared to conventional products

#### <对引线端面提供良好的爬锡性>

对QFN铜引线端面的爬锡性比较  
 Comparison of wetting up for QFN Cu lead edge surface

回流焊环境：大气 Reflow condition : Air  
 评价零部件：0.5mmP QFN (Cu端子) Evaluation components :0.5mm pitch QFN (Cu terminals)



通过改善助焊剂的流动性，爬锡性相比以往产品  
 得到大幅度提高。  
 Cu lead edge surface exposed due to insufficient wetting

### TLF-204-TNA23K、TLF-204F-TNA23K 【特点】不含卤化物、减少BGA未融合的发生、支持通孔回流焊

[Feature] Halogen free, Reduction of BGA HiP/HoP Suitable for through-hole reflow

合金组成 Alloy composition	粉末粒径 Particle size	助焊剂型 Flux type	粘度 Viscosity	助焊剂含量 Flux content
Sn/3.0Ag/0.5Cu	Type5, Type4	ROL0	190 Pa·s	12.3 %

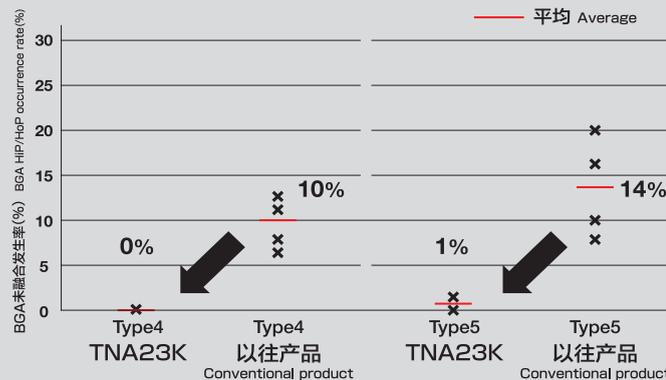
各种特性评价条件 Each characteristics test conditions  
 粉末粒径：激光衍射法、助焊剂型：IPC J-STD-004  
 Particle size : LASER diffraction method, Flux type : IPC J-STD-004  
 粘度：JIS Z 3284、助焊剂含量：JIS Z 3197  
 Viscosity : JIS Z 3284, Flux content : JIS Z 3197

#### <减少BGA未融合的发生>

采用0.5mm P BGA对BGA未融合进行评估

Reduction of BGA HiP/HoP  
 HiP/HoP test for 0.5mm pitch BGA

膜厚：0.08mmt、回流焊环境：大气 Stencil thickness :0.08mm, Reflow condition :Air  
 评价零部件：0.5mmP BGA (85°C85%RH 24hr加热劣化处理, 228Pin)、N=4  
 Evaluation components:0.5mm pitch BGA (85°C85%RH 24hr Heat degradation treatment, 228pins), N=4

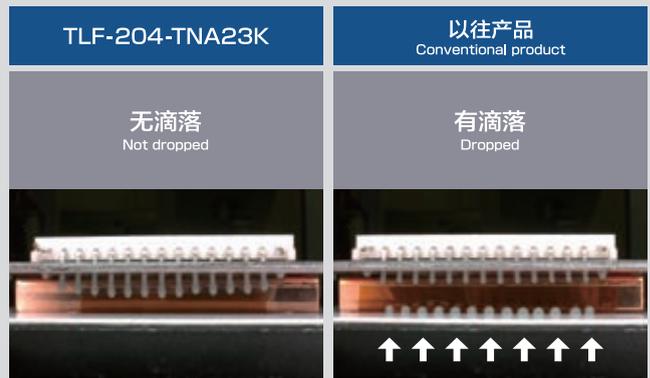


Type4和Type5的BGA未融合发生数量相比以往产品均大幅度降低。  
 Both Type4 and Type5 have significantly reduced the occurrence rate of BGA HiP/HoP compared to conventional products.

#### <对应通孔回流焊>

焊锡滴落测试  
 Suitable for through-hole reflow  
 Solder dropping test

加热条件：升温速度2°C/sec Heating condition :Rising temperature speed 2°C/sec  
 预热150~170°C、100sec Pre-heat 150~170°C, 100sec



相比以往产品，预热时焊锡变得不容易滴落。  
 Solder dropping occurrences rate is less than conventional product during pre-heat.

通过多样化的产品阵容，解决客户的各种问题。

# 用循环锡制作的无铅锡膏

Solve all kinds of quality matters with our wide range of products Pb-free solder paste for SMT



## LFSOLDER TLF-204F-GT02-NH-R

接合材料 Joining materials

废弃锡膏回收  
Waste paste recovery



提纯公司 →  
循环利用Sn  
Refining company →  
Recycled Tin

锡膏  
Solder paste

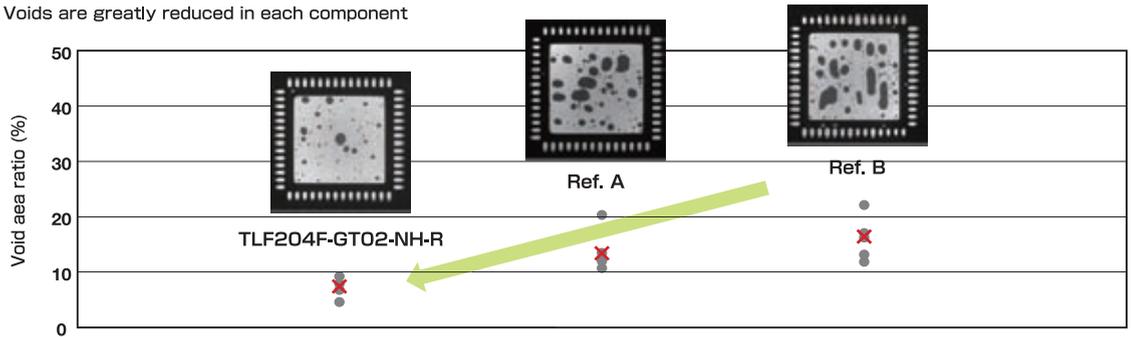
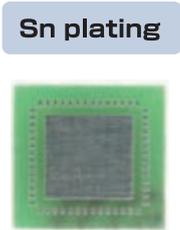
焊锡粉  
Solder powder

采用的粉末中加入了循环锡。The powder is made from recycled Sn.



### 底面电极空洞减少

Voids are greatly reduced in each component



最大空洞面积率 大幅度降低 Significantly reduced maximum void area ratio

### 异种金属的润湿性

Good wettability to dissimilar metals

基板材料 Plate	铜 Copper (Cu)	Nickel (Ni)	黄铜 Brase (CuZn)	洋白(铜镍锌) Nickel Silver (CuZnNi)
TLF204F-GT02-NH-R				
Ref. A				
Ref. B				

针对各种母材的润湿性良好 Good wettability to dissimilar metal base materials

用于细微线路板的模板印刷

# MINI LED 对应细微印刷无铅焊膏

For stencil-printing on fine patterns Pb-free solder paste for fine pitch printing

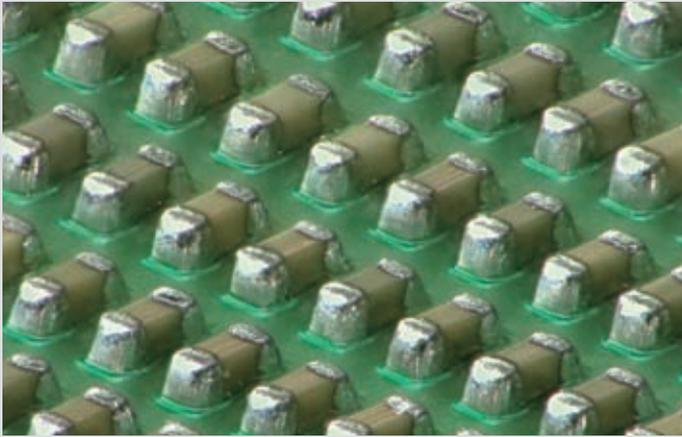


## LFSOLDER TLF-204G-HFW Series

接合材料 Joining materials

### 良好的焊接性能 抑制焊珠产生

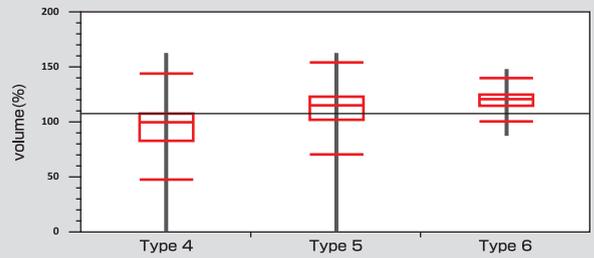
Good solderability Suppress solder ball occurrence



### 使用Type6粒径的印刷安定性

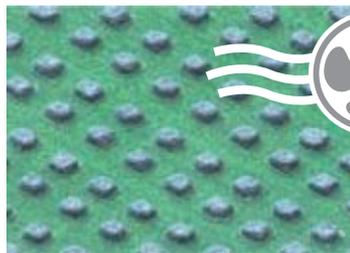
稳定的印刷性在008004 Chip 尺寸上

Stable printing at 008004 Chip size by using Type 6 powder



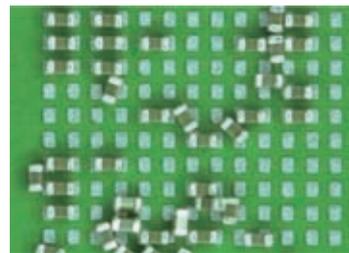
网板厚度 Stencil thickness: 40um 开孔尺寸 Stencil opening: 100um\*80um  
印刷基板张数 Number of sheets of print: 各10张 合计焊盘数 Total number of patterns: 15220

### 保持长时间的粘着力 Maintain tackiness for long time

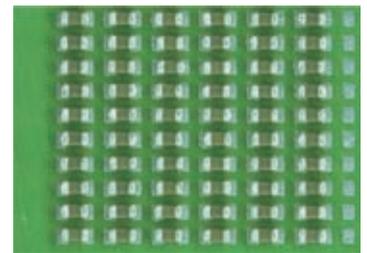


持续吹风 2h  
Blow the wind for 2 hours

008004芯片贴装  
Chip mount

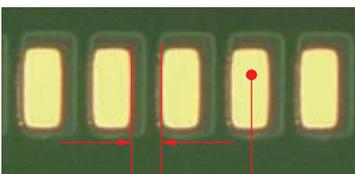


以往产品 : NG  
Conventional



TLF-204G-HFWSeries: OK

### 优秀的助焊剂残留物清洗性 Excellent flux residue washability



200um 焊盘尺寸  
Land size  
0.64x0.30mm

评价位置 Evaluation point

零部件剥离后 After components peeling



助焊剂残留物  
Flux residue

清洗前 Before washing

准水类 清洗剂  
10分钟浸渍  
Soak in semi-aqueous detergent for 10 min

零部件剥离后 After components peeling



清除助焊剂残留物  
Flux residue removed

清洗后 After washing

# 耐热性低的零部件·基板也可适用，具有环保性，还可降低成本的 低温接合材料

Applicable to low heat resistance components and/or substrates Eco-friendly product Process cost reduction.  
Low temperature joining material



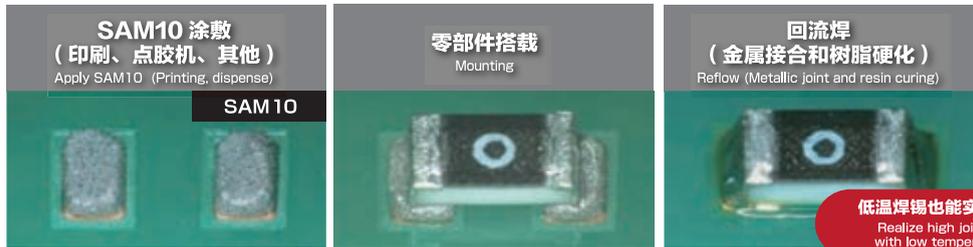
## 导电性接合材料 SUPER ARZERITE SAM10-401-27

Conductive joining material SUPER ARZERITE SAM10-401-27 Non-clean type / High reliability

### 特長 Features

- 通过低温金属接合和树脂来同时实现辅助加强  
Realize low temperature soldering and thermosetting resin reinforcement at once
- 提高连续印刷性能  
Improved continuous printing
- 不含VOC，不含卤化物  
VOC free, Halogen free
- 接合温度160°C4分钟  
Heating condition: 160deg.C.4min
- 无助焊剂的飞溅  
Less flux scattering

### 工序 Process



低温焊锡也能实现高强度的接合  
Realize high joint strength even with low temperature solder alloy

耗电量 / CO<sup>2</sup> 排放量 Power consumption · CO<sub>2</sub> emission

SAM10-401-27

Sn3Ag0.5Cu  
锡膏 Solder Paste

回流焊电力消耗量 kW·h Reflow oven energy consumption

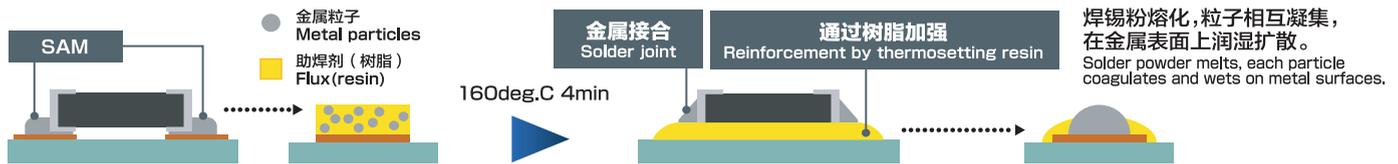
9.6

12.2

CO<sup>2</sup> 排放 Kg-CO<sup>2</sup> 排放量 CO<sub>2</sub> emission Kg-CO<sub>2</sub>

4.27

5.25



# 通过替代ACF、连接器的接续来降低成本 SnBi类异方向导电性接合材料

SnBi-Solder type anisotropic conductive paste / Alternative to ACF/connectors



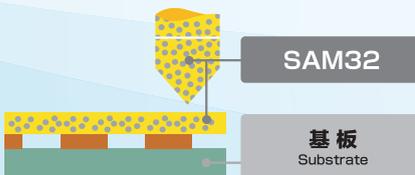
## SAM32-401E-13

### 特長 Features

- 缩短工序  
Process time reduction
- 最适合节省空间、轻量化设计  
For space saving and lightweight design
- 可返工  
Reworkable
- 不含VOC，不含卤化物  
Halogen-free / VOC-free

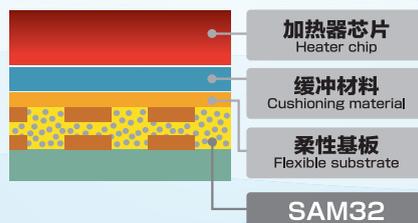
### 工序 Process

采用注射进行涂敷 Applying with syringe

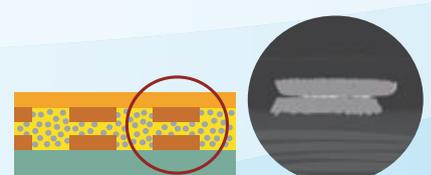


涂敷方法：点胶形式  
Application method : Dispensing

定位 Alignment



热压 Thermal-compression bonding (TCB)



热压条件 TCB condition :  
150°C-1.0MPa-10sec

# 通过非接触式、无掩膜方式向各种类型的基板提供焊锡 对应喷射方式的无铅(Pb)锡膏

For solder paste deposit by non-contact/ stencil-less process Jettable Pb-free solder paste

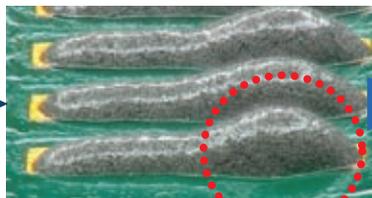
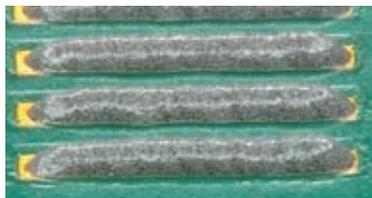


## LFSOLDER JDS Series

**减少助焊剂残留量** Easy to adjust deposit shape and volume

**向 QFP 焊盘涂敷的示例：通过形成底面的焊接圆角提高接合可靠性**

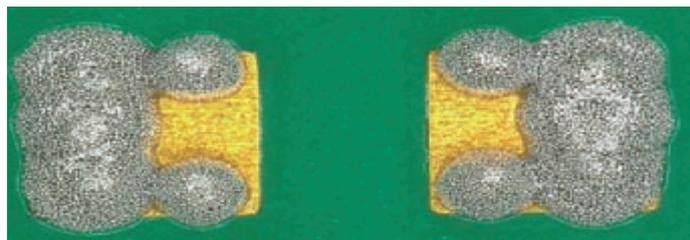
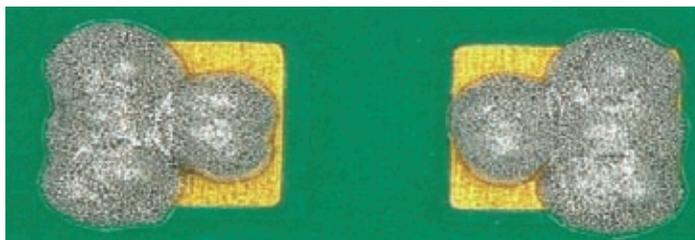
Example of deposit shape on QFP pad : Joint reliability improvement for back-fillet formation



**涂敷量调节**  
Deposit adjustment

**贴装→加热后**  
Mount → Reflow

**芯片焊盘的涂敷示例：芯片旁锡珠对策** Example of deposit shape on chip component pads: Solder ball measures



**对应0603、0402芯片的贴装** For 0603 and 0402 chip size

	0603 (metric)	0402 (metric)
X50		
X100		
X150 斜 diagonal		
		X200
		X200 斜 diagonal

# 抑制因快速加热而产生的锡珠 对应局部加热无铅锡膏

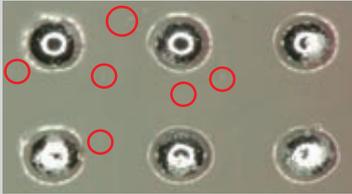
Less solder ball occurrence with rapid heating Pb free Solder paste for rapid local heating



## LFSOLDER LSM Series

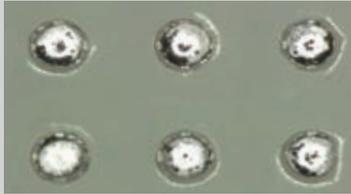
### 优良的焊接性，及可以抑制锡珠产生 Good solderability and less solder ball occurrence

#### 非对应局部加热的产品 Not for local soldering



大量产生锡珠  
Lots of solder balls

#### LSM10-204-NH03



抑制产生锡珠  
Less solder ball occurrence

#### 激光焊接条件 Local soldering condition

评价位置 Evaluation area	0.4 mm $\phi$ Cu pad
激光装置 Laser apparatus	MLS-808FS 阿波罗精工制造 Apollo Seiko Ltd.
激光波长 Wave length	808 nm
激光照射直径 Radiation diameter	667 $\mu$ m

### 优良的助焊剂残留物清洗性 Excellent flux residues cleanability

#### 残留助焊剂清洗前 Before cleaning



#### 残留助焊剂清洗后 After cleaning

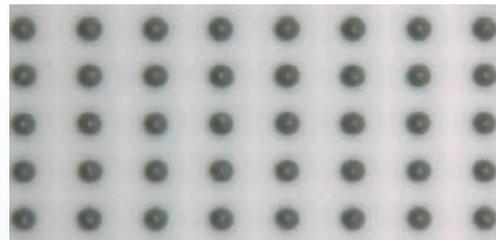
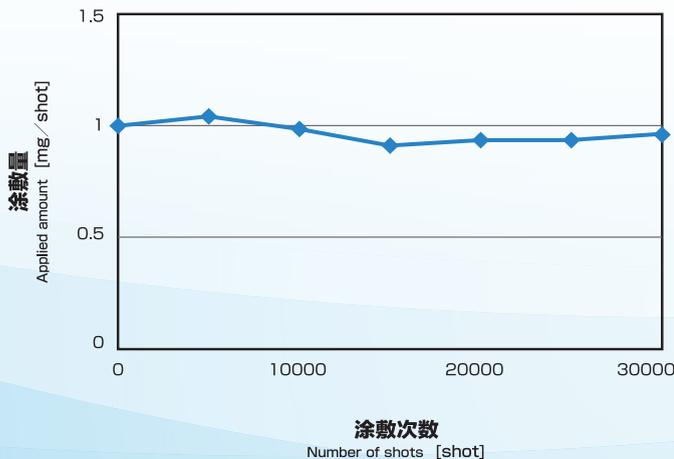


使用焊膏 Solder paste : LSM10-204-NH03

#### 助焊剂残留物清洗条件 Flux residue cleaning condition

清洗液 Detergent	纯水系 Hydro-carbonate 准水类 Semi-aquaious
清洗方法 Cleaning	超声波清洗 Ultrasonic 40 $^{\circ}$ C-10min
冲洗方法 Rinsing	纯水 DI water 浸渍 Dipping -1 min
干燥方法 Drying	120 $^{\circ}$ C-1 min

### 稳定的连续涂敷成形效果 Stable continuous dispensing performance



30,000次吐出后仍可实现稳定的涂敷形状  
Stable dot shape even after 30,000 shots

装置 Dispenser	ShotMini 武藏高科技公司制造 Musashi Engineering, Inc.
喷嘴内径 Nozzle inside diameter	$\phi$ 0.30mm (精密喷嘴 Precision nozzle)
间隙 Clearance	0.30mm
涂敷时间 Application time	0.50 sec
涂敷量 Applied amount	1.00mg/shot
实验环境温度 Test condition	25 $\pm$ 3 $^{\circ}$ C

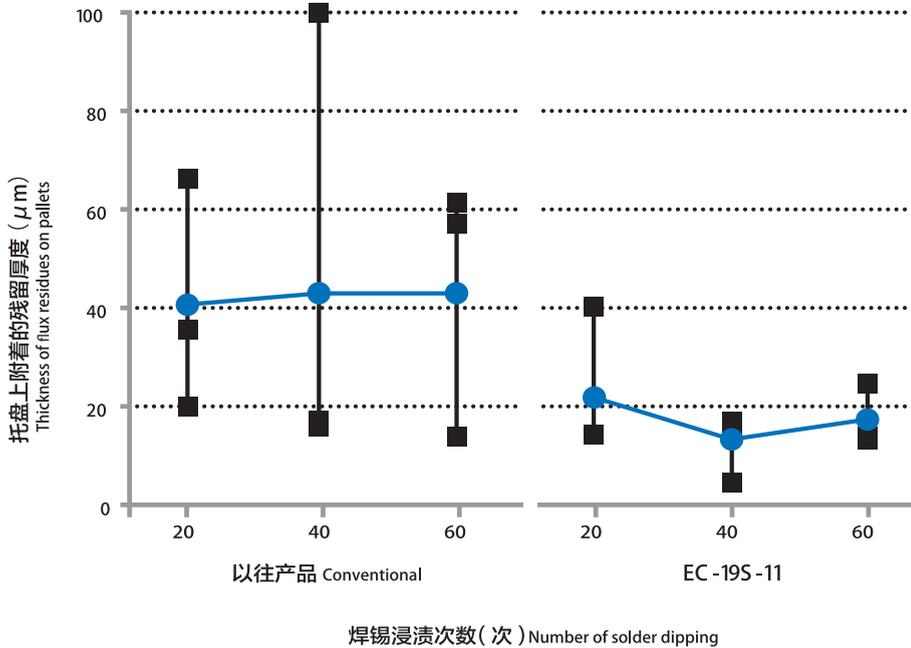
# 在保持原有助焊剂的作业性基础上, 减少基板、托盘的残留附着量 无铅通用型液状助焊剂

Less flux residue cohesion and as good workability as conventional soldering flux  
Pb-free soldering flux for general use

## LEAD FREERITE EC-19S-11



### 减少助焊剂残留量 Flux residue amount reduction



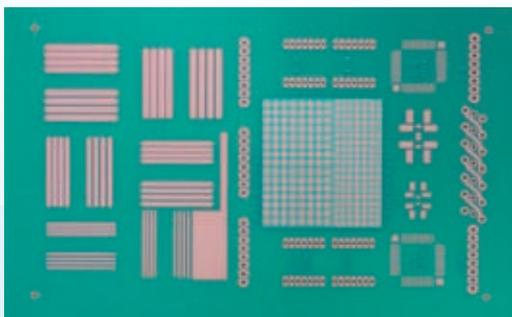
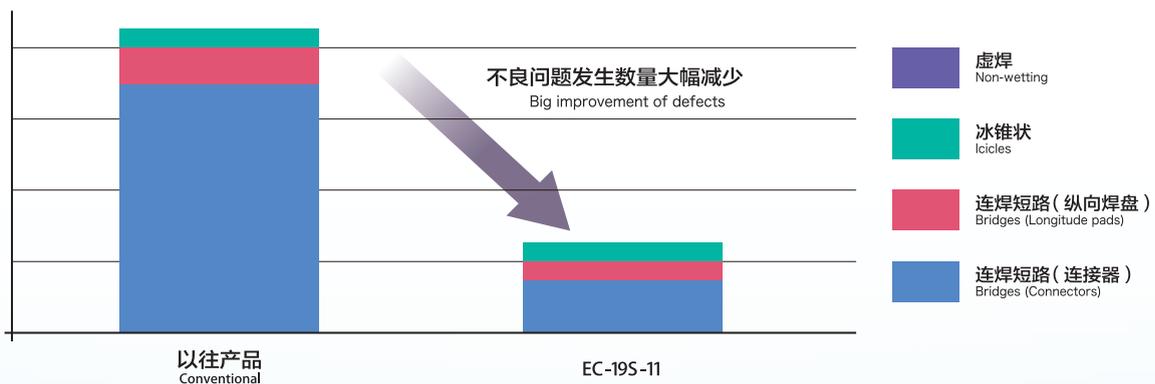
### 使用托盘 Test pallet



#### 评价条件 Test condition

助焊剂量 (mL/cm <sup>2</sup> ) Flux amount	100
焊锡温度 (°C) Soldering temp. (°C)	250
预备加热 (°C) Pre-heating (°C)	100
传送带速度 (m/min) Conveyor speed	1
焊锡组成 Solder alloy	Sn/3.0Ag/0.5Cu

### 确保作业性、焊接性 Secure workability/solderability



#### 评价条件 Test condition

助焊剂量 (mL/cm <sup>2</sup> ) Flux amount	70
焊锡温度 (°C) Soldering temp. (°C)	255
预备加热 (°C) Pre-heating (°C)	100
焊锡波 Solder wave	双波 Double-wave
传送带速度 (m/min) Conveyor speed	1.5
焊锡组成 Solder alloy	Sn/3.0Ag/0.5Cu

※为了能够比较助焊剂的特性, 基板设计采用了增大焊盘, 间距狭窄化, 容易产生不良的设计。  
上述记载的数据为本公司实验的结果, 不保证在客户方的实验结果。

\*Evaluated by our test boards which easily causes defects in order to make differences clearer  
The data mentioned above was tested by our test methods, which does not guarantee your test results

# 黑色阻焊油墨

Black color photo imageable solder resist



## ABSOLIGHT APB-200 Series / DSR-8000S18 Series

### 特点 Features

● 对应DI曝光

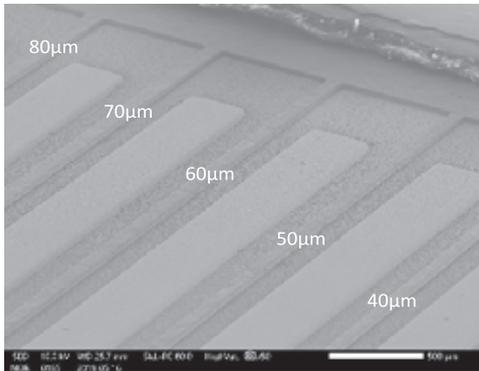
Suitable for Direct-imaging

● 高感度

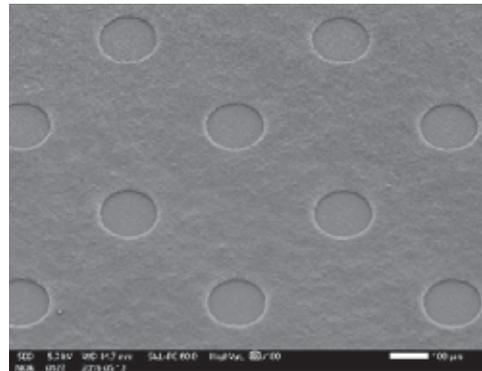
High sensitivity

● 高解像度

High resolution



40μm~80μm Solder Dam  
(Copper Thickness 35μm)



200μm Via on copper

绝缘材料 Insulation materials

项目 Items	评价条件 Test Condition	APB-200-25	DSR-8000S18 -11MBK(H)-3	DSR-8000S18 -11MBK(H)-2	DSR-8000S18 -11BK
特点 Features		对应DI曝光 Suitable for Direct-imaging  高感度 High sensitivity  高解像度 High resolution	对应DI曝光 Suitable for Direct-imaging	通用型 For all propose	光泽 Gloss type
导体上膜厚 Thickness on conductor		10-12 μm	18-22 μm	18-22 μm	18-22 μm
外观 Appearance	目视 / 光泽值(60°) Visual inspection / Gloss value 60°	黑色雾面 Black matte/13	黑色雾面 Black matte/10	黑色雾面 Black matte/10	黑色光泽 Black gloss
曝光量 Exposure energy	3线DI曝光机 3Wave DI Exposure machine	60mJ/cm <sup>2</sup> (DI对应DI曝光)	100mJ/cm <sup>2</sup> (DI对应DI曝光)	300mJ/cm <sup>2</sup>	300mJ/cm <sup>2</sup>
感度 Sensitivity	Stouffer 阶段式曝光表 (阻焊层上) Stouffer step tablet 21 steps	6段 steps	8段 steps	8段 steps	9段 steps
解像性 Resolution		6-10 μm	15-20 μm	15-20 μm	15-20 μm

# 适用于在严酷环境下要求具备可靠性的车载基板 高耐热高可靠性阻焊剂

Solder Resist for automotive application with outstanding reliability even in harsh environments

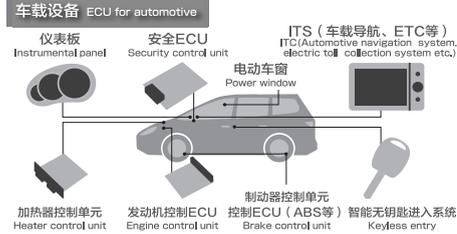


## FINEDEL DSR-2200 ACR Series

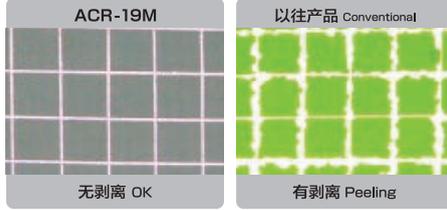
### 特点 Features

- 实现了卓越的耐龟裂性、耐热性、耐湿性及绝缘可靠性  
Outstanding reliability, such as thermal shock resistance, thermal storage resistance, humidity resistance and insulation resistance

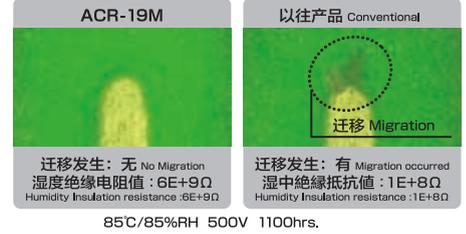
### 用途 Application



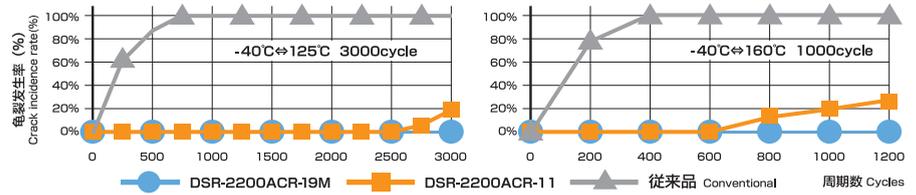
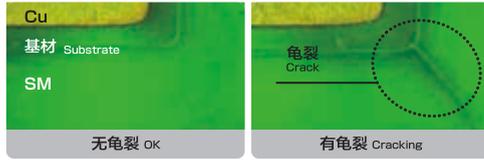
### 耐热性 Thermal storage resistance



### 绝缘可靠性 Insulation resistance



### 耐龟裂性 Thermal shock resistance



### 其他普通特性 General properties

项目 Items	评价条件 Test condition	DSR-2200 ACR-11	DSR-2200 ACR-19M 不含卤化物 Halogen-free type
外观 Appearance	目视 Visual inspection	绿色光泽 Green gloss	绿色光泽 Green gloss
焊锡耐热性 Soldering resistance	260C 10秒/3次 (ULF-210R) 260C-10sec/3cycle	无剥离 No Delamination	无剥离 No Delamination
涂膜硬度 Film hardness	JIS K54003	4H	4H
耐酸性 Acid resistance	10% H <sub>2</sub> SO <sub>4</sub> 20min (25C)	无剥离 No Delamination	无剥离 No Delamination
耐碱性 Alkaline resistance	5% NaOH 20min (25C)	无剥离 No Delamination	无剥离 No Delamination
绝缘可靠性 Insulation reliability	L/S=100/100μm 85C/85%RH/50V/2000hrs.	2E+12Ω	2E+12Ω
分辨率 Resolution	Dry Thickness 40μm/80μm on FR-4	60μm/90μm 曝光量 Exposure 300mJ/cm <sup>2</sup>	50μm/80μm 曝光量 Exposure 200mJ/cm <sup>2</sup>

# 曝光液态显影型 阻焊剂

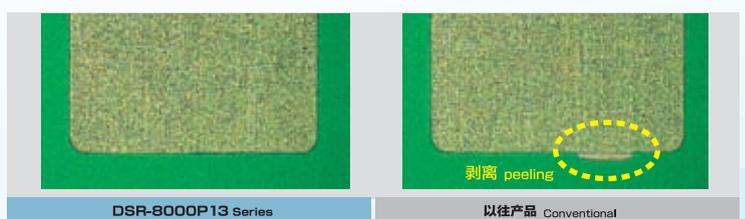
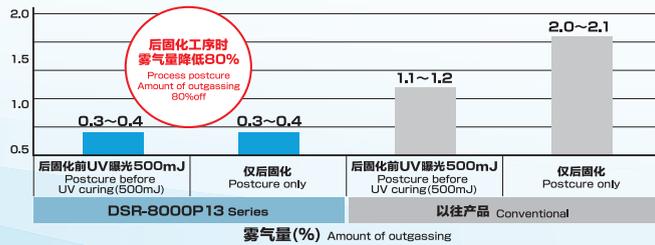
Photo-imageable liquid solder resist for general rigid substrates



## 喷涂工艺用阻焊剂 DSR-8000 P13 Series Coating spray type of solder resist

### 特点 Features

- 低雾气型 Low outgas
- 优良的耐无电解电镀性 High resistance to ENIG process
- 不含卤化物 Halogen free type is available



项目 Items	评价条件 Test condition	DSR-8000 P13 Series
外观 Appearance	目视 Visual inspection	绿色 Green
感度 (150-250mJ/cm <sup>2</sup> ) Sensitivity	Stouffer 21 级曝光尺 Stouffer step tablet 21 steps	10-12 级 10-12 steps
涂膜硬度 Film hardness	JIS K5400	6H
致密性 Adhesion Cross cut test	Cu 上 On Copper	100 / 100
焊锡耐热性 Soldering resistance	260C 10 秒 3 次 260C 10sec/3 Cycle	无剥离 No Delamination
耐电镀性 Electroless Ni/Au resistance	Ni : 3-5μm, Au : 0.05μm	无剥离 No Delamination
绝缘可靠性 Insulation resistance	85C 85%RH/50V/IPC-25A-D, 1000hrs.	初始 Initial : 1.0E+13Ω 1000hrs : 1.0E+12Ω

# 感光性覆盖膜

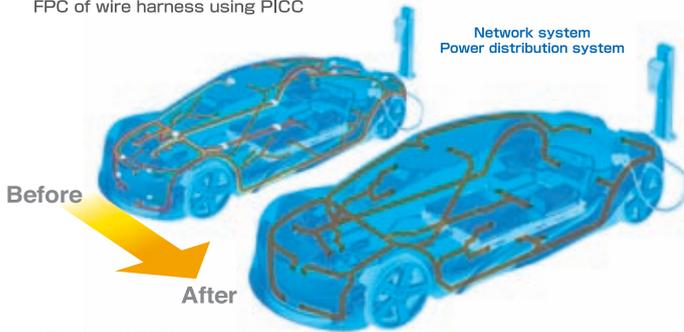
Photo-imageable coverlay coat



## PAF, APB-800 Series (液状 Liquid type) / TPL-800 Series (干膜 Film type)

### 特点 Features

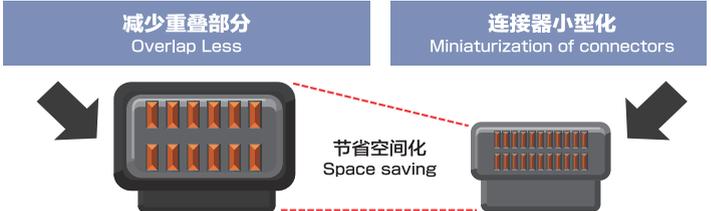
●例：车载 (For automotive)  
通过使用 PICC 实现线束的 FPC 化  
FPC of wire harness using PICC



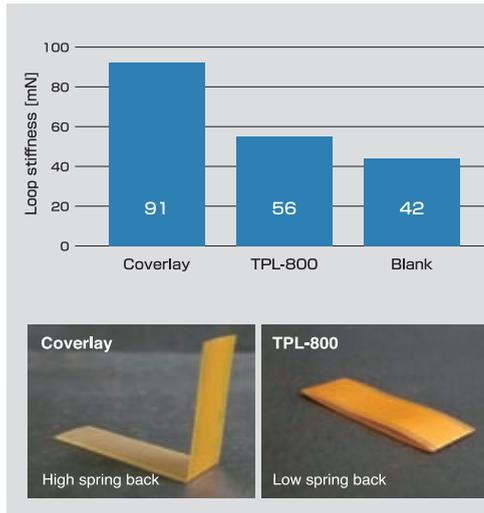
通过PICC实现FPC化的优势  
Advantages of FPC by PICC

长尺对应 Ultra long FPC	轻量化 Weight saving	节省空间化 Space saving	减少接合时间 Reduced wiring operation
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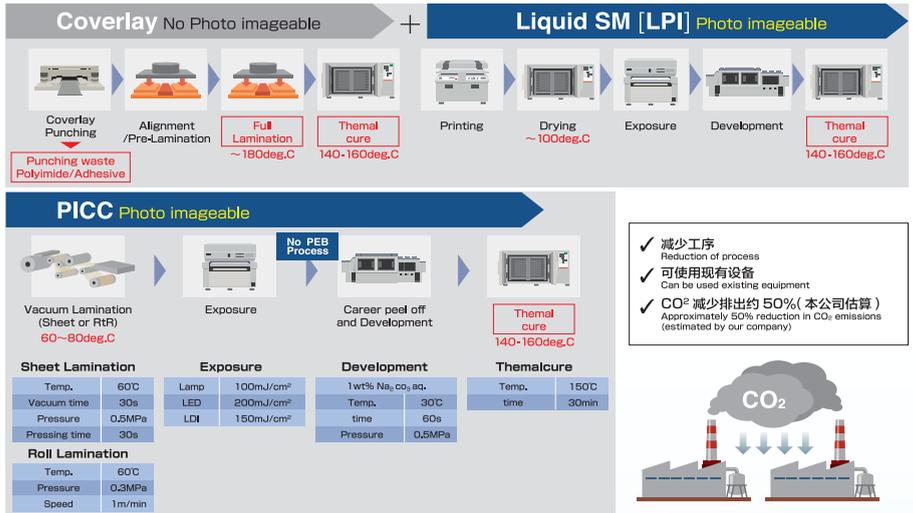
●例：智能手机 (For smart phone)  
通过使用 PICC 面向智能手机 FPC 化  
FPC of smart phone using PICC



●低反弹 Low spring back



●感光性覆盖膜工序 PICC process



項目 Items	评价条件 Test Condition	PAF, APB-800 Series (Liquid type)	TPL-800 Series (Film type)
外观 Appearance	目視 Visual inspection	琥珀色光泽 Amber gloss / 黑色雾面 Black Matte	琥珀色光泽 Amber gloss / 黑色雾面 Black Matte
曝光能量 Exposure energy	D I 曝光机 DI Exposure machine	100 ~ 200mJ/cm <sup>2</sup>	100 ~ 200mJ/cm <sup>2</sup>
塗膜硬度 Film hardness	JIS K5400	2H	3H
密着性 Adhesion Cross cut test	PI 上面 On Polyimide	100/100	100/100
	铜上面 On Copper	100/100	100/100
耐酸性 Acid resistance	10%HCl-15min 透明胶带剥离 10%HCl-15min tape peeling test	无剥离 No Delamination	无剥离 No Delamination
耐溶解性 Solvent resistance	IPA-30min 透明胶带剥离 IPA-30min tape peeling test	无剥离 No Delamination	无剥离 No Delamination
UL	UL-94	VTM-O 相当 VTM-O equiv.	VTM-O 相当 VTM-O equiv.

绝缘材料 Insulation materials

# FPC用 高耐热性液态阻焊剂

Liquid photo imageable solder resist with high heat resistance for FPC

## PAF/APB-280 Series



绝缘材料  
Insulation materials

### FPC用 黑色液态阻焊剂

Black color photo-imageable solder resist for FPC

### APB-280-32HR

### FPC用 绿色/琥珀色液态阻焊剂

Green/Amber color photo-imageable solder resist for FPC

### PAF-280-11G/PAF-280-11A

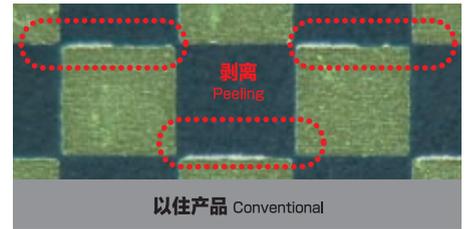
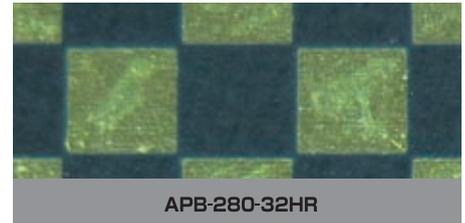
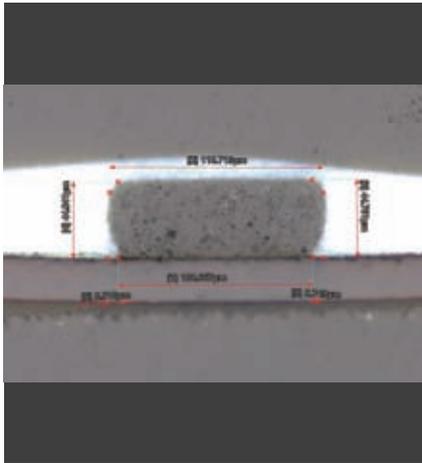
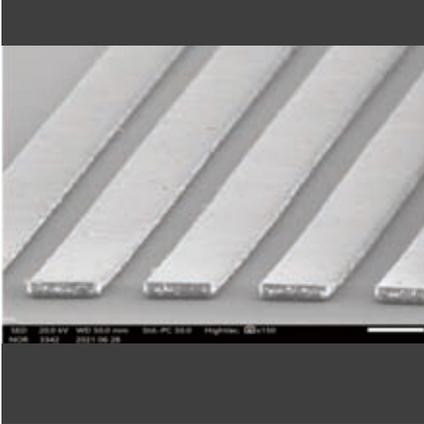
#### 特点 Features

- 对应DI曝光 Suitable for Direct-imaging
- 高分辨率 High resolution
- 高耐热性 High heat resistance
- 无卤产品 Halogen free

#### 可有效避免Undercut过大引起的裂纹、剥离

Prevents cracks and peeling caused by less Undercut

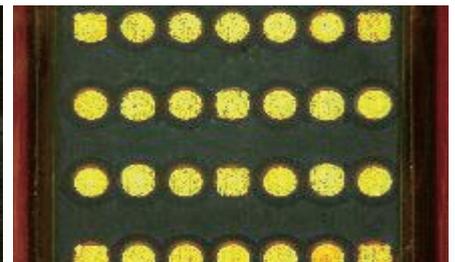
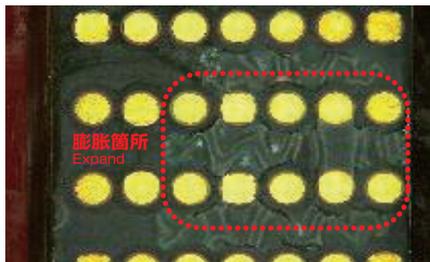
S<sub>Rt</sub> = 40μm



#### 优良的弯曲性 Good Flexibility



#### 耐FLUX性评价 Flux resistance test



项目 Items	评价条件 Test Condition	APB-280-32HR	PAF-280-11G PAF-280-11A
外观 Appearance	目视 Visual inspection	黑色雾面 / Black matte	绿色光泽 / Green gloss 琥珀色光泽 / Amber gloss
感度 Sensitivity	Stouffer 21 格 曝光尺 曝光量 100mJ/cm <sup>2</sup> STOUFFER 21 Steps Exposure energy	9-12 格 9-12 steps	6-8 格 6-8 steps
膜硬度 Film Hardness	JIS C 5012-1993 8.6.3 铅笔刮划试验 pencil hardness	3H	4H
附着性 Adhesion Cross cut test	JIS C 5012-1993 8.6.2 Cross-cut Tape Test	100/100	100/100
解析度 Resolution	曝光量 100mJ/cm <sup>2</sup> Exposure energy 100mJ/cm <sup>2</sup>	铜上-30μm on Copper PL上-30μm on polyimide	铜上-30μm on Copper PL上-30μm on polyimide
电镀性 Electroless Ni/Au resistance	电解打线镀金 Electrolytic wire bonding and gold plating Ni: 3~5μm Au: 0.3μm 无电解镀金 Electroless gold plating Ni: 3~5μm Au: 0.05μm	涂膜无异常 No abnormality in cured film	涂膜无异常 No abnormality in cured film
绝缘电阻 Insulation resistance	85°C 85%RH 50V 1000h IPC B Pattern	无电子迁移 No electron migration	无电子迁移 No electron migration

对应DI曝光

# FPC用黑色液状阻焊油墨

Black absorbing materials for FPC



## ABSOLIGHT APB-300 Series

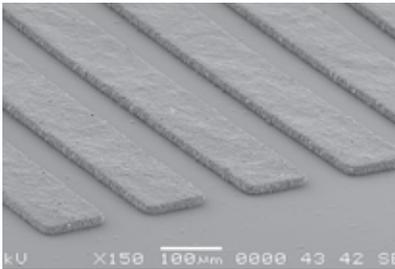
### 高温焊接耐热性良好 黑色液状阻焊油墨 APB-300-32RD

High temperature solder heat resistance black color photo-imageable solder resist for FPC

#### 特長 Features

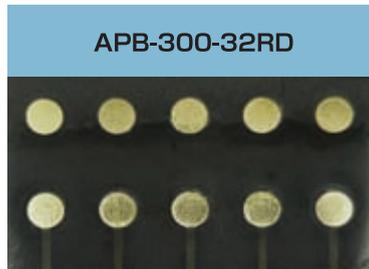
- **对应DI曝光**  
Suitable for Direct-imaging
- **高温焊接耐热性**  
High temperature solder heat resistance
- **不含卤化物, 阻燃性**  
Halogen-free and flame-resistance

#### 解像性 Resolution



100µm Solder Dam

#### 耐热性 Thermal storage resistance



320°C-20次无剥离  
320°C 20Times No Delamination



320°C-5次有剥离  
320°C 5Times Delamination

项目 Items	评价条件 Test Condition	APB-300-32RD
外观 Appearance	目视 Visual inspection	黑色雾面 Black Matte
露光量 Exposure energy	D I 露光機 DI Exposure machine	100mJ/cm <sup>2</sup>
屈曲性 Flexibility	对折交叠(聚酰亚胺 25µm上) Bending 180degree (on Polyimide 25µm)	5次 5times
涂膜硬度 Film hardness	JIS K5400	3H
附着力 Adhesion Cross cut test	聚酰亚胺上 On Polyimide	100/100
	Cu上 On Copper	100/100
耐热性 Heat resistance	320°C-8sec	20次 20times
UL	UL-94	VTM-0

### 高柔软性 黑色液体阻焊油墨 APB-300-21

High flexibility black color photo-imageable solder resist for FPC

#### 特長 Features

- **对应DI曝光**  
Suitable for Direct-imaging
- **高柔软性**  
High flexibility
- **不含卤化物, 阻燃性**  
Halogen-free and flame-resistance

项目 Items	评价条件 Test Condition	APB-300-21
外观 Appearance	目视 Visual inspection	黑色雾面 Black Matte
露光量 Exposure energy	D I 露光機 DI Exposure machine	100mJ/cm <sup>2</sup>
屈曲性 Flexibility	对折交叠(聚酰亚胺 25µm上) Bending 180 degree (On Polyimide 25µm)	10次 10times
涂膜硬度 Film hardness	JIS K5400	H
附着力 Adhesion Cross cut test	聚酰亚胺上 On Polyimide	100/100
	Cu上 On Copper	100/100
耐酸性 Acid resistance	10%HCl-15min 透明胶剥离测试 10%HCl-15min tape peeling test	无剥离 No Delamination
耐溶剂性 Solvent resistance	IPA-30min 透明胶剥离测试 IPA-30min tape peeling test	无剥离 No Delamination
UL	UL-94	VTM-0

# 适用于显示屏的阻焊油墨

Solder resist for display applications.



## REFLIGHT RPW Series TPL-300 Series

### FPC用白色反射材料

White reflective material for FPC

#### 特長 Features

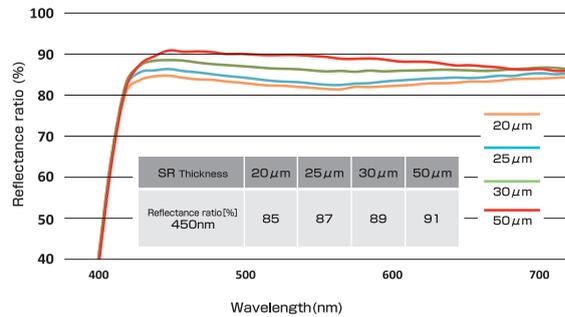
#### ● 优异的弯折性

Excellent bending property



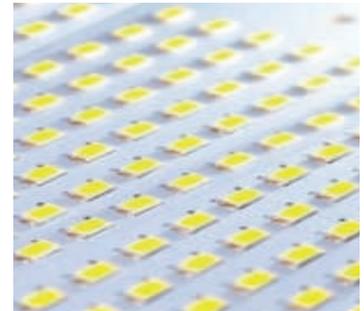
#### ● 高反射率

High reflectance



#### ● 用于背光灯

Backlight application



After Reflow (Low warpage)



Conventional



Under Development



项目 Items	评价条件 Test Condition	RPW-300-17
感度 Sensitivity	Stouffer 21格 曝光尺 STOUFFER 21 steps 250mJ/cm <sup>2</sup>	6段 6Steps
屈曲性 Flexibility	对折交叠 Bending 180degree 300g Loading (On Polyimide 25µm)	2次 2 Times
翘曲性 Warpage	尺寸50×50mm Size 50×50 (On Polyimide 25µm)	3~4mm
涂膜硬度 Film hardness	JIS K5400	2H
密着性 Adhesion Cross cut test	聚酰亚胺 On Polyimide	100/100
	铜(Cu)上 On Copper	100/100
耐酸性 Acid resistance	10%HCl-15min 透明胶剥落(测试) tape peeling test	无剥离 No Delamination
耐溶剂性 Solvent resistance	IPA-30min 透明胶剥落(测试) tape peeling test	无剥离 No Delamination
解像性 Resolution	聚酰亚胺 On Polyimide (25µm)	110µm
	Cu上 On Cu of two layer CCL (Cu: 12µm, PI: 25µm)	50µm
HHBT	L/S=100µm/100µm 85°C-85%RH DC50V	1000小时OK 1000h Pass
UL	UL-94	VTM-0
	Tg (TMA)	50~55°C
物性值 Physical values	破断强度 Breaking strength	15~20MPa
	破断伸展 Elongation	10~20%
	弹性率 Elastic modulus	0.6~0.8GPa



## ■ 产品描述

### ★ 1. 业界最强加热能力

- 40年以上技术结晶,在相同条件设定下,可以保证大小元器件吸热差做到最小。
- 设定温度和基板温度差最小。

### ★ 2. 业界最强助焊剂回收能力

- 更加高效的松香回收装置。四个回收箱保证松香在最佳的状态以最高效的方式回收松香。
- 回收箱打扫更简单,保养更便利。

### ★ 3. 业界唯一标配一对一变频器控制马达 (数量最大可达26个)

- 方便更精确个别调整某一段的温度曲线。
- 保证每个马达在出厂时出来的热风在一个水准。

### ★ 4. 独创技术的风刀(N2knife)设计

阻断隔绝气流保证炉体内部氧浓度稳定,大量减少氮气的使用量。另外隔绝松香流出,保证松香在炉体被回收。

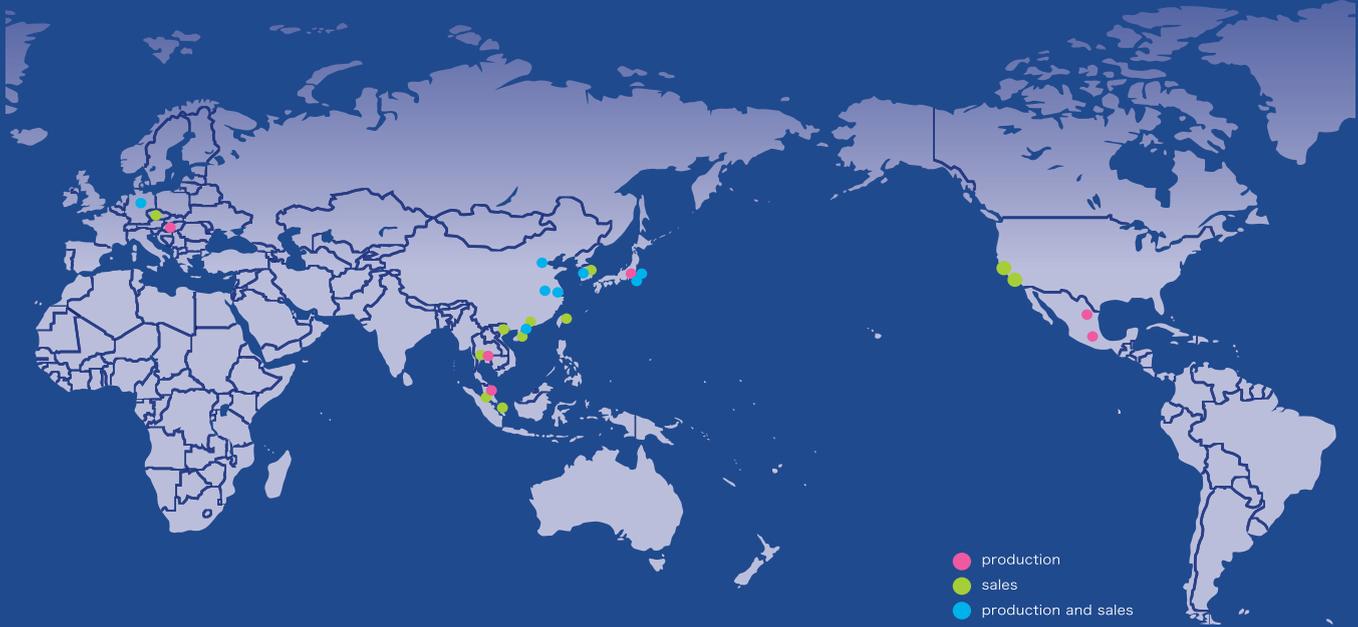
### ★ 5. 省能源

两种启动方式可选。(同时启动和分时启动)用了特殊的材料隔绝了热量,降低了室温。

TAMURA VerIII 系列 高品质热风回流炉  
TAMURA VerIII series

### TNV Ver.3

型号	TNV-	TNV-	TNV-	TNV-	TNV-	TNV-
	M508CR	L568CR	M6110CR	L6710CR	M6812CR	L7412CR
搬送方式	轨道或网带					
基板宽度	50-300mm	50-500mm	50-300mm	50-500mm	50-300mm	50-500mm
加热温区数 /温区构成	8	8	10	10	12	12
加热长(mm)	2800	2800	3500	3500	4200	4200
冷却长(mm)	700	700	1000	1000	1000	1000
设备长度(mm)	5100	5700	6100	6700	6800	7400
设备宽度(mm)	1530					
设备高度(mm)	1591					
氮使用量(m <sup>3</sup> /h)	30					
最大温度设定	290°C					
电源容量 (最大值)(KVA)	26/41	40/60	34/54	47/73	47/73	53/88
电压规格	AC200V / AC380V / 415V					
启动方式	同步或分时启动					
标准部品高度	±30					



## Japan

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## Taiwan area

- ④ TAIWAN TAMURA TECHNOLOGY CO.,LTD.

## China area

- ⑤ SHANGHAI XIANGLE TAMURA ELECTRO CHEMICAL INDUSTRY CO.,LTD.
- ⑥ TAMURA CORPORATION OF HONG KONG LIMITED.
- ⑦ TAMURA KAKEN (DONGGUAN) LTD.
- ⑧ TAMURA ELECTRONIC MATERIAL (TIANJIN) CO.,LTD.
- ⑨ TAMURA FA SYSTEM (SUZHOU) CORPORATION
- ⑩ TAMURA FA SYSTEM (SUZHOU) CORPORATION:South China Office

## Korea area

- ⑪ TAMURA CHEMICAL KOREA CO.,LTD.
- ⑫ TAMURA CORPORATION OF KOREA (FA SALES DEPT)

## ASEAN area

- ⑬ TAMURA CORPORATION SINGAPOLE PTE. LTD.
- ⑭ TAMURA KAKEN(M)SDN. BHD.
- ⑮ ESE INDUSTRIES(M) SDN.BHD.(Malaysia)
- ⑯ TAMURA CORPORATION (THAILAND) CO., LTD.
- ⑰ ESE INDUSTRIES(Thai) Co.,Ltd.(Thailand)
- ⑱ TAMURA CORPORATION VIETNAM CO.,LTD.(Vietnam)

## Europe area

- ⑲ TAMURA ELSOLD GmbH (Germany)
- ⑳ Brenntag Hungária Kft. (Hungary)
- ㉑ TAMURA EUROPE LIMITED. o.s.(CZECH Branch)

## America area

- ㉒ TAMURA KAKEN CORP.,U.S.A.
- ㉓ TAMURA H.A. MACHINERY, INC.
- ㉔ Alpha Assembly Solutions , S.A. de C.V. (Mexico)
- ㉕ MACDERMID ENTHONE DE MEXICO, S.A. DE C.V. (Mexico)