ECO SOLDER® PASTE

HF M705-RGS800HF T5

SMIC

Senju Metal Industry Co., Ltd.

RGS (Refined S70G Solder paste) 800 Series Halogen Free

ECO SOLDER® PASTE

HF M705-RGS800HF T5

Feature

- Good print capability and solder capability for fine pitch.
- High yield joint-ability for BGA .
- Halogen Free (Flux type ROL0) and no clean paste.

SMIC
Senju Metal Industry Co., Ltd.

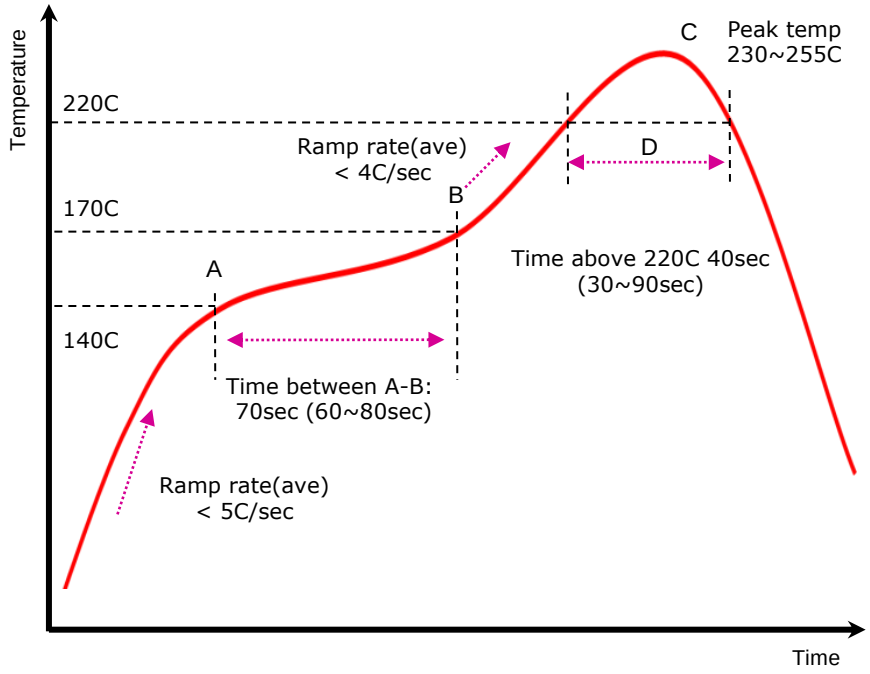
RGS800HF Data Sheet

Category		RGS800HF	Test Method / Remark
Powder	Solder alloy	Ag:3.0 %, Cu:0.5 %, Sn:Bal	JIS Z 3282 Class A
	Melting temperature	217-219 C	DSC
	Powder shape	Spherical type	SEM
	Particle size	15-25um	SEM, Screen method
Flux	Flux type & activity	ROL0	IPC-J-STD-004
	Halogen content	< 500 ppm	EN14582 Combustion IC
	Surface Insulation Resistance (40C90%RH,168h)	Over 1.0E+12 ohms	JIS Z 3284 40C90%RH
	Electrochemical migrarion (85C85%RH Bias DC45V, 1000h)	Over 1.0E+9 ohms No migration	JIS Z 3284 85C85%RH
	Copper mirror test	Pass	IPC–J-STD 004
	Fluoride test	Pass	JIS Z 3284
	Silver chromate test	Pass	IPC–J-STD 004
Paste	Viscosity	200 Pa·s	JIS Z 3284 Malcom
	T.I.	0.60	JIS Z 3284 Malcom
	Flux content	12.0 %	JIS Z 3197
	Slump	No bridging 0.3 mm gap & above	JIS Z 3284
	Tack Force	1.2N/ over 24h	JIS Z 3284
	Copper plate corrosion test	Pass	IPC–J-STD 004
	Validity	6 month (Provisional)	Unopened, keep condition 0-10C

Recommended Reflow Profile

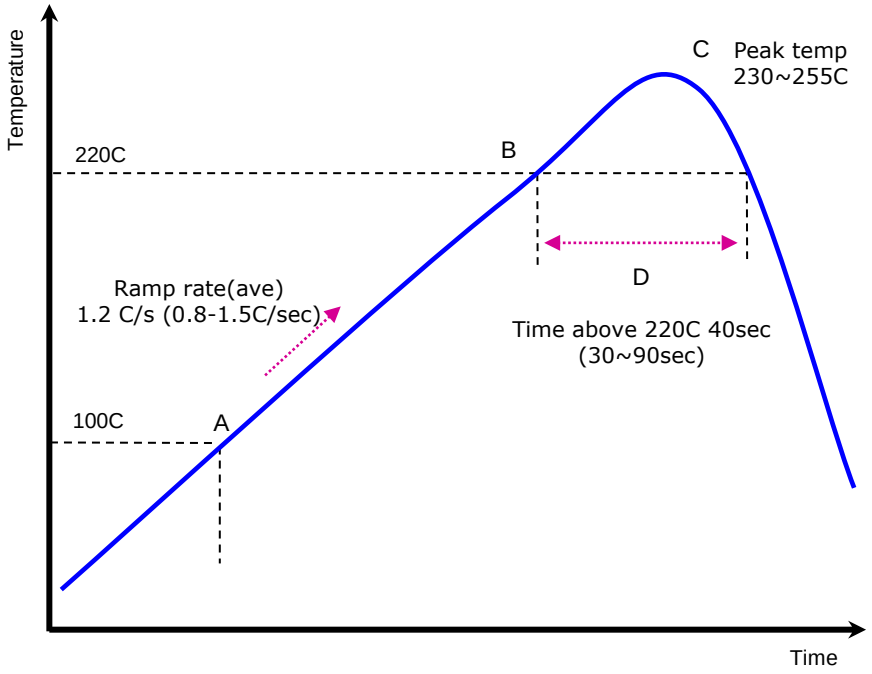
Adaptable reflow atmosphere: Air & Nitrogen

Non-linear reflow profile



Point		Recommend	Upper limit	Lower limit
A	Start preheating	140C	160C	130C
B	End preheating	170C	180C	160C
A-B	Time of preheating	70sec	80sec	60sec
C	Peak temperature	240C	255C	230C
D	Time above 220C	40sec	90sec	30sec

linear reflow profile



Point		Recommend	Upper limit	Lower limit
A	Start preheating	100C	-	-
B	End preheating	220C	-	-
A-B	Time of preheating	100sec	150sec	80sec
Ramp rate		1.2 C/sec	0.8C/sec	1.5C/sec
C	Peak temperature	240C	255C	230C
D	Time above 220C	40sec	90sec	30sec

Printing capability

Printing condition	
Machine	Panasonic SP-60P-L
Stencil thickness	100um
Printing speed	50mm/ sec
Pressure	0.2 N/mm
Removal speed	2.5mm/s

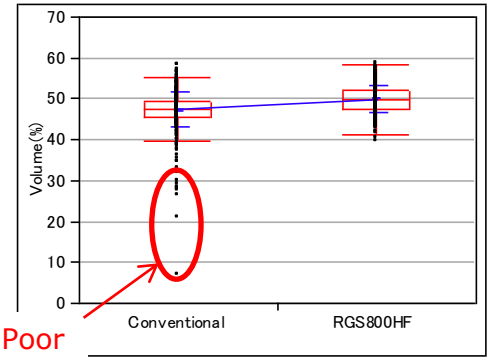


Fig1. Solder volume compared the conventional to RGS800HF (Square 200um).

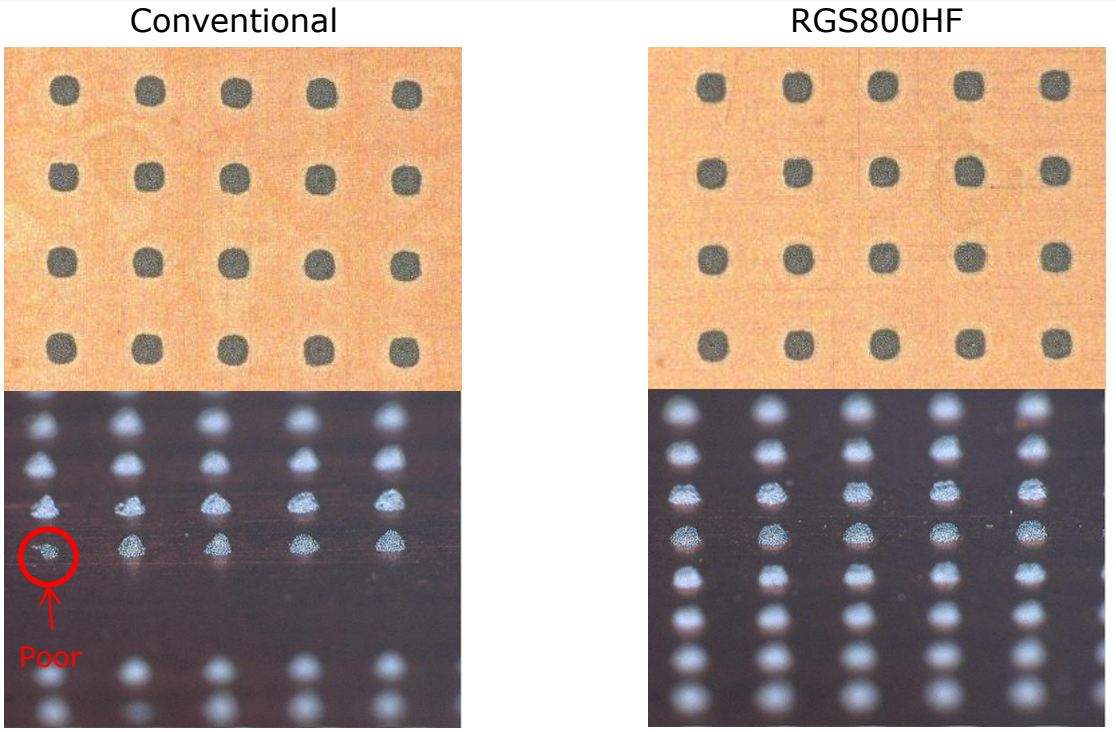


Fig2. Observation of 200um square.

Table. Solder volume compared the conventional to RGS800HF (Square 200um).

	Conventional	RGS800HF
Volume average (%)	47.5	50.0
Standard deviation	4.3	3.3

'RGS800HF' is good printing performance and volumetric stability to 200um square.

SMIC
Senju Metal Industry Co., Ltd.

Soldering capability

Test condition	
Oven	Senju SNR-825
Stencil thickness	100um
Dot pattern	200um square(Fig.1)
Reflow profile	See Fig.2
Atmosphere	Air

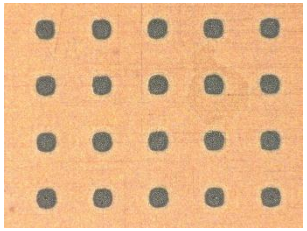


Fig.1 Dot pattern

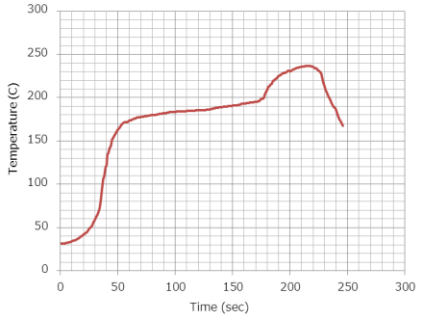
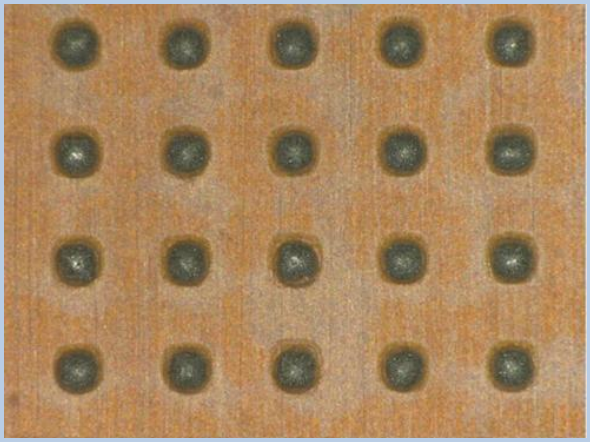
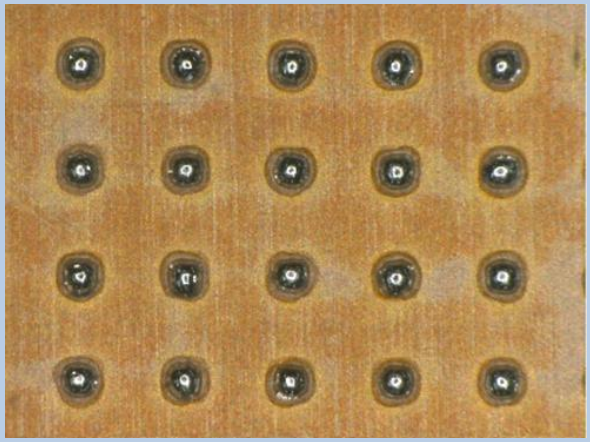
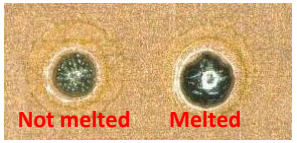


Fig.2 Reflow profile

Preheat Temp.	170-196C
Preheat Time	120sec
Time above liquid	39sec
Peak Temp.	238C

* This profile is harder than Senju recommended profile.

	Conventional	RGS800HF
200um Square		



The solder-ability of RGS800HF is very good as fine aperture.

BGA HIP (Head In Pillow)

Condition

Surface finish:	Cu-OSP
Land pattern:	280um circle
Stencil aperture:	280um circle
Stencil thickness:	120um
BGA ball:	SAC305 300um 353 balls/ PKG
Ball pitch:	500um
PKG precondition:	85C 85%R.H. 72h +baking 125C 3h
Reflow profile:	See below
Reflow atmosphere:	Air

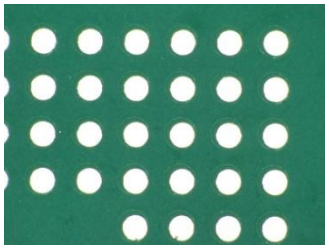


Fig1. PCB pattern.

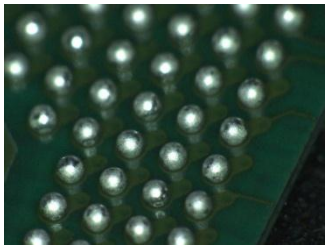
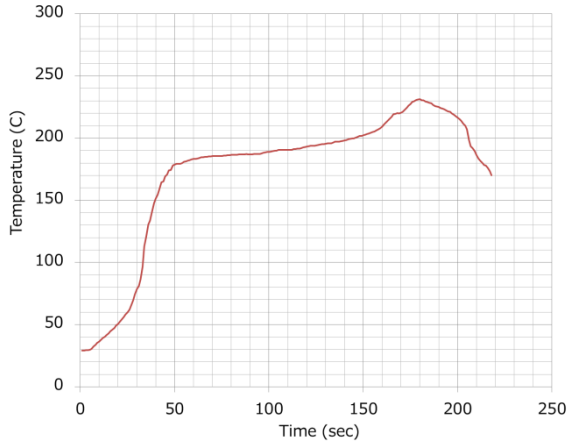


Fig2. BGA.

Reflow profile



Preheat Temp.	180-205C
Preheat Time	110sec
Time above liquid	15sec
Peak Temp.	225C

* This profile is harder than Senju recommended profile.

BGA HIP

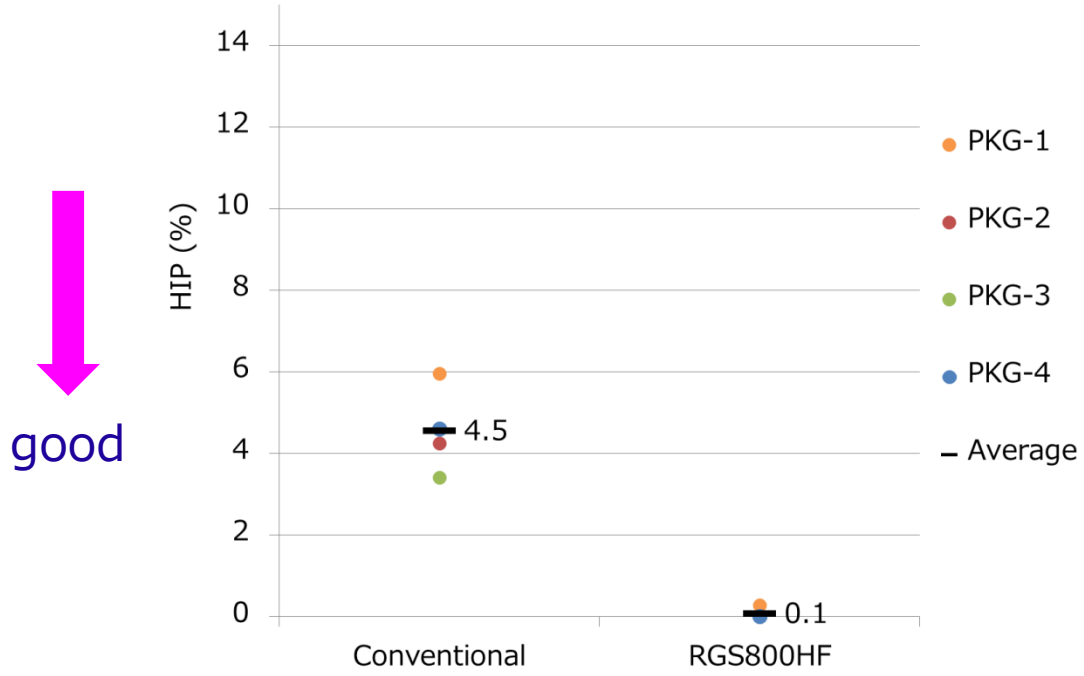


Fig. Bump number of HIP per a PKG. (%)

Table. Bump number of HIP per a PKG (%).

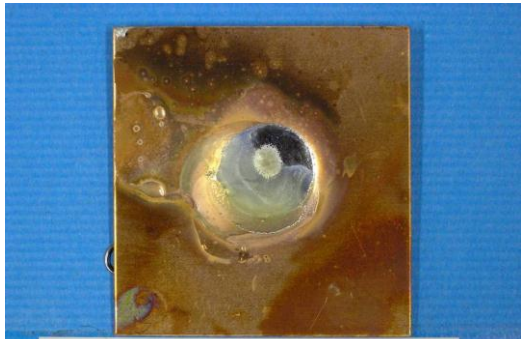
	PKG-1	PKG-2	PKG-3	PKG-4	Average
Conventional	5.9	4.2	3.4	4.6	4.5
RGS800HF	0.3	0	0	0	0.1

RGS800HF is strongly preventable HIP compared to the conventional paste.

Reliability data

Cu corrosion

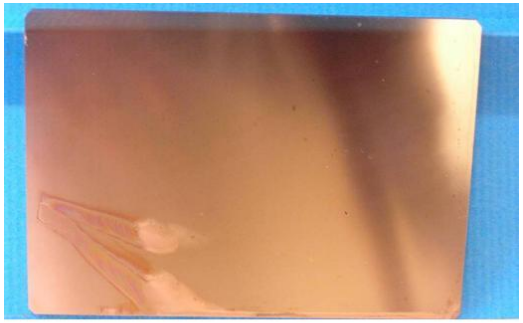
Reference: IPC J-STD 004 Result: Pass



RGS800HF

Cu mirror

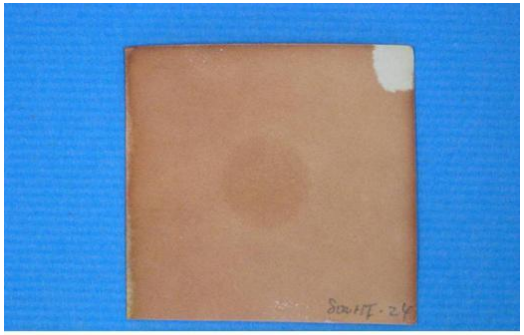
Reference: IPC J-STD 004 Result: Pass



Standard flux RGS800HF

Ag Chromate paper

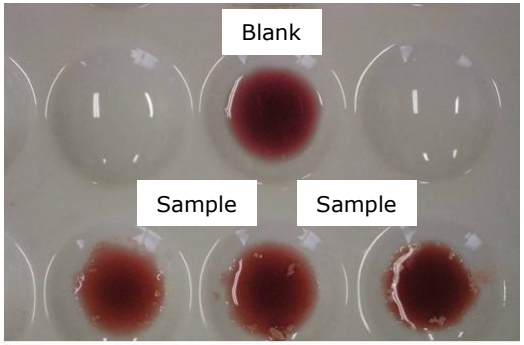
Reference: JIS Z 3197 Result: Pass



RGS800HF

Fluoride

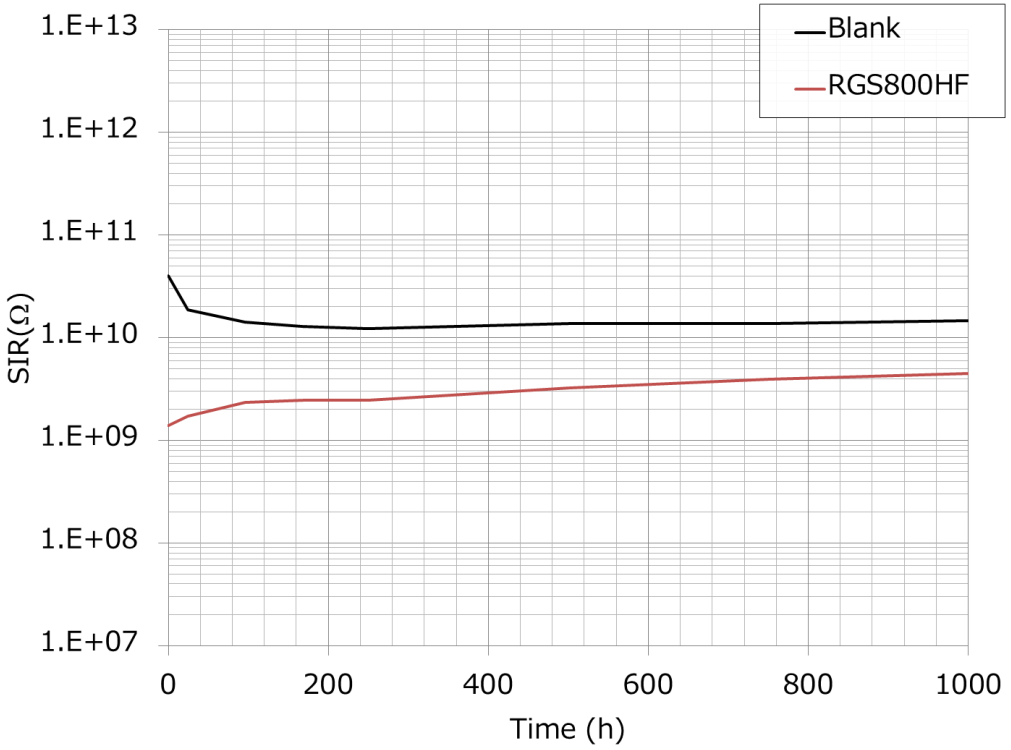
Reference: JIS Z 3284 Result: Pass



RGS800HF

Surface Insulation Resistance

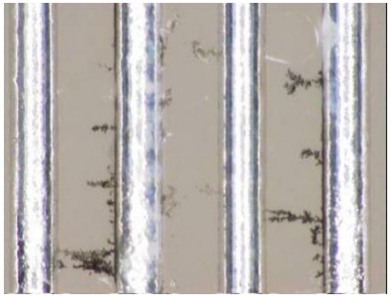
Test condition	
Reference	JIS Z 3197
Environment	85C85%RH
Measuring voltage	DC100V
Applied voltage	DC45V



Blank								
Ch.	Time (h)							
	0	24	96	168	250	500	750	1000
1	3.98E+09	1.34E+10	1.16E+10	1.09E+10	9.87E+09	1.12E+10	1.17E+10	1.25E+10
2	7.66E+10	2.40E+10	1.70E+10	1.49E+10	1.45E+10	1.62E+10	1.58E+10	1.69E+10
3	4.03E+10	1.87E+10	1.43E+10	1.29E+10	1.22E+10	1.37E+10	1.38E+10	1.47E+10
Average	4.03E+10	1.87E+10	1.43E+10	1.29E+10	1.22E+10	1.37E+10	1.38E+10	1.47E+10
M705-RGS800HF								
Ch.	Time (h)							
	0	24	96	168	250	500	750	1000
1	1.44E+09	1.76E+09	2.38E+09	2.30E+09	2.38E+09	3.26E+09	3.94E+09	4.59E+09
2	1.29E+09	1.65E+09	2.17E+09	2.38E+09	2.36E+09	3.01E+09	3.61E+09	4.12E+09
3	1.48E+09	1.73E+09	2.52E+09	2.69E+09	2.69E+09	3.49E+09	4.26E+09	4.80E+09
Average	1.40E+09	1.71E+09	2.36E+09	2.46E+09	2.48E+09	3.25E+09	3.94E+09	4.50E+09

Electrochemical Migration

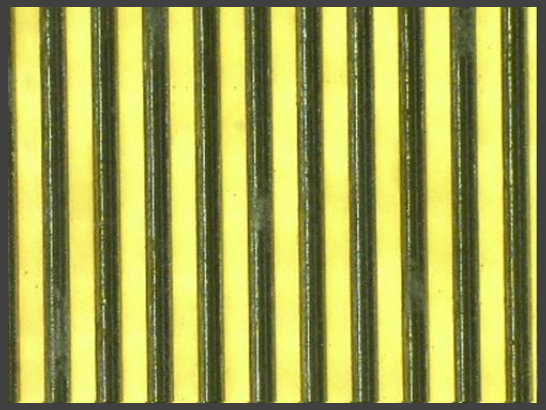
Test condition	
Reference	JIS Z 3197
Environment	85C85%RH
Test time	1000hrs
Applied voltage	DC45V



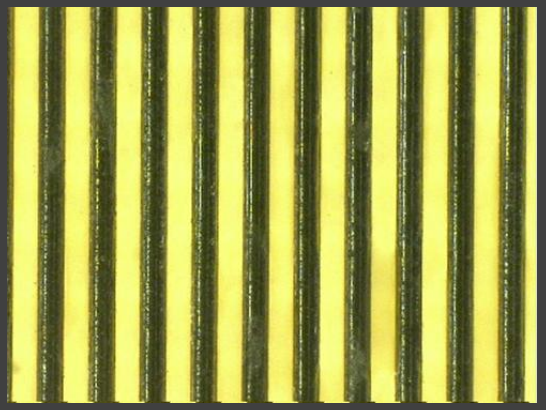
NG sample
(Reference)

Comb pattern status after testing

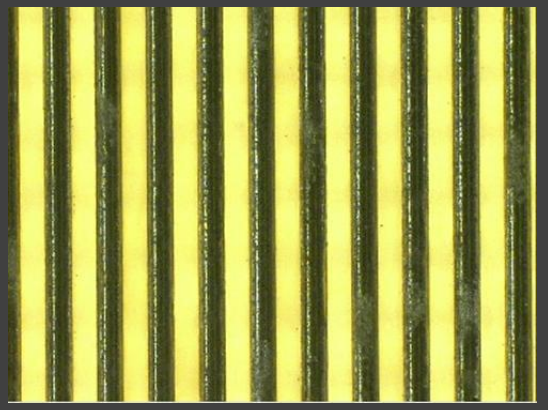
No1



No2



No3



Result: Pass
No generation of migration