

Product or Process Change Notification (PCN)



PCN Form Number:	2016_F	Date:	07.07.2016
Company:	KOA Europe GmbH Kaddenbusch 6 D-25578 Dägeling	Department:	Product Engineering & Quality
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Affected product: KOA's thickfilm smd series RK73.
Size: (1E=0402, 1J=0603, 2A=0805, 2B=1206)

KOA part number: RK73B*, RK73H* and RK73Z*.

Customer part number: Several on request

Description of change: **Add an outsourcing plating company (Japanese manufacturer).**

Reason for the change: To increase the plating process capacity.

Effective Date of the change: Immediately upon customer approval (no later by end of Dec. 2016)

Product identification: By lotnumber.

Quality and reliability: The electrical and mechanical performance will not be affected by this change Please check also attached document:

Add outsourcing to the plating process.pdf

-This is a Computer Generated Document – valid without signature -

Please acknowledge the receipt of this PCN within 30 days.
Lack of acknowledgement of the PCN within 30 days constitutes acceptance of the change.
After acknowledgement, lack of additional response within a 90 days period constitutes acceptance of the change.
(according to JEDEC Standard JESD46-B)

In case of a contract, the above acknowledgement rules are replaced by the contractual agreements.

Add outsourcing to the plating process in KOA China Factory

K O A CORPORATION

Product Engineering

Thick Film Center

SHIMO-INA Business Field

« Target Product »

- Product name :

Thick film chip resistor

RK73 B · H · Z series

1E · 1J · 2A · 2B (1005 ~ 3216 size)

- Target factory: KOA China Factory

KOA ELECTRONICS(TAICANG) CO.,LTD

(Jiangsu Province, China Taicang)

« Reason for Change »

To enhance the production capacity of KOA China factory plating process, we will add the plating outsourcing.

« The contents details »

We add an outsourcing in the electrode plating process in KOA China factory (KOA electronics (Taicang) Co., Ltd.) to build a stable product supply system

【Current】 KOA China Factory only

**【After】 KOA China Factory
+ Outsourcing (Japan-based company)**

Concurrent
production

【3】 Change point ▪ shift point

Confidential

KOA

The subcontractor added in the electrode plating process

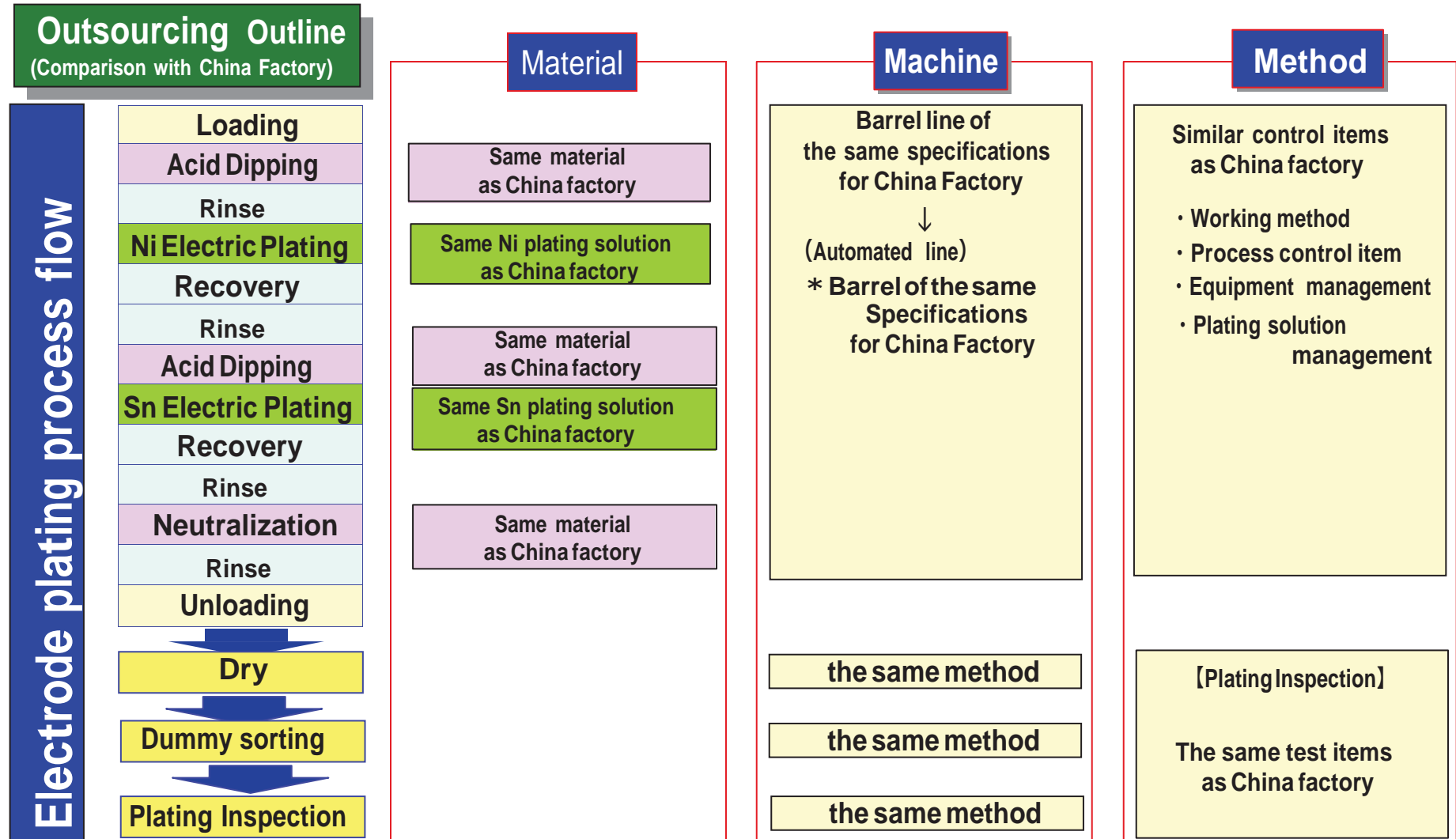
	Change point ・ Shift point
Machinery	It is the equipment and the same mechanism of proven equipment that is being used to KOA of plating process
Material	This is the same material as the plating process of KOA
method	This is the same method and management to KOA of plating process
Man	This is appointed as worker who was specified education and training (ISO 9001 registration factory)
Quality	Reliability test data was not a problem compared to the KOA China Factory
Location	It is located in the close location of the 40km-position to the KOA China Factory (Jiangsu Province Suzhou City)
Building	The building was built in June 2001, there is no problem in infrastructure , etc., even in the context of increased production (KOA China factory, founded in June 2000)
Logistics	We are regularly transported in dedicated vehicles between KOA China factory and Outsourcing

【4】 Confirmation of the change point

Confidential

KOA

The electrode plating of the outsourced factory has been deployed in China factory on the basis of the cultivated plating technology from Japan. There is a processing performance to same degree as KOA for 14 years. In addition, there is already a delivery record of 5 years as outsourcing electrode plating company to customers that have gotten approval.



【5】Confirmation of plating quality ①

Confidential

KOA

1. Plating thickness

In-house

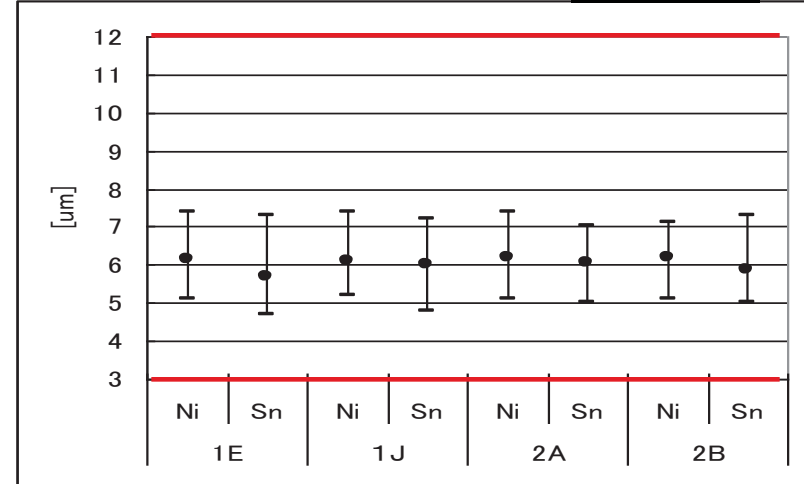
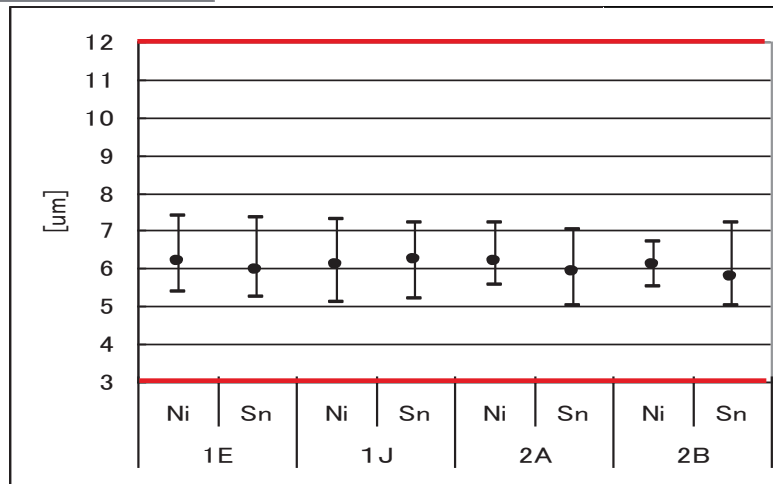
n=20

Standard

Outsourcing

n=20

Standard:
3~12 μm



This is to determine that there is no problem no difference compared to the current

2.Solderability ①

In-house

n=20

Outsourcing

n=20

Standard:
Solder-covered is
that more than 95%

	1E	1J	2A	2B
1	OK	OK	OK	OK
2	OK	OK	OK	OK
3	OK	OK	OK	OK
4	OK	OK	OK	OK
5	OK	OK	OK	OK
6	OK	OK	OK	OK
7	OK	OK	OK	OK
8	OK	OK	OK	OK
9	OK	OK	OK	OK
10	OK	OK	OK	OK
11	OK	OK	OK	OK
12	OK	OK	OK	OK
13	OK	OK	OK	OK
14	OK	OK	OK	OK
15	OK	OK	OK	OK
16	OK	OK	OK	OK
17	OK	OK	OK	OK
18	OK	OK	OK	OK
19	OK	OK	OK	OK
20	OK	OK	OK	OK

	1E	1J	2A	2B
1	OK	OK	OK	OK
2	OK	OK	OK	OK
3	OK	OK	OK	OK
4	OK	OK	OK	OK
5	OK	OK	OK	OK
6	OK	OK	OK	OK
7	OK	OK	OK	OK
8	OK	OK	OK	OK
9	OK	OK	OK	OK
10	OK	OK	OK	OK
11	OK	OK	OK	OK
12	OK	OK	OK	OK
13	OK	OK	OK	OK
14	OK	OK	OK	OK
15	OK	OK	OK	OK
16	OK	OK	OK	OK
17	OK	OK	OK	OK
18	OK	OK	OK	OK
19	OK	OK	OK	OK
20	OK	OK	OK	OK

This is to determine that there is no problem no difference compared to the current

【5】Confirmation of plating quality ②

Confidential

KOA

2. Solderability② (Quick heating method-Judge by zerocross time)

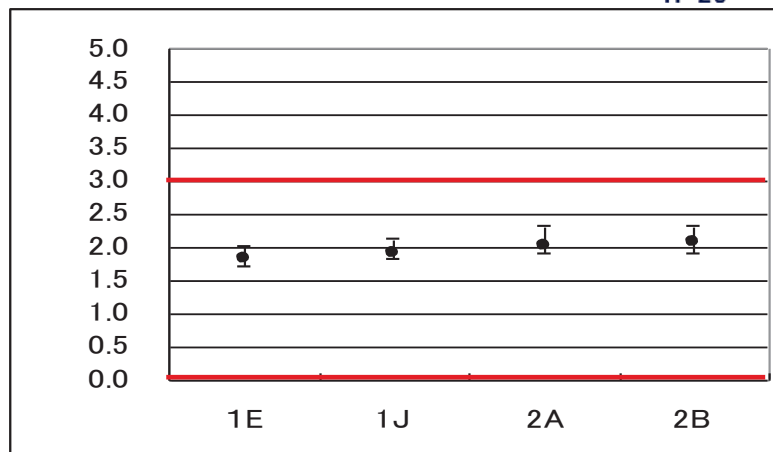
Condition	Methods	quick heating method (Judge by zerocross time)		Judgment	Within 3 seconds
	Test temp.	245℃	Sn - 3 A g - 0. 5 C u		

1.No Pre-treatment

Standard :
within 3sec

In-house

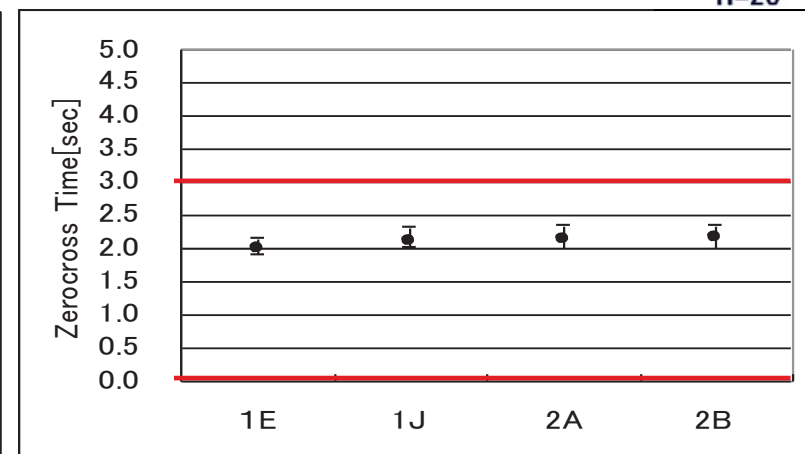
n=20



Standard

Outsourcing

n=20



This is to determine that there is no problem no difference compared to the current

【5】 Confirmation of plating quality ②

Confidential

KOA

2. Solderability② (Quick heating method-Judge by zerocross time)

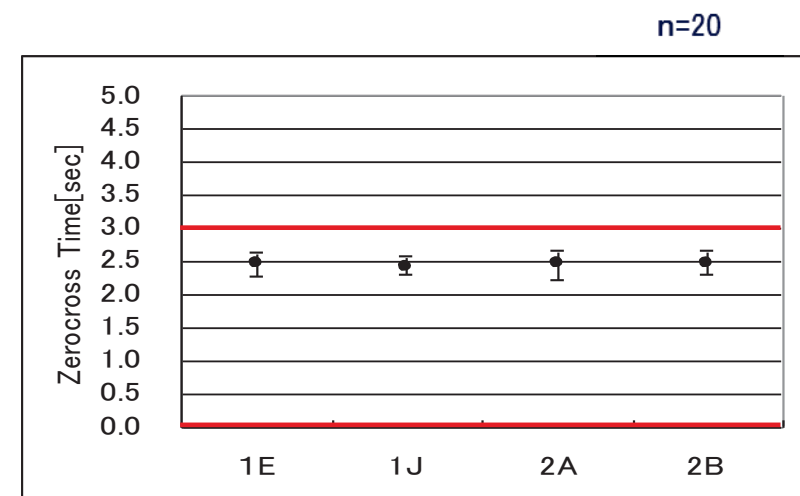
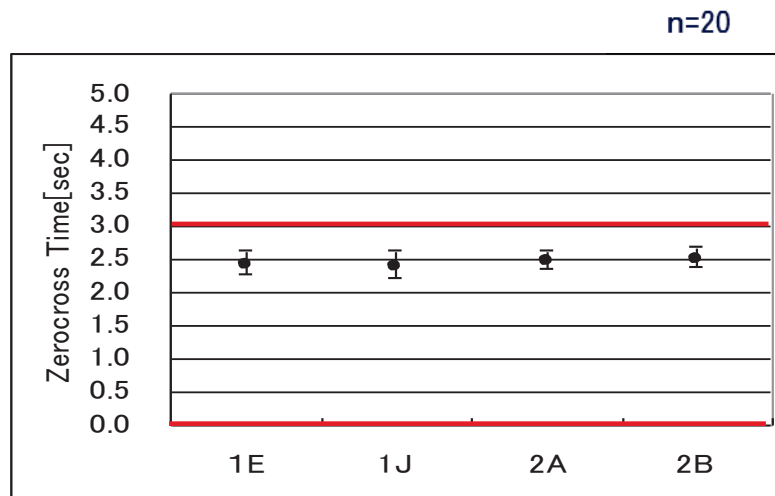
2. Pre-treatment
PCT 121°C 2atm

Standard :
within 3sec

In-house

— Standard

Outsourcing



This is to determine that there is no problem no difference compared to the current

【5】Confirmation of plating quality ③

Confidential

KOA

3. Bending strength

Standard :
within $\pm 1\%$

Bending test	Condition	Bending length	RK73	1E 3 mm		1J · 2A · 2B 5 mm	
		Keeping time			5 sec		
		<div><div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><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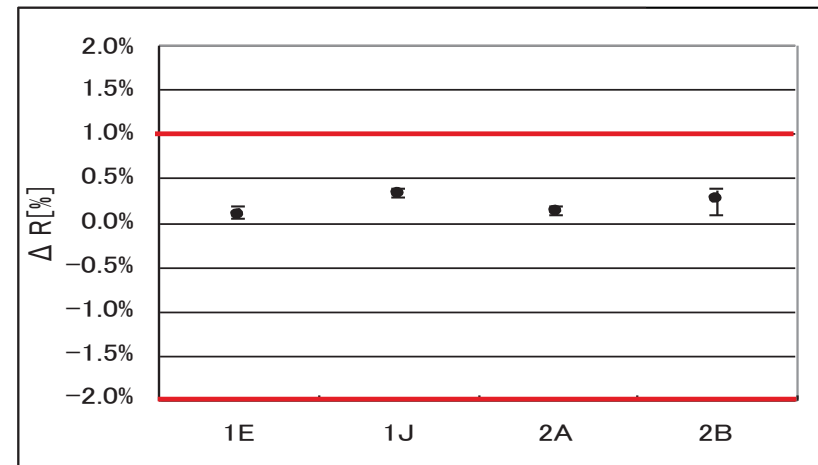
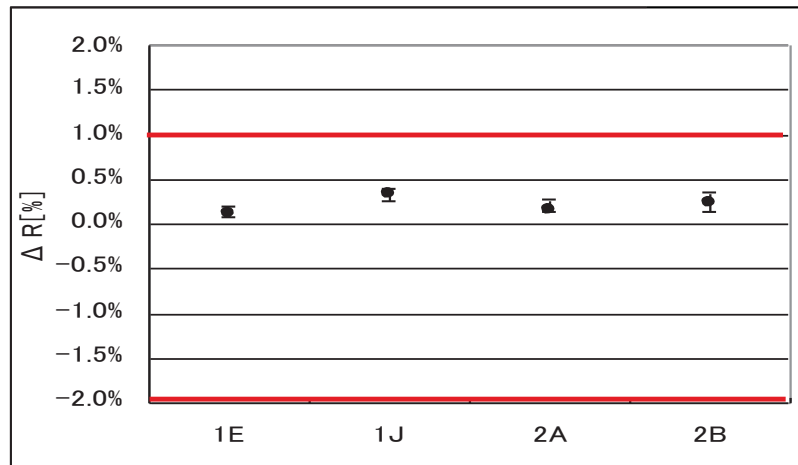
In-house

n=20

Standard

Outsourcing

n=20



This is to determine that there is no problem no difference compared to the current

【5】Confirmation of plating quality ④

Confidential

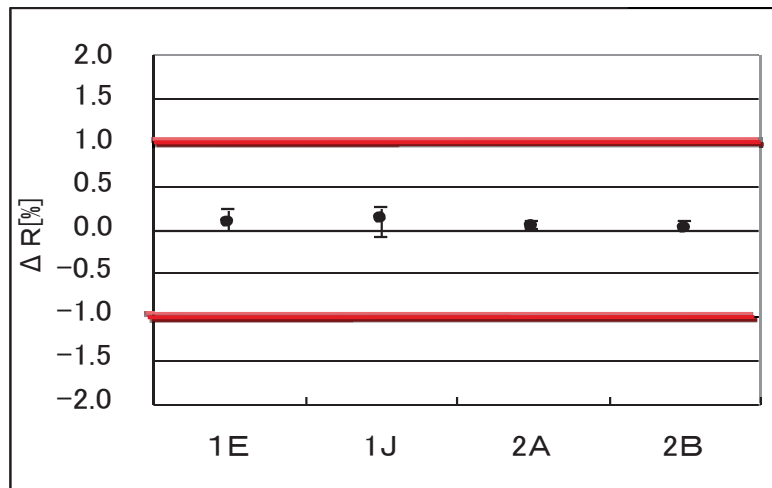
KOA

4.Solder heat

Condition	260°C	10sec
Judgment	$\Delta R \leq \pm 1\%$ ($10R \leq \Delta R \leq 1M$)	

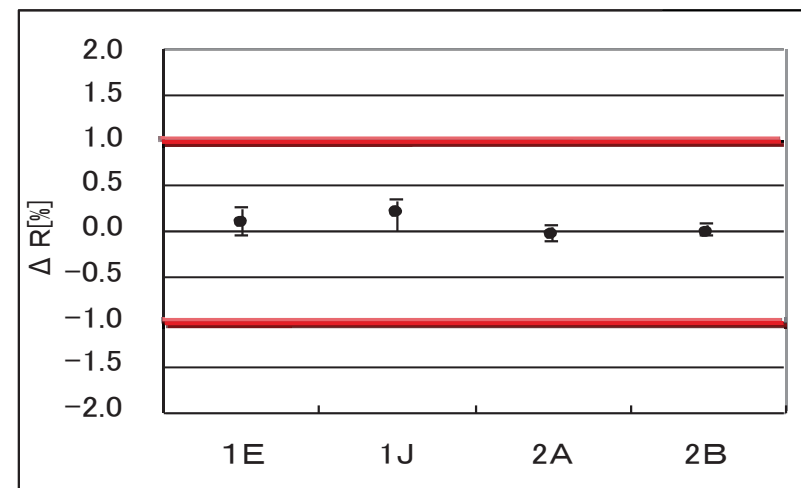
In-house

n=20



Outsourcing

n=20



This is to determine that there is no problem no difference compared to the current

【5】Confirmation of plating quality ⑤

Confidential

KOA

5. Whisker

ITEM	Temperature cycle		High Temperature High Humidity Exposure		Ambient storage	
	Temperature	-40/85°C	Temperature	60°C	Temperature	20~25°C
	Time	20min/20min	Time	87%RH	Time	30~80%RH

Type		500h	1000h	2000cys	4000 c y s	2000cys	4000 c y s
In-house	1 E 1005						
		Max 5.5 um	Max 11.8 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um
Outsourcing	1 E 1005						
		Max 13.9 um	Max 14.4 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um
In-house	1 J 1608						
		Max 2.7 um	Max 7.8 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um
Outsourcing	1 J 1608						
		Max 13.6 um	Max 13.2 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um

【5】Confirmation of plating quality ⑤

Confidential

KOA

ITEM	Temperature cycle		High Temperature High Humidity Exposure		Ambient storage	
	Temperature	-40/85°C	Temperature	60°C	Temperature	20~25°C
	Time	20min/20min	Time	87%RH	Time	30~80%RH

Type		500h	1000h	2000cys	4000 c y s	2000cys	4000 c y s
In-house	2 A 2125						
		Max 4.3 um	Max 4.8 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um
Outsourcing	2 B 3216						
		Max 12.8 um	Max 17.1 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um
In-house	2 B 3216						
		Max 0 um	Max 10.5 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um
Outsourcing	2 B 3216						
		Max 9.3 um	Max 12.4 um	Max 0 um	Max 0 um	Max 0 um	Max 0 um

This is to determine that there is no problem no difference compared to the current