

IK0020(A)/IK0020(B)

A proposal of outdoor display for SMD

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Opto. Team

Improving point

IK0010 has good reliability for indoor SMD application.

However, the adhesive strength with L/F is not enough, it is using under high temperature / high humidity, and delamination with L/F is happened occasionally. New IK0020 is improved color stability under UV and adhesive strength with L/F for outdoor using

- Adhesive strength is improved with L/F
- Color stability is improved under heat and UV

Component

	IK0010	IK0020
Epoxy Type	Cycloaliphatic epoxy 100%	Cycloaliphatic epoxy 100%
Inhibitor	Oxidation A	Oxidation A+B UV
Hardener	MHHPA+HHPA Catalyst A	MHHPA+HHPA Catalyst A Additive

Liquid properties

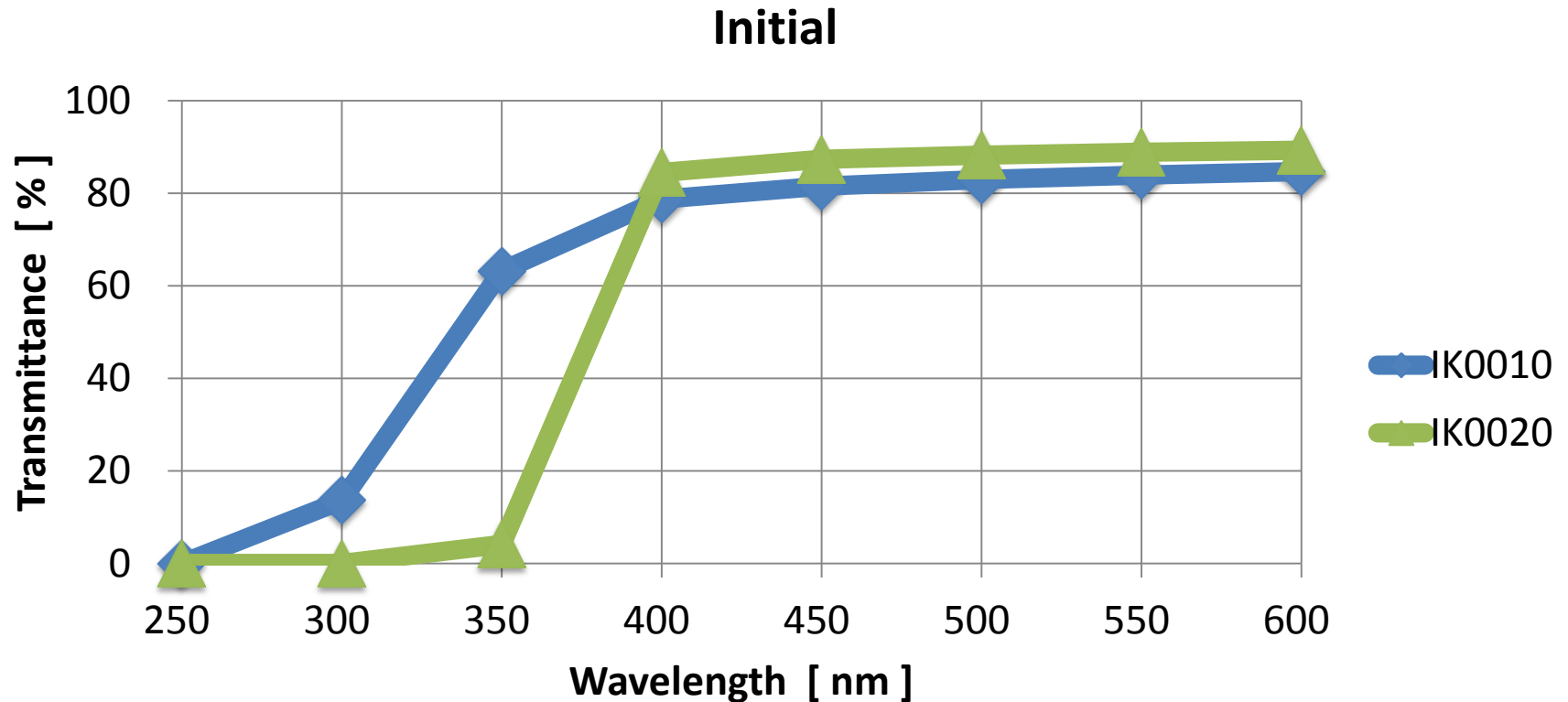
		IK0010		IK0020	
Test item	Unit	IK0010(A)	IK0010(B)	IK0020(A)	IK0020(B)
Color		Light Yellow	Light Yellow	Light Yellow	Light Yellow
Mixing rate		100	125	100	90
Viscosity (25°C)	mPa・s	3,000±1,000	2,500±1,000	2,900	5,700
Mixed viscosity (A:B=100:125)		2,500±500		3,080	
Gel time (121°C)	Min.	5-10		5-10	

physical properties

		IK0010	IK0020
Mixing ratio	A/B	100/125	100/90
Curing condition		135'C/1hr + 150'C/4hrs	135'C/1hr + 150'C/4hrs or 150'C/5hrs
DSC Tg	'C	146.9	142.4
Tg TMA	'C	161.6	167.8
CTE1	ppm/'C	60.3	58.1
CTE2	ppm/'C	171	154
E 30'C	GPa	4.0	3.9
E 200'C	MPa	15.0	24.0

Optical properties transmittance

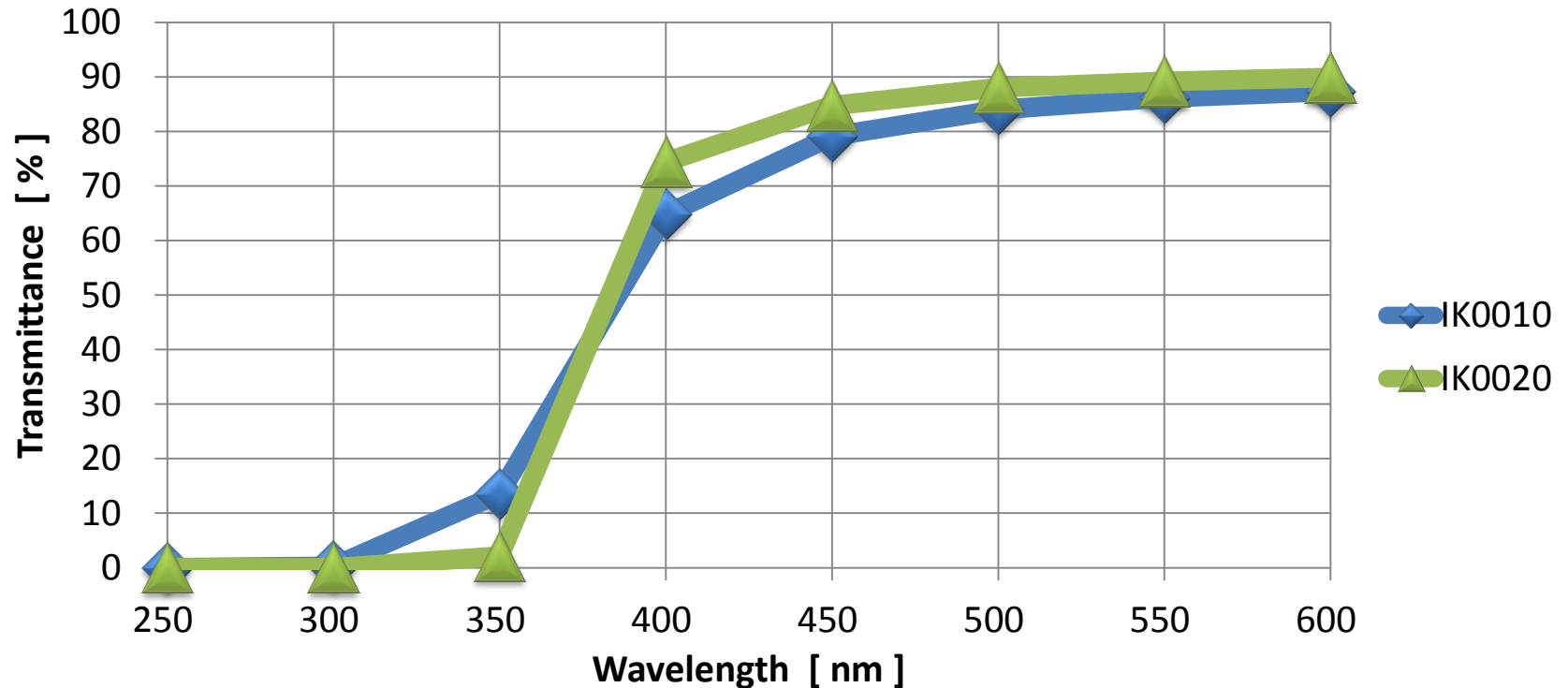
(thickness=3mm)



- Initial transmittance

After heat aging

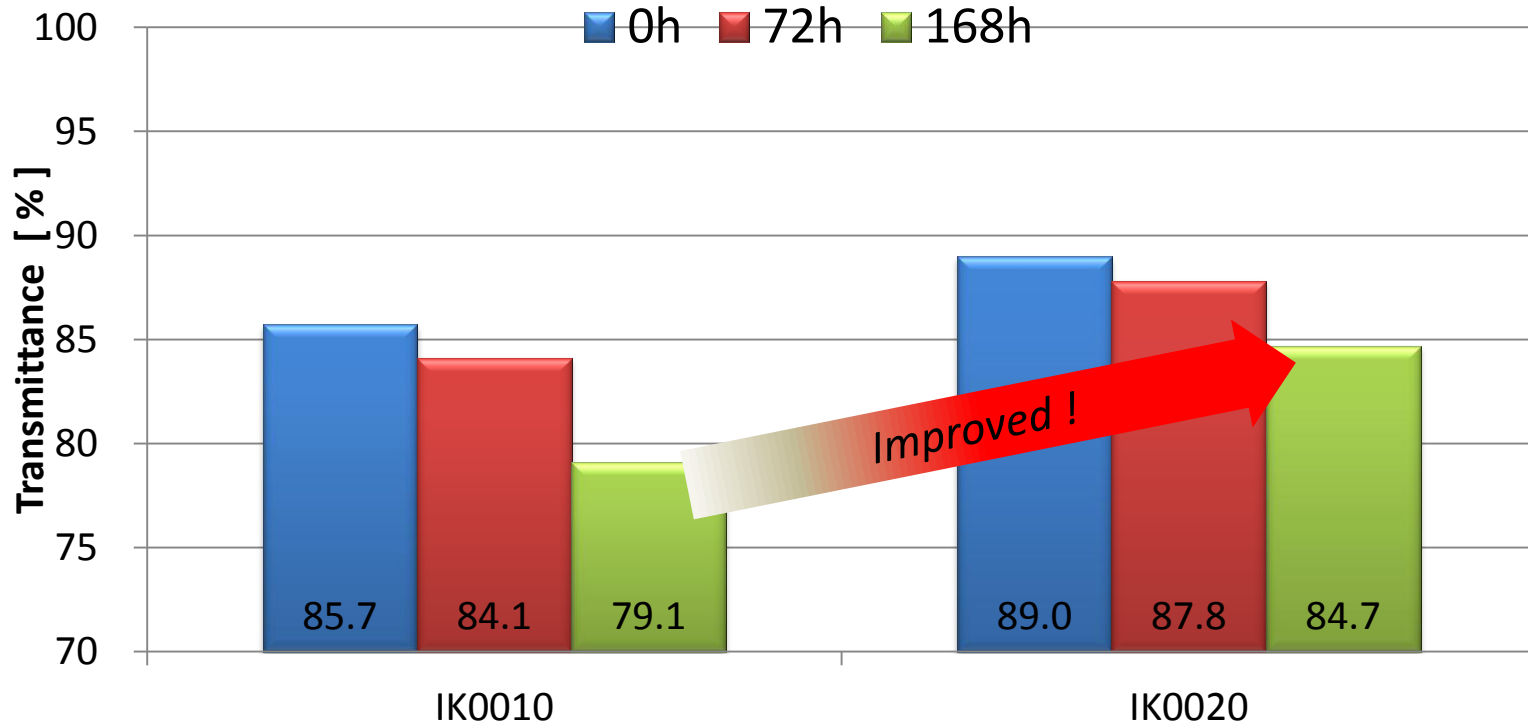
Transmittance after 150°C / 7days



- IK0020 is improved under heat aging

Heat resistivity

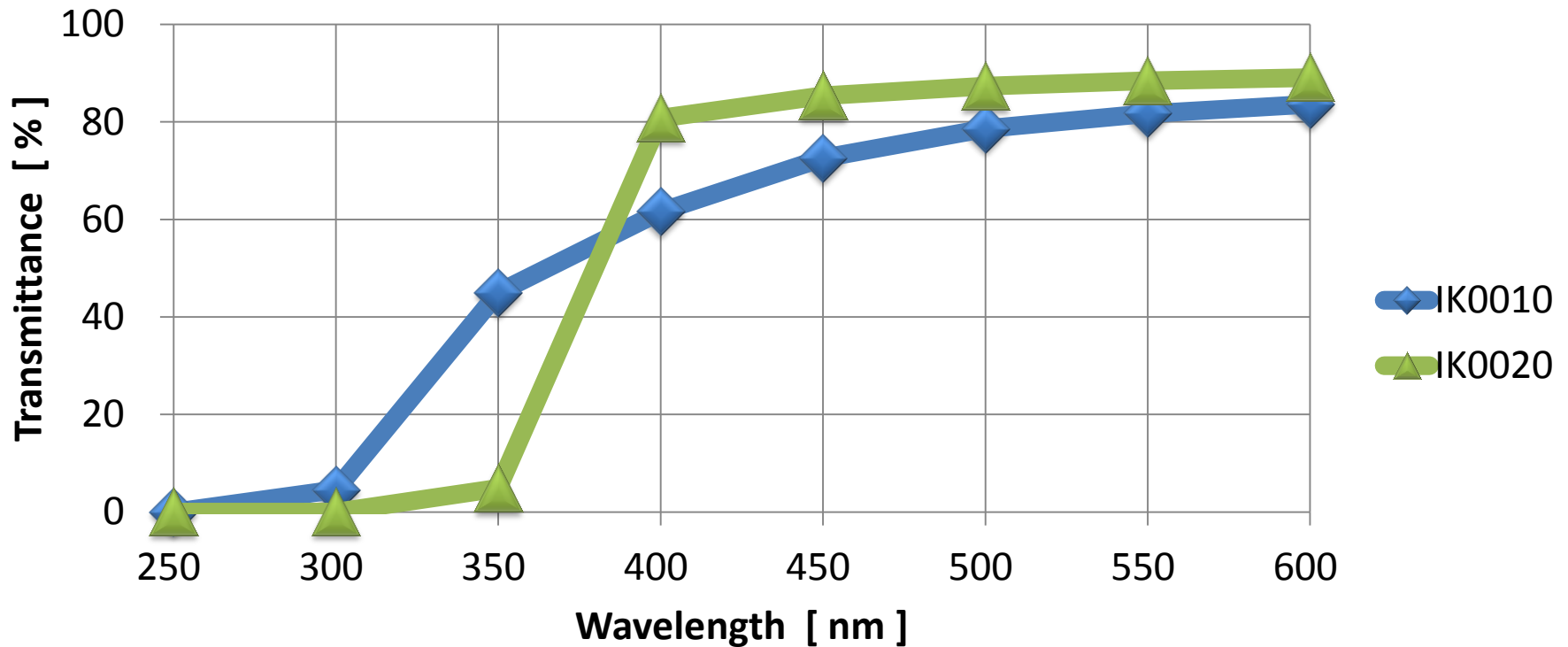
Heat resistivity @ 450nm [Aging:150'C]



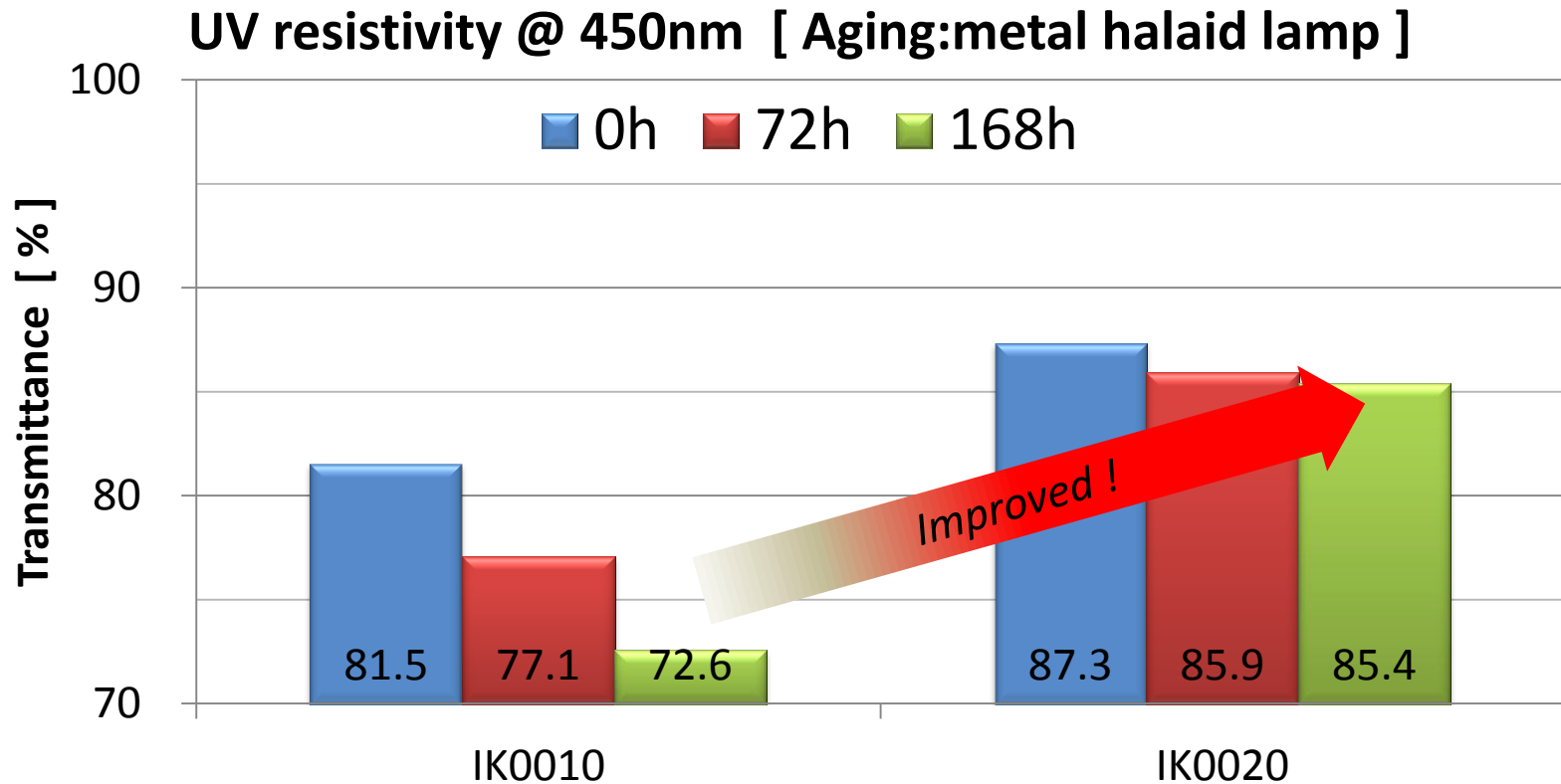
- IK0020 is improved under heat aging

After UV irradiation

Transmittance after metal halide lamp/7days

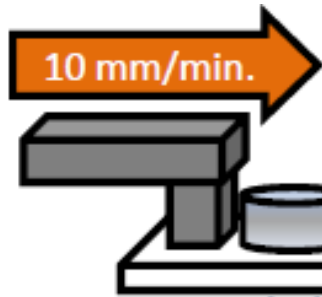


UV resistivity



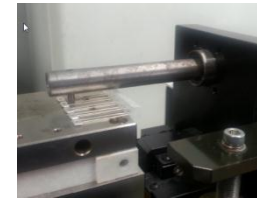
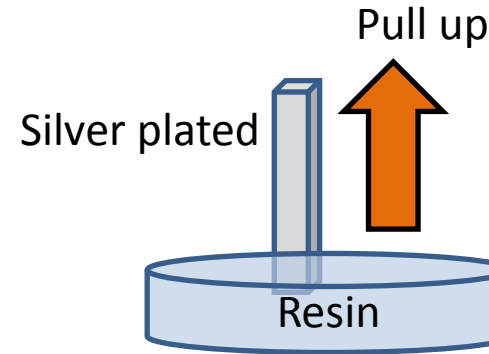
The UV resistance of IK0020 improves

Adhesion strength



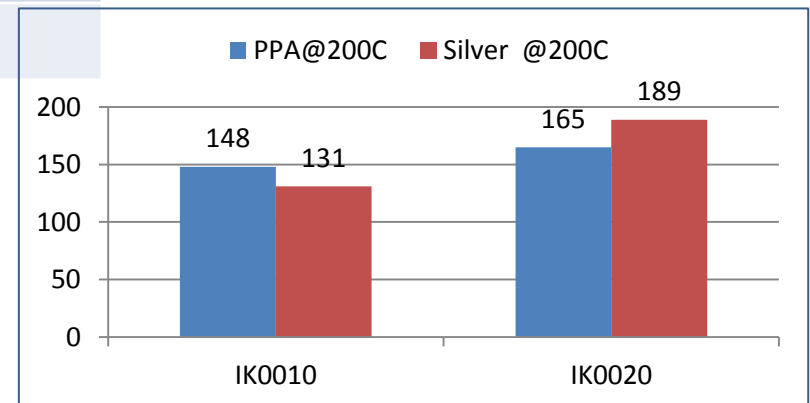
Unit :N/5mmφ

PPA: Amodel A4122NL WH905



Unit :N/12mm²

	PPA@200C Die shear	Silver @200C Pull up
IK0010	148N	131N
IK0020	165N	189N



Sulfuration test

Photos : ↗

Initial Substrate



Blank



Sulfide test conditions : 40°C, 80%RH 100hrs
Concentration of hydrogen sulfide 12.5ppm

EG-6301



SR-7010 ↗



↗

LPS-5547



IK0010 ↗



EG6301 Dow

SR-7010 Dow

LPS-5547 Shinetsu

Methyl silicone

Phenyl Silicone

IK0020 is same as base materials

Package level assessment

PLCC SMD 2528 Amodel WH905 without LED die
IR reflow 260°C x30 sec

After 60°C/60% 73hr

Delamination	IK0010	IK0020
1 pass	0/24	0/24
3 pass	12/24	0/24

PPM of Halogen content

Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>006</u>
Fluorine (F)	mg/kg	50	592
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Thanks