UV Curable Inkjet Marking Ink

IJR-4000 LW100

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TAIYO INK MFG. CO., (KOREA) LTD

Head office & factory : 166, MANHAE-RO, DANWON-GU, ANSAN-CITY, GYEONGGI-DO, KOREA.
TEL +82-31-491- 9250(Ex:426,427) FAX +82-31-492-2710

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1. FEATURES

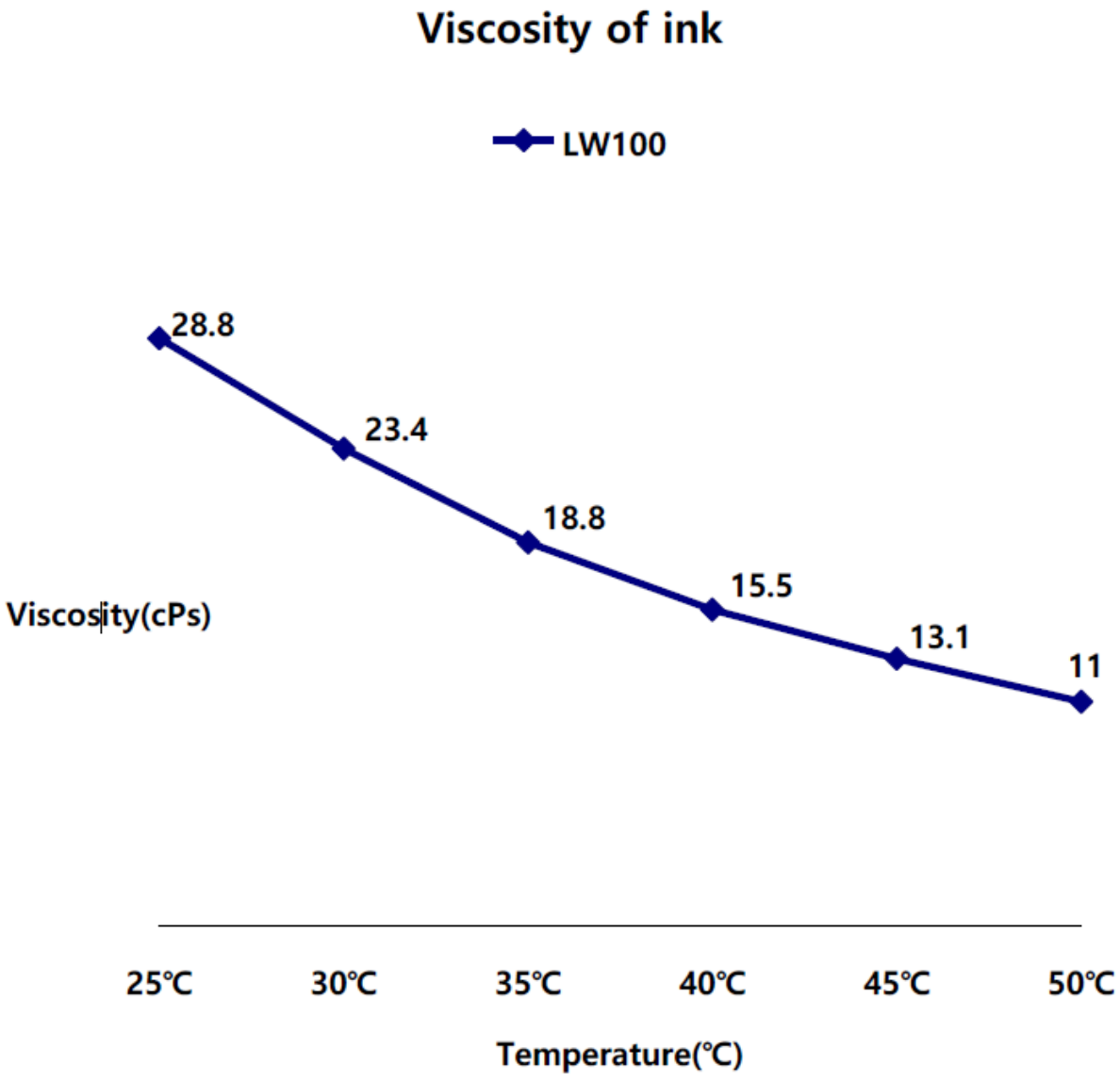
IJR-4000 LW100 is UV LED (380~420nm) curable Inkjet Marking ink on Printed Wiring Boards an application of Piezo drop-on-demand (DOD) print head

- Good settling stability, Jet stability & low nozzle failure.
- Excellent adhesion and Good surface hardness.
- RoHS approved & Low-halogen contents(Halogen-free).

1) Specification

Main Agent	IJR-4000 LW100 (UL 名 : IJR-4000KBQ)
Color	WHITE
Viscosity	<15cps (Cone-plate type Viscometer, 5rpm, 50℃)
Specific Gravity	1. 17
Surface tension	22~25 mN/m at 20~25℃
Shelf- Life	5 month after manufacturing (Keep in dark place at 10~20℃)

* The temperature of ink before printing should be maintained in accordance with the room temperature. (10~20℃).



2) Lot number Sign

Lot No.	2017	02	09	1	01
Explanation	Year	Month	Day	Divide	Number

2. PROCESS

Follow the recommended processes as listed in below. The change of process beyond what is recommended causes deterioration of quality and reliability.

1) Tacky Free Condition

(1) Metal halide lamp & High pressure mercury lamp : 100~200mJ/cm^2

(2) UV LED lamp(380~420nm) : 150 ~200mJ/cm^2(UVA2)

2) Process Flow Chart

We recommend the following (1) or (2).

(1) Development of solder masks → Inkjet printing → Thermosetting (150˚C x 30-60 minutes)

*Progress is possible simultaneously with the thermosetting of the solder mask.

(2) Thermal curing of the solder mask → A process / B process / C process

Step A: Inkjet printing → Thermal curing (150˚C x 30-60 minutes)

Step B: Inkjet printing → UV Bump → thermosetting (150˚C x 30-60 minutes)

Step C: Inkjet printing → thermosetting (150˚C x 30-60 minutes) → UV Bump

*Optional UV Bump1000mJ/cm2 application prior to or after process thermosetting

Remark : Physical properties of the inkjet marking ink after curing may change depending on the kind of solder resist and manufacturing process.

3) Attention On Process

(1) Keep the operation room cleaned. The product must be protected from dust.

(2) The contamination of substrates has an influence on the quality and reliability deterioration.

(3) Keep the operating condition at 20~25℃ / 50~ 60%RH.

(4) Avoid direct UV and sunlight exposure. Use ink under the condition without UV light sources.

(5) Open up the package when it becomes the ambient temperature. Stir well before use.

(6) Use ink without any dilution procedure.

(7) Appropriate coating thickness on the solder resist after curing is 10~15 ㎛. Thicker coating thicknesses give rise to poor adhesion, chemical resistance and pencil hardness.

(8) Curing condition is variable depending on the lamp type, wavelength range and its intensity. Curing condition out of recommendable parameters causes deteriorate the properties of resist coating.

(9) As for cleaning of ink jet head, specified esters can be only used.

(10) Do not use alcohol when cleaning equipment.

3. PROPERTIES

(1) General Properties

Item	Test method	Test standard	Test Result
Pencil Hardness	≥ 4H on the solder resist (ASTM D-3363)	The copper must not be seen	Pass (≥ 4H)
Solder Heat Resistance	Solder float test ; Non-cleaning Flux 260±5℃ / 10 sec , 3cycle (J-STD-003)	No ink peeling	Pass
Adhesion	Cross Cut 10×10 Tape Test	Must remain 100/100	Pass
Appearance /color	Visual Inspection	Identical with past Lot.	Pass
Solvent Resistance	PGM- Ac and IPA, 20℃ / 30 min Tape Test	No peeling by scrubbing	Pass
Acid & Alkaline Resistance	10 Vol.% H_2SO_4 20℃ / 30min 10 Wt.% NaOH 20℃ / 30min Tape Test	No ink peeling	Pass

(2) Reliability

Dielectric Strength	- Raise DC 500V/sec	No change of ink in DC 500V	Pass (1.3KV)
Insulation Resistance	- 1min maintenance in DC100V - 1min maintenance in DC100V, after HASL	More than $5\times10^8\Omega$ More than $5\times10^8\Omega$	- Pass ($4.2\times10^{12}\Omega$) - Pass ($3.6\times10^{11}\Omega$)
Moisture and Insulation Resistance	- 1min maintenance in DC100V, after 50℃×24hr - 1min maintenance in DC100V, after 25℃~65℃ × 85%RH × D.C50volt × 7day (20Cycle)	More than $5\times10^8\Omega$ More than $5\times10^8\Omega$	- Pass ($1.8\times10^{12}\Omega$) - Pass ($4.9\times10^{11}\Omega$)
Electro Migration	- 85℃×90%RH×DC 10V×168 hr - Evaluate by decuple magnifying	More than $2\times10^6\Omega$ No change of appearance	Pass
Hydrolytic Stability	- 97±2℃ 90-98%RH 28days - Macrography and Ink surface rub	External appearance, restless, Crack	Pass
Thermal shock	-65℃15 min to +125℃15 min, Transition should not exceed 2 minutes. 100 cycles	No blistering, crazing, and delamination	Pass
RoHS approved	2005/618/EC(IEC62321 Edition 1.0:2008)		Pass
Halogen-free approved	JPCA-ES01-2003		Pass
Outgassing	ASTM E595 %TML-%WVR(1.40-0.94);<1.0% %CVCM(0.01);<0.10%		0.46% 0.01%

* Note : The above- mentioned test result is based on our test condition.

4. TROUBLE SHOOTING

No.	Problems	Action	Note
1	Spreading of the ink	- Temperature of substrate - Exposure energy - Viscosity of ink - Room Temperature	
2	Poor drawing off	- Examination of the jetting condition - Viscosity & flowing of ink	
3	Pin hole and etc.	- Coating thickness of ink - Temperature on substrate - Development drying and rinsing condition	
4	Poor adhesion	- Coating thickness of ink - Exposure energy - Development drying and rinsing condition	
5	Poor pencil hardness	- Coating thickness of ink - Exposure energy - Development drying and rinsing condition	

* Contact sales department or R&D institute of TAIYO INK MFG. CO., (KOREA) LTD for more information.

5. CAUTION FOR SAFETY

- Before use, read caution for safety and use exactly..
- The Caution for safety is to prevent danger or damage beforehand in using the product.
- Make the workers to know the caution for safety in catalog.

WARNING

* Use a suitable conveyance tool at transfer of heavy thing. When convey by oneself, take right posture. Excessive force may cause injury and lumbago.
* When use, put protection mask, goggle and protection gloves etc. Injury can happen by inhalation and contact in a long or short time.
* Install local exhauster in operation room. While using, the case which long time or excess amount will inhale the fume it is nauseous, vomit, dizzy and the internal organs damage etc. will be able to occur.
* After using, annul the empty receptacle without another application.
* Dispose of the waste according to related law. It can cause serious environmental pollution that incinerate or abandon the waste in land and water.

CAUTION AT USE

* Do not use the product when it is expired.

  Once the expiration date is past, it should be exchanged with a new one; otherwise pigments of this ink settle to the bottom faster and it becomes sticky and hard. The sedimentation and agglomeration can cause major systemic problems.
* Avoid direct sunlight, fire, and any other heat sources.

  This product is very sensitive to light.

  Even short exposure to light can adversely affect the proper functioning of this ink.

  Keep this product in dark. Do not store in refrigerator.
* Necessarily, keep the optimum temperature(10~20℃). Use the inks 1day after leaving alone at recommendation temperature to intercept the inflow of water and make the state stable.

* Reactive metals which can promote free radical reactions, such as unlined carbon steel, copper alloys, brass and bronze should not be used as materials of construction in direct contact with acrylates.
* As for cleaning of ink jet head, specified cleaners can be only used.
*Do not use alcohol when cleaning equipment.

Misapplication different from above contents results in quality deterioration