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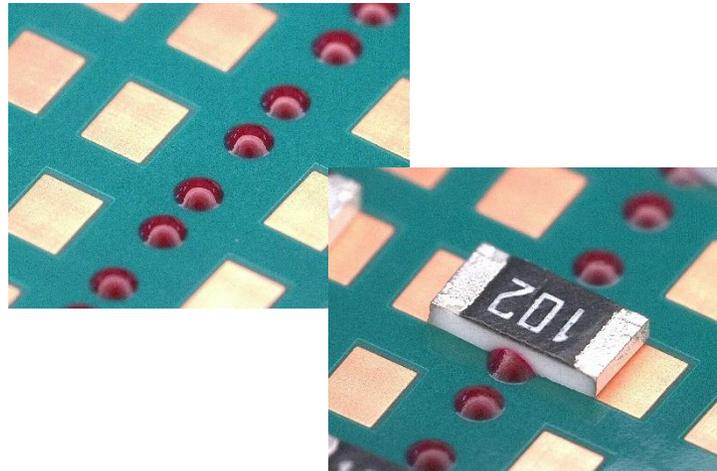
Handling Guide

Surface Mount Adhesive

Surface Mount Adhesive for Printing

JU-50P

Product Information



Disclaimer:

This Product Information contains product performance assessed strictly according to our own test procedures and is not the guaranteed results at end-users. Please conduct thorough process optimization before mass production application.



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- Printing application adhesive to hold down surface mount devices prior to soldering
- Stable print shape during continuous use
- Fine pattern printing available
- Post curing adhesive ensures high electrical reliabilities
- Superior heat slump resistance allows it to retain its height during the curing process



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Properties – Before Curing

Purpose		Printing Application
Product Name		JU-50P
Property	Condition / Note / [unit]	Performance
Before Curing	Composition	—
	Appearance/ Color	Visual observation
	Specific Gravity	25°C, pycnometer
	Viscosity	Malcom PCU-205, 25 °C 10rpm [Pa·s]
	Non-volatile Content	105 °C, 180 minutes [%]
	Shelf Life	Refrigerated (10 °C)
		25 °C
	Copper Plate Corrosion	40 °C, 95%RH, after 240 hours
		Epoxy resin
		Paste, red
		1.51
		150±25
		>99.0
		6 months
		1 month
		No anomalies

Above results are measured performances in a lab setting and are not guaranteed performance.



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Properties – After Curing

Purpose		Printing Application	
Product Name		JU-50P	
Property	Condition/ Note/ [unit]	Performance	
After curing	Appearance/ Color	Visual observation	Solid, reddish brown
	Copper Plate Corrosion	40 °C,90%RH, after 240 hours* ¹	No anomalies
	Solder Resistance	Solder bath: SAC305, 250 °C X10sec./ 3216R* ¹	No anomalies
	Solvent Resistance	Soak in solvents (IPA, acetone) for 1 hour / 3216R* ¹	No anomalies
	Surface Insulation Resistance	Initial (out of chamber), [Ω], JIS Z 3197 comb-pattern PCB, 200μm flat application* ²	>1.0X10 ¹⁴
		85 °C, 85%RH, after 168 hours, in chamber* ² [Ω]	>1.0X10 ⁹
		85 °C, 85%RH,after 168 hours, out of chamber* ² [Ω]	>1.0X10 ¹³
	Moisture Absorption	1 hours, in accordance with JIS K 6911 [%]* ³	<1.0
	Grass Transition Temperature	DSC,10 °C /min, room temp. ~200°C, 2nd run [°C]	97

Above results are measured performance in a lab setting and are not guaranteed performance. Test samples are cured under following condition depending on the amount of application for the respective test.

*1: 130 °C X90sec., *2 130 °C X10min., *3 130 °C X60min.



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Properties – After Curing

Purpose		Printing Application
Product Name		JU-50P
Property	Condition/ Note/ [unit]	Performance
After curing	Coefficient of Linear Expansion	$\alpha_L 2.89 \times 10^{-5}$
		$\alpha_H 1.18 \times 10^{-4}$
	Permittivity	1MHz,23°C ^{*4} 3.53
	Loss Tangent	1MHz,23°C ^{*4} 0.011
	Young's Modulus	JIS K 7161-1,23°C,MPa ^{*4} 8246
	Poisson's Ratio	JIS K 7161-1,23°C ^{*4} 0.336

Above results are measured performance in a lab setting and are not guaranteed performance. Test samples are cured under following condition depending on the amount of application for the respective test.

*4: 60 °C X60min. >> 80 °C X30min. >> 100 °C X60min. >> 130°CX10min.



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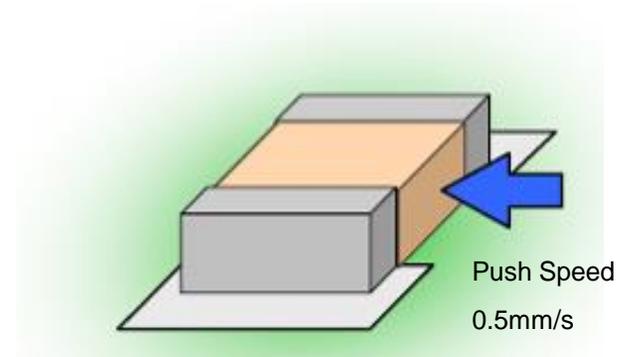
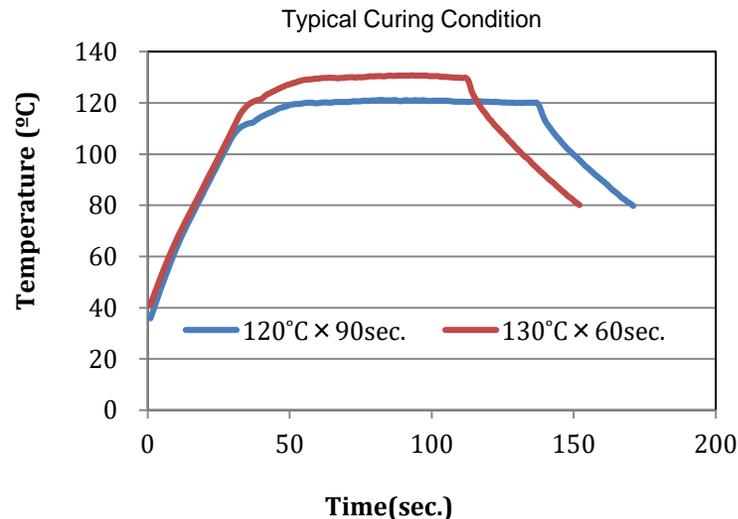
Curing Condition/ Strength

< Test Method >

Print the adhesive on a glass-epoxy PCB using a 150 μ m thick stencil with 0.8mm Φ aperture. Mount 3216 chip resistors and cure the adhesive. Let the board cool down to room temperature and measure the adhesion strength using a bond tester.

< Test Condition and Equipment >

Test Equipment: Multi-purpose bond tester 4000Plus (Nordson DAGE)
 Test Condition: Push strength test, push speed 0.5mm/ sec., room temperature
 PCB: FR-4 grade glass-epoxy PCB
 Heat Source: Reflow simulator, SMT SCOPE SK-5000 (Sanyo-Seiko)
 Sample Size: 32 chips per curing condition



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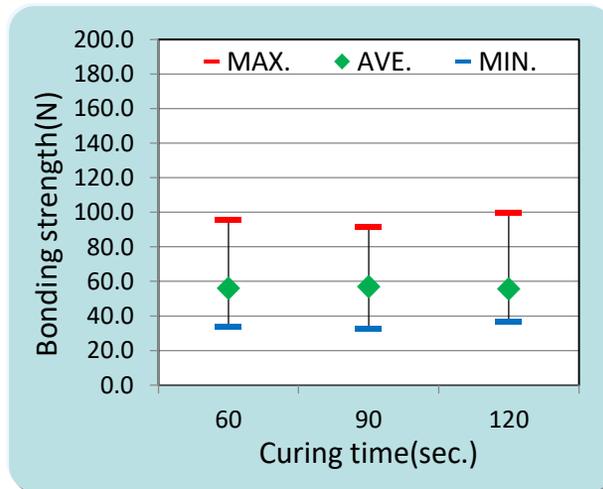
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Curing Condition/ Strength

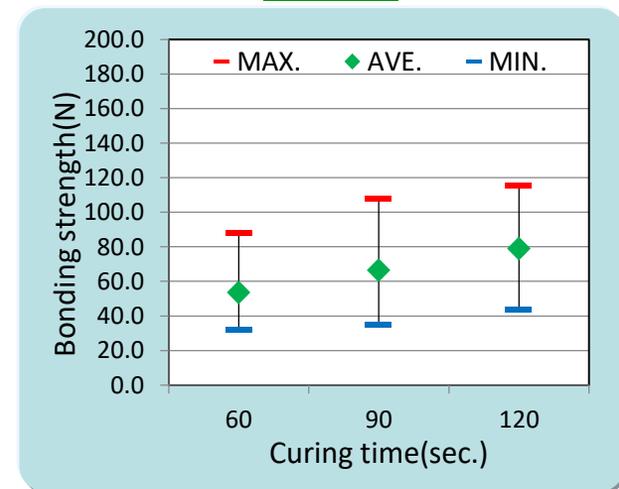
Curing Temp. (°C)		120			130		
Curing Time (sec.)		60	90	120	60	90	120
Bond Strength (N)	Ave.	56.0	57.0	55.6	53.5	66.5	79.0
	Max.	95.7	91.5	99.8	88.0	107.9	115.4
	Min.	33.9	32.6	36.9	32.3	34.7	43.5

[Unit: N]

120 °C



130 °C



Recommended curing condition is 120 °C for 90 seconds or longer and 130 °C for 60 seconds or longer.



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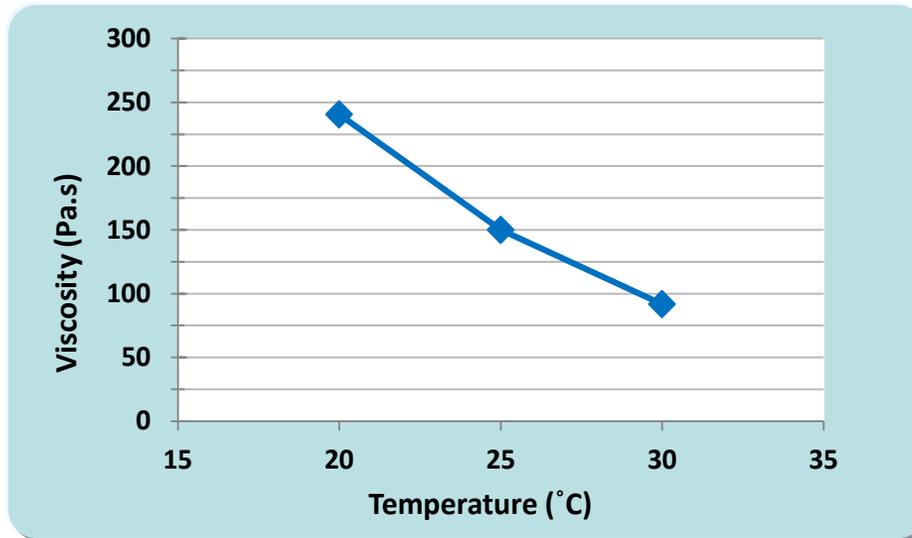
<Test Method>

Measure the viscosity at each test condition.

<Condition>

Equipment: PCU-205 (Malcom)

Test Condition: 10rpm



<Viscometer Malcom PCU-205>



Temp. (°C)	Viscosity (Pa.s)
20	240.5
25	150.0
30	91.7

When temperature is increased, viscosity of JU-50P will be reduced.



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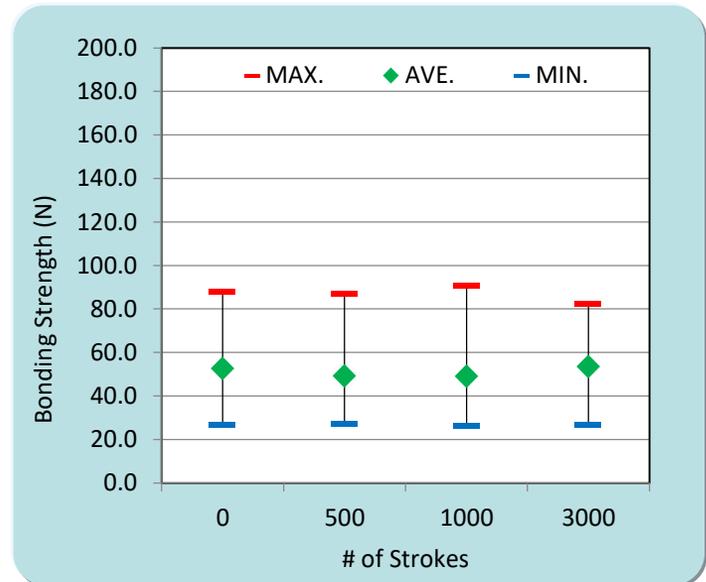
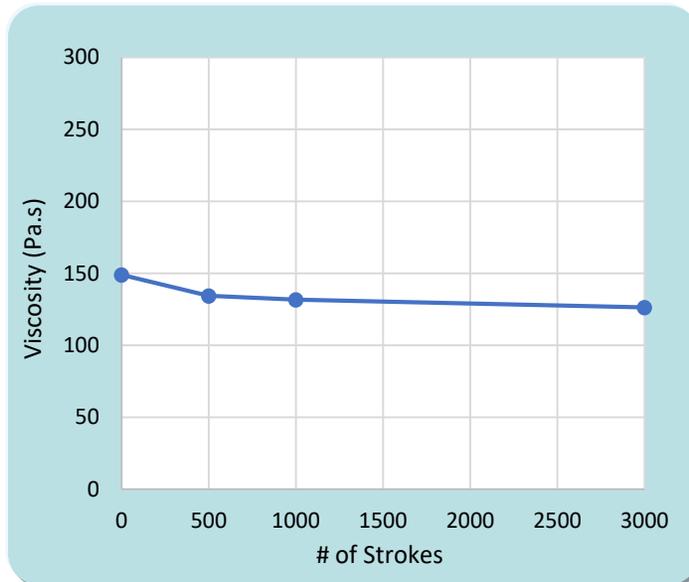
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Viscosity Stability

Test condition

Print (knead) Adhesive on the sealed-up stencil continually up for 24 hours to observe viscosity variation.

- | | | | |
|--------------------------|--------------------------|----------------------|---------------------------------|
| • Squeegee : | Metal blade, Angle - 60° | • Viscosity : | PCU-205, Malcom 10rpm, 25°C |
| • Squeegee speed : | 30mm/sec. | • Bonding Strength : | See "Cure condition / Strength" |
| • Print stroke : | 300mm | • Curing : | 130°C x 90sec. |
| • Printing environment : | 21.0~25.0°C | | |



JU-50P retains consistent rheology during continual printing and ensures stable print quality.

Also, no degradation in bonding strength shall occur due to the continual rolling on the stencil.



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Printability

<Test Method>

According to recommended print conditions, perform print test and determine threshold value to each stencil thickness.

<Test Conditions>

Substrate:	Glass epoxy FR-4
Stencil:	t=150, 200, 250 μ m, Laser cut
Squeegee:	Metal blade, Angle- 55°
Print speed:	20mm/sec.
Print pressure:	50N
Stencil separation speed :	1mm/sec.
Atmosphere:	23.0~25.0°C (40~60%RH)



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Printability (Circles)

	Typical failure	Φ0.5mm	Φ0.6mm	Φ0.8mm	Φ1.0mm	Min. dia.
t=0.15mm		OK	OK	OK	OK	Φ0.5 mm
t=0.20mm		NG Insufficient	OK	OK	OK	Φ0.6 mm
t=0.25mm		NG Insufficient	NG Insufficient	NG Insufficient	OK	Φ1.0 mm
t=0.25mm (dual print)		NG Insufficient	NG Insufficient	OK	OK	Φ0.8 mm



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Printability (Lines)

	Typical failure	0.3mm × 0.15mm	0.4mm × 0.15mm	0.5mm × 0.2mm	Min. aperture
t=0.15mm		OK	OK	OK	0.3mm × 0.15mm
t=0.20mm		NG  Insufficient	OK	OK	0.4mm × 0.15mm
t=0.25mm		NG  Insufficient	NG  Insufficient	OK	0.5mm × 0.2mm
t=0.25mm (dual print)		NG  Insufficient	NG  Insufficient	OK	0.5mm × 0.2mm



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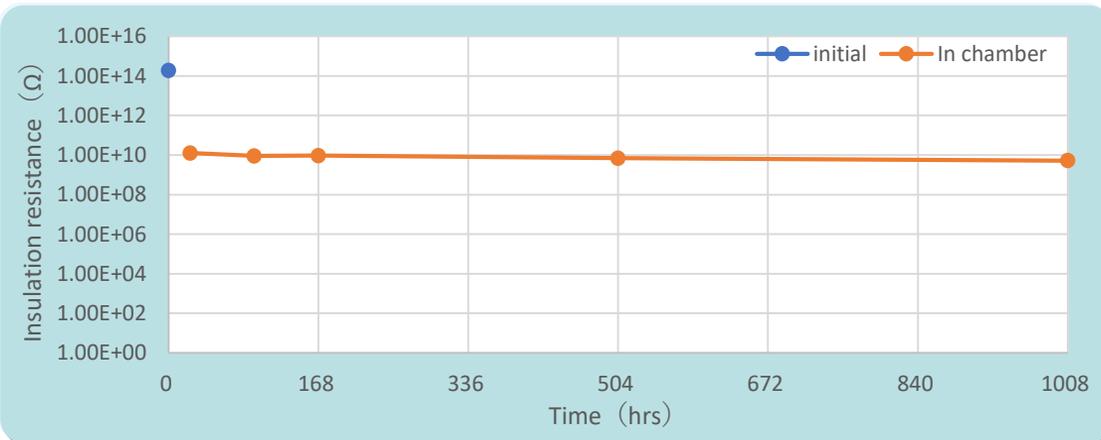
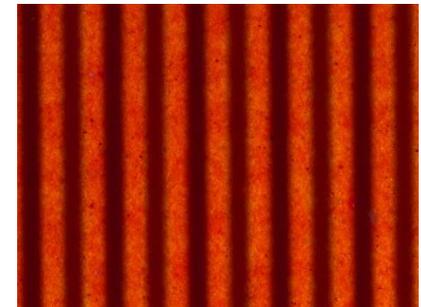
<Test Method>

Measure the surface insulation resistance in a consistent temperature/ humidity chamber while applying bias voltage.

<Test Condition>

Test PCB: Comb-pattern board defined by JIS Z 3197
 Application: Print with squeegee covering the comb patterns
 Thickness: 200 μ m
 Curing Condition: 130 $^{\circ}$ C x 10minutes
 Test duration: 1008hrs
 Bias voltage: 50V
 Measurement voltage: 100V
 Chamber condition: 85 $^{\circ}$ C/ 85%RH

Observation between tracks of comb pattern after test



JU-50P showed good surface insulation resistance.



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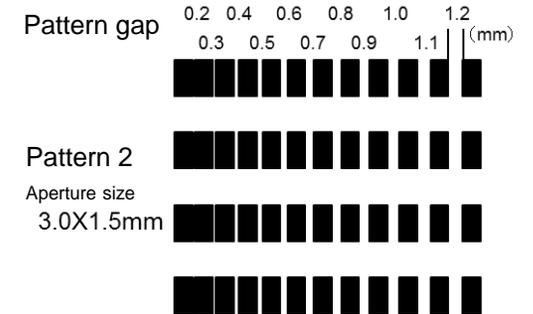
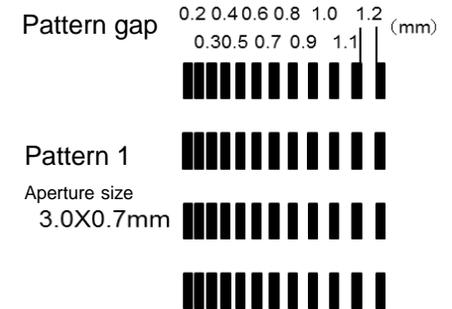
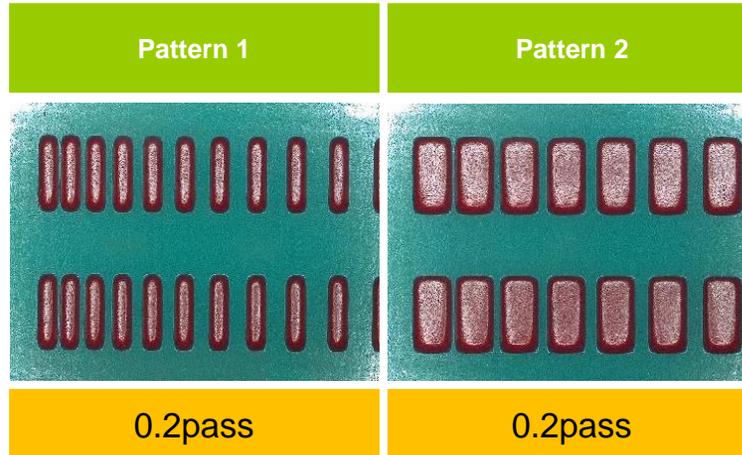
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Heat Slump Property

<Test Conditions>

Substrate: Glass epoxy FR-4
 Stencil: t=200 μm, Laser cut
 Apertures: See right
 Curing : 130 °C x 10 min.



JU-50P showed almost no heat slump during the curing process..



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1. Recommended Printing Conditions

(1) Squeegee

- | | |
|-------------------|----------------------------------|
| 1. Kind | : Flat |
| 2. Material | : metal, urethane, plastic blade |
| 3. Pressure | : Lowest |
| 4. Squeegee speed | : 10~20mm/sec. |

(2) Stencil

- | | |
|----------------------|---|
| 1. Thickness | : 150~250 μ m See "Printability" |
| 2. Separation speed | : 0.5~10mm/sec. |
| 3. Snap-off distance | : <0mm |
| 4. Stencil Cleaning | : Acetone is recommended especially for micro-pattern apertures. IPA may also be used.
Water-based cleaners are typically not recommended due to relatively weak cleaning power. |

(3) Ambiance

- | | |
|----------------|------------|
| 1. Temperature | : 22~27°C |
| 2. Humidity | : 40~60%RH |



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2. Recommended curing condition:

- (1) 120°C x ≥ 90sec.
- (2) 130°C x ≥ 60sec.

3. Shelf life

- (1) 0~10°C: 6 months from manufacturing date
- (2) 25°C: 1 month from manufacturing date

4. Caution

- (1) This product shall be refrigerated (0~10°C)
- (2) Bring back to room temperature before placing in the printer.
Rapidly heating the product in the container will cause the adhesive to expand and cause unstable performance.
- (3) Once the material is worked on the stencil, the leftover should be kept in a separate container.
- (4) Refer to the product's SDS for other guidance.

* How to interpret lot number

ex. Lot No. 0 03 20 1

- Batch number: 1st batch
- Production date: 20th
- Production month: April
- Production year: 2020

Recommended Curing Profile:
Lower limit of curing temperature and time

