

Senju Metal Industry Co.,LTD.

**ECO SOLDER®**

Pb-Free Solder Paste

**M705-LFAC19**



Manufacturer

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Senju Metal Industry Co.,Ltd.

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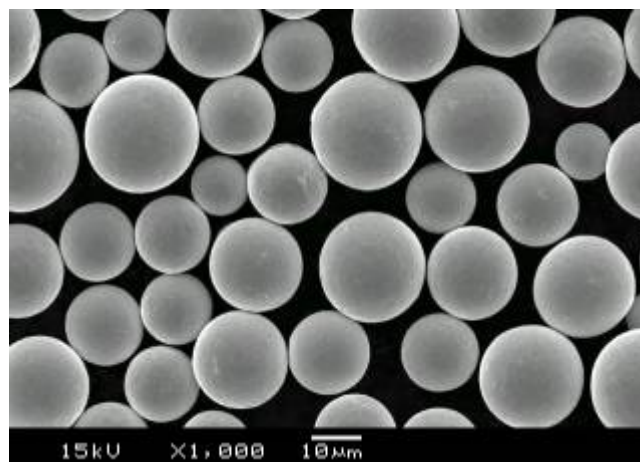
## ECO SOLDER PASTE M705 – LFAC19

M705-LFAC19 is a lead free pastes developed for the jet system. This pastes to be able to adjust the viscosity property to adjust to a special usage and to do a stable supply. This pastes uses of Type5 powder ,but good wetting for hot air reflow oven. Moreover, it is possible to get wet enough even if shifting from the pcb pad. And, the soldering ball is not generated either.

### A characteristic of M705 alloy

		M705	63Sn-Pb
Alloy Composition(%)		Ag3.0-Cu0.5-SnBal	Sn63-PbBal
Specific gravity		7.4	8.4
Melting temperature (C)	Solidus	217	183
	Peak	219	
	Liquidus	220	
Tensile strength (Mpa)		53.3	56.0
Elongation(%)		46	59
Young's module (GPa)		41.6	26.3
0.2% Yield point (MPa)		39.4	45.8
CTE (ppm/C)		21.7	23.5
Vickers Hardness (Hv)		17.9	16.6

### SEM Photo of Solder powder



This powder is a globular form, and has very little surface oxidization. Such is the case with all ECO-solder paste products from Senju Metals. This picture shows type-5(15-25um) as a reference

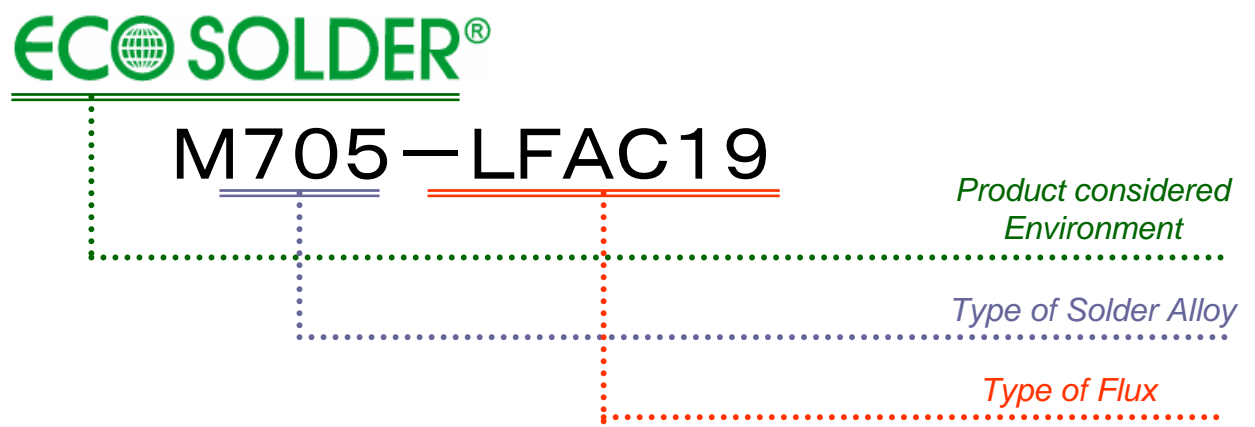
M705-LFAC19 characteristics

Items	M705-LFAC19	Test method /Remarks
<b>Solder Powder</b>		
Alloy Composition	Ag3.0-Cu0.5-Sn:Balance	---
Melting Temperature	Solidus: 217 °C Peak: 219 °C Liquidus: 220 °C	DSC
Powder Shape	Spherical	SEM
Powder size/distribution	15 ~ 25um (Standard)	SEM & Laser method
<b>FLUX</b>		
Type	RO	J-STD-004
Activity	L1	J-STD-004
Halogen	0.01%under/Flux	Titration method
Surface Insulation Resistance (40C90%RH,168hr)	Over 1.0E+12	JIS Z 3284
Electro-migration Resistance (85C85%RH Bias DC45V, 1000hr)	Over 1.0E+9 No visible migration	JIS Z 3284
Copper mirror test	PASS	JIS Z 3197
Fluoride Test	PASS	JIS Z 3197
<b>Solder Paste</b>		
Viscosity	100Pa.s	JIS Z 3284
Thixotropic Index	0.7	JIS Z 3284
Flux Content	14.0%	JIS Z 3197
Slump in Heat	0. 7mm Max.	JIS Z 3284
Tackiness	1.0N	JIS Z 3284
Tackiness time	Over 24h/1.0N	JIS Z 3284
Copper plate corrosion test	PASS	JIS Z 3197
Validity (unopened, keep in cool:0 ~ 10C)	<b>6 months</b>	---

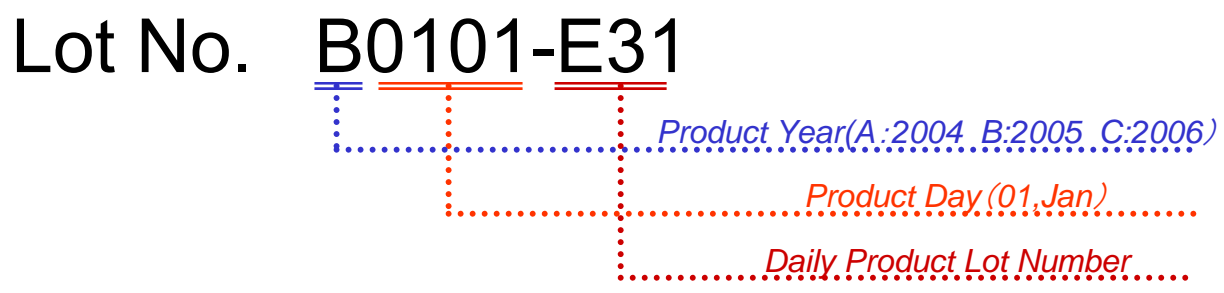
\*\* number of this table is for reference

About M705-LFAC19

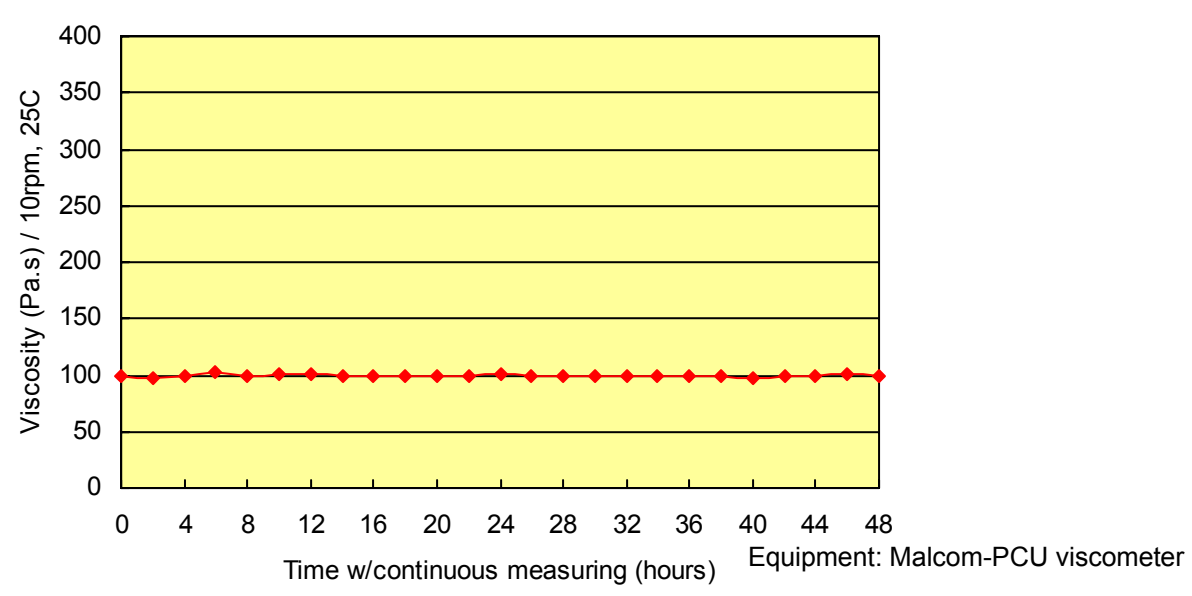
Name of product



Lot No.

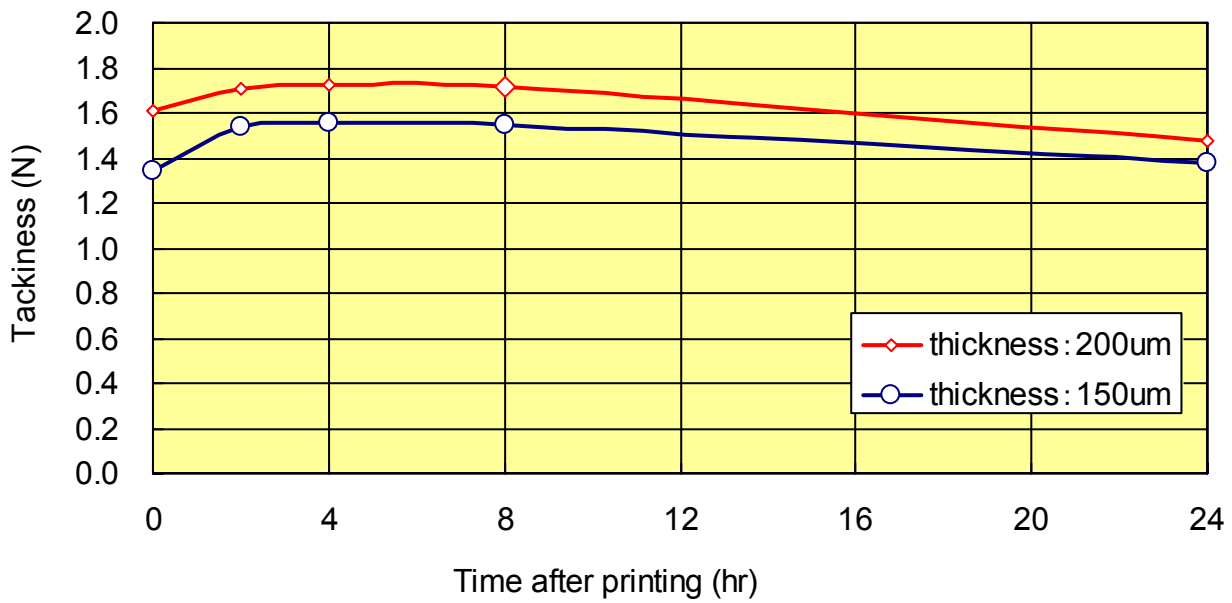


M705-LFAC19 stability of viscosity



This product has little change from the first stage, and its printing characteristics are stable over a long period of time.

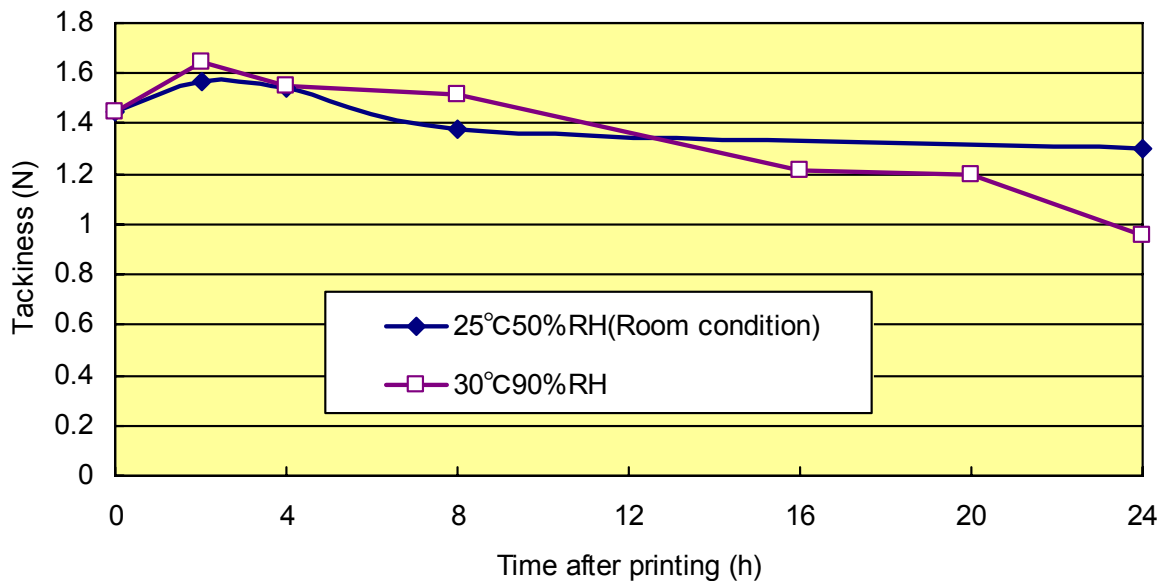
*M705-LFAC19 Tackiness and Tackiness time*



*Tackiness and Tackiness time*  
**M705-LFAC19**  
 Test conditions:  
 Equipment: Rhesca, Tackiness tester  
 Immersion speed: 2.0mm/s      Press time: 0.2s  
 Press load: 0.49N                      Test speed: 10.0mm/s  
 Environment: 25°C50%RH

Paste tackiness and tack time are important characteristics influencing the component loading in high-speed placement (PCB) type of equipment. Tackiness time especially affects the defect rate (missing component, tombstone etc.) after pausing for machine maintenance. LFAC19 has higher initial tackiness and longer tackiness over time after printing.

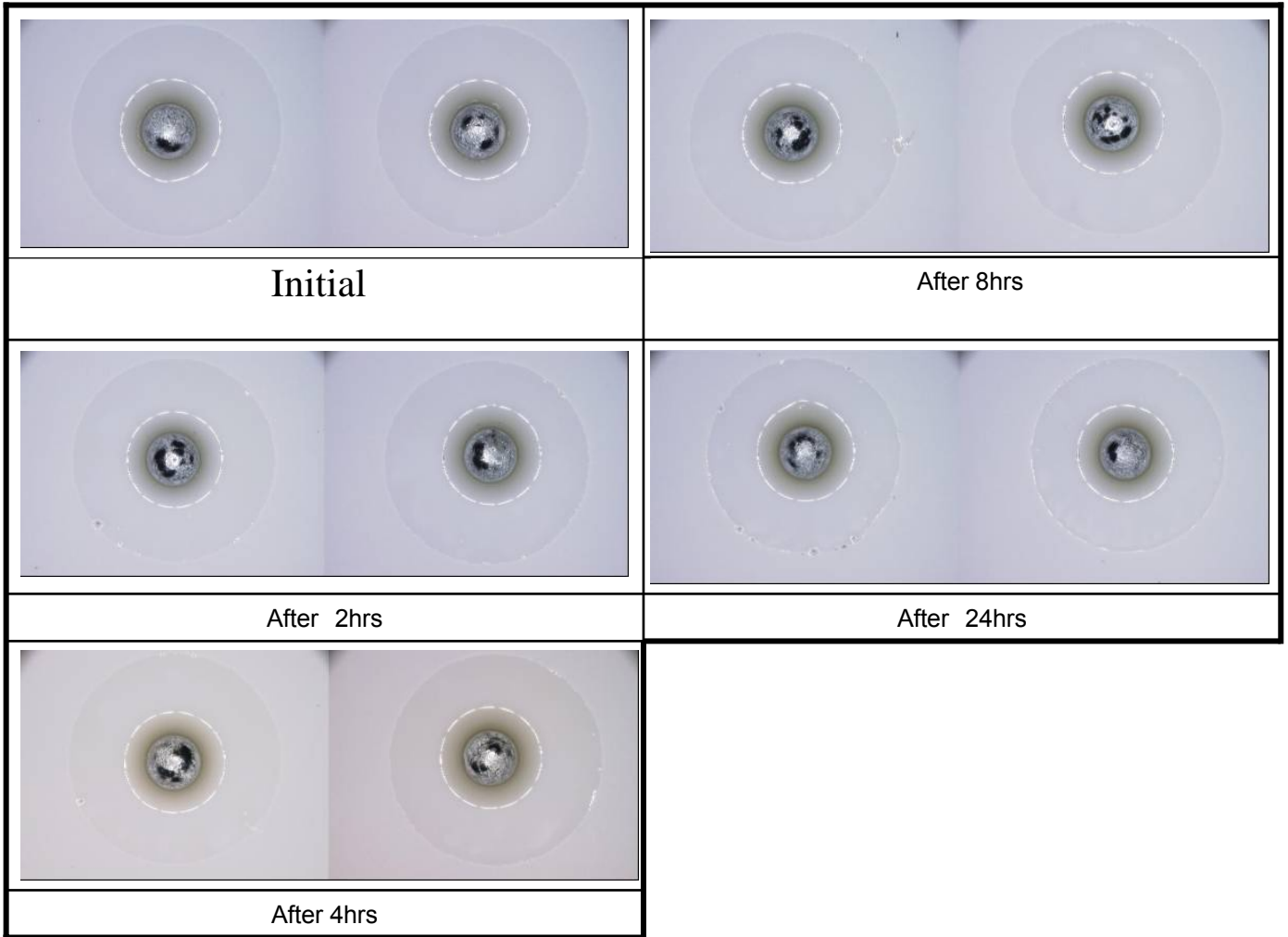
*M705-LFAC19 Tackiness and Tackiness time under the humidity environment*



M705-LFAC19 Solder Ball

**Solder ball test M705-LFAC19**

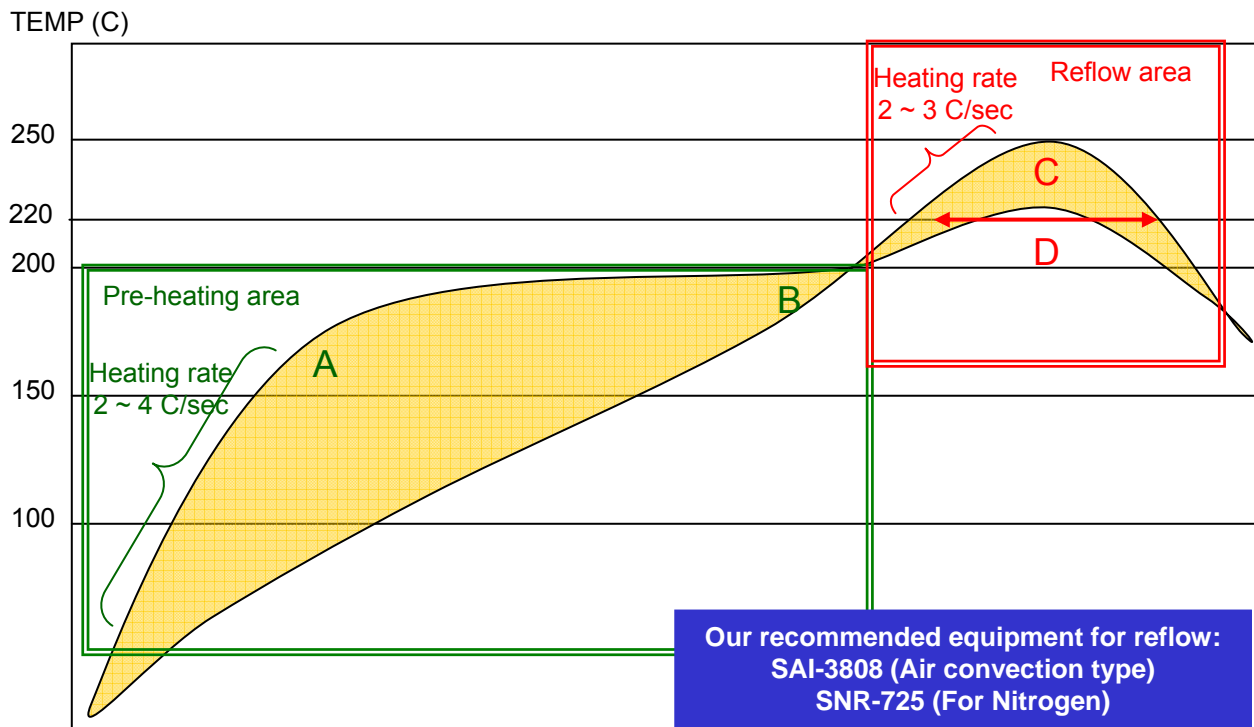
(JIS Z 3284)  
Stencil thickness: 150um  
Preheat: 180°C120sec  
Peak temp.: 235°C (above 220°C 40sec)



M705-LFAC19 Recommended reflow temperature profile

Senju's recommended reflow temperature profile for M705-LFAC19 is shown below. On the PCB, a difference of temperature occurs according to differences in heat capacity of parts on the assembled PCB. However, it is ideal that all soldering points on the PCB reach the following recommended zones and times.

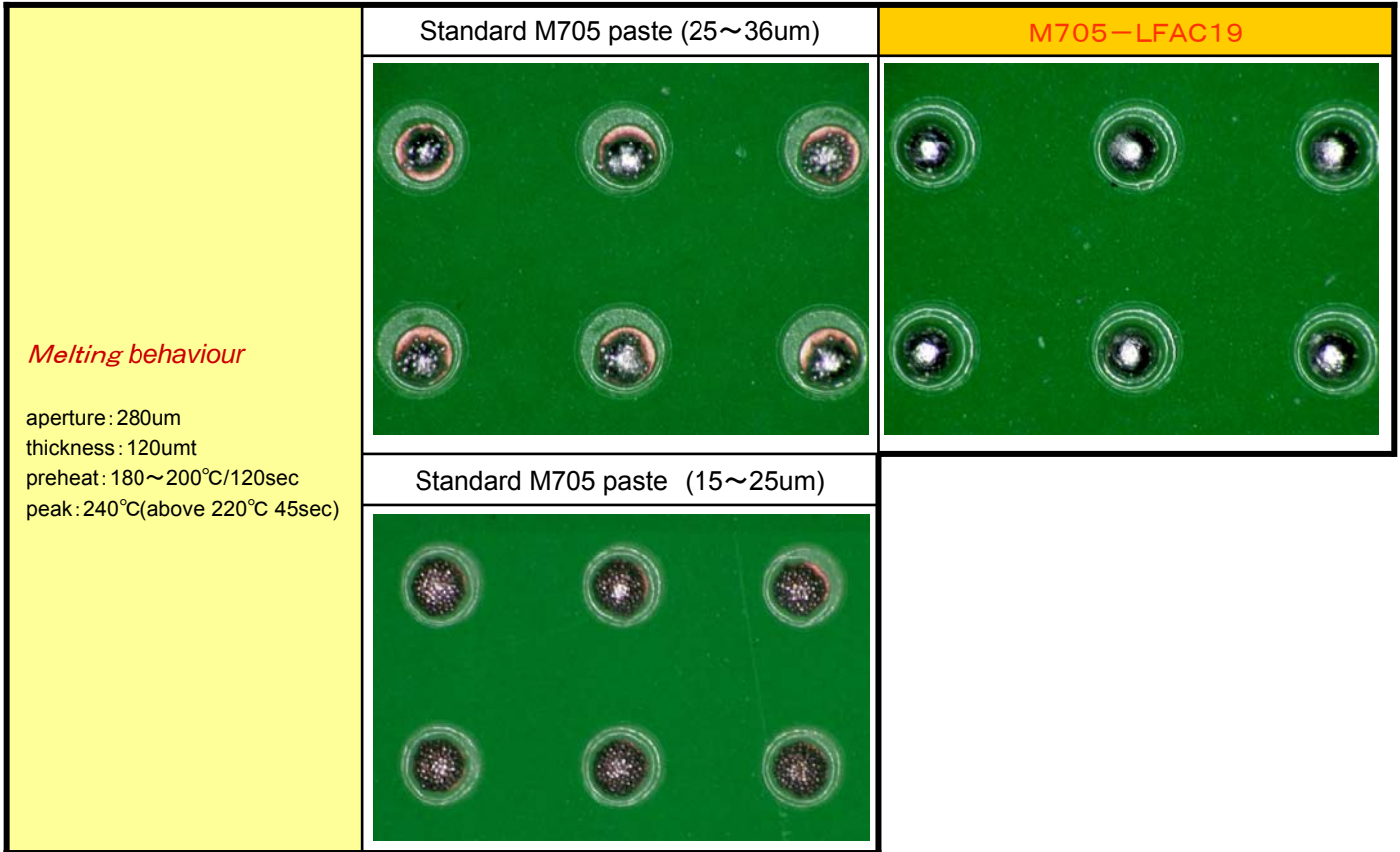
In addition, soldering characteristics may vary depending on reflow oven specifics, PCB mounting, and loading components. Performing a check evaluation is recommended.



Recommendation Value at each point			
A: soak start:	150~180°C	C: Peak temp.:	230~250°C
B: soak end:	170~200°C	D: time above 220°C	30~60sec
A-B: soak time:	90±30sec	(solidus line)	

**The use of nitrogen improves soldering.**

M705-LFAC19 Reflow-ability



M705-LFAC19 Wet-ability

*Wetting and Dewetting*  
*M705-LFAC19*

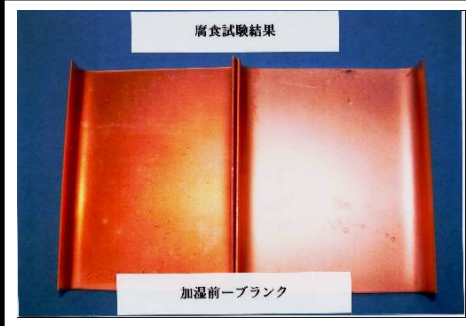
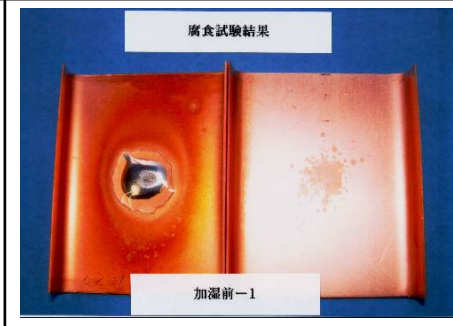
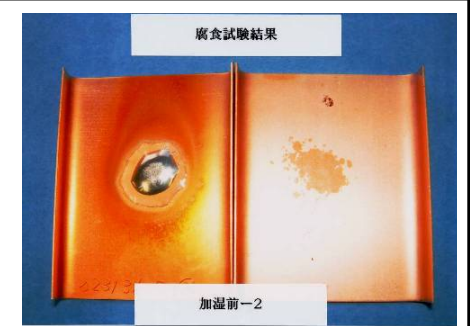

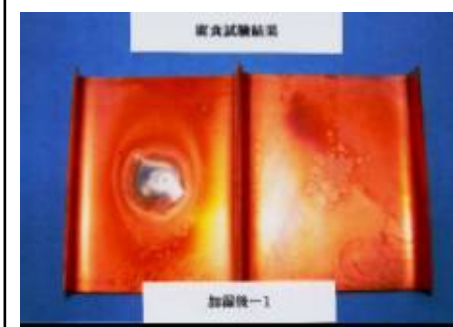
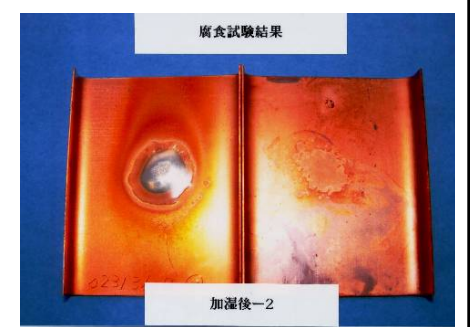
(JIS Z 3284)  
Stencil thickness: 150um  
Preheat: 180°C120sec  
Peak temp.: 235°C (above 220°C 40sec)



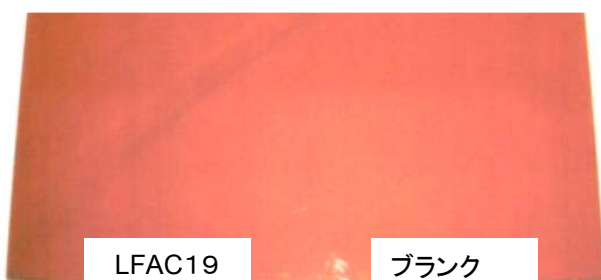


M705-LFAC19 Reliability

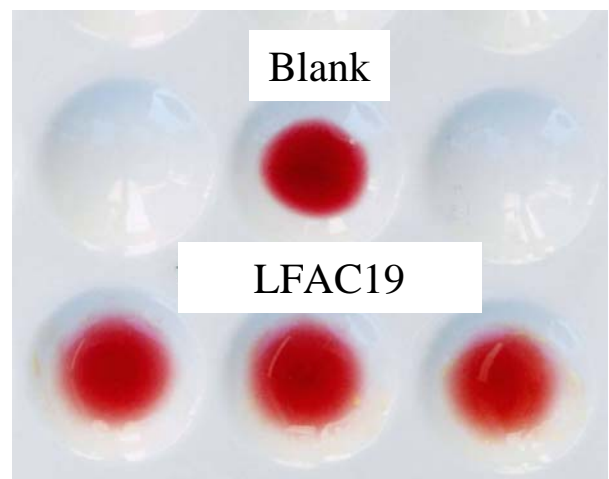
**Copper Corrosion Test**  
**M705-LFAC19**  
(JIS Z 3197)

 <p>腐食試験結果</p> <p>加湿前-ブランク</p>	 <p>腐食試験結果</p> <p>加湿前-1</p>	 <p>腐食試験結果</p> <p>加湿前-2</p>
<p>Initial (blank)</p>	<p>Initial (M705-LFAC19)</p>	
 <p>腐食試験結果</p> <p>加湿後-ブランク</p>	 <p>腐食試験結果</p> <p>加湿後-1</p>	 <p>腐食試験結果</p> <p>加湿後-2</p>
<p>After 72hrs at 40°C90% (blank)</p>	<p>After 72hrs at 40°C90% (M705-LFAC19)</p>	

**Copper Mirror Test**  
**M705-LFAC19**  
(JIS Z 3197)



**Fluoride Test**  
**M705-LFAC19**  
(JIS Z 3197)

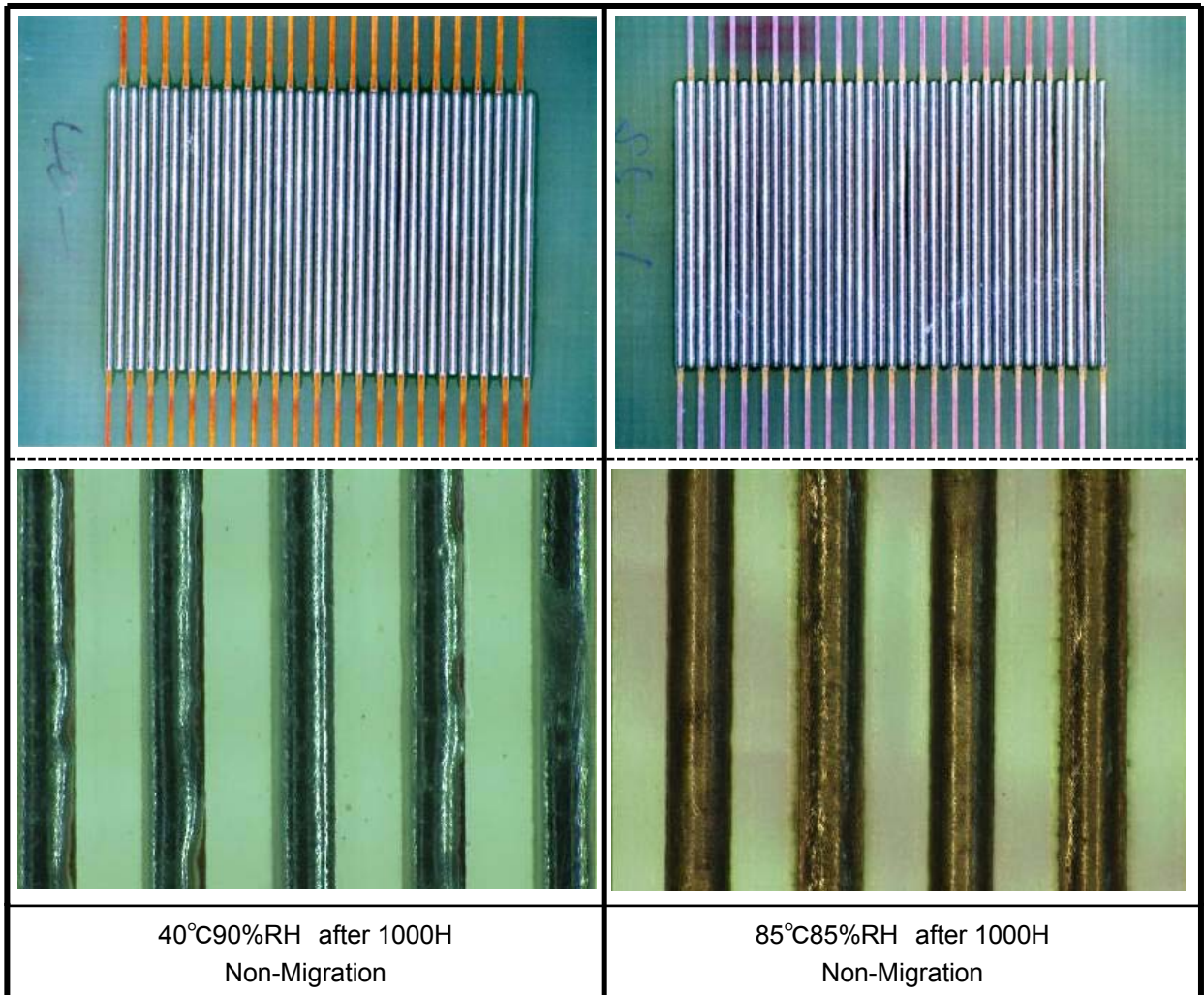
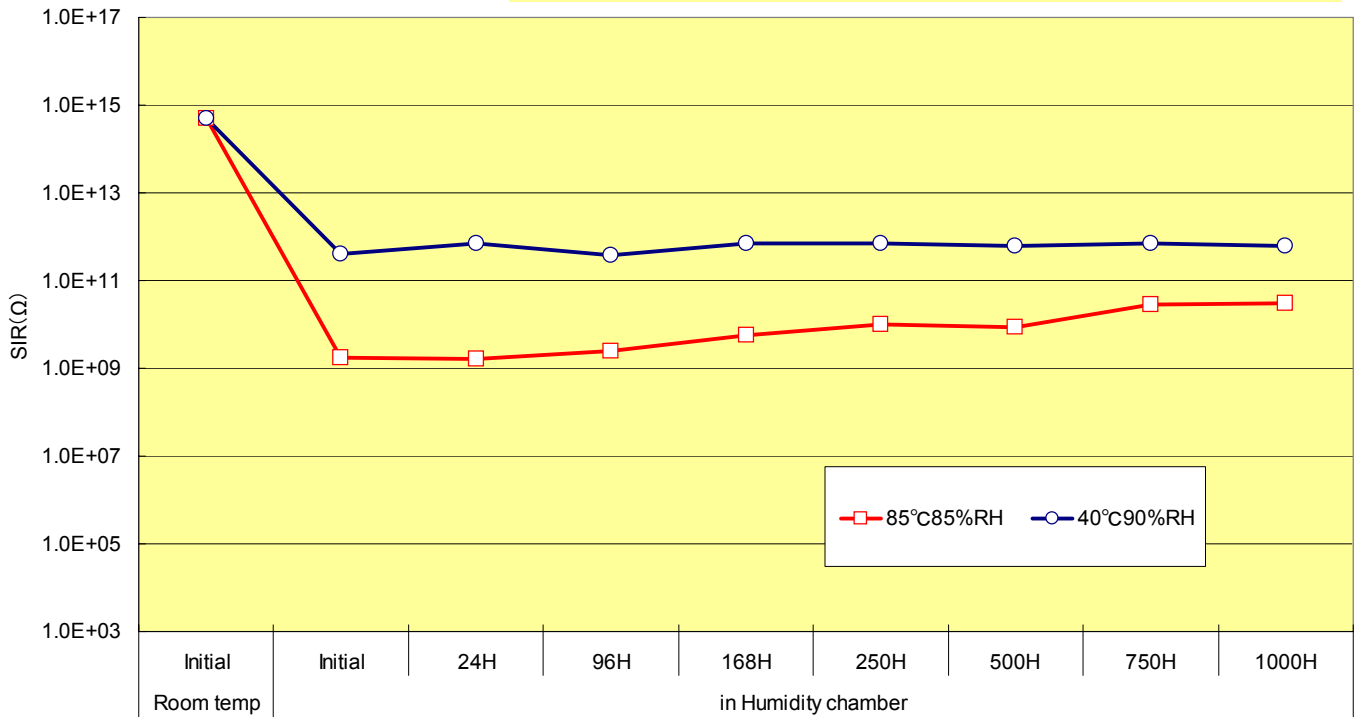


**M705-LFAC19Reliability**

**Migration test**

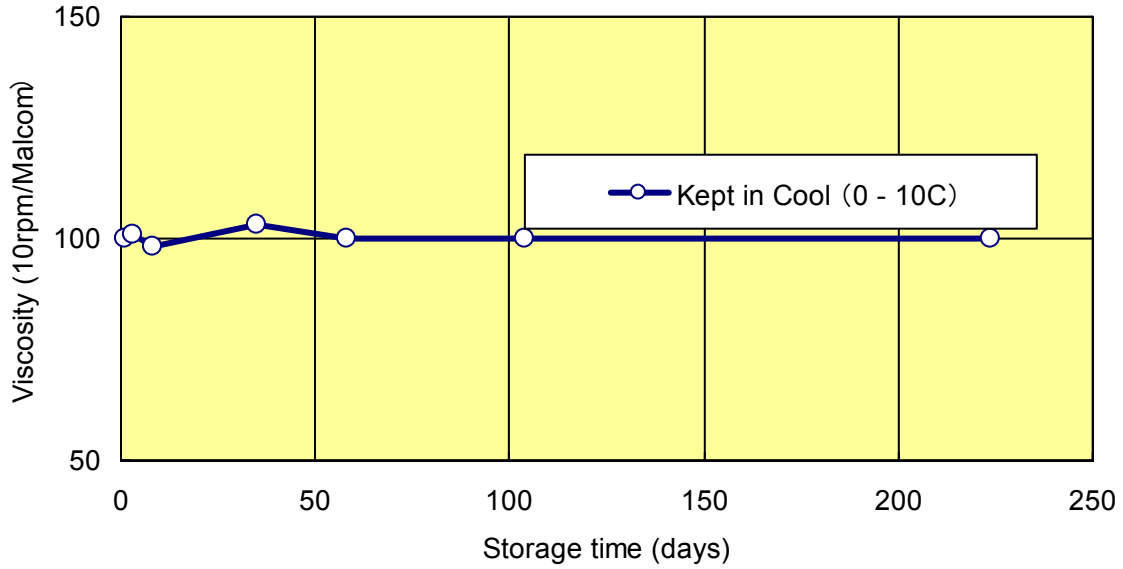
Test condition:  
40°C90%RH, 85°C85%RH

Measuring Voltage: 100V(In chamber)  
Applied Voltage: 45V



M705-LFAC19 Storage stability

Viscosity monitoring results with Storage time (Initial ~ over 6 months)



Quality and stability over long periods of time are characteristics required to make paste material workable. Especially in the case of irregularities in production and other operation variables. In addition, the guaranteed shelf life for this paste is six months in syringe and refrigerated storage condition (0-10 degrees C).