LOCTITE ABLESTIK JM 7000 Data Package

November 2020

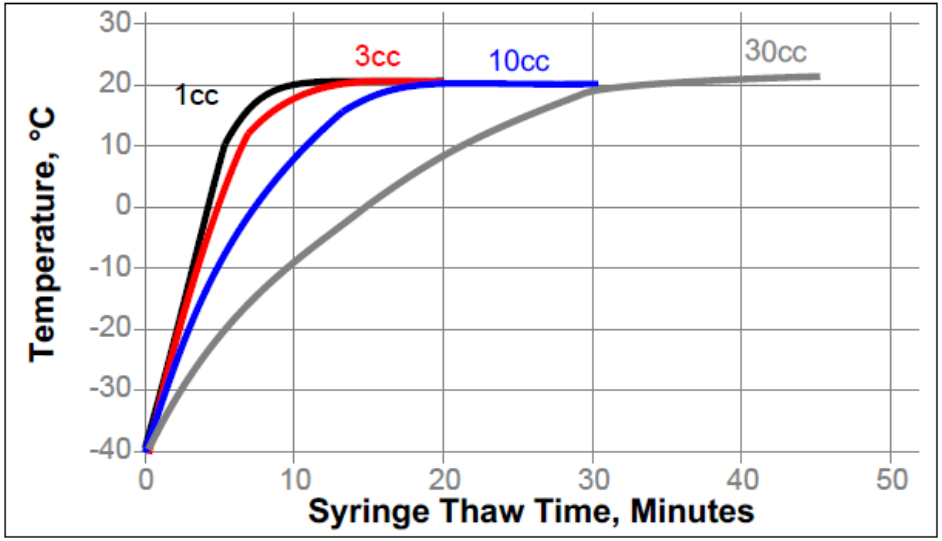
Content

Product description & key material properties

-- Product Description

- LOCTITE ABLESTIK JM 7000 is a legacy product from Johnson Matthey (JM)
- Cyanate Ester based adhesive with outstanding thermal stability.
- Very stable at high temp
- Used in high throughput die attach applications
- Approved by DESC and Rome Laboratory for military products.

Thawing

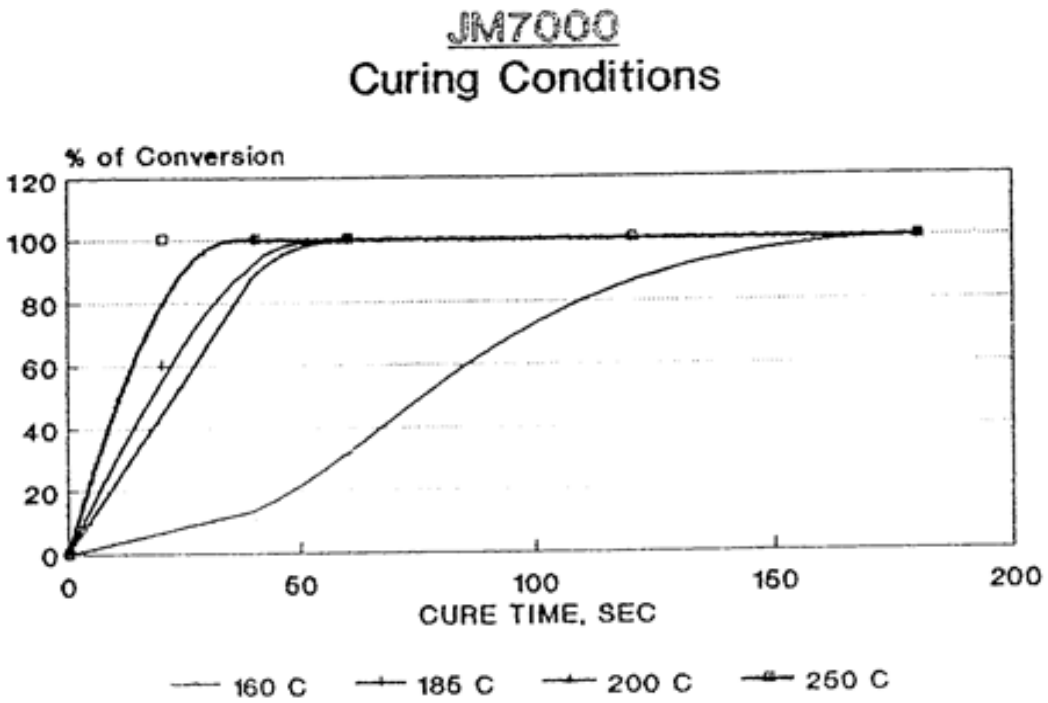


- Allow enough thawing time compare to the actual temperature increase with considering temperature variation inside of syringe.
- Suggested thawing time for 3cc is ~30min

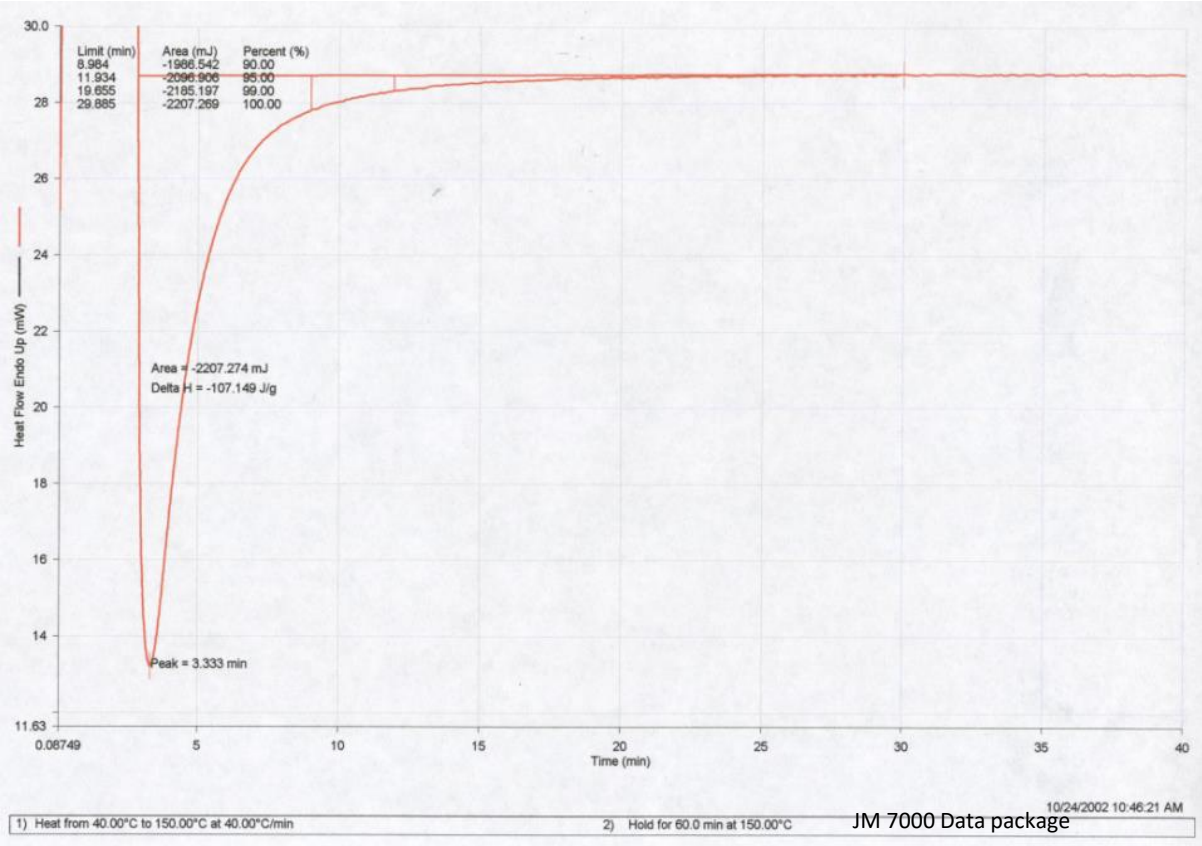
Curing Profile

- Suggested temperature cures are from (150 to 350)°C.
- Typical cure schedule is 30 minutes at 150°C.
- For applications requiring higher electrical conductivity, a cure cycle of 15 minutes at 300°C is recommended.
- Product properties will not be affected by subsequent post die attach thermal exposure, i.e., wirebond, and/or lid seal up to 370°C.

Curing profile



Isothermal DSC at 150°C



Cured Properties

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Coefficient of Thermal Expansion, :		
Below Tg, ppm/°C		33
Glass Transition Temperature (Tg) by TMA, °C		240
Bulk Thermal Conductivity, W/(m-K):		
@ 90°C		1.1
@ 165°C		1.0
Tensile Modulus, DMTA :		
Cured 30 minutes @ 300ºC	N/mm² (psi)	10,000 (1,450,377)

Extractable Ionic Content, @ 100°C:	
Chloride (Cl-)	<10
Sodium (Na+)	<15
Potassium (K+)	<15
Decomposition (in N2):	
TGA analysis @ 10ºC/ minute ramp from 25 to 400 ºC	
@ 340ºC, %	0.2
@ 400ºC, %	0.3

Electrical Properties

Sample cured 30 minutes @ 300ºC	
Volume Resistivity, ohm-cm	≤0.01

Cured Properties

TYPICAL PERFORMANCE OF CURED MATERIAL

Die Shear Strength:

2 X 2 mm Si die, kg-f,
cured 20 minutes @ 150ºC

Substrate	DSS
Ag/Cu LF	≥5

Tensile Strength :

cured 30 minutes @ 300ºC, MPa

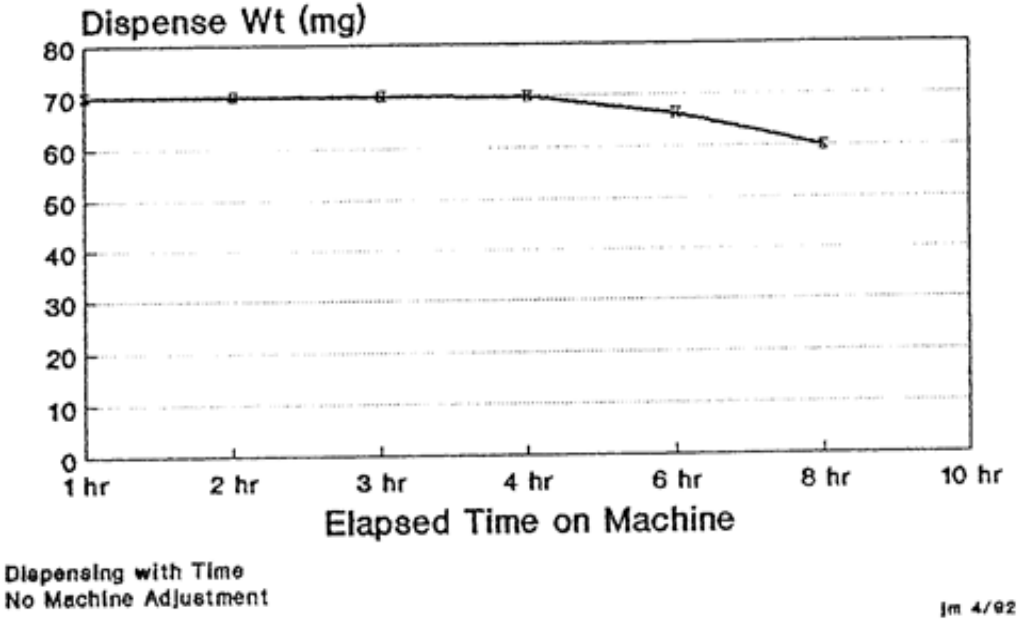
After Cure	After 1000 TC'C"
>17	>17

Radius of Curvature:

Si die on Alumina, meters
cured 30 minutes @ 300ºC

Chip Size:	ROC
15 x 15 mm	> 5

Work life

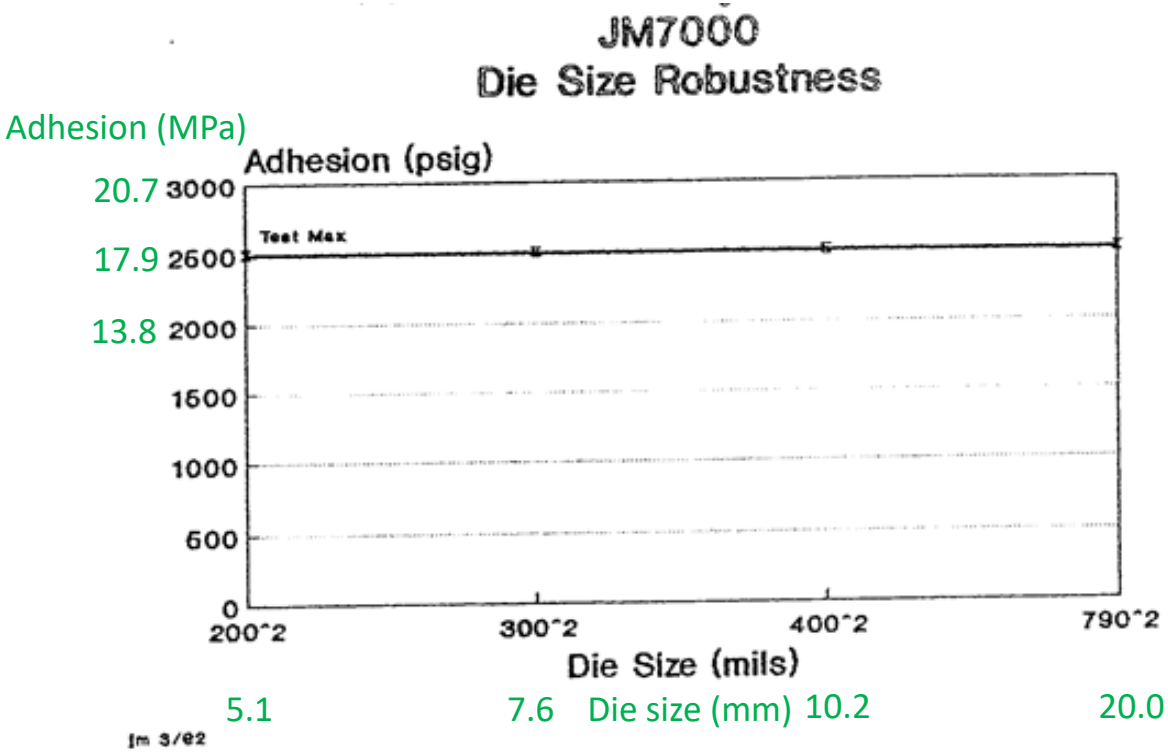


Dispensing with Time
No Machine Adjustment

jm 4/92

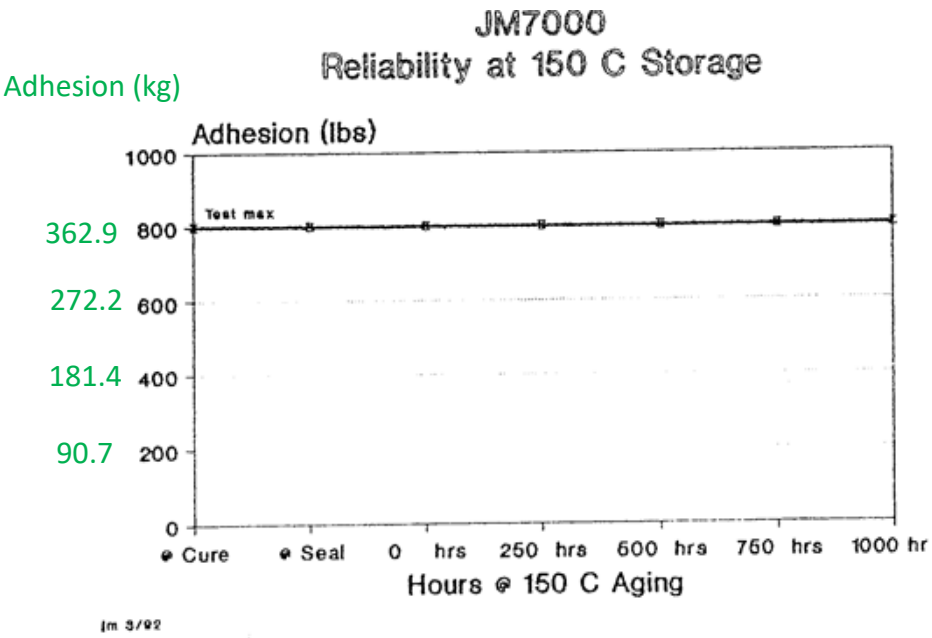
- JM7000 has a work life of approximately 8 hours on the machine.

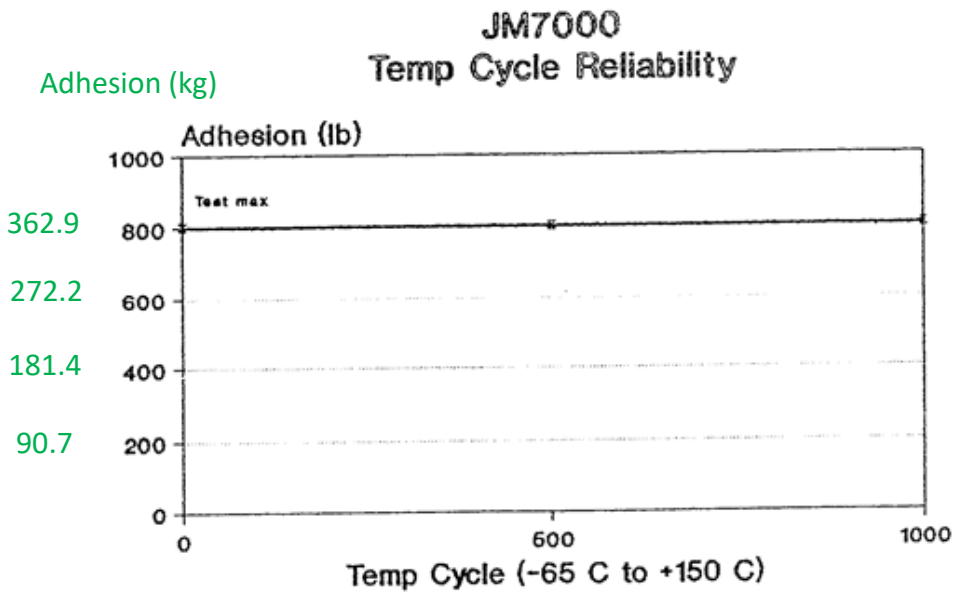
Die size robustness



- JM7000 shows good and stable robustness for different die sizes

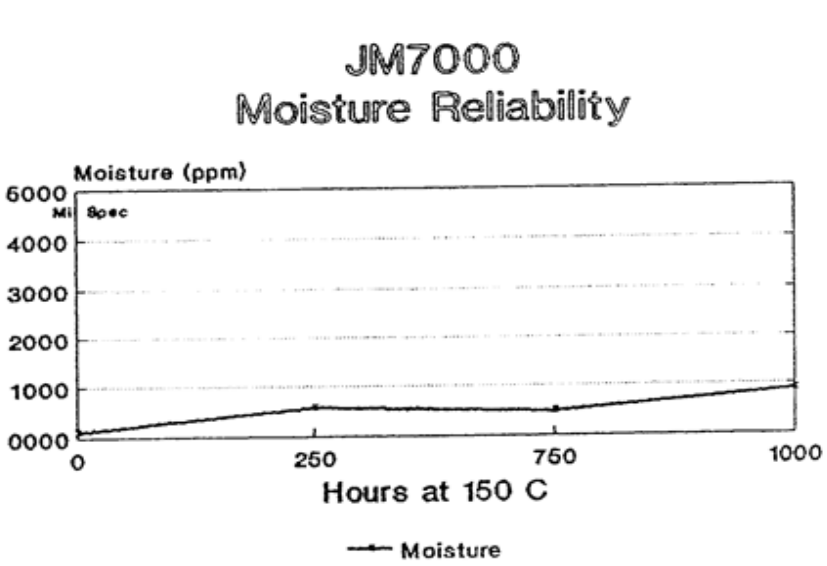
High temperature storage and thermal cycling

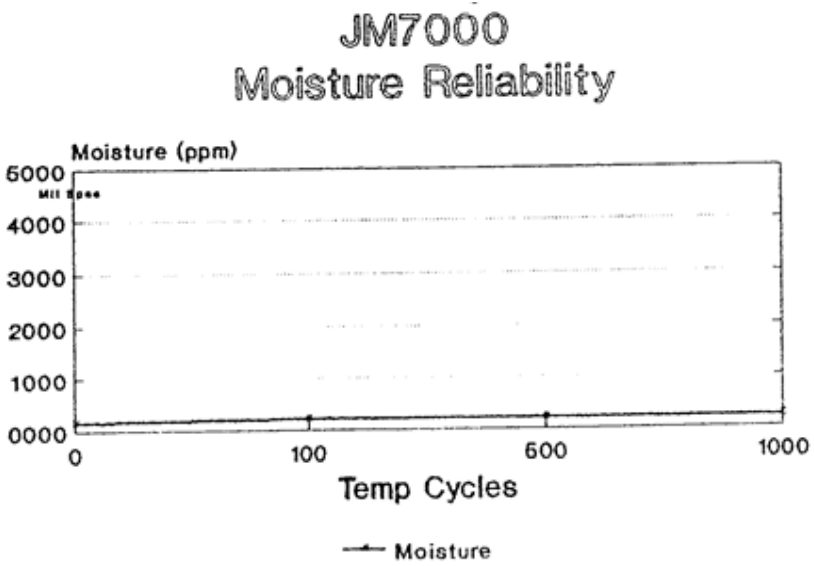




- JM7000 shows good and reliable adhesion over heat storage and temperature cycling

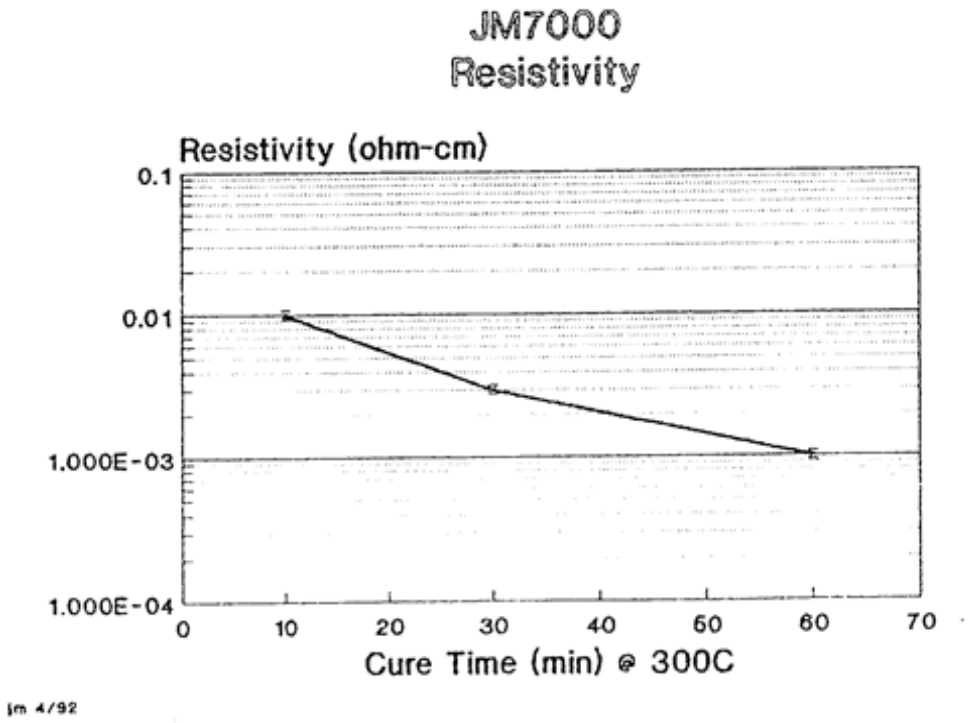
Moisture reliability





- JM7000 shows good and constant adhesion during heat storage and temperature cycling

Resistivity



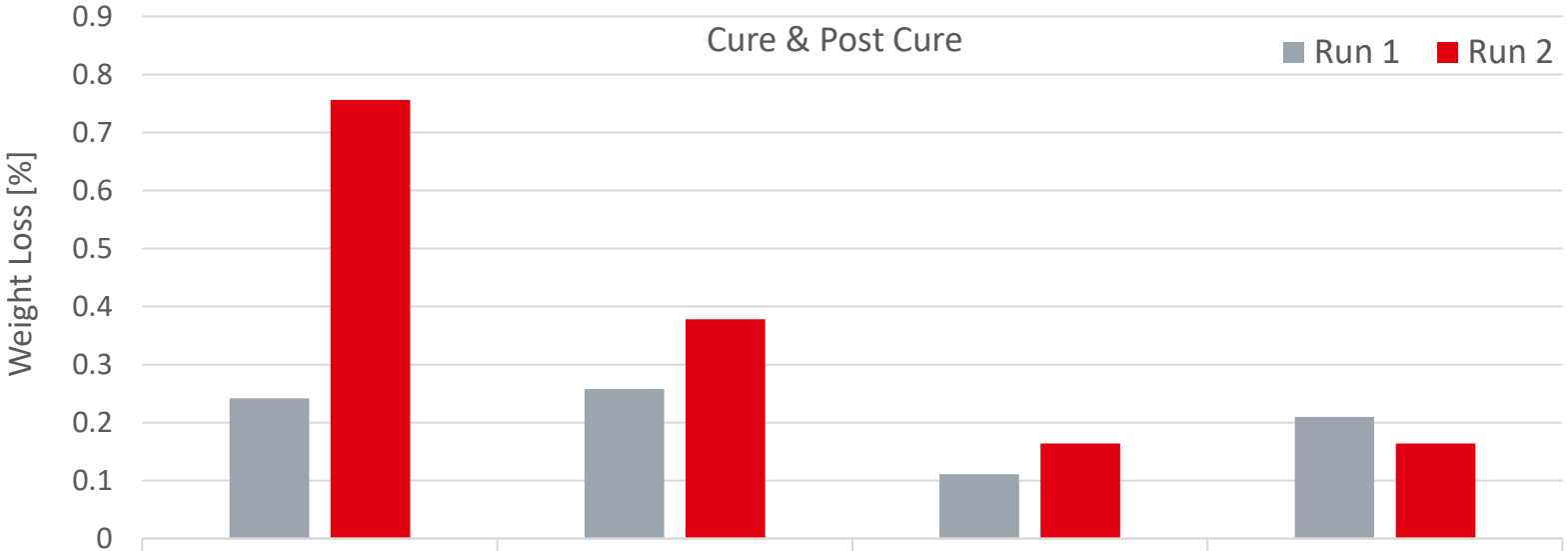
Outgassing
Run 1

LOCTITE ABLESTIK JM7000			
Outgassing after different conditions			
Condition	weight loss at 150°C [%]	weight loss at 300°C [%]	weight loss at 700°C [%]
After cure	0.0133	0.2416	14.63
After cure + pre bake (2min at 325°C)	0.0295	0.1112	15.79
After cure + 24hrs at 150°C	0.0219	0.2580	17.68
After cure + 24hrs at 150°C + pre bake (2min at 325°C)	0.0036	0.2101	15.83

Outgassing
Run 2

LOCTITE ABLESTIK JM7000			
Outgassing after different conditions			
Condition	weight loss at 150°C [%]	weight loss at 300°C [%]	weight loss at 700°C [%]
After cure	0.0935	0.7563	19.79
After cure + pre bake (2min at 325°C)	0.0685	0.1637	18.20
After cure + 24hrs at 150°C	0.0227	0.3780	16.30
After cure + 24hrs at 150°C + pre bake (2min at 325°C)	0.0470	0.1644	16.12

TGA Weight loss at 300°C



	Cured	Cured + 150°C	Cured + 325°C	Cured + 150°C + 325°C
Run 1	0.242	0.258	0.111	0.21
Run 2	0.756	0.378	0.164	0.164

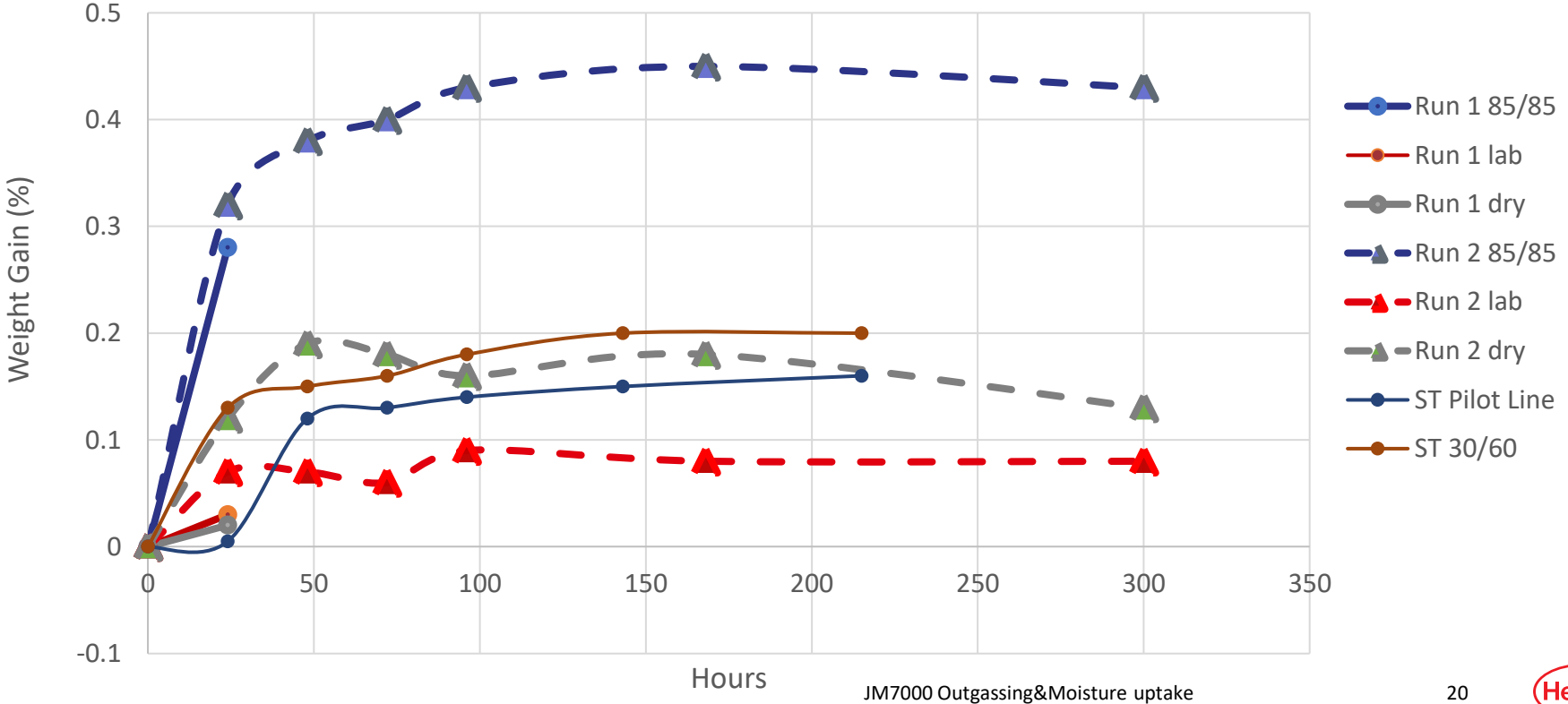
Moisture Uptake
Run 1

LOCTITE ABLESTIK JM7000					
Moisture uptake					
Property	Unit	#	Initial	24hrs	
			[g]	[g]	[%]
85% RH / 85°C	%	1	1.06	1.06	0.33%
	%	2	2.84	2.85	0.24%
	%	3	2.21	2.21	0.28%
	%	Avg	2.04	2.04	0.28%
RT	%	1	2.09	2.09	0.05%
	%	2	2.33	2.33	0.01%
	%	3	2.02	2.03	0.03%
	%	Avg	2.15	2.15	0.03%
Dry Cabinet	%	1	1.23	1.23	0.02%
	%	2	1.10	1.10	0.03%
	%	3	1.01	1.01	0.02%
	%	Avg	1.11	1.11	0.02%

Moisture Uptake
Run 2

LOCTITE ABLESTIK JM7000														
Moisture uptake														
Property	#	Initial	24hrs		48hrs		72hrs		96hrs		168hrs		300hrs	
		[g]	[g]	[%]	[g]	[%]	[g]	[%]	[g]	[%]	[g]	[%]	[g]	[%]
85% RH / 85°C	1	0.48	0.49	0.35%	0.49	0.45%	0.49	0.47%	0.49	0.50%	0.49	0.50%	0.49	0.47%
	2	0.58	0.58	0.33%	0.58	0.34%	0.58	0.36%	0.58	0.41%	0.58	0.46%	0.58	0.43%
	3	0.73	0.73	0.27%	0.73	0.36%	0.73	0.37%	0.73	0.38%	0.73	0.40%	0.73	0.40%
	Avg	0.60	0.60	0.32%	0.60	0.38%	0.60	0.40%	0.60	0.43%	0.60	0.45%	0.60	0.43%
RT (19.7°C, 48% RH)	1	0.43	0.43	0.05%	0.43	0.07%	0.43	0.05%	0.43	0.07%	0.43	0.12%	0.43	0.05%
	2	0.26	0.26	0.08%	0.26	0.08%	0.26	0.11%	0.26	0.15%	0.26	0.04%	0.26	0.11%
	3	0.40	0.40	0.07%	0.40	0.05%	0.40	0.02%	0.40	0.05%	0.40	0.10%	0.40	0.07%
	Avg	0.36	0.36	0.07%	0.36	0.07%	0.36	0.06%	0.36	0.09%	0.36	0.08%	0.36	0.08%
Dry Cabinet	1	0.39	0.39	0.05%	0.39	0.08%	0.39	0.08%	0.39	0.08%	0.39	0.13%	0.39	0.08%
	2	0.53	0.53	0.11%	0.53	0.19%	0.53	0.19%	0.53	0.15%	0.53	0.15%	0.53	0.15%
	3	0.47	0.47	0.19%	0.47	0.30%	0.47	0.28%	0.47	0.26%	0.47	0.26%	0.47	0.17%
	Avg	0.46	0.46	0.12%	0.46	0.19%	0.46	0.18%	0.46	0.16%	0.46	0.18%	0.46	0.13%

Moisture Uptake Data
Comparison



Thank you!