Panasonic
ideas for life

MEGTRON6(G) R-5775(G) / R-5670(G) Technical Report

June 20 , 2012
Industrial Devices Company
Panasonic Corporation

Panasonic Confidential

1-1. Basic properties

・#1067 / #1035

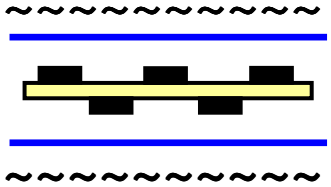
	Item		R-5775(G)			R-5775(K)		
	Construction		#1067 RC 64%			#1035 RC 65%		
			35-35 HVLP			35-35 HVLP		
	Test Item	Spec	NANYA			NITTOBO		
			lot.1	lot.2	lot3	lot.1	lot.2	lot3
Thermal Property	Tg(DSC)	> 175℃	190	191	189	191	190	192
	T-288 (With Cu)	>15min	>120	>120	>120	>120	>120	>120
Electrical Property	Dk (1GHz)	3.5±0.2	3.48	3.46	3.49	3.46	3.48	3.44
	Df (1GHz)	< 0.004	0.002	0.002	0.002	0.002	0.002	0.002
Mechanical Property	Cu peel strength	>0.5 kN/m	0.81	0.82	0.81	0.82	0.81	0.83

The test samples is 0.8mm of R-5775(MEGTRON6) materials.

R-5670(G)	
#1067 RC 69%	NANYA
D-2/100+Solder dip(288℃) 30seconds	NO Blister
D-4/100+Solder dip(288℃) 30seconds	NO Blister
D-6/100+Solder dip(288℃) 30seconds	NO Blister

R-5670(K)	
#1035 RC 70%	NITTOBO
D-2/100+Solder dip(288℃) 30seconds	NO Blister
D-4/100+Solder dip(288℃) 30seconds	NO Blister
D-6/100+Solder dip(288℃) 30seconds	NO Blister

【Construction 】



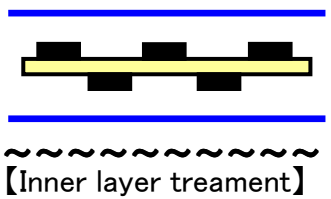
Prepreg(#1067 RC:69%)

CCL(0.10mmt 18/18um Copper area rate:50%)

Prepreg(#1067 RC:69%)

【Inner layer treament】
Multi-bond (Mac Dermid)

【Construction 】



Prepreg(#1035 RC:70%)

CCL(0.10mmt 18/18um Copper area rate:50%)

Prepreg(#1035 RC:70%)

【Inner layer treament】
Multi-bond (Mac Dermid)

1-2. Basic properties

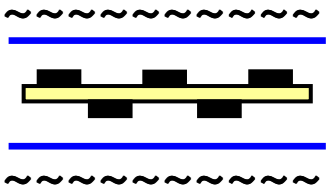
▪#1078

	Item		R-5775(G)			R-5775(K)		
	Construction		#1078 RC 63%					
			35-35 HVLP					
	Test Item	Spec	NANYA			NITTOBO		
			lot.1	lot.2	lot3	lot.1	lot.2	lot3
Thermal Property	Tg(DSC)	> 175℃	189	188	191	190	189	192
	T-288 (With Cu)	>15min	>120	>120	>120	>120	>120	>120
Electrical Property	Dk (1GHz)	3.5±0.2	3.52	3.53	3.51	3.51	3.49	3.52
	Df (1GHz)	< 0.004	0.002	0.002	0.002	0.002	0.002	0.002
Mechanical Property	Cu peel strength	>0.5 kN/m	0.83	0.85	0.85	0.83	0.82	0.81

The test samples is 0.8mm of R-5775(MEGTRON6) materials.

#1078 RC 64%	R-5670(G)	R-5670(K)
	NANYA	NITTOBO
D-2/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister
D-4/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister
D-6/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister

【Construction : Panasonic Pattern】



Prepreg(#1078 RC:64%)

CCL(0.10mmt 35/35um Copper area rate:50%)

Prepreg(#1078 RC:64%)

【Inner layer treament】
Multi-bond (Mac Dermid)

1-3. Basic properties

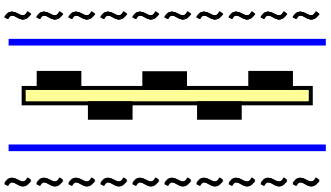
▪#3313

	Item		R-5775(G)			R-5775(K)		
	Construction		#3313 RC 54%					
			35-35 HVLP					
	Test Item	Spec	NANYA			NITTOBO		
			lot.1	lot.2	lot3	lot.1	lot.2	lot3
Thermal Property	Tg(DSC)	> 175℃	190	191	192	189	190	189
	T-288 (With Cu)	>15min	>120	>120	>120	>120	>120	>120
Electrical Property	Dk (1GHz)	3.5±0.2	3.69	3.68	3.69	3.68	3.69	3.68
	Df (1GHz)	< 0.004	0.002	0.002	0.002	0.002	0.002	0.002
Mechanical Property	Cu peel strength	>0.5 kN/m	0.80	0.82	0.83	0.80	0.81	0.82

The test samples is 0.8mm of R-5775(MEGTRON6) materials.

#3313 RC 54%	R-5670(G)	R-5670(K)
	NANYA	NITTOBO
D-2/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister
D-4/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister
D-6/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister

【Construction : Panasonic Pattern】



Prepreg(#3313 RC:54%)

CCL(0.10mmt 35/35um Copper area rate:50%)

Prepreg(#3313 RC:54%)

【Inner layer treament】
Multi-bond (Mac Dermid)

1-4. Basic properties

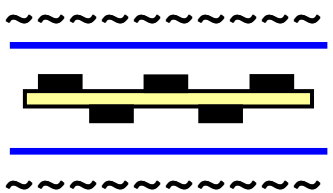
▪#2116

	Item		R-5775(G)			R-5775(K)		
	Construction		#2116 RC 54%					
			35-35 HVLP					
	Test Item	Spec	NANYA			NITTOBO		
			lot.1	lot.2	lot3	lot.1	lot.2	lot3
Thermal Property	Tg(DSC)	> 175℃	188	190	189	189	188	190
	T-288 (With Cu)	>15min	>120	>120	>120	>120	>120	>120
Electrical Property	Dk (1GHz)	3.5±0.2	3.70	3.72	3.71	3.70	3.69	3.71
	Df (1GHz)	< 0.004	0.002	0.002	0.002	0.002	0.002	0.002
Mechanical Property	Cu peel strength	>0.5 kN/m	0.83	0.84	0.82	0.82	0.81	0.83

The test samples is 0.8mm of R-5775(MEGTRON6) materials.

#2116 RC 54%	R-5670(G)	R-5670(K)
	NANYA	NITTOBO
D-2/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister
D-4/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister
D-6/100+Solder dip(288℃) 30seconds	NO Blister	NO Blister

【Construction : Panasonic Pattern】



Prepreg(#2116 RC:54%)

CCL(0.10mmt 35/35um Copper area rate:50%)

Prepreg(#2116 RC:54%)

【Inner layer treament】
Multi-bond (Mac Dermid)

2-1. CAF Resistance Data (HAST 110℃ 85% 50V)

■**Test Condition**

1) Pre-condition : 255℃×8 Reflow
2) Treatment condition: 110℃ 85% DC50V
3) Judgment : ＞1.0E＋06（Ω）, ～300hr

■**Test sample**

■Construction

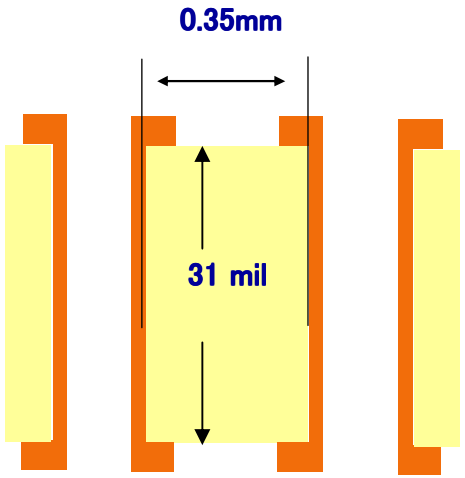
1067(1035 NITTOBO)*16ply

1078*12ply

2116*6ply

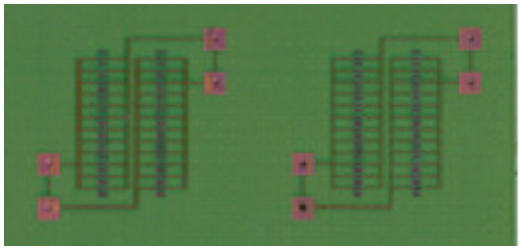
3313*8ply

Cross section

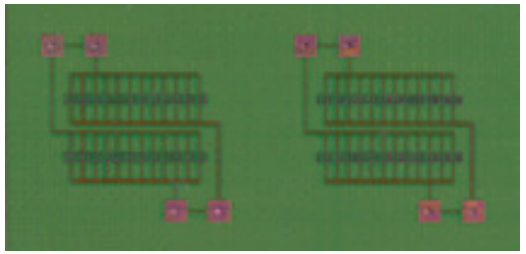


TH φ :0.35mm
TH wall – wall :0.35mm

Surface view



Warp-Direction n=2

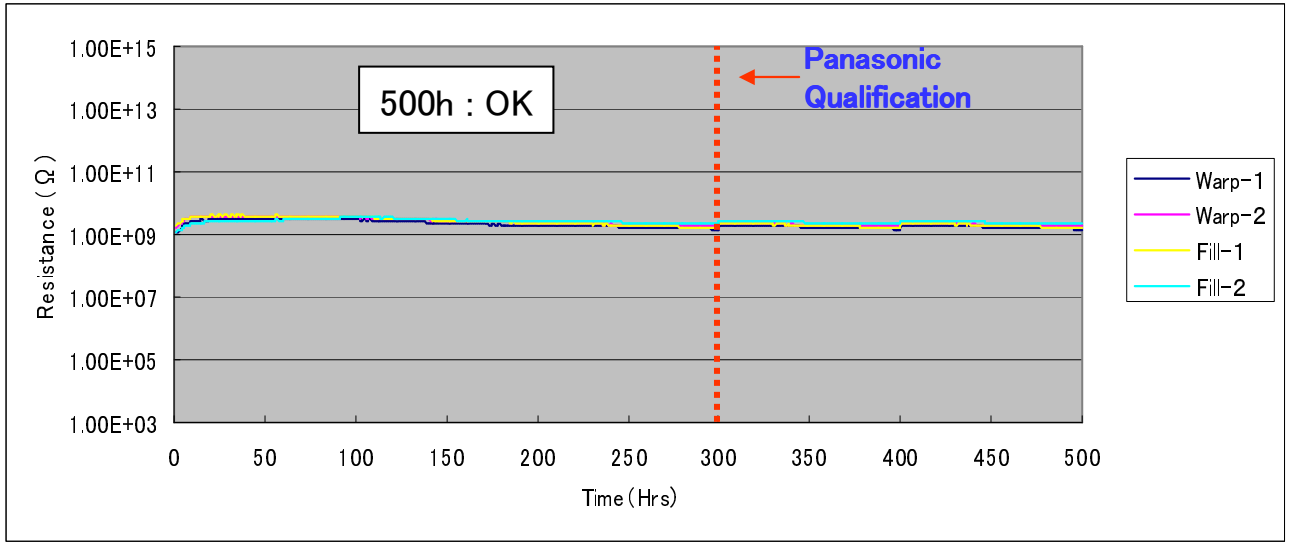


Fill-Direction n=2

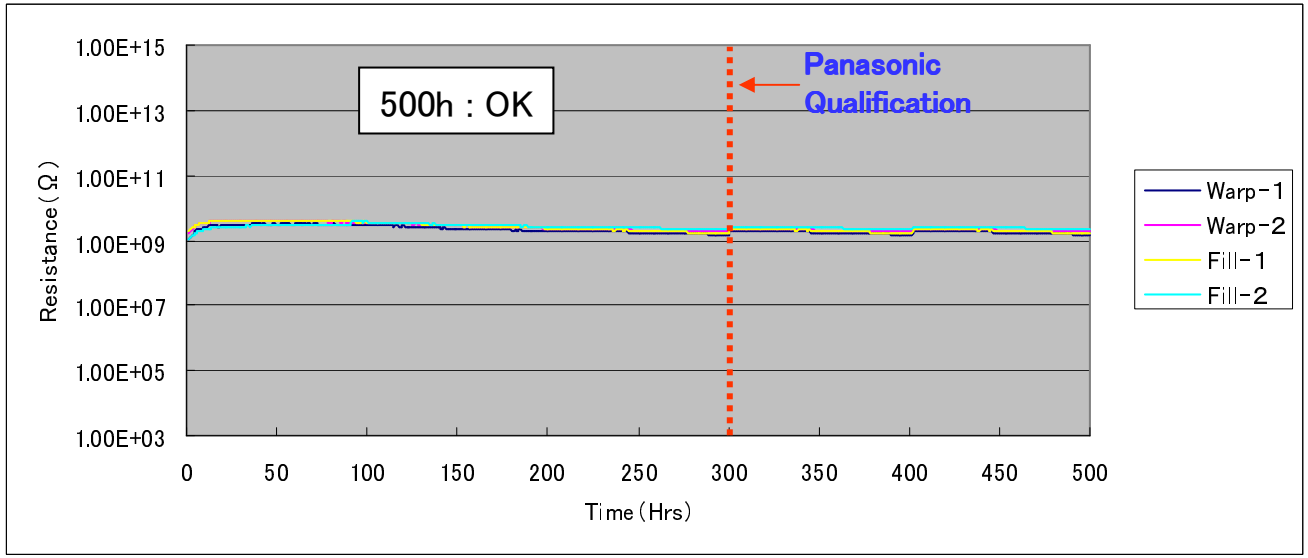
Test point: TH 50 holes – 50 holes

2-2. CAF Resistance Data (#1067/#1035)

R-5775(G)
Glass cloth : NANYA 1067

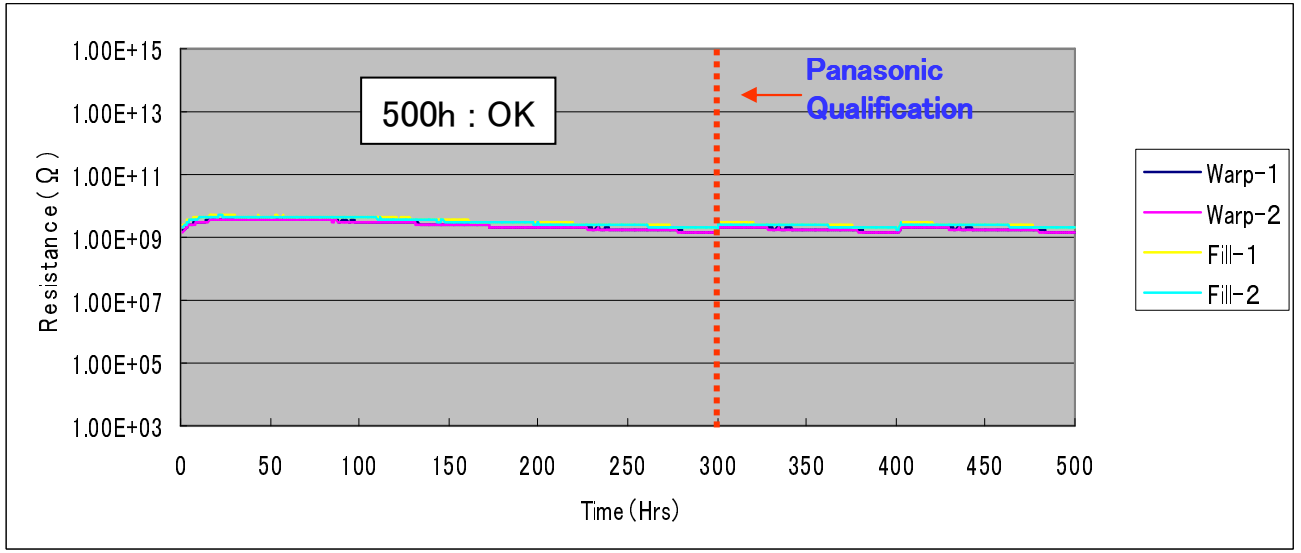


R-5775(K)
Glass cloth : NITTOBO 1035

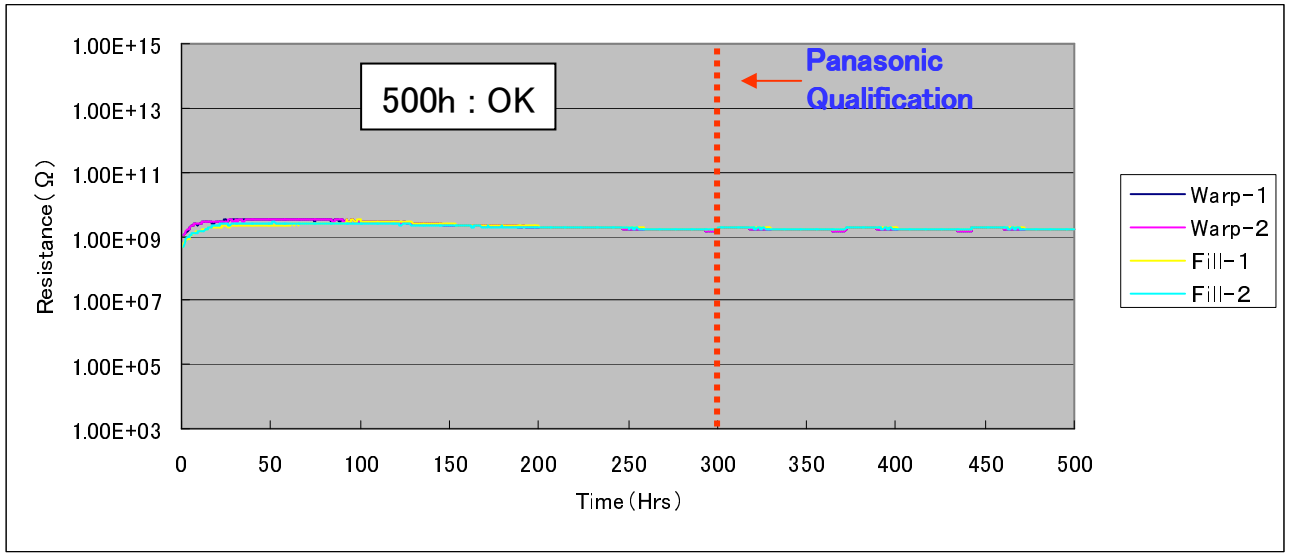


2-3. CAF Resistance Data (#1078)

R-5775(G)
Glass cloth : NANYA 1078

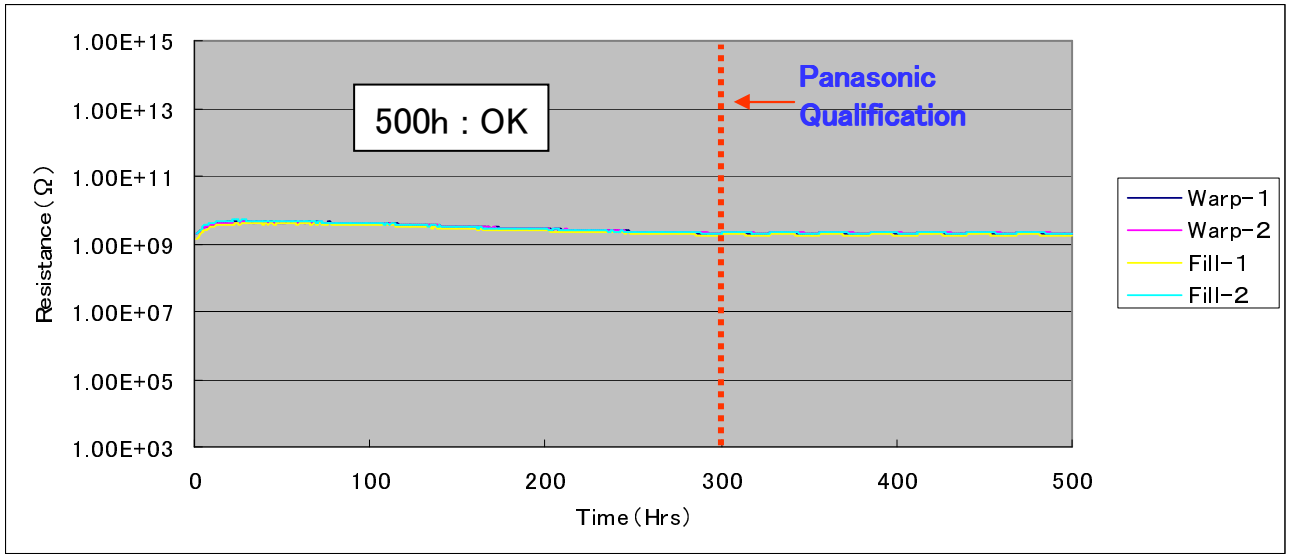


R-5775(K)
Glass cloth : NITTOBO 1078

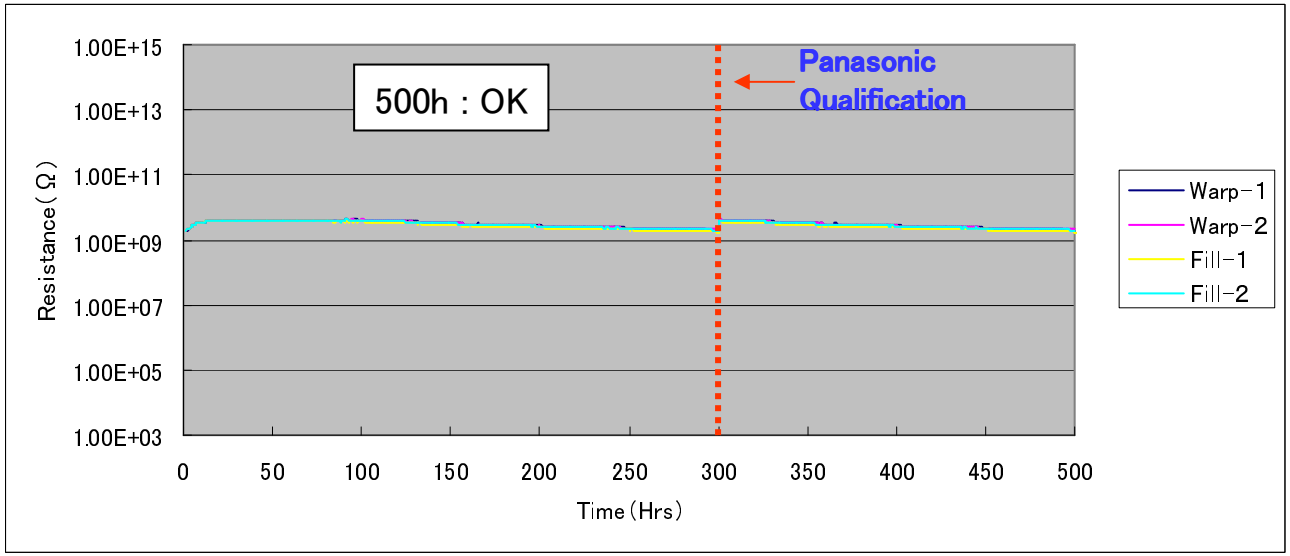


2-4. CAF Resistance Data (#3313)

R-5775(G)
Glass cloth : NANYA 3313

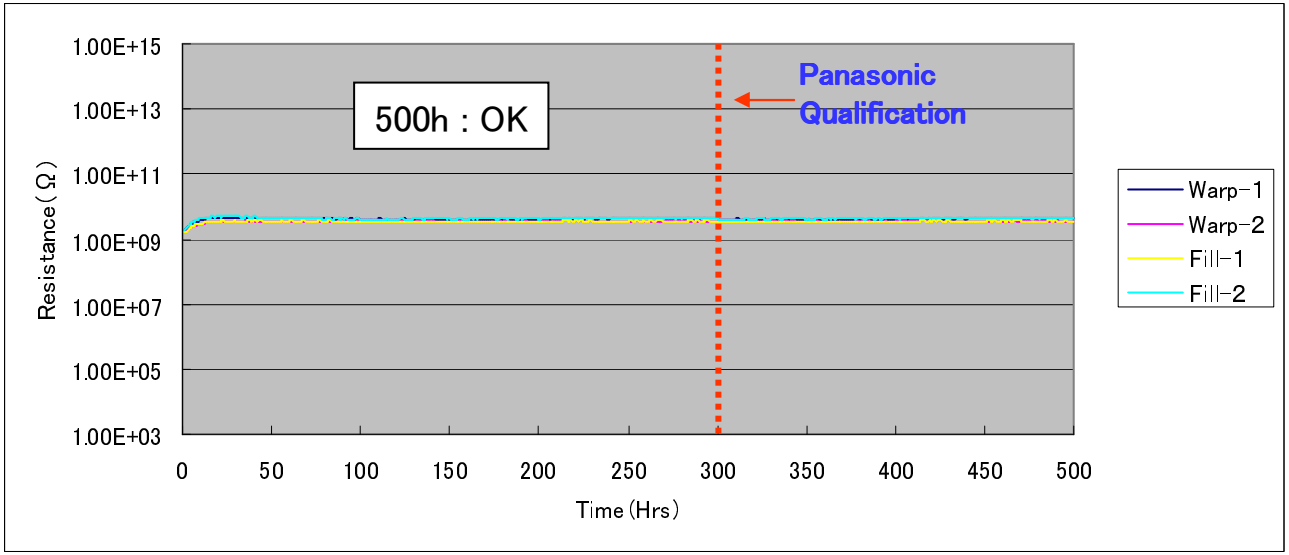


R-5775(K)
Glass cloth : NITTOBO 3313

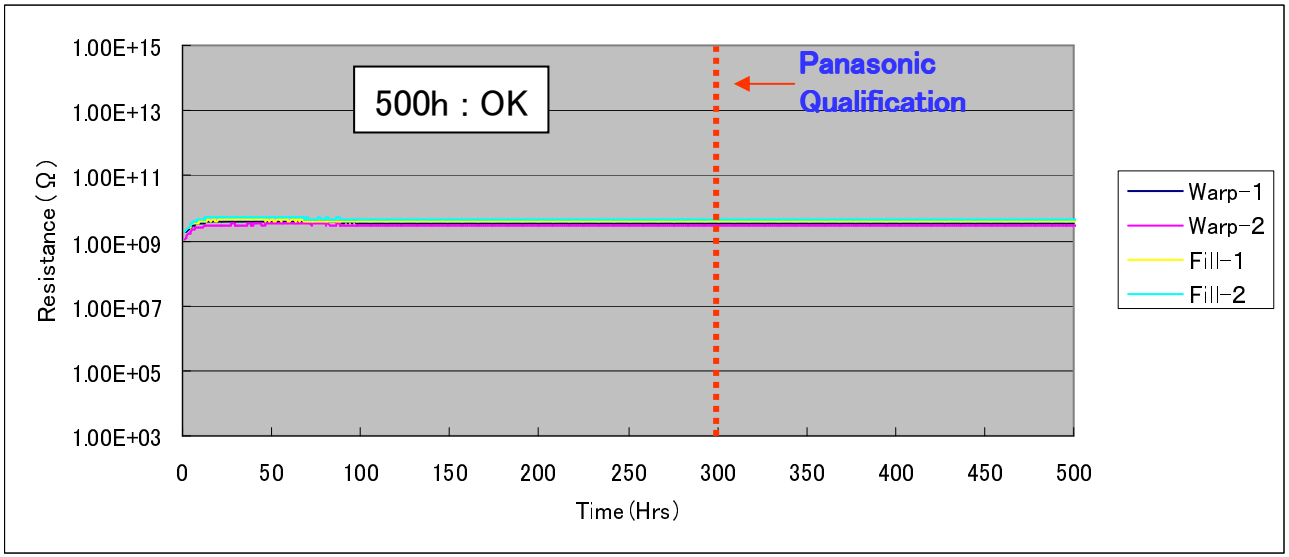


2-5. CAF Resistance Data (#2116)

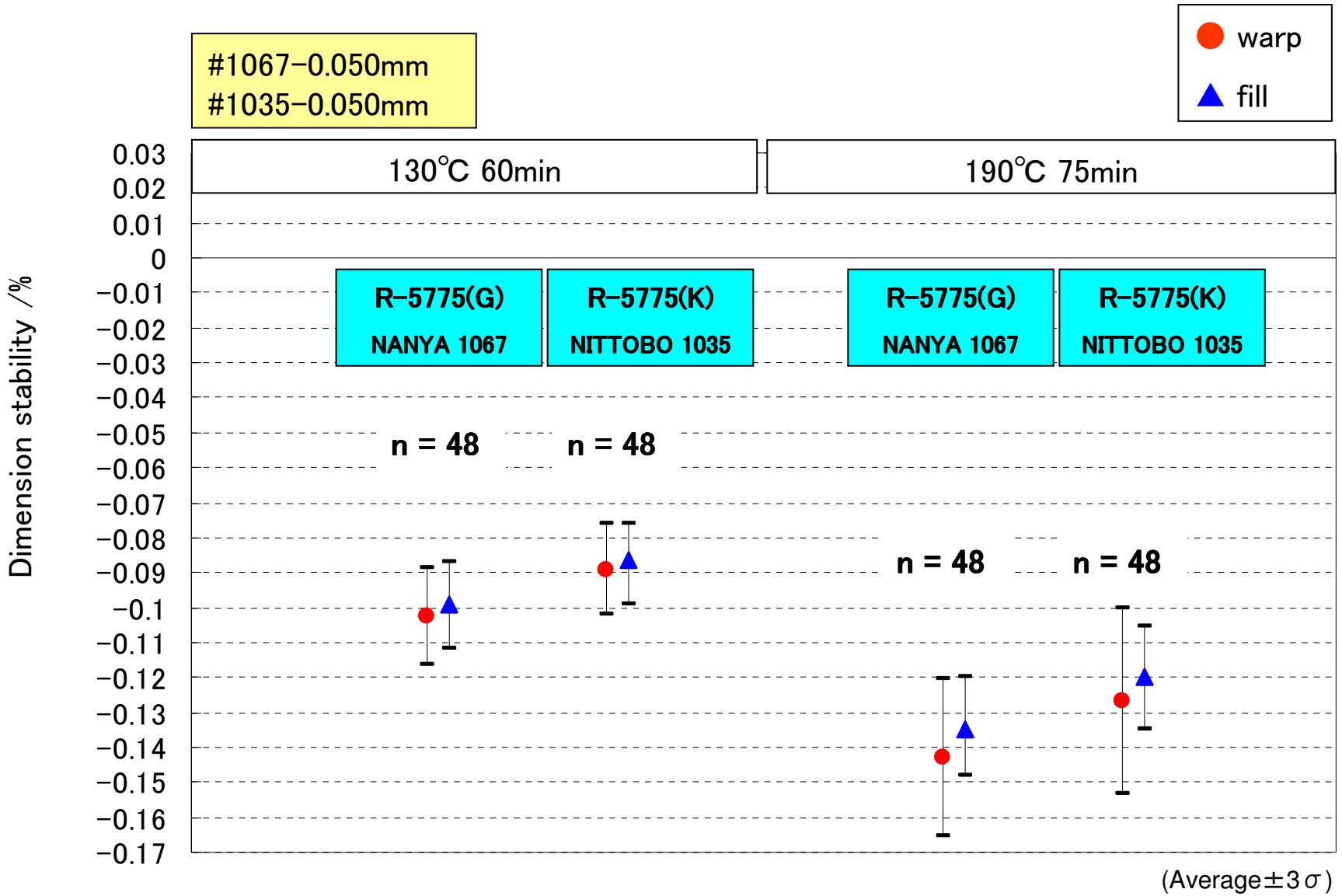
R-5775(G)
Glass cloth : NANYA 2116



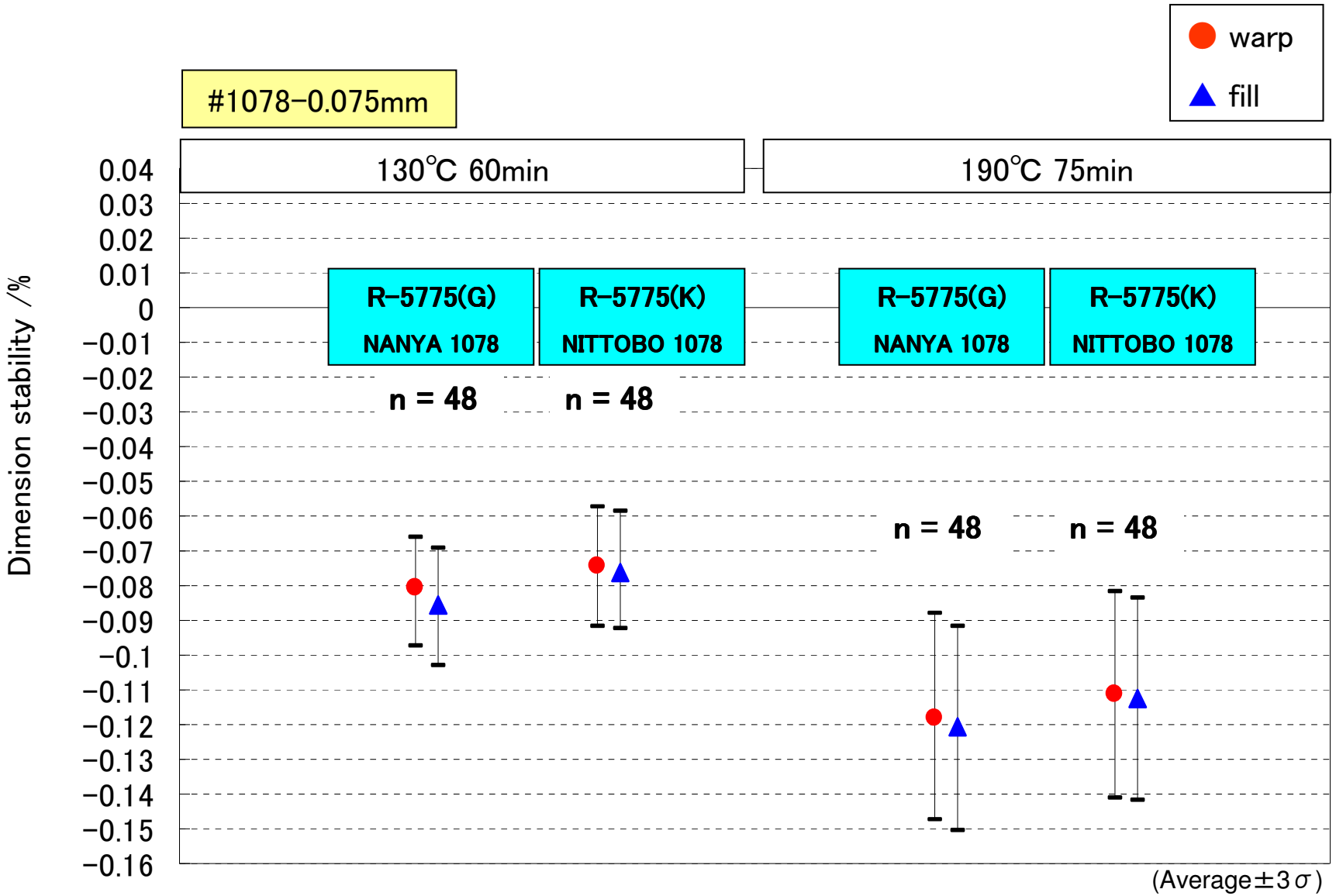
R-5775(K)
Glass cloth : NITTOBO 2116



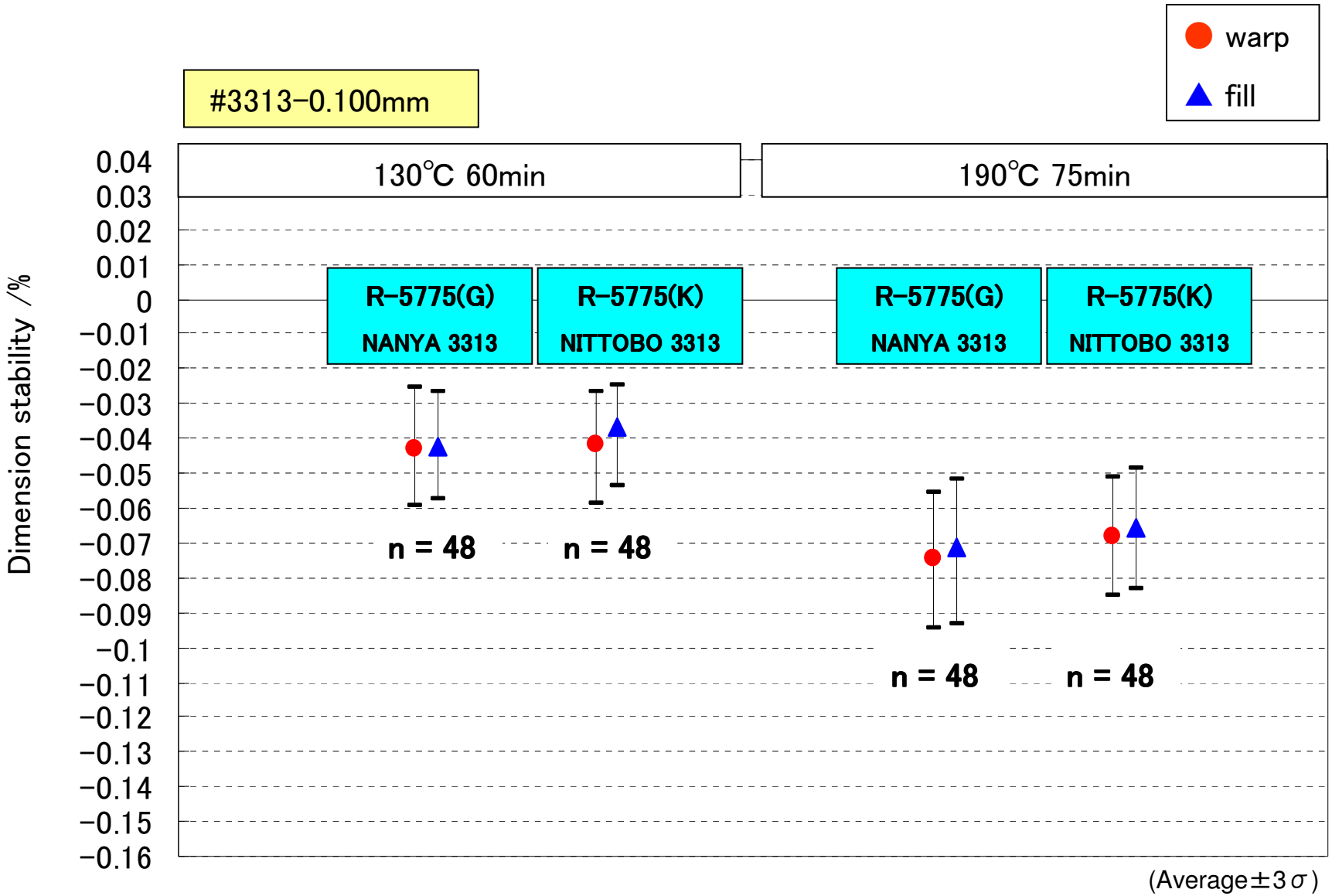
3-1. Dimensional Stability #1067(NANYA)vs#1035(NITTOBO)



3-2. Dimensional Stability #1078(NANYA vs NITTOBO)

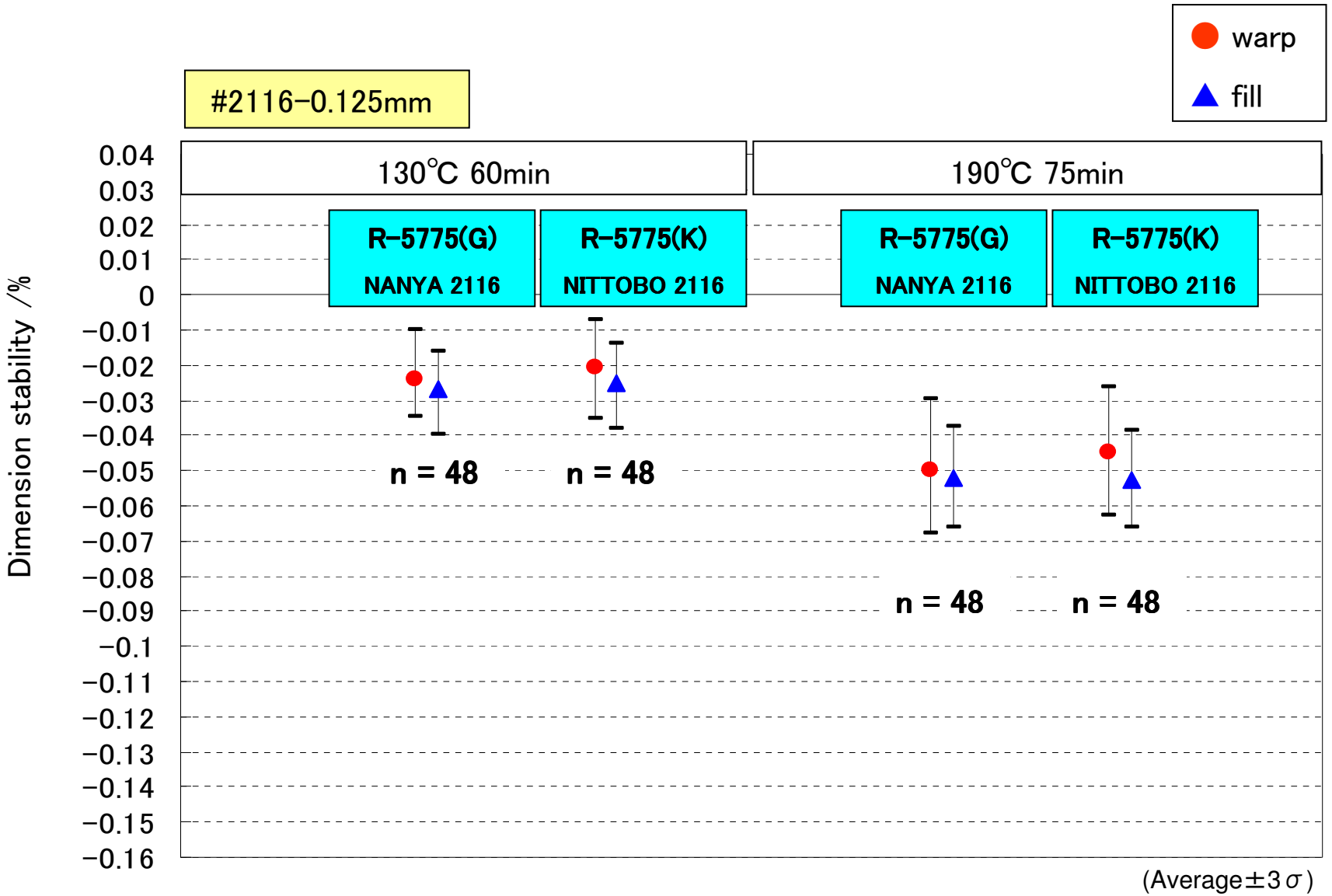


3-3. Dimensional Stability #3113(NANYA vs NITTOBO)



(Average±3σ)

3-4. Dimensional Stability #2116(NANYA vs NITTOBO)



4-1. CCL Thickness

■0.050 mm

Item / Glass cloth	Average (mm)	Max (mm)	Min (mm)	n	Tolerance (mm) (IPC classC)	Cpk
R-5775(G) / NANYA 1067	0.050	0.056	0.045	30	0.050±0.013	1.42
R-5775(K) / NITTOBO 1035	0.051	0.057	0.046	30	0.050±0.013	1.39

■0.075 mm

Item / Glass cloth	Average (mm)	Max (mm)	Min (mm)	n	Tolerance (mm) (IPC classC)	Cpk
R-5775(G) / NANYA 1078	0.076	0.081	0.073	30	0.075±0.013	1.47
R-5775(K) / NITTOBO 1078	0.075	0.080	0.072	30	0.075±0.013	1.48

4-2. CCL Thickness

■0.100 mm

Item / Glass cloth	Average (mm)	Max (mm)	Min (mm)	n	Tolerance (mm) (IPC classC)	Cpk
R-5775(G) / NANYA 3313	0.101	0.108	0.094	30	0.100±0.013	1.36
R-5775(K) / NITTOBO 3313	0.102	0.108	0.093	30	0.100±0.013	1.35

■0.125 mm

Item / Glass cloth	Average (mm)	Max (mm)	Min (mm)	n	Tolerance (mm) (IPC classC)	Cpk
R-5775(G) / NANYA 2116	0.126	0.138	0.115	30	0.125±0.018	1.65
R-5775(K) / NITTOBO 2116	0.126	0.137	0.116	30	0.125±0.018	1.67