

# MEC A/S

Solderability Test

of

Multimec Switches for Through Hole Mount



Title	Solderability Test of Multimec Switches for Through Hole Mount
Project No.	0511c Solderability Test of Multimec TH Switch
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(Test Temperature 235°C)

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(Test Temperature 235°C)

Appendix A.3 Test Data for Through Hole Components with Sn plated terminations.

(Test Temperature 265°C)

# **Report Concerning Project No.**

# **0511c Solderability Test of Multimec TH Switch**

### 1. **Problem Description**

The scope of this report is to verify the solderability of a Lead-Free and RoHS compatible switch (Multimec).

For the purpose of reference a Tin/Lead (SnPb) plated switch has been tested in a conventional SnPb solderability test process.

For the purpose of verifying backward compatibility a lead-free component has been tested in a SnPb solderability test process.

The solderability test temperatures have been chosen according to EN/IEC 60068-2-54.



The Through Hole Components with Tin/Lead plated Terminations are tested with SnPb solder at 235°C. The Components with Lead-free Terminations are also tested with SnPb solder at 235°C, furthermore they have been tested with a Lead-free Solder at 265°C.

#### 2. Applicable Documents

• EN/IEC 60068-2-54

### 3. Test parameters for Multicore MUST II

Depth:	1,77	Durn:	5	Clips:	1	Recpt:	Bath
Lead:	1	Space:		Temp:	se *	Range:	+/-1mN
				X-Section:	Rect	Diam:	
Width:	0,80	Thick:	0,30	TimeZero:	5,0	TimeBuoy:	5,0
Time 1:	2,0	Force 1:	0,16	Time 2:	5,0	Force 2:	0,14
Speed:	20	Solder:	se *	T to 2/3 Fmax:	5,0	Flux:	Rosin SM/NA

\*Test Temp/Solder: 235°C with Sn60Pb40 and 265°C with Lead Free Sn99.3Cu0.7Ni (SN100C)

### 4. Definition of Solderability Test



A Through Hole (TH) test object is dipped vertically into a solder Bath. The solderability can be defined from the wetting force according to EN/IEC 60068-2-54.





### 5. Work Description

For Verification of the Solderability the following has been carried out as reported in section 6:

6.1 Solderability Test according to EN/IEC 60068-2-54 of Components with **Tin/Lead** plated Terminations

50 components have been tested at **235°C** with **Tin/Lead** Solder in Bath (Sn60Pb40). See Appendix A.1



6.2 Solderability Test according to EN/IEC 60068-2-54 of Components with **Lead-free** plated Terminations

50 components have been tested at **235°C** with **Tin/Lead** Solder in Bath (Sn60Pb40). See Appendix A.2



6.3 Solderability Test according to EN/IEC 60068-2-54 of Components with **Lead-free** plated Terminations

50 Components have been tested at **265**°C with **Lead-free** Solder in Bath (Sn99.3Cu0.7Ni). See Appendix A.3



- 6.4 Comparison between three Types of Solderability Test
- 6.5 Summary Conclusion

### 6. Test results

6.1 Graphic Representation of 10 Tests of Through Hole Components with SnPb plated terminations. (Test Temperature 235°C)

Graphic Representation of 10 Tests selected from the Solderability Test.



Component	Graph No.	Test No.	Test Solder	Test Temp.
Туре			Bath	Bath
(Termination				
SnPb	1	26, 32,45	Sn60Pb40	235°C

### 6.2 Graphic Representation of 10 Tests of Through Hole Components with Sn plated terminations.

#### (Test Temperature 235°C)

Graphic Representation of 10 Tests selected from the Solderability Test.



Component Type (Termination finish)	Graph No.	Test No.	Test Solder Bath	Test Temp. Bath
Sn (Lead-Free)	2	70, 74, 80	Sn60Pb40	235°C

### 6.3 Graphic Representation of 10 Tests of Through Hole Components with Sn plated terminations.

(Test Temperature 265°C)

Graphic Representation of 10 Tests selected from the Solderability Test.



Test p	arameters
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Component Type (Termination finish)	Graph No.	Test No.	Test Solder Bath	Test Temp. Bath
Sn (Lead-Free)	3	131, 137, 156	Sn99.3Cu0.7Ni	265°C



### 6.4 Comparison between three types of Solderability Tests

The following Graphic Representations illustrate three Tests from each type of Solderability Test.



Ta Th	h = 5.0 h = 5.0			Test F1 = 0.35 F2 = 0.30	Limits 2 mN at 8 mN at	2.0s 5.0s	5.0s t Buoyanc	0 2/3 FMax 2y= -0.03
Te	est No	Та	Tb	F1	F2	T to 2/3	Dewettin	g Result
	26	0.342	0.351	0.53	0.59	0.621	0	PASS
1	32	0.335	0.345	0.49	0.64	1.274	0	PASS
	45	0.331	0.341	0.53	0.65	0.879	0	PASS
	70	0.605	0.620	0.72	0.73	0.817	1	PASS
2	74	0.529	0.551	0.76	0.75	0.773	2	PASS
	80	0.605	0.630	0.70	0.76	1.072	1	PASS
	131	0.368	0.373	0.81	0.79	0.456	12	PASS
3	137	0.347	0.352	0.80	0.78	0.449	15	PASS
	156	0.345	0.349	0.70	0.67	0.437	26	PASS

Component Type (Termination finish)	Graph No.	Test No.	Test Solder Bath	Test Temp. Bath
SnPb	1	26, 32,45	Sn60Pb40	235°C
Sn (Lead-Free)	2	70, 74, 80	Sn60Pb40	235°C
Sn (Lead-Free)	3	131, 137, 156	Sn99.3Cu0.7Ni	265°C



### 6.5 Summary Conclusion

The test has been conducted with a non-activated flux (SM/NA) and all the tested Through Hole components show acceptable wetting according to EN/IEC 60068-2-54. The solderability on the Lead-Free plating has been verified to a level comparable with the conventional tin-lead plating in a conventional tin-lead solderability process.



# 7. Appendix A

# Appendix A.1

Test Data for Through Hole Components with SnPb plated terminations. (Test Temperature  $235^\circ\mathrm{C})$ 

$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				Test	Limits		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Ta =	5.0	F1 =	0.352	mN at	2.0s	5.0s to 2/3 FMax
Test No   Ta   Tb   P1   P2   T to 2/3   Dewetting Result     14   0.345   0.353   0.55   0.73   1.353   0   PASS     15   0.347   0.359   0.51   0.58   0.835   0   PASS     16   0.347   0.357   0.46   0.55   0.955   0   PASS     17   0.347   0.367   0.66   0.57   0.948   0   PASS     19   0.328   0.340   0.54   0.67   0.948   0   PASS     21   0.356   0.47   0.55   1.232   0   PASS     22   0.351   0.587   0.67   0.548   0.487   0.588   0.997   0   PASS     24   0.344   0.351   0.531   0.55   0.932   0   PASS     25   0.342   0.310   0.54   0.641   0.621   0   PASS     26   0.342   0.345   0.444	Tb =	5.0	F2 =	0.308	mN at	5.0s	Buoyancy= -0.03
Test No   Ta   Tb   F1   F2   T to 2/3   Dewetting Result     14   0.347   0.353   0.55   0.73   1.353   0   PASS     16   0.347   0.357   0.44   0.51   0.903   0   PASS     17   0.347   0.357   0.46   0.55   0.955   0   PASS     18   0.349   0.367   0.46   0.55   0.908   0   PASS     20   0.344   0.352   0.466   0.556   0.908   1   PASS     21   0.356   0.371   0.45   0.55   1.232   0   PASS     22   0.351   0.367   0.468   0.621   1.229   0   PASS     23   0.345   0.368   0.48   0.62   1.229   0   PASS     24   0.342   0.351   0.53   0.59   0.621   0   PASS     25   0.342   0.345   0.44   0.49							
14   0.345   0.353   0.55   0.73   1.353   0   PASS     15   0.347   0.353   0.55   0.73   1.353   0   PASS     16   0.349   0.371   0.44   0.55   0.955   0   PASS     17   0.347   0.357   0.46   0.55   0.955   0   PASS     19   0.328   0.340   0.54   0.66   0.908   1   PASS     20   0.344   0.352   0.46   0.55   1.232   0   PASS     21   0.356   0.371   0.45   0.55   1.232   0   PASS     22   0.354   0.367   0.58   0.997   0   PASS     23   0.344   0.356   0.48   0.621   0.229   0   PASS     24   0.344   0.351   0.55   0.621   0.297   0   PASS     25   0.540   0.368   0.47   0.56   0.9		Tost No To	m b	121	77	m +o 2/2	Dewetting Pegult
12 0.333 0.335 0.73 1.333 0 PASS   15 0.347 0.359 0.51 0.535 0 PASS   16 0.347 0.357 0.46 0.55 0 PASS   18 0.347 0.357 0.46 0.555 0 PASS   19 0.328 0.340 0.54 0.67 0.948 0 PASS   20 0.344 0.352 0.46 0.556 0.908 1 PASS   21 0.356 0.371 0.45 0.657 1.370 0 PASS   22 0.351 0.367 0.46 0.62 1.229 0 PASS   24 0.344 0.358 0.48 0.62 1.229 0 PASS   25 0.354 0.368 0.47 0.58 0.997 0 PASS   26 0.342 0.351 0.55 0.680 0.911 0 PASS   29 0.335 0.345 0.44 0.49 0.812 0 PASS <td></td> <td>Test NO Ta</td> <td>10 252</td> <td>FT 0 22</td> <td>0 72</td> <td>1 252</td> <td>Demerring Kesnir</td>		Test NO Ta	10 252	FT 0 22	0 72	1 252	Demerring Kesnir
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$		36 0.335	0.340	0.47	0.50	0.970	
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$		30 0.347	0.354	0.30	0.01	0.949	
41 0.342 0.352 0.54 0.66 0.929 0 PASS   42 0.342 0.352 0.54 0.66 0.935 0 PASS   43 0.337 0.346 0.51 0.63 1.065 0 PASS   44 0.352 0.364 0.50 0.68 1.592 0 PASS   45 0.331 0.341 0.53 0.65 0.879 0 PASS   46 0.337 0.344 0.50 0.63 1.106 0 PASS   47 0.365 0.379 0.47 0.60 1.413 1 PASS   48 0.356 0.370 0.47 0.65 1.555 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 <td></td> <td>40 0 342</td> <td>0.349</td> <td>0.45</td> <td>0.57</td> <td>0 674</td> <td>0 PASS</td>		40 0 342	0.349	0.45	0.57	0 674	0 PASS
41 0.342 0.352 0.54 0.63 0.925 0 PASS   43 0.337 0.346 0.51 0.63 1.065 0 PASS   44 0.352 0.364 0.50 0.68 1.592 0 PASS   45 0.331 0.341 0.53 0.65 0.879 0 PASS   46 0.337 0.344 0.50 0.63 1.106 0 PASS   45 0.337 0.344 0.50 0.63 1.106 0 PASS   46 0.337 0.344 0.50 0.63 1.106 0 PASS   47 0.365 0.379 0.47 0.60 1.413 1 PASS   48 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 <td></td> <td>41 0 342</td> <td>0.352</td> <td>0.54</td> <td>0.66</td> <td>0 979</td> <td>0 PASS</td>		41 0 342	0.352	0.54	0.66	0 979	0 PASS
41 0.337 0.346 0.51 0.63 1.065 0 PASS   44 0.352 0.364 0.50 0.68 1.592 0 PASS   45 0.331 0.341 0.53 0.65 0.879 0 PASS   46 0.337 0.344 0.50 0.63 1.106 0 PASS   47 0.365 0.379 0.47 0.60 1.413 1 PASS   48 0.356 0.370 0.47 0.65 1.555 0 PASS   49 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.348 0.44 0.54 1.042 1 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.363 0.377 0.52 <td></td> <td>42 0 342</td> <td>0 352</td> <td>0.54</td> <td>0.64</td> <td>0 935</td> <td>0 PASS</td>		42 0 342	0 352	0.54	0.64	0 935	0 PASS
44 0.352 0.364 0.502 0.63 1.603 0 PASS   45 0.331 0.341 0.53 0.65 0.879 0 PASS   46 0.337 0.344 0.50 0.63 1.106 0 PASS   47 0.365 0.379 0.47 0.60 1.413 1 PASS   48 0.356 0.379 0.47 0.65 1.555 0 PASS   49 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.67 1.675 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 <td></td> <td>43 0.337</td> <td>0 346</td> <td>0.51</td> <td>0 63</td> <td>1 065</td> <td>0 PASS</td>		43 0.337	0 346	0.51	0 63	1 065	0 PASS
41 0.331 0.341 0.53 0.65 0.879 0 PASS   46 0.337 0.344 0.50 0.63 1.106 0 PASS   47 0.365 0.379 0.47 0.60 1.413 1 PASS   48 0.356 0.379 0.47 0.60 1.413 1 PASS   48 0.356 0.370 0.47 0.65 1.555 0 PASS   49 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.67 1.675 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 <td></td> <td>44 0 352</td> <td>0 364</td> <td>0 50</td> <td>0 68</td> <td>1 592</td> <td>0 PASS</td>		44 0 352	0 364	0 50	0 68	1 592	0 PASS
46 0.337 0.344 0.50 0.63 1.106 0 PASS   47 0.365 0.379 0.47 0.60 1.413 1 PASS   48 0.356 0.370 0.47 0.60 1.413 1 PASS   49 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   52 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   55 0.363 0.377 0.52 0.68 1.436 0 PASS   56 0.363 0.369 0.50 <td></td> <td>45 0 331</td> <td>0 341</td> <td>0 53</td> <td>0 65</td> <td>0 879</td> <td>0 PASS</td>		45 0 331	0 341	0 53	0 65	0 879	0 PASS
47 0.365 0.379 0.47 0.60 1.413 1 PASS   48 0.356 0.370 0.47 0.65 1.555 0 PASS   49 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.042 1 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 <td></td> <td>46 0.337</td> <td>0 344</td> <td>0.50</td> <td>0 63</td> <td>1 106</td> <td>0 PASS</td>		46 0.337	0 344	0.50	0 63	1 106	0 PASS
48 0.356 0.370 0.47 0.65 1.555 0 PASS   49 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.046 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.368 0.390 0.42 0 PASS   55 0.349 0.358 0.42 0 PASS   55 0.349 0.351 0.49 0.67 1.675 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   56 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS		47 0.365	0.379	0.47	0.60	1.413	1 PASS
49 0.360 0.369 0.53 0.68 1.394 0 PASS   50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   58 0.365 0.382 0.51 0.66 1.328 0 PASS   60 0.365 0.362 0.46 0.58 1.229 0 PASS   61 0.363 0.374 0.48 <td></td> <td>48 0.356</td> <td>0.370</td> <td>0.47</td> <td>0.65</td> <td>1.555</td> <td>0 PASS</td>		48 0.356	0.370	0.47	0.65	1.555	0 PASS
50 0.347 0.363 0.44 0.54 1.046 0 PASS   51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.67 1.675 0 PASS   54 0.368 0.349 0.64 1.123 0 PASS   54 0.368 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   55 0.363 0.377 0.52 0.68 1.436 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 <td></td> <td>49 0.360</td> <td>0.369</td> <td>0.53</td> <td>0.68</td> <td>1.394</td> <td>0 PASS</td>		49 0.360	0.369	0.53	0.68	1.394	0 PASS
51 0.337 0.349 0.45 0.56 1.004 0 PASS   52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.362 0.46 0.58 1.229 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		50 0.347	0.363	0.44	0.54	1.046	0 PASS
52 0.358 0.368 0.49 0.59 1.042 1 PASS   53 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		51 0.337	0.349	0.45	0.56	1.004	0 PASS
53 0.354 0.361 0.49 0.64 1.123 0 PASS   54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		52 0.358	0.368	0.49	0.59	1.042	1 PASS
54 0.368 0.380 0.49 0.67 1.675 0 PASS   55 0.349 0.358 0.42 0.54 0.847 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		53 0.354	0.361	0.49	0.64	1.123	0 PASS
55 0.349 0.358 0.42 0.54 0.847 0 PASS   56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		54 0.368	0.380	0.49	0.67	1.675	0 PASS
56 0.363 0.377 0.52 0.68 1.436 0 PASS   57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		55 0.349	0.358	0.42	0.54	0.847	0 PASS
57 0.365 0.380 0.48 0.65 1.571 0 PASS   58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		56 0.363	0.377	0.52	0.68	1.436	0 PASS
58 0.358 0.369 0.50 0.62 0.971 0 PASS   60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		57 0.365	0.380	0.48	0.65	1.571	0 PASS
60 0.365 0.382 0.51 0.66 1.328 0 PASS   61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS		58 0.358	0.369	0.50	0.62	0.971	0 PASS
61 0.351 0.362 0.46 0.58 1.229 0 PASS   62 0.363 0.374 0.48 0.60 1.185 0 PASS   65 0.363 0.374 0.48 0.60 1.185 0 PASS		60 0.365	0.382	0.51	0.66	1.328	0 PASS
62 0.363 0.374 0.48 0.60 1.185 0 PASS		61 0.351	0.362	0.46	0.58	1.229	0 PASS
		62 0.363	0.374	0.48	0.60	1.185	0 PASS
CO U.368 U.381 U.4/ U.34 I.113 1 PASS		65 0.368	0.381	0.47	0.54	1.115	1 PASS
67 0.356 0.370 0.46 0.58 1.352 0 PASS		67 0.356	0.370	0.46	0.58	1.352	0 PASS
69 0.375 0.388 0.51 0.66 1.465 0 PASS		69 0.375	0.388	0.51	0.66	1.465	0 PASS
				·			
Test parameters				Test	param	leters	

Component Type (Termination finish)	Graph No.	Test No.	Test Solder Bath	Test Temp. Bath
SnPb			Sn60Pb40	235°C



# Appendix A.2

Test Data for Through Hole Components with Sn plated terminations. (Test Temperature  $235^{\circ}$ C)

-	- <u> </u>		Test L	imits		F 0	t - 0 (0 T)(
ra = Th =	5.0	F1 = F2 =	0.352	mN at mN at	2.0s	5.0s Buova	to 2/3 FMax ncv = -0.03
	0.0	12 -	0.000	ac	0.00	24074	
	Test No	Ta Tb	F1	F2	T to 2/3	Dewetting	Result
	70	0.605 0.620	0.72	0.73	0.817	1	PASS
	72	0.572 0.595	0.09	0.00	0.092	1	PASS
	74	0.529 0.551	0.76	0.75	0.773	2	PASS
	78	0.555 0.578	0.77	0.75	0.802	3	PASS
	79	0.584 0.609	0.73	0.79	0.953	0	PASS
	80	0.605 0.630	0.70	0.76	1.072	1	PASS
	81	0.638 0.670	0.67	0.72	1.469	3	PASS
	82	0.587 0.613	0.70	0.77	1.025	0	PASS
	83	0.54/ 0.50/	0.75	0.74	0./8/	4	PASS
	85	0.050 0.000	0.57	0.00	0 965	3	PASS
	87	0.558 0.592	0.74	0.74	1.007	1	PASS
	88	0.638 0.672	0.65	0.76	1.365	ō	PASS
	89	0.514 0.538	0.71	0.73	1.071	2	PASS
	93	0.630 0.651	0.73	0.77	0.978	0	PASS
	94	0.563 0.590	0.73	0.72	0.944	3	PASS
	95	0.578 0.599	0.74	0.72	0.834	4	PASS
	96	0.550 0.569	0.78	0.79	0.765	Û	PASS
	97	0.717 0.703	0.51	0.62	1.520	2	DACC
	90	0.653 0.682	0.66	0.67	1.203	5	PASS
	100	0.649 0.678	0.65	0.63	1.183	<b>6</b>	PASS
	101	0.620 0.649	0.55	0.69	1.619	ō	PASS
	102	0.648 0.691	0.60	0.71	1.415	0	PASS
	103	0.635 0.666	0.69	0.68	1.065	5	PASS
	104	0.505 0.532	0.57	0.63	1.244	3	PASS
	105	0.598 0.625	0.63	0.73	1.086	0	PASS
	106	0.629 0.654	0.67	0.73	1.114	1	PASS
	107	0.643 0.688	0.53	0.63	1.473	1	PASS
	108	0.625 0.653	0.68	0.74	1.135	0	PASS
	109	0.559 0.582	0.75	0.77	0.876	1	PASS
	110	0.556 0.576	0.74	0.77	0.862	0	PASS
	112	0.074 0.094	0.72	0.75	0.042	7	PADD
	114	0.694 0.724	0.02	0.07	1 230	2	PASS
	115	0.578 0.604	0.70	0.74	1.206	1	PASS
	116	0.611 0.643	0.64	0.75	1.485	õ	PASS
	117	0.660 0.703	0.59	0.73	1.469	ŏ	PASS
	118	0.787 0.826	0.52	0.57	1.437	6	PASS
	119	0.574 0.622	0.58	0.63	1.516	8	PASS
	121	0.731 0.770	0.56	0.64	1.301	0	PASS
	122	0.565 0.594	0.71	0.69	0.979	5	PASS
	123	0.647 0.689	0.50	0.65	1.513	3	PASS
	124	0.624 0.673	0.51	0.65	1.671	1	PASS
	125	0.649 0.699	0.53	0.62	1.522	9	PASS
	126	0.679 0.720	0.60	0.73	1.506	2	PASS
	127	0.684 0.727	0.54	0.73	1.746	0	PASS
	128		0.65	0.75	1.312	U A	PASS
	TCA	0.005 0.700	U.04	0./5	1.440	U	FR00
			Test	parame	ters		

Component Type (Termination finish)	Graph No.	Test No.	Test Solder Bath	Test Temp. Bath
Sn (Lead-Free)			Sn60Pb40	235°C



# Appendix A.3

Test Data for Through Hole Components with Sn plated terminations. (Test Temperature  $265^{\circ}$ C)

			Test Li	mits			
Ta =	5.0	F1 =	0.352 m	Nat 2	.0s	5.0s	to 2/3 FMax
Tb =	5.0	F2 =	0.308 m	Nat 5	.0s	Buoya	ncy= -0.03
						_	-
	Test No Ta	Tb	F1	F2 T	to 2/3	Dewetting	Result
	130 0.379	0.384	0.79	0.72	0.465	21	PASS
	131 0.368	0.373	0.81	0.79	0.456	12	PASS
	132 0.354	0.358	0.87	0.87	0.437		PASS
	133 0 377	0 381	0 65	0 51	0.469	37	PASS
	134 0 351	0 355	0.05	0 72	0 441	21	PASS
	135 0.340	0.345	0 73	0.67	0 436	20	DACC
	126 0.354	0.340	0.64	0.56	0.445	24	DAGG
	107 0.0047	0.300	0.04	0.30	0.440	15	DICC
	120 0.347	0.352	0.00	0.70	0.449	15	PASS
		0.356	0.83	0.78	0.441	10	PASS
	139 0.352	0.358	0.75	0.73	0.450	18	PASS
	140 0.351	0.357	0.79	0.74	0.445	20	PASS
	141 0.363	0.368	0.68	0.64	0.456	22	PASS
	142 0.330	0.334	0.77	0.76	0.422	19	PASS
	143 0.349	0.355	0.72	0.76	0.443	12	PASS
	145 0.379	0.385	0.82	0.71	0.493	21	PASS
	147 0.351	0.356	0.69	0.67	0.444	26	PASS
	148 0.352	0.357	0.71	0.69	0.444	20	PASS
	149 0.354	0.358	0.69	0.63	0.447	28	PASS
	150 0.349	0.355	0.66	0.62	0.442	28	PASS
	151 0.358	0.363	0.75	0.73	0.447	20	PASS
	152 0.363	0.366	0.78	0.77	0.459	15	PASS
	153 0.354	0.359	0.72	0.68	0.444	24	PASS
	154 0.347	0.351	0.76	0.74	0.439	19	PASS
	156 0.345	0.349	0.70	0.67	0.437	26	PASS
	157 0.352	0.357	0.76	0.76	0.446	13	PASS
	158 0.351	0.356	0.73	0.72	0.441	18	PASS
	160 0.363	0.369	0.65	0.61	0.464	29	PASS
	163 0.382	0.388	0.65	0.59	0.480	32	PASS
	164 0.356	0.361	0.75	0.73	0.450	19	PASS
	165 0.349	0.354	0.69	0.66	0.440	26	PASS
	166 0.354	0.360	0.71	0.69	0.443	17	PASS
	169 0.356	0.362	0.66	0.60	0.451	32	PASS
	170 0.352	0.358	0.72	0.71	0.444	18	PASS
	172 0.368	0.372	0.80	0.78	0.455	15	PASS
	173 0.368	0.374	0.66	0.62	0.461	21	PASS
	174 0.351	0.356	0.69	0.69	0.440	21	PASS
	175 0 360	0 365	0 66	0 56	0 452	37	PASS
	176 0 358	0 363	0 77	0 74	0 447	16	PASS
	178 0 360	0.365	0 73	0 70	0 443	22	DASS
	179 0.363	0.368	0.66	0 59	0 458	33	PASS
	180 0 356	0.362	0.78	0.76	0 444	17	PASS
	181 0 347	0.352	0.72	0.68	0 435	20	DASS
	182 0 342	0 369	0 67	0.63	0.450	25	PASS
	183 0.303	0.356	0.75	0.00	0 440	22	PASS
	184 0 252	0 357	0.68	0 62	0 443	20	DAGG
		0.337	0.00	0.02	0.432	22	DASS
	186 0.344	0.349	0.75	0.71	0.432	20	PASS
		0.333	0.75	0.71	0 434	16	DAGG
		0.353	0.75	0.72	0.434	20 TO 0	DAGG
	100 0.349	0.334	0.00	0.04	0.443	20	DICC
	103 0.301	0.3/1	0.09	0.01	0.430	21	LUDD

Component Type (Termination finish)	Graph No.	Test No.	Test Solder Bath	Test Temp. Bath
Sn (Lead-Free)			Sn99.3Cu0.7Ni	265°C