Title: SOLDERABILITY REQUIREMENTS FOR TERMINALS OF COMPONENTS

Revision History Table

ECN No.	Rev.	Date	Originator	Details of change
41662	B	2-1-84		
50327	AC	12-14-88	L. SALMON	ALL
55470	AD	02-27-89	T. BURNETTE	1, 2
50375	AE	03-05-91	A. BOSSERT	1, 2
59430	AF	01-20-93	J. JONES	1, 2
DP119780	AG	09-13-06	R. ARNOLD	ALL

CONTROLLED AND REPORTABLE MATERIALS

The device must meet the requirements set by the latest version of the 12M40697W18 specification.

1. Controlled substances must not exceed the thresholds defined in Appendix A: Controlled Substances. (Exceptions must be reviewed with Continental defining the reasons before the component can be determined to be either acceptable or unacceptable.)

2. 100% material content reporting must be provided as part of device qualification.

Title: SOLDERABILITY REQUIREMENTS FOR TERMINALS OF COMPONENTS

1. SCOPE

This standard covers the requirements and tests for the solderability of component terminals intended for soldering onto etched electrical PWB circuits.

A. Application

This Standard is applicable ONLY to the solderability of components and is NOT applicable, in any way, to the electrical or mechanical performance of the component itself.

This standard provides procedures for evaluating solderability for the terminals of components with either conventional SnPb or Pb-free solder alloys

The objective of this specification is to ensure that the component lead or termination solderability is sufficient to produce acceptable solder joints consistent with the requirements of IPC-A-610.

B. Applicable Documents:

IPC-A-610: Acceptability of Electronic Assemblies
IEC-60068-2-58: Tests-Td: Test Methods for Solderability, Resistance to Dissolution of Metallization and to Soldering Heat of Surface Mounting Devices (SMD).

2. MANUFACTURER'S REQUIREMENTS

Specimens shall be tested in their "as-received" condition and meet all Component Engineering requirements as specified by the applicable component specification. These components shall represent normal production parts as prepared by the supplier for either wave or reflow assembly. The manufacturer shall plate the terminal as specified on the Continental component document. Plating shall be such that the manufacturer can demonstrate conformance to the requirements of this Standard for all solderable leads. Manufacturer shall provide test results indicating conformance to this standard as required by Continental.

2.1. Reporting

Supplier shall report the following information

a) Terminal finish (e.g. 90Sn/10Pb, Nordau, Matte Sn)
b) Plating stack-up (Identify individual Layer types)
c) Plating thickness per Layer
d) Sample Lot/Date Code information
e) Quantity of devices and/or leads tested

3. SOLDERABILITY TEST

Care should be taken not to contaminate the surfaces to be tested either by contact with the fingers, or by other means such as wiping, cleaning, scraping etc. Test shall be performed at room atmospheric conditions of 25°C ± 10°C and 25% to 75% RH.

Test shall be carried out in accordance with the requirements of IEC 60068-2-58 (the Table below supersedes IEC 60068-2-58 Section 10 Table) and as further detailed by the following (the numbers in () below refer to the corresponding sections in IEC 60068-2-58);

	Detail (applicable 60068-2-58 sub-clause/sub-section reference)	
Item description (60068-2-58 reference)	**Lead free solder alloy**	**Solder alloy containing lead**
Property to be tested (a)	Solderability (Clause/Section 1)	
Applicable test method (b)	Solder reflow method (Clause/Section 1)	
Solder temperature and duration (i)	245°C 3s (8.1.1)	230°C 30s (8.2.1)
Solder paste (j)	Indium SMQ230 per 1044345U01 (7.1.2.1)	Multicore RP15 per 1044346U01 (7.1.2.2)
Dimensional details of test substrate (k)	25mil Nominal thickness {Alumina 90-98%} of sufficient surface area for testing (7.1.3)	
Thickness of solder paste (l)	See Attachment 1 (7.2.2)	
Amount of solder paste (m)	See Attachment 2 (7.2.2)	
Placement procedure (n)	Automated machine assembly is preferred, but hand assembly is also acceptable. {Solder paste deposit must not be smeared or otherwise appreciably disturbed} (7.2.3)	
Pre-heating for solder reflow (o)	None	Default (8.2.2.1)
Temperature profile (p)	Default Group 3 profile (8.1.2.1)	Refer to TX05WI-3503 (8.2.2.2)
Removal procedure (s)	See Attachment 3 (9.1)	
Cleaning method (t)	See Attachment 4 (9.2)	
Areas of the terminations to be examined (v)	See Attachment 5 (9.3.1)	
Final inspection requirements and acceptance criteria (w)	95% Wetting (Max 5% Dewetting) of the surfaces indicated in Attachment 5 (9.3.1, 9.3.2)	
Note: Items c,d,e,f,g,h,q,r & u from IEC 60068-2-58, Clause/Section 10 do not apply since these items are outside the scope of evaluating solderability by the Solder reflow method		

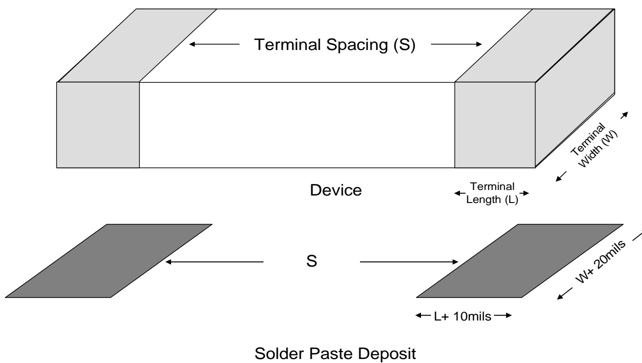
Attachment 1 - Thickness of solder paste

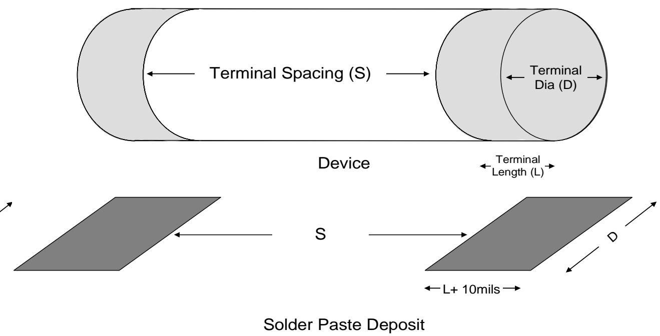
Device Type	Thickness
≤ 0402 Chips (e.g. Resistor, Capacitor, Inductor)	5mils
≤ 20mil Pitch Gull-Wing Leaded (e.g. QFP, TSOP, SOIC)	5mils
≤ 0.8mm Pitch BGAs	5mils
All Others*	6mils
*Through Hole Devices (e.g. Connectors) Require Special Instructions	

Attachment 2 - Amount of solder paste

Requirements: (Thickness per Part I, Area as follows) Note: Or as agreed up between Continental and user
1) For Passive Chip and Gull Wing Leaded Components refer to the following (stencil aperture dimensions are shown below each device lead type)
2) For all other device lead types, stencil apertures size shall follow DFM3 Guidelines (e.g. J and L leaded, QFN, etc)

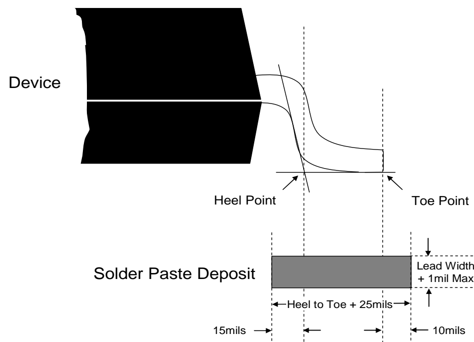
Device Type	Goal
Passive Components (Rectangular and Cylindrical Chips)	Areas shall be printed as follows, one for each terminal lead, based on nominal device dimensions Printed deposit shall be aligned with the inside edge of the terminal ends Printed deposit shall extend 10mils past the remaining three edges of each terminal lead edge





Device Type	Goal
Gull Wing Components	Areas shall be printed as follows, one for each terminal lead (using nominal device dimensions) Printed deposit shall be essentially the same width as the terminal lead (rounded up to nearest mil incremen Printed deposit shall extend 10mils past the Toe end and 15mils past the Heel end of the terminal lead Note: Refer to the following to determe where to set the Toe and Heel Points

Note: Applies to QFP, SOIC, TSOP and even non-heat sink leads of SOT



Attachment 3 - Removal procedure

Within 60 minutes of the test and after the specimen has been allowed to cool to room temperature, the flux residue shall be removed with MCF 800 from Henkel Corp. (or an alternative solvent agreed to by Continental and the supplier).

Attachment 4 - Cleaning method

1. Place the PCB/components in a heated (75 ^{o}C) MCF 800 pre-wash solution for 2 minutes.
2. Remove and ultrasonicate the PCB/components in a heated (75 ^{o}C) MCF 800 wash solution for 5 minutes.
3. Cool and agitate in a DI rinse for 5 minutes
4. Agitate in fresh DI rinse for 5 minutes
5. Place PCB/components in heated fresh DI rinse water (85 ^{o}C) and agitate for 2 minutes.
6. Hot air dry

Attachment 5 - Areas of the terminations to be examined

Requirements:
1) Surfaces of the terminal leads that contact solder paste during placement are required to exhibit 95% full wetting
2) Additionally, the same inspection criteria applies to solder that must wick or climb all exposed metal lead surfaces as indicated by the following

Device Type (See Appendix A, Critical Component Surfaces)	Sodler Wicking or Climbing Distance
"J" Leaded	2X Lead Thickness
Passive Components	
Rectangular Chips	1/4X Lead Thickness or 0.5mm whichever is less
Cylindrical Chips	1/4X Lead Diameter or 0.5mm whichever is less
Gull Wing Leaded	1X Lead Thickness
Leadless Chip Carriers	2/3X Metallized Lead Thickness
"L" leaded Components	1X Lead Thickness

Exclusion:
terminal lead areas that are cut or trimmed after lead plating for soldering (e.g. sides of some QFN and Toe ends of some gull wing leaded devices)

Notes:
a) Refer to and Annex A (Criteria for Visual Examination)
b) Nominal device dimmensions apply