



Corporate Quality Network GOVERNING SPECIFICATION

Intel Board Assemblies and Module Product Ecology Marking Requirements

25-GS1035

Revision 1

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1.0 PURPOSE AND SCOPE

The purpose is to establish Intel Printed Circuit Board Assembly (PCBA) and board module marking requirements in order to identify material content of the bare board, board finish and component mounting solders as an aid for rework/repair and recycling end-of-life electronic assemblies. It also outlines marking requirements for China's Management Methods for Controlling Pollution by Electronic Information Products (commonly known as China Restriction of Hazardous Substances or China RoHS) and finally, establishes Printed Circuit Board (PCB) marking requirements for the EU Waste Electrical and Electronic Equipment (WEEE) Directive.

This specification ensures:

- Intel board products are marked in accordance with industry standard IPC/JEDEC J-STD-609,
- Intel board products are marked in accordance with environmental legal requirements (e.g. China RoHS and EU WEEE Directive) and
- Intel business groups are using the same methodology of board and board module marking.

This specification provides high level guidance to a portion of the IPC/JEDEC J-STD-609 which is applicable to Intel-branded products. Intel's component marking specification is the Standard Package Marking Criteria (see Reference).

The scope includes all Intel printed circuit boards (except Digital Health Group (DHeG) products, which are covered within their own document quality system) that require ecology labeling to identify material content. All products in scope of this document will comply with applicable sections of J-STD-609, China RoHS and WEEE.

Out of Scope: All optional items contained in J-STD-609 as well as non-ecology regulatory markings, container markings, shipping package markings and component markings.

Component markings are included in the Standard Package Marking Criteria Specification. Non-environmental product regulatory markings (e.g. Safety, EMC, and Wireless) are covered by other Corporate Quality Network (CQN) Specifications.

For customer-specific marking requirements, references to the customer documents can be found in the corresponding Statement of Work (SOW) for those products.

2.0 BUSINESS REQUIREMENTS

All Intel Divisions and Business Units, except DHeG, shall follow the guidelines set forth in this specification.

3.0 OPERATIONAL PROCEDURES

3.1 General

Business units are to include ecology markings on their products accordingly, as specified in Appendix A. Business units may adopt customer-specific requests as appropriate. For new business operations and/or new product types not aligned to Appendix A, please contact Corporate Product Regulations and Standards (CPRS) for additional guidance.

3.2 Pb / Pb-Free and HF Markings

3.2.1 General

This portion of the specification details the markings for PCB and PCBA. The marking consists of 1) the board surface finish (prior to assembly), 2) the composition of the solders used to mount the components to the PCB and 3) the board halogen content.

Board Surface Finish: This mark is used to describe the predominant board finish on the bare board. b0 through b6 describe the material categories.

b0	Contains Pb, traditional SnPb, Hot Air Solder Level (HASL) or solder reflow
b1	Pb-Free HASL, Sn alloys with no bismuth or zinc
b2	Immersion silver (Ag)
b3	Sn (electrolytic or immersion)
b4	gold (electrolytic or immersion), electroless nickel immersion gold, nickel gold
b5	screened carbon (carbon ink)
b6	organic solderability preservative (OSP)

Interconnect Solder / Material for Component Mounting: This mark is used to describe the solder(s) used to mount the components to the PCB.

Note: this mark designates a Pb/Pb-Free solder, but does not describe the Pb that may or may not exist in a component, e.g. Pb in resistors, or Pb in the first level interconnect.

e0	Contains intentionally added Pb
e1	Tin-silver-copper (SnAgCu)
e2	Tin alloys with no bismuth or zinc, excluding SnAgCu
e3	Sn
e4	Precious metal (e.g. Ag, Au, NiPd, NiPdAu (no Sn))
e5	SnZn or any tin-zinc alloys and not including Bismuth.
e6	Contains Bismuth
e7	Low temperature solder containing indium (In) with no Bismuth.
e8	Low Silver (Ag) mixture (Ag <= 1.5%)

HF: The Halogen-Free (HF) mark should be applied to bare printed circuit boards whose resins plus reinforcement matrix contain a maximum halogen content of 1500 ppm, with less than 900 ppm for bromine and chlorine, each. This mark should be interpreted to denote the chemical makeup of the PCB base material (HF) and not the entire assembly. The absence of the HF mark implies the use of a halogen-containing base resin and reinforcement matrix.

3.2.2 Symbol

The **board surface finish** symbol ranges from **b0** to **b6**, depending on the material content.

The **2nd Level Interconnect Material** symbol ranges from **e0** to **e8**, depending on the material composition.

The **HF symbol** is simply the letters **HF**

The **Pb-Free symbol** may be used in place of the words "Pb-Free". If the board is marked Pb-Free, the entire assembly must be Pb-Free, including all components without exemptions.



3.2.3 Color

Bare board surface finish designation, 2nd level termination finish and HF marks shall have a color that provides sufficient contrast.

3.2.4 Mark Location and Application

Marking of the PCB/PCBA should be located on the topside at the lower right-hand segment, next to the part/serial number on the board or next to the company logo. The marking sequence should be clearly identifiable and separate from other board markings. If there is insufficient room, alternative locations may be specified with the procurement documentation.

3.2.5 Mark Dimension and Font

The minimum mark size should be legible to corrected, unmagnified vision.

3.2.6 HF Legal Disclaimer

The HF legal disclaimer must be provided in product declarations when the HF board mark is applied on the PCB or label (per Halogen-Free Board Definition of IPC/JEDEC J-STD-609). This disclaimer is maintained at the Intel Legal Website under approved disclaimers (See References). If there are any questions, please contact your business unit attorney or EHS Legal.

Note: The HF Mark applies to the halogen content of the bare PCB base materials.

3.2.7 Pb-Free Legal Disclaimer

The Pb-Free legal disclaimer must be provided in product declarations when the board is marked as Pb-Free (or Pb-Free 2LI) per IPC/JEDEC J-STD-609. The appropriate disclaimer is maintained at the Intel Legal Website under approved disclaimers (See References). If there are any questions, please contact your business unit attorney or EHS Legal.

3.3 China RoHS Markings

3.3.1 General

Electronic information products shall be marked with pollution control symbols to indicate if a product contains any restricted materials exceeding the maximum concentration value.

3.3.2 Symbols

The symbols (logos) below are used to mark the boards for compliance with China Management Methods for Controlling Pollution by Electronic Information Products (referred to in industry as "China RoHS") as specified in the *Marking for Control of Pollution Caused by Electronic Information Products SJ/T11364* document.

1. This symbol used when the product does not contain any of the restricted materials above the Maximum Concentration Value (MCV):



The "e" in the artistic style at the middle of the logo stands for electrical, electronic and environmental, signifying green and environmental electronic information products; the outer, curved arrows form a circle, demonstrating that the electronic information products can be recycled. The entire logo indicates that this electronic information product does not contain any toxic or hazardous substances or elements, and is green and environmental. The logo also signifies that the product can be recycled after being discarded.

2. This symbol is used when the product contains restricted chemicals:



Note: The number in this symbol is only for demonstration. When in actual use, it shall be replaced with the corresponding environmental protection use period of the product (see below).

This symbol is normally orange, making prominent the attribute of caution, specifically meaning that the products contain certain toxic or hazardous substances or elements. The replaceable number in the middle of the logo indicates the environmental protection use period for the electronic information product. The logo's outer border is also a circle formed by curved arrows, demonstrating that the electronic information product can be recycled. The entire logo means that this electronic information product contains certain toxic or hazardous substances or elements, and can be used safely during its environmental protection use period.

3.3.3 Color

The marking shall be clear, distinguishable, visible, hard to fade and hard to remove.

3.3.4 Mark Location and Application

The marking shall be clear, distinguishable, visible, hard to fade and hard to remove.

3.3.5 Mark Dimension and Font

The marking shall be clear, distinguishable, visible, hard to fade and hard to remove.

3.3.6 EPUP Product Lookup Table

Please mark boards in accordance with proper EPUP label, as found in Attachment B of *General Guidelines of Environment-friendly Use Period of Electronic Information Products SJ/Z11388-2009* (shown below). It is intended to use as a basis for industry to follow in determining a normative use period.

Communications Equipment Products	EPUP # [Years]
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a) Network communications products	50
b) Handsets	20
c) Telephone sets	20

Computer Industry Products	
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a) Workstations	20
b) Microcomputers	10
c) Notebook computers	10
d) Printing equipment	10
e) Scanners	10
f) Projectors	10
g) Digital cameras	10
h) LCD Displays	10
i) [Solid State] Storage Devices	20
j) Floppy disk drives	10
k) POS systems	10

Others	
---------------	--

a) Electrical light sources	10
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3.4 EU WEEE Marking

3.4.1 General

Board assemblies and modules shall be marked with the wheelie bin symbol as detailed below.

3.4.2 Symbol

The symbol indicating separate collection for electrical and electronic equipment consists of the crossed-out wheeled bin is:



3.4.3 Color

The symbol must be printed visibly, legibly and indelibly.

3.4.4 Mark Location and Application

The symbol must be printed visibly, legibly and indelibly. See section 3.4.5 for additional details.

3.4.5 Mark Dimension and Font

The symbol's relational dimensions must be preserved (Figure 1).

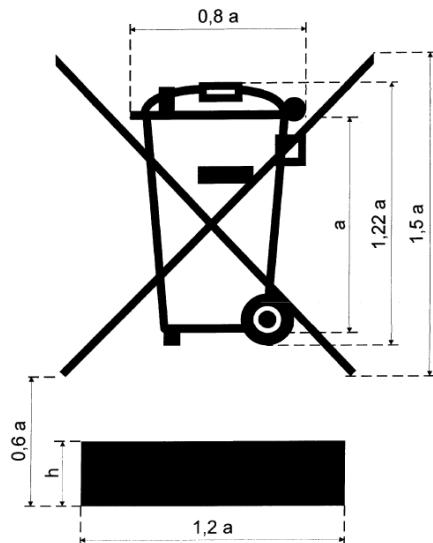


FIGURE 1. EU WEEE WHEELIE BIN ARTWORK

NOTE: If the product is too small in size to support the minimum size WEEE Label (7mm height x 4mm width, see Document EN50419 in References) then alternately, the marking shall go onto product packaging and into the user documentation (operating instructions and warranty certificates). The symbol should be placed on the lowest level box (i.e. retail packaging, clam shell, etc.).

3.5 Material Content Verification

Confirm the material content of the board aligns with the markings. Verification may be achieved through the business unit's due diligence business processes, e.g. material analysis and data evaluation from various tools and procedures. Consult the Product Ecology or Product Regulations Engineer for further guidance.

4.0 ROLES AND RESPONSIBILITIES

Role (Person, Forum, Org)	Responsibilities
Corporate Product Regulations and Standards (CPRS)	Provide corporate guidance regarding industry ecology and regulatory standard requirements which impact Intel business processes.
PRE / BU Ecology Representative	<p>Provide feedback to CPRS on business unit practices and products during industry standards development or updates.</p> <p>Ensure the marking requirements as outlined in this specification are incorporated into product design requirements and information is disseminated to appropriate stakeholders (e.g. board layout designers).</p>

5.0 REFERENCES

Description	Location
IPC/JEDEC J-STD-609 Marking and Labeling of Components, PCB's and PCBA's to Identify Lead (Pb), Pb-Free and Other Attributes	http://www.jedec.org/
WEEE: EUROPA > European Commission Website	http://ec.europa.eu/environment/waste/wEEE/legis_en.htm
WEEE: EN 50419 Marking of electrical and electronic equipment in accordance with Article 11(2) of Directive 2002/96/EC (WEEE)	http://moss.amr.ith.intel.com/sites/cprs/ecology/PE_Web/Product%20Take-Back/EOL_Product_Take_Back.aspx
China RoHS: Marking for Control of Pollution Caused by Electronic Information Products SJ/T11364-2006	http://goto/ChinaRoHS
China RoHS: General Guidelines of Environment-friendly Use Period of Electronic Information Products SJ/Z 11388-2009	http://goto/ChinaRoHS
Intel Legal's Green Marketing Website	http://legal.intel.com/Marketing/Green+Marketing.htm
Pb-Free & HF Legal Disclaimers	http://legal.intel.com/Marketing/notices+and+disclaimers.htm
40-0404 Standard Package Marking Criteria Specification (Component Labeling)	http://vfa.intel.com
Additional Markings – Please see the CPRS Website	http://moss.amr.ith.intel.com/sites/cprs/Pages/Default.aspx
DHeG Product Regulatory Compliance	SOP-7-009 (Located within DHeG's Product Data Management System, requires authorized access)

6.0 REVISION HISTORY

Rev	Date	Description	Owner
1	November 2011	Owner change; Additional Approver for JEDEC representation changed	Sheri Williams per Chelsea Beck
0	May 2010	New spec replacing GG-1035. Class 1 Approval (significant changes from GG) <ul style="list-style-type: none">• Formatting changed from Group Guideline to Governing Spec.• Updated reference to new IPC/JEDEC J-STD-609A.1 (May 2010).• Added China RoHS and EU WEEE Directive marking requirements.• Removed references to shipping packaging markings and component, container markings (this is captured in other specifications).	Allyn Clevinger

7.0 GLOSSARY

ACRONYMS:

BUWG	Business Unit Working Group
CPRS	Corporate Product Regulations and Standards
CQN	Corporate Quality Network
DHeG	Digital Health Group
EFUP	China RoHS term: Environmental Friendly Use Period
EPUP	China RoHS term: Environmental Protection Use Period (preferred over EFUP in US market)
EU WEEE	European Union Waste Electrical and Electronic Equipment Directive (2002/96/EC)
HASL	Hot Air Solder Level
HF	Halogen Free
HST	Hazardous Substance Table
MCV	Maximum Concentration Value
Pb	Lead
PCB	Printed Circuit Board (also known as bare fab or bare board)
PCBA	Printed Circuit Board Assembly
PRE	Product Regulations Engineer
PVC	Polyvinyl Chloride
RoHS	Restriction of Hazardous Substances Directive (2002/95/EC)
SOW	Statement of Work



















DEFINITIONS:

CHINA RoHS - China Restriction of Hazardous Substances. China RoHS is officially known as China Management Methods for Controlling Pollution by Electronic Information Products (Ministry of Information Industry Order 39)

HALOGEN FREE (HF) – Applies only to halogenated flame retardants and PVC. Halogens are below 900 ppm bromine and 900 ppm chlorine.

MODULE – Integrated circuits mounted on a printed circuit board and designed for use in personal computers, workstations and servers. The module may stand on its own or may need to be integrated with other boards to make a system operable or ready for retail sales. The modules may or may not have additional enclosures. This specification applies to the board level module before the addition of a full or partial enclosure.

8.0 APPENDIX A: MARKING SUMMARY

Product Item	Mark Location	Marking Requirements				
		Required	Pb-Free J-STD-609A.1	China RoHS MII Order 39	EU WEEE EN 2002/96/EC	Halogen Free * J-STD-609A.1
Server	Board, unless otherwise noted	Pb-Free categories for assembly solder types. Appropriate HF, PB-Free marking, PB-Free logo 2nd Level Interconnect. Number in China RoHS EPUP mark must be based on BU. All 3 marks must be indelible and legible	Example graphic:  See Sect 4.1, 5.2.2, 5.3.2			HF (Per Sect 5.1.1)
NICs	Board, unless otherwise noted	Pb-Free categories for assembly solder types. Appropriate HF, PB-Free marking, PB-Free logo 2nd Level Interconnect. Number in China RoHS EPUP mark must be based on BU. All 3 marks must be indelible and legible	Example Graphic  See Sect 4.1, 5.2.2, 5.3.2			HF (Per Sect 5.1.1)
Reference Design Vehicles	Board, unless otherwise noted	Pb-Free categories for assembly solder types. Appropriate HF, PB-Free marking, PB-Free logo 2nd Level Interconnect. Number in China RoHS EPUP mark must be based on BU. All 3 marks must be indelible and legible	Example graphic:  See Sect 4.1, 5.2.2, 5.3.2			HF (Per Sect 5.1.1)
Wireless	Board, unless otherwise noted	Pb-Free categories for assembly solder types. Appropriate HF, PB-Free marking, PB-Free logo 2nd Level Interconnect. Number in China RoHS EPUP mark must be based on BU. All 3 marks must be indelible and legible	Example graphic:  See Sect 4.1, 5.2.2, 5.3.2	 Marking is in China HST not on board due to limited board size.	 Marking is in online user docs, not boards, due to limited size.	HF (Per Sect 5.1.1)
SSDs	Board, unless otherwise noted	Pb-Free categories for assembly solder types. Appropriate HF, PB-Free marking, PB-Free logo 2nd Level Interconnect. Number in China RoHS EPUP mark must be based on BU. All 3 marks must be indelible and legible	Example graphic:  See Sect 4.1, 5.2.2, 5.3.2			HF (Per Sect 5.1.1)
Desktop/Motherboard	Board, unless otherwise noted	Pb-Free categories for assembly solder types. Appropriate HF, PB-Free marking, PB-Free logo 2nd Level Interconnect. Number in China RoHS EPUP mark must be based on BU. All 3 marks must be indelible and legible	Example graphic:  See Sect 4.1, 5.2.2, 5.3.2			HF (Per Sect 5.1.1)

* Legal Disclaimer Must Be Included In the Product Declaration Sheet