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RoHS COMPLIANCE AND GREEN PACKAGE POLICY
(subject to change without notice)

1. GENERALITIES

European Union regulatory agencies have enacted or proposed limits that will restrict the amount of lead (Pb), specific heavy metals and halogen containing compounds in the future. Those propositions have been issued under the European Union Directive RoHS 2002/95/EC. EM Microelectronic is working to insure that its products will meet the requirements of the European Union Directive.

In accordance with environmental concerns, the need for RoHS compliant / Green solutions in electronic components and systems is receiving increasing attention within the semiconductor and electronics industries. EM Microelectronic is committed to work with its customers and subcontractors to be able to offer products which meet their specific requirements in this area.

The need for halogen-free solutions is also of concern to the semiconductor industry. EM Microelectronic is working with its subcontractors to use so-called "Green" mold compounds, die attach epoxy and substrates that do not contain halogens (chloride and bromine) or antimony (Sb2O3).

As of April 1st 2006, all products delivered by EM will be "Green", meaning that they are compliant with the weight limits of the Commission Decision of 18 August 2005 regarding the RoHS 2002/95/EC directive. Table 1 shows the official definitions of the three currently used terminologies.

Weight limits as per RoHS 2002/95/EC directive

Table with 7 columns: Substances, Weight limit (ppm), CAS number, UE declaration, Lead-free, RoHS, Green (material). Rows include Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent chromium (Cr+6), Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Antimony (Sb2O3), Chlorine (Cl), and Bromine (Br).

Table 1

Occasionally the word "lead-free" might appear in EM documentation: in this case, EM Microelectronic actually means that its product conforms to the RoHS requirements including the weight limits defined by the RoHS 2002/95 /EC directive indicated above and is Green. "Leaded" means that the products are neither lead-free nor RoHS compliant/Green.



## 2. QUALIFICATION and AVAILABILITY

EM Microelectronic is currently carrying out the qualification of both RoHS compliant and Green products in parallel with its subcontractors. The qualification is made individually for each **package family**.

To date most packages have been qualified. Very few are still under qualification. Today EM provides samples of RoHS compliant products in qualified Green packages upon request. The standard lead time to receive Green samples is usually 7 weeks for most products. Please contact your local EM sales office for samples, ordering quantity, pricing and lead times. EM Microelectronic encourages its customers to request Green engineering samples today.

### STATUS OF QUALIFICATION

Package (note 1)	Pin Count	Sn/Pb Parts	RoHS Parts		Lead frame finish	Qual
		MSL	MSL	Dry Pack		
SOT23	3, 5	1	1	No	Matte Tin	Done
SC70	3, 4, 5	1	1	No	Matte Tin	Done
SOT144	8	1	1	No	Matte Tin	Done
SOT223	3	1	1	No	Pure Tin	Done
SOIC	8	1	1	No	Matte Tin	Done
SOIC	14 to 28	2	2	No	Matte Tin	Done
SOIC RTC	28	2	2	No	Matte Tin	Done
PSOP	16	3	3	Yes	Matte Tin	Done
PDIP/DIL	8 to 28	N/A	N/A	N/A	Matte Tin	Done
TSSOP	8	1	1	No	Matte Tin	Done
TSSOP	16 to 28	2	2	No	Matte Tin	Done
MQFP	44	3	3	Yes	Matte Tin	Done
MQFP	52	3	3	Yes	Matte Tin	Done
TO92	3	1	1	No	Pure Tin	Done
TAB		N/A	N/A	N/A		Done
Smart card	module					Done
TQFP	28 to 64	3	2	No	Matte Tin	Done
PLCC	28, 44	3	3	Yes	Matte Tin	Done
MLF	32	2	3	Yes	Matte Tin	Done
CID pack	2	1	1	No	Ag	Done

**Note 1:** All Green packages will be with laser marking only

**Table 2**

The **reflow profile for soldering** complies with JEDEC J-STD-020 standards at 260°C peak temperature, for RoHS soldering compatibility. Matte tin (Sn), Pure Tin, Ag, SnAgCu or NiPdAu are used to replace conventional SnPb as the plating material (see Table 2). Assistance or services regarding soldering processes are available from third parties specialized in this field.

For a specific product, the Moisture Sensitivity Level (MSL) might be different for the RoHS compliant/Green version than for its leaded counterpart. If the MSL is "3" for a given RoHS compliant package, this means that the product will be delivered in Dry Pack. The consequences of having to use Dry Pack might have an impact on handling and logistics.



### 3. ORDERING RoHS COMPLIANT/GREEN PRODUCTS, PART NUMBERING, DATASHEETS

Summary of differences between leaded and RoHS compliant products, using examples:







	Leaded Product	RoHS compliant Product
<b>Part Numbering</b> Customer uses this number when ordering	EM6325CYP5B-2.9 EM6353BX2SP3B-2.9 V6309LSP3B V6300FTO3E H6060V15SO8A	EM6325CYP5B-2.9+ EM6353BX2SP3B-2.9+ V6309LSP3B+ V6300FTO3E+ H6060V15SO8A+
<b>Package marking</b> What is seen physically printed on the package	■ SOT23 and SC70 package (top): ANCU ALWH AEAL  ■ All other packages: varies by product   	■ SOT23 and SC70 package (top): BNCU BLWH BEAL  ■ All other packages: There will be a <b>vertical bar</b> to the right of the usual (leaded) marking   
<b>Label</b> What comes outside a reel or an antistatic bag.		The wording "GREEN/RoHS 2002/95/EC" is printed (note 1).  
<b>Datasheet</b>	Existing. Ordering information is for leaded products.	Most datasheets are not updated for the moment; <b>please add a "+" symbol at the end of the part number when ordering to receive RoHS compliant /Green part.</b>

Table 3

#### Part Numbering:

This is the number shown in a datasheet and used for ordering parts. There is a slight change in part number for a RoHS compliant product. All packaged RoHS compliant/Green products will have a "+" symbol attached at the end of the traditional (leaded) part number. When ordering RoHS compliant products, the customer should always add this "+" symbol at the end of the part number.

*Example:* EM6325CYP5B-2.9 (leaded) ; EM6325CYP5B-2.9+ (RoHS compliant /Green)

#### Package Marking:

The package marking, or top marking, is what is physically printed on the outside of the package and can be used for traceability. All Green packages will be with laser marking only.

- ❑ For **SOT23 and SC70 packages only** (all pin count), concerning a majority of voltage supervisory IC products, the top marking is a four-letter mark. For leaded products, the top marking begins with the letter "A", whereas for Green products, it begins with the letter "B", the following three characters remaining the same (e.g. ANCU = EM6325CYP5B-2.9 (leaded) ; BNCU = EM6325CYP5B-2.9+ (Green)).
- ❑ For **all other packages**, there is a vertical bar printed to the right of the usual (leaded) marking

#### Label:

The label is attached to the outside of the reel or of the antistatic bag containing the products.

For RoHS compliant/Green products, the wording "GREEN/RoHS 2002/95/EC" is printed on the label. One can also verify that the "Part #" has a "+" symbol at the end.

#### Note 1:

On the top left corner of the label appears a 4 or 5 digit number. This is an internal sales number which is usually of no use to the customer. For a RoHS compliant product, this number will either end with a letter "G" or be greater or equal to 6000. Otherwise it refers to a leaded product (e.g. 4237 = leaded ; 4237G = Green , 6005 = Green)



#### Datasheet:

Most datasheets today contain part number and top marking information for ordering leaded products. At the moment, in order to avoid confusion between leaded and RoHS compliant/Green products in the same document, EM Microelectronic does not plan to update individual datasheets to reflect RoHS compliant information outlined above. The update of all EM datasheets is planned for 2006, as the deadline of 1<sup>st</sup> July 2006 approaches. Please use the information contained in this document to order RoHS compliant products. **When ordering a Green product, simply always add a “+” symbol at the end of the part number.**

## 4. REPORTS and OFFICIAL DOCUMENTS

All reports or certificates mentioned below are available on request to [info@emmicroelectronic.com](mailto:info@emmicroelectronic.com).

- Test results and qualification documents are available from EM Microelectronic and their subcontractors:
  - **Qualification Report** by package, prepared by EM subcontractor (assembly house)
  - **Final Test Report** also by package type, prepared by EM Microelectronic. This document is a simple test sheet with “pass/no pass” .
- An official EM **RoHS Compliant Certificate** will be available by package type, shortly upon completion of their qualifications by EM. This certificate is a declaration of substances contained in a given package and it is delivered by EM.
- Material Composition** reports are available.

Please note that independent reports about EM RoHS compliance can be obtained from third companies. For such reports (material composition analysis report) or for an independent analysis of EM Green products, it is the customer's sole choice and benefit to contact the independent companies for organising such analysis of EM RoHS compliant /Green devices.

In all cases, EM customer shall remain responsible for:

- any change made to EM product,
- insuring the compatibility with its soldering process,
- handling its own stock management,
- qualifying the product within its application,
- verifying box labelling, date-code (MSL), product marking.

## 5. TRANSITION, PRODUCT DISCONTINUATION

The transition to RoHS compliant/Green products started on 1<sup>st</sup> July 2005 allowing EM customers to plan their own transition well before the deadline of 1<sup>st</sup> July 2006. The conversion date is between July 2005 and 31<sup>st</sup> March 2006. It is EM's goal to provide only RoHS compliant product by 31<sup>st</sup> March 2006.

In the transition to Green products, **an official PCN (PCN # 05004) has been issued** by EM Microelectronic-Marine SA to its customers in July 2005. For ASIC products, EM will work closely with customers to gradually replace the products containing potentially harmful materials with equivalent RoHS compliant/Green products.

EM MICROELECTRONIC, April 2006