

# APTOS Technology

## RoHS Specification

Revision Date: January 31, 2006

Supersedes: Any previous revision date

Bestan, Inc. and APTOS Technology, hereto referred to as APTOS Technology, have developed this RoHS Specification to establish material requirements for all suppliers providing parts and/or materials to APTOS Technology. This RoHS specification is in effect for all materials that are subject to the requirements of the European Unions Directive 2002/95/EC, Restriction on the use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS). The European Unions Directive 2005/618/EC sets the maximum allowable levels of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs) and/or polybrominated diphenyl ethers (PBDEs) in certain electrical and electronic equipment.

This specification applies to all materials, parts, components and/or products (whether finished or semi-finished) that have this RoHS specification cited on or in their APTOS technology part number, drawing, part or product specification, purchase order or other documentation.

### **RoHS Compliant Materials/Parts:**

Any parts, materials, products or components covered by this specification may not contain more than the maximum concentration levels shown in Table 1 of RoHS restricted substances. These levels apply to the substance as well as any compounds containing the substance.

**Table 1**

| <u>Substance</u>                       | <u>Maximum Concentration Level</u> |
|--|------------------------------------|
| Lead (Pb)                              | 0.1% by weight/1000 ppm*           |
| Mercury (Hg)                           | 0.1% by weight/1000 ppm            |
| Hexavalent Chromium (Cr+6)             | 0.1% by weight/1000 ppm            |
| Cadmium (Cd)                           | 0.01% by weight/100 ppm            |
| Polybrominated Biphenyls (PBBs)        | 0.1% by weight/1000 ppm            |
| Polybrominated Diphenyl Ethers (PBDEs) | 0.1% by weight/1000 ppm            |

\*Maximum limit (ppm) on Lead (Pb) does not apply to applications for which the RoHS Directive has granted exemptions. See Exemptions section below.

### **Compliance Verification:**

APTOS Technology suppliers should be prepared to meet RoHS requirements no later than April 1, 2006, so that APTOS Technology can provide sufficient lead time to allow its customers time to meet the July 1, 2006 deadline. Supplier must maintain records on RoHS compliance, including all analytical and laboratory test data regarding RoHS substances as well as any test data or RoHS certifications provided to suppliers by their suppliers. Suppliers must make these records available to APTOS Technology upon request. Upon reasonable request, APTOS Technology is willing to enter into confidentiality agreements regarding these records.

Certified analysis should be performed on “homogeneous materials”, including for sample preparation and test standards. Certified analysis should be performed using a reference EPA (or equivalent) test method that is performed at an ISO 17205 accredited (or equivalent) laboratory.

### **High Temperature Requirements:**

APTOS Technology recognizes the inherent changes in requirements when switching to a lead free processing environment. A higher processing temperature requirement indicates a need for better insulator material to be able to withstand temperatures that can reach 260° C. APTOS Technology has established a new part number system to address the RoHS Directive requirements as well as High Temperature processing requirements.

APTOS Technology will add a “-G” at the end of all part numbers that are RoHS compliant. A “V” will also be inserted into the part number ahead of the plating code to ensure that all pin and plating materials meet the RoHS requirements. For High Temperature processing requirements, An “F” will be placed ahead of the “G” to signify a part that is capable of withstanding High Temp processing.

APTOS Technology parts with the “-G” designation at the end of the part number must meet all the requirements in the “RoHS Compliant Materials/Parts” section above. These parts will have less than maximum allowable levels of RoHS restricted substances. Insulator materials in these parts are able to withstand most conventional processing with high peak temperatures of 230 °C or less. Insulator material may consist of but not limited to PBT, Nylon66, and Low Grade Nylon-6T.

APTOS Technology parts with the “-FG” designation at the end of the part number must meet all the requirements in the “RoHS Compliant Materials/Parts” section above. These parts will have less than maximum allowable levels of RoHS restricted substances. Insulator materials for these parts must be able to withstand higher processing temperatures. APTOS Technology “-FG” parts must be able to withstand a max processing temp of 250-260° C for limited periods of exposure for use in Reflow and other SMT processing methods. Insulator material may consist of but not limited to High Grade Nylon-6T, Nylon-9T, Nylon46 and LCP.

Future requirement will move toward a fixed max temperature requirement of 260° C as specified in Joint Industry Standards (IPC/JEDEC J-STD-020C).

### **Definitions:**

*Homogeneous Material:* A material that cannot be mechanically disjointed into different materials. The term “homogeneous” means “of uniform composition throughout.” Examples of “homogeneous materials” are individual types of: plastics, ceramics, glass, metals, alloys, paper, board, resins and coatings. An electronic connector that consists of metallic pins surrounded by a non-metallic insulator material is an example of a “non-homogeneous material” because the different materials could be separated by mechanical process. In this case the limit values of the directive would apply to each of the separated materials individually.

*Mechanically Disjointed:* Means that materials can be, in principle, separated by mechanical actions such as for example: unscrewing, cutting, grinding, crushing, and abrasive processes.

*RoHS:* Refers to the European Union’s Directive 2002/95/EC on the Restriction of Hazardous Substances in Electrical and Electronic Equipment, adopted February 2003, as amended.

*RoHS Compliant:* Material, part, product or component that does not exceed the RoHS restricted substances levels set forth in the “RoHS Compliant Materials/Parts” section of this specification or that is exempt under RoHS.

## **Exemptions:**

The following applications are exempt from the requirements of the RoHS directive.

Lead (Pb) in glass of cathode ray tubes, electronic components and fluorescent tubes.

Lead (Pb) as an alloying element in steel containing up to 0.35% by weight or 3500 ppm, as an alloying element in aluminum containing up to 0.4% or 400 ppm, or as an alloying element in copper containing up to 4% or 40000 ppm.

Lead (Pb) in high melting temperature type solders (ie., Lead-based alloys containing more than 85% by weight or more lead).

Lead (Pb) in electronic ceramic parts (e.g., piezoelectric devices).

Mercury (Hg) in compact fluorescent lamps not exceeding 5 mg per lamp; mercury (Hg) in straight fluorescent lamps for special purposes, and mercury (Hg) in straight fluorescent lamps for general purposes not exceeding 10 mg for halophosphate, 6 mg for triphosphate with normal lifetime, and 8 mg for triphosphate with long lifetime.

Mercury (Hg) in other lamps not specifically above.

Lead (Pb) in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission as well as network management for telecommunications..

Spare parts for the repair of electrical and electronic equipment put on the market before July 1, 2006 and replacement components that expand the capacity of and/or upgrade electrical and electronic equipment placed on the market before July 1, 2006 (if the spare parts are for products sold to customers before July 1, 2006).

Reuse of electrical and electronic equipment placed on the market before July 1, 2006.

Hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators.

Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/333/EEC amending Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations (except that such cadmium in cadmium plating is subject to the 75 ppm maximum concentration level specified in Table 1 above).

DecaBDE in polymeric applications.

Lead (Pb) used in compliant pin connector systems.

Lead (Pb) as a coating material for the thermal conduction module c-ring.

Lead (Pb) and cadmium in optical and filter glass.

Lead (Pb) in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight.

Lead (Pb) in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages.