Q & A about RoHS Compliance Products

Q-1: Which RoHS exemptions clauses are adopted by NeoPhotonics' products?

A: the below exemption clauses have been conditionally adopted by NeoPhotonics:

5a. Lead in glass of cathode ray tubes.

6a. Lead as alloying element in steel for machining purpose and in galvanized steel containing up to 0.35% lead by weight.

6b. Lead as alloying element in aluminum containing up to 0.4% lead by weight.

6c. Copper alloy containing up to 4% lead by weight.

7b.Lead in solder for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission, and network management for telecommunications;

7c1.Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound;

Note: *Available RoHS exemption clauses are updated based on the latest EU commission decision amending for RoHS (2011/65/EU) annex exemptions.*

Q-2: What is the definition for lead-free product?

A: NeoPhotonics lead-free definition, 2nd level interconnect homogenous materials of Products do not contain lead (Pb) in concentrations greater than 0.1wt%, other materials are RoHS compliant.

Note: *The definition of a 2nd level interconnect is the interconnection made by the attachment of a device or component to the printed circuit board.*

Q-3: What is RoHS 5/6 or RoHS 6/6 compliance product?

A: The designations RoHS 5/6 and RoHS 6/6 are not official terms in the EU RoHS legislation. They are terms commonly used in the telecommunications industry to describe products which fall under the lead exemptions described in clause 7b of the Annex in the 2011/65/EU RoHS directive. Neophotonics supplies products which meet these designations according to the definitions shown below.

①**RoHS 5/6 product:** products which utilize the "lead in solder" exemption and are restricted to use in telecommunications networking infrastructure applications; Lead (Pb) is contained ONLY in solder, component lead finishes, and/or the resulting joint formed in the soldering process. Except for the specific applications listed in "RoHS Exemptions", the component and materials do NOT contain RoHS restricted substances greater than:

a) Quantity limit of 0.1% (1000 PPM) for: Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE); and b) Quantity limit of 0.01% (100 PPM) for: Cadmium

②**RoHS 6/6 product:** Products which do not utilize the "lead in solder" exemption and are suitable for use in broader applications. Except for the specific applications listed in "RoHS Exemptions", the components and materials do not contain RoHS restricted substances greater than: a) Quantity limit of 0.1% (1000 PPM) by weight at raw homogenous materials level for: Lead (Pb), Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE); and b) Quantity limit of 0.01% (100 PPM) by weight at raw homogenous materials level for Cadmium

Q-4: Which markings, symbols or labels distinguish lead-free products?

A: According to the standard of IPC-1066, all lead-free and RoHS compliant products must have a special lead-free symbol mark on the lowest level shipping package container. If space permits, the product should be marked with the special lead-free symbol.

For examples of the lead-free symbol and relevant labels please refer to the figures below.

Figures-1: the lead-free symbol

Figures-2: the label attached to the product if space permits.

Figures-3: the label attached to the lowest level shipping package container, e.g. a carton.

Q-5: Which tests have been performed to ensure lead-free/RoHS compliant products reliability?

A: Testing of all NeoPhotonics products is based on the Telcordia standard for reliability assurance of opto-electronic products, GR-468 CORE. Tests include mechanical shock, frequency conversion vibration, temperature cycling, damp heat, accelerated aging life test, and others.

Q-6: What is NeoPhotonics' position on tin-whisker growth in its lead-free products?

A: NeoPhotonics continues to monitor tin-whisker growth during accelerated aging of representative lead-free products, following test protocols published in the technical literature. At present there are no finalized industrial or international standard test conditions or requirements. However, to date tin-whisker growth in NeoPhotonics products is consistent with published data from other sources, and NeoPhotonics does not believe that there is a significant risk of electrical shorts in its lead-free products due to tin-whisker growth.