



DEVELOPMENT COMPANY
Established 1947

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Manufacturer of Ceramic Capacitors and Zinc Oxide Varistors

Maida Development Company's Environmental Statement of RoHS-Compliance for Metal Oxide Varistor Products

RoHS 2 Definition:

Quantity limit of 0.1% by mass (1000 PPM) in homogeneous material for: Lead (Pb), Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE) and quantity limit of 0.01% by mass (100 PPM) of homogeneous material for Cadmium

Maida Development Company (MDC) now supplies all metal oxide varistors (MOVs) to be compliant with the Restriction of Hazardous Substances (RoHS) regulations of EU Directive 2011/65/EU that officially became effective on July 1, 2011. After July 1, 2011, RoHS-compliant varistors will be the standard varistor construction manufactured and supplied by all MDC factory locations, unless non-compliant MOVs are specifically required or allowed by the customer's purchase order. For the manufacture of RoHS-compliant varistors, only RoHS-compliant raw materials and processing aids are used. RoHS-compliant varistor part numbers and minimum part markings required for safety agency recognitions will not change. Instead, all packaging containers for RoHS-compliant varistors will bear an established "No-Lead / RoHS Compliant" emblem or label for ease of recognition.

Ceramic electronic parts are specifically exempted from the requirements of EU Directive 2011/65/EU effective on July 1, 2011. Nonetheless, Maida understands the need for downstream RoHS-compliance of our customers' products and we are pleased to provide varistors that are RoHS-compliant.

Customers who require or can accept non-RoHS-compliant varistors should so state on all requests for quotation and purchase orders. Otherwise all varistor items will be manufactured to be RoHS compliant.

Rationale for proof of compliance

For the purpose of chemical assay consistent with RoHS definitions, a metal oxide varistor is a heterogeneous assembly of homogeneous constituent parts. A homogeneous constituent is one of uniform composition that cannot be mechanically separated into parts of differing composition. "Mechanically separated" means separation by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes". Homogeneous materials include individual types of ceramics, glass, metals, alloys, and plastic coatings. Using these descriptions, a bare ceramic element is considered to be "homogeneous" throughout because it consists exclusively of one ceramic formulation. As a result, the maximum concentration limits of the RoHS Regulations would apply separately to that ceramic formulation.

Conversely, a fully assembled metal oxide varistor component may comprise several separable homogeneous constituents including but not limited to: (1) the ceramic element with the fired-on (fused) screen-printed electrodes, (2) the electro-tin plated wire terminals, (3) the solder alloy that bonds the terminals to the electrodes, and the plastic encapsulant that insulates the varistor from its electrical environment. The RoHS maximum concentration values would apply separately to each homogeneous member. If each member constituent itself satisfies the maximum allowable RoHS ppm concentrations, then the aggregate concentrations, in whatever ratio they may be adjoined, likewise cannot exceed allowable RoHS ppm concentrations. An exception would be if some extraneous fugitive processing aid(s) were to contaminate the finished product beyond the allowable limits.

By design Maida Development Company uses only RoHS-compliant raw materials and processing aids in the construction of lead-free varistors. Each such raw material is supported by a vendor-supplied Certificate of Compliance and/or a Certificate of Chemical Assay from an internationally recognized 3rd-party laboratory showing RoHS-compliance. In addition, certificates from 3rd-party laboratories support RoHS-compliance for exemplar samples of homogeneous ceramic elements made by Maida representing each of the several varistor ceramic formulations in current usage.

The above compilation of vendor-supplied proofs of RoHS-compliance for raw materials, plus third-party Certificates of Analysis showing RoHS-Compliance for the homogeneous ceramic elements manufactured by Maida Development Company, constitute de facto evidence that Maida's varistor products incorporating only these ingredients are also RoHS-compliant. Statements and Certificates of RoHS-Compliance issued by Maida Development Company are based upon this rationale.



Ceramic elements with fired-on electrodes. As in the prior art, Maida's sintered MOV ceramic elements with screen-printed, fired-on electrodes remain lead-free and RoHS compliant.



Lead wires and terminals. Sn/Pb solder-plated hardware of the prior art has been replaced by lead-free pure tin plated copper hardware.



Immersion solder for assembly. The Sn/Pb/Ag alloy previously used has been changed to lead-free Sn/Ag solder or Sn/Ag/Cu solder.



Conformal epoxy coating. Prior art epoxy contained a very minor lead content to facilitate laser marking. An RoHS-compliant epoxy that utilizes the same resin/filler system is now used.



Lead-free RoHS compliant bill-of-materials. No ingredients or process materials known to contain lead in excess of RoHS limits are added to the MOV components.



Verification of RoHS compliance. Internationally recognized third-party laboratory assays will be used to detect and report incidental process contamination by any named RoHS materials.



Available Documentation. A standardized **Material Declaration Data Sheet** (MDDS) plus third-party **Certificates of Analysis** from recognized test labs are available upon request. The third party assay Certificate for finished varistor components may be a generically representative report for an item that closely approximates the construction of the varistor part number(s) requested. As a practical matter the costs of third-party analyses and time delays involved would be prohibitive if applied to each of the thousands of standard and custom designs that Maida offers. The format of the **MDDS** is in accordance with the **Material Composition Declaration Guide** and **EIA Material Declaration Template** sponsored jointly by the Electronic Industry Alliance (EIA), European Industry Association (EICTA), and Japan Green Procurement Survey Standardization Initiative (JGPSSI).

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