



90 Industrial Way
Wilmington
MA 01887-4610

main: 978.284.4000
fax: 978.284.4999
www.mkstinst.com

MKS Policy for Researching China RoHS Chemical Composition Data

Revision A

2-7-07

This process describes the method used by MKS to develop chemical composition information of our products – with respect to the RoHS6 chemical list cited in the China RoHS legislation.

The intent of process is to provide our “best effort” estimate of chemical composition to our customers – who require this information to comply with their China RoHS labeling requirements.

MKS will use the following estimation methods:

1. **Lead (Pb): Use the default value of 37% of the weight of all solder sources and add 1000 PPM to the total.** This default value is based on the following logic:
 - The predominant presence of Pb in any MKS product is the solder used for electrical connections & solder flash on PC boards.
 - The recommended approach for determining the mass of PCBA solder is to weigh a PCB assembly before and after soldering of all its components to determine the amount of solder present.
 - MKS and its suppliers typically used 63/37 tin/lead solder in the fabrication process – so 37% (370K PPM) of the solder is lead.
 - Additional solder used to form joints in connectors, wiring, etc is presumed to be of the same solder ratio.
 - No other significant sources of Pb are expected in any parts used in the MKS design; however, an additional 1000 PPM is included to cover any trace amounts of Pb any discrete electronic components (either active or passive), mechanical parts, plating, paints, etc.
 - **NOTE: The Pb value for a product will drop to the 1K PPM “trace value” if all assemblies are soldered using a RoHS compliant process.**

2. **Mercury (Hg): Use the default value of X% of the weight of the relevant part groups and 100 PPM to the total** This default value is based on the following logic:
 - There is no intentional addition of Hg in the design of an MKS product.
 - Possible sources of Hg may be present in some purchased parts (e.g. level/tilt switches, lamps etc).
 - The value of X% will be determined using industry input from manufacturers of the above commodities – if used in the applicable MKS design.
 - No other significant sources of Hg are expected in any parts used in the MKS design; however, an additional 100 PPM is included to cover any trace amounts of Hg any discrete electronic components (either active or passive), mechanical parts, plating, paints, etc.



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3. **Cadmium (Cd): Use the default value of X% of the weight of all cable assembly and related part groups and add 50 PPM to the total.** This default value is based on the following logic:
 - There is no intentional addition of Cd in the design of an MKS product.
 - Based on industry input from major manufacturers, Cd is an undesirable substance and not used.
 - No other significant sources of Cd are expected in any parts used in the MKS design; however, an additional 50 PPM is included to cover any trace amounts of Cd any discrete electronic components (either active or passive), mechanical parts, plating, paints, etc.

4. **Hexavalent Chromium (Cr6): Use the default value of X % of the weight of the relevant part groups and add 100 PPM to the total.** This default value is based on the following logic:
 - There is no intentional addition of Cr6 in the design of an MKS product.
 - Possible sources of Cr6 may be present in some purchased parts (e.g. on wave-guides, sheet metal coatings [anodize, chemical films, iridite, alodyne], conversion coatings, casting coatings, primers etc.).
 - The value of X% will be determined using industry input from manufacturers of the above commodities – if used in the applicable MKS design
 - No other significant sources of Cr6 are expected in any parts used in the MKS design; however, an additional 100 PPM is included to cover any trace amounts of Cr6 any discrete electronic components (either active or passive), mechanical parts, plating, paints, etc.

5. **Polybrominated Biphenyl (PBB): Use the default value of 100 PPM for any product.** This default value is based on the following logic:
 - There is no intentional addition of PBB in the design of an MKS product.
 - Based on industry input from major manufacturers, PBB is a generally banned substance and not used.
 - No other significant sources of PBB are expected in any parts used in the MKS design; however, a 100 PPM “adder” is included to cover any trace amounts of PBB any discrete electronic components (either active or passive), mechanical parts, plating, paints, etc.

6. **Polybrominated Diphenyl Ether (PBDE): Use the default value of X% of the weight of relevant part groups and add 100 PPM.** This default value is based on the following logic:
 - There is no intentional addition of PBDE in the design of an MKS product.
 - Possible sources of PBDE - used as a flame retardant -may be present in some purchased parts (e.g. bare pc boards, plastic parts, connectors, insulators/insulation, etc.).
 - The value of X% will be determined using industry input from manufacturers of the above commodities – if used in the applicable MKS design
 - No other significant sources of PBDE are expected in any parts used in the MKS design; however, an additional 100 PPM is included to cover any trace amounts of PBDE any discrete electronic components (either active or passive), mechanical parts, plating, paints, etc.