mks
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MKS Policy for RoHS Conversion of Electrical Components October 6, 2006

As you are no doubt aware, the Restriction of Hazardous Substances (RoHS) Directive took effect in the EU on July 1, 2006. This directive calls for the elimination of 6 substances (Lead, Mercury, Cadmium, Hexavalent Chromium, PBE & PBDE) from any product (within the scope of the directive) delivered to the EU after 7/1/06. The implementation of this directive has had a dramatic impact on the OEM component part suppliers as they update their product lines to eliminate the substances that are now banned by the RoHS Directive. The vast majority of the MKS product line is not covered by the RoHS directive, however, there has been and continues to be an increasing effect on MKS due to the conversion of the supply chain to RoHS compliance.

Until recently, MKS has been able to use its multiple franchised distributors to obtain the leaded parts previously made by the OEM component manufacturers. However, as the OEM component supply chain drives to full conversion of RoHS parts, MKS is finding that our supplier lead times (and in some cases costs) are continuing to increase for the leaded parts previously provided. This lead-time extension is a direct consequence of the OEM component manufacturer's conversion to RoHS compliance and the resulting reduction in demand for the older, leaded parts.

As a result of this industry wide conversion, MKS has determined that we must convert our component parts to the newer RoHS versions - in order to ensure a consistent flow of material and thus ensure on-time product delivery to our customers. In parallel with our concern of uninterrupted supply, MKS also understands the need to ensure proper control over changes to material in our supply chain. As such, we have evaluated the various scenarios that represent typical change situations that occur today and their potential affect on our product functionality. The result of that evaluation is that MKS has adopted a policy, which describes our method for controlling changes driven by RoHS compliance and the resulting "mixed technology" assemblies. This policy has been developed to ensure the most effective conversion of parts to RoHS compliance- while still managing to maintain direct control over the product performance.

Please be advised that this policy relates to RoHS conversion changes only. There will be no change in policy for any other existing change control agreements in place. MKS wants to reassure our valued customers that we are committed to executing the conversion to RoHS in an effective manner that will ensure uninterrupted supply of our products. In addition, we recognize that global regulations will continue to change over time. As such, this policy may be revised periodically to address the ever-changing needs of global environmental regulation.

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The following policy "rules" will be used by MKS when making electrical component changes due to the OEM manufacturer's conversion to LF/RoHS. This obligatory policy is enacted to assure continued production of MKS products as component manufacturers discontinue production of non-RoHS parts. This policy is necessary due to the hundreds of part number changes that occur weekly now that the EU RoHS directive in effect.

1. This policy will be used - **by all MKS business units** - when making RoHS conversion changes to products under a customer "Copy Exact" agreement.

2. LF/RoHS compliant parts listed as "fully backwards compatible" by the OEM manufacturer will be used as a direct substitute in all MKS circuit assemblies – as they become available.

    a. Where applicable, BoM changes will be made to note the new LF/RoHS part number. As RoHS parts are added to the AVL, the non-RoHS equivalents will be removed.

3. Until a fully RoHS compliant BoM is developed, a mix of LF/RoHS compliant parts will be used to build PC assemblies using our standard "leaded" solder processes. This decsion is based on OEM manufacturer & industry recommendations that using LF/RoHS parts in a "leaded" process can be done without degradation to product quality & reliability.

    a. No LF (SAC alloy) solder will be used to build MKS assemblies until all parts are confirmed as 100% LF/RoHS compliant.
    b. Conversions to a SAC/RoHS/LF manufacturing process will be submitted for customer approval using an ECO. These changes will typically occur at the end item level and likely include a P/N change to indicate complete RoHS compliance.

4. When changes are made, they will be done using the "levels" listed in Table 1.

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Table 1

Change Level	Change Type	MKS Design Change Status	Expected Product Performance Impact	MKS Implementation Effectivity	Customer Communication
1	No physical change to existing AVL component. Change to new Mfg part number to identify as RoHS	None	None expected. No testing or qualification will be done	Immediate – upon availablity	None
2	Change only to component lead finish. All component specifications remain the same (with or w/o P/N change)	None	None expected. Standard product testing will be performed (but no new qualification will be done)	Immediate – upon availablity	None
3	Similar part - but specifications not identical to existing AVL component (may have change of P/N or OEM manufacturer)	May require in-circuit qualification, re-layout of PCB. No change in circuit function	None expected – but MKS testing (only) will be done to confirm	Upon successful completion of internal testing	Notification Required
4	Use of entirely new part/technology	Will require new circuit design to accommodate new part	Effect on top level functionality. New testing and/or qualification will be done. Data provided to customer w/change	Upon Customer Approval	Approval Required