



WHITE PAPER SERIES

Mill Compliance To EU Directive 2002/95/EC ‘RoHS’

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The “ Restriction of Hazardous Substances” or “RoHS” covers Cadmium, Hexavalent Chromium, Lead, Mercury, PBB and PBDE. Which of these substances is likely to be of concern for copper and copper alloy strip?

PBB/PBDE:

Polybrominated biphenyles, (PBB), and polybrominated diphenyl ethers, (PBDE) are manufactured chemicals added to plastics as flame retardants. The decomposition temperature of PBB and PBDE is below the melting temperature of copper. At 800°C, PBB and PBDE are undetectable. The recommended temperature for treatment of waste PBB and PBDE is 1,000°C and the melting point temperature for copper is 1083°C. Many copper alloys require even higher melting temperatures which makes the presents of PBB and PBDE extremely unlikely. PMX purchases raw materials free from coatings and plastics – sources of PBB and PBDE are therefore avoided.

Chromium (VI):

The hexavalent oxidation state of chromium does not exist in metal. The most common sources for hexavalent chromium , (Cr VI), are produced by industrial processes such as chromium manufacturing and processing plants. PMX does not chrome plate copper or copper alloy strip product. We do not use HVC in any processing operations nor are they contained in any machinery.

Mercury: (Hg) and its compounds:

The low boiling point of Mercury at 357°C, precludes its presence in copper and copper alloy strip products.

Cadmium:

Cadmium (Cd), Lead (Pb) and their compounds are the only other substances covered under RoHS to consider. For cadmium the RoHS requirement limit is 0.01% by weight. PMX excludes any Cd bearing alloy scrap (alloys like C14300, C14310) from our RAW MATERIALS/SCRAP stream. Statistical analysis and heat sampling of copper and copper alloys cast at PMX Industries indicate that the concentration of cadmium to be well below the 0.01% by weight limit. To further support and eliminate the uses of Cd, PMX has developed alloys to replace Cd bearing alloys like C14300, C14300, and C16200. PMX alloys offer the benefits and performance of Cd bearing alloys (softening and arc quenching) while providing a Cd free solution.

Contact your representative for information on our Cd alloy substitutes, i.e. XP10 and XP11.

Lead:

Historically lead is added to copper alloys for improved machinability. In key stock, lead allows ease of chip breaking when the key is machined to fit a particular lock pattern. One of the most common alloys used is the free machining alloy C35300 which contains from 1.5 to 2.5 % lead.

Additionally, solder coatings containing a mixture of tin and lead have been used to reduce soldering temperatures or prevent Sn whiskers. These coatings were used for corrosion protection, assistance in solderability and for providing a gas tight contact mating surface for connectors.

The RoHS standard limits lead to 0.1% by weight. PMX can easily monitor scrap and melting practices for the presence of lead and tightly control this impurity during alloy formulation. PMX Industries does not manufacture lead containing copper alloys or coat strip with solder coatings. All scrap used in casting is of non-leaded stock without solder coatings. In fact, all PMX alloys are RoHS “LEAD FREE”.

To compliment our RoHS Lead-Free Alloy offering, PMX also has developed a series of Lead-Free Solder Coatings based on the popular Sn-Ag-Cu standard. These coatings are available pre-plated on our strip/coil alloys and provide added benefits including:

- Continuous operation at 150°C
- Cost effective replacement for pure Ag
- Reduced insertion force
- Enhanced fretting performance

PMX is not addressing other mills' abilities or systems used to control lead levels. The purchaser should ask for statements of compliance from each source of material. PMX can provide IMDS numbers upon request.

PMX maintains our ability to control and monitor compliance to the EU directive 2002/95/EC through close attention to raw material and scrap streams as well as employing analytical techniques during material formulation.

In conclusion, alloys and coatings are available that meet or exceed the requirements of the RoHS directive. PMX controlled formulations and coating alternatives assure the end user of material which meets the RoHS directive. Our product development staff will work with designers on solutions for specific manufacturing and end use requirements.

For additional information or help with your material needs contact the technical staff at PMX industries by calling 1-800-531-5268 or e-mail sales@ipmx.com. Please visit our website at www.pmxindustries.info

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