

Environmental Protection Program

Management and Reduction of Chemical Substances

While chemical substances are essential for our daily life, without proper management, these can have grave effects on the environment. Oki Electric is well aware of this fact and is striving to limit the use of chemical substances.

1. Chemical Substance Management

Chemical substances used for production as well as in products and those, which seriously effect the environment, are classified as prohibited substances and voluntarily restrict substances.

Prohibited and voluntarily restricted chemical substances

Classification	Number of substance types	Management method	Examples
Prohibited substances	46	Substances which are prohibited for use	Trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, Chlorofluorocarbon (CFC), halon, etc.
Voluntarily restricted substances	114	Substances that are monitored in terms of amounts used in production or contained in products, the use of which needs to be reduced.	Relevant laws and regulations controlling substances, industry voluntary restricted substances, carcinogens, etc.

2. PRTR (Pollutant Release and Transfer Registers) System Related Activities

PRTR system provides a way to monitor the release of polluting substances into the environment. A law for the implementation of PRTR was enacted in July, 1999 and the first report prepared in accordance with this law is expected to be filed beginning April 2002.

Oki Electric was implementing the PRTR system before the enactment of this law, and since 1997, the system has been in place for the reduction of toxic chemicals in accordance with the guidelines provided by the Electronic Industries Association of Japan. The following table contains results data provided in accordance with the reporting format that will take effect from 2002.

FY2000 Records of PRTR Activities

(Unit: tons)

Substance	Usage	Discharge amount				Transfer amount	
		Atmospheric release	Release to public water	Ground release	Land fill inside a site	Transfer as waste	Transfer to sewage
Hydrogen fluoride and hydrogen fluoride compounds	131.26	0.06	0.63	0	0	0	0.03
Xylene derivatives	56.59	11.08	0	0	0	45.51	0
2-Amino ethanol	40.75	7.34	0	0	0	33.41	0
Nickel	15.01	0	0	0	0	0	0
Formaldehyde	10.29	0.01	0	0	0	1.73	0
Water-soluble copper salt	6.35	0.01	0	0	0	1.86	0
1-1-dichloro-1-fluoroethane	4.26	4.14	0	0	0	0	0
N-N-dimethylformamide	3.68	0.66	0	0	0	3.02	0
Toluene	3.63	2.59	0	0	0	1.04	0
Lead and lead compounds	3.12	0	0	0	0	0	0
Ethoxy-ethyl acetate	2.99	0.54	0	0	0	2.45	0
Pyrocatechol	2.22	0.4	0	0	0	1.82	0
Nickel compounds	1.54	0	0	0	0	0.83	0
Chlorobenzene	1.51	0.27	0	0	0	1.24	0
Total	283.2	27.1	0.63	0	0	92.91	0.03

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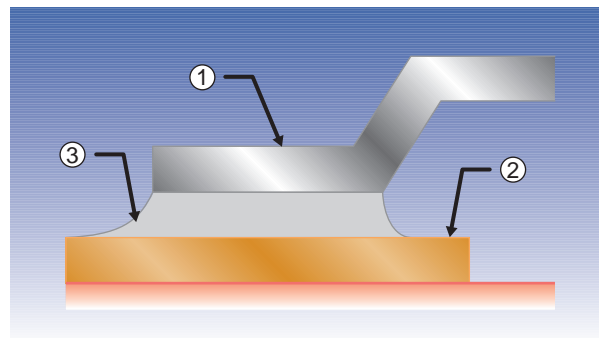
3. Elimination of Lead Solder

Solders which include lead, as a part of their composition, are used to connect ICs and printed circuit boards in common electronic products. When such products are disposed of, the solder may be dissolved by acid rain and this could be a threat with the discharge of lead, as lead is a toxic metal. In order to restrict such discharge, activities for a reduction in the amount of solder that is used with lead, as well as consideration for the use of a solder without the lead composition (lead-free solder), are being conducted in research and development, as well as in the production process.

■ Program for totally eliminating the use of lead solder

Lead solder is used for the connection of ICs to printed circuit boards, at three locations of (1) surface layer plating on the IC leads, (2) surface layer plating of the copper patterns on printed circuit boards and (3) solder for connections as shown in the diagram to the right. In order to totally eliminate the use of lead solder, alternatives must be implemented for these three locations.

Oki Electric is considering the use of lead-free solder for locations (1) and (3). For location (2), elimination of the surface layer plating is being considered (with some products, this elimination has already been implemented).



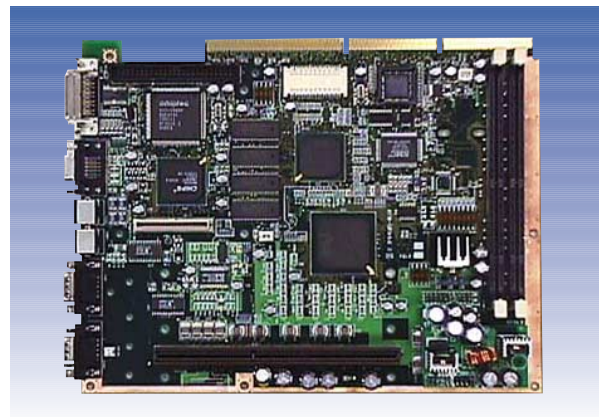
Locations where lead solders are used

■ Research of lead-free solder for connections

Since the amount of solder used for the connection of IC leads and copper patterns, in the diagram above (3), is large, the elimination of lead solder for such use is urgent. As a countermeasure for this problem, Oki Electric is conducting research into the practical use of lead-free solder for such cases.

Through research, they have found that the mounting conditions, Sn-Ag-Cu lead-free solder with a high melting point, can be used under roughly the same conditions as existing mounting requirements.

Some of the products now use lead-free solder, as a result of findings into this research.



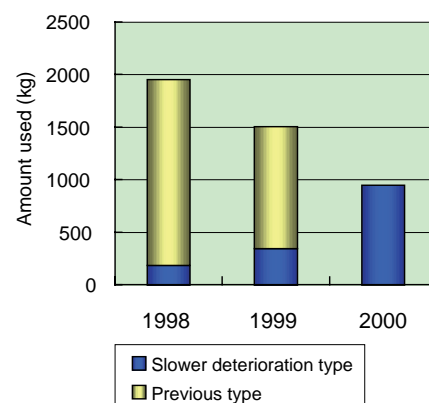
A printed circuit board with electronic components connected by lead-free solder

■ Program for reducing lead solder used in the production process

The characteristics of cream solder, used in the soldering process of printed circuit boards, deteriorate in a short time and since those with deteriorated characteristics can not be used for production, they were disposed of.

As a measure to counter this problem, examinations were made on the implementation of cream solders with a slower characteristic deterioration rate and by switching the cream solders being used to slower deteriorating cream solders, the amount of solder used has been reduced.

In Oki Electric Honjo District, solders with a slower characteristic deterioration rate were used for all work in FY2000, resulting in a solder use reduction up to half of the amount used in FY1998.



Reduced cream solder use (Oki Electric Honjo District)