Detoxification of PCBs

Advanced and Reliable Technology

**Sodium Pulverulent Process “SP Process”**

Although widely used for industrial products and industrial applications in the past, polychlorinated biphenyl (PCB) has been deposited for more than 30 years in an unneat condition, even after its toxic effects on the human body became clear and its production was stopped, and no effective processing method has been developed. PCB detoxification system “SP process” removes chlorine from PCBs and detoxifies PCBs by chemical reaction of sodium and PCB. The process is adopted by The Chugoku Electric Power Co., Inc Insulating Oil Recycling Center and Hokkaido PCB Waste Treatment Faciltiy.

**Sodium Dispersion (SD)**

SD is a reactive agent in the SP process used to dechlorinate and detoxify PCBs. Fine-grained sodium particles react calmer with air or water than solid sodium as the sodium particles are constantly covered with oil. We have established SD production facilities at the Harima Plant and Muroran SD Production Plant to supply the PCB treatment process.

**Solvent Extraction and Decomposition Process “SED Process”**

PCBs are widely used for transformer and capacitor, etc. of electrical apparatus, and adhered to the cases and components of these products. The SED process is a pre-treatment technique that dismantles electrical apparatus, removes PCBs with solvent washing and heating drying under vacuum. Combination with the SP process completes an integrated treatment technology for handling electrical apparatuses containing PCBs. The process is adopted by the Toyota PCB Waste Treatment Facility and Hokkaido PCB Waste Treatment Facility.

**Plasma Melting Technology for PCB-contaminated Waste**

Plasma melting technology allows collective processing of different kinds of PCB-contaminated wastes in a drum, and thus removes the complicated manual work which is necessary to break them down. Combining high-temperature plasma generated by electric energy with molten slag bath increases the ability to manage high-temperature wastes that are used as a heat source to decompose and detoxify PCBs. The technology has been used by Kitakyushu PCB waste treatment facility and Hokkaido PCB waste treatment facility.

**Heated-oil Circulation Washing**

The heated-oil circulation washing method (on-site washing method) was developed by Central Research Institute of Electric Power Industry. This technology allows collective treatment of large waste electrical apparatus contaminated with a very small amount of PCBs, which is hard to transport, at a location where it is placed within a short period of time.

Although officially licensed industrial waste disposal companies have started incinerated waste transformers and other electrical apparatuses contaminated with a very small amount of PCBs, there remain so many apparatuses that cannot be incinerated because of the capacity of incineration facilities or transportation restrictions (weight, size, and others). Such large electrical apparatuses can be detoxified by the circulation washing with heated oil washing the inside of the apparatuses.

**Features of Heated-oil Circulation Washing Method**

1. Safety Control to Prevent Environmental Contamination
   - The inside of the apparatus is washed without being dismantled. Washing of circulations through the closed route between the apparatus, washing device, and connecting pipes.
   - This results in an extremely lower risk of contaminating the surrounding environment.
   - As washing is completed on-site, there is no risk of transporting PCB-contaminated wastes.

2. Operational Safety
   - Unlike the incineration treatment, this method does not generate combustion gas and can be conducted at a relatively low temperature of around ambient temperature to 80°C.
   - The washing device can immediately be shut down by just pressing an emergency stop button. In case of an emergency, a prompt response is possible.
   - *Because of no PCBs being exposed to the outside, the risk is low that operators are exposed to PCBs.*

3. Difference from Incineration Treatment
   - The apparatuses after being washed are recyclable as ordinary scrap (can be sold as valuable materials).
   - (Reprocessed materials (paper and wood) should be incinerated.)
   - There is no need to contract out its costly transportation to licensed collection and transportation businesses of industrial waste subject to special control (PCB).
   - There is no need to treat the apparatuses difficult to dispose of in incineration facilities.
   - *Large apparatuses exceeding acceptance standards established by incineration facilities*
   - *Apparatuses too large to transport*
   - *Apparatuses difficult to carry away from a location where they are used and/or placed*