

Chemistry matters

Protecting the environment

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Industries throughout the world have a responsibility to protect the environment from toxic waste. The importance of this effort has never been greater, as millions of tons of chemicals are produced and used by industries worldwide every year. ABB makes every effort to minimize its environmental impact when manufacturing products. With the rapid growth of China's economy and its expanding industrial capacity, ABB China has had a great opportunity to reduce chemical emissions by imposing restrictions on the chemicals used by its suppliers. Initiatives to replace materials with equivalent biodegradable products will further reduce the impact on the environment.



Productivity

Understanding the complex behavior of chemicals in the environment and the implications they may have on public health is far from easy. Some groups of chemicals have been shown to slowly degrade our environment, contributing to acid rain, global warming or the destruction of stratospheric ozone, while others have more immediate effects on living organisms, such as carcinogens or teratogens.

Each year, ABB manufactures and delivers millions of products and can therefore positively influence chemical emissions in the environment. ABB constantly reviews the materials used in its operations around the world and makes every effort to ensure that the most environmentally friendly materials are used to manufacture its products. ABB China has successfully reduced chemical emissions by imposing restrictions on the chemicals used by companies supplying materials for use in ABB products.

Reducing VOCs

Volatile organic compounds (VOCs) are characterized by their tendency to vaporize and disperse into the environment. The most commonly occurring VOC is the greenhouse gas methane, but the group includes organic solvents, such as those found in paint and paint stripper, and many other

household chemicals. The main contributor to the production of VOCs in ABB China was the paint used to protect motors and transformers ¹. In 2007, ABB operations generated more than 800 tons of VOCs worldwide, 22 percent (179 tons) of which was generated in ABB China. ABB as a group has successfully reduced these emissions ² [1].

When painting with water-based paints an 80 percent reduction in VOCs can be made as compared with solvent-based paints.

VOCs are toxic in their own right, but they pose an additional hazard because they react in sunlight with nitrogen oxides to produce ozone. Although ozone plays a positive role in the stratosphere to protect the Earth from excess ultraviolet radiation from the sun, at ground level it can cause respiratory problems.

Already in 2000, ABB took an important step to reduce VOC emissions, requiring its suppliers to stop using benzene, toluene and xylene in the paints they supplied to ABB to coat and protect motors produced at the ABB Shanghai Motor Company Ltd.

The use of solvent-based paints to protect motors is a common practice among motor manufacturers. In 2007, encouraged by this successful initiative, ABB embarked on a factory trial of water-based paints to reduce emissions further still. After six months of testing, in March 2008 ABB was able to replace its solvent-based paints with remarkable results. VOC emissions are reduced by 80 percent when solvent-based paints are replaced by water-based paints. Using water-based paints it is now possible for the motor factory to avoid 20 tons of VOC emissions every year.

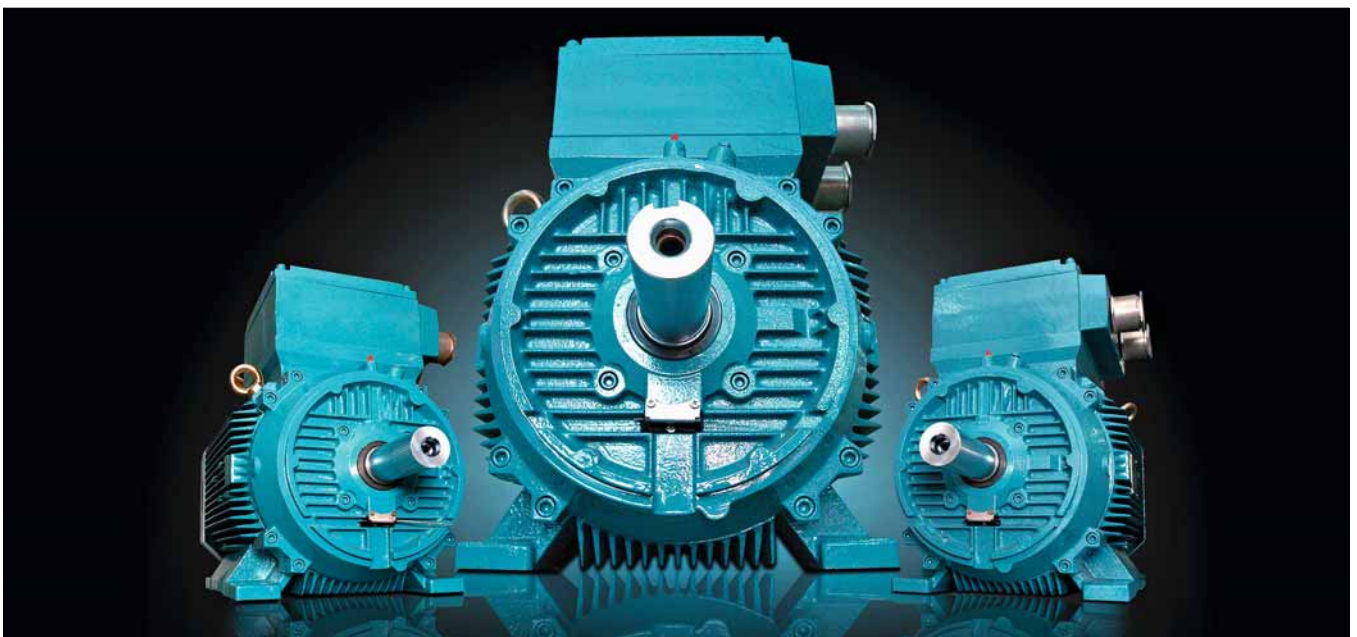
Replacing POP-containing materials

Another large group of hazardous compounds that can be produced during manufacturing processes are the persistent organic pollutants (POPs). Unlike VOCs, POPs are resistant to degradation in the environment, and because they are so long lived, wind and rain can disperse them over wide

² VOC emission reductions

	Y2007 tons	Y2006 tons	Y2005 tons
ABB Group	814	992	981
ABB China	179	261	226
% from China	22	26	23

¹ Motors from ABB Shanghai Motors Company, Ltd



3 Automatic processing system for cable

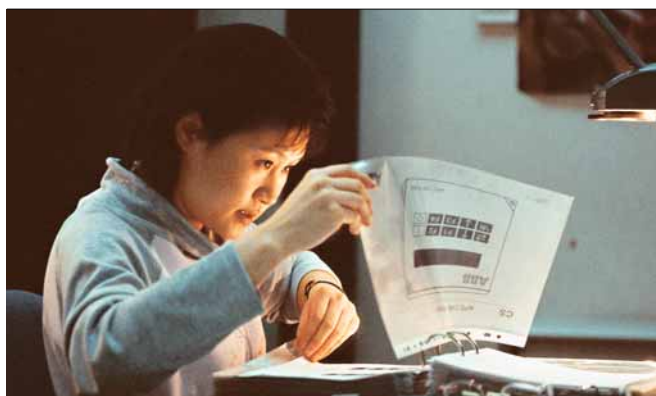


areas. POPs are fat soluble and so accumulate in the food chain and can ultimately accumulate in humans.

Many chemicals fall into the POP group, including brominated flame retardants, such as polybrominated biphenyl (PBB) and polybrominated biphenyl ethers (PBDE), which are used in the manufacturing of printed circuit boards, computer cases and insulation for polymer cables. The rise in demand for electronic equipment has led to a dramatic increase in the use of such POPs.

Polymer cable insulation is widely used in ABB, and some contains brominated flame retardants 3. These are used at ABB Xiamen Switchgear Company Ltd and ABB Xiamen Low Voltage Equipment Company Ltd. Although there are no regulations in China to prohibit their use, ABB is taking actions to replace cable insulators using brominated flame retardants with more environmentally friendly

5 Careful monitoring of ABB's performance



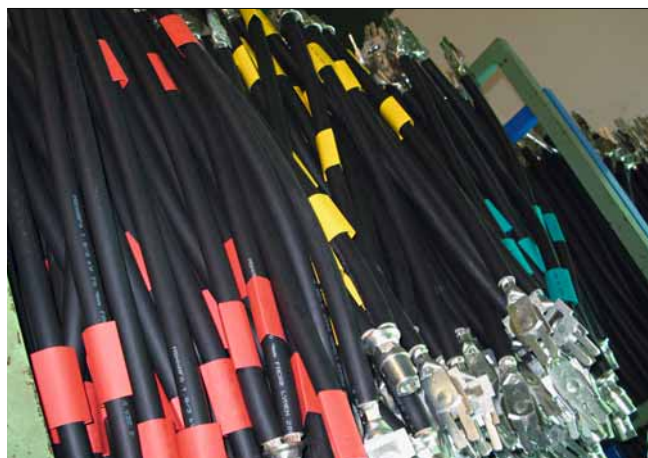
alternatives. From September 2007, both ABB Xiamen Switchgear and ABB Xiamen Low Voltage Equipment took action to phase out brominated flame retardants. By the end of May 2008, 25 of 30 suppliers had already removed these substances from their insulated cables 4.

Although there are no regulations in China to prohibit the use of POPs, ABB is taking actions to replace cable insulators that use brominated flame retardants with more environmentally friendly alternatives.

Finding alternatives

ABB China is collaborating to phase out hazardous substances and compounds with a negative environmental impact. The process involves theoretical investigations, calculations and material testing. ABB is well equipped to undertake such investigations with experienced staff, knowledgeable in materials, mechanics and chemistry, making tests in

4 Finished cable for main circuit



state-of-the-art laboratories. All new materials to be used in ABB production processes are checked to determine if they contain hazardous compounds and to find better alternatives to reduce their environmental impact. For more detailed information about ABB's environmental sustainability program, see "The ABB Group Annual Report 2007." [1]

In addition to these routine tests, ABB is continuously surveying appropriate biodegradable alternative materials with the aim of replacing petroleum-based plastics. As oil prices are increasing steadily, there are also likely to be cost benefits when using renewable resource materials that can be grown locally. To find such bio-based materials and replace old, well-known technology takes time, but these investments lead to great environmental benefits.

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Reference

[1] ABB Sustainability Report 2007. Contributing to a better world. [http://library.abb.com/global/scot/scot266.nsf/veritydisplay/8213e927815a7165c1257410003c0c60/\\$File/Sustainability%20review%202007.pdf](http://library.abb.com/global/scot/scot266.nsf/veritydisplay/8213e927815a7165c1257410003c0c60/$File/Sustainability%20review%202007.pdf) (August 2008)