newsletter

Lead as a pollutant

While lawsuits relating to lead-containing paint have been under way in the US for years now, recalls are made at regular intervals for products with an excessive lead content.

Lead: application and distribution

Lead can look back on a long tradition of industrial application thanks to its special characteristics: high resistance to corrosion, high density, a low melting point, relative ease of processing and low costs.
And the world cannot get enough of it: consumption rose from 4.5 tonnes in 1970 to more than 6 million tonnes in 2000. Some 3 million tonnes of lead are mined annually, with the rest of world demand being covered by recycling. The biggest mining nations are Australia, China and the US.

Most lead compounds and dusts are toxic, which is why lead has been subject to numerous international and national bans. Over the past few decades this has prompted a big shift in the use of lead-containing products. More than 80% of the world's lead consumption goes into the manufacture of batteries. The most important applications used to be tetra-ethyl lead (TEL), an anti-knock agent in petrol, lead carbonate used as a white pigment in paint, and lead oxide used in anti-rust paint.

Use of lead in end-products	1970 (%)	2000 (%)	Use of lead-containing end-products	1990 (%)
Batteries	39	75	Cathode-ray tubes	40
Cable sheeting	12	3	Crystal glass	15
Rolled, extruded lead	12	6	Plastic additives	23
Ammunition	4	3	Paint	4
Alloys	7	4	Ceramics	2
Petrol additives	10	1		
Total OECD(1 000 t)	3.050	5.600		
Total world (1 000 t)	4.500	6.500		approx 340

Lead as a pollutant

Lead dust and inorganic and organic lead compounds are toxic and are classified as environmental pollutants. No lead compound is known to have a positive effect on living organisms. As most of them are not biologically degradable and break down only very slowly, the mere assimilation of minor quantities can lead to a concentration in the body that is detrimental to health. Lead accumulates in the bones, while fat-soluble lead compounds (such as tetra-ethyl lead) build up in bodily tissue.
Lead poisoning can be of an acute or chronic nature, the latter being more frequent and thus more significant. Symptoms manifest themselves at a blood concentration of 50 µg/dl, although children can show symptoms with lower concentrations.
The critical preliminary symptoms of lead poisoning are tiredness, headaches, aches and pains, loss of appetite, intestinal colic and nausea. Those afflicted

with serious cases of poisoning suffer from pale skin (“lead pallor”), anaemia, changes to their organic and skeletal systems, rapid weight loss and impairment to their central and peripheral nervous systems (eg muscle paralysis). A blue discolouration of the gums is characteristic of lead poisoning. Children and foetuses are the most exposed as lead has a detrimental effect on the development of the human organism, specifically on the growth of the brain. Lead can also cause infertility. Since 2006, lead and its inorganic compounds have been classified by the German Research Foundation as being "carcinogenic in animal experiments". Illnesses caused by lead have also been classified in Germany as occupational diseases (Federal Law Figure 1101).

Regulations, legislation

Lead compounds number among the most strictly regulated substances on earth. There are a number of international conventions and national laws regulating, restricting or forbidding the use of this group of substances. There are also limitations on levels in many areas, eg for drinking water, fresh water, foodstuffs and lead concentration in the workplace.

Substance/substance group	Comments
Anti-knocking agents; tetra-ethyl lead (TEL)	Banned worldwide (with the exception of a number of states, eg Yemen); banned in Germany since 1988; in the US since 1995 and in the EU since 2005
Lead-containing paint	Banned in residential buildings in the US since 1978; subject to severe restrictions in commodities and paint in the EU since 1989; the use of lead carbonate and lead sulphate is forbidden
Emissions from industrial processes, refuse incineration	US: generally regulated by the Clean Air Act (CAA) 1970: EU: Directive 82/884 EEC (on a limit value for lead in the air) and numerous additional special directives on regulating maximum lead concentrations
Hunting and fishing equipment:	Various bans and limitations
PVC stabilisers	Voluntary commitment by European PVC manufacturers to restrict use by 2015 at the latest

Contaminated sites

Wide-ranging bans have resulted in a sharp decline in lead emissions in the key industrial nations, with the result that lead plays virtually no role as an air pollutant today. The ban on lead-containing petrol additives was a major factor in this regard. In the US, for example, lead emissions declined by more than 93% from 220 000 tonnes per year in 1970 to below 4 000 tonnes in 2002. The success of regulatory measures was also evident in the screening of the population's blood lead concentrations. Over a 24-year period (1978–2002) the percentage of children with high concentrations of lead in their blood fell by almost 97%.

Those who still have an increased concentration of lead in their blood can usually attribute this to historical contamination:

- Due to the presence of lead-containing wall paints (lead carbonate) in homes built prior to 1978 in the US. Children who place the sweet-tasting peeling paint in their mouths are particularly exposed.
- Those who regularly spend time near mines, power plants, shooting ranges and garbage dumps.
- The consumption of water polluted by lead leeching out of soil and surfaces(eg lead-containing water pipes and roofing tiles).

Product recalls

Despite today's stringent regulations traces of lead are regularly found in consumer products, mostly notably in children's toys and jewellery. Most of these products come from Asia (China and India), where lead-containing compounds (eg in paints) continue to be used for cost reasons.
Examples:

- Virtually one in four product recalls in the RAPEX database (EU early-warning system for consumer protection) is for children's toys, of which one in eight is due to high lead content.
- In March 2006 a four-year-old child from Minneapolis died of acute lead poisoning after swallowing part of a bracelet. The producer, a leading manufacturer of sports goods, subsequently recalled 300 000 products.
- Since 2003 the database of US consumer protection authority CPSC has registered thirteen recalls involving more than 163 million individual items. The biggest one was the voluntary recall in 2004 of 150 million rings, necklaces and bracelets sold in jewellery vending machines.

US

For years now lawsuits have been raging in the US on the issue of lead-containing paint. Until being banned in 1978 such paint was used across the US, mainly in private households. Tenants are now suing landlords and the manufacturers of lead-containing paint. The defendants are being accused of being responsible for the excessive contamination of private residences or of not giving their tenants sufficient warning of the inherent dangers. What is more, there is a growing trend of filing for compensation via an alternative avenue to that of traditional product liability, namely on the grounds of so-called "public nuisance law". It remains to be seen whether these lawsuits will be successful or not and whether litigation will also spread to lead-containing products.

Information for the underwriter

It has long been an undisputed fact that most lead-containing compounds are pollutants and often associated with undesirable, negative consequences for health. The many bans and regulations that have been issued, particularly those related to lead additives in petrol, have led to a marked decline in the lead contamination of mankind and the environment. The issue that remains uppermost for liability insurers is historical contamination, as demonstrated by the litigation under way in the US with regard to lead-containing paints. For this reason, technical risk analyses always factor in the possibility of historical contamination.
Alongside historical contamination, account should also be taken of the fact that lead continues to be detected in consumer products, especially in children's toys, which can have implications for product liability and recall.

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