NATIONAL REPORT

LEAD IN INDONESIA'S NEW ENAMEL HOUSEHOLD PAINTS

BaliFokus

2015

IPEN
a toxics-free future

National Report

Lead in New Enamel Household Paints in Indonesia 2015

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This report was produced as part of the Asian Lead Paint Elimination Project. The Asian LeadPaint Elimination Project was established to eliminate lead in paint and raise widespread awareness among business entrepreneurs and consumers about the adverse human health impacts of lead-based household enamel paints, particularly on the health of children under six years old.

The Asian Lead Paint Elimination Project is being implemented by IPEN over a period of three years in seven countries (Bangladesh, India, Indonesia, Nepal, Philippines, Sri Lanka, and Thailand) with funding from the European Union (EU) totalling 1.4 million Euros. While this report has been produced with the assistance of the European Union, its contents are the sole responsibility of BaliFokus together with IPEN, and can in no way be taken to reflect the views of the European Union. In addition, this report was produced with financial contributions from the Swedish Environment Protection Agency and Swedish public development co-operation aid through the Swedish Society for Nature Conservation, SSNC. The views herein shall not necessarily be taken to reflect the official opinion of any of these donors, including SSNC or its donors.

BaliFokus is a non-governmental organisation working on environmental management and health issues with various stakeholders, to create a healthy and sustainable living environment. BaliFokus is a Participating Organisation of IPEN.

IPEN is an international NGO network of health and environmental organisations from all regions of the world in which BaliFokus participates. IPEN is a leading global organisation working to establish and implement safe chemicals policies and practices to protect human health and the environment. Its mission is a toxics-free future for all. IPEN helps build the capacity of its member organisations to implement on-the-ground activities, learn from each other's work, and work at the international level to set priorities and achieve new policies.

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Abbreviations

APCI	*Asosiasi Produsen Cat dan Coating Indonesia*
BSN	*Badan Standarisasi Nasional*
CDC	Centers for Disease Control and Prevention
ELPAT	Environmental Lead Proficiency Analytical Testing
EU	European Union
GAELP	Global Alliance to Eliminate Lead Paint
ICCM	International Conference on Chemicals Management
IDR	Indonesian Rupiah
IPEN	International POPs Elimination Network
LSE	*Lembaga Sertifikasi Ekolabel*
LVE	*Lembaga Verifikasi Ekolabel*
NGO	Non-Governmental Organization
PAUD	*Pendidikan Anak Usia Dini* (Early Childhood Education)
ppm	part per million
SAICM	Strategic Approach to International Chemicals Management
SNI	*Standar Nasional Indonesia*
UNEP	United Nation Environmental Programme
WHO	World Health Organization

1.00 USD	=	*13,188.29 IDR*
1.00 EUR	=	*14,391.18 IDR*

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Preface

Leaded paints for home use continue to be widely produced, sold, and used in developing countries despite the fact that most highly industrial countries banned leaded house paints more than 40 years ago.

In 2007 and 2008, NGOs in the IPEN network collected and analysed decorative (home use) paints on the market in 11 developing countries, and in countries with economies in transition. The results were startling. In every one of these countries, many of the paints had dangerously high lead content. In response, IPEN launched a worldwide lead paint elimination campaign. Since then, IPEN-affiliated NGOs and others have sampled and analysed paints on the market in approximately 40 low and middle-income countries.[1] In every country where there was no law or regulation prohibiting, the paints had high, and often dangerously high, lead contents.

This 2015 National Report on Lead Paint presents new data on the lead content of decorative enamel paints that are offered for sale in the Indonesia market. This is the second time that BaliFokus has analysed paints sold in Indonesia for their lead content. A previous study that was conducted in 2013 reported on the lead content of 78 solvent-based enamel paints from 43 brands. The current study reports on the lead content in 121 samples from 63 brands. Forty-nine out of the total 121 samples analysed in 2015 were also analysed in 2013.

In addition to new data on lead in paint, the report also presents background information on why the present and former use of decorative enamel paints with high lead content is a source of serious concern, especially to children's health. It also proposes action steps by different stakeholders to protect children and others from lead paint and lead dust.

Denpasar, 27 May 2015
Yuyun Ismawati
Project Supervisor
BaliFokus Foundation

[1] *Information about the indicated countries and studies can be found at http://www.balifokus.asia*

Executive Summary

While lead exposure is harmful to adults, lead exposure harms children at much lower levels, and the health effects are generally irreversible and can have a lifelong impact. The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate. The human foetus is the most vulnerable and a pregnant woman can transfer lead that has accumulated in her body to her developing child.

Lead is also transferred through breast milk when lead is present in a nursing mother. Evidence of reduced intelligence caused by childhood exposure to lead has led the World Health Organisation (WHO) to list "lead-caused mental retardation" as a recognised disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.

Most highly industrialised countries adopted laws or regulations to control the lead content of decorative paints—the paints used on the interiors and exteriors of homes, schools, and other child-occupied facilities—beginning in the 1970s. No similar regulation is in place in Indonesia. However, a national standard of lead content in the enamel paint has been drafted and is expected to be released soon as a new national standard of lead in paint.

BaliFokus conducted its first study on lead in paint during 2012-2013. The study included 76 paints from 43 brands of enamel decorative paints available in the Indonesian market, and 77% of the paints were shown to contain lead concentrations higher than 90 ppm. In 2014-2015, BaliFokus conducted a second study and purchased a total of 121 cans of solvent-based enamel decorative paints from stores in the Denpasar, Bogor, Depok, Tangerang and Jakarta regions in Indonesia. Samples from 83% of the paints contained lead above 90 ppm, the maximum allowed lead content in many highly industrialised countries.

The paints were from 63 different brands of paint and selected because 1) they were shown to contain lead above 90 ppm in the 2013 study, or 2) because they had not previously been analysed for their total lead content. Paints shown to have a lead content below 90 parts per million (ppm, dry weight) in earlier studies were not included in this study.

All paints were analysed by participating laboratories in Europe for their total lead content, based on dry weight of the paint. In this study, 49 out of 121 paints were from the same brands and colours as in the 2013 study.

At the same time as this report is being prepared,, the National Standardisation Agency, or *Badan Standarisasi Nasional* (BSN), is in the process of approving a new voluntary national standard, SNI 8011:2014, that limits the content of lead in enamel-decorative paints produced in Indonesia to 600 ppm or lower. Of the 121 paints analysed in this study, 94 (78% of the paints) contained lead above 600 ppm.

Both the 2012-13 and the 2014-15 paint studies were undertaken as part of the Asian Lead Paint Elimination Project. The Asian Lead Paint Elimination Project carries out focused activities to eliminate lead paint from the market in seven project countries: Bangladesh, India, Indonesia, Nepal, Philippines, Sri Lanka and Thailand.

Findings

The majority of sampled paints sold in Indonesia would not be permitted for sale in the U.S. or other industrialised countries and the high lead levels above 10,000 ppm in more than a third of the paints could be considered highly dangerous.

- Samples from 20 of the 121 paints (17% of paints) had a lead content below 90 ppm and could be sold in any country in the world;
- Samples from 94 of the 121 paints (78% of paints) had a lead content greater than 600 ppm would not pass the new Indonesian paint standard and o would not be permitted for sale in countries anywhere in the world regulating lead content of paint;
- 101 samples or 83% had lead content greater than 90 parts per million, and would not be permitted for sale or use in the United States and other industrialised countries;
- 50 samples or 41% samples had lead content greater than 10,000 parts per million lead, which can be considered to be extremely hazardous.

One or more paint from 90% of the 63 brands included in the 2015 study would not be permitted for sale in the United States.

- One or more paints from 57 of the brands analysed (90% of brands) contained lead above 90 ppm;
- One or more paints from 53 of the brands analysed (83% of brands) contained lead above 600 ppm;

For more than half of the brands sampled (38 out of 63), at least one of the paints analysed contained dangerously high lead levels of 10,000 ppm or greater.

- The highest levels of lead tended to be in yellow, orange, green, and red coloured paints.
- One or more paint 38 of the brands analysed (60% of brands) contained lead above 10,000 ppm.

The technology is available in Indonesia to produce unleaded decorative paints, but change is needed from both transnational and Indonesian headquartered paint companies.

- Nearly a quarter (15 out of 63) of the paint brands analysed sold at least one paint with a lead concentration below 90 ppm, suggesting that it is feasible to produce paints without lead in Indonesia;
- 11 Indonesian headquartered paint companies and 4 foreign/international companies manufactured paints with lead content below 90 ppm;
- Lead-free pigment producers and suppliers are available and exist in Indonesia.

Conclusion

In 2015, 83% of the enamel decorative paints analysed had a lead concentration above 90 ppm. NGOs in the IPEN network generally recommend a mandatory standard limiting the lead content in paint to a maximum of 90 ppm as an achievable and protective.

The soon to be approved Indonesian voluntary standard for lead content in enamel decorative paints, SNI 8011:2014, sets a maximum lead content of 600 ppm for paint manufactured in Indonesia.

The fact that 12% of paint brands analysed, includes one or more paints with a lead concentration below 90 ppm, are manufactured and sold by Indonesian manufacturers, suggests that it is feasible to produce paints without lead in Indonesia. It also suggests that the technology and the lead-free pigments and other paint ingredients are available in Indonesia at an affordable price and are feasible to implement.

Recommendations

BaliFokus recommends:

- For government and relevant agencies:
  Announce the new SNI voluntary standard of a maximum lead content of 600 ppm and set a time frame for when this will be mandatory.
  Manufacturers should be encouraged to participate in a third-party certification scheme to verify that their paint is lead safe.
  Paint can labels should contain a warning or precautions to alert users to the hazards of lead-contaminated dust and other materials when previously painted surfaces are scraped or sanded in preparation for repainting.

- For the private sector:
  Switch immediately to lead-free paint ingredients that are available in Indonesia.
  As the ASEAN Free Trade Area (AFTA) and ASEAN-China Free Trade Area (ACFTA) agreements already coming into force in 2015 and 2010, respectively, the opportunity exists to sell products that comply with the international standard and that are within safe levels. This can be a business advantage for Indonesian manufacturers.

- For consumers and individuals as well as organisations:
  Choose unleaded paints in your purchases by asking for lead-free paints to protect the health of children and all family members.

- For all stakeholders:
  Cooperate in establishing a reliable third-party certification system of lead in paint to ensure that paints sold in the market meet a maximum limit of 90 ppm to follow the most restrictive regulations in the world.

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May 2015

1. Background

Health and Economic Impact of Lead Exposure

Children are exposed to lead from paint when deteriorating paint on walls, windows, doors, or other painted surfaces begins to chip or deteriorate and lead is released to dust and soil. When a surface previously painted with lead paint is sanded or scraped in preparation for repainting, very large amounts of lead-contaminated dusts are also produced and spread and can constitute a severe health hazard.[2]

Children playing indoors or outdoors get house dust or soil on their hands, and then ingest it through normal hand-to-mouth behaviour. If the house dust or the soil is contaminated with lead, the children ingest lead. Hand-to-mouth behaviour is especially prevalent in children aged six years and under, the age group most easily harmed by exposure to lead. A typical one-to-six-year-old child ingests between 100 and 400 milligrams of house dust and soil each day.[3]

In some cases, children pick up paint chips and put them directly into their mouths. This can be especially harmful because the lead content of chips is typically much higher than that found in dust and soils. When toys, household furniture, or other articles are painted with lead paint, children may chew on them and directly and ingest the lead-contaminated, dried paint. Nonetheless, the most common way that children ingest lead is through lead-contaminated dust and soil that gets onto their hands.[4]

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[2] Clark, S., Grote, J., Wilson, J., Succop, P., Chen, M., Galke, W. and McLaine, P. (2004) Occurrence and determinants of increases in blood lead levels in children shortly after lead hazard control activities, Environmental Research. 96, 196-205.

[3] World Health Organisation. 2010. Childhood Lead Poisoning. page 18. http://www.who.int/ceh/publications/leadguidance.pdf

[4] Lanphear, B. P., Matte, T. D., Rogers, J., Clickner, R. P., Dietz, B., Bornschein, R. L., Succop, P., Mahaffey, K. R., Dixon, S., Galke, W., Rabinowitz, M., Farfel, M., Rohde, C., Schwartz, J., Ashley, P. and Jacobs, D. E. (1998) The contribution of lead-contaminated house dust and residential soil to children's blood lead levels, Environmental Research. 79, 51-68.

While lead exposure is also harmful to adults, lead exposure harms children at much lower levels, and the health effects are generally irreversible and can have a lifelong impact.[5] The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate.[6] The human foetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child.[7] Lead is also transferred through breast milk when lead is present in a nursing mother.[8]

Once lead enters a child's body through ingestion, inhalation, or across the placenta, it has the potential to damage a number of biological systems and pathways. The primary target is the central nervous system and the brain, but lead can also affect the blood system, the kidneys, and the skeleton.[9] It is generally agreed that one key element in lead toxicity is its capacity to replace calcium in neurotransmitter systems, proteins, and bone structure, altering function and structure and thereby leading to severe health impacts. Lead is also known to affect and damage cell structure.[10]

According to the World Health Organisation (WHO): "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6% of the global burden of disease."[11] Evidence of reduced intelligence caused by childhood exposure to lead has led WHO to list "lead-caused mental retardation" as a recognised disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental

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[5] World Health Organisation. (2010). Childhood Lead Poisoning. page 12 http://www.who.int/ceh/publications/leadguidance.pdf

[6] World Health Organisation. (2010) Childhood Lead Poisoning. page 48 http://www.who.int/ceh/publications/leadguidance.pdf

[7] Bellinger D, Leviton A, Waternaux C, et al. 1987.Longitudinal analyses of prenatal and postnatal lead exposure and early cognitive development. N. Engl. J. Med. 316:1037–43

[8] Bjorklund, K. L., Vahter, M., Palm, B., Grander, M., Lignell, S. and Berglund, M. (2012) Metals and trace element concentrations in breast milk of first time healthy mothers: a biological monitoring study, Environmental Health. 11.

[9] Needleman, H. (2004) Lead Poisoning, Annual Review of Medicine.**55**, 209-222.

[10] Verstraeten, S.V., et al, Aluminium and lead: molecular mechanisms of brain toxicity, (Archives of Toxicology 82:789–802. DOI 10.1007/s00204-008-0345-3, 2008)

[11] World Health Organisation. (2010). Childhood Lead Poisoning. page 11: http://www.who.int/ceh/publications/leadguidance.pdf

factors.[12]

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower levels of lead exposure.[13,14] According to WHO: **"There is no known safe level of exposure to lead."**[15]

When a young child is exposed to lead, the harm to her or his nervous system makes it more likely that the child will have difficulties in school and engage in impulsive and violent behaviour.[16] Lead exposure in young children is also linked to increased rates of hyperactivity, inattentiveness, failure to graduate from high school, conduct disorder, juvenile delinquency, drug use, and incarceration.[17] Lead exposure impacts on children continue throughout life and have a long-term impact on a child's work performance, and—on average—are related to decreased economic success.

In 2011, there were over 32 million Indonesian children at the golden age of development (0-6 years old). Participation rate in *Pendidikan Anak Usia Dini* (PAUD) programs (early childhood education) in 2014 was 60% (approximately 19 million children), and has been projected to increase to 70% in 2015, reaching approximately 22 million children.[18]

Currently, there is no specific regulation or guidance for procurement of paints used in early childhood education facilities. As early childhood education facilities are commonly painted

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[12] A. Prüss-Üstün and C. Corvalán, World Health Organisation. (2006). Preventing Disease Through Healthy Environments: Towards an estimate of the environmental burden of disease, 2006, page 12: http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

[13] Herbert Needleman. (2004). Lead Poisoning. Annual Review of Medicine 2004. http://www.rachel.org/files/document/Lead_Poisoning.pdf)

[14] World Health Organization, Childhood Lead Poisoning, page 26 (citing the work of Lanphear et al., 2000): http://www.who.int/ceh/publications/leadguidance.pdf, 2010

[15] World Health Organisation, Frequently Asked Questions, International Lead Poisoning Awareness Campaign, Week of Action, 19-25 October, 2014, page 1: http://www.who.int/ipcs/lead_campaign/faq_lead_poisoning_prevention_campaign_en.pdf?ua=1

[16] Mielke, H.W. and Zahran, S. (2012). The urban rise and fall of air lead (Pb) and the latent surge and retreat of societal violence (Environment International. 43 (2012) 48-55)

[17] World Health Organisation. (2010). Childhood Lead Poisoning. page 28: http://www.who.int/ceh/publications/leadguidance.pdf, 2010

[18] Kementerian Pendidikan dan Kebudayaan Indonesia (Ministry of Education and Culture, 2013)

in bright colours, which may contain lead, approximately 30 million Indonesian children are potentially at risk, especially in older facilities. In the last 10 years, many PAUD facilities were built in a new setting or located in old buildings. Some of these sites have regular maintenance but staff at many of them has no awareness of the hazards of deteriorating lead paint or training in minimising exposure to lead by daily cleaning practices.

The period of early childhood is the golden period for brain development or educational progress. This period is valuable for a child to recognise various kinds of facts on their environment as a stimulus to the development of personality, psychomotor, cognitive and social.

Studies shown that, approximately 50% of the adult intelligence capability is developed at the age of 4 years of age, 80% have occurred at 8 years of age, and development culminates at 18 years old. Any interruption to the brain development, could lead to a lower IQ and create a lifelong adverse impact. Therefore, protecting children's health and their growth is very crucial as their brain only grows once, not twice.[19]

A recent study considered the neuro-developmental effects on lead-exposed children, as measured by reduced IQ points, and it correlated lead exposure-related reductions in children's IQ scores to reductions in lifetime economic productivity, as expressed in lifelong earning power.[20]

The study identified many different sources of lead exposure in children, with lead paint as one major source. Broken down by region, the economic burden of childhood lead exposure as estimated by this study was:

- Africa: $134.7 billion of economic loss, or 4.03% of Gross Domestic Product (GDP);
- Latin America and the Caribbean: $142.3 billion of economic loss, or 2.04% of GDP;
- Asia: $699.9 billion of economic loss, or for Indonesia, $37.9 billion of economic loss or 3.35% of Indonesia's GDP.

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[19] Philippe Grandjean. 2013. Only One Chance: How Environmental Pollution Impairs Brain Development – and How to Protect the Brains of the Next Generation. Oxford: Oxford University Press.

[20] Teresa M. Attina and Leonardo Trasande. (2013). Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries. Environmental Health Perspectives • volume 121, number 9, September 2013. http://ehp.niehs.nih.gov/wp-content/uploads/121/9/ehp.1206424.pdf

2. The Use of Lead in Paint

Lead is a toxic metal that is found in some paints. Paints contain lead when the paint manufacturer intentionally adds one or more leaded compounds to the paint during the manufacturing process. A paint product may also contain some amount of lead when paint ingredients contaminated with lead are used, or when there is cross-contamination from other product lines in the same factory. Water-based paints rarely contain lead, but solvent-based enamel paints have been found to have high lead content in many countries.[21]

The leaded compounds most commonly added to paints are pigments. Pigments are used to give the paint its colour, make the paint opaque (so it covers well), and protect the paint and the underlying surface from degradation caused by exposure to sunlight. Lead-based pigments are sometimes used alone, and sometimes used in combination with other pigments.

Leaded compounds also may be added to enamel paints for use as driers (sometimes called drying agents or catalysts). Leaded compounds are also sometimes added to paints used on metal surfaces to inhibit rust or corrosion. The most common of these is lead tetroxide, sometimes called red lead or minium.

Non-leaded pigments, driers, and anti-corrosive agents have been widely available for decades, and are used by manufacturers producing the highest quality paints. When a paint manufacturer does not intentionally add lead compounds in the formulation of its paints, and takes care to avoid the use of paint ingredients that are contaminated with lead, the lead content of the paint will be very low – less than 90 parts per million (ppm) total lead by dry weight and frequently down to 10 ppm or less.

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints—the paints used on the interiors and exteriors of homes, schools, and other child-occupied facilities—which began in the 1970s and 1980s. Many also imposed

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[21] See e.g. Brosché, S., Denney, V., Weinberg, J., Calonzo, M. C., Withanage, H. and Clark, C. S. (2014) Asia Regional Paint Report
Clark, C. S., Rampal, K. G., Thuppil, V., Chen, C. K., Clark, R. and Roda, S. (2006) The lead content of currently available new residential paint in several Asian countries, Environmental Research. 102, 9-12.
Clark, C. S., Rampal, K. G., Thuppil, V., Roda, S. M., Succop, P., Menrath, W., Chen, C. K., Adebamowo, E. O., Agbede, O. A., Sridhar, M. K. C., Adebamowo, C. A., Zakaria, Y., El-Safty, A., Shinde, R. M. and Yu, J. F. (2009) Lead levels in new enamel household paints from Asia, Africa and South America, Environmental Research. 109, 930-936.

controls on the lead content of paints used on toys and for other applications likely to contribute to lead exposure in children. These regulatory actions were taken based on scientific and medical findings that lead paint is a major source of lead exposure in children, and that lead exposure in children causes serious harm, especially to children aged six years and under.

The use of lead in production of decorative paint is prohibited in the European Union through regulations related to safety of consumer products and specific prohibitions for most leaded raw materials. In the U.S., Canada, Australia and other countries with regulations restricting the use of leaded ingredients in decorative paint, standards specifying a maximum lead limit are in place. The current standard for household paints in the U.S. and Canada is 90 ppm, and adherence to this ensures that a manufacturer can sell its paint anywhere in the world. Some other countries have established standards of 600 ppm.

Fig. 1. Childhood lead exposure can cause a lifelong adverse impact but preventable.

3. Paint Market and Regulatory Framework in Indonesia

Paint Market in Indonesia

The Asia-Pacific region is the fastest growing segment of the global coating resin market and is mainly attributed to high economic growth rate followed by heavy investment across industries such as automotive, consumer goods and appliances, building and construction, and furniture.

More than 40% of the total coating resins demand was consumed by the architectural coating industry in 2013. The growth of the automotive and general industrial coating segments is also driving the growth for coating resins. The drivers of the industry are government regulatory support, public awareness, application growth for coating resins in Asia-Pacific.[22] Currently there are 60 brands of paint that circulated in Indonesia. About 60% of the Indonesian paint market are dominated by the decorative paint segment.

MARS Indonesia, a leading research company, study in 2014 revealed that the paint users are mainly from Indonesia's major cities such as the Greater Jakarta, Bandung, Surabaya, Semarang, Medan, and Makassar reaching 48% of the building materials consumers compared to other building materials products. They choose quality at an appropriate price. However, the study also found that majority of consumers do not understand the specification of the paint they have purchased.

MARS' study also captured the consumer behaviour and some interesting facts were revealed:

- Almost 75% use of paint is to renovate the house while the remainder is used for new buildings;
- The majority of consumers purchased the paints in the building material stores;
- They know the brand they want to buy;
- The brand is chosen based on what they see in the television commercial/ads.

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[22] Markets and Markets. (2014). Coating Resins Market by Type (Acrylic, Alkyd, Vinyl, PU, Epoxy, Amino, UPR, SPR & Others), by Technology (Waterborne, Powder, High Solvents, High Solids, UV Cure), by Application (Architectural, Automotive, Wood, & Others) - Global Forecast to 2019 http://www.marketsandmarkets.com/Market-Reports/coating-resins-market-72316133.html Accessed by 21 May 2015

Another report noted that Indonesian paint consumption per capita (PCP) was still low at 3.27 kg per person, compared to Asia's overall PCP rate of approximately 4-4.5kg and a worldwide PCP of 6-7 kg per person.[23] This condition could be seen as an opportunity to fill the market share.

Data provided by APCI (*Asosiasi Produsen Cat Indonesia* or Association of Paint Manufacturers Indonesia) and a survey conducted by PT. MARS Indonesia, state that the value of the paint market in Indonesia reached IDR 10.47 trillion (approximately US$ 805 million) in 2010. Then in 2011 it increased by 8.6% or about IDR11.37 trillion (approximately US$ 875 million). In 2012 the estimated value of the paint market was no less than IDR 12.51 million (US$ 962 million) or an increase of about 10% from the year before. Further, the paint market in 2013 was worth IDR 13.8 trillion (approximately US$ 1 billion). In 2014, sales of paint in Indonesia increased up to IDR 15 trillion (approximately US$ 1.1 billion) or 8.7% higher compared with the previous year. According to APCI, the increased sales was due to the increased demand of paint for the oil refinery plant sector in the country.

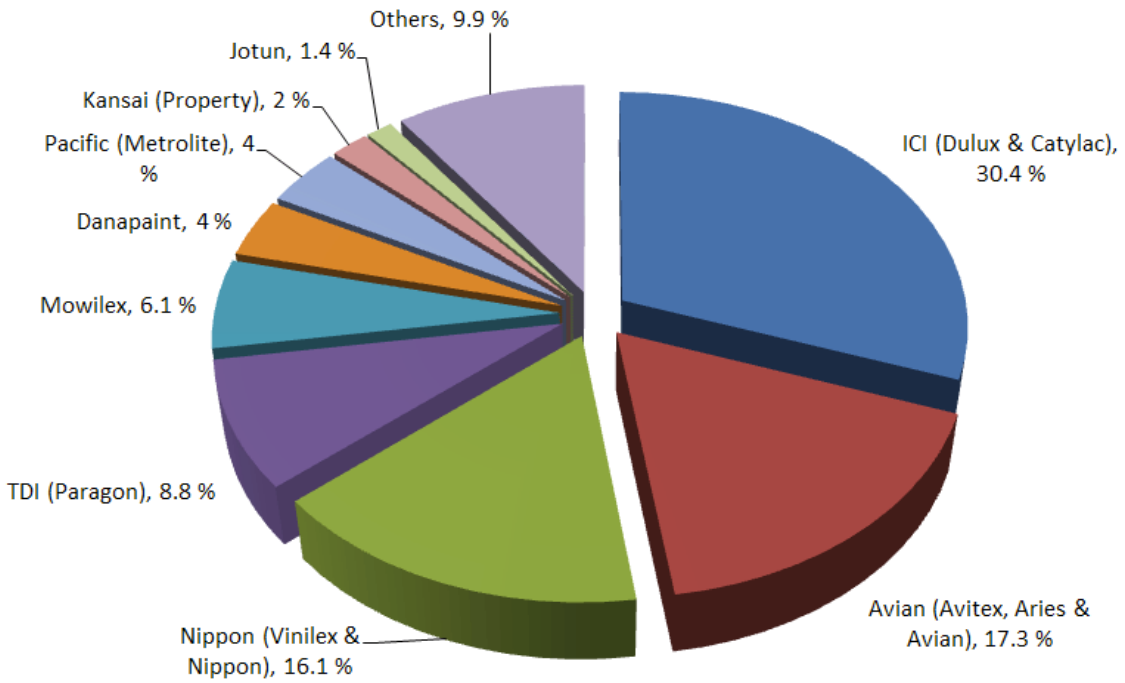

Figure 2. Market share of paint manufacturers in Indonesia (%)
Source: PT. MARS Indonesia, May 2013

[23] Asian Paint and Coating Journal, 2010; MARS Indonesia, 2013

In 2015, Akzo Nobel (owner of ICI) stated that Indonesia is its largest market in Southeast Asia and claimed that its market growth in Indonesia in 2014 had reached double digits, and has a particularly strong position in the decorative paint segment. Collectively, PT. Nipsea Paint and Chemicals and ICI Paints Indonesia estimated their combined decorative paint market share to be more than 30 percent.[24]

Two other major paint manufacturers in Indonesia are Avian and Jotun. Avian claims it has three paint factories with a total production capacity of 150 million kg per year. Jotun claims that its production has reached 45 million litres per year and claims a market share in decorative paints of about 10% of the national market share. The company expects this to increase up to 30%. With production capacity of 100 million litre per year starting in 2015, Jotun Indonesia claims to be the leader of the protective and marine paints business segment and has programs to reduce hazardous materials.[25,26]

Lead-free pigment provider, Clariant has announced an expansion at its Tangerang, Indonesia, site. Its expansion of production and service capabilities at Tangerang includes doubling existing capacity and an enlarged application development laboratory to enhance support for customers in the personal-care and industrial-care sectors.

Figure 3. Characteristic of the paint industry in Indonesia

According to the Indonesian Ministry of Industry, the characteristics of the paint industry in Indonesia are best described as technology and innovation dependent, required strong capital support, depends

[24] Perkokoh Dominasi Di Segmen Dekoratif, ICI Paints Luncurkan Dulux Easy Clean. Kamis, 20 Maret 2014. Accessed by 22 May 2015. http://www.berita-bisnis.com/berita/3137--perkokoh-dominasi-di-segmen-dekoratif-ici-paints-luncurkan-dulux-easyclean.html

[25] 2015, Kapasitas Produksi Jotun Mencapai 100 Juta Liter. Accessed by 22 May 2015. http://www.berita-bisnis.com/berita/1431--2015-kapasitas-produksi-jotun-mencapai-100-juta-liter.html

[26] Jotun. Reduction of hazardous materials. Accessed 22 May 2015. http://www.jotun.com/ap/en/corporate/hse/jotun-greensteps/hazardous.aspx

on formulation, about 99% raw materials are still imported, chemicals dependent, applied mostly as decorative, coating, furniture and automotive (Fig. 3).[27]

Paint producers, however, have not made much progress in expanding sales abroad due to tight competition in the international market. Indonesia's products have not been competitive even in the regional market. An APCI representative stated that exports are not even 10% of production.[28]

Meanwhile, imports remain substantial. Local products are not competitive in price because of the official import duty of 5% on most of the basic materials needed to manufacture paint - this was originally zero percent and is currently reduced from 10%. The price of locally produced basic materials created with some imported components, are therefore even higher than imported materials. For example, the price of locally produced resin is US$ 2.35 per kg as against the price of US$ 2.00 per kg of imported resin from Singapore.[29]

Furthermore, the Finance Minister Regulation, or *Peraturan Menteri Keuangan* No. 241/2010 on the Classification System of Goods and Imposition of Import Duty (*Bea Masuk*) on imported goods, created an adverse impact on the margins and production of the national paint industry, as most of the raw materials contained within paint are still imported.

The rapid growth of building materials industry

The building materials industry in Indonesia is growing rapidly with increasingly positive national economic conditions. The increased welfare of the community contributed to the development of the building materials industry as a major component in the construction of facilities and infrastructures.

One of the indicators of the rapid growth of the building materials industry is the increased numbers of building materials stores that have modern concepts such as supermarkets with large buildings which contain huge number of items. They are one stop shops for the purchase of all types of building materials.

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[27] Ministry of Industry of Indonesia, 2015

[28] IndustriBisnis.com. (2013). Industri Cat Tahun Ini Diproyeksi Stagnan. http://industri.bisnis.com/read/20130916/257/163195/industri-cat-tahun-ini-diproyeksi-stagnan

[29] P.T. Data Consult, Inc. (2014). Paint production predicted to increase 8%.The Free Library. Accessed by 20 May. 2015 http://www.thefreelibrary.com/Paint+production+predicted+to+increase+8%25.-a0365688457

Big potential and huge opportunities come hand-in-hand with a big challenge. One of these challenges is the competition between brands. Research conducted by MARS Indonesia in 2014 revealed that the paint industry has the highest number of competing players compared to other building materials industries. There are more than 60 outstanding brands in this industry. In addition to wall paint, a large number of manufacturers are also identified in the paint timber sector with over 40 brands. The huge numbers of brands also indicate the serious intention of those companies in the sector to become the leader in this competitive industry.

In order to dominate this inter-brand competition, brand owners or manufacturers need to determine the most effective marketing strategies. One way is to determine which market segments are to be targeted. Secondly, the early adoption of international standards will open the way to increased market share, including a wider share of the international market.

Lead Paint Regulatory Framework

Paint manufacture, import, sale or use of lead paint for interiors or exteriors of homes, schools and commercial buildings is already banned and prohibited in many industrialised countries. In some countries, these regulations have become increasingly stringent in recent years. The standard adopted by the United States imposes an upper limit of 90 parts per million (ppm) on total lead (dry weight) for decorative paints and many other paint categories. Other countries have adopted mandatory limits in the range of 90 to 600 ppm total lead (dry weight).

BaliFokus and other Non-Governmental Organisations (NGOs) associated with the IPEN network generally promote the 90 ppm total lead limit standard as one that is fully achievable and useful in reducing exposure, especially to children.

Several regulations in various sectors in Indonesia have addressed heavy metals concentration in paint as seen in Table 1. In the last couple of years, new standards relevant to paint manufacturers have been issued and published as shown in Table 2.

Table 1. Indonesian regulations related to lead in paint	
Regulation	**Rule**
Ministry of Public Works Decree No. 441/KPTS/1998 regarding Technical Requirement for Buildings	Painting of wooden constructions must adhere to SNI 2407:2008.
Ministry of Health Decree No. 1204/MENKES/SK/X/ 2004 regarding the Environmental Requirements for Hospitals	No use of paints containing heavy metals.
Ministry of Industry Regulation No. 24/M-IND/PER/ 4/2013 regarding Mandatory Implementation of Indonesian National Standard for Toys	Mandatory implementation of a set of standards for toys produced and sold in Indonesia. Specification for migration of certain elements (including lead). 2 certification laboratories are appointed.

Between 2013-2014, the IPEN Asian Lead Paint Elimination Project organised a series of activities, discussion and awareness raising campaigns in 7 countries, including Indonesia, in order to eliminate lead in paint. Participants at the second Indonesian stakeholders meeting in 2013 agreed to set a standard for lead in paint that followed the international standard of 90 ppm. However, some industry representatives were concerned about the tight standard applied to the small and medium enterprises and proposed to have a standard of lead in paint (dry weight) of 600 ppm.

In November 2014, after conducting 3 consultation meetings with the paint standard committee, the *Badan Standarisasi Nasional* (BSN) issued a new voluntary SNI *(Standar Nasional Indonesia)* for organic-based decorative paint manufactured and sold in Indonesia to be below 600 ppm (dry weight). The SNI 8011:2014 establishes the specifications of organic solvent-based paints (solvent-borne) used for architecture purposes, that is, decorative paints applied to both interiors and exteriors. At the time of this report's release SNI 8011:2014 has yet to be publicly released, but it had been welcomed by several paint manufacturers as being complementary to other national standards.

Fig. 4. Stakeholders forum and engagement is the key to push for a policy & regulation development.

Table 2. Indonesian standard related to paint manufacture

Standard	Compliance	Content
SNI 06-0347-1989 on specification of putty for wood	Voluntary	Using lead white pigment.
SNI 06-1450-1989 on roofing tile paint	Voluntary	No specification on lead.
SNI 06-3685-1995	Voluntary	Purity of Pb_3O_4 min. 97.0, levels of insoluble impurities in HNO3 and H2O2 max. 1% passes a sieve 325 min 99.0 (% w/w). Test method in accordance with SNI 06-2157-1991.
SNI 06-4825-1998 on specification of ready mixed white and yellow traffic paints	Voluntary	Specifying titanium oxide pigment for white paint, lead chromate pigment on yellow paint.
SNI 06-4827-1998 on specification of Ready-Mixed Oil-Based Paint	Mandatory for buildings (SNI 2407:2008 based on State Min. of Public Works Decree no. 441/1998)	Maximum allowable total lead* content is 0.06% based on the total weight of the non-volatile portion of the paint. *Indonesian language says “timah” (tin) instead of “timah hitam” (lead), refers to AASHTO M. 70-90 standard.
SNI 06-6397-2000 on Specification for foliage green colour bridge paint	Voluntary	Specifying lead carbonate white pigment.
SNI 06-3685.1-2000 on Specification for red lead ready-mixed paint	Mandatory for buildings (SNI 2407:2008 based on State Min. of Public Works Decree no. 441/1998)	Prescribes the use of red lead (Pb_3O_4) primer for base coat, top coat, or maintenance coat on surface of bridges and other steel structures. Cautions not to use on surfaces of facilities accessible to children or other public places.
SNI 2407:2008 on Code of conduct for wood painting for houses and buildings	Mandatory for buildings (State Minister of Public Works Decree no. 441/1998)	Wood primer refer to SNI 06-3685.1-2000 Wood paint refer to SNI 06-4827-1998 and not containing mercury and lead.
SNI 3564: 2009 on Emulsion Wall Paint	Voluntary	Heavy metals (Pb, Cu, Hg, Cd, Cr^{6+}) undetected by ASTM D 5702 test.
SNI ISO 8124-3:2010 Toy Safety - Part 3: Specification for migration of certain elements	Mandatory; come into force 6 months after 12 April 2013 (Min. of Industry Rule 24/2013)	Pb < 90 mg/kg Recall of non-compliant product
SNI 7188.6: 2010 on Ecolabel Criteria: Part 6 - Wall Paint Product Category	Voluntary	Allowable content: Pb < 90 mg/kg. Test method: ISO 3856-1 or ASTM D 3335 on red, blue, white, yellow and black paint as base for other colours.
SNI 8011:2014 for decorative solvent-based organic paint	Voluntary	Decorative solvent-based organic paint with lead content maximum of 600 ppm (dry weight)
SNI 3564:2014 for emulsion paint	Voluntary	Revisi SNI 3564:2009. Syarat kandungan timbal max. 90 ppm, mercury max. 60 ppm, cadmium max 75 ppm, krom hexavalen (Cr (VI) max 60 ppm
SNI 0465:2014 on sampling methodology	Mandatory	Revised SNI 06-0456-1989 Method of sampling paints, lacquers, varnishes, and the like
SNI 8069:2014 on standard test method to determine low concentrations of heavy metals in paint	Mandatory	New SNI adopted ASTM D 3335-851, IDT: Standard test method for low concentration of lead, cadmium, and cobalt in paint by atomic absorption spectroscopy
RSNI3 - paint for children’s toys		New SNI, just finished the consultation process at BSN (28 January - 30 March 2015)
RSNI3 - standard for epoxy-based paint to prevent corrosion		New SNI, just finished the consultation process at (28 January - 30 March 2015)

New standard on lead in paint and regulation

Fig. 5. Technical regulation development and implementation

Technical regulatory processes are usually developed based on voluntary standards established as *Standar Nasional Indonesia* (SNI). Standards can be made mandatory at the national or in particular strategic projects to ensure consistent quality of works and results are performed all over the country. Figure 5 shows the technical regulation implementation process.

A national standard has been set in 2010 to limit lead content in toys to less than 90 ppm (migration).[30] The standard has been made mandatory and supposedly enter into force after 12 October 2013, covering both toys manufactured in Indonesia or imported.[31] This regulation aims to protect children from the harmful effect of chemical exposures from toys, but it is worth noting that children also interact and may be exposed to certain chemicals from dust and other painted surfaces such as doors, windows, walls, floors, and furniture.

Fig. 6. About 32 million children age 0-6 in Indonesia are at risks to lead exposure

However, the enforcement of the regulation has been postponed due to the objection from the children's toys association. The association argued that they need more time to change their practices to achieve the standard set by government.[32]

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[30] SNI ISO 8124-3:2010, Toy Safety - Part 3: Specification For Migration Of Certain Elements

[31] Indonesian Ministry of Industry Regulation No. 24/M-Ind/Per/4/2013

[32] SNI Mainan: Pengusaha Minta Kejelasan Pelonggaran Aturan. Wike Dita Herlinda Rabu, 03/12/2014. Accessed By 22 May 2015. Http://Industri.Bisnis.Com/Read/20141203/12/379509/Sni-Mainan-Pengusaha-Minta-Kejelasan-Pelonggaran-Aturan

Regulation on Eco-label

Infrastructure for Eco-labelling had been prepared jointly by the Ministry of Environment and Forestry, *Badan Standarisasi Nasional* (BSN) or National Standardisation Agency, *Komite Akreditasi Nasional* (KAN) or National Accreditation Committee and other stakeholders.

Indonesian Law No. 32 of 2009 on the Protection and Management of the Environment, Article 43 paragraph (3) g addressed the development of eco-friendly labelling system as an economic instrument proactive.

In January 2014, the Ministry of Environment and Forestry of Indonesia issued the Ministerial Decree No. 2/2014 on the inclusion of the Eco-label logo. Eco-label is a mean of delivering accurate information, verifiable and to inform consumers regarding the environmental aspects of a product (good or service), a component or packaging following the guidance set in ISO 14020.

The regulation contains information related to the procedure for the approval of the inclusion of an Eco-label logo and self-declared Indonesian Eco-label logo. The provision of the Eco-label logo will be given to a product that has been certified by an Eco-label Certification Agency (*Lembaga Sertifikasi Ekolabel/LSE*) and that its criteria meets the standards and requirements set forth in the Eco-label guidelines.

The Eco-label self-declared logo is awarded to a product based on the results of verification conducted by the Eco-label verification agencies (*Lembaga Verifikasi Ekolabel/LVE*) on claims of manufacturers, importers, distributors, retailers, the trademark owner or other interested parties.

Komite Akreditasi Nasional (KAN) or the National Accreditation Commission), as an authorised institution in granting the accreditation of the Eco-label certification body, can develop policies to support the application Eco-label. There is a need for surveillance of environmentally friendly products, especially self-declared, in the market.

Study conducted by BaliFokus in 2013 and 2015 found several self-declared "lead-free" paints from several brands but not verified by any verification companies or relevant agencies.

4. Materials and Methods

From November 2014 until January 2015, BaliFokus purchased 121 cans of enamel decorative paints from various stores in 5 cities. These paints from 63 different brands were produced by 52 manufacturers. In most cases, BaliFokus selected one white paint and one or more bright-coloured paints such as red, orange or yellow. The availability of these paints in retail establishments suggested that they were intended to be used within home environments. Excluded were automotive and industrial paints that are not typically used for domestic housing applications or for painting toys.

During the paint sample preparation, information such as colour, brand, country where manufactured, purchase details, date manufactured as provided on the label of the paint can was recorded. The formats used for date of manufacturer varied with some companies providing day, month and year and others providing only month and year. In addition, some paint companies used only a single word to describe some colours, such as "red," while others used "bright red." Colours were recorded as provided on the can. For the red and yellow paints the protocol called for obtaining "bright" or "strong" red and yellow paints when available. Dates of purchase were recorded in the day/month/year format in most cases.

Paint sampling preparation kits containing individually numbered, untreated wood pieces, single-use paintbrushes and stirring utensils made from untreated wood sticks were assembled and shipped to the BaliFokus by the staff of the IPEN partner NGO, Arnika, in the Czech Republic.

Each can of paint was thoroughly stirred and was subsequently applied onto individually numbered triplicates of untreated wood pieces using different unused single-use paintbrushes by the staff of BaliFokus.

Each stirring utensil and paintbrush was used only once, and extra caution was taken to avoid cross contamination. All samples were then allowed to dry at room temperature for five to six days. After drying, the painted wood pieces were placed in individual resealable plastic bags and shipped to an ELPAT (Environmental Lead Proficiency Analytical Testing program) participating laboratory in Europe for analysis of total lead content of dry weight of the paint.

The paint samples were analysed using method CPSC-CH-E1003-09 (Inductively Coupled Plasma (ICP) spectroscopy, as recognised both by WHO and the United States Consumer Product Safety Commission as appropriate for the purpose.[33,34]

Fig. 7. Paint sampling preparation

[33] WHO Library Cataloguing-in-Publication Data. (2011). Brief guide to analytical methods for measuring lead in paint. http://www.who.int/ipcs/assessment/public_health/lead_paint.pdf

[34] United States Consumer Product Safety Commission, Directorate for Laboratory Sciences, Division of Chemistry. (2009). Test Method: CPSC-CH-E1003-09 Standard Operating Procedure for Determining Lead (Pb) in Paint and Other Similar Surface Coatings. https://www.cpsc.gov/PageFiles/128129/CPSC-CH-E1003-09.pdf

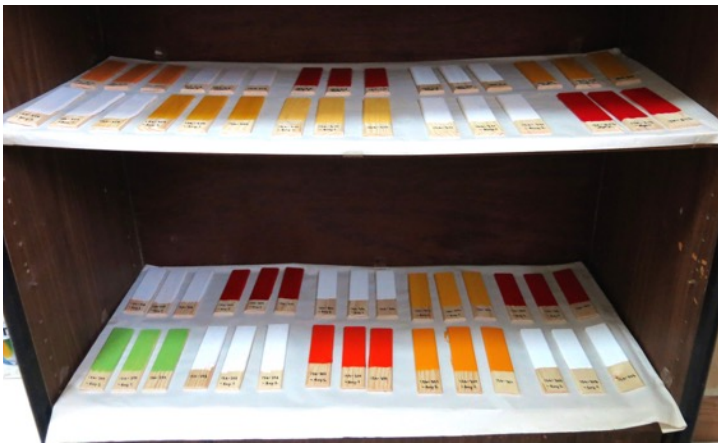

Fig. 8a. Paints stirring and brushing (top).
Fig. 8b. Paints samples drying (middle).
Fig. 8c. Paints samples packaging (bottom).

5. Summary

A total of 121 cans of new enamel decorative paints from 63 brands were purchased in 5 cities in Indonesia and analysed for their lead content. Results are given in parts per million (ppm) lead, based on dry weight of the paint. Please see Appendix A for full analysis results.

The majority of sampled paints would not be permitted for sale in the U.S. or other industrialised countries and more than a third of the samples contained dangerously high lead levels.

- 94 paints (78% of paints) had a lead content greater than 600 ppm and would not be permitted for sale in Indonesia under the new proposed regulation, and in many other countries;
- 101 paints (83% of paints) had a lead content greater than 90 parts per million, and would not be permitted for sale or use in the United States and many other industrialised countries;
- 50 paints (41% of paints) had a lead content greater than 10,000 parts per million lead, which can be considered to be extremely hazardous.

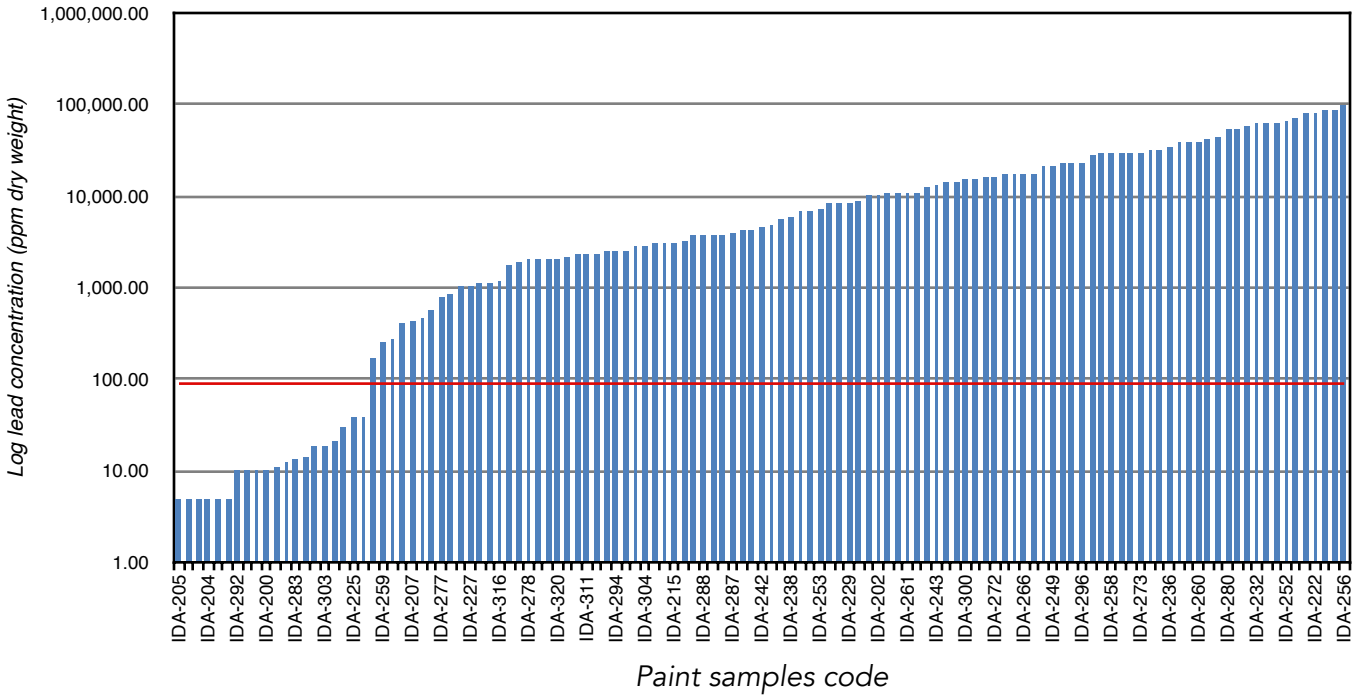

Fig. 9. Lead content of the 121 analysed paints, ordered from lowest to highest.

Lead content in different brands

One or more paint from 90% of all the 63 brands included in the 2015 study would not be permitted for sale in the United States.

- One or more paints from 57 of the brands analysed (90% of brands) contained lead above 90 ppm;
- One or more paints from 53 of the brands analysed (84% of brands) contained lead above 600 ppm;
- One or more paints from 38 of the brands analysed (60% of brands) contained lead above 10,000 ppm;
- The highest lead concentration found was in the yellow colour paint from the brand Kuda Terbang: 102,000 ppm or more than 1000 times of the recommended level 90 ppm.
- The 20 paints that contained lead below 90 ppm and could be legally sold in the U.S., EU and other industrialised countries belonged to the following brands: (Dulux V-Gloss (yellow), Emco Lux (red), Pacific WeatherGuard Gloss (white), Dulux V-Gloss (orange), Brillo (gold), Bee Brand Junior 66 (white); Emco Lux (blue), Supro Higloss enamel (yellow), Brillo (white), Pacific Weather Guard Gloss (yellow), Anlux (white), 3 kambing (white), Bitalac (red), Envi (red), Decolux (white), Duplex (white), Gamatex (white), Millatex (white and fuschia), Ftalit (white));
- 7 paints contained lead between 91 ppm and 600 ppm, and belong to the following brands: Gendang (white), Mowilex (red), Garuda (white), Kangaroo (gold), Lenkote Platinum (white), Meni best Neocortex (green) and Ferrol (light brown).

Companies that produced one or more paint sampled in this study with lead concentrations below 600 ppm are shown in Table 3. Eight out of 10 companies are Indonesian companies.

Table 3. Paint Samples with Lead Concentration below 600 ppm in 2015

No.	Brand	Company	Number of samples (colour)	Min. lead con. (ppm)	Max. lead con. (ppm)
1	Dulux V-Gloss	PT ICI Paints Indonesia	2 (orange, yellow)	<5	<5
2	Pacific WeatherGuard Gloss	Pacific Paint	2 (white, yellow)	< 5	10
3	SUPRO Higloss Enamel	PT KCC Paints, Korea	1 (yellow)	< 10	< 10
4	Bitalac	PT Bital Asia, Tangerang	1 (red)	13	13
5	Envi	PT Indaco Coatings Industri Solo	1 (red)	14	14
6	Millatex	PT Gajah Maju Jaya	2 (white, red)	30	40
7	Mowilex	PT Mowilex Indonesia	1 (red)	260	260
8	Kangoroo	PT Asia Sukma Chemindo Indonesia	1 (gold)	410	410
9	Meni Besi Nicortex	Nicortex Paint Factory, Jakarta	1 (green)	470	470
10	Ferrol	PT Patna Paint, Surabaya	1 (brown)	570	570

Lead content of paints produced by the market leaders in Indonesia in 2015

26 paints from 8 market leaders were analysed in 2015 (Tab 4).

- All samples from 3 out of eight market leaders contained lead below 600 ppm (ICI/Akzo Nobel, Pacific Paint, Mowilex);
- All paints from 5 out of eight market leaders contained lead above 600 ppm and produced paints in extremely dangerous lead concentration above 10,000 ppm (Avian, Nippon, Danapaint, Kansai, RJ London).

The technology is available in Indonesia to produce unleaded decorative paints, but change is needed from both transnational and Indonesian headquartered paint companies.

- Nearly a quarter or 15 out of 63 brands analysed sold at least one paint with a lead concentration below 90 ppm, suggesting that it is feasible to produce paint without lead in Indonesia;
- 15 Indonesian headquartered paint companies and 5 foreign/international companies manufactured paints with lead content below 90 ppm;
- Organic pigment producer and suppliers are available and exist in Indonesia.

Table 4. Lead concentration of 10 market leaders in 2013 and 2015 studies

No.	Brand (Company)	HQ Country	Market Share (%)*	Color of paint	Lead concentration in 2013 (ppm)	Lead concentration in 2015 (ppm)
1	Dulux and Catylac (ICI/Akzo Nobel)	NLD	30.4	Cinnabar orange	529	5
2	Avian (Avia Avian)	IDN	17.3	Yellow / Medium Yellow 465	17,059	15,700
				White	5,807	5,640
3	Nippon Bee Brand 9000, Bee Brands Junior 66 and 1000 (Nippon)	JPN	16.1	119 Thick white / 119 Platimum grey (same code, different color)	7,414	3,820
				166 Mayan yellow	98,372	63,000
				9102 Super white	5,394	<5
				602 Golden yellow	32,544	22,000
				White	69	
4	Mowilex	IDN	6.1	675 Popcorn / Germanium-470	115,056	260
5	Danalac (Danapaint)	IDN	4.0	Golden canary	51,897	62,000
				White	5,339	3,150
6	Glo-Tex and Pacific WeatherGuard Gloss (Pacific Paint)	IDN	4.0	Yellow	349	10
7	Ftalit and Property Glozz (Kansai)	JPN	2.0	600 Bright orange	23,292	44,000
				203 Irish white	3,463	38
8	Jotun Gardex (Jotun)	NOR	1.4	Yellow	100	Not tested
9	R.J. London (R.J. London)	SGP	-	200 Black	4,708	3,690
				102 Super white	2,349	2,490
				500 Yellow	36,811	14,100
				403 Spring green	31,236	17,100
				308 Romance blue	3,437	2,400
				903 Brown	6,095	3,090
10	Ace and Kensington-Clark (Ace Hardware Corp.)	USA	-	Ultra white	101	Not tested
				Safety yellow	12	Not tested

Note: AUS = Australia, IDN = Indonesia, JPN = Japan, NLD = Netherlands, NOR = Norway, SGP = Singapore, ROK = Republic of Korea

Lead concentrations* in different *paint colours

Of the paints analysed in 2015, the highest levels of lead were found in **yellow, orange, green and red** coloured paints (Tab A.4), where the average concentrations were 35,370 ppm, 20,000 ppm, 18,560 ppm and 9,440 ppm respectively.

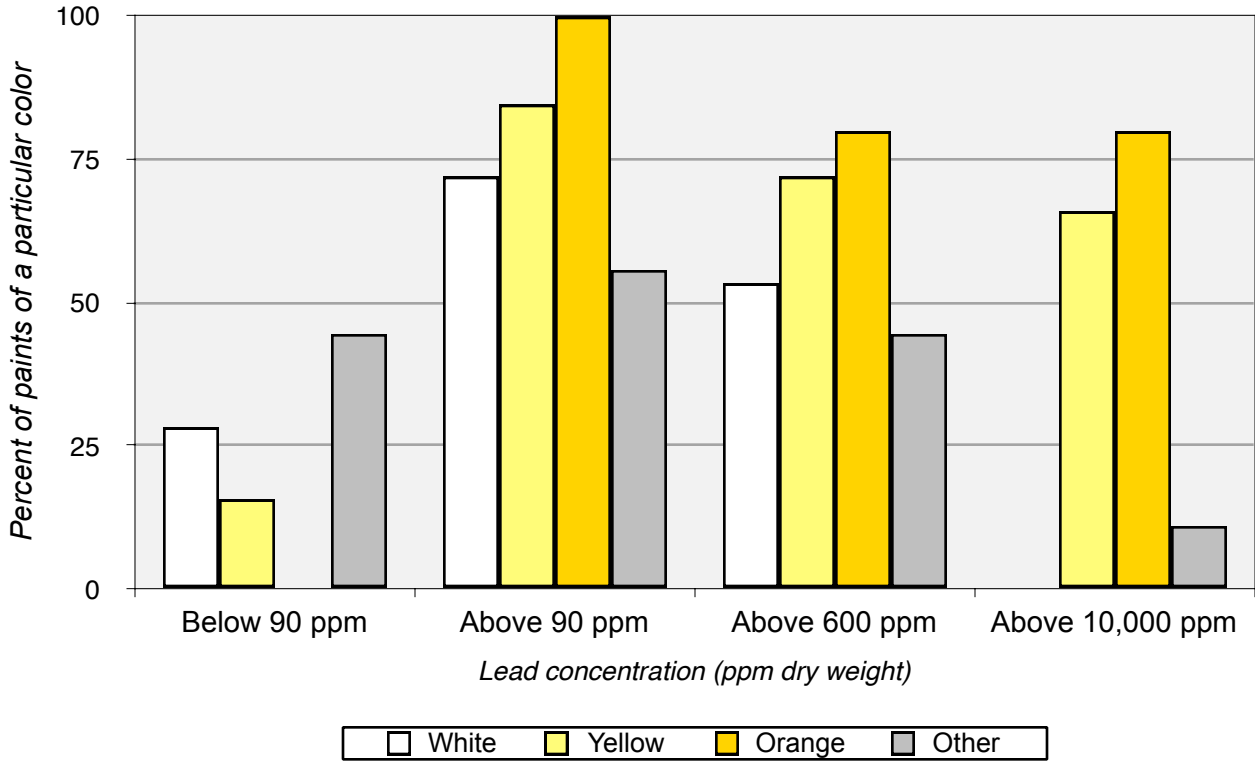

Fig. 10. Lead concentration based on colours (ppm dry weight)

Self-claimed lead-free labels

Only a few (7 out of 121) paints analysed have self-declared or self-claimed lead-free labels, whereas the rest of the paints (94% of paints) have no labels or no information about lead content. Lead content in all paints with lead-free labels were below 90 ppm.

Fig. 11. Self-claimed lead-free labels in some paints 2015

Fig. 12. Paints analysed in 2015 in various sizes

Comparison of 2013 study vs the 2015 study

Forty-nine paints were included in the 2015 study that was shown to contain high lead concentration greater than 90 ppm in the 2013 study (Tab A.8). An improvement was seen in 2015 for paints with lead levels below 10,000 ppm in the 2013 study. However, paints with dangerously high levels above 10,000 ppm in 2013 still contained the same high levels in 2015.

- 6 paints (12% of paints included in both studies) had a reduced lead content in 2015 below 90 ppm;
- 9 paints (18% of paints included in both studies) contained lead below 600 ppm in 2015, while in 2013 it was only 3 paints (6% of paints included in both studies);
- Still, about half of the 49 paints included in both studies contained lead above 10,000 ppm both in the 2013 study (53% of paints included in both studies) and the 2015 study (49% of paints included in both studies).

6. Discussion and Conclusions

When BaliFokus analysed paint samples in 2013, only one of the market leaders, Dulux & Catylac (ICI/Akzo Nobel) was producing paints with low lead levels. This study shows that one or more samples of three of the market leaders (ICI/Akzo Nobel, Pacific Paint, Mowilex) had lead content below 600 ppm.

In this study, 11 Indonesian headquartered paint companies and 4 foreign/international companies manufactured one or more paints with lead content below 90 ppm. Switching from lead-based pigment to organic pigment and non-lead based driers could lead to a significant drop of lead concentration in paints.

Nevertheless, paint with high lead levels continue to be sold by small and medium-sized manufacturers representing 61% of the paint market. These producers often face special barriers in shifting to low lead products and may require additional technical information, better access to suppliers of non-leaded paint ingredients and other types of help in re-formulating their products.

As three-fourth of paints are used in existing housing and more than 80% of the enamel paints with bright colours contained lead above the safe level, it is important to address the issue of controlling dust hazards when preparing previously painted surfaces for repainting.

The advocacy by BaliFokus has raised awareness of the hazard of lead paint among consumers. However, it remains virtually impossible for consumers to identify which paints contain high levels of lead, since most companies don't provide information about lead content on their labels and those that do are not independently verified. Although the truthfulness of the few can labels with lead-free claims were verified in this study, all eco-labels or other labels used by paint manufacturers to indicate low lead content need to be verified. Specific lead-free labels need to be introduced to ensure the paint sold in the market are free from lead.

Since BaliFokus began investigating lead in decorative paint, a new standard of solvent-based paint SNI 8011:2014 has been proposed by the paint standard committee to restrict lead content in paint to 600 ppm. These actions demonstrate that government officials have become aware of the danger lead paint poses to young children and the nation's economy and are willing to prevent childhood lead exposure.

7. Recommendations

Government

- Approve the new SNI standard of 600 ppm for decorative paints and set the time frame for this to be compulsory. If possible, set a review of the standard in two years and schedule a revision of the standard to 90 ppm.
- Manufacturers should be encouraged to put the Eco-label and or lead-free labels in compliance with the Indonesian regulation in their paint and a warning or precautions to alert for users to the hazards of lead-contaminated dust and other materials when previously painted surfaces are scraped or sanded in preparation for repainting.
- Green procurement should include lead-free paints especially for public buildings, childcare facilities, early childhood education facilities, health care facilities and government office.
- Consideration should be given to the inclusion of provisions for compliance, monitoring, and enforcement once a standard is in place.
- Enforcement should be conducted by the Ministry of Industry and the Ministry of Environment.
- Provide technical capacity building and financing for SMEs to switch to organic pigment should be facilitated by the Ministry of Industry
- Mandate labelling requirements including information about the hazard associated with disturbing surfaces coated with lead paint when preparing for repainting.

Paint Industry

- Switch immediately to lead-free paint ingredients that are available in Indonesia;
- Take advantage of the ASEAN Free Trade Area (AFTA) and ASEAN-China Free Trade Area (ACFTA) agreements to sell products that comply with the international standard and that are within safe levels.
- Protect your employees and identify lead contaminated hotspots within your factories perimeter. Clean up the contaminated soil immediately to prevent the long term adverse effect to human health and the environment.
- Protect your employees and identify lead contaminated hotspots within your factories perimeter. Clean up the contaminated soil immediately to prevent the long term adverse effect to human health and the environment.
- Manufacturers should be encouraged to put the Eco-label and or lead-free labels in compliance with the Indonesian regulation in their paint and a warning or precautions to

alert for users to the hazards of lead-contaminated dust and other materials when previously painted surfaces are scraped or sanded in preparation for repainting.

For consumers and individuals as well as organisations:

When purchasing paints, ask about their content and, whenever possible, select paints with low lead levels to protect the health of children and all family members.

For all stakeholders:

- To increase awareness of health hazards from lead paints and lead dust and ways to reduce exposure
- Cooperate in establishing a reliable third-party certification system of lead in paint to ensure that paints sold in the market meet the acceptable limit of 90 ppm.

Lastly, there are several pending issues need to be addressed and consider by all stakeholders:

a) Regulation to manage used cans of paint containing lead above 90 ppm should be considered to be taken back by the industry as an Extended Producers' Responsibility (EPR) practice;
b) Identification of lead contaminated soil around the factory that produced high lead content paints;
c) Assess the impact of lead exposure to workers in paint factories that use lead-based pigments and produced paints with lead concentration above 90 ppm;
d) Socialisation of lead-free pigments producers/distributors in Indonesia;
e) Dissemination of best practices and the provision of technical assistance to produce lead-free paints for SMEs;
f) A mandatory regulation requiring lead-free paint procurement for public, health and educational facilities, early childhood education facilities, child care, mother and baby clinics, etc.;
g) Development and provision of guidance for the paint industry to phase out and withdraw paints with lead content above 600 ppm by 2020 including industrial paints;
h) Development and dissemination of guidance to scrap paints when renovate or rehabilitate buildings that have identified using high lead concentration paints in the past;
i) Restriction and monitoring of lead-containing paint importation, production, use, and its waste disposals.

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Appendix A

Table A.1. New Solvent-based, Enamel Paints Included in the Study

No.	Sample #	Brand Name	Country of Brand HQ	Country Where Manufactured	Colours	Paint Can Size	Date Manufactured (if given)	Batch # (if given)	Price (IDR)	Information from Can label, i.e. lead content, website, other information
1	IDA-200	Pacific WeatherGuard Gloss	IDN	IDN	Yellow	0, 9 L	N/A	431010002	50,000	Yes (Chrome lead free; www.pacificpaint.com)
2	IDA-201	Pacific WeatherGuard Gloss	IDN	IDN	White	0,9 L	N/A	20212344	50,000	Yes (Chrome lead free; www.pacificpaint.com)
3	IDA-202	Garuda	IDN	IDN	Yellow 912	1 L	N/A	23 52013	35,000	No
4	IDA-203	Garuda	IDN	IDN	White	1 L	N/A	N/A	30,000	No
5	IDA-204	Dulux V-Gloss	NLD	IDN	Cinnabar orange	1 L	N/A	47575 8/53	47,100	Yes (No added lead)
6	IDA-205	Dulux V-Gloss	NLD	IDN	Mustard Banana	I L	N/A	5135798, 4504545820	47,100	Yes (No added lead)
7	IDA-206	Lenkote Platinum	AUS	IDN	16 Bright spirit	1 L	N/A	MCB 20, 0159510101	87,600	No (www.lenkotepaints.com)
8	IDA-207	Lenkote Platinum	AUS	IDN	01 Absolute white	1 L	N/A	S-IDB 18.1	89,000	No (www.lenkotepaints.com)
9	IDA-208	Sendai	IDN	IDN	Yellow 126 (kuning lemon)	0.8 L	N/A	S2815820040	30,000	No
10	IDA-209	Sendai	IDN	IDN	110 White	0,9L	N/A	SAP12761163935	30,000	No
11	IDA-210	RJ London	SGP	N/A	200 Black	0.1 L	N/A	332024.BK	7,250	No (www.rjlondon.com)
12	IDA-211	RJ London	SGP	N/A	102 Super white	0.1 L	N/A	271922.KBB	47,000	No (www.rjlondon.com)
13	IDA-212	RJ London	SGP	N/A	500 Yellow	0.1 L	N/A	241624.BK	7,250	No (www.rjlondon.com)
14	IDA-213	RJ London	SGP	N/A	403 Spring green	1 L	N/A	221219.IT	47,000	No (www.rjlondon.com)
15	IDA-214	RJ London	SGP	N/A	308 Romance blue	1 L	N/A	341321KKI	47,000	No (www.rjlondon.com)

16	IDA-215	RJ London	SGP	N/A	903 Brown	0.1 L	N/A	161924.BK	7,250	No (www.rjlondon.com)
17	IDA-216	Decolux	IDN	IDN	Pale lemon 894	0.9 L	N/A	14E23-51AL4A	50,000	No
18	IDA-217	Decolux	IDN	IDN	830	0.9 L	N/A	14C21-51AL3A	50,000	No
19	IDA-218	Decolux	IDN	IDN	White	1 L	N/A	14I29-51AK1A	35,000	No
20	IDA-219	Recolac	IDN	IDN	980 Lemon	0.8 L	N/A	FLYFS040	40,000	No
21	IDA-220	Recolac	IDN	IDN	018 white	0.8 L	N/A	ABOGAB	40,000	No
22	IDA-221	Seiv Chemolux	IDN	IDN	180 Super white	1 L	N/A	N/A	48,000	No
23	IDA-222	Seiv Master Gloss	IDN	IDN	529 hot orange	0.8 L	N/A	08H14	48,000	No (wwww.seiv.co.id)
24	IDA-223	Seiv	IDN	IDN	500 Lemon yellow	1 L	N/A	ELLOW	50,000	No (wwww.seiv.co.id)
25	IDA-224	Ftalit	JPN	IDN	600 Bright orange	1 L	N/A	4080997 / 50-115-600-1065	55,000	No (www.gtp-kansai.co.id)
26	IDA-225	Ftalit	JPN	IDN	203 Irish white	1 L	N/A	50-115-203-1068	50,000	No (www.kansaicoatings.co.id)
27	IDA-226	Al-Tex	IDN	IDN	White	1 L	N/A	11310074	55,000	No
28	IDA-227	Al-Tex	IDN	IDN	MERAH 78	0.1 L	N/A	31310841	10,000	No
29	IDA-228	Al-Tex	IDN	IDN	18 Yellow	1 L	N/A	1310599	55,000	No
30	IDA-229	Brillo	IDN	IDN	3430 MANGO	0,9 L	N/A	S2814120023	51,400	No
31	IDA-230	Brillo	IDN	IDN	4480 GOLD	0.9 L	N/A	SAM12760785895 (1079230	104,500	No
32	IDA-231	Brillo	IDN	IDN	1111 Super white	1 L	N/A	0620010101/ SAM12760968631	51,400	No
33	IDA-232	Danalac	IDN	IDN	Golden canary	1 L	N/A	083-3568, 14016232	55,000	No
34	IDA-233	Danalac	IDN	IDN	White	1 L	N/A	12100049	55,000	No
35	IDA-234	Avian	IDN	IDN	Medium Yellow 465	0.9 L	N/A	N/A	48,000	No
36	IDA-235	Avian	IDN	IDN	630 green	0.1 L	N/A	N/A	12,000	No
37	IDA-236	Avian	IDN	IDN	MERAH 192	0,1 L	N/A	N/A	15,000	No
38	IDA-237	Avian	IDN	IDN	White	0.1 L	N/A	N/A	15,000	No

39	IDA-238	Property Glozz	JPN	IDN	033 Super white	1 L	N/A	2100647	43,000	No (www.kansaicoatings.co.id)
40	IDA-239	Property Glozz	JPN	IDN	007 Summer sun	1 L	N/A	50-112-007-2577, 4011783	41,200	No (www.gtp-kansai.co.id)
41	IDA-240	Yoko primer	IDN	IDN	Loodmenie	0,7 L	N/A	S-PDC 06.1	37,000	No
42	IDA-241	Yoko	IDN	IDN	781 Bright orange	1 L	N/A	J-SAK 02	42,000	No
43	IDA-242	Yoko	IDN	IDN	Super white	1 L	N/A	J-SBK 19	42,000	No
44	IDA-243	Vim	IDN	IDN	906 Yellow	1 L	N/A	HC0671	35,000	No
45	IDA-244	Bintang Laut	IDN	IDN	Red	0.1 L	N/A	N/A	15,000	No
46	IDA-245	Bintang Laut	IDN	IDN	B20 Bright orange	0.8 L	N/A	304030169	42,000	No
47	IDA-246	Bee Brand 1000	JPN	IDN	119 (platinum grey)	1 L	N/A	BO BAQRS	49,000	No (www.nipponpaint-indonesia.com)
48	IDA-247	Bee Brand 1000	JPN	IDN	166 Mayan yellow	1 L	N/A	BO DTCS	40,000	No (www.nipponpaint-indonesia.com)
49	IDA-248	Bee Brand Junior 66	JPN	IDN	9102 Super white	0,94 L	N/A	P.BART, 0325040101	47,500	No (www.nipponpaint-indonesia.com)
50	IDA-249	Bee Brand Junior 66	JPN	IDN	602 Golden yellow	0,94 L	N/A	PAENT, 0020030101	47,500	No
51	IDA-250	Delta	IDN	IDN	967 Golden yellow	0.2 L	N/A	1044.11111115	15,000	No
52	IDA-251	Paiton 8000	IDN	IDN	White 801	0.1 L	N/A	ML07	45,000	No
53	IDA-252	Super Lux	IDN	IDN	Yellow	0.1 L	N/A	MH 05	10,000	No
54	IDA-253	Mawar	IDN	IDN	400 HoneyWood	0.2 L	N/A	CLI231	15,000	No
55	IDA-254	Mawar	IDN	IDN	Cherry Red 534	1 L	N/A	COK 192	55,000	No
56	IDA-255	Kuda Terbang	IDN	IDN	White	0.1 L	N/A	FQOLFS	10,000	No
57	IDA-256	Kuda Terbang	IDN	IDN	922 Yellow	0.1 L	N/A	BCOE BOAB	12,000	No
58	IDA-257	Kuda terbang	IDN	IDN	Green	0.1 L	N/A	ROOHFS010	10,000	No
59	IDA-258	Kuda Terbang 1/2 Duco	IDN	IDN	980 Lemon	1 L	N/A	UHIFS123	49,000	No

60	IDA-259	Mowilex	IDN	IDN	Germanium-470	1 L	N/A	20130624	72,000	No
61	IDA-260	ABC	IDN	IDN	955 Sunshine	0,8 L	N/A	C26800	42,000	No
62	IDA-261	ABC	IDN	IDN	905 Sunrise	0.8 L	N/A	B1**** (print not clear)	40,000	No
63	IDA-262	500 Plus Paints	IDN	IDN	330 Paprika	0.8 L	N/A	WYYUNQ0830	40,000	No
64	IDA-263	Cendrawasih	IDN	IDN	8600 Bright Orange	0.9 L	N/A	170514	39,000	No
65	IDA-264	Millatex	IDN	IDN	White	1 L	N/A	1400512	35,000	No
66	IDA-265	Millatex	IDN	IDN	346 Fushia	1 L	N/A	1303711-	35,000	No
67	IDA-266	Luna	IDN	IDN	903 Ivory yellow	0.75 L	N/A	N/A	41,000	No
68	IDA-267	Penlux	IDN	IDN	292 Yellow	0.1 L	N/A	2069058	15,000	No
69	IDA-268	Kangoroo	IDN	IDN	935 Gold	0.1 L	N/A	140213	15,000	No
70	IDA-269	Ferrol	IDN	IDN	Brown	1 L	N/A	N/A	30,000	No
71	IDA-270	7Lux	IDN	IDN	721 exclusive green	1 L	N/A	16042014	45,000	No
72	IDA-271	7Lux	IDN	IDN	White	0.8	N/A	0209201*	45,000	No
73	IDA-272	7Lux	IDN	IDN	701 orange	1 L	N/A	30713	45,000	No
74	IDA-273	Wita	IDN	IDN	142 Yellow	1 L	N/A	91213	45,000	No
75	IDA-274	Wita	IDN	IDN	155	1 L	N/A	11609* (print not clear)	45,000	No
76	IDA-275	Wita	IDN	IDN	White	1 L	N/A	D40814	38,000	No
77	IDA-276	Wita	IDN	IDN	158 Gree	1 L	N/A	040714 (print not clear)	45,000	No
78	IDA-277	Kansai Primer	IDN	IDN	008 Red oxide primer	1 L	N/A	50-102-008-1063	47,000	No (Kansai Paint Co, Ltd)
79	IDA-278	Bel Mas	IDN	IDN	711 Green	1 L	N/A	0-500-21	47,000	No
80	IDA-279	Meni Besi Nocortex	IDN	IDN	Green	1 L	N/A	N/A	42,000	No
81	IDA-280	Picolux	IDN	IDN	906 Yellow	0.1 L	N/A	N/A	9,000	No
82	IDA-281	Destun	IDN	IDN	720 Vermillion	0.8 L	N/A	11JXSBA-MB20BM	45,000	No
83	IDA-282	Envi	IDN	IDN	923 Vermillion	0,9 L	N/A	3114110950	48,000	Yes, No added Lead and Mercury
84	IDA-283	Bitalac	IDN	IDN	1035 Flame	I L	N/A	(0663610101)8-103LAME	49,000	Lead and Hg free (with explanation about 90 ppm standard)
85	IDA-284	3 kambing	IDN	IDN	White	0.5 L	N/A	N/A	25,000	No

86	IDA-285	3 kambing	IDN	IDN	Winner R-242 (yellow)	0.5 L	N/A	N/A	25,000	No
87	IDA-286	Romatex	IDN	IDN	242 Yellow orange	0.9 L	N/A	D4731A	48,000	No
88	IDA-287	Romatex	IDN	IDN	232 Signal Red	0.9 L	N/A	P**** (print not clear)	48,000	No
89	IDA-288	Romatex	IDN	IDN	White	0.9 L	N/A	Print not clear	48,000	No
90	IDA-289	Emco Lux	IDN	IDN	35 Bud Green	0.2 L	N/A	INZINH 9 908100203523	18,000	No
91	IDA-290	Emco Lux	IDN	IDN	68 Pumpkin Orange	0.2 L	N/A	IQZZZH	18,000	No
92	IDA-291	Emco Lux	IDN	IDN	117 Lemon yellow	1 L	N/A	HZZBZ	50,000	No
93	IDA-292	Emco Lux	IDN	IDN	Biru 75 ocean blue 75	0.2 L	N/A	INZZKN MINI K (9908100207538)	18,000	No
94	IDA-293	Emco Lux	IDN	IDN	78 Ruby Red	0.2 L	N/A	INZIIN 9908100207835	18,000	No
95	IDA-294	Gothic	IDN	IDN	White	0.1 L	N/A	071014 WHITE	10,000	No
96	IDA-295	Gothic	IDN	IDN	501 cream yellow	1 L	N/A	501creamyellow 121213	45,000	No
97	IDA-296	Ligatex	IDN	IDN	2018 golden yellow	0.8 L	N/A	2503014HY-MB03014RY	35,000	No
98	IDA-297	Figo	IDN	IDN	White	1 L	N/A	170914	35,000	No
99	IDA-298	Kambing	IDN	IDN	White	1 L	N/A	850814	30,000	No
100	IDA-299	Kambing	IDN	IDN	58 Green	I L	N/A	200614	30,000	No
101	IDA-300	Kembang	IDN	IDN	936 Red	0.8 L	N/A	lot 120369, 010816	35,000	No
102	IDA-301	Duplex	IDN	IDN	606 Golden yellow	0.9	N/A	NDD**54 (print not clear)	7,000	No
103	IDA-302	Duplex	IDN	IDN	118 Mustard	0.9 L	N/A	NH010B	55,000	No
104	IDA-303	Duplex	IDN	IDN	White	0.9 L	N/A	ODO415	55,000	No
105	IDA-304	Gendang	IDN	IDN	588 Million Red	1 L	N/A	MA6X4	33,000	No
106	IDA-305	Gendang	IDN	IDN	White	1 L	N/A	OK13X4	30,000	No
107	IDA-306	Gamatex	IDN	IDN	White	0.1 L	N/A	1203010	12,000	No
108	IDA-307	Gamatex	IDN	IDN	308 Red	0.1 L	N/A	1105203	12,000	No
109	IDA-308	Anlux	IDN	IDN	White	1 L	N/A	27-Dec-13	40,000	No

110	IDA-309	Anlux	IDN	IDN	554 Yellow	1 L	N/A	55402-14	40,000	No
111	IDA-310	Elite	IDN	IDN	Primrosse yellow 669	1 L	N/A	B1702053	40,000	No
112	IDA-311	Bali Lux	IDN	IDN	White	0.1 L	N/A	07VII14-PUTIH, 828-BLX	10,000	No
113	IDA-312	Bali Lux	IDN	IDN	2001 Papaya	0.1 L	N/A	29K11-PPPLY, 2001-BLX	10,000	No
114	IDA-313	Synthetic 3000	IDN	IDN	Vermillion Red 3308	0.8 L	N/A	B#3031269400	43,500	No (www.propanraya.com / info@propanraya.com)
115	IDA-314	Dextrolux	IDN	IDN	738 suoer white	1 L	N/A	N/A	35,000	No
116	IDA-315	Dextrolux	IDN	IDN	803 Red	0.05 L	N/A	N/A	10,000	No
117	IDA-316	Polibest	IDN	IDN	1224 Super white matte	0,8 L	N/A	lot209176, 042785	50,000	No
118	IDA-317	Polibest	IDN	IDN	906 yellow	0,8 L	N/A	lot.413131, 04251`8	50,000	No
119	IDA-318	Ocean Gloss	IDN	IDN	JAFFA YELLOW 209	0,8 L	N/A	141014	40,000	No
120	IDA-319	SUPRO Higloss Enamel	ROK	ROK	KCC HiglossK13317	1 L	N/A	KCC HiglossK13317 (base 3 #13061844)	121,388	Yes, No lead and mercury
121	IDA-320	Colormax	IDN	IDN	110 White	0,9 L	N/A	JSG-04-0181	37,000	No

Note:

AUS = Australia

IDN = Indonesia

JPN = Japan

NLD = Netherlands

SGP = Singapore

ROK = Republic of Korea

	Table A.2. Results of Lab Analysis of the New Solvent-based Enamel Paints						
No.	**Sample #**	**Brand Name**	**Color of Paint**	**2015 results (ppm)**	**Country of Brand HQ**	**Country Where Manufactured**	**Information from Can label, i.e. lead content, website, other information**
1	IDA-200	Pacific WeatherGuard Gloss	Yellow	**10**	IDN	IDN	Yes (Chrome lead free; www.pacificpaint.com)
2	IDA-201	Pacific WeatherGuard Gloss	White	**< 5**	IDN	IDN	Yes (Chrome lead free; www.pacificpaint.com)
3	IDA-202	Garuda	912 Yellow	**10,500**	IDN	IDN	No
4	IDA-203	Garuda	White	**270**	IDN	IDN	No
5	IDA-204	Dulux V-Gloss	Cinnabar Orange	**< 5**	NLD	IDN	Yes (No added lead)
6	IDA-205	Dulux V-Gloss	Mustard Banana	**< 5**	NLD	IDN	Yes (No added lead)
7	IDA-206	Lenkote Platinum	16 Bright spirit	**64,103**	AUS	IDN	No (www.lenkotepaints.com)
8	IDA-207	Lenkote Platinum	01 Absolute White	**422**	AUS	IDN	No (www.lenkotepaints.com)
9	IDA-208	Sendai	126 Lemon Yellow	**15,777**	IDN	IDN	No
10	IDA-209	Sendai	110 White	**1,080**	IDN	IDN	No
11	IDA-210	RJ London	200 Black	**3,684**	SGP	N/A	No (www.rjlondon.com)
12	IDA-211	RJ London	102 Super White	**2,487**	SGP	N/A	No (www.rjlondon.com)
13	IDA-212	RJ London	500 Yellow	**14,100**	SGP	N/A	No (www.rjlondon.com)
14	IDA-213	RJ London	403 Spring Green	**17,100**	SGP	N/A	No (www.rjlondon.com)
15	IDA-214	RJ London	308 Romance Blue	**2,406**	SGP	N/A	No (www.rjlondon.com)
16	IDA-215	RJ London	903 Brown	**3,094**	SGP	N/A	No (www.rjlondon.com)
17	IDA-216	Decolux	894 Pale Lemon	**7,000**	IDN	IDN	No
18	IDA-217	Decolux	830 White	**5,000**	IDN	IDN	No
19	IDA-218	Decolux	White	**18**	IDN	IDN	No
20	IDA-219	Recolac	980 Lemon	**23,000**	IDN	IDN	No
21	IDA-220	Recolac	018 White	**1,120**	IDN	IDN	No
22	IDA-221	Seiv, Seiv Chemolux , Seiv Master Gloss	180 Super white	**2,267**	IDN	IDN	No
23	IDA-222	Seiv Master Gloss	529 Hot Orange	**83,272**	IDN	IDN	No (wwww.seiv.co.id)
24	IDA-223	Seiv	500 Lemon yellow	**10,900**	IDN	IDN	No (wwww.seiv.co.id)
25	IDA-224	Ftalit	600 Bright orange	**44,000**	JPN	IDN	No (www.gtp-kansai.co.id)
26	IDA-225	Ftalit	203 Irish white	**38**	JPN	IDN	No (www.kansaicoatings.co.id)

27	IDA-226	Al-Tex	White	**2,992**	IDN	IDN	No
28	IDA-227	Al-Tex	78 Red	**1,067**	IDN	IDN	No
29	IDA-228	Al-Tex	18 Yellow	**30,000**	IDN	IDN	No
30	IDA-229	Brillo	3430 Mango	**8,500**	IDN	IDN	No
31	IDA-230	Brillo	4480 Gold	**< 5**	IDN	IDN	No
32	IDA-231	Brillo	1111 Super white	**< 10**	IDN	IDN	No
33	IDA-232	Danalac	Golden Canary	**62,000**	IDN	IDN	No
34	IDA-233	Danalac	White	**3,153**	IDN	IDN	No
35	IDA-234	Avian	465 Medium Yellow	**15,700**	IDN	IDN	No
36	IDA-235	Avian	630 Green	**12,258**	IDN	IDN	No
37	IDA-236	Avian	192 Red	**34,780**	IDN	IDN	No
38	IDA-237	Avian	White	**5,635**	IDN	IDN	No
39	IDA-238	Property Glozz	033 Super white	**5,825**	JPN	IDN	No (www.kansaicoatings.co.id)
40	IDA-239	Property Glozz	007 Summer Sun	**69,000**	JPN	IDN	No (www.gtp-kansai.co.id)
41	IDA-240	Yoko, Yoko primer	Loodmenie (Dark Orange)	**4,365**	IDN	IDN	No
42	IDA-241	Yoko	781 Bright Orange	**17,900**	IDN	IDN	No
43	IDA-242	Yoko	Super white	**4,567**	IDN	IDN	No
44	IDA-243	Vim	906 Yellow	**13,000**	IDN	IDN	No
45	IDA-244	Bintang Laut	Red	**10,400**	IDN	IDN	No
46	IDA-245	Bintang Laut	B20 Bright Orange	**2,900**	IDN	IDN	No
47	IDA-246	Bee Brand 1000	119 Platinum Grey	**3,819**	JPN	IDN	No (www.nipponpaint-indonesia.com)
48	IDA-247	Bee Brand 1000	166 Mayan Yellow	**63,000**	JPN	IDN	No (www.nipponpaint-indonesia.com)
49	IDA-248	Bee Brand Junior 66	9102 Super White	**< 5**	JPN	IDN	No (www.nipponpaint-indonesia.com)
50	IDA-249	Bee Brand Junior 66	602 Golden Yellow	**22,000**	JPN	IDN	No
51	IDA-250	Delta	967 Golden Yellow	**86,000**	IDN	IDN	No
52	IDA-251	Paiton 8000	801 White	**8,300**	IDN	IDN	No
53	IDA-252	Super Lux	Yellow	**68,000**	IDN	IDN	No
54	IDA-253	Mawar	400 HoneyWood	**7,400**	IDN	IDN	No
55	IDA-254	Mawar	534 Cherry Red	**17,100**	IDN	IDN	No
56	IDA-255	Kuda Terbang , Kuda Terbang 1/2 Duco	White	**2,050**	IDN	IDN	No
57	IDA-256	Kuda Terbang	922 Yellow	**102,000**	IDN	IDN	No

58	IDA-257	Kuda terbang	Green	**28,875**	IDN	IDN	No
59	IDA-258	Kuda Terbang 1/2 Duco	980 Lemon	**29,000**	IDN	IDN	No
60	IDA-259	Mowilex	470 Germanium	**260**	IDN	IDN	No
61	IDA-260	ABC	955 Sunshine	**39,000**	IDN	IDN	No
62	IDA-261	ABC	905 Sunrise	**11,200**	IDN	IDN	No
63	IDA-262	500 Plus Paints	330 Paprika	**4,300**	IDN	IDN	No
64	IDA-263	Cendrawasih	8600 Bright Orange	**9,000**	IDN	IDN	No
65	IDA-264	Millatex	White	**30**	IDN	IDN	No
66	IDA-265	Millatex	346 Fushia	**40**	IDN	IDN	No
67	IDA-266	Luna	903 Ivory yYellow	**17,500**	IDN	IDN	No
68	IDA-267	Penlux	292 Yellow	**60,000**	IDN	IDN	No
69	IDA-268	Kangoroo	935 Gold	**410**	IDN	IDN	No
70	IDA-269	Ferrol	Light Brown	**570**	IDN	IDN	No
71	IDA-270	7Lux	721 Exclusive Green	**11,200**	IDN	IDN	No
72	IDA-271	7Lux	White	**1,060**	IDN	IDN	No
73	IDA-272	7Lux	701 Orange	**16,500**	IDN	IDN	No
74	IDA-273	Wita	142 Yellow	**30,000**	IDN	IDN	No
75	IDA-274	Wita	155 Dark Orange	**1,820**	IDN	IDN	No
76	IDA-275	Wita	White	**2,100**	IDN	IDN	No
77	IDA-276	Wita	158 Green	**23,000**	IDN	IDN	No
78	IDA-277	Kansai Primer	008 Red oxide primer	**799**	IDN	IDN	No (Kansai Paint Co., Ltd)
79	IDA-278	Bel Mas	711 Green	**1,994**	IDN	IDN	No
80	IDA-279	Meni Besi Nocortex	Green	**470**	IDN	IDN	No
81	IDA-280	Picolux	906 Yellow	**53,000**	IDN	IDN	No
82	IDA-281	Destun	720 Vermillion	**10,600**	IDN	IDN	No
83	IDA-282	Envi	923 Vermillion	**14**	IDN	IDN	Yes, No added Lead and Mercury
84	IDA-283	Bitalac	1035 Flame	**13**	IDN	IDN	Lead and Hg free (with explanation about 90 ppm standard)
85	IDA-284	3 kambing	White	**12**	IDN	IDN	No
86	IDA-285	3 kambing	Winner R-242 Yellow	**14,000**	IDN	IDN	No
87	IDA-286	Romatex	242 Yellow Orange	**55,000**	IDN	IDN	No
88	IDA-287	Romatex	232 Signal Red	**3,900**	IDN	IDN	No
89	IDA-288	Romatex	White	**3,700**	IDN	IDN	No
90	IDA-289	Emco Lux	35 Bud Green	**31,106**	IDN	IDN	No
91	IDA-290	Emco Lux	68 Pumpkin Orange	**38,499**	IDN	IDN	No

92	IDA-291	Emco Lux	117 Lemon Yellow	**79,000**	IDN	IDN	No
93	IDA-292	Emco Lux	75 Ocean Blue	**< 10**	IDN	IDN	NO
94	IDA-293	Emco Lux	78 Ruby Red	**< 5**	IDN	IDN	NO
95	IDA-294	Gothic	White	**2,500**	IDN	IDN	No
96	IDA-295	Gothic	501 Cream Yellow	**7,000**	IDN	IDN	No
97	IDA-296	Ligatex	2018 Golden Yellow	**23,000**	IDN	IDN	No
98	IDA-297	Figo	White	**3,000**	IDN	IDN	No
99	IDA-298	Kambing	White	**2,500**	IDN	IDN	No
100	IDA-299	Kambing	58 Green	**41,000**	IDN	IDN	No
101	IDA-300	Kembang	936 Red	**15,100**	IDN	IDN	No
102	IDA-301	Duplex	606 Golden Yellow	**88,000**	IDN	IDN	No
103	IDA-302	Duplex	118 Mustard	**31,000**	IDN	IDN	No
104	IDA-303	Duplex	White	**18**	IDN	IDN	No
105	IDA-304	Gendang	588 Million Red	**2,900**	IDN	IDN	No
106	IDA-305	Gendang	White	**165**	IDN	IDN	No
107	IDA-306	Gamatex	White	**21**	IDN	IDN	No
108	IDA-307	Gamatex	308 Red	**2,200**	IDN	IDN	No
109	IDA-308	Anlux	White	**11**	IDN	IDN	No
110	IDA-309	Anlux	554 Yellow	**870**	IDN	IDN	No
111	IDA-310	Elite	669 Primrosse Yellow	**8,400**	IDN	IDN	No
112	IDA-311	Bali Lux	White	**2,300**	IDN	IDN	No
113	IDA-312	Bali Lux	2001 Papaya	**3,700**	IDN	IDN	No
114	IDA-313	Synthetic 3000	3308 Vermillion Red	**29,014**	IDN	IDN	No (www.propanraya.com / info@propanraya.com)
115	IDA-314	Duplex	738 Super white	**1,950**	IDN	IDN	No
116	IDA-315	Dextrolux	803 Red	**28,000**	IDN	IDN	No
117	IDA-316	Polibest	1224 Super White Matt	**1,210**	IDN	IDN	No
118	IDA-317	Polibest	906 Yellow	**21,000**	IDN	IDN	No
119	IDA-318	Ocean Gloss	209 Jaffa Yellow	**38,000**	IDN	IDN	No
120	IDA-319	SUPRO Higloss Enamel	KCC Higloss K13317 , Yellow	**< 10**	ROK	ROK	Yes, No lead and mercury
121	IDA-320	Colormax	110 White	**2,100**	IDN	IDN	No
			Average	**17,217**			

Table A.3. Distribution of Lead Concentration by Brand							
No.	**Brand**	**Number of Samples**	**Number of Samples >90 ppm Lead**	**Number of Samples >600 ppm Lead**	**Number of Samples >10,000 ppm Lead**	**Minimum ppm**	**Maximum ppm**
1	Pacific WeatherGuard Gloss	2	0	0	0	< 5	10
2	Garuda	2	2	1	1	270	10,500
3	Dulux V-Gloss	2	0	0	0	<5	<5
4	Lenkote Platinum	2	2	1	1	422	64,103
5	Sendai	2	2	2	1	1,080	15,777
6	RJ London	6	4	4	2	2,406	17,100
7	Decolux	3	2	2	0	18	7,000
8	Recolac	2	2	2	1	1,120	23,000
9	Seiv, Seiv Chemolux , Seiv Master Gloss	3	3	3	2	2,267	83,272
10	Ftalit	2	1	1	1	38	44,000
11	Al-Tex	3	3	3	1	1,067	30,000
12	Brillo	3	1	1	1	< 5	8,500
13	Danalac	2	2	2	1	3,153	62,000
14	Avian	4	4	4	3	5,635	34,780
15	Property Glozz	2	2	2	1	5,825	69,000
16	Yoko, Yoko primer	3	3	3	1	4,365	17,900
17	Vim	1	1	1	1	13,000	13,000
18	Bintang Laut	2	2	2	1	2,900	10,400
19	Bee Brand 1000	2	2	2	1	3,819	63,000
20	Bee Brand Junior 66	2	1	1	1	< 5	22,000
21	Delta	1	1	1	1	86,000	86,000
22	Paiton 8000	1	1	1	0	8,300	8,300
23	Super Lux	1	1	1	1	68,000	68,000
24	Mawar	2	2	2	1	7,400	17,100
25	Kuda Terbang , Kuda Terbang 1/2 Duco	4	4	4	3	2,050	102,000
26	Mowilex	1	1	0	0	260	260
27	ABC	2	2	2	2	11,200	39,000
28	500 Plus Paints	1	1	1	0	4,300	4,300
29	Cendrawasih	1	1	1	0	9,000	9,000
30	Millatex	2	0	0	0	30	40
31	Luna	1	1	1	1	17,500	17,500
32	Penlux	1	1	1	1	60,000	60,000
33	Kangoroo	1	1	0	0	410	410

34	Ferrol	1	1	0	0	570	570
35	7Lux	3	3	3	2	1,060	16,500
36	Wita	4	4	4	2	1,820	30,000
37	Kansai Primer	1	1	1	0	799	799
38	Bel Mas	1	1	1	0	1,994	1,994
39	Meni Besi Nocortex	1	1	0	0	470	470
40	Picolux	1	1	1	1	53,000	53,000
41	Destun	1	1	1	1	10,600	10,600
42	Envi	1	0	0	0	14	14
43	Bitalac	1	0	0	0	13	13
44	3 kambing	2	1	1	1	12	14,000
45	Romatex	3	3	3	1	3,700	55,000
46	Emco Lux	5	3	3	3	< 5	79,000
47	Gothic	2	2	2	0	2,500	7,000
48	Ligatex	1	1	1	1	23,000	23,00
49	Figo	1	1	1	0	3,000	3,000
50	Kambing	2	2	2	1	2,500	41,000
51	Kembang	1	1	1	1	15,100	15,100
52	Duplex	4	3	3	2	18	88,000
53	Gendang	2	2	1	0	165	2,900
54	Gamatex	2	1	1	0	21	2,200
55	Anlux	2	1	1	0	11	870
56	Elite	1	1	1	0	8,400	8,400
57	Bali Lux	2	2	2	0	2,300	3,700
58	Synthetic 3000	1	1	1	1	29,014	29,014
59	Dextrolux	1	1	1	1	28,000	28,000
60	Polibest	2	2	2	1	1,210	21,000
61	Ocean Gloss	1	1	1	1	38,000	38,000
62	SUPRO Higloss Enamel	1	0	0	0	< 10	< 10
63	Colormax	1	1	1	0	2,100	2,100
		121					

Table A.4. Lead Concentration (ppm) by Color						
Lead concentration (ppm)	**White**	**Yellow**	**Orange**	**Red**	**Green**	**Other**
Below 90 ppm	10	3	2	2	0	3
Above 90 ppm	3	0	0	1	1	2
Above 600 ppm	22	4	8	5	1	4
Above 10,000 ppm	0	29	7	7	7	0
Total	35	36	17	15	9	9

Table A.5. Consumer Information About Lead on Paint Cans

NO	Sample #	Brand Name		Batch # (if given)	Information from Can label, i.e. lead content, website, other information	Lead content or other lead information on the label (YES/ NO)	Independent, third party certification of "lead safe" claims? (YES/NO)	Information about lead hazard to children (YES/NO)	Information about lead hazard when painting or remodelling (YES/ NO)
1	IDA-200	Pacific Weather Guard Gloss	Pacific Paint	431010002	Yes (Chrome lead free; www.pacificpaint.com)	Yes	No	No	No
2	IDA-201	Pacific Weather Guard Gloss	Pacific Paint	20212344		Yes	No	No	No
3	IDA-202	Garuda	PT UKSA Paint	23 52013	No	No	No	No	No
4	IDA-203	Garuda	PT UKSA Paint	N/A		No	No	No	No
5	IDA-204	Dulux V-Gloss	PT ICI Paints Indonesia	47575 8/53	Yes (No added lead)	Yes	No	No	No
6	IDA-205	Dulux V-Gloss	PT ICI Paints Indonesia	5135798, 4504545820		Yes	No	No	No
7	IDA-206	Lenkote Platinum	under license Lenkote Paint Professional, PT Avia Avian	MCB 20, 0159510101	No (www.lenkotepaints.com)	No	No	No	No
8	IDA-207	Lenkote Platinum	under license Lenkote Paint Professional, PT Avia Avian	S-IDB 18.1		No	No	No	No
9	IDA-208	Sendai	No Info (PT Rajawali Hiyoto)	S2815820040	No	No	No	No	No
10	IDA-209	Sendai	No Info (PT Rajawali Hiyoto)	SAP12761163935		No	No	No	No
11	IDA-210	RJ London	RJ London	332024.BK	No (www.rjlondon.com)	No	No	No	No
12	IDA-211	RJ London	RJ London	271922.KBB		No	No	No	No
13	IDA-212	RJ London	RJ London	241624.BK		No	No	No	No
14	IDA-213	RJ London	RJ London	221219.IT		No	No	No	No
15	IDA-214	RJ London	RJ London	341321KKI		No	No	No	No
16	IDA-215	RJ London	RJ London	161924.BK		No	No	No	No
17	IDA-216	Decolux	PT Warna Agung, Tangerang	14E23-51AL4A	No	No	No	No	No
18	IDA-217	Decolux	PT Warna Agung, Tangerang	14C21-51AL3A		No	No	No	No

19	IDA-218	Decolux	PT Warna Agung, Tangerang	14I29-51AK1 A	No	No	No	No	No
20	IDA-219	Recolac	PT Trico Paint Factory	FLYFS040	No	No	No	No	No
21	IDA-220	Recolac	PT Trico Paint Factory	ABOGAB		No	No	No	No
22	IDA-221	Seiv Chemolux	PT Sumber Makmur Bahagia	N/A	No	No	No	No	No
23	IDA-222	Seiv Master Gloss	PT Sumber Makmur Bahagia	08H14	No (wwww.seiv.co.id)	No	No	No	No
24	IDA-223	Seiv	PT Sumber Makmur Bahagia	ELLOW	No (wwww.seiv.co.id)	No	No	No	No
25	IDA-224	Ftalit	PT Gajah Tunggal Prakarsa (Kansai Paint)	4080997 / 50-115-600-1065	No (www.gtp-kansai.co.id)	No	No	No	No
26	IDA-225	Ftalit	PT Gajah Tunggal Prakarsa (Kansai Paint)	50-115-203-1068		No	No	No	No
27	IDA-226	Al-Tex	PT Atlantic Ocean Paint	11310074	No	No	No	No	No
28	IDA-227	Al-Tex	PT Atlantic Ocean Paint	31310841		No	No	No	No
29	IDA-228	Al-Tex	PT Atlantic Ocean Paint	1310599		No	No	No	No
30	IDA-229	Brillo	PT Rajawali Hiyoto, bandung	S2814120023	No	No	No	No	No
31	IDA-230	Brillo	PT Rajawali Hiyoto, bandung	SAM12760785895 (1079230		No	No	No	No
32	IDA-231	Brillo	PT Rajawali Hiyoto, bandung	0620010101/ SAM12760968631		No	No	No	No
33	IDA-232	Danalac	PT Danapaint Indonesia	083-3568, 14016232	No	No	No	No	No
34	IDA-233	Danalac	PT Danapaint Indonesia	12100049		No	No	No	No
35	IDA-234	Avian	PT Avia Avian	N/A	No	No	No	No	No
36	IDA-235	Avian	PT Avia Avian	N/A		No	No	No	No
37	IDA-236	Avian	PT Avia Avian	N/A		No	No	No	No
38	IDA-237	Avian	PT Avia Avian	N/A		No	No	No	No
39	IDA-238	Property Glozz	PT Gajah Tunggal Prakarsa (Kansai Paint)	2100647	No (www.kansaicoatings.co.id)	No	No	No	No
40	IDA-239	Property Glozz	PT Gajah Tunggal Prakarsa (Kansai Paint)	50-112-007-2577, 4011783		No	No	No	No
41	IDA-240	Yoko primer	PT Avia Avian	S-PDC 06.1	No	No	No	No	No

42	IDA-241	Yoko	PT Avia Avian	J-SAK 02	No	No	No	No	No
43	IDA-242	Yoko	PT Avia Avian	J-SBK 19	No	No	No	No	No
44	IDA-243	Vim	Penta Prima, PT Bina Adidaya	HC0671	No	No	No	No	No
45	IDA-244	Bintang Laut	PT Warnatama Cemerlang	N/A	No	No	No	No	No
46	IDA-245	Bintang Laut	PT Warnatama Cemerlang	304030169		No	No	No	No
47	IDA-246	Bee Brand 1000	PT Nipsea Paint and Chemicals Indonesia	BO BAQRS	No (www.nipponpaint-indonesia.com)	No	No	No	No
48	IDA-247	Bee Brand 1000	PT Nipsea Paint and Chemicals Indonesia	BO DTCS		No	No	No	No
49	IDA-248	Bee Brand Junior 66	PT Nipsea Paint and Chemicals Indonesia	P.BART, 0325040101	No	No	No	No	No
50	IDA-249	Bee Brand Junior 66	PT Nipsea Paint and Chemicals Indonesia	PAENT, 0020030101		No	No	No	No
51	IDA-250	Delta	PT Putra Mataram Coating International, Sidoarjo Indonesia	1044.11111115	No	No	No	No	No
52	IDA-251	Paiton 8000	PT Nusantara Paint Indonesia	ML07	No	No	No	No	No
53	IDA-252	Super Lux	CV Bumi Nusantara Indah, Surabaya	MH 05	No	No	No	No	No
54	IDA-253	Mawar	PT Mikatasa Agung	CLI231	No	No	No	No	No
55	IDA-254	Mawar	PT Mikatasa Agung	COK 192		No	No	No	No
56	IDA-255	Kuda Terbang	PT Trico Paint Factory	FQOLFS	No	No	No	No	No
57	IDA-256	Kuda Terbang	PT Trico Paint Factory	BCOE BOAB		No	No	No	No
58	IDA-257	Kuda terbang	PT Trico Paint Factory	ROOHFS010		No	No	No	No
59	IDA-258	Kuda Terbang 1/2 Duco	PT Trico Paint Factory	UHIFS123	No	No	No	No	No
60	IDA-259	Mowilex	PT Mowilex Indonesia	20130624	No	No	No	No	No
61	IDA-260	ABC	PT San Sentra Indah Bandung	C26800	No	No	No	No	No
62	IDA-261	ABC	PT San Sentra Indah bandung	B1**** (print not clear)		No	No	No	No
63	IDA-262	500 Plus Paints	PT HPI Indonesia	WYYUNQ0830	No	No	No	No	No

64	IDA-263	Cendrawasih	PT Cendrawasih Indonesia	170514	No	No	No	No	No
65	IDA-264	Millatex	PT Gajah Maju Jaya, Jakarta	1400512	No	No	No	No	No
66	IDA-265	Millatex	PT Gajah Maju Jaya, Jakarta	1303711-		No	No	No	No
67	IDA-266	Luna	PT Sinar Matahari	N/A	No	No	No	No	No
68	IDA-267	Penlux	PT Difan Prima Paint	2069058	No	No	No	No	No
69	IDA-268	Kangoroo	PT Asia Sukma Chemindo Indonesia	140213	No	No	No	No	No
70	IDA-269	Ferrol	PT Patna Paint, Surabaya	N/A	No	No	No	No	No
71	IDA-270	7Lux	PT Niaga Sejahera Bersama	16042014	No	No	No	No	No
72	IDA-271	7Lux	PT Niaga Sejahera Bersama	0209201*		No	No	No	No
73	IDA-272	7Lux	PT Niaga Sejahera Bersama	30713		No	No	No	No
74	IDA-273	Wita	No Info	91213	No	No	No	No	No
75	IDA-274	Wita	No Info	11609* (print not clear)		No	No	No	No
76	IDA-275	Wita	No Info	D40814		No	No	No	No
77	IDA-276	Wita	No Info	040714 (print not clear)		No	No	No	No
78	IDA-277	Kansai Primer	PT Gajah Tunggal Prakarsa (Kansai Paint)	50-102-008-1063	No (kansaipaint.co,ltd)	No	No	No	No
79	IDA-278	Bel Mas	PT Avia Avian	0-500-21	No	No	No	No	No
80	IDA-279	Meni Besi Nocortex	Nicortex Paint Factory	N/A	No	No	No	No	No
81	IDA-280	Picolux	PT Cat Tunggal Djaja Indah	N/A	No	No	No	No	No
82	IDA-281	Destun	PT CM Indonesia	11JXSBA-MB20BM	No	No	No	No	No
83	IDA-282	Envi	PT Indaco Coatings Industri Solo	3114110950	Yes, No added Lead and Mercury	Yes	No	No	No
84	IDA-283	Bitalac	PT Bital Asia, Tangerang	(0663610101) 8-103LAME	Lead and Hg free (with explanation about 90 ppm standard)	Yes	No	No	No
85	IDA-284	3 kambing	tidak tercantum di kaleng	N/A	No	No	No	No	No

86	IDA-285	3 kambing	tidak tercantum di kaleng	N/A		No	No	No	No
87	IDA-286	Romatex	No Info (CV mega Indah jaya)	D4731A	No	No	No	No	No
88	IDA-287	Romatex	No Info (CV mega Indah jaya)	P**** (print not clear)		No	No	No	No
89	IDA-288	Romatex	No Info (CV mega Indah jaya)	Print not clear		No	No	No	No
90	IDA-289	Emco Lux	PT Mataram	INZINH 9 908100203523	No	No	No	No	No
91	IDA-290	Emco Lux	PT Mataram	IQZZZH		No	No	No	No
92	IDA-291	Emco Lux	PT Mataram	HZZBZ		No	No	No	No
93	IDA-292	Emco Lux	PT Mataram	INZZKN MINI K (9908100207538)		No	No	No	No
94	IDA-293	Emco Lux	PT Mataram	INZIIN 9908100207835		No	No	No	No
95	IDA-294	Gothic	PT Artindo Pratama Sejahtera	071014 WHITE	No	No	No	No	No
96	IDA-295	Gothic	PT Artindo Pratama Sejahtera	501creamyellow 121213		No	No	No	No
97	IDA-296	Ligatex	PT Tritunggal Delta Sejahtera	2503014HY-MB03014RY	No	No	No	No	No
98	IDA-297	Figo	(Tidak tercantum di kaleng), PT Zeven	170914	No	No	No	No	No
99	IDA-298	Kambing	Fen Lie Paint	850814	No	No	No	No	No
100	IDA-299	Kambing	Fen Lie Paint	200614		No	No	No	No
101	IDA-300	Kembang	PT Tunggal Djaja indah	lot 120369, 010816	No	No	No	No	No
102	IDA-301	Duplex	Penta Prima, PT Bina Adidaya	NDD**54 (print not clear)	No	No	No	No	No
103	IDA-302	Duplex	Penta Prima, PT Bina Adidaya	NH010B		No	No	No	No
104	IDA-303	Duplex	Penta Prima, PT Bina Adidaya	ODO415		No	No	No	No
105	IDA-304	Gendang	No info	MA6X4	No	No	No	No	No
106	IDA-305	Gendang	No info	OK13X4		No	No	No	No
107	IDA-306	Gamatex	PT Gajah Maju Jaya, Jakarta	1203010	No	No	No	No	No
108	IDA-307	Gamatex	PT Gajah Maju Jaya, Jakarta	1105203		No	No	No	No

109	IDA-308	Anlux	PT Mitra Jaya Utama	27-Dec-13	No	No	No	No	No
110	IDA-309	Anlux	PT Mitra Jaya Utama	55402-14		No	No	No	No
111	IDA-310	Elite	PT Bersama Wijaya Sentosa	B1702053	No	No	No	No	No
112	IDA-311	Bali Lux	PT Asia Permai Mandiri, Bekasi	07VII14-PUTIH, 828-BLX	No	No	No	No	No
113	IDA-312	Bali Lux	PT Asia Permai Mandiri, Bekasi	29K11-PPPLY, 2001-BLX		No	No	No	No
114	IDA-313	Synthetic 3000	PT Propan Raya ICC	B#3031269400	No (www.propanraya.com / info@propanraya.com)	No	No	No	No
115	IDA-314	Dextrolux	(Tidak tercantum di kaleng)	N/A	No	No	No	No	No
116	IDA-315	Dextrolux	(Tidak tercantum di kaleng)	N/A		No	No	No	No
117	IDA-316	Polibest	PT Cat Tunggal Djaja Indah	lot209176, 042785	No	No	No	No	No
118	IDA-317	Polibest	PT Cat Tunggal Djaja Indah	lot.413131, 04251`8		No	No	No	No
119	IDA-318	Ocean Gloss	PT Ocean Gloss tangerang	141014	No	No	No	No	No
120	IDA-319	SUPRO Higloss Enamel	PT KCC Paints	KCC HiglossK13317 (base 3 #13061844)	Yes, No lead and mercury	No	No	No	No
121	IDA-320	Colormax	No Info	JSG-04-0181	No	No	No	No	No

	Table A.6. Lead Concentration in 49 Samples of 2013 Study in 2015					
No.	**Sample #**	**Brand**	**Color**	**New color**	**Lead content in 2013 study**	**Lead content in 2015 study**
1	IDA-200	Pacific WeatherGuard Gloss	Yellow		349	10
2	IDA-202	Garuda	Yellow		15,964	10,500
3	IDA-203	Garuda	White		365	270
4	IDA-204	Dulux V-Gloss	Cinnabar orange		529	<5
5	IDA-206	Lenkote Platinum	16 Bright spirit		3,362	64,100
6	IDA-207	Lenkote Platinum	01 Absolute white		777	422
7	IDA-209	Sendai	110 White		1,764	1,080
8	IDA-210	RJ London	200 Black		4,708	3,690
9	IDA-211	RJ London	102 Super white		2,349	2,490
10	IDA-212	RJ London	500 Yellow		36,811	14,100
11	IDA-213	RJ London	403 Spring green		31,236	17,100
12	IDA-214	RJ London	308 Romance blue		3,437	2,400
13	IDA-215	RJ London	903 Brown		6,095	3,090
14	IDA-218	Decolux	White		2,864	18
15	IDA-219	Recolac	980 Lemon		47,643	23,000
16	IDA-220	Recolac	063 White	018 White	2,896	1,120
17	IDA-221	Seiv	180 Super white		2,947	2,270
18	IDA-223	Seiv	500 Lemon yellow		28,341	10,900
19	IDA-224	Ftalit	600 Bright orange		23,292	44,000
20	IDA-225	Ftalit	203 Irish white		3,463	38
21	IDA-226	Al-Tex	White		4,014	2,990
22	IDA-228	Al-Tex	18 Yellow		116,496	30,000
23	IDA-229	Brillo	4480 Pumpkin	3430 Mango	27,072	8,500
24	IDA-231	Brillo	1111 Super white		4,970	<10
25	IDA-232	Danalac	Golden canary		51,897	62,000
26	IDA-233	Danalac	White		5,339	3,150
27	IDA-234	Avian	Yellow	Medium Yellow 465	17,059	15,700
28	IDA-237	Avian	White		5,807	5,640
29	IDA-238	Property Glozz	033 Super white		6,947	5,830
30	IDA-239	Property Glozz	007 Summer sun		45,692	69,000
31	IDA-241	Yoko	781 Bright orange		47,873	17,900
32	IDA-242	Yoko	Super white		8,319	4,570
33	IDA-243	Vim	906 Yellow		14,758	13,000
34	IDA-245	Bintang Laut	B20 Bright orange		21,827	2,900
35	IDA-246	Bee Brand 1000	119 Thick white	119 Platimum grey (same code, different color)	7,414	3,820
36	IDA-247	Bee Brand 1000	166 Mayan yellow		98,372	63,000

37	IDA-248	Bee Brand Junior 66	9102 Super white		5,394	<5
38	IDA-249	Bee Brand Junior 66	602 Golden yellow		32,544	22,000
39	IDA-250	Delta	967 Golden yellow		36,313	86,000
40	IDA-252	Super Lux	Yellow		50,573	68,000
41	IDA-254	Mawar	117 Lemon yellow	Cherry Red 534	51,304	17,100
42	IDA-255	Kuda Terbang	White		9,970	2,050
43	IDA-256	Kuda Terbang	922 Yellow		63,936	102,000
44	IDA-258	Kuda Terbang 1/2 Duco	980 Lemon		84,795	29,000
45	IDA-259	Mowilex	675 Popcorn	Germanium-470	115,056	260
46	IDA-260	ABC	955 Sunshine		87,403	39,000
47	IDA-273	Wita	142 Yellow		23,420	30,000
48	IDA-291	Emco Lux	117 Lemon yellow		103,104	79,000
49	IDA-301	Duplex	606 Golden yellow		88,938	88,000

References

Asian Paint and Coating Journal, 2010.

A.Prüss-Üstün And C. Corvalán, World Health Organisation. (2006). Preventing Disease Through Healthy Environments: Towards An Estimate Of The Environmental Burden Of Disease, 2006, Page 12: http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

Bellinger D, Leviton A, Waternaux C, et al. 1987.Longitudinal analyses of prenatal and postnatal lead exposure and early cognitive development. N. Engl. J. Med. 316:1037–43

Bjorklund, K. L., Vahter, M., Palm, B., Grander, M., Lignell, S. and Berglund, M. (2012) Metals and trace element concentrations in breast milk of first time healthy mothers: a biological monitoring study, Environmental Health. 11.

Berita Bisnis. (2014). 2015, Kapasitas Produksi Jotun Mencapai 100 Juta Liter. Accessed By 22 May 2015. http://www.berita-bisnis.com/berita/1431--2015-kapasitas-produksi-jotun-mencapai-100-juta-liter.html

Brosché, S., Denney, V., Weinberg, J., Calonzo, M. C., Withanage, H. And Clark, C. S. (2014) Asia Regional Paint Report. IPEN.

Clark, S., Grote, J., Wilson, J., Succop, P., Chen, M., Galke, W. And Mclaine, P. (2004) Occurrence And Determinants Of Increases In Blood Lead Levels In Children Shortly After Lead Hazard Control Activities, Environmental Research. 96, 196-205.

Clark, C. S., Rampal, K. G., Thuppil, V., Chen, C. K., Clark, R. And Roda, S. (2006) The Lead Content Of Currently Available New Residential Paint In Several Asian Countries, Environmental Research. 102, 9-12.

Clark, C. S., Rampal, K. G., Thuppil, V., Roda, S. M., Succop, P., Menrath, W., Chen, C. K., Adebamowo, E. O., Agbede, O. A., Sridhar, M. K. C., Adebamowo, C. A., Zakaria, Y., El-Safty, A., Shinde, R. M. And Yu, J. F. (2009) Lead Levels In New Enamel Household Paints From Asia, Africa And South America, Environmental Research. 109, 930-936

Herbert Needleman. (2004). Lead Poisoning. Annual Review Of Medicine 2004. http://www.rachel.org/files/document/Lead_Poisoning.pdf)

Indonesian Ministry of Industry Regulation No. 24/M-Ind/Per/4/2013

Jotun. Reduction Of Hazardous Materials. Accessed 22 May 2015. http://www.jotun.com/ap/en/corporate/hse/jotun-greensteps/hazardous.aspx

Kementerian Pendidikan dan Kebudayaan Indonesia (Ministry of Education and Culture, 2013)

Lanphear, B. P., Matte, T. D., Rogers, J., Clickner, R. P., Dietz, B., Bornschein, R. L., Succop, P., Mahaffey, K. R., Dixon, S., Galke, W., Rabinowitz, M., Farfel, M., Rohde, C., Schwartz, J., Ashley, P. And Jacobs, D. E. (1998) The Contribution Of Lead-Contaminated House Dust And Residential Soil To Children's Blood Lead Levels, Environmental Research. 79, 51-68.

Markets And Markets. (2014). Coating Resins Market By Type (Acrylic, Alkyd, Vinyl, Pu, Epoxy, Amino, Upr, Spr & Others), By Technology (Waterborne, Powder, High Solvents, High Solids, Uv Cure), By Application (Architectural, Automotive, Wood, And Others) - Global Forecast To 2019 http://www.marketsandmarkets.com/Market-Reports/coating-resins-market-72316133.html Accessed By 21 May 2015

MARS Indonesia, 2013

Ministry of Industry of Indonesia, 2015

Mielke, H.W. And Zahran, S. (2012). The Urban Rise And Fall Of Air Lead (Pb) And The Latent Surge And Retreat Of Societal Violence (Environment International. 43 (2012) 48-55)

Murao, Satoshi and Ono, Kyoko. (2012). Current Status and Future of Lead-Based Paints and Pigments in Asia and the Pacific. Interim Report. United Nations Environmental Programme Regional Office for Asia and the Pacific (UNEP-ROAP) and National Institute of Advanced Industrial Science and Technology (AIST). Tsukuba, Japan.

Needleman, H. (2004). Lead Poisoning. Annu. Rev. Med. 55, 209–22. Available on http://www.rachel.org/files/document/Lead_Poisoning.pdf. Accessed in May 29, 2015.

Occupational Knowledge International (OKI). (2013). Lead Paint Background. Available on http://www.okinternational.org/lead-paint/Background. Accessed in May 22, 2015.

Philippe Grandjean. 2013. Only One Chance: How Environmental Pollution Impairs Brain Development – And How To Protect The Brains Of The Next Generation. Oxford: Oxford University Press.

Perkokoh Dominasi Di Segmen Dekoratif, Ici Paints Luncurkan Dulux Easy Clean. Kamis, 20 Maret 2014. Accessed By 22 May 2015. Http://Www.Berita-Bisnis.Com/Berita/3137--Perkokoh-Dominasi-Di-Segmen-Dekoratif-Ici-Paints-Luncurkan-Dulux-Easyclean.Html

P.T. Data Consult, Inc. (2014). Paint Production Predicted To Increase 8%. The Free Library. Accessed By 20 May. 2015 Http://Www.Thefreelibrary.Com/Paint+Production+Predicted+To+Increase+8%25.-A0365688457

Scientific Opinion on Lead in Food. (2010). EFSA Panel on Contaminants in the Food Chain (CONTAM), EFSA Journal 2010. Available on http://www.efsa.europa.eu/en/efsajournal/doc/1570.pdf. Accessed in May 21, 2015.

SNI Mainan: Pengusaha Minta Kejelasan Pelonggaran Aturan. Wike Dita Herlinda Rabu, 03/12/2014. Accessed By 22 May 2015. Http://Industri.Bisnis.Com/Read/20141203/12/379509/Sni-Mainan-Pengusaha-Minta-Kejelasan-Pelonggaran-Aturan

SNI ISO 8124-3:2010, Toy Safety - Part 3: Specification For Migration Of Certain Elements

Teresa M. Attina And Leonardo Trasande. (2013). Economic Costs Of Childhood Lead Exposure In Low- And Middle-Income Countries. Environmental Health Perspectives • Volume 121, Number 9, September 2013. Http://Ehp.Niehs.Nih.Gov/Wp-Content/Uploads/121/9/Ehp.1206424.Pdf

US CDC. (2007). Information on Childhood lead exposure. "US Centre for Disease Control & Prevention (US CDC). Available on http://www.cdc.gov/Features/ChildhoodLead/. Accessed in May 30, 2015.

United States Consumer Product Safety Commission, Directorate For Laboratory Sciences, Division Of Chemistry. (2009). Test Method: Cpsc-Ch-E1003-09 Standard Operating Procedure For Determining Lead (Pb) In Paint And Other Similar Surface Coatings. Https://Www.Cpsc.Gov/Pagefiles/128129/Cpsc-Ch-E1003-09.Pdf

Verstraeten, S.V., Et Al, Aluminium And Lead: Molecular Mechanisms Of Brain Toxicity, (Archives Of Toxicology 82:789–802. Doi 10.1007/S00204-008-0345-3, 2008)

Weinberg, Jack. (2009). An NGO Guide to SAICM. The Strategic Approach to International Chemicals Management, A Framework for Action To Protect Human Health and the Environment From Toxic Chemicals. International POPs Elimination Network. Available on http://www.ipen.org/ipenweb/documents/book/saicm%20introduction%20english.pdf. Accessed in April 20, 2013.

Weinberg, Jack and Clark, Scott. (2012). Global lead paint elimination by 2020: A test of the effectiveness of the Strategic Approach to International Chemicals Management. IPEN. Available on http://ipen.org/pdfs/ipen_global_lead_paint_elimination_report_2012.pdf. Accessed in May 15, 2013.

World Health Organisation, Childhood Lead Poisoning. (2000). Page 26 (Citing The Work Of Lanphear Et Al., 2000): http://www.who.int/ceh/publications/leadguidance.pdf.

World Health Organisation, Frequently Asked Questions, International Lead Poisoning Awareness Campaign, Week Of Action, 19-25 October, 2014, Page 1: http://www.who.int/ipcs/lead_campaign/faq_lead_poisoning_prevention_campaign_en.pdf?ua=1

World Health Organisation. (2010). Childhood Lead Poisoning. Page 28: http://www.who.int/ceh/publications/leadguidance.pdf, 2010

World Health Organisation Library Cataloguing-In-Publication Data. (2011). Brief Guide To Analytical Methods For Measuring Lead In Paint. http://www.who.int/ipcs/assessment/public_health/lead_paint.pdf

World Health Organization. (2006). Preventing disease through healthy environments, p. 6. http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

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