

TANZANIA

NATIONAL REPORT: LEAD IN ENAMEL DECORATIVE PAINTS IN TANZANIA



2015



AGENDA A
For Environment and Responsible Development



NATIONAL REPORT LEAD IN ENAMEL DECORATIVE PAINTS IN TANZANIA

July 2015

ACKNOWLEDGEMENTS

We take this opportunity to thank all those who were instrumental in compiling and shaping this report on lead paint elimination.

Sincere thanks go to the Global Environment Facility for providing funding support. We express our gratitude to UNEP for its counsel and guidance in collaborating with IPEN in the writing and review of this document. We also acknowledge the great efforts of IPEN NGO partners in Africa and around the world working for lead paint elimination. Special thanks go to IPEN staff whose work made this report possible

This report was produced as part of the Africa Lead Paint Elimination Project. The Africa Lead Paint Elimination Project carries out focused activities to eliminate lead in paint in four project countries – Cameroon, Ethiopia, Ivory Coast, and Tanzania.

The project is funded by the Global Environment Facility; the United Nations Environment Programme (UNEP) is the Project Implementing Agency; and IPEN is the Project Executing Agency. The contents of this booklet, however, are the sole responsibility of IPEN and AGENDA.



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CONTENTS

Preface.....	4
Executive Summary.....	5
Background on Lead in Paint.....	9
Lead Exposure and its Health Effects	11
Economic Impacts of Lead Paint Exposure.....	14
Global Lead Paint Elimination Efforts.....	16
Tanzania Framework for Eliminating Lead Paint	18
Lead Paint Market Tanzania.....	20
Materials and Methods	22
Results.....	24
Conclusions and Recommendations	27
Appendix A.....	29

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 paints for household use more than 40 years ago. IPEN, the United Nations Environment Programme (UNEP), the World Health Organization (WHO), and others are cooperating to raise awareness that childhood lead exposure remains a serious problem, and have catalyzed national activity in a number of developing countries to eliminate lead paint and protect children.

In 2007 and 2008, NGOs in the IPEN network collected and analyzed solvent-based, enamel decorative 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 analyzed paints on the market in approximately 40 low- and middle-income countries.¹ Twelve of these studies were carried out with UNEP support.²

This report presents new data on the lead content of solvent-based, enamel decorative paints that are offered for sale in the Tanzanian market. This is the second time that AGENDA has analyzed paints sold in Tanzania for their lead content. A previous study, conducted in 2009 (20 solvent-based, enamel decorative paints from six brands), found that all 20 paints (100 percent) contained lead at levels above 90 ppm, while 19 paints (95 percent) contained lead at levels above 600 ppm. Tanzania does not have a legally binding standard for lead content of paints for household use.

This report presents background information on why the present and former use of enamel decorative 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.

The report was prepared by AGENDA with support and assistance from the African Lead Paint Elimination Project, which 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 paints, particularly on the health of children under six years old.

1 Information about the indicated countries and studies is provided in Annex A of this report.

2 Ibid.

EXECUTIVE SUMMARY

While lead exposure is also harmful to adults, lead exposure harms children at much lower doses, and the health effects are generally irreversible and can have a lifelong impact.³ The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate.⁴ The human fetus 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.

According to WHO, "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6% of the global burden of disease."⁵ Evidence of reduced intelligence caused by childhood exposure to lead has led the World Health Organization (WHO) to list "lead-caused mental retardation" as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.⁶

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—beginning in the 1970s and 1980s. Many also imposed 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. Exposure to lead also harms adults, especially those working in occupations associated with high lead exposure. Lead in paint can contribute to high occupational lead exposure in painters, auto body shop workers, construction workers involved in building renovations, and others.

In 2014–2015, staff at AGENDA collected samples of solvent-based, enamel decorative paint sold on the market in Tanzania as part of the African Lead Paint Elimination Project. The Africa Lead Paint Elimination Project carries out focused activities to eliminate lead in paint in four project countries – Cameroon, Ethiopia, Ivory Coast, and Tanzania. The project is funded by the Global Environment Facility; the United Nations Environment Programme (UNEP) is the Project Implementing Agency; and IPEN is the Project Executing Agency.

3 Ibid, page 12

4 Ibid, page 48

5 World Health Organization, Childhood Lead Poisoning, 2010, page 11: <http://www.who.int/ceh/publications/leadguidance.pdf>

6 A. Prüss-Üstün and C. Corvalán, World Health Organization, 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

The Tanzanian paint market is dominated by locally manufactured as well as imported paint brands. The most common paint brands that are manufactured locally include Coral, Robbialac/Berger, Sadolin, Goldstar, Kiboko, Crown and AZTEC. Major imported brands include: Master, Dura Coat, Basco Value and Haraka. Frost & Sullivan, a global research firm, placed revenues from paints and coatings in Kenya and Tanzania market at US\$ 123.3 million as of 2013. It also indicated that Crown Paints controls approximately 65% of the paint market in Kenya.

In 2015, AGENDA purchased a total of 56 cans of solvent-based, enamel decorative paints from stores in Arusha, Dar es Salaam and Mwanza. The paints were from 11 brands. All paints were analyzed by an accredited laboratory in the United States of America (USA) for their total lead content based on the dry weight of the paint.

FINDINGS

Lead Levels in Paint

- More than half of the paints analyzed (36 out of a total of 56 paints) in this study contained lead levels above 90 parts per million (ppm) and could not be sold in most highly industrialized countries.
- Nearly one-fourth of the paints (13 out of a total of 56 paints) contained exceedingly high lead levels, above 10,000 ppm, and 7 samples contained extremely high levels of lead ranging from 52,000 ppm to 99,000 ppm.

Lead Levels by Brand

- At least one paint color from 9 of 11 paint brands analyzed contained lead at levels above 10,000 ppm.
- 6 of the 11 brands analyzed included one or more paints containing extremely high lead levels above 50,000 ppm.
- Of the 11 brands analyzed, all of the paints from only one brand – Dura Coat – contained lead at levels below 90 ppm. In addition, five out of six paints from the brand Coral also contained lead levels below 90 ppm.

Lead Levels by Color

- Red and yellow paints contained the highest levels of lead: 10 of 12 yellow paints and 8 of 10 red paints contained lead levels above 90 ppm; the highest lead level detected in these colors was above 99,000 ppm and 69,000

ppm respectively. The average lead content of the yellow paints was 43,800 ppm and of the red paints 9,200 ppm.

- White paints typically contain lower levels of lead than brightly colored paints. Of the 12 white paints included in this study, 7 contained lead levels below 90 ppm.

Comparison with 2009 Paint Sampling

- Though some paints from 3 brands analyzed both in 2009 and 2015 had reduced lead levels in the current study, other paints had a higher lead content.
- Coral brand appears to have made the most improvement with lead levels in five of six paints in the current study under 90 ppm and the sixth paint with 270 ppm. In 2009, lead levels in these same colors ranged between 5,500 and 120,000 ppm.
- For two other brands, Goldstar and Sadolin, some paint colors contained lower levels in the current study, but other colors contained higher levels. Sometimes the change was dramatic as with Sadolin Sunglow yellow, where lead levels increased from 3,900 ppm in 2009 to 34,000 ppm in the current study.

Consumer Information

- No paint can from any brand provided the consumer with information about the lead content of the paint or labelled which paints contained high levels of lead.

RECOMMENDATIONS

- National efforts should be encouraged to promote the establishment of appropriate national regulatory frameworks to control the manufacture, import, export, sale and use of lead paints and products coated with lead paints. In setting priorities and timeframes for implementation, special attention should be given to the elimination of lead decorative paints and lead paints for other applications most likely to contribute to childhood lead exposure.
- Given the serious impact childhood lead poisoning has on both an individual and a nation's future, there is a need for public information campaigns in Tanzania and other countries where results show the presence of lead paint on the market. These campaigns should inform the public about the hazards of lead exposure, especially in children; the presence of paints with high lead content for sale and use on the national market; lead paint as a

significant source of childhood lead exposure; and the availability of technically superior and safer alternatives.

- Paint manufacturers should be encouraged to act voluntarily to eliminate lead compounds in the formulation of their paints – particularly, their decorative paints and paints for other applications likely to contribute to lead exposure in children and others before and after the national lead control legal instruments are in place. Voluntary action is important in reinforcing the legal instruments especially in countries where enforcement is poor.

BACKGROUND ON 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 lead compounds to the paint for some purpose. 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.

The lead compounds most commonly added to paints are pigments. Pigments are used to give the paint its color, 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.

Lead compounds also may be added to enamel (oil-based) paints for use as driers (sometimes called drying agents or catalysts). Enamel paints dry to a hard and smooth surface through a process that involves chemical reactions in which paint ingredients called binders polymerize and crosslink. The driers serve as catalysts that speed up the process and make paints dry faster and more evenly. When lead compounds are used as driers, they are generally not used alone, but are usually combined with other driers, including compounds of manganese, cobalt, and others.

Lead 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.

Inorganic pigments, fillers, and possibly some other ingredients used in the manufacture of paints may be derived from natural, earth-based materials, and may be more or less contaminated with lead depending on geological characteristics at the location where they were mined. When lead-contaminated ingredients are used in the manufacture of paints, this will contribute to the lead content of the paint.

Finally, when a paint manufacturer uses lead-containing compounds in the manufacture of some of its paints (such as industrial paints), other paints pro-

duced in the same facility might become contaminated with lead when proper housekeeping and cleanup procedures are not followed.

Non-lead pigments, driers, and anti-corrosive agents have been widely available for decades, and are used by manufacturers producing the highest quality paints. In most cases, by avoiding the use of lead pigments, lead driers, and other intentionally added lead compounds, a paint manufacturer will produce paints with lead content well below 90 ppm that can be sold in any country in the world.

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—beginning in the 1970s and 1980s. Many also imposed 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.

Lead Paint Terminology

As used in this booklet:

- “Paint” includes varnishes, lacquers, stains, enamels, glazes, primers, or coatings used for any purpose. Paint is typically a mixture of resins, pigments, fillers, solvents, and other additives.
- “Lead paint” is paint to which one or more lead compounds have been added.
- “Lead pigments” are lead compounds used to give a paint product its color.
- “Lead anti-corrosive agents” are lead compounds used to protect a metal surface from rusting or other forms of corrosion.
- “Lead driers” are lead compounds used to make paint dry more quickly and evenly.
- “Decorative paint” refers to paints that are produced for use on inside or outside walls, and surfaces of homes, schools, commercial buildings, and similar structures. Decorative paints are frequently used on doors, gates, and windows, and to repaint household furniture such as cribs, playpens, tables, and chairs.
- “Solvent-based, enamel decorative paint” or “enamel decorative paint” refers to oil-based paints.
- “PPM” means parts per million total lead content by weight in a dried paint sample.



LEAD EXPOSURE AND ITS HEALTH EFFECTS

Children are not generally exposed to lead from paint while the paint is still in the can or when the paint is being newly applied to a previously unpainted or uncoated surface. Rather, lead exposure generally occurs after the lead paint has already dried on a painted wall or object.

Over time, paint on a surface will chip, wear, and deteriorate. This happens more quickly when the surface is exposed to sunlight or is subject to friction and impact (such as with windows and doors). Any lead present in the deteriorating paint is released to dust and soil in and around the home, school, or other location where the paint was used. When a surface previously painted with lead paint is sanded or scraped in preparation for repainting, very large amounts of lead-contaminated dusts are produced and spread.

Children playing indoors or outdoors get house dust or soil on their hands, and then ingest it through normal hand-to-mouth behavior. If the house dust or the soil is contaminated with lead, the children ingest lead. Hand-to-mouth behavior 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.⁷

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 can be much higher than what is typically found in dust and soils. When toys, household furniture, or other articles are painted with lead paint, children may chew on them and directly 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.

While lead exposure is also harmful to adults, lead exposure harms children at much lower doses, and the health effects are generally irreversible and can have a lifelong impact.⁸ The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate.⁹

7 “The amount of soil and house dust that a typical 1–6-year-old child ingests is said to be 100 mg/24 h, but a more conservative estimate of 200 mg/24 h with an upper percentile of 400 mg/24 h has also been suggested.” World Health Organization, *Childhood Lead Poisoning*, page 18. <http://www.who.int/ceh/publications/leadguidance.pdf> (2010)

8 *Ibid*, page 12

9 *Ibid*, page 48

The human fetus 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.

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.

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

Children are more sensitive to the harmful effects of lead than adults for several reasons, including:¹¹

- A child's brain undergoes very rapid growth, development, and differentiation, and lead interferes with this process. For example, it has been shown that moderate lead exposure (5 to 40 µg/dL) during early childhood is connected to region-specific reductions in adult gray matter volume. Moderate blood levels have been linked to an increased likelihood of impaired cognition and executive function, impulsiveness, aggression, and delinquent behavior. The loss of gray matter in the brain constitutes a potential explanation for cognitive and behavioral problems associated with lead exposure.¹² Brain damage caused by chronic, low-level exposure to lead is irreversible and untreatable.
- Exposure to lead early in life can re-program genes, which can lead to altered gene expression and an associated increased risk of disease later in life. For example, gene alterations caused by prenatal lead exposure have been implicated in the development of Alzheimer's disease.¹³
- Gastrointestinal absorption of lead is enhanced in childhood. Up to 50 percent of ingested lead is absorbed by children, as compared with 10 percent in adults. (Pregnant women may also absorb more ingested lead than other adults.)¹⁴

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 Organization, Childhood Lead Poisoning, <http://www.who.int/ceh/publications/leadguidance.pdf>, 2010

12 Cecil, K.M., et al., Decreased Brain Volume in Adults with Childhood Lead Exposure, (PLOS Medicine (2008) 5(5): e112. DOI:10.1371/journal.pmed.0050112)

13 Mazumdar, M., et al., Prenatal Lead Levels, Plasma Amyloid β Levels, and Gene Expression in Young Adulthood, (Environmental Health Perspectives (2012) 120 (5))

14 World Health Organization, Childhood Lead Poisoning, <http://www.who.int/ceh/publications/leadguidance.pdf>, 2010

Lead Exposure Reduces Intelligence

Lead exposure in children may be measured in micrograms of lead per deciliter of blood ($\mu\text{g}/\text{dL}$) or in micrograms of lead per liter of blood ($\mu\text{g}/\text{L}$). At the low end of the lead exposure spectrum, an increase in blood lead level in a pre-school child from less than $1 \mu\text{g}/\text{dL}$ to $10 \mu\text{g}/\text{dL}$ is associated with a six point decrease in IQ (intellectual quotient) points. For children whose blood lead level is in the range of $10\text{-}20 \mu\text{g}/\text{dL}$, a quarter to a half of an IQ point is lost for each $1 \mu\text{g}/\text{dL}$ increase in the blood lead.¹

1 World Health Organization, Childhood Lead Poisoning, page 25, 2010



According to WHO: "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6% of the global burden of disease."¹⁵ Evidence of reduced intelligence caused by childhood exposure to lead has led the World Health Organization (WHO) to list "lead-caused mental retardation" as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.¹⁶

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower lead exposures.^{17,18} According to the World Health Organization: "There is no known safe level of exposure to lead."¹⁹

15 World Health Organization, Childhood Lead Poisoning, 2010, page 11: <http://www.who.int/ceh/publications/leadguidance.pdf>

16 A. Prüss-Üstün and C. Corvalán, World Health Organization, 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

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

18 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

19 World Health Organization, 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

ECONOMIC IMPACTS OF LEAD PAINT EXPOSURE

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 behavior.²⁰ 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.²¹ 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 as measured by lifelong earnings.

A recent study investigating the economic impact of childhood lead exposure on national economies in all low- and middle income countries estimated a total cumulative cost burden of \$977 billion international dollars²² per year.²³ The study considered the neurodevelopmental 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. 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

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

21 World Health Organization, *Childhood Lead Poisoning*, page 28: <http://www.who.int/ceh/publications/lead-guidance.pdf>, 2010

22 An International dollar is a currency unit used by economists and international organizations to compare the values of different currencies. It adjusts the value of the U.S. dollar to reflect currency exchange rates, purchasing power parity (PPP), and average commodity prices within each country. According to the World Bank, "An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States." The international dollar values in this report were calculated from a World Bank table that lists GDP per capita by country based on purchasing power parity and expressed in international dollars. The data from the table (at: <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>) was accessed by the report's authors in February 2012.

23 Teresa M. Attina and Leonardo Trasande, *Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries*, (*Environmental Health Perspectives*; DOI:10.1289/ehp.1206424; <http://ehp.niehs.nih.gov/1206424/>)

- **Asia:** \$699.9 billion of economic loss, or 1.88% of GDP

CHAPTER FOUR

GLOBAL LEAD PAINT ELIMINATION EFFORTS

An international convention limiting the use of white lead was adopted by the General Conference of the International Labour Organization and ratified by 63 countries as early as 1921. Many highly industrial countries enacted laws, regulations, or mandatory standards to protect the health of their people in the 1970's and 1980's. These laws generally prohibit the manufacture, import, sale, or use of lead paint for interiors or exteriors of homes, schools, and other child-occupied facilities. The standard adopted by the United States imposes an upper limit of 90 ppm on total lead (dry weight) for decorative paints and many other paint categories. Other countries have adopted mandatory limits such as 90 or 600 ppm total lead (dry weight).

Analytical data from paint studies show that in countries where no national law, binding regulation, or other legal instrument specifically forbids it, some or most of the brands of enamel decorative paints for sale on the national market contain high levels of lead. This suggests that national laws, binding regulations, or other legal instruments are a key tool for controlling the lead content of paints.

At the second session of the International Conference on Chemicals Management (ICCM), held in 2009, several chemical issues were identified by consensus to be international priority issues of concern. One of these was lead in paints, and there was a decision to establish it as an international emerging policy issue.²⁴ In response to the ICCM decision, the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) jointly initiated a global partnership to eliminate the use of lead compounds in paints in order to protect public health and the environment. This partnership is called the Global Alliance to Eliminate Lead Paint (GAELP).²⁵ GAELP's broad objective is to phase out the manufacture and sale of paints containing lead, and eventually to eliminate the risks from such paints.²⁶

24 http://www.saicm.org/images/saicm_documents/iccm/ICCM2/ICCM2%20Report/ICCM2%2015%20FINAL%20REPORT%20E.doc

25 <http://www.unep.org/hazardoussubstances/LeadCadmium/PrioritiesforAction/LeadPaints/tabid/6176/Default.aspx>

26 <http://www.unep.org/hazardoussubstances/LeadCadmium/PrioritiesforAction/GAELP/GAELPObjectives/tabid/6331/Default.aspx>

In establishing a national legislative or regulatory framework to control the lead content of paints, the Global Alliance to Eliminate Lead Paint proposes the objectives should include the following:

- Prevention of the manufacture, import, use, and export of lead paint;
- Development of a system with effective means of enforcement and compliance;
- Establishment of institutional responsibilities and arrangements for management and enforcement of legislation and/or regulation.²⁷

²⁷ Ibid

CHAPTER FIVE

TANZANIA FRAMEWORK FOR ELIMINATING LEAD PAINT

In Tanzania, there is no specific policy or Act regulating the content of lead in enamel-based, decorative paints. A voluntary standard (Standard TZS 722:2008) of 0.045 percent (i.e., 450 ppm) exists for matte emulsion paints (but not for solvent-based enamel paints) for interior and exterior use.

A number of policies and Acts aimed at protecting human health and the environment are in place in Tanzania. Among these are: the National Environment Policy (1997); National Water Policy (2002); National Trade Policy (2003); Development Policy (2003); the National Health Policy (2003); the Industrial and Consumer Chemicals (Management and Control) Act No. 3 of 2003; the Environmental Management Act, 2004; the Standards Act No. 2 of 2009; the Tanzania Food, Drugs and Cosmetic Act, 2003; and the Occupational Health and Safety Act, 2003.

Several key agencies are responsible for public health, environment, industry and other areas relevant to lead paint manufacture:

- Ministry of Health and Social Welfare;
- Government Chemist Laboratory Agency, also the SAICM Focal Point in Tanzania;
- Local Authorities under the Prime Minister's Office;
- Vice President's Office – Division of Environment – also the National GEF Focal Point in Tanzania;
- National Environment Management Council (NEMC);
- Ministry of Industries and Trade;
- Tanzania Bureau of Standards (TBS).

In 2012, AGENDA implemented a project titled “Awareness-Raising on Lead Paint Poisoning in Tanzania,” through IPEN’s International SAICM Implementation Project (ISIP). During this project, AGENDA worked with stakeholders including government, the paint industry, and civil society organizations to raise awareness of the hazards of lead in paint. Government institutions involved in this project included:

- Vice-President Office, Division of Environment (DoE). The DoE is the National Focal Point for the Global Environment Facility, and the Stockholm and Basel Conventions, among other instruments.
- Tanzania Bureau of Standards (TBS).
- Government Chemist Laboratory Agency (GCLA) (National SA-ICM Focal Point).

CHAPTER SIX

LEAD PAINT MARKET TANZANIA

This project identified 11 different paint brands sold in Tanzania. The paint market is dominated by locally manufactured as well as imported paint brands. The paint brands that are manufactured locally include Coral, Robbialac/Berger, Sadolin, Goldstar, Kiboko, and AZTEC; imported brands include Crown, Master, Dura Coat, Basco Value and Haraka.

Tanzania borders the Indian Ocean on the east and eight countries on the north, west and south, including Kenya, Uganda, Burundi, Rwanda, Democratic Republic of Congo, Zambia, Malawi and Mozambique. Entry points of commodities including paints are therefore complex and difficult to control. During the paint survey conducted for this study, it was noted that the paint brands that are manufactured in Kenya are sold mainly in Mwanza and Arusha, the Northern part of Tanzania. In Dar es Salaam, the country's major business capital, paint brands from United Arab Emirates as well as from Kenya are sold in addition to the paint brands that are manufactured locally.

Frost & Sullivan, a global research firm, placed revenues from paints and coatings in Kenya and Tanzania market at US\$ 123.3 million and estimates this market will grow to US\$ 188.5 million by 2018. Contributing to growth is the Kenya National Construction Bill, which will initiate new construction projects and improve the quality of existing infrastructure and the Tanzania government's strategic plan for 2012 – 2017, which includes the expansion of housing units.²⁸

Crown or Crown Berger is the market leader in the paint market in Kenya and is the only paint company listed at the Nairobi Securities Exchange. It controls approximately 65% of the market with a goal of controlling about 75% of Kenya market share. The company also operates business in Uganda and announced plans to set up a US\$ 3 million paint manufacturing plant in Tanzania.

Basco Paints is based in Kenya. It is Kenya's second largest paint company, and it manufactures the Dura Coat brand of paint. It is a family run paint manufacturer with a capacity of around 22 million litres of paint per year. Basco also launched the Dura Coat Antibacterial Range of paints as well as the Dura Coat

²⁸ <http://www.european-coatings.com/Markets-companies/Coatings-market/Paint-coatings-market-in-Kenya-and-Tanzania-to-grow>

Lead and Chrome Free range of paints. Basco Paints operates the Dura Coat Expert Training Centre, the firm's flagship CSR project, where painters are turned into experts and they are trained for one week, examined and then certified. Over 1,000 certified experts have graduated from the center.

Sadolin Paints (East African) Ltd has been operating in Kenya since 1959. Originally a subsidiary of a Danish paint manufacturer, Sadoline and Holmblad, which was acquired by Akzo Nobel Coatings in the 1980s.²⁹ Today, Sadolin Kenya has a Technical and Trademark Agreement with Akzo Nobel.³⁰

29 Paint company information from: <http://building.co.ke/the-paint-market-in-kenya/>

30 Information from Sadolin Kenya's website: <http://www.sadolin.co.ke/index.php/en/about-us>

CHAPTER SEVEN

MATERIALS AND METHODS

From February 2015, AGENDA purchased 56 cans of solvent based, enamel decorative paints from various stores in Arusha, Dar es Salam and Mwanza. These paints from 11 different brands were produced by 11 manufacturers. In most cases, AGENDA selected one white paint and several bright-colored paints such as red, orange or yellow from each brand.

During the sampling, information such as color, brand, country where manufactured, purchase details, date manufactured as provided on the label of the paint can was recorded. For some paint cans, date of manufacture was not provided. 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 colors, such as “red,” while others used “bright red, signal red, or posta red.” Colors were recorded as provided on the can, and later grouped according to color of the dry paint. For the red and yellow paints the protocol called for obtaining “bright” or “strong” red and yellow paints when available. The dates of purchase were recorded in the day/ month/year format in most cases.



All paints were purchased from paint stores in local markets and communities, hardware stores, building supply stores and larger retail establishments used by the general public — in other words, paints presumed to be intended for home use. Excluded were automotive and industrial paints that are not typically used for domestic housing applications or to paint toys or household articles.

Paint sampling preparation kits containing individually numbered, untreated wood pieces, single-use paint brushes and stirring utensils made from un-

treated wood sticks were assembled and shipped to AGENDA by the staff of the IPEN partner NGO, Arnika, in the Czech Republic.

Each can of paint was labeled to give it a sample identity, shaken well, thoroughly stirred and paint from each can was subsequently applied onto individually numbered triplicates of untreated wood pieces using different unused single-use paint brushes by the staff of AGENDA.

Each stirring utensil and paint brush 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 Forensic Analytical Laboratories, Inc. in the US. Paint samples were analyzed using method EPA 3050B/7420 (atomic absorption), a method recognized as suitable by WHO.³¹

31 WHO (2011). Brief guide to analytical methods for measuring lead in paint. http://www.who.int/ipcs/assessment/public_health/lead_paint.pdf

CHAPTER EIGHT

RESULTS

A total of fifty six cans of solvent-based enamel decorative paints were purchased in Arusha, Dar es Salaam and Mwanza in Tanzania and analyzed for their lead content. Results are given in parts per million (ppm) lead, dry weight of the paint (Table 2 in the appendix). The fifty-six paint samples came from 11 paint brands: Goldstar, Sadolin, Coral, Robbialac/Berger, Crown, Kiboko, AZTEC/Alpha, Master, Dura Coat, Basco Value and Haraka. (Analysis details can be found in Tables 1-5 in the Appendix.)

Overall Results

- Twenty paint samples (36 percent) contained lead below 90 ppm and could be sold anywhere in the world.
- Five additional paints contained lead concentrations at 600 ppm or below and could be sold in some countries in the world.
- Nearly one-fourth of the paints (13 paints or 23 percent) contained exceedingly high lead levels, above 10,000 ppm lead.
- Seven paints contained shockingly high levels of lead ranging from 52,000 ppm to 99,000 ppm.

Lead Concentrations by Brand

- Dura Coat, a Kenyan paint brand, was the only brand out of the 11 paint brands where none of the analyzed paints contained lead above 90 ppm. 5 out of 6 paints from Coral brand, an Indian paint company, contained lead levels below 90 ppm.
- Nine of the 11 brands sold at least one paint color with lead levels above 10,000 ppm.

Lead Concentrations by Color

A total of 44 colored paints and 12 white paints were analyzed. Of the colored paints, 12 were yellow, 10 red, 7 black or grey, 8 green, and 7 blue. Paint can colors with names like Serpentine, Ginger boy, and Mandarine were grouped according to the color of the dry paint. In addition, the color cream was included in the group of white paints, and the color golden brown was included in the yellow paint category based on the color of the dry paint.

Yellow and red paints contained the highest lead levels, with an average of 43,800 and 9,200 ppm respectively.

- Ten of 12 yellow samples, contained lead above 90 ppm, with the highest recorded level of 99,000 ppm.
- Eight of 10 red samples contained lead above 90 ppm, with the highest recorded level being 69,000 ppm.

White was the paint least likely to have a high lead level.

- No white paints contained lead above 10,000, but 5 of the white paints analyzed contained lead above 90 ppm.

Comparison with 2009 paint sampling results

Three of the eleven brands that were analyzed in this study (Goldstar, Sadolin and Coral) were also analyzed in a 2009 study, *Lead in New Decorative Paints*, published by the Indian NGO, Toxics Link. Details of the 2009 study can be found in table 5 in the appendix. Nineteen of the twenty solvent-based, enamel decorative Tanzania paints analyzed in the 2009 were also included in the current study.

In the 2009 study, all enamel decorative paints were found to contain lead at concentrations higher than 90 ppm and 95% of enamel decorative paints contained lead concentrations higher than 600 ppm.

In the current study, all three brands included in both studies sold one or more paint with lead at concentrations higher than 90 ppm and two out of the three brands sold one or more paint with lead levels higher than 600 ppm.

Coral (brand headquarters in India). Lead concentrations in all of the Coral brand paint colors were significantly lower in the current study than in the 2009 study. In the current study, five of the six colors contained less than 90 ppm lead and the sixth paint contained 270 ppm lead. In the 2009 study, lead concentrations in the same colors of Coral brand paint ranged from 5,500 ppm to 120,000 ppm. The paint that now contains 270 ppm lead contained 7,700 ppm in the earlier study. Coral paint appears to have eliminated the use of lead compounds in these paints.

Goldstar. Lead concentrations in two of the six Goldstar paints analyzed in both studies were much lower, with the lead content of the white paint decreasing from 3,400 ppm in 2009 to 80 ppm in the current study, and the lead content of a black paint decreasing from 11,000 ppm in 2009 to below 60 ppm in the current study. A blue paint contained roughly the same levels of lead in the two studies (4,300 ppm in 2009; 2,600 ppm in the current study), and two

colors contained dramatically higher levels of lead in the current study than in 2009 (lead content of a green paint increased from 3,600 ppm in 2009 to 24,000 ppm in the current study; lead content of a yellow paint increased from 2,500 ppm in 2009 to 61,000 in the current study).

Sadolin. The lead concentration in one color was much higher in the current study than in 2009: lead concentration in Sunglow yellow paint increased from 3,900 ppm to 34,000 ppm. Lead concentration in green paint decreased from 32,000 ppm (green) to 3,800 ppm (ripple green). Lead concentrations in the other four colors were in the same range in both studies. A pink Sadolin paint that was analyzed in the Global Study (2,700 ppm) was not included in the current study.

Consumer Information

No information about the lead content of the paint was provided on any paint can analyzed in this study, giving consumers no way to distinguish between those colors or paint brands offering paint with lower levels of lead.

CONCLUSIONS AND RECOMMENDATIONS

The Tanzania paint market is dominated by locally manufactured as well as imported paints. In both cases, the paint is regulated under the Industrial and Consumer Chemical Act No 3 of 2003 (Management and Control) and the Tanzania Bureau of Standards under the Standards Act No. 2 of 2009. However, there is no specific legal requirement under these two legal instruments that control the level of lead in paint.

Although there has been some improvement in lead levels in paints since a similar study in 2009, paints sold in Tanzania continue to have high lead levels, including some with alarmingly high levels of lead.

Regulatory Framework

Industry, government and civil society should engage in national efforts to promote the establishment of appropriate national regulatory frameworks to control the manufacture, import, export, sale, and use of lead paints and products coated with lead paints. In setting priorities and timeframes for implementation, special attention should be given to the elimination of lead in enamel decorative paints and paints for other applications most likely to contribute to childhood lead exposure. The regulatory framework should establish an appropriate lead paint standard, such as 90 ppm, and consideration should be given to the inclusion of provisions for compliance, monitoring, and enforcement.

Public Awareness

Given the serious impact childhood lead poisoning has on both an individual's and the nation's future, there is a need for public information campaigns in Tanzania and other countries where results show the presence of lead paint on the market. These campaigns should inform the public about the hazards of lead exposure, especially in children; the presence of lead decorative paints for sale and use on the national market; lead paint as a significant source of childhood lead exposure; and the availability of technically superior and safer alternatives. There is also a need to raise awareness of the need to take special precautions when preparing a previously painted surface for repainting; the need for training in lead-safe work practices for painters and others

working on previously-painted surfaces; and the need for resources to conduct such training.

Government agencies, NGOs and other organizations of civil society, as well as health professionals and others, are encouraged to carry out awareness-raising in the above-mentioned areas. Stakeholders are encouraged to foster voluntary initiatives by paint manufacturers, importers, and vendors to phase out the use of lead compounds in their products, even before any national legal instrument is adopted or enters into force.

Voluntary Action and Labeling

In some countries, some paint manufacturers have acted voluntarily to eliminate lead compounds in the formulation of their paints. Paint manufacturers in countries that lack a well-enforced national lead paint control regime, such as Tanzania, should be encouraged to act voluntarily to eliminate lead compounds in the formulation of their paints – particularly, their enamel decorative paints and paints for other applications likely to contribute to lead exposure in children and others. This can be done before and after the national lead control legal instruments are in-place. Voluntary action is important in reinforcing the enforcement of the legal instruments especially in countries where enforcement is poor.

Paint manufacturers are also encouraged to consider voluntary participation in programs that provide third-party certification of no added lead, and product labeling to enable consumers to identify paints that do not contain added lead. In addition, paint manufacturers could provide information on paint can labels warning of the serious risk that may arise from lead dust when preparing a previously painted surface for repainting.

APPENDIX A

TABLE 1. SOLVENT-BASED, ENAMEL DECORATIVE PAINTS PURCHASED AND ANALYZED FOR LEAD CONTENT IN TANZANIA

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (TZS)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
TNZ 30	Goldstar	White	0.5 litre	8,000	Not given	1502741	03-Feb-15	email: info@goldstarpaints.com
TNZ 31	Goldstar	Yellow	0.5 litre	8,000	Not given	1407842	03-Feb-15	email: info@goldstarpaints.com
TNZ 32	Goldstar	Signal red	0.5 litre	8,000	Not given	1401922	03-Feb-15	email: info@goldstarpaints.com
TNZ 33	Goldstar	Black	0.5 litre	8,000	Not given	1502420	03-Feb-15	email: info@goldstarpaints.com
TNZ 34	Goldstar	Grass green	0.5 litre	8,000	Not given	3553108	03-Feb-15	email: info@goldstarpaints.com
TNZ 35	Goldstar	Dutch blue	0.5 litre	8,000	Not given	1405522	03-Feb-15	email: info@goldstarpaints.com
TNZ 36	Sadolin	Ascot grey	0.5 litre	8,000	Not given	4050247	04-Feb-15	-
TNZ 37	Sadolin	Black	0.5 litre	8,000	Not given	4100249	04-Feb-15	-
TNZ 38	Sadolin	Dutch blue	0.5 litre	8,000	Not given	4011509	04-Feb-15	-
TNZ 39	Sadolin	Sunglow yellow	0.5 litre	8,000	Not given	3071471	04-Feb-15	-
TNZ 40	Sadolin	Ripple green	0.5 litre	8,000	Not given	2060652	04-Feb-15	-
TNZ 41	Sadolin	White	1 litre	6,000	Not given	4090561	04-Feb-15	-

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (TZS)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
TNZ 42	Coral	Black	0.5 litre	7,500	January-15	2046	04-Feb-15	email:info@insigniatz.com
TNZ 43	Coral	Dutch blue	1 litre	7,500	Aug-14	1014718	04-Feb-15	email:info@insigniatz.com
TNZ 44	Coral	Green	0.5 litre	7,500	Oct-13	18319	04-Feb-15	email:info@insigniatz.com
TNZ 45	Coral	Golden yellow	0.5 litre	7,500	Aug-14	1014347	04-Feb-15	email:info@insigniatz.com
TNZ 46	Coral	Red	1 litre	7,500	Oct-14	1019325	04-Feb-15	email:info@insigniatz.com
TNZ 47	Coral	White	1 litre	7,500	Nov-14	1023400	04-Feb-15	email:info@insigniatz.com
TNZ 48	Berger/Robbi-alac	Signal red	0.5 litre	8,000	Not given	03141266	03-Feb-15	www.berger-paintsintl.com
TNZ 49	Berger/Robbi-alac	Golden yellow	1 litre	8,000	Not given	020130996	03-Feb-15	www.berger-paintsintl.com
TNZ 50	Berger/Robbi-alac	White	1 litre	8,000	Not given	09124468	03-Feb-15	www.berger-paintsintl.com
TNZ 51	Crown	White	4 litre	5,500	Mar-14	Not given	03-Feb-15	www.crown-paints.co.ke
TNZ 52	Crown	Tivoli gold (Yellow)	4 litre	5,500	Mar-14	Not given	03-Feb-15	www.crown-paints.co.ke
TNZ 53	Crown (Super plus Gloss)	Red-Oxide (Not primer)	1 litre	5,500	Apr-14	Not given	03-Feb-15	www.crown-paints.co.ke
TNZ 54	Kiboko Paints	Posta red	4 litre	7,000	Not given	13508	03-Feb-15	www.kiboko-paints.com
TNZ 55	Kiboko Paints	Golden yellow	1 litre	7,000	Not given	2716	03-Feb-15	www.kiboko-paints.com
TNZ 56	Kiboko Paints	White	0.5 litre	7,000	Not given	14421	03-Feb-15	www.kiboko-paints.com

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (TZS)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
TNZ 57	Kiboko Paints	Dutch blue	1 litre	7,000	Not given	6983	07-Feb-15	www.kiboko-paints.com
TNZ 58	Kiboko Paints	Ripple green	1 litre	7,000	Not given	6286	07-Feb-15	www.kiboko-paints.com
TNZ 59	Kiboko Paints	Light Grey	0.5 litre	7,000	Not given	2276	07-Feb-15	www.kiboko-paints.com
TNZ 60	AZTEC /Alpha paints	White	4 litre	8,000	Not given	705500012 076839000	03-Feb-15	email: info@alphapaintstz.com
TNZ 61	AZTEC /Alpha paints	Scarlet (signal red)	1 litre	6,000	Not given	605800027 540534	09-Feb-15	email: info@alphapaintstz.com
TNZ 62	AZTEC /Alpha paints	Lemon yellow	4 litre	6,000	Not given	5000 2667 0414	16-Feb-15	email: info@alphapaintstz.com
TNZ 63	AZTEC /Alpha paints	Golden brown	4 litre	6,000	Not given	2706500 00010614	07-Feb-15	email: info@alphapaintstz.com
TNZ 64	AZTEC /Alpha paints	Light green	4 litre	6,000	Not given	640703503 23802200	07-Feb-15	email: info@alphapaintstz.com
TNZ 65	Master paint	Post red	0.5 litre	7,000	Not given	Not given	03-Feb-15	www.national-paints.com
TNZ 66	Master paint	White	0.5 litre	7,000	Not given	Not given	03-Feb-15	www.national-paints.com
TNZ 67	Master paint	Yellow	0.5 litre	7,000	Not given	Not given	03-Feb-15	www.national-paints.com
TNZ 68	Dura Coat	Brilliant white	1 litre	22,500	Not given	162204	02-Feb-15	It has a logo of GAELP
TNZ 69	Dura Coat	Mandarine	1 litre	22,500	Not given	278584	02-Feb-15	It has a logo of GAELP
TNZ 70	Dura Coat	Serpentine	1 litre	22,500	Not given	Not given	02-Feb-15	It has a logo of GAELP
TNZ 71	Dura Coat	Ginger boy	1 litre	22,500	Not given	Not given	02-Feb-15	It has a logo of GAELP

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (TZS)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
TNZ 72	Dura Coat	Black	1 litre	22,500	Jan-11	248565	02-Feb-15	It has a logo of GAELP
TNZ 73	Dura Coat	Danish Blue	1 litre	22,500	Not given	Not given	02-Feb-15	It has a logo of GAELP
TNZ 74	Basco Value (Super brand)	White	1 litre	8,000	Jun-13	289636	02-Feb-15	www.basco-paints.com
TNZ 75	Basco Value (Super brand)	Ruby red	0.25 litre	8,000	Sep-14	614216	02-Feb-15	www.basco-paints.com
TNZ 76	Basco Value (Super-brand)	Green	0.5 litre	8,000	Sep-14	615572	02-Feb-15	www.basco-paints.com
TNZ 77	Basco Value (Super-brand)	Deep blue	0.5 litre	8,000	Aug-12	274613	02-Feb-15	www.basco-paints.com
TNZ 78	Basco Value (Super-brand)	Black	0.5 litre	8,000	Nov-14	6189105	02-Feb-15	www.basco-paints.com
TNZ 79	Basco Value (Super brand)	Tibet yellow	0.5 litre	8,000	May-12	268814	02-Feb-15	www.basco-paints.com
TNZ 80	Haraka paints	White	0.5 litre	8,000	Not given	Not given	02-Feb-15	email: nay-anproducts@yahoo.com
TNZ 81	Haraka paints	Cream	0.5 litre	8,000	Not given	Not given	02-Feb-15	email: nay-anproducts@yahoo.com
TNZ 82	Haraka paints	Signal red	0.5 litre	8,000	Not given	Not given	02-Feb-15	email: nay-anproducts@yahoo.com

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (TZS)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
TNZ 83	Haraka paints	Tibet yellow	0.5 litre	8,000	Not given	Not given	02-Feb-15	email: nay-anproducts@yahoo.com
TNZ 84	Haraka paints	Dutch blue	0.5 litre	8,000	Not given	Not given	02-Feb-15	email: nay-anproducts@yahoo.com
TNZ 85	Haraka paints	Kenya green	0.5 litre	8,000	Not given	Not given	02-Feb-15	email: nay-anproducts@yahoo.com

TZS: Tanzanian Shilling

TABLE 2: RESULTS OF LEAD ANALYSIS FOR SOLVENT-BASED ENAMEL DECORATIVE PAINTS PURCHASED IN TANZANIA

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Manufacturer Name	Is there information on can about lead content of paint?
TNZ 30	Goldstar	White	80	TANZANIA	Tanzania	Goldstar Paints (T) Limited	No
TNZ 31	Goldstar	Yellow	61,000	TANZANIA	Tanzania	Goldstar Paints (T) Limited	No
TNZ 32	Goldstar	Signal red	3,800	TANZANIA	Tanzania	Goldstar Paints (T) Limited	No
TNZ 33	Goldstar	Black	< 60	TANZANIA	Tanzania	Goldstar Paints (T) Limited	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Manufacturer Name	Is there information on can about lead content of paint?
TNZ 34	Goldstar	Grass green	24,000	TANZANIA	Tanzania	Goldstar Paints (T) Limited	No
TNZ 35	Goldstar	Dutch blue	2,600	TANZANIA	Tanzania	Goldstar Paints (T) Limited	No
TNZ 36	Sadolin	Ascot grey	3,500	TANZANIA	Tanzania	Sadolin Paints (T) Ltd	No
TNZ 37	Sadolin	Black	1,400	TANZANIA	Tanzania	Sadolin Paints (T) Ltd	No
TNZ 38	Sadolin	Dutch blue	3,300	TANZANIA	Tanzania	Sadolin Paints (T) Ltd	No
TNZ 39	Sadolin	Sun-glow yellow	34,000	TANZANIA	Tanzania	Sadolin Paints (T) Ltd	No
TNZ 40	Sadolin	Ripple green	3,800	TANZANIA	Tanzania	Sadolin Paints (T) Ltd	No
TNZ 41	Sadolin	White	3,200	TANZANIA	Tanzania	Sadolin Paints (T) Ltd	No
TNZ 42	Coral	Black	< 60	INDIA	Tanzania	Insignia Limited	No
TNZ 43	Coral	Dutch blue	270	INDIA	Tanzania	Insignia Limited	No
TNZ 44	Coral	Green	< 60	INDIA	Tanzania	Insignia Limited	No
TNZ 45	Coral	Golden yellow	< 60	INDIA	Tanzania	Insignia Limited	No
TNZ 46	Coral	Red	< 60	INDIA	Tanzania	Insignia Limited	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Manufacturer Name	Is there information on can about lead content of paint?
TNZ 47	Coral	White	< 60	INDIA	Tanzania	Insignia Limited	No
TNZ 48	Rob-bialac/ Berger	Signal red	69,000	INDIA	Tanzania	Berger Paints International Limited	No
TNZ 49	Rob-bialac/ Berger	Golden yellow	44,000	INDIA	Tanzania	Berger Paints International Limited	No
TNZ 50	Rob-bialac/ Berger	White	2,600	INDIA	Tanzania	Berger Paints International Limited	No
TNZ 51	Crown	White	< 60	KENYA	Kenya	Crown Paints Kenya Ltd	No
TNZ 52	Crown	Tivoli gold (Yellow)	34,000	KENYA	Kenya	Crown Paints Kenya Ltd	No
TNZ 53	Crown (Super plus Gloss)	Red-Oxide (Not primer)	8,000	KENYA	Kenya	Crown Paints Kenya Ltd	No
TNZ 54	Kiboko Paints	Posta red	2,900	TANZANIA	Tanzania	Kiboko Paints Limited	No
TNZ 55	Kiboko Paints	Golden yellow	60,000	TANZANIA	Tanzania	Kiboko Paints Limited	No
TNZ 56	Kiboko Paints	White	4,800	TANZANIA	Tanzania	Kiboko Paints Limited	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Manufacturer Name	Is there information on can about lead content of paint?
TNZ 57	Kiboko Paints	Dutch blue	1,500	TANZANIA	Tanzania	Kiboko Paints Limited	No
TNZ 58	Kiboko Paints	Ripple green	4,000	TANZANIA	Tanzania	Kiboko Paints Limited	No
TNZ 59	Kiboko Paints	Light Grey	7,300	TANZANIA	Tanzania	Kiboko Paints Limited	No
TNZ 60	AZTEC / Alpha paints	White	< 60	Tanzania	Tanzania	Alpha Paints Tanzania Limited	No
TNZ 61	AZTEC / Alpha paints	Scarlet (signal red)	200	Tanzania	Tanzania	Alpha Paints Tanzania Limited	No
TNZ 62	AZTEC / Alpha paints	Lemon yellow	52,000	Tanzania	Tanzania	Alpha Paints Tanzania Limited	No
TNZ 63	AZTEC / Alpha paints	Golden brown	99,000	Tanzania	Tanzania	Alpha Paints Tanzania Limited	No
TNZ 64	AZTEC / Alpha paints	Light green	540	Tanzania	Tanzania	Alpha Paints Tanzania Limited	No
TNZ 65	Master paint	Post red	2,500	PAKISTAN	UAE	National Paints Factories Co. Ltd	No
TNZ 66	Master paint	White	< 60	PAKISTAN	UAE	National Paints Factories Co. Ltd	No
TNZ 67	Master paint	Yellow	62,000	PAKISTAN	UAE	National Paints Factories Co. Ltd	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Manufacturer Name	Is there information on can about lead content of paint?
TNZ 68	Dura Coat	Brilliant white	80	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 69	Dura Coat	Mandarine	< 60	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 70	Dura Coat	Serpentine	< 60	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 71	Dura Coat	Ginger boy	< 60	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 72	Dura Coat	Black	< 60	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 73	Dura Coat	Danish Blue	< 60	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 74	Basco Value (Super brand)	White	< 60	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 75	Basco Value (Super brand)	Ruby red	600	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 76	Basco Value (Super-brand)	Green	12,000	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 77	Basco Value (Super-brand)	Deep blue	60	KENYA	Kenya	Basco Products (Kenya) Ltd	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Manufacturer Name	Is there information on can about lead content of paint?
TNZ 78	Basco Value (Super-brand)	Black	< 60	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 79	Basco Value (Super-brand)	Tibet yellow	56,000	KENYA	Kenya	Basco Products (Kenya) Ltd	No
TNZ 80	Haraka paints	White	160	KENYA	Kenya	Nayan Products (Kenya) Ltd	No
TNZ 81	Haraka paints	Cream	1,900	KENYA	Kenya	Nayan Products (Kenya) Ltd	No
TNZ 82	Haraka paints	Signal red	4,800	KENYA	Kenya	Nayan Products (Kenya) Ltd	No
TNZ 83	Haraka paints	Tibet yellow	23,000	KENYA	Kenya	Nayan Products (Kenya) Ltd	No
TNZ 84	Haraka paints	Dutch blue	< 60	KENYA	Kenya	Nayan Products (Kenya) Ltd	No
TNZ 85	Haraka paints	Kenya green	6,800	KENYA	Kenya	Nayan Products (Kenya) Ltd	No

TABLE 3. DISTRIBUTION OF LEAD CONCENTRATION BY BRAND OF SOLVENT-BASED, ENAMEL DECORATIVE PAINTS PURCHASED IN TANZANIA

Brand	Number of Paints	Number of Paints >90 ppm Lead	Number of Paints >600 ppm Lead	Number of Paints >10,000 ppm Lead	Minimum Lead Concentration (ppm)	Maximum Lead Concentration (ppm)
Goldstar	6	4	4	2	< 60	61,000
Sadolín	6	6	6	1	1,400	34,000
Coral	6	1	0	0	< 60	270
Berger/Robbialac	3	3	3	2	2,600	69,000
Crown	3	2	2	1	< 60	34,000
Kiboko	6	6	6	1	1,500	60,000
Aztec/Alpha	5	4	2	2	< 60	99,000
Master	3	2	2	1	< 60	62,000
Dura Coat	6	0	0	0	< 60	80
Basco Value	6	3	2	2	< 60	56,000
Haraka	6	5	4	1	< 60	23,000

** When calculating the averages, levels < 60 ppm were approximated to 60 ppm*

TABLE 4. LEAD CONCENTRATION BY COLOR OF SOLVENT-BASED, ENAMEL DECORATIVE PAINTS PURCHASED IN TANZANIA

Color	Number of Samples	Average Lead Concentration (ppm)	Number of Samples >90 ppm Lead	Number of Samples >600 ppm Lead	Number of Samples >10,000 ppm Lead	Minimum Lead Concentration (ppm)	Maximum Lead Concentration (ppm)
White ¹	12	1,100	5	4	0	< 60	4,800
Blue	7	1,100	4	3	0	< 60	3,300
Black/ Grey	7	1,800	3	3	0	< 60	7,300
Green ²	8	6,400	6	5	2	< 60	24,000
Red ³	10	9,200	8	7	1	< 60	69,000
Yellow ⁴	12	43,800	10	10	10	< 60	99,000

Footnotes

- 1 Including paint can color name Cream
- 2 Including paint can color name Serpentine
- 3 Including paint can color name Ginger boy
- 4 Including paint can color name Mandarine and Golden Brown

TABLE 5. LEAD CONCENTRATIONS OF SOLVENT-BASED ENAMEL DECORATIVE PAINTS STUDIED IN TANZANIA IN 2009

Sample no.	Paint Brand	Date of Purchase (dd/mm/yy)	Volume of Paint Can	Purchase Price per Liter in TZS	Type of Paint-plastic/Enamel	Colour of the Paint	Lead Concentration (ppm)	Lead Concentration (%)
TNZ 03	Sadolin	13/11/08	4 l	5,000	Oil-based	Black	2,219	0.2
TNZ 06	Sadolin	13/11/08	4 l	5,000	Oil-based	Mist Pink	2,670.2	0.3
TNZ 09	Goldstar	13/11/08	1 l	5,000	Oil-based	Green	3,651	0.4
TNZ 10	Goldstar	13/11/08	1 l	5,000	Oil-based	Akot Green	3,612.2	0.4
TNZ 11	Goldstar	13/11/08	1 l	5,000	Oil-based	Yellow	2,522	0.2
TNZ 12	Sadolin	13/11/08	1 l	5,000	Oil-based	Sunglow yellow	3,914.2	0.4
TNZ 13	Goldstar	13/11/08	1/2 l	5,000	Oil-based	Black	11,360	1.1
TNZ 14	Goldstar	13/11/08	1/2 l	5,000	Oil-based	White	3,387	0.3
TNZ 15	Coral	13/11/08	1/2 l	5,000	Oil-based	Red	44,068.5	4.4
TNZ 16	Sadolin	13/11/08	1 l	5,000	Oil-based	Green	31,581	3.1
TNZ 17	Sadolin	13/11/08	1 l	5,000	Oil-based	Blue	4,073.1	0.4
TNZ 18	Sadolin	13/11/08	1/2 l	5,000	Oil-based	Grey	9,841	0.9
TNZ 19	Sadolin	13/11/08	1/2 l	5,000	Oil-based	White	1,541.2	0.1
TNZ 20	Godstar	13/11/08	1/2 l	5,000	Oil-based	Blue	4,188	0.4
TNZ 21	Coral	13/11/08	1/2 l	5,000	Oil-based	White	7,602	0.8
TNZ 22	Goldstar	13/11/08	1/2 l	5,000	Oil-based	Red	193.2	0.01
TNZ 23	Coral	13/11/08	1/2 l	5,000	Oil-based	Black	5,484	0.5
TNZ 24	Coral	13/11/08	400 ml	5,000	Oil-based	Blue	7,722	0.8
TNZ 25	Coral	13/11/08	400 ml	5,000	Oil-based	Yellow	120,862.1	12.1
TNZ 26	Coral	13/11/08	1/2 l	5,000	Oil-based	Green	20,248	2.0

TZS: Tanzanian Shilling



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