



LEAD IN SOLVENT-BASED PAINTS IN CAMEROON

January 2024



NATIONAL REPORT: LEAD IN SOLVENT-BASED PAINTS IN CAMEROON

January 2024



Centre de Recherche et d'Education pour le Développement (CREPD) is a Cameroon-based non-profit NGO created since 2004 dedicated to bridge the gap between science and action in Cameroon and sub-Saharan Africa and to promote sustainable development.



Established in 1998, **IPEN** comprises over 600 Participating Organizations in over 125 countries, primarily developing and transition countries. IPEN brings together leading environmental and public health groups around the world to establish and implement safe chemicals policies and practices that protect human health and the environment. IPEN's mission is a toxics-free future for all.

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Cite this publication as: Kuepou G, Ngakeng A, Guarino J, and Brosché S (2024). *Lead in Solvent-Based Paints in Cameroon: Compliance Monitoring*, CREPD and IPEN.

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ACKNOWLEDGMENTS

We take this opportunity to thank all those who were instrumental in compiling and shaping this paint study. We are particularly grateful to the Ministry of Environment, Protection of Nature and Sustainable Development, and the Ministry of Public Health for their institutional support.



This report was undertaken as part of IPEN's Global Lead Paint Elimination Campaign and funded by the New York Community Trust (NYCT) and the Swedish Government. It was conducted in Cameroon by *Centre de Recherche et d'Education pour le Développement* (CREPD) in partnership with IPEN.

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PREFACE

Lead paints for home use continue to be widely produced, sold, and used in developing countries despite the fact that most highly industrial countries banned lead paints for decorative or household use more than 40 years ago. IPEN and its Participating Organizations are part of the global movement to eliminate lead paint to protect children's health.

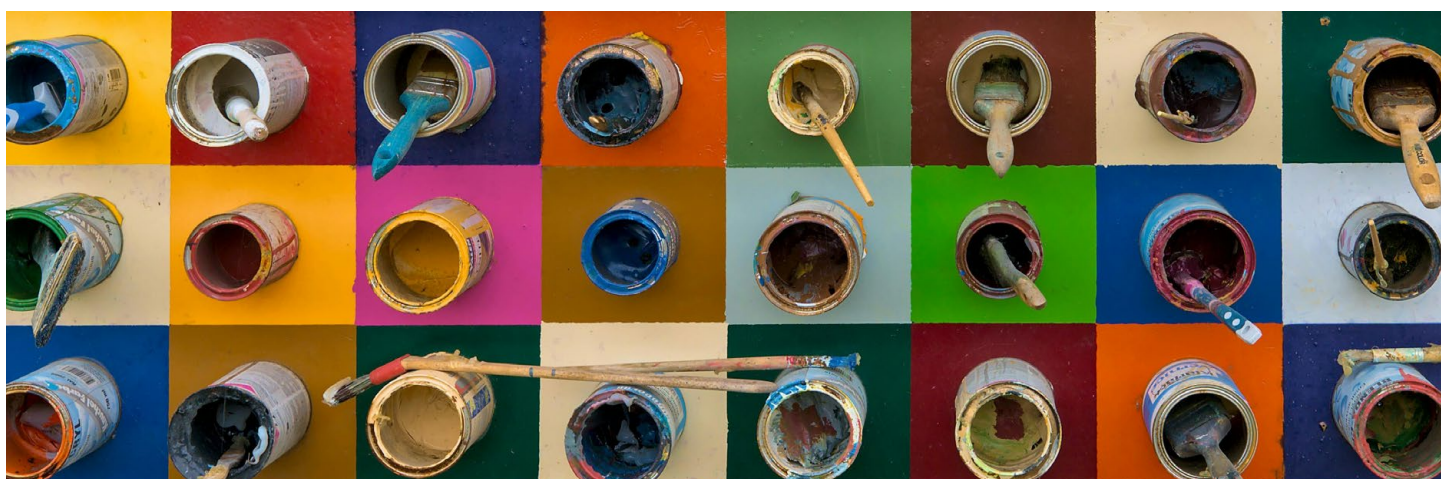
In 2007 and 2008, NGOs in the IPEN network collected and analyzed decorative (home use) paints on the market in 11 developing countries, and in countries with economies in transition. The results were startling. In every one of these countries, many of the paints contained exceedingly high lead levels. In response, IPEN launched its Global Lead Paint Elimination Campaign, which seeks to eliminate lead in paint and raise widespread awareness among business entrepreneurs and consumers about the adverse human health impacts of lead paint, particularly on the health of children. Since then, IPEN-affiliated NGOs and others have sampled and analyzed paints on the market in more than 50 low- and middle-income countries.

This report presents new data on the total lead content of solvent-based paints available on the market in Cameroon. It also presents background information on why the use of lead paint is a source of serious concern, especially to children's health; a review of national policy frameworks that are in place to ban or restrict the manufacture, import, export, distribution, sale, and use of lead paint, and provides a strong justification to strengthen compliance monitoring and enforcement of lead paint regulatory controls in Cameroon. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint.

This study was conducted by *Centre de Recherche et d'Education pour le Developpement* (CREPD) in partnership with IPEN.

IPEN is an international NGO network of health and environmental organizations from all regions of the world of which CREPD is a member. IPEN is a leading global organization 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 organizations 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.

CREPD is a Cameroon-based non-profit NGO created since 2004 dedicated to bridge the gap between science and action in Cameroon and sub-Saharan Africa and to promote sustainable development. The organization was granted its legal status in 2005. CREPD has a consultative status with ECOSOC and UNEA and is active in two international public interest NGO umbrella organizations—International Pollutants Elimination Network (IPEN) and the World Alliance for Mercury Free Dentistry (WAMFD)—and is member of several other international public interest organizations such as Healthcare Without Harm, Break Free from Plastics, Zero Mercury Working Group, and many more.



EXECUTIVE SUMMARY

Lead is a toxic metal that causes adverse effects on both human health and the environment. 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.

The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate. 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.

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.

Lead paint is a major source of childhood lead exposure. The term lead paint is used in this report to describe any paint to which one or more lead compounds have been added. The cut-off concentration for lead paint used in the report is 90 parts per million (ppm, dry weight of paint), the strictest legal limit enacted in the world today. All lead concentrations in the report are total lead levels, unless otherwise specified.

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. In Cameroon, there is currently a regulation in place limiting the amount of lead in all paints to 90 ppm.

From May to June 2023, CREPD purchased a total of 38 cans of solvent-based paints—28 paints intended for home and decorative use, seven anticorrosive paints, and three aerosol paints or spray paints—from stores in Yaoundé and Douala, Cameroon. The paints represented 15 different brands produced by 13 manufacturers. All paints were analyzed by an accredited laboratory in the United States of America for their lead content, based on dry weight of the paint. The laboratory participates in the Environmental Lead Proficiency Analytical Testing (ELPAT) program operated by the American Industrial Hygiene Association (AIHA), assuring the reliability of the analytical results.

RESULTS

Twelve out of 38 analyzed solvent-based paints (32 percent of paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm, dry weight of paint). This is also the regulatory limit for lead in decorative paint in e.g., Morocco, Ethiopia, Kenya, Tanzania, Saudi Arabia, Jordan, Iraq, India, China, South Korea, Georgia, Ukraine, Colombia, and the United States of America. Moreover, five paints (13 percent of paints) contained extremely high lead concentrations above 10,000 ppm. The highest lead concentration detected was 90,000 ppm in a yellow Asmaco Spray Paint manufactured by Anchor Allied Factory L.L.C. in the United Arab Emirates (UAE).

On the other hand, 26 out of 38 solvent-based paints (68 percent of paints) did not contain intentionally added lead,¹ suggesting that the technology to produce paint without lead ingredients exists in Cameroon.

Seven out of 15 analyzed brands (47 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Also, four out of 15 analyzed brands (27 percent of paint brands) sold at least one lead paint with extremely high lead concentrations above 10,000 ppm.

1. There were 26 paints with lead concentrations reported as “less than 400 ppm,” “less than 200 ppm,” and “less than 100 ppm.” In this report, we say that these 26 paints did not contain “intentionally added lead.” Intentionally adding lead compounds to paint either as pigment or drier will yield concentrations of lead that are higher than 200 ppm. According to Module A-3 (Paint Basics) of UNEP’s Toolkit for Establishing Laws to Eliminate Lead Paint, “Lead-based pigments may contribute around 1,500 ppm to over 100,000 ppm” concentrations of lead in paint, while “lead-based driers may contribute around 1,200 ppm to 6,000 ppm” concentrations of lead in paint. (<https://wedocs.unep.org/bitstream/handle/20.500.11822/37030/PAINT.pdf?sequence=3&isAllowed=y>, p.14-15)

This study shows that yellow paints most frequently contained extremely high lead concentrations above 10,000 ppm. Of eight yellow paints, three (38 percent of yellow paints) contained lead levels above 10,000 ppm; of five green paints, one (20 percent of green paints) contained lead levels above 10,000 ppm; and of 13 red paints, one (eight percent of red paints) contained lead levels above 10,000 ppm.

In general, paint can labels did not carry meaningful information about lead content or the hazards of lead paint. Only 19 out of 38 paints (50 percent of paints) provided information about lead on their labels, i.e., “lead concentration less than 90 ppm,” and “without lead” claims. Among these, four paints were falsely marked as “lead concentration less than 90 ppm,” or “without lead” despite containing lead levels ranging from 200 ppm to as high as 3,500 ppm.

Most paints carried little information about any ingredients on can labels. Most paints were merely labeled as “solvents, pigments and resin,” with no further details on the type of solvents and pigments (organic or inorganic) provided on paint can labels. Warning symbols on most of the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

Manufacturing dates were included on the labels of three out of 38 paints (eight percent of paints) included in this study. The batch numbers of 19 out of 38 paints (50 percent of paints) were provided on the labels.

The results of the four studies conducted by CREPD and IPEN in 2011, 2015, 2017, and 2023 indicated an increase in the percentage of compliant solvent-based decorative paints with lead concentrations below 90 ppm. The percentage of similar paints exceeding 90 ppm and 10,000 ppm, on the other hand, had considerably decreased. For example, the study conducted in 2011 prior to the issuance of the lead paint regulation showed that 67 percent of 60 analyzed paints had lead content above 90 ppm. In contrast, only 32 percent of 38 analyzed paints in 2023 exceeded the 90 ppm limit after the lead paint regulation was enacted in September 2017. The percentage of paints with lead levels above 10,000 ppm also decreased: from 25 percent of 60 paints in 2011 to 13 percent of 38 paints in 2023.

However, the number of lead paints in 2023 is still considerably high six years after the regulation took effect. What’s worse, some of these paints falsely claim that their lead content is “less than 90 ppm” despite study results saying otherwise.

CONCLUSIONS

This study demonstrates that solvent-based paints with high concentrations of lead are still available in Cameroon despite the enactment of a lead paint regulation banning the manufacture, import, and use of lead paints in September 2017. However, the fact that 26 out of 38 paints (68 percent of paints) did not contain intentionally added lead indicates that the technology to produce paints without added lead exists in Cameroon. The study results provide a strong justification to strengthen compliance monitoring and enforcement mechanisms to ensure adherence to the national ban on the manufacture, import, export, distribution, sale, and use of paints with total lead concentrations greater than 90 ppm.

RECOMMENDATIONS

In the interest of upholding the national ban on lead-containing paints, thereby protecting the health of children and other vulnerable populations, CREPD and IPEN propose the following recommendations:

FOR GOVERNMENT AND GOVERNMENT AGENCIES

All the competent ministerial departments, namely the Ministry of the Environment, Protection of Nature and Sustainable Development (MINEPDED); the Ministry of Commerce (MINCOMMERCE); the Ministry of Industry, Mines and Technological Development (MIMITD); the Ministry of Public Health (MINSANTE); and the National Standards and Quality Agency (ANOR) must each take steps to ensure that paints marketed in Cameroon comply with the legal limit of 90 ppm lead or less. Regulation without enforcement is simply no regulation. Complementary to the appropriate enforcement of the existing regulation, relevant Government and Government Agencies should endeavor to develop national capacities to identify lead in paints, develop a

Third-Party Certification program, establish lead exposure assessment and monitoring programs, and impose stringent restriction on the importation of lead chromates, the ingredient used to manufacture lead paints.

FOR THE PAINT INDUSTRY

Paint companies that still produce lead paints should expeditiously stop the use of leaded paint ingredients in paint formulations. Paint companies that have shifted to non-lead paint production should get their products certified through independent, third-party verification procedures to increase the customer's ability to choose paints with no added lead. Paint manufacturers, importers, and wholesalers must ensure that their paint products bear clear labels informing consumers of the lead content that is in compliance with the 90 ppm legal limit.

FOR INDIVIDUAL, HOUSEHOLD AND INSTITUTIONAL CONSUMERS

Paint consumers should demand paints with no added lead from paint manufacturers and retailers, as well as full disclosure of a paint product's content. Household and institutional consumers should ask for, consciously buy, and apply only paints with no added lead in places frequently used by children such as homes, schools, day care centers, parks, and playgrounds.

FOR ORGANIZATIONS AND PROFESSIONAL GROUPS

Public health groups, consumer organizations and other concerned entities should support the elimination of lead paint and conduct activities to inform the public and protect children from lead exposure through lead paint, lead in dust and soil, and other sources of lead. They should advocate for the establishment of national lead exposure assessments and monitoring programs to identify and eliminate other lead hazard sources and ensure compliance to the lead paint regulation.

FOR ALL STAKEHOLDERS

Stakeholders from the government, business and industry, health care sector, academia, and the civil society should actively support policies and programs that will contribute to the reduction of children's, women's, and workers' exposures to lead from lead-containing paint, as well as from lead-contaminated dust and soil towards a lead-safe future for all.



1. BACKGROUND

1.1 HEALTH AND ECONOMIC IMPACTS OF LEAD EXPOSURE

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 anticorrosive 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 or coating materials 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. All lead concentrations in the report are total lead levels, unless otherwise specified.



Children are exposed to lead from paint when lead-containing paint on walls, windows, doors or other painted surfaces begins to chip or deteriorate, since this causes lead to be 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 dust is produced, which, when spread, can constitute a severe health hazard.^[1]

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 dust or the soil is contaminated with lead, the children will 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.^[2]

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 paint chips is typically much higher than what is found in dust and soils. When toys, household furniture, or other articles are painted with lead paint, children may directly ingest the lead-contaminated, dried paint when chewing on them. Nonetheless, the most common way that children ingest lead is through lead-contaminated dust and soil that gets onto their hands.^[3]

While lead exposure is also harmful to adults, lead exposure harms children at much lower levels. In addition, children absorb up to five times as much of ingested lead than adults. Children with nutritional deficiencies absorb ingested lead at an even increased rates.^[2]

The younger the child, the more harmful lead can be, and the health effects are generally irreversible and can have a lifelong impact. The human fetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child.^[4] Lead is also transferred through breast milk when lead is present in a nursing mother.^[5]

Once lead enters a child's body through ingestion, inhalation, or across the placenta, it has the potential to damage several 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.^[6] Lead is also categorized as an endocrine-disrupting chemical (EDC).^[7]

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.^[8]

According to the World Health Organization (WHO): "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6 percent of the global burden of disease."^[2] Evidence of reduced intelligence caused by childhood exposure to lead has led 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.^[9]

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower levels of lead exposure.^[2, 6] According to the factsheet on Lead Poisoning and Health from WHO: "There is no known level of lead exposure that is considered safe."^[10]

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.^[11] 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.^[2] 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.

A 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 dollars² per year.^[12] 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 percent of Gross Domestic Product (GDP);
- Latin America and the Caribbean: \$142.3 billion of economic loss, or 2.04 percent of GDP; and
- Asia: \$699.9 billion of economic loss, or 1.88 percent of GDP.

Country estimates used in this study can be accessed at a publicly available website, <http://www.med.nyu.edu/pediatrics/research/environmentalpediatrics/leadexposure>, and shows that **economic loss in Cameroon is estimated at \$2.52 billion or 5.28 percent of the country's Gross Domestic Product (GDP).**

2. 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.

1.2 THE USE OF LEAD IN PAINT

Paints contain high levels of lead when the paint manufacturer intentionally adds one or more leaded 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. Leaded paint ingredients are most commonly intentionally used in solvent-based paint due to their chemical properties, and solvent-based paints have been found to have high lead content in many countries.^[13-15]

The leaded 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.

Leaded compounds may also be added to enamel paints for use as driers (sometimes called drying agents or drying 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 anticorrosive 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) 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 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.

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 decorative household paints in e.g., the U.S., China, India, South Korea, Saudi Arabia, Jordan, Iraq, Morocco, Ethiopia, Kenya, Tanzania, Georgia, Ukraine, and Colombia is a total maximum lead content of 90 ppm, and adherence to this limit in Cameroon was aimed to ensure that a local manufacturer can sell its paint anywhere in the world. This standard is also recommended in the *Model Law and Guidance for Regulating Lead Paint*,³ which was developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme. Some other countries such as Brazil, South Africa, and Sri Lanka have established standards of 600 ppm total lead.

1.3 PAINT MARKET AND REGULATORY FRAMEWORK IN CAMEROON

PAINT MARKET IN CAMEROON

A pilot paint market study in Cameroon in 2011 indicated that 45 percent of the paints distributed in Cameroon were oil-based paints or enamels, while 38 percent were latex, and 17 percent comprised other types of paints (e.g., synthetic paints). About 40 percent of paints sold in Cameroon were imported from other countries and regions, indicating a relatively significant local paint industry providing the remaining 60 percent of the market. This data is inferred to be the same or alike in 2023. Details about the paints from other countries and regions imported into Cameroon were available in the 2011 market study report. However, this report needs to be updated amid the observed dynamics in the paint market in Cameroon.

3. <https://www.unenvironment.org/resources/publication/model-law-and-guidance-regulating-lead-paint>

For instance, CREPD's brief 2023 market survey covered more than 35 paint retailer outlets and wholesalers distributing solvent-based, enamel decorative and other architectural paints in Yaoundé and Douala which is different from the 2017 paint market survey. It showed that paint products from the brands or manufacturers noted below were no longer available in stores. However, this does not necessarily mean that these paints will not be available for sale on the market again.

The 2023 study also helped identify three new paint brands available for sale on the market in Cameroon, namely Vernilac (Greece), AILI Paint (France), and Ocean Paint (UAE). Another relevant information to note in this 2023 study was that several brands of paints on sale in Cameroon reported in 2011, 2015, and to some extent, 2017, were no longer available in the market. More than a dozen brands are now not found in the country's markets, or even withdrawn from the Cameroonian market by their producers. These paints were mainly imported from North African countries (i.e., Tunisia, Algeria, and Morocco), European countries (i.e., France, Italy, and Spain), and Middle East and Asian countries (i.e., UAE, Lebanon, and China), but there were also paints from local manufacturers that were not found in 2023.

The non-exhaustive list of paints that were found in previous studies but were not found on the market in 2023 include: BASF SA Sunvinil (Brazil), Batilac (Tunisia), Camero-peint/ SOQUICAM (Cameroon), Capcolor (Tunisia), Caporouille (Tunisia), Casati (Italy), CIAC (Cameroon), Colorado (Morocco), Contifer (Algeria), Continental (Algeria), Farbe (Italy), Force One (France), Impa Tech (Italy), International Trust (Lebanon), Littocol (Cameroon), Nespoli (Italy), Oxirite (Spain), Pelican (Cameroon), Prodec (Morocco), Ritver (UAE), SIMPEX (EU), Valentine (Tunisia), Vulcain (Cameroon), and Xylazel (Spain).

LEAD PAINT REGULATORY FRAMEWORK

In September 2017, Cameroon's Minister of Environment enacted Order N°: 004/MINEPDED/CAB—a national regulation that amended the 2011 list of harmful and hazardous substances under the Prime Minister Decree N°: 2011/2581/PM. The 2017 regulation added lead and lead compounds used in the manufacture of paints to its list of regulated hazardous chemicals. This regulation also established a national standard limit of 90 ppm on the use of lead in all paints manufactured, imported, sold, and distributed in the country. The regulation has been adopted by the Ministry of Environment after a participatory process involving all the relevant stakeholders.

2. MATERIALS AND METHODS

From May to June 2023, 38 cans of solvent-based paints—28 paints intended for home and decorative use, seven anticorrosive paints, and three aerosol paints or spray paints—were purchased by CREPD from various stores in Yaoundé and Douala, the two main cities of Cameroon. The paints represented 15 different brands produced by 13 manufacturers.

In most cases, one white paint and one or more bright-colored paint such as red, green, orange, or yellow were selected. Additionally, seven anticorrosive paints and three spray paints for consumer use were also included in this study. 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.

During the paint sample preparation, information such as color, brand, manufacturer, country where manufactured, product codes, production dates, and other details as provided on the label of the paint can were recorded. Generic paint colors were recorded, e.g., “yellow” instead of “sunflower.” For all colored paints, the protocol called for obtaining “bright” or “strong” red and yellow paints when available.

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 CREPD 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; labeled wood pieces using different unused, single-use paintbrushes by a researcher of CREPD as shown in Figures 1 and 2.



Figure 1: Paint sample preparation by CREPD team.



Figure 2: Paint samples applied on wood sticks were air-dried at room temperature.

Each stirring utensil and paintbrush were used only for the same paint, 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 individually labeled, resealable plastic bags and shipped for analysis of lead content to SGS Forensic Laboratories in the United States of America. The laboratory participates in the Environmental Lead Proficiency Analytical Testing (ELPAT) Program operated by the American Industrial Hygiene Association. In the laboratory selection process, IPEN further assessed the reliability of the laboratory results by conducting an independent quality assurance testing. This was made by sending paint samples with a known lead content to the laboratory, and evaluating the results received.

The laboratory's lower limit of detection for the lead concentration in the paint samples is dependent on the amount of paint in the samples. Generally, the lowest detection limit for the method used is 60 ppm, but if only a small amount of paint is available, the detection limit increases. Therefore, the detection limit was higher (up to 400 ppm) for some of the samples.

The paint samples were analyzed using method EPA3050B/7000B, i.e., through acid digestion of the samples, followed by Flame Atomic Absorption Spectrometry, as recognized by the WHO as appropriate for the purpose.^[16]

3. RESULTS

3.1 SUMMARY OF RESULTS

This study shows that:

- 12 out of 38 analyzed solvent-based paints (32 percent of paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. In addition, five paints (13 percent of paints) contained extremely high lead concentrations above 10,000 ppm.
- Seven out of 15 analyzed brands (47 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Also, four out of 15 analyzed brands (27 percent of paint brands) sold at least one lead paint with extremely high lead concentrations above 10,000 ppm.
- Nine out of 27 bright-colored paints (33 percent of bright-colored paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. Yellow paints were the most hazardous with three out of eight paints (38 percent of yellow paints) containing lead concentrations greater than 10,000 ppm; one out of five green paints (20 percent of green paints) and one out of 13 red paints (eight percent of red paints) also contained extremely high lead concentrations above 10,000 ppm.

- The highest lead concentration detected was 90,000 ppm in a yellow Asmaco Spray Paint manufactured by Anchor Allied Factory L.L.C. in the United Arab Emirates (UAE) and sold for home and nonprofessional use.
- Only 19 out of 38 paints (50 percent of paints) provided information about lead on their labels and most paints carried little information about ingredients. Most paints were merely labeled as “solvents, pigments and resin,” with no further details on the type of solvents and pigments (organic or inorganic) provided. Most warning symbols on the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.
- Four lead-containing paints were falsely marked as “lead concentration less than 90 ppm” or “without lead” despite containing lead levels ranging from 200 ppm to as high as 3,500 ppm.

3.2 LEAD CONTENT ANALYSIS

Twelve out of 38 analyzed solvent-based paints (32 percent of paints) were lead paints, i.e., contained a lead concentration above 90 ppm – five of these contained extremely high lead concentrations above 10,000 ppm (13 percent of paints).

A yellow Asmaco Spray Paint manufactured in UAE by Anchor Allied Factory L.L.C. contained the highest concentration of lead at 90,000 ppm, while the lowest concentration of lead less than 70 ppm was detected in two paints from the following brands: SOCIPEC (grey) and GOLD STAR (red)—both of which were anticorrosive paints.

The 11 solvent-based paints with the highest amounts of lead are summarized in Table 1.

Table 1 Top 11 Solvent-Based Paints with the Highest Lead Content.

RANK	SAMPLE NO.	BRAND	MANUFACTURER	COLOR	LEAD CONTENT (ppm)
1	CMR-431	Asmaco (Spray Paint)	Asmaco (UAE)	yellow	90,000
2	CMR-410	Seigneurie (Enamel)	CEP – PPG (Cameroon)	red	60,000
3	CMR-419	National (Enamel)	National (UAE)	yellow	19,000
4	CMR-404	Smalto (Enamel)	Smalto (Cameroon)	yellow	13,000
5	CMR-423	National (Enamel)	National (UAE)	green	12,000
6	CMR-418	Duco (Enamel)	PPG (Cameroon)	red	3,500
7	CMR-433	Ocean Paints (Enamel)	Ocean Paints (UAE)	white	3,200
8	CMR-437	Ferox (Anticorrosive)	Sylvia Group (Cameroon)	red	1,700
9	CMR-406	Smalto (Enamel)	Smalto (Cameroon)	green	1,300
10	CMR-401	Seigneurie (Enamel)	CEP – PPG (Cameroon)	green	1,100
11	CMR-422	National (Enamel)	National (UAE)	white	1,100

On the other hand, 26 out of 38 analyzed paints (68 percent of paints) had lead concentrations reported as “less than 400 ppm,” “less than 200 ppm,” and “less than 100 ppm.” In this report, we say that these 26 paints did not contain “intentionally added lead.”

Intentionally adding lead compounds to paint either as pigment or drier will yield concentrations of lead that are higher than 200 ppm. According to Module A-3 (Paint Basics) of UNEP’s *Toolkit for Establishing Laws to Eliminate Lead Paint*, “Lead-based pigments may contribute around 1,500 ppm to over 100,000 ppm” concentrations of lead in paint, while “lead-based driers may contribute around 1,200 ppm to 6,000 ppm” concentrations of lead in paint.⁴

4. <https://wedocs.unep.org/bitstream/handle/20.500.11822/37030/PAINT.pdf?sequence=3&isAllowed=y>, p.12–13

3.3 PAINT BRAND ANALYSIS

Four out of 15 analyzed brands (27 percent of paint brands) sold at least one paint with extremely high lead concentration above 10,000 ppm.

Among 28 decorative paints, a red Seigneurie Enamel Paint manufactured by PPG contained the highest concentration of lead at 60,000 ppm. On the other hand, at least one paint from each of the following brands did not contain intentionally added lead, including Aili Paint (yellow); APSCA (yellow); Duco (green and white); Gold Star (white); National (red); Seigneurie (grey, orange, white, and two yellows); Smalto (red and white); Universal (green, red, white, and yellow); and Vernilac (red). This indicates that the technology to produce paints without added lead exists in Cameroon.

Among seven anticorrosive paints, a red Ferox Anticorrosive Paint locally manufactured by the Sylvia Group contained the highest concentration of lead at 1,700 ppm. On the other hand, at least one paint from each of the following brands did not contain intentionally added lead, including Gold Star (red); Rossignol (red); Smalto (red); Sociepec (grey and red); and Universal (red).

Among three imported spray paints, a yellow Asmaco Spray Paint manufactured in UAE by Anchor Allied Factory L.L.C. contained the highest concentration of lead at 90,000 ppm. On the other hand, two ABRO Spray Paints (red and white) imported from the USA did not contain intentionally added lead.

3.4 PAINT COLOR ANALYSIS

Nine out of 27 bright-colored paints (33 percent of bright-colored paints) such as yellow, green, red, and orange contained lead concentrations above 90 ppm, five paints of which contained extremely high lead concentrations above 10,000 ppm (19 percent of bright-colored paints).

This study included 13 red paints, eight yellow paints, eight white paints, five green paints, two grey paints, one blue paint, and one orange paint. Yellow, red, and green paints contained the highest lead concentrations.

Among bright-colored paints, three out of eight yellow paints (38 percent of yellow paints); one out of five green paints (20 percent of green paints); and one out of 13 red paints (eight percent of red paints) contained lead concentrations above 10,000 ppm.

3.5 LABELING

In general, most paint can labels did not carry meaningful information about lead content or the hazards of lead paint.

Only 19 out of 38 paints (50 percent of paints) provided information about lead on their labels such as “lead concentration less than 90 ppm” and “without lead” claims. Among these, four lead-containing paints were falsely marked as “lead concentration less than 90 ppm” or “without lead” despite containing lead levels ranging from 200 ppm to as high as 3,500 ppm.

Most paints were merely labeled as “solvents, pigments and resin,” with no further details on the type of solvents and pigments (organic or inorganic) provided on paint can labels. Manufacturing dates were included on the labels of three out of 38 paints (eight percent of paints), while the batch numbers were indicated on 19 paints (50 percent of the paints) included in this study. Warning symbols on most of the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

3.6 COMPLIANCE OF PAINTS WITH LEGAL LIMITS AND COMPARISON WITH RESULTS FROM EARLIER STUDIES

The results of the four studies conducted by CREPD and IPEN in 2011, 2015, 2017, and 2023 indicated an increase in the percentage of compliant solvent-based decorative paints with lead concentrations below 90 ppm. The percentage of similar paints exceeding 90 ppm and 10,000 ppm, on the other hand, had considerably decreased. For example, the study conducted in 2011 prior to the issuance of the lead paint regulation showed 67 percent of 60 analyzed paints had lead content above 90 ppm. In contrast, only 32 percent of 38 analyzed paints in 2023 exceeded the 90 ppm limit after the lead paint regulation was

enacted in September 2017. The percentage of paints with lead levels above 10,000 ppm also decreased: from 25 percent of 60 paints in 2011 to 13 percent of 38 paints in 2023.

However, the number of lead paints in 2023 is still considerably high six years after the regulation took effect. What’s worse, some of these paints falsely claim that their lead content is “less than 90 ppm” despite study results saying otherwise.

Thirteen decorative enamel paints, five anticorrosive paints, and one spray paint analyzed in 2017 were also analyzed in this study. Among these, four decorative paints and one anticorrosive paint remained non-compliant with the legal limit and still contains intentionally added lead in 2023. These include two Smalto enamel paints (yellow and green), one Seigneurie enamel paint (green), one National enamel paint (green), and one Ferox anticorrosive paint (red).

Moreover, three decorative enamel paints and one spray paint did not contain intentionally added lead in 2017. But in 2023, these paints were found to contain lead. In particular, a yellow Asmaco spray paint had a lead content less than 200 ppm in 2017, but now had a lead level of 90,000 ppm—the highest lead content in the 2023 study.

On the other hand, two decorative enamel paints (a yellow Seigneurie enamel paint and a red National enamel paint) and one anticorrosive paint (red Gold Star anticorrosive paint) were now compliant with the 90 ppm legal limit. Also, four decorative enamel paints and three anticorrosive paints did not contain intentionally added lead in 2023, similar to the 2017 study.

Table 2 Comparison of Lead Concentrations in Some Solvent-Based Paints.

SAMPLE NO.	BRAND NAME	COLOR	2023 LEAD CONTENT (ppm)	2017 LEAD CONTENT (ppm)	REMARKS
CMR-416	Seigneurie (enamel)	yellow	< 100	26,000	Contains no “intentionally added lead” compared to 2017
CMR-421	National (enamel)	red	< 100	9,900	Contains no “intentionally added lead” compared to 2017
CMR-418	Gold Star (anticorrosive)	red	< 70	3,200	Contains no “intentionally added lead” compared to 2017
CMR-417	Duco (enamel)	green	< 100	< 100	Contains no “intentionally added lead” similar to 2017
CMR-405	Smalto (enamel)	red	< 200	< 100	Contains no “intentionally added lead” similar to 2017
CMR-408	Smalto (enamel)	white	< 100	< 200	Contains no “intentionally added lead” similar to 2017
CMR-407	Smalto (anticorrosive)	red	< 90	< 80	Contains no “intentionally added lead” similar to 2017
CMR-411	Universal (enamel)	white	< 90	< 70	Contains no “intentionally added lead” similar to 2017
CMR-413	Universal (anticorrosive)	red	< 100	< 60	Contains no “intentionally added lead” similar to 2017
CMR-424	Socipec (anticorrosive)	red	< 200	< 60	Contains no “intentionally added lead” similar to 2017
CMR-419	National (enamel)	yellow	19,000	< 70	Now contains “intentionally added lead” (most likely lead pigment) in contrast to 2017
CMR-431	Asmaco (spray paint)	yellow	90,000	< 200	Now contains “intentionally added lead” (most likely lead pigment) in contrast to 2017

Table 2 Comparison of Lead Concentrations in Some Solvent-Based Paints. (continued)

SAMPLE NO.	BRAND NAME	COLOR	2023 LEAD CONTENT (ppm)	2017 LEAD CONTENT (ppm)	REMARKS
CMR-418	Duco (enamel)	red	3,500	< 60	Now contains “intentionally added lead” (possibly lead pigment or lead drier) in contrast to 2017
CMR-403	Smalto (enamel)	blue	200	< 200	Now contains lead (most likely from trace amounts of lead contaminants) in contrast to 2017
CMR-404	Smalto (enamel)	yellow	13,000	30,000	Still contains “intentionally added lead” (most likely lead pigment) similar to 2017
CMR-423	National (enamel)	green	12,000	6,600	Still contains “intentionally added lead” (most likely lead pigment) similar to 2017
CMR-401	Seigneurie (enamel)	green	1,100	47,000	Still contains “intentionally added lead” (most likely lead drier) similar to 2017
CMR-406	Smalto (enamel)	green	1,300	5,500	Still contains “intentionally added lead” (most likely lead drier) similar to 2017
CMR-437	Ferox (anticorrosive)	red	1,700	720	Still contains “intentionally added lead” (possibly lead pigment or lead drier) similar to 2017

4. CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that solvent-based paints with high concentrations of lead are still available in Cameroon despite the enactment of a lead paint regulation banning the manufacture, import, and use of lead in paints in September 2017. However, the fact that 26 out of 38 paints (68 percent of paints) did not contain intentionally added lead indicates that the technology to produce paints without added lead exists in Cameroon. The study results provide a strong justification to strengthen compliance monitoring and enforcement mechanisms to ensure adherence to the national ban on the manufacture, import, export, distribution, sale, and use of paints with total lead concentrations greater than 90 ppm.

In the interest of upholding the national ban on lead-containing paints, thereby protecting the health of children and other vulnerable populations, CREPD and IPEN propose the following recommendations:

FOR GOVERNMENT AND GOVERNMENT AGENCIES

All the competent ministerial departments, namely the Ministry of the Environment, Protection of Nature and Sustainable Development (MINEPDED); the Ministry of Commerce (MINCOMMERCE); the Ministry of Industry, Mines and Technological Development (MIMITD); the Ministry of Public Health (MINSANTE); and the National Standards and Quality Agency (ANOR) must each take steps to ensure that paints marketed in Cameroon comply with the legal limit of 90 ppm lead or less. Regulation without enforcement is simply no regulation. Complementary to the appropriate enforcement of the existing regulation, relevant Government and Government Agencies should endeavor to develop national capacities to identify lead in paints, develop a Third-Party Certification program, establish lead exposure assessment and monitoring programs, and impose stringent restriction on the importation of lead chromates, the ingredient used to manufacture lead paints.

FOR THE PAINT INDUSTRY

Paint companies that still produce lead paints should expeditiously stop the use of leaded paint ingredients in paint formulations. Paint companies that have shifted to non-lead paint production should get their products certified through independent, third-party verification procedures to increase the customer's ability to choose paints with no added lead. Paint manufacturers, importers, and wholesalers must ensure that their paint products bear clear labels informing consumers of the lead content that is in compliance with the 90 ppm legal limit.

FOR INDIVIDUAL, HOUSEHOLD, AND INSTITUTIONAL CONSUMERS

Paint consumers should demand paints with no added lead from paint manufacturers and retailers, as well as full disclosure of a paint product's content. Household and institutional consumers should ask for, consciously buy, and apply only paints with no added lead in places frequently used by children such as homes, schools, day care centers, parks, and playgrounds.

FOR ORGANIZATIONS AND PROFESSIONAL GROUPS

Public health groups, consumer organizations and other concerned entities should support the elimination of lead paint and conduct activities to inform the public and protect children from lead exposure through lead paint, lead in dust and soil, and other sources of lead. They should advocate for the establishment of national lead exposure assessments and monitoring programs to identify and eliminate other lead hazard sources and ensure compliance to the lead paint regulation.

FOR ALL STAKEHOLDERS

Stakeholders from the government, business and industry, health care sector, academia, and the civil society should actively support policies and programs that will contribute to the reduction of children's, women's, and workers' exposures to lead from lead-containing paint, as well as from lead-contaminated dust and soil towards a lead-safe future for all.



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ANNEX

Table 3 Solvent-Based Paints Included in the Study.

SAMPLE NO.	BRAND	COLOR	VOLUME (L)	PRICE (FCFA)	DATE OF MANUFACTURE (D/M/Y)	BATCH NO.	DATE OF PURCHASE (D/M/Y)	IS THERE WEBSITE ON LABEL?
CMR-436	Seigneurie/PPG (Enamel)	Orange	1	9500	N/A	N/A	16/05/2023	Yes
CMR-446	Seigneurie/PPG (Enamel)	Yellow	1	9500	N/A	N/A	16/05/2023	Yes
CMR-410	Seigneurie/PPG (Enamel)	Red	0.1	2500	N/A	N/A	16/05/2023	Yes
CMR-427	Seigneurie/PPG (Enamel)	Grey	0.1	2000	N/A	12090	24/05/2023	Yes
CMR-401	Seigneurie/PPG (Enamel)	Green	0.1	2000	N/A	10288	24/05/2023	Yes
CMR-414	Seigneurie/PPG (Enamel)	White	0.1	2000	N/A	10257	09/06/2023	Yes
CMR-416	Seigneurie/PPG (Enamel)	Yellow	0.1	2000	N/A	N/A	09/06/2023	Yes
CMR-415	Duco/PPG (Enamel)	White	1	9500	N/A	F/4622/00123	24/05/2023	Yes
CMR-417	Duco/PPG (Enamel)	Green	0.1	2000	N/A	N/A	09/06/2023	Yes
CMR-418	Duco/PPG (Enamel)	Red	1	9500	N/A	N/A	09/06/2023	Yes
CMR-404	Smalto (Enamel)	Yellow	0.1	2000	N/A	N/A	16/05/2023	Yes
CMR-405	Smalto (Enamel)	Red	0.1	2000	N/A	19060231	17/05/2023	Yes
CMR-408	Smalto (Enamel)	White	1	6500	N/A	22080194	17/05/2023	Yes
CMR-406	Smalto (Enamel)	Green	0.1	2000	N/A	20100700	24/05/2023	Yes
CMR-403	Smalto (Enamel)	Blue	0.1	2000	N/A	19100500	09/06/2023	Yes
CMR-407	Smalto (Anticorrosive)	Red	1	6500	N/A	19060231	25/05/2023	Yes
CMR-421	National (Enamel)	Red	0.1	2000	N/A	N/A	16/05/2023	No
CMR-419	National (Enamel)	Yellow	0.1	2000	N/A	N/A	16/05/2023	No
CMR-423	National (Enamel)	Green	0.1	2000	N/A	N/A	16/05/2023	No
CMR-422	National (Enamel)	White	0.1	2000	N/A	N/A	16/05/2023	No
CMR-411	Universal (Enamel)	White	1	6000	N/A	N90825	18/05/2023	Yes
CMR-410	Universal (Enamel)	Green	1	6000	N/A	43254	09/06/2023	Yes
CMR-409	Universal (Enamel)	Red	1	6000	N/A	43254	09/06/2023	Yes
CMR-412	Universal (Enamel)	Yellow	1	6000	N/A	71079	09/06/2023	Yes

Table 3 Solvent-Based Paints Included in the Study. (continued)

SAMPLE NO.	BRAND	COLOR	VOLUME (L)	PRICE (FCFA)	DATE OF MANUFACTURE (D/M/Y)	BATCH NO.	DATE OF PURCHASE (D/M/Y)	IS THERE WEBSITE ON LABEL?
CMR-413	Universal (Anticorrosive)	Red	1	6000	N/A	N55003	18/05/2023	Yes
CMR-424	Socipec (Anticorrosive)	Red	1	6500	16/03/2023	N/A	16/05/2023	No
CMR-425	Socipec (Anticorrosive)	Grey	1	6500	N/A	P53A629032023	16/05/2023	No
CMR-426	Gold Star (Enamel)	White	1	6000	N/A	N/A	17/05/2023	Yes
CMR-432	Gold Star (Anticorrosive)	Red	1	6000	N/A	N/A	17/05/2023	Yes
CMR-430	ABRO (Spray Paint)	White	0.4	3000	N/A	N/A	09/06/2023	No
CMR-428	ABRO (Spray Paint)	Red	0.4	3000	N/A	N/A	18/05/2023	No
CMR-431	Asmaco (Spray Paint)	Yellow	0.4	3000	N/A	N/A	17/05/2023	No
CMR-434	Vernilac (Enamel)	Red	1	6500	N/A	0360319	17/05/2023	No
CMR-438	Aili Paint (Enamel)	Yellow	0.75	7500	N/A	25092021	18/05/2023	No
CMR-433	Ocean Paints (Enamel)	White	1	6500	07/09/2022	22102023	23/05/2023	No
CMR-439	APSCA (Enamel)	Yellow	0.1	3000	12/11/2020	N/A	23/05/2023	No
CMR-435	Rossignol (Anticorrosive)	Red	1	6000	N/A	19189	09/06/2023	No
CMR-437	Ferox (Anticorrosive)	Red	1	5000	N/A	N/A	09/06/2023	Yes

Table 4 Results of Laboratory Analysis of Solvent-Based Paints.

SAMPLE NO.	BRAND	COLOR	LEAD CONTENT, DRY WEIGHT (ppm)	COUNTRY OF BRAND HEADQUARTERS	COUNTRY OF MANUFACTURE	IS THERE INFORMATION ON CAN ABOUT LEAD CONTENT OF PAINT?
CMR-436	Seigneurie/PPG (Enamel)	Orange	< 200	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-446	Seigneurie/PPG (Enamel)	Yellow	< 200	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-410	Seigneurie/PPG (Enamel)	Red	60,000	Cameroon	Cameroon	No
CMR-427	Seigneurie/PPG (Enamel)	Grey	< 200	Cameroon	Cameroon	No
CMR-401	Seigneurie/PPG (Enamel)	Green	1,100	Cameroon	Cameroon	No
CMR-414	Seigneurie/PPG (Enamel)	White	< 200	Cameroon	Cameroon	No
CMR-416	Seigneurie/PPG (Enamel)	Yellow	< 100	Cameroon	Cameroon	No
CMR-415	Duco/PPG (Enamel)	White	< 200	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-417	Duco/PPG (Enamel)	Green	< 100	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-418	Duco/PPG (Enamel)	Red	3,500	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-404	Smalto (Enamel)	Yellow	13,000	Cameroon	Cameroon	No
CMR-405	Smalto (Enamel)	Red	< 200	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-408	Smalto (Enamel)	White	< 100	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-406	Smalto (Enamel)	Green	1,300	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-403	Smalto (Enamel)	Blue	200	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-407	Smalto (Anticorrosive)	Red	< 90	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-421	National (Enamel)	Red	< 100	UAE	UAE	No
CMR-419	National (Enamel)	Yellow	19,000	UAE	UAE	No
CMR-423	National (Enamel)	Green	12,000	UAE	UAE	No
CMR-422	National (Enamel)	White	1,100	UAE	UAE	No
CMR-411	Universal (Enamel)	White	< 90	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-410	Universal (Enamel)	Green	< 200	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-409	Universal (Enamel)	Red	< 80	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-412	Universal (Enamel)	Yellow	< 200	Cameroon	Cameroon	Lead concentration less than 90 ppm

Table 4 Results of Laboratory Analysis of Solvent-Based Paints. (continued)

SAMPLE NO.	BRAND	COLOR	LEAD CONTENT, DRY WEIGHT (ppm)	COUNTRY OF BRAND HEADQUARTERS	COUNTRY OF MANUFACTURE	IS THERE INFORMATION ON CAN ABOUT LEAD CONTENT OF PAINT?
CMR-413	Universal (Anticorrosive)	Red	< 100	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-424	Socipec (Anticorrosive)	Red	< 200	Cameroon	Cameroon	No
CMR-425	Socipec (Anticorrosive)	Grey	< 70	Cameroon	Cameroon	No
CMR-426	Gold Star (Enamel)	White	< 90	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-432	Gold Star (Anticorrosive)	Red	< 70	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-430	ABRO (Spray Paint)	White	< 200	USA	USA	No
CMR-428	ABRO (Spray Paint)	Red	< 400	USA	USA	No
CMR-431	Asmaco (Spray Paint)	Yellow	90,000	UAE	UAE	No
CMR-434	Vernilac (Enamel)	Red	< 200	Greece	Greece	No
CMR-438	Aili Paint (Enamel)	Yellow	< 200	France	France	No
CMR-433	Ocean Paints (Enamel)	White	3,200	UAE	UAE	No
CMR-439	APSCA (Enamel)	Yellow	< 400	Cameroon	Cameroon	No
CMR-435	Rossignol (Anticorrosive)	Red	< 200	Cameroon	Cameroon	Lead concentration less than 90 ppm
CMR-437	Ferox (Anticorrosive)	Red	1,700	Cameroon	Cameroon	Without lead

Table 5 Distribution of Lead Concentration by Brand.

BRAND	NO. OF SAMPLES	NO. OF SAMPLES ABOVE 90 ppm	NO. OF SAMPLES ABOVE 10,000 ppm	MINIMUM LEAD CONTENT (ppm)	MAXIMUM LEAD CONTENT (ppm)
ABRO (Spray Paint)	2	0	0	< 200	< 400
Aili Paint	1	0	0	< 200	< 200
APSCA	1	0	0	< 400	< 400
Asmaco (Spray Paint)	1	1	1	90,000	90,000
Duco/PPG	3	1	0	< 100	3,500
Ferox (Anticorrosive)	1	1	0	1,700	1,700
Gold Star	2	0	0	< 70	< 90
National	4	3	2	< 100	19,000
Ocean Paints	1	1	0	3,200	3,200
Rosignol (Anticorrosive)	1	0	0	< 200	< 200
Seigneurie/PPG	7	2	1	< 100	60,000
Smalto	6	3	1	< 90	13,000
Socipec (Anticorrosive)	2	0	0	< 70	< 200
Universal	5	0	0	< 80	< 200
Vernilac	1	0	0	< 200	< 200

Table 6 Distribution of Lead Concentration by Color.

COLOR	NO. OF SAMPLES	NO. OF SAMPLES ABOVE 90 ppm	NO. OF SAMPLES ABOVE 10,000 ppm	MINIMUM LEAD CONTENT (ppm)	MAXIMUM LEAD CONTENT (ppm)
Blue	1	0	0	200	200
Green	5	3	1	< 100	12,000
Grey	2	0	0	< 70	< 200
Orange	1	0	0	< 200	< 200
Red	13	3	1	< 70	60,000
White	8	2	0	< 90	3,200
Yellow	8	3	3	< 100	90,000



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