LEAD IN SOLVENT-BASED INDUSTRIAL PAINTS SOLD IN THE PHILIPPINES

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IPEN
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NATIONAL REPORT

LEAD IN SOLVENT-BASED INDUSTRIAL PAINTS SOLD IN THE PHILIPPINES

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While this study was undertaken with funding assistance from GiveWell, Affinity Impact, SSNC, and the Swedish Government, responsibility for the content lies entirely with IPEN and EcoWaste Coalition. GiveWell, Affinity Impact, SSNC, and the Swedish Government do not necessarily share the expressed views and interpretations.

IPEN
for a toxics-free future

IPEN is a network of over 600 non-governmental organizations working in more than 120 countries to reduce and eliminate the harm to human health and the environment from toxic chemicals.

www.ipen.org

EcoWaste Coalition
78-A Masigla St. Extension, Barangay Central
1100 Quezon City, Philippines
https://ecowastecoalition.blogspot.com

EcoWaste Coalition

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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 household use more than 40 years ago. IPEN and Participating Organizations are part of the global movement to eliminate lead paint by 2020 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 extremely 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 industrial paints available on the market in the Philippines. 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 effectively monitor compliance to the country's lead paint regulation. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint.

This study was conducted by the EcoWaste Coalition in partnership with IPEN.

IPEN is an international NGO network of health and environmental organizations from all regions of the world of which the EcoWaste Coalition 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.

The EcoWaste Coalition is a not-for-profit network of over 140 public interest groups in the Philippines that have coalesced to realize the envisioned zero waste and toxics-free society where communities enjoy a safe and healthy environment. Founded in 2000, the EcoWaste Coalition advances sustainable and holistic approaches and solutions by working with local, national and global stakeholders to address waste, chemical pollution and environmental injustice.

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. The Philippines promulgated its lead paint policy in 2013 through a Chemical Control Order (CCO), which prohibits lead in paint above 90 ppm of the total non-volatile content of the dried paint film and provides for phase-out deadlines for different categories of lead-containing paints.

From December 2020 to January 2021, the EcoWaste Coalition purchased a total of 68 cans of solvent-based industrial paints sold in retail stores in 15 cities in the National Capital Region, including Caloocan, Makati, Malabon, Mandaluyong, Manila, Marikina, Muntinlupa, Navotas, Parañaque, Pasay, Pasig, Valenzuela, Quezon, San Juan, and Taguig Cities. Some of the paints were directly ordered from paint manufacturers, and a few paints were purchased from dealers in online shopping platforms. The

paints represented 49 different brands produced by 30 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

Twenty-one out of 68 analyzed solvent-based industrial paints (31 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 all types of paint, including industrial paint in e.g., Cameroon, Ethiopia, Israel, Kenya, Morocco, Nepal, Tanzania, and Ukraine. This standard is also recommended for all paints, including paints for industrial applications, in the Model Law and Guidance for Regulating Lead Paint developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme.

Moreover, 13 paints (19 percent of paints) contained extremely high lead concentrations above 10,000 ppm (nine of which had lead concentrations at or above 100,000 ppm). The highest lead concentration detected was 220,000 ppm in a yellow epoxy paint.

On the other hand, 47 out of 68 solvent-based industrial paints (69 percent of paints) contained lead concentrations at or below 90 ppm, suggesting that the technology to produce paint without leaded ingredients exists in the Philippines.

Seventeen out of 49 analyzed brands (35 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Twelve out of 49 analyzed brands (24 percent of paint brands) sold at least one lead paint with extremely high lead concentrations above 10,000 ppm.

Yellow paints most frequently contained extremely high lead concentrations above 10,000 ppm. Of 37 yellow paints, 12 (32 percent of yellow 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 five out of 68 paints (seven percent of paints) provided information about lead on their labels and most paints carried little information about ingredients. None of the lead-containing paints provided information about lead on their labels and most paints carried little information about any ingredients on can labels.

Of the five paints with "lead-free" or "lead-safe" claims, one paint tested with 120 ppm of lead.

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 or batch numbers were included on the labels of 53 out of 68 paints (78 percent of paints) included in this study. 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.

CONCLUSIONS

This study demonstrates that solvent-based industrial paints with high concentrations of lead are still available in the Philippines despite the phase-out of lead-containing paints used for industrial applications, which was completed on 31 December 2019. However, the fact that 47 out of 68 paints (69 percent of paints) contained lead concentrations below 90 ppm—with 45 of these paints containing lead concentrations at or below 60 or 70 ppm—indicates that the technology to produce industrial paints without added lead exists in the Philippines. The study results provide a strong justification to intensify monitoring of compliance to the country's lead paint regulation banning all types of paints with total lead concentrations greater than 90 ppm.

RECOMMENDATIONS

To address the problem of lead in paint, the EcoWaste Coalition and IPEN propose the following recommendations:

Government and Government Agencies

The national government should review and strengthen monitoring and enforcement measures to ensure strict compliance to the ban on lead in all paints, including conducting random product tests, issuing product recalls and public health warnings, seizing non-compliant products, and penalizing errant manufacturers and traders. Local government units should enact ordinances requiring mandatory procurement and use of certified lead-safe paints for construction, maintenance and renovation projects and activities.

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 distributors should take back any remaining stocks of their old lead-containing paints from retail outlets to stop their sale and use.

Individual, Household, Institutional, Commercial and Industrial 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. Individual, household, institutional, commercial, and industrial consumers should ask for, consciously buy, and use lead-safe paints for all uses.

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.

All Stakeholders

All stakeholders should come together and unite in promoting further policies and programs that will contribute to preventing and reducing lead exposure among children and other vulnerable groups from lead paint and other sources.

1. BACKGROUND

1.1 HEALTH AND ECONOMIC IMPACTS OF LEAD EXPOSURE

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 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 dollars* 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:

* 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.

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 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.
- "Industrial paint" refers to paints or coating materials used for automotive, marine, product manufacturing, structural and other uses, and for various civil engineering works, including road markings, steel bridges, industrial tanks, concrete floors, ships, etc.
- "Solvent-based, industrial paint" refers to alkyd or oil-based paints, acrylic and nitro lacquers, epoxies, polyurethanes, zinc-rich coatings, etc., which have usually high volatile organic compound (VOC) content.
- "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.

- **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 the Philippines is estimated at $15 billion, or 3.8 percent of the country's Gross Domestic Product (GDP).

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 anti-corrosive agents have been widely available for decades and are used by manufacturers producing the highest quality paints. When a paint manufacturer does not intentionally add lead compounds in the formulation of its paints and takes care to avoid the use of paint ingredients that are contaminated with lead, the lead content of the paint will be very low—less than 90 parts per million (ppm) 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 paint is prohibited in the European Union through regulations related to safety of consumer products and specific prohibitions for most leaded raw materials. In some countries with regulations restricting the use of leaded ingredients in all paints, standards specifying a maximum lead limit are in place. The current stan-

dard for all paints, including industrial paints, in e.g., Cameroon, Ethiopia, Israel, Kenya, Morocco, Nepal, Philippines, Tanzania, and Ukraine is a total maximum lead content of 90 ppm, and adherence to this ensures that a manufacturer can sell its paint anywhere in the world. This standard is also recommended in the *Model Law and Guidance for Regulating Lead Paint*,* which was developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme.

1.3 PAINT MARKET AND REGULATORY FRAMEWORK IN THE PHILIPPINES

Paint Market in the Philippines

The country's paint manufacturing began in 1911 with the establishment of a Spanish-owned paint factory. After the devastating World War II, the paint industry gradually grew as a result of post-war reconstruction efforts in the 1950s and the 1960s. From 18 in 1969, the number of paint manufacturers grew to 75 by 1978. However, the hard-hitting challenges from 1989 to 1992, including a major construction slump, the uncertain supply of raw materials, high interest and inflation rates and the Gulf War, affected the paint industry's growth and progress.

As the economy improves, the paint industry has flourished into a PHP 30 billion industry growing by as much as five to 10 percent annually. The country's paint manufacturing sector produces some 290 million liters of paints, of which 70 percent is architectural and decorative paints. Water-based and solvent-based paints constitute 60 percent and 40 percent, respectively, of the country's non-industrial paint outputs. Ninety-five percent of the country's paint output comes from the member paint companies of the Philippine Association of Paint Manufacturers (PAPM) who have taken advantage of the steady construction boom.

Founded in 1961, PAPM, the country's lone paint industry organization, counts on paint manufacturers, coating producers, chemical professionals, raw material makers, and machinery and auxiliary product suppliers among its affiliates. PAPM is an active member of the Chemical Industries Association of the Philippines (SPIK) and the Asian Paint Industry Council (APIC).

Among the PAPM members are three companies that have successfully passed the third-party Lead Safe Paint® Certification** program managed

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

** https://www.leadsafepaint.org

by the US-based SCS Global Services.* These are Pacific Paint (Boysen) Philippines, Inc., the country's paint market leader, with four certified paint brands (Boysen, Nation, Titan, Virtuoso Silk); Davies Paints Philippines, Inc. with one certified paint brand (Davies); and Sycwin Coating and Wires with 10 certified paint brands, including some industrial paint brands (Alabama, Delaware, Guilder, Illinois, Kansas, Minnesota, PureCoat Advance, PureCoat Premium, Sycwin, and WeatherGard).

The full list of paint manufacturers affiliated with the PAPM includes ADD Research Paints and Chemicals, Inc.; Amstar Process Technology, Inc.; Asian Coatings Philippines, Inc.; Campbridge Paints, Inc.; Cebu 7H Technochem Industries, Inc.; Century Chemical Corp.; Davies Paints Philippines, Inc.; FH Colors and Coatings Corp.; Globesco, Inc.; Grand Aces Ventures, Inc.; Jotun Philippines, Inc.; Magna Prime Chemical Technologies, Inc.; March Resources Manufacturing Corp.; Mayon Industrial Corp.; Mega Paint and Coating Corp.; Nippon Paint (Coatings) Philippines, Inc.; Pacific Paint (Boysen) Philippines, Inc.; Perma Colour, Inc.; Pioneer Adhesive, Inc.; Roosevelt Chemical, Inc.; Sealbond Chemical Industries, Inc.; Sycwin Coating and Wires, Inc.; Times Paint Corp.; Treasure Island Industrial Corp.; Twin Aces Industries, Inc.; and the Universal Paint and Coatings (Philippines), Inc.

Non-PAPM member companies that also form part of the local paint industry include the A-Jaycee Chemicals Trading Corp.; Andalucia Manufacturing Corp.; Breb Color Paint Station; CORD Chemicals, Inc.; Euro Chem Manufacturing Corp.; Filipinas Paints and Chemicals Manufacturing, Inc.; Globe International Distributor Center Inc.; Hazz Paint and Coating Solutions, Inc.; KHI; Luffax Enterprises; Maincoat Inc.; Paradise Chemical Corp.; PPLM Industrial Corp.; Prime Coating and Chemical, Inc.; RCAC Capitol Ventures Corp.; Sucat Commercial; Super Globe Inc.; Ultracote Paints and Coatings Corp.; and United Paints Inc.

While home-grown paint brands dominate the market, foreign brands such as 3Trees Paint, ACE Paint, Chugoku Paint, DecoMAS Paint, International Paint, Jotun Paint, Kansai Paint, Oxyplast Paint, and TransOcean Paint are also available locally. Also, imported spray paints for general use, many of which lack manufacturer's markings, are sold in hardware stores, home improvement shops, general merchandise retailers, motorcycle supplies dealers, as well as in online shopping platforms.

An article published in the Coatings World has identified some of the challenges facing the paint and coating industry in the Philippines, including prohibitive cost structure related to logistics, energy and raw

* https://www.scsglobalservices.com/services/lead-safe-paint

materials, which are not available domestically; low capacity utilization rates, and low investment in technology upgrades.**

Regulatory Framework in the Philippines

The Philippines through the Department of Environment and Natural Resources (DENR) Administrative Order 2013-24, also known as the Chemical Control Order for Lead and Lead Compounds (or the CCO), establishes a total lead content limit of 90 parts per million (ppm) for lead used as pigment, drying agent or for some other intentional purposes in paint formulations.

The CCO sets a phase-out deadline of three years (2013-2016) for lead-containing paints used for architectural, decorative, and household applications, and six years (2013-2019) for lead-containing paints used for industrial applications. By 2020, the Philippines completed the phase-out of lead in all paint categories.

** https://www.coatingsworld.com/issues/2019-09-01/view_india_asia_pacific_reports/the-paints-and-coatings-industry-in-the-philippines/#

Following the adoption of the CCO, the Bureau of Philippine Standards (BPS) of the Department of Trade and Industry (DTI), with active participation of the members of the BPS Technical Committee on Paints, harmonized the outdated limit on lead in paint from 1,000 ppm to 90 ppm in accordance with the CCO.

The Department of Education (DepEd), the Department of Interior and Local Government (DILG) and the Department of Social Work and Development (DSWD) also took important steps to reinforce the ban on lead in paints in line with DENR A.O. 2013-24.

DepEd Order 4, Series of 2017 on the "Mandatory Use of Lead-Safe Paints in Schools" requires the use of independently certified lead-safe paints/coatings in the painting and repainting, among other things, of school facilities and amenities such as playground, covered court and the like.

DILG Memorandum Circular 2018-26 on the "Mandatory Use of Lead-Safe Paints by Local Government Units (LGUs)" enjoins provincial governors, city mayors, municipal mayors and barangay chairpersons to adopt a "Lead-Safe Paint Procurement Policy" for painting jobs paid out of public funds. This circular further instructs local officials to ensure prohibited uses of lead, including their use in indoor and outdoor playground equipment, are duly observed.

The DSWD memorandum issued in 2017 requires the use of lead safe paints as a mandatory requirement in facilities catering to disadvantaged and vulnerable sectors. According to the memorandum, "the Standards Bureau/Unit shall ensure compliance by all social welfare and development agencies that their residential and non-residential facilities, including furniture, fixture and equipment, are using lead safe paints or coatings prior to licensing or re-accreditation."

Locally, the Quezon City Government and the Davao City Government enacted ordinances in 2018 requiring the mandatory procurement and use of certified lead-safe paints, including enamels, glazes, lacquers, primers, stains, varnishes and other surface coatings, in government-funded construction, maintenance and renovation projects.

As a result of the EcoWaste Coalition-IPEN joint study on lead concentrations in spray paints sold locally, the Food and Drug Administration (FDA) through Advisory No. 2020-1585 issued a public health warning against the purchase and use of 37 spray paints containing significant levels of lead in excess of the 90 ppm maximum limit.

While third-party certification is not integrated into the CCO, the promulgation of the policy led to the birth of a voluntary Lead Safe Paint® Certification* program initiated by the International Pollutants Elimination Network (IPEN) and the EcoWaste Coalition with support from the Philippine Association of Paint Manufacturers (PAPM). This third-party certification program verifies and certifies that a paint brand has less than 90 ppm lead allowing it to use the Lead Safe Paint® logo, a visual tool that can assist consumers in making an informed choice when purchasing paints.

The CCO bagged the prestigious 2021 Future Policy Award (special category on lead in paint) from the World Future Council for successfully implementing the phase-out out of lead in all paints.**

* https://www.leadsafepaint.org
** https://www.worldfuturecouncil.org/p/2021-protection-from-hazardous-chemicals/

2. MATERIALS AND METHODS

From December 2020 to January 2021, 68 cans of solvent-based industrial paints were purchased by the EcoWaste Coalition from various stores located in 15 cities in the National Capital Region, namely Caloocan, Makati, Malabon, Mandaluyong, Manila, Marikina, Muntinlupa, Navotas, Parañaque, Pasay, Pasig, Valenzuela, Quezon, San Juan, and Taguig Cities. Some of the paints were directly ordered from paint manufacturers, and a few of the paints were purchased from online dealers. The paints represented 49 different brands produced by 30 manufacturers.

In most cases, bright-colored paints such as green, red, orange, or yellow were selected. Among the paints purchased were automotive acrylic, enamel and lacquer paints, epoxy enamel paints and primers, anti-corrosive primers, traffic paints, floor paints, marine or anti-fouling paints, and a zinc-rich primer.

During the paint sample preparation, information such as color, brand, manufacturer, country of manufacture, 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 sourced locally by the EcoWaste Coalition.

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 researchers of the EcoWaste Coalition as shown in Figure 1.

Each stirring utensil and paintbrush was 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 Forensic Analytical Laboratories, Inc. 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

Figure 1. Sample preparation conducted by researchers of EcoWaste Coalition.

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.

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:

- 21 out of 68 analyzed solvent-based industrial paints (31 percent of paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. In addition, 13 paints (19 percent of paints) contained extremely high lead concentrations above 10,000 ppm.
- 17 out of 49 analyzed brands (35 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Also, 12 out of 49 analyzed brands (24 percent of paint brands) sold at least one lead paint with extremely high lead concentrations above 10,000 ppm.
- 21 out of 64 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 12 out of 37 paints (32 percent of yellow paints) containing lead concentrations greater than 10,000 ppm. The highest lead concentration detected was 220,000 ppm in a yellow Rigid Epoxy Paint (Industrial Finishes).
- 5 out of 68 paints (seven percent of paints) provided information about lead on their labels and most paints carried little information about ingredients. One paint with "lead-free" claim was found to contain 120 ppm lead. 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.

3.2 LEAD CONTENT ANALYSIS

Twenty-one out of 68 analyzed solvent-based industrial paints (31 percent of paints) were lead paints, i.e., contained a lead concentration above 90 ppm — 13 of these contained extremely high lead concentrations above 10,000 ppm (19 percent of paints).

A yellow Rigid Epoxy Paint (Industrial Finishes) contained the highest concentration of lead at 220,000 ppm, while the lowest concentration of lead less than 60 ppm was detected in 30 paints from the following brands: Boysen Epoxy Enamel (red), Boysen Traffic Enamel Paint (yellow), Brebwise Metal Primer (red), Buildrite Metal Primer (red), Canadian Automotive Lacquer (yellow), Davies Traffic Paint (yellow), Delaware Automotive Lacquer (yellow), Domino 2000 Automotive Lacquer (yellow), Glazer Duramel Automotive Enamel (orange and yellow), Guilder Automotive Acrylic (yellow), International Intertuf 262 Epoxy Primer (red), Macnell Traffic Paint (yellow), Megashield Epoxy Finish Marine Paint (red), Nippon Metalguard Epoxy Primer (gray), Para-Lux Galva Seal Epoxy Primer (yellow), Pinnacle Industrial Finishes Epoxy Enamel (yellow), Prime High Gloss Automotive Acrylic (orange), Protecto Marine Enamel (red), Protecto Epoxy Enamel (orange), Seagull Marine Epoxy Coatings (yellow), Sphero Automotive Lacquer (yellow), Translac Automotive Lacquer (yellow), Trend Automotive Laqcuer (yellow), Triton Marine Epoxy (red), USA Epoxy Enamel (red and yellow), Weber 2K Urethane Paint (red), Weber Automotive Enamel (yellow), and Welcoat Premium Traffic Paint (yellow).

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

TABLE 1. TOP 13 SOLVENT-BASED INDUSTRIAL PAINTS WITH THE HIGHEST LEAD CONTENT.

Rank	Sample No.	Brand	Manufacturer	Color	Lead Content (ppm)
1	PHL-350	Rigid Epoxy Paint (Industrial Finishes)	Prime Coating & Chemical, Inc.	Yellow	220,000
2	PHL-327	R-M Alpha-Cryl Automotive Acrylic	Euro Chem Manufacturing Corp.	Yellow	210,000
3	PHL-318	McGill's G-3 Acrylic	Century Chemical Corp.	Yellow	180,000
4	PHL-349	Rhinecote Traffic Paint	PPLM Industrial Corp.	Yellow	150,000
5	PHL-305	Dallas Automotive Lacquer	Andalucia Manufacturing, Corp.	Yellow	140,000
6	PHL-301	Gold Primera Automotive Acrylic Paint	A-Jaycee Chemicals Trading Corp.	Yellow	140,000
7	PHL-340	Macnell Epoxy Enamel	Mayon Industrial Corp.	Yellow	130,000
8	PHL-367	Ultracote Traffic Marking	Ultracote Paints & Coatings Corp.	Yellow	130,000
9	PHL-366	Ultracote Marine Enamel	Ultracote Paints & Coatings Corp.	Yellow	100,000
10	PHL-331	Bronco Rubberized Floor Coating	Globe International Distributor Center	Yellow	52,000
11	PHL-343	Megashield Epoxy Finish Marine Paint	Mega Paint Corp.	Yellow	29,000
12	PHL-302	Gold Ultima Automotive Enamel	A-Jaycee Chemicals Trading Corp.	Yellow	16,000
13	PHL-321	Cord Armor Epoxy Coating	Cord Chemicals, Inc.	Green	15,000

3.3 PAINT BRAND ANALYSIS

Twelve out of 49 analyzed brands (24 percent of paint brands) sold at least one paint with extremely high lead concentration above 10,000 ppm.

Among solvent-based industrial paints, a yellow Rigid Epoxy Paint (Industrial Finishes) contained the highest concentration of lead at 220,000 ppm. On the other hand, at least one paint from each of the following brands contained lead below 90 ppm: Boysen Epoxy Enamel (red), Boysen Traffic Enamel Paint (yellow), Brebwise Metal Primer (red), Bronco Metal Primer (red), Bronica Automotive Lacquer (orange), Buildrite

Metal Primer (red), Canadian Automotive Lacquer (yellow), Chugoku Epicon Finish HB Epoxy Marine Paint (yellow), Coat Saver Epoxy Primer (gray), Cord Armor Epoxy Coating (red), Davies Traffic Paint (yellow), Daylight High Gloss Automotive Enamel (yellow), Delaware Automotive Lacquer (yellow), Domino 2000 Automotive Lacquer (yellow), Glazer Duramel Automotive Enamel (orange and yellow), Gold Ultima Automotive Enamel (red), Guilder Automotive Acrylic (yellow), Illinois Automotive Acrylic (yellow), International Intertuf 262 Epoxy Primer (red), Lux Metal Primer (red), Macnell Traffic Paint (yellow), Megashield Epoxy Finish Marine Paint (red), Nippon Metalguard Epoxy Primer (gray), Para-Lux Galva Seal Epoxy Primer (yellow), Pinnacle Industrial Finishes Epoxy Enamel (yellow), Prime High-Gloss Automotive Acrylic (orange), Prime-Coat Paint Metal Primer (red), Protecto Marine Enamel (red), Protecto Epoxy Enamel (orange), Seabirdtone Metal Primer (red), Seagull Marine Epoxy Coatings (yellow), Sphero Automotive Lacquer (yellow), Time Out Automotive Acrylic (yellow), Translac Automotive Lacquer (yellow), Trend Automotive Laqcuer (yellow), Tri-Safe Paint Automotive Acrylic (yellow), Tri-Safe Paint Automotive Lacquer (red), Triton Marine Epoxy (red), USA Acrylic Primer (yellow), USA Epoxy Enamel (red and yellow), Weber Epoxy Enamel (orange), Weber 2K Urethane Paint (red), Weber Automotive Enamel (yellow), Welcoat Metal primer (red), and Welcoat Premium Traffic Paint (yellow). This indicates that the technology to produce paints without added lead exists in the Philippines.

3.4 PAINT COLOR ANALYSIS

Twenty-one out of 64 bright-colored paints (33 percent of bright-colored paints such as yellow, green, orange, and red) contained lead concentrations above 90 ppm, 13 paints of which contained extremely high lead concentrations above 10,000 ppm (20 percent of bright-colored paints).

This study included 37 yellow paints, 19 red paints, six orange paints, four gray, and two green paints. Yellow and green paints contained the highest lead concentrations. Among bright-colored paints, 14 out of 37 yellow paints (38 percent of yellow paints) contained lead concentrations above 90 ppm, 12 paints of which exceeded more than 10,000 ppm of lead (32 percent of yellow paints). In addition, two green paints (100 percent of green paints), two gray paints (50 percent of gray paints), two red paints (11 percent of red paints), and one orange paint (17 percent of orange paints) contained lead concentrations above 90 ppm. One green paint (50 percent of green paints) contained lead concentrations above 10,000 ppm.

The distribution of lead concentrations in different colors is shown in Figure 2.

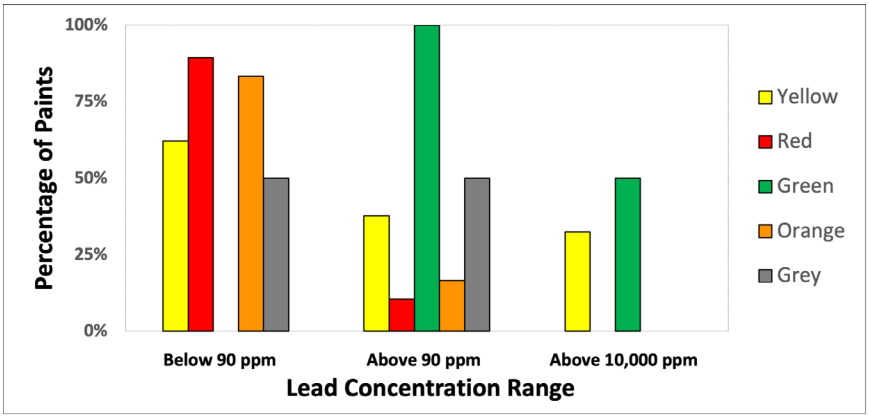

Figure 2. Distribution of lead concentrations in industrial paints by color.

3.5 LABELING

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

Only five out of 68 paints (seven percent of paints) provided information about lead on their labels and most paint can labels carried little information about any ingredients. One analyzed paint is labeled "lead-free," but tested with 120 ppm of lead. 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 or batch numbers were included on the labels of 53 out of 68 paints (78 percent of paints) included in this study. 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.

4. CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that solvent-based industrial paints with high concentrations of lead are still sold in the local market despite the 31 December 2019 phase-out deadline for such paints. However, the fact that 47 out of 68 paints (69 percent of paints) contained lead concentrations below 90 ppm indicates that the technology to produce paints without added lead exists in the Philippines. The study results provide a strong justification to intensify monitoring of compliance to the country's lead paint regulation banning the manufacture, import, export, distribution, sale and use of all paints with total lead concentrations greater than 90 ppm.

To address the problem of lead in paint, the EcoWaste Coalition and IPEN propose the following recommendations:

For the national government to review and strengthen monitoring and enforcement measures that will ensure strict compliance to the ban on lead in all paints, including conducting random product tests, issuing product recalls and public health warnings, seizing non-compliant products, and penalizing errant manufacturers and traders. Local government units should enact ordinances requiring mandatory procurement and use of

certified lead-safe paints for construction, maintenance and renovation projects and activities.

For paint companies that still produce lead paints to 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 distributors should take back any remaining stocks of their old lead-containing paints from retail outlets to stop their sale and use.

For paint consumers to demand paints with no added lead from paint manufacturers and retailers, as well as full disclosure of a paint product's content. Individual, household, institutional, commercial, and industrial consumers should ask for, consciously buy, and use lead-safe paints for all uses.

For public health groups, consumer organizations and other concerned entities to 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.

For all stakeholders to come together and unite in promoting further policies and programs that will contribute to preventing and reducing lead exposure among children and other vulnerable groups from lead paint and other sources.

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ANNEX A: TABULATED DATA ON ANALYZED SOLVENT-BASED INDUSTRIAL PAINTS

TABLE 2. SOLVENT-BASED INDUSTRIAL PAINTS INCLUDED IN THE STUDY.

Sample No.	Brand	Product Type	Color	Volume (L)	Price (PHP)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
PHL-301	Gold Primera	Automotive Acrylic	Yellow	4	1,000	20116133	18/12/20	Yes
PHL-302	Gold Ultima	Automotive Enamel	Red	4	720	N/A	18/12/20	Yes
PHL-303	Gold Ultima	Automotive Enamel	Yellow	4	740	N/A	18/12/20	Yes
PHL-304	International	Intertuf 262 Epoxy Primer	Red	4	2,050	UF0493RP	18/12/20	Yes
PHL-305	Dallas	Automotive Lacquer	Yellow	4	780	021718	13/12/20	No
PHL-306	Seabirdtone	Metal Primer	Red	1	85	0803192	12/12/20	No
PHL-307	Para-Lux	Galva Seal Epoxy Primer	Yellow	4	980	11092020	13/12/20	No
PHL-308	Translac	Automotive Lacquer	Yellow	4	530	10012019	14/12/20	No
PHL-309	Trend	Automotive Lacquer	Yellow	4	640	1111020	16/12/20	No
PHL-310	USA	Epoxy Enamel	Red	4	980	3350920	13/12/20	No
PHL-311	USA	Epoxy Enamel	Yellow	4	980	1380920	13/12/20	No
PHL-312	USA	Acrylic Primer	Yellow	4	950	310319	13/12/20	No
PHL-313	Welcoat Premium	Traffic Paint	Yellow	4	695	242072020	15/12/20	No
PHL-314	Welcoat	Metal Primer	Red	1	135	2331020	15/12/20	No
PHL-315	Brebwise	Metal Primer	Red	4	397	1126201	3/01/21	No
PHL-316	Bronica	Automotive Lacquer	Orange	4	570	N/A	19/12/20	No
PHL-317	Daylight	High Gloss Automotive Enamel	Yellow	4	780	09271701	19/12/20	No

Sample No.	Brand	Product Type	Color	Volume (L)	Price (PHP)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
PHL-318	McGill's	G-3 Acrylic	Yellow	4	1,150	19420712	12/12/20	No
PHL-319	Chugoku	Epicon Finish HB Epoxy Marine Paint	Yellow	4	1,120	10580771	18/12/20	No
PHL-320	Cord	Anti-Fouling Paint	Red	4	2,144	12531912	16/12/20	No
PHL-321	Cord	Armor Epoxy Coating	Green	4	2,117	07421907	16/12/20	No
PHL-322	Cord	Armor Epoxy Coating Primer	Red	4	2,074	02401903	16/12/20	No
PHL-323	Coat Saver	Epoxy Primer	Gray	1	287	11021264	20/12/20	No
PHL-324	Davies	Traffic Paint	Yellow	4	700	11011224	16/12/20	No
PHL-325	Protecto	Marine Enamel	Red	4	510	10931836	18/12/20	No
PHL-326	Protecto	Epoxy Enamel	Orange	4	920	11011690	17/12/20	No
PHL-327	R-M	Alpha-Cryl Automotive Acrylic	Yellow	4	1,680	1004309	15/12/20	No
PHL-328	Glazer	Duramel Automotive Lacquer	Yellow	4	800	201107722	14/12/20	No
PHL-329	Glazer	Duramel Automotive Enamel	Orange	4	800	200921702	14/12/20	No
PHL-330	Bronco	Metal Primer	Red	1	179.78	10241738	12/12/20	No
PHL-331	Bronco	Rubberized Floor Coating	Yellow	1	647.77	06112035	13/12/20	No
PHL-332	Canadian	Automotive Lacquer	Yellow	4	1,200	N/A	12/12/20	No
PHL-333	Sphero	Epoxy Enamel	Orange	4	1,100	32011023	19/12/20	No
PHL-334	Sphero	Automotive Lacquer	Yellow	4	880	38090254	14/12/20	No
PHL-335	Buildrite	Metal Primer	Red	1	155	N/A	12/12/20	Yes
PHL-336	Prime	High-Gloss Automotive Acrylic	Orange	4	1,000	052520	12/12/20	No
PHL-337	Weber	Epoxy Enamel	Orange	4	970	N/A	12/12/20	No
PHL-338	Weber	Automotive Enamel	Yellow	4	660	111918	12/12/20	No
PHL-339	Weber	2K Urethane Paint	Red	4	2,400	15181	13/12/20	No
PHL-340	Macnell	Epoxy Enamel	Yellow	4	940	N/A	12/12/20	No
PHL-341	Macnell	Traffic Paint	Yellow	4	1,258	N/A	12/12/20	No

Sample No.	Brand	Product Type	Color	Volume (L)	Price (PHP)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
PHL-342	Megashield	Epoxy Finish Marine Paint	Red	4	1,150	UJ1618PH	17/12/20	No
PHL-343	Megashield	Epoxy Finish Marine Paint	Yellow	4	1,150	WK2616PH	17/12/20	No
PHL-344	Nippon	Metalguard Epoxy Primer	Gray	4	580	F1701024	17/12/20	No
PHL-345	Nippon	Roadline Paint	Yellow	5	1,421	1807116917	29/12/20	No
PHL-346	Boysen	Epoxy Enamel	Red	4	960.45	17180222	13/12/20	Yes
PHL-347	Boysen	Traffic Enamel Paint	Yellow	4	1,285.35	Q0202436X	13/12/20	Yes
PHL-348	Rhinecote	Steelast Zinc Rich Primer	Gray	4	3,129	N/A	18/12/20	Yes
PHL-349	Rhinecote	Traffic Paint	Yellow	4	3,048	N/A	18/12/20	Yes
PHL-350	Rigid	Epoxy Paint Industrial Finishes	Yellow	4	550	N/A	14/12/20	No
PHL-351	Rigid	Epoxy Paint Industrial Finishes	Green	4	550	N/A	14/12/20	No
PHL-352	Orient	Metal Primer	Red	4	397	N/A	17/12/20	No
PHL-353	Grand Master	Epoxy Primer	Gray	1	240	N/A	17/12/20	No
PHL-354	Prime-Coat	Metal Primer	Red	4	380	10115693	14/12/20	No
PHL-355	Triton	Marine Epoxy	Red	4	1,050	10112614	17/12/20	No
PHL-356	Lux	Metal Primer	Red	1	165	N/A	12/12/20	No
PHL-357	Tri-Safe	Automotive Acrylic	Yellow	4	1,200	19090364	14/12/20	No
PHL-358	Tri-Safe	Automotive Lacquer	Red	4	995	19020105	14/12/20	No
PHL-359	Domino 2000	Automotive Lacquer	Yellow	4	750	19100227	14/12/20	No
PHL-360	Pinnacle	Industrial Finishes Epoxy Enamel	Yellow	4	950	20110050	16/12/20	No
PHL-361	Time Out	Automotive Acrylic	Yellow	4	850	19090372	14/12/20	No
PHL-362	Delaware	Automotive Lacquer	Yellow	4	600	02200113	12/12/20	Yes
PHL-363	Guilder	Automotive Acrylic	Yellow	4	970	12190173	12/12/20	No
PHL-364	Illinois	Automotive Acrylic	Yellow	4	810	06200033	12/22/20	No

Sample No.	Brand	Product Type	Color	Volume (L)	Price (PHP)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
PHL-365	Seagull	Marine Epoxy Coatings	Yellow	4	1,040	2052684	17/12/20	No
PHL-366	Ultracote	Marine Enamel	Yellow	4	1,900	12212020	21/12/20	Yes
PHL-367	Ultracote	Traffic Marking	Yellow	4	1,700	12212020	21/12/20	Yes
PHL-368	Dutch Boy	CRB Floor Coating	Yellow	4	1,285.35	Q07191823	13/12/20	Yes

TABLE 3. RESULTS OF LABORATORY ANALYSIS OF SOLVENT-BASED INDUSTRIAL PAINTS.

Sample No.	Brand	Product Type	Color	Country of Brand Headquarters	Country of Manufacture	Lead Content Label	Lead Content (ppm)
PHL-301	Gold Primera	Automotive Acrylic	Yellow	Philippines	Philippines	None	140,000
PHL-302	Gold Ultima	Automotive Enamel	Red	Philippines	Philippines	None	< 70
PHL-303	Gold Ultima	Automotive Enamel	Yellow	Philippines	Philippines	None	16,000
PHL-304	International	Intertuf 262 Epoxy Primer	Red	Netherlands	Singapore	None	< 60
PHL-305	Dallas	Automotive Lacquer	Yellow	Philippines	Philippines	None	140,000
PHL-306	Seabirdtone	Metal Primer	Red	Philippines	Philippines	"Lead free"	90
PHL-307	Para-Lux	Galva Seal Epoxy Primer	Yellow	Philippines	Philippines	None	< 60
PHL-308	Translac	Automotive Lacquer	Yellow	Philippines	Philippines	None	< 60
PHL-309	Trend	Automotive Lacquer	Yellow	Philippines	Philippines	None	< 60
PHL-310	USA	Epoxy Enamel	Red	Philippines	Philippines	None	< 60
PHL-311	USA	Epoxy Enamel	Yellow	Philippines	Philippines	None	< 60
PHL-312	USA	Acrylic Primer	Yellow	Philippines	Philippines	None	< 70
PHL-313	Welcoat Premium	Traffic Paint	Yellow	Philippines	Philippines	None	< 60
PHL-314	Welcoat	Metal Primer	Red	Philippines	Philippines	None	< 70
PHL-315	Brebwise	Metal Primer	Red	Philippines	Philippines	None	< 60
PHL-316	Bronica	Automotive Lacquer	Orange	Philippines	Philippines	None	< 70
PHL-317	Daylight	High Gloss Automotive Enamel	Yellow	Philippines	Philippines	None	< 70
PHL-318	McGill's	G-3 Acrylic	Yellow	Philippines	Philippines	None	180,000
PHL-319	Chugoku	Epicon Finish HB Epoxy Marine Paint	Yellow	Japan	Philippines	None	< 70
PHL-320	Cord	Anti-Fouling Paint	Red	Philippines	Philippines	None	110
PHL-321	Cord	Armor Epoxy Coating	Green	Philippines	Philippines	None	15,000
PHL-322	Cord	Armor Epoxy Coating Primer	Red	Philippines	Philippines	None	70

Sample No.	Brand	Product Type	Color	Country of Brand Headquarters	Country of Manufacture	Lead Content Label	Lead Content (ppm)
PHL-323	Coat Saver	Epoxy Primer	Gray	Philippines	Philippines	None	< 70
PHL-324	Davies	Traffic Paint	Yellow	Philippines	Philippines	Lead Safe Paint®	< 60
PHL-325	Protecto	Marine Enamel	Red	Philippines	Philippines	None	< 60
PHL-326	Protecto	Epoxy Enamel	Orange	Philippines	Philippines	None	< 60
PHL-327	R-M	Alpha-Cryl Automotive Acrylic	Yellow	USA	Philippines	None	210,000
PHL-328	Glazer	Duramel Automotive Lacquer	Yellow	Philippines	Philippines	None	< 60
PHL-329	Glazer	Duramel Automotive Enamel	Orange	Philippines	Philippines	None	< 60
PHL-330	Bronco	Metal Primer	Red	Philippines	Philippines	None	80
PHL-331	Bronco	Rubberized Floor Coating	Yellow	Philippines	Philippines	None	52,000
PHL-332	Canadian	Automotive Lacquer	Yellow	Philippines	Philippines	None	< 60
PHL-333	Sphero	Epoxy Enamel	Orange	Philippines	Philippines	None	1,700
PHL-334	Sphero	Automotive Lacquer	Yellow	Philippines	Philippines	None	< 60
PHL-335	Buildrite	Metal Primer	Red	Philippines	Philippines	"Lead-free"	< 60
PHL-336	Prime	High-Gloss Automotive Acrylic	Orange	Philippines	Philippines	None	< 60
PHL-337	Weber	Epoxy Enamel	Orange	Philippines	Philippines	None	< 70
PHL-338	Weber	Automotive Enamel	Yellow	Philippines	Philippines	None	< 60
PHL-339	Weber	2K Urethane Paint	Red	Philippines	Philippines	None	< 60
PHL-340	Macnell	Epoxy Enamel	Yellow	Philippines	Philippines	None	130,000
PHL-341	Macnell	Traffic Paint	Yellow	Philippines	Philippines	None	< 60
PHL-342	Megashield	Epoxy Finish Marine Paint	Red	Philippines	Philippines	None	< 60
PHL-343	Megashield	Epoxy Finish Marine Paint	Yellow	Philippines	Philippines	None	29,000
PHL-344	Nippon	Metalguard Epoxy Primer	Gray	Japan	Philippines	None	< 60

Sample No.	Brand	Product Type	Color	Country of Brand Headquarters	Country of Manufacture	Lead Content Label	Lead Content (ppm)
PHL-345	Nippon	Roadline Paint	Yellow	Japan	Malaysia	None	120
PHL-346	Boysen	Epoxy Enamel	Red	Philippines	Philippines	None	< 60
PHL-347	Boysen	Traffic Enamel Paint	Yellow	Philippines	Philippines	None	< 60
PHL-348	Rhinecote	Steelast Zinc Rich Primer	Gray	Philippines	Philippines	None	4,100
PHL-349	Rhinecote	Traffic Paint	Yellow	Philippines	Philippines	None	150,000
PHL-350	Rigid	Epoxy Paint Industrial Finishes	Yellow	Philippines	Philippines	None	220,000
PHL-351	Rigid	Epoxy Paint Industrial Finishes	Green	Philippines	Philippines	None	110
PHL-352	Orient	Metal Primer	Red	Philippines	Philippines	None	120
PHL-353	Grand Master	Epoxy Primer	Gray	Philippines	Philippines	None	130
PHL-354	Prime-Coat	Metal Primer	Red	Philippines	Philippines	None	70
PHL-355	Triton	Marine Epoxy	Red	Philippines	Philippines	None	< 60
PHL-356	Lux	Metal Primer	Red	Philippines	Philippines	"Lead free"	< 70
PHL-357	Tri-Safe	Automotive Acrylic	Yellow	Philippines	Philippines	None	< 70
PHL-358	Tri-Safe	Automotive Lacquer	Red	Philippines	Philippines	None	< 70
PHL-359	Domino 2000	Automotive Lacquer	Yellow	Philippines	Philippines	None	< 60
PHL-360	Pinnacle	Industrial Finishes Epoxy Enamel	Yellow	Philippines	Philippines	None	< 60
PHL-361	Time Out	Automotive Acrylic	Yellow	Philippines	Philippines	None	< 70
PHL-362	Delaware	Automotive Lacquer	Yellow	Philippines	Philippines	None	< 60
PHL-363	Guilder	Automotive Acrylic	Yellow	Philippines	Philippines	None	< 60
PHL-364	Illinois	Automotive Acrylic	Yellow	Philippines	Philippines	None	< 70
PHL-365	Seagull	Marine Epoxy Coatings	Yellow	Philippines	Philippines	None	< 60
PHL-366	Ultracote	Marine Enamel	Yellow	Philippines	Philippines	None	100,000
PHL-367	Ultracote	Traffic Marking	Yellow	Philippines	Philippines	None	130,000
PHL-368	Dutch Boy	CRB Floor Coating	Yellow	Philippines	Philippines	"Lead-free"	120

TABLE 4. 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)
Boysen	2	0	0	< 60	< 60
Brebwise	1	0	0	< 60	< 60
Bronco	2	1	1	80	52,000
Bronica	1	0	0	< 70	< 70
Buildrite	1	0	0	< 60	< 60
Canadian	1	0	0	< 60	< 60
Chugoku	1	0	0	< 70	< 70
Coat Saver	1	0	0	< 70	< 70
Cord	3	2	1	70	15,000
Dallas	1	1	1	140,000	140,000
Davies	1	0	0	< 60	< 60
Daylight	1	0	0	< 70	< 70
Delaware	1	0	0	< 60	< 60
Domino 2000	1	0	0	< 60	< 60
Dutch Boy	1	1	0	120	120
Glazer	2	0	0	< 60	< 60
Gold Primera	1	1	1	140,000	140,000
Gold Ultima	2	1	1	< 70	16,000
Grand Master	1	1	0	130	130
Guilder	1	0	0	< 60	< 60
Illinois	1	0	0	< 60	< 60
International	1	0	0	< 60	< 60
Lux	1	0	0	< 70	< 70
Macnell	2	1	1	< 60	130,000
McGill's	1	1	1	180,000	180,000
Megashield	2	1	1	< 60	29,000
Nippon	2	1	0	< 60	120
Orient	1	1	0	120	120
Para-Lux	1	0	0	< 60	< 60

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)
Pinnacle	1	0	0	< 60	< 60
Prime	1	0	0	< 60	< 60
Prime-Coat	1	0	0	70	70
Protecto	2	0	0	< 60	< 60
R-M	1	1	1	210,000	210,000
Rhinecote	2	2	1	4,100	150,000
Rigid	2	1	1	110	220,000
Seabirdtone	1	0	0	90	90
Seagull	1	0	0	< 60	< 60
Sphero	2	1	0	< 60	1,700
Time Out	1	0	0	< 70	< 70
Translac	1	0	0	< 60	< 60
Trend	1	0	0	< 60	< 60
Tri-Safe	2	0	0	< 70	< 70
Triton	1	0	0	< 60	< 60
Ultracote	2	2	2	100,000	130,000
USA	3	0	0	< 60	< 70
Weber	3	0	0	< 60	< 70
Welcoat	1	0	0	< 70	< 70
Welcoat Premium	1	0	0	< 60	< 60

TABLE 5. 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)
Gray	4	2	0	< 60	4,100
Green	2	2	1	110	15,000
Orange	6	1	0	< 60	1,700
Red	19	2	0	< 60	120
Yellow	37	14	12	< 60	220,000

ANNEX B: FEEDBACK FROM SOME PAINT COMPANIES

1. **Rigid Epoxy Paint Industrial Finishes (PHL-350; yellow; 220,000 ppm lead; and PHL-351; green, 110 ppm lead)**

   "We have received the copy of the test you've conducted on our products and have concluded that the lead content might come from the oil tinting colors that have been added to the epoxy paint. The two tinting colors (lemon yellow and phthalo green) are old stocks, which were manufactured on October 29, 2015 and February 21, 2015, respectively. We commit to reformulate and omit the possible source of lead on our products and abide by the requirements of DENR A.O. 2013-24 phasing out lead in paints."

   – ***Kendrick Tan, Prime Coating & Chemical, Inc.***

2. **McGill's G3 Acrylic (PHL-318; yellow; 180,000 ppm lead)**

   "Thank you for informing us regarding the results of your product sampling. Based on the product you had acquired, it was manufactured in the year 2019. We are trying and urging our customers to implement a first-in-first-out system so that they would always have fresh products and use up the old ones, but this is very difficult to impose. This is one of the main reasons why we would get these kinds of samples in the market, which is also causing us some problems. Nevertheless, we do not manufacture that particular product anymore and in accordance with DENR A.O. 2013-24, we already phased out lead in all our paint products. Rest assured that we are fully supportive of the lead free drive. We do not purchase and use leaded raw materials anymore and we will be removing all these products from our upcoming price list as a number of items were already phased out."

   – ***Ely Kenneth Ong Sue, General Manager, Century Chemical Corp.***

3. **Rhinecote Traffic Paint (PHL-349; yellow; 150,000 ppm lead) and Rhinecote Steelast Zinc-Rich Primer (PHL-348; gray; 4,100 ppm lead)**

"After receiving your letter, our company immediately addressed your concern about the lead content found in our products. We conducted an investigation based on the report you have given us and disseminated the result to our suppliers. One of them informed us that the pigment we used for these products had lead. Even before the release of DENR A.O. 2013-24, or the Chemical Order for Lead and Lead Compounds, PPLM is abiding by the rules of not using raw materials with lead content. We did not expect that our products had lead exceeding the total lead content limit. We will immediately take action in reformulating our paint products to abide by the DENR requirements. We will assure you that our company will expand its knowledge about lead-free (alternatives) to help in protecting not only the environment, but also human health. Thank you for taking time and effort in relaying this important information to us. We sincerely appreciate your insight and this will serve as a future reference in developing our products."

–Amelia L. Mendoza, Vice President for Finance and Administration, PPLM Industrial Corp.

4. **Dallas Automotive Lacquer (PHL-305; yellow; 140,000 ppm lead)**

"The product that you have tested was manufactured on February 19, 2018 as per its batch number. Furthermore, the said product was obtained from a store that does not directly purchase from our company. It could be a reseller and was unable to sell the product right away. We are still investigating which authorized distributor they purchased the said product from, as we have to course through that distributor to facilitate product recall. Our company has already reformulated our products to replace lead additives and pigments. Before 2019 ended, all the products we are manufacturing have been tested and are already within the allowable lead content limit. We wish to thank your organization for bringing this matter to our attention. Our company is aware of the adverse effects of lead on human health and the environment. Thus, we are in full support of your eliminating lead in paint project."

–Jose C. Que Pua, Jr., General Manager, Andalucia Manufacturing Corp.

5. Megashield Ep8oxy Finish Marine Paint (PHL-343; yellow; 29,000 ppm lead)

"We are unaware of any lead content found in our paint products. Given your findings, we will conduct an internal investigation and will let you know of the results. You have our commitment to abide by the DENR A.O. 2013-24 and other orders aimed at protecting the environment. We are ever mindful of the impact of our products and services to the environment. So, we thank you for informing us of your investigation."

– Rolando P. Magat, Jr., Chief Executive Officer, Megapaint Corp.

6. Sphero Epoxy Enamel (PHL-333; orange; 1,700 ppm lead)

"In compliance with the requirements of DENR A.O. 2013-24, the said product was already reformulated since 2015 with no added lead using organic pigment PO34. Upon investigation, this batch was accidentally dumped with leaded formulation by our newly hired personnel who was not informed about old stocks that were recalled from our warehouse. We apologize for this incident and be assured we will take serious precautionary measures to prevent this from happening again. However, old stocks that are still in the market, especially in remote provinces where product turn-over is very slow, is beyond our control. Rest assured that we are partners for the elimination of leaded paint products not only for public health, but also to protect workers vulnerable to adverse effects of lead exposure. We are committed to abide by the government directive according to DENR A.O. 2013-24."

– Elvie G. Velasco, Pollution Control Officer/R&D Chemist; Aurelia A. Mamenta, Technical Head; and Victoriano G. Siy, Jr., President

7. Nippon Paint Roadline Paint (PHL-345; yellow; 120 ppm lead)

"Upon receipt of this information, we immediately put on hold the distribution of our existing stocks of yellow Roadline Paint until we have checked and verified the issue. We also engaged with Carmine Paint Center to notify them on the incident, and to recover the stocks for checking. However, they have sold all their inventory of the said products already. Due to this, we cannot trace anymore the source of lead for this particular case so we instead conducted checking of the stocks we have currently. The XRF analysis of our current stocks of yellow Roadline Paint and other Roadliner color shows no lead content. In addition, we also engaged a third party laboratory, Intertek, to conduct lead content test for the abovementioned product. The

test report shows it passed the 90 ppm lead content (limit). Referring to DENR A.O. 2013-24, lead has already been eliminated from our Roadline Paint formulations since 2018. We assure you that these products are manufactured in full compliance to the order. Rest assured that our company ensures that Nippon Paint products we manufacture locally adhere to these standards. We also assure you that Nippon Paint products imported from Nippon Paint Malaysia are also lead-free. We appreciate your efforts to monitor and remind paint manufacturers on our responsibility to the consumers and the environment. We highly support DENR and EcoWaste Coalition's objective for a healthier and lead-free paint industry."

– Michael Francisco, Deputy General Manager, Nippon Paint (Coatings) Philippines

ecowastecoalition.blogspot.com
@EWCoalition

www.ipen.org
ipen@ipen.org
@ToxicsFree