

- Conducting Paint Studies
- Alternatives to Lead in Paint
- The SME Perspective

Central and West Africa
Workshop on the
Development of National and
Regional Regulations and
Standards on Lead in Paints
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a toxics-free future

A Global NGO Network



700 NGOs in more than 100 Countries working on:

- ✓ POPs
- ✓ Toxic Metals: Lead and Mercury
- ✓ Safe Chemicals Management (SAICM)



a toxics-free future

Mission

A TOXICS FREE FUTURE FOR EVERYONE

A world in which chemicals are no longer produced or used in ways that harm human health and the environment



IPEN's Global Lead Paint Elimination Campaign

- Launched in 2009 in reaction to high lead levels in paint found in India
- Active in all UN Regions
- Organized studies of lead in paint in 46 countries to date
- Binding regulatory controls limiting lead content of paint enacted or are pending in 6 Asian and 4 African countries
 - The East African Community (EAC) adopted mandatory standards restricting the use of lead in paint in its 5 member states

African Lead Paint Elimination Project (2014-2017)

- Funded by the Global Environment Facility;
Implemented by UNEP; Executed by IPEN
- 4 Focus Countries: Cameroon, Cote d'Ivoire,
Ethiopia, Tanzania
- Paint studies in additional 8 African countries (data
to be released in 2017!)
- Project activities include
 - Sampling and analyzing paint
 - Outreach to paint manufacturers to encourage
voluntary action
 - Promoting legal Instruments
to control lead in paints



Recalling the Toolkit's usefulness

<http://web.unep.org/chemicalsandwaste/noleadinpaint/toolkit>


To achieve the overall goal of the workshop
*“...to advance understanding, commitment,
and actions towards the development of
national and regional regulations and
standards on a **total lead content limit
of 90 ppm for all paints** in Central and
West Africa.”*

Toolkit Modules

Toolkit for Establishing Laws to Control the Use of Lead in Paint

Module C.ii.

Analytical Methods for Measuring Lead in Paint



1 GLOBAL ALLIANCE TO ELIMINATE LEAD PAINT LEAD PAINT ALLIANCE

Module E

Alternatives to lead in paint



1 GLOBAL ALLIANCE TO ELIMINATE LEAD PAINT LEAD PAINT ALLIANCE

Module G

Challenges for Small and Medium Sized (SME) Paint Manufacturers



1 GLOBAL ALLIANCE TO ELIMINATE LEAD PAINT LEAD PAINT ALLIANCE

+ Some additional information not in the toolkit, but useful for the goals of this workshop

All Paint

The term “paint” includes: varnishes, lacquers, stains, enamels, glazes, primers or coatings used for any purposes

- Consumer Paint
 - e.g. Decorative paint; home use anti-corrosives; primers, etc.
- Non-consumer Paint
 - e.g. Traffic paint; marine paint; industry machinery; steel structures; automobiles; aviation, etc.

Non-consumer paint may still be a hazard since
- workers (and their families) get exposed during production
- it often end up in regular stores

Reasons for Analyzing Lead Content of Paint

- Assess the availability of lead-containing paint in the market and the need for better government regulation and enforcement
- Provide consumers with information so they can choose non-lead paint and can push for government controls on lead paint
- Draw attention to companies that produce lead-containing paint and encourage them to voluntarily reformulate their products



Measuring Lead Content of Paint

- Leaded ingredients are primarily used in solvent-based paint, however, high levels of lead have been detected in water-based paint in a few cases
- Important to use internationally recognized standardized methods
- NOTE: Standardized methods do not specify any legal levels, only the analytical method
- Lead paint formulations and regulatory standards for lead in new paint are usually expressed as a percentage (%) or as parts per million (ppm) of lead in dry paint

$$100 \text{ ppm} = 0.01\% = 100 \mu\text{g/g} = 100 \text{ mg/kg}$$

Important Lab Considerations

- Lab selection crucial to ensure accuracy and reliability of results
- Trained personnel and good quality assurance procedures are essential
- Laboratory should participate in a proficiency-testing scheme, e.g. the Environmental Lead Proficiency Analytical Testing (ELPAT) program
- A range of suitable internationally recognized standardized methods (ISO, ASTM, etc.) exists to measure total lead content
- By allowing for the whole range of standardized methods to be used in national standards, lab options increase

International Standards for Analyzing Lead in Paint

Sample preparation

- **ISO 1513**, Paints and varnishes - Examination and preparation of test samples
- **ASTM E1645-01**, Practice for Preparation of Dried Paint Samples by Hotplate or Microwave Digestion for Subsequent Lead Analysis
- **ASTM E1979-12**, Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead

Analytical methods

- **ISO 6503**, Paints and varnishes - Determination of total lead - flame atomic absorption spectrometric method. (For measurement of lead concentration of 0.01% to 2.0%)
- **ASTM D3335-85a(2014)**, Standard test method for low concentrations of lead, cadmium, and cobalt in paint by atomic absorption spectroscopy. (For measurement of lead concentration of 0.01% to 5.0%)
- **ASTM E1613-12**, Standard Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques (Measurement of lead concentration differs per analytical technique)

Conducting Paint Studies

Data from 4 Project Focus Countries

Country	Study Year	Number of Paints	% Above 90 ppm (Total)	% Above 10,000 ppm (Total)
Cameroon	2015	54	50%	22%
Cote d'Ivoire	2015	49	76%	33%
Ethiopia	2015	36	78%	47%
Tanzania	2015	56	64%	23%

Conducting Paint Studies

Data from Other African Countries

Country	Study Year	Number of Paints	% Above 90 ppm (Total)	% Above 10,000 ppm (Total)
Egypt	2009	20	65%	-
Ghana	2013	18	33%	17%
Kenya	2013	31	87%	29%
Nigeria	2009	23	100%	65%
Senegal	2009	21	86%	14%
Seychelles	2009	28	68%	43%
South Africa	2009	29	66%	31%
Tunisia	2013	30	70%	27%
Uganda	2012	50	26%	-

Why a Total Lead Content Limit is Recommended

- Measured by extracting all lead present in the paint
- Almost all national regulatory standards use total lead content
- Promotes harmonization for exports to countries with total lead standards for products
- Cheap, routine lab methods are available and many labs can do the measurements
- Provides a more predictable test for manufacturers based on lead content of added ingredients

Conducting Paint Studies

What is the difference between measuring total lead content in a paint and measuring soluble lead content?

Note: Soluble lead content also called Migration of Lead

Why a Soluble Lead Content Limit is Not Recommended

- Supposed to simulate uptake of lead from gut when paint chips or coated objects being swallowed

NOTE

- No scientific basis support this assumption.
- Doesn't take main exposure route of dust into account and does not provide the best measure of potential health risks
- More expensive for manufacturer and enforcement agency since the lab method is more complicated and few labs can do the analysis
- Complicated, expensive method increase likelihood for non-compliance
- Technical modifications to paint can hide dangerous lead content (e.g., paint shown to have 13,000 ppm total lead content not detected by soluble lead method)

Important Reminders about Exposure

- Exposure = the blood lead levels, not the amount of lead in the paint
- Exact blood lead level impossible to predict from lead in the paint
- Scientifically well established link between lead paint and blood lead levels
 - Lead in worn and chipping paint released to household dust
 - Household dust ingested by children
 - Ingested lead-contaminated dust release lead into the bloodstream
- This is a general route, not country specific

Alternatives to Lead in Paint

90 ppm Total Lead Limit

- Achievable
 - ⇒ levels as low as 10 ppm and lower is in many cases achieved when care is taken with raw materials and production procedures
- 90 ppm is currently the most protective legal limit enacted: e.g. US, Philippines, Nepal, India
- 90 ppm drafted legal limit in Cameroon
- The lower the legal limit, the more protective. However, a 0 ppm legal limit is not a feasible standard

Alternatives to Lead in Paint

Replacing Leaded Ingredients

- Two leaded paint components: driers and pigments
- Consumer Paint
 - Cost-effective, high quality alternatives have been used for decades and are widely available
- Non-consumer Paint
 - Typically used for special qualities such as heat resistance
 - High quality alternatives are around but substitution can sometimes be more complicated
- No 1:1 substitutes
- Key is to find a supplier who can provide the right materials in the right quantities for the right price
- Technology for reformulation

Alternatives to Lead in Paint

Replacing Lead Driers

- Easily substituted by just changing the leaded ingredients for one other compound
- Optimization process includes finding right substitute ratio
- Strontium driers are best substitute
 - Non-toxic
 - Less strontium is needed to achieve same effect as compared to lead (1:3 ratio)
- Other non-lead alternatives available, but many still toxic e.g. zirconium compounds
- <http://ipen.org/documents/lead-drier-replacement-solvent-based-alkyd-decorative-paints>

Alternatives to Lead in Paint

Replacing Lead Pigments

- **White lead** easily replaceable with titanium dioxide (both cheaper and produce a higher quality paint!)
- Alternatives to **red lead** anticorrosive pigment widely available
- Lead sulphochromate (PY34) and lead chromate molybdate sulphate (PR104)
 - Lead pigments that produce bright colors (yellow, red, green, orange, etc.)
 - Replacement typically require more research
 - Best substituted by a combination of different organic and inorganic pigments to give the desired color and properties
- <http://ipen.org/documents/replacement-lead-pigments-solvent-based-decorative-paints>

Most Manufacturers Support Lead Paint Elimination

- Lead paint production due to
 - Unawareness
 - Lack of knowledge about hazards of lead in paint
 - Lack of access to know-how about paint reformulation
 - Lack of knowledge of consequences of changing production
- Enforced legally binding restrictions necessary to level the playing field
- Large manufacturers have in-house labs and access to suppliers ⇒ rapid reformulation
- Smaller manufacturers may need more time and/or technical support

Eliminating Lead from Paint is Good for Business

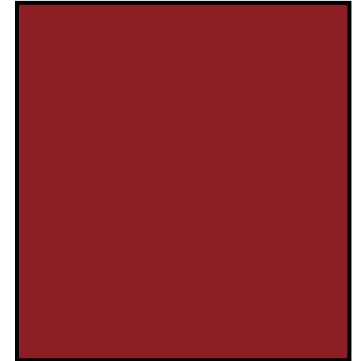
- Lead Safe Paint certifies that all paints under a brand contain lead levels below 90 ppm
- Complements national regulations, ⇒ not a replacement for legal limits
- Developed by a multi-stakeholder group lead by the **Philippine Association for Paint Manufacturers**, initiated by the EU-funded IPEN Asian Lead Paint Elimination Project
- Managed by SCS Global Services, an independent international third-party certification company

<https://www.scsglobalservices.com/>





Merci!
Thank You!



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