



## Overview of IPEN analysis of water-based paint

### Background

It is generally believed that the most common, intentional use of lead compounds is in solvent-based paint because of its chemical properties. IPEN has therefore conducted studies focused on lead in solvent-based paint sold for home use together with NGO partners in almost 60 countries since 2009. However, very little research is done in relation to lead content of water-based paint.

Therefore, in studies in 26 countries conducted between 2015 and 2017, a few cans of water-based paint were also included in the analysis in addition to the solvent-based paint. The rationale for including these paints was that if lead was frequently used in water-based paint, these samples could serve as an early warning.

### Results

Of the 63 water-based paints analyzed, six of the 43 yellow paints (14% of yellow paints) contained lead above 90 ppm. The levels in three of the paints were low enough to indicate contamination (100, 220 and 300 ppm), whereas three of these paints contained levels indicating intentionally added lead (1500, 3700, and 21000 ppm).

**Table 1. Colors and lead content of analyzed paints**

Color	Number of paints	Number of paints with lead content above 90 ppm
Yellow	43	6
White	12	0
Green	4	0
Red	3	0
Orange	1	0
<b>Total</b>	<b>63</b>	<b>6</b>

### Conclusions

This screening of a few water-based paints from 26 countries was only conducted to provide an indication of intentional use of lead compounds in water-based paints and cannot be used to draw any general conclusions.

However, the results show that there were water-based paints on the market in two countries that contained levels of lead indicating intentional use of lead pigments (lead chromates).

Therefore, further studies are justified, that analyze a representative set of samples of water-based paint from a set of countries. This would provide important insights into whether this is a more common practice than generally believed, and if this is especially prevalent for some colors, types of paint, brands or in some countries.



## **Appendix I. Method**

Paint sampling preparation kits containing individually numbered, untreated wood pieces, single-use paintbrushes, and stirring utensils made from untreated wood sticks were assembled and shipped to the office of the NGO by 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, labelled wood pieces using different unused, single-use paintbrushes. 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 labelled, 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 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 (see <https://www.who.int/publications/i/item/9789240006058>).



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## Appendix II. Details of analyzed paints

Sample Number	Brand Name	Manufacturer	Country of Brand Headquarters	Country Where Manufactured	Color of Paint	Date Manufactured (if given) D/M/Y	Date of Purchase D/M/Y	Is there information on can about lead content? [yes/no] If yes, enter "yes" and information on can. If no information, enter "No" Also enter website if given.	Lead Content (ppm)
ARG-26	GALA	N/A	Argentina	Argentina	yellow	N/A	08-02-2016	No	100
ARG-27	Üxell	N/A	Argentina	Argentina	yellow	N/A	09-28-2016	No	Below 70
ARM-50	Tsiatsan Akrylic Paint	N/A	N/A	Armenia	yellow	N/A	24/06/2016	No [www.tsiatsan.am]	3700
ARM-51	Tsiatsan Matt Latex	N/A	N/A	Armenia	yellow	N/A	24/06/2016	No [www.tsiatsan.am]	21000
BEL-49	Snieżhka Nature	N/A	Poland	Poland	yellow	14/11/2015	13/09/2016	No	Below 60
BEL-50	VGT Enamel (wd-ak)	N/A	Russia	Russia	yellow	07-08-2015	13/09/2016	No	Below 60
BEN-36	Lefranc	N/A	Benin	Benin	white	N/A	01-05-2017	No	67
BEN-22	Vinil Plus	N/A	Benin	Benin	white	N/A	01-05-2017	No	Below 60
BEN-37	Play Scilaque	N/A	Benin	Benin	white	N/A	01-05-2017	No	71
COL-13	Roseta	N/A	Colombia	Colombia	yellow	N/A	23/08/2016	No [http://www.roseta.com.co/#!]	Below 80
COL-14	Roseta	N/A	Colombia	Colombia	green	N/A	23/08/2016	No [http://www.roseta.com.co/#!]	Below 70
COL-15	Roseta	N/A	Colombia	Colombia	red	N/A	23/08/2016	No [http://www.roseta.com.co/#!]	Below 90



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COL-22	Grupo Orbis Compañía Global de Pinturas	N/A	Colombia	Colombia	green	02-05-2012	23/06/2016	No [ <a href="http://www.pintuco.com/index.php/43-internacional/noticias/487-pintuco-cumple-70-anos-y-bate-records-historicos-en-produccion-y-ventas">http://www.pintuco.com/index.php/43-internacional/noticias/487-pintuco-cumple-70-anos-y-bate-records-historicos-en-produccion-y-ventas</a> ]	Below 60
COL-23	Grupo Orbis Compañía Global de Pinturas	N/A	Colombia	Colombia	yellow	26/03/2012	23/06/2016	No [ <a href="http://www.pintuco.com/index.php/43-internacional/noticias/487-pintuco-cumple-70-anos-y-bate-records-historicos-en-produccion-y-ventas">http://www.pintuco.com/index.php/43-internacional/noticias/487-pintuco-cumple-70-anos-y-bate-records-historicos-en-produccion-y-ventas</a> ]	80
YVE-106	Osca Pro-éco	Osca Cipel	France	Côte d'Ivoire	green	N/A	24/03/2017	No	Below 60
GAM-27	Suvinil	N/A	Brazil	Brazil	yellow	N/A	18/12/2017	No [ <a href="http://www.suvinil.com.br">www.suvinil.com.br</a> ]	Below 300
GEG-38	Profigroup/Sniezka	N/A	Georgia/ Poland	Georgia/ Poland	orange	16/05/2014	24/06/16	No	Below 60
GEG-39	Paint Barva/Color - Palizh	N/A	Ukraine/ Russia	Georgia/ Russia	yellow	Sep-15	24/06/16	No	Below 60



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IRQ-04	Fabiano	N/A	Iraq	Iraq	yellow	17/10/2017	30/12/2017	No	Below 60
IRQ-21	Lays Paints	N/A	Iraq	Iraq	yellow	28/08/2016	30/12/2017	No [alwameethpaints@gmail.com]	Below 200
JAM-33	EdgeChem Color Glow Flat Emulsion	N/A	Jamaica	Jamaica	yellow	N/A	10-07-2018	No	Below 60
KAZ-7-40	Colors Enamel	N/A	Russia	Russia	yellow	03-02-2016	19/06/2016	No [ <a href="http://www.kraski-raduga.ru/products/140/3253/">http://www.kraski-raduga.ru/products/140/3253/</a> ]	Below 60
KAZ-A-09	Raduga P-220 Enamel	LLP Paint Factory (Raduga)	Russia	Russia	white	N/A	22/09/2016	No	Below 100
KAZ-A-10	Raduga P-220 Enamel	LLP Paint Factory (Raduga)	Russia	Russia	yellow	N/A	22/09/2016	No	Below 100
KAZ-A-11	Raduga P-220 Enamel	LLP Paint Factory (Raduga)	Russia	Russia	red	N/A	22/09/2016	No	Below 60
KAZ-A-12	Rainbow 0150 Primer	LLP (VCCP) Rainbow	Russia	Russia	green	03-02-2016	22/09/2016	No	Below 60
KEN-53	Galaxy Premium	N/A	Kenya	Kenya	yellow	02-08-2016	23/08/2016	No	Below 60
KEN-54	Sadolin	N/A	Kenya	Kenya	yellow	23/08/2016	23/08/2016	No [www.sadolin.co.ke]	Below 60



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KEN-55	Dulux	N/A	Kenya	Kenya	yellow	31/01/2015	12-08-2016	No [www.dulux.co.ke]	Below 60
KYG-52	White Stork Acrylic Paint	N/A	Kyrgyzstan	Kyrgyzstan	white	N/A	Jun-16	No	Below 300
MAL-40	Dulux Inspire	N/A	Singapore	Malaysia	popcorn yellow	N/A	15/09/2016	Yes. "No added lead" [www.dulux.com.sg]	300
MOL-30	Coler	N/A	Moldova	Moldova	red	06-05-2016	09-08-2016	No [www.supraten.md]	Below 60
MOL-31	Coler	N/A	Moldova	Moldova	yellow	22/06/2016	09-08-2016	No [www.supraten.md]	Below 60
MNG-23	Tex	N/A	Russia	Russia	white	N/A	19/02/2017	No	Below 60
MOR-05	Aquastral	Akzo Nobel	Netherlands	Morocco	white	N/A	02-01-2017	No	Below 60
MOR-20	Colovinyl 600	Colorado	Morocco	Morocco	white	N/A	02-01-2017	No	Below 60
MOR-21	Colovinyl 600	Colorado	Morocco	Morocco	yellow	N/A	02-01-2017	No	Below 60
MOR-30	Aquamat	Facop	Morocco	Morocco	white	N/A	02-01-2017	No	Below 60
MOR-38	Odavinyl	O'dassia	Morocco	Morocco	white	N/A	19/11/2016	No	Below 60
MOR-39	Odavinyl	O'dassia	Morocco	Morocco	yellow	N/A	19/11/2016	No	Below 70



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MOR-40	Pinicola	Jafep	Spain	Spain	white	N/A	28/02/2017	No	Below 60
MOR-41	Pinicola	Jafep	Spain	Spain	yellow	N/A	28/02/2017	No	Below 60
NIG-55	Precious Paint (Emulsion)	N/A	Nigeria	Nigeria	yellow	N/A	31/08/2016	No	1500
NIG-56	Career Paint (Silk)	N/A	Nigeria	Nigeria	yellow	N/A	31/08/2016	No	Below 80
PAK-59	Primax	N/A	Pakistan	Pakistan	yellow	N/A	17/12/2016	No	220
PAK-31	SS Paints	N/A	Pakistan	Pakistan	yellow	N/A	17/12/2016	No	80
RUS-73	Diamond Dulux	N/A	UK	Russia	yellow	16/06/2016	20/07/2016	No	Below 60
RUS-74	Pufas Latex Paint	N/A	Germany	Germany	yellow	09-03-2016	11-07-2016	No [www.pufas.com]	60
RUS-75	Krafor Acrylic Enamel	N/A	Russia	Russia	yellow	04-06-2016	19/07/2016	No [www.krafor.com]	Below 200
RUS-76	Multicolor	N/A	China	China	yellow	28/06/2016	11-07-2016	No [www.alfagermenic.ru] (importer)	Below 60
TWN-48	Nippon Water-Based Enamel Paint	N/A	Japan	China	yellow	N/A	09-10-2015	Yes. "No lead added"	60



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TWN-49	Nippon Water-Based Paint 450	N/A	Taiwan	Taiwan	white	25/12/2014	09-10-2015	Yes. "No lead added"	70
TWN-50	Nippon Water-Based Paint 420	N/A	Taiwan	Taiwan	yellow	11-12-2014	09-10-2015	No	60
TAJ-52	Ranginkamon	N/A	Tajikistan	Tajikistan	yellow	N/A	30/06/2016	No	80
TAJ-53	Profi Teks	N/A	Russia	Russia	yellow	N/A	30/06/2016	No	70
TAJ-54	Colorant Universal	N/A	Russia	Russia	yellow	N/A	30/06/2016	No	Below 60
UGA-23	Sadolin Weather Guard Emulsion Paint	Sadolin Paints (U) Ltd.	Uganda	Uganda	yellow	17/06/2016	13/07/2016	No	80
UKR-54	Aura	N/A	Estonia	Ukraine	yellow	11-05-2016	09-08-2016	No [www.eskaro.ua]	Below 60
UKR-55	Triora	N/A	Ukraine	Ukraine	yellow	21/07/2016	09-08-2016	No [www.zip.ua; www.triora.ua]	Below 60
UKR-56	Kompozit	N/A	Ukraine	Ukraine	yellow	14/06/2016	09-08-2016	No [www.kompozit.ua]	Below 60
UKR-57	Sniezka	N/A	Poland	Poland	yellow	14/11/2015	09-08-2016	No [www.snieszka.ua; www.snieszkanature.com]	Below 60
ZAM-41	Dulux Acrylic PVA	N/A	Zambia	Zambia	yellow	N/A	04-02-2017	No [www.dulux.co.za]	Below 60





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ZAM-42	Prestones PVA	N/A	Zambia	Zambia	yellow	N/A	01-03-2017	No	Below 60