

What Are Lead Chromates and How Do They Cause Harm?

This presentation covers

- What lead chromates are
- Lead toxicity and why lead chromates are a hazard to health
- Lead exposure pathways.

This PowerPoint Presentation is the 1st in a series of 8 presentations on Lead Chromates and the Rotterdam Convention, prepared by IPEN in order to help NGOs, civil society, and government officials better understand the important role a lead chromate listing by the Rotterdam Convention can play in reducing childhood lead exposure and accelerating global lead paint elimination. For other presentations in this series, please visit IPEN's [website](#).

IPEN's Campaign to List Lead Chromates

IPEN is a network of over 600 NGOs in more than 120 countries working together for a toxics-free future.

- IPEN has been working with NGOs to promote lead paint elimination in low- and middle-income countries for fifteen years.
- Initiatives by governments and these NGOs has led to the adoption of new lead paint regulation in several countries.
- IPEN-affiliated NGOs in countries that recently adopted lead paint control laws are now encouraging their Governments to nominate lead chromates for a Rotterdam Convention listing.

IPEN's Campaign to List Lead Chromates

The Rotterdam Convention is an international treaty that operates a legally binding Prior Informed Consent (PIC) procedure that applies to international trade in the hazardous chemicals listed in its Annex III.

- The lead paint control regulations that many countries recently adopted impose severe restrictions on the use of lead chromate pigments as ingredients in paints.
- These pigments are the predominant source of lead in lead paints.
- Countries that recently adopted lead paint regulations can submit Notifications to the Rotterdam Convention that nominate lead chromates for a Convention listing.
- A decision by the Rotterdam Convention to list lead chromates can help greatly accelerate the global elimination of all lead paints.

IPEN's Campaign to List Lead Chromates

Those interested in submitting Notifications may wish to review two documents that better explain the listing process and its impact.

[*Controlling Lead Chromate Pigments: The Case for a Rotterdam*](#)

[*Convention Listing*](#). What are Lead Chromates; The Lead Chromate Hazard; Uses of Lead Chromates; and the Impact of a Rotterdam Convention Listing.

[*Preparing a Rotterdam Convention Notification Listing*](#). Why Countries that Recently Adopted Lead Paint Controls Can Nominate Lead Chromates; the Rotterdam Listing Process; Most Recent Regulatory Actions were based on Risk Evaluations; Establishing Controls on Trade in both Lead Chromates and in Paints that Contain them; How to Satisfy the Convention's Listing Criteria.

What Are Lead Chromates and How Do They Cause Harm?

The remainder of this presentation will address four topics.

- Briefly, how a lead chromate listing by the Rotterdam Convention will reduce childhood lead exposure
- What lead chromates are
- Lead toxicity and why lead chromates are a hazard to human health
- Lead exposure pathways

How Will a Lead Chromate Listing by the Rotterdam Convention Reduce Childhood Lead Exposure?

Lead is a *non-threshold toxicant* in young children.

- There is a strong body of evidence demonstrating that even small exposures to lead can have life-long, harmful health effects in young children.
- No level of lead exposure is known to be safe. All preventable sources of lead exposure should, therefore, be prevented.
- But despite all the evidence, too many young children continue having their life prospects diminished because of lead exposure.

How Will a Lead Chromate Listing by the Rotterdam Convention Reduce Childhood Lead Exposure?

Countries that recently adopted controls on the lead content of paints can nominate lead chromates for a Rotterdam Convention listing.

A Rotterdam Convention listing would make international trade in lead chromates and in paints (and other products) that contain lead chromates subject to the Rotterdam Convention's Prior Informed Consent (PIC) procedure.

How Will a Lead Chromate Listing by the Rotterdam Convention Reduce Childhood Lead Exposure?

If lead chromates are listed, every country would have the right to impose international controls on imports of lead chromates and on products that contain them.

- A listing decision would signal that the international community has agreed that lead chromates are a hazard to human health.
- The listing would encourage governments that have not yet done so, to consider whether the continued national production and/or import of lead chromate pigments and paints that contain them is in their country's national interest.

What are Lead Chromates?

Lead chromates are a family of bright yellow, orange, and red pigments that are commonly used as ingredients in paints, mainly in solvent-based (oil) paints.

- Lead chromate pigments give the paint its hue and color.
- They also help protect underlying surfaces from wear and corrosion.

What are Lead Chromates?

The Lead Chromate Family has Three Members:

1. Lead Chromate (CAS number 7758-97-6) is a yellow crystalline pigment whose chemical formula is PbCrO_4 . It is sometimes used as a paint ingredient. In its relatively pure form, however, lead chromate is more commonly used as an ingredient in the manufacture of other, more complex, lead chromate pigments.



What are Lead Chromates?

The Lead Chromate Family has Three Members:

2. Lead Sulfochromate Yellow (CAS number 1344-37-2) is a yellow crystalline pigment that is commonly used as an ingredient in paints.



The pigment is composed of mixed-phase crystals that contain both lead chromate and lead sulphate (PbSO_4) in every crystal. The crystals are, typically, around 65% lead chromate, around 25% lead sulphate and possibly, a few percent of other substances.

What are Lead Chromates?

The Lead Chromate Family has Three Members:

3. Lead Chromate Molybdate Sulphate Red (CAS 12656-85-8) is an orange or red crystalline pigment that is commonly used as an



ingredient in paints. The pigment is composed of mixed-phase crystals that contain lead chromate, lead sulphate, and lead molybdate (PbMoO_4) in each crystal. The crystals are, typically, around 75% lead chromate, around 12% lead sulphate, around 5% lead molybdate, and possibly a few percent of other substances.

What are Lead Chromates?

Some Common Names for Lead Chromate Pigments

Yellow-Pigments

Chrome Yellow

Middle Chrome

Lemon Chrome

Primrose Chrome

Medium Chrome Yellow

Pigment Yellow 34

Orange or Red Pigments

Molybdate Orange

Molybdate Red

Chrome Vermilion

Vynamon Scarlet

Pigment Red 104

Lead Chromate Toxicity and Why Lead Chromates are a Hazard to Health

Lead chromates exhibit toxicity from both their lead content and their hexavalent chromium content.

- ***Lead Toxicity.*** Lead chromates are approximately 65% lead (Pb), by weight. A person who ingests or inhales lead chromate will be exposed to lead and will suffer the harmful health effects of its lead toxicity.
- ***Hexavalent Chromium Toxicity.*** Lead chromates are approximately 16% chromium (Cr), by weight. The chromium is in a form called *hexavalent chromium* which is highly toxic and carcinogenic by nature.

Lead Chromate Toxicity and Why Lead Chromates are a Hazard to Health

Lead Toxicity

Whenever lead chromate is used as an ingredient in paint or in another product, it becomes a source of human exposure to lead.

The World Health Organization says that lead *“is particularly harmful to young children,”* and that *“there is no level of exposure to lead that is known to be without harmful effects.”*

Lead Chromate Toxicity and Why Lead Chromates are a Hazard to Health

Lead exposure in young children

A young child who is exposed to even small amounts of lead can suffer lead-induced neurological deficits or impairments. These deficits or impairments are lifelong and irreversible. They can cause:

- Reduced intelligence
- Decreased attention span
- Less success in school
- Increased impulses toward violent behavior
- Increased chance of incarceration
- Decreased lifelong earnings

Lead Exposure Pathways

Paints that contain lead chromate pigments are very likely the most widespread source of lead exposures in young children. They are often used in and around homes, schools and play areas.

- Lead-containing paint fragments enter indoor dust and outdoor soil when the painted surface wears or weathers; or when it is scraped or sanded prior to repainting.
- Young children at play, dirty their hands with lead-contaminated dust and soil. They then often put their fingers in their mouths, and they then ingest lead by sucking on their fingers.

Lead Exposure Pathways

Occupational lead exposure.

Lead exposure is also harmful to adults. It causes hypertension and is a risk factor for heart disease, stroke, and chronic kidney disease.

Workers can be exposed to lead from lead chromates by inhalation or dermal contact:

- When spray painting;
- During the removal of old surface coatings;
- From accidental spillage; and
- During transport, warehousing, and paint production.

Lead Exposure Pathways

Hexavalent Chromium Toxicity

Human exposures to hexavalent chromium occurs mainly in the workplace.

- Primary routes of hexavalent chromium exposure include breathing air that contains suspended particles; ingesting hexavalent chromium compounds in food or water; or direct contact with the skin.
- The United States National Toxicology Program states, with no qualifications, that hexavalent chromium compounds “*are known to be human carcinogens based on sufficient evidence of carcinogenicity from studies in humans.*”

Lead Exposure Pathways

Lead Chromates in Paints

Lead chromates are still widely used as pigments in the manufacture of yellow-, orange-, red-, and green-colored paints and industrial coatings.

Lead Exposure Pathways

Lead Chromates in Decorative Paints

Decorative paints include interior and exterior wall paints, wood finishes, enamels, putties, and primers.

- Most of the larger transnational paint companies have now stopped using lead chromate pigments as ingredients in their decorative paints;
- But lead chromate pigments are still widely present in the decorative paints produced by smaller transnational, national, and local companies; and
- Decorative paints that contain lead chromate pigments are still common in most of the countries that have not yet adopted regulatory controls on the lead content of paints.

Lead Exposure Pathways

Lead Chromates in Industrial Paints and Coatings

Many large and small paint manufacturers still use lead chromates as ingredients in the industrial coatings that they produce. These industrial coatings are then used:

- On toys, school supplies, sporting goods, and other consumer products
- On new cars and other vehicles
- As refinish coatings for older cars and other vehicles
- As protective coatings for bridges and other structures; for boats and other marine applications; and others
- For road marking

Lead Exposure Pathways

Lead Chromates in Industrial Paints and Coatings (Continued)

There is no justification for continuing the use of lead chromates as ingredients in **ANY** paint or coating product:

- Several of the world's largest transnational paint companies have declared that they have completely stopped using lead chromates as ingredients in their industrial coatings.
- The European Union no longer permits **ANY** use of lead chromates as an ingredient in any paint, coating, or other product.
- Cost-effective alternatives are available that can be used as substitutes for **All** uses of lead chromates.

Lead Exposure Pathways

Lead Chromates in Plastics

Lead chromates continue being widely used as toxic, coloring agents in plastics, and in other polymer-based materials:

- Plastic that contains lead – in any form – can become a source of lead exposure in children
- If a plastic product that contains lead is:
 - Recycled, its lead content is transferred into the downstream products.
 - Burned or incinerated, its lead content is released into the air and into the ash.
 - Landfilled, its lead content can be released into the leachate
- And lead in micro-plastics can leach in the environment and biota.

Lead Exposure Pathways

Other Uses of Lead Chromates

- ***Printing Inks:*** Lead chromates were once used as color pigments in printing inks. But we think this use is no longer common.
- ***Pyrotechnics.*** Lead chromates have been used as a firing delay in hand grenades, fireworks, demolitions, and other pyrotechnics. More research is needed, but we think this use is now rare.
- ***Ceramic glazes.*** Lead oxides are still widely used in ceramic glazes. But the use of lead chromates in ceramic glazes is now rare.
- ***Artists' paints.*** Restorationists still use lead chromate pigments when restoring certain art works. But their use in current artwork is uncommon, dangerous, and discouraged.

What Are Lead Chromates and How Do They Cause Harm?



For Additional information and other *Lead Chromates and the Rotterdam Convention* PowerPoint presentations, please visit IPEN's [website](https://ipen.org/site/listing-lead-chromates-under-rotterdam-convention). (https://ipen.org/site/listing-lead-chromates-under-rotterdam-convention)