中国政府为消除含铅涂料做的努力
China Government's Efforts with the Elimination of Lead Paint

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含铅涂料的暴露及危害
Exposure and harm of lead paint

- 涂料由成膜物质、颜料、溶剂和各种添加剂组成
  Composed of film forming material, pigment, solvent and various additives
- 一般意义上的"含铅涂料"是指添加一种或多种铅化合物的涂料，包括清漆、天然漆、着色剂、瓷漆、釉料、底漆和涂层，特别针对与人体接触的涂料等
  Generally lead paint refers to the addition of one or more lead compound, including varnish, lacquer, enamel, stain, glaze, primer and coating, especially paint contacted with human body etc.
- 添加的铅化合物通常包括：一氧化铅、辛酸铅、铬酸铅（铬黄）、2-乙基已酸铅、硫酸铅、氧化铅、钼酸铅、硝酸铅、铅铬黄、环烷酸铅、钼镉红、四氧化三铅（红丹）、碳酸铅（铅白）、氧化铬酸铅和碱式碳酸铅。其中最常见的是铬酸铅（铬黄），四氧化三铅（红丹）和碳酸铅（铅白）
  Lead compounds typically include lead oxide, lead octanoate, lead chromate (chrome yellow), 2- lead ethylhexanoate, lead sulfate, lead oxide, lead molybdate, lead nitrate, lead chrome yellow, lead naphthenate, cadmium molybdenum red, lead orthoplumbate (lead tetraoxide), lead carbonate (white lead), lead chromate oxide and basic lead carbonate. The most common lead compounds are lead chromate (chrome yellow), lead orthoplumbate (lead tetraoxide) and lead carbonate (white lead)

含铅涂料的暴露及危害
Exposure and harm of lead paint

- 油漆的生产、使用和移除过程中产生铅污染

  Lead can be released during paint manufacture, application and removal.

  - 旧的含铅油漆碎片和粉尘污染家庭环境

    Old lead paint fragments into flakes and dust that contaminate the home environment.

- 铅对全身各系统和器官均有毒性作用

  Lead is toxic to all systems and organs of the body.

  - 铅的毒性效果包括抑制酶、贫血、神经紊乱、损害免疫系统和生殖系统、损害肾脏和心血管功能，甚至导致死亡。

    Lead effects may range from enzyme inhibition and anemia to disorders of the nervous, immune and reproductive systems, impaired kidney and cardiovascular functions, and even death.

图片来源于网络

含铅涂料的暴露及危害
Exposure and harm of lead paint

- 儿童更易受到铅暴露的影响
  Children are more likely to be exposed to lead.
  - ·经常的手-嘴行为导致他们摄入较多的灰尘、污垢、土壤及其他含铅的颜料
    hand-to-mouth activity
  - ·内脏吸收铅是成年人的4 ~ 5 倍
    absorb 4-5 times more lead from the gut than adults

- **油漆粉尘是生活在使用含铅油漆家庭中儿童的主要铅暴露来源**
  Paint dust is a primary source of lead exposure for children living in homes with lead-containing paint.
- 铅中毒可能会妨碍他们的身体和精神发育、给他们带来行为表现上的问题以及低智商
  Lead poisoning may interfere with their physical and mental development, bring them behavior problems and low IQ.

图片来源于网络

中国含铅涂料生产使用概况
General situation of production and use of lead paint in China

- 我国目前主要的含铅涂料是铅铬颜料，是以铬酸铅为主要成分的无机彩色颜料，包括柠檬黄、中铬黄、钼铬等 At present the main lead paint used in China is lead chromate pigment. Lead chromate is the main component of inorganic color pigments, including lemon yellow, chrome yellow, chromium molybdenum etc.
- 铅铬颜料具有色泽鲜艳、着色力好、遮盖力强等特点，耐光性、耐热性和稳定性较好，在建筑、工业、木器和防腐等领域应用广泛 Lead chrome pigment has the characteristics of bright color, good color, strong hiding power, light resistance, heat resistance and good stability, widely used in construction, industry, wood, anti-corrosion and other fields.

用途 Uses	当前使用程度Current Situation
油漆和艺术涂料用的颜料（铬酸铅、钼酸铅、高铅酸钙、白铅）Pigments for paints and coatings (Lead chromate, lead molybdate, calcium plumbate, white lead)	几个国家禁止或限制使用白铅。仅少数几个国家限制使用其它含铅颜料。Some countries prohibit or restrict the use of white lead. Only a few countries restrict the use of other lead containing pigments.
塑料颜料（铬酸铅和钼酸铅）Plastic pigment (Lead chromate and lead molybdate)	普遍widely used
抗锈底漆（红铅）Anti rust primer (lead tetraoxide)	普遍widely used
清漆和油漆干燥剂（环烷酸铅）Varnish and paint desiccant (lead naphthenate)	部分类型的油漆普遍；一些国家已经逐步淘汰许多用途。Some types of paint are commonly used; Some countries have phased out many uses.

中国含铅涂料生产使用概况
General situation of production and use of lead paint in China

- 2011年我国铅铬颜料产销量分别为52699.9t 和49779.3t
  In 2011, the production and sales of lead chromate pigments were 52699.9t and 49779.3t .
- 2013年，铅铬颜料进口1746t，同比增长53.74%；出口数量7000t，同比下降43.95%；连续两年出口数量和出口金额大幅下降
  In 2013, China imported 1746t lead chromate pigments, an increase of 53.74%; exported 7000t, export volume decreased by 43.95%; for two consecutive years the export volume decreased sharply.
- 含铅涂料中除铅铬黄颜料因同种颜色的有机颜料耐候性尚不能达到一些领域的要求，如室外建筑、交通标示等，目前尚未有成熟的替代产品外，其他含铅涂料都已有成熟的替代产品
  Lead chrome yellow pigment due to the same color of organic pigment's weather ability still could not meet the requirements in some areas, such as outdoor construction, traffic marking, could not be substituted. Yet there are mature alternative products mature for other lead paint.

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

发改委《产业结构调整指导目录（2011年本）》和工信部《部分工业行业淘汰落后生产工艺装备和产品指导目录》（2010年本）

Ministry of Industry 'The Elimination of Backward Production Technology and Equipment and Product Guidance Catalogue (2010 Edition)' and Development and Reform Commission 'Industrial Structure Adjustment Guidance Catalogue (2011 Edition)'

- 淘汰 **Phased out**
  - ✓ 有害物质含量超标准的内墙、溶剂型木器、玩具、汽车、外墙涂料，含红丹等有害物质的涂料

    To eliminate the paint with the content of harmful substances exceeded the standards, such as paint used for interior wall, solvent based wood, toys, cars, exterior wall paint, and paint with red lead and other harmful substances
- 限制 **Restricted**
  - ✓ 铅铬黄、溶剂型涂料（不包括鼓励类的涂料品种和生产工艺）

    Lead chromate, solvent based paint (except encouraged produced paint and production technology)

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

- 鼓励 **Encouraged**
  - ✓ 采用“亚磷酸钙防锈颜料”替代“铅系、铅铬系及锌系防锈颜料”；

    The use of calcium phosphate as antirust pigment instead of lead, lead chromate and zinc antirust pigment;
  - ✓ 鼓励先进污染防治示范技术“稀土硫化物颜料的制备技术”应用于颜料生产行业清洁生产技术改造；

    To encourage advanced pollution prevention and control demonstration technology ‘preparation technology of rare earth sulfide pigment’ applied to clean production technology transformation of pigment production industry;
  - ✓ 鼓励水性木器、工业、船舶涂料，高固体分、无溶剂、辐射固化、功能性外墙外保温涂料等环境友好、资源节约型涂料生产。

    To encourage environment friendly and resource conserving coatings production, such as water wood, industrial and marine coatings, high solid, solvent-free, radiation curing, the function of exterior wall thermal insulation coatings etc.

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

环保部《“高污染、高环境风险”产品目录（2013年版）》

Ministry of Environmental Protection, 'High Pollution and High Environmental risk" Product Catalog (2013 Edition)

- 在消除含铅涂料方面，我国将硬脂酸铅、环烷酸铅、异辛酸铅、辛酸铅、铅铬黄、醋酸铅、松香铅皂、碱式碳酸铅、一氧化铅、四氧化三铅等含铅涂料原料列入了《“高污染、高环境风险”产品目录（2013年版）》

  To eliminate lead paint, stearic acid lead, lead naphthenate, octanoic acid, lead, lead octanoate, lead chromate, lead acetate, rosin lead soaps, basic lead carbonate, lead oxide, lead orthoplumbate were listed in the High Pollution and High Environmental Risk Product Catalog (2013 Edition)

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

工信部 科技部 环保部《国家鼓励的有毒有害原料（产品）替代品目录（2012 年版）》

Ministry of Industry, Ministry of science and technology and Ministry of Environmental Protection, Catalogue of the toxic and harmful raw materials (products) substitutes encouraged by the state(2012 Edition)

- **应用类：重金属替代** Heavy metal substitution

替代品名称: 亚磷酸钙防锈颜料

Name of the substitute : calcium phosphate anti rust pigment

被替代品名称: 铅系、铅铬系及锌系防锈颜料

Be replaced: lead, lead chromate and zinc anti rust pigment

适用范围: 颜料 防锈、防腐

Scope of use: pigment antirust, anticorrosive

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

◘ 涂料行业“十三五”规划 The 13th Five-Year Plan of Paint Industry

将包括产业发展规划、科技发展规划、节能环保发展规划以及政策法规及标准发展规划

Including industrial development plan, science and technology development plan, energy conservation and environmental protection development plan and policies and regulations and standards development plan

- ✓ **节能环保发展规划**中主要包括重点涂料涂装领域的VOC排放与防治规划、含铅涂料的替代和最终淘汰等。

  Energy conservation and environmental protection development plan: Substitution and final elimination of lead paint

- ✓ **政策法规与标准发展规划**中，政策研究工作重点和项目包括：工业涂装VOC排放特征及防治对策研究、建筑类涂料VOC含量限值及管控途径研究、逐步替代含铅涂料的政策研究、环境保护综合名录涂料相关内容的修订、产业结构调整指导目录涂料相关内容的修订等；标准化工作的重点任务和重点项目包括行业规范、环保标准及产品标准。

  Policies and regulations and standards development plan: Study on the policy of gradually replacing lead paint

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

➢ 产品标准Product standards

标准编号 Standard Number	标准名称 Standard Name	可溶性铅含量限值 Soluble lead content limits （mg/kg）
GB 8771-2007	铅笔涂层中可溶性元素最大限量 Maximum limits soluble elements content pencil coating	90
GB 18581-2009	室内装饰装修材料　溶剂型木器涂料中有害物质限量 Indoor decorating and refurbishing materials –Limit of harmful substances of solvent based coating for woodenware	90（限色漆、腻子和醇酸清漆color paint, alkyd varnish and putty）
GB 18582-2008	室内装饰装修材料 内墙涂料中有害物质限量 Indoor decorating and refurbishing materials –Limit of harmful substances of interior architectural coating	90
GB 18584-2001	室内装饰装修材料　　木家具中有害物质限量 Indoor decorating and refurbishing materials –Limit of harmful substances of wood based furniture	90（限色漆color paint）
GB 18585-2001	室内装饰装修材料 壁纸中有害物质限量 Indoor decorating and refurbishing materials – Limit of harmful substances of wallpapers	90

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

标准编号 Standard Number	标准名称 Standard Name	可溶性铅含量限值 Soluble lead content limits（mg/kg）
GB 24408-2009	建筑用外墙涂料中有害物质限量 Limit of harmful substances of exterior wall coatings	1000 （限色漆、腻子color paint, putty）
GB 24409-2009	汽车涂料中有害物质限量 Limit of harmful substances of automobile coatings	1000（限色漆color paint）
GB 24410-2009	室内装饰装修材料　水性木器涂料中有害物质限量 Indoor decorating and refurbishing materials – Limit of harmful substances of water based coating for woodenware	90 （限色漆、腻子color paint, putty）
GB 24613-2009	玩具用涂料中有害物质限量 Limit of harmful substances of coatings for toys	铅含量lead content 600 mg/kg; 可溶性铅限量值Soluble lead content 90mg/kg
GB/T 23994-2009	与人体接触的消费产品用涂料中特定有害元素限量 Limit of certain harmful elements of coatings for consumer products contacting with human body	铅含量lead content 600mg/kg; 可溶性铅限量值Soluble lead content 90mg/kg

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

- ICCM3后，对下列标准进行修订：

After ICCM3, the following standards were revised:

- ✓ 对GB 18582-2008 室内装饰装修材料 内墙涂料中有害物质限量、GB 18581-2009 室内装饰装修材料 溶剂型木器涂料中有害物质限量、GB 24410-2009 室内装饰装修材料 水性木器涂料中有害物质限量、HJT 414-2007 室内装饰装修用溶剂型木器涂料、HJ 2515-2012 环境标志产品技术要求 船舶防污漆、HJ 2537-2014 环境标志产品技术要求 水性涂料进行修订，并规定**可溶性铅含量≤90mg/kg**；

  GB 18582-2008 indoor decoration materials, interior wall paint hazardous substances limited, GB 18581-2009 interior decoration materials solvent based wood coatings harmful substances limited, GB 24410-2009 indoor decorating and refurbishing materials waterborne wood coatings harmful substances, HJT414-2007 interior decoration with solvent based wood coatings, HJ 2515-2012 environment symbol product technical requirements of marine antifouling paint, HJ 2537-2014 environmental mark product technical requirements for Waterborne Coatings
  Soluble lead content is less than 90mg/kg

- ✓ 对GB 24409-2009 汽车涂料中有害物质限量、GB 24408-2009 建筑用外墙涂料中有害物质限量、建筑钢结构防腐涂料中有害物质限量（2014年报批稿）进行修订，规定**铅含量≤1000mg/kg**。

  GB 24409-2009 Limits of harmful substances in automotive coatings, GB 24408-2009 Limited amount of harmful substances in exterior wall coatings for building, limits of harmful substances in building steel structure anticorrosive coatings **Lead content is less than 1000mg/kg**

国内削减含铅涂料的相关政策法规
Policies and regulations to eliminate lead paint

- 排放标准 Emission Standard

《涂料工业水污染物排放标准》：总铅 0.1mg/L

Water pollutant emission standard of paint industry: total lead 0.1mg/L

- 地方标准 Provincial Standard
  - ✓ 上海：《儿童水性内墙涂料》（T31/01002-C001-2014）

Shanghai: Water based interior wall paint for children

  - ✓ 广州：《儿童活动场所内墙涂料》（DB44/T 1814-2016）

Guangzhou: Interior wall paint in children's activity place

淘汰含铅涂料存在的问题
Existing problems of the elimination of lead paint

➢ 法规标准不够完善
Inadequate standards and regulations

- ✓ 含铅标准体系更新速度慢。 Slowly updated standard system of lead paint.
- ✓ 涂料企业多而散的特点，使得执法监管困难，仍有超标含铅涂料的生产和使用。 Difficult enforcement and supervision; there are still production and use of lead paint which could not meet the standards.
- ✓ 含铅涂料应用广泛，淘汰含铅涂料需要多部门联合执法。 The elimination of lead paint requires multi sectoral joint enforcement and supervision.

➢ 替代技术尚不成熟
Immature alternative technology

- ✓ 含铅涂料生产工艺成熟、成本低廉、产品性能优越，优异的性价比使其占有一定市场。 Lead paint production technology is mature, low cost, superior product performance and excellent price to make it occupy a certain market.
- ✓ 我国涂料生产工艺和装备水平比较落后，缺乏系统的无铅涂料研究和开发投入。 China's paint production technology and equipment level is relatively backward and lacks systematic research and development investment of lead-free paint.

淘汰含铅涂料存在的问题
Existing problems of the elimination of lead paint

➢ 行业发展无序
Disordered development of the paint industry

- ✓ 涂料企业呈多、小、散等特点，行业集中度不高。There are too many small and scattered coating enterprises. The industry concentration is not high.
- ✓ 缺乏市场准入规则，涂料行业发展不规范。Lack of market access rules and the development of paint industry is not standardized.

➢ 公众缺乏危害意识
Lack of knowledge and public awareness

- ✓ 公众尚未树立起铅危害意识，对铅污染认知度低。The public has not yet established the awareness of hazard of lead and pollution caused by lead.
- ✓ 公众普遍缺乏铅污染防范知识。The public lacks knowledge of lead pollution prevention.
- ✓ 尚未建立涂料行业认证体系，消费者无法识别所购买的产品是否含铅，增加了消费者受铅危害的风险。Paint industry has not yet established certification system. Consumers can not identify whether the products they bought have lead or not, which increased the risk of lead exposure.

淘汰含铅涂料的几点建议
Suggestions on the elimination of lead paint

- 建立完善政策法规和标准
  Establish and improve policies, regulations and standards

- 加大替代技术研发力度
  Increase the research and development of alternative technology

- 正确认知含铅涂料风险，提高公众意识
  Correctly understand the risk of lead paint and raise public awareness

环境保护部固体废物与化学品管理技术中心

谢 谢！
Thank you!