

Australian/New Zealand Standard™

Guide to hazardous paint management

Part 2: Lead paint in residential, public and commercial buildings



AS/NZS 4361.2:2017

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee CH-003, Paints and Related Materials. It was approved on behalf of the Council of Standards Australia on 4 December 2017 and by the New Zealand Standards Approval Board on 20 December 2017.
This Standard was published on 22 December 2017.

The following are represented on Committee CH-003:

Australasian Corrosion Association
Australian Institute of Building
Australian Paint Manufacturers' Federation
Australian Wall and Ceiling Association
CSIRO
Institution of Professional Engineers New Zealand
Master Painters Australia
Master Painters New Zealand Association
National Association of Testing Authorities Australia
National Painting and Decorating Institute
Surface Coatings Association Australia

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com or Standards New Zealand web site at www.standards.govt.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of Standards Australia or the New Zealand Standards Executive at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS 4361.2:2017.

Australian/New Zealand Standard™

Guide to hazardous paint management

Part 2: Lead paint in residential, public and commercial buildings

First published as AS 4361.2—1998.
Jointly revised and designated as AS/NZS 4361.2:2017.

COPYRIGHT

© Standards Australia Limited

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, PO Box 1473, Wellington 6140.

ISBN 978 1 76035 969 0

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CH-003, Paints and Related Materials, to supersede AS 4361.2—1998, *Guide to lead paint management, Part 2: Residential and commercial buildings*.

This Standard is Part 2 of a series of two parts providing guidance on management of hazardous paints. Part 1 covers management of lead and other hazardous metallic pigments in industrial applications.

The revision of this Part 2 has not widened the scope to include other toxic metallic compounds that have historically been used in paints. Although the controls for most of these other toxicants are similar to those used to manage lead in paint, there are specific differences in toxicology and environmental impact that would require extensive modifications and additions to the general procedures of this Standard.

The objective of this Standard is to provide guidelines for the successful management of lead paints and related hazards on non-industrial structures, such as dwellings and public buildings, particularly when any paint disturbance or removal is carried out.

This document may be referred to in legislation dealing with the treatment of lead paints. When preparing specifications for large projects involving the removal of lead paints, the assistance of competent experts is necessary.

The management of lead paint, as covered by this Standard, requires compliance with regulations that apply at the time of commencing work, with regard to the jurisdiction within which the work is carried out.

The recommendations contained in a number of publications, issued by both the Australian and New Zealand Governments, and industry organizations, have been taken into account when preparing this Standard.

CONTENTS

	<i>Page</i>
FOREWORD.....	5
 SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE.....	6
1.2 APPLICATION	6
1.3 REFERENCED DOCUMENTS.....	7
1.4 DEFINITIONS.....	7
1.5 LEAD PAINT	10
1.6 RISK OF LEAD PAINT	10
1.7 HOME AND BUILDING OWNERS	10
1.8 SMALL PROJECT	10
1.9 LEAD ABATEMENT CONTRACTOR	11
1.10 LEAD SPECIALIST	11
1.11 BUILDING CLASSIFICATIONS	11
1.12 SYSTEMATIC APPROACH.....	11
1.13 RISK ASSESSMENT	11
 SECTION 2 DETECTION AND ASSESSMENT OF LEAD PAINT	
2.1 GENERAL.....	12
2.2 HISTORICAL LEAD LEVEL	12
2.3 CONDITION OF PAINT.....	12
2.4 METHODS OF DETECTION	13
2.5 INTERPRETATION OF RESULTS	13
 SECTION 3 OPTIONS FOR MANAGING LEAD PAINT	
3.1 GENERAL.....	15
3.2 CONTRACTOR COMPETENCY	15
3.3 DOING NOTHING.....	15
3.4 LEAD PAINT STABILIZATION.....	15
3.5 LEAD PAINT ABATEMENT	15
3.6 CONTAINMENT	18
 SECTION 4 PROCEDURES FOR PAINT STABILIZATION	
4.1 GENERAL.....	19
4.2 CONTAINMENT	19
4.3 OVER-PAINTING.....	19
4.4 ENCAPSULATION.....	20
 SECTION 5 PROCEDURES FOR PAINT REMOVAL	
5.1 GENERAL.....	21
5.2 CONTAINMENT OF LEAD-BEARING DUST AND WASTE.....	21
5.3 PRECAUTIONS FOR INTERIOR PAINTWORK	22
5.4 PRECAUTIONS FOR EXTERIOR PAINTWORK	23
5.5 FINAL CLEAN-UP OF DUST	23
5.6 CLEARANCE TESTING	24
 SECTION 6 PROTECTION OF WORKERS AND THE PUBLIC	
6.1 GENERAL.....	26
6.2 EXPOSURE.....	26

	<i>Page</i>
6.3 REGULATED AREA	26
6.4 PROTECTIVE CLOTHING AND EQUIPMENT	27
6.5 PERSONAL HYGIENE	27
6.6 RESPONSIBLE PERSON	28
6.7 HEALTH MONITORING	28
6.8 SIGNS	28
6.9 NON-COMPETENT WORKERS	28
6.10 PUBLIC HEALTH	28
 SECTION 7 WASTE MANAGEMENT	
7.1 SCOPE.....	29
7.2 BACKGROUND INFORMATION	29
7.3 WASTE GENERATORS.....	29
7.4 RESPONSIBILITIES.....	29
7.5 SITE HANDLING AND STORAGE OF WASTE.....	30
7.6 WASTE SAMPLING, CLASSIFICATION AND ANALYSIS.....	30
7.7 HAZARDOUS WASTE DISPOSAL	31
7.8 DISPOSAL OF NON-HAZARDOUS SOLID WASTE	32
7.9 WASTEWATER MANAGEMENT	32
7.10 DISPOSAL OF CONSUMABLE SUPPLIES	32
7.11 WASTE MANAGEMENT PLAN	32
 SECTION 8 PROJECT DESIGN, IMPLEMENTATION AND COMPLETION	
8.1 GENERAL.....	33
8.2 PROJECT DESIGN	33
8.3 PROJECT START-UP AND IMPLEMENTATION	34
8.4 PROJECT COMPLETION	35
8.5 PROJECT COMPLETION REPORT.....	36
 APPENDICES	
A IDENTIFICATION OF LEAD IN PAINT	37
B DETERMINATION OF LEAD IN SOIL.....	41
C DETERMINATION OF LEAD IN SURFACE DUST	45

FOREWORD

White lead (lead carbonate) was once the principal white pigment in paints for houses and public buildings. Paint with lead pigment was manufactured up until the late 1960s, although in diminishing quantities from 1950 onwards. In 1969, the National Health and Medical Research Council's Uniform Paint Standard was amended to restrict lead content in domestic paint.

Many older homes and buildings still contain lead paint, even though it may be covered with layers of more recent paint. It was used mainly on exterior surfaces, and, to a lesser extent, on interior doors and architraves, especially in undercoats and primers where concentrations of up to 20% lead were commonly used. Interior walls were not commonly painted with paint containing white lead, but some colours did contain red, yellow or orange lead-chrome pigments.

Although all paints manufactured for non-industrial use, from the 1970s onwards, contain less than 1% lead, it is possible that industrial paints, having higher concentrations of lead, may have been applied to residential, public and commercial buildings. Paints manufactured since 1997 contain less than 0.1% of lead by mass, and this limit has been adopted for the definition of lead-containing paint in this Standard.

Lead in any form is toxic to humans when ingested and inhaled. Repeated inhalation or ingestion of lead paint particles may produce the cumulative effects of lead poisoning (plumbism). Thus, lead paint removal methods give rise to two potential health problems; inhalation or ingestion of lead paint by the workers and public in the vicinity of the structure and the deposition of lead paint particles on nearby footpaths, streets or soil where they may be resuspended, tracked into houses or buildings where it can be inhaled or ingested. In most instances, workers involved in lead paint management may be simply and easily protected by protective equipment, and the public may be protected by preventing access to the work site. However, deposition of lead paint waste may be much more complex, and difficult to manage, depending on the size, shape and location of the building.

Women of child-bearing age, pregnant women and children should be excluded from lead paint removal areas, as lead can have detrimental effects on a child's intellectual development, and may cause other health problems.

While potentially toxic elements and compounds, other than those containing lead, might have historically been used in the manufacture of paints, this Standard does not specifically address such constituents. Metals and compounds of metals, such as chromium, cadmium, arsenic, antimony, bismuth and mercury have been used in the past and might be present in existing paint. Users of this Standard will need to employ additional strategies where the presence of these materials is suspected. Expert professional assistance should be sought in these circumstances.

Paint management principles for a building coated with lead paint as set out in this Standard have been determined with reference to a number of publications on the subject. This Standard facilitates consideration of all aspects that are critical to the successful management of lead paint. The practices and procedures detailed in this Standard may require modification to accommodate different structures, locations and legislation. Nevertheless, a mechanism for the proper management of non-industrial structures coated with lead paints is documented.

Contractors are advised that this Standard recommends that an appropriate waste management plan be prepared prior to any lead paint management work (particularly paint removal) being undertaken. Waste minimization is an important aspect of any waste management plan.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Guide to hazardous paint management

Part 2: Lead paint in residential, public and commercial buildings

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard provides guidance for the management of lead paint on non-industrial structures such as residential, public and commercial buildings. It provides information on methods for determining whether lead is present on a building, the amount of lead present and the selection of an appropriate management strategy. Although this Standard does not fully address requirements for the evaluation of worker health and safety, which are covered by current regulatory requirements, it does provide guidelines to produce a safer working environment.

NOTES:

- 1 Industrial paint removal methods, such as abrasive blasting and water blasting, which may involve high to very high emissions, are covered by AS/NZS 4361.1.
- 2 AS/NZS 2311 should be referred to for general information on the painting of buildings.

1.2 APPLICATION

This Standard applies to lead paint only. As the buildings covered are generally occupied, one specific limit of lead concentration has been defined (see Definitions 1.4.15 and 1.4.16). In AS/NZS 4361.1, which covers industrial applications, a paint is deemed to be 'hazardous' depending on not only the concentration of lead, but also the total amount of hazardous pigment present (comprising lead, zinc chromate, arsenic and cadmium) such that additional limits apply.

This Standard is intended to assist builders, trades people, architects and the owners or administrators of residential, public and commercial buildings, in which lead paint is present. It provides guidance on the management of lead paint, but should not be called up in contracts without a detailed specification, which may be derived from it.

Improper management of lead paint can create hazards to public health and the environment. This Standard is a guide for trades people associated with lead paint management work to deal with lead paint and the related hazards in a safe and responsible manner. Trades people should obtain appropriate training and competency prior to undertaking paint management work.

Where the disturbance or removal of lead paint involves public buildings, such as schools or hospitals, it is recommended that all work be carried out by hazardous coating workers who are assessed as competent in lead-risk work and who have a Responsible Person to plan and oversee the work. In addition, this Standard recommends that a Lead Specialist be consulted to provide project support, such as conducting sampling and testing in relation to a project.

Do-it-yourself (DIY) renovators should seek the assistance of trained and competent people prior to undertaking lead paint management. If it is intended to apply this Standard without professional help, additional information and training should be obtained before attempting any lead paint management work.

Local authority requirements, public safety and health requirements, site preparation, waste disposal and contamination control all need to be fully considered prior to the commencement of any work.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this document:

AS

- 1324 Air filters for air conditioning and general ventilation and airconditioning (series)
- 2106 Methods for determination of the flashpoint of flammable liquids (closed cup) (series)
- 4260 High efficiency particulate air (HEPA) filters—Classification, construction and performance

AS/NZS

- 1715 Selection, use and maintenance of respiratory protective equipment
- 1716 Respiratory protective devices
- 2310 Glossary of paint and painting terms
- 2311 Guide to the painting of buildings
- 4361 Guide to hazardous paint management
- 4361.1 Part 1: Lead and other hazardous metallic pigments in industrial applications

AS/NZS ISO

- 31000 Risk management—Principles and guidelines

Australian Building Codes Board (ABCB)

NCC National Construction Code

New Zealand Building Code

1.4 DEFINITIONS

For the purpose of this Standard the definitions given in AS/NZS 2310 and those below, apply.

1.4.1 Blood lead level

The level of lead in the venous or capillary blood of a person.

1.4.2 Chain-of-custody form

A form that is used to identify the movements of, and to ensure the security and integrity of, a sample.

1.4.3 Containment system

A system that minimizes or prevents the waste, generated during surface preparation or the removal of lead paint, from entering into the environment, and which facilitates the controlled collection of the waste for disposal. It can include cover panels, screens, tarps, scaffolds, supports used to enclose an entire work area and shrouds to enclose paint removal tools. Containment systems may include ground covers or water booms.

1.4.4 Disposal

The transfer of hazardous waste to a waste receiptal or waste treatment facility in accordance with prevailing regulations.

1.4.5 Encapsulation

The process of sealing off a lead-paint surface by the direct application of an encapsulant material, such as a specialized high-build paint, wallpaper or vinyl sheeting.

1.4.6 Enclosure

The process of sealing off a lead-paint surface from the occupied space using a new surface, where the new surface is fixed to the substrate by mechanical fasteners such as screws or nails, and the enclosure material does not rely on adhesion to the lead paint for its durability.

1.4.7 Hazardous coating worker

A worker engaged in lead-risk work as described in this Standard.

1.4.8 Hazardous waste

Wastes that are classed as hazardous by the relevant statutory authority.

NOTE: Waste contaminated with lead may be considered hazardous in some jurisdictions if TCLP (See Definition 1.4.28) testing indicates the presence of lead in the leachate ≥ 5.0 ppm.

1.4.9 Health monitoring

Monitoring to identify changes in workers' health status because of exposure to lead.

1.4.10 HEPA filter

A high-efficiency particulate air (HEPA) Type 1, Class A filter as specified in AS 1324 which meets all requirements of AS 4260 with a minimum performance of Grade 2.

1.4.11 HEPA vacuum

A vacuum cleaner fitted with a HEPA filter.

1.4.12 Impermeable

Impervious to dust, water and wind.

1.4.13 Industrial structure

Plant, structures and buildings, which may include bridges, pylons, towers, pipelines, storage facilities, manufacturing facilities, processing plants and similar structures.

1.4.14 Lead abatement contractor

A contractor who has acquired, through training, qualification or experience or a combination of these, the knowledge and skill enabling that person to perform lead paint abatement for residential, public and commercial buildings.

1.4.15 Lead-free paint

A paint that contains less than, or equal to, 0.1% lead by mass in the dry film.

1.4.16 Lead paint

A paint film that contains greater than 0.1% lead by mass in the dry film.

Lead paint is sometimes referred to as 'lead-based paint', 'lead paint', 'lead-containing paint' and 'paint containing lead'.

1.4.17 Lead paint abatement

The replacement of components painted with lead paint, or the enclosure or removal of lead paint.

NOTE: See Clause 3.5 for abatement methods.

1.4.18 Lead Specialist

A person who, through formal training and experience, has the expertise required to undertake activities required for lead project work such as training, technical advice, documentation, sampling and testing.

1.4.19 Over-painting

The application of one or more coats of lead-free paint that effectively isolates a surface that is painted with lead paint from the surrounding environment.

1.4.20 Owner

The principal holding the title to the asset, or in whom the responsibility for the asset is vested.

1.4.21 Regulated area

An area established at the work site to identify lead-risk work areas, outside of which the airborne concentrations of lead can reasonably be expected to not exceed the relevant regulated air quality setting for lead.

1.4.22 Representative sample

A single or composite sample that can be expected to accurately represent the properties of the waste stream or contents of a container.

1.4.23 Residential building

A building that is classified as residential under the Australian National Construction Code (NCC) or New Zealand Building Code.

1.4.24 Responsible Person

A person who is capable of identifying lead hazards (by experience and training) and has authorization to take corrective measures.

1.4.25 Stabilization

Over-painting or covering a surface with an encapsulant to isolate the lead paint from the environment.

1.4.26 Temporary storage

Holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

1.4.27 Total suspended particulate (TSP)

The total of any particulate matter emitted into ambient air and analysed from samples collected using high-volume air samplers.

1.4.28 Toxicity characteristic leaching procedure (TCLP)

A test for determining whether or not waste is hazardous based on an analysis of a leachate.

NOTE: TCLP tests are employed on the premise that wastes will be consolidated with other rotting wastes, which in time will produce organic acids.

1.4.29 Treatment

Any method, technique, or process that changes the physical, chemical or biological characteristics or composition of any hazardous waste so as to neutralize such waste, or so as to render such waste non-hazardous, or less hazardous, safer to transport, store or dispose of, or amenable for recovery, storage, or reduction in volume.

1.4.30 Ventilation system

Includes both natural ventilation and artificial ventilation (mechanical fans, hoods and duct work) to provide air movement across the work area. Dust collectors are employed to clean the discharged air.

1.4.31 Waste generator

The owner of the property where hazardous waste, which is subject to regulation, is produced. A contractor for lead paint management or removal may, at times, be classed as the waste generator.

1.4.32 Worker

An individual who works under a contract of employment, apprenticeship or traineeship.

1.5 LEAD PAINT

Paints manufactured since 1997 contain 0.1% lead by mass or less. This concentration has been determined as the value which, if exceeded, might render the paint hazardous to humans.

1.6 RISK OF LEAD PAINT

Lead paint presents a risk to health if it is ingested or inhaled. There is minimal risk where lead paint is in a sound condition, but paint does present a health risk if it exhibits chalking or flaking, or if it is subject to abrasion (e.g. sash window). Dust created from deteriorated lead paint is a recognized source of lead exposure in residential, public and commercial buildings. The peeling and flaking of lead paint may also cause dangerous residues of lead to build up in accumulated dust.

As well as depositing inside buildings, lead paint dust can settle on adjacent external soil, water, food and vegetation. Therefore food-producing gardens, or water supplies for human or animal consumption, should not be positioned close to areas where lead contamination is suspected.

Lead paint also presents a health risk if is disturbed by paint removal methods, such as sanding or burning. Even mechanical scraping of lead paint poses health risks. The removal of paint can create particularly high risks as the small particle sizes of the dust generated may lodge in furnishings and carpets, making detection or removal difficult.

It is possible that proposed work sites may already be contaminated with lead as a result of earlier poorly controlled maintenance, or repainting practices. It may be necessary to determine background levels in surrounding soil, or on interior and exterior surfaces, prior to commencement of the work.

1.7 HOME AND BUILDING OWNERS

Owners of a residential building, as classified by the National Construction Code Class 1a, parts (i) and (ii), or Building Regulation New Zealand Clause A1, parts (i), (ii) and (iii), may undertake lead abatement work, on their own dwelling. In the context of this Standard, an owner may be a company, trust or similar entity.

Regardless of the scope of work, protective measures should be taken to protect all occupants from the health and safety implications of this work.

1.8 SMALL PROJECT

For all classes of building, other than those described in Clause 1.7, a small project can be defined as a single job involving the disturbance or removal of less than 10 square metres of lead paint surface area, in a 12 month period. Where the scope of work exceeds this definition, abatement should be undertaken by a lead abatement contractor.

1.9 LEAD ABATEMENT CONTRACTOR

The disturbance or removal of lead paint from residential, public and commercial buildings will create a hazard, as a result of the work processes employed. It is critical to the health and safety of occupants that buildings be cleared of all lead residue prior to returning the building to its former use. This work carries a high risk and it is therefore important that contractors have the necessary competence to undertake the scope of work, with no negative impact on the internal and external environment.

Contractors should be able to demonstrate that they are competent to carry out the required work in compliance with all work health and safety requirements for the jurisdiction within which the work is carried out.

1.10 LEAD SPECIALIST

While lead abatement contractors require competence in the management of lead paint in residential, public and commercial buildings the owner of a building might not be similarly competent, or have an employee with the necessary experience and competency. It is recommended that such owners should engage a Lead Specialist, in order to ensure that lead abatement work will deliver the required durability, with no negative impact on the health and safety of workers or the public, or to the interior or exterior environment.

The Lead Specialist should be able to demonstrate their competence in lead paint management, and have a wide range of experience. An example of demonstrated competence may be qualifications or accreditation for the management of lead paint removal that are recognized by a relevant industry body.

1.11 BUILDING CLASSIFICATIONS

For the purposes of this Standard, building types are referred to as 'residential', 'public' or 'commercial' buildings. As detailed in Clause 1.4, the classifications are those provided in the Australian National Construction Code (NCC), or Building Regulation New Zealand (BRNZ) documents. Owners of buildings, other than those described in Clause 1.7, should engage a Lead Specialist to assist with all aspects of lead abatement work, and should employ an accredited lead abatement contractor to carry out the work. All workers should be appropriately trained and competent in lead paint management.

1.12 SYSTEMATIC APPROACH

The successful management of a lead paint project involving a residential, public or commercial building, requires consideration of many factors. Each project will require an assessment of the design life and service environment of the building, condition of the existing coating system, and management of hazards associated with lead paint disturbance or removal.

The design phase of a lead paint project involves a systematic approach aimed at ensuring that the project achieves its durability aims with no negative impact on workers, adjacent workers, public health or the environment adjoining the site. Guidance with regards to each step in the process is given in Sections 2 to 8.

1.13 RISK ASSESSMENT

Part 1 of this Standard recommended the use of a documented process, involving an assessment of the risks associated with the public, adjacent workers and the environment surrounding an industrial work site. This Part 2 addresses residential, public and commercial buildings, where the public may be present on a continuous basis, and recommends that the highest level of risk be routinely assigned to lead paint projects.

NOTE: General information on risk management is given in AS/NZS ISO 31000.

SECTION 2 DETECTION AND ASSESSMENT OF LEAD PAINT

2.1 GENERAL

The presence of lead contamination within or outside a building may result from renovation of that building, or may emanate from other external sources such as—

- (a) atmospheric deposits caused by leaded petrol previously used in motor vehicles;
- (b) residues from nearby industrial sites, such as smelters;
- (c) other lead paint removal projects performed in the vicinity of the building;
- (d) naturally occurring lead (some geographical regions);
- (e) deteriorating in-situ lead paint; or
- (f) residues from previous land use activities.

Historical records may show that lead paints were used in an applied paint system, however, the absence of lead paint from the original paint specification for a building does not ensure that lead paint has not been applied subsequently.

All sampling and testing of paint for lead content should be carried out by persons competent to do so. A Lead Specialist may be engaged for sampling and testing, and to provide technical support, associated with lead work on the relevant building classification.

2.2 HISTORICAL LEAD LEVEL

Paint on buildings prior to the 1970s often had lead concentrations of 10% to 20%. Paints containing white lead pose the greatest risk since the white lead is highly reactive, readily absorbed and its sweet taste is attractive to children. However, paint with more than 1% lead, or paint containing any amount of white lead, were prohibited for domestic use after 1965.

Since 1997, paints manufactured for use in buildings were prohibited through regulation from containing lead in excess of 0.1%. Most manufacturers had already reduced the lead content of paints to such levels prior to 1997, and water-borne acrylic paints in particular rarely had a lead content above 0.1%. However, it is possible that paints with more than 0.1% lead have been applied at some time prior to 1997. It should also be noted that industrial paints, which do not comply with these requirements, might have been used on large residential, public or commercial building projects.

2.3 CONDITION OF PAINT

2.3.1 Lead in deteriorating paint

If lead is present in paint that is still in sound condition, and is not a friction or impact surface, it is not likely to present a health hazard unless disturbed. However, if the paint is in poor condition, e.g. flaking, peeling or badly chalking, it may be a risk to those touching it, or through disturbance by rain or high winds.

Flaking of old lead paint from exterior surfaces is common even where a number of coats of more recent lead-free paints have been applied. These flakes usually settle on soil or paved areas, and may then be ingested or inhaled if crushed or weathered.

If paint is known to be pre-1997, is in poor condition and is accessible to children, it may present a health risk, and the paint should be tested for the presence of lead, using either of the methods described in Clauses 2.4.2 or 2.4.3. If it is found to contain more than 0.1% of lead by weight, careful and immediate measures are required to control this hazard.

If the presence of lead is known or suspected, the extent of the hazard will be related to the amount and condition of lead paint present, and the lead concentration. A single wall panel or metal door-frame with high lead levels may not be as great a hazard as the entire exterior of a house with peeling lead paint of a lower lead concentration. Small area hazards are usually easier to control.

2.3.2 Lead in paint during maintenance or renovation

Renovation of buildings usually involves some disturbance of paint. Under such circumstances, lower levels of lead in paint can be made hazardous by unsafe practices.

Dust should be controlled during all maintenance and renovation work, even if the lead content of the paint is relatively low. Dry sanding a large area covered with paint with a low concentration of lead could present a greater risk than wet scraping where paint contains a higher concentration of lead.

Dust emissions generated during renovations can be difficult to contain and remove, and may pose a danger to the occupants. Lead dust has been shown to remain in carpets for many years after renovations, and can be inadvertently transferred to other areas of buildings.

The extent of the hazard is related to the amount of the particular paint present but the method of removal can increase the risk.

2.4 METHODS OF DETECTION

2.4.1 General

If the presence of lead in paint is known or suspected, testing should be carried out using either of the methods described in Clauses 2.4.2 or 2.4.3. Methods of detection are fully described in Appendix A.

2.4.2 Portable X-ray fluorescence (XRF) field tests

This method uses a portable instrument in the field to provide a numerical value for the amount of lead present in paint on a surface. It provides an instantaneous result and is non-destructive.

There may be a requirement, in some jurisdictions, for operators to be trained, competent and licensed to use portable XRF analysers.

2.4.3 Laboratory analysis

This method provides both confirmation of the presence of lead and its concentration in an existing paint film. The laboratory result is a combined value for all layers of paint, and its accuracy is dependent to some extent on the sampling technique.

2.5 INTERPRETATION OF RESULTS

2.5.1 XRF field test results

XRF measures the amount of lead in paint per unit area, in mg/cm^2 . The XRF result is a combined value for all layers of paint on the surface. Using an isotope based XRF, location of the lead can be determined using the depth index. All layers in a coating system can be measured.

Since XRF analysis in the field is a specialized task, the interpretation of test results is usually provided with the service.

2.5.2 Laboratory analysis results

Laboratory results express the lead content in absolute terms as its concentration by mass of paint, either as a percentage or as mg/kg [also known as parts per million (ppm)].

Laboratory analysis of paint samples gives an average lead content for all the paint in the sample submitted. Any paint remaining on the surface is not tested, so care should be taken to remove all the paint when taking the sample.

It is possible that a paint sample consisting of pre-1997 paint, containing lead at more than 0.1%, which has later been overcoated with one or more layers of lead-free paint, will record a laboratory analysis result of less than 0.1% of lead for the entire sample. Careful examination of the entire paint system is recommended when sampling to allow correct interpretation of the laboratory result.

TABLE 2.1
COMPARISON OF METHODS FOR DETECTION OF LEAD IN PAINT

Subject of comparison	XRF field tests	Laboratory analysis
Method description (Appendix A)	Paragraph A3.1	Paragraph A3.2
Instant result?	Yes	No (3–14 days)
Destructive to paint film?	Not normally	Small area of paint removed
Potential to create dust and waste	None	Moderate
Need to reseal sample area	Not normally required	Usually required
Distinguish between layers	No (depth indication may be possible)	No
Required level of skill	Fully trained and licenced operator required	Correct sampling and laboratory technique to be used
Quantitative?	Yes	Yes
Units	mg/cm ²	mg/kg (= ppm) or % by weight of dry paint (0.1% = 1000 ppm)
Advantages	Non-destructive, instant result, accurate, quantitative	Accurate and quantitative, inexpensive
Disadvantages	Expensive equipment and fully trained operator, not widely available, averages lead content between layers, interpretation needed	Destructive, delay before results available; averages lead content between layers
Recommended use	Use if available	Use on large buildings where the paint may be identical on large areas, or on areas of special concern