

LEAD HAZARD EVALUATION NOTICE

Address: 20 Sampson Avenue, Apartment 4, Seaside Heights, New Jersey 08751

SRP0043851

Evaluation Completed (circle one): Paint Inspection Paint Testing Risk Assessment


Date: 01/09/14

Summary of Results:


No lead-based paint or lead-based paint hazards were found.

Lead-based paint and/or lead-based paint hazards were found. See attachment for details

Contact person for more information about the risk evaluation:

Printed name: Robert Carlucci
Signature: 
Date: 01/14/14
Organization: Creative Environment Solutions Corp
Street: 39 West 37th Street, 14th Floor
City & State: New York, NY
Zip: 10018
Phone #: 212-290-6323

Person who prepared this notice:

Printed name: Michael Rattacasa
Signature: 
Date: 01/14/14
Organization: Creative Environment Solutions Corp
Street: 39 West 37th Street, 14th Floor
City & State: New York, NY
Zip: 10018
Phone #: 212-290-6323

Summarize the types and locations of lead-based paint hazards below or attach your own summary. The summary must list at least the bare soil locations, dust-lead locations, and/or building components (including type of room or space and the material underneath the paint), and types of lead-based paint hazards found:

Contaminated Soil		
Area	mg/g (ppm)	Location
<input checked="" type="checkbox"/> None		
<input type="checkbox"/> Perimeter	___ mg/kg (ppm)	
<input type="checkbox"/> Play Area	___ mg/kg (ppm)	
<input type="checkbox"/> Other	___ mg/kg (ppm)	

Contaminated Dust		
Area	µg/SF	Location
<input type="checkbox"/> None		
<input type="checkbox"/> Windowsill	___ µg/SF	
<input checked="" type="checkbox"/> Floor	41 µg/SF	Living Room
<input checked="" type="checkbox"/> Floor	65 µg/SF	Bedroom
<input type="checkbox"/> Other	___ µg/SF	

Other Hazards				
Component*	Location	Condition (good, fair, poor)	Friction or Impact Surface?	Lead Content (if known)
1.				___ mg/cm ² (ppm)
2.				___ mg/cm ² (ppm)
3.				___ mg/cm ² (ppm)
4.				___ mg/cm ² (ppm)
5.				___ mg/cm ² (ppm)
6.				___ mg/cm ² (ppm)
7.				___ mg/cm ² (ppm)
8.				___ mg/cm ² (ppm)
9.				___ mg/cm ² (ppm)
10.				___ mg/cm ² (ppm)
11.				___ mg/cm ² (ppm)
12.				___ mg/cm ² (ppm)
13.				___ mg/cm ² (ppm)
14.				___ mg/cm ² (ppm)

* Components include but are not limited to (interior and exterior) windows, doors, trim, fences, porches, walls and floors.



Creative Environment Solutions Corp.

39 West 37th Street, 14th Floor, New York, NY 10018

Phone: 212.290.6323 Fax: 212.290.6325

LICENSED & APPROVED by NYS DOH/DOL/DOS, NYC DOB/DEP, FDNY, PIE

LEAD-BASED PAINT RISK ASSESSMENT REPORT

Site Location:

**20 Sampson Avenue
Apartment 4
Seaside Heights, New Jersey 08751
SRP0043851**

Prepared for:

**Gilbane Building Company
New Jersey LLRP Program
3150 Brunswick Pike, Suite 300
Lawrenceville, New Jersey 08648**

Prepared by:

Creative Environment Solutions Corp.
39 West 37th Street, 14th Floor
New York, New York 10018

January 14, 2014

EXECUTIVE SUMMARY

Creative Environment Solutions Corp. (CES) was retained by Gilbane Building Company; located at, 3150 Brunswick Pike, Suite 300, Lawrenceville, New Jersey 08648, to perform a Risk Assessment for Lead-Based Paint (LBP) at the Private Residence; located at, 20 Sampson Avenue, Apartment 4, Seaside Heights, New Jersey 08751. The inspection was conducted in conjunction with the residence's participation in the New Jersey Landlord Repair Program (LLRP).

CES' New Jersey Department of Health and Senior Services certified Lead Paint Inspector/Risk Assessor, Robert Carlucci, performed a LBP Risk Assessment at the above-referenced location. The inspection was conducted to identify the presence of any LBP and/or lead hazards located within the aforementioned interior and/or exterior of the residence. Mr. Carlucci utilized an [Innov-X System Alpha Series X-Ray Fluorescence Spectrometer] (XRF) to determine the presence or absence of lead in paint.

The analytical results from this Assessment effort identified the following lead-based paint (LBP) and Lead hazards, as defined by the United States Environmental Protection Agency (USEPA) and/or the department of Housing and Urban Development (HUD) standards:

Interior LBP

- No LBP was identified on the interior due to the lack of coated surfaces.

Exterior LBP

- Not Applicable

Existing Lead-Based Paint Hazards and Potential Lead Hazards

There were no areas coated with LBP that is deteriorated and currently present existing lead-based paint hazards.

Dust hazards were identified in the Living Room and Bedroom.

Future renovations plans were not provided to CES at the time of the inspection.

Please refer to the enclosed for further inspection details, XRF results and/or laboratory analytical results.

Please refer to Table I for a full summary of inspection results.

IDENTIFYING INFORMATION

A Lead Hazard Risk Assessment and LBP Testing (Assessment) was conducted at 20 Sampson Avenue, Apartment 4, Seaside Heights, New Jersey 08751 on January 9, 2014 from 11:30 to 12:00. The Assessment was conducted by Robert Carlucci, (NJ-027111). The purpose of the Assessment was to identify the presence of lead hazards on and/or in a limited number of surfaces inside and outside the residence, as well as to identify the presence of deteriorated lead-based paint (LBP) and LBP that may be disturbed during planned renovation and/or restoration activities.

RESIDENT QUESTIONNAIRE

Address: 20 Sampson Avenue, Apartment 4, Seaside Heights, New Jersey 08751

Children in the Household: N/A, Unoccupied

Children's Bedroom Locations: N/A

Children's Eating Locations: N/A

Primary Interior Play Area(s): N/A

Primary Exterior Play Area(s): N/A

Toy Storage: N/A

Pets: N/A

Children's Blood Lead Testing History: N/A

Observed Chewed Surfaces: N/A

Women of Child Bearing Age: N/A

Previous Lead Testing: N/A

Most Frequently Used Entrance: N/A
Most Frequently Opened Windows: N/A
Structure Cooling Method: N/A
Gardening - Type and Location(s): No
Plans for Landscaping: No
Cleaning Regiment: N/A
Cleaning Methods: N/A
Recently Completed Renovations: N/A
Demolition Debris on Site: No
Resident(s) Work in Lead Industry: N/A
Planned Renovations: Repair damage

BUILDING CONDITION SURVEY

Address: 20 Sampson Avenue, Apartment 4, Seaside Heights, New Jersey 08751
Date of Construction: 1962
Apparent Building Use: Rental
Setting: Residential
Front Entry Faces: N/A
Design: Apartment Building
Construction Type: Wood frame with brick
Lot Type: Flat
Roof: Flat
Foundation: Cement Slab
Front Lawn Condition: N/A
Back Lawn Condition: N/A
Drip Line Condition: Poor
Site Evaluation: Poor
Exterior Structural Condition: Poor
Interior Structural Condition: Poor
Overall Building/Site Condition: Poor

PROPERTY RENOVATION AND REPAIR HISTORY

Historic renovation and repair history for the subject property were not provided to CES at the time of the assessment. The subject property is a one bedroom, one bathroom residence that was constructed in 1962.

PREVIOUS SAMPLING AND TESTING

Records regarding previous lead sampling and/or testing at the subject property were not provided to CES at the time of the assessment.

IDENTIFIED LEAD HAZARDS

The subject property was impacted by Hurricane Sandy; therefore, all materials coated with LBP have the potential to be impacted by future renovation and/or restoration activities.

Existing Lead Hazards

The following areas are coated with Lead-Based Paint (LBP) that is *deteriorated* and currently present existing lead-based paint hazards.

No areas were identified.

Potential Lead Hazards

No areas were identified.

Please refer to the enclosed for further inspection details, XRF results and/or laboratory analytical results.

PAINT SAMPLING AND TESTING

LBP Testing, conforming with HUD Guidelines 24 CFR 35 Section 35.930 (c), (d) was accomplished at this residence on surfaces found to have deteriorated paint and/or where it was indicated to the Assessor that planned renovation would occur. No paint chip samples were taken. On January 9, 2014, a total of two (2) tests (assays) were taken at a limited number of specified surfaces on the inside and outside of the residence using an x-ray fluorescence analyzer. Deteriorated paint and areas that were specified to be disturbed during the planned renovation project were tested. Lead concentrations that meet or exceed the HUD published levels identified as being potentially dangerous (e. g., greater than or equal to 1.0 milligrams per centimeter square [$> 1.0 \text{ mg/cm}^2$]) were not encountered.

It should be noted that lead concentrations (in paint) that are less than the levels that identify a surface coating as LBP still have the potential of causing lead poisoning. Should these or any potential LBP painted components and/or surfaces be disturbed in any manner that generates dust, extreme care must be taken to limit its spread. It should be assumed that any and all painted surfaces, components, or surfaces not requested to be tested as part of this investigation, or any previous investigations, are coated with LBP, and that renovation or repair activities in these areas dictate the use of safe work practices that limit dust generation and area contamination.

INTERIOR DUST SAMPLING

A total of four (4) single surface dust wipe samples were collected in an effort to help to determine the levels of lead-containing dust on the interior windowsills and floors. These samples were collected from areas most likely to be lead contaminated if lead-in-dust is present. These samples were collected in accordance with the requirements of ASTM Standard E-1728, Standard Practice for Field Collection of Settled Dust Samples Using Wipe Sampling Methods for Lead Determination by Atomic Spectrometry Techniques. USEPA and HUD regulations define the following as dangerous levels for lead dust in residences: floors – $\geq 40 \text{ } \mu\text{g}/\text{ft}^2$ (micrograms per square foot); interior windowsills – $\geq 250 \text{ } \mu\text{g}/\text{ft}^2$; and, interior window troughs – $\geq 400 \text{ } \mu\text{g}/\text{ft}^2$. Please refer to **Appendix B – Laboratory Analytical Results** for the detailed information regarding dust sampling results. According to the laboratory analytical results, two (2) out of the four (4) samples collected exhibited lead concentrations in excess of the aforementioned regulatory thresholds. These samples were obtained from the living room and bedroom floors and constitute a dust-lead hazard in that room.

SOIL SAMPLING AND LABORATORY INFORMATION

Not applicable.

ONGOING MONITORING

Ongoing monitoring is necessary in all dwellings in which LBP is known or assumed to be present. At these dwellings, the very real potential exists for LBP hazards to develop. Hazards can develop by means such as, but not limited to: the failure of lead hazard control measures; previously intact LBP becoming deteriorated; dangerous levels of lead-in-dust (dust lead) re-accumulating through friction, impact, and deterioration of paint; or, through the introduction of contaminated exterior dust and soil into the interior of the structure. Ongoing monitoring typically includes two different activities: re-evaluation and annual visual surveys. A re-evaluation is a risk assessment that includes limited soil and dust sampling and a visual evaluation of paint films and any existing lead hazard controls. Re-evaluations are supplemented with visual surveys by the Owner, which should be conducted at least once a year. Owner conducted visual surveys do not replace the need for professional re-evaluations. Visual surveys should confirm that all Paint with known or suspected LBP are not deteriorating, that lead hazard control methods have not failed, and that structural problems do not threaten the integrity of any remaining known, assumed or suspected LBP. The partial table below is taken from Table 6.1, Standard Re-evaluation Schedules, as found in the HUD publication entitled; Guidelines for the Evaluation and Control of LBP Hazards in Housing, dated June 1995, with September 1997 revisions. It is intended as a guideline for the Owner to assess the condition of areas where hazard control activities occurred.

Factors at this residence require the use of Ongoing Monitoring Schedule item number five (5), to dictate monitoring protocol. Visual surveys by the Owner should occur on at least a yearly basis for all painted surfaces. All surfaces that have undergone the hazard control strategy of Interim Controls, Encapsulation or Enclosure should also be checked during this survey. If components are replaced (windows), no re-evaluation or visual survey would be needed, since the LBP would have been removed with the old windows. Please refer to your community development agency, housing authority, or other applicable agency for additional local/regional regulations and guidelines governing re-evaluation activities.

Standard Re-evaluation Schedule

Schedule	Original Evaluation Results	Action taken	Re-evaluation Frequency & Duration	Visual Survey Schedule
3	The average of leaded dust levels on all floors, interior window sills, or window troughs sampled exceeds the applicable standard, but by less than a factor of 10.	A. Interim controls and/or hazard abatement (or mixture of the two), including, but not necessarily limited to, dust removal. This schedule does not include window replacement. B. Treatments specified in section A plus replacement of all windows with lead hazards. C. Abatement of all lead-based paint using encapsulation or enclosure. D. Removal of all lead-based paint.	1-2 Years. 1 Year. None None	Annually and whenever information indicates a possible problem except for encapsulants. The first visual survey of encapsulants should be done one month after clearance; the second should be done 6 months later and annually thereafter. Same as above. None

DISCLOSURE REGULATIONS

A copy of this complete report must be made available to new lessees (tenants) and/or must be provided to purchasers of this property under Federal law before they become obligated under any future lease or sales contract transactions (Section 1018 of Title X – found in 24 CFR Part 35 and 40 CFR Part 745), until the demolition of this property. Landlords (Lessors) and/or sellers are also required to distribute an educational pamphlet developed by the EPA entitled “Protect Your Family From Lead in Your Home” and include standard warning language in their leases or sales contracts to ensure that parents have the information they need to protect their children from LBP hazards.

FUTURE RENOVATION AND/OR REHABILITATION PRECAUTIONS

It should be noted that during this Assessment, a limited number of areas were tested for the presence of LBP. All LBP, dust, and soil hazards that were identified are addressed in this report. However, LBP, dust lead hazards, and/or soil lead hazards may be present at other locations of the property. Additional paint testing should precede any future remodeling activities that occur at any untested areas. Additional dust and/or soil sample collection and analysis should follow any hazard control activity, repair, remodeling, or renovation effort, and any other work efforts that may in any way disturb LBP and/or any lead containing materials. These Assessment activities will help the Client and owner to ensure the health and safety of the occupants and the neighborhood. Details concerning lead safe work techniques and approved hazard control methods can be found in the HUD publication entitled: “Guidelines for the Evaluation and Control of LBP Hazards in Housing” (June 1995 & 1997 Revision).

LEAD HAZARD CONTROL OPTIONS AND COST ESTIMATES

Lead-safe work practices and worker/occupant protection practices complying with current EPA, HUD and OSHA standards will be necessary to safely complete all work involving the disturbance of LBP coated surfaces and components. In addition, any work considered Lead hazard control will enlist the use of interim control (temporary) methods and/or abatement (permanent) methods. It should be noted that all lead hazard control activities have the potential of creating additional hazards, or even creating hazards that were not present before. All persons and/or firms performing lead hazard control activities must have received proper training in Lead-Safe Work Practices and/or Lead Abatement. Details for the listed lead hazard control options and issues surrounding occupant/worker protection practices can be found in the publication entitled: Guidelines for the Evaluation and Control of LBP Hazards in Housing (June 1995 & 1997 Revision) published by the HUD, as well as in the Occupational Safety and Health Administration (OSHA) regulations found in 29 CFR, Part 1926.62, known as the OSHA Lead Exposure in Construction Industry Standard.

The associated cost estimates, unless otherwise noted, include the labor and materials to accomplish the stated activity and most additional funds typically found to be necessary to complete worker protection, site containment, and cleanup procedures. These are approximate estimates only and due to a variety of potential factors, may not accurately reflect all local cost factors. A precise estimate must be obtained from a certified LBP abatement contractor or a contractor trained in lead safe work practices. Properly trained and/or licensed persons, as well as properly licensed firms (as mandated) should accomplish all abatement/interim control activities conducted at this residence.

Interim controls, as defined by HUD, means a set of measures designed to temporarily reduce human exposure to LBP hazards and/or lead containing materials. These activities include, but are not limited to: component and/or substrate repairs; paint and varnish repairs; the removal of dust-lead hazards; renovation; remodeling; maintenance; temporary containment; placement of seed, sod or other forms of vegetation over bare soil areas; the placement of at least 6 inches of an appropriate mulch material over an impervious material, laid on top of bare soil areas; the tilling of bare soil areas; extensive and specialized cleaning; and, ongoing LBP maintenance activities.

Abatement, as defined by HUD, means any set of measures designed to permanently eliminate LBP and/or LBP hazards. The product manufacturer and/or contractor must warrant abatement methods to last a minimum of twenty (20) years, or these methods must have a design life of at least twenty (20) years. These activities include, but are not necessarily limited to: the removal of LBP from substrates and components; the replacement of components or fixtures with lead containing materials and/or lead containing paint; the permanent enclosure of LBP with construction materials; the encapsulation of LBP with approved products; the removal or permanent covering (concrete or asphalt) of soil-lead hazards; and, extensive and specialized cleaning activities.

Special Cleaning Preceding Lead Hazard Control Activities

Before any lead hazard control activities begin, the structure and site must be inspected and pre-cleaned following HUD specified cleaning protocols, as detailed in the Guidelines for the Evaluation and Control of LBP Hazards in Housing (June 1995 & 1997 Revision), published by the U.S. Department of Housing and Urban Development. Some of the required steps include removing large debris and paint chips followed by HEPA vacuuming of all horizontal surfaces (floors, windowsills, troughs, etc.). The cleaning protocols described in this publication can assist the contractor in doing a preliminary cleaning and improving the chances of passing clearance inspections after remediation.

Table II: Lead in Dust/Soil Contamination Cost Estimate

Line Items	Material(s)	Cost Estimate
1	Living Room Floor	\$1,900.00
2	Bedroom Floor	\$1,900.00

*The aforereferenced cost estimate assumes all abatement activities are conducted by Union Labor. Additionally the cost estimate assumes that the residency achieves regulatory compliance following one(1) contamination clean-up.

LIMITATIONS AND CONDITIONS

CES has performed the tasks set forth above in a thorough and professional manner consistent with industry standards. CES cannot guarantee and does not warrant that this assessment has revealed all adverse environmental conditions affecting the site. Nor can CES warrant that the assessment requested will satisfy the dictates of, or provide a legal defense in connection with, environmental laws or regulations. The observations and findings were representative of the conditions from the site on the date of inspection. Often materials are located in confined or inaccessible locations with little or no visible manifestation of their presence. These materials may be found in various areas under existing flooring materials, above ceilings, behind walls, materials within fixtures, electrical wire casing, or buried pipes and wires. Due to the potential for hidden materials to be present, it may not be possible to determine if all suspect building materials have been identified, located, and subsequently tested. Destructive measures to access these and other potentially hidden

materials were not employed by CES as part of this project. However, CES does warrant that its investigations and methodology reflect our best efforts based upon prevailing standard of care in the environmental industry.

The information contained in this report was prepared based upon specific parameters and regulations in force at the time of this report. The information herein is only for the specific use of the client and CES. CES accepts no responsibility for the use, interpretation, or reliance by other parties on the information contained herein, unless written authorization has been obtained from CES.



Robert Carlucci
Certified Lead Paint Inspector/Risk Assessor

01/14/2014
Date



Michael J. Rattacasa
Operations Director

01/14/2014
Date

APPENDIX A

XRF Testing Results Table

**20 Sampson Avenue, Apartment 4
Seaside Heights, New Jersey 08751**

Reading #	Room location	Wall	Component	Subcomponent	Substrate	Color	Condition	Result	Lead mg cm2
1	Living Room	A	Window	Sill	Wood	White	Good	Negative	-0.1
2	Living Room	A	Door		Wood	Varnish	Good	Negative	0.2

APPENDIX B

Laboratory Analytical Results

**EMSL Analytical, Inc.**

307 West 38th Street, New York, NY 10018

Phone/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com>manhattanlab@emsl.com

EMSL Order:	031401131
CustomerID:	CES50
CustomerPO:	
ProjectID:	

Attn: **Creative Environment Solutions Corp.**
39 West 37th Street
14th Floor
New York, NY 10018

Phone: (212) 290-6323
 Fax: (212) 290-6325
 Received: 01/10/14 5:10 PM
 Collected: 1/9/2014

Project: 13-07.339/ GILBANE/ GILBANE LLRP SRP0043851/ 20 SAMPSON APT 4

Test Report: Lead in Dust by Flame AAS (SW 846 3050B*/7000B)

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Area Sampled</i>	<i>Lead Concentration</i>
01 Site: BEDROOM FLOOR	0001	1/9/2014	1/11/2014	144 in ²	41 µg/ft ²
02 Site: LIVING ROOM FLOOR	0002	1/9/2014	1/11/2014	144 in ²	65 µg/ft ²
03 Site: LIVING ROOM SILL	0003	1/9/2014	1/11/2014	198 in ²	48 µg/ft ²
04 Site: BEDROOM FLOOR	0004	1/9/2014	1/11/2014	144 in ²	26 µg/ft ²

M. Apfeldorfer

Miron Apfeldorfer, Laboratory Manager
 or other approved signatory

Reporting limit is 10 ug/wipe. The QC data associated with these sample results included in this report meet the method quality control requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities.

* slight modifications to methods applied Samples received in good condition unless otherwise noted. Quality Control Data associated with this sample set is within acceptable limits, unless otherwise noted
 Samples analyzed by EMSL Analytical, Inc. New York, NY AIHA-LAP, LLC--ELLAP Accredited #102581, NYS ELAP 11506

Initial report from 01/11/2014 13:26:56



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www.CEScenter.com

Creative Environment Solutions Corp.

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Phone: 212.290.6323 Fax: 212.290.6325

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SAMPLING CHAIN-OF-CUSTODY FORM

PAGE 1 OF 1

Date Collected: <u>1-9-14</u>	Project Name: <u>Gilbane LLC SRP0043851</u>	Client: <u>Gilbane</u>
Collected by: <u>Bob Carucci</u>	Project Location: <u>20 Sampson Apt 4</u>	Project No.: <u>13-07.339</u>

Task / Activity: Background, Pre-Abatement/Clean-Up, During Abatement/Clean-Up,
 Post Abatement/Clean-Up, Inspection, Repair/ Interim Control,
 Construction/Alteration/Demolition, Other: _____

Matrix: S = SOIL; L = LIQUID; A = AIR; SL = SLUDGE; W = WIPE; P = PAINT CHIPS; B = BULK MATERIAL

Laboratory: EMSL ELAP No. 11506 Analysis Requested: NIOSH 7400A
 _____ ELAP No. _____ TEM (AHERA)
 _____ ELAP No. _____ Other: _____
 _____ ELAP No. _____ As Indicated

Sample ID	Matrix	Flow Rate		Average Flow Rate	Time		Total Minutes	Total Volume	Sample Location / Description	Analysis Requested/Results:				
		Start	Finish		Start	Finish				Lead	Asbestos PLM	Asbestos TEM	VOC	SVOC
01	W								Bedroom floor 12x12	X				
02	W								Living room floor 12x12	X				
03	W								Living room sill 36x5 1/2	X				
04	W								Bedroom floor 12x12	X				
<u>03/14/1131</u>														

Turn-Around-Time: Immediate, 4 Hr, 24 Hr, 48 Hr, 72 Hr Results to: X Fax: 212-290-6325
 3-5 Days, 5-10 Days, Other _____ X E-mail: ceslabresults@aol.com
Special Instructions: _____ Other: _____

Site		Laboratory	
Relinquished By	Delivery Method	Received By	Date
<u>Bob Carucci</u>		<u>Jenny Petros</u>	<u>1/10 @ 5:00 PM</u>

APPENDIX C

Licenses and Certifications

Performance Characteristic Sheet

EFFECTIVE DATE: October 25, 2006

EDITION NO.: 5

MANUFACTURER AND MODEL:

Make: *Radiation Monitoring Devices*Model: *LPA-1*Source: *⁵⁷Co*

Note: This sheet supersedes all previous sheets for the XRF instrument of the make, model, and source shown above ***for instruments sold or serviced after June 26, 1995. For other instruments, see prior editions.***

FIELD OPERATION GUIDANCE

OPERATING PARAMETERS:

Quick mode or 30-second equivalent standard (Time Corrected) mode readings.

XRF CALIBRATION CHECK LIMITS:

0.7 to 1.3 mg/cm ² (inclusive)

SUBSTRATE CORRECTION:

For XRF results below 4.0 mg/cm², substrate correction is recommended for:

Metal using 30-second equivalent standard (Time Corrected) mode readings.

None using quick mode readings.

Substrate correction is not needed for:

Brick, Concrete, Drywall, Plaster, and Wood using 30-second equivalent standard (Time Corrected) mode readings

Brick, Concrete, Drywall, Metal, Plaster, and Wood using quick mode readings

THRESHOLDS:

30-SECOND EQUIVALENT STANDARD MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm ²)
Results corrected for substrate bias on metal substrate only	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	0.9
	Plaster	1.0
	Wood	1.0

QUICK MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm ²)
Readings not corrected for substrate bias on any substrate	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0

BACKGROUND INFORMATION

EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted on approximately 150 test locations in July 1995. The instrument that performed testing in September had a new source installed in June 1995 with 12 mCi initial strength.

OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

XRF CALIBRATION CHECK:

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm² in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm² film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

SUBSTRATE CORRECTION VALUE COMPUTATION:

Chapter 7 of the HUD Guidelines provides guidance on correcting XRF results for substrate bias. Supplemental guidance for using the paint film nearest 1.0 mg/cm² for substrate correction is provided:

XRF results are corrected for substrate bias by subtracting from each XRF result a correction value determined separately in each house for single-family housing or in each development for multifamily housing, for each substrate. The correction value is an average of XRF readings taken over the NIST SRM paint film nearest to 1.02 mg/cm² at test locations that have been scraped bare of their paint covering. Compute the correction values as follows:

Using the same XRF instrument, take three readings on a bare substrate area covered with the NIST SRM paint film nearest 1 mg/cm². Repeat this procedure by taking three more readings on a second bare substrate area of the same substrate covered with the NIST SRM.

Compute the correction value for each substrate type where XRF readings indicate substrate correction is needed by computing the average of all six readings as shown below.

For each substrate type (the 1.02 mg/cm² NIST SRM is shown in this example; use the actual lead loading of the NIST SRM used for substrate correction):

$$\text{Correction value} = (1^{\text{st}} + 2^{\text{nd}} + 3^{\text{rd}} + 4^{\text{th}} + 5^{\text{th}} + 6^{\text{th}} \text{ Reading}) / 6 - 1.02 \text{ mg/cm}^2$$

Repeat this procedure for each substrate requiring substrate correction in the house or housing development.

EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use either the Quick Mode or 30-second equivalent standard (Time Corrected) Mode readings.

Conduct XRF re-testing at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family and multi-family housing, a result is defined as a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

BIAS AND PRECISION:

Do not use these bias and precision data to correct for substrate bias. These bias and precision data were computed without substrate correction from samples with reported laboratory results less than 4.0 mg/cm² lead. The data which were used to determine the bias and precision estimates given in the table below have the following properties. During the July 1995 testing, there were 15 test locations with a laboratory-reported result equal to or greater than 4.0 mg/cm² lead. Of these, one 30-second standard mode reading was less than 1.0 mg/cm² and none of the quick mode readings were less than 1.0 mg/cm². The instrument that tested in July is representative of instruments sold or serviced after June 26, 1995. These data are for illustrative purposes only. Actual bias must be determined on the site. Results provided above already account for bias and precision. Bias and precision ranges are provided to show the variability found between machines of the same model.

30-SECOND STANDARD MODE READING MEASURED AT	SUBSTRATE	BIAS (mg/cm ²)	PRECISION* (mg/cm ²)
0.0 mg/cm ²	Brick	0.0	0.1
	Concrete	0.0	0.1
	Drywall	0.1	0.1
	Metal	0.3	0.1
	Plaster	0.1	0.1
	Wood	0.0	0.1
0.5 mg/cm ²	Brick	0.0	0.2
	Concrete	0.0	0.2
	Drywall	0.0	0.2
	Metal	0.2	0.2
	Plaster	0.0	0.2
	Wood	0.0	0.2
1.0 mg/cm ²	Brick	0.0	0.3
	Concrete	0.0	0.3
	Drywall	0.0	0.3
	Metal	0.2	0.3
	Plaster	0.0	0.3
	Wood	0.0	0.3
2.0 mg/cm ²	Brick	-0.1	0.4
	Concrete	-0.1	0.4
	Drywall	-0.1	0.4
	Metal	0.1	0.4
	Plaster	-0.1	0.4
	Wood	-0.1	0.4

*Precision at 1 standard deviation.

CLASSIFICATION RESULTS:

XRF results are classified as positive if they are greater than the upper boundary of the inconclusive range, and negative if they are less than the lower boundary of the inconclusive range, or inconclusive if in between. The inconclusive range includes both its upper and lower bounds. Earlier editions of this *XRF Performance Characteristics Sheet* did not include both bounds of the inconclusive range as "inconclusive." While this edition of the Performance Characteristics Sheet uses a different system, the specific XRF readings that are considered positive, negative, or inconclusive for a given XRF model and substrate remain unchanged, so previous inspection results are not affected.

DOCUMENTATION:

An EPA document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD. A HUD document titled *A Nonparametric Method for Estimating the 5th and 95th Percentile Curves of Variable-Time XRF Readings Based on Monotone Regression* provides supplemental information on the methodology for variable-time XRF instruments. A copy of this document can be obtained from the HUD lead web site, www.hud.gov/offices/lead.

This XRF Performance Characteristic Sheet was developed by QuanTech, Inc., under a contract from the U.S. Department of Housing and Urban Development (HUD). HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.



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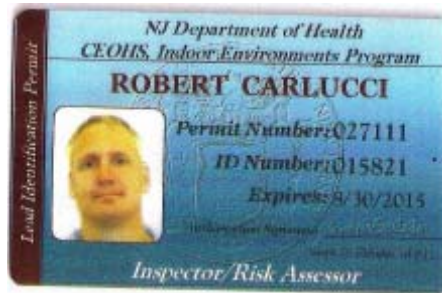
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