



SECTION 028300

LEAD-BASED PAINT REMOVAL AND RELATED WORK

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS that are hereby made a part of this Section of the Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT AND GENERAL CONDITIONS.

1.02 DESCRIPTION OF WORK

- A. Certain surfaces at [PROPERTY NAME] have been [identified **OR** presumed] as being coated with lead based paint (LBP). The results of the LBP [inspection **OR** screening] conducted at [PROPERTY NAME] are contained in the report [TITLE AND DATE], prepared by [LEAD PAINT CONSULTANT]. This report provides information on the substrates that were tested and the results. A complete copy of the report is included herewith as part of this specification section.
- B. The Contractor is responsible for performing the work in accordance with this specification, with all referenced documents included as part of this specification, and with all applicable Federal, state and local regulations governing work involving lead based paint. Wherever there is a conflict or overlap of requirements, the most stringent provisions shall apply.
- C. All work that disturbs [presumed] lead paint, including but not limited to, demolition, scraping, sanding, or removal of paint from brick walls, removal of building components, and preparation of surfaces for painting, shall comply with this Section.
- D. [COMMERCIAL: It is the intent of the Work to remove any loose and flaking [presumed] lead based paint in areas that will remain in place in the building and to remove, intact, any building materials that are [presumed to be] coated in lead based paint that require full demolition/removal as identified in other specification sections. [The Contractor is responsible to review the lead paint audit report referenced above for specific interior and exterior locations of lead-painted surfaces. The lead paint report is considered to be representative of surfaces and substrates identified within [PROPERTY NAME].]
- E. [RESIDENTIAL LEAD SAFE: It is the intent of the Project to have the Work at PROPERTY carried out as Renovation Work in accordance with 454 CMR 22.11.]
- F. [RESIDENTIAL FULL COMPLIANCE: It is the intent of the Work to bring PROPERTY NAME, SPECIFIC UNIT NUMBERS, ETC. into compliance with Massachusetts regulations and to obtain a letter of Lead Abatement Compliance that indicates that all painted surfaces that exceed the regulatory threshold for Lead (> 1.0 mg/cm² with XRF)



and that could present a hazard to building occupants are being controlled and are in compliance.]

- G. [RESIDENTIAL: Abatement of interior lead painted surfaces shall include THIS DESCRIPTION WILL VARY BASED ON PROJECT GOALS, BUT MAY INCLUDE: INTACT REMOVAL AND DISPOSAL OF PAINTED COMPONENTS or INTACT REMOVAL AND DISPOSAL OF PAINTED COMPONENTS EXCEPT FOR SELECT ITEMS THAT ARE IDENTIFIED ELSEWHERE IN THE SPECIFICATIONS, WHICH WILL BE STRIPPED IN PLACE]. Abatement of exterior lead painted surfaces shall include [THIS DESCRIPTION WILL VARY BASED ON PROJECT GOALS, BUT MAY INCLUDE: INTACT REMOVAL AND DISPOSAL OF EXTERIOR TRIM or INTACT REMOVAL AND DISPOSAL OF SELECT EXTERIOR TRIM EXCEPT FOR SELECT COLUMNS AND COMPONENTS THAT WILL BE STRIPPED IN PLACE or REMOVAL AND DISPOSAL OF ANY LOOSE/FLAKING PAINT ON EXTERIOR SHINGLES, CLAPBOARDS, AND TRIM IN PREPARATION FOR RE-PAINTING OF THE WOOD]. The Contractor is responsible to review the lead paint audit report referenced above for specific interior and exterior locations of lead-painted surfaces.]
- H. The work of this section consists of, but is not limited to:
1. Furnishing all labor, materials, facilities, equipment, services, and insurance necessary to perform the work in accordance with this section and with all Federal, state and local regulations;
 2. Completion of required regulatory notifications, if/when applicable;
 3. Installation of required regulatory warning signs and maintenance of work area/site security;
 4. Preparation of work area, including installation of decontamination areas as required;
 5. Provision of engineering controls and dust control work methods to prevent the release of dust generated by lead-based paint removal work or other activities that may disturb lead-based paint to building occupants, adjacent building areas or the outdoors.
 6. Clean-up and final decontamination of all work areas;
 7. Implementation of a worker protection and training program in compliance with all applicable regulations;
 8. Proper storage (including signage, secondary containment, etc.), labeling, transportation and disposal of all waste generated as part of activities in compliance with all applicable regulations.
- H. The Contractor is responsible for ensuring that all personnel performing work under this section shall be properly trained in accordance with all Federal, state and local regulations, including but not limited to the Occupational Safety & Health Administration's (OSHA) Lead Exposure in Construction Standard (29 CFR 1926.62) and EPA's March 31, 2008 Renovation, Repair, and Painting Rule (Section 402 c (3)) of the Toxic Substances Control Act (TSCA). The Contractor is required to provide proof of training of any and all employees completing the work of this section as part of an initial Lead Paint Contractor Submittal Package at least 10 days prior to the start of Work.



- I. It is the Contractor's responsibility to determine the most efficient method to legally perform this Work. Unless specifically noted, this Specification does not dictate specific methods to be implemented in the performance of the Work.
- J. The Project Manager may have an independent environmental consultant on-site to perform testing, including but not limited to fence line or work area perimeter dust monitoring. The Contractor is responsible for all personnel/employee monitoring, including establishing and maintaining safe work zones. The Contractor shall coordinate their work schedule closely with the Project Manager and shall cooperate fully with the environmental consultant.
- K. Excavation, handling, sampling, transport and disposal of potentially lead contaminated soil will be subject to the requirements of Section 026100 – Excavated Soil and Material Management Plan.
- L. The Contractor will clean all work areas of any visible debris at the end of each workday using a HEPA vacuum and will collect and store all lead waste (e.g., lead paint chips) on site in secured container(s) that are properly labeled and meet all regulatory requirements. Disposal of removed lead based paint waste and debris coated with intact lead based paint is further specified in Paragraph 3.10.

1.03 RELATED WORK

- A. Section 013529 – HAZARDOUS MATERIALS HEALTH AND SAFETY
- B. Section 013543 – ENVIRONMENTAL PROTECTION
- C. Section 015000 – TEMPORARY FACILITIES AND CONTROLS
- D. Section 017419 – CONSTRUCTION AND DEMOLITION DEBRIS MANAGEMENT
- E. Section 020720 – PCB REMEDIATION OF BUILDING MATERIALS
- F. Section 024100 – BUILDING AND ANCILLARY STRUCTURES DEMOLITION
- G. Section 024119 – SELECTIVE DEMOLITION AND SALVAGED MATERIAL
- H. Section 026000 – MISCELLANEOUS HAZARDOUS MATERIAL REMOVAL
- I. Section 026100 – EXCAVATED SOIL AND MATERIALS MANAGEMENT
- J. Section 028200 – ASBESTOS ABATEMENT AND RELATED WORK
- K. Section 099000 – PAINTING AND COATING

1.04 REFERENCES



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The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. The list provided below is not intended to be all inclusive of each regulation prevailing over the work. The latest version of the document listed shall govern the work performed.

- A. Occupational Safety and Health Administration (OSHA)
 - 1. General Industry Standards, 29 CFR 1910.
 - 2. Lead Standard for General Industry, 29 CFR 1910.1025.
 - 3. Respiratory Protection, 29 CFR 1910.134.
 - 4. Hazard Communication, 29 CFR 1910.1200.
 - 5. Specifications for Accident Prevention (Sign and Tags), 29 CFR 1910.245.
 - 6. Construction Industry Standards, 29 CFR 1926.
 - 7. Construction Industry Lead Standard, 29 CFR 1926.62.
- B. Environmental Protection Agency (USEPA)
 - 1. United States Environmental Protection Agency Regulations, 40 CFR Part 261.
- C. Department of Housing and Urban Development (HUD)
 - 1. Lead- Based Paint Regulations, 24 CFR Parts 35, 36, 37.
 - 2. Guidelines for the Evaluation and Control of Lead- Based Paint Hazards in Housing.
- D. Massachusetts Department of Public Health (Mass DPH)
 - 1. Lead Poisoning Prevention and Control, 105 CMR 460.000.
- E. Massachusetts Department of Labor Standards (Mass DLS)
 - 1. Deleading Regulations, 454 CMR 22.00.
- F. Massachusetts Department of Environmental Protection (Mass DEP)
 - 1. Hazardous Waste Regulations, 310 CMR 30.000.
 - 2. Massachusetts Contingency Plan, 310 CMR 40.000.
 - 3. Air Pollution Control Regulations, 310 CMR 7.00-9.00.
 - 4. Massachusetts Solid Waste Management Regulations, 310 CMR 19.000.
- G. Massachusetts General Law Chapter 111 Sections 189A through 199B
- H. Steel Structures Painting Council (SSPC)



1. Guide for Containing Debris Generated During Paint Removal Operations, Guide 61 (CON).
 2. Guide for the Disposal of Lead Contaminated Surface Preparation Debris, Guide 71 (DIS)
- I. American Society for Testing and Materials (ASTM)
1. Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover, ASTM E154 - 08a.
 2. Standard Test Method for Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete, ASTM C156 – 05.
 3. Standard Specification for Aluminum Bronze Rod, Bar, and Shapes, ASTM B150 / B150M – 08.
 4. Standard Specification for Polyethylene Film and Sheeting, ASTM D 2103.
 5. Standard Test Methods and Practices for Emulsified Asphalts, ASTM D244 – 04.
- J. City of Boston, Health & Hospitals Ordinance.
- K. City of Cambridge, Board of Health Ordinance.
- L. Harvard University, Construction Environmental Health and Safety Standard.



1.05 DEFINITIONS

- A. **Abatement/Removal:** Any measure designed to permanently eliminate lead- based paint hazards in accordance with standards established by the EPA Administrator pursuant to Title IV of the Toxic Substances Control Act (TSCA). Abatement strategies include: removal of lead- based paint; enclosure of lead- based paint; encapsulation of lead- based paint (with a product that has been shown to meet standards established or recognized pursuant to Title IV of TSCA); replacement of building components coated by lead- based paint; removal of lead- contaminated dust; removal or covering of lead- contaminated soil with a durable covering (not grass or sod, which are considered interim control measures); as well as all preparation, cleanup, disposal, post- abatement clearance testing, record- keeping, and monitoring (if applicable).
- B. **Abatement Area:** The exterior of the building or an area isolated from the building interior by containment.
- C. [RESIDENTIAL: Accessible, Mouthable Surfaces mean windowsills five feet or less from the floor, stair tread, or ground; handrails; and railing caps (105 CMR 460)]
- D. **Action Level:** An *action level* is an indoor air concentration which should prompt consideration of the need to implement a recommended response. The Action Level for lead is 30 ug/m³ (8-hour, time-weighted average).
- E. **AIHA:** American Industrial Hygiene Association
- F. **BUD:** Beneficial Use Determination (310 CMR 19.000).
- G. **Change Room:** The area of a worker decontamination facility used for removing protective equipment prior to entering the clean room.
- H. **Clean Room:** The area of a worker decontamination facility used for donning protective equipment and storing street clothes.
- I. **Code Enforcement Agency:** The State Lead Poisoning Prevention Program or its agent, or the local Board of Health or other agency responsible for enforcing the State Sanitary Code or sections thereof.
- J. [RESIDENTIAL: **Common Area.** A portion of a building generally accessible to all residents or users of the building, including but not limited to hallways, stairways, laundry and recreational rooms, playgrounds, community centers and boundary fences.]
- K. **Containment:** Means a process for protecting other workers, residents, and the environment by isolating areas from exposures to lead dust and debris created during abatement in a work area.
- L. **Contractor:** Refers to the General Contractor and/or Subcontractor responsible for the Work under contract with Project Manager.
- M. **Deleading:** Refers to the abatement or containment of materials containing dangerous levels of lead in residences by the removal, covering, or encapsulation of lead paint or by replacement of whole building components per 454 CMR 22.00. Deleading does not mean that all lead-based paint has been removed, only that dangerous levels of lead have been controlled to the required standards. Deleading is not to be confused with paint stripping and/or removal, which may be required for restoration and may not be covered by the same deleading regulations.



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- N. DOT: United States Department of Transportation
- O. Enclosure: Covering surfaces and sealing or caulking with durable materials so as to prevent or control chalking, peeling, or flaking substances containing toxic levels of lead from becoming part of house dust or accessible to children.
- P. Engineer: Authorized representative of the Harvard Project Manager. Engineer may refer to the Architect, Designer of Record for the project, Lead Inspector, Risk Assessor or Consultant.
- Q. EPA: United States Environmental Protection Agency
- R. Harvard Project Manager: A representative of the Property Owner, President and Fellows of Harvard College.
- S. Harvard EHS: Harvard University, Environmental Health & Safety
- T. Hazardous Waste Level of Lead: The RCRA Toxicity Characteristic Leachate Procedure (TCLP) standard is 5.0 mg/L (ppm) as defined by the Massachusetts Hazardous Waste Regulations at 310 CMR 30.000.
- U. HEPA Filter: High Efficiency Particulate Air Filter
- V. High Phosphate Detergent: Detergent which contains at least five percent (5%) tri- sodium phosphate (TSP) or other equally effective cleaning agent.
- W. Lead-based: Refers to paints, glazes, another surface coverings containing a toxic level of lead.
- X. Mass DEP: Massachusetts Department of Environmental Protection
- Y. Mass DLS: Massachusetts Department of Labor Standards
- Z. Mass DPH: Massachusetts Department of Public Health
- AA. Moveable, Impact Surfaces means surfaces on windows with sills five feet or less from the floor, stair tread or ground, which either move or come in contact with window surfaces that move, and include, but are not limited to, window sashes, wells, parting beads, stops and windowsills.
- BB. OSHA: Occupational Safety and Health Administration
- CC. Paint Stripping/Removal: Removal of coatings of paint and/or varnish from a building surface.
- DD. PEL: Permissible Exposure Limit. The PEL for lead is 50 ug/m³ (0.05 mg/m³) for an 8-hour exposure.
- EE. RCRA: Resource Conservation and Recovery Act
- FF. Residential Premises or Residential Property means every building or shelter constructed prior to 1978, used or intended for human habitation, including exterior surfaces and all common areas thereof, and all other property, including other structures located within the same lot line whose existence causes or is likely to affect noncompliance with the provisions of 105 CMR 460.000. Residential premises are comprised of one or more dwelling units.



GG.SDS: Safety Data Sheets

HH. Toxic Level of Lead in Surface Coatings: 1.0 milligram or more per square centimeter (mg/cm²) by XRF methods, or 5,000 g/g (0.5%) by laboratory testing, as defined in HUD Regulation and the Lead- Based Paint Poisoning Prevention Act.

II. TSCA: Toxic Substance Control Act

JJ. TSP: Tri-Sodium Phosphate

KK. TCLP: Toxicity Characteristic Leachate Procedure

LL. VOC: Volatile Organic Compound

1.06 LOCATION OF WORK AND SITE CONSTRAINTS

A. Any areas where lead-based paint removal activities are occurring shall be restricted to authorized personnel. **[RRP Renovation:** Exclusion of Personnel. Access to the Work Area shall be limited to persons directly engaged in carrying out the work, emergency response personnel, consultants carrying out work within the scope of their authority and inspectors operating under their own jurisdiction. Limitations on access to the Work Area shall be in place at all times when work is in progress and until such time as the standards for post-renovation cleaning verification set forth at 454 CMR 22.11(9)(h) are met. The Contractor is not required to employ the use of a sign in/out log to ensure the exclusion of unauthorized persons from accessing the Work Area as would be required on a Deleading Project. However, the use of a sign in/out log is one means of documenting compliance with 454 CMR 22.00.]

[Residential Deleading: Access to the Work Area shall be restricted to the Owner, deleaders, licensed lead paint inspectors, representatives of the Director, and any others authorized by the Director. Signs warning that Deleading Work is being conducted shall be posted at all approaches to the Work Area. Signs shall meet the standards set forth at 29 CFR 1926.62(m)(1) with additional language prohibiting entrance to the Work Area by unauthorized personnel. The Deleading Contractor and Deleader-supervisor shall use barriers or other appropriate means to secure the Work Area.]

[OSHA Lead in Construction: Access to the Work Area shall be limited to persons directly engaged in carrying out the work, emergency response personnel, consultants carrying out work within the scope of their authority and inspectors operating under their own jurisdiction. Limitations on access to the Work Area shall be in place at all times when work is in progress.

B. Temporary Utilities: Refer to Section 015000 for procedures and costs relating to sanitary facilities, temporary power and temporary water. [Currently there are electricity sources available at the *PROPERTY NAME*. The Contractor will be required to provide temporary power as well as bathroom facilities during the abatement period. Water is available at the Site, but not inside buildings.]

C. Prior to the commencement of work and at the Project Manager's request, the Contractor, along with representatives and agents of Harvard shall meet with the occupants and representatives of any tenant to discuss the scope and schedule of work, potential impacts to the tenant's space, and security and access to tenant's space.

1.07 QUALIFICATIONS



- A. The Contractor shall ensure that all work that disturbs painted building substrates, including but not limited to, manual demolition, removal of paint from building substrates, removal of building components, and preparation of surfaces for painting, shall comply with requirements of OSHA 29 CFR 1926.62 Lead, including, but not limited to: a written compliance program; engineering and work practices; employee training; medical surveillance; personnel protective equipment; hygiene facilities and practices; and employee lead exposure assessment. This includes work associated with both deleading and paint stripping activities.
- B. The Contractor shall have an individual on-site designated to perform the duties of the “Competent Person” as specified by OSHA 29 CFR 1926.62. The competent person shall be a person who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has the authorization to take prompt corrective measures to eliminate them.
- C. [RESIDENTIAL: The Contractor, or Abatement Subcontractor, performing any of the Work detailed in this specification must be a **[Project specific: Massachusetts-licensed Deleading Contractor OR Moderate Risk Lead-safe Renovation Contractor OR Renovation Lead-safe Renovation Contractor]**. Copies of all required license shall be provided to the Project Manager at least 10 days prior to the start of the work of this section as part of an initial Lead Paint Contractor Submittal Package. For lead-paint abatement work that will be sub-contracted, the Contractor is responsible to ensure that the abatement Subcontractor has reviewed and will strictly adhere to this specification, all reference documents, and with all Federal, state and local regulations.
- D. [RESIDENTIAL: Deleading for compliance with MA DPH regulations:
 - 1. Deleader Contractor – Contract shall be licensed to perform deleading operations as required by 105 CMR 460 and 454 CMR 22.00.
 - 2. All workers and supervisors shall be licensed as required by 105 CMR 460.000 454 CMR 22.00.
 - 3. The Deleader Contractor shall employ a competent licensed supervisor with at least three years lead hazard control supervisory experience on projects of similar scope and magnitude who shall be responsible for all work involved lead-based paint abatement as described in the specifications and defined in applicable regulations, and have full-time daily supervision of the same.]
- E. [RESIDENTIAL **Deleading for compliance with MA DPH regulations** : The Abatement Subcontractor for lead abatement work must have successfully completed at least three abatement projects involving all requirements and elements of abatement work, including worker protection, medical monitoring, work area preparation, clean- up and clearance, valued at a minimum of fifty thousand dollars (\$50,000.00) for each project. Only properly licensed lead abatement contractors are allowed to work on Harvard property.]
- F. [RESIDENTIAL **Deleading for compliance with MA DPH regulations**: The lead Abatement Subcontractor shall employ a competent licensed supervisor with at least three years lead hazard control supervisory experience on projects of similar scope and magnitude who shall be responsible for all work involving lead- based paint abatement as described in the specifications and defined in applicable regulations, and have full- time daily supervision of the same.]

1.08 CONTRACTOR RESPONSIBILITY



- A. The Contractor shall assume full responsibility and liability for the compliance of all federal, state and local regulations pertaining to:
 1. Worker safety and hygiene.
 2. Protection of workers, the public, Harvard University, building components, occupants, occupants' possessions, and the environment against potential lead exposure or contamination.
 3. Transportation and disposal of lead contaminated waste.
- B. The Contractor shall be responsible for determining airborne lead concentrations for each task performed that will impact building materials coated with lead-based paint.
- C. The Contractor shall be responsible for establishing a regulated work area for each task performed that will impact building materials coated with lead-based paint.
- D. Work Areas Affected - In general, the following activities are minimum requirements of this Section and affect the demolition performed on the painted components:
 1. No demolition activities may occur that increase the workers' exposure above the Action Level of $30 \mu\text{g}/\text{m}^3$, without the Contractor taking appropriate precautions for employee and occupant protection. Contractor shall fully comply with the OSHA lead standard at 29 CFR 1926.62.
 2. All workers shall be informed of the components to be demolished that have been identified as containing lead. For buildings constructed prior to 1978, lead-based paint is assumed to be present.
- E. The Contractor shall provide appropriate respiratory protection, protective clothing, and engineering controls to minimize the exposure of employees to airborne lead. All work involving the disturbance of paints containing lead at the site and all work where employees may be exposed to lead in excess of the Action Level of $30 \mu\text{g}/\text{m}^3$ shall be performed by workers that have received appropriate lead training and personal protective equipment.
- F. The Contractor shall be responsible for proper clean-up procedures, handling and disposal of the waste and materials generated in accordance with the methods described in this Section. The Contractor shall collect all wastes resulting from the work and perform appropriate sampling as required by RCRA and other applicable regulations for the proper packaging, handling, shipment and off-site waste disposal. The Contractor shall provide Engineer with all results of waste characterization and all transport and disposal manifests.
- G. [The owner has pre-arranged hazardous materials pick-up, transportation, and disposal with an outside vendor. The contractor may choose to utilize this service but is fully responsible for costs associated with this service as well as preparation and completion of all University and regulatory-related paperwork and manifests that may be required.]
- H. The Contractor shall be responsible to make all arrangements for the proper transportation and disposal of lead contaminated materials as described in Section 3.11.
- I. The Contractor shall provide laboratory analytical services for the analysis of lead samples. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA) and be a successful participant in the AIHA Proficiency Analytical Testing (PAT) program. The Contractor



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shall perform monitoring and sampling as follows:

1. Personal air sampling in accordance with OSHA 29 CFR 1926.62.
2. Waste characterization (i.e., TCLP lead) of debris samples from lead-based paint removal activities as required by RCRA.



1.09 SCHEDULING

- A. The Contractor shall develop an abatement schedule for each phase of work prior to the Pre-Construction Conference. The Engineer may choose to alter the work sequence as they see fit.
- B. The Contractor shall update the schedule and submit any schedule changes for review by the Engineer at the weekly construction meetings.
- C. There shall be a sufficient number of trained and qualified workers, foremen and superintendents to accomplish the work within the required schedule. No untrained or fully qualified person shall be employed to speed up completion of the abatement work.
- D. Should the Contractor elect to utilize the University's transportation and disposal company, the Contractor is required to coordinate with the project manager relative to the set schedule for University waste pick-ups. Any special pick-ups required by the Contractor shall be at the Contractor's expense including any additional costs or fees. Temporary storage requirements must be maintained as outlined in this section.

1.10 PERMITTING AND INSPECTION

- A. [RESIDENTIAL: The Contractor is responsible for obtaining and/or filing any permits, notifications, and/or approvals and for making any regulatory notifications required to perform the work of this section. The Contractor shall deliver a copy of all permits, approvals and notifications to the Project Manager as part of their initial Lead Paint Contractor Submittal Package.]
- B. The Contractor shall allow the work of this contract to be inspected if required by local, state, federal and any other authorities having jurisdiction over such work. The Contractor shall immediately notify Project Manager and Engineer and shall maintain written evidence of such inspection for review by the Engineer, Consultant and Project Manager.
- C. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory noncompliance or negligence.
- D. The Contractor shall, at his/her own cost and expense, comply with all laws, ordinances, rules, and regulations of federal, state, regional and local authorities regarding handling and storing of lead waste material.
- E. In the case of an emergency, the Contractor shall contact local fire, police, hospitals or local emergency response teams and inform them of the type of hazardous waste activity and ask for assistance in the event of an accident. Secondly, the Harvard Operations Center (617-495-5560) shall also be notified in the event of an emergency.
- F. During the course of the project, the Contractor shall maintain the following on-site: (1) a suitable fire extinguisher(s) near the work area; (2) an immediate means of communication with a regulatory agency in the event of an emergency; and (3) a list of contacts and phone numbers including regulatory agencies.



- G. The Contractor is responsible to ensure that all employees on-site are trained on how to deal with typical emergencies and accidents that may occur during the course of work. The Contractor shall identify an on-site emergency coordinator to ensure that emergency procedures are carried out in the event an emergency arises.
- H. The Contractor shall keep and maintain a "Right to Know Manual" that is easily accessible to all employees.
- I. All requisite permits and notifications shall be maintained by the contractor and shall be made available for review by Harvard EHS and the Engineer.

1.11 SUBMITTALS

- A. The Contractor shall submit each item in this Article according to the Conditions of the Contract and Section 013300 SUBMITTALS, for information only, unless otherwise indicated.
- B. All submittals shall be submitted to the Engineer prior to the start of work. Submittals that vary from building to building must be submitted prior to the start of work in the applicable building. Duplication of submittals that are constant from building to building is not required.
- C. The Contractor shall submit a Lead-Based Paint Removal Plan describing the procedures to be employed for complying with this Section and OSHA regulation 29 CFR 1926.62. Include detailed description of methods to be used for removal, containment, packaging, transportation, and disposal of lead paint. [This submittal should cover both deleading and paint stripping activities.]
- D. The Contractor shall submit a Site Safety Plan which includes a set of emergency procedures and include provisions for the following:
 - 1. Evacuation of injured workers;
 - 2. Emergency and fire exit routes from all work areas, including local telephone numbers for fire and medical emergency personnel; and
 - 3. Employee work logs.The Site Safety Plan shall be posted in a conspicuous place at the work site so that it is available to all employees.
- E. The Contractor shall provide sample literature for proposed protective clothing to be used on this project.
- G. The Contractor shall provide certification of compliance with OSHA requirements including but not limited to medical surveillance, record keeping and personal monitoring.



- H. The Contractor shall provide Safety Data Sheets (SDSs) on all materials and chemicals to be used on the project.
- I. The Contractor shall provide copies of manifests and receipts acknowledging disposal of all hazardous and non-hazardous waste material from the project showing delivery date, quantity, and appropriate signatures.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Polyethylene sheet in a roll size to minimize the frequency of joints shall be delivered to job site with factory label indicating 6 mil conforming to ASTM Standard Specification for Polyethylene Film and Sheeting, ASTM D- 2103. Sheeting shall be flame retardant [For projects in Boston, all sheeting is to be supplied with flame certification from the Boston Fire Department Chemist].
- B. Polyethylene disposable bags shall be six (6) mil with pre-printed label. Tie wraps for bags shall be plastic, five (5) inches long (minimum), pointed and looped to secure filled plastic bags.
- C. Tape or adhesive spray will be capable of sealing joints in adjacent polyethylene sheets and for attachment of polyethylene sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water.
- D. Impermeable containers are to be used to receive and retain any lead containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with EPA and DOT standards.
- E. All caustics shall be properly labeled and containerized in leak-tight containers.
- F. Machine sanding equipment shall be of the dual action, rotary action, orbital or straight line system type, fitted with a high efficiency particulate air (HEPA) dust pick-up system. Air compressors utilized to operate this equipment shall be designed to continuously provide 90 to 110 psi or as recommended by the manufacturer.
- G. Heat blower gun equipment (electrically-operated) shall be a flameless electrical paint softener type. The heat-blower shall have electronically controlled temperature settings to allow usage below a temperature of 1,000 degrees Fahrenheit. The heat-blower shall be DI type (non-grounded) 120 V, AC application. The heat-blower shall be equipped with various nozzles to cover all common applications (cone, fan, glass protector, spoon reflector, etc.).
- H. Chemical stripping removers shall contain no methylene chloride products. Chemical removers shall be compatible with, and not harmful to the substrate that they are applied to. Chemical removers used on masonry surfaces shall contain anti-stain formulation that inhibits discoloration of stone, granite, brick and other masonry construction. Chemical removers used on interior surfaces shall not raise or discolor the surface being abated.



- I. To protect the building components and its occupants from exposure to potentially harmful volatile organic compounds (VOCs), only low-VOC and low-odor products shall be utilized.
- J. Chemical stripping agent neutralizer may be used on exterior surfaces only. Neutralizers shall be compatible with and not harmful to the substrate that they are applied to. Neutralizers shall be compatible with the stripping agent that has been applied to the surface substrate.
- K. Vacuum units, of suitable size and capacities for project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97% of all monodispersed particles of 0.3 micrometers in diameter.

PART 3 – EXECUTION

3.01 GENERAL

- A. The Contractor shall evaluate each work activity to determine if employee exposure to lead may occur.
- B. Until the Contractor documents that employee exposures are below the OSHA PEL for each type of activity where lead is present, including but not limited to manual demolition of structures, preparation of surfaces for painting, clean-up activities, or at any other time when exposure to lead is a possibility, the Contractor shall provide the following:
 - 1. Appropriate respiratory equipment as required by OSHA 29 CFR 1926.62(f).
 - 2. Appropriate personal protective equipment as required by 29 CFR 1926.62(g).
 - 3. Change areas as required by 29 CFR 1926.62 (i)(2).
 - 4. Hand washing facilities as required by 19.26.62 (i)(5).
 - 5. Biological monitoring as required by 29 CFR 19.26.62(j)(1)(i).
 - 6. Training as required by 29 CFR 1926.62 (l)(1)(i), 29 CFR 1926.62(l)(2)(ii) and 29 CFR 1926.21

3.02 AIR MONITORING

- A. The Contractor shall determine worker's exposure to airborne lead for each phase of work, i.e., removal of paint from brick walls, removal of building components, preparation of surfaces for repainting, cleaning of work areas, etc. Personal air sampling shall be conducted at the start of each phase of work. Initial personal exposure monitoring shall be performed on employees who are anticipated to have the highest exposures for each activity.
- B. Airborne lead sampling performed as required by OSHA regulation 29 CFR 1926.62 shall be full-shift sampling collected in the breathing zone of the worker being monitored. The Contractor shall ensure that all workers wear suitable respiratory protection at all times, if exposure to airborne lead is a possibility.

3.03 WORK AREA PREPARATIONS



- A. Isolate work area from adjacent areas of the building. Post caution signs meeting the specifications of OSHA regulation 29 CFR 1926.62 (m) at any location or approach to a location where airborne lead concentrations may exceed the Action Level of 30 $\mu\text{g}/\text{m}^3$. Caution signs shall be posted at a sufficient distance from the work area to permit an employee to read the sign and take the necessary precautionary measures to avoid exposure. Additional caution signs may need to be posted following construction of workplace enclosure barriers (if applicable).
- B. Seal, airtight, all intake and exhaust vents in the work area with duct tape and 6-ml flame retardant polyethylene sheeting. The Contractor shall also seal any seams in system components that pass through the work areas. Coordinate shutdown and lock-out of all heating, ventilation, and air conditioning system (HVAC) components that are located in, supply, or pass through the work areas with the Project Manager.
- C. Protect all facility equipment and objects in the work area from lead contamination and damage from conduct of the work.
- D. Provide clean change area equipped with separate storage facilities for protective work clothing and equipment and for street clothes.
- E. Provide hand washing and shower facilities for employees whose exposure to lead is above the PEL.
- F. Ensure proper fall protection equipment and procedures are used during each phase of the work, including erection of scaffolding. Provisions shall be used to protect workers from falling equipment, materials and debris.

3.04 WORK CONSTRAINTS

- A. The Contractor shall provide required respiratory and personal protective equipment to all employees who may be exposed to airborne lead in excess of 30 $\mu\text{g}/\text{m}^3$.
- B. Lead-based paint removal operations where airborne lead concentrations exceed 30 $\mu\text{g}/\text{m}^3$ shall be performed within a fully contained work enclosure and require decontamination facilities.
- C. Lead-based paint removal operations where airborne lead concentrations exceed 50 $\mu\text{g}/\text{m}^3$ shall be performed within a fully contained work enclosure, under negative pressure with required decontamination facilities.
- D. Paint removal activity shall be engineered and conducted such that the least amount of airborne dust is generated. The Contractor shall ensure that all dust is contained within the work area and does not contaminate the building, equipment in the building, or the environment.
- E. Engineering controls employed to contain dust generated by paint removal activity may include, but not be limited to, sealing all openings to the work area with impermeable barriers, dust collection equipment with HEPA filtration and mechanical ventilation equipped with HEPA filtration to maintain negative pressure in the work area with respect to adjacent areas of the building.



3.05 AUTHORITY TO STOP WORK

- A. The Engineer has the authority to issue a stop work order at any time the Project Manager or Engineer determines that conditions are not within the specifications and applicable regulations. The stoppage of work shall continue until conditions have been abated and corrective steps have been taken to the satisfaction of the Engineer. Standby-time required to resolve violations shall be at the Contractor's expense, and any fines, etc., for hazardous conditions or non-compliance will be at the Contractor's expense and will not be justification for change orders or time extension.
- B. Stop work orders may be issued for, but not be limited to, the following:
 - 1. Respirable dust levels measured outside the lead removal work area that exceed established background levels.
 - 2. Area air samples analyzed for lead in accordance with NIOSH Method 7082 that exceed established background levels.

3.06 INTERIOR LEAD REMOVAL

- A. **[FOR COMMERCIAL:** Interior de-leading may include the removal of loose, chipped, cracking, flaking, blistering, or chalking paint in areas that require preparation for re-painting as identified in other specification sections. Hand-scraping using wet methods and/or vacuum powered tools and/or caustic paste removal are the only acceptable methods of removal.]
- B. **[FOR RESIDENTIAL Seeking Full Compliance:** Abatement or containment of lead-based paint, other coating, plaster or putty must be performed as follows:
 - 1. Loose lead-based paint, other coating, plaster or putty on surfaces that are neither moveable impact surfaces nor accessible mouthable surfaces must be abated intact or contained.
 - 2. Lead-based paint, other coating, plaster or putty on moveable impact surfaces shall be abated, or, with the exception of window sashes that are part of an interior habitable area or which need to be useable to meet ventilation requirements under the state Building Code (780 CMR), contained with an approved covering. In the case of metal windows, only lead-based paint or other coating on the sills shall be abated or contained. Other moveable impact surfaces on metal windows must be intact or, if loose, made intact.
 - 3. Lead-based paint, other coating, plaster or putty shall be abated on accessible, mouthable surfaces to a height of five feet, and four inches in from each edge, or such surfaces may be contained. Encapsulants applied to suitable accessible, mouthable surfaces must be applied to the entire surface, rather than only to a height of five feet and only four inches in from each edge.
 - 4. Lead-based paint, other coating, plaster or putty shall be abated on friction surfaces at all points of potential friction where the components meet. Stair treads must be abated in their entirety to the wall or balusters, or such surfaces may be covered. Friction surfaces may not be encapsulated.

The Contractor, and the abatement Subcontractor if used, shall review the attached *Lead Inspection Report* for specific interior locations of lead-painted surfaces that require removal.]

- C. Interior de-leading may also include the intact removal of lead painted building components as identified in other specification sections. The Contractor shall remove lead



painted building components in a manner that does not generate airborne lead contaminated dust. These components shall be segregated from other demolition waste and disposed of in accordance with this section.

- D. **[RESIDENTIAL:** The Contractor, or abatement Subcontractor, shall strip lead painted components using approved work practices described in 454 CMR 22.00. Lead waste from interior stripping activities shall be containerized and segregated from other waste and disposed of in accordance with sections 3.10 and 3.11.]
- E. One layer of flame retardant polyethylene sheeting will be laid on the floor adjacent to areas where lead based paint removal will be performed. The sheeting shall extend a distance of 10 feet. In addition, the Contractor will use flame retardant polyethylene sheeting to effectively separate all work areas to ensure that no paint chips and/or dust generated during the work is allowed to migrate beyond the work area.
- F. All visible debris shall be cleaned up at the end of each workday. Prior to removal, all protective polyethylene sheeting will be HEPA vacuumed.
- G. Containerized lead waste and removed lead painted building components shall be segregated from other demolition waste and disposed of in accordance with sections 3.10 and 3.11.

3.07 EXTERIOR LEAD REMOVAL

- A. Exterior de-leading may [RESIDENTIAL: will] include the removal of loose, chipped, cracking, flaking, blistering, or chalking paint in preparation for re-painting as identified in other specification sections. Hand-scraping using wet methods and/or vacuum powered tools and/or caustic paste removal are the only acceptable methods of removal. The Contractor, and the abatement Subcontractor if used, shall review the attached *Lead Inspection Report* for specific exterior locations of lead-painted surfaces that require removal.
- B. Closing of Doors and Windows. Where Renovation Work involves the disturbance of lead paint, lead-painted structures or lead paint debris on the side of a building, all doors and windows within a horizontal distance of 20 feet from the area where the work is taking place, on the same floor, and on all floors below, shall be closed for the duration of the work.
- C. Exterior de-leading of PROPERTY may also include the intact removal of lead painted building components as identified in other specification sections. The Contractor shall remove lead painted building components in a manner that does not generate airborne lead contaminated dust.
- D. One layer of flame retardant polyethylene sheeting will be laid on the ground cover and over any shrubbery and shall extend from the building a distance of 20 feet prior to the start of any exterior scraping activities or the removal of any exterior building components. Extreme care shall be taken to ensure that no paint chips are allowed to migrate beyond the sheeting. Enclosures are required if chips fall more than 40 feet or adverse conditions such as wind limit containment. Care shall be taken to prevent puncture of sheeting.
- E. Sheeting shall be secured at perimeters by means of stakes or weights.
- F. Precautions must be taken to ensure landscaping is not damaged by being covered.



- G. No work shall be performed when the wind conditions are such that dispersal of paint dust and chips may occur. Said determination shall be made by the Engineer.
- H. All visible debris shall be cleaned up at the end of each workday. Prior to removal, all protective polyethylene sheeting will be HEPA vacuumed.
- I. Containerized lead waste from exterior scraping activities and removed lead painted building components shall be segregated and disposed of in accordance with sections 3.10 and 3.11.

3.08 CLEAN-UP

- A. Clean-up activities shall include the use of HEPA filtered vacuums and a 5 % solution of Tri-sodium Phosphate, or other high phosphate cleaner to clean all surfaces within the work area which may be contaminated with lead dust or particulate.
- B. [RESIDENTIAL DELEADING: Clean-up of the work area shall be conducted until a level of no visible paint chips, dust or debris is achieved on the interior horizontal and vertical surfaces. Dust testing will be performed by the Engineer in accordance with the Mass DPH Lead Dusts Monitoring Protocol 105 CMR 460.170 to document adequate cleaning by the Contractor.]
- C. [LEAD-SAFE RENOVATION: Clean-up Requirements. All interior and exterior surfaces which may have become contaminated with lead dust or debris, and all tools and equipment used during work operations, shall be cleaned of all paint chips, dust, debris and other residue at the conclusion of the project. Acceptable cleaning methods shall include HEPA-filtered vacuuming, wet wiping or washing with solutions of tri-sodium phosphate or any general household detergent and other forms of low-disturbance mechanical transfer. Non-HEPA-equipped vacuums shall not be used. Dry sweeping and compressed air release shall not be employed as cleaning methods.
 1. When vacuuming carpets and rugs, the HEPA-vacuum shall be equipped with a beater bar.
 2. Plastic sheeting and other barriers that separate the Work Area from other areas shall remain in place until all other areas of the Work Area have been thoroughly cleaned of all dust and debris, and the requirements of 454 CMR 22.11(9)(h) have been met.
 3. Interior horizontal surfaces shall be cleaned by HEPA-vacuuming followed by wet wiping or mopping. Vertical surfaces shall be cleaned by HEPA-vacuuming or by wet wiping.
 4. The Work Area and any other areas exposed to lead dust, paint chips or lead-contaminated debris from the Work Area shall be cleaned of all such visible contamination at the end of each day. All lead-contaminated materials shall be securely contained in the Work Area or disposed of according to applicable EPA and MassDEP regulations.
 5. All equipment used in Renovation Work shall be thoroughly cleaned of visible dust and debris prior to removal from the Work Area. 6. At the conclusion of a Renovation Project, all surfaces within the Work area shall be cleaned to the level of no visible dust and debris using HEPA-vacuuming, mopping, washing or a combination of these methods.]
- C. Re-cleaning will be required until an inspection performed by the Engineer indicates no visible dust or debris remains in the work area.



- D. If visible suspect debris is observed outside of the work area, re-cleaning will be required until a level of no visible dust or debris is achieved and the lead dust levels specified in section 3.09 are achieved.

3.09 FINAL INSPECTION

- A. **[RESIDENTIAL for Compliance:** Notify the Engineer 24 hours in advance of completion of cleaning activities and removal of debris from the work area.
- B. The Engineer will visually inspect the work area for visible dust, debris or contamination. The Contractor shall perform all additional cleaning of the work area required by the Engineer at the Contractor's expense.
- C. The "clearance criteria" to indicate that the work area is "clean" shall be based on a visual inspection and surface testing. The clearance criteria will be that the surface area is visually free of dust and the surface lead dust levels are less than 250 $\mu\text{m}/\text{ft}^2$ as measured by Atomic Absorption.] 105 CMR 460.170: *Lead Dust Monitoring*]
- D. **[RRP: Lead-safe Renovation:** A Certified Lead-safe Renovator-supervisor must perform a visual inspection and comply with all Procedures for Post-renovation Cleaning Verification (454 CMR 22.91)]
- E. Maintain engineering controls until clearance is confirmed by the Engineer.

3.10 REUSE AND RECYCLING OF BUILDING MATERIALS

- A. The Contractor is responsible for any required testing and for the ultimate reuse or recycling of materials generated from the Work of this section. These materials may include, but is not limited to, lead-painted building components.
- B. For reuse and/or recycling of the lead-paint building components (i.e., windows, doors, door sashes, molding), the lead-based paint must first be stripped from the building component prior to the building component material being reused or recycled.
- C. The Contractor is required, through testing (real-time and/or analytical methods), to demonstrate that all the lead paint has been removed and the building component and the material meets the lead paint standard as provided in the Department of Housing and Urban Development (24 CFR Parts 35, 36, 37), HUD Lead- Based Paint Regulations, HUD Guidelines for the Evaluation and Control of Lead- Based Paint Hazards in Housing, and the Massachusetts Department of Public Health (105 CMR 460.000) Lead Poisoning Prevention and Control. All test results shall be provided to the Project Manager and EHS prior to arranging for the off-site reuse and/or recycling of the building components.
- D. Coated/painted brick and concrete may be re-used on-site as fill material provided that the following three conditions are met: (1) the brick and concrete material is not a hazardous waste in accordance with the federal and state hazardous waste regulations; (2) the brick and concrete material is reduced to less than six inches in size; and (3) a BUD has been received and approved by Mass DEP. (A copy of the BUD must be provided to the Project Manager and EHS.)



3.11 DISPOSAL/TREATMENT

- A. The Contractor is responsible for any required testing and for arranging for the ultimate off-site recycling and/or disposal of all waste generated from the Work of this section. This waste may include, but is not limited to, lead-painted building components, lead paint chips, wastewater, and dust from HEPA filters and from damp sweeping, solvents and caustics used in any stripping process, wash water, disposable work clothes and respirator filters.
- B. The Contractor shall provide results of all testing conducted of the waste materials to the Harvard Project Manager.
- C. Disposal/Treatment of Lead Contaminated Material.
 - 1. The Contractor must comply fully with all federal, state and local regulations concerning the testing, handling, hauling, labeling, and disposal of all lead paint waste (i.e., paint chips, wastewater, disposable protective clothing, building materials, polyethylene sheeting, etc.) generated during this project.
 - a. At a minimum, the Contractor shall collect and submit samples to a Massachusetts Certified Laboratory for TCLP analysis (EPA Method 1311 in accordance with Appendix II of 40 CFR 261). The Contractor is advised that additional testing may be required by the disposal facility and it is the Contractor's responsibility to determine the types and quantity of testing required. All expenses for sample collection and analysis shall be incurred by the Contractor.
 - b. If building components are not suitable for reuse or recycling (section 3.10), the Contractor shall dispose of the materials off site as a solid waste, unless determined to be a hazardous waste.
 - c. All visible paint and painted debris shall be removed from the ground surface within and surrounding the work site prior to building demolition. All paint and painted debris material shall be tested and properly disposed off-site.
 - e. Lead-containing material that meets the characteristics of a hazardous waste (i.e., lead TCLP standard is 5 mg/L), or by "definition" is a hazardous waste, shall be disposed or treated in accordance with applicable hazardous waste regulations.
- D. For all other lead waste (chips, lead dust, waste water, filters, solvents, work clothes, etc.), the Contractor shall store waste in appropriate, compatible containers/drums for disposal as hazardous waste and shall be labeled and stored in accordance with all applicable regulations. The Contractor shall also submit to the Project Manager and Harvard EHS the name, address and proof of permit for the recycling/disposal facility that has agreed to accept the containerized lead waste at least 5 days prior to shipment.
- E. The Contractor is responsible for completing all disposal documents, which may include, but are not limited to, waste profiles, hazardous waste manifests and land ban restriction forms. Harvard University (EHS, 46 Blackstone Street, Cambridge, MA 02139) shall be designated at the Generator on all documents and shall sign the documents as such. Note that Harvard University is registered as a generator of hazardous waste under several EPA ID numbers; the Contractor shall contact EHS (617-496-9152) for the appropriate EPA# and Generator status. Copies of all disposal documents shall be delivered to the Project



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Manager and Harvard EHS for review at least 5 days prior to shipment. Coordination for the Project Manager/Generator's signature on hazardous waste disposal documents shall be made through Harvard EHS.

- F. Should the Contractor elect to utilize the University's disposal company it does not release the Contractor from performing any and all waste characterization required within this Section.
- G. For lead waste that is being shipped and disposed of using a hazardous waste manifest, the Contractor shall provide the bottom three copies of the manifest to the Harvard EHS at the time of shipment for distribution to the appropriate agencies.
- H. The Contractor shall only deliver hazardous waste materials to a Harvard utilized Facility as identified on the EHS website.