

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this section when performing following Work:
 - .1 Manual disassembly of the stone facing, of the masonry filling and the top part of the brick chimneys, one by one, according to the procedures elaborated in the current section of the specifications and as indicated in the architecture plans. The mortar joints between the stones contain lead and it is friable. The work must be performed from the top (exterior) and not by the interior in the attic.

1.2 RELATED REQUIREMENTS

- .1 The current section of the specifications is applicable when the worker exposure levels is superior to 0.05 mg/m^3 , the time-weighted average (TWA) during the sampling for the first work days on the mortar joints of the stone facing. Note that sampling will be conducted by the Departmental Representative as specified in section 3.5.
- .2 Section 02 83 12 (Lead Abatement – Minimal precautions) is applicable for work under lead conditions when worker exposure to lead is equal to or less than the TWA of 0.05 mg/m^3 . Air sampling will be conducted by the Departmental Representative as specified in section 3.5.
- .3 The Contractor must coordinate the removal of the sections of wood timbers which are a part of the roof structure with the removal of the panels and the asbestos cement debris under asbestos conditions as specified in section 02 82 00.01 (Lead Abatement – Minimal Precautions) as well as the removal of the sections of wood timbers which are of the roof structure under mould conditions as specified in section 02 85 00.02 (Mould Remediation – Medium Precautions).
- .4 The Contractor must submit, for approval by the Departmental Representative, the sequence and the work methods that they intend to follow as well as a detailed schedule of work for the completion of all the asbestos work. These documents are mandatory in order to obtain authorization to start the work.
- .5 Once work has begun on a chimney stack, the work must continue until it has been completed.
- .6 The Contractor must repair all damaged surfaces and replace the material or damaged equipment to this complete satisfaction of the Departmental Representative, in the case where the damage is a result of the work that was executed by the Contractor.
- .7 All lead contaminated waste must be disposed of daily in an acceptable receptacle (see article 2.1.7 – Lead Waste Containers, of these specifications) and subsequently transported to the container reserved for this purpose. Place the waste containers in the area designated by the Departmental Representative. While on-site, ensure the containers are fixed, covered and sealed. The loading zone of the container must be clear at all times. The container's location will be specified by the Departmental Representative at the first work-site meeting. The waste must be removed from the site daily.
- .8 The Contractor must await the authorization of the Departmental Representative before beginning lead abatement work.

- .9 The Contractor must provide the installation of extra lighting, when needed, that meets CSST requirements.
- .10 The Contractor shall bear all costs of temporary storage, handling, transportation and removal of lead waste.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Z180.1-[00(R2005)], Compressed Breathing Air and Systems.
- .2 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .4 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .6 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007-[1995], Sampling House Dust for Lead.
- .7 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .8 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation - 29 CFR 1926.62-[1993].
- .9 Underwriters' Laboratories of Canada (ULC)

1.4 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Departmental Representative or designated representatives of regulatory agencies.
- .3 Occupied Area: area of building or work site outside Work Area.

- .4 Dioctyl Phthalate (DOP) Test: testing method used to evaluate particle penetration and air flow resistance properties of filtration materials - HEPA filter leak test with bis(2-ethylhexyl).
- .5 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Appropriate capacity for scope of work.
- .6 Airlock: ingress or egress system for personnel and materials without permitting air movement between contaminated area and uncontaminated area, consisting of two curtained doorways at least 2 m apart.
- .7 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:
 - .1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.
 - .2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.
 - .3 Overlap each polyethylene sheet at openings by at least 1.5 m on each side.
- .8 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 0.05 milligrams per cubic meter of air calculated as an 8-hour time-weighted average (TWA). The removal of lead-containing mortar as described in section 1.1 requires that the minimum precautions for lead abatement be used when the airborne lead concentration is less than 0.05 milligrams per cubic meter. Maximum precautions for lead abatement are based on airborne lead concentrations greater than 0.05 milligrams per cubic meter of air within Work Area.
- .9 Competent person: Departmental Representative capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.
- .10 Lead in Dust: wipe sampling on the vertical and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.
- .11 Negative Air Pressure Machine: extracts air directly from work area and filters extracted air through a HEPA filter, discharge air to exterior of building.
 - .1 Maintain pressure differential of at least 5 Pa relative to adjacent areas outside of work areas. Machine to be equipped with alarm to warn of system breakdown, and equipped with instrument to continuously monitor and automatically record pressure differences.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide a diagram of the layout for the work enclosures, the airlocks, and the decontamination areas for approval.

- .3 Provide proof satisfactory to the Departmental Representative that suitable arrangements have been made to dispose of lead-containing mortar in accordance with requirements of authority having jurisdiction.
- .4 Provide documents describing the provincial requirements for preparation of the Notice of Project Form.
- .5 Provide proof of Contractor's General and Environmental Liability Insurance.
- .6 Quality Control:
 - .1 Submit to the Departmental Representative necessary permits for transportation and disposal of the lead-containing mortar waste and proof it has been received and properly disposed.
 - .2 Provide proof satisfactory to the Departmental Representative that employees had instruction on hazards of lead exposure, respirator use, required protective clothing, entry and exit from Work Area, and aspects of work procedures and protective measures.
 - .3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.
- .7 Product data:
 - .1 Provide documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
 - .1 Encapsulants.
 - .2 Amended water.
 - .3 Slow drying sealer.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead-containing materials, provided that in case of conflict among those requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Require construction work to be in compliance with the occupational health and safety regulations in 01 35 29.06 - Health and Safety Requirements.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers while in the work area includes:
 - .1 Removal of the existing stone facing which contains lead with power tools: NIOSH approved respirator equipped with filter cartridges with assigned protection factor of 50, acceptable to the authority having jurisdiction. Suitable for the type of lead and the level of lead dust exposure in the lead work area. Provide sufficient filters so workers can install new filters following

- disposal of used filters and before re-entering contaminated areas.
- .2 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .3 Work gloves.
- .2 Requirements for workers:
 - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
 - .2 Remove gross contamination and lead-contaminated dust from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.
 - .3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers must not use this system as means to leave or enter Work Area.
- .3 Eating, drinking, chewing, and smoking are not permitted in Work Area.
- .4 Ensure workers are fully protected with respirators and protective clothing during preparation of the system of enclosures prior to commencing actual lead abatement.
- .5 Ensure workers wash hands and face when leaving work area. The location of facilities for washing will be designated during the first worksite meeting.
- .6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this section, in both official languages.
- .7 Ensure no person required to enter Work Area has facial hair or head hair that affects seal between respirator and face.
- .8 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.

- .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of the lead-containing mortar waste generated by removal activities of the stone facing of the chimneys must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double thickness 0.15 mm bags or leak proof drums. Label containers with appropriate warning labels.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 EXISTING CONDITIONS

- .1 All reports and information relating to lead containing materials are attached to the current section.
- .2 Lead was identified in the following:
 - .1 In the mortar of the stone facing of the chimneys.
- .3 It should be noted that the lead content in the mortar exceeds 1%. The mortar is comparable to a hazardous material according to SIMDUT (disclosure list) and must be disposed of according to current regulations. These materials may pose a health and an environmental risk. Their management must be done according to all current procedures, regulations and guidelines.

1.9 SCHEDULING

- .1 No less than two (2) days previous to beginning the work described in this section of the specifications, notify the following in writing:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .2 Inform subcontractors of the presence of lead-containing materials identified in Existing Conditions.
- .3 Provide the Departmental Representative copy of notifications prior to start of Work.

1.10 PERSONNEL TRAINING

- .1 Provide the Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.

- .2 Instruction and training related to respirators includes, at minimum:
 - .1 Proper fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Supervisory personnel must have completed required training.

Part 2 Products

2.1 MATERIALS

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 Polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for trapping the lead-containing material residue.
- .5 Lead waste containers: metal or fibre types are acceptable to dump operators, with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
 - .1 Warning labels: bilingual and clearly visible warning labels are to be put on the lead-containing mortar waste when the containers are sealed are ready for removal to disposal site.

Part 3 Execution

3.1 SUPERVISION

- .1 Approved Supervisor must remain within Work Area during any disturbance, removal, or handling of lead containing materials.

3.2 PREPARATION

- .1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by the Departmental Representative.
- .2 Work Area:
 - .1 The Work Area must be sealed off on the inside if work will be done in the attic. There must be sufficient space in order to execute the work. Nevertheless, the zone can be open to the outside air. At the roof, the enclosure must extend at least 0.30 m above the top of the materials being removed.

- .2 Shut off and isolate HVAC system to prevent lead dust and particulate dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight, if necessary.
- .3 Pre-clean fixed and storage furniture and equipment within work areas, using HEPA vacuum and cover them with polyethylene sheeting sealed with tape.
- .4 When possible, clean the work areas using a HEPA vacuum. Otherwise, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.
- .5 Install negative pressure machine system and operate continuously from installation of polyethylene sheeting until completion of final cleanup. Provide automatic continuous monitoring and recording instrument of pressure difference between the work area and the rest of the building.
- .6 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.
- .7 Cover floor surfaces in work area from wall to wall with fibre reinforced polyethylene drop sheets to protect existing floor during removal.
- .8 Build airlocks at entrances and exits from work areas to ensure work areas are always closed off by one curtained doorway when workers enter or exit.
- .9 At point of access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used:
 - .1 CAUTION LEAD HAZARD AREA (25 mm).
 - .2 NO UNAUTHORIZED ENTRY (19 mm)
 - .3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).
 - .4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).
- .10 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.
- .11 Where water application is required for wetting lead containing materials, garden sprayers will be the only equipment permitted.
- .12 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.
- .3 Worker Decontamination Enclosure System:
 - .1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:
 - .1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of the suite, and one to work area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.

- .2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
- .4 Construction of Decontamination Enclosures:
 - .1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape, apply two layers of FR polyethylene on floor.
 - .2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closure comprising doorway always remains closed.
 - .3 Shower room in decontamination facility to be provided with the following:
 - .1 Hot and cold water or water of constant temperature not less than 40 degrees Celsius or more than 50 degrees Celsius.
 - .2 Individual controls inside to regulate water flow and temperature.
 - .4 Prior to each shift in which a decontamination facility is being used, a competent person should inspect the facility to ensure that there are no defects that would allow lead-containing dust to escape. Defects should be repaired before the facility is used. The decontamination facility should be maintained in a clean and sanitary condition.
- .5 Separation of Work Areas from Occupied Areas:
 - .1 Barriers between Work Area and occupied area to be constructed as follows:
 - .1 For this work, the work area (the portion of the chimney above the roof down to two feet below the roof) must be separated from the attic.
 - .2 Construct floor to ceiling lumber stud framing, cover with polyethylene sheeting and seal with duct tape. Apply 9 mm plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.
 - .3 Cover plywood with polyethylene sheeting and seal with tape.
- .6 Maintenance of Enclosures:
 - .1 Maintain enclosures in tidy condition.
 - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
 - .3 Visually inspect enclosures at beginning of each working day.
 - .4 Use smoke test method to test effectiveness of barriers as directed by the Departmental Representative.

3.3 LEAD ABATEMENT

- .1 Removal of lead-containing mortar to be performed using power tools that are attached to dust-collecting vacuums with HEPA filters.

- .2 Remove the lead- containing mortar in small sections and dispose of it as it is being removed in sealable 0.15 mm plastic bags and place the bags in labelled containers for transport.
- .3 The stones must be washed with wet cloths in the work area before being removed from the work area.
- .4 Use wet methods during work to reduce dust generation. Examples of wet methods include wetting surfaces, wet scraping, and wet shovelling. Wet method should not be used if it creates a hazard or causes damage to equipment or to the project.
- .5 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Immediately remove the containers from the work area to the staging area. Clean the external surfaces thoroughly again by wet sponging before moving the containers to the decontamination Washroom. Wash containers thoroughly in the decontamination Washroom, and store in the Holding Room pending removal to the Unloading Room and subsequently outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .6 After removal of the material and inspection and approval by the Departmental Representative, apply a continuous coat of slow drying sealer to surfaces. Do not disturb work area for [8] hours: no entry, activity, or ventilation or any other activity which may disturb the work surfaces, other than operation of the negative air machine during this period.
- .7 After sealing the surfaces in the work area, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from requirements not been approved in writing by the Departmental Representative will result in Work shutdown, at no cost to Owner.
- .2 The Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed for additional labour or materials required to provide specified performance level.
- .3 When lead dust leakage from Work Area occurs the Departmental Representative will order a Work shutdown.
 - .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 SAMPLING - WORK AREAS

- .1 Sampling of the workers' exposure during the dismantling of the chimneys will be conducted by the Departmental Representative as follows:
 - .1 The sampling will be conducted according to the IRSST 362 method. The samples will be analyzed according to the NIOSH 7082 method.

- .2 The Contractor and their sub-contractors must at all times cooperate with the Departmental Representative so as to facilitate the air sampling. The Contractor must be cautious of the Departmental Representative's equipment and will be held responsible for damages to said equipment.
- .2 As needed, a final wipe sample on the surfaces specified by the scope of work could be done as follows.
 - .1 Once the work zone has been visually inspected so as to ascertain the overall cleanliness of the zone and the zone has been approved by the Departmental Representative, apply a layer of fixative to the treated surfaces and allow drying for eight (8) hours. After the wait period has passed, the Departmental Representative will take a wipe sample.
 - .1 The results of the above described sampling must show that the lead concentration in the dust sampled is below 40 micrograms per square foot. The samples must be taken and analysed in accordance to EPA EPA 747-R-95-007.
 - .2 If the results show that the lead concentration is greater than 40 micrograms per square foot, the zone must be cleaned again, without additional cost for the Owner, and another layer of fixative must be applied to the surfaces, as necessary.
 - .3 Repeat the cleaning operation until the lead concentration is less than 40 micrograms per square foot.

3.6 FINAL CLEANUP

- .1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to the centre of the work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and lead-contaminated mortar waste in plastic bags and sealed labelled waste containers for transport.
- .4 Clean up Work areas, Equipment and Access Room, and other contaminated enclosures.
- .5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by the Departmental Representative.

END OF SECTION