

Part 1 General

1.1 REFERENCES

- .1 Definitions
 - .1 Low-pressure water soaking: less than 250 kPa (36psi), measured at nozzle tip.
- .2 Reference Standards
 - .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Canadian Environmental Assessment Act (CEAA), 2012.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .3 United States Department of Labor
 - .1 Mine Safety and Health Administration/National Institute for Occupational Safety and Health (MSHA/NIOSH) Standards

1.2 ALTERNATIVES

- .1 Obtain in writing, from Departmental Representative authorization for changes of cleaning method, cleaning medium, tools, pressure, and flow rates.

1.3 SCHEDULING

- .1 Complete work within approved schedule time.
 - .1 Do not change Schedule without written approval of Departmental Representative.
- .2 Coordinate cleaning work schedule with other work on site.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide WHMIS MSDS - Material Safety Data Sheets documentation in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide proposed cleaning method and type of protection from cleaning residue for in-place conditions.
- .4 Submit procedure for collection, removal and disposal of waste product and run-off from cleaning procedure.
- .5 Product Data:
 - .1 Provide technical data on cleaning materials, equipment, machinery, compressors, tools and nozzles.
- .6 Samples:

- .1 Provide samples of cleaning materials for approval of Departmental Representative.
- .2 Demonstrate machinery, tools and nozzles for approval by Departmental Representative.
- .7 Test and Evaluation Reports:
 - .1 Provide test results.
 - .1 Provide digital copy of test results describing cleaning method, water pressure at compressor, tools, nozzle size and distance from masonry surface, used for cleaning of test patches.
 - .2 Proceed with cleaning upon receiving written approval by Departmental Representative concerning tested cleaning methods.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure work is performed in compliance with CEPA and applicable Provincial regulations.
- .2 Comply with requirements of Workplace Hazardous Materials Information Sheet (WHMIS).
- .3 Mock-ups:
 - .1 Do mock-ups tests in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Notify Departmental Representative 48 hours before commencing cleaning of each test patch.
 - .1 Obtain approval from Departmental Representative before commencing test.
 - .3 Before proceeding with mock-up;
 - .1 Ensure area of testing is watertight and decorative elements, adjacent surfaces and landscaping are protected.
 - .2 Ensure contaminated water is kept in containers and their disposal respects environmental regulations.
- .4 Conduct tests to determine effectiveness of 250 kPa water pressures, two hour time periods in areas of light soiling, four hour time periods in areas of heavy soiling, types of nozzles, spraying distances from wall surface.
- .5 Test pressure at each storey height to determine effect of "line drop" on effectiveness of water jets.
- .6 Test effectiveness of brushing in areas of heavy soiling. Consult Departmental Representative to review test results. Use method approved by Departmental Representative.
- .7 Locate test patches in inconspicuous places directed by Departmental Representative.
- .8 Test patches: 2 m².

- .9 Conduct tests to determine best methods of protecting surrounding historic material, openings and plants during test cleaning procedure, and monitor for detrimental effects.
- .10 Do not proceed with work without approval of mock-up.
- .11 Desired result and degree of cleanliness will be determined at mock-up, to the satisfaction of the Departmental Representative.
- .12 Accepted mock-up will demonstrate minimum standard for work. Mock-up may remain as part of finished work.
- .13 Protect approved test patches to ensure subsequent cleaning can be measured against the standard.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Packaging Waste Management: remove from site and dispose at appropriate recycling facilities.

1.7 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Do not use wet cleaning methods when there is threat of frost within a 48 hour period.
 - .2 Do not use chemical cleaners when ambient temperature or surface temperature is below 15°C.
 - .3 Follow manufacturer's written instructions on use of chemical cleaners in accordance with product's temperature range application.
 - .4 Provide shading to wall to avoid cleaning in full, hot sunlight.
 - .5 Do not clean if there is risk of chemical spray being blown onto surrounding historic material, publicly accessible areas or plants.
 - .6 Protect work in the event of high winds.
 - .7 Provide protection (dust, rain, and other elements) of the masonry and stone units after wet cleaning.
- .2 Existing Conditions
 - .1 Report to Departmental Representative conditions of deteriorated masonry or pointing found during cleaning.
 - .2 Provide photographic record to document existing conditions, before cleaning. Upon completion of cleaning, provide photographic record to document cleaned condition. Advise Departmental Representative of potential cleaning problems.
 - .3 Do not clean areas of deteriorated masonry without prior written approval of Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Use clean potable water, free from contaminants. Monitor for active agents to ensure a PH close to neutral.
- .2 Treat water which has high metal content before use in cleaning.
- .3 Use air free from oil or other contaminants.
- .4 Masking material to approval of Departmental Representative.
- .5 Paint Strippers
 - .1 Gel form, with active ingredient Methylene Dichloride.
 - .2 Stripper Systems: Single application, heavy duty paint removal system, non-toxic, zero VOC, as recommended for stone surfaces.
- .6 Attapulgite or Diatomaceous Clay (Fullers Earth): for use as poultice medium.
- .7 Amended water: Non-sudsing surfactant in water to soak stains and environmental soiling.

2.2 TOOLS AND EQUIPMENT

- .1 Use brushes with natural or soft plastic bristles.
- .2 Use scrapers of wood or plastic.
- .3 Use water pumps fitted with accurate pressure regulators and gauges capable of being present and locked at maximum specified levels.
 - .1 Water pumps to have rating of 250 kPa.
- .4 Use air compressors equipped with on-line oil filters to avoid spraying oil onto masonry.
- .5 Use gun equipped with pressure gauge at nozzle end.
- .6 Use plastic or non-ferrous metal piping and fittings.
- .7 Use nozzles that give nebulized droplet spray. Use nozzles with 12 mm opening.
- .8 Heavy duty electric heat gun. Heat generated from electric coils. No open flame.
- .9 Vacuum cleaner designed for industrial use, Hepa type.

Part 3 Execution

3.1 PREPARATION

- .1 Protect operatives, other site personnel and public from hazards.
 - .1 Ensure good ventilation in work area.
 - .2 Ensure workers wear eye, head and face protection, protective gloves, coveralls, boots and respirator to MSHA/NIOSH standard.
 - .3 Provide trained Operators to ensure proper use of tools and equipment.

- .2 Place safety devices and signs near work areas as indicated and directed.
- .3 Seal or repair openings and joints where there is potential risk of water/chemical infiltration.

3.2 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover and protect surfaces and non-masonry finishes not to be cleaned. Obtain approval of protection method from Departmental Representative before commencing cleaning procedure.
- .2 Protect vents, windows, and other openings, to prevent water entry or fine dust residue. Protect masonry openings from water/chemical infiltration during cleaning.
- .3 Protect wood, glass, and metal adjacent to masonry.
- .4 Hang sheeting material from scaffolding to enclose water spray.
- .5 Protect cleaned surfaces which are to be painted from contact with rain and snow.
- .6 Protect rainwater leaders, eaves troughs and gutters from being blocked by residue.
- .7 Protect adjacent Work from spread of dust and dirt beyond work areas.

3.3 EXECUTION OF CLEANING

- .1 Stop work when cleaning has detrimental effect on surrounding material and plants.
- .2 Use brushing and scraping only to supplement water washing.
- .3 Soften and loosen heavy deposits with prolonged water spray, then brush. Remove thick incrustations with wooden or plastic scrapers.
- .4 Removal of vegetation or organic growth growing in or on masonry.
 - .1 Soak masonry with low-pressure water.
 - .2 Follow soaking by gentle scrubbing with natural bristle brushes.
- .5 Low-Pressure Water Cleaning:
 - .1 Pre-wet masonry surface when necessary, by soaking with a low-pressure misting system to swell and loosen soiling, for a maximum period of 2 hours. Work from top of wall downwards.
 - .2 Avoid prolonged wetting and excessive water penetration.
 - .3 Do not exceed maximum pressure at nozzle or have nozzle closer to masonry than approved by Departmental Representative at mock-up.
 - .4 Heavily soiled areas will require proportionately more soaking time than cleaning open areas, up to a maximum of 4 hours. Avoid running streams of water down wall elevations and excessive soaking of masonry with subsequent damage to wall envelope. Concealed iron fittings and structural components can be seriously damaged by prolonged wetting of masonry, leading to spalling, severe staining and structural damage.
 - .5 Avoid steel or iron pipes and spray heads/nozzles. Provide plastic piping and fittings for general use.

- .6 Follow soaking by gentle scrubbing with natural bristle brushes, in areas of heavy soiling. Rinse thoroughly with clean water for a minimum period of 30 minutes.
- .6 Ensure masonry is cleaned after removal of scaffolding to eliminate possible staining from tie-backs.
- .7 Ensure finishpointing mortar is sufficiently cured prior to final cleaning. Mortar joints damaged during final cleaning must be raked out, and finishpointing reinstalled.

3.4 CLEANING OF BIRD DROPPINGS

- .1 Note that pigeon droppings are considered a hazardous substance. Take all required safety precautions, when handling and disposing of pigeon droppings.
- .2 As no single method will remove this soiling, provide the means and equipment to clean difficult stains as may be necessary.
- .3 Remove all thick deposits with non-ferrous trowels and remove from work site immediately.
- .4 Carry out trial cleans using wet poultices of solvents mixed with diatomaceous clay and/or mythylene dichloride based stripper. Leave on surface for 2 hours, covered to prevent drying. Remove. Vigorously scrub surface of stone with stiff bristle brush while blotting softened dirt with cotton rags soaked in the chemical. If method is successful, continue on remainder of affected surface.
- .5 Should chemical removal of pigeon related soiling fail to work sufficiently, carry out trial cleaning using low pressure micro-abrasive cleaning system. Should method be successful, continue cleaning affected areas to approved level of clean. Over cleaning and damage to stone must be avoided.

3.5 CAULKING REMOVAL

- .1 Scrape surfaces with non-ferric scrapers to remove caulking.
- .2 Beyond scraping of caulking, prepare mock-up using a heat gun and scraper to determine the effectiveness of this method in removing any remaining residue. This work to be performed under the direction and supervision of the Departmental Representative.

3.6 CLEANING

- .1 Rinse off masonry to satisfaction of Departmental Representative.
- .2 Rinse from bottom to top and from top to bottom.
- .3 Clean up work area as work progresses. At end of each work day remove debris and waste from site.
- .4 Upon completion, clean and restore areas used for work to condition equal to that previously existing.
- .5 After final cleaning, notify Departmental Representative to complete a final inspection of the masonry. Repair all noted deficiencies before dismantling scaffolding.

3.7 PROTECTION OF WORK

- .1 When the exterior low temperature is below 5 °C, maintain scaffolding protection and heating in place after wet cleaning for a period of 10 days to allow the stone to dry sufficiently, before being exposed to the elements.
- .2 Protect finished Work from damage until take-over.

END OF SECTION