AIA/CSI SECTION 02 83 13 LEAD HAZARD CONTROL ACTIVITIES
AIA/CSI SECTION 02 83 19.13 LEAD-BASED PAINT ABATEMENT – ENCAPSULATION
NIBS/WBDG/UFGS 02 83 00 LEAD REMEDIATION
USACE/NAVFAC/AFCEC/UFGS 02 82 33.13 or 02 83 19.10
(Abatement of Lead-Containing Materials by Encapsulation)
V. 25205

DIVISION 02 – EXISTING CONDITIONS
SECTION 02 83 00 LEAD-BASED PAINT ABATEMENT (REMEDIATION)
SECTION 02 83 19.13 LEAD-BASED PAINT ABATEMENT ENCAPSULATION

Sentinel Lead Encapsulant™ as Basis of Design

PART 1 - ENCAPSULATION PROJECT ORGANIZATION & EXECUTION[1]

1.00 GENERAL REQUIREMENTS

1.1 ORGANIZATION OF LEAD ABATEMENT BY ENCAPSULATION PROJECTS

A. GENERAL INFORMATION FOR LEAD-BASED PAINT RELATED WORK

a. Provide labor, equipment and materials to complete work involving long-term to permanent abatement via encapsulation of Lead-Based Paint (LBP, a subset of Lead-Containing Materials)[2].

b. Work included requires management of dust and particulate release from known or suspected lead-containing materials, and clean-up as necessary. Because lead cleanup presents challenges different from ordinary particulate, consider addition of a specification module on lead-specific cleaning into project documents.

c. All construction projects are unique, as are the sources and situations involving lead. Lead is found not just in historic/heritage-related preservation projects. Lead is encountered in an unlimited variation of circumstances; can be present in everyday remodeling, renovation; and also revealed as a consequence of disaster.

i. Lead in paint was used in residential, commercial and industrial coatings.

ii. Lead in structural coatings was not banned in several nations until recently, so even structures built within the last 2-3 decades may have been painted with lead[3].

iii. Lead-containing paints are still produced to serve specialized needs[4].

d. This specification for lead-based paint encapsulation is not inclusive of all requirements, methods or procedures that are appropriate or necessary on a particular abatement project.

i. The only complete set of instructions for a lead encapsulation project incorporates at a minimum:

1. This specification, or equivalent

2. Product label for encapsulant (and corollary products)
3. Data Sheet, Safety Data Sheet for encapsulant (and corollary products)
4. Pertinent Technical Bulletin (if any)
5. Pertinent and/or Project-Specific Written Guidance (if any)
6. Requirements of an AHJ (see SUPERIORITY)

e. Not all components with LBP are suitable for any/every/all encapsulation process, and not all encapsulation systems are applicable even when a lead-containing component has been deemed suitable for encapsulation.

f. Completion is an encapsulation system that is opaque white, with approximately 100% hiding of underlying/preceding color.[5] Tinting to custom colors, and/or topcoats (service and/or decorative) can determine appearance at completion.

g. The resulting encapsulation will be a laminar film of sufficient build and cohesion that the lead-containing coated surface is no longer an immediate lead hazard as inhalable or ingestible lead dust is generated by ordinary aging or incidental physical contact.[6]

B. EXPECTATIONS FOR INSTALLER:

a. Encapsulation ***shall***[7] be conducted by Installer:

i. Be conducted in accord with mandatory work practices, licensing requirements, disposal permitting, and all other related regulatory responsibilities.

ii. Installer shall be responsible for compliance with all Authorities Having Jurisdiction (AHJ, AHJs)[8]. This responsibility shall include but not be limited to:

1. Awareness that requirements may be in force from local, state/provincial, and/or national/federal entities; and,
2. Shall abide by the strictest requirement when rules are in conflict; or for,
3. Obtaining clarification from designated oversight professionals (assessor, inspector), and/or Materially-Interested Parties (MIP, MIPs)[9].

iii. Installer shall be sufficiently trained and experienced, and capable of ensuring that encapsulation subcontractors (e.g., painters) have necessary skills and awareness, or are provided with training before installation.

b. Installer ***should***[10] abide by industry standard of care by, in all project phases, utilizing best work practice standards for abatement, including selection of materials explicitly formulated for an encapsulation process, and which are sufficiently durable to be considered permanent.[11]

1.02 RELATED SECTIONS, REFERENCES, NOTES TO SPECIFIER:

A. Specified elsewhere:
   a. Section 00 26 00 – Hazardous Material Assessment
   b. Section 00 26 23 – Asbestos Assessment
   c. Section 00 31 26 - Existing Lead Information
   d. Section 02 26 26 – Lead Assessments
   e. Section 02 82 00 – Asbestos Abatement
   f. Section 02 83 19 – Lead-Based Paint Remediation
   g. Section 02 83 33 – Removal and Disposal of Materials Containing Lead
   h. Section 02 83 33.13 – Lead-Based Paint Removal and Disposal
   i. Section 03 00 00 - Concrete
   j. Section 04 00 00 – Masonry
   k. Section 05 00 00 – Metals
   l. Section 06 00 00 – Wood, Plastics and Composite
   m. Section 09 90 00 – Finishes
   n. Section 09 01 20 – Plaster Restoration
   o. Section 09 03 90 - Conservation Treatment For Period Painting And Coating
   p. Section 09 03 91.23 - Conservation Treatment For Period Interior Painting
   q. Section 09 90 00 – Finishes
   r. Section 09 91 00 – Painting & Coating

B. References
   a. ASTM (formerly American Society for Testing and Materials)
      i. D 1005
      ii. D 1212
      iii. D 1308
      iv. D 1475
      v. D 1653
      vi. D 2370
      vii. D 2486
      viii. D 2794

ix. D 3273
x. D 3274
xi. D 3363
xii. D 3891
xiii. D 3924
xiv. D 3925
xv. D 3960
xvi. D 4060
xvii. D 4214
xviii. D 4263
xix. D 4414
xx. D 522
xxi. D 824
xxii. E 84
xxiii. G 154

b. Lead References
   i. ASTM E 1795-04 Standard Specification for Non-Reinforced Liquid Coating Encapsulation Products for Leaded Paint in Buildings, 2004
   ii. ASTM E 1796-03(2011) Standard Guide for Selection and Use of Liquid Coating Encapsulation Products for Leaded Paint in Buildings
   iii. Requirements for Lead-Based Paint Activities in Target Housing and Child-Occupational Facilities: 40 CFR 745, U.S. Environmental Protection Agency (EPA) (1996)
   iv. U.S. Department of Housing and Urban Development (HUD), Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Chapter 13 - Abatement by Encapsulation, And Chapter 14 – Cleaning. 2nd edition, July 2012
   v. Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title X of the Housing and Community Development Act of 1992 (US Public Law 102-550), Section 1017, 42 U.S.C. 4852c)
   vi. Protect Your Family from Lead in Your Home. , U.S. Environmental Protection Agency (EPA)[12] (2013)
   vii. Painting and Decorating Contractors of America (PDCA): PDCA P5, "Benchmark Sample Procedures for Paint and Other Decorative Coating Systems."
   viii. Lead Standard: 29 CFR 1910.1025 and 29 CFR 1926.62, U.S. Occupational Safety and Health Administration (OSHA) (1993)

ix. *How Much Cleaning is Enough*, National Center for Lead-Safe Housing. (1999)
x. South Coast Air Quality Management District (SCAQMD): Rule 1113 - Architectural Coatings
xi. Also recommended:
    1. Lead and Environmental Hazards Association (LEHA)
    2. Association for Materials Protection and Performance (AAMP), formerly NACE International, and Steel Structures Painting Council (SSPC)

C. PUBLIC SECTOR SPECIFICATIONS – Integration Compatible[13]
    a. U.S. Army Corps of Engineers (USACE) Guide Specifications (CEGS 13281)
    b. United Field Guide Specification (UFGS) 028300

D. SUPERIORITY: Where contradicted by federal, state, or local laws and regulations, any of the preceding supplant the information in this document.

E. SUSTAINABILITY:
    a. Encapsulant should contain no more than 100 g/l content Volatile Organic Compounds (VOCs);
        i. Specifier will prefer very low VOC content of 15 g/l or less.
        ii. Should not contain HAPS (Hazardous Air Pollutants) petroleum distillates, alcohols, or similar solvents or oxidizers.
    b. Encapsulation can contribute to sustainable preservation of spaces and surfaces, especially as a solution for LEED BD+C: LEED for Building Design and Construction (used for major renovations of existing buildings):
        i. Encapsulation of lead-based paint retains architectural detail that is often an irreplaceable community asset;
        ii. Reduces/avoids demolition and associated pollution of airborne lead particulates;
        iii. Reduces waste contribution to C&D landfills;
        iv. Relieves pressure on project schedules because preparation and encapsulation require generally less time than removal and replacement.

F. NOTES TO USERS OF THIS DOCUMENT
    a. This is a Compendium-type specification. It is supplied in an exhaustive format with the intent of achieving as comprehensive inclusion of project factors as possible. ***The specifier is not obligated to utilize this specification in entirety, but instead is encouraged to apply those provisions which are applicable to specific projects.***

b. Support is available from Sentinel when site-specific, customized versions of this Specification are needed. Please reach out to Sentinel at 763-571-0630 x. 107, or getinfo@senpro.com .

c. This specification may be substituted as an "or equal" methodology with encasement protocols. From the regulatory perspective, encasement is an alternate term usable as a synonym for encapsulation, and encapsulation is historically the primary/dominant term of both compliance and best practice.

d. It is understood that certain client or project dynamics preclude the use of product or manufacturers' names. Section 2, Basis of Design (below), is intended to provide the specifier with performance criteria that can be utilized to establish minimum criteria, but without identifying any specific product by name, model number or manufacturer. The specifier can omit the product and manufacturer name and utilize those performance criteria that are most project-applicable as the minimum requirements for submittals. Sentinel will also assist with competitive bid situations where the client requires 3+ encapsulants for lead-based paint.

e. At the end of this document are End Notes, which often include some commercial or sales information that many users find is helpful information. The specifier has the option to retain the End Notes, keep certain notes relevant to a project, or delete the End Notes altogether. The availability of an End Note is indicated by a numeral. Clicking on that numeral helps the reader jump back and forth between the main text and the note.

f. This is a specification prepared exclusively for Sentinel and Sentinel users and specifiers by ColeTrainConsulting (CTC). Services for consulting, specialized expert, applicator training, specification development and many others can be arranged through Sentinel.

G. Contact Sentinel for specification assistance for unusual lead contamination situations. For example, this specification does not include guidance for LBP encapsulation or abatement related to:

a. Floors/Horizontal traffic surfaces/Friction-bearing surfaces

b. Contaminated building contents

c. Air Conveyance Systems (ACS), aka Heating, Ventilation, Air Conditioning & Refrigeration (HVAC&R) systems

d. Lead Contamination from fire damage, (see Wildfire & Lead Technical Bulletin at link), industrial processes, or vehicle exhaust

e. Flat and Very-Low Pitch LBP on Roofs

f. Lead Coated Copper & other metallic elements

H. Metric Conversions: Metric conversion, where used, is soft metric conversion.

1.03 QUALITY ASSURANCE

A. GENERAL RECORDKEEPING: All contractors shall document their work, and supply recordkeeping and documentation to appropriate Materially-Interested Parties (MIP, MIPs) when requested during and/or at completion of the work. Such recordkeeping should include but is not limited to a legible organized site log/daily activity record that includes several monitoring metrics recommended by this specification and/or industry best practices.

B. PERFORMANCE WORKMANSHIP: Apply encapsulants consistent with workmanship that exceeds industry standard-of-care, and the following inadequate performance defects will not be tolerated:

   a. Anywhere encapsulant is not contiguous and consistent in film-build (Thickness);

   b. Less than 100% hide of underlying surface color[14];

   c. The generation of dust, particles, or deteriorated paint from physical touch (fingertip pressure);

   d. Post-application delamination or deterioration of the underlying LBP (indicating failure to sufficiently prepare LBP on surfaces to clean, dry, sound and when necessary, deglossed).

C. AESTHETIC WORKMANSHIP: specifier may invoke when encapsulant appearance directly impacts spaces or surfaces visible to occupant.

   a. Apply coatings (encapsulants; and primers, and finishes) consistent with workmanship that exceeds pertinent industry standard-of-care, and the following inadequate defects will not be tolerated:

      i. Runs,

      ii. drips,

      iii. "ropiness",

      iv. uneven cut-ins,

      v. over-application,

      vi. or other defects in final finish will not be accepted.

   b. Finished surfaces will be deemed acceptable if, in the sole opinion of the Engineer, Owner's Designee, or Architect, there are no insufficient or excessive application irregularities when viewed in normal lighting from 8 feet away, whether or not such irregularities existed prior to start of encapsulation and painting work. The party responsible for determining acceptance shall be determined in advance of coating application and notice given in writing to both General Contractor and Installer.

D. THICKNESS OF LEAD-BASED PAINT ENCAPSULATION

a. Specifications, RFPs, Bid Proposals and Solicitations for encapsulation projects should clearly denote the:
    i. Gallons/Liters to be applied.
    ii. Wet film thickness of each application
    iii. Dry film thickness of each application
    iv. Coverage Rate per Gallon or Liter
b. Specifiers, MIPs, Owners and their agents may elect for several reasons to require during project design a dry film thickness (DFT) considerably thicker than the minimum (which will in turn result in lower yield per gallon and may increase the number of applications). Examples of why greater DFT might be preferred include demanding environments (e.g., marine exposure, high altitude, industrial chemical exposure, anticipated occupant abuse).
c. Wet mil film thickness should be measured throughout any encapsulation project using a wet mil gauge or coupon panel.
    i. Wet film thickness gauges are available upon request and at no charge from the manufacturer of the encapsulant.
    ii. Use wet film thickness gauges to monitor coatings. Test surfaces where end brackets are both flush such that all teeth are evenly in contact with wet film. Designate a quality assurance person for all documentation, including taking wet film measurements using a metal wet film thickness gauge, and recording results 2-3x daily in the project log.
d. Coupon Panel: Another method to assure that a minimum dry film thickness is achieved, is to affix a panel ("coupon") (with a predetermined thickness), to the area being coated so that it receives the same treatment as the surrounding area. Once the film dries the panel should be measured again using a micrometer or dial caliper. Subtract overall thickness from the panel thickness to determine the dry film thickness. After the project, provide the coupon to the Owner with other project documentation.

E. SAMPLING & MOCK-UP:

a. When directed by MIPs (e.g., Owner, or Architect/Engineer) obtain test samples from a distributor or the manufacturer.
b. If directed by Architect/Engineer, provide a clear list of samples coordinated as applicable to each unit of work, and position within each application process (i.e., primer, conditioner, finish, texture, protective finish) and critical performance function (e,g. intumescent, encapsulant, waterproofing membrane, odor sealer).
c. Pilot Application/Mock-Up:
    i. Upon request, it may be determined necessary to provide a mock-up for validation of performance expectations, and anticipated application workmanship.

ii. Prepare surfaces designated for verification of suitability of proposed surface preparation procedures.

iii. Ensure test areas are representative in both conditions and number of test locations.

iv. Apply LBP encapsulant at specified thickness, and ideally when (if used on project in question) penetrating encapsulation is has developed a tack to the touch by fingertip.

v. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.

vi. Retain mock-up during construction as a standard for comparison with completed work.

d. Do not proceed with remaining work until pertinent project authority (By Owner, Client, Enforcement Authority, Architect or Engineer), approves the mock-up.

i. Standard for Accepting Work: Encapsulated surfaces will be deemed acceptable if among the MIPs, there are no insufficient or excessive application irregularities when viewed in normal lighting (see AESTHETIC and PERFORMANCE WORKMANSHIP above).

ii. Do not alter or remove mock-up until work is completed or removal is authorized. Subject to compliance with requirements in this section, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. RESPONSIBILITY FOR SURFACE PREPARATION

a. If substrate preparation is the responsibility of another contractor, the installer shall notify the owner's agent of unsatisfactory preparation before proceeding.

1.04 SUBMITTALS:

A. DELIVERY OF SUBMITTALS:

a. Submit electronically under provisions of Section 01 30 00 - Administrative Requirements

b. Provide PDF or URL for most recent encapsulation product literature including.

i. Technical data (and relevant Technical Bulletins)

ii. Performance testing (Manufacturer's certification of testing to demonstrate conformance (meet or surpass ASTM E 1795, with specific data provided on request)

1. Technical Bulletin to certify testing conducted shall indicate the minimum dry film thickness at which the encapsulant passes all requirements of ASTM E 1795, as application at a lower thickness

(higher than recommended spread rate) is not considered lead abatement, and is therefore not fulfilling the project objectives.

iii. Safety Data Sheet

iv. Warranty (min. 20 years, limited, product replacement only)

1. Warranty solely against manufacturer defect is unacceptable

v. Label.

vi. Submittal of Ancillary (Corollary)Products (e.g., surface preparation, decorative topcoats): provide electronically the technical data sheet and Safety Data sheet for products including lead-specific cleaner, primers, historic and/or decorative color finishes, and non-coating products (such as foam, caulks and joint compounds).

vii. Maintenance Instructions: Submit manufacturer's maintenance instructions, including maintenance procedures and materials, procedures for stain removal and surface repair, and recommended schedule for cleaning.

B. SUPPORT STATEMENT: Submit contact information for local representatives of Approved encapsulation coatings manufacturer. Manufacturer must have representation sufficiently knowledgeable, available and informative no less than next-day by email or phone in order to resolve project and material-specific questions.

C. U.S. STATE ENCAPSULATION PROGRAMS: In certain states, there are lead encapsulation programs, some of which maintain product lists or product fact sheets. Contact the manufacturer if any such questions arise.

D. SINGLE SOURCE RESPONSIBILITY (Reserved)

E. CONTRACTOR QUALIFICATIONS (Reserved)

F. “OR EQUAL” ELIGIBILITY: Bidders are encouraged to submit materials that meet the Basis of Design.

a. In order to have a material accepted as an Approved Encapsulant for the work, submittals must be received by the engineer/consultant/architect for evaluation and approval no less than 4 days prior to the original published bid date.

b. Approved alternative Encapsulants will be by Addendum only.

i. Submittals circumventing this process will not be approved and will not be acceptable for inclusion in this project.

ii. Alternative/substitution products considered in accordance with provisions of Section 01 60 00 specifications attached by consulting architects and engineers to the overall scope of this project.

iii. Only submit products with compliant VOC-content based on project location and requirements including regulations e.g., CARB, OTC, SCAQMD, LADCO). To ensure compliance with district regulations and other rules, businesses that perform coating activities should contact the local district in each area where the coating will be used. Lead

encapsulants are often classified as “Primer-Sealer-Undercoater” or similar.

iv. Substitutions will only be considered for products manufactured by companies of primarily U.S. ownership, and when the proposed substitute product is “all or virtually all” manufactured in the United States (in accord with the Made in USA Standard of the Federal Trade Commission (FTC)).

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING (see Section 01 60 00 - Product Requirements)

A. Deliver manufacturer's unopened containers to the work site.
   a. Ensure inclusion on labels of containers of all products, including encapsulants[15]:
      i. Product name, and type (description).
      ii. Batch Number
      iii. Manufacture date.
      iv. Product SKU
      v. Color number/identification

B. Storage of materials:
   1. Store only acceptable project materials on site.
   2. Store in suitable location convenient to progress of work.
   3. Comply with health and fire regulations.
   4. Storage temperature shall be between 40° F (4.5° C) and 90° F (32° C), or such other ambient temperature conditions as may be specifically recommended by the product manufacturer.
   5. Encapsulants shall not be permitted to freeze on site, and delivery of encapsulant should be refused if freezing during transit is probable.
   6. Avoid storage directly in hot sun exposures.
   7. Keep containers tightly closed when not in use.
   8. Keep out of reach of children.

C. Handling:
   a. Dispose of water-based and solvent-based materials, encapsulant and supplemental products, in accordance with requirements of local authorities having jurisdiction.

b. Verify that encapsulant and supplemental products are within acceptable shelf life, and do not utilize any product that is older than the maximum shelf life stated by the manufacturer.

D. Extra Materials:

a. Furnish extra encapsulant materials. Furnish Owner with an additional one percent of each encapsulant and color, but not less than 1 gal (3.8 l), pail (19 l), or 1 case, as appropriate and collectively agreed upon in advance of substantial completion.

b. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

1.06 JOB CONDITIONS

A. Environmental Requirements

1. Installer should keep a log of environmental site conditions during the project and provide that to Owner or their agent upon substantial completion. See Recordkeeping above.

2. Comply with manufacturer's recommendations as to environmental conditions under which encapsulant coating systems can be applied.

a. Temperature:

i. At Application: Surfaces to be coated and ambient air temperature shall be between 45° F (7.2° C) and 90° F (32° C). Do not apply encapsulants at temperatures beyond those limits, unless specified in writing by the manufacturer.

ii. After Application: Site surface and air temperature shall remain within the manufacturer's acceptable range for no less than six (6) hours post-application.

iii. Fluctuating Conditions: When temperatures are expected to be consistently in the cooler segment of the acceptable range (<50 F), or temperatures are expected to fluctuate significantly, multiple thin applications with dry time in between is advisable versus a single application. Supply of air movement may be recommended to aid curing when site conditions are minimal for application.

b. Humidity:

i. Ideal humidity for encapsulant application is 40-50% Relative Humidity (%RH).

ii. Humidity in excess of 70% RH will slow the drying and curing of encapsulant coatings. Supply of dry air movement may be

recommended when site conditions are minimal for application.

iii. Do not apply any encapsulant when the Relative Humidity is above 85% or when the Dew Point is closer than 3 degrees to the ambient air temperature.

3. Surface/Substrate Moisture:

a. Depending on the manufacturer, surfaces may be lightly damp to the touch. Consult manufacturer regarding whether topical dampness (latent moisture tangible by touch) after wet cleaning or recent precipitation is acceptable at time of application, or if a completely dry substrate is required.

b. After washing, applicators are expected to account for slow-drying surface elements (such as shaded areas, hairline cracks, nail holes).

c. Do not apply encapsulants to materials both wetted at the topical surface, and with unusual moisture subsurface. At no time should coatings be applied where significant topical moisture is present (such as droplets, “beading” water).

i. Review carefully and comply with manufacturer’s permissible maximum moisture content (MC%) for product and substrate combinations where entrained substrate moisture could influence curing and performance, especially when trapped substrate moisture will attempt to escape or balance in future, such as when influenced by radiant heating/cooling cycles (or other similar causes of “vapor drive”).

ii. Maximum Moisture Content of Substrates: Moisture Content should generally be closer to the dry end of the paintable range, especially with the encapsulant. This is especially important as meters have variable information interfaces. When measured generally in MC % with an electronic moisture meter, consider best general guidance as follows:

A. Concrete: 12 percent.

B. Fiber-Cement Board: 12 percent.

C. Masonry (Clay and CMUs): 12 percent

D. Wood: 15 percent for paints/primers; 11 percent for lead encapsulant.

E. Portland Cement Plaster: 12 percent.

F. Gypsum Board: variable with manufacturer

iii. Moisture content readings taken should be recorded alongside other notes on environmental site conditions in the applicator's project log. See Recordkeeping above.

d. For all products, prevent wide temperature fluctuations that could cause moisture condensation on freshly coated surfaces

e. Do not apply any coatings outdoors when precipitation can be reasonably expected to directly contact the curing film within 24 hours after application, when fog/mist is prevalent, and/or when temperatures are less than 5°F (3°C) above dew point.

B. Surface Protection/Prevention of Cross-Contamination

a. Protective Procedures for People and Property:

i. Cover or otherwise protect finished work.

ii. Do not apply encapsulants in areas where dust or other airborne particulate matter is being generated.

iii. Avoid cross-contaminating encapsulation areas with dust. Such particulate may contain asbestos, lead and other hazardous contaminants. These contaminants may bias clearance testing as well as introduce unwanted and potentially health-affecting substances.

iv. Do not begin application of intermediate or final painting coats until work is sufficiently advanced that coatings will not be damaged by later construction operations.

C. Worker Safeguards: Shall exceed activity-specific requirements as promulgated by OSHA and relevant AHJs. To include but not limited to:

a. Provide adequate illumination (Maintain minimum 80 footcandles (861 lx) on surfaces to be coated) and ventilation during application.

b. Utilize adequate engineering controls to ensure worker and occupant safety and health and prevent cross-contamination by satisfying requirements of regulations for relevant AHJs.

i. Engineering controls may include, but are not limited to, source containment, isolation barriers, pressure differentials, dust suppression, and high efficiency particulate air (HEPA) vacuuming and filtration.

ii. Utilities, including electric, water, heat and finished lighting to be supplied by General Contractor.

c. Contractor shall ensure and document provision with and training for use of all necessary Personal Protective Equipment (PPE).

i. No other party shall be responsible for failure of Installer to properly equip and train installer's workers with PPE.

ii. Manufacturer, Prime Contractor, and Owner shall bear no responsibility for failure of Installer to properly equip and train workers with PPE.

B. Damage: Each Contractor and Subcontractor shall be held responsible for and shall pay for all damage to or soiling of other work caused by its work or operations.

a. Maintain adequate safeguards concerning the premises and protecting the public from hazards associated with the work of this Section.

b. Post abatement work site signage, as described in lead requirements.

c. Post “Wet Paint” signs at surfaces subject to contact while drying.

d. Ensure that site and on-site supplies are secured, locked, wheels chocked, equipment is powered down and protected against accident, intrusion, vandalism, and curiosity.

PART 2 – MATERIALS AND MANUFACTURERS as Basis of Design

2.00 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer
a. Sentinel Products, Inc., 8901 Wyoming Ave. N., Brooklyn Park, MN 55445
b. PHONE: 763-571-0630
c. FAX: 763-571-1819
d. EMAIL: getinfo@senpro.com

B. Substitutions:
a. Only with advance consent of MIPs
b. See above Section 1.04, and provisions of 01 60 00 – Product Requirements

2.02 ACCEPTABLE LEAD-BASED PAINT ENCAPSULANT - WHITE [or equal]

A. Basis of Design: Sentinel Lead Encapsulant™ - White [or equal]
B. Performance and Design Requirements/Key Attributes for Specifier
a. Category Type: Elastomeric, Styrene-Acrylic Polymer.
b. Meets or surpasses U.S. HUD & EPA for abatement by encapsulation: Yes
c. Viscosity - Stormer viscosity (KU): 110-120 KU
d. pH - Neutral Range: 8.25-9
e. Solids Content
i. NV% (by wt.): 55.9

ii. NV% (by vol.): 40.2

f. Number of Applications: 2+

g. Wet Film Thickness: 15 mils aggregate total

h. Dry film Thickness (final): 6-8 mils aggregate total

i. Miscible (with water or other solvents): No. Products must not be reduced with water or solvents. Except see Tinting.

j. Color:
   i. Wet (unapplied): White
   ii. Dry film: White

k. Anti-Ingestant: Yes

l. Gloss (60°): Flat 2.0

m. Flexibility - Mandrel bend; 1/8” Conforms
   i. ASTM D522
   ii. No cracking or other defects

n. Chemical Resistance – No blistering, cracking, delamination, softening
   i. ASTM D1308
      1. Distilled Water Conforms
      2. Ethyl Alcohol Conforms
      3. Acetic Acid (3%) Conforms
      4. Sodium Hydroxide Conforms
      5. Hydrochloric Acid (10%) Conforms
      6. Citric Acid in Water (1:19) Conforms
      7. Corn Oil Conforms
      8. Coffee Conforms
      9. TSP in Water (1:19) Conforms

o. Water Immersion Conforms
   i. ASTM D1308
   ii. Water Resistant: Cured film tolerates incidental immersion
   iii. Not for constant immersion service (e.g., pools)

p. Density of coating (weight lbs./gal), ASTM D1475: 11.3

q. Permeance (perms) 48.1
   i. ASTM D1653
   ii. Method A dry cup (free film)

r. Tensile and elongation Conforms
   i. ASTM D2370
   ii. Max tensile strength (psi); stress 218.7
   iii. Elongation @ break, %; strain 54.8

s. Scrub resistance (cycles to failure) ASTM D2486: 1315
t. Impact Resistance (80 inch-lbs); direct 9J
    i. ASTM D2794
    ii. Direct: 9 J (80 in·lbs) without cracking to the substrate
    iii. Indirect: 9 J (80 in·lbs) without cracking to the substrate
u. Exposure: Interior/Exterior
v. Post Weathering (see UV exposure testing below)
w. Accelerated Ageing Conforms
    i. Two E 1795 specific protocols, one for Exterior Product (see ppg 11.10.1), and one for Interior Products (see ppg 11.10.2). Severity of stress, frequency of cycle changes, and recovery time reflect intended exposure. Then, for both interior and exterior, post-stress testing is conducted.
        1. Post-Weathering Adhesion (Exterior) 5A
        2. Post Weathering Flexibility (Exterior) Conforms
        3. Post Weathering Adhesion (Interior) 5A
        4. Post Weathering Flexibility (Interior) Conforms
x. Resistance to Mold Growth (10 = 0% defacement), D3273: 10
    i. Evaluate Mold Disfigurement, ASTM D3274: feeds data to 3273
y. Adhesion tape test X cut Method A (5A best; 0A poorest)
    i. ASTM D3359 5A
    ii. Tape pull test; X cut (5A = best, no picking)
z. HMIS Rating (Hazardous Material Identification System) Rating:
    i. Health: 1
    ii. Flammability: 0
    iii. Physical: 0
    iv. Personal Protection: A
aa. Hazardous or Degrading Constituents
    i. Volatile Organic Content[1], 0.9 g/L
        1. ASTM D3960, g/l: (calc-ultra-low=<5g/L)
    ii. Hazardous Air Pollutants (HAPS) none
    iii. Solvents none
bb. Paintability: 5A
    i. ASTM E 1795, ppg. 11.13.1
    ii. Evaluated using acrylic latex. Adhesion per ASTM D3359

[1] *A zero V.O.C. coating by industry standard means the product contains less than 5 grams of V.O.C.'s per liter. Tints and colorants may add V.O.C.'s to the product.

cc. Repairability: 5A
    i. ASTM E 1795, ppg. 11.13.2
    ii. Evaluated using encapsulant. Adhesion per ASTM D3359
dd. Accelerated Dry Abrasion (Taber Abraser; 2.5 mils Leneta) 0.3% loss
    i. ASTM D4060
ee. Chalking of exterior coating films No Chalking
    i. G154 for accelerated ageing
    ii. ASTM D4214 review & report
ff. Fire rating (Flame Resistance & Smoke Development
    i. ASTM E84 (Tunnel Test)
        1. Flame Spread Index (FSI) 0-Class A
        2. Smoke Developed Index (SDI) 0-Class A
    ii. ASTM E662 Opacity
        1. Flaming avg Dm: 23
        2. Non-Flaming avg Dm: 35
gg. Weathering (UV Exposure (QUV); 1000 hr cycle
    i. ASTM G154
        1. Post-Weathering Chalking No chalking
        2. Post-Weathering Adhesion 5A
        3. Post Weathering Flexibility Conforms
hh. Odor: Slight Acrylic
ii. Freeze-Thaw: Zero Cycles – Do Not Freeze
jj. Tintable : This product may be tinted with universal colorant systems. Colorant loading to a maximum of 2 oz. per gallon.

2.02 COLORS

A. White
B. Can be supplied in custom and historic colors

2.03 MIXING

A. Accomplish job mixing and application only when acceptable to the Architect/Engineer.

B. Mix components only in containers furnished or approved in writing by the Manufacturer.

C. Do not add more than two-ounces per gallon of universal liquid colorant when tinting any encapsulant to custom colors. Medium and deep-base tints are not possible without changing the performance characteristics of an encapsulant. Tinting should only occur at a paint store or similar acceptable to the manufacturer and conducted by experienced staff. The manufacturer is not responsible for fading, or other deterioration of custom-tinted encapsulant. Thinning, diluting or field tinting of the encapsulant is not permitted, unless expressly instructed in writing in advance by the manufacturer.

SPECIFICATION CONTINUES IN PART 3

PART 3 – EXECUTION

3.01 EXAMINATION

A. PRE-WORK VISUAL INSPECTION

a. Visually examine surfaces to be encapsulated. The purpose of the visual inspection is to evaluate existing surface conditions. If the surface cannot be put into an acceptable condition, do not encapsulate.

b. Notify Owner's agent immediately upon determination that surfaces scheduled to receive encapsulant are unacceptable, even with preparation for proper adhesion or subsequent performance.

c. Work should commence only after conditions have been corrected and approved by all parties, otherwise encapsulant application will be considered as an acceptance of surface conditions.

B. PRE-WORK SURFACE ASSESSMENTS:

a. SUBSTRATE STABILITY (DEGREE OF DETERIORATION, SUITABILITY OF PURPOSE):

A. VISUAL INSPECTION: Installer should perform their own visual inspection to verify conditions have not changed since the scope pf work was written. Visual inspection is also the opportunity to verify that encapsulation and paint system composition and function are not incompatible.

B. PHYSICAL STABILITY: Painted surfaces may appear intact, but within the surface the bond between certain elements can be compromised. While mindful of generating and cleaning up dust and particulate that can minimally occur, the Installer should conduct common-sense evaluations that stress the adhesion and cohesion of the surface (e.g., initial adhesion tape tests, D3359 modified X-cut. Contact manufacturer for test description).

C. ENCAPSULANT PILOT TEST/MOCKUP: Described at 1.03 of this specification.

D. WATER-BREAK & pH TESTS: To check for unseen adhesion-preventing factors (such as hydrophobic (water repellent, oily contamination; and high or low pH), perform a hybrid pH and water-break test, especially where these conditions are reasonable to expect.

1. Fasten pH indicator paper to surface to be tested. A few drops of distilled water are placed on the surface, or apply by spray from trigger bottle, or apply a light splash from a drinking cup. pH indicator paper should be sufficiently moistened for color

change, but not washed out. [pH testing instruments (pH "Pen") may be faster and more accurate, and are recommended when available].

2. Hydrophobic: Wet a portion of the surface with clean water by splashing to induce runoff in a sheeting action. If the water does not break into droplets (i.e., the water scattering from a newly waxed car), then the surface is free from contamination. If water "beads", oil and/or grease is still present, and the washing and/or rinsing procedure below must be repeated..
3. Excess acid or alkaline pH: the ideal pH is 7, which is neutral. Encapsulants can typically tolerate conditions in a "neutral range" of 6-8. If this test indicates conditions below 6 or above 8, then the surface may be too acidic or alkaline respectively. Frequently alkaline surfaces, such as stucco, concrete and block can pose unique circumstances (e.g., efflorescence) when it comes to properly preparing and encapsulating these substrates. Contact the manufacturer to develop site-specific recommendations.

3.02 PREPARATION OF SURFACES

A. All surfaces to be encapsulated should be properly prepared so that all are clean and dry at the time of application.

B. CAUTION NOTICE: DRY SANDING, SCRAPING AND OTHER SURFACE PREPARATION PROCEDURES CAN CREATE TOXIC DUST AND HAZARDOUS WASTE. A HEPA (HIGH EFFICIENCY PARTICULATE AIR) VACUUM SHOULD BE USED ON ALL SURFACES TO REMOVE HAZARDOUS DUST AND PARTICLES. USE MSHA/NIOSH APPROVED OR EQUIVALENT RESPIRATORY PROTECTION SUITABLE FOR CONCENTRATIONS AND TYPES OF AIR CONTAMINANTS ENCOUNTERED.

C. LBP should be sufficiently intact and free of deterioration such that the barrier formed by the cured encapsulant is stable; or, by using leadsafe methods the dimensional stability of the lead-containing painted surface can be improved to soundness that can support the cured encapsulation. REMINDER – Not all LBP surfaces can be encapsulated. Preparation may be impossible, or the necessary preparation may not be cost feasible.

D. GENERAL CLEANING

A. Initial general preparation is to HEPA-vacuum all surfaces. HEPA equipment should employ a bristle intake nozzle fixture or similar to agitate surface contaminants and encourage removal into the airstream suction of the vacuum. HEPA-vacuum may be the only preparatory step required for most clean areas of the project.

B. The second general step in preparation, if necessary, is wet cleaning treatment by wiping. During wet cleaning:

I. Replace rags, wipes, sponges, microfiber cloths and mops frequently.

II. Replace cleaning solution and rinse water when dirty.

III. Do not use a high-phosphate detergent (such as TSP Trisodium Phosphate). Use product deemed compatible by encapsulant manufacturer, and label instructions supercede this specification. Consider both pre-soaked towels, and liquid cleaner in a properly prepared pressure sprayer.

IV. Pre-spray with prepared lead cleaner solution, but do not allow to dry. Only prespray as far ahead of physical cleaning activity as personnel resources and drying conditions together dictate.

V. Prespray with a pump-up, compression type sprayer to target cleaning solution activity in a controlled manner that minimizes runoff. Use a foaming tip or similar to generate some foaming that extends contact time on vertical and overhead surfaces.

VI. Use a “three-bucket” system for all lead-dust wiper cleaning activity.

1. Fill one bucket with a cleaning solution.

2. Fill the second bucket with rinse water.

3. Leave the third bucket empty. Or use a three-chamber bucket

4. Put cleaning implement (e.g., mop, rag, sponge) into the bucket of cleaning solution, then wring out excess into empty bucket.

5. Clean a small section and rinse in the rinse bucket. Wring out excess into empty bucket.

6. Repeat until entire surface is clean.

7. Rinse with clean water from pressure sprayer, and wipe/mop with a new clean implement.

8. Dispose of wastewater and soiled implements properly. Rinse surfaces with clean water. Avoid uncontrolled release of rinsate

beyond the work area, as it may contain lead. Jurisdictional regulations for management of rinsate (collection and disposal of waste liquids) can vary, and project-specific requirements are the responsibility of the installer.

vii. New cementitious materials must cure for 28 days before accepting any water-based coating, including the encapsulant that is the Basis for Design. Follow instructions for new paint when applying to compounds, glazing, caulk and other repair products. Avoid water-repellent products, such as most that contain silicone

VIII. Avoid the following preparation methods unless authorized by the project's MIPs, and installer is provided with written authorization: blowing with compressed/pressurized air, pressure washing, "shop vac" or other suction cleaning without filtration capable of capturing LBP dust & particulate matter, washing or other wet cleaning using more than slight amounts of topical moisture.

3.03 APPLICATION

A. VERIFICATION OF CONDITIONS AT APPLICATION START

a. a. After cleaning and cleaning verification, visually examine vertical and overhead surfaces to be encapsulated. The purpose of the visual inspection is to evaluate existing surface conditions and determine how to properly encapsulate in accordance with this Specification. If the surface cannot be put into an acceptable condition, as described within this Specification for the particular substrate type and/or surface conditions, do not encapsulate.

b. Examine surfaces scheduled to receive encapsulant for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work as included in 3.02. PREPARATION OF SURFACES.

c. Notify Owner's agent immediately upon determination that surfaces scheduled to receive encapsulant are unacceptable for proper adhesion or subsequent performance. If substrate preparation is the responsibility of another installer, notify Owner's agent of unsatisfactory preparation before proceeding.

d. Do not proceed with surface preparation or encapsulant application until conditions are suitable. Work should commence only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

e. Do not proceed with surface preparation and application without first consulting with AHJs (federal, state and local authorities) for specific work practice guidelines and safety procedure information for that jurisdiction.

f. During the visual inspection of surfaces, direct special attention to doors, windows and other surfaces that may receive repeated friction or wear from ordinary operation. Components of doors and windows that do not receive friction and abrasion during ordinary operation (e.g., casing, muntins, mullions, jalousies) may be encapsulated in accordance with this Specification for the particular substrate type and/or surface conditions.

g. Apply encapsulant only after the surface has been examined, assessed, prepared, cleaned, and dried, as outlined in the surface assessment and preparation sections of this specification, as well as relevant guidance on product label, technical data, and satisfaction of professional judgment and “common sense”.

h. Application of encapsulant to surfaces that are not clean and dry as described will void all reasonable expectations of performance.

i. Installer is responsible for verification of jobsite environmental conditions when application is to commence.

B. SURFACE PREPARATION INSTRUCTIONS FOR ENCAPSULATION OF SPECIFIC SUBSTRATES:

a. WOOD

i. Water-soluble Stains: Surfaces which exhibit water-damage, or highly-pigmented woods (including, but not limited to redwood, cypress, cedar, and/or knots in most wood substrates) rendered bare by deterioration of existing paint or by surface preparation should be primed with a stain-blocking primer.[16]

b. CONCRETE, MASONRY, STUCCO, BRICK, CONCRETE BLOCKS, ETC.: After cleaning, it can be possible to install the lead encapsulant without further surface preparation or priming. Depending on the manufacturer, the encapsulant may be self priming (for adhesion, not stain-blocking) atop the existing paint system, as well as cementitious substrates rendered bare in spots. The remaining points in this section address common complications that the installer needs to understand and be able to recognize.

i. Remove surface dust or chalk that can recur after cleaning.

ii. Remove efflorescence (a growth of salt crystals on a surface caused by evaporation of alkali/salt-laden water). Efflorescence indicates the presence of alkaline surface residues that may interfere with the adhesion of any topically-applied coating. Consult manufacturer for appropriate acid cleaner.[17]

iii. Since alkaline residues may persist after ordinary cleansing, check suspect areas with pH indicator pen suitable for detecting surface pH in the 3-12 range. Follow the manufacturer’s instructions for the proper use of pH indicator pen, and use distilled water whenever possible to avoid analysis biased by acidic tap water.

iv. If a highly-alkaline surface pH is detected, apply a manufacturer-recommended acid wash solution designed to neutralize alkaline surface conditions. Rinse neutralizer residue with clean water and permit the surface to dry. Retest pH after neutralization, and repeat process as necessary before encapsulation.

v. If surfaces continue to spall and/or exhibit chalk after thorough and repeated cleaning, apply a masonry conditioner to bind up loose surface particulate matter.

vi. Consider an Encapsulant Patch Test to determine whether a masonry conditioner or other primer coat is necessary.

vii. Surfaces which exhibit water-damage, discoloration, or highly-pigmented bare brick or masonry substrates should be primed with a stain-blocking primer

viii. Some masonry conditioners can also block some potential migrating stains.

ix. For below-grade applications to cementitious substrates such as concrete, the Architect or Engineer may direct contractor to conduct multiple Encapsulant Patch Tests, and observe tests for a longer than normal evaluation period. Below-grade applications can be impacted by hydrostatic pressure and water-vapor transmission through substrates on the perimeter of a foundation. Generally, lead encapsulants do not efficiently permit moisture to migrate through the encapsulant film.

x. Brick (especially, red, brown) can contain iron and other mineral compounds which can migrate into an encapsulant topcoat creating a bleeding stain similar to a rust stain. Bare brick, especially dark color brick, may need to be sealed with a stain blocking primer or masonry conditioner.

xi. For fieldstone or “whole stone”, especially when below-grade, contact manufacturer to develop a custom protocol before proceeding.

xii. Previously applied waterproofing/damproofing membranes, mastics and coatings (e.g., Thoroseal, Bituthene, bitumen) can be hydrophobic and interfere with the adhesion of an encapsulant.

C. PLASTER, GYPSUM WALLBOARD

a. All surface defects shall be filled, wet sanded and spot primed with a masonry conditioner, stain blocking primer, or equivalent sealant/undercoat.

b. Gypsum wallboard exhibiting “nail-popping” shall be repaired, filled, wet sanded and spot-primed with a 100% acrylic rust-inhibiting universal surface primer prior to encapsulating.

D. METAL (For severe or demanding exposures, or special metals (e.g., copper, aluminum, galvanized[18], cast iron, wrought iron) consult the manufacturer)

a. Investigate the soundness of any existing coatings to determine the amount of surface preparation that is necessary and desirable. If the steel was not properly prepared on the previous painting, it must be accomplished before applying an encapsulant. Specifically, sharp edges, protruding welds, and weld splatters must be ground smooth before repainting. Grease, rust, scale, dirt and dust are required to be removed as follows:

b. Remove rust and scale by wire brushing and wet sanding. Always avoid dry wire brushing or sanding any lead-containing surfaces as this may increase lead exposure.

    i. Follow the Joint Surface Preparation Standards (JSPS) now maintained and updated by AMPP. These standards are widely accepted and used by contractors and organizations for metal preparation. These standards were originally promulgated by NACE International and the Society for Protective Coatings (SSPC). NACE and SSPC have merged to form the Association for Materials Protection and Performance (AMPP).

    ii. Minimum preparation is SSPC-SP-2: Hand Tool Cleaning. This preparation level involves non-power handheld tools. Hand tool cleaning is intended to remove all loose (as opposed to adherent) mill scale, rust, paint, and other contaminants that may be detrimental to a coating application. According to SSPC, “adherent” contaminants are those that can’t be removed by lifting them off with a dull putty knife. SSPC-SP-3 Power Tool Cleaning is preferred when it can be performed and may be required for certain encapsulation products, and other long-warranty finishes. Ideal preparation level is NACE No. 3/SSPC-SP-6: Commercial Blast Cleaning No. 3/SP-6, but project circumstances may preclude abrasive media blasting.

c. Degreasing/Cleaning to Remove Hydrophobic Contaminants that can interfere with adhesion (when determined to be necessary:

    i. Remove dust, dirt, oil and grease. Clean surfaces using a manufacturer-approved degreasing surface cleaner which is free-rinsing, and does not require a neutralizer.

    ii. Perform a water-break test to determine if oil and grease have been removed. Repeat if necessary.

    iii. Apply phosphoric acid solution. Let set as recommended by acid etch manufacturer.

    iv. Rinse with clean water. If water “beads-up” on the surface, oil and/or grease is still present and cleaning process must be repeated before applying

d. PRIMING METAL (FERROUS METAL): It is almost always necessary to prime metal rendered bare by any cause (existing paint deterioration, surface preparation prior to new coatings)

    i. When cleaned ferrous metal surfaces are thoroughly dry, immediately apply a manufacturer-approved rust inhibiting metal primer to prevent “flash” rusting[19].

Follow label for primer regarding dry time before encapsulant should be applied.

ii. For environmental and worker safety reasons, water-based metal primers are preferred (although alkyd red oxide is typically more suited to demanding environments, and/or application directly to solid rust). Applicators are directed to consult with encapsulant manufacturer too ascertain if a water-based, rust-inhibiting, corrosion-resistant, direct-to-metal (DTM) coating for use on ferrous and non-ferrous metal is available and compatible. Ideally, primer will be formulated with an advanced resin system that is effective to reduce rust because it is both humidity and water-resistant.

iii. After preparation, prime with 2 coats of water-based Direct-to-Metal primer.

1. Pay careful attention to flash rusting of ferrous metal rendered bare by preparation. Pre-coat/"Stripe" coat crevices, welds, and sharp angles to prevent early failure in these areas.
2. Generally apply 2 primer coats to all surfaces to be encapsulated. Instruct applicators: the 1st coat catches the rust; the 2nd coat caps it.
    a. Attempts to save product by spot priming extensively adds often unneeded complexity, and increases probability of missed (unprimed) areas causing rust to return.
    b. Even pinholes that run down to the ferrous metal can cause bleeding up to the surface. Pinhole bleeding, given certain conditions, can transform into "creeping rust", which ultimately can detstabilize the encapsulant – compromising performance as a protective barrier.

iv. PREVIOUSLY PAINTED FERROUS METAL SURFACES: Prepare ruptured or scratched surfaces as for unfinished metal. Spot prime bare ferrous metal as conditions dictate/and as described above. Degloss if necessary. Apply a test area, allowing DTM to dry one week before testing adhesion. If adhesion is poor, additional abrasion of the surface and/or removal of the previous coating may be necessary. Retest surface for adhesion. Conduct a tape adhesion test to account for possible intercoat delamination.

3.03 APPLICATION OF COATINGS

A. ENCAPSULANT: Apply encapsulant only after the surface has been examined, assessed, prepared, cleaned, primed and dried, as outlined in the surface assessment and preparation sections of this specification (sections 3.01 and 3.02).

a. Application of encapsulant to surfaces that are not clean, dry, sound, deglossed and properly primed as described will void all warranties.

b. Apply encapsulant at a wet mil film thickness that will yield the recommended minimum dry mil film thickness at which the submitted testing to ASTM E 1795 documents compliance with performance requirements mandated in regulations (see Submittals Section 1).

c. Wet mil film thickness should be measured throughout any encapsulation project using a wet mil gauge

B. METHODS OF APPLICATION

a. Apply Lead Encapsulant with a brush, roller or an airless sprayer

i. Sprayer:

1. Apply with a .019-.021 spray tip. Contact manufacturer for advice concerning operating pressure, fan size, hose length, etc. It is possible to configure spray equipment to support two applicators simultaneously.

2. Technique of Spraying - For best results, apply encapsulants in sweeping strokes always keeping the tip of the gun parallel to the surface at a distance between 12" to 18" inches. It is recommended to use a double cross-hatch technique. E.g., normally a slow to moderate sweeping stroke of first horizontal followed by vertical passes will afford the desired results.

3. Spray Settings for Encapsulant listed in Section 2 Basis of Design (Using Titan Impact 440X Sprayer fitted with an RX-80 3600 PSI Spray Gun with a low pressure HEA TR1 517 tip.):
   a. Recommended High-Pressure Tip Size: .017
   b. Recommended P.S.I.: 2500 - 3000 P.S.I.
   c. Recommended Low-Pressure Tip Size: .017
   d. Recommended P.S.I.: 1200 - 1500 P.S.I.

4. The speed at which the product is applied depends on the system used.

5. If necessary, an angular mist coat may be applied to even out irregularities. For very rough and irregular surface profiles, consider airless spray immediately followed with backrolling. For encapsulants to perform optimally, no voids should persist in the dry, cured film.

6. When spraying an overage/loss of 10% is to be expected. When spraying complex steel structures, such as “spaghetti steel” cross-braces, perlins, I-beams, etc., this rate can rise to 50-70% depending on the skill of the applicator. Corrugation (deck panels, wall panels) should be factored in as if the surface wrinkles can be drawn taught[20].

ii. Roller: For best results apply with a 3/8" - 1/2" nap wool blend roller cover (manufacturer recommendations may vary. This reflects manufacturer in Basis of Design – Section 2).

1. Notes on Rolling: a high quality ½” nap wool blend roller cover is not intended to be disposable, but rather if properly care for, can be used for several projects. Throwaway roller covers can take much longer to create a good wet coat; and disposable covers don’t hold as much coating and deliver it inconsistently increasing stipple marks, lap marks, and ridges of build-up.

2. Wool covers tend to shed fibers when first used. To minimize shedding, wrap the new roller cover with masking tape and peel it off to remove loose fibers. Repeat this a few times. Some painters call this defuzzing the roller.

3. Wool covers also tend to become matted down if you apply too much pressure while painting.

4. Ridges of paint left by the edge of the roller, or “fat edges,” are a common problem. Avoid overloading the roller, and don’t start at edges or corners with a full roller.

5. Don’t attempt to stretch the encapsulant, or press too hard.

iii. Brush: Apply liberally and uniformly with a polyester or nylon brush.

3.04 POST APPLICATION (SITE CLEANING, PROTECTION)

C. All products in this specification are best cleaned up with a mixture of warm water and mild soap or detergent. For application tools, immerse into soap and water, soak if necessary, and work water-soap through and around all surfaces (such as brush bristles, roller nap).

D. Remove debris promptly from work area and dispose of it properly.

E. Remove spilled, splashed, or splattered coating materials from all surfaces.

F. Do not mar surface finish of items being cleaned.

3.05 FINISH SCHEDULE

A. [RESERVED FOR PROJECT SPECIFIER IN CONSULTATION WITH ENCAPSULANT MANUFACTURER]

3.06 WARRANTY

A. Sentinel Products Inc. warrants this product to perform satisfactorily for 20 years from the date that the product is applied when used in on interior applications in accordance with the label directions. Sentinel Products Inc. will replace the product or refund the purchase price in the event this product is proven defective, which shall be the exclusive remedy under the warranty. Liability for consequential damages is specifically excluded. No other warranties expressed or implied are given.

B. Unpaid invoices void all warranties.

END OF SECTION

END NOTES (INCLUDES SUPPLEMENTARY SYSTEM PRODUCTS) This section is provided as an aid to the specifier or project designer/manager. This section may be included or excluded in the project specific specification at their discretion.

This section is provided as a courtesy to the specifier or project designer/manager.

This section may be included or excluded in the project specific specification at discretion.

- The effective encapsulation of any abatement project is contingent upon the competence of the applicator.
- If encapsulated surfaces are damaged, repair and re-encapsulate immediately to prevent exposure to potential hazards. HUD, EPA and state governments recommend periodic and/or annual examination of all encapsulated surfaces for damage.
- This specification does not fully describe all the limitations, warnings and precautions related to the products described herein.
- Reference should be made to the Technical Product Data Sheets for complete technical information on all products manufactured by Sentinel.
- Safety Data Sheets (SDS) should be referred to for health and safety information. Copies of all SDS sheets can be obtained by visiting our website at https://www.senpro.com/technical-resources/safety-data-sheets/

END NOTES FROM WITHIN SPECIFICATION TEXT:

[1] This specification is in U.S. English. Partial translations may be available. Please contact your Sentinel representative for more information.
[2] LBP (Lead-Based Paint). Other construction elements can be lead-containing, and all to varying degree constitute a health hazard. There are contamination situations that must be considered hazardous, and some can be encapsulated. Non-paint lead hazards will be subject to other specifications. Contact Sentinel for available guidance.
[3] Lead was banned in paint: Canada 1976, U.S. 1978, Australia 1992,1997, New Zealand early 1980s, UK 1992.
[4] Present day coatings manufactured with lead: e.g., anti-fouling, highway signs, marine.
[5] Sentinel does not, as of the time of printing this specification edition, supply to professional industry a clear lead paint encapsulant that satisfies the fundamental criteria: meets or surpasses ASTM E 1795 testing, contains an FDA-approved anti-ingestant, and is provided with a manufacturers performance warranty of no less than 20 years (not only against "manufacturer's defects."
[6] Also, which satisfies government requiurements for abatement by encapsulation. This is addressed elsewhere in the specification.
[7] In this specification, ***shall*** is to be interpreted as mandatory, i.e., not optional. Shall indicates non-negotiable directions as legislated by humans, or the immutable laws of nature.
[8] Authorities Having Jurisdiction (AHJ, AHJs)
[9] Materially-Interested Parties (MIP, MIPs)
[10] In this specification, ***should*** is conducting project design and execution in accord with the generally accepted standard of care. The standard of care can be expressed in industry-produced standards, non-regulatory guidance published by AHJs, and/or professional judgment of an experienced abatement contractor.
[11] Permanent when properly maintained and repaired. It is good practice to visually assess encapsulated surfaces for damage at least annually, and promptly repair and recoat where damage is found.
[12] EPA, and also US Consumer Product Safety Commission, and US Department of Housing and Urban Development
[13] Contact Sentinel for project-specific integration assistance with public sector specifications.
[14] References applications of opaque white as encapsulation, and is not relevant of use as interim control or othoer less than full abatement applications.
[15] Material Certificates: Upon request by Architect, submit manufacturer's certificate evidencing compliance with specified requirements and that materials are manufacturer's best quality trade product of each type. A Certificate of Analysis (COA) specific to batch numbers found on containers of product delivered and to be used will be acceptable.
[16] Sentinel Stain-Blocking Primer (SBP) is compatible with the encapsulant that is the Basis for Design. https://www.senpro.com/2019/06/12/sentinel-sbp-stain-blocking-primer-available-in-a-white-finish/
[17] Recommended for efflorescence: Sentinel 371 Multipurpose Acid Cleaner (product information from getinfo@senpro.com
[18] GALVANIZED METAL, ALUMINUM: Surface oil should be wiped off with mineral spirits and a clean rag. Remove all oil, grease, dirt, oxide and other foreign material per SSPC-SP1. Galvanized should have weathered and aged 6-8 months.
[19] Contact Sentinel for information re: DTM Direct-to-Metal acrylic water-based primer.
[20] Consult Sentinel when estimating these projects.